

Less is more - Global energy efficiency

Global energy crisis

Following on from our work on water (*The Global Water Sector*), we turn our attention to another global sustainability mega-trend – energy. We believe the world may be facing a global energy crisis, with primary energy demand expected to increase by a third by 2035 (vs. 2010). As a result, energy-related CO2 emissions are likely to increase by 20%, following a trajectory consistent with a long-term rise in the average global temperature in excess of 3.5°C – and potentially resulting in irreversible climate change, according to the IEA.

Energy efficiency is the answer

In a resource-constrained world, energy demand needs to adjust to limited supply. The rationale for change includes: costs, economic competitiveness, energy security, environmental sustainability, access to energy, and fuel poverty. We believe that energy efficiency – the goal of efforts to reduce the amount of energy required to provide products and services – is a logical response. We also believe that the recession is making “less is more” the watchword of our era, with energy efficiency increasingly becoming the central plank of energy policy worldwide.

Greatest potential for energy, cost & emissions savings

End-use energy efficiency has a 40-year record of success, and we think offers the greatest potential of any current technology to contribute to energy demand reduction and CO2 emissions abatement by 2030-35, potentially accounting for over 50% of total CO2 savings. Cost will be the key driver, in our view, with a general rule of thumb across sectors that every dollar spent on energy efficiency means US\$2-4 in lifetime cost savings.

Seven major entry points for investors

We have mapped energy efficiency exposure across a number of sectors' value chains to highlight the diverse range of entry points available to investors wishing to play the energy efficiency theme: 1) Automobiles; 2) Buildings; 3) Industrials and Integrated Plays; 4) IT; 5) Lighting and LEDs; 6) Smart Grid and Energy Storage; and 7) Transport – Bus, Rail and Shipping. We examine these areas more fully in standalone sections of the report.

BofAML Global Energy Efficiency Exposure Stock list

Together with our sector analysts, we have created a list of 100+ global stocks covered by BofAML, based on our estimates of their current exposure to energy efficiency themes and solutions, and given the role of energy efficiency as a long-term growth driver. Our aim is to provide investors with information to identify company and sub-sector specific opportunities and risks inherent in the theme.

No part of this report may be used or reproduced or quoted in any manner whatsoever in Taiwan by the press or other persons without the express written consent of BofA Merrill Lynch.

>> Employed by a non-US affiliate of MLPF&S and is not registered/qualified as a research analyst under the FINRA rules.

Refer to “Other Important Disclosures” for information on certain BofA Merrill Lynch entities that take responsibility for this report in particular jurisdictions.

BofA Merrill Lynch does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision.

Refer to important disclosures on page 260 to 264. Analyst Certification on Page 238. Price Objective Basis/Risk on page 214. Link to Definitions on page 238.



Sarbjit Nahal >> +44 20 7996 8031
Equity Strategist
MLI (UK)
sarbjit.nahal@baml.com

Valery Lucas-Leclin >> +44 20 7996 8058
Equity Strategist
MLI (UK)
valery.lucas-leclin@baml.com

Julie Dollé >> +33 1 53655828
Equity Strategist
Merrill Lynch (France)
julie.dolle@baml.com

John King +44 20 7996 9062
Global SRI Sales
MLI (UK)
john.king1@baml.com



Click the image above to watch the video.

Contents

Less is more	3
Energy efficiency, the path to a sustainable energy future	12
Auto, green “transficiency” evolution	32
Buildings - the easiest & largest efficiency gains	62
Industrials & integrated plays	92
IT, “big data” & semis	122
Lighting & LEDs	155
Smart grid & energy storage, the ElectriNet	169
Transport - rail, bus & shipping	190

Less is more Investing in global energy efficiency

The world faces a global energy crisis with primary energy demand expected to rise by a third between 2010 and 2035. As a result, energy-related CO2 emissions are likely to increase by 20%, following a trajectory consistent with a long-term rise in the average global temperature in excess of 3.5°C, according to the IEA.

In a fossil fuel and resource-constrained world, energy demand inevitably has to adjust to limited supplies. We see the rationale for change as follows:

- energy supply-demand balance;
- costs and economic competitiveness;
- energy security;
- environmental sustainability;
- access to energy and fuel poverty.

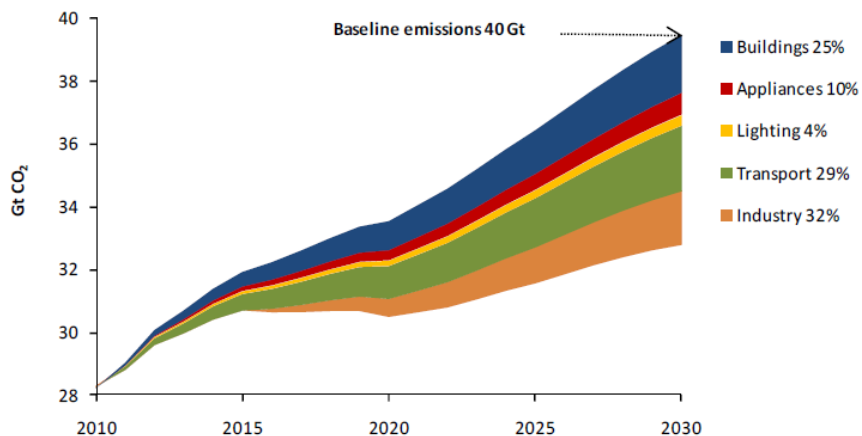
We believe energy efficiency – the goal of efforts to reduce the amount of energy used to provide products and services – offers the fastest, cheapest and most efficient way to cut energy costs, CO2 emissions, and long-term energy demand.

We have mapped energy efficiency exposure across a number of sector value chains to show the range of entry points available to investors wishing to play the energy efficiency theme: 1) Automobiles; 2) Buildings; 3) Industrials & Integrated Plays; 4) IT; 5) Lighting and LEDs; 6) Smart grid and Energy Storage; and 7) Transport – Bus, Rail and Shipping. We examine these more fully below.

BofAML Global Energy Efficiency Exposure Stock list is not a recommended list either individually or as a group of stocks. Investors should consider the fundamentals of the companies and their own individual circumstances/objectives before making any investment decisions.

BofAML Global Energy Efficiency Exposure Stock list: Based on our view of the level and materiality of exposure to energy efficiency themes – and the role of energy efficiency as a long-term growth driver – we have created a list of stocks covered by BofAML. The aim of the stock list is to provide investors with the information to identify company and sub-sector specific risks and opportunities inherent in the energy efficiency theme.

Chart 1: Estimated CO2 emissions savings through implementation of energy efficiency



Source: IEA's Clean Energy progress Report 2011

BofAML Global Energy Exposure Stock list is not a recommended list either individually or as a group of stocks. Investors should consider the fundamentals of the companies and of their own individual circumstances / objectives before making any investment decisions.

BofAML Global Energy Efficiency Exposure Stock list

We have mapped energy efficiency opportunities across seven major themes: 1) Automobiles; 2) Buildings; 3) Industrials and Integrated Plays; 4) IT; 5) Lighting and LEDs; 6) Smart grid and Energy Storage; and 7) Transport – Bus, Rail and Shipping. We outline these areas below and examine them in much greater detail in standalone sections in the report.

For each theme, together with our BofAML Global Research sector analysts we have estimated the level and materiality of companies' exposure to energy efficiency themes – and the role of energy efficiency as a long-term growth driver. For each company, we have characterised their energy efficiency exposure according to the following scale and criteria:

- **Low** – Energy efficient products, services, and services are not very material to global revenues and/or growth but are a factor among others for the business model, strategy & R&D of the company.
- **Medium** – Energy efficient products, services, and services are an important factor for the business model, strategy & R&D of the company; material to sales and/or growth.
- **High** – Energy efficient products, services, and services are core to the business model, strategy and R&D of the company; material sales and/or growth driver; pure play (i.e. 100% of sales from equipments, products, services or solutions which reduce energy use and CO2 emissions).

Although it is difficult to accurately gauge the link between such exposure and share price performance (as many factors outside the scope of this analysis are likely to play a role in short- and long-term price development), we still consider energy efficiency exposure as an important positive point to track.

The aim of the Global Energy Efficiency Exposure Stock List and its seven underlying themes is to provide investors with information to identify company and sub-sector specific risks and opportunities that are inherent in the energy efficiency theme.

Table 1: BofAML Auto & Energy Efficiency Stock List

Company	EE exposure
AQUARIUS PLATINUM	Low
BORGWARNER INC	High
CLEAN ENERGY FUELS	High
CONTINENTAL AG	Medium
ELRINGKLINGER AG	High
FAURECIA	Low
JOHNSON CONTROLS INC	Medium
JOHNSON MATTHEY PLC	Low
LANXESS	Low
LKQ CORP	Low
MAGNA INTERNATIONAL	Medium
MICHELIN (CGDE)-B	Medium
SOLVAY	Low
TESLA MOTORS INC	High
TORAY INDUSTRIES INC	Low
VALEO SA	High
VICTREX Plc	Low
WESTPORT INNOVAT.	High

Source: BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of energy efficiency exposure.

Table 2: BofAML Buildings & Energy Efficiency Stock List

Company	EE exposure
CSR LIMITED	Medium
HONEYWELL	Medium
INGERSOLL RAND	High
JOHNSON CONTROLS	Medium
KINGSPAN	High
KONE	High
NIPPON SHEET GLASS	Medium
RINNAI CORP	High
SAINT-GOBAIN	High
UNITED TECHNOLOGIES	Low

Source: BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency products, services, technologies and solutions.

Auto, a green “transficiency” evolution

Road transport represented c.17% of total CO2 fuel combustion emissions in 2009, according to the IEA. Road transport was thus the third highest source of CO2 emissions from fuel combustion. Within road transport, automobiles and light trucks produce well over 60% of emissions (Source: IEA). With non-OECD and emerging market car sales set to exceed those in the OECD by 2020, and the global passenger car fleet set to double to almost 1.7 billion by 2035, the auto sector is under growing pressure in terms of oil consumption, energy security and CO2 emissions, and in improving fuel economy via efficiency gains.

Path to automotive fuel efficiency more of an evolution than revolution

This could involve a three-stage transition including: 1) leveraging technology to improve the efficiency of the internal combustion engine and light weighting of the vehicle; 2) increasing use of hybrid and hybrid electric powertrains; and 3) exogenous technology shocks. Growing fuel efficiency regulation around the world is placing an increasingly significant R&D burden on all auto OEMs, but we do not believe that regulation alone will be a driver of material change. We anticipate the evolution will be market driven as consumers demand more fuel efficient vehicles to ultimately reduce personal expenditure on fuel.

Stocks well placed to benefit from the energy efficiency theme

We believe a number of stocks are well placed to benefit from the energy efficiency theme in the auto sector through their involvement in equipment, products and services such as autocatalysts, diesel, electric vehicles (EVs), engine and transmission components, gasoline direct injection (GDI), light-weighting, li-ion batteries, natural gas, specialty polymers, turbochargers and tyres, among other areas.

Buildings - the easiest & largest efficiency gains

Single largest source of global energy use & CO2 emissions are buildings. Buildings account for c.40% energy use and c.30% of CO2 emissions. The biggest culprits, heating and cooling, can together with lighting account for up to 60% of a building’s energy consumption. We believe there is a broad array of easily accessible, cost-effective materials and technologies that could reduce energy consumption to a fraction of current levels. Energy efficiency in buildings offers the greatest potential of any sector to make cost savings and reduce energy use (by 30% to 50% by 2030-50, according to the IEA). We believe little of the huge energy efficiency potential of this sector has been captured to date.

Energy efficiency in buildings cuts down energy use and energy costs

Efficiency reduces the need for capex in energy infrastructure and promotes energy security. Long-term growth drivers are extremely favourable and include efforts to lower CO2 emissions and create affordable housing, and highlights the economic importance of the sector in terms of GDP and jobs, favourable demographics, emerging market growth, a focus on tackling fuel poverty, the potential to realise a green premium on efficient buildings, the low-risk nature of financing efficiency, and global urbanisation trends.

Stocks well placed to benefit from the energy efficiency theme

We believe a number of stocks are well placed to benefit from the theme of energy efficiency in buildings through their involvement in equipment, products and services such as building automation, energy services, efficient HVAC systems, insulation materials and technologies, high-efficiency lighting (including LEDs) and appliances, windows (including multiple glazing and low-e), and the distribution of building products.

Table 3: BofAML Industrials and Integrated Plays & Energy Efficiency Stock List

Company	EE exposure
ABB LTD	Medium
ALFA LAVAL	Medium
ALSTOM	Medium
ATLAS COPCO AB-A SHS	Low
CROMPTON GREAVES	Low
EATON CORP	Low
ELECTROLUX AB-SER B	Medium
GEA	High
HEXAGON AB	Low
HEXCEL CORP	High
HONEYWELL	Medium
INVENSYS PLC	Low
METSO	Low
NEXANS	Medium
PHILIPS ELECTRONICS	Medium
PRYSMIAN	Low
REXEL SA	Low
ROCKWELL AUTOMATION	Medium
SCHNEIDER ELECTRIC SA	Medium
SIEMENS AG-REG	Medium
SIEMENS INDIA	Low
SMC CORP	High
SPIRAX-SARCO ENG.	High
VALLOUREC	Low

Source: BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency products, services, technologies and solutions

Industrials & integrated plays, the enablers

Industrial energy use accounts for a third of global energy consumption

Industrials also account for 36% of CO2 emissions (Source: IEA). The long-term case for energy efficiency is clear – with 80% of energy lost across the value chain from inefficiencies between the gathering of energy sources and their eventual consumption in industry (Source: ABB). In no other area are so few players capable of making such a big difference, with energy efficiency in industry saving money, reducing the need for new power, and lowering GHGs. The IEA estimates that industry could improve its energy efficiency by up to 26% and reduce CO2 emissions by up to 32% via the adoption of best practices and technologies that are already available.

Industrial & integrated plays - Cap Goods in particular - are key enablers

This segment can improve the energy efficiency of equipment and power, and thus industrial productivity. We see efficiency as a long-term growth driver for the sector on the back of sustainability megatrends such as rising energy prices, EM growth in power and automation, expanding production volumes, grid and generation build out, renewable interconnections, and CO2, efficiency and environmental regulation.

Energy efficiency to drive replacement but Cap Goods to slow near-term

Energy efficiency should drive product replacement cycles but we still expect the Cap Goods sector to grow more slowly in the near term than between 2004 and 2011. Among the strongest growth outliers are structural opportunities (shale gas, resource scarcity, food/beverage and pharma capex, LNG, transmission, aerospace), the aftermarket, and recovery plays (US housing, commercial construction, appliances, autos/trucks, marine and power). The weakest are those affected by austerity (government-related spending) and the tougher competitive environment, and GDP plays, which have seen the best of the recovery.

Stocks well placed to benefit from the energy efficiency theme

We believe a number of stocks are well placed to benefit from the energy efficiency theme for industrials and integrated plays through their involvement in equipment, products and services such as automation (building and industrial), controls, grid and smart grid, heat transfer, lighting, power distribution and generation, process management, renewable interconnections, and T&D, among others.

Table 4: BofAML IT & Energy Efficiency Stock List

Company	EE exposure
AMAZON	Low
AMD	High
ARM HOLDINGS	High
ASML	High
CISCO SYSTEMS	Medium
EMC CORPORATION	High
EQUINIX INC	High
GOOGLE	Low
HEWLETT-PACKARD CO	Low
IBM	Low
INTEL	High
INTERXION	High
SALESFORCE.COM	High
TELECITY GROUP	High
VMWARE	High

Source: BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency products, services, technologies and solutions

Table 5: BofAML Lighting & LED Energy Efficiency Stock List

Company	EE exposure
CREE INC	High
EPISTAR	High
EVERLIGHT ELECTR.	High
GENERAL ELECTRIC	Low
PHILIPS ELECTRONICS	Medium
SEMILEDS CORP	High
SEOUL SEMICONDUCTOR	High
SIEMENS	Medium
VEECO INSTRUMENTS	High

Source: BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency products, services, technologies and solutions

IT, “big data”

Global IT sector emerging as the latest target area for energy efficiency.

The global boom in “big data” on the back of phenomena like social media and cloud computing has seen the world’s total digital output grow tenfold from 2006-11. Data volumes are projected to grow a further 29x to 2020 (Source: IDC). This means a significant increase in computing infrastructure and support infrastructure, such as cooling. It also means that the sector is consuming upwards of 3-5% of electricity in markets such as the EU, the US and Japan (Source: ACEEE) and that its global CO2 emissions – c.2% of the world’s total – are already on a par with the aviation sector.

Rising energy consumption & prices lead to business/capacity constraints

This is particularly the case for energy-hungry data centres and we expect it to create significant opportunities for the ‘greening’ of data centres, which could become a US\$40bn market by 2020 (Source: Pike Research). We also expect energy efficiency to become a major growth driver for the US\$117bn addressable cloud computing market, as the cloud’s scale can lower energy use and emissions by 30-90%. Finally, we regard semiconductors as a key enabler of realising energy efficiency in the buildings, IT, capital goods, and transport sectors – as well as aiding the business case for renewables.

Stocks well placed to benefit from the energy efficiency theme

We believe a number of stocks are well placed to benefit from the theme of energy efficiency in IT through their involvement in equipment, products and services areas such as cloud computing, consolidation, data centre design and operation, DCIM, heating and cooling, power management, thin provisioning, virtualisation, and semiconductors.

Lighting & LEDs

Lighting consumes 19% of electricity output; 30% to 75% systems inefficient

New technologies can reduce electricity consumption by up to two-thirds. Moreover, energy efficiency lighting sources such as LEDs, luminaries, control gear and intelligent lighting control tools and concepts can thus make significant contributions to reducing electricity use and cutting CO2 emissions.

We anticipate strong growth for energy efficient lighting solutions

This should help the global lighting market to grow from €55-60bn in 2011 to €80bn by 2015 (Source: Philips). While the picture in 2012 is challenging because of long payback periods and oversupply, long-term drivers include favourable legislation and a further reduction in costs with better performance. Short-term usage will be driven by mobile phones and TVs, with 60-70% of new TVs having LED backlighting. General lighting applications are gradually beginning to gain momentum and we anticipate that LEDs in lighting will emerge as the biggest growth opportunity after 2013.

Stocks well placed to benefit from the energy efficiency theme

We believe a number of stocks are well placed to benefit from the energy efficiency theme in Lighting in LEDs through their involvement in equipment, products and services such as chips, CFLs, components, deposition equipment, LEDs, lighting management, lighting solutions, luminaries, MOCVD equipment, and process equipment, among others.

Table 6: BofAML Smart Grid & Energy Storage Stock List

Company	EE exposure*
A123 SYSTEMS INC	High
AMERESCO INC	High
ELSTER GROUP SE	High
ENERNOC INC	High
ITRON	High
SAFT	High
SQM	Low

Source: BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency products, services, technologies and solutions

Table 7: BofAML Transport – Rail, Bus & Shipping Stock List

Company	EE exposure (sales)
ALSTOM SA	Medium
ANSALDO STS SPA	High
BOMBARDIER INC	High
CAF SA	High
CANADIAN NTNL. RAIL	High
CHINA RAILWAY CONST.	Medium
CHINA RAILWAY GROUP	High
CSR CORPORATION	High
FIRSTGROUP PLC	High
GO-AHEAD GROUP PLC	High
GUANGSHEN RAILWAY	High
NATIONAL EXPRESS	High
STAGECOACH GROUP	High
VOSSLOH	High
YANGZIJANG SHIP.	Low
ZHUZHOU CSR	High

Source: BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency products, services, technologies and solutions

Smart grid & energy storage, the ElectriNet

Smart grid offers greatest growth potential in grid management industry

By 2020 smart grids are estimated to represent a global market of up €50bn (Source: Alstom). Key market drivers include improved grid reliability and stability, the maximisation of CO2-free energy, increasing energy efficiency, and reducing CO2 emissions. The smart grid should also facilitate and improve prospects for greater energy efficiency in buildings, IT and transport.

Storing electrons at grid scale could be a ground-breaking breakthrough

This technology could change the way that energy is produced, consumed, and valued. Electricity storage is the ultimate goal of cleantech because it enables (1) the electrification of transportation, (2) the smoothing of renewable intermittency, and (3) the elimination of spatial and temporal price disparities. High cost remains an inhibitor to adoption near term, with utilities considering grid storage in demonstration projects, but we believe investors should become familiar with grid storage technologies and vendors.

Stocks well placed to benefit from the energy efficiency theme

We believe a number of stocks are well placed to benefit from the energy efficiency theme in smart grid and energy storage through their involvement in equipment, products and services such as advanced metering infrastructure (AMI), automatic meter reading (AMR), batteries for grid storage, customer-side systems, distributed grid management, electric vehicle (EV) charging infrastructure, ICT integration, li-ion batteries, renewables integration, and wide area monitoring and control.

Transport - rail, bus & shipping

The transport sector accounts for 23% of global emissions

Transport accounts for 6.5 billion tonnes of CO2 – or the equivalent of 1t of CO2 per inhabitant of the planet. The carbon footprint of transport is linked to the fact that almost 20% of the world's total delivered energy is used in the sector, where liquid fuels are the dominant source (i.e., gasoline, diesel and LPG on roads, kerosene in the air, fuel oil for shipping). Transportation alone accounts for more than 50% of world consumption of liquid fuels, and this share is forecast to increase to over 60% by 2035 (Source: International Union of Railways). This means growing pressure in terms of fuel costs and energy efficiency.

Environment for rail, bus, coach & shipping more positive than in years

High fuel prices, energy security concerns, rising household bills, traffic congestion and environmental concerns are all leading to greater investments in rail and bus in particular. They are seen as solution providers, transporting more people further and faster, with lower emissions and congestion impacts. While changing mobility behaviour will be key to realising the efficiency opportunity, rail is set for strong growth, with the accessible market set to reach €148bn by 2015-16E (Source: UNIFE). Bus and coach is also seeing a CAGR of 4.2% from 2009-14E (Source: Fredonia). Finally, changing regulations should see efficiency emerge as a major opportunity in the shipping sector.

Stocks well placed to benefit from the energy efficiency theme

We believe a number of stocks are well placed to benefit from the theme of energy efficiency in transport through their involvement in equipment, products and services such as locomotives, passenger rail operators, rail services, railway signalling and control systems, rail transport for freight, public bus and coach operators, rolling stock and fuel efficient shipbuilders.

BofAML Global Energy Efficiency Exposure Stock List

The BofAML Global Energy Exposure Stock list is not a recommended list either individually or as a group of stocks? Investors should consider the fundamentals of the companies and of their own individual circumstances / objectives before making any investment decisions.

We have created a BofA Merrill Lynch Global Research list of stocks which have exposure to energy efficiency-related themes and that we consider should benefit from long-term global energy efficiency growth.

The aim of the stock list is to provide investors with information to understand company and sub-sector specific risks and opportunities inherent in the energy efficiency theme. We have also provided factual overviews of other companies, outside of our research coverage, that are exposed to energy efficiency (see relevant sections of the report).

BofAML Global Energy Efficiency Exposure Stock list

Ticker	Name	Country	MCap (US\$ mn)	BofAML		Energy efficiency sub-sector	EE exposure
				Ticker	BofAML Rating		
AQP LN	AQARIUS PLATINUM LIMITED	Australia	1021.2	AQPMF	Buy	Auto	Low
BWA US	BORGWARNER INC	United States	9792.8	BWA	Buy	Auto	High
CLNE US	CLEAN ENERGY FUELS CORP.	United States	1493.0	CLNE	Buy	Auto	High
CON GR	CONTINENTAL AG	Germany	18115.9	CTTAF	Neutral	Auto	Medium
ZIL GR	ELRINGKLINGER AG	Germany	2088.7	EGKLF	Underperform	Auto	High
EO FP	FAURECIA	France	3062.6	FURCF	Neutral	Auto	Low
JCI US	JOHNSON CONTROLS INC	United States	22623.6	JCI	Buy	Auto	Medium
JMAT LN	JOHNSON MATTHEY PLC	UK	7969.7	JMPLF	Neutral	Auto	Low
LXS GR	LANXESS	Germany	6334.6	LNXSF	Buy	Auto	Low
LKQX US	LKQ CORP	United States	4648.5	LKQX	Neutral	Auto	Low
MG/A CN	MAGNA INTERNATIONAL INC-CL A	Canada	11275.8	MGA	Buy	Auto	Medium
ML FP	MICHELIN (CGDE)-B	France	12718.7	MGDDF	Buy	Auto	Medium
SOLB BB	SOLVAY	Belgium	9818.5	SVYSF	Buy	Auto	Low
TSLA US	TESLA MOTORS INC	United States	3540.5	TSLA	Buy	Auto	High
3402 JP	TORAY INDUSTRIES INC	Japan	11699.8	TRYIF	Buy	Auto	Low
FR FP	VALEO SA	France	4035.6	VLEEF	Buy	Auto	High
VCT LN	VICTREX Plc	UK	1779.1	VTXPF	Neutral	Auto	Low
WPRT US	WESTPORT INNOVATIONS	United States	2110.3	WPRT US	Buy	Auto	High
AONE US	A123 SYSTEMS INC	United States	234.2	AONE	Buy	Smart Grid & Storage	High
AMRC US	AMERESCO INC	United States	578.5	AMRC	Buy	Smart Grid & Storage	High
ELT US	ELSTER GROUP SE	Germany	1645.0	ELT	Buy	Smart Grid & Storage	High
ENOC US	ENERNOC INC	United States	249.6	ENOC	Underperform	Smart Grid & Storage	High
ITRI US	ITRON	United States	1847.1	ITRI	Underperform	Smart Grid & Storage	High
SAFT FP	SAFT	France	750.8	SGPEF	Neutral	Smart Grid & Storage	High
SQM US	SQM	United States	15723.6	SQM	Neutral	Smart Grid & Storage	Low
SGO FP	COMPAGNIE DE SAINT-GOBAIN	France	25057.2	CODGF	Buy	Buildings	High
CSR AU	CSR LIMITED	Australia	1050.3	CSRLF	Underperform	Buildings	Medium
HON US	HONEYWELL INTERNATIONAL INC	United States	46685.4	HON	Buy	Buildings	Medium
IR US	INGERSOLL RAND	United States	12772.5	IR	Buy	Buildings	High
JCI US	JOHNSON CONTROLS	United States	22623.6	JCI	Buy	Buildings	Medium
KSP ID	KINGSPAN	Ireland	1794.3	KGSPF	Buy	Buildings	High
KNEBV FH	KONE	Finland	15367.7	KNYJF	Buy	Buildings	High
5202 JP	NIPPON SHEET GLASS	Japan	1583.4	NPSGF	Neutral	Buildings	Medium
5947 JP	RINNAI CORP	Japan	3573.1	RINIF	Buy	Buildings	High
UTX US	UNITED TECHNOLOGIES	United States	75894.2	UTX	Buy	Buildings	Low
ABBN VX	ABB LTD	Switzerland	47602.9	ABLZF	Buy	Industrials & Integrated	Medium
ALFA SS	ALFA LAVAL	Sweden	8476.7	ALFVF	Underperform	Industrials & Integrated	Medium
ALO FP	ALSTOM	France	12685.9	AOMFF	Buy	Industrials & Integrated	Medium
ATCOA SS	ATLAS COPCO AB-A SHS	Sweden	31569.9	ATLKF	Neutral	Industrials & Integrated	Low
CRG IN	CROMPTON GREAVES	India	1849.9	CPGZF	Underperform	Industrials & Integrated	Low
ETN US	EATON CORP	United States	17642.1	ETN	Buy	Industrials & Integrated	Low
ELUXB SS	ELECTROLUX AB-SER B	Sweden	6150.2	ELUXF	Neutral	Industrials & Integrated	Medium
GEA GR	GEA	Germany	4676.1	GEAGF	Buy	Industrials & Integrated	High

BofAML Global Energy Efficiency Exposure Stock list

Ticker	Name	Country	MCap (US\$ mn)	BofAML Ticker	BofAML Rating	Energy efficiency sub-sector	EE exposure
HEXAB SS	HEXAGON AB	Sweden	7107.2	HXGBF	Buy	Industrials & Integrated	Low
HXL US	HEXCEL CORP	United States	2506.4	HXL	Neutral	Industrials & Integrated	High
HON US	HONEYWELL	United States	46685.4	HON	Buy	Industrials & Integrated	Medium
ISYS LN	INVENSYS PLC	UK	2710.7	IVNSF	Buy	Industrials & Integrated	Low
MEO1V FH	METSO	Finland	7009.0	MXTOF	Neutral	Industrials & Integrated	Low
NEX FP	NEXANS	France	2000.8	NXPRF	Neutral	Industrials & Integrated	Medium
PHIA NA	PHILIPS ELECTRONICS NV	United States	19869.9	PHGFF	Underperform	Industrials & Integrated	Medium
PRY IM	PRYSMIAN	Italy	3475.5	PRYMF	Buy	Industrials & Integrated	Low
RXL FP	REXEL SA	France	5893.4	RXLSF	Neutral	Industrials & Integrated	Low
ROK US	ROCKWELL AUTOMATION UNC	United States	11506.1	ROK	Buy	Industrials & Integrated	Medium
SU FP	SCHNEIDER ELECTRIC SA	France	35925.5	SBGSF	Buy	Industrials & Integrated	Medium
SIE GY	SIEMENS AG-REG	Germany	87089.3	SMAWF	Neutral	Industrials & Integrated	Medium
SIEM IN	SIEMENS INDIA	India	5531.0	SMNBF	Underperform	Industrials & Integrated	Low
6273 JP	SMC CORP	Japan	11849.0	SMECF	Buy	Industrials & Integrated	High
SPX LN	SPIRAX-SARCO ENGINEERING	UK	2536.4	SPXSF	Neutral	Industrials & Integrated	High
VK FP	VALLOUREC	France	7781.9	VLOUF	Underperform	Industrials & Integrated	Low
AMZN US	AMAZON	United States	81945.3	AMZN	Buy	IT	Low
AMD US	AMD	United States	5505.4	AMD	Underperform	IT	High
ARM LN	ARM HOLDINGS	UK	12544.0	ARMHF	Underperform	IT	High
ASML NA	ASML	Netherlands	19122.5	ASMLNF	Buy	IT	High
CSCO US	CISCO SYSTEMS	United States	108817.2	CSCO	Buy	IT	Medium
EMC US	EMC CORPORATION	United States	60525.9	EMC	Buy	IT	High
EQIX US	EQUINIX INC	United States	6504.8	EQIX	Buy	IT	High
GOOG US	GOOGLE	United States	199064.0	GOOG	Buy	IT	Low
HPQ US	HEWLETT-PACKARD CO	United States	64194.4	HPQ	Buy	IT	Low
IBM US	IBM (INT'L. BUSINESS MACHINES)	United States	226084.1	IBM	Buy	IT	Low
INTC US	INTEL	United States	136988.3	INTC	Buy	IT	High
INXN US	INTERXION	Netherlands	994.7	INXN	Buy	IT	High
CRM US	SALESFORCE.COM	United States	22936.0	CRM	Buy	IT	High
TCY LN	TELECITY GROUP	UK	2129.2	TLCTF	Buy	IT	High
VMW US	VMWARE	United States	44206.4	VMW	Buy	IT	High
CREE US	CREE INC	United States	3310.7	CREE	Underperform	LEDs & Lighting	High
2448 TT	EPISTAR	Taiwan	2235.9	EPIPF	Underperform	LEDs & Lighting	High
2393 TT	EVERLIGHT ELECTRONICS	Taiwan	952.7	EVLEF	Underperform	LEDs & Lighting	High
PHIA NA	PHILIPS ELECTRONICS NV	United States	19869.9	PHGFF	Underperform	LEDs & Lighting	Medium
LEDS US	SEMILEDS CORP	United States	102.8	LEDS	Underperform	LEDs & Lighting	High
046890 KS	SEOUL SEMICONDUCTOR	South Korea	1332.3	SLSOF	Underperform	LEDs & Lighting	1High
SIE GY	SIEMENS	Germany	87089.3	SMNBF	Neutral	LEDs & Lighting	Medium
VECO US	VEECO INSTRUMENTS	United States	1085.2	VECO	Neutral	LEDs & Lighting	High
ALO FP	ALSTOM SA	France	12685.9	AOMFF	Buy	Road, Rail & Shipping	Medium
STS IM	ANSALDO STS SPA	Italy	1399.0	ASDOF	Buy	Road, Rail & Shipping	High
BBD/B CN	BOMBARDIER INC	Canada	8417.7	YBBD B	Underperform	Road, Rail & Shipping	High
CAF SM	CAF SA	Spain	1875.6	CAUXF	Buy	Road, Rail & Shipping	High
CNI US	CANADIAN NATIONAL RAILWAY	Canada	33889.9	CNI	Neutral	Road, Rail & Shipping	High
1186 HK	CHINA RAILWAY CONSTRUCTION	Hong Kong	9640.4	CWYCF	Underperform	Road, Rail & Shipping	Medium
390 HK	CHINA RAILWAY GROUP LIMITED	Hong Kong	8706.3	CRWOF	Neutral	Road, Rail & Shipping	High
1766 HK	CSR CORPORATION	Hong Kong	1050.3	CSRGF	Underperform	Road, Rail & Shipping	High
FGP LN	FIRSTGROUP PLC	UK	2237.3	FGROF	Underperform	Road, Rail & Shipping	High
GOG LN	GO-AHEAD GROUP PLC	UK	878.3	GHGUF	Neutral	Road, Rail & Shipping	High
525 HK	GUANGSHEN RAILWAY CO LTD	Hong Kong	2785.8	NGGYF	Neutral	Road, Rail & Shipping	High
NEX LN	NATIONAL EXPRESS GROUP PLC	UK	1784.8	NXPGF	Buy	Road, Rail & Shipping	High
SGC LN	STAGECOACH GROUP PLC	UK	2746.7	SAGKF	Buy	Road, Rail & Shipping	High
VOS GR	VOSSLOH	Germany	1416.7	VOSSF	Underperform	Road, Rail & Shipping	High
YZJ SP	YANGJIJIANG SHIPBUILDING	Singapore	4123.8	YSHLF	Buy	Road, Rail & Shipping	Low
3898 HK	ZHUZHOU CSR	Hong Kong	2768.2	ZHUZF	Neutral	Road, Rail & Shipping	High

Source: BofA Merrill Lynch Global Research, Bloomberg. *EE exposure = BofAML estimates of current sales derived from energy efficiency related products, services, technologies and solutions.

Energy efficiency, the path to a sustainable energy future

Short-term variations in economic growth have only marginal impacts on long-term energy and climate change trends

On the path to an unsustainable energy future Without a bold change of policy, the world risks locking itself into an insecure, inefficient and high-carbon energy system. Assuming that actual implementation of intended G20 policies and measures is undertaken in a cautious manner – in line with the IEA's World Energy Outlook's central New Policies scenario – primary energy demand is expected to increase by one-third between 2010 and 2035. As a result, energy-related CO₂ emissions are likely to increase by 20%, following a trajectory consistent with a long-term rise in the average global temperature in excess of 3.5°C.

Energy efficiency is the easy answer In a fossil fuel and resource-constrained world, energy demand inevitably has to adjust to limited supplies. The rationale is multifold, from supply-demand balance, to energy and infrastructure costs, to energy security, to environmental sustainability, to access to energy and fuel poverty. Barring an outright, long-term economic downturn – we believe that this process needs to occur through a combination of energy efficiency improvements and gradual substitution of oil and fossil fuels. Both of these can help restrain our growing appetite for energy in the long-term - although we believe that energy efficiency offers the single, greatest prospects among currently available options for cheap and easy energy and cost savings.

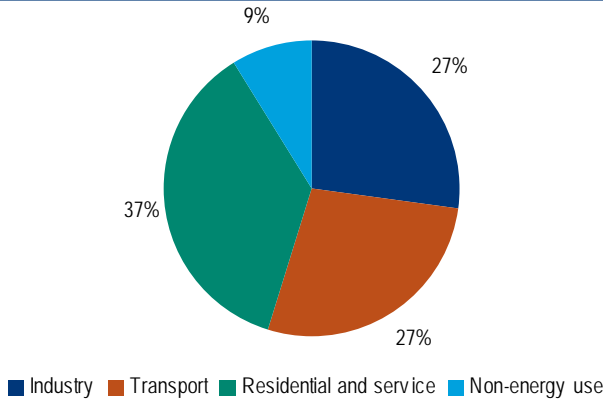
Global public policy is moving en masse in favour of efficiency A combination of the unsustainability of current and expected energy use, rising energy costs – and a desire to balance energy security with reduced emissions – means that we are seeing intensifying regulatory pressure on energy efficiency. We believe that the recession – which has made “less is more” the watchword of the last few years – is adding to the weight and direction of public policy pressure which is clearly focused on increasing efficiency and decreasing consumption and costs. Energy efficiency is becoming the central plank of governmental energy policy – and new and emerging regulations will increasingly requires companies to improve their energy efficiency – creating significant investment opportunities across buildings, industry, IT, power and transport.

Short-term variations in economic growth have only marginal impacts on long-term energy and climate change trends

On the path to an unsustainable energy future

Without a bold change of policy, the world risks locking itself into an insecure, inefficient and high-carbon energy system. Assuming that actual implementation of intended global policies and measures is undertaken in a cautious manner – under the IEA's World Energy Outlook's central New Policies scenario – primary energy demand is expected to increase by one-third between 2010 and 2035. As a result, energy-related CO₂ emissions are likely to increase by 20%, following a trajectory consistent with a long-term rise in the average global temperature in excess of 3.5°C.

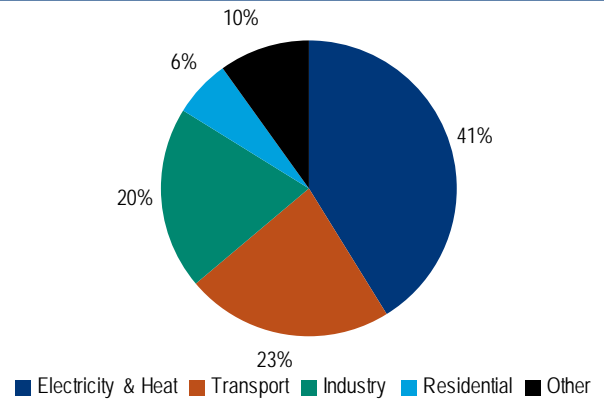
Chart 2: World total energy consumption - 2009



Source: IEA, BofA Merrill Lynch Global Research

Average energy consumption per capita in IEA member countries is 5 toe/year or 2x the global average and 8x India. But IEA countries have the lowest energy intensity due to higher GDP per capita and the impact of energy efficiency implementation (Source: IEA).

Chart 3: World CO2 emissions - 2009

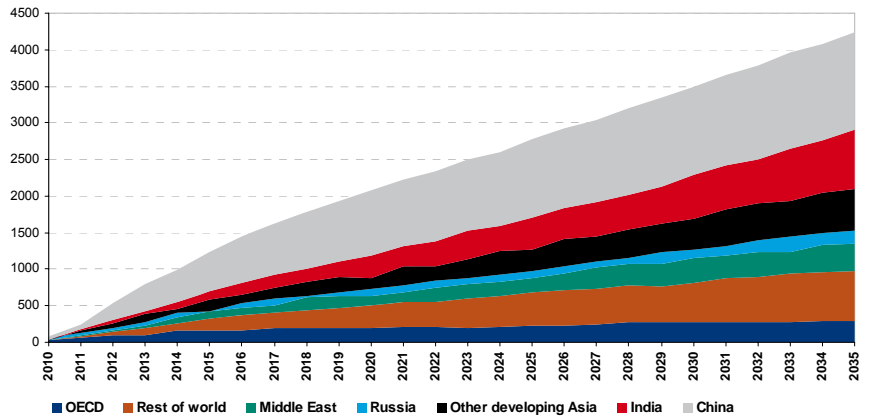


Source: IEA, BofA Merrill Lynch Global Research

90% of the growth in non-OECD economies

90% of the projected growth in global energy demand will come from emerging markets. China alone will account for 30% of increased demand – with China set to be the world’s largest energy consumer by 2035, consuming 70% more than the U.S. (even if its per capita demand will still be less than half the level in the U.S). Brazil, India, Indonesia and the Middle East will see energy demand grow even faster than China to 2035. EMs also dominate the expansion of supply of fossil fuels (Source: IEA).

Chart 4: Global energy demand increases by one-third from 2010 to 2035 (Mtoe)

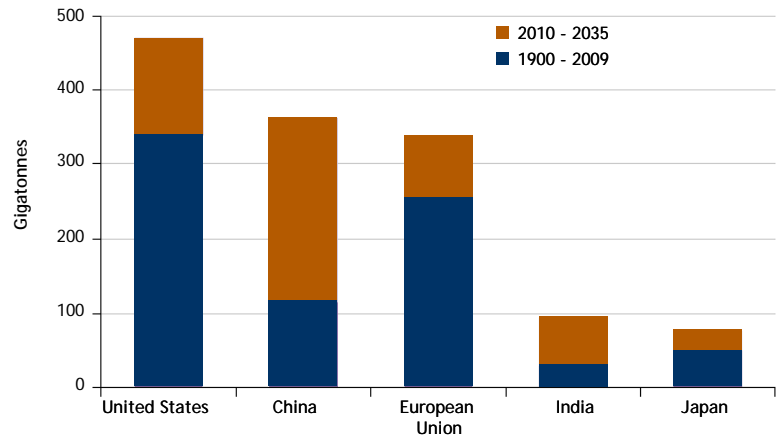


Source: EA WEO 2011, BofA Merrill Lynch Global Research

Demand is set to grow for all energy sources

Positively, from a climate change perspective, the share of fossil fuels in global primary energy consumption is set to fall from around 81% today to 75% in 2035. However, the IEA’s central scenario anticipates that world demand will grow for all energy sources to 2035.

Chart 5: Additional primary energy demand to 2035



Source: IEA WEO 2011

- **Coal use to rise by 65%** in absolute terms by 2035 (+17% vs. 2010), largely driven by emerging markets.
- **Oil demand increases by 15%** largely driven by transport.
- **Gas gains in importance:** Gas' share in the energy mix is expected to rise – with absolute growth similar to coal and oil combined - and its use is set to catch up with total global coal consumption.
- **Renewables increase from 13% to 18% of the mix in 2035** with the growth accounting for half of new installed capacity, but continuing to be underpinned by subsidies; while relative growth is faster than any other energy form; absolute renewables supply is still not close to the level of any single fossil fuel by 2035.
- **Nuclear generation grows by 70%** driven by China, India and South Korea (Source: IEA).

Table 8: Energy demand: 2008 vs. 2035

	2008 demand (Mtoe)	2008 share in energy mix	2035 demand Mtoe	2035 share in energy mix
Coal	3,315	27%	3,934	23%
Oil	4,059	33%	4,661	28%
Gas	2,596	21%	3,748	22%
Nuclear	712	6%	1,273	8%
Hydro	276	2%	476	3%
Biomass	1,225	10%	1,957	12%
Other renewables	89	1%	699	4%
TOTAL	12,271		16,748	

Source: IEA, BofA Merrill Lynch Global Research

Energy for electricity remains fastest-growing sector

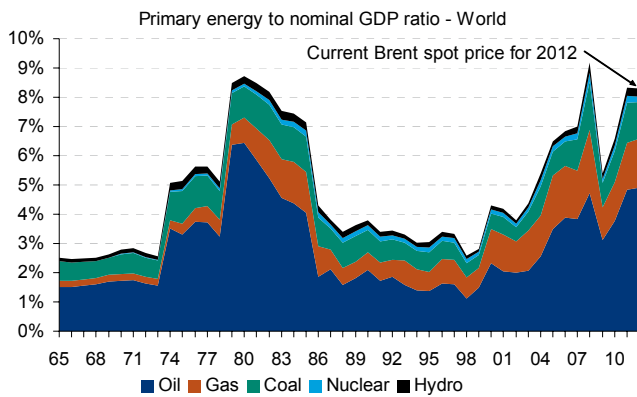
Global electricity demand is expected to grow at between 2.5% (Source: IEA) and 2.6% p.a. (Source: BP) to 2030, of which over 80% is attributable to EMs. Power generation capacity additions are projected to total 4,800GW by 2030, with the largest additions in China (Source: IEA). Energy used to generate electricity is expected to account for 57% of the projected growth in primary energy consumption to 2030 (vs. 54% for 1990-2010) (Source BP).

See our Global Commodity Research team's *Rationing oil in the medium term for a 5Y perspective on oil supply and demand & regional trends*

[Global Energy Paper, 20 February 2012](#)

The world economy can hardly afford to spend more than 9% of its GDP on energy

Chart 6: The world economy can hardly afford to spend more than 9% of its GDP in energy



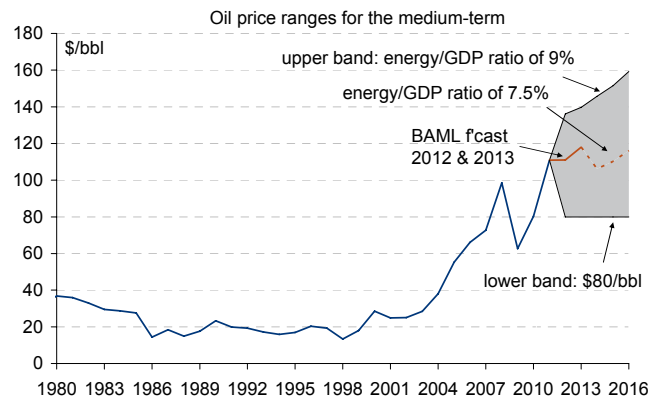
Source: IEA, BP, IMF, WB, Bloomberg, BofA Merrill Lynch Global Commodities Research

High oil prices are here to stay

High oil prices are unlikely to be a temporary phenomenon with the oil market balance deteriorating in the medium- to long-term according to our BofAML Global Commodities Research team:

- **Oil prices unlikely to fall below \$80/bbl through 2016** Brent crude oil prices are unlikely to dip below \$80/bbl on average, as significant non-OPEC supply constraints and rising OPEC budgets will likely create a high floor on oil prices.
- **Oil could spike to \$200/bbl.** In a supply-constrained world, increased liquidity should set oil prices on an upward path and oil prices will likely remain a key constraint on global economic growth. Occasional demand rationing episodes could result in prices occasionally spiking to \$200/bbl over the next five years. Taking a longer-term horizon, the IEA estimates the average oil price could approach \$120-\$150/barrel (in year-2010 dollars) in 2035.

Chart 7: On our estimates, occasional demand rationing episodes could push oil as high as \$200/bbl over the next five years

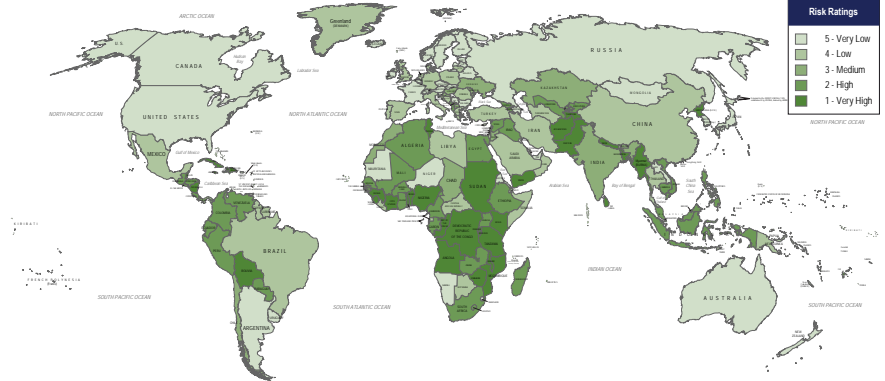


Source: Bloomberg, BP, BofA Merrill Lynch Global Commodities Research

\$38tn in future energy investments needed to 2035

The expected growth in world demand in 2035 would mean that \$38tn in global investment in energy-supply infrastructure is required from 2011 to 2035, an average of \$1.5tn per year. Oil and gas combined would be the biggest recipient, requiring nearly \$20tn on the back of higher costs and a need for more upstream investment. The power sector would claim nearly \$17tn of the total investment. Coal and biofuels account for the remaining investment. Two-thirds of the global amount is required in emerging markets (Source: IEA).

Chart 8: High global energy infrastructure needs



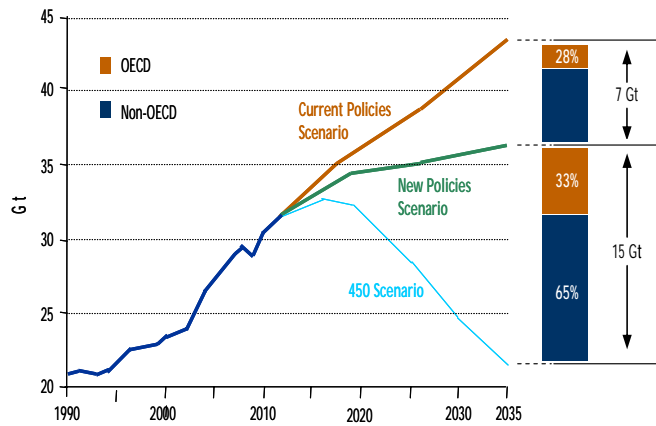
Source: BofA Merrill Lynch Global Research WDW (Who Does What Where) geographic risk screening tool

Irreversible climate change becomes a reality

As things stand – under the IEA’s central “New Policies” scenario – rising fossil energy use will lead to irreversible and potentially catastrophic climate change. Global energy-related emissions of CO2 grew by 5.3% in 2010 to a record 30.4Gt. Under this scenario, emissions would rise by 20% to 2035, reaching 36.4Gt. This trajectory would be consistent with a long-term global temperature increase of more than 3.5°C (Source: IEA).

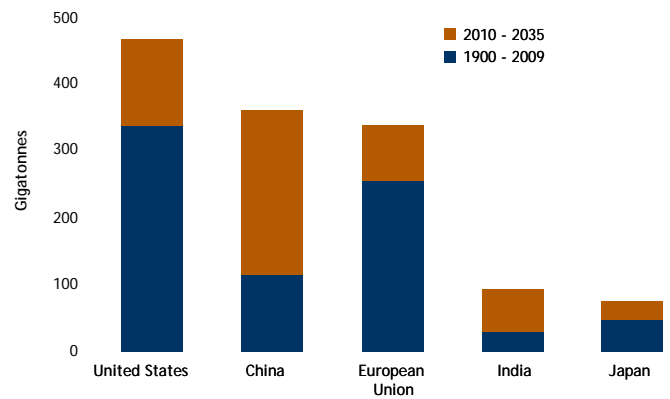
At the current pace, cumulative CO2 emissions over the next 25 years will amount to three-quarters of the total from the past 110 years - and China’s per-capita emissions will match the average of OECD countries. (Source: IEA)

Chart 9: IEA CO2 emissions scenarios to 2025



Source: IEA, BofA Merrill Lynch Global Research

Chart 10: Cumulative energy-related CO2 emissions in selected regions

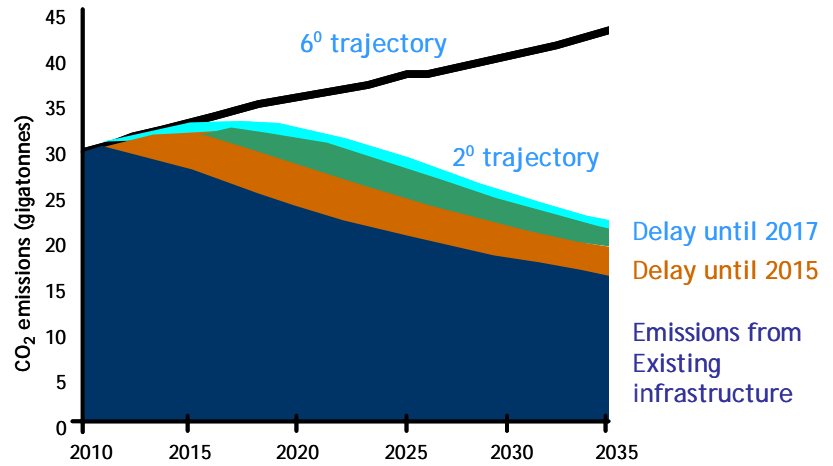


Source: EA, BofA Merrill Lynch Global Research

Short-term, lower rates of economic growth would only have minimal impact on these energy and climate trends.

Were new policies not implemented, we could be on an even more dangerous path, to an increase of 6°C – which would be significantly higher than the globally agreed goal of an increase of 2°C (which would require the long-term atmospheric concentration of GHGs in the atmosphere to be limited to 450 parts per million (ppm) of CO2-eq (Source: IEA).

Chart 11: CO2 emissions temperature trajectories to 2035

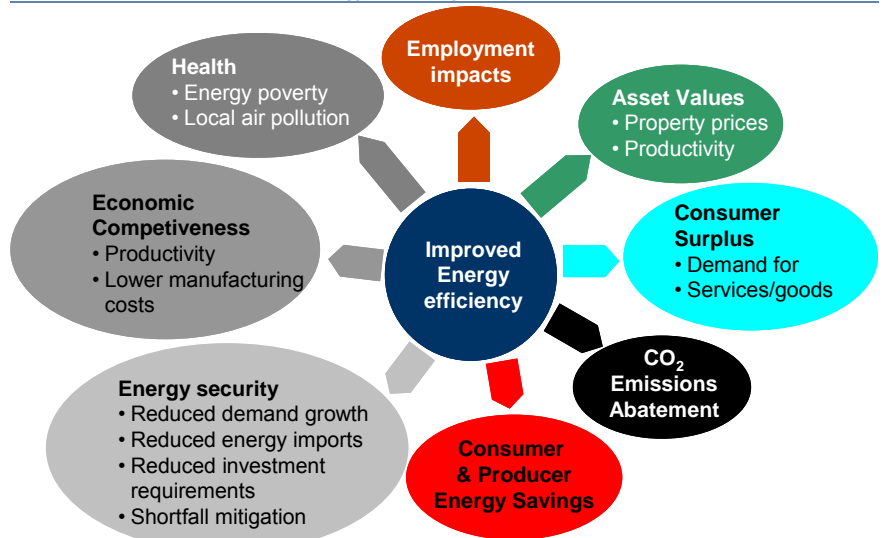


Source: IEA WEO 2011

Energy efficiency is the answer

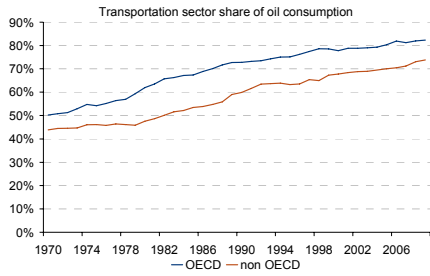
In a fossil fuel and resource-constrained world, energy demand inevitably has to adjust to limited supplies. The rationale is multifold from supply-demand balance, to energy and infrastructure costs, to energy security, to environmental sustainability, to access to energy and fuel poverty. Barring an outright, long-term economic downturn, we believe that this process needs to occur through a combination of energy efficiency improvements and gradual substitution out of oil and fossil fuels. Both of these can help restrain our growing appetite for energy in the long-term - although we believe that energy efficiency offers the single, greatest prospects among currently available options for cheap and easy energy and cost savings.

Chart 12: Benefits of improved energy efficiency



Source: IEA, BofA Merrill Lynch Global Research

Chart 13: Oil is primarily a transportation fuel



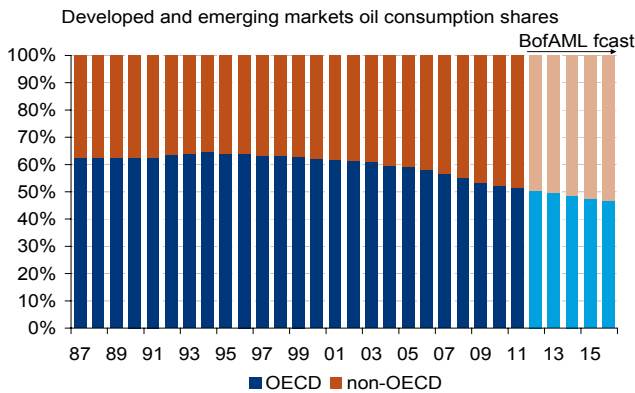
Source: IEA, BofA Merrill Lynch Global Research

Substitution offers limited near-term prospects

Oil (c.30% of energy demand) is primarily a transportation fuel. In absolute terms, our Global Commodities Research team finds that oil consumption growth over the medium term to 2016 will be driven entirely by EMs, with rapid income growth, expanding car fleets and urbanization underpinning strong oil demand growth. On its estimates, emerging markets, which already accounts for half of global output, will also overtake the developed world in 2013 in terms of oil consumption. By 2016, we estimate that EMs will comprise 53% of global oil consumption, with China alone making up 12.8%, or 12 million b/d of global consumption, up from 9.5 million b/d in 2011.

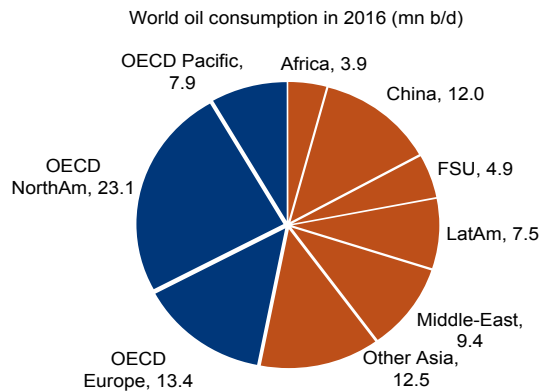
As seen in the Autos section of this report, even if the technology were to allow for substitution out of oil in transportation, via natural gas-powered vehicles or plug-in hybrid vehicles, there is limited scope for large-scale substitution unless energy policies set the right incentives and until the necessary infrastructure and distribution systems are developed. Thus, oil efficiency improvements will hinge in the near term on fuel efficiency advancements in transportation and upgrading of the fleet, while in the longer term they will probably be contingent on game-changing technologies.

Chart 14: The developing world will in 2013 also overtake the developed world in terms of oil consumption



Source: IEA, BofA Merrill Lynch Global Commodities Research

Chart 15: By 2016 we estimate that DMs will comprise 53% of global oil consumption, with China alone comprising 12.8% or 12 million b/d



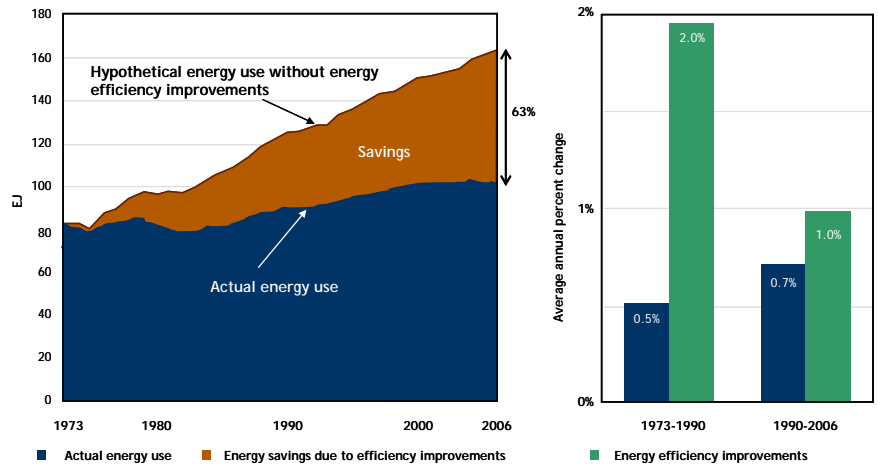
Source: IEA, BofA Merrill Lynch Global Commodities Research

An average fridge sold today uses under 700kWh/year vs. 2,000+ in 1973

End use efficiency, 30Y track record of success

We believe that end use energy efficiency offers the greatest potential to reduce energy use, energy costs and emissions across sectors. Its historical track record bears witness in this regard. Without the savings from improved energy efficiency – notably across buildings, industry, power and transport – since 1973, global energy consumption would now be at least 63% higher in IEA countries. This is the equivalent of 59 EJ of energy not consumed and 4.2Gt CO2 - and has played an integral role in restraining the overall growth of primary energy consumption.

Chart 16: Historical impact of energy efficiency* (1973-2006)



Source: IEA. * Based on the historical impacts for EA 11, a group of 11 IEA countries which have statistics available over the 40 past years. The countries sampled account for ~ 80% IEA energy consumption

Globally, the level of total primary energy supply (TPES) required for each unit of GDP has fallen. Since 1974; global energy demand rose by 100% vs. a 170% growth in GDP vs. 69% growth in population (Source: IEA).

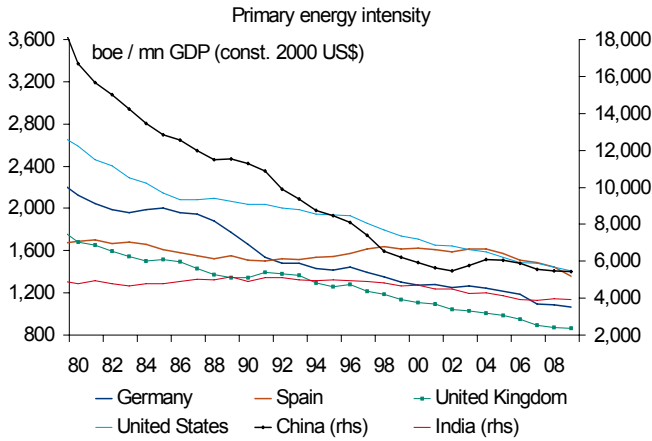
Oil intensity has been on a 30Y decline

We note that global oil intensity has declined by 2.4% p.a. on average since 1980. Going forward, our Global Commodities Research team expect it to decline by 2.9% p.a. out to 2015. Energy intensity has a non-linear relationship with income growth. At early stages of development, heavy industries grow strongly, taking up a larger share of the total economy as countries industrialise. As an economy moves from an industrializing to an advanced service economy, intensity of all energy types tends to decline. Of course, the process is not just dependent on economic growth. With the help of technological advancements in transportation, industrial processes, buildings and consumer appliances, energy intensity continues to decline in advanced economies.

Energy consumption per unit of GDP falls as lighter service industries grow in importance and thus the relationship between oil consumption and development plateaus at higher levels of development.

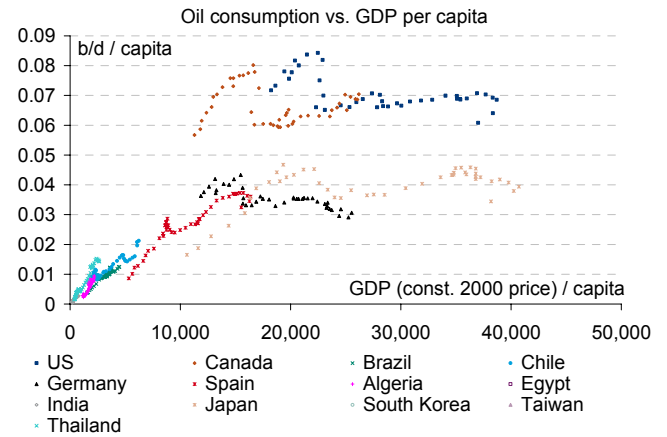
01 March 2012

Chart 17: Energy intensity has been steadily declining in most economies around the world since the 1980s



Source: IMF, BP, IEA, BofA Merrill Lynch Global Commodities Research

Chart 18: Energy consumption per unit of GDP falls as lighter service industries grow in importance



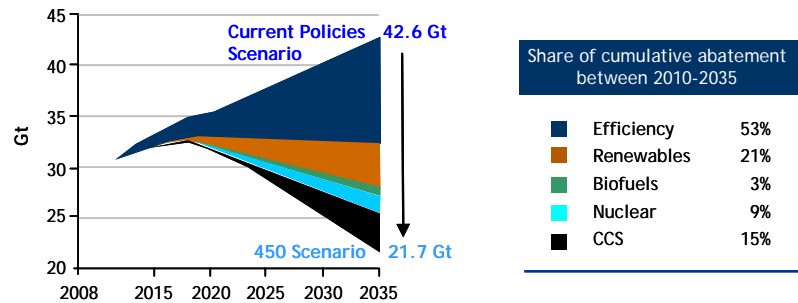
Source: IMF, BP, IEA, BofA Merrill Lynch Global Commodities Research

The biggest challenge will be ensuring action by EMs. The IEA's 450 Scenario envisages EM carbon taxes in the range \$20-45 per tonne in 2020, rising to \$95-120 for all countries by 2035.

Greatest potential for energy, cost & CO2 savings to 2030-5

End-use energy efficiency offers the largest greatest potential of any current technology to contribute to CO2 emissions abatement by 2030-35, accounting for over 50% of the total CO2 savings in the IEA's 450 Scenario. Under this scenario, we would see relatively optimistic implementation of national energy plans and pledges made by countries, including on their future emissions of GHGs.

Chart 19: World energy-related CO2 emission savings by technology in the 450 Scenario



Source: IEA WEO

Under this scenario – which the IEA has called “the pathway to Green Growth” – global CO2 pledges and resolutions (e.g. Copenhagen, Cancun, and Durban) would be acted on to alter the trajectory of the global energy system.

- Fossil fuel use and CO2 emissions peak before 2020, and energy-related CO2 emissions would be reduced to 3.8Gt, just 6% higher in 2020 than in 2007.
- GHG emissions stabilise at 450 ppm of CO2-eq by 2035, in line with an increase in global temperature of around 2°C (and back to 1990 levels).
- China & the US offer greatest abatement potential. Geographically, China would account for 32% of abatement, followed by the US at 18%, EU at 8%, India at 7%, Middle East at 4%, Russia at 4%, and Rest of World at 27%.

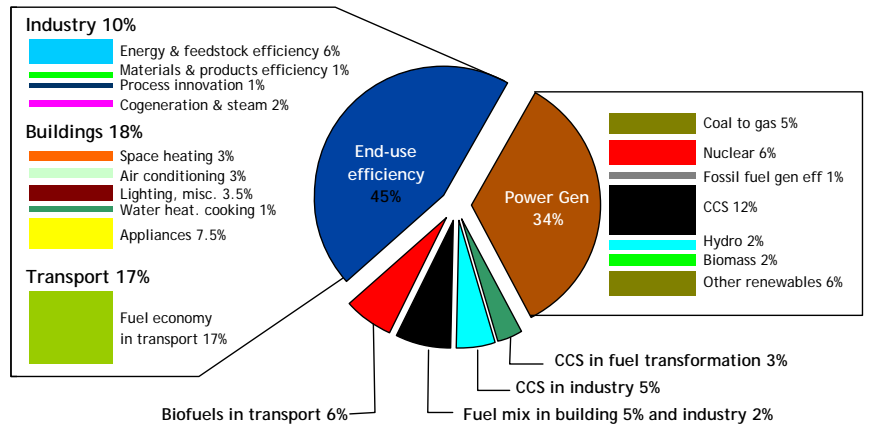
- **Fuel savings would offset investments.** Incremental investments of US\$10tn from 2010-30 would be needed, equivalent to 0.5% of global GDP in 2020, rising to 1.1% of GDP in 2030. Energy savings of US\$8.6tn across buildings, industry and transport would be achieved to 2030.

The greatest potential savings from end-use efficiency is in EMs.

Huge savings across buildings, industry, power & transport

As we shall see throughout the report, there is huge scope for end use energy efficiency improvement – both to reduce energy use and costs – across the buildings, industry, power and transport sectors.

Chart 20: 2050 – 32Gt of CO2 abatement reduction potential*

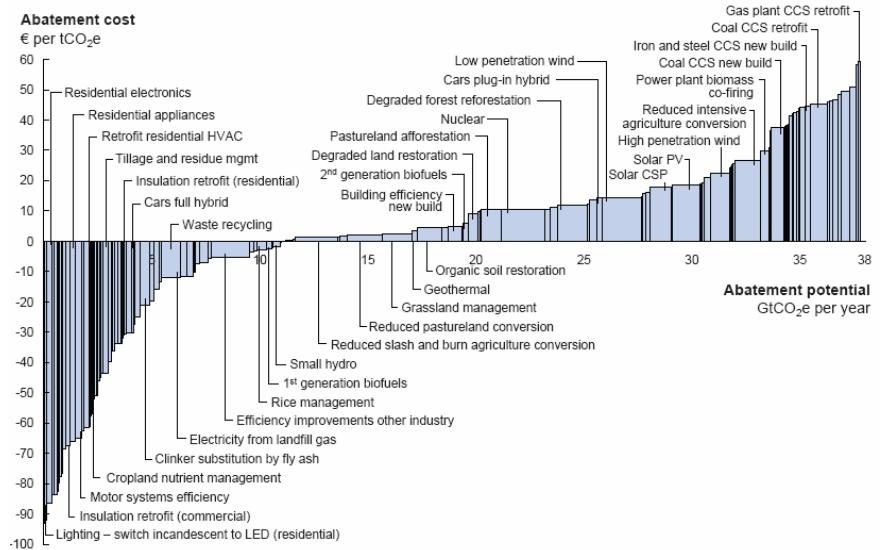


Source:IEA. * Under the IEA's ACT (Accelerated Technology Scenarios) which assumes relatively optimistic uptake of end-use efficiency and other abatement technologies

Short paybacks & negative CO2 abatement costs

Energy efficiency investments in buildings, industry and transport have short payback periods and negative abatement costs. The energy / fuel cost savings over the lifetime of the capital stocks often outweigh the additional capex costs of the efficiency measure, even when future savings are discounted – while enabling significant CO2 abatement potential.

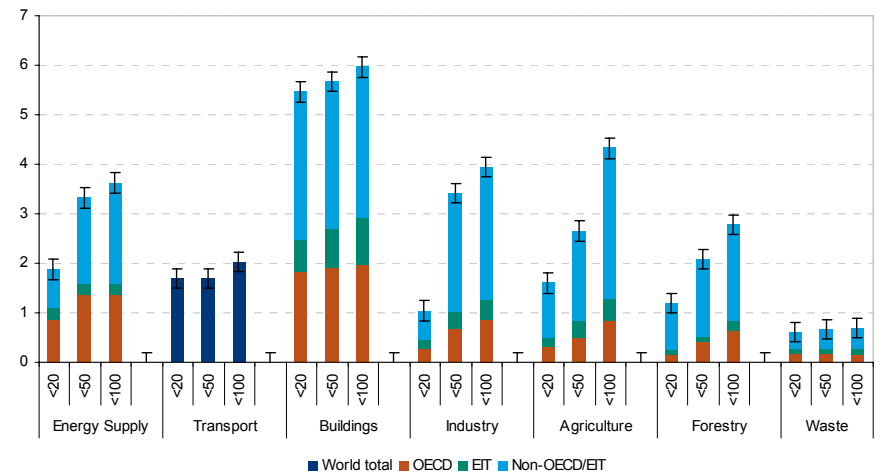
Chart 21: Energy efficiency dominates the net-negative portion of the CO2 abatement curve (2030E)



Source: Global GHG Abatement Cost Curve v2.0. The curve presents an estimate of the maximum potential of all technical GHG abatement measures below €60 per tCO₂-eq.

The chart below shows sectoral estimates of the economic mitigation potential of using technologies and practices expected to be available by 2030, at various costs in US\$ per tCO₂-eq. Buildings offer the greatest potential for short paybacks and negative abatement costs – with huge potential across sectors for significant CO₂ savings for less than \$20 or 50/tCO₂-eq.

Chart 22: Buildings have the greatest CO2 mitigation potential to 2030 (potential at <\$100, <\$50, <\$20 per tCO2-eq)



Source: UN IPCC, BofA Merrill Lynch Global Research

World electricity demand (2.6% p.a.) is projected to grow more rapidly than total energy over the next 20 years, although not as rapidly as GDP. Efficiency gains in power generation mean that the fuel inputs grow less rapidly than power output, averaging 2.1% p.a. 2010-30 (Source: BP).

The average cost of an energy efficiency kWh in the US is \$0.027/kWh compared with the average retail rate of \$0.097/kWh (Source: National Academy of Sciences)

Efficiency is key to controlling demand growth

Annual gains from energy efficiency averaged an impressive 1.9% from 1974-1990, but lower energy prices and a slowdown in energy efficiency implementation have seen this fall to 1% since 1990. But energy efficiency has been stepped up in the past few years and is expected to reach 2.0% globally per year going forward to 2030/5, with improvements across almost all key countries and regions. This acceleration is key to the sustainability of energy, in that it controls the overall growth of primary energy. Energy efficiency gains and a long-term structural shift away from industry and toward less energy-intensive activities – first in rich and then in newly industrialised economies – underpins this trend.

Cost is the key driver, US\$1 invested is US\$2-4 saved

Globally, we believe that we need to get back on track on energy efficiency, for no other reason than cost. A common rule of thumb is that every dollar spent on energy efficiency appliances, buildings, equipment and expenditures avoids more than US\$2 of investment in electricity supply, and saves up to US\$4 in lifetime energy expenditures.

88% of manufacturers realise efficiency is key to business success

An estimated 88% of manufacturers say industrial energy efficiency will be a critical success factor for their business in the coming two decades, largely for reasons of cost competitiveness, especially for energy-intensive sectors. With sub-optimal efficiency practices widespread across industry, there is huge potential for energy, cost and CO2 reductions, with 59% of manufacturers citing the price of energy as one of the biggest factors (Source: ABB).

Table 9: How significant are the following in your organization's energy efficiency decisions

2011	2010	Drivers of efficiency	EU	NAm	China	India
1	1	Energy cost savings	1	1	1	1
4	2	Government/utility incentives/rebates	2	3		2
3	3	Enhanced brand or public image				3
NA	4	Increasing energy security	3	2	2	
2	4	GHG reduction				
6	6	Existing policy			3	

Source: Institute for Building Efficiency, initiative of Johnson Controls. * Based on the 2011 Energy Efficiency Indicator (EEI) is the fifth annual survey of global executives and building owners responsible for energy management and investment decisions in commercial and public-sector buildings

Trillion dollar potential energy cost savings

Investments in energy efficiency will be more than offset by lifecycle savings in energy costs. Globally, the most work in this regard has been done on the US market, where it is estimated that a potential 23% reduction in annual energy consumption by 2020 could be achieved via a US\$520bn investment through 2020. This would translate to approximately US\$1.2tn in gross energy savings (Source: McKinsey).

Key to fighting poverty and enhancing prosperity

The link between a well-performing energy system and lifting up the world's poor is well established. Those countries with underperforming energy systems lose up to 2% of growth potential annually due to electric power outages and inefficient use of scarce energy sources (Source: World Bank). The UN has specifically recognised the role that energy efficiency can play as a solution with the Secretary General's Advisory Group on Energy and Climate Change looking to reduced energy intensity as one of its two key policy recommendations.

The challenge is partly financial, with an additional US\$30-35bn of energy efficiency capital required for low-income countries and US\$140-170bn for

3bn of the world's "energy poor" suffer the health consequences of inefficient combustion of solid fuels in inadequately ventilated buildings, as well as the economic consequences of insufficient power for productive income-generating activities and for other basic services such as health and education

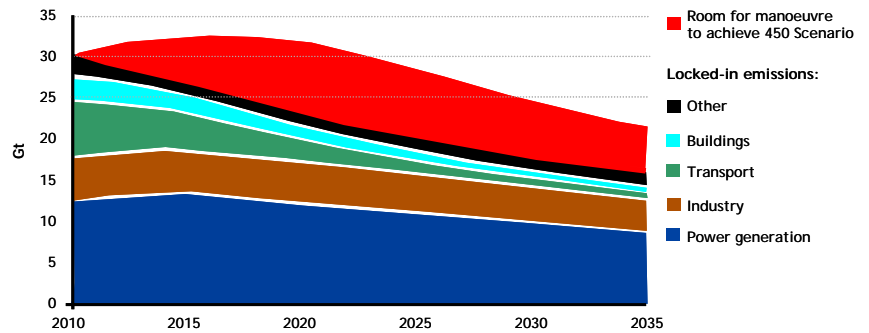
middle-income countries annually until 2030, above the IEA's reference case. Moreover, while most energy efficiency investments are cost-effective, the costs of energy efficiency are typically front-loaded, with the benefits accruing over time. This means that low-income countries and their consumers often have access to only limited and expensive capital and energy options (Source: UN).

"Governments need to introduce stronger measures to drive investment in efficient and low-carbon technologies. The Fukushima nuclear accident, the turmoil in parts of the Middle East and North Africa and a sharp rebound in energy demand in 2010 which pushed CO2 emissions to a record high, highlight the urgency and the scale of the challenge." (Source: IEA)

Delaying action is a false economy

There is an inherent danger in waiting too long to act on energy efficiency. For instance, under the IEA's 450 Scenario – which would limit temperature rises to 2°C – 80% of the total energy-related CO2 emissions to 2035 are already locked in by existing capital stock (i.e. building, industry, power stations). Without further action by 2017, the energy-related infrastructure then in place would generate all the CO2 emissions allowed in the Scenario up to 2035. As a result, the IEA argues that delaying action and investment on energy efficiency is a false economy, because for every US\$1 of avoided efficiency investments in the power sector before 2020, an additional US\$4.30 would need to be spent after 2020 to compensate for the increased emissions (Source: IEA).

Chart 23: Locked-in CO2 emissions vs. room for manoeuvre to achieve 450 Scenario



Source: IEA WEO 2011

Source: IEA WEO 2011

73% of executives expect to increase expenditure on energy efficiency in the coming three years (Source: ABB)

Public policy shift in favour of efficiency

A combination of the unsustainability of current and expected energy use, rising energy costs and a desire to balance energy security with reduced emissions means that we are seeing intensifying regulatory pressure on energy efficiency. We believe that the recession – which has made “less is more” the watchword of the past few years – is adding to the weight and direction of pressure on public policy. Governments are clearly focused on increasing efficiency and decreasing consumption and costs.

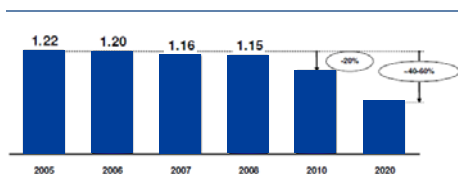
As the following overview of some of the major global markets shows, energy efficiency has become the central plank of governmental energy policy. Moreover, new and emerging regulations will require companies to improve their energy efficiency, creating significant investment opportunities across buildings, industry, IT, power and transport.

Brazil: 109 TWh of electricity savings by 2030

While Brazil's per capita energy consumption is 31% below the global average, it is higher than the non-OECD average and its total energy consumption has been growing by 3%+ in recent years. This is pushing the government to place increasing focus on energy efficiency:

For further research on China's Strategic Priorities, see the work of our China Strategist David Cui.

Chart 24: Chinese government driving energy efficiency (tons of coal eq. / RMB 10 k GDP)



Source: Honeywell, BofA Merrill Lynch Global Research

- **The National Climate Change Plan (PNMC (2008))** seeks to increase energy efficiency across various sectors of the economy in line with best practices, and to maintain the high renewable energy mix in Brazil's transport and electricity sectors.
- **The National Energy Efficiency Action Plan** anticipates a reduction in electricity consumption of c.10% by 2030, equivalent to savings of 106 TWh. Focus areas include the replacement of 10 million fridges over 10 years, reducing T&D losses by 1,000 GWh p.a. for 10Y and improving efficiency in buildings, industry and transport.
- **A 36.1-38.9% GHG reduction by 2020** was announced in 2009 with [tackling] deforestation, as well as changes in land and energy use, being the main drivers (Source: ABB).

China, a top national governmental imperative

China started pushing energy efficiency as a top government imperative two years ago, with the topic forming a key plank of the "Long March to Green: 12th Five Year Plan (FYP) of Energy Sector". The broad aims are:

1. **Achieving a 17.4% energy saving in terms of primary energy consumption per GDP** (i.e. increase in coal to power efficiency via technology improvement, and introduction of more efficient generators; changes in the economic structure from fixed capital investment to services, lowering the contribution from high energy-intensive industries; and cutting down exports of high energy-intensive products, such as steel and fertilizers.
2. **Reducing carbon intensity (GHG emissions per unit of GDP) by 17%**
3. **Reflecting the full economic cost of energy consumption.**

Policies, subsidies & bans

In addition to the usual tax and other benefits afforded to high-tech industries, China has plans to undertake the following:

- Five-year phase-out of incandescent light bulbs with a ban on 100w+ bulbs from 1 October 2012, on 60w+ bulbs from 1 October 2014, and on 15w+ bulbs from 1 October 2016. The NDRC also launched the Green Light Project in 1996 to promote energy-saving lighting, and it has subsidized the purchase of 312mn CFLs.
- Invest US\$370bn in the grid from 2011 to 2015, including smart grid on UHV construction and rolling stock.
- Build capacity to produce 500,000 electric vehicles per year.
- Ban sales of low-efficiency motors, and subsidize the purchase of high efficiency motors and high efficiency air conditioners (which use high efficiency motors).
- Subsidize energy management contract (EMC) service providers for energy saved and mandate the use of better heat-proofing materials to cut buildings' energy consumption.
- Launch energy-saving, low-carbon activities at 10,000 high energy-consuming enterprises, an expansion of the existing Top 1000 Enterprises Program.
- Possibly introduce environmental and carbon taxes.

Aggressive targets and inflationary pressure

Our bottom-up analysis suggests that the government’s 5Y energy-saving target (of 17.4%, vs. our 7%) might be too aggressive. Moreover, shifting the energy mix away from coal towards alternatives and reflecting the full economic cost of energy would certainly drive up inflation, at least in the short run.

EU: most challenging targets & integrated vision

The European Union has set some of the most challenging, integrated approaches to energy policy, climate change and sustainable economic growth, including the 2007 establishment of its 20/20/20 targets, to be met by 2020:

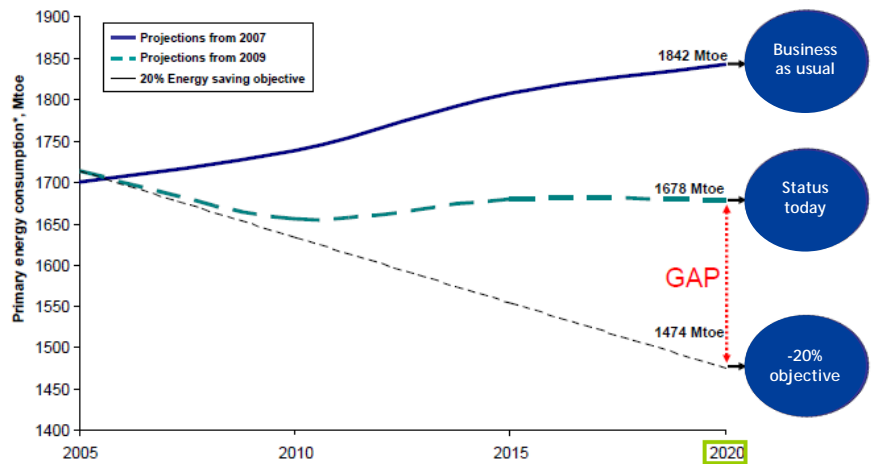
- 20% reduction of GHG emissions by 2020 compared with 1990.
- 20% share of renewable energy in final energy consumption by 2020.
- 20% reduction in EU primary energy consumption by 2020 (vs. projected levels), to be achieved by improving energy efficiency.

The EU is even possibly prepared to move to a reduction / efficiency target of 30% by 2020 if certain conditions are met, but no decision has yet been taken on this.

EC’s DG for Energy 60% confident in efficiency target

Substantial strides have been made towards achieving the efficiency objective, particularly on appliances and buildings. However, a 2011 impact assessment accompanying the EU’s Energy Roadmap for 2050 has raised doubts about whether the EU will reach its 20% energy efficiency target, with the recession negatively impacting public, commercial and private efficiency investment decisions. The report also highlights "split incentives" or "principal agent market failures", where energy decision-makers are detached from price signals, as an issue. However, the EC’s DG for Energy has said that he is 60% confident that the target will be achieved. A new energy efficiency directive could also act as a driver.

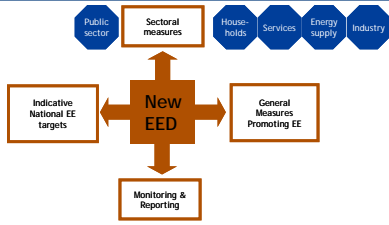
Chart 25: EU may fall short of its 2020 20% energy saving target



Source: European Commission. *Gross inland consumption minus non-energy uses

“The combined effects of full implementation of the existing and new measures will transform our daily life and have the potential to generate financial savings of up to €1,000 per household every year; improve Europe’s industrial competitiveness; create up to 2 million jobs; and reduce annual greenhouse gas emissions by 740 million tons.” (Source: EC)

Chart 26: Proposed new Energy Efficiency Directive



Source: European Commission

Proposed Energy Efficiency Directive (EED)

In June 2011, the European Commission proposed a new set of measures for increased energy efficiency whereby the 2020 20% energy savings target would become a legally binding requirement (as are the 20% CO2 reduction and renewable energy targets). Although the directive would allow for some latitude, the targets would become a legal obligation after 2014 if existing national schemes were not delivering. The new requirements would see all member states establish a number of energy-saving schemes with the most ambitious target requiring member states to establish rules obliging energy firms to cut energy sales by 1.5% each year, and requiring 3% of public buildings annually to be given an energy-efficient makeover.

EU Energy Commissioner Günther Oettinger has said he will give EU countries two years to get energy efficiency savings back on track before proposing legally binding targets. While the European Parliament is broadly supportive of the proposed EED, there is on-going debate between the Council, DG of Energy and DG of Environment – as well as some EU member states opposing any legally binding obligations – making it tougher for the EC to push efficiency. This could lead to an eventual relaxing of some of its rules. We also note that mandatory targets could depress EUA prices unless caps were tightened or fewer credits issues.

Table 10: European Commission's proposed Energy Efficiency Directive

Focus area	Current energy efficiency status	EED proposals
Public sector	<ul style="list-style-type: none"> Public sector consumption makes up 19% share of EU's GDP 12% share of public buildings in building stock Low average energy performance of existing building stock Cost optimal renovation could bring up to 60% energy savings 	<ul style="list-style-type: none"> Purchase products, services & buildings w/ high efficiency performance Annual renovation target of 3% for public buildings above 250m² Local efficiency plans and introduction of energy management systems More systematic use of Energy Performance Contracting
Consumers	<ul style="list-style-type: none"> Large saving potential unrealised in residential & services sectors Slow uptake of market for energy efficiency services Lack of awareness & access to appropriate information on benefits Techno. developments not sufficiently reflecting household interests 	<ul style="list-style-type: none"> National energy efficiency obligation scheme for utilities Obligation for individual energy meters (smart meters) Ensure accuracy & frequency of billing based on actual consumption
Transmission & distribution	<ul style="list-style-type: none"> Fragmented regulations/incentives to address waste re supply chain Increase CHP usage: uses 30% less fuel for same heat & power New generation installations not reflecting Best Available Technologies 	<ul style="list-style-type: none"> Appropriate info. w/ bill providing comprehensive account of costs 10Y national heat & cooling plans CHP obligation for new and existing power & industrial plants
Industry	<ul style="list-style-type: none"> 23% share in overall final energy consumption Considerable progress made but potential remaining Energy efficient technologies and EE best practices readily available 	<ul style="list-style-type: none"> Network tariffs design encourages energy saving & control consumption National inventories of generation installations to monitor efficiency Member States incentives for SMEs to undergo energy audits Dissemination of best practices of energy management for SMEs Mandatory audits for large companies & incentives for best practices

Source: European Commission, BofA Merrill Lynch Global Research

[For further information see our India Strategy report on Energy Efficiency](#)

[The IST Report, 09 November 2011](#)

India: an imperative for faster, sustainable growth

India faces some of the most significant energy efficiency issues of any of the BRICs, notably from a supply perspective, with transmission losses of c.30%, high levels of energy theft, geographically imbalanced supply and load demand, and basic issues of access, with a majority of rural residents and over 10% of urban residents lacking electricity access. Recent estimates suggest that up to US\$600bn of investment is needed (Source: Honeywell). Achieving 9% GDP growth would require energy consumption to grow at around 6.5% p.a., implying a difficult balance between energy dependence and environmental challenges.

Improving policy focus

The approach paper to the 12th five year plan (FY13-FY17) states that: "Increased energy efficiency is the only way to contain energy demand without jeopardizing growth and it must therefore receive high priority". The paper also stresses that "Increasing energy efficiency requires action on two fronts: rationalizing energy prices to incentivize energy efficiency and taking non-price initiatives to push the economy towards greater energy efficiency". Two key developments are:

- Enactment of an Energy Conservation Act, which provides a legal framework for national energy efficiency including the establishment of the Bureau of Energy Efficiency (BEE), which coordinates and implements energy conservation activities.
- Establishment of a National Mission for Enhanced Energy Efficiency as one of eight missions under its National Action Plan on Climate Change. The mission aims to enable Rs 75,000 crore (US\$16.75bn) worth of energy efficiency transactions through policy and financing demand-side management activities and establishing a market-based energy trading initiative. Targets for 2014-15 include: annual fuel savings of at least 23 Mtoe, a cumulative avoided electricity capacity addition of 19,000 MW and a CO2 emission mitigation of 98 Mt.

Table 11: NMEEE - Overall estimated investment and expected impact

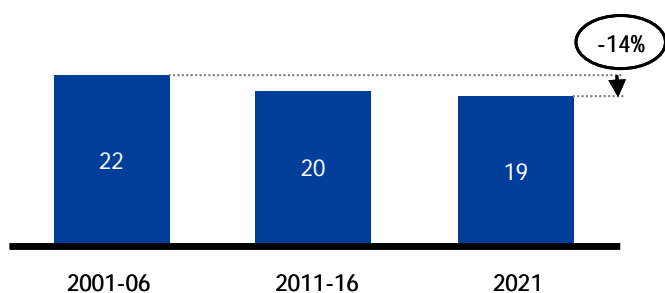
Initiative	Investment Estimated (Rs. crores)	Fuel Saving (Mtoe)	GHG Emissions saving (mt)	Avoided Capacity (MW)
Perform, Achieve and Trade (PAT)	30,603	9.78	26.21	5623
Demand side management	44,000	13.22	72.75	14335
Total	74,603	23	98.96	19,958

Source: BEE

Up to 25% emission intensity reduction by 2020

India has set a goal of reducing its emission intensity by 20-25% by 2020 from 2005 levels, with energy efficiency at the core of its strategy. According to P Uma Shankar, the secretary of India's Ministry of Power, India's energy efficiency plans will help to avoid 20GW of additional electricity generation capacity over the next four years and 100 million tons of GHG emissions annually.

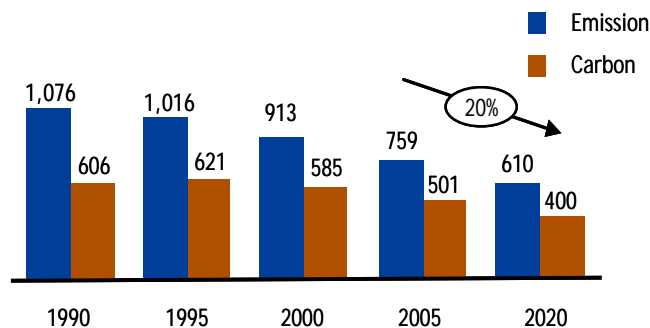
Chart 27: National Plan to Improve Energy Efficiency
Kg of Oil Equivalent / Thousand Rs of GDP



Source: Honeywell, BofA Merrill Lynch Global Research

Realising its full energy efficiency potential could save Russia up to US\$80bn annually (Source: World Bank)

Chart 28: A Trend of Reducing Emission & Carbon Intensity
Tons of CO2 Equivalent / USD Million PPP 2005



Source: Honeywell, BofA Merrill Lynch Global Research

Russia: 56% reduction in energy intensity by 2030

With per capita energy consumption at 2x the global average, energy intensity 3x higher than for OECD Europe, a high proportion of energy-intensive industry and antiquated industrial stock, Russia is increasingly placing energy efficiency at the heart of its energy strategy (Source: ABB, Energy Charter Protocol).

2009-30 Energy Strategy

Russia's Energy Strategy – ES2030, adopted in 2009 – sets a 56% energy intensity reduction target for 2030 (vs. 2005 levels). Among the planned measures are a mix of liberalisation; creation of an energy services market; new standards, incentives and penalties; and increasing the energy efficiency of buildings by 50%.

A Federal Law on Energy Conservation and Increase of Energy Efficiency was adopted in November 2009 to create a legal framework for the promotion of energy efficiency – which mainly focuses on buildings, compulsory metering and the establishment of energy passports.

Stakeholders argue that Russia needs to go further

Stakeholders have criticised Russia’s measures as being too general, lacking sufficient incentives, and being too top-down (vs. at municipal level). They also argue that energy markets have been closed and that little is being done to promote consumer awareness on efficiency. This has seen civil society and companies take a more active role, although it is still early days compared with other markets.

US: efficiency gaining significant momentum

Since 2002-3, the US government has taken increasing measures to improve energy efficiency, including the Global Climate Change Initiative (2002), the Energy Independence and Security Act (2005), the American Recovery and Reinvestment Act (2009), and the National Action Plan for Energy Efficiency (NAPEE), a private-public program, targeting energy savings of 200 TWh by 2025. This comes on the back of increasing recognition that US energy consumption is 60% higher than the OECD average and that primary energy intensity was 20% higher, posing cost and energy security challenges.

Efficiency at the heart of 2012 budget

Energy efficiency is one of the President’s three strategic priorities for the FY 2012 Budget – Economic Prosperity. The DOE’s request for US\$1.8bn to accelerate the deployment of energy efficiency measures in order to reduce energy consumption in residential and commercial buildings, and the industrial and Federal sectors, represents over 56% of the budget request.

Table 12: Energy efficiency at the core of US FY2012 budget request

	FY 2010 Current Approp.	FY 2011 Annualised CR	FY 2012 Cong. Request	FY 2012 vs. FY 2010	
				\$	%
Hydrogen Technology	170,297	-	-	- 170,297	-100.0%
Hydrogen and Fuel Cell Technologies	-	-	100,450	+100,450	N/A
Biomass and Biorefinery Systems RD&D	21,625	-	340,500	+124,275	57.5%
Solar Energy	243,396	-	457,000	+213,604	+87.8%
Wind Energy	79,011	-	126,859	+47,848	+60.6%
Geothermal Technology	43,120	-	101,535	+58,415	+135.5%
Water Power	48,669	-	38,500	- 10,169	-20.9%
Vehicle Technologies	304,223	-	588,003	+283,780	+93.3%
Building Technologies	219,046	-	470,700	251,654	+114.9%
Industrial Technologies	94,270	-	319,784	+225,514	+239.2%
Federal Energy Management Program	32,000	-	33,072	+1,072	+3.4%
Facilities and Infrastructure	19,000	-	26,407	+7,407	39.0%
Program Direction	140,000	-	176,605	+36,605	26.1%
Program Support	45,000	-	-	- 45,000	-100.0%
Strategic Programs	-	-	53,204	+53,204	N/A
Weatherisation and Intergovernmental	270,000	-	393,798	+123,798	+45.9%
Congressionally Directed Projects	292,135	-	-	- 292,135	-100.0%
<i>Subtotal, Energy Efficiency and Renewable Energy</i>	<i>2,216,392</i>	<i>2,242,500</i>	<i>3,226,417</i>	<i>+1,010,025</i>	<i>+45.6%</i>
Adjustments	-	-	- 26,364	-26,364	N/A
Total, Energy Efficiency and Renewable Energy	2,216,392	2,242,500	3,200,053	+983,661	+44.4%

Source:US DOE February 2012

Table 13: State Energy Efficiency Targets*

State	Approx. Annual Savings Target	Year of Implementation
Delaware	2.5%	2009
Massachusetts	2.4%	2008
Vermont	2.25%	2000
Arizona	2.2%	2009
Indiana	2.0%	2010
New York	1.9%	2011
Maryland	1.5-1.8%	2008
Iowa	1.0-1.5%	2008
Minnesota	1.5%	2010
Ohio ¹	1.3%	2009
Illinois	1.7%	2008
Hawaii	1.5%	2004
Maine	1.25%	2010
Indiana	1.2%	2009
Colorado	1.0%-1.5%	2009
Washington	1.0%-1.5%	2010
California	1.0%	2004
Connecticut	1.0%	2007
Michigan ²	1.0%	2008
Pennsylvania	1.0%	2009
Nevada	0.6%	2007
New Mexico ³	0.7%	2008
Arkansas	0.5%	2010
Texas	0.4%	2009

Source: "The 2011 State Energy Efficiency Scorecard," American Council for an Energy-Efficient Economy, October 2011; and state regulatory commissions. * Energy is electric and natural gas; 1. Target is average through 2025; 2. Target ramps up to 1% in 2012; 3. Target is average through 2020

DOE putting major focus on efficiency

The U.S. Department of Energy released its inaugural Quadrennial Technology Review report (DOE-QTR) in September 2011, as an initial step towards a government-wide Quadrennial Energy Review to help formulate a national energy policy. The QTR marks a major policy-level move away from technologies that are "multiple generations away from practical use", towards energy efficiency to provide a more immediate payoff for the US economy and address energy security and competitiveness. It comprises six key strategies:

- Increasing vehicle efficiency
- Electrifying the light duty fleet
- Deploying alternative fuels
- Increasing building and industrial efficiency
- Modernising the electrical grid
- Deploying clean electricity

US catching up with the EU

The EU has long been considered as being far ahead of the US on energy efficiency, but the US EIA projects that structural changes in energy consumption will cut power demand by 33% over the next 30 years. Energy efficiency is projected to cut 13% of power demand over the same period. Given the aggressive demand reduction initiatives at state level (see margin table), we do not see energy efficiency easing (cf. [Electric Utilities and Competitive Power, 04 January 2012](#)), with smart meters and more efficient lighting and appliances all having an impact.

Table 14: US energy efficiency progress vs. EU 2000-2009

Overview	2009		2000-2009 (%/year)	
Primary intensity (EU = 100)	140	--	-2.1%	+
CO2 intensity (EU = 100)	156	--	-2.4%	+
CO emissions per capita (in tCO2/cap)	16.7	--	-1.7%	++
Power generation	2009		2000-2009 (%/year)	
Efficiency of thermal power plants (in %)	39	-	0.5%	+
Rate of electricity T&D losses (in %)	6	+	0.1%	--
CO2 emission per kWh generated (in gCO2/kWh)	508	--	+1.2%	-
Industry	2009*		2000-2009* (%/year)	
Energy intensity (EU = 100)	137	-	-1.7%	-
Share of industrial CHP in industry consumption (in %)	17	-	1.1%	-
Unit consumption of steel (in toe/t)	0.39	+	2.4%	+

Source: ABB, BofA Merrill Lynch Global Research

* 2008 and 2000-2008 for steel

1 The European Union, as the best-performing region, is used as the benchmark. ++ Among best countries + Better than the EU average - Below the EU average -- Among countries with lowest performances

Source: ABB, BofA Merrill Lynch Global Research. 1 The European Union, as the best-performing region, is used as the benchmark. ++ Among best countries + Better than the EU average - Below the EU average -- Among countries with lowest performances

01 March 2012

Overview of major U.S. energy efficiency regulations

Measure	Target	Year	Measure	Target	Year
Mandatory Reporting of Greenhouse Gases Rule	•Industry, Multi-sectoral policy	2010	Energy Conservation Codes for Public and Assisted Housing	•Buildings	2008
American Recovery and Reinvestment Act: Appropriations for Clean Energy	•Appliances, buildings, industry, transport	2009	Energy Efficiency and Conservation Block Grant Programme	•Multi-sectoral Policy	2008
American Recovery and Reinvestment Act of 2009: Tax-Based Provisions	•Multi-sectoral policy, Transport	2009	Energy Efficiency Standard for Manufactured Housing	•Buildings	2008
Assisted Housing Stability and Energy and Green Retrofit Investments	•Buildings, industry, multi-sectoral policy, transport	2009	Energy-Efficient Appliance Credit	•Appliances	2008
Electric Drive Vehicle Battery and Component Manufacturing Initiative	•Transport, Multi-sectoral Policy	2009	Energy Improvement and Extension Act 2008 - Tax Incentives	•Appliances •Buildings •Industry •Transport	2008
Energy-Efficient Federal Motor Vehicle Fleet Procurement	•Transport	2009	Energy Independence and Security Act of 2007	•Appliances, buildings, multi-sectoral policy, transport	2008
Energy Efficient Retrofits	•Buildings	2009	Energy Provisions - National Defense Authorization Act for fiscal year 2009	•Transport	2008
Executive Order 13514: Federal Leadership in Environmental, Energy, and Economic Performance	•Buildings •Transport	2009	Food, Conservation, and Energy Act of 2008	•Industry, multi-sectoral Policy •Transport •Transport	2008
Grants for Impact Aid Construction	•Buildings •Industry	2009	Near-term Transportation Sector Electrification Program	•Transport	2008
Technical Assistance Program (TAP)	•Buildings	2009	New Federal Buildings Regulations	•Buildings	2008
Waste Energy Recovery Registry (WERR)	•Industry	2009	Plug-in Electric Drive Motor Vehicle Tax Credit	•Transport	2008
Accelerated Recovery Period for Depreciation of Smart Meters and Smart Grid Systems	•Multi-sectoral Policy	2008	Regional Greenhouse Gas Initiative (RGGI)	•Industry •Multi-sectoral Policy	2008
Advanced Technology Vehicles Manufacturing Loan Program	•Transport	2008	Smart Grid Technology Research, Development, and Demonstration	•Industry	2008
Appliance Energy Efficiency Standards	•Appliances	2008			

Source: U.S. government, BofA Merrill Lynch Global Research

Table 15: BofAML Auto & Energy Efficiency Stock List

Company	EE exposure (sales)
AQUARIUS PLATINUM	Low
BORGWARNER INC	High
CLEAN ENERGY FUELS	High
CONTINENTAL AG	Medium
ELRINGKLINGER AG	High
FAURECIA	Low
JOHNSON CONTROLS INC	Medium
JOHNSON MATTHEY PLC	Low
LANXESS	Low
LKQ CORP	Low
MAGNA INTERNATIONAL	Medium
MICHELIN (CGDE)-B	Medium
SOLVAY	Low
TESLA MOTORS INC	High
TORAY INDUSTRIES INC	Low
VALEO SA	High
VICTREX Plc	Low
WESTPORT INNOVATIO.	High

Source: BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency products, services, technologies and solutions

Cross Reference - Global Automotive Supplier Review's "The Path Towards Fuel Efficiency"

A comprehensive overview of the efficiency and fuel economy issues raised in this section can be found in our Global Auto team's "Who Makes the Car" report [Global Automotive Supplier Review, 18 May 2011](#)

Auto, green "transficiency" evolution

Globally, road transport-related CO2 emissions represented almost 17% of the total CO2 emissions from fuel combustion in 2009 according to the IEA. Road transport was thus the third highest source of CO2 emissions from fuel combustion. Within road transport, automobiles and light trucks produce well over 60% of emissions (Source: IEA). With non-OECD and emerging market car sales set to exceed those in the OECD by 2020, and the global passenger car fleet is set to double to reach almost 1.7bn by 2035, the auto sector is coming under growing pressure on oil consumption, energy security and CO2 emissions – and in terms of making gains on fuel economy via efficiency gains.

We believe that ultimate path towards automotive fuel efficiency will be more of an evolution than a revolution. It could involve a three stage transition including: 1) leveraging technology to improve the efficiency of the internal combustion engine and light weighting of the vehicle; 2) increasing use of hybrid and hybrid electric powertrains; and 3) exogenous technology shock. Growing fuel efficiency regulation around the world is placing an increasingly significant R&D burden on all auto OEMs, but we do not believe that regulation alone will be a driver of material changes. We anticipate the evolution will be market driven as consumers demand more fuel efficient vehicles to ultimately reduce personal expenditure on fuel.

We believe that a number of stocks are well placed to benefit from the theme of energy efficiency in the auto sector through their involvement in areas such as autocatalysts, diesel, electric vehicles (EVs), engine and transmission components, gasoline direct injection (GDI), light-weighting, li-ion batteries, natural gas, specialty polymers, turbochargers and tyres, among other areas.

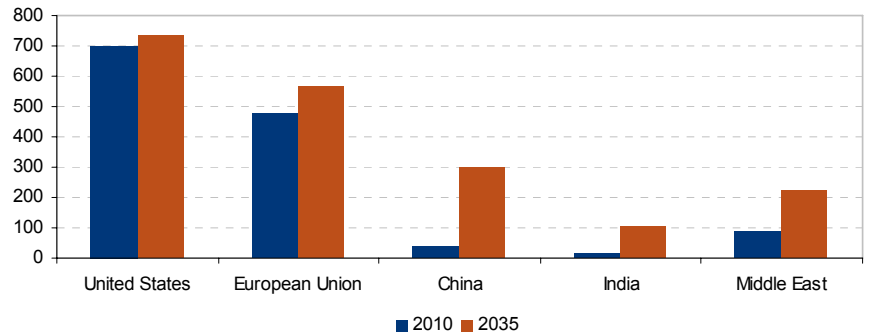
Road transport, #3 source of fuel combustion-related emissions

#3 source of fuel combustion-related emissions

Transport – including road, air and maritime – accounts for about 19% of global energy use and 23% of global energy-related CO2 emissions. Road transport-related CO2 emissions represented almost 17% of the total CO2 emissions from fuel combustion in 2009 according to the IEA. Road transport was thus the third-highest source of CO2 emissions from fuel combustion after "electricity and heat production" and "manufacturing industries and construction".

With non-OECD and emerging market car sales set to exceed those in the OECD by 2020, and the global passenger car fleet set to double to reach almost 1.7bn by 2035, the auto sector is coming under growing pressure on oil consumption, energy security and CO2 emissions – and in terms of making gains on fuel economy via efficiency gains.

Chart 29: Vehicles per 1000 people in selected markets 2010-35

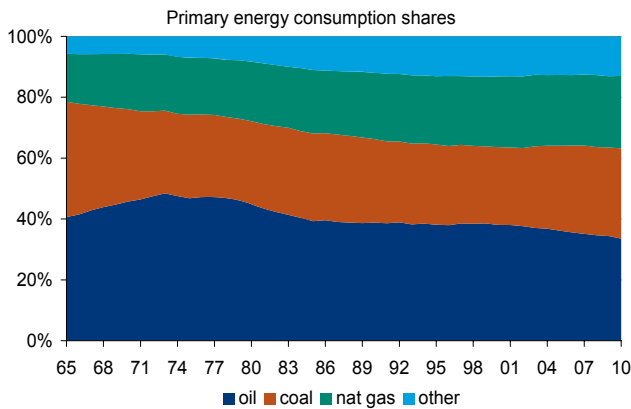


Source: IEA WEO 2011, BofA Merrill Lynch Global Research

Substitution is tough in the transportation sector

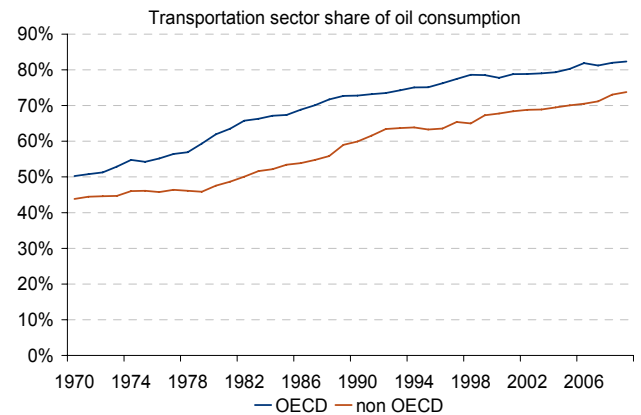
Oil today is primarily a transportation fuel. As we outline below, even if the technology were to allow for substitution out of oil in transportation, via natural gas-powered vehicles or plug-in hybrid vehicles, there is limited scope for large-scale substitution unless energy policies set the right incentives and until the necessary infrastructure and distribution systems are developed. Thus, oil efficiency improvements will hinge primarily in the near term on fuel efficiency advancements in transportation and upgrading of the fleet.

Chart 30: The aftermath of the oil crisis of the 70s and 80s saw large-scale substitution out of oil into other and cheaper thermal fuels



Source: IEA, BofA Merrill Lynch Global Research

Chart 31: Oil is today primarily a transportation fuel



Source: IEA, BofA Merrill Lynch Global Research

OECD demand growth will contract medium term

On our Global Commodities Research team's estimates, oil consumption in the OECD countries will continue to decelerate beyond 2012. Over 80% of oil demand in the OECD is generated by the transportation sector. Fuel efficiency standards of new cars and airplanes have steadily improved since the 1970s, and further improvements will make a negative contribution to oil consumption growth in the OECD over the medium

Our Global Commodities Research team sees OECD demand shrinking by an average of 0.3 million b/d YoY from 2012 to 2016, with the strongest decelerations in OECD Europe. Their views on oil demand are outlined in this section.

- **OECD North America demand will continue to contract.** On our estimates, North American demand will fall by a cumulative 0.44 million b/d for the period 2012-16, with US consumption declining by 0.54 million b/d, partially made up by growth in Mexico and Canada. The contraction in demand is particularly sharp in 2012, given the drag on miles travelled from a weak economy. On the other hand, US targets for fuel efficiency standards

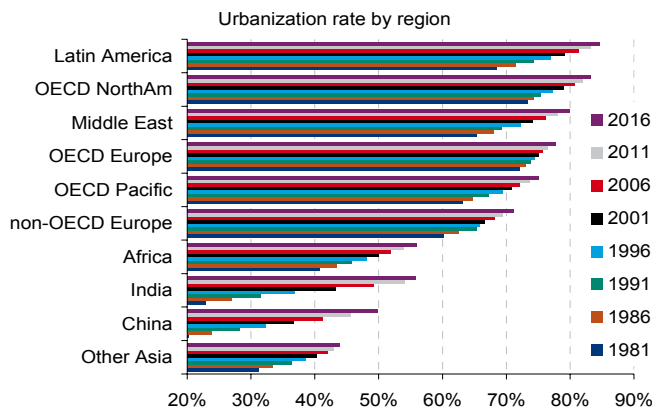
by 2016 are among the least ambitious in the OECD, in contrast to standards in the EU and Japan, emphasizing the potential for further substantial improvements by moving to smaller or diesel engine cars.

- **Scope for large efficiency gains in North America.** Should US policy targets on car fuel efficiency become more ambitious, we could see significantly larger reductions in oil consumption over the medium term. High fuel prices and low real rates, however, may already be doing part of the work for policy makers. The median age of the US fleet has been rising in recent years, and our Autos team predicts that we are on the verge of a fleet replacement cycle. Not only is the fleet replacement rate picking up, but there is a shift towards small to medium sized cars, while SUVs are falling out of favour.
- **Western Europe becoming more efficient, ageing, and oil demand shrinking.** We expect even larger demand contractions in Europe over the medium term due to ongoing efficiency gains. Europe continues to push the global frontier for fuel efficiency targets in new cars, and also has a rapidly ageing population. We expect OECD Europe demand to decline by a cumulative 0.9 million b/d to 2016.

Non-OECD oil demand growth will stay strong medium-term

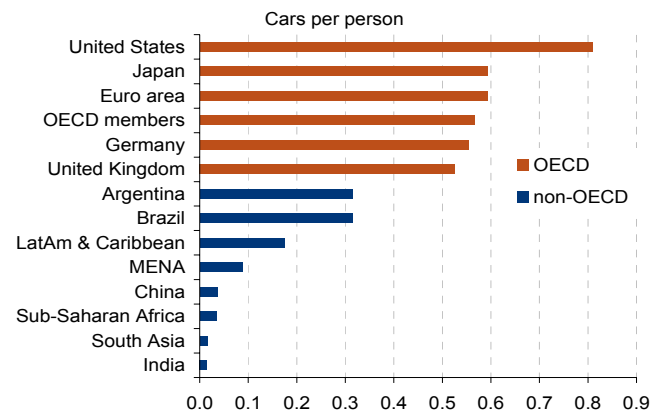
Non-OECD oil demand growth has been clearly accelerating for the past two decades, and we expect this trend to be sustained over the next five years. We estimate that EM oil consumption will grow by an average of 1.5 million b/d per year from 2012 to 2016. Urbanization and industrialization increase demand for transportation as people commute to work in urban areas. Moreover, rising middle-class incomes come with higher demand for cars. In EMs, most car sales are new additions to the overall fleet (i.e. as opposed to a replacement focus). Thus, with car penetration per capita in EMs still far behind most DMs, we see significant potential for higher oil consumption.

Chart 32: The process of urbanization increases the demand for transportation as people commute to work in urban areas



Source: World Bank, UN, BofA Merrill Lynch Global Commodities Research

Chart 33: With car penetration per capita in EMs far behind most DMs, we see potential for rising car fleets and thus higher oil consumption

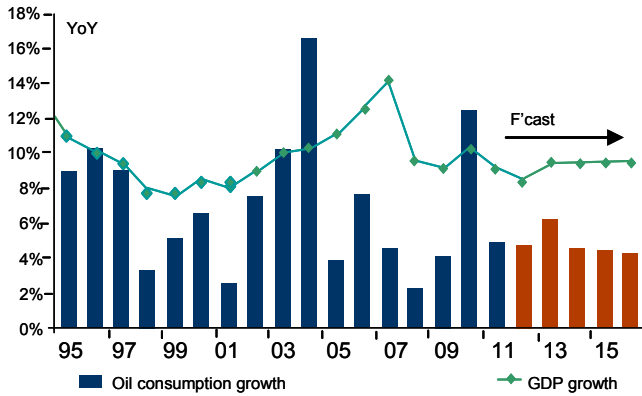


Source: World Bank, BofA Merrill Lynch Global Commodities Research

- **The outlook for China's demand growth remains positive.** Through 2016, we see China's oil consumption growing by an average of 0.5 million b/d p.a. from 2011 levels, or a cumulative 2.5 million b/d. Consumption in 2013 is likely to expand by a strong 600 thousand b/d, followed by more sustainable growth of 490 thousand b/d, on average, until 2016. Overall, the

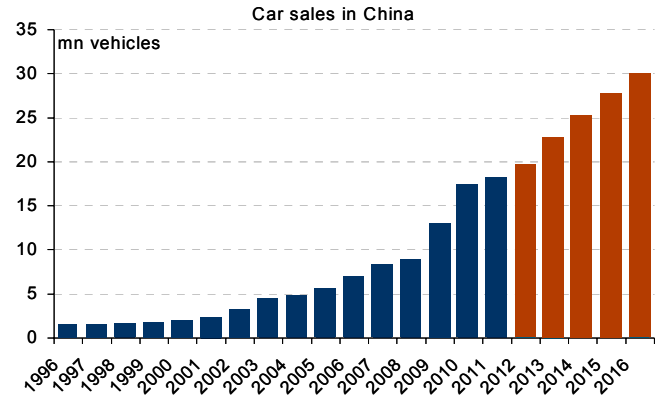
outlook for Chinese oil demand growth remains positive over the medium term, given our expectation of an exponential rise in car sales. In addition to the impact of urbanisation, the car fleet could expand by 125 million.

Chart 34: Through 2016, we see China's oil consumption growing by an average of 0.5 million b/d per year



Source: IEA, IMF, BofA Merrill Lynch Global Commodities Research

Chart 35: Rising incomes and urbanization will likely lead to an exponential rise in car sales in China



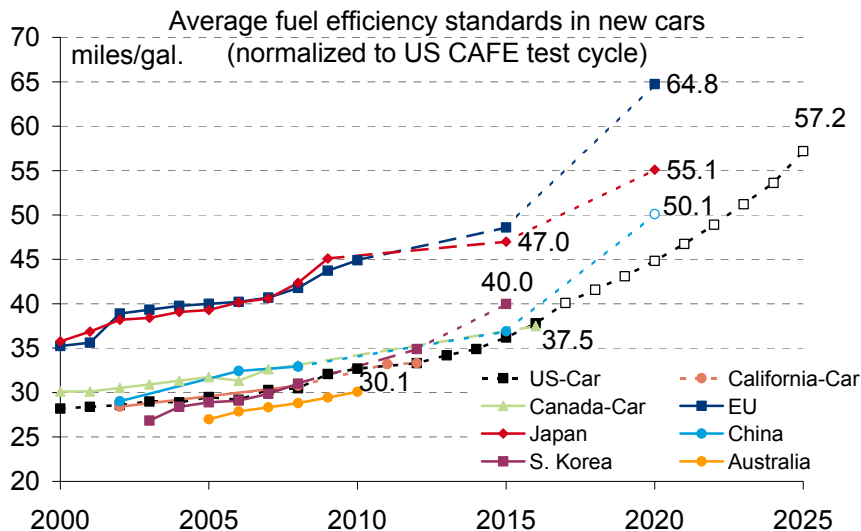
Source: JD Power, IMF, BofA Merrill Lynch Global Commodities Research

- **Other Asian countries should also see strong growth.** Oil consumption in non-OECD Asia excluding China is also set to expand significantly over the medium term, with annual average growth of 0.4 million b/d from 2012 to 2016. About a third of the growth in this region will come from India, which has just 0.015 cars per person, below China's 0.037 and much lower than the OECD average of 0.57. That said, high oil prices could put government budgets and fuel subsidies under pressure.
- **Latin America gasoline demand will continue to grow.** For Latin America, we estimate that oil demand will grow by an annual average of 0.2 million b/d from 2011 to 2016. Brazil will account for the bulk of this growth, driven in large part by the transportation sector. In 2011, robust economic activity and an expanding middle class led to record-high car sales in Brazil. Further, rising ethanol prices helped support stronger gasoline demand. This is because drivers of flex fuel vehicles, which currently make up about 50% of Brazil's fleet and 80-85% of new car sales, increasingly turned to blended gasoline, as opposed to hydrous (standalone ethanol) fuels.

Regulation alone will not drive material change

Increasingly stringent global fuel economy and CO2 emission regulations are requiring automakers to remain focused on improving their fuel economy. This is simultaneously becoming a slightly greater focus area for consumers.

Chart 36: Targets for improvements in fuel efficiency standards of new cars in the US by 2016 are among least ambitious in the OECD



Source: ICCT, BofA Merrill Lynch Global Research

Solid dots and lines represent historical performance; Solid dots and dashed lines: enacted targets; Solid dots and dotted lines: proposed targets; Hollow dots and dotted lines: unannounced proposal

Existing technologies vs. EVs

While the shift to these new standards is arguably more aggressive than transitions implemented in the past, and will likely result in additional cost to the industry, we continue to believe that regulation alone will not drive a material move towards all-electric vehicles. Instead, we expect existing technologies geared towards making traditional internal combustion engines more fuel efficient to gain greater acceptance over the near term in the first stage of the evolutionary process.

Table 16: Global Passenger Vehicle Current Target Standards

Country or Region	Target Year	Standard Type	Unadjusted Fleet Target/Measure	Structure	Targeted Fleet	Test Cycle
U.S./California (enacted)	2016	Fuel Economy/GHG	34.1 mpg* or 250gCO2/mi	FP-based corporate average	Cars/Light Truck	U.S. Combined
U.S. (notice of Intent)	2025	Fuel Economy/GHG	47-62 mpg or 190-143 gCO2/mi	FP-based corporate average	Cars/Light Truck	U.S. Combined
Canada (proposed)	2016	GHG	153 (141)** gCO2/km	FP-based corporate average	Cars/Light Truck	U.S. Combined
EU (enacted)	2015	CO2	120-130 gCO2	Wt.-based Corp. average	Cars/SUVs	NEDC
Australia (voluntary)	2010	CO2	222 gCO2/km	Single average	Cars/Light Truck	NEDC
Japan (enacted)	2015	Fuel Economy	16.8 km/L	Wt.-based Corp. average	Cars	JC08
China (proposed)	2015	Fuel Consumption	7 L/100km	Wt. based/vehicle & Corp. average	Cars/SUVs	NEDC
Taiwan/China (enacted)*	2012	Fuel Economy	n/a	Engine size-based per vehicle	Cars/Light Truck	U.S. combined/ NEDC
South Korea (proposed)	2015	Fuel economy/GHG	17 km/L or 140 gCO2/km	Wt.-based Corp. average	Cars/SUVs	U.S. Combined

Source: The International Council on Green Technology

* Assumes all manufacturers take advantage of A/C credit

** Canada announced target of 153 g/km for MT16 in 4/2010; Assumes Canada will achieve same 5.5% annual improvement rate as U.S. from 2008-2016

Most challenging regulations in Europe

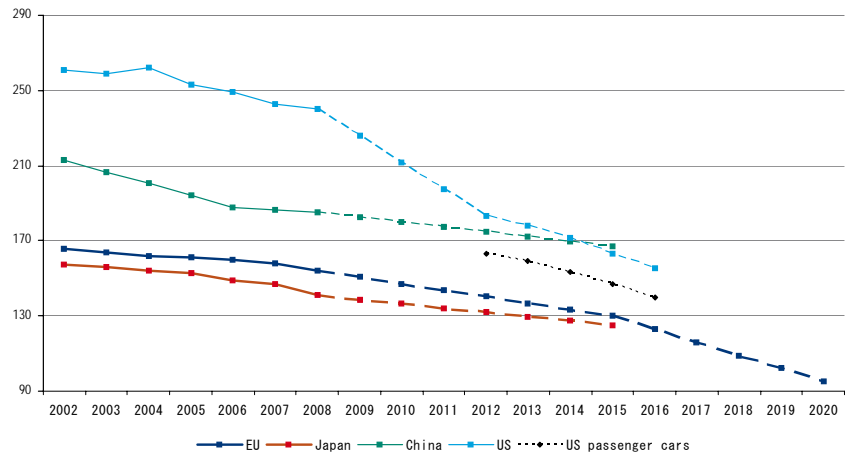
Road transport contributes about 20% of the EU's total CO2 emissions and its emission levels have been rising faster than in other sectors since 1990. This has seen the European Commission taken a pioneering role among global regulators in regulating CO2 emissions, with a 2015 target of 130gCO2/km by 2015 and 95gCO2/km by 2020.

130 gCO₂/km for OEMs by 2015

In December 2008 the European Parliament and Council set new rules on CO2 emissions for OEMs whereby the average CO2 emissions of each car manufacturer's sold fleet in Europe must be below 130gCO2/km by 2015. An additional reduction of 10gCO2/km is targeted to be derived from complementary measures, including greater use of biofuels and via tyres. As these measures are not primarily driven by the car producers, their primary target generally stands at 130gCO2/km.

At the end of 2009, the average emissions amounted to 145.9gCO2/km (2007: 158.7gCO2/km). There are also intermediate requirements that need to be fulfilled: 65% of new cars have to comply with the requirements in 2012; 75% in 2013; 80% in 2014; and 100% in 2015. Increasing penalties, from €5 to €95 for each g/km exceeded, have been established (€5 for the 1st additional gram, up to €95 for the 4th additional gCO2/ km and more).

Chart 37: CO2 emission by geography



Source:ICCT, NHTSA, ML

There is a different provision for niche manufacturers like Porsche, with 10,000-300,000 cars per year. As it would be practically impossible for some of these producers to meet the 130gCO2/km target, there is a simple regulation calling for a 25% reduction of 2007 emission levels until 2016.

Individual targets may vary depending on weight

The general requirement of 130gCO2/km could actually be slightly higher, depending on the weight of the cars. This means that the requirement for heavier cars is slightly loosened. For example, Daimler needs to achieve 138gCO2/km (instead of the general 130gCO2/km) by 2015. However, from 2014 weight increases in new cars will be studied to avoid cars getting heavier simply to secure larger CO2 allowances.

Incentives through Super-credits and Penalties

Super-credits will be assigned to vehicles emitting less than 50gCO₂/km. In 2012, such a car will count as 3.5 cars when it comes to calculating the average fleet emission, thus it is a clear incentive. The super-credits will be phased out by 2016, at which point these cars will have a normal weighting of one.

On the flipside to this incentive, the imposed penalties pose an expensive threat in the event of non-compliance. The penalty amounts to €95 for each gram in excess of the target. Small deviations from the requirement will be penalized on a lesser scale, with €5-25 per gram for 1-3gCO₂/km.

OEMs on track to meet targets

To date, according to data from the EU, OEMs are on track to meet the 2015 targets – with average CO₂ emissions from new passenger cars registered in the EU27 in 2009 at 145.7 gCO₂/km, and 65% of new passenger cars registered in 2009 already below 130 gCO₂/km.

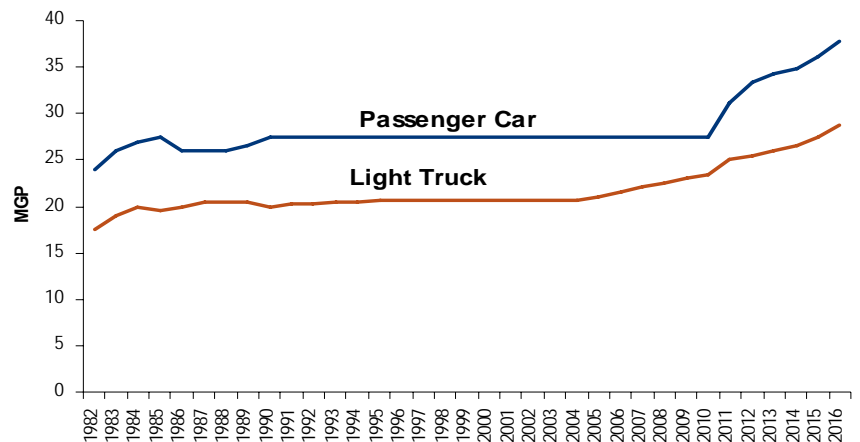
95g/km by 2020

The long-term goal is to reduce CO₂ emissions to 95gCO₂/km by 2020. The modalities of reaching this target are to be defined no later than the beginning of 2020

And finally some progress in the US

Standards for fuel economy in the US have remained fairly steady in both the passenger car and light truck categories over the past decade. In fact, prior to recent regulation that will phase in over the next few years, it appears only modest progress has been made since the early 1980s. Over this time the industry has made progress on engine and transmission technology, but the benefits have gone to increased performance as opposed to fuel efficiency.

Chart 38: CAFE Standards



Source: NHTSA

The table below outlines the National Highway Traffic Safety Administration's (NHTSA) 2010 fuel economy standards for the US light vehicle market in more detail. These rules will begin to phase in during 2011 and ultimately require average US fuel economy of 34.1mpg by 2016.

Table 17: Average Required Fuel Economy (mpg) under CAFE Standards

Vehicle Type	2012	2013	2014	2015	2016
Passenger Cars	33.3	34.2	34.9	36.2	37.8
Light Trucks	25.4	26.0	26.6	27.5	28.8
Combined	29.7	30.5	31.3	32.6	34.1

Source: NHTSA

In our view, NHTSA's most recent ruling was unique in that the group worked jointly with the Environmental Protection Agency (EPA) to broaden the scope of regulation. As a result, the new US fuel economy standards now include CO2 emission limitations, which effectively increase the implicit fuel economy targets. For instance, the 34.1 mpg target for 2016 is actually increased to 35.5 mpg as CO2 emission reductions from 295 g/mi in 2011 to 250 g/mi in 2016 are enforced.

The 2010 ruling was unique in that NHTSA worked jointly with the Environmental Protection Agency (EPA) to broaden the scope of regulation to include CO2 standards, which effectively increases the implicit fuel economy targets.

Table 18: EPA rules and their effect on mpg if NHTSA targets also reached

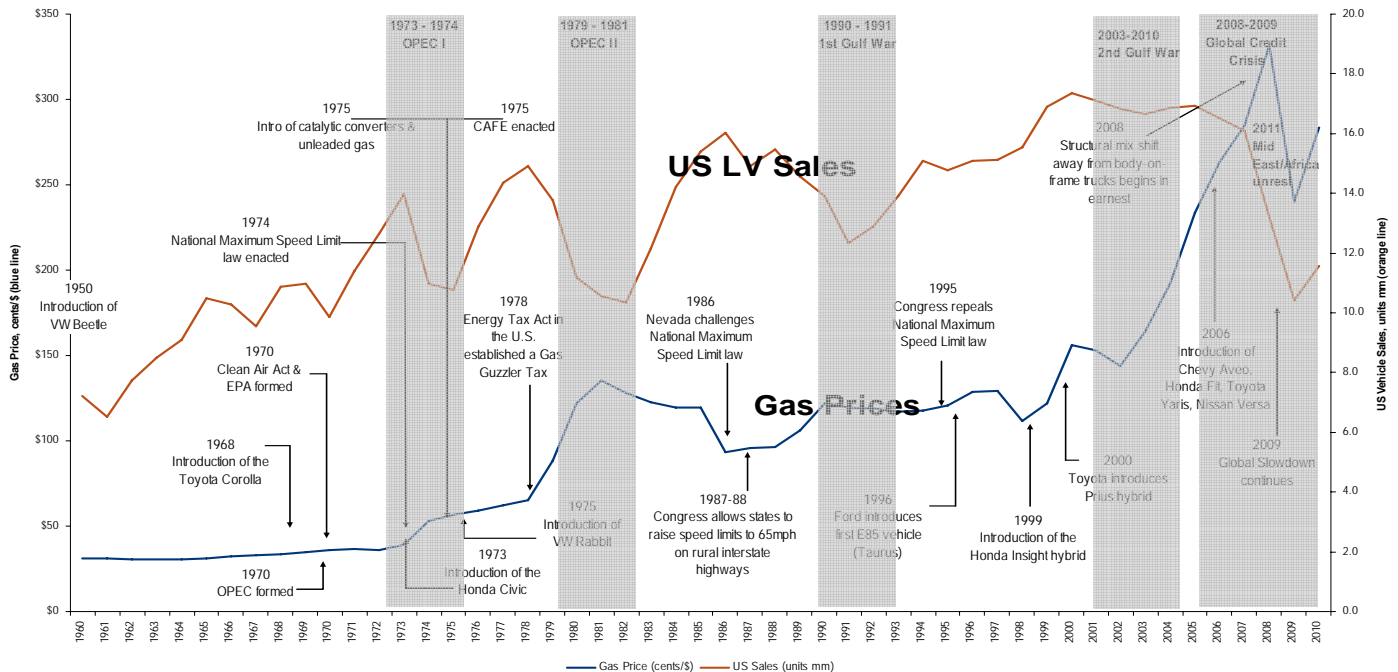
Vehicle Type	2012	2013	2014	2015	2016
Passenger Cars (g/mi)	263	256	247	236	225
Light Trucks (g/mi)	346	337	326	312	298
Combined Cars & Trucks (g/mi)	295	286	276	263	250
Passenger Cars (mpg)	33.8	34.7	36	37.7	39.5
Light Trucks (mpg)	25.7	26.4	27.3	28.5	29.8
Combined Cars & Trucks (mpg)	30.1	31.1	32.2	33.8	35.5

Source: EPA: NHTSA

But for consumers, evolution rather than revolution

Unless consumers are faced with an immediate financial impact or a major imminent national security risk, a significant change in consumption patterns is unlikely, in our view. We believe this trend is best illustrated by the generally muted demand and mix shifts historically experienced from rising gas prices; that is, until a short-term gas price shock (summer of 2008) or fears of a gasoline supply shortage emerges (OPEC I & OPEC II), rapidly driving up pump prices

Chart 39: Historical average retail gas prices, US Sales, and industry milestones

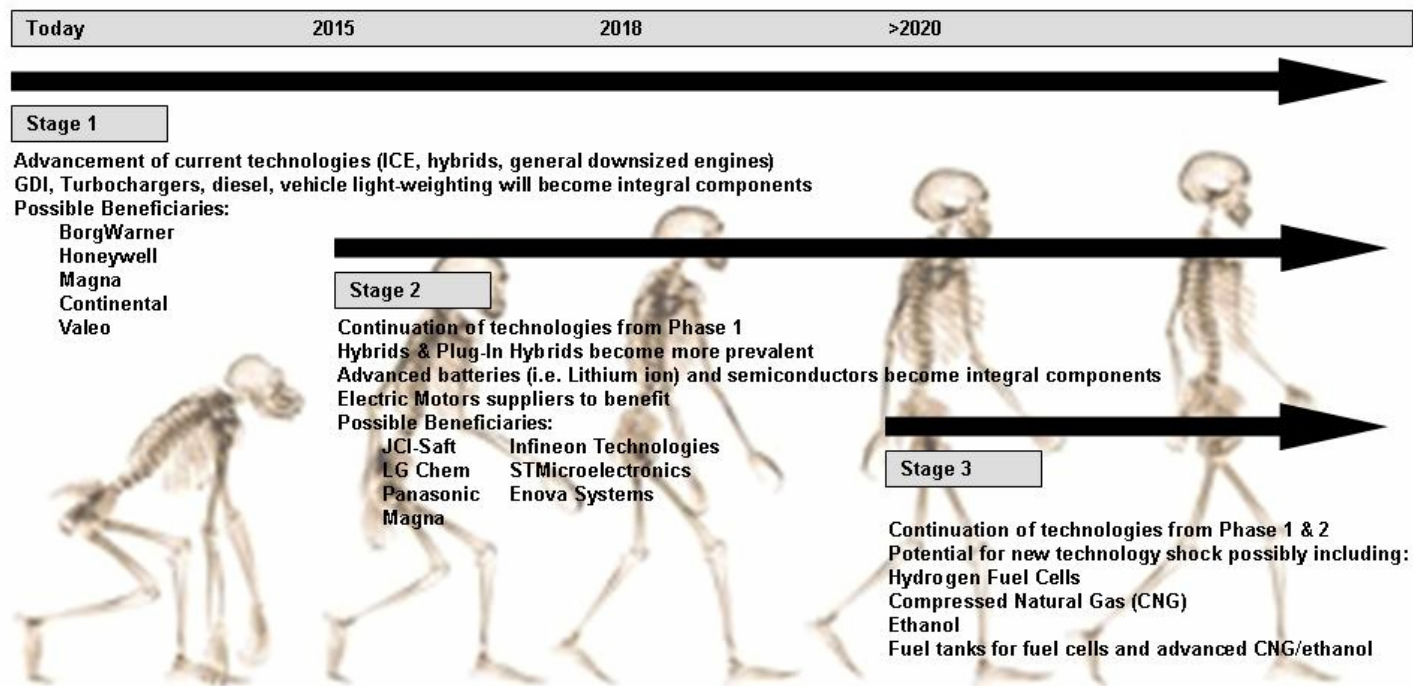


Source: Merrill Lynch, Energy Information Administration (EIA), industry sources

Three stages of fuel efficiency evolution

The estimated timing of the three stages outlined below is for illustrative purposes, but in the end could prove reasonably accurate, in our view.

Chart 40: The three likely stages of the “Green” Evolution



Source:BoFA Merrill Lynch Global Research

The US department of energy estimates that only ~15-20% of the energy in gasoline actually reaches the wheels in the average ICE vehicle, which compares to an estimated 75% energy conversion from the battery in an electric vehicle.

Stage 1 (Present-2020), existing technologies

In our view, the simple conclusion of our analysis of stage 1 is that there are numerous ways to improve fuel economy and CO2 emissions using technology that is already in existence. Furthermore, many of these technologies add very little to the incremental price a consumer will pay for an average light vehicle. The table on the following page illustrates the estimated potential fuel savings, CO2 reduction, and incremental price to the consumer from incorporating select technologies onto the average light vehicle today.

In our view, suppliers with the greatest leverage to Stage I are those that develop components geared towards improving existing engine technology and reducing vehicle weight (e.g. BorgWarner, Honeywell, Magna)

Table 19: Estimated Fuel economy improvement, CO2 emission reductions, and cost of implementing existing technologies

	Technology	Reduction in fuel consumption	Reduction in CO2 emissions	Incremental price per vehicle
Engine	Low-friction lubricants	0.5%	0.5%	\$3
	Engine friction reduction	1-2%	1-3%	\$50-100
	Variable valve timing and lift	1-3%	3-4%	\$125-259
	Cylinder deactivation	2.5-3%	6%	\$150-169
	Turbocharged downsized engine	15-30%	20%	\$149-1,099
	Camless valve actuation	1-3%	5-15%	\$501
	Gasoline direct injection (stoichiometric)	2-3%	1-2%	\$209-346
Transmission	Continuously variable transmission	0.7-2%	6%	\$192-224
	Six-speed automatic	1.4-3.4%	4.5-6.5%	\$99
	Six-speed dual clutch	5-15%	5.5-13%	\$47-92

Table 19: Estimated Fuel economy improvement, CO2 emission reductions, and cost of implementing existing technologies

	Technology	Reduction in fuel consumption	Reduction in CO2 emissions	Incremental price per vehicle
Vehicle	Aerodynamic drag reduction (20% cars, 10% trucks)	2-3%	2-3%	\$42
	10% reduction in tire-rolling resistance	1-2%	1-2%	\$6
	10% reduction in weight	6-7%	6.5%	\$518-666
	High-efficiency alternator and electrified accessories	1-2%	1-2%	\$76
	Electric power steering	1-2%	1.5-2%	\$94
	Integrated stop-start system	7-8%	7.5%	\$351-437
	Hybrid motor assist	20-30%	20-30%	\$2,854-4,431

Source: EPA; NHTSA; BWA; BofA Merrill Global Research Estimates

We believe that the global automotive industry will likely continue its current trend of engine downsizing, with additional power and efficiency provided primarily through gasoline direct injection (GDI) and turbocharging.

GDI engines, turbochargers, diesel, and reduced weight

We believe that the global automotive industry will continue its current trend of engine downsizing, with additional power and efficiency provided primarily through gasoline direct injection (GDI) and turbocharging. Essentially, GDI and turbochargers allow for leaner and more efficient usage of fuel, thus reducing the need for larger engines to provide vehicle performance. We also believe turbocharged diesel engines could gain some support in NA, although we do not expect penetration levels to ever rival those of gasoline. Many US consumers continue to associate diesel technology with the loud and unpleasant odour emitting versions of the 1970s and 1980s, and therefore remain reluctant to revisit the technology. Finally, we expect vehicles to continue to be built lighter, a process that will likely be assisted by further proliferation of hydroformed structural parts.

Table 20: Existing technologies that stand to benefit during Stage 1

Technology	Overview	Deployment
Gasoline Direct-Injection (GDI)	Derivation of traditional fuel injection that generates its efficiency and emission reducing capabilities by directly inserting highly pressurized fuel into the combustion chamber of each cylinder. This process allows for a leaner and more powerful usage of fuel, thus reducing the need for larger engines	BorgWarner, in conjunction with CSM, JD Power, and Global Insight research, estimates that the use of GDI engines will grow from ~7% of the global engine market in 2010 to ~23% by 2015 and to ~35% by 2020
Turbochargers	Use a vehicles exhaust to drive an internal turbine, which in turn forces compressed air into the engine, providing enhanced engine combustion/power. Essentially, turbochargers allow smaller engines to replace larger engines, without compromising power during acceleration and while improving fuel economy at constant speeds	BWA estimates that its turbochargers provide 15-30% fuel savings and up to 20% CO2 reduction. BWA, utilizing JD Power and CSM estimates, forecasts rapid expansion in the global turbocharger market, with diesel turbocharger growth of ~31% from 2010 to 2015 and gasoline turbocharger growth of ~180% over the same timeframe
Diesel engines	Lower fuel cost point versus gasoline, ~25-40% improved mileage, an extended lifespan, lower carbon dioxide emissions, and high torque; generally come equipped with at least one turbocharger, which improves performance and results in fuel efficiency that rivals most hybrids.	Represent ~50% of European vehicle engines on the road today, will also occupy a position in this initial stage of transformation, especially outside North America

Source: BofA Merrill Lynch Global Research

Lose the pounds and gain fuel economy

We estimate the average curb weight of model year 2011 passenger car offerings at approximately 3,500 pounds. In addition, we estimate the average curb weight of the group of MY11 CUV, SUV, van, and light truck offerings at approximately 5,200 pounds, for a total average MY11 light vehicle weight of roughly 4,300 pounds. We estimate that the vehicle component system with the largest weight contribution is Body & Structural at ~29% and the largest raw material input in a vehicle is steel at 55%. As a result, we believe the greatest opportunity for light-weighting a vehicle is in the body and structural system.

Hydroforming: Key Technology for Lighter Vehicles

Hydroforming ¹ was developed by Magna in 1995 and remains a leading technology for developing lighter, stronger vehicles. We believe hydroforming will continue to play a key role in the automotive industry as OEMs work diligently to meet intensifying global fuel economy standards, the biggest opportunity being on light trucks.

Opportunities for speciality polymers

Speciality or high-performance polymers should be a beneficiary. They are materials that offer a wide range of high-performance attributes which make them particularly suited to replacing other materials (e.g. metals) in a number of growing niches. Some key attributes on top of those common features are: corrosion protection, biocompatibility, transparency, toughness, elasticity, flexibility of design, to name but a few. They should see growing use in the auto sector with the use of plastics progressing quickly thanks to its ability to reduce weight and its ease of assembly flexibility, which have enabled more complex designs and productivity gains. Arkema, Solvay and Victrex are possible beneficiaries (see further [Specialty polymers: punching above their weight, 20 February 2012](#)).

Potential fuel economy improvements through weight reduction

Fuel Economy Improvement (%) per 100 lb. Weight Reduction - Gasoline Engines

Baseline Engine	Highway		EPA	EURO ECE	30MPH	45MPH	60MPH	75MPH
	City FTP75	HWFET	Combined					
Small Car	1.7%	1.1%	1.5%	1.3%	0.8%	0.7%	0.6%	0.5%
Mid-Size Car	0.8%	0.7%	0.8%	0.6%	0.1%	0.5%	0.4%	0.3%
Small SUV	0.8%	0.6%	0.7%	0.6%	0.3%	0.3%	0.4%	0.3%
Large SUV	0.7%	0.4%	0.6%	0.5%	0.3%	0.3%	0.3%	0.2%
Truck	0.7%	0.4%	0.6%	0.5%	0.2%	0.2%	0.3%	0.2%

Fuel Economy Improvement (%) per 100 lb. Weight Reduction - Gasoline Engines

Downsized Engine	Highway		EPA	EURO ECE	30MPH	45MPH	60MPH	75MPH
	City FTP75	HWFET	Combined					
Small Car	2.7%	1.7%	2.3%	2.9%	2.2%	1.7%	1.3%	0.9%
Mid-Size Car	2.1%	1.5%	1.9%	2.2%	2.0%	1.4%	1.1%	0.9%
Small SUV	1.6%	1.1%	1.5%	1.9%	1.5%	1.2%	0.6%	0.3%
Large SUV	1.4%	0.9%	1.2%	1.6%	1.2%	1.0%	0.7%	0.5%
Truck	0.9%	0.6%	0.8%	0.8%	0.6%	0.5%	0.3%	0.2%

Source:Ricardo Inc. City FTP75 - (Federal Test Procedure 75) test simulating city driving conditions. Highway HWFET (Highway Fuel Economy Test). Euro ECE (European drive cycle test)

If the use of low rolling resistance was progressively generalised, about 20 Mt CO2 emissions would be saved annually by 2020

For EVs, the impact of tires can be 30%+ of total energy consumption

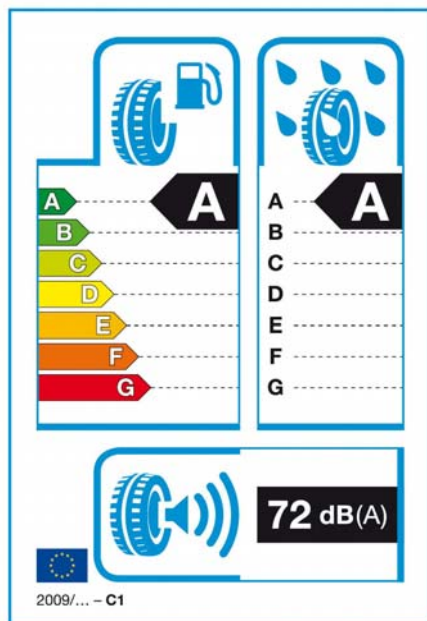
Tires, 20% of fuel consumption

We also note that up to 20% of fuel consumption is influenced by tire rolling resistance, which is generated when the rubber compounds are distorted. It is influenced by three main factors: tire design, tyre rubber compounds and tire inflation pressure. Low rolling resistance tires are a partial and growing solution to this challenge with a 10% rolling resistance improvement resulting in approximately – 1.6% less fuel consumption and 2g less CO2.

Low rolling resistance tires currently represent about 50% of passenger car tyres sold in Europe on the replacement market. Market leader Michelin estimates that original equipment sales of these tires will increase from 300mn units in 2010 to 500mn in 2020. However, their development on the market is slow, partly because the consumer is not paying much attention to the environmental impact

¹ Hydroforming is a process by which metal tubes are extruded into a desired shape by the injection of water at very high pressure (up to 100,000 PSI, but typically 30,000-60,000 PSI) into both ends

Chart 41: New labelling required from Nov 2012



Source: EU website

We believe it will take at least 5 to 10 more years before advanced battery technology is perfected and made affordable for mainstream use in automobiles

The greatest risk for electric motor suppliers is that OEMs will increasingly in-source the manufacturing of this component, due to its inherent importance to hybrid and EVs and the opportunity for differentiation

when purchasing tires and because it is very difficult for them to measure fuel savings engendered by switching to low-rolling resistance tyres.

New performance criteria & labelling for tires

We should see a further push on low-rolling resistance tires with new performance criteria and standardised labelling for tires being introduced in Europe, Japan and South Korea in 2012 and the US in 2013.

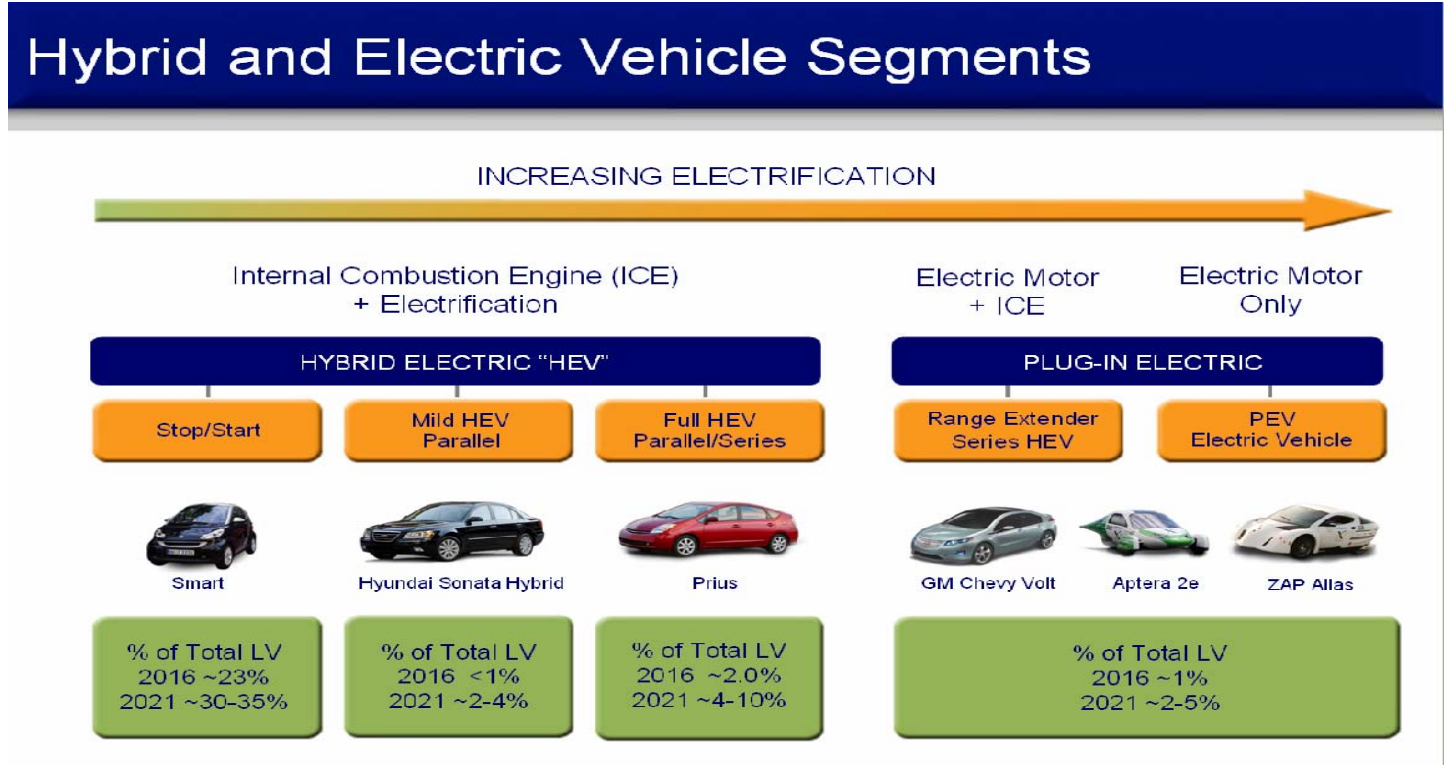
- Europe:** As of November 2012, under EU regulation 1222/2009, the tyre industry has to meet tougher standards aimed at increasing energy efficiency. Suppliers of tyres for passenger cars, light and heavy duty vehicles (C1, C2 and C3 tyres) will have to inform consumers about fuel efficiency, wet grip and noise in any technical promotional materials, including websites. Re-treaded tyres, off-road professional tyres and racing tyres will be exempt from this requirement.
- South Korea:** Voluntary tire labelling in South Korea took effect on 14 November 2011 and will become mandatory from November 2012. A label is placed on tires and shows a grading based on five levels across the fuel efficiency and the wet grip characteristics. It will first be applied to passenger car tires and light truck tires, and later to truck and bus tires.
- Japan:** Voluntary labelling standards were adopted in 2010 and will become mandatory this year. They are technically at the same level as the EU standards and enable the establishment of a grading system by combining rolling resistance and wet grip performance.
- US:** The Department of Transportation proposed in July 2009 a "tire efficiency consumer information program". This proposed a label for replacement tyres, which will provide information about the tire's impact on fuel economy and CO2 emission reductions from 2013.

Stage 2 (2016-20+), hybrids & EVs

In our view, current electric motor technology is sufficient to meet most, if not all, requirements of hybrid and EVs, although the efficiency of these components continues to improve each year. However, we believe that it will take at least 5-10 more years before advanced battery technology is improved to a level that makes it affordable for mainstream use in automobiles. Furthermore, it is likely to take at least this much time for the requisite infrastructure to be established to support battery recharging in the US. When these obstacles are addressed, we believe that hybrid and EVs could become more prevalent, due to their increased efficiency and reduced impact on the environment.

We believe that Stage 2 will be dominated by suppliers that manufacture electric motors (Magna and smaller and more specialised companies), advanced automotive batteries (large, well-funded battery suppliers such as JCI and Panasonic are likely to be in the mix), and the semiconductors (Infineon, STMicroelectronics, and Freescale) that allow these advanced hybrid and electric systems to communicate with one another.

Chart 42: Hybrid & Electric Vehicle Segments



Source: BWA, CSM

Hybrid Electric Vehicles (HEV)

All-electric vehicles are aspirational but are the basis of a disruptive business.

HEVs can be divided into three broad categories: mild HEVs, full HEVs, and plug-in hybrid electric vehicles (PHEVs).

Table 21: Three main categories of HEVs

Technology	Overview	Fuel savings	Cost	Deployment
Mild HEVs	Employ a series drive train and regenerative braking capability in which the battery provides some electric power to propel a vehicle; the vehicle's internal combustion engine is always running, and the electric motor provides power in a supplemental fashion	Enables a mid-size car to improve average fuel economy by approximately 20% (to 35 MPG) and reduce its emissions over a standard internal combustion vehicle by 20%	Estimated incremental cost is approximately \$600-1,200	well suited for vehicles that operate in a stop-and-go fashion at low speeds
Full HEVs	Employ a parallel or dual system drive train and regenerative braking capability in which the battery can provide electric power to propel a vehicle autonomously under certain conditions; the combustion engine is directly connected to the wheels, which eliminates the inefficiency of converting mechanical power to electricity and back	Enables a mid-size car to improve average fuel economy by approximately 40% (for 40-60 MPG) and reduce its emissions over a standard internal combustion vehicle by 30%	Estimated incremental cost is approximately \$800-2,200.	Toyota Prius (dual drive train) commands more than a 75% market share of full hybrid vehicles
Plug-in hybrids (PHEVs) and EVs	PHEVs use the same three drive train architectures found in HEVs, but PHEVs use an energy-dense battery that enables the vehicle to rely more on electric power throughout a given trip Battery Electric Vehicles (BEVs), commonly referred to as EVs, do not have an internal combustion engine. The vehicle operates solely from stored electric energy from the grid and does not have backup	Fuel economy varies according to how the battery energy is used: -Charge depleting mode -Blended mode -Charge sustaining mode -Mixed mode	Varies	Full commercialization of EVs will take time (creating the EV ecosystem and enhancing battery density while lower costs will be key determinants).

Source: BofA Merrill Lynch Global Research

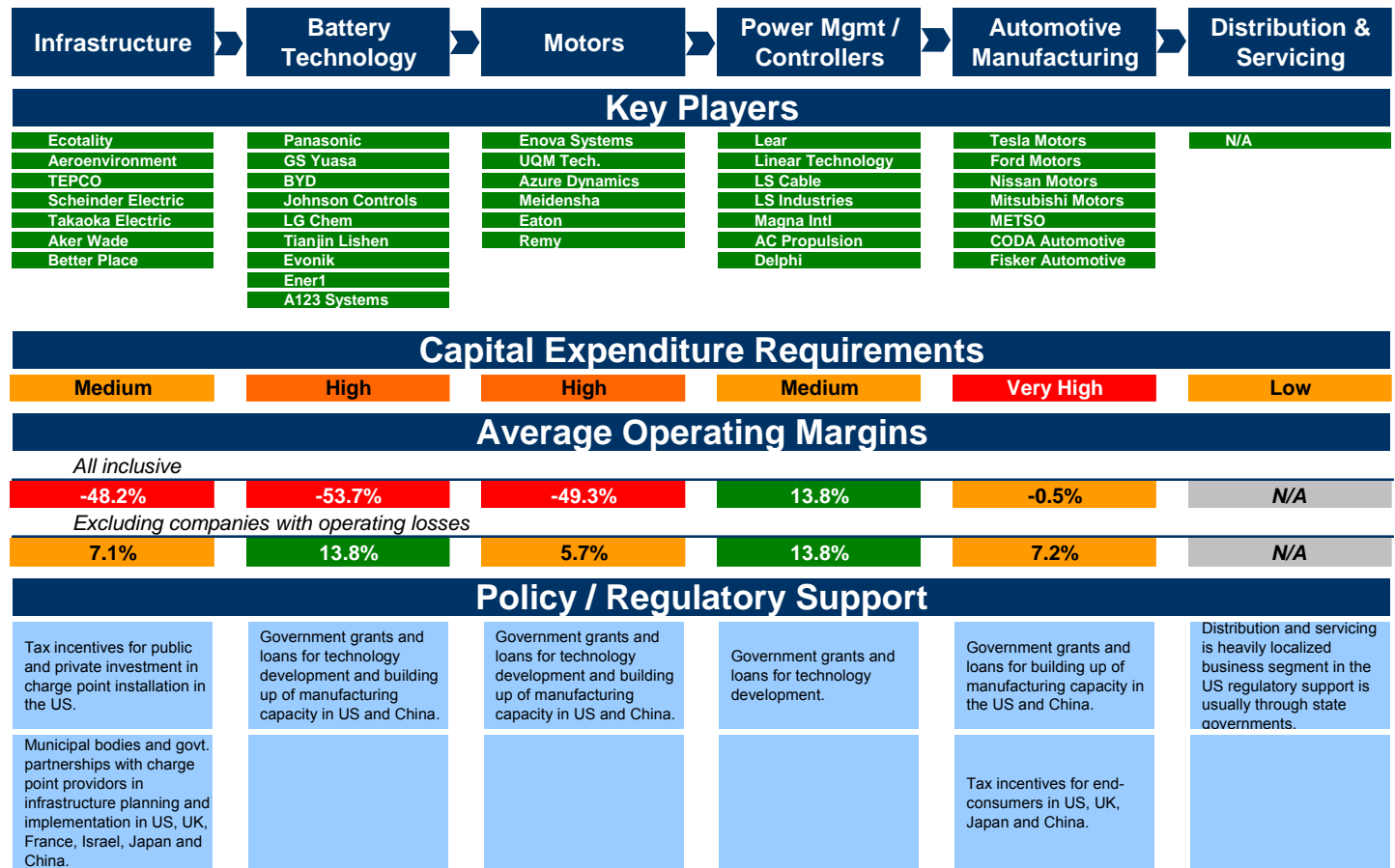
In terms of powering the drivetrain of hybrid and electric vehicles, permanent magnet motors and induction motors are the prevailing technologies

What types of electric motors are used?

While over 50-100+ electric motors may be installed in an average vehicle, most are low power output versions used to control electric seats, windshield wipers, parking breaks, etc. However, in terms of powering the drivetrain of hybrid and electric vehicles, permanent magnet motors (brushless) are by far the most prevalent (90%+), though induction motors are being used on high-end performance vehicles such as the Tesla Roadster.

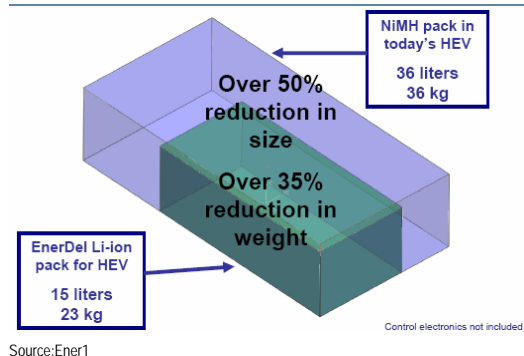
Permanent magnet motors, which began in brush form but are now almost exclusively brushless when used to power automobile drivetrains, gained popularity due to their exceptional efficiency and high power density. However, the raw earth metal magnets create additional cost and potential scarcity of supply.

Exhibit: 1: Electric Vehicle Industry Value Chain



Source:BoFA Merrill Lynch Global Research, Bloomberg New Energy Finance

Figure 1: EnerDel Li-ion vs. NiMH battery pack



According to a 2009 Harris Interactive/Johnson Controls survey, 80% of Americans see cost as the barrier in buying an electric vehicle

Improving manufacturing yield is an important step in reducing the cost of electric vehicles. Some industry observers claim that sub-par yields can result in a 30-40% increase in the cost of goods sold

Batteries 101: Game Ion

Lithium-ion (Li-ion) batteries are gaining momentum as the preferred technology to power the next generation of vehicles. Other advanced battery technologies, such as nickel-metal hydride (NiMH), come up short because the energy density is small compared to Li-ion chemistries. For example, Ener1 replaced a Prius NiMH battery pack with a Li-ion battery pack and achieved twice as much power and density. The same shift that was seen in the consumer electronics battery market from NiMH to Li-ion is playing out in the quest for automotive-grade batteries and largely for the same reasons: longer life, greater reliability, and higher energy density.

What you auto know

To penetrate the auto market, battery makers will need to (1) develop their battery chemistries and packaging to best meet the specifications required by each vehicle type (HEV, PHEV, or EV), (2) perfect the manufacturing process to have consistently reliable products, and (3) successfully scale to drive costs down.

- **No silver bullets for battery chemistries:** Key characteristics that matter in an automotive-grade battery: energy, power, energy density, cycle life and safety.
- **Chemistry:** A wide range of combinations emerges by changing these variables, leading to multiple uses. This is why comparisons between battery chemistries are only relevant when taking into account the application.
- **Chemistry-related costs:** The electrification of the automobile is still in its infancy, but “peak lithium” is already a concern. But based on expert forecasts, there should be some 30Mt of lithium readily available to be mined. At volume, H/EVs might use 70,000t/y. In addition, the lithium in a battery, which is about 3% of total battery cost, can be recycled. Of the active materials employed, cobalt has exhibited a high degree of volatility since 40% of global supply derives from the Katanga Province of the Democratic Republic of Congo
- **Reducing battery costs:** Our analysis indicates that costs per kWh for lithium-ion batteries are close to US\$800 per kWh after accounting for production costs, production yield adjustment, lack of scale, and a poor components supply and distribution network. OEMs we’ve spoken with indicate that battery costs will need to come down by 33-50% over the next five years for EVs to begin to achieve meaningful penetration rates. Cost reduction measures include technological changes, working with a domestic supply chain, improving coater speed and doubling the speed of all manufacturing processes.
- **Material costs:** Materials constitute the majority of battery costs at more than 80% of cell and 90% of pack costs. Battery makers are addressing this constraint through advances in packaging, improvements in manufacturing yield, forming alliances across the EV supply chain, and selecting the optimal cost-performance chemistry.
- **Manufacturing yield:** Lithium-ion production is a highly complex process incorporating various materials, chemistries, hardware, and software – with automotive-grade batteries requiring a higher degree of quality control than do consumer batteries. Experienced large-scale battery makers such as Panasonic and Samsung have the benefit of many years of high volume

production, potentially making the transition from consumer battery to automotive-grade production easier. Employing a high degree of manufacturing automation is another step manufacturers can take to improve yield. Newer entrants that may have demonstrated capable technology at smaller scales could be more susceptible to production difficulties and higher manufacturing costs as the market for EVs increases. As the competitive environment for OEM supply contracts heats up, early market share winners and losers will be ultimately determined by their respective manufacturing yield, in our view.

- **Strength in the supply chain:** EV manufacturing integrates a host of ingredients from a variety of suppliers across a very diverse value chain. At this point in the industry's evolution, the auto maker appears to be calling the shots and setting the tempo. However, it's likely that charging infrastructure developers and utilities will gain stronger voices as adoption grows.
- **Alliances forming:** There are a number of solid players with large resources in the automotive battery space. Primearth (Panasonic/Toyota) and AESC (NEC/Nissan) have to top the list. A123 says it most sees LG Chem, Johnson Controls-Saft, and Ener1, which are its counterparts in the Automotive Battery Consortium. Although many battery-car partnerships have been announced, the EV industry is new enough that partners could change. Also, there are expected to be second sources on most contracts since no car maker wants to put all its eggs in one basket.

The competitive landscape for advanced batteries is rapidly evolving. Most automakers are partnering-up with battery manufacturers through joint-ventures, which helps dilute the capital intensity of new production capacity, while integrating new systems to OEM specifications

We estimate the majority of advanced battery capacity will be directed towards stationary grid and heavy duty transportation applications given higher density requirements as well as higher margins

We estimate roughly 3,500 MWh will go towards light-duty transportation, with the bulk of capacity coming from China, Japan and South Korea

Annualized, this capacity level would be enough to produce 1.5 million Nissan Leafs (24 kWh EV) or 2.2 million Chevy Volts (16 kWh PHEV). At 1-2 million units, non-hybrid electric vehicles would represent 1-2% of global annual auto sales

Exhibit 2: Battery manufacturer competitive landscape

Lithium Battery Chemistry	Battery Company	Joint Venture	Partner/ Customer	Other customers
LMO	NEC	49% → Automotive Energy Supply Corp.	← 51% Nissan	Subaru
NCA	Panasonic	20% → Primearth EV Energy	← 80% Toyota	Continental, Volkswagen, Porsche, Audi, Ford
LMO	GS Yuasa	51% → Lithium Energy Japan	← 49% Mitsubishi	
LMO		51% → Blue Energy	← 49% Honda	
LMO	Samsung	50% → SBLMotive	← 50% Bosch	BMW
LFP	Lishen	60% → Tianjin Lishen	← 40% Coda	
LMO	LG Chem	49% → HL Green Power	← 51% Hyundai	
LFP	A123	49% → Shanghai Advanced Traction	← 51% SAIC	
NCA	Evonik / Li-Tec	10% → Deutsche Accumotive	← 90% Daimler	
LMO	Ener1	40% → Wanxiang - Ener1	← 60% Wanxiang	
NCA	Saft Groupe	→ JCI - Saft	← Johnson Controls	GM, Ford, Daimler
LMO	Kokam	→ Dow Kokam	← Dow Chemical	Magna, Ford
LFP	A123 Systems			GM, Nissan, Renault, BMW, Daimler, Fisker
LFP	BYD			
Li-Ion Polymer	Electrovaya			Chrysler
LMO / LTO	EnerDel			Think, Volvo
LMO	LG Chem			General Motors

Source: BofA Merrill Lynch Global Research

Table 22: Estimated advanced battery capacity by 2015

Company	2015 Capacity (MWh)
BYD	2,200
AESC (Nissan + NEC JV)	1,200
Primearth EV Energy (Panasonic + Toyota)	1,200
LG Chem (Compact Power + HL Green Power)	900
A123 Systems (Including SAIC JV)	740
EnerDel (Including Wanxiang JV)	500
Johnson Controls (JCI + Saft America JV)	400
SB LiMotive (Samsung + Bosch JV)	400
Sanyo	300
Hitachi Vehicle Energy	175
Dow / Kokam	150
Lishen (JV with Coda Automotive)	150
China BAK Battery	150
Toshiba	150
Lithium Energy Japan (Mitsubishi + GS Yuasa JV)	140
Saft (Not including Saft America)	125
Blue Energy (Honda + GS Yuasa JV)	100
Deutsche Automotive (Evonik + Daimler)	100
SK Energy	70
Total	9,950
Advanced battery capacity slated for stationary storage applications	3,980 40%
Advanced battery capacity slated for heavy duty transportation	2,488 25%
Advanced battery capacity slated for light duty transportation	3,483 35%
<i>Leaf equivalents (24 kWh Plug-in Electric Vehicle)</i>	<i>1,451,042</i>
<i>Volt equivalents (16 kWh Plug-in Hybrid Electric Vehicle)</i>	<i>2,176,563</i>

Source: BofA Merrill Lynch Global Research estimates, Roland Berger Consultants

Semiconductors are also key

Given the increased complexity of the electronics in hybrid and EVs, we believe semiconductors will also be critical to Stage 2 of the automotive evolutionary process. Very simply, semiconductors are the brains that allow the sophisticated components of advanced vehicle architectures, such as the battery and electric motor, to effectively communicate. The degree of electric performance required varies directly with the degree of hybridization of the vehicle. According to GM Powertrain specialists, these “chips” account for approximately 20% of the incremental cost of a hybrid vehicle.

Semiconductors are becoming increasingly prevalent in non-hybrid/electric vehicles as well, which should add to the potential automotive growth opportunity for manufacturers of these components

We would also note that semiconductors are becoming increasingly prevalent in non-hybrid/electric vehicles as well, which should add to the potential automotive growth opportunities for these companies, in our view. In fact, Freescale Semiconductor Holdings forecasts the market for automotive semis to grow at a 12% CAGR from 2010 to 2013.

Stage 3 (2020 and beyond): exogenous technology shock may be needed

Beyond the next 10 years it is possible that a technology not yet discussed may solve the fuel efficiency/emission conundrum. A few potentially viable alternatives for the automotive industry include fuel cell technology, compressed natural gas, and ethanol. However, lack of infrastructure (fuelling stations) and prohibitively high cost points (lowering price will require scale) remain significant headwinds for most options. Therefore, we believe a shock that renders Stage 1 & 2 technologies no longer viable or that provides a solution to current constraints for Stage 3 technologies may be necessary for the final step in vehicle evolution to gain a foothold.

In our view, suppliers with the greatest leverage to Stage 3 are those developing fuel cell technology and more viable methods of transporting and storing natural gas and ethanol.

Table 23: Possible stage 3 technologies

	Deployment	Advantages	Challenges
Fuel Cells	<ul style="list-style-type: none"> •Technology has been viable for decades (Apollo space missions) •OEMs have developed and distributed (on a very limited basis) fuel cell cars for use in test fleets 	<ul style="list-style-type: none"> •Complete lack of a carbon footprint (only emission is water) •Potential economic savings (hydrogen is a naturally occurring element in the atmosphere) 	<ul style="list-style-type: none"> •very high cost of production •lack of infrastructure for refuelling
Compressed Natural Gas (CNG):	<ul style="list-style-type: none"> •Penetration in vehicle fleets: Pakistan 61%, Bolivia: 20%, Argentina: 12%, Brazil: 3%, US: <1% 	<ul style="list-style-type: none"> •Compared to gasoline: reduces CO emissions 90-97%, CO2 25%, NOx 35-60%, non-methane hydrocarbons 50-75%, fewer toxic and carcinogenic pollutants, little or no particulate matter •Supply of CNG in the US is abundant 	<ul style="list-style-type: none"> •Highly flammable NG must be compressed at significant pressures (~3,600 psi) to store ample fuel in a vehicles tank. This could create inherent fire and explosion risk, particularly when considering a high speed collision scenario
Ethanol	<ul style="list-style-type: none"> •Has been around for years and are among other alternative engine technologies to receive media attention. 	<ul style="list-style-type: none"> •E10 is compatible with current distribution infrastructure •E85 offers more significant emissions improvement 	<ul style="list-style-type: none"> •E10 does not offer significant emissions reduction •E85 requires a new distribution infrastructure since the ethanol corrodes current materials used to distribute petrol •Lack of consumer knowledge and distribution headwinds

Source:BoFA Merrill Lynch Global Research

In our view, the battery is by far the largest cost component in hybrid and electric vehicles. This is clearly a complicating factor and challenges the economics of advanced vehicle technology

Cost vs. the environment

As battery technology advances further in the years ahead, the cost of manufacturing this highly complex component will likely decline. In turn, we believe it is reasonable to assume that the cost of hybrid and EVs will also decline, on a relative basis. In our view, the battery is by far the largest cost component in hybrid and electric vehicles, with industry estimates indicating the battery could actually account for 50% of the incremental cost versus a conventional ICE vehicle. This is clearly a complicating factor and challenges the economics of advanced vehicle technology.

Cost/benefit analysis of advanced vehicles

In the table on the following page, we have outlined our analysis of the cost/benefit of several advanced vehicles versus what we believe to be close non-hybrid/electric vehicle comps, manufactured by the same OEM.

- This analysis uses the non-hybrid/EV as a base in each scenario, compares the fuel economy and contemplates the potential fuel cost savings at US\$4.00 and US\$5.00/gal gasoline.
- In addition, we have assumed a 5-year new vehicle ownership cycle, 12,500 miles driven per year for the average consumer, and a 1% discount rate to derive a theoretical net present value of the fuel cost differential between the advanced technology vehicle and its conventional comp. Finally, we have incorporated Edmunds' 5-year forecast for depreciation on each vehicle, which is a component of its True Cost of Ownership calculation, and applied the US\$7,500 tax break on the Nissan Leaf.

We believe our analysis illustrates that the value proposition of owning a hybrid or electric vehicles is still questionable, even considering US\$5.00/gallon gasoline and 100% city driving

We believe our analysis illustrates that the value proposition of owning a hybrid or EVs is still questionable, even considering US\$5.00/gallon gasoline, which is ~US\$1.00 or 25% above the current national average. It is also important to note that this analysis does not consider the potential inconvenience of factors such as a lack of charging stations, which in theory should raise the discount rate applied, rendering hybrid/EV ownership even less appealing from an economic standpoint.

Chart 43: Toyota and Nissan vehicle ownership comparison

Toyota Cost analysis of owning a Toyota Camry vs a Toyota Prius @ \$4.00/gallon gasoline								
<p>\$4.00/gallon gas; 5-year ownership, 12.5K miles/yr, 27 EPA/22 City mpg base, 1% discount rate</p>								
Vehicle	Starting Price	MPG (City)	MPG (Highway)	EPA combined (55/45)	Estimated \$ Fuel Cost over ownership cycle @ EPA comb. 27mpg Vs. 50 mpg	Estimated \$ Fuel Cost over ownership cycle @ 100% City 22mpg Vs. 51 mpg	5 Yr Depreciation*	
2011 Toyota Prius	\$22,120	51	48	50	\$5,035	\$4,902	\$17,470	
2011 Toyota Camry	\$20,195	22	33	27	\$9,276	\$11,364	\$10,323	
	Price Delta	Fuel economy Improvement (City)	Fuel economy Improvement (HWY)	Fuel economy Improvement (EPA Comb.)	Fuel Savings over ownership cycle @ EPA Comb.	Fuel Savings over ownership cycle @ 100% City	Delta in 5 yr depreciation	
Comparison	\$1,925	132%	45%	84%	\$4,137	\$6,303	(\$7,147)	
<p>Relative \$ (cost)/benefit of alternative technology @ \$4.00/gl gas</p>								
Savings w/o depreciation					\$2,212	\$4,378		
Savings with depreciation					(\$4,935)	(\$2,769)		
Toyota Cost analysis of owning a Toyota Camry vs a Toyota Prius @ \$5.00/gallon gasoline								
<p>\$5.00/gallon gas; 5-year ownership, 12.5K miles/yr, 27 EPA/22 City mpg base, 1% discount rate</p>								
Vehicle	Starting Price	MPG (City)	MPG (Highway)	EPA combined (55/45)	Estimated \$ Fuel Cost over ownership cycle @ EPA comb. 27mpg Vs. 50 mpg	Estimated \$ Fuel Cost over ownership cycle @ 100% City 22mpg Vs. 51 mpg	5 Yr Depreciation*	
2011 Toyota Prius	\$22,120	51	48	50	\$6,294	\$6,127	\$17,470	
2011 Toyota Camry	\$20,195	22	33	27	\$11,596	\$14,205	\$10,323	
	Price Delta	Fuel economy Improvement (City)	Fuel economy Improvement (HWY)	Fuel economy Improvement (EPA Comb.)	Fuel Savings over ownership cycle @ EPA Comb.	Fuel Savings over ownership cycle @ 100% City	Delta in 5 yr depreciation	
Comparison	\$1,925	132%	45%	84%	\$5,171	\$7,879	(\$7,147)	
<p>Relative \$ (cost)/benefit of alternative technology @ \$5.00/gl gas</p>								
Savings w/o depreciation					\$3,246	\$5,954		
Savings with depreciation					(\$3,901)	(\$1,193)		
Nissan Cost analysis of owning a Nissan Versa vs a Nissan Leaf @ \$4.00/gallon gasoline								
<p>\$4.00/gallon gas; 5-year ownership, 12.5K miles/yr, 27 EPA/22 City mpg base, 1% discount rate</p>								
Vehicle	Starting Price**	MPG (City)	MPG (Highway)	EPA combined (55/45)	Estimated \$ Fuel Cost over ownership cycle @ EPA comb. 31mpg Vs. 100mpg	Estimated \$ Fuel Cost over ownership cycle @ 100% City 28mpg Vs. 106mpg	5 Yr Depreciation*	
2011 Nissan Leaf	\$25,280	106	92	100	\$2,508	\$2,358	\$20,772	
2011 Nissan Versa	\$14,160	28	34	31	\$8,143	\$8,929	\$8,350	
	Price Delta	Fuel economy Improvement (City)	Fuel economy Improvement (HWY)	Fuel economy Improvement (EPA Comb.)	Fuel Savings over ownership cycle @ EPA Comb.	Fuel Savings over ownership cycle @ 100% City	Delta in 5 yr depreciation	
Comparison	\$11,120	279%	171%	225%	\$5,497	\$6,409	(\$12,422)	
<p>Relative \$ (cost)/benefit of alternative technology @ \$4.00/gl gas</p>								
Savings w/o depreciation					(\$5,623)	(\$4,711)		
Savings with depreciation					(\$18,045)	(\$17,133)		
Nissan Cost analysis of owning a Nissan Versa vs a Nissan Leaf @ \$5.00/gallon gasoline								
<p>\$5.00/gallon gas; 5-year ownership, 12.5K miles/yr, 27 EPA/22 City mpg base, 1% discount rate</p>								
Vehicle	Starting Price**	MPG (City)	MPG (Highway)	EPA combined (55/45)	Estimated \$ Fuel Cost over ownership cycle @ EPA comb. 31mpg Vs. 100mpg	Estimated \$ Fuel Cost over ownership cycle @ 100% City 28mpg Vs. 106mpg	5 Yr Depreciation*	
2011 Nissan Leaf	\$25,280	106	92	100	\$3,134	\$2,948	\$20,772	
2011 Nissan Versa	\$14,160	28	34	31	\$10,179	\$11,161	\$8,350	
	Price Delta	Fuel economy Improvement (City)	Fuel economy Improvement (HWY)	Fuel economy Improvement (EPA Comb.)	Fuel Savings over ownership cycle @ EPA Comb.	Fuel Savings over ownership cycle @ 100% City	Delta in 5 yr depreciation	
Comparison	\$11,120	279%	171%	225%	\$6,872	\$8,011	(\$12,422)	
<p>Relative \$ (cost)/benefit of alternative technology @ \$5.00/gl gas</p>								
Savings w/o depreciation					(\$4,248)	(\$3,109)		
Savings with depreciation					(\$16,670)	(\$15,531)		

Source:BoFA Merrill Lynch Global Research; Edmunds. *5-yr estimated depreciation as per Edmunds.com True Cost of Ownership. **Leaf cost includes \$7,500 tax break

Perhaps the most challenging hurdle that the alternative vehicle industry faces is lack of infrastructure

Convenience vs. the environment

Perhaps the most challenging hurdle that the alternative vehicle industry faces is lack of infrastructure. Arguably, the issue is truly that of the chicken versus the egg. In other words, companies are likely unwilling to invest in the requisite infrastructure to support alternative technologies, such as fuelling stations, until sufficient consumer demand is in place. On the other hand, consumer demand is unlikely to grow substantially until owning, fuelling, and servicing alternative vehicles is as convenient as it is for traditional internal combustion engine vehicles. In total, the EPA estimates that approximately 7,300 alternative fuelling stations exist in the US as compared to over 160K gasoline stations nationwide.

In our view, the lack of supportive infrastructure for alternative automotive technologies is a significant roadblock that is unlikely to be overcome without substantial investment by the US government. We believe that Stage three of the green evolution could be jump-started by a significant degree of government stimulus supporting alternative vehicle infrastructure.

Auto & energy efficiency companies

We have identified the following companies covered by BofA Merrill Lynch Global Research that have exposure to fuel efficiency as percentage of sales vis-à-vis their involvement as suppliers for the sector or as providers of pure play energy efficiency solutions. Although it is difficult to accurately gauge the link between such exposure and share price performance (as many factors outside the scope of this analysis play a role in short- and long-term price development), we still consider energy efficiency exposure as an important positive point to track.

Table 24: List of companies covered by BofAML involved in Auto & Energy Efficiency

BBG Ticker	Company	Location	BofAML Ticker	Market Cap (US\$m)	Investment Opinion	EE Exposure
AQP LN	AQUARIUS PLATINUM LIMITED	AUSTRALIA	AQPMF	1021.2	Buy	Low
BWA US	BORGWARNER INC	UNITED STATES	BWA	9792.8	Buy	High
CLNE US	CLEAN ENERGY FUELS CORP	UNITED STATES	CLNE	1493.0	Buy	High
CON GR	CONTINENTAL AG	GERMANY	CTTAF	18115.9	Neutral	Medium
ZIL GR	ELRINGKLINGER AG	GERMANY	EGKLF	2088.7	Underperform	High
EO FP	FAURECIA	FRANCE	FURCF	3062.6	Neutral	Low
JCI US	JOHNSON CONTROLS INC	UNITED STATES	JCI	22623.6	Buy	Medium
JMAT LN	JOHNSON MATTHEY PLC	UK	JMPLF	7969.7	Neutral	Low
LXS GR	LANXESS	GERMANY	LNXSF	6334.6	Buy	Low
LKQX US	LKQ CORP	UNITED STATES	LKQX	4648.5	Neutral	Low
MG/A CN	MAGNA INTERNATIONAL INC-CL A	CANADA	MGA	11275.8	Buy	Medium
ML FP	MICHELIN (CGDE)-B	FRANCE	MGDDF	12718.7	Buy	Medium
SOLB BB	SOLVAY	BELGIUM	SVYSF	9818.5	Buy	Low
TSLA US	TESLA MOTORS INC	UNITED STATES	TSLA	3540.5	Buy	High
3402 JP	TORAY INDUSTRIES INC	JAPAN	TRYIF	11699.8	Buy	Low
FR FP	VALEO SA	FRANCE	VLEEF	4035.6	Buy	High
VCT LN	VICTREX Plc	UK	VTXPF	1779.1	Neutral	Low
WPRT US	WESTPORT INNOVATIONS	UNITED STATES	WPRT	2110.3	Buy	High

Source: IQ, DataStream, BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency products, services, technologies and solutions

Table 25: Aquarius Platinum Limited - Key data

Analyst's Name	Jason Fairclough >>		
Analyst's Email Id.	jason.fairclough@baml.com		
Analyst's Phone No.	+44 20 7995 0225		
	2011	2012E	2013E
Revenues	676	682	804
Operating Profit	157	14	97
Operating Margin	23.3%	2.0%	12.1%
Y-o-Y Growth	59.8%	-91.3%	613.0%
Net Profit	(17)	(77)	49
Net Margin	-2.5%	-11.3%	6.1%
Y-o-Y Growth	-145.6%	353.6%	-163.9%
EBIT	157	14	97
EBIT Margin	23.3%	2.0%	12.1%
EBITDA	219	83	167
EBITDA Margin	32.4%	12.2%	20.8%
Operating Cash Flow	157.1	83.2	99.5
Capex	85.0	49.7	59.0
Free Cash Flow	72.1	33.4	40.5
Net Debt/Equity	(8.3)	8.2	3.2

Source: Company data, BofA Merrill Lynch Global Research

Aquarius Platinum

Aquarius Platinum is a focused platinum group metals (PGM) producer with operations on both the eastern and western limbs of the Bushveld Complex in South Africa and the Great Dyke in Zimbabwe. Aquarius does not operate smelting and refining facilities. Instead, the company produces PGM concentrate at its operations, which is on-sold to either AngloPlat or Implats for metallurgical processing and sale in terms of long-term off-take agreements.

The company (low EE exposure) is a secondary efficiency play on platinum which is used in autocatalysts which reduce pollution. Auto sales continue to recover and traditional demand for PGMs will be augmented by the autocatalysis of heavy diesel trucks in the short term, and potentially other heavy and/or off-road applications in the medium term. Longer-term, light duty vehicle production is expected to increase to 2015 - and stakeholder pressure for "cleaner" air in emerging markets is likely to strongly drive PGM demand. Aquarius' business model is defined by its capital rather than a labour intensive approach to mining, and by selling concentrates on life-of-mine agreements rather than taking on smelting risk. With Everest coming back on stream, Aquarius is well positioned to benefit from delivering additional volumes into higher forecast PGM prices.

Table 26: BorgWarner Inc. - Key data

Analyst's Name	John Murphy		
Analyst's Email Id.	johnj.murphy@baml.com		
Analyst's Phone No.	+1 646 855 2025		
	2011	2012E	2013E
Revenues	7,115	8,254	9,499
Operating Profit	818	1,016	1,218
Operating Margin	11.5%	12.3%	12.8%
Y-o-Y Growth	45.1%	24.2%	19.9%
Net Profit	572	702	839
Net Margin	8.0%	8.5%	8.8%
Y-o-Y Growth	43.5%	22.8%	19.5%
EBIT	818	1,016	1,218
EBIT Margin	11.5%	12.3%	12.8%
EBITDA	1,101	1,311	1,527
EBITDA Margin	15.5%	15.9%	16.1%
Operating Cash Flow	708.2	962.0	1,079.9
Capex	393.7	500.0	537.5
Free Cash Flow	314.5	462.0	542.4
Net Debt/Equity	39.5	3.8	(9.4)

Source: Company data, BofA Merrill Lynch Global Research

BorgWarner

BorgWarner is a leading supplier of powertrain components to automakers worldwide. The company designs, engineers, and manufactures a range of products levered to the trends toward lower emissions and higher fuel economy including, fuel and air management and diesel and petrol engine components. In addition, the company is a leader in the four and all-wheel drive systems markets.

BWA (high EE exposure) is one of the best positioned suppliers on fuel efficiency. Its product portfolio is focused on the Engine (71% of sales) and Transmission component systems (29% of sales) of the vehicle, both of which we believe are high growth areas. BWA's component offerings include turbochargers (e.g. 15-30% improvement in fuel economy), torque transfer, and transmissions (clutches), all of which are geared towards improving the performance and fuel efficiency of vehicles. Fuel efficiency is a clear growth driver with LV turbochargers, for instance, expected to experience 14% CAGR 2012-17E for gasoline and 5% for diesel – and 110% growth in China. In our view, BWA possesses all three tenets of a successful supplier, namely proprietary technology, a solid balance sheet, and customer diversification. BWA's operations remain strong and stable, and we believe key businesses will also see long-term benefit from increasing emission standard regulations and leading technology.

Table 27: Clean Energy Fuels Corp. - Key data

Analyst's Name	Steven Milunovich		
Analyst's Email Id.	steven.milunovich@baml.com		
Analyst's Phone No.	+1 646 855 1272		
	2010	2011E	2012E
Revenues	212	277	320
Operating Profit	(6)	(33)	(53)
Operating Margin	-2.6%	-12.1%	-16.4%
Y-o-Y Growth	-83.2%	499.6%	57.0%
Net Profit	(8)	(36)	(63)
Net Margin	-3.6%	-13.0%	-19.5%
Y-o-Y Growth	-76.8%	370.3%	73.4%
EBIT	(6)	(33)	(53)
EBIT Margin	-2.6%	-12.1%	-16.4%
EBITDA	17	(3)	(17)
EBITDA Margin	8.0%	-1.1%	-5.2%
Operating Cash Flow	(10.2)	3.8	(27.1)
Capex	50.5	74.5	195.0
Free Cash Flow	(60.7)	(70.8)	(222.1)
Net Debt/Equity	2.3	0.4	50.4

Source: Company data, BofA Merrill Lynch Global Research

Clean Energy Fuels

Founded in 1996, Clean Energy (CLNE) provides natural gas as an alternative fuel for vehicle fleets in the US and Canada. The company designs, builds, finances, and operates fuelling stations, supplying compressed natural gas (CNG) and liquefied natural gas (LNG) to customers in the public transit, refuse hauling, airport, taxi, seaport, and regional trucking markets. Clean Energy is based in Seal Beach, CA.

CLNE high EE exposure) is an efficiency pure play on selling natural gas (NG) as a fuel for heavy-duty vehicles, where it is the pioneer in a new category. NG looks promising as an intermediate solution to our dependence on diesel fuel and the company is having success getting shippers to put pressure on carriers to use NG trucks. Clean Energy Fuels has signed over 140 non-disclosure agreements to assess shippers' needs. In aggregate, we estimate these 63 companies had more than \$1.5 trillion in North American sales in 2011. Near-term drivers include: 1) Clean is funded to build 150 LNG fuelling stations across the U.S. over the next couple years with many underway. Once completed, the network will have capacity to service more than 20,000 LNG trucks with 525,000 gallons of LNG; 2) Barriers to entry might be higher than they appear. The two most important are (a) Clean's exclusive relationship with Pilot Flying J and its 550 truck stops to co-locate gas dispensers, and (b) the corporate relationships being built through the NDAs. We don't look for higher Class-8 penetration to affect the financials until 2013-14. Our math indicates that high-mileage fleets could enjoy unsubsidized payback period less than two years given a \$1.50/gal fuel differential, yielding project IRRs north of 30% in some cases. Despite near-term headwinds, we see improving NG economics and the involvement of a large NG producer as an early sign of increased demand-pull for 2012/2013.

Table 28: Continental AG - Key data

Analyst's Name	Thomas Besson >>		
Analyst's Email Id.	thomas.besson@baml.com		
Analyst's Phone No.	+33 1 53 65 59 47		
	2010	2011E	2012E
Revenues	26,047	30,324	30,438
Operating Profit	1,935	2,534	2,285
Operating Margin	7.4%	8.4%	7.5%
Y-o-Y Growth	-286.0%	30.9%	-9.8%
Net Profit	576	1,240	1,053
Net Margin	2.2%	4.1%	3.5%
Y-o-Y Growth	-134.9%	115.2%	-15.0%
EBIT	1,935	2,534	2,285
EBIT Margin	7.4%	8.4%	7.5%
EBITDA	3,588	4,165	3,911
EBITDA Margin	13.8%	13.7%	12.9%
Operating Cash Flow	2,138.2	2,178.8	2,668.7
Capex	1,242.6	1,661.0	1,811.0
Free Cash Flow	895.6	517.8	857.7
Net Debt/Equity	117.7	92.4	75.6

Source: Company data, BofA Merrill Lynch Global Research

Continental

Following the acquisition of VDO, Continental combines one of the largest auto suppliers (top 5 globally) involved in active safety, telematics and powertrain - often competing with Bosch - with a strong European passenger tyre operations and two smaller divisions: truck tyres and ContiTech (non-tyre rubber assets).

Continental (medium EE exposure) is an efficiency play on powertrains and tires. It is well positioned on traditional technologies such as low-resistance tires, brake systems and electronic powertrains - and has become a player on hybrids (micro, mild, full). By 2012, its products should help reduce CO2 emissions from cars by 15% and trucks by 5%; hybrid drives will provide a further 10- 25% reduction. Continental has strong positions in fuel efficiency, active safety and telematics - attractive sub-segments of this industry. Tyres only account for 25% of revenues now. We continue to view the company as a long-term winner in the global Auto sector.

Table 29: ElringKlinger AG - Key data

Analyst's Name	Thomas Besson >>		
Analyst's Email Id.	thomas.besson@baml.com		
Analyst's Phone No.	+33 1 53 65 59 47		
	2010	2011E	2012E
Revenues	796	1,003	1,087
Operating Profit	116	159	137
Operating Margin	14.6%	15.9%	12.6%
Y-o-Y Growth	83.3%	37.5%	-14.3%
Net Profit	66	102	83
Net Margin	8.2%	10.1%	7.6%
Y-o-Y Growth	97.5%	55.1%	-18.7%
EBIT	116	159	137
EBIT Margin	14.6%	15.9%	12.6%
EBITDA	198	246	227
EBITDA Margin	24.9%	24.6%	20.9%
Operating Cash Flow	116.2	131.4	165.2
Capex	134.3	108.0	109.0
Free Cash Flow	(18.2)	23.4	56.2
Net Debt/Equity	19.1	23.0	16.8

Source: Company data, BofA Merrill Lynch Global Research

ElringKlinger AG

ElringKlinger is a German niche automotive supplier focusing on gaskets and heat shield products for engines, transmissions and exhaust systems. Positioned as a play on CO2 reduction, the company has achieved superior returns over the last decade.

ElringKlinger (high EE exposure) is a high-quality niche player in the European auto components industry achieving superior returns thanks to strong positions in its segments and technology leadership. Positioned as a play on CO2 reduction the company has been identified by investors for its high margins and resilience in the downturn.

Table 30: Faurecia SA - Key data

Analyst's Name	Thomas Besson >>		
Analyst's Email Id.	thomas.besson@baml.com		
Analyst's Phone No.	+33 1 53 65 59 47		
	2011	2012E	2013E
Revenues	16,190	16,368	17,594
Operating Profit	593	546	679
Operating Margin	3.7%	3.3%	3.9%
Y-o-Y Growth	41.3%	-8.0%	24.4%
Net Profit	371	304	405
Net Margin	2.3%	1.9%	2.3%
Y-o-Y Growth	84.1%	-18.1%	33.3%
EBIT	593	546	679
EBIT Margin	3.7%	3.3%	3.9%
EBITDA	1,083	1,026	1,160
EBITDA Margin	6.7%	6.3%	6.6%
Operating Cash Flow	725.5	778.3	891.5
Capex	451.4	500.0	460.0
Free Cash Flow	274.1	278.3	431.5
Net Debt/Equity	96.7	85.6	62.5

Source: Company data, BofA Merrill Lynch Global Research

Faurecia

Faurecia is the 2nd-largest OE supplier in Europe behind Bosch in terms of revenues, Faurecia has leading European positions in seats, interior, front end and exhaust systems. While over 65% of its sales are to Europe, we believe Faurecia's most attractive growth prospects should come from Asia and the US. VW and PSA are Faurecia's largest customers, PSA being as well its majority owner.

Faurecia (low EE exposure) is an efficiency play on lightweighting as its components and modules account for 15% to 20% of the vehicle's total weight and its "Light Attitude" program can reduce this by 15% to 30% (exteriors, ECT, seating, interior systems). It also has broader environmental exposure via its exhaust system and controlling vehicle's emissions (combustion gases, CO2 and soot particulates (Particulate Filters for Diesel engines), recovering heat and reducing weight). Management's clear vision of where Faurecia is going mid-term and solid drive to reach targets are key supports.

Table 31: Johnson Controls Inc. - Key data

Analyst's Name	John Murphy		
Analyst's Email Id.	johnj.murphy@baml.com		
Analyst's Phone No.	+1 646 855 2025		
	2011	2012E	2013E
Revenues	40,833	43,417	47,813
Operating Profit	2,356	2,695	3,518
Operating Margin	5.1%	5.3%	6.4%
Y-o-Y Growth	23.0%	14.4%	30.5%
Net Profit	1,624	1,858	2,513
Net Margin	4.0%	4.3%	5.3%
Y-o-Y Growth	8.9%	14.4%	35.2%
EBIT	2,356	2,695	3,518
EBIT Margin	5.8%	6.2%	7.4%
EBITDA	3,087	3,520	4,385
EBITDA Margin	7.6%	8.1%	9.2%
Operating Cash Flow	1,076.1	2,369.7	2,980.6
Capex	1,325.0	1,700.0	1,600.0
Free Cash Flow	(248.9)	669.7	1,380.6
Net Debt/Equity	42.7	36.7	26.0

Source: Company data, BofA Merrill Lynch Global Research

Table 32: Johnson Matthey - Key data

Analyst's Name	Andrew Stott >>		
Analyst's Email Id.	andrew.stott@baml.com		
Analyst's Phone No.	+44 20 7996 2180		
	2011	2012E	2013E
Revenues	9,985	10,771	11,516
Operating Profit	353	421	436
Operating Margin	3.5%	3.9%	3.8%
Y-o-Y Growth	34.0%	19.2%	3.6%
Net Profit	182	300	319
Net Margin	1.8%	2.8%	2.8%
Y-o-Y Growth	11.0%	64.4%	6.5%
EBIT	353	421	436
EBIT Margin	3.5%	3.9%	3.8%
EBITDA	520	584	600
EBITDA Margin	5.2%	5.4%	5.2%
Operating Cash Flow	93.4	461.1	410.8
Capex	137.4	191.1	185.6
Free Cash Flow	(44.0)	270.0	225.3
Net Debt/Equity	45.5	30.2	20.1

Source: Company data, BofA Merrill Lynch Global Research

Johnson Controls

Johnson Controls has three distinct businesses: Seating & Interiors, Power Solutions, and Building Efficiency. Both the Seating & Interiors and Power Solutions businesses are automotive related, while Building Efficiency is a top provider of building control systems hardware, software and facilities management.

JCI (medium EE exposure) is a two-fold efficiency play both as an auto equipment supplier and building efficiency actor. In auto, it is the world's largest provider of battery power solutions for OEM and the aftermarket – and a leader in new technologies (stop-start, li-ion, bought out Saft from JV on EV batteries). In buildings, it is the largest global supplier of commercial building services, HVAC&R equipment and building control systems. Long-term, it is looking to combine its expertise via energy storage for smart grid and solar generation for buildings (e.g. Panoptix platform). Management's foresight to diversify away from the Detroit Three in its auto business and, more importantly, away from the auto business toward its Controls and batteries businesses has put the company in a relatively strong position versus most other auto suppliers. We also expect JCI's Building Efficiency segment to gain momentum as the general economy continues to improve and municipal spending re-accelerates.

Johnson Matthey

Johnson Matthey is the joint leader globally in emissions controls for the automotive industry. It also has expertise in precious metals chemistry for process catalysts and pharmaceuticals materials, as well as being a leader in precious metals refining, fabrication and marketing.

The company (low EE exposure) is a secondary efficiency play on autocatalysts, where it has a joint No.1 position in the \$14bn global market – and has managed to attain a leadership position in the emerging technology of heavy-duty diesel (trucks and off-road machinery emission legislation). The market is likely to grow at 2-5% p.a. – with U.S. environmental legislation, Chinese demand and HDD regulation for large trucks all growth drivers. Longer-term, JMAT has a world leading position in the development and manufacture of catalysts and catalysed components for fuel cells. Combined with likely above-GDP growth in the process catalysts business we see JMAT attaining premium EPS growth post 2012-14. Likely challenges are likely to be related to auto production and, in turn, looser PGM markets. Longer-term, a compelling combination of sustainability-centred legislation driven growth (autocatalysts) and demographics (fine chemicals) as well as inflationary effects of supply-side limitations on PGM prices leave the company well placed.

Table 33: Lanxess AG - Key data

Analyst's Name	Andrew Stott >>		
Analyst's Email Id.	andrew.stott@baml.com		
Analyst's Phone No.	+44 20 7996 2180		
	2010	2011E	2012E
Revenues	7,120	8,637	8,152
Operating Profit	607	848	710
Operating Margin	8.5%	9.8%	8.7%
Y-o-Y Growth	307.4%	39.8%	-16.3%
Net Profit	379	562	451
Net Margin	5.3%	6.5%	5.5%
Y-o-Y Growth	847.5%	48.4%	-19.8%
EBIT	607	848	710
EBIT Margin	8.5%	9.8%	8.7%
EBITDA	890	1,166	1,029
EBITDA Margin	12.5%	13.5%	12.6%
Operating Cash Flow	505.0	616.1	857.7
Capex	501.0	600.0	600.0
Free Cash Flow	4.0	16.1	257.7
Net Debt/Equity	74.8	69.3	53.5

Source: Company data, BofA Merrill Lynch Global Research

Table 34: LKQ Corporation - Key data

Analyst's Name	John Lovallo		
Analyst's Email Id.	john.lovalloi@baml.com		
Analyst's Phone No.	+1 646 855 2942		
	2010	2011E	2012E
Revenues	2,470	3,264	4,100
Operating Profit	299	376	499
Operating Margin	12.1%	11.5%	12.2%
Y-o-Y Growth	27.6%	25.9%	32.7%
Net Profit	169	210	286
Net Margin	6.8%	6.4%	7.0%
Y-o-Y Growth	32.7%	24.2%	36.2%
EBIT	299	376	499
EBIT Margin	12.1%	11.5%	12.2%
EBITDA	337	425	561
EBITDA Margin	13.6%	13.0%	13.7%
Operating Cash Flow	159.2	197.0	223.9
Capex	61.4	90.0	90.0
Free Cash Flow	97.7	107.0	133.9
Net Debt/Equity	35.7	53.2	42.0

Source: Company data, BofA Merrill Lynch Global Research

Lanxess

Lanxess is a specialty chemicals company involved in Performance Polymers: Mainly for auto tyres, also construction electronics oil E&P aerospace; Advanced Intermediates: Basic chemical intermediates, fine chemicals for pharma/agro; and Performance Chemicals: Specialties/semi-specialties including leather and rubber, inorganic pigments for construction

Lanxess (low EE exposure) is an efficiency play on the back of November 2012 EU regulation (1222/2009) which will push the tyre industry to meet tougher standards aimed at increasing energy efficiency. Specifically, it has exposure to the provisions for the 120gCO₂/km target which can partly be achieved via fuel efficient tyres, as well as new tire labelling provisions. This could potentially serve as a boost to Lanxess' product mix, i.e. decreasing the basic grade PBR content to reduce rolling resistance and save fuel. Demand for higher grade rubbers (e.g. SBR and N-BR) should also continue to improve well before the deadline. Although difficult to quantify, we see a material improvement in ROCE as the benefits of the Singapore investment begin to accrue, as well as the above less identifiable ongoing benefit to product mix/margin from legislation. It also has efficiency exposure to light-weighting for auto, aviation and railways. We also note its exposure to the sustainability megatrends of water (quality, treatment) and agriculture (increasing harvesting capacities) and health (tropical diseases). Lanxess was one of the worst performing stocks in 2011.

LKQ Corporation

LKQ Corporation is the largest supplier of wholesale recycled OEM replacement parts and related services to the US automotive LV market (collision & mechanical). In 10/07, LKQX acquired Keystone Corp., providing the company with leading positions in two additional product categories: aftermarket and refurbished parts. LKQX also operates a retail self-service recycled auto parts business, a heavy-duty recycled truck parts business, and derives revenue from the sale of left over scrap material.

LKQ (low EE exposure) is something of a different take on energy efficiency with its core business of distributing new aftermarket and recycled automobile parts and refurbishing collision-damaged vehicle parts "green" or "less is more" by nature. Collision products is a US\$15bn market and LKQ is #1 or #2 in its key markets on distributing of refurbished wheels, bumper covers and lights to the US collision repair market; heavy duty truck recycling / disposal in the US; paint distributor to the collision repair market; remanufactured and recycled engines and transmissions to the US collision repair market; self service auto parts yards; and as a mechanical alternative parts distributor in the UK. In addition to diverting c.400,000 vehicles from landfill, it is, on average, able to recycle approximately 82% of each salvage vehicle by weight. We believe LKQ's size, product diversification, and proprietary technology provide it with a clear advantage over its competition. We expect the company to continue generating mid-to high-single-digit organic revenue growth, and believe the successful integration of acquisitions will further bolster its topline. In addition, we expect LKQX to leverage its operating expenses to drive meaningful margin expansion in the years ahead.

Table 35: Magna International Inc. - Key data

Analyst's Name	John Murphy		
Analyst's Email Id.	johnj.murphy@baml.com		
Analyst's Phone No.	+1 646 855 2025		
	2010	2011E	2012E
Revenues	23,624	28,910	30,612
Operating Profit	1,223	1,357	1,492
Operating Margin	4.6%	4.3%	4.5%
Y-o-Y Growth	-768.3%	11.0%	9.9%
Net Profit	1,000	962	1,153
Net Margin	4.2%	3.3%	3.8%
Y-o-Y Growth	-301.0%	-3.8%	19.8%
EBIT	1,223	1,357	1,492
EBIT Margin	5.2%	4.7%	4.9%
EBITDA	1,883	2,036	2,193
EBITDA Margin	8.0%	7.0%	7.2%
Operating Cash Flow	1,872.0	1,448.3	1,799.1
Capex	784.0	1,100.0	1,155.0
Free Cash Flow	1,088.0	348.3	644.1
Net Debt/Equity	(24.7)	(21.9)	(23.6)

Source: Company data, BofA Merrill Lynch Global Research

Magna International

Toronto-based Magna International (MGA) is one of the world's most-diversified auto suppliers. MGA manufactures auto interiors, engine parts, interior and exterior trim, metal stampings and body structures, mirrors, electronics, sunroofs and even designs and assembles complete vehicles. We view MGA as one of the best operators in the supply industry, and an important partner for OEMs with global platforms.

MGA (medium EE exposure) is an efficiency play on auto equipment. We believe MGA's portfolio of fuel efficient products will continue to grow in the years ahead, with a focus on improving and light-weighting existing vehicle technology, while also exploring alternative strategies in its E-Car and powertrain businesses. MGA is currently a leader in providing light-weight structural products using its patented high-pressure hydroforming technology, but also focuses on powertrain efficiency with its AWD systems. We expect OEMs to further utilize both of these technologies as global fuel efficiency standards become increasingly stringent in the years ahead. In the near-term, we believe MGA will continue to post solid NA results as volumes recover in the quarters ahead, and believe inefficiencies in Europe will ultimately be resolved. Longer-term, we view Magna as one of the highest-quality auto suppliers. We also believe Magna's industry-leading technology, relatively strong balance sheet, and customer diversification will allow the company to grow through consolidation and takeover business. We also note that MGA has recently completed several shareholder-friendly actions that should alleviate corporate governance concerns.

Table 36: Michelin - Key data

Analyst's Name	Thomas Besson >>		
Analyst's Email Id.	thomas.besson@baml.com		
Analyst's Phone No.	+33 1 53 65 59 47		
	2011	2012E	2013E
Revenues	20,719	21,174	23,017
Operating Profit	1,945	2,089	2,432
Operating Margin	9.4%	9.9%	10.6%
Y-o-Y Growth	14.7%	7.4%	16.4%
Net Profit	1,462	1,366	1,628
Net Margin	7.1%	6.5%	7.1%
Y-o-Y Growth	39.3%	-6.6%	19.2%
EBIT	1,945	2,089	2,432
EBIT Margin	9.4%	9.9%	10.6%
EBITDA	2,878	3,089	3,532
EBITDA Margin	13.9%	14.6%	15.3%
Operating Cash Flow	1,195.8	2,293.0	2,411.0
Capex	1,668.0	1,900.0	2,000.0
Free Cash Flow	(472.2)	393.0	411.0
Net Debt/Equity	27.7	22.1	17.2

Source: Company data, BofA Merrill Lynch Global Research

Michelin

Michelin is one of the world's largest tyre manufacturers along with Bridgestone and Goodyear, and dominates the European passenger and truck tyre markets. It also enjoys significant positions in the US and Asia. The company ranks as world leader in truck tyres, with dominant positions in Europe. Its 3rd division includes specialty tyres (earthmovers, agricultural, aircraft, etc) and other smaller businesses.

Michelin (medium EE exposure) is an efficiency play on tires, with the company being the world leader in fuel efficient (low rolling resistance) tires. It has brought four generations of "Green" tires on to the market with its SaverGreen tires able to save up to 1,000l of fuel per 1mn km travelled. It is looking to further reduce tire rolling resistance by another 25% in the next 10Y. Michelin estimates that OEM sales of low rolling resistance tires will increase from 300mn units in 2010 to 500mn in 2020. Michelin has dominant positions in truck tyres and global leadership on highly profitable specialty tyres, exposure to replacement markets, benefits of restructuring efforts in mature countries support rising group margins in the mid-term. We view Michelin as one of the best plays on mature markets trucks cyclical recovery.

Table 37: Solvay S.A. - Key data

Analyst's Name	Laurent Favre >>		
Analyst's Email Id.	laurent.favre@baml.com		
Analyst's Phone No.	+44 20 7995 0171		
	2011	2012E	2013E
Revenues	8,109	12,744	13,476
Operating Profit	561	1,129	1,443
Operating Margin	6.9%	8.9%	10.7%
Y-o-Y Growth	120.9%	101.2%	27.8%
Net Profit	247	555	824
Net Margin	3.0%	4.4%	6.1%
Y-o-Y Growth	-86.1%	124.8%	48.4%
EBIT	561	1,129	1,443
EBIT Margin	6.9%	8.9%	10.7%
EBITDA	1,021	1,788	2,110
EBITDA Margin	12.6%	14.0%	15.7%
Operating Cash Flow	794.0	1,181.5	1,602.1
Capex	585.0	885.7	864.7
Free Cash Flow	209.0	295.8	737.5
Net Debt/Equity	26.5	23.3	15.3

Source: Company data, BofA Merrill Lynch Global Research

Table 38: Tesla Motors Inc. - Key data

Analyst's Name	Steven Milunovich		
Analyst's Email Id.	steven.milunovich@baml.com		
Analyst's Phone No.	+1 646 855 1272		
	2011	2012E	2013E
Revenues	204	580	2,095
Operating Profit	(252)	(261)	196
Operating Margin	-123.2%	-45.0%	9.4%
Y-o-Y Growth	71.3%	3.6%	-175.3%
Net Profit	(254)	(270)	180
Net Margin	-124.6%	-46.7%	8.6%
Y-o-Y Growth	64.9%	6.3%	-166.5%
EBIT	(252)	(261)	196
EBIT Margin	-123.2%	-45.0%	9.4%
EBITDA	(235)	(216)	248
EBITDA Margin	-114.9%	-37.2%	11.8%
Operating Cash Flow	(114.3)	(160.7)	211.7
Capex	197.9	215.0	160.0
Free Cash Flow	(312.2)	(375.7)	51.7
Net Debt/Equity	11.1	NM	84.7

Source: Company data, BofA Merrill Lynch Global Research

Solvay

Including the recently agreed acquisition of Rhodia, Solvay has become a global chemicals company with leadership in a number of attractive activities. Its sales are now more balanced in terms of geographies (Western Europe down to 44% of group, Latam, Apac and Eastern Europe at 39%) and end markets (consumer, construction and autos are the three largest).

Solvay (low EE exposure) is primarily an efficiency play on lightweighting: i) Specialty Polymers (light-weight and bio-based engineering polymers) for the auto sector with premiumisation a major growth driver; and ii) PEEK, which enables lightweighting opportunities for fuel cost reduction driven aerospace companies. The group also has efficiency exposure on fuel cell technology, nextgen batteries, advanced materials (energy efficient lamps, auto catalysts) – and sustainability megatrend exposure (green chemistry, energy services incl. carbon emissions trading). After over a year of significant uncertainty on the reinvestment of pharma proceeds, Solvay now offers a clear proposition. The combination with Rhodia generates synergies on top of an underlying activity benefitting from late-cyclical construction upturn, structural growth in consumer chemicals and polymers/advanced materials.

Tesla Motors

Tesla Motors, Inc. designs, manufactures, and sells high-performance EVs and EV powertrain components. The Company owns its sales and service network with and sells electric powertrain components to other automobile manufacturers.

Tesla (high EE exposure) is one of the few pure energy efficiency plays on EVs – and has the opportunity to both create and lead the electric vehicle revolution. It delivered more than 1,800 Roadsters - the world's first EV sports car with up to 245 miles per charge - to customers worldwide. Its Model S – the first built from the ground up premium EV sedan with up to 300 miles per charge – is on schedule to go on the market in mid-2012. It has also unveiled the Model X crossover, which is a worthy addition to the family and should be available in 2014. Tesla also works with Daimler (signed a full drivetrain supply agreement for an all EV, battery packs and chargers, A-Class EV), Toyota (RAV4 EV) and Panasonic (batteries). Tesla has the opportunity to both create and lead the electric vehicle revolution. The company's strategy of a pure EV sourced primarily in-house is risky, but we think has a reasonable probability of succeeding and creating significant shareholder value. Tesla's disruptive technology and new sales/service model offer a distinctive opportunity to gain mindshare in the established auto industry.

Table 39: Toray - Key data

Analyst's Name	Akiko Kuwahara >>		
Analyst's Email Id.	akiko.kuwahara@baml.com		
Analyst's Phone No.	+81 3 6225 6902		
	2011	2012E	2013E
Revenues	1,539,693	1,603,300	1,614,400
Operating Profit	100,087	109,000	102,000
Operating Margin	6.5%	6.8%	6.3%
Y-o-Y Growth	149.5%	8.9%	-6.4%
Net Profit	57,925	62,000	60,400
Net Margin	3.8%	3.9%	3.7%
Y-o-Y Growth	-509.1%	7.0%	-2.6%
EBIT	100,087	109,000	102,000
EBIT Margin	6.5%	6.8%	6.3%
EBITDA	170,566	179,500	172,500
EBITDA Margin	11.1%	11.2%	10.7%
Operating Cash Flow	129,214.0	109,802.0	120,000.0
Capex	51,093.0	95,000.0	100,000.0
Free Cash Flow	78,121.0	14,802.0	20,000.0
Net Debt/Equity	60.2	57.0	52.8

Source: BofA Merrill Lynch Global Research estimates

Toray Industries Inc

Toray is Japan's largest domestic synthetic fiber maker. It has a solid reputation for R&D and technological depth, is a top global maker of PAN carbon fibers, has strong tie-ups with top users in all business segments and has strong environmental credentials – all of which position Toray advantageously for growth.

Toray (low EE exposure) is an energy efficiency play on carbon fibre and engineered plastics role in the auto, aircraft and wind power segments. Toray's carbon fibre materials can for instance make a plane up to 20% lighter, improving energy efficiency and reducing emissions by 26,000t over 10Y. It is looking to expand its "green innovation" business globally to ¥500bn in revenues by 2013. We think that there is a strong possibility that the share price will correct over the short term due to softening prices for general carbon fiber and price declines for display materials. From a long-term standpoint, however, weakening of the share price due to macro factors will be an investment opportunity, in our view. We believe carbon fibre sales including those to the aircraft industry will start to contribute to earnings and that profit gains will be especially large for the carbon fiber composite materials and environment & engineering businesses.

Table 40: Valeo - Key data

Analyst's Name	Thomas Besson >>		
Analyst's Email Id.	thomas.besson@baml.com		
Analyst's Phone No.	+33 1 53 65 59 47		
	2010	2011E	2012E
Revenues	9,632	10,690	10,955
Operating Profit	590	662	591
Operating Margin	6.1%	6.2%	5.4%
Y-o-Y Growth	602.4%	12.3%	-10.8%
Net Profit	365	412	362
Net Margin	3.8%	3.8%	3.3%
Y-o-Y Growth	-338.6%	12.7%	-12.0%
EBIT	590	662	591
EBIT Margin	6.1%	6.2%	5.4%
EBITDA	1,114	1,192	1,141
EBITDA Margin	11.6%	11.2%	10.4%
Operating Cash Flow	997.0	871.5	864.2
Capex	476.0	680.0	732.7
Free Cash Flow	521.0	191.5	131.5
Net Debt/Equity	(6.9)	24.0	20.7

Source: BofA Merrill Lynch Global Research estimates

Valeo SA

Valeo is an independent and diversified global automotive parts supplier. It operates 4 business units (Powertrain, thermal, comfort and detection and visibility systems) and also owns a large after-market operation (17% of 2010 sales). The company enjoys world and/or European leadership in most of its business areas.

Valeo (high EE exposure) derives approximately one-half of its sales from fuel efficient equipment and 80% of its portfolio is linked to CO2 emissions reductions. It is well positioned in all market segments from downsizing to micro-hybrids to EVs and smart driving. It has development contracts for range extenders and full EV drivetrain, and new innovations include an electrical driven compressor, energy recovery and EV motors. Returns have improved sharply over the last 3 years thanks to solid organic growth driven by attractive new products, specifically in powertrain (focusing on CO2 reduction, like stop start systems, torque converter, double clutch technology...) and comfort and driving assistance (park assist, active safety tools like lane departure warnings systems...). Valeo has suffered from a serious de-rating over the last decade on declining top-line growth and lower margins. We believe solid results delivered over the last 2.5 years driven by a sharp rebound in organic growth make management's long term targets more credible. The group also benefits from a strong balance sheet and an ambitious restructuring plan.

Table 41: Victrex - Key data

Analyst's Name	Fabio Lopes >>		
Analyst's Email Id.	fabio.lopez@baml.com		
Analyst's Phone No.	+44 20 7996 9108		
	2011	2012E	2013E
Revenues	216	220	236
Operating Profit	94	94	101
Operating Margin	43.5%	42.8%	42.9%
Y-o-Y Growth	25.2%	0.6%	7.5%
Net Profit	71	70	75
Net Margin	33.0%	31.7%	31.7%
Y-o-Y Growth	32.0%	-2.0%	7.3%
EBIT	94	94	101
EBIT Margin	43.5%	42.8%	42.9%
EBITDA	103	104	113
EBITDA Margin	47.5%	47.3%	47.7%
Operating Cash Flow	65.9	72.2	86.0
Capex	9.0	20.0	25.0
Free Cash Flow	56.9	52.2	61.0
Net Debt/Equity	(32.6)	(33.2)	(35.8)

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 42: Westport Innovations, Inc. - Key data

Analyst's Name	Christiansen, Peter		
Analyst's Email Id.	peter.christiansen@baml.com		
Analyst's Phone No.	+1 646 855 5622		
	2010	2011E	2012E
Revenues	144	261	406
Operating Profit	(21)	(30)	(9)
Operating Margin	-14.7%	-11.7%	-2.2%
Y-o-Y Growth	11.6%	42.8%	-70.6%
Net Profit	(40)	(61)	(39)
Net Margin	-27.4%	-23.2%	-9.6%
Y-o-Y Growth	19.3%	52.8%	-35.4%
EBIT	(21)	(30)	(9)
EBIT Margin	-14.7%	-11.7%	-2.2%
EBITDA	(18)	(23)	2
EBITDA Margin	-12.6%	-8.9%	0.4%
Operating Cash Flow	(18.9)	(77.7)	(48.9)
Capex	2.7	9.1	46.0
Free Cash Flow	(21.7)	(86.7)	(94.9)
Net Debt/Equity	(53.1)	41.8	(16.7)

Source: Company data, BofA Merrill Lynch Global Research

Victrex

Victrex is a UK based manufacturer of the high grade polymer, PEEK. All manufacturing is completed in the UK and exported globally.

Victrex (low EE exposure) is an efficiency play on lightweighting in transport via PEEK. In automotive, growth will be driven fuel efficiency, safety and reliability improvements resulting from consumer and regulatory trends, especially coming from China. Premiumisation will also benefit specialty polymers as it drives increased content per vehicle. It should also benefit in aerospace where the need of fuel cost reduction should be achieved largely through weight reduction. Victrex claims they will have 1t of PEEK per Boeing 787 aircraft. On a full run-rate of 100 units per year, that's 100t of PEEK against an estimated total current market of 3,500t for all applications. In the medium-term, we see the highest potential for organic growth coming from the transport applications (51% of the 2,328 tonne pipeline), with aerospace driven by new deliveries of Boeing 787 and automotive driven by penetration of developed world technology into emerging markets and from alternative energies (photovoltaic, batteries). Long term view: structural growth at elevated margins.

Westport Innovations

Based in Vancouver, Canada, Westport Innovations Inc. is a leader in alternative fuel, low-emissions technologies that allow engines to operate on clean-burning natural gas (CNG/LNG). Through its business units and joint ventures, the company is focused on the engineering, design and marketing of natural gas-enabling technology, including automotive systems, components and engines for the light-, medium-, and heavy-duty commercial vehicle markets.

Westport (high EE exposure) is a pure efficiency play on the compelling economics in switching to gaseous engine technology. The company's product portfolio is rapidly expanding into very large commercial vehicle segments and new geographies. Key partnerships with top-tier OEMs testify to the notion that Westport is more than just an OEM supplier. Thanks to many years of disciplined R&D investment, we expect Westport's substantial IP advantage and economic moat to be strong for several years. We also see Westport's partnership-driven operating model prompting the broader ecosystem to scale both rapidly and profitably. We see a considerable opportunity in disrupting incumbent transportation technology, given the reliance on one fuel source – oil. We see the confluence of a developing fuelling infrastructure, a trucking replacement cycle, and a compelling fuel differential presenting an opportunity for the company to grow revenue at a 30% CAGR over the next 5-7 years.

Table 43: List of other companies involved in Auto & Energy Efficiency

BBG Ticker	Company	Location	BofAML Ticker	Local currency	Market Cap (mn)	Investment Opinion	EE Exposure
AMS SJ	ANGLO AMERICAN PLATINUM	SOUTH AFRICA	NR	ZAR	157,680	NR	Low
PRIVATE	BETTER PLACE	United States	NR	USD	NA	NR	High
6041 JP	BOSCH CORP	Japan	NR	JPY	NA	NR	High
DLPH US	DELPHI AUTOMOTIVE	United States	NR	USD	10,277	NR	Medium
ZIP US	ZIPCAR INC	United States	NR	USD	524	NR	High

Source: Company, BBG, BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency related products, services, technologies and solutions

Table 44: Companies involved in Auto & Energy Efficiency that we do not cover

Company	BBG ticker	Overview
ANGLO AMERICAN PLATINUM	AMS SJ	Anglo Platinum is the world's leading primary producer of platinum group metals - PGMs (Platinum, Palladium, Rhodium, Osmium, Iridium, Ruthenium). Its operations include 13 mines, three smelters, a base metals and precious metals refinery. Operations exploit the world's richest PGM deposit, known as the Bushveld Complex in South Africa. Nickel and copper provide valuable by-product revenue. The company is a secondary efficiency play on platinum which is used in autocatalysts which reduce pollution. 44% of platinum is used in autocatalysts - and 40% of platinum demand is produced by Anglo Platinum. Global auto sales are seeing recovery and traditional demand for PGMs could be augmented by the autocatalysis of heavy diesel trucks in the short term, and potentially other heavy and/or off-road applications in the medium term. Longer-term, light duty vehicle production is expected to increase to 2015 - and stakeholder pressure for "cleaner" air in emerging markets is likely to strongly drive PGM demand.
BOSCH	6041 JP	The Bosch Group is a leading global supplier of technology and services in the areas of automotive and industrial technology, consumer goods, and building technology. The Group comprises Robert Bosch GmbH and its more than 350 subsidiaries and regional companies in over 60 countries. Bosch is a primarily efficiency play on auto and buildings. In auto, it is the world's leading supplier with strong positions on injection technology and stop-start and a growing position in hybrids. In buildings, it is the European market leader in thermotechnology (e.g. condensing appliances, heat pumps). We note that it is also a player on solar energy following its ersol stake and wind via Bosch Rexroth - and that improved efficiency is a factor for its consumer appliances.
DELPHI AUTOMOTIVE	DLPH US	Delphi manufactures vehicle components. The Company produces electrical and electronic, powertrain, safety and thermal technology components for automobile and commercial vehicle manufacturers. Delphi supplies original equipment manufacturers throughout the world. It has efficiency exposure via powertrains, hybrids and EVs, fuel cells - and also has commercial and residential-related HVAC exposure.
BETTER PLACE INC	Private	Better Place is the leading global provider of electric car networks that enables the mass market adoption of electric cars through an innovative battery switch model that makes driving electric cars more affordable, convenient and sustainable than today's petrol-based cars. Better Place is a pure play on efficiency - owning and operating a network of battery switch stations and public/personal charge spots, along with the supply of batteries that power the cars, to provide drivers with instant range extension and the convenience to drive, switch and go across an entire region. Where possible, Better Place uses renewable sources of energy to deliver fully zero emissions driving. It has invested or launched in Australia, China, Denmark, Israel, Japan - and North America and the EU, to date. The World Economic Forum has named Better Place a "Global Growth Company Industry Shaper" for its innovative approach in advancing the global switch to electric cars.
ZIPCAR INC.	ZIP US	Zipcar is the world's leading car sharing network with more than 575,000 members and more than 8,200 vehicles in 15 major urban areas and 230 college campuses throughout the U.S., Canada and the UK. Zipcar offers more than 30 makes and models of self-service vehicles by the hour or day to residents and businesses looking for an alternative to the high costs and hassles of owning a car. Zipcar is a pure energy efficiency play on the theme of car sharing where it has an industry first mover advantage. The company believes it to be a \$10bn addressable market with expansion possible in markets with high population density, high total costs of car ownership, strong public transport and solid or developing middle class. Membership and revenues grew by 66% and 68% CAGR from 2005-2010 - and ZIP had 3.5mn reservations in 2010. ZIP estimates an average member's lifetime value at \$537 (net) and is planning to develop both its business and international offers.

Source: Bloomberg, company sources

Buildings - the easiest & largest efficiency gains

Table 45: BofAML Buildings & Energy Efficiency Stock List

Company	EE exposure
CSR LIMITED	Medium
HONEYWELL	Medium
INGERSOLL RAND	High
JOHNSON CONTROLS	Medium
KINGSPAN	High
KONE	High
NIPPON SHEET GLASS	Medium
RINNAI CORP	High
SAINT-GOBAIN	High
UNITED TECHNOLOGIES	Low

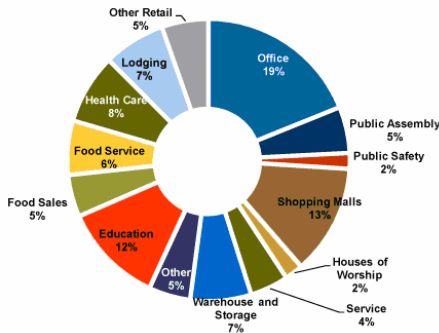
Source: BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency products, services, technologies and solutions. See also Industrials & Integrated for Building Automation companies.

Energy consumption within buildings accounts for the single largest component of global energy use and CO2 emissions, at c.40% and c.30% respectively. The biggest culprits are heating and cooling, which, together with lighting, can account for up to 60% of buildings' energy consumption. We believe that there is a broad array of easily accessible, cost-effective materials and technologies that could reduce energy consumption to a fraction of current levels. Indeed, energy efficiency in the buildings sector offers the greatest potential of any sector to make cost savings and reduce energy use (by 30% to 50% by 2030-50 according to the IEA). We believe that little of the huge energy efficiency potential of this sector has been captured to date.

The biggest drivers for improving energy efficiency in buildings, especially in a recessionary environment, are that it cuts down on energy use and energy costs; reduces the need for capex in energy infrastructure; and promotes energy security. Long-term growth drivers are extremely favourable and include efforts to lower CO2 emissions and create affordable housing, the economic importance of the sector in terms of GDP and jobs, favourable demographics, emerging market growth, a focus on tackling fuel poverty, the potential to realise a green premium on efficient buildings, the low-risk nature of financing efficiency, and global urbanisation trends.

We believe that a number of stocks are well placed to benefit from the theme of energy efficiency in buildings through their involvement in areas such as building automation, energy services, efficient HVAC systems, insulation materials and technologies, high-efficiency lighting (including LEDs) and appliances, windows (including multiple glazing and low-e), as well as the distribution of building products.

Chart 44: End use CO2 emissions by US commercial building type % of total



Source: Urban Land Institute, BofA Merrill Lynch Global Research

#1 source of energy use & CO2 emissions

Energy consumption within residential, commercial and public buildings accounts for c.40% of energy use in most countries and c.30% of global CO2 emissions (Source: IEA). The figures are higher in developed markets, with buildings accounting for closer to 40% of both energy demand and CO2 emissions in the EU and US (Source: EU, EIA).

Table 46: Building sector's share of energy consumption & CO2 emissions

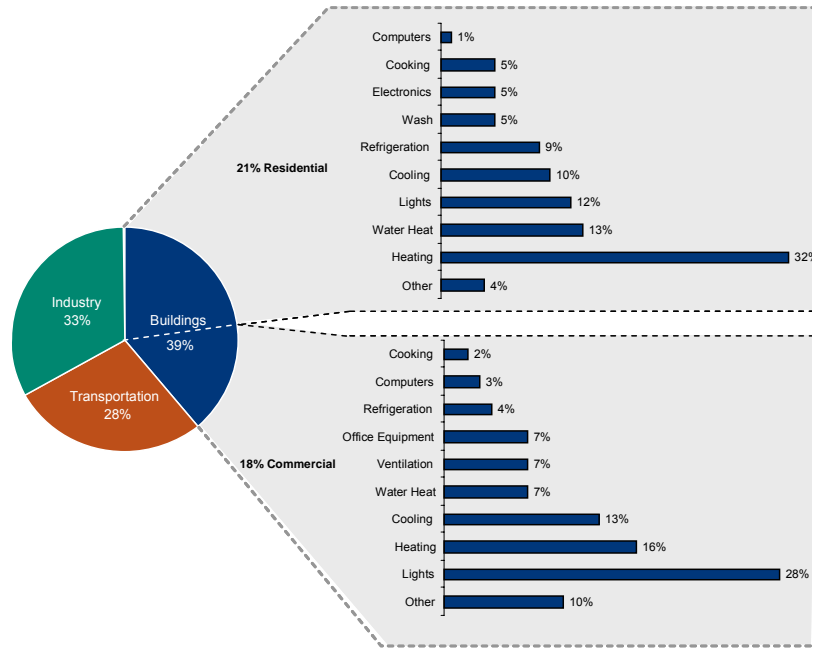
Region or Country	Total Buildings Sector								Residential				Commercial & Public								
	Primary Energy Use		Delivery Energy		Electricity		Emissions		Primary Energy Use		Delivery Energy		Electricity		Emissions						
	% of total	EJ	Quads	% of total	TWh	% of total	Gt	% of total	EJ	Quads	% of total	TWh	% of total	Gt	% of total	EJ	Quads	% of total	TWh	% of total	Gt
Global	38%	109	77.0	51%	7995	33%	7.1	29%	82	50.3	28%	4309	21%	4.5	9%	27	26.4	24%	3686	12%	2.6
Australia			0.7	53%	111				0.4	30%	62					0.3	23%	49			
Brazil		1.3	1.0	46%	174				0.6	23%	86				0.4	0.4	24%	88			
Canada	29%			55%	292		16%	0.9	29%	155			13%				26%	137			
China		5.6	7.1	21%	491				5.2	14%	335				1.7	1.9	7%	156			
EU								13.9													
France				64%	274					34%	147						29%	127			
Germany				52%	272					27%	142						25%	130			
India		7.1	1.6	29%	146			6.6	1.3	21%	108			0.5	0.3	8%	39				
Indonesia				61%	69					39%	44						22%	25			
Italy				47%	146					22%	68						25%	78			
Japan			5.0	65%	640				2.1	29%	280				2.9		37%	261			
Korea				46%	172					14%	53						32%	120			
Mexico		0.9	0.5	37%	70				0.7	0.4	25%	48			0.2	0.1	11%	22			
Russia		6.0	5.3	33%	225				4.6	4.2	17%	113			1.4	1.1	16%	112			
S. Africa		0.8		33%	66				0.6	19%	38			0.2			14%	28			
UK				62%	214					34%	116						28%	97			
USA	39%		19.0	71%	2651	38%	2.2	21%	10.8	36%	1352	20%	1.2	18%	8.2		35%	1300	18%	1	

Source: IEA, EIA, Government of Canada, BofA Merrill Lynch Global Research

Heating, cooling & lighting are the biggest culprits

The largest proportion of energy use in buildings is for heating and cooling, as well as providing hot water. In the US, for instance, the top three end uses – space heating, water heating, and lighting – account for close to 60% of both energy consumption (Source: IEA) and building-related emissions (Source: US DOE).

Chart 45: Energy consumption of buildings in US



Source: Centre for Sustainable Building Research, BofA Merrill Lynch Global Research

Energy demand set to rise for the next 40 years

Energy demand from buildings has been on the rise for many years. In the US, primary energy consumption from buildings increased by 50% between 1980 and 2008. Projections are that demand in the sector will increase by 60% by 2050, meaning significant rises in energy demand and CO2 emissions unless we see concerted action to improve energy efficiency (Source: IEA, OECD).

Energy demand set to grow again despite recession

While this growth has temporarily stagnated due to the recession, it is expected to resume – with the U.S. EIA’s 2013 energy demand figures projected to exceed 2008 levels and further growth anticipated to 2035. With an annual growth rate of 0.6%, total primary energy consumption is expected to reach 47 quads by 2035, an 18% increase over 2008 levels (Source: US EIA).

60% CO2 increase projected by 2050

Buildings-related CO2 emissions are expected to increase by 60% by 2050 – which is greater than projections for both industry and transport (Source: IEA, OECD). This is being fuelled primarily by growth in populations, households, and commercial and residential floor space, all of which are expected to increase by 30-40% between 2008 and 2035 (Source: IEA), as well as by increased electric water heating in emerging markets (Source: Vattenfall).

Table 47: Building efficiency factors across major regions

Region / country	Overview
Western Europe	<ul style="list-style-type: none"> • New build rate going forward will move up but only to a moderate level due to slow demographic movement/increased urbanisation • Aggressive tightening of building codes will multiply insulation volumes per square metre • Stimulus packages are short-term a solid foundation in key markets • Rising energy prices to be passed on to building owners - high level of energy taxes
Central & Eastern Europe	<ul style="list-style-type: none"> • Consolidation potential very low • New build is at an absolute low point but will move up to reflect low level of m2 per inhabitant • Aggressive tightening of new build codes exception

Table 47: Building efficiency factors across major regions

Region / country	Overview
Russia	<ul style="list-style-type: none"> • Renovation need substantial but no subsidy programmes to support market forces • Effect of rising energy prices strengthened by elimination of subsidies and individual metering of consumption • Consolidation possibilities low • New build rates are moving up and are expected to stay reasonable due to increased urbanisation and higher no. of m2 per inhabitant • Tightening of building codes ongoing • Strong subsidies to bring down very high energy consumption in existing buildings; public finances benefit from high energy prices • High energy prices increasingly passed on to final consumer and increased use of individual metering • Consolidation potential reasonable
North America	<ul style="list-style-type: none"> • The newbuild rate will (post-crisis) be lifted by demographics • New build standards expected to be lifted substantially but major legislative framework not in place • Subsidy programmes expected • Energy prices for final consumer still substantially lower than in the EU • Consolidation potential low
Asia	<ul style="list-style-type: none"> • Fastest growing construction market in the world fuelled by strong macro-economics, urbanisation & need for more m2 per inhabitant • Legislation: insulation is applied in Northern regions (China) but is more or less absent in Southern regions where AC is growing fast • Insulation of infrastructure (power plants, industrial processes) growing fast • Limited or no renovation activity • Consolidation potential high

Source: Rockwool, BofA Merrill Lynch Global Research

World average per capita residential electricity consumption is c.600kWh/y but reaches 1,500kWh/y in W. Europe and >4,000kWh/y in NAm (Source: WEC)

Energy & cost savings, the key drivers

Residential and commercial buildings consume 40% of global energy consumption – and energy consumption is one of the fastest-growing areas of energy use, especially in emerging markets (e.g. growing water heating and AC). The IEA estimates that the energy saving potential in the building sector will be in the range of 20 EJ per year by 2030, which is the equivalent of the current annual electricity consumption of the US and Japan combined.

30%+ in energy savings

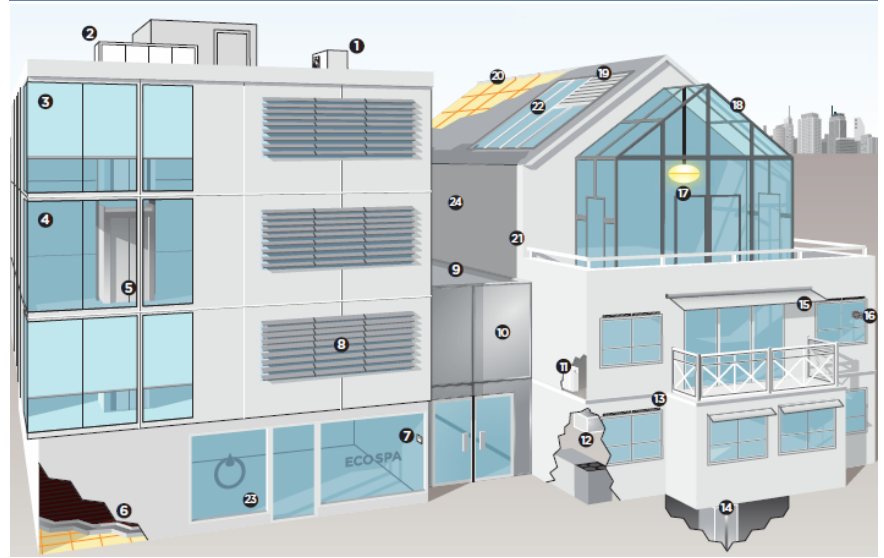
Residential and commercial buildings (including installed equipment and appliances) consumed the equivalent of 114 EJ worldwide in 2005. Making use of simple energy-efficient solutions in new and existing buildings could save as much as 34% of the projected primary energy consumption by the world's buildings by 2020. This estimate would represent a reduction of 52 to 57 EJ (3.8 to 4.7bn t of CO2) by 2020 and 79 to 84 EJ (5.8 to 6.9bn t of CO2) by 2030. The potential global energy savings in buildings by 2030 are equal to the current energy consumption for all uses in Europe (Source: UN Foundation).

Table 48: US energy use (in Quads)

Energy use	Quads
Residential buildings	21.3
Commercial buildings	38.8
Total building use	38.8
Total US energy use	98.3

Source: US government sources

Chart 46: Technologies for improving the energy efficiency of buildings*



Source: EuroACE. *1. Air Cooled Chiller; 2. Heat Pump; 3. Automated Roller Blind; 4. Glazing; 5. Regenerative Drive Elevator; 6. Floor Insulation; 7. Heating Controls: Room Thermostat; 8. Automated Exterior Venetian Blind; 9. Insulation; 10. Insulated Wall System; 11. Heating Controls: Radiator Thermostat; 12. Heat Recovery Ventilation; 13. Humidity Sensitive Air Inlets; 14. Heat Pump; 15. Automated Roller Blind; 16. Humidity Controlled Extract Unit; 17. Lighting; 18. Sunspace; 19. Automated Awning; 20. Insulation; 21. Sealants; 22. Roof Window; 23. Solar-control/ Low E-window Film; and 24. Air Tightness Membrane

The equivalent of 3+ mn barrels of oil could be saved each day in Europe if buildings were made more energy efficient.

Lowest-hanging fruit, fast payback, huge financial benefits

The argument for energy savings is compelling and can often be achieved at low or no cost. In most cases, energy-efficient technologies for buildings make economic sense on a life-cycle cost analysis (Source: IEA). Moreover, as such measures reduce dependence on fossil fuels, they also address energy security concerns. The payback is billions to trillions in financial benefits.

Table 49: Financial benefits of green buildings (\$US/m²)

Category	20-year NPV
Energy value	\$62.3
Emissions value	\$12.7
Water value	\$5.5
Waste value (construction only) -1 year	\$0.3
Commissioning O&M value	\$91.2
Productivity and health value (certified and silver)	\$397.1
Productivity and health value (gold and platinum)	\$595.6
Less green cost premium	(\$43.1)
Total 20-year NPV (certified and silver)	\$526.0
Total 20-year NPV (gold and platinum)	\$724.5

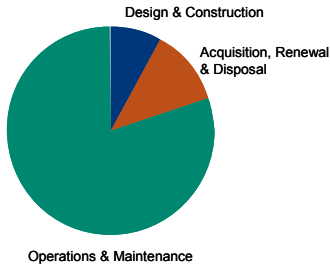
Source: Kats, BofA Merrill Lynch Global Research

Table 50: Financial benefits of energy efficiency in buildings

	Investment	Benefits
IEA	US\$2.5tn between 2010 and 2030	US\$5tn (undiscounted) in energy savings over the life of the investment
World Business Council on Sustainable Development (WBCSD)	US\$150bn/yr of green building investment in the US, EU, Japan, China, India and Brazil	Pay back the additional upfront investment in less than five years. An additional US\$150bn/yr of investment would pay back within 5-10 years
ACEEE		US could reduce energy consumption by up to 30% over the next 10-15 years by implementing efficiency measures in the residential and commercial building sector. This amount, which represents 695bn kWh p.a., could save American homes and businesses \$78bn p.a. in electricity bills
Jülich Research Centre	€1.4bn invested in 2010 by the German State	Created an additional €5.4bn of tax receipts and €1.8bn savings in unemployment benefits. An estimated 340,000 jobs were created or safeguarded as a result
Kats		Average payback time from energy savings for green buildings of 6Y; over 20Y financial gains from reduced energy costs exceed the green premium by a factor of four to six – US\$43.1 - \$172.2 per m ²

Source: IEA, WBCSD, ACEEE, Jülich Research Centre, Kats,

Chart 47: Typical total cost of ownership



Source: National Institute of Building Sciences

Efficiency is key to minimising TCO

Typical buildings have occupied lives of 50-75 years or longer. Operating costs usually account for 60-85% of building lifecycle costs – compared with 5-10% for design and construction costs. Implementing energy efficiency is thus key given that energy costs represent a large chunk of a commercial building’s operating costs (c.40% in the EU) and are rising faster than most other costs (Source: Ingersoll Rand).

New buildings can achieve the largest savings – with as much as 80% of the operational costs of standard new buildings saved through integrated design principles on energy efficiency, often at no or little extra cost. High-efficiency renovation or refurbishment is also an important way of reducing emissions, especially in developed markets. For instance, in Europe, which has 1bn ft² of commercial space, retrofits can enable 20-50% energy and operating cost savings (Source: Ingersoll Rand) and reduce European greenhouse gas emissions by c.12% (Source: EuroACE).

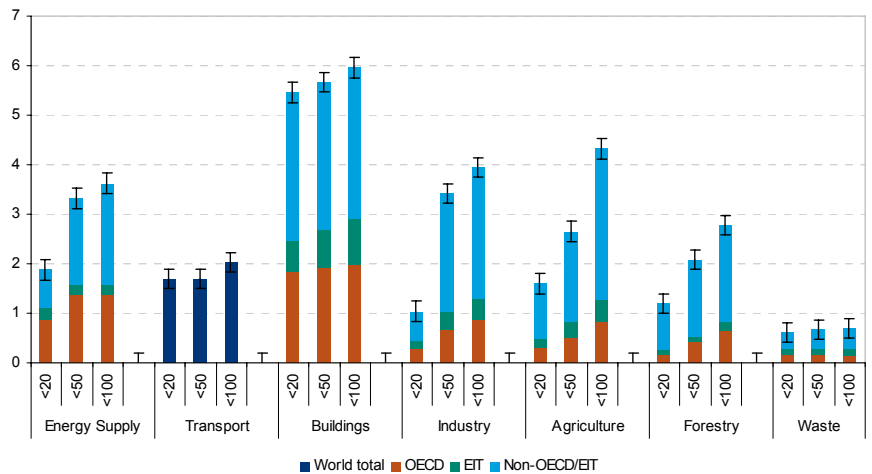
Efficiency is key during a recession

A recessionary environment – with a twin focus on productivity and cost reduction – amplifies the need for energy efficiency given the limited capital investments and clear paybacks.

Huge CO2 mitigation potential at low cost

The IEA and OECD estimate that building-sector CO₂ emissions will need to be reduced from the 15.2 Gt p.a. currently projected for 2050 to approximately 2.6 Gt p.a. if the sector is to successfully meet long-term climate change goals such as the EU’s 2050 80% decarbonisation target. Efficiency offers a huge range of abatement opportunities below \$20-50/tCO₂ in the building sector, which come at zero or negative cost. Acting on these will, however, require concerted action to avoid the risk of lock-in - i.e. an inadequate level of renovation by pursuing only the “lowest hanging fruit” (Source: EuroACE).

Chart 48: Buildings have the greatest CO2 mitigation potential to 2030 (potential at <\$100, <\$50, <\$20 per tCO2-eq)



Source: UN IPCC, BoFA Merrill Lynch Global Research

c.30% reduction at zero cost

The UN IPCC analysed some 80 studies spanning 36 countries, which suggested that a 29% reduction in projected baseline CO₂ emissions by 2020 was

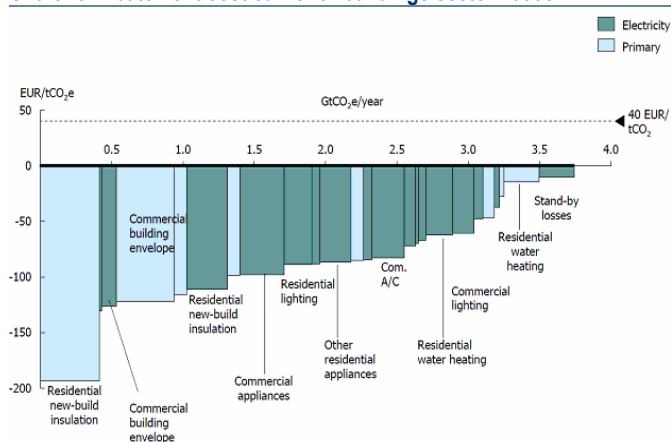
achievable at zero cost (costs below 0US\$/tCO₂-eq), while further improvements could be made with relatively low levels of investment. According to various estimates, an 8.2Gt to 12.6Gt reduction in building-sector emissions could be achieved by 2050 (vs. 2010 levels).

Low-cost mitigation potential

Buildings have the highest economic mitigation potential of any sector using technologies and practices expected to be available by 2030. The graphic below illustrates the mitigation potential expressed in GtCO₂-eq/yr according to the amount that can be achieved at less than US\$20, \$50 and \$100 per tCO₂-eq. Assuming a cost per tCO₂-eq of no more than US\$100, the global economic mitigation potential ranges between 5.3 and 6.7 GtCO₂-eq/yr by 2030 (Source: UN IPCC). Note that 90% of this potential could be achieved at less than US\$20 per tCO₂-eq.

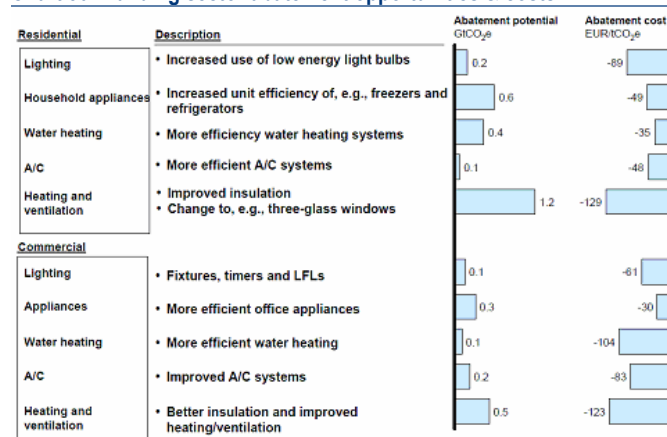
Close to 500Mt of CO₂ could be reduced each year in Europe alone through cost-effective energy efficiency measures in buildings. This is the equivalent of 100mn+ cars being taken off the road each year.

Chart 49: Abatement cost curve for buildings sector 2030e



Source:BoFA Merrill Lynch Global Research estimates

Chart 50: Building sector abatement opportunities & costs



Source:BoFA Merrill Lynch Global Research estimates

However, there are varying estimates of the annual investment needed to achieve such reductions, with the IEA and OECD projecting US\$308bn/yr to 2050 and the Peterson Institute for International Economics US\$1tn/year to 2050.

Table 51: Economics of global buildings & energy efficiency transformation

Country/region	Additional investment, 2005-50 (US\$ billion/year)	NPV 2005-50 ¹⁰	CO ₂ reduction* (million tonnes 2050)	Ave. abatement cost, 2005-50 (US\$/tonne)
OECD N.America	244	-46	1699	30
USA	209	-40	1555	28
OECD Europe	170	-26	915	30
OECD Pacific	67	-17	353	48
Japan	37	-9	168	52
Transition Economies	78	-12	548	24
Developing Asia	188	-26	2343	14
China	114	-15	1427	14
India	19	-2	221	12
Latin America	31	-5	148	39
Middle East	80	-17	663	32
Africa	29	-3	298	10
WORLD	1042	-180	8200	25

Source:IEA & OECD, BoFA Merrill Lynch Global Research. * Relative to business as usual

Solid long-term growth drivers

In addition to the huge energy, cost-saving and CO2 reduction potential, we believe that increasing energy efficiency in buildings will be supported by a series of long-term drivers:

- **Affordable and sustainable housing:** this is a priority for many emerging and developed market governments.
- **Climate legislation:** there are close to 60 countries worldwide with pending or approved carbon reduction mandates that affect buildings.
- **CO2 emissions:** emissions from buildings will grow by 50+% by 2030E, the bulk of which from North America and Asia (Source: IPCC).
- **Corporate commitments:** 51% of the “global 500” have publicly disclosed GHG reduction goals – of these, the majority identify energy efficiency of their buildings as a priority.
- **Demand for power set to increase**
- **Economic importance of the sector:** in the EU, for instance, the building sector accounts for 9% of EU27 GDP, 8% of employment and c.€2tn of annual turnover.
- **Emerging markets growth:** over the next 10 years, over 110 billion additional square feet of commercial space will be built (vs. c.400bn ft² of global space today), 80%+ of which will be in emerging markets (Source: Johnson Controls). Electricity consumption often outpaces economic growth as living standards and demand for AC rise.

In the UK, 25% of UK power stations will close over the next decade - the replacement cost = £110bn. Demand for electricity is expected to double within 40 years (Source: Ingersoll Rand)

Table 52: Expected construction growth 2011-15

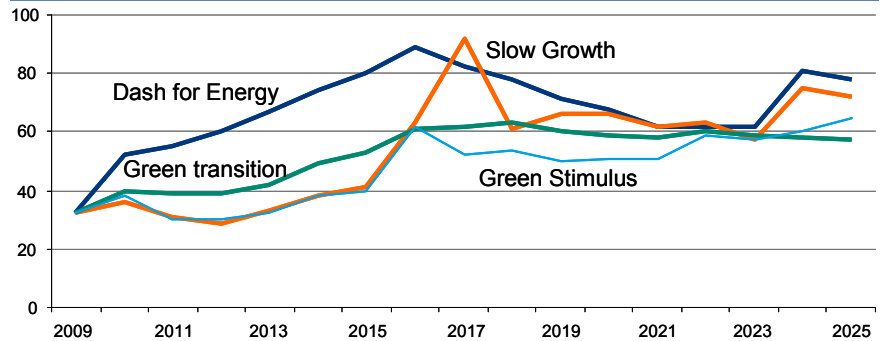
Region	Construction growth 2011-15e
Asia	11%
Middle East	11%
Latin America	10%
Eastern Europe	10%
North America	9%
Western Europe	4%

Source: Johnson Controls, BofA Merrill Lynch Global Research

- **Energy costs:** 20-40% energy savings are available on existing buildings over five years old (i.e. favourable NAV).
- **Energy prices to rise:** energy prices are expected to increase across the globe over the long term, driving energy efficiency in renovations.

In the UK, average electricity prices have increased by 65% over the past 10Y. Ofgem’s Project Discovery modelled four future energy use scenarios, all of which predict the wholesale electricity price will more than double between 2009 and 2016

Chart 51: Wholesale electricity prices

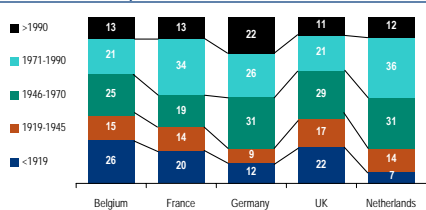


Source: Ofgem, Project Discovery – four energy use scenarios

Energy efficiency loan defaults of 0-3% compare favourably with residential mortgage default rates of 5.67%, credit card default rates of 9.14%, and even car loan defaults at 1.94%

In the UK, where fuel poverty is defined as spending >10% of household income on energy, the latest UK Government figures show c. 4.5mn fuel-poor households, double the figure from 5 years ago

Chart 52: Relative age of building stock in select EU countries (% of housing stock by year of construction)



Source: Global Energy Reduction Fund

- **Energy security** is promoted as the demand for imported energy is reduced
- **Low financing risk:** energy efficiency financing programmes are thought to have low default rates, with one recent US study of 24 EE loan programmes finding default rates of only 0-3%, with rates holding fast since the housing bubble (Source: The American Council for an Energy Efficient Economy)
- **Reduces fuel poverty:** rising energy costs are leading to fuel poverty in certain developed markets and pushing governments to invest in EE as a means of controlling the issue (i.e. reducing the cost for the poor to heat their homes).
- **Green premium:** high-performance green buildings command higher rents (up to 6% in terms of effective rents according to many estimates), enjoy higher occupancy rates, and sell for more on the market.
- **Job creation:** the economic growth potential of buildings is often neglected – with estimates that large-scale renovation could create up to 530,000 jobs in Europe and 1.1 million in the US (Source Renovate Europe, Rocky Mountain Institute).
- **New build rates:** these are driven by demographics, M2 per inhabitant, macroeconomics and urbanisation.
- **Long-termism:** newbuilds rarely replace old buildings – they just add to the building stock. For instance, an estimated 50% of the c.210mn buildings in the EU were built before the first global oil crisis in 1973 and only 0.1% of buildings are demolished each year (vs. a newbuild rate of 1%). Globally, industry estimates that 65% of buildings that exist today will still be in use in 2050.
- **Short-term stimulus packages** for energy refurbishment
- **Urbanisation in emerging markets:** 50% of the world's population currently lives in urban areas. This will grow to 70% by 2030. Over 90% of urban growth will be in emerging markets (Source: UN).

Table 53: Major opportunities for green buildings

	Retrofits	Newbuilds
Developed markets	<i>KEY FOCUS</i> <ul style="list-style-type: none"> •Single homes that lack efficiency norms (EU) Homes to increase lifespan (Japan) 	<i>SECONDARY FOCUS</i> <ul style="list-style-type: none"> •New construction in US & Japan •New green standards
Emerging markets	<i>SECONDARY FOCUS</i> <ul style="list-style-type: none"> •Single homes needing retrofits to meet basic sustenance levels (electricity etc.); built by the informal sector to meet basic efficiency standards •Multi-family homes 	<i>KEY FOCUS</i> <ul style="list-style-type: none"> •Huge housing shortages and greening publicly subsidised and privately financed housing •Huge demand for office space and greening via corporate demand

Source:WBCSD, BofA Merrill Lynch Global Research

The role of government remains key

Governments will play a critical role in promoting greater energy efficiency within the building sector and the increased use of more energy-efficient products. While manufacturers may develop innovative products, experience in most countries shows that builders and consumers need to be “persuaded” or “incentivised” to use them: this is why government legislation is vital.

Legislation is driving volumes

We remain of the view that a cyclical demand recovery will be the principal driver of revised EPS forecasts for buildings and materials companies. That said, we see additional potential upside to our forecasts and longer-term strategic attractions from energy efficiency-related legislation.

Incremental driver in tough times

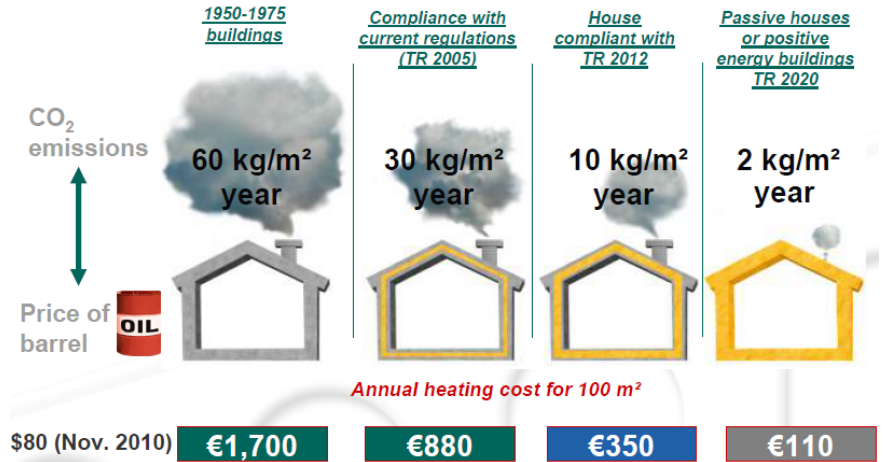
Government legislation acts as a structural driver of long-term demand, but it can fail to underpin demand sufficiently during periods of cyclical contraction. It does, however, provide an incremental driver to volumes when they are recovering or growing. We believe that with little short-term technological innovation likely, the push for higher and improved efficiency standards will directly lead to a proportionate increase in the volume of efficient material used/required. For example, to achieve a 20% improvement in thermal insulation qualities requires 20% more insulation material to be used, irrespective of which sort of insulation material is specified.

EU has taken the strongest lead

The EU has taken a strong lead on tightening building codes over the past decade, with long-term goals (by 2020) of cutting emissions by 29% for residential buildings and 13% for commercial (vs. 2008 baseline), reducing the EU’s “energy bill” by about €200bn/year, lowering energy dependence and capex investments in energy infrastructure, and creating up to 2mn new jobs (Source: EC).

The UK, US, Germany and Poland are all targeting a doubling in insulation standards between 2010 and 2016. This translates into a CAGR of c.12%

Chart 53: Tightening regulations on thermal efficiency



Source: Saint-Gobain

EPBD & nearly zero energy buildings

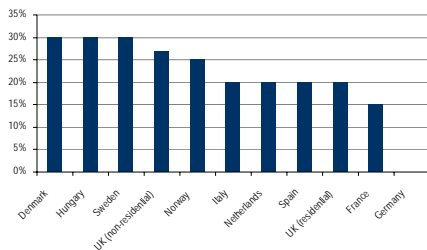
The Directive on the Energy Performance of Buildings (EPBD) – which was introduced in 2002 and strengthened in 2010 – requires Member States to set minimum energy performance requirements for buildings:

Individual goals are set by member states and a number of countries have already anticipated the new regulations:

- France: energy-positive buildings by 2020
- Netherlands: energy-neutral buildings by 2020
- UK: zero-carbon homes by 2016 (heating & lighting)

Various paths are being followed in different countries with the UK focusing on energy suppliers, and France, Germany, and Scandinavia stimulating building owners with direct subsidies

Chart 54: Potential energy reductions in new buildings: 2009 targets



Source: EC. Sweden- electrically-heated buildings only; Netherlands- Residential only.

- **Nearly zero energy buildings:** From 2020, all new buildings in the EU will have to be 'passive', i.e. "nearly zero energy buildings that comply with high energy-performance standards. This is defined as: "a building that has a very high energy performance (covering all energy uses, expressed in primary energy use) and the nearly zero or very low amount of energy required should to a very significant level be covered by energy from a renewable source including RES onsite and nearby" (Source: EU). For buildings owned and occupied by public authorities, these standards need to be met by the end of 2018. Intermediate targets are to be set by 2015.
- **Minimum energy requirements for renovations** covering building components like walls, roofs, windows, etc., applied every time these components are introduced or replaced.
- **For existing buildings,** member states shall follow the leading example of the public sector, develop policies and take measures, such as setting targets, to stimulate the transformation of buildings that are refurbished into very low-energy buildings, and inform the Commission thereof in their national plans.
- **Ensure that an Energy Performance Certificate** is issued when buildings are constructed, sold or rented out. The EPCs need to be included as part of the advertising for sale or rent, displayed for buildings of 1000 m²+, and for 250 m²+ by 2015.

The first new national Building Codes following the EPBD came into effect in 2006 and there has been a correspondingly positive impact on the energy efficiency of new buildings in many member states. In the most proactive countries, this has led to a tightening of their energy performance demands for new buildings by some 25% to 30% to date.

Proposed Directive on Energy Efficiency

The European Commission has proposed a new set of measures aimed at increased energy efficiency, whereby the 2020 20% energy savings target would become a legally binding requirement. The Directive is still being debated, but if it came into effect it could have an important impact on the building sector, with the most ambitious target requiring member states to renovate a minimum of 3% of public buildings each year.

Table 54: Overview of identified energy efficiency financial instruments in place (2010)

	Preferential Loans	Subsidies	Grants	3 rd Party Financing	Trading	Tax Rebate	Tax Deduction	Reduced VAT
Austria	1	1	3	2				
Belgium		5					1	1
Czech Republic	1	1	6					
Denmark			1					
Estonia	1							
France	5		2		1	1		1
Germany	3		1					
Hungary	4		3					
Italy	3		1		1	2	1	
Netherlands				1		1	1	
Norway	1		1					
Poland		1		1				
Romania			1					
Slovenia	2		5					
Spain	2		2					
Sweden			1				1	
UK	2		6			2	1	1

Source: EuroACE, BofA Merrill Lynch Global Research

“Upgrading the energy efficiency of America’s buildings is one of the fastest, easiest, and cheapest ways to save money, cut down on harmful pollution, and create good jobs right now. But we can’t wait for Congress to act” US President Obama

US finally making some progress

As far as energy-efficient building codes are concerned, the US has long been a laggard compared with the EU, CEE, Russia, Japan, South Africa and parts of Latin America. However, despite the recession, the past two years have seen a number of positive signals including the American Jobs Act, Obama’s Better Building Challenge, Executive Order 13514, concerted action at city and state level, and the first national green building code. We believe that we could see further action when the economy settles down, while a post-2012 election environment could facilitate greater willingness to build consensus.

- **American Jobs Act:** Repair or modernize 35,000 schools
- **“Better Buildings Initiative”:** The plan proposed by President Obama aims to reduce commercial building energy use by 20% by 2020, reduce companies’ and business owners’ energy bills by about US\$40bn p.a.; save energy by reforming outdated incentives, and challenge the private sector to invest in energy efficiency. In December 2011, it saw a commitment of US\$4bn over the next 24 months for energy upgrades to public and private buildings (including a US\$2bn commitment to upgrade the energy efficiency of federal buildings using long-term energy savings to pay for upfront costs and US\$2bn pledged in private capital).

New York City estimates 75% of the city's CO2 emissions stem from energy used in buildings - and today's buildings will still make up 85% of the real estate in 2030

"It (IGCC) represents a change in the standard of construction. It will affect everyone that touches buildings...it will be a big leap." - Director of Sustainability Advocacy at the American Institute of Architects

- **Federal Executive Order 13514** (Federal Leadership in Environmental, Energy, and Economic Performance) whereby, starting in 2020, all new Federal buildings must achieve net-zero energy by 2030.
- **Cities and states are moving**, with 11 states adopting the International Energy Conservation Codes and Austin, New York City, San Francisco, Seattle and Washington DC enacting benchmarking legislation in large buildings (with some requiring the information to be given to buyers, lessees or lenders and/or additional audit requirements. Nine states are also currently developing laws that would require energy rating and disclosure.
- **IgCC, 1st national green building code**: the International Green Construction Code (IgCC) is set to be published in March 2012 and will be the first US model code to establish baseline regulations for new and existing buildings relating to energy efficiency. The code will apply to all new and renovated commercial buildings and residential buildings over three stories. It will create a mandatory "floor" of enforceable minimum standards. A number of local and state governments have already started adopting it – and, in time, it is likely to be absorbed into industry standards (like The American Disability Act, which also came in for criticism on grounds of cost when first released).

Table 55: Efficiency provisions of the International Green Construction Code

EE provision	Overview
Site Development, Land Use	Restricts development on greenfields (undeveloped land), although there are exceptions based on existing infrastructure. It includes clear guidelines for site disturbance, irrigation, erosion control, transportation, heat island mitigation, graywater systems, habitat protection, and site restoration.
Materials	A minimum of 50% of construction waste must be diverted from landfills, and at least 55% of building materials must be salvaged, recycled-content, recyclable, bio-based, or indigenous. Buildings must be designed for at least 60 years of life, and must have a service plan that justifies that.
Energy Efficiency	Total efficiency must be "51% of the energy allowable in the 2000 International Energy Conservation Code" (IECC), and building envelope performance must exceed that by 10%. It sets minimum standards for lighting and mechanical systems, and requires certain levels of sub-metering and demand-response automation.
Water Efficiency	Establishes maximum consumption of fixtures and appliances and sets standards for rainwater storage and graywater systems.
Indoor Air Quality	Addresses radon, asbestos, VOCs, sound transmission, and daylighting.
Commissioning, Operations	Requires extensive pre- and post-occupancy commissioning and education of building owners and maintenance employees.
Additional Elective	Every project is also required to choose an additional "elective," which pushes the envelope for the developer further. Once they choose it, it's enforceable. There's a long menu of elective choices, including whole-building life-cycle assessment to more stringent recycled content.

Source:BofA Merrill Lynch Global Research estimates

Building envelope & efficiency opportunities

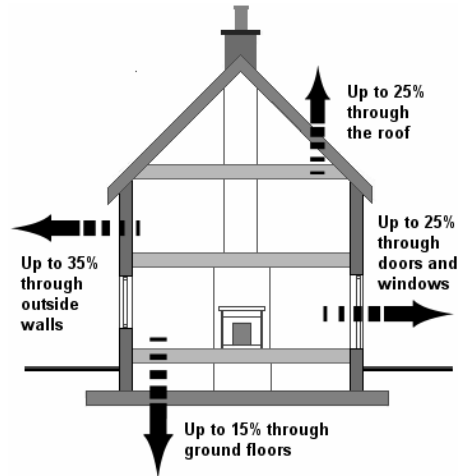
We see significant value arising from energy efficiency in new construction and building retrofits. This growth will take different forms with developed countries having higher potential for green refurbishment and retrofits and emerging markets focused on efficiency in new construction.

Effective thermal envelope is key, 2-4x improvements

An effective thermal envelope is the key to energy efficiency in buildings. A thermal envelope refers to the ability of the shell of a building to act as a barrier to heat transfer between its interior and exterior. Its effectiveness is a function of three factors: 1) insulation levels (walls, ceiling/roof, ground/basement); 2) windows and doors; and 3) the rate of inside and outside air and air tightness of the building envelope (HVAC).

It is estimated that 40% of the EU's total energy consumption is from buildings, with an estimated €270bn lost because of poor energy efficiency every year (Source: EC). Improvements in the thermal envelope can, for instance, reduce heating requirements by up to 2-4x, as well as lower summer cooling energy use (Source: UN IPCC). Up to 78% of the energy used in buildings can be saved through thermal renovation – and simple measures around windows and insulation (Source: Saint-Gobain).

Chart 55: Heat loss from poor thermal envelope



Source: Low Energy House

Table 56: Efficiency gains from thermal envelope

Technology	Energy savings	Cost	Overview	Barriers
Building airtightness	10-40% of HVAC	Low	Reduce energy loss through unintentional air leakage via the building envelope; retrofits possible	Lack of understanding of cost & impact, poor construction practices, lack of regulations
Cool roofing	6-16% of cooling energy	Low to Med	Coatings w/ high solar resistance reflect heat, transfer less heat to buildings	Aesthetics (white coatings), limited life cycle (degradation), lack of regulations
Electrochromic windows	<19-26% of cooling loads, <45-65% of lighting energy	High	Adjust light transmission properties of glazing to minimise solar heat gain & maximise natural lighting	High initial cost: incremental costs are US\$1000/m ² (\$93/ft ²) of glazing
High performance windows	39% of heating & 32% of cooling energy	Med.	2 nd gen low-e coatings, high insulation technologies w/ triple or quadruple panes, vacuum spaces & aerogels, retrofits possible	High initial cost: US\$30-50/m ² higher than standard
Improved insulation	12%	Low	Improved insulation products or practices to avoid loss of thermal insulation R-values, thermal bridging & air leakage	Lack of consumer & builder education, could be expensive

Source: Industry, BofA Merrill Lynch Global Research

Globally, insulation of buildings saves 2.4 GtCO₂e. Assuming best-in-class insulation standards were applied globally, the abatement potential could grow another 1.7Gt CO₂e by 2030 (Source: Vattenfall)

1) Insulation

Thermal insulation reduces heat loss or gain by providing a barrier between areas that are different in temperature. It is used for walls, roofs, boilers and hot water pipes and plays the largest role in maximising the long-term thermal performance of buildings, by keeping cold out in winter months and preventing heat from entering during summer months.

Reduced energy consumption, costs & emissions

High-performance insulation significantly reduces energy consumption, costs and GHG emissions. In the US, for instance, all insulation products installed in buildings save consumers about 12 quadrillion BTUs annually or about 42% of the energy that would have been consumed with no insulation in place (Source: Source: Saint-Gobain); they also reduce US CO₂ emissions by 780Mt/y. Importantly, there is huge room for improvement – in the US it is estimated that up to 60% of homes are under-insulated and that up to 50% of the energy in buildings is lost due to inadequate insulation (Source: Saint-Gobain).

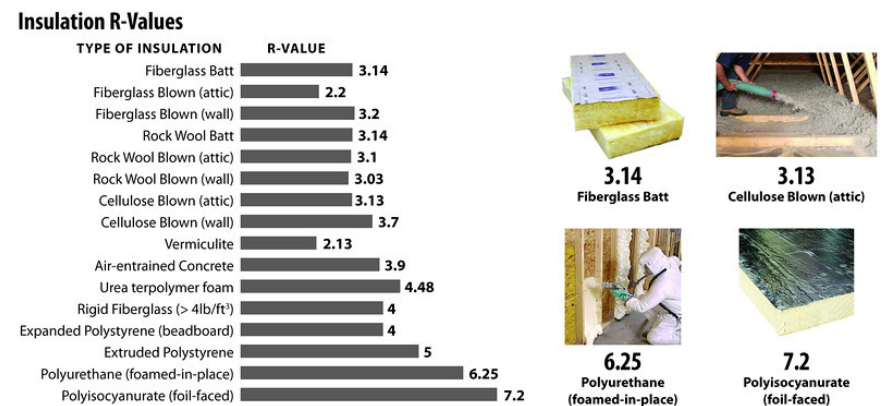
Table 57: Insulation types

Insulation	Overview
Glass wool	Most popular and widely used insulation material Made from recycled glass bottles (eco-friendly), easy to handle and install, cost-effective
Mineral wool	Solid structure makes it ideal for situations where it may be under compression, (e.g. on a flat roof).
Foam	Rigid foam insulation (e.g. EPS (expanded polystyrene) and XPS (extruded polystyrene) has high compressive strength and is usually used where it needs to support weight (e.g. under a floor, or in lofts as a storage solution). Also provides fire resistance and acoustic insulation

Source: BofA Merrill Lynch Global Research

The R-factor – a measure of thermal resistance – can be used to evaluate different types of insulation: the higher the R-factor, the more energy-efficient the insulation.

Chart 56: Insulation R-Values

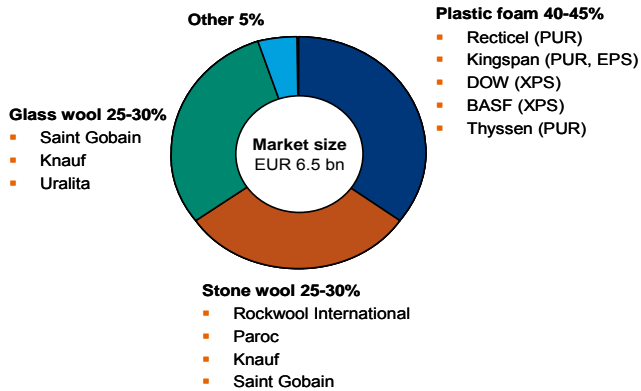


Source: National Energy Education Development Project

US\$17bn+ market

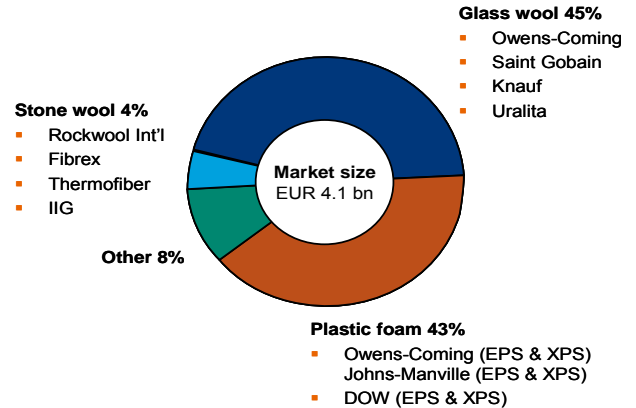
The European, North American, Chinese and South-East Asian insulation markets are currently estimated to be worth over €13bn/year, with Europe being the most important (€6.5bn), North America (€4.1bn) coming a close second, and China and South-East Asia increasingly gaining in importance.

Chart 57: EU insulation market 2010



Source:Rockwool, BofA Merrill Lynch Global Research

Chart 58: North American insulation market 2010



Source:Rockwool, BofA Merrill Lynch Global Research

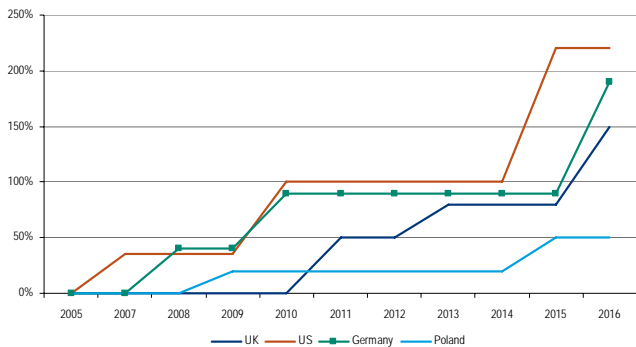
Costs driving regulation

With oil prices flirting around US\$100 a barrel, cost is driving many jurisdictions to regulate more efficient insulation. For instance, in the US there are an estimated 60 million under-insulated homes that face energy costs of up to 47% higher this winter. Such homes emit 0.5t more CO2 each year than their properly insulated neighbours (Source: Owens-Corning).

Efficiency still a driver during the recession

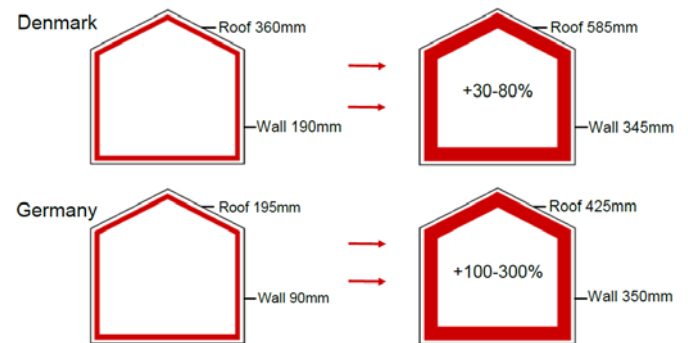
In Europe, we are seeing a market recovery led by France (cf. Grenelle de l'Environnement) and Germany (cf. government efficiency programmes including doubling the renovation target to 2% and €1.5bn in funding for 2012), and positive trends in the Nordics. Meanwhile, the Dutch, Spanish and UK markets remain challenging. In North America, insulation sales are growing despite a weak housing market, with a strong state focus on efficiency (Source: Kingspan, Rockwool).

Chart 59: Percentage improvement in insulation standards from 2005



Source:EU, BofA Merrill Lynch Global Research estimates

Chart 60: Tightening of new build codes aimed at passive houses by 2018-20



Source:Rockwool

Chart 61: Energy savings & GHG abatement in US by adding exterior R-4 insulation in a single family home

Energy Savings Provided

by Adding Exterior R-4 EPS Insulation in a Single Family Home

The added efficiency from installing R-4 EPS insulation saves 6.58 million BTUs each year in the average U.S. home.

	ENERGY INVESTMENT	MILLIONS BTU's
EPS Production		8.90
EPS Transportation		0.13
Total Energy Invested		9.03

ENERGY SAVINGS (millions of BTU's)	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	U.S. AVG.
Annual Energy Savings	11.37	9.58	7.84	5.58	5	6.58
Payback Period (years)	0.79	0.94	1.15	1.62	1.81	1.37
Savings Over 50 Years	568	479	392	279	250	329

Global Warming Potential Reductions Provided by Adding Exterior R-4 EPS Insulation in a Single Family Home

The added efficiency from installing R-4 EPS insulation saves 982 pounds of carbon dioxide from being emitted each year in the average U.S. home.

	GLOBAL WARMING POTENTIAL INVESTMENT	LBS. CO ₂ EQUIV.
EPS Production		8.90
EPS Transportation		0.13
Total Energy Invested		9.03

GLOBAL WARMING REDUCTIONS (compared to base wall)	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	U.S. AVG.
Annual Reductions (lbs. CO ₂)	1,669	1,354	1,155	831	777	982
Payback Period (years)	0.49	0.61	0.71	0.99	1.05	0.83
Savings Over 50 Years	83,473	67,682	57,739	41,257	38,867	49,095

Source: Chemistry and Energy Efficiency

High R-values mean lower costs & rapid paybacks

The payback periods for insulation will vary widely according to climate (warm, moderate or cold), how much insulation is already present, the size of the building, the number of external walls, and the fuel used to heat or cool the property. Regardless, there is still a substantial ROI from investing in high R-value insulation:

- North American paybacks are no greater than two years (for R-6 insulation in zone 5) and can be as little as three months (for R-4 insulation in the Northwest Territories of Canada) (Source: EPS Molders). We also note that insulation is one of only a few products which save more energy over a lifetime than is used for their production.

Table 58: North American & emerging market insulation market overview

Market	Attributes	Growth drivers
North America residential new construction	<ul style="list-style-type: none"> Cyclical business Multiple distribution channels Strong contractor customer base 	<ul style="list-style-type: none"> Housing starts Building energy code adaptation Household formation
North America residential repair & remodel	<ul style="list-style-type: none"> Diverse contractor & DIY customer base Project focused Big box retail 	<ul style="list-style-type: none"> Ageing housing stock Energy efficiency policies Existing home sales
North America commercial & industrial	<ul style="list-style-type: none"> Broad end-market applications Engineered product solutions Total building system focused 	<ul style="list-style-type: none"> Code & green specification driven Owner operator focus Accessible financing
Emerging markets	<ul style="list-style-type: none"> Strong long-term economic growth Emerging building code development 	<ul style="list-style-type: none"> Growing middle class Infrastructure improvements Urbanisation of China

Source: Johnson Controls, BofA Merrill Lynch Global Research

- UK paybacks are no greater than two years for loft insulation while cavity and wall insulation offer greater savings (although they require professional installation).

Table 59: UK payback for loft, cavity & wall insulation

Measure	Annual saving per year	DIY cost	Payback	CO ₂ saving per year
Loft insulation (if no existing insulation is present - i.e. laying 270mm)	Around £175	£50-£350	Less than 2 years (DIY)	Around 730kg
Loft insulation (if topping up - i.e. laying 100-270mm)	Around £25	£50-£350	From 2 years (DIY)	Around 210kg
Cavity wall insulation	Up to £135	£100-£350	1-3 years	Around 560kg
Solid wall insulation (internal)	Around £455	£5,500-£8,500	Varies	Around 1,800kg
Solid wall insulation (external)	Around £475	£10,500-£14,500	Varies	Around 1,900kg

Source: Energy Saving Trust. The costs and paybacks shown are approximate, are provided for illustrative purposes only and are based on a gas heated semi-detached house with 3 bedrooms. The savings are the same as those used for CERT, assume a gas price of 4.39p/kWh and include a reduction factor for comfort taking. Installed costs and paybacks assume that installation is undertaken by a professional installer, unless otherwise stated, and both loft and cavity wall insulation costs include a subsidy which can be obtained under CERT. The total, unsubsidised cost of installing either loft or cavity wall insulation is typically around £500.

2) Windows, glazing

The use of advanced window and door glazing solutions can significantly reduce the need for heating and cooling in buildings, thus reducing energy use and CO₂ emissions.

Reduced energy consumption, costs & emissions

Anywhere from 20% to 35% of the heat within most homes escapes through inefficient windows and glass, adding up to 10% to national carbon emissions annually (Source: US DoE). High-performance windows significantly reduce energy consumption, costs and emissions. Efficiency is primarily measured by a window's U Value or thermal transfer value (i.e. how well it prevents heat from escaping), with performance improving significantly in recent years via double and triple glazing and low-e coatings, which can reduce heat loss by up to 70%.

Table 60: Energy efficiency benefits of windows

Glazing type	Overview
Double glazing	Increased insulating capacity (vs. single glazing)
Triple glazing	'U value' is up to 8x more efficient than single glazing & 4x basic double glazing
Low-emissivity (low-e) coatings	Adding metallic-oxide based coatings or gas fills between glazing layers to suppress radiative heat flow while letting light pass makes them 2.5-5x more efficient than basic double glazing Coated triple glazing is an essential component of passive / nearly-zero energy buildings
Solar control	Reflect/absorb reduces solar heat gain by up to 75%, combined with low-e to maximise efficiency
Electrochromic / gasochromic	Can reduce the average annual daylight glare index (DGI) and can reduce the peak electric loads by 20-30 percent. The multi-layer tungsten-oxide coating switches provide efficient solar heat gain rejection when required.

Source: Company sources, BofA Merrill Lynch Global Research

Table 61: Typical glazing characteristics

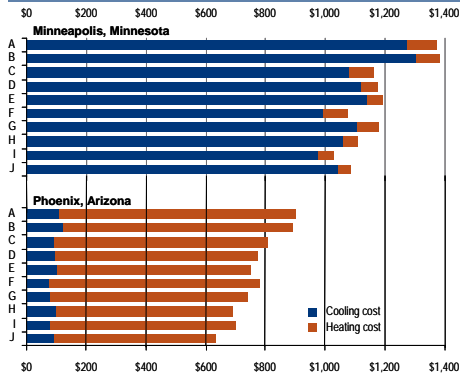
Type of glazing	U-Value (R-Value)	Visible Light Transmittance	UV Light Transmittance*	Solar-Heat-Gain Coefficient	Recommended Applications
Single glazing, clear	1.0 (1.0)	90%	71% (85%)	0.86	None
Double glazing, clear	.50 (2.0)	81%	56% (59%)	0.76	None
Double glazing, low-E, high-solar gain	.35 (2.9)	75%	47% (51%)	0.71	Cold climates; passive solar
Double glazing, high-solar gain, low-E, argon**	.29 (3.4)	75%	47% (51%)	0.71	Cold climates; passive solar
Double glazing, moderate-solar gain, low-E, argon	.27 (3.7)	78%	23% (40%)	0.58	Cold or mixed climates
Double glazing, spectrally selective low-E, argon***	.25 (4.0)	71%	16% (33%)	0.39	Hot or mixed climates; west-facing glass
Double glazing (1 inch) with clear Heat film	.21 to .26 (3.8 to 4.8)	20 to 81% (varies with coating type)	<1% (28% to 53%)	.14-.57	Match coating to climate and design needs

Source: Best Practices Guide to Residential, Construction

* Number in () is "damage-weighted transmittance (T-dw)" which includes the portion of visible light that contributes to fading. Lower numbers indicate less fading

** High-solar-gain glass uses "hard-coat" or pyrolytic coatings

Chart 62: Glazing comparison for US houses



Source: Center for Sustainable Building Research. * Annual energy performance for a 2000-square-foot house with different glazing types using a wood or vinyl frame in two U.S. climates. A=Single, clear, B=Single, tint, C=Double, clear, D=Double, tint, E=Double, high-performance tint, F=Double, high solar gain low-E, G=Double, moderate solar gain low-E, H=Double, low solar gain low-E, I=Triple, moderate solar gain low-E, J=Triple, low solar gain low-E

Lower U-values mean lower costs & rapid paybacks

In spite of these technical improvements, the cost of glazing and windows has remained constant or even dropped in real terms. Using advanced glazing solutions can significantly reduce the need for heating and cooling in buildings, thereby reducing energy consumption and associated CO2 emissions. Studies show that savings of more than 100Mt of CO2 could be achieved annually if all Europe's buildings were fitted with advanced energy-saving glass (Source: Glass for Europe).

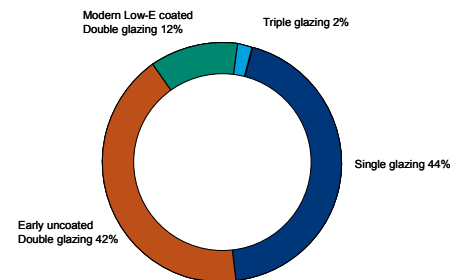
The incremental cost of using high-performance glazing when a building's windows are retrofitted or replaced is small compared with the lifetime saving generated through energy savings. Calculating the ROI of a move to energy-efficient windows is dependent on a number of factors including initial glazing in place, energy needs, energy source, energy price, the efficiency of the building envelope, the existence of incentives, and climate. But, depending on the parameters, the full payback period for energy-efficient windows from replacement is commonly estimated at 3-9Y – whereas windows stay in buildings for an average of 25-30Y, meaning a generation of energy bill and CO2 savings.

Table 62: Payback from windows

Organisation	Efficiency measure	Payback
Glass and Glazing Federation	replacing single glazing with A rated double glazing	Could save £8,211 and 22t of CO2 in a typical detached house, or £5,855 and 16t CO2 in a typical semi-detached house
Pilkington	replacing single glazing with A rated double glazing	Typical semi-detached house could save over £10,000 over a 20 year period
Energy Savings Trust	installing Energy Saving Recommended windows	Average household installing can typically cut CO2 emissions by approximately 0.75t/y
British Fenestration Rating Council (BFRC)	installing energy efficient windows	Can save and reduce energy bill by up to £461/y

Source: BofA Merrill Lynch Global Research estimates

Chart 63: Glazing type distribution in EU

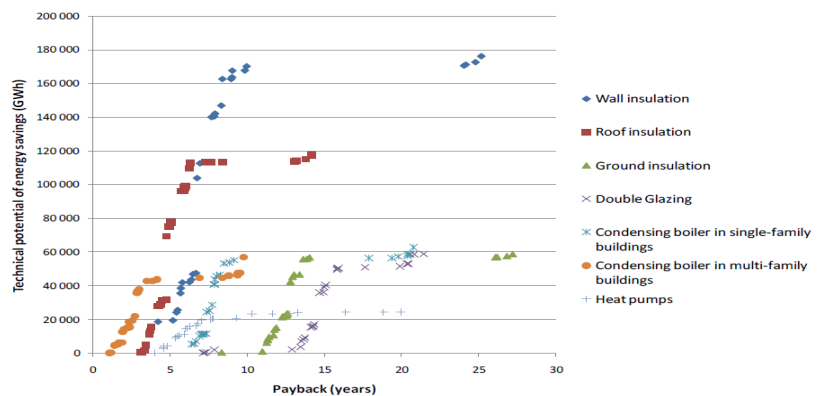


Source: Glass for Europe

Huge growth potential

Studies show that 100mt in CO2 savings could be achieved annually if all of the EU's buildings were fitted with energy-efficient glass – the equivalent of one-third of its building-related energy savings targets. The potential for growth is huge, even in Europe: early uncoated double glazing is still used in 42% of buildings; 44% of windows in the EU's buildings are still single glazed; and <15% of the EU's windows contain energy-saving glass (Source: Glass for Europe).

Chart 64: EU-27 cumulative additional energy savings from various EE measures according to their payback time in the residential sector



Source: BofA Merrill Lynch Global Research estimates

3) HVAC

With heating and cooling responsible for 40-60% of energy use and costs in buildings, it is natural that significant efficiency focus is being placed on heating, ventilation, and air conditioning (HVAC). In the US residential sector, HVAC accounts for 39% of total energy use, while in the commercial sector, it accounts for nearly a third (Source: DOE). From an efficiency perspective, most buildings waste 10%+ of their energy consumption owing to inefficient HVAC operation. New HVAC systems are up to 30% more efficient than existing systems, making a clear case for attractive growth from upgrades.

Reduced energy consumption, costs & emissions

HVAC is the largest energy consumer in buildings and an area where large savings can be realised. For instance, improper design and installation of HVAC equipment can reduce their efficiency by as much as 30% (Source: McKinsey).

Table 63: HVAC products

Segment	Overview	
Commercial	Advanced Thermal Technologies	
	Airside and Terminal Devices	
	Building Services	
	Chillers	
	Controls	
	HVAC incl. parts & supplies	
	Microturbines	
	Unitary Systems (heating/cooling/fan)	
	Residential	Air cleaners
		AC
Air exchangers		
Air handlers (distribute air evenly)		
Furnaces		
Heat pumps		
Humidifiers		
Packaged heating & cooling systems		
Thermostats & controls		
Parts & service		

Source: BofA Merrill Lynch Global Research

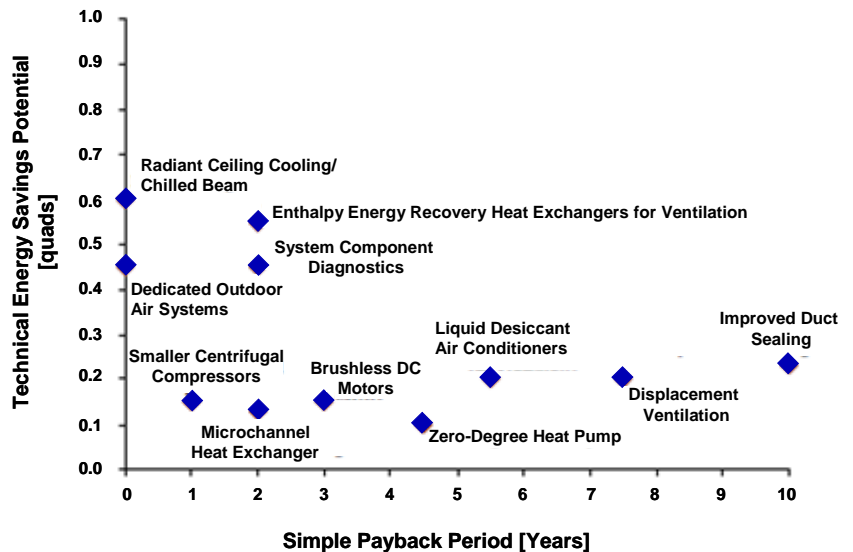
Table 64: Summary of savings potential from four HVAC installation measures

Measure	Energy Savings Potential	Peak Demand Savings Potential
Proper Sizing	2% to 10%	Moderate
Ensure Proper Air Flow	7%	Very Small
Proper Charging	13%	Small
Duct Sealing	10%	Large

Source: Proctor National Study

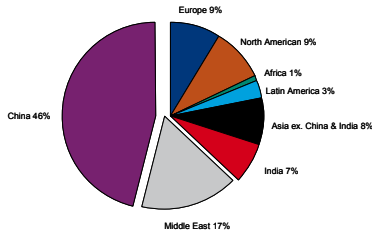
The energy-saving benefit of efficient HVAC systems is on average +30% versus existing systems. The savings can be even higher. For example, efficient measures such as low-lift cooling (i.e. chillers, fans pumps) versus a building with a conventional HVAC system can range from 60-74% for temperate to hot climates, to 30-70% in milder climates (Source: US DOE).

Chart 65: Estimated technical energy savings potential and simple payback periods for HVAC options



Source: U.S. National Technical Information Service

Chart 66: HVAC/Controls growth value from incremental building stock 2011-2021



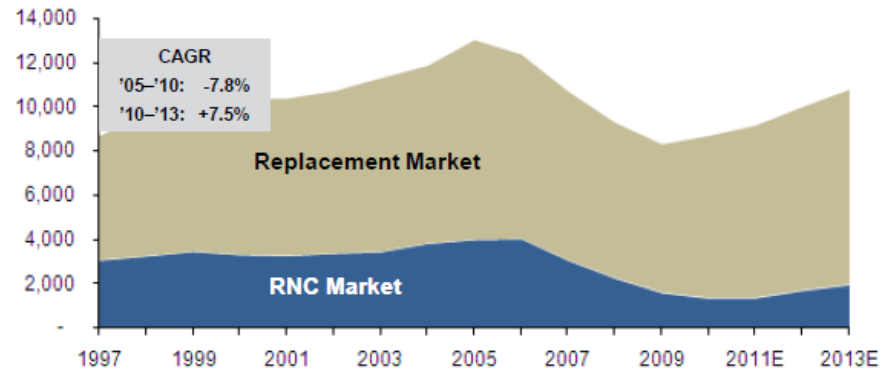
Source: Johnson Controls, BofA Merrill Lynch Global Research

US\$113bn market with strong growth prospects

The global HVAC systems and service market is estimated at around US\$180bn, of which the addressable market opportunity is still a significant US\$113bn (Source: Johnson Controls). This includes targeted HVAC services (US\$48bn), non-residential HVAC systems (US\$31bn), global residential (US\$25bn) and NAM residential (US\$9bn). Energy and sustainability – energy solutions building retrofits, distributed renewables, GHG advisory services and retro-commissioning – expand the core addressable market by 20% to US\$137bn (Johnson Controls). The key market drivers are:

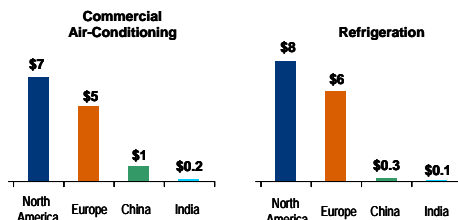
- **Replacement demand** – both for commercial and residential buildings, which is approaching double-digit growth, on the back of a desire to reduce energy costs and more stringent regulations. The retrofit of old HVAC systems was a US\$4bn market in the US in 2010, and it is expected to double by 2013 [source: Ingersoll Rand]. It is also worth noting that HVAC systems last only 10-15 years and 70-80% of HVAC industry sales in the US are derived from the replacement of existing units, i.e. there is some catch-up demand from the past few years still to come.

Chart 67: HVAC replacement & RNC market growth



Source: Ingersoll Rand

Chart 68: Growth opportunities (metrics per capita)

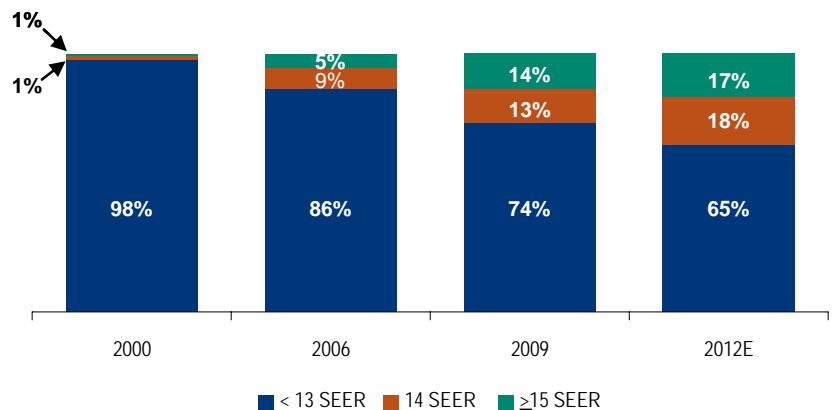


Source: UTC

Executives from leading US HVAC stakeholders, including the AHRI, ACEEE, Alliance, NRDC, NEEP, ASAP, CEC and NWPCC, have signed an agreement to establish regional energy efficiency standards for HVAC appliances with stricter standards for new constructions. The standards are expected to save US\$13bn from 2013-30 and an overall 3.7 quad Btu of energy (i.e. energy consumed by 18mn US households/y), and reduce CO2 emissions by 23Mt tons by 2030

- **Emerging markets** – 90%+ of urban growth in the coming years will be in these markets, which, together with rising living standards, could see AC demand triple before 2030 (Source: McKinsey/Vattenfall).
- **Increasingly stringent efficiency standards** – regulators and industry are moving towards stricter efficiency standards for HVAC appliances, as well as energy-efficiency mandates for government buildings. We expect the stringent standards to further drive growth.

Chart 69: Industry shipments by SEER*



Source: Ingersoll Rand. Seasonal energy efficiency Ratio = used to define the seasonal efficiency of air conditioners and refrigeration equipment. The SEER rating of a unit = cooling output in Btu during a typical cooling season / total electric energy input in watt-hours during the same period. The higher the unit's SEER rating, the more energy efficient it is.

HVAC alternatives gaining traction

Alternatives to conventional HVAC systems in commercial buildings are gaining increasing traction as they can reduce HVAC system energy use by up to 75%, as well as help to reduce heating and cooling loads.

Table 65: HVAC alternatives

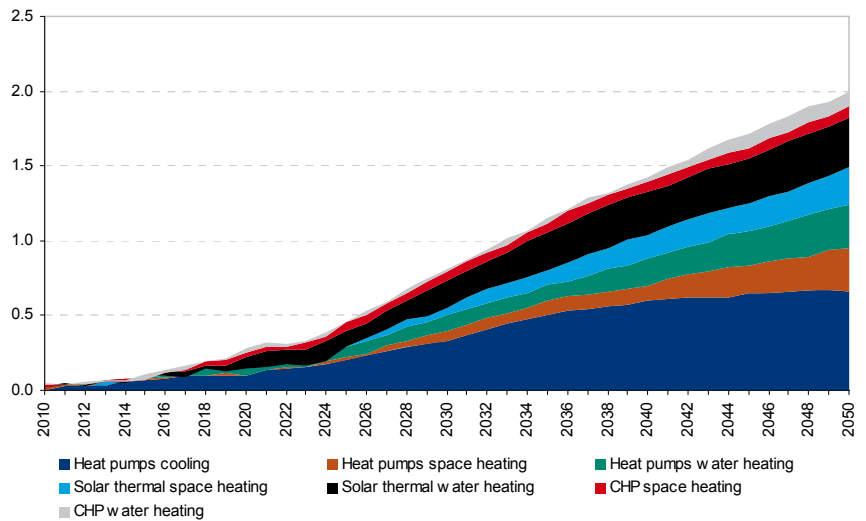
Alternative	Overview
Radiant chilled-ceiling cooling	Circulating water through pipes or lightweight panels results in significant energy savings as water better transports heat than air, the water is supplied at 16-20°C allowing a higher chiller COP when the chiller operates and allowing more frequent use of 'water-side free cooling,' in which the chiller is bypassed altogether and water from the cooling tower is used directly for space cooling.
Displacement ventilation	Air is introduced at low speed through diffusers in the floor or along the sides of a room and is warmed by internal heat sources (occupants, lights, plug-in equipment) as it rises to the top of the room, displacing the air already present. The advantage is that the supply air temperature is significantly higher for the same comfort conditions (c.18°C vs. 13°C in a conventional mixing ventilation system). It also permits significantly smaller airflow.

Source: BofA Merrill Lynch Global Research

Huge potential for low/zero carbon heating & cooling technologies

Low/zero-carbon and energy-efficient heating and cooling technologies for buildings have the potential to reduce CO2 emissions by up to 2Gt and save 710Mtoe of energy by 2050 (Source: IEA).

Chart 70: Low/zero carbon heating & cooling technologies could save 2Gt CO2 by 2050



Source: IEA, BofA Merrill Lynch Global Research. Excludes the impact of improved building shells on reducing heating and cooling loads.

Most of these technologies – which include solar thermal, combined heat and power (CHP), heat pumps & thermal energy storage – are commercially available today.

Table 66: Low/zero carbon heating & cooling technologies

Technology	Overview
Active solar thermal (AST)	Can provide space and water heating, and cooling needs
Combined heat and power (CHP): Heat pumps	Traditional systems are a mature, transitional technology; micro-CHP, biomass CHP and fuel cell systems (hydrogen) may emerge Pumps for cooling and space and water heating are mature, highly efficient technologies that take advantage of renewables
Thermal storage	Can maximise energy savings & efficiency potential of other technologies, facilitate the use of renewables and waste heat Includes sensible (hot water, underground storage) and latent ("phase change" ice storage, micro-encapsulated phase-change materials) and thermo-chemical storage

Source: IEA, BofA Merrill Lynch Global Research

Table 67: Top 25 energy conservation measures (ECM) technologies and applications

Major ECM Category	ECM Type	Technology/ECM Name	Rating*
Controls	General/Special	Upgrade to Direct Digital Control	100%
Industrial	Compressed Air	Implement Compressed Air Utility Management	100%
Water	Reduce Use	Install Low Flow/Use Fixtures	96%
Controls	General/Special	Retro/Recommission Controls for Optimizing Savings	94%
Controls	General/Special	Install Lab Hoods Control - Flow Safe Lab Hoods	94%
Supply Side Management	Manage Energy Supply	Change Regulated Utility Rate/Tariff	94%
Water	Smart Metering	Install Smart Meters & software -- for Billing & Accuracy	94%
Electrical	Lighting	Install Lighting Controls	92%
Electrical	Lighting	Replace T-8s for HiBays with T5s	92%
Plant	Boilers	Install Tankless/Instantaneous Water Heaters	92%
Supply Side Management	Manage Energy Supply	Change to Interruptible Rates and Use Electric Generators	92%
Architectural	Envelope	Install Weather-Stripping	92%
Electrical	Lighting	Upgrade Fluorescent Fixtures w/ T8 or T5 Lamps and Electronic Ballasts	92%
Electrical	Lighting	Retrofit Incandescent Lamps w/ Compact Fluorescent Lamps	92%
Electrical	Lighting	Replace Exit Sign w/new LED Fixture	92%
Plant	Boilers	Adjust Burner as Regular Maintenance	92%
HVAC (Building/Non-Plant)	Unit Upgrade	Convert CV to VAV	88%
HVAC (Building/Non-Plant)	Unit Upgrade	Convert Dual Duct to VAV	88%
Electrical	Lighting	Replace HID HiBay fixtures with T5s or T8s	86%
Electrical	Lighting	Add LED night lights in halls	86%
Architectural	Roof	New Construction with Green Roofs (Plants)	85%
	Water Source Heat		
Plant	Pump Systems	Install Water Source Heat Pump System	83%
Plant	Motors/Pumping	Install VFD/VSDs for Pumps	81%
Controls	Resetting	Reduce Outdoor Air To Design Level	78%
Controls	Resetting	CO2-Based Demand-Controlled Ventilation	78%

Source:Ingersoll Rand. * Score of 0-100% with 100% being the best ranking – based on: Savings potential, Practicality, Commercial viability, Risk management, Business differentiation

iv) Building Automation

See *Industrials & integrated*.

Many challenges remain

Energy efficiency in buildings may seem a ‘no-brainer’ in terms of the energy cost and emissions savings, but further progress is needed at a number of levels for its full potential to be realised. This includes greater political will across the globe, mandatory efficiency targets, financial support, enforcement of regulation, and better communication and education.

Major progress needed on renovation cycle

Energy efficiency targets are unlikely to be met by changes in behaviour or deploying efficient technology, as electricity consumption is rising at a higher rate than other energy usage. With new construction representing less than 2% of existing building stock, even if all new construction had energy consumption of 50% less than existing stock, the result would still be an increase in EU electricity consumption of 18%.

10% renovation rate required

The refurbishment of existing building stock and improvements in energy management are thus vital to meet emission reduction targets. At the very least, we need to see renovation of 10% per year of existing stock to achieve a 20% reduction in energy consumption. The need for renovation is even more pressing in emerging markets, such as CEE and Russia.

Of the EU’s c.210 million buildings, 50% were built before the first oil crisis in 1973

Building companies & energy efficiency

We have identified the following companies covered by BofA Merrill Lynch Global Research that have exposure to energy efficiency as a percentage of sales vis-à-vis their involvement as suppliers for the sector or as providers of pure-play energy efficiency solutions. Although it is difficult to accurately gauge the link between such exposure and share price performance (as many factors outside the scope of this analysis play a role in short- and long-term price development), we still consider energy efficiency exposure an important positive point to track.

Table 68: List of companies covered by BofAML involved in Buildings & Energy Efficiency

BBG Ticker	Company	Location	BofAML Ticker	Market Cap (US\$mn)	Investment Opinion	EE Exposure
SGO FP	COMPAGNIE DE SAINT-GOBAIN	France	CODGF	25057.2	Buy	High
CSR AU	CSR LIMITED	Australia	CSRLF	1050.3	Underperform	Medium
HON US	HONEYWELL INTERNATIONAL INC	United States	HON	46685.4	Buy	Medium
IR US	INGERSOLL RAND	United States	IR	12772.5	Buy	High
JCI US	JOHNSON CONTROLS	United States	JCI	22623.6	Buy	Medium
KSP ID	KINGSPAN	Ireland	KGSPF	1794.3	Buy	High
KNEBV FH	KONE	Finland	KNYJF	15367.7	Buy	High
5202 JP	NIPPON SHEET GLASS	Japan	NPSGF	1583.4	Neutral	Medium
5947 JP	RINNAI CORP	Japan	RINIF	3573.1	Buy	High
UTX US	UNITED TECHNOLOGIES	United States	UTX	75894.2	Buy	Low

Source: IQ, DataStream, BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency products, services, technologies and solutions

Table 69: CSR Limited - key data

Analyst's Name	Ben Chan >>		
Analyst's Email Id.	ben.chan@baml.com		
Analyst's Phone No.	+61 3 9659 2004		
	2011	2012E	2013E
Revenues	1,937	1,818	1,878
Operating Profit	212	152	152
Operating Margin	10.9%	8.3%	8.1%
Y-o-Y Growth	-41.8%	-28.5%	0.5%
Net Profit	(78)	61	85
Net Margin	-4.0%	3.4%	4.5%
Y-o-Y Growth	-30.2%	-178.5%	38.6%
EBIT	212	152	152
EBIT Margin	10.9%	8.3%	8.1%
EBITDA	308	241	243
EBITDA Margin	15.9%	13.2%	12.9%
Operating Cash Flow	143.9	187.5	171.6
Capex	143.1	102.0	75.9
Free Cash Flow	0.8	85.5	95.7
Net Debt/Equity	(10.9)	(8.1)	(11.8)

Source: Company data, BofA Merrill Lynch Global Research estimates

CSR Limited

CSR is a diversified conglomerate with three distinct businesses. CSR Building Products manufactures plasterboard, fibre cement, clay bricks and pavers, aerated lightweight concrete, roofing tiles and insulation (all mainly in Australia but also in New Zealand and increasingly in Asia). Viridian is Australia's only flat glass producer. CSR also has a 26% interest in the tomago aluminium smelter (530ktpa).

CSR's (medium EE exposure) Building Products division exposes it to energy efficiency via insulation, lightweight systems, energy-efficient glass, bricks, HVAC ducting, roofing, lightweight concrete products and PV panels. It is also looking to new product development, targeting "affordable" energy-efficient solutions to reduce pay-backs. Since 2008, Viridian's sales of higher-margin energy-efficient glass (double glazing, low-e, "Smartglass") have more than doubled despite total glass sales decreasing. CSR's medium/long-term efficiency outlook is positive: housing stock deficiency; increasing energy prices on the back of government regulation to drive energy efficiency demand (i.e. mandatory 6-star building standards in most states); strong immigration intake; and population growth.

Table 70: Honeywell International Inc. - key data

Analyst's Name	John G. Inch		
Analyst's Email Id.	john.inch@baml.com		
Analyst's Phone No.	+1 646 855 2454		
	2011	2012E	2013E
Revenues	36,528	37,757	40,032
Operating Profit	2,162	4,899	5,467
Operating Margin	7.3%	13.0%	13.7%
Y-o-Y Growth	-30.5%	126.5%	11.6%
Net Profit	698	3,340	3,774
Net Margin	1.9%	8.8%	9.4%
Y-o-Y Growth	-63.7%	378.8%	13.0%
EBIT	2,162	4,899	5,467
EBIT Margin	5.9%	13.0%	13.7%
EBITDA	3,119	5,919	6,547
EBITDA Margin	8.5%	15.7%	16.4%
Operating Cash Flow	2,833.0	4,457.9	5,314.0
Capex	798.0	850.0	880.0
Free Cash Flow	2,035.0	3,607.9	4,434.0
Net Debt/Equity	(1.0)	(12.0)	(21.3)

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 71: Ingersoll Rand Plc - key data

Analyst's Name	Andrew Obin		
Analyst's Email Id.	andrew.obin@baml.com		
Analyst's Phone No.	+1 646 855 1817		
	2011	2012E	2013E
Revenues	14,782	14,341	15,076
Operating Profit	1,507	1,583	1,786
Operating Margin	10.2%	11.0%	11.9%
Y-o-Y Growth	20.8%	5.0%	12.9%
Net Profit	347	964	1,105
Net Margin	2.4%	6.7%	7.3%
Y-o-Y Growth	-42.4%	177.4%	14.7%
EBIT	1,507	1,583	1,786
EBIT Margin	10.2%	11.0%	11.9%
EBITDA	1,954	2,034	2,264
EBITDA Margin	13.2%	14.2%	15.0%
Operating Cash Flow	1,011.6	1,369.9	1,334.0
Capex	188.5	207.3	217.7
Free Cash Flow	823.1	1,162.6	1,116.3
Net Debt/Equity	37.6	34.7	18.6

Source: Company data, BofA Merrill Lynch Global Research estimates

Honeywell International

Honeywell International is a diversified, global technology and manufacturing company. Its operations are organized under four business segments: Aerospace, Automation and Control Solutions, Specialty Materials, and Transportation Services. The company is a premier supplier of avionics, power, and control systems for the aerospace industry. Honeywell management has accomplished much in only a few years, including selling weak businesses, reinvesting in product development, and expanding the global footprint.

Honeywell (medium EE exposure) is positioned to meaningfully expand its margins and cash flow, in our view, with energy efficiency acting as a favourable tailwind. Roughly 60% of its ACS segment is linked to energy efficiency, with its products and services enabling building owners and end users to optimise efficiency. Furthermore, the company is a major smart grid player. Its Transportation segment is seeing a 10-12% CAGR from fuel-saving turbochargers, which could be a US\$10bn+ market from 2010-14. It also has a strong GHG reduction offering. Overall, more than 50% of its products are linked to energy efficiency which according to the company could, if immediately and comprehensively adopted, reduce US energy consumption by 20-25%.

Ingersoll Rand

Ingersoll Rand (IR) is a global, diversified industrial manufacturer of refrigeration equipment, industrial equipment (air compressors, air tools), golf cars, and architectural hardware (locks, door openers, electronic security devices). Products include well-recognized brands such as Thermo-King, Ingersoll Rand, Club Car, and Schlage.

IR (high EE exposure) is an efficiency play on energy-efficient HVAC systems, building and contracting services, parts support and advanced controls for homes and commercial buildings, as well as transport temperature control. Its Residential Solutions segment stands to benefit from energy efficiency in the HVAC market (>80% of segment revenues), which should see heavy demand for retrofits of old systems – a US\$4bn market in 2010, which is expected to double by 2013. A further increase in efficiency standards through to at least 2015 should further accelerate sales. Overall, IR is growing high energy efficiency sales (i.e. ≥ 15 SEER for HVAC efficiency) at twice the rate of overall share and is transitioning itself from products to integrated efficiency systems. We think the stock provides exposure to recovery in the later-cycle non-residential construction markets. IR is also well-positioned on the cyclical strength of its key industrial markets.

Johnson Controls

See *Auto* section.

Table 72: Kingspan Group Plc - key data

Analyst's Name	Mark Hake >>		
Analyst's Email Id.	mark.hake@baml.com		
Analyst's Phone No.	+44 20 7996 1194		
	2010	2011E	2012E
Revenues	1,193	1,448	1,520
Operating Profit	67	85	97
Operating Margin	5.6%	5.8%	6.4%
Y-o-Y Growth	7.5%	25.4%	14.8%
Net Profit	49	54	65
Net Margin	4.1%	3.7%	4.3%
Y-o-Y Growth	2.1%	10.4%	21.6%
EBIT	67	85	97
EBIT Margin	5.6%	5.8%	6.4%
EBITDA	108	144	157
EBITDA Margin	9.1%	9.9%	10.3%
Operating Cash Flow	38.0	57.6	66.4
Capex	16.0	45.0	50.0
Free Cash Flow	22.1	12.6	16.4
Net Debt/Equity	18.5	32.4	28.4

Source: Company data, BofA Merrill Lynch Global Research estimates

Kingspan

Kingspan is Ireland's second-largest building materials group. It manufactures a range of "lightside" building products, principally insulation panels and boards, but also suspended floors, off-site and structural kits, and environmental containers. The bulk of operations are focused on Western Europe, but the group has recently acquired businesses in Turkey, Canada and Australia.

Kingspan (high EE exposure) is primarily an efficiency play on insulation products, which account for 60% of revenue. The company is a world leader in high-performance insulation (no.1 UK and Ireland) and its brand is well associated with low carbon innovation for buildings. It is looking to nextgen insulation and has an objective to launch fundamentally new, commercially viable lo-lambda insulation in 2014/15, and aims to achieve solar integration with insulation by 2013. While short-term trading prospects retain an element of uncertainty, Kingspan's business is recovering more quickly than anticipated in the residential sector, and its longer-term position looks attractive given the demand dynamics of insulation products. Moreover, we expect a return to more meaningful levels of profitability for the Environmental & Renewables division (including solar thermal system, solar cooling and heating systems, hot water systems, air source heat pumps, etc.).

Table 73: Kone OYJ - key data

Analyst's Name	Ben Maslen >>		
Analyst's Email Id.	ben.maslen@baml.com		
Analyst's Phone No.	+44 20 7996 4783		
	2010	2011E	2012E
Revenues	4,987	5,225	5,759
Operating Profit	709	798	773
Operating Margin	14.0%	13.9%	13.4%
Y-o-Y Growth	23.3%	12.7%	-3.2%
Net Profit	535	644	601
Net Margin	10.7%	12.3%	10.4%
Y-o-Y Growth	15.0%	20.2%	-6.7%
EBIT	709	798	773
EBIT Margin	14.2%	15.3%	13.4%
EBITDA	774	864	862
EBITDA Margin	15.5%	16.5%	15.0%
Operating Cash Flow	752.1	599.4	810.6
Capex	45.6	87.0	54.2
Free Cash Flow	706.5	512.4	756.4
Net Debt/Equity	(46.8)	(40.8)	(53.7)

Source: Company data, BofA Merrill Lynch Global Research estimates

KONE

KONE is the fourth-largest elevator company (second-largest pure play) in the world. Based in Finland, it also sells escalators and a small number of access control products and doors. Around 60% of revenues are generated in Europe, with Asia Pacific (22%) the fastest-growing region. Around 45% of revenues come from new build activity, 25% from retrofit activity and 30% from service (more of earnings).

KONE (high EE exposure) is a play on energy-efficient elevators and escalators. Elevators typically use 5% of a building's energy, so efficiency is a big focus for the company, whose products are machine room-less, have regenerative drives (recover braking energy), and have Ecodisc efficient hoists and energy saving lights. Together, these features have reduced energy use by 50-60% from 2008-11. It should benefit from a governmental and best practice push on energy efficiency in building modernisation and refurbishment (e.g. SNEL legislation in Europe). We expect new equipment markets to trough in 2011 and recover in 2012/13, and margins to hit the 16% target in 2013 (with the potential to go higher after that). The balance sheet is very strong, offering scope for accretive acquisitions and/or enhanced cash return to shareholders. We think KONE is an attractive long-term investment with sustainability trends benefiting both new equipment (urbanisation, changing demographics, efficiency) and modernisation (ageing equipment and population, safety, efficiency).

Table 74: Nippon Sheet Glass - key data

Analyst's Name	Akiko Kuwahara >>		
Analyst's Email Id.	akiko.kuwahara@baml.com		
Analyst's Phone No.	+81 3 6225 6902		
	2011	2012E	2013E
Revenues	577,212	566,300	561,700
Operating Profit	14,352	23,500	25,500
Operating Margin	2.5%	4.1%	4.5%
Y-o-Y Growth	-183.5%	63.7%	8.5%
Net Profit	1,661	14,000	15,200
Net Margin	0.3%	2.5%	2.7%
Y-o-Y Growth	-104.0%	742.9%	8.6%
EBIT	14,352	23,500	25,500
EBIT Margin	2.5%	4.1%	4.5%
EBITDA	62,462	63,000	69,000
EBITDA Margin	10.8%	11.1%	12.3%
Operating Cash Flow	60,041.0	33,202.0	53,200.0
Capex	30,234.0	38,000.0	44,000.0
Free Cash Flow	29,807.0	(4,798.0)	9,200.0
Net Debt/Equity	135.0	184.0	170.5

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 75: Rinnai Corp - key data

Analyst's Name	Asuka Inami >>		
Analyst's Email Id.	asuka.inami@baml.com		
Analyst's Phone No.	+81 3 6225 7609		
	2011	2012E	2013E
Revenues	239,436	249,260	258,340
Operating Profit	25,238	27,140	29,470
Operating Margin	10.2%	10.9%	11.8%
Y-o-Y Growth	23.8%	7.5%	8.6%
Net Profit	15,510	15,770	18,950
Net Margin	6.5%	6.3%	7.3%
Y-o-Y Growth	33.2%	1.7%	20.2%
EBIT	25,238	27,140	29,470
EBIT Margin	10.5%	10.9%	11.4%
EBITDA	33,283	35,120	37,610
EBITDA Margin	13.9%	14.1%	14.6%
Operating Cash Flow	27,536.0	21,099.0	25,990.0
Capex	7,590.0	8,430.0	9,000.0
Free Cash Flow	19,946.0	12,669.0	16,990.0
Net Debt/Equity	(13.7)	(15.9)	(22.6)

Source: Company data, BofA Merrill Lynch Global Research estimates

Nippon Sheet Glass

Established in Japan in 1918, Nippon Sheet Glass (NSG) now has a global production and sales network thanks to its 2006 acquisition of Pilkington. It has one of the highest shares of the global market for sheet glass and is the no.3 flat glass specialist after Asahi Glass and Saint-Gobain.

NSG (medium EE exposure) is well positioned to benefit from growth in? Energy-efficient building products including double glazing, low e, solar control glass and glass for PV. It should also benefit from the auto sector's push on emissions reductions, with glazing exposure to solar energy control, weight reduction and energy saving. The company is transitioning its business structure towards priority investments in Eastern Europe and South America, where demand is expected to grow, as well as solar energy and other high-performance glass. Economic unpredictability in the EU and the yen's appreciation pose risks. Upside risks include: 1) heightened expectations of glass for PV power generation because of renewed interest in renewables post-Fukushima, and 2) stronger-than-expected demand for building glass in Europe.

Rinnai Corp

Rinnai is the largest maker of domestic gas equipment, with a global presence in highly differentiated gas-fired tankless water heaters. Following the appointment of Hiroyasu Naito as president, the company has continued to increase profitability owing to a more profit-oriented structure and the launch of successful new products. The company has also been expanding aggressively overseas.

Rinnai (high EE exposure) is an efficiency pure play on energy-efficient gas equipment (including sensors) and water heaters. The company is well-positioned on the back of (1) stable domestic shipments supported by replacement demand, (2) a strong lead in terms of technology and patents, constituting high global barriers to entry and thus a weak competitive threat, (3) an expected slight trend back to gas and a move away from all-electric homes due to energy-saving requirements and consumer desire for better energy efficiency, and (4) growth in domestic gas equipment in emerging markets, which are increasingly looking to safety and efficiency issues. While performance in the overseas business has been disappointing, we expect it to become a positive factor for the company from FY13.

Table 76: Saint-Gobain - key data

Analyst's Name	Mark Hake >>		
Analyst's Email Id.	mark.hake@baml.com		
Analyst's Phone No.	+44 20 7996 1194		
	2010	2011E	2012E
Revenues	40,119	42,475	43,594
Operating Profit	2,524	3,059	3,013
Operating Margin	6.3%	7.2%	6.9%
Y-o-Y Growth	103.5%	21.2%	-1.5%
Net Profit	1,129	1,667	1,740
Net Margin	2.8%	3.9%	4.0%
Y-o-Y Growth	458.8%	47.7%	4.4%
EBIT	2,524	3,059	3,013
EBIT Margin	6.3%	7.2%	6.9%
EBITDA	4,146	4,651	4,635
EBITDA Margin	10.3%	10.9%	10.6%
Operating Cash Flow	3,276.8	3,242.7	3,582.5
Capex	1,450.0	2,000.0	2,000.0
Free Cash Flow	1,826.8	1,242.7	1,582.5
Net Debt/Equity	39.3	31.1	24.1

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 77: United Technologies Corp - key data

Analyst's Name	Ronald J. Epstein		
Analyst's Email Id.	r.epstein@baml.com		
Analyst's Phone No.	+1 646 855 5695		
	2011	2012E	2013E
Revenues	58,190	60,447	63,641
Operating Profit	8,099	8,643	9,627
Operating Margin	13.9%	14.3%	15.1%
Y-o-Y Growth	12.7%	6.7%	11.4%
Net Profit	4,979	5,266	5,870
Net Margin	8.6%	8.7%	9.2%
Y-o-Y Growth	13.9%	5.8%	11.5%
EBIT	8,099	8,643	9,627
EBIT Margin	13.9%	14.3%	15.1%
EBITDA	9,446	10,024	11,042
EBITDA Margin	16.2%	16.6%	17.4%
Operating Cash Flow	6,590.0	7,495.4	7,475.7
Capex	983.0	1,100.0	1,150.0
Free Cash Flow	5,607.0	6,395.4	6,325.7
Net Debt/Equity	18.6	3.8	(7.3)

Source: Company data, BofA Merrill Lynch Global Research estimates

Saint-Gobain

Saint-Gobain is a diversified industrial materials and distribution group. It is among the global market leaders in flat glass, glass containers, glass fibres, insulation, pipes and ceramics/refractories and abrasives, with leading regional roles in American building materials and European builders merchandising.

SGO (high EE exposure) has energy efficiency solutions for each stage of the economic development cycle and the segment is growing faster than other products. Its "Habitat" businesses (insulation, reinforced thermal insulation glass, industrial mortars, etc.) delivered strong growth with investments in efficiency products and solutions almost doubling in 2011, buoyed by new efficiency regulations in force. Efficiency is expected to account for 38% of sales by 2015. The company also has ambitious plans in solar, currently supplying around a fifth of the world's glass for PV systems, and anticipating €2bn in sales in 2015. In a residential recovery scenario, earnings growth could be material, as 21% of its sales are driven by new residential construction and 36% by residential renovation (the remaining 43% relating to infrastructure, non-residential building, industrial production and household consumption).

United Technologies Corp

United Technologies is an industrial conglomerate that has six operating units organised into two groups: Commercial business consisting of Otis (the world's largest elevator company), Carrier (commercial/residential heating and air-conditioning systems and commercial transport refrigeration equipment), UTC Fire & Security. Aerospace business consisting of Pratt & Whitney (supplies military and civil aircraft engines and service operations), Sikorsky (helicopters), and Hamilton Standard (aviation controls and systems).

UTX's (low EE exposure) primary energy efficiency exposure is via HVAC systems and elevators for buildings (e.g. Carrier's Evergreen® Cooling system and Otis's Gen2 Elevator system). Material exposure also arises via technologies to reduce emissions for air travel, which it believes to be a growing business opportunity (e.g. Pratt & Whitney's PurePower PW1000G nextgen engine). UTC Power has a large portfolio of grid efficiency products, namely fuel cells, where it is no.1 for on-site/stationary cells for buildings, transportation cells for ZEVs and for space. We like UTX due to its balanced growth, end-market exposure, operating leverage and execution – which provide a hedge during periods of economic uncertainty.

Table 78: List of other companies involved in Buildings & Energy Efficiency

BBG Ticker	Company	Location	BofAML Ticker	Local currency	Market Cap (mn)	Investment Opinion	EE Exposure
CLLN LN	CARILLION PLC	UK	NR	GBP	1,465.20	NR	Low
LR FP	LEGRAND SA	France	NR	EUR	7,166.50	NR	Medium
OC US	OWENS-CORNING	United States	NR	USD	3,871.60	NR	Medium
ROCK A/B DC	ROCKWOOL INTL A/S-B SHS	Denmark	NR	DKK	12,466.40	NR	High
SHI LN	SIG PLC	UK	NR	GBP	679.50	NR	Low
ST5 GR	STEICO SE	Germany	NR	EUR	76.20	NR	High

Source: Company, BBG, BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency related products, services, technologies and solutions

Table 79: Companies involved in Buildings & Energy Efficiency that we do not cover

Company	BBG ticker	Overview
CARILLION PLC	CLLN LN	<p>Carillion plc is one of the UK's leading support services and construction companies. It has a wide range of products and services from construction services, health, education and regeneration to road, rail, defence and commercial property. The group is mainly located in the UK, Canada, the Caribbean and MENA. Its construction service division often operates via Public Private Partnership and builds/refurbishes schools, hospitals, military accommodation and prisons. Its acquisition of EAGA in April 2011 – rebranded Carillion Energy Services (CES) – makes it the UK's largest independent energy services provider with total market share of <5%. CES is focused on three energy efficiency markets: private housing, commercial and non-domestic property and local authority & social landlord housing. The total value of these markets is currently c.£15bn p.a. and forecast to increase by around 50% to £22bn by 2015. Key growth drivers for CES include: energy security/rising energy prices, UK Legislation to reduce carbon emissions, social trend towards energy conservation and the technology/products to reduce energy consumption. The group also develops sustainable designed buildings respecting several standards (BREEAM, CEEQUAL and LEED).</p>
LEGRAND	LR FP	<p>Legrand specializes in products and systems for electrical installations and information networks. The company's products are offered for residential, commercial, and industrial use. It provides an array of efficiency solutions enabling automated or programmable management of lighting and temperature, ranging from automatic switches through to BUS lighting management systems, and from room thermostats through to multizone systems that automatically set the temperature according to the use of each zone. It saw a 64% increase in sales of energy efficiency solutions between 2002 and 2009.</p>
OWENS CORNING	OC US	<p>OC is a leading global producer of residential and commercial building materials, glass-fibre reinforcements and engineered materials for composite systems. It has significant energy efficiency exposure via insulation (25% of sales), where it is the #1 producer in the North American market. OC expects insulation revenue growth of 10%+ annually with a modest recovery in US housing and on the back of ramped-up green building codes, which could see this market double; it also benefits via roofing (36% of sales). OC is the global leader in glass fibre composites (37% of sales) with key efficiency markets including transport (car panels), construction (interiors) and energy (wind turbine blades) – and the business is growing at 5-6% per annum.</p>
ROCKWOOL GROUP	ROCK A/B DC	<p>Rockwool develops and produces stone wool, a fibre made from melted volcanic rock, and stone-wool-based products such as insulation (#1 global position on stone wool insulation, #2 global insulation producer) and fire protection and noise and vibration control products. The company's product line also includes acoustic ceilings, facade panels, and horticultural substrates. It is an energy efficiency beneficiary both via insulation (80% of revenues) and systems (20%) – with mineral wools well positioned to benefit from regulatory and government efficiency schemes, particularly for smaller buildings.</p>
SIG PLC	SHI LN	<p>SIG is one of Europe's leading distributors of thermal insulation, roofing, commercial interiors and other building-related products. Operations are focused on the UK, Germany and France, with smaller interests in Poland and Belgium. SIG is exposed to energy efficiency via building materials distribution - insulation & building environments, exteriors, interiors, and specialist construction products. While market conditions have been exceptionally tough since 2008, in the long term, demand for insulation products, driven by continued and more stringent legislation and environmental issues, is expected to outperform overall construction demand.</p>
STEICO SE	ST5 GR	<p>Steico manufactures energy-saving insulating materials for roofs, floors and walls - for both new construction and renovation projects. It is known for its environmentally friendly wood fibre insulation materials and also produces hemp insulation, beams (structural building products) and hardboard.</p>

Source: Bloomberg, company sources

Table 80: BofAML Industrials and Integrated Plays & Energy Efficiency Stock List

Company	EE exposure
ABB LTD	Medium
ALFA LAVAL	Medium
ALSTOM	Medium
ATLAS COPCO AB-A SHS	Low
CROMPTON GREAVES	Low
EATON CORP	Low
ELECTROLUX AB-SER B	Medium
GEA	High
HEXAGON AB	Low
HEXCEL CORP	High
HONEYWELL	Medium
INVENSYS PLC	Low
METSO	Low
NEXANS	Medium
PHILIPS ELECTRONICS	Medium
PRYSMIAN	Low
REXEL SA	Low
ROCKWELL AUTOMATION	Medium
SCHNEIDER ELECTRIC SA	Medium
SIEMENS AG-REG	Medium
SIEMENS INDIA	Low
SMC CORP	High
SPIRAX-SARCO ENG.	High
VALLOUREC	Low

Source: BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency products, services, technologies and solutions

Industrials & integrated plays

Industrial energy use accounts for a third of global energy consumption and 36% of CO2 emissions (Source: IEA). The long-term case for energy efficiency is clear – with 80% of energy lost across the value chain from inefficiencies between the gathering of energy sources and their eventual consumption in industry (Source: ABB). In no other area are so few players capable of making such a big difference, with energy efficiency in industry saving money, reducing the need for new power, and lowering GHGs. The IEA estimates that industry could improve its energy efficiency by up to 26% and reduce CO2 emissions by up to 32% via the adoption of currently available best practices and technologies.

Industrial and integrated plays - and the Cap Goods sector in particular - are key enablers for improving the energy efficiency of equipment and power, and thus industrial productivity. We expect efficiency to be a long-term growth driver for the sector on the back of sustainability megatrends such as rising energy prices, EM growth in power and automation, expanding production volumes, grid and generation build out, renewable interconnections, and CO2, efficiency and environmental regulations.

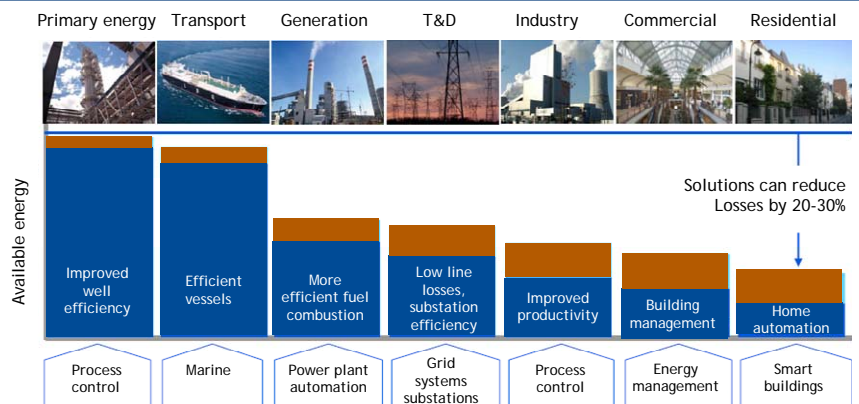
While energy efficiency will drive product replacement cycles, we assume that the Cap Goods sector will see lower growth near-term than between 2004 and 2011. Among the strongest growth outliers are structural opportunities (shale gas, resource scarcity, food/beverage and pharma capex, LNG, transmission, aerospace), the aftermarket, and recovery plays (US housing, commercial construction, appliances, autos/trucks, marine and power). The weakest are those impacted by austerity (government-related spending) and the tougher competitive environment, and GDP plays, which have seen the best of the recovery.

We believe that a number of stocks are well placed to benefit from the theme of energy efficiency for industrials and integrated plays through their involvement in areas such as automation (building and industrial), controls, grid and smart grid, heat transfer, lighting, power distribution and generation, process management, renewable interconnections, and T&D, among others.

Long-term growth vs. embracing austerity

The long-term business case for energy efficiency in the broad industrial space is clear – with 80% of energy lost from production to consumption, and efficiency gains needed across the value chain (Source ABB).

Chart 71: 80% of energy is lost along the value chain from production to consumption



Source: ABB

See further our EMEA Cap Goods team's *Embracing Austerity* report
[Capital Goods, 12 January 2012](#)

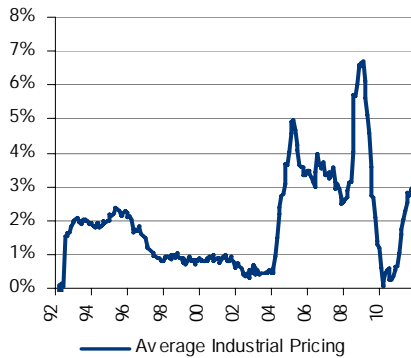
Table 81: Average organic growth

	1990 -1996	1997 -2003	2004 -2011	2004 -2011*
Organic Growth				
Sector	NA	2.3%	5.9%	8.6%
Europe	NA	2.0%	5.5%	8.3%

* - excluding 2009

Source: BofA Merrill Lynch Global Research

Chart 72: An exceptional period of pricing for the sector occurred during the BRIC period



Source: BofA Merrill Lynch Global Research

If growth and margin upside are reduced, earnings growth will be slower

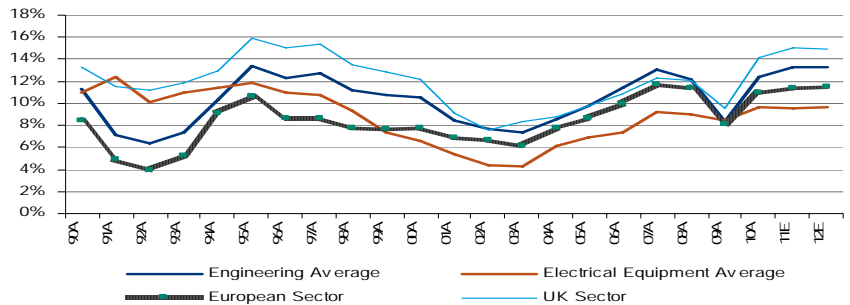
Energy efficiency will be a strong factor driving product replacement cycles. But in the near term we assume that the Cap Goods sector will see lower growth than between 2004 and 2011 given the amount of de-leveraging required. Despite this volatile outlook, we identify a number of names that look well placed to benefit from energy efficiency trends, even in a more difficult macroeconomic environment.

Tough comparisons vs. a golden age

Even including the very deep 2009 recession, we estimate that the Cap Goods sector averaged 5.5% organic growth between 2004 and 2011 (vs. 2.0% between 1997 and 2003, i.e. almost 3x the rate seen previously). We look at the factors that drove this share price outperformance and ask whether they remain intact:

- **Growth is unlikely to match 2004-11**, when organic growth was propelled by the development of the BRIC and other emerging economies, a greater focus on energy efficiency, and high levels of borrowing and spending in developed economies.
- **Many headwinds to growth exist.** We expect global growth to be more subdued going forward. Our economists forecast global GDP growth of 3.3% in 2012 and 2013, well below the trend rate (excluding 2009) enjoyed between 2004 and 2011. Developed markets growth is likely to remain hampered by debt and the diminishing scope for further monetary stimulus. Emerging markets growth looks set to remain strong, but to slow as economies mature and central banks work harder to balance growth and inflation. Growth could also be more stop-start in nature.
- **The scope for margin improvement is more limited** as the starting point – 13.3% in 2011 – is already a record and will be difficult to improve on. Moreover, there is a lack of momentum – if growth rates are lower, then it is tougher to increase margins.

Chart 73: Sector margins are back at record levels. It has to be harder to get them up further



Source: BofA Merrill Lynch Global Research

- **Widespread earnings outperformance will be tougher.** If growth rates are slower and it is more difficult to increase margins, then sector earnings growth will be lower, making it more difficult to outperform consistently. That said, the sector will still see cyclical spurts of earnings acceleration and deceleration. With a less powerful growth and margin tailwind, stock selection will be more important than it was in 2003-11.

We think BRIC growth is a positive tailwind for the sector, but not as powerful a delta as it was in 2004-08

We assume average growth rates are lower in the next cycle

Identifying strongest growth prospects

With overall growth prospects looking less attractive in the next cycle than the last, we think companies and investors will have to work harder to find growth. We no longer see geographical mix as the primary differentiator of growth prospects (although we are still positive on emerging markets), and think that over the medium term many developed market segments can also recover strongly. The emphasis needs to be more on finding the best end-market growth opportunities, regardless of geography.

Divergent growth prospects

We think the best growth prospects will come from: (1) those markets with the best structural growth opportunities, (2) those markets which are cyclically (not structurally) most depressed, and (3) related service/aftermarket businesses (which, as we illustrate below, tend to amplify existing growth trends).

The weakest growth prospects, in our view, will come from those segments which: (1) face structural headwinds (either the drag of government austerity or greater competition), or (2) have already rebounded and are tied to a more sluggish global GDP growth outlook.

On average, we model 3% organic growth for the sector over 2012-14. This may seem low, but it includes a mild recession in 2012 (especially for companies with high European exposure). This growth figure is above what companies delivered in 1990-96 and 1997-03, reflecting that we still see BRIC demand as a tailwind.

Table 82: We expect growth to turn more subdued

Organic Growth Sector	1990-96	1997-03	2004-11	2004-11 (ex 2009)	2012-14
NA	NA	2.3%	5.9%	8.6%	2.9%
UK	NA	1.7%	4.8%	7.8%	3.3%
Europe	NA	2.0%	5.5%	8.3%	2.4%

Source: BofA Merrill Lynch Global Research Estimates

We see significant risk of reality deviating from our central forecast for industrial production growth. **However, we do not think the relative rankings of the different companies in terms of growth will change much.**

- **Structural opportunities: Shale gas, resource scarcity, food/beverage and pharma capex, LNG, transmission, aerospace** – areas where the best growth prospects are over the medium term, and where demand could exceed GDP (and grow without the tailwind of a strong cycle).
- **Aftermarket: amplifying existing trends, protecting downside.** In a flat growth environment, increasing penetration of the installed base (which is increasing anyway in most markets) could amplify a company's growth rate. This should also be positive for margins and returns, in our view, given that this business is usually more profitable and highly cash-generative.
- **Recovery plays: US housing, commercial construction, appliances, trucks, autos, marine, power.** These markets are also less vulnerable, in our view, to a global double-dip recession (have less far to fall). Some may have yet to bottom, but they are our preferred recovery end-markets (i.e. those with the greatest scope for mean reversion to more normal levels).

Need a discount for structural headwinds or GDP plays

The names with the weakest growth prospects, in our view, are those where either: (1) we have identified specific growth headwinds, or (2) the organic growth rate is largely dependent on GDP or IP growth (which, in our view, looks like being lower going forward and is likely to slow over the near term).

- **Austerity - government-related, healthcare, defence, institutional construction, rail & road construction.** These are the end markets that are exposed to developed economy government spending.
- **Tougher competitive environment - power, construction equipment, appliances, railway equipment.** There could be new competitive threats from developed economies (e.g. the expansion of CAT/NAV into LatAm truck markets) or, more likely, due to the emergence of EM players.
- **GDP plays/markets which have seen the best of the recovery - European trucks, industrial production.** For many segments, the markets have recovered to previous peaks and they now face a slowdown to more normalised levels.

Segments like bearings, trucks (Europe), cutting tools, developed economy automation, air compressors, standard heat exchangers and standard industrial products look to have seen their fastest growth rates already, have benefited from an inventory rebuild, and appear to have lower (or at least very “average”) growth prospects. We would highlight the following markets as being back to trend levels of activity (i.e. already recovered):

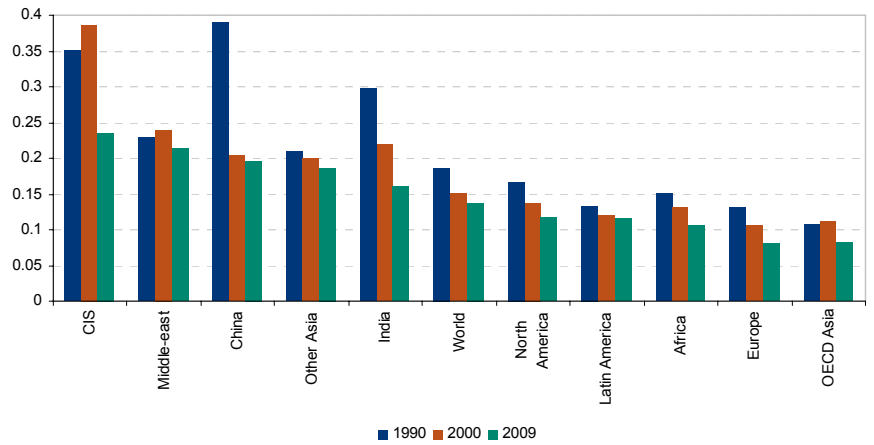
Industry, a third of energy use & 36% emissions

Industrial use accounts for around a third of global energy consumption and 36% of CO2 emissions (Source: IEA). The chemical, petrochemical, iron and steel, pulp and paper, metals and minerals and cement industries account for two-thirds of this amount. While energy intensity has been declining in developed markets with the adoption of more efficient technologies, the emerging market industrial boom has meant that overall industrial energy consumption has grown from 1990-2008:

- **The share of electricity in global industrial consumption increased to 24% in 2009 (vs. 20% in 1990).** The share is above 30% in Europe and North America, and above 25% in OECD Asia.
- **Industrial electricity use is on the rise in all regions.** The largest increases were in China (industrial energy consumption grew from 10% to 20% from 1990-2008) and emerging Asia.
- **Industrial energy intensity has decreased in all regions since 1990 (i.e. energy required per unit of value added).** Globally it fell 1.6%/y between 1990-2009 and 1%/y between 2000 and 2009. It is lowest in Europe and OECD Asia, which are 40% below the world average (vs. North America, which is 13% below the world average). The biggest decreases were in EMs, with China and India recording 5.5%/y and 3.2%/y reductions between 1990 and 2008, respectively (although they remain 40% and 20% higher than the world average).

Based on adoption of available best practices & technologies, the global manufacturing industry could improve its energy efficiency by 18-26% and reduce CO2 emissions by 19-32% (Source: IEA)

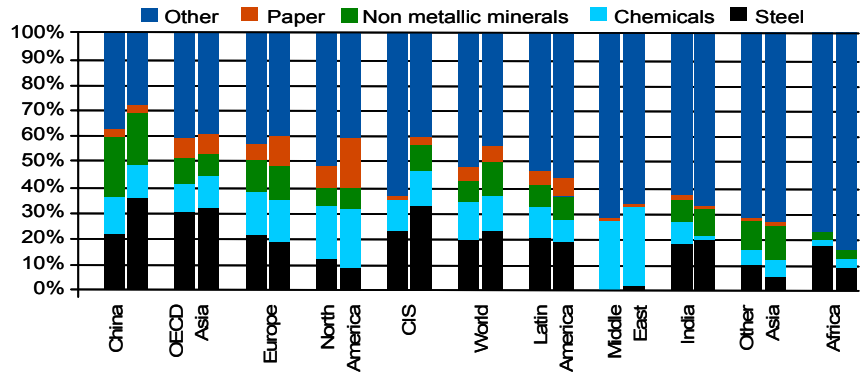
Chart 74: Industrial energy intensity trends 1990-2009 (koe/\$2005ppp)



Source: ABB, BofA Merrill Lynch Global Research

- **Recession has hit industrial energy intensity** especially in developed markets, where energy-intensive industries have been hit harder than the drop in industrial production.
- **Share of energy-intensive industries in industrial consumption is highest** in the OECD, the CIS and China (i.e. steel, chemicals, and non-metallic minerals) (Source: ABB).

Chart 75: Share of energy-intensive industries in industrial consumption (1990 / 2008)



Source: ABB based on Enerdata

49% of EM industry managers have invested in improving energy efficiency vs. 34% in DMs and 21% in NAM (Source: ABB)

Industry needs to do more on efficiency

A 2011 white paper and survey by ABB showed that while most industry managers appreciate the importance of energy efficiency in securing long-term financial performance, only 40% say they have invested in capital, plant and equipment within the past three years for this purpose.

Table 83: Energy efficiency overview for largest industrial sectors

Sector	% industrial energy consumption	Energy efficiency overview
Steel	20%	<ul style="list-style-type: none"> •Half of the world's crude steel production is supplied by China, Japan & the US •Greatest efficiency improvements seen by countries using the electric process: uses 50% of energy required by oxygen/blast furnaces. 2008: 38% of steel produced via electric process (vs. 28% in 1990) •Energy consumption could be reduced by 40% globally if main producing countries were to move to efficiency best practices; 60% of those energy savings would be made in China.
Chemical industry	>14%	<ul style="list-style-type: none"> •The US – where chemicals accounted for 25% of industrial consumption in 2009 – had highest energy consumption per unit of value added; energy intensity has increased by 0.8% p.a. since 1990 •China has high energy intensity because of its coal-based production
Non-metallic metals (cement, glass, ceramics)	<14%	<ul style="list-style-type: none"> •Cement accounts for 70-80% of consumption & China alone accounts for 50% of energy for cement •Average energy consumption per ton of cement produced decreased in the main producing countries from 1990-2008 (ex-France, the US, Turkey and Russia) •Most efficient production technologies found in Japan, Mexico and EU (vs. Asia & NAM) •Efficiency of production depends on process used to produce clinker, the main component in cement manufacturing (dry or wet) & type of kiln. Dry process avoids the need for water evaporation and is less energy-intensive (vs. wet); dry kilns w/ pre-heater and pre-calciner are most efficient (vs. vertical shaft).
Paper industry	6%	<ul style="list-style-type: none"> •Consumption mainly used to produce steam. Largest producers are US (>30% of consumption), Japan, EU, China and Canada •Consumption per ton of paper decreased in all main producing countries from 1990-1998 (ex-Brazil) •Efficiency related to technical age of production facilities (i.e. ageing US mills). Other factors: % of imported pulp, process used to manufacture pulp (mechanical = highest consumer), % recycled paper.
Aluminium	NA	<ul style="list-style-type: none"> •Production is made up of primary aluminium production & recycling, former is 20x more energy intensive than recycling. Main producers = 60% of production (China, Russia, NAM, Australia, Brazil) •Specific electricity consumption for primary aluminium production decreased by 5% from 1990-2008. •Primary production requires large amounts of electricity for smelting, while alumina plants use steam energy (CHP production in modern facilities). For smelters: Hall-Héroult system w/ pre-baked anodes (10% of market) has high energy efficiency w/ 13-16.5 MWh/t; vs. Søderberg cell with in-situ baked electrodes (70% of market), at 15-18 MWh/t. •Long-term, electrolysis process designs using aluminium chloride or carbothermic processes could become the production norm

Source:ABB, IEA, company sources, BofA Merrill Lynch Global Research

See further section on *Buildings*

Building automation

As explored further in our section on *Buildings*, energy consumption within buildings accounts for the single largest component of global energy use and CO2 emissions, at c.40% and c.30% respectively. The biggest culprits in residential and commercial buildings are heating and cooling, which, together with lighting, can account for up to 60% of buildings' energy consumption. Alongside tackling buildings' thermal envelopes, building automation will play an important role in reducing energy use by the targeted 30% to 50% by 2030-50 (Source: IEA). The key market players are Siemens and Schneider in Europe and Honeywell and Johnson Controls in the US. Other players include GE, Ingersoll Rand, Tyco and UTC.

US\$80bn+ market by 2016

The global building automation and control systems market was estimated to be worth US\$41bn in 2011 and is expected to grow to US\$82bn in 2016 – an estimated CAGR of 14.8% from 2011 to 2016 (Source: Products and Technologies). These figures encompass building automation in a broad sense including access controls, building management systems, communication protocols, entertainment controls, lighting controls, management and metering, outdoor controls, protocols and standards, security controls; wireless technologies. Applications include commercial, industrial, infrastructure and institutional use.

Intelligent building control

Building automation reduces energy use via intelligent building control, whereby sensors (humidity, temperature, motion detectors, etc) are connected with controllers or actuators, allowing building administrators to monitor and control functions such as climate control, HVAC, lighting, operation and sun control more efficiently. It allows energy to be used only when required, only in the amount actually needed and enables better control of "in/desirable" external factors impacting energy balance.

For example, with the KNX OSI-based network communications protocol for intelligent buildings, all sensors (buttons, motion detectors etc.) are interconnected to the actuators (dimming or roller shutter actuators etc.) via a data cable as opposed to directly wired switches and consumers (conventional installation). The actuators control the power circuit to the consumer. Communication for all devices is implemented using data telegrams on the same bus cable. The sensors send commands and the actuators "listen in" and execute a defined function as soon as they are addressed.

Up to 30% energy savings & 2-10Y ROI

Although energy savings will depend on the type of automation system installed or retrofitted, company and scientific studies show that coordinated behaviour across multiple systems can result in overall energy savings of 11-31%. Based on energy savings alone, this would mean an ROI of 2-10 years, which implies that building automation is well positioned vis-à-vis building envelope efficiency measures (10+ year payback) or modernisation of HVAC (5+ year payback). Beside energy savings, having building automation in place increases property values.

Table 84: Potential energy savings from building automation

Automation measure	Potential savings
Room heating control	14-25%
Heating automation	7-17%
Shutter control	9-32%
Lighting control	25-58%
AC control	20-45%
Average energy saving	11-31%

Source:ABB based on scientific studies

Recession hitting the market near-term

The biggest argument for adopting building automation, especially in a recessionary environment, is that it cuts down on energy use and energy costs, which are a huge proportion of long-term TCO and the subject of growing CIO/CFO interest. That said, building automation is likely to remain under pressure from slower forecast growth in non-residential due to weaker than expected spending across most sectors, the slow recovery in office and commercial, and weakness in the residential HVAC business.

But some positive signs

Positively, institutional and industrial markets are leading the improvement, there is strong growth in Asia-Pacific (e.g. Australia, China, Singapore) and there is potential upside from our Cap Goods team's preferred recovery plays – US housing and commercial construction (i.e. those with the greatest scope for mean reversion to more normal levels)

Table 85: Organic growth forecasts for construction end market*

Activity	2012				2013			
	NAm	Europe	Asia/EM	World	NAm	Europe	Asia/EM	World
Residential Building	1.80%	0.50%	8.00%	3.50%	17.20%	2.40%	15.00%	10.50%
Commercial Building	3.20%	-2.20%	7.00%	2.40%	3.40%	1.50%	10.00%	5.00%

Source:BoFA Merrill Lynch Global Research. * As reflected in company forecasts (before company specific adjustments for investn,tor, mkt share etc.)

Long-term drivers are favourable

Long-term growth drivers are extremely favourable, particularly for emerging markets:

- **The urban population is expected to grow by 1.5bn** people globally over the next 20 years (Source: UN). This places greater pressure on industrial plants and residential and commercial buildings, such as hospitals, schools, offices, and shopping centres, to be as efficient as possible.
- **Commercial building stock growth:** While there is ~400bn ft² of commercial building space globally, over the next 10 years more than 110 additional bn² will be built, 80%+ in emerging markets. (Source: Johnson Controls)

Industrial automation

Industry consumes about 42% of all electricity generated, according to the IEA – with the cement, chemical and iron & steel industries being the most energy-intensive. Close to 70% of the electricity consumed by industry is used by the electrical motors driving machines, compressors, fans, pumps and conveyors in almost all industrial sectors (Source: IEA). Energy efficiency via measures such as high-efficiency motors and variable speed drives offers huge energy and cost saving potential. The key market players are Siemens, ABB, Emerson, Schneider, Rockwell, Invensys and Atlas Copco.

Huge untapped energy saving & cost potential

Most motors run at a fixed speed – i.e. throttling valves in pump systems, vanes in fans, belt drives, gearboxes, hydraulic couplings – regardless of the actual output needed. This constant stream of power and torque means billions of dollars in wasted energy.

In China alone by 2020, industrial motors will consume >30% of electricity and provide >10% of carbon emissions - likely 1-2% of global emissions (Source: ARM)

Optimising motor-drive systems worldwide could save the power equivalent to the annual output of 250 nuclear reactors (Source: ABB)

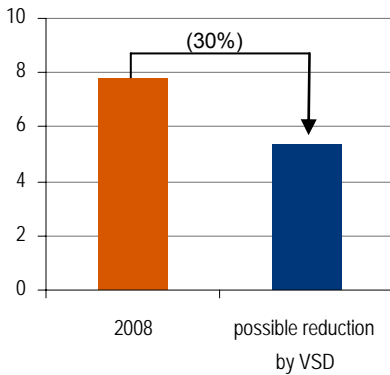
Switching to energy-efficient motor-driven systems could save Europe alone up to 202bn kWh in electricity consumption, equivalent to a reduction of €10bn per year in operating costs for industry (Source: ABB). Globally, efficient motors could save the US 2% of total electricity consumption, the EU 7%, and China 2-10% (Source: ARM).

Table 86: Savings potential for motor systems in the EU is over 200bn kWh/year

Motor system	EU-15	EU-27	France	Germany	Italy	UK
High efficiency motors	24	27	4	6	4	3
Variable speed drives	45	50	8	10	7	6
Pumps, fans, compressors	112	125	19	26	17	15
Total electricity saving potential	181	202	31	42	28	24

Source:ABB

Chart 76: Energy consumption of electric motors (tn kWh)



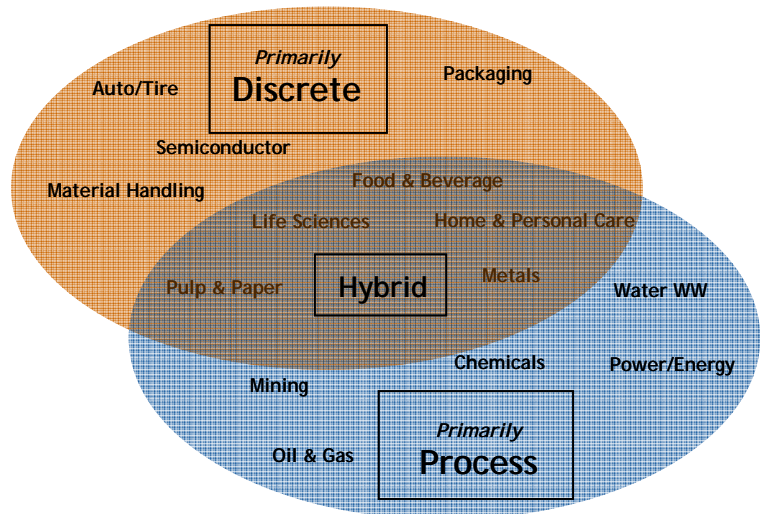
Source:Infineon, IEA

Intelligent motor control via variable speed drives

The most effective way of controlling a motor's speed is through variable speed drives (VSD). VSDs can reduce energy use by up to 30% by matching driver speed or motor output to the actual energy requirements of an application (i.e. load-dependent speed control). In pump and fan applications, they can cut the energy bill by as much as 60%, as a pump or fan running at half speed uses only a quarter of the energy of one running at full speed.

However, less than 10% of motors are equipped with such devices (Source: ABB), meaning tremendous opportunity, over time, to retrofit millions of installed motors. While industrial demand should continue for years, industrial customers are also seeking an intelligent motor control package which can capture data from these devices through IT systems that interface with factory information systems.

Chart 77: Industrial automation overview

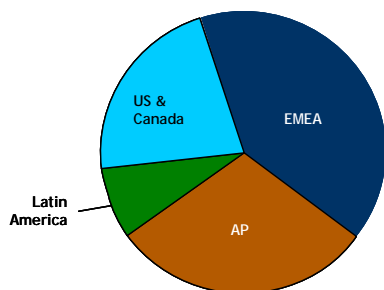


Source:Rockwell, BofA Merrill Lynch Global Research

Cost & regulation will be key drivers

Each US\$1 spent on purchasing a more efficient electrical motor can save US\$100 in energy costs over the motor's lifetime (Source: Infineon). In addition to the cost advantages, VSDs benefit from increasing regulation of electric motors, with the EU stipulating since mid-2011 that electric motors in the 750-375kWh range must have electronic speed control; more stringent regulations are set to follow in 2015 and 2017. Canada and the US have passed similar regulations.

Chart 78: Automation market



Source: Rockwell, BofA Merrill Lynch Global Research

See further section on *Lighting and LEDs*

US\$68bn market growing faster than global GDP

The industrial automation market is estimated at US\$68bn and is growing faster than global GDP (Source: Rockwool). Key market drivers include energy efficiency, commodity demand, use of energy (oil & gas), factory automation, and transportation and mobility.

Near-term environment looking increasingly attractive

2009 to 2011 saw the Automation market suffer from its exposure to general industrial capex trends. However, 2012 has seen companies experiencing broad-based order and revenue growth across all regions – and 2013 forecasts look strong. Our Cap Goods team sees automation products as having some of the strongest near-term growth prospects in terms of pricing. Asian automation in particular is seeing strong growth, with China pushing to expand more into export markets. It is expected to invest heavily to improve the quality of its products and automate more processes as labour costs inflate.

Table 87: Organic growth forecasts for industrial capex & production*

Activity	2012				2013			
	NAm	Europe	Asia/EM	World	NAm	Europe	Asia/EM	World
General industrial capex	0.0%	(6.0%)	7.5%	0.3%	3.0%	3.0%	10.0%	5.5%
General industrial production	(0.5%)	(4.0%)	7.5%	1.0%	1.4%	(1.8%)	7.2%	2.2%

Source: BofA Merrill Lynch Global Research. * As reflected in company forecasts (before company specific adjustments)

Lighting

Lighting consumes 19% of the world's electricity output. Seventy-five percent of office and industrial lighting systems are inefficient and 30% of road light use technology dates back to 1960. Energy-efficient lighting sources such as CFLs, LEDs, luminaries, control gears and intelligent lighting control tools and concepts can thus make significant contributions to energy, cost and CO2 savings. The key market players are Philips, Siemens and GE, followed by niche LED players such as Cree, Epistar and Zumtobel, as well as companies involved in LED components and processes.

Challenging near-term outlook

In the near term, our Capital Goods team sees a more challenging outlook for lighting. Commercial construction could improve, but is likely to be offset by price pressures in LED. Consumer demand could also improve, but pricing remains difficult.

Table 88: Organic growth forecasts for lighting end market*

	2012 FORECASTS				2013 FORECASTS			
	NAM	EUROPE	ASIA/EM	WORLD	NAM	EUROPE	ASIA/EM	WORLD
Lighting	1.0%	(4.0%)	5.0%	0.4%	2.0%	2.0%	5.0%	3.1%

Source: BofA Merrill Lynch Global Research. * As reflected in company forecasts (before company specific adjustments)

But strong long-term drivers

We anticipate strong long-term growth for energy-efficient lighting solutions, which could help the global lighting market to grow from €55-60bn in 2011 to €80bn by 2015 (Source: Philips). Drivers include increasingly favourable legislation, lower production and operating costs and the growth of light points, with above average-growth from markets like Asia, the Middle East and the US.

Efficiency could be a long-term concern for some

For companies such as Philips, the move to energy-efficient lighting is a potential long-term concern, as LED implies: (1) lower replacement rates once adoption matures, (2) increased low-cost competition and price pressure, and (3) uncertainty over which part of the value chain (lumiled, luminaires, distribution) is most profitable.

Power: largest energy-consuming industry

Power generation is by far the largest energy-consuming industry. It is also relatively inefficient, with only about 35% of fuel consumed being converted into electricity. There is huge margin for improvement with a global move to thermal efficiency levels of 45% (i.e. the average of the top 10 countries) – this would reduce fossil fuel consumption for power generation by 700Mtoe, or about 30%, and CO2 emissions per kWh produced by about 20% (i.e. 2.3 GtCO2).

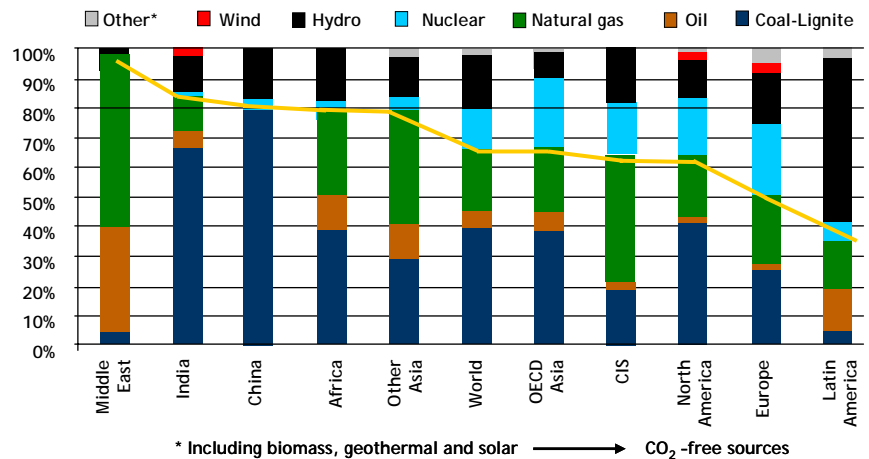
Power is set to become a US\$130bn market by 2015 based on the current 5-10% CAGR, with efficiency being a key driver vis-à-vis economic growth and increasing electricity consumption, ageing networks and power plants, renewables integration, grid and generation build out, and smart grid and environmental regulations.

Some progress, but efficiency still a long way off

The last decade has seen improvements in the energy efficiency of the global power sector, but there is still significant work to be done in terms of energy mix, T&D losses and CO2 emissions:

- **Coal is still king, but low-CO2 sources are 1/3 of the energy mix** - Globally, thermal sources represented 60%+ of total electricity production in 2009. Natural gas accounted for 20%. Low / “zero” CO2 sources represent about a third of the power mix.

Chart 79: Power generation by source (2009)

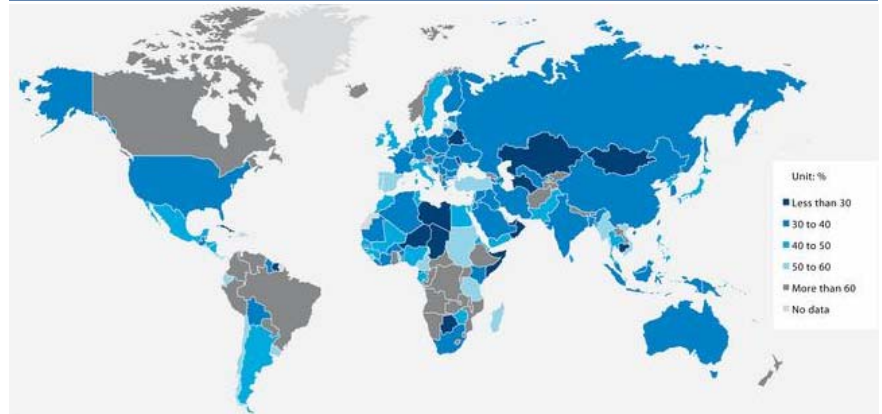


The spread of gas combined cycle plants over the past decade has helped to improve thermal efficiency levels

Source: ABB based on Enerdata

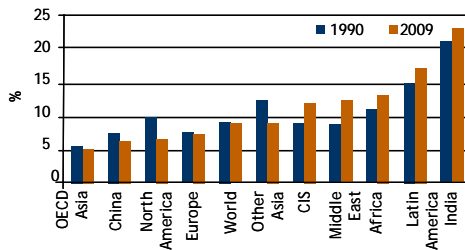
- **Global efficiency of thermal plants stood at 35% in 2009.** North America and the EU were at 40%, while OECD Asia and Latin America were also very efficient (relatively speaking). Most emerging markets remain below the global average, with China and India hit by their heavy reliance on coal despite efforts to improve efficiency.

Chart 80: Energy efficiency of total electricity generation (2009)



Source:ABB based on Enerdata

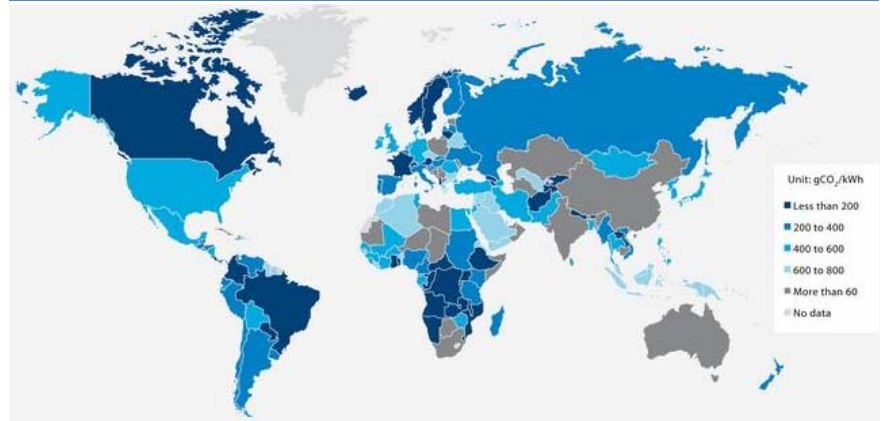
Chart 81: T&D losses 2000-2009



Source:ABB based on Enerdata

- **Global T&D losses were at 9% of distributed volumes in 2009.** Developed markets have the most efficient grids thanks to the use of low-loss conductors and transformers, the standardisation and upgrading of T&D voltages, and reactive power control. Emerging markets – India and Latin America in particular – have the highest losses, at 15-20%.
- **Global CO2 emission factor was at 500 gCO2/kWh in 2009.** 20% of countries had a factor of 200gCO2/kWh but over 10% had a factor of 800gCO2/kWh. The CO2 emission factor increased by 0.3%/year worldwide from 1990-2009 on the back of emerging market coal use.

Chart 82: CO2 emission factor in power generation (2009)



Source:ABB based on Enerdata

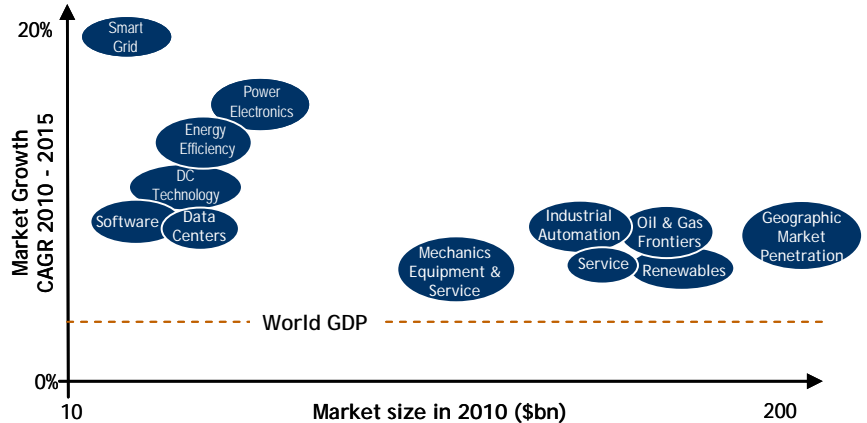
Huge energy & CO2 savings potential

If the world were to reach thermal efficiency levels of 45% (i.e. the average of the top 10 countries), then fossil fuel consumption for power generation could be reduced by 700Mtoe, or about 30%, and CO2 emissions per kWh produced would be reduced by about 20% (i.e. 2.3 GtCO2).

US\$130bn market by 2015

Assuming average annual global GDP growth of 3-4%, the power market is expected to grow at a 6% CAGR from US\$100bn in 2010 to US\$130bn in 2015 (Source: ABB).

Chart 83: Market is growing faster than global GDP



Source: ABB, BofA Merrill Lynch Global Research

5-10% growth to 2015

Emerging markets should see the highest growth at +10%, followed by utility sectors at +8%, industrial sectors at +7% and developed mid-markets at +5% (Source: ABB). This will mean opportunities for power capacity and infrastructure, grid upgrades, the smart grid, renewables and interconnections on the back of the drivers outlined below.

Table 89: Key power market drivers 2010-15

Driver	Growth	Europe	Growth	Americas	Growth	Asia & MEA	Market growth
Cost pressure, ageing infrastructure	3	-Drive for energy efficiency in T&D	4	-Increasing power outages in US	1	-Reduced blackouts	•EMS +10%
Distributed generation	4	-Interconnections	2	-Wind in key US states	1	-Likely to come in India	•Utility sectors: 8%
Remote bulk generation from renewables	4	-Grid upgrades	2	-Large hydro in LatAm	3	-Large hydro, offshore wind & utility solar	•Industrial sectors: 7%
Urbanisation	1	-Germany & UK offshore wind connections	1	-SAM	4	-Increasing population	•Mature markets: +5%
		-Eastern Europe				-Growing middle class	

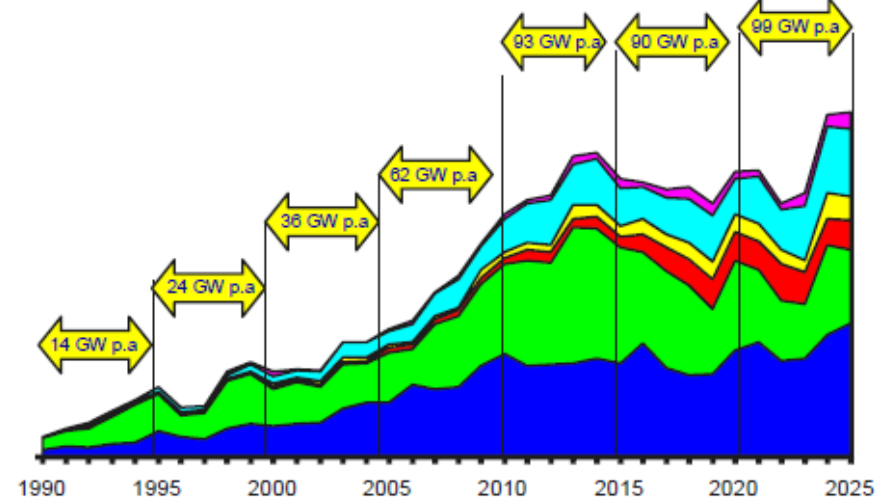
Source: ABB. Growth: 4 = higher, 1 = lower

Economic growth and increasing electricity consumption

Global electricity demand is expected to double over the next 25 years, with emerging markets expanding 3x faster than OECD countries. EM electricity consumption per capita is projected to grow exponentially, and total electricity consumption is forecast to increase fourfold between 2006 and 2030. The share of electricity in the total global energy mix is expected to grow from 17% in 2005 to 22% in 2030 (Source: ABB).

This has important long-term implications for energy efficiency, as 60% of the 2030 installed base has yet to be built. For new coal plants, a +20ppt rise in efficiency saves 40% in CO2 emissions, for gas +20ppt in efficiency saves 33% in CO2 (Source: Alstom).

Chart 84: Fleet age 1990-2025

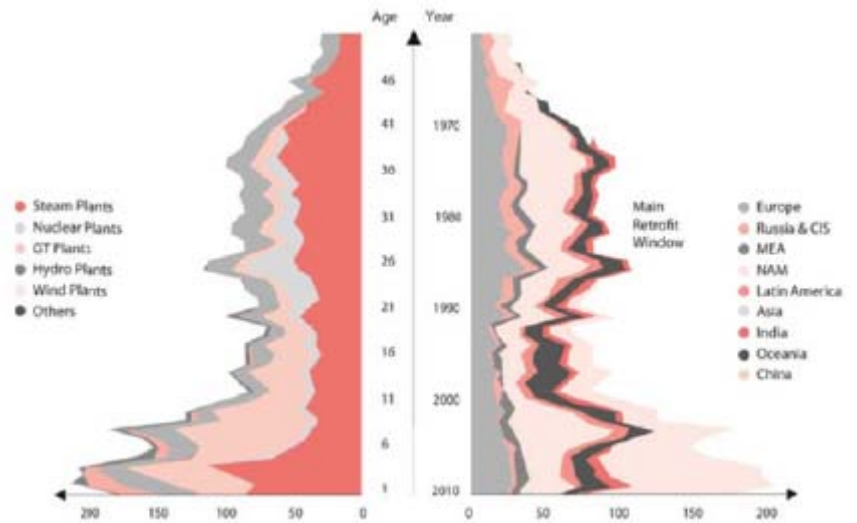


Source:Alstom

Ageing networks and power plants

Ageing infrastructure, especially in North America and the EU, will mean rising modernisation, service and replacement needs, as 60% of the CO2 emitted in 2030 will come from today's installed base. For example, retrofits via plant optimisation and turbine retrofits can reduce CO2 emissions by 5%, boiler retrofits by 3% and automation retrofits by 1% (Source: Alstom)

Chart 85: World installed base in 2010



Source:Alstom based on IEA

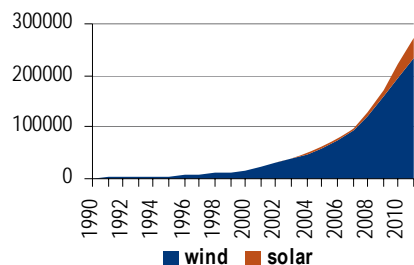
Cross Reference

[Renewable Energy, 10 January 2012](#)

Renewable integration, moving towards grid parity

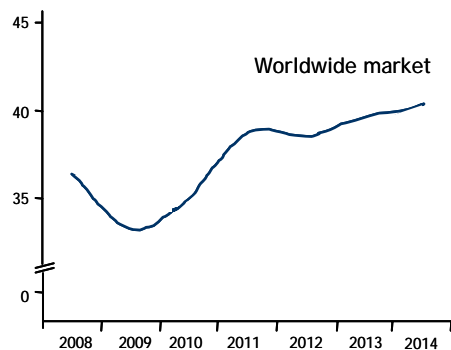
Renewables pose power challenges in terms of balancing supply and demand in real time given their unpredictable / intermittent nature. Take-up is also largely contingent on cost. While the cost of renewables has fallen over the past three years, so have benchmark power prices, especially in the US, due to shale gas production. Renewables remain uncompetitive and demand will continue to be driven by regulatory targets and subsidies, in our view. The story in Europe is slightly better as gas prices retain a closer link to oil but spreads are minimal,

Chart 86: Cumulative wind & solar build-out



Source: BofA Merrill Lynch Global Research

Chart 87: €40bn grid market by 2014



Source: Alstom

reflecting the high reserve margins, and carbon prices have recently collapsed due to a worsened outlook for industrial production. Renewables are more often competitive in some emerging markets because of the high cost of importing LNG. We highlight that the cost of wind power was actually slightly lower than gas in the most recent Brazil auction.

The table below is our European Renewables analyst's attempt to illustrate the relative new build costs of different technologies in Europe (so reflects a narrow oil-gas spread, spot CO2 pricing and average weather based load factors). Over the past two years, the cost of wind has fallen by about 30% per MWh and PV solar has fallen by over 50%. We believe PV has overtaken CSP. Offshore wind remains very expensive but costs should fall substantially once the next generation of turbines comes on the market in 2014/15. Unfortunately, current power prices are well below new entrant costs because of low spreads, so renewables are not quite as close to grid parity as the table suggests.

Table 90: New build cost in Europe

Technology	Cost (€/MWh)
Hydro	53
Nuclear	58
Coal (at \$115/t with €10/t CO2)	66
Geothermal	67
Gas (at \$100 oil linked supply)	71
Onshore Wind	73
CCS	93
Offshore Wind	108
PV	191
CSP (concentrated solar power/solar thermal)	220

Source: BofA Merrill Lynch Global Research

Grid and generation build-out, EM key to €40bn market

Electricity demand is growing faster than primary energy growth, with the world needing 1GW of power generation and related grid infrastructure every week for the next 20 years if it is to meet its anticipated energy needs in 2030. The market is sustained by large governmental investment programmes for both thermal and renewable energy, especially in Asia.

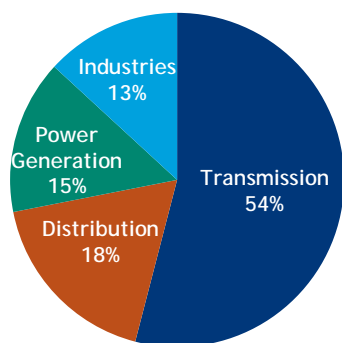
Major grid and generation markets

Market	% grid	Drivers
China	19%	-Biggest individual market -Recurring business to sustain growth in consumption -Power generation located far from the mega cities: need to support economic growth which is linked to its power supply -Investment in large HVDC and Ultra High Voltage (UHV) interconnections to move bulk energy to cities
Middle East & Africa	18%	-Consolidating market due to general slowdown of grid investment -Sustained investment in specific markets e.g. Saudi Arabia -Future interconnections between renewable resources in North Africa & EU
Europe	17%	-Environmental targets (the 20/20/20 directive) -Network built on individual country grids: need to enable increased power transmission -Large HVDC projects being deployed and planned (DC offshore wind connections (UK, Germany), HVDC Interconnections -Recurring business volume increasing due to infrastructure renewal -Major renewable resources in Northern Africa will be connected to EU
Eastern Asia and Pacific	13%	-Developed countries consolidating and improving their grid (Korea, Australia...)
North America	12%	-Developing countries need investment to sustain their industrial growth -Ageing AC network -Need to improve power quality and network reliability -Electrical infrastructure upgrade planned

Latin America	9%	<ul style="list-style-type: none"> -Major interconnection project to access additional capacity (on & offshore wind and hydro) in the planning -Strong investment in generation and transmission capacity planned in Brazil -Large infrastructure projects in Argentina and Chile -Power generation far from consumers: need to interconnect regions / countries for shared energy reserves
India	9%	<ul style="list-style-type: none"> -Continuous increase in recurring business and additional opportunities due to deployment of new generation capability -Resource and load locations: long distance bulk transmission; alleviate congestion from Bhutan -Push on efficiency vis-à-vis national grid
Russia	3%	<ul style="list-style-type: none"> -Grid modernization a key objective of the government in the short to mid term

Source:Alstom, company sources, BofA Merrill Lynch Global Research

Chart 88: Grid market by end customer



Source:Alstom, BofA Merrill Lynch Global Research

A significant proportion of the growth will also come from major HVDC (high voltage direct current) projects. HVDC allows for bulk power transmission over greater distances, higher efficiency / lower losses, has a reduced cost per MW, enables integration of renewables, facilitates grid interconnections and optimises generation capacity, and is suitable for overhead, underground and sub-sea transmission. HVDC could become a €50bn market by 2020 with China, the Americas, India and the EU offering the greatest potential (Source; ABB)

Table 91: Grid and generation market

Products	Mkt. CAGR 2010-15	Key products	Business overview
High voltage (66-1,200kv)	2-5%	Gas insulated switchgear, air insulated & hybrid switchgear, generator circuit breakers	<ul style="list-style-type: none"> -Global & local standards -Rigid utility certification process -Products configured & assembled to order -Majority of sales to utilities -Transmission is a key driver
Medium voltage (1+66kv)	5-6%	Primary switchgear, secondary switchgear apparatus, distribution automation, modular solutions, service	<ul style="list-style-type: none"> -Local standards -Products with varying degrees of customization -Fragmented market -Diverse customer & channel mix -Distribution is a key driver
Power transformers	2-5%	Mainstream, Ultra-high voltage, HVDC, industrial, phase shifters	<ul style="list-style-type: none"> -Global standards -Global players -Emerging competitors -Some applications require cutting edge technology
Distribution transformers	5-8%	Oil-type, dry-type	<ul style="list-style-type: none"> -Local standards -Mainly local/regional players -Fragmented market
Speciality transformers & other	5-8%	Application-specific, traction, components, service	<ul style="list-style-type: none"> -Diverse requirements -Industrial focus -Customers drive innovation -OEM market for components -Fragmented service market

Source:ABB

See further section on *Smart grid & energy storage, the ElectricNet*

Smart grids, main segment of long-term growth

Smart grids will be the biggest growth driver in the grid management industry for the next decade and by 2020 they could represent a global market of up to €50bn, according to Alstom. Key market drivers include managing power system volatility, improving grid reliability and stability, increasing energy efficiency, maximising CO2-free energy, and facilitating and improving prospects for greater energy efficiency in buildings, IT and transport. The key technology influencers will be AC and DC technology, demand (AMI/AMR) and energy storage.

Table 92: Current vs. evolving grid

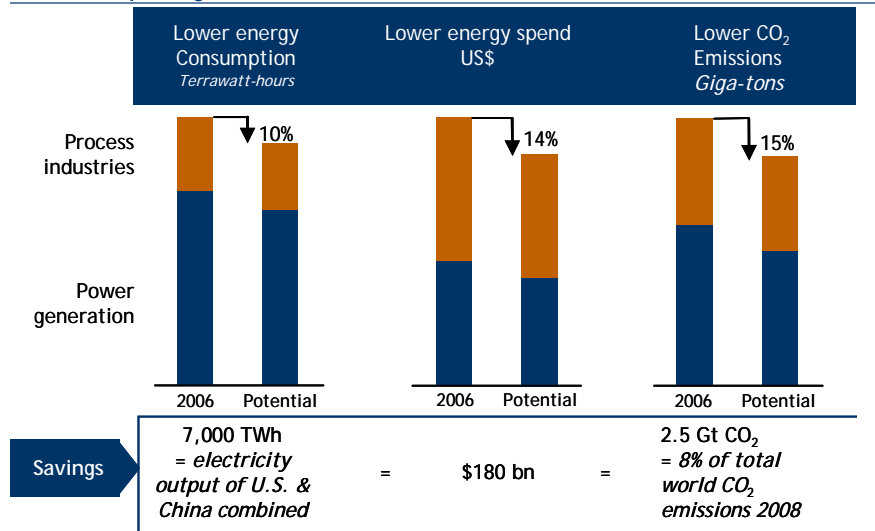
Current grids	Evolving grids
Centralised	More distributed
Stable, reliable, adjustable generation (fossil fuels, nuclear, hydro)	Renewable generation is unstable, unreliable (wind, solar)
Supply follows the demand	Power is available when people don't need it
Instant delivery	
Limited grid accessibility for new producers	More grid accessibility & multi-direction flow
One-directional power flow	Demand management and e-mobility add to complexity
Minimal storage needs	Storage needed to balance supply and demand

Source:BoFA Merrill Lynch Global Research estimates

Environmental regulations on CO2 & energy efficiency

The long-term trend will continue to be towards lowering energy consumption spend via diversification of the energy mix with the adoption of lower CO2 or CO2-free technologies, efficiency improvements, and ultimately carbon capture and storage (CCS).

Chart 89: Savings potential from applying energy-efficient technologies in process industries & power generation



Source:ABB

Near-term signs of growth potential

Our Capital Goods team thinks power systems and large T&D projects are on the rise in both Asia and US/Europe. Power products have competitive risks but grid structures will become more complicated ('smart grid' – see below section on *Smart Grid and Energy Storage*), which offers structural growth opportunities for ABB, Alstom and Siemens.

Given reserve ratios in Europe and regulatory issues in the US, the power equipment sector in developed markets remains relatively depressed. The large power players like Siemens and Alstom, and a number of suppliers (GEA, Hexagon, Metso, Bodycote, IMI, Rotork, Invensys and Weir) should benefit, in our view.

Table 93: Organic growth forecasts for power end market*

	NAmerica	Europe	Asia/EM	World	NAmerica	Europe	Asia/EM	World
Utilities/IPPs – Wind Turb.	25.00%	6.00%	-3.00%	7.30%	(11.00%)	10.00%	20.00%	8.60%
Critical/Other Power	(2.0%)	(4.0%)	8.0%	0.8%	1.0%	1.0%	8.0%	3.5%
Utilities – High Voltage	1.0%	3.0%	8.0%	4.3%	2.0%	3.0%	8.0%	4.6%
Utilities – Medium	2.0%	1.0%	9.0%	4.1%	1.0%	(1.0%)	9.0%	3.1%
Utilities – Traditional Gen.	0.0%	(2.0%)	7.0%	1.7%	2.0%	2.0%	7.0%	3.8%

Source:Source:BofA Merrill Lynch Global Research. * As reflected in company forecasts (before company specific adjustments for invest,tor, market share etc.)

Tougher competition from EM players

The market has had concerns about the power equipment sector, given the rise of Korean and Chinese power equipment companies. Western players have had to adapt to try and meet the challenge head-on, forming JVs with Asian players, relocating cost bases, and moving into more value-added areas (e.g. software). The headwinds are significant in this sector, but widely recognised for the Western players, in our view (Alstom, ABB, Siemens, and GEA).

Industrials and integrateds & energy efficiency

We have identified the following companies covered by BofA Merrill Lynch Global Research that have exposure to energy efficiency as a percentage of sales as integrated providers of energy efficiency solutions. Although it is difficult to gauge the link between such exposure and share price performance (as many factors outside the scope of this analysis play a role in short- and long-term price development), we still consider energy efficiency exposure an important positive point to track.

Table 94: List of companies covered by BofAML involved in Industrials & Integrated Plays and Energy Efficiency

BBG Ticker	Company	Location	BofAML Ticker	Market Cap (US\$m)	Investment Opinion	EE Exposure
ABBN VX	ABB LTD	SWITZERLAND	ABLZF	47602.9	Buy	Medium
ALFA SS	ALFA LAVAL	SWEDEN	ALFVF	8476.7	Underperform	Medium
ALO FP	ALSTOM	FRANCE	AOMFF	12685.9	Buy	Medium
ATCOA SS	ATLAS COPCO AB-A SHS	SWEDEN	ATLKF	31569.9	Neutral	Low
CRG IN	CROMPTON GREAVES	INDIA	CPGZF	1849.9	Underperform	Low
ETN US	EATON CORP	UNITED STATES	ETN	17642.1	Buy	Low
ELUXB SS	ELECTROLUX AB-SER B	SWEDEN	ELUXF	6150.2	Neutral	Medium
GEA GR	GEA	GERMANY	GEAGF	4676.1	Buy	High
HEXAB SS	HEXAGON AB	SWEDEN	HXGBF	7107.2	Buy	Low
HXL US	HEXCEL CORP	UNITED STATES	HXL	2506.4	Neutral	High
HON US	HONEYWELL	UNITED STATES	HON	46685.4	Buy	Medium
ISYS LN	INVENSYS PLC	UK	IVNSF	2710.7	Buy	Low
MEO1V FH	METSO OYJ	FINLAND	MXTOF	7009.0	Neutral	Low
NEX FP	NEXANS	FRANCE	NXPRF	2000.8	Neutral	Medium
PHIA NA	PHILIPS ELECTRONICS	NETHERLANDS	PHGFF	19869.9	Underperform	Medium
PRY IM	PRYSMIAN	ITALY	PRYMF	3475.5	Buy	Low
RXL FP	REXEL SA	FRANCE	RXLSF	5893.4	Neutral	Low
ROK US	ROCKWELL AUTOMATION	UNITED STATES	ROK	11506.1	Buy	Medium
SU FP	SCHNEIDER ELECTRIC SA	FRANCE	SBGSF	35925.5	Buy	Medium
SIE GY	SIEMENS AG-REG	GERMANY	SMAWF	87089.3	Neutral	Medium
SIEM IN	SIEMENS INDIA	INDIA	SMNBF	5531.0	Underperform	Low
6273 JP	SMC CORP	JAPAN	SMECF	11849.0	Buy	High
SPX LN	SPIRAX-SARCO ENG.	UK	SPXSF	2536.4	Neutral	High
VK FP	VALLOUREC	FRANCE	VLOUF	7781.9	Underperform	Low

Source:IQ. DataStream, BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency products, services, technologies and solutions

Table 95: ABB Ltd. - key data

Analyst's Name	Mark Troman >>		
Analyst's Email Id.	mark.troman@baml.com		
Analyst's Phone No.	+44 20 7996 4194		
	2011	2012E	2013E
Revenues	37,990	38,835	40,371
Operating Profit	4,667	5,102	5,506
Operating Margin	12.3%	13.1%	13.6%
Y-o-Y Growth	22.2%	9.3%	7.9%
Net Profit	3,168	3,483	3,811
Net Margin	8.3%	9.0%	9.4%
Y-o-Y Growth	23.7%	9.9%	9.4%
EBIT	4,667	5,102	5,506
EBIT Margin	12.3%	13.1%	13.6%
EBITDA	5,662	6,156	6,590
EBITDA Margin	14.9%	15.9%	16.3%
Operating Cash Flow	5,079.0	4,408.3	4,921.7
Capex	964.0	1,153.0	1,186.8
Free Cash Flow	4,115.0	3,255.4	3,734.9
Net Debt/Equity	(10.8)	(18.4)	(26.7)

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 96: Alfa Laval - key data

Analyst's Name	Ben Maslen >>		
Analyst's Email Id.	ben.maslen@baml.com		
Analyst's Phone No.	+44 20 7996 4783		
	2010	2011E	2012E
Revenues	24,720	28,652	29,530
Operating Profit	4,401	4,691	4,826
Operating Margin	17.8%	16.4%	16.3%
Y-o-Y Growth	9.2%	6.6%	2.9%
Net Profit	3,088	3,223	3,294
Net Margin	12.5%	11.2%	11.2%
Y-o-Y Growth	13.9%	4.4%	2.2%
EBIT	4,401	4,691	4,826
EBIT Margin	17.8%	16.4%	16.3%
EBITDA	5,197	5,521	5,523
EBITDA Margin	21.0%	19.3%	18.7%
Operating Cash Flow	4,005.0	3,524.0	3,350.3
Capex	398.0	541.0	354.2
Free Cash Flow	3,607.0	2,983.0	2,996.0
Net Debt/Equity	(4.1)	21.6	14.0

Source: Company data, BofA Merrill Lynch Global Research estimates

ABB Ltd

ABB is a global leader in power distribution (high and medium voltage) and automation technologies. The company has five divisions: Power Products (29% of sales), Power Systems (21%), Automation Products (24%), Discrete Auto & Motion (22%) and Low Voltage Products (14%).

ABB (medium EE exposure) is an efficiency play via its exposure to some of the most attractive energy efficiency growth markets in the Capital Goods sector, being the global leader in electrical T&D networks (high voltage, medium voltage, HVDC) and a Top 3 player in many automation segments (low voltage equipment, switches, fuses, drives and motors). Energy efficiency is a clear market driver for ABB, with growing convergence between T&D and automation, emerging markets growth, infrastructure renewal, rising commodity prices, connecting remote power and renewables (hydro, wind, solar) to the grid and the need for smarter grids (that can increase transmission capacity by up to 50% and improve stability, reliability and power quality).

Pricing power is likely to remain a key driver of earnings. Overall, we expect ABB to show superior growth to other capital goods groups over the medium term.

Alfa Laval

Alfa Laval is the global market leader in heat transfer and separation equipment, making heat exchangers, separators, decanters and sanitary equipment. Over 40% sales are tied to energy production or efficiency, with Marine, Food, Beverage and Pharmaceutical production being other key end-markets.

Alfa (medium EE exposure) is an energy efficiency play on efficient heat transfer (i.e. heat exchangers transferring heating or cooling from one fluid to another), centrifugal separation and filtration (improved yield, better recycling, reduced waste and lower energy consumption), and fluid-handling technologies (minimise cleaning fluid and contamination risk). It should also benefit from sustainability trends around Marine environmental systems, which are currently subject to a weak shipbuilding cycle, and ballast water treatment, which could benefit from new international regulations. Alfa Laval is well positioned to deliver a solid performance in a weak global economy, in our view, because a high percentage of its revenues are derived from emerging markets and it has a solid aftermarket and lean manufacturing system. High margins and strong cash flows lend Alfa Laval defensive characteristics and warrant a sector valuation premium.

Table 97: Alstom - key data

Analyst's Name	Mark Troman >>		
Analyst's Email Id.	mark.troman@baml.com		
Analyst's Phone No.	+44 20 7996 4194		
	2011	2012E	2013E
Revenues	20,923	20,337	21,443
Operating Profit	858	1,219	1,447
Operating Margin	4.1%	6.0%	6.7%
Y-o-Y Growth	-48.1%	42.1%	18.7%
Net Profit	459	830	987
Net Margin	2.2%	4.1%	4.6%
Y-o-Y Growth	-62.2%	80.9%	18.9%
EBIT	858	1,219	1,447
EBIT Margin	4.1%	6.0%	6.7%
EBITDA	1,529	1,882	2,127
EBITDA Margin	7.3%	9.3%	9.9%
Operating Cash Flow	231.0	521.7	1,736.8
Capex	747.0	729.0	781.2
Free Cash Flow	(516.0)	(207.3)	955.6
Net Debt/Equity	31.0	39.0	20.8

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 98: Atlas Copco - key data

Analyst's Name	Ben Maslen >>		
Analyst's Email Id.	ben.maslen@baml.com		
Analyst's Phone No.	+44 20 7996 4783		
	2010	2011E	2012E
Revenues	69,875	81,203	85,345
Operating Profit	13,915	17,560	17,945
Operating Margin	19.9%	21.6%	21.0%
Y-o-Y Growth	53.1%	26.2%	2.2%
Net Profit	9,921	12,963	12,963
Net Margin	14.2%	16.0%	15.2%
Y-o-Y Growth	58.9%	30.7%	0.0%
EBIT	13,915	17,560	17,945
EBIT Margin	19.9%	21.6%	21.0%
EBITDA	16,413	20,082	20,627
EBITDA Margin	23.5%	24.7%	24.2%
Operating Cash Flow	10,825.0	8,421.0	14,434.0
Capex	1,322.0	2,283.0	1,444.9
Free Cash Flow	9,503.0	6,138.0	12,989.1
Net Debt/Equity	14.0	44.9	16.8

Source: Company data, BofA Merrill Lynch Global Research estimates

Alstom

Alstom is a global leader in power generation equipment/services and rail transport. Power comprises turbines (steam, gas, hydro, and more recently it entered the wind market), generators, power plants, boilers, environmental control systems, service. Rail transport comprises high-speed trains (TGV), metros, trams, commuter trains, locomotives, and signalling. In 2010, it re-acquired Areva Transmission, making it the no.3 player in the high-voltage transmission market.

Alstom (medium EE exposure) is an energy efficiency play on end-markets that are likely to experience solid demand over the long term, namely Power Generation (where it has the largest installed base of steam turbines and is no.3 in gas turbines) and Transport (where it has a top 2 position). It also has strong positions in hydro, wind, carbon capture and storage (CCS) and smart grids, giving it a broad efficiency product line. Order growth for equipment has been very cyclical (especially in Power) but is now recovering, driven mainly by emerging markets demand.

Atlas Copco

Atlas Copco develops and manufactures electric and pneumatic tools, compressed air equipment construction and mining equipment, and assembly systems. It also offers related service and equipment rental. The products are sold and rented under different brands through a worldwide sales and service network spanning 150 countries, half of which are served by wholly or partly owned sales companies.

Atlas Copco (low EE exposure) is an energy efficiency play on stationary and portable air compressors, where it is the world no.1. It offers energy optimisation products (e.g. Carbon Zero compressors, which offer zero net energy use) and software and aftermarket services to maximise the efficiency of facilities (growth in aftermarket services driven by energy efficiency - 70% lifetime product cost). It is also a global market leader in Variable Speed Drives (VSD), which allow customers to flex their supply of compressed air to meet demand (and thereby save energy). We also note its exposure to water-related sustainability trends (i.e. compressors for water treatment, drilling tools). We believe that Atlas Copco is well positioned to deliver a solid performance in a slowing global economy, as a high percentage of its revenues are derived from the aftermarket and it has a lean assembly-based manufacturing system. High margins and strong cash flows lend Atlas Copco defensive characteristics and warrant a sector valuation premium, in our view.

Table 99: Crompton Greaves Ltd - key data

Analyst's Name	Jonas Bhutta >>		
Analyst's Email Id.	jonas.bhutta@baml.com		
Analyst's Phone No.	+91 22 6632 8688		
	2011	2012E	2013E
Revenues	100,051	119,384	125,349
Operating Profit	11,502	6,678	9,192
Operating Margin	11.5%	5.6%	7.3%
Y-o-Y Growth	0.0%	-41.9%	37.7%
Net Profit	8,887	5,214	7,283
Net Margin	8.9%	4.4%	5.8%
Y-o-Y Growth	0.0%	-41.3%	39.7%
EBIT	11,502	6,678	9,192
EBIT Margin	11.5%	5.6%	7.3%
EBITDA	13,438	9,314	12,185
EBITDA Margin	13.4%	7.8%	9.7%
Operating Cash Flow	5,604.9	5,540.4	10,398.0
Capex	6,259.1	8,988.6	4,922.4
Free Cash Flow	(654.2)	(3,448.3)	5,475.6
Net Debt/Equity	5.2	22.5	16.5

Source: Company data, BofA Merrill Lynch Global Research estimates

Crompton Greaves

Crompton is a leading industrial company and part of the Avantha group. It has presence across three primary sectors: power transmission & distribution, industrial automation and consumer products. Crompton has footprints in Asia, Europe, North America and MENA. It had turnover of US\$2.1bn and earnings of US\$190mn in FY11, corresponding to 15% and 32% CAGRs (FY07-11), respectively.

Crompton (low EE exposure) is primarily an efficiency play on its Industrial Systems division, where energy efficiency is a key business driver. We believe CRG's industrial segment will continue to grow despite a slowdown in capex, as the company's products are more focused on energy efficiency (e.g. entry into VFDs, industrial controls (SCADA), railway traction, Emotron and the consumer segment (fans, appliances). Our main near-term concern is that its power segment (65% of revenue) will continue to face competitive headwinds in its domestic business, while profitability in its international operations hinges on a recovery in the EU and North America, as well as management's ability to implement a low-cost manufacturing model. Greater upside risk would require a consistent increase in its domestic power margins towards historical levels.

Table 100: Eaton Corp - key data

Analyst's Name	Andrew Obin		
Analyst's Email Id.	andrew.obin@baml.com		
Analyst's Phone No.	+1 646 855 1817		
	2011	2012E	2013E
Revenues	16,049	16,893	17,970
Operating Profit	1,667	1,898	2,163
Operating Margin	10.4%	11.2%	12.0%
Y-o-Y Growth	43.2%	13.8%	14.0%
Net Profit	1,347	1,468	1,650
Net Margin	8.4%	8.7%	9.2%
Y-o-Y Growth	45.1%	9.0%	12.4%
EBIT	1,667	1,898	2,163
EBIT Margin	10.4%	11.2%	12.0%
EBITDA	2,235	2,493	2,789
EBITDA Margin	13.9%	14.8%	15.5%
Operating Cash Flow	1,150.5	1,768.5	2,198.5
Capex	585.8	591.3	539.1
Free Cash Flow	564.7	1,177.3	1,659.4
Net Debt/Equity	35.9	22.8	8.0

Source: Company data, BofA Merrill Lynch Global Research estimates

Eaton Corp

Eaton Corp. (ETN) is a leading diversified industrial manufacturer of fluid power systems, electrical control products, automotive systems, and medium- and heavy-duty truck transmissions.

ETN (low EE exposure) is primarily an energy efficiency play on its market-leading position in electrical control and power distribution products and services selling into industrial, utility, commercial and residential markets (circuit breakers, power distribution equipment, metering systems, power management software, uninterruptible power supplies and surge protection devices). It is also looking to new markets such as EV charging, renewables and cooling. Efficiency is a driver for other divisions, too: Fluid Power (motors, motion control, and power management), Truck (drivetrain systems, hybrid buses) and Automotive (fuel management). Our positive sentiment on ETN reflects (1) a more optimistic stance on production increases at the company's earlier-cycle Hydraulics, Auto and Truck business, and (2) more conviction on ETN's margin improvement in the next cycle. We also think that ETN might achieve higher multiples in the next cycle due to more consistent execution.

Table 101: Electrolux AB - key data

Analyst's Name	Ben Maslen >>		
Analyst's Email Id.	ben.maslen@bamf.com		
Analyst's Phone No.	+44 20 7996 4783		
	2010	2011E	2012E
Revenues	106,326	101,598	109,149
Operating Profit	5,430	3,017	4,295
Operating Margin	5.1%	3.0%	3.9%
Y-o-Y Growth	44.4%	-44.4%	42.3%
Net Profit	3,997	2,064	2,575
Net Margin	3.8%	2.0%	2.4%
Y-o-Y Growth	53.3%	-48.4%	24.8%
EBIT	5,430	3,017	4,295
EBIT Margin	5.1%	3.0%	3.9%
EBITDA	8,758	6,190	7,432
EBITDA Margin	8.2%	6.1%	6.8%
Operating Cash Flow	7,628.0	5,376.0	6,233.5
Capex	4,198.0	3,569.4	3,246.9
Free Cash Flow	3,430.0	1,806.6	2,986.6
Net Debt/Equity	(2.7)	31.5	25.1

Source: Company data, BofA Merrill Lynch Global Research estimates

Electrolux

Electrolux is the no.1 European and no.3 US appliance manufacturer, selling over 40 million appliances every year under brands like Electrolux, AEG, Zanussi, Eureka and Frigidaire. Kitchen appliances represent 60% of sales, laundry 20%, floorcare 8% and professional products around 10%. Electrolux also sells toasters and mixers.

Electrolux (medium EE exposure) is an energy efficiency play on environmentally friendly consumer products, which accounted for 22% of net sales and contributed 35% of the group's gross profits in 2010. Efficiency drivers include efforts to educate consumers, appliance replacement, and the need for smart, green, connected appliances. Electrolux Appliances has been named Energy Star Partner of the Year by the US Department of Energy (DOE) and the US Environmental Protection Agency (EPA). Electrolux is undergoing an ambitious restructuring programme and accelerated product launch, but is right now struggling with the twin headwinds of declining volumes and high raw material costs. We expect these headwinds to become less significant over time, which should support a trough in earnings in coming quarters.

Table 102: GEA GROUP AG - key data

Analyst's Name	Ben Maslen >>		
Analyst's Email Id.	ben.maslen@baml.com		
Analyst's Phone No.	+44 20 7996 4783		
	2010	2011E	2012E
Revenues	4,418	5,416	5,722
Operating Profit	238	475	580
Operating Margin	5.4%	8.8%	10.1%
Y-o-Y Growth	-11.4%	99.9%	22.1%
Net Profit	132	316	408
Net Margin	3.0%	5.8%	7.1%
Y-o-Y Growth	-17.8%	139.4%	29.1%
EBIT	238	475	580
EBIT Margin	5.4%	8.8%	10.1%
EBITDA	341	646	726
EBITDA Margin	7.7%	11.9%	12.7%
Operating Cash Flow	269.4	188.9	452.3
Capex	93.5	118.5	141.1
Free Cash Flow	175.9	70.4	311.2
Net Debt/Equity	(2.9)	21.9	11.3

Source: Company data, BofA Merrill Lynch Global Research estimates

GEA

GEA provides specialty mechanical equipment and process engineering to a variety of industries such as dairy & food, petrochemicals and energy. It is divided into six broad divisions: heat exchangers (30% of sales), process engineering (29%), mechanical equipment (16%), farm technologies (9%), convenience food services (6%) and refrigeration technologies (12%).

GEA (high EE exposure) is primarily an efficiency play via its heat exchanger business, which offers numerous applications, from AC systems to air-cooled condensers, wet cooling towers, plate heat exchangers, HVAC systems, and shell-and-tube heat exchangers. Its mechanical equipment division is also exposed, as its products (separators, decanters, ceramic membrane elements, valves, pumps, and homogenizers) help to cut production costs and lower the environmental impact. Moreover, it has sustainability megatrend exposure to water, as 20% of its products contribute in some way to water savings. An investment in GEA thus offers exposure to growth through rising demand for higher value-added food & beverages, as well as to a cyclical recovery in oil, gas, chemicals and construction. GEA generates half of its sales from the food & beverage industry. The 2008-09 crisis gave GEA's management the opportunity to push through long-overdue organisational changes, which should drive up margins, in our view.

Table 103: Hexagon AB - key data

Analyst's Name	Ben Maslen >>		
Analyst's Email Id.	ben.maslen@baml.com		
Analyst's Phone No.	+44 20 7996 4783		
	2010	2011E	2012E
Revenues	1,481	2,169	2,335
Operating Profit	152	431	487
Operating Margin	10.2%	19.9%	20.9%
Y-o-Y Growth	0.7%	184.3%	13.0%
Net Profit	90	295	353
Net Margin	6.1%	13.6%	15.1%
Y-o-Y Growth	-23.4%	228.4%	19.5%
EBIT	152	431	487
EBIT Margin	10.2%	19.9%	20.9%
EBITDA	203	535	611
EBITDA Margin	13.7%	24.7%	26.2%
Operating Cash Flow	227.9	236.3	559.4
Capex	87.2	135.0	136.5
Free Cash Flow	140.7	101.3	422.8
Net Debt/Equity	84.7	74.7	54.0

Source: Company data, BofA Merrill Lynch Global Research estimates

Hexagon AB

Hexagon is a supplier of systems for the measurement of objects in one, two or three dimensions. The Metrology sub-division provides testing equipment for product testing and manufacture in the automotive, aerospace, truck and manufacturing segments. The Geosystems segment provides satellite-driven testing and measurement systems used in surveying, heavy construction, and machine control.

Hexagon (low EE exposure) is an energy efficiency play on efficiencies derived via the measurement of objects: Geosystems (geographical information, 3D images for execution and monitoring of roads, bridges, railroads, airplanes and ports); Metrology (measuring every step in the manufacturing process to reduce or eliminate defects); and Technology (enterprise engineering software, geospatially powered solutions). We also note its sustainability megatrend exposure to water via water management (monitoring, geophysical studies and assessment of water resources). We think Hexagon is well placed relative to the sector from a top-line perspective in 2012 and beyond, given (1) the push of Intergraph into China (60%+ growth rates), (2) strong auto capex and aerospace deliveries in Metrology, (3) market share gains in PP&M, and (4) a stronger backlog in SG&I, a stabilising Chinese rail market, and a construction pick-up in China and the US in Geosystems.

Honeywell

See *Buildings*.

Invensys

Invensys is an automation, controls and process solutions group for the process & batch industries, from oil & gas and power & utilities to the chemicals, rail systems and data communications sectors. It offers components, systems and services to the heating management, commercial refrigeration, residential safety and auto industries, etc.

Invensys (low EE exposure) is an energy efficiency play on controls (components and systems for appliances, HVAC, building systems), process automation for energy-intensive industries, and rail signalling. Its products enable 20% of the world's electricity generation, 36% of the world's nuclear energy generation, 64% of the world's LNG production, 24% of the world's chemical production and 17% of the world's crude oil refining. Process automation and rail signalling have strong market positions and growth prospects.

Table 104: Invensys - key data

Analyst's Name	Alex Toms >>		
Analyst's Email Id.	alex.toms@baml.com		
Analyst's Phone No.	+44 20 7995 8720		
	2011	2012E	2013E
Revenues	2,486	2,623	2,723
Operating Profit	262	206	277
Operating Margin	10.5%	7.8%	10.2%
Y-o-Y Growth	5.6%	-21.5%	34.8%
Net Profit	202	157	210
Net Margin	8.1%	6.0%	7.7%
Y-o-Y Growth	16.1%	-22.1%	33.4%
EBIT	262	206	277
EBIT Margin	10.5%	7.8%	10.2%
EBITDA	303	246	320
EBITDA Margin	12.2%	9.4%	11.8%
Operating Cash Flow	175.0	(31.8)	177.5
Capex	93.0	86.3	58.7
Free Cash Flow	82.0	(118.1)	118.7
Net Debt/Equity	(63.4)	(27.6)	(32.9)

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 105: Metso Oyj - Key data

Analyst's Name	Ben Maslen >>		
Analyst's Email Id.	ben.maslen@baml.com		
Analyst's Phone No.	+44 20 7996 4783		
	2010	2011E	2012E
Revenues	5,552	6,646	7,043
Operating Profit	445	572	649
Operating Margin	8.0%	8.6%	9.2%
Y-o-Y Growth	51.6%	28.4%	13.5%
Net Profit	257	356	417
Net Margin	4.6%	5.4%	5.9%
Y-o-Y Growth	71.9%	38.3%	17.2%
EBIT	445	572	649
EBIT Margin	8.0%	8.6%	9.2%
EBITDA	623	744	831
EBITDA Margin	11.2%	11.2%	11.8%
Operating Cash Flow	563.2	513.8	540.9
Capex	134.0	164.0	220.6
Free Cash Flow	429.2	349.8	320.4
Net Debt/Equity	23.9	20.8	16.1

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 106: Nexans SA - key data

Analyst's Name	Caroline Cohen >>		
Analyst's Email Id.	caroline.cohen@baml.com		
Analyst's Phone No.	+33 1 53 65 59 26		
	2010	2011E	2012E
Revenues	4,309	4,594	4,706
Operating Profit	195	(48)	266
Operating Margin	4.5%	-1.0%	5.7%
Y-o-Y Growth	-19.1%	-124.6%	-654.1%
Net Profit	82	(178)	127
Net Margin	1.9%	-3.9%	2.7%
Y-o-Y Growth	1071.4%	-317.1%	-171.6%
EBIT	195	(48)	266
EBIT Margin	4.5%	-1.0%	5.7%
EBITDA	333	88	417
EBITDA Margin	7.7%	1.9%	8.9%
Operating Cash Flow	16.0	153.0	293.4
Capex	129.0	130.0	149.0
Free Cash Flow	(113.0)	23.0	144.4
Net Debt/Equity	6.5	11.6	5.1

Source: Company data, BofA Merrill Lynch Global Research estimates

Metso

Metso is a global supplier of process industry machinery and systems, as well as aftermarket services, serving customers in the pulp & paper, rock & minerals processing, power, hydrocarbon and process industries, and panelboard production.

Metso (low EE exposure) is an efficiency play with broad industrial exposure, including: 1) the pulp & paper industry (responsible for 6% of global industrial energy consumption): environmentally sound pulping and fibre processes, biomass drying systems, energy-efficient recovery boilers, fibre recycling processes, and process automation solutions; and 2) Power: fluidized bed and biomass boilers, process automation solutions, flue-gas cleaning systems. It also has exposure to recycling, oil & gas (automation), construction, and metals & mining (energy-saving solutions).

Metso sees its long-term growth being fuelled by sustainability megatrends, such as growing EM investments in transportation, energy and other infrastructure, as well as in mining, packaging board and tissue, and efficiency and environmental concerns. Most of Metso's earnings are generated from mining and construction equipment, where we think the demand outlook is robust. The pulp & paper equipment division remains more of a margin improvement story, but we think cost-cutting could support earnings going forward.

Nexans

Nexans is a global manufacturer of copper cables for the infrastructure, industry and building markets. It produces high-, medium- and low-voltage cables for the energy and telecoms markets.

Nexans (medium EE exposure) is an efficiency play in the sense that it generates 15-20% of sales from its Renewables (providing long-distance energy transportation products such as HVDC technology) and Public Transport divisions (mainly railways). Its T&D activities also mean that it is well positioned to benefit from the expected development of smart grids. Nexans is one of the leaders in the cable industry, it holds strong positions in high-end products, which protects margins, and it has increasing exposure to emerging countries. The company is highly geared to economic developments in Europe given its numerous cyclical end-markets, so it should benefit from improved economic data in 2012. On the negative side, possible pressure on selling prices and volume declines could hit earnings.

Philips

See *Lighting and LEDs*.

Table 107: Prysmian - Key data

Analyst's Name	Caroline Cohen >>		
Analyst's Email Id.	caroline.cohen@baml.com		
Analyst's Phone No.	+33 1 53 65 59 26		
	2010	2011E	2012E
Revenues	4,571	7,918	8,509
Operating Profit	307	85	385
Operating Margin	6.7%	1.1%	4.5%
Y-o-Y Growth	-20.5%	-72.2%	351.1%
Net Profit	150	(90)	217
Net Margin	3.3%	-1.1%	2.5%
Y-o-Y Growth	-39.5%	-159.8%	-341.6%
EBIT	307	85	385
EBIT Margin	6.7%	1.1%	4.5%
EBITDA	385	233	542
EBITDA Margin	8.4%	2.9%	6.4%
Operating Cash Flow	250.0	280.8	325.9
Capex	106.0	141.0	145.0
Free Cash Flow	144.0	139.8	180.9
Net Debt/Equity	58.2	90.7	73.6

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 108: Rexel - key data

Analyst's Name	Mark Troman >>		
Analyst's Email Id.	mark.troman@baml.com		
Analyst's Phone No.	+44 20 7996 4194		
	2010	2011E	2012E
Revenues	11,960	12,717	13,062
Operating Profit	485	597	656
Operating Margin	4.1%	4.7%	5.0%
Y-o-Y Growth	53.6%	23.0%	9.9%
Net Profit	228	318	355
Net Margin	1.9%	2.5%	2.7%
Y-o-Y Growth	183.5%	39.3%	11.6%
EBIT	485	597	656
EBIT Margin	4.1%	4.7%	5.0%
EBITDA	599	686	774
EBITDA Margin	5.0%	5.4%	5.9%
Operating Cash Flow	424.5	428.9	441.0
Capex	59.4	94.8	130.6
Free Cash Flow	365.1	334.1	310.3
Net Debt/Equity	70.4	59.3	50.6

Source: Company data, BofA Merrill Lynch Global Research estimates

Prysmian

Prysmian is a global leader in cable manufacturing for the energy telecoms industries, with estimated market share of 6-7%. It addresses three end-markets: infrastructure, industrial and building. The group also produces High Voltage Direct Current (HVDC) interconnectors.

Prysmian (low EE exposure) is a play on energy efficiency via its cables, which are used in the Utilities sector to ensure efficient T&D. The Utilities segment currently represents 28% of group sales and includes cables used for renewables (double-digit growth in wind, whereas growth is declining in solar) and for the development of smart grid technologies. It is one of the leaders in this industry, which we believe should be fairly resilient in the current economic environment. Moreover, it has exposure to high-end products (high-voltage in particular) and a well-controlled cost structure. While the company could be hit in the near term by volume and selling price declines, in the long run we believe it should benefit from the structural growth of transmission and umbilicals.

Rexel

Rexel is the world's leading distributor of low-voltage electrical products to the industrial, commercial construction and residential construction markets. Over half of its sales are in Europe, with approximately a third in the US following the acquisition of the Hagemeyer distribution business.

Rexel (low EE exposure) is an energy efficiency play on electrical distribution and services for buildings and industry. It is seeing increased customer focus on energy-efficient buildings and is targeting €650mn in related sales by 2012. Growth segments include variable speed drives, HVAC, LEDs and lighting retrofits (estimated 750 million lighting points need to be replaced within 3Y, a €1.4bn addressable market). Rexel is looking to gain market share with specialists, rail and e-commerce, and is also a player in wind (sourcing, integrated supply) and PV (pre-installation, project management, combining electrical and solar). By 2015, the group expects 50% of its revenue in the building industry to be derived from helping to improve energy efficiency. While 2012 is off to a solid start, we remain below Rexel's 2012-13 targets, as we believe that its high exposure to Europe (60%) and the construction sector make such targets difficult to achieve. Longer-term, we expect Rexel to show strong execution and to sustain its reputation for value-creating acquisitions.

Table 109: Rockwell Automation Corporation - key data

Analyst's Name	John G. Inch		
Analyst's Email Id.	john.inch@bamf.com		
Analyst's Phone No.	+1 646 855 2454		
	2011	2012E	2013E
Revenues	6,000	6,334	6,778
Operating Profit	927	1,059	1,176
Operating Margin	15.5%	16.7%	17.3%
Y-o-Y Growth	53.3%	14.3%	11.0%
Net Profit	696	760	848
Net Margin	11.6%	12.0%	12.5%
Y-o-Y Growth	50.3%	9.1%	11.6%
EBIT	927	1,059	1,176
EBIT Margin	15.5%	16.7%	17.3%
EBITDA	1,058	1,215	1,348
EBITDA Margin	17.6%	19.2%	19.9%
Operating Cash Flow	564.7	669.6	910.0
Capex	120.1	120.0	120.0
Free Cash Flow	444.6	549.6	790.0
Net Debt/Equity	(4.8)	0.3	(11.5)

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 110: Schneider - key data

Analyst's Name	Mark Troman >>		
Analyst's Email Id.	mark.troman@bamf.com		
Analyst's Phone No.	+44 20 7996 4194		
	2010	2011E	2012E
Revenues	19,580	22,191	22,729
Operating Profit	2,703	2,809	2,775
Operating Margin	13.8%	12.7%	12.2%
Y-o-Y Growth	72.0%	3.9%	-1.2%
Net Profit	1,720	1,804	1,761
Net Margin	8.8%	8.1%	7.7%
Y-o-Y Growth	101.9%	4.9%	-2.4%
EBIT	2,703	2,809	2,775
EBIT Margin	13.8%	12.7%	12.2%
EBITDA	3,289	3,441	3,507
EBITDA Margin	16.8%	15.5%	15.4%
Operating Cash Flow	2,160.0	1,619.9	2,531.8
Capex	528.0	595.9	674.9
Free Cash Flow	1,632.0	1,023.9	1,856.9
Net Debt/Equity	18.3	34.5	26.7

Source: Company data, BofA Merrill Lynch Global Research estimates

Rockwell Automation Inc

Rockwell Automation is a global supplier of industrial automation equipment, software, and services and is divided into two segments. The Architecture & Software segment contains integrated control and information architecture that allows the customer to connect its manufacturing enterprise. The Control Products & Solutions segment includes intelligent motor control and industrial control products that allow the customer to implement an automation or information solution on the plant floor.

Rockwell (medium EE exposure) is an energy efficiency play on industrial automation, being the no.2 global player for discrete factory automation systems. We believe that several favorable secular drivers should continue to boost Rockwell's revenues and profits this cycle. We expect one of the most important drivers to be increasing industrial customer demand for energy efficiency products, such as its Power Control division (variable speed drives, intelligent motor control), which is entering a sweet spot. It is also well positioned in segments such as energy assessment and power and energy management. Moreover, it is one of the best-placed industrial names to benefit from global automotive strength (automation software). The company is a high-quality, leveraged play on cycle recovery. We believe that Rockwell can earn more per share during the next expansion cycle, on average, than it earned at the prior peak.

Schneider

Schneider is a global leader in electrical distribution (medium and low voltages) and automation & control, offering products and services for the residential, buildings, industry, energy and infrastructure markets.

Schneider (medium EE exposure) is an energy efficiency play on electrical distribution, industrial automation, and IT data centres. It is a global market leader in energy management across sectors: no.1 power (low voltage & renewable), no.1 energy (medium voltage), no.2 industry (industrial automation), no.1 IT (critical power & cooling) and no.4 buildings (building automation & security). It also continues to build out its smart grid platform, and in our view Schneider is one of the better-positioned companies in this area. We also like its strategy of diversifying away from the construction and industry cycles and into data centres and utilities/infrastructure to give a good balance between early, mid and late cycle markets.

The group has changed its profile in recent years, having increased its emerging market exposure to around a third of sales. Schneider also has strong returns and defensive earnings, in our view. Furthermore, c.20% of sales relate to energy efficiency, which we think is likely to experience above-average growth. Our main concerns relate to the company's exposure to the US and European construction markets.

Table 111: Siemens AG - key data

Analyst's Name	Mark Troman >>		
Analyst's Email Id.	mark.troman@baml.com		
Analyst's Phone No.	+44 20 7996 4194		
	2011	2012E	2013E
Revenues	73,515	74,762	75,949
Operating Profit	8,105	7,483	8,106
Operating Margin	11.0%	10.0%	10.7%
Y-o-Y Growth	37.9%	-7.7%	8.3%
Net Profit	6,835	5,141	5,511
Net Margin	9.3%	6.9%	7.3%
Y-o-Y Growth	73.3%	-24.8%	7.2%
EBIT	8,105	7,483	8,106
EBIT Margin	11.0%	10.0%	10.7%
EBITDA	10,897	10,408	11,173
EBITDA Margin	14.8%	13.9%	14.7%
Operating Cash Flow	7,504.1	6,724.6	7,742.6
Capex	3,230.7	3,408.4	3,308.2
Free Cash Flow	4,273.4	3,316.2	4,434.4
Net Debt/Equity	11.2	8.3	2.8

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 112: Siemens Ltd - key data

Analyst's Name	Jonas Bhutta >>		
Analyst's Email Id.	jonas.bhutta@baml.com		
Analyst's Phone No.	+91 22 6632 8688		
	2011	2012E	2013E
Revenues	118,936	130,679	144,145
Operating Profit	10,329	11,319	11,941
Operating Margin	8.7%	8.7%	8.3%
Y-o-Y Growth	-6.7%	9.6%	5.5%
Net Profit	8,454	8,447	8,918
Net Margin	7.1%	6.5%	6.2%
Y-o-Y Growth	2.2%	-0.1%	5.6%
EBIT	10,329	11,319	11,941
EBIT Margin	8.7%	8.7%	8.3%
EBITDA	11,851	13,117	14,032
EBITDA Margin	10.0%	10.0%	9.7%
Operating Cash Flow	107.1	7,034.1	13,366.5
Capex	3,982.8	2,500.0	3,000.0
Free Cash Flow	(3,875.8)	4,534.1	10,366.5
Net Debt/Equity	(33.4)	(33.4)	(44.6)

Source: Company data, BofA Merrill Lynch Global Research estimates

Siemens

Siemens is a leader in the electrical engineering and electronics sector. It focuses on energy, industry, communications, transportation, health care and lighting.

Siemens (medium EE exposure) is a diversified conglomerate play on energy efficiency. It has strong positions in power generation (wind, fossil, nuclear); T&D (including smart grid); building technologies (automation, power distribution, HVAC, lighting and LEDs); and automation products and services (industry, variable speed drives). In FY10, Environmental Portfolio products and solutions generated revenue of €27.6bn, which Siemens hopes to grow to over €40bn by FY14, with new products and high-growth areas like renewables and infrastructure & cities ("smart" technologies).

Siemens has successfully restructured to match the profitability of peers. Key strengths are its products and market positions (it dominates in many areas). It is now focusing on profitable growth within its 'One Siemens' framework, which benchmarks performance against its peers and includes ROCE targets. In the near term, we think a focus on productivity is key to supporting margins, ROIC and share price performance in a low growth environment. In this respect, Siemens appears to lag behind its competitors.

Siemens India

Siemens India is the Indian listed subsidiary of Siemens AG, which holds a 75% stake. Siemens India operates across three primary segments of Energy, Industry and Healthcare. In FY12 it will create a new business segment, Infrastructure and Cities. Projects contribute 60% of revenues. Its revenues & earnings have grown at a 12% and 13% CAGR FY07-11, respectively.

Siemens (low EE exposure) India is an energy efficiency play along the same lines as its parent company (above). We note that it was the only Indian company to have secured large industrial orders and benefited from demand for its energy efficiency short-cycle products, leading to strong revenue growth of 28% YoY in FY11, ahead of its peers. We expect project revenues to continue to be impacted in FY12. However, we believe that the launch of its SMART (entry-level) products (10% of FY11 order inflows) will be a key growth driver for this segment. Our near-term concerns are a) flat order inflows in FY12E, as the major sectors targeted by Siemens experience a structural downtrend and even receding cyclical headwinds do not revive the capex cycle in FY12; b) continued low margins for SMART products; and c) reduced revenue visibility. Upside risks are a faster than estimated reversal in capex and higher-than-estimated margins for the company's SMART products.

Table 113: SMC - Key data

Analyst's Name	Hideyuki Mizuno >>		
Analyst's Email Id.	hideyuki.mizuno@baml.com		
Analyst's Phone No.	+81 3 6225 8528		
	2011	2012E	2013E
Revenues	325,116	337,000	352,000
Operating Profit	81,971	90,000	96,000
Operating Margin	25.2%	26.7%	27.3%
Y-o-Y Growth	220.6%	9.8%	6.7%
Net Profit	47,761	55,000	63,000
Net Margin	14.7%	16.3%	17.9%
Y-o-Y Growth	143.7%	15.2%	14.5%
EBIT	81,971	90,000	96,000
EBIT Margin	25.2%	26.7%	27.3%
EBITDA	92,774	102,000	109,000
EBITDA Margin	28.5%	30.3%	31.0%
Operating Cash Flow	74,487.0	16,716.1	64,898.6
Capex	11,672.0	15,000.0	14,000.0
Free Cash Flow	62,815.0	1,716.1	50,898.6
Net Debt/Equity	(36.3)	(31.5)	(35.6)

Source: Company data, BofA Merrill Lynch Global Research estimates

SMC Corp

SMC is the leading pneumatic equipment maker, holding a 60% share of the Japanese market and about a 30% share of the global market. Rich product pipelines, successful R&D, and shorter lead time are the sources of its strong competitiveness. The firm has been stepping up overseas sales expansion to increase its market share. Its subsidiary in China is a great advantage in terms of production.

SMC (high EE exposure) is an energy efficiency play on pneumatic and electrical automation products (including actuators, valves, vacuum and air preparation products, dryers, chillers, fittings and tubings), which help to optimise compressed air-related energy use. The company is the top manufacturer of pneumatic equipment in the world and is widely used for the automation of plant processes. Its market share has grown steadily from 26% in 2009 to 31% in 1Q FY3/12. We think that the market will soon start valuing order recovery and the strong growth potential of pneumatic equipment.

SMC is well positioned in the machinery sector for the following reasons: 1) it has the highest global share of pneumatic equipment; 2) heightened automation needs are a tailwind; 3) customers are becoming more diversified; 4) SMC is one of only a few companies that are likely to post record-high profit; 5) the FY3/12 operating margin is at a historical high; 6) earnings are characterised by cyclical growth; 7) its ample cash is on an upward trend; and 8) the shares seem undervalued taking account of this cash.

Table 114: Spirax-Sarco - Key data

Analyst's Name	Alex Toms >>		
Analyst's Email Id.	alex.toms@baml.com		
Analyst's Phone No.	+44 20 7995 8720		
	2010	2011E	2012E
Revenues	590	647	662
Operating Profit	124	132	135
Operating Margin	20.6%	20.0%	20.0%
Y-o-Y Growth	57.2%	6.2%	2.2%
Net Profit	87	92	94
Net Margin	14.7%	14.2%	14.2%
Y-o-Y Growth	78.0%	5.5%	2.7%
EBIT	124	132	135
EBIT Margin	21.0%	20.4%	20.3%
EBITDA	150	158	163
EBITDA Margin	25.5%	24.5%	24.5%
Operating Cash Flow	84.3	96.4	111.3
Capex	31.1	30.7	31.0
Free Cash Flow	53.2	65.7	80.2
Net Debt/Equity	(9.1)	(10.3)	(18.0)

Source: Company data, BofA Merrill Lynch Global Research estimates

Spirax Sarco

Spirax Sarco is the world leader in the control and efficient use of steam and other industrial fluids. It has a comprehensive product range providing system solutions for steam, fluid handling and peristaltic pumping.

Spirax Sarco (high EE exposure) is an energy efficiency pure play on industrial efficiency and optimising steam and thus heat transfer at customer facilities. Its products include steam traps, temperature and pressure controls, pumps and pipeline ancillaries – all of which typically have a 3-9 month payback period. Its key competitive advantage is its large, well-trained salesforce, which comprises steam-system specialists who can provide customers with energy-saving solutions. Key drivers are industrial production (steam is used in every industrial process), energy costs and geographic sales penetration. We continue to like Spirax's long-term positioning, business model and management. Its growth and returns profile also suggests that it would make an attractive long-term investment, particularly in a low-growth environment with potential restructuring-related margin upside.

Table 115: Vallourec - Key data

Analyst's Name	Fiona Maclean >>		
Analyst's Email Id.	fiona.maclean@baml.com		
Analyst's Phone No.	+44 20 7995 6099		
	2010	2011E	2012E
Revenues	4,491	5,146	5,401
Operating Profit	682	675	732
Operating Margin	15.2%	13.1%	13.6%
Y-o-Y Growth	-12.5%	-1.1%	8.4%
Net Profit	410	389	426
Net Margin	9.1%	7.6%	7.9%
Y-o-Y Growth	-19.8%	-5.0%	9.4%
EBIT	682	675	732
EBIT Margin	15.2%	13.1%	13.6%
EBITDA	866	884	1,002
EBITDA Margin	19.3%	17.2%	18.6%
Operating Cash Flow	439.8	246.7	735.9
Capex	872.6	843.6	650.0
Free Cash Flow	(432.8)	(596.9)	85.9
Net Debt/Equity	7.9	24.2	23.9

Source: Company data, BofA Merrill Lynch Global Research estimates

Vallourec

Vallourec is a leading manufacturer of seamless steel tubes primarily for the Oil & Gas and Power Generation industry. Oil & Gas tubes include casing and tubing for well construction/completion and drill pipe for drilling. Vallourec owns 51 production sites (including four steel mills) and operates in 11 countries. Current tube production capacity is c.3.2 mtpa.

Vallourec (low EE exposure) is an energy efficiency play on power generation, where it is the world's no.1 across the full spectrum of tubes used in a power plant. It is the recognised leader in solutions for "supercritical" and "ultra-supercritical" power plants, which operate at increased pressures and temperatures to achieve greater efficiency and reduce CO2 emissions by approximately a third per kwh. It also works with customers to develop new solutions for the next generation of "high advanced" power plants. Furthermore, it is a secondary efficiency play on the auto and oil & gas industries. In the near term, we believe Vallourec will suffer from the volatility of its earnings and the macro outlook. Upside risks: higher-than-anticipated oil prices could drive stronger-than-expected activity, thereby increasing demand for its products; lower competition from new entrants could improve the pricing power of existing players like Vallourec, supporting higher margins in the business.

Table 116: BofAML IT & Energy Efficiency Stock List

Company	EE exposure
AMAZON	Low
AMD	High
ARM HOLDINGS	High
ASML	High
CISCO SYSTEMS	Medium
EMC CORPORATION	High
EQUINIX INC	High
GOOGLE	Low
HEWLETT-PACKARD CO	Low
IBM	Low
INTEL	High
INTERXION	High
SALESFORCE.COM	High
TELECITY GROUP	High
VMWARE	High

Source: BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency products, services, technologies and solutions

IT, “big data” & semis

The global IT sector is emerging as the latest target area in terms of energy efficiency. The global boom in “big data” on the back of phenomena like social media and cloud computing has seen the world’s total digital output grow tenfold from 2006-11. Data volumes are projected to grow a further 29x to 2020 (Source: IDC). This means a significant increase in computing infrastructure and support infrastructure, such as cooling. It also means that the sector is consuming upwards of 3-5% of electricity in markets such as the EU, the US and Japan (Source: ACEEE) and that its global CO2 emissions – c.2% of the world’s total – are already on a par with the aviation sector.

Energy efficiency poses a significant challenge, in that growing energy consumption and prices mean that energy costs are leading to business and capacity constraints, particularly for energy-hungry data centres. We expect this to create significant opportunities for the ‘greening’ of data centres, which could become a US\$40bn market by 2020 (Source: Pike Research).

We also expect energy efficiency to become a major growth driver for the US\$117bn addressable cloud computing market, as the cloud’s scale can lower energy use and emissions by 30-90%.

Finally, we regard semiconductors as a key enabler of realising energy efficiency in the buildings, IT, capital goods, and transport sectors – as well as aiding the business case for renewables.

We believe that a number of stocks provide exposure to the theme of energy efficiency in IT through their involvement in areas such as cloud computing, consolidation, data centre design and operation, DCIM, heating and cooling, power management, thin provisioning, virtualisation, and semiconductors.

IT & energy efficiency, cost is key driver

While one might not expect the IT sector to be at the forefront of the drive to increase energy efficiency, rising energy consumption and costs have placed efficiency high up on corporate agendas. The sector as a whole – and data centres in particular – are facing growing challenges from energy costs, capacity constraints and security and supply.

25-75% of energy costs in commercial buildings

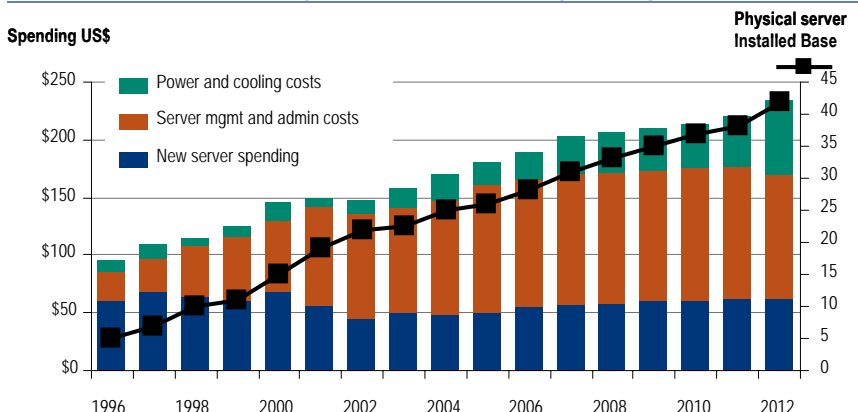
ICT systems typically account for 25% of direct electricity use in commercial office buildings. For energy-inefficient buildings or locations with a high density of IT equipment, such as data centres, this figure may be as high as 60-75%.

Table 117: Overview of ICT sector

Category	Equipment
Equipment	Computing, storage, networking, telecoms, media, biomedical, etc.
Edge gear	PCs, printers, faxes, phones, mobile devices, TVs, radios, SOHO modems/routers etc.
Facilities	Data centers, equipment rooms, telephone central offices (COs), engineering cores, research labs, network and television operating centres (NOCs & TOCs), call centres, media studios etc.
Connectivity	Local, metropolitan, and wide area networks (LANs, MANs, & WANs), broadcast infrastructures, telephony networks, etc.

Source: BofA Merrill Lynch Global Research

Chart 90: Worldwide IT spending on servers, power, cooling & management administration



Source: IDC

Emissions will exceed those of airlines

ICT's increasing energy consumption means rising CO2 emissions, with the sector now approaching 2-2.5% of total global carbon emissions, equivalent to the global aviation industry. For the US, EU and Japan, the number is closer to 5-6% and is growing at a double-digit pace. The industry's carbon footprint is expected to triple to 2020 (vs. a 2002 baseline), with the boom in data centres, mobile phones / smartphones, PCs / laptops / tablet ownership, broadband uptake and ICT infrastructure.

Table 118: ICT sector's emissions

	Emissions 2007 (MtCO2e)	% 2007	Emissions 2020 (MtCO2e)	% 2020
Data centres	116	14%	257	18%
Telecoms infrastructure & devices	307	37%	358	25%
PCs & peripherals	407	49%	815	57%
Total	830	100%	1,430	100%

Source: Smart 2020, Greenpeace; BofA Merrill Lynch Global Research

Recession upping the focus on efficiency

The debt crisis and the threat of a double-dip recession have stalled the expected return to growth in IT spending. The difficult operating environment means companies are placing increased focus on energy efficiency as a way of cutting costs and expanding their businesses. In particular, many companies are looking at third-party data centre outsourcing and the cloud, preferring this to the capex involved in building up their own data centres and the huge opex implications (equipment, space, uninterruptable power, energy costs, engineers, security, insurance, maintenance, high-capacity communication links, etc.).

That said, in 2011, 33% of IT decision-makers said that a lack of funding to pay for improvements was the greatest obstacle to pursuing energy efficiency at their organisations, despite the cost trends (Source: Institute for Building and Efficiency).

Moving up the COO/CIO agenda

In 2011, an estimated 76% of IT decision-makers polled said that their companies had either an energy or carbon reduction goal (Source: Institute for Building and Efficiency) – this was a significant increase from an estimated 45% in 2007 (Source: IBM & EIU). The key driver of the growing focus on efficiency is the rise in server management and administration costs, along with power and cooling costs.

Data centres, emissions growing faster than airlines

It is only one small but invisible step from Facebook, Outlook, Twitter and YouTube to the 2,000+ data centres, as well as the cloud, storing and making data instantaneously available to consumers, governments and corporates. With the world's digital output set to grow 29x from 2010 to 2020 (Source: IDC), the data centre boom will continue, with the facilities consuming an increasing proportion of global energy and having an ever-larger carbon footprint.

We anticipate that this will create significant opportunities for the greening of data centres, which could become a US\$40bn market by 2020 (Source: Pike Research).

Big data, 29x increase by 2020

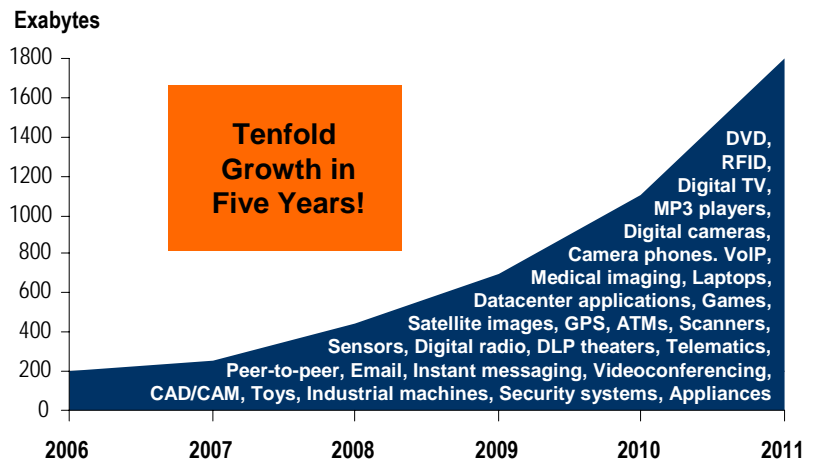
Thanks to the mega-trend of digitalisation over the past two decades, driven by Moore's Law and the rapid advancement in microprocessors, storage and communication technologies, the amount of digital information that is being generated, stored, processed and analysed each year is increasing at an exponential rate.

According to IDC, the world's total digital output was about 180 exabytes in 2006 and will grow to around 1,800 in 2011, i.e. a tenfold increase in just five years (1 exabyte = 1,000,000,000 gigabyte). IDC predicts that the total data volume will reach 35,000 exabytes in 2020, compared with 1,200 in 2010, representing a remarkable 29-fold increase in ten years.

Cross Reference - for further information on data centres, see our Server & Enterprise Software's teams research

[Server & Enterprise Software, 09 January 2012](#)

Chart 91: Data volumes are growing exponentially



Source: IDC

Total world's digital information has expanded rapidly:

- 2006: 0.18 Zettabytes
- 2010: 1.2 Zettabytes
- 2020: 35 Zettabytes

1 Zettabyte = 1,000,000,000,000 Gigabyte

Volume growth is driven by the proliferation of data sources

The rapid growth in the digital universe is driven by multiple factors – the explosion of internet applications tracking every single click and page view for each user, the proliferation of digital video recorders, digital cameras, mobile phones, sensors and RFIDs, all generating huge amounts of real-time data constantly, the analog to digital conversion in all types of electronics and communications devices, as well as the enterprises in various vertical industries such as financial services, media, telecommunications, and transportation, which are increasingly capturing, processing and analysing all sorts of business data about customers, products, transactions, inventory management, logistics, etc.

Big data poses multiple challenges

Big data poses a complex problem because it involves new challenges across four main dimensions.

Table 119: Big data challenges

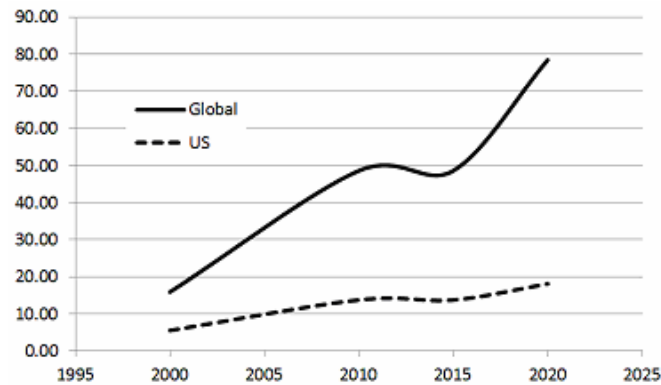
Challenge	Overview
High Volume	data volume is growing exponentially, multiplying tenfold every five years
High Velocity	machines and computers are generating data in constant streams at dizzying speed
High Variety	incredibly rich variety of data sources and data types
High Complexity	managing, understanding, correlating and drawing useful information from the immense variety of data sets is a daunting computer science challenge

Source: BofA Merrill Lynch Global Research

Data centre boom

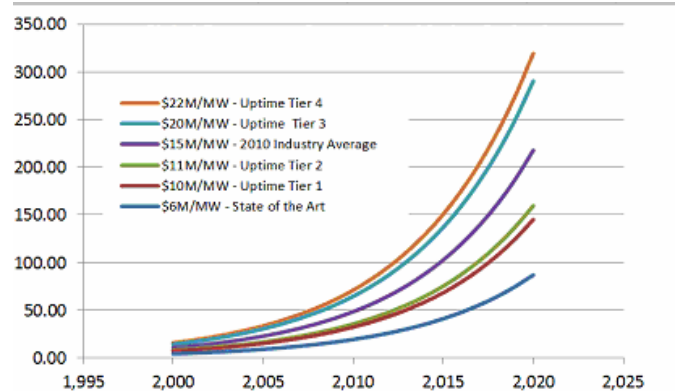
The growth in big data has seen an associated boom in data centres – facilities used to house computer systems and associated components (i.e. telecommunications and storage system, redundant / backup power supplies, redundant data communications connections, cooling, and safety and security devices). It is estimated that there are currently at least 2,199 co-location data centres from 81 countries globally (Source: Data Center Map) – and these figures could be on the low side given the uncertainty over the number of corporate data centres.

Chart 92: Projected annual data centre construction market size (\$bn)



Source: Microsoft

Chart 93: Global data centre construction market projection



Source: Microsoft

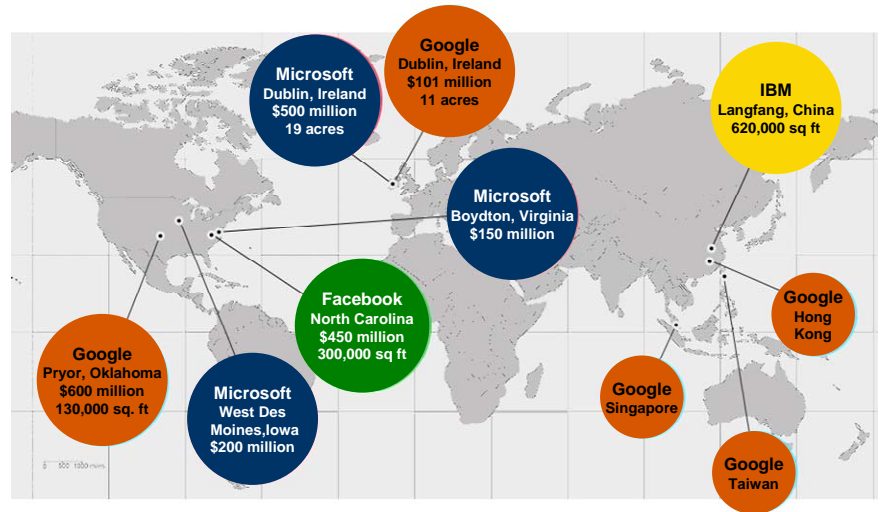
Big data centres are getting bigger

Data centres keep getting bigger – and spending more money on servers, storage, and networking. According to projections by Gartner, in 2010 about 2% of data centres worldwide comprised 52% of total floor space and 63% of total spending on hardware. By 2015, Gartner estimates that the top 2% of data centres will make up 60% of aggregate floor space and 71% of server, storage, and networking spending across all of the data centres in the world.

2012 will be a banner year for new data centres

2012 is expected to follow 2011 as a banner year for data centres, with dozens of state-of-the-art facilities opening for business globally.

Chart 94: 2012 data centre expansion plans



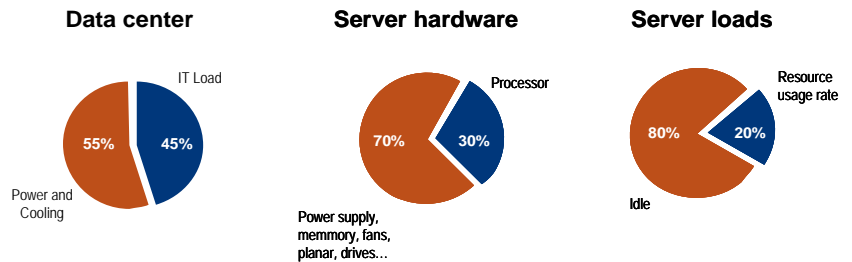
Source: Online Tech

55-80% of energy use goes towards power consumption

The boom in numbers and size has important implications for energy use. It is commonly estimated by industry that less than half of the power used by typical data centres is for IT equipment (i.e. servers, storage, and network). The other half goes towards supporting associated infrastructure (i.e. chillers, humidifiers, computer room air conditioners (CRAC), power distribution units (PDU), uninterruptible power supplies (UPS), lights, and power distribution). The primary source of energy consumption is powering the necessary cooling systems to keep the processors from overheating.

The current data centre ratio is typically 45% to power IT equipment and 55% to power associated equipment. The ratios are even further imbalanced for server hardware because of inefficient hardware and server loads owing to low utilisation rates (i.e. up to 80% of equipment / investment is being “wasted”).

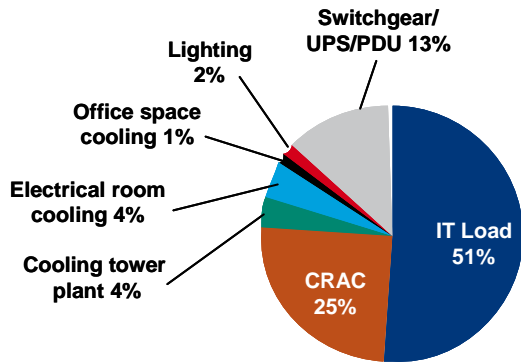
Chart 95: Energy use in a typical data centre



Source: IBM

It is expected that 2012 will see power costs for data centre equipment over its useful life exceed the cost of the original capital investment (Source: US EPA)

Chart 96: Energy consumption profile of a data centre



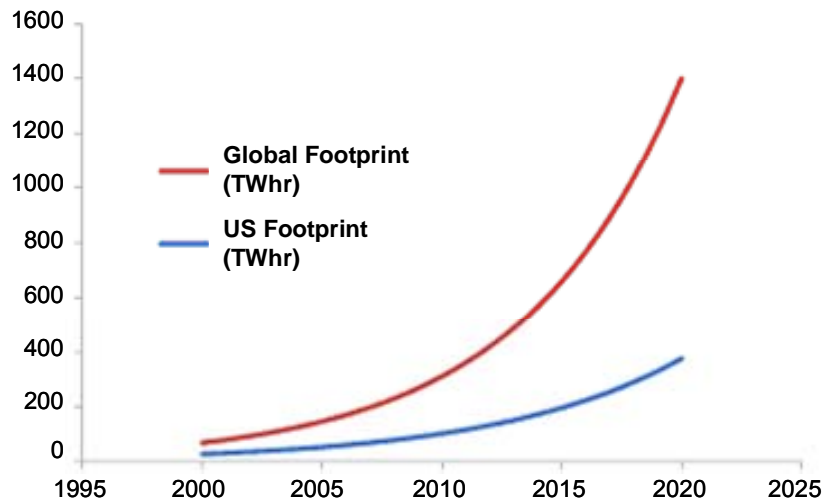
Source: Schneider

Energy use growing at 12% p.a.

Globally, data centres are commonly estimated by IT companies to consume anywhere between 1.5% and 2% of all global electricity – with the figures thought to be growing by as much as 12% p.a. and electricity use doubling every five years (Source: Semiconductor Industry Association). This is raising serious energy- and cost-related concerns:

- **Increasing cost of energy** – While the cost of a kW of electricity has risen only slightly in recent years, the cost of operating servers has increased significantly. This is attributable to growth in server energy consumption outpacing growth in the associated utility cost – on the back of virtualisation and increasing virtual image densities.
- **Power capacity running out** – Corporates are facing growing challenges in terms of deploying additional power-hungry servers as utilities' power feeds are at capacity, especially in major urban areas.
- **Cooling capacity running out** – With many data centres now 10 or 20 years old, heat density often exceeds their original design (i.e. 2-3 kW of cooling per rack vs. today's requirement for 20-30 kW/rack).
- **Physical capacity running out** – The ongoing addition of new projects and applications online – and their images, servers or storage subsystems – is rapidly filling up data centre physical space and posing expensive capex challenges (Source: IBM).

Chart 97: Projection of data centre electricity use



Source: Microsoft

Industry-like energy use & emissions profile

The energy use and emissions profile for data centres more closely resembles industry than commercial buildings. Data centres are energy-intensive, requiring much higher levels of power and cooling than buildings where the focus is on the materials used in construction. In fact, data centres can be 40x more energy-intensive than office buildings, meaning that they more closely resemble industrial facilities (Source: Schneider).

Carbon footprint in line with aviation

The US EPA estimates that servers and data centres are responsible for up to 1.5% of total US electricity consumption, or roughly 0.5% of US GHG emissions. The EPA had originally estimated that data centres would overtake airlines as a source of CO2 emissions by 2020, but there is a growing feeling that the big data boom may see this date brought forward. That said, future estimates must be accounted for in the light of efficiency and cost gains, technological shifts, and new business models.

Key factors impacting carbon footprint

- 1) **Location** – Geography and weather influence energy consumption, with greater consumption in locations with extreme temperatures and humidity levels. As such, Canada, Finland, Sweden and Switzerland are all pushing to attract data centres. The local energy mix (coal vs. nuclear vs. NG vs. coal vs. renewables) will also significantly affect the carbon footprint and the frequency of avoided emissions (i.e. average activity of peaker plants and potentially higher carbon footprint).
- 2) **IT load** – This represents how much power the IT equipment itself consumes including hardware / business architecture (servers, routers, computers, storage devices, telecommunications equipment) and the fire, security and monitoring systems that protect them. The higher the load, the more power needed to keep the system running and the higher the carbon footprint.
- 3) **Electrical efficiency** – Typically, data centres' physical infrastructure is oversized in order to build in a margin for error in terms of capacity. This results in underutilisation, which can be tackled by solutions like design, modular and scalable IT and physical infrastructure (i.e. "pay as you grow"), advances in capacity planning software and technologies (Source: APC)

Greater scrutiny from regulators on the horizon

We expect an increasing number of jurisdictions to be looking to improve energy efficiency and cut emissions in the ICT sector. While such efforts have largely been voluntary to date, we believe it is only a matter of time before binding standards are brought in.

UK's CRC Energy Efficiency Scheme

The UK Environment Agency's CRC Energy Efficiency Scheme (2008) is a mandatory scheme designed to tackle CO2 emissions not already covered by Climate Change Agreements (CCAs) and the EU Emissions Trading Scheme. Companies that consume more than 6,000MWh/year of half hourly metered electricity during 2008 – encompassing many data centre operators – qualify for full participation and register with the Environment Agency. The scheme features an annual performance league table that ranks participants on energy efficiency performance. The first CRC league table was released in November 2011 featuring 2,106 companies.

EU code of conduct for data centres

The EU Code of Conduct was created in response to growing data centre energy consumption. It aims to raise awareness and encourage data centre operators to reduce energy consumption in a cost-effective manner by improving their understanding of energy demand and recommending energy-efficient best practices and targets. The focus is on reducing energy loss by using efficient hardware, cooling, cold aisle containment, and PUE (power usage effectiveness) as a KPI.

A US data centre's energy source "mix" may be 60% coal, 20% oil, 10% natural gas and 5% hydro and 5% wind farms - while a data centre in central France would draw 95% of its electricity from nuclear
(Source: APC)

The European Commission also acknowledges those data centre operators with efficient operations with IBM, for instance, being recognised for having 27 energy-efficient data centres, the largest for any one company

Servers that currently hold the Energy Star seal under v1.1 are typically about 30% more energy-efficient than standard servers, with one or two socket Energy Star servers saving anywhere between US\$200 to US\$500 each over their lifetimes. This is expected to increase even more once v2.0 is finalized in 2012. (Source: EPA)

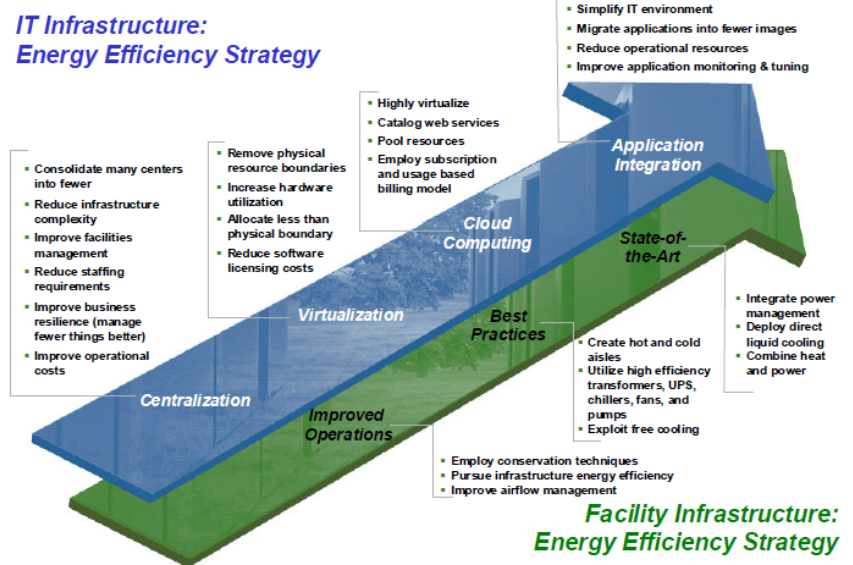
US EPA's Energy Star

The US EPA's Energy Star program – which gives a rating for qualified energy-efficient products and equipment – first established a rating for data centre products in 2010. All Energy Star-labelled data centre products come with an associated “Power and Performance Datasheet” that lists product information and detailed test results. The EPA announced an update in January 2012 which added UPS, network gear and storage to its rating spec processes and will be finalised in 2012/13. Energy Star has teamed up with Standard Performance Evaluation Corporation to develop an active power performance measurement tool called SERT, which will offer details about the energy performance of servers running common workloads.

Greening data centres, a US\$40bn opportunity by 2015

With the energy use and cost factors, along with GHG emissions, all becoming serious bottom-line issue, the ICT sector is looking more and more to energy efficiency solutions for data centres. This transformation increasingly encompasses the sector's latest developments in design, technology and operational best practice principles.

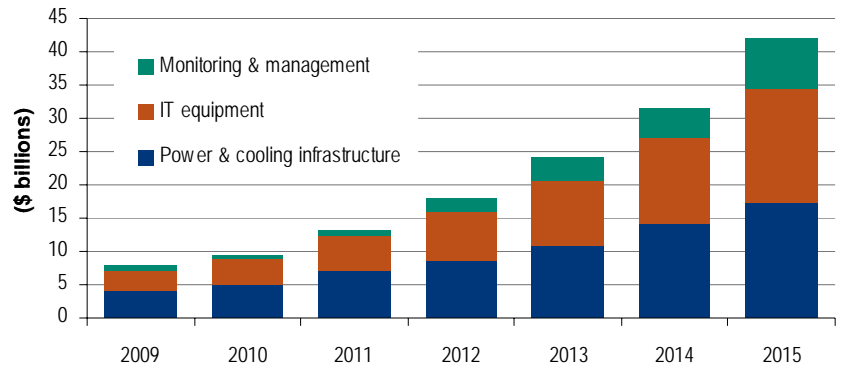
Chart 98: Energy efficiency options across facilities and IT



Source:IBM

Investment in greener data centres should experience rapid growth over the next five years, increasing from US\$7.5bn in global revenues in 2010 to US\$41bn by 2015. The US is projected to be the largest single market, with revenues expected to grow to US\$13.8bn by 2015. Power and cooling infrastructure solutions are expected to account for the largest portion of the green data centre market opportunity (c.46% of the market by 2015), followed by efficient IT equipment (c.41%) and monitoring and management (c.14%) (Source: Pike Research).

Chart 99: Green(er) data centre revenue estimates to 2015

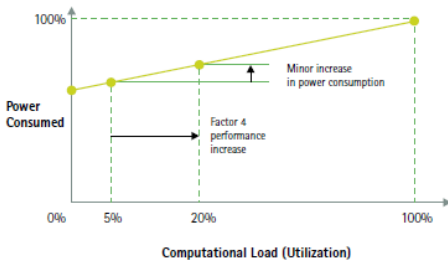


Source: Pike Research

Energy efficiency solutions

With today's energy efficiency best practices, 20-50% energy savings are possible, extending the life and capacity of existing data centre infrastructure, significantly reducing opex costs, and avoiding millions of metric tons of carbon emissions (Source: US EPA). Among the solutions gaining increasing traction are the following:

Chart 100: Relationship between server utilization & power consumption



Source: Accenture

a) Upgrading & consolidating technology

Table 120: Upgrading & consolidating technology

Energy efficiency measure

Virtualisation

Overview/benefits

By consolidating multiple, independent servers to a single physical server, those servers can operate more efficiently and reduce energy costs by 10% to 40%.

Decommissioning un/under-utilised servers

15% to 30% of the equipment running in data centres consumes electricity without doing any computing.

Consolidating lightly used servers

A typical server's utilization is about 5% to 15%, yet it draws full power.

Organising and improving stored data

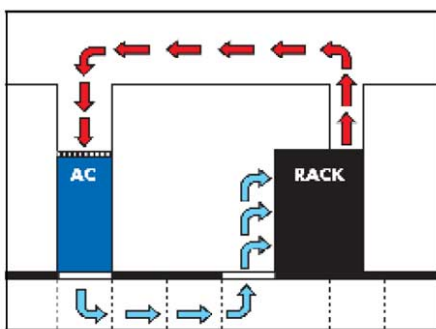
Storage utilisation averages only around 30%. It is common for organizations to have 20 or more copies of the same data, wasting storage space.

Investing in technologies that use energy more efficiently

An ENERGY STAR qualified server uses 30% less energy than a conventional server.

Source: BoFA Merrill Lynch Global Research, company and government sources

Chart 101: Managing air flow



Source: Oracle

b) Managing air flow

Table 121: Energy efficiency benefits of managing air flow

Energy efficiency measure

Overview/benefits

"Hot Aisle/Cold Aisle" layout

Fronts of the server racks face each other and the backs of the server racks face each other - reduces mixing of hot and cold air to improve efficiency.

Contain / enclose server racks

Using flexible strip curtains or rigid enclosures reduces mixing the cold supply air with the hot exhaust air

Review general air flow improvement tips

Examples of how less leakage helps direct more cold air to the equipment that needs cooling include: blanking panels decrease server inlet air temperatures and increase the temperature of air returning to the CRAC, and improve operational efficiency; using structured cabling to avoid restricting air flow to servers; installing grommets to seal areas where cables enter and exit plenums (such as a raised floor).

Table 121: Energy efficiency benefits of managing air flow

Energy efficiency measure	Overview/benefits
Free cooling	Increasing number of data centres are piping outside air in to cool equipment (air-side economization). Traditional data center cooling systems recirculate air, moving hot air exhausted from server racks (up to 115°F) into air-cooling units and then pumping the cool air back to the servers. For new data centers, the potential savings of free cooling are significant, and depending on the outside temperature: one can either avoid using mechanical cooling systems for weeks at a time or all together
Water / liquid cooling	Water cooled systems are gaining in popularity as 1l of water can absorb c.4,000x more heat than the same volume of air. Chilled building water can feed water cooling units (WCUs) – and heat produced by the system can be passed to building water - lowers temperatures & lower power consumption

Source: BofA Merrill Lynch Global Research, company and government sources

c) HVAC

Table 122: Energy efficiency benefits of HVAC

Energy efficiency measure	Overview/benefits
Replacing chiller or UPS systems	Replacing 15Y+ old UPS equipment with best in class equipment means up to 70% greater energy efficiency; new chillers can improve efficiency by up to 50%
Adjust temperature and humidity	The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) established new recommended temperature and humidity ranges at the inlet of the server in 2008. However, many data centres set their temperatures as low as 55°F (when the recommended range is 65°F to 80°F) and keep very tight controls on humidity. Data centres can save 4% to 5% in energy costs for every 1°F increase in server inlet temperature.
Retrofit AC with variable speed fan drives	Retrofit kits for CRACs have a two year payback by being able to adjust fan speed to accommodate changing cooling loads in the data centre.
Install an air-side economizer	Bring outside cooling air into a building. Because data centres must be cooled 24/7, 365 days per year, air-side economizers may even make sense in hot climates, where they can take advantage of cooler evenings and winter air temperatures to save 60% on cooling.
Install a water-side economizer	Using the evaporative cooling capacity of a cooling tower fan produces chilled water during the winter months. During water-side economizer operation, costs of a chilled water plant are reduced by up to 70%.

Source: BofA Merrill Lynch Global Research, company and government sources

d) Reducing power consumption

Table 123: Energy efficiency benefits of reducing power consumption

Energy efficiency measure	Overview/benefits
Hardware solutions	Power conversion and distribution; temperature, humidity and atmospheric pressure sensors; static power save, new monitoring systems/functions; HVDC

Source: BofA Merrill Lynch Global Research, company and government sources

e) Data centre infrastructure management

Table 124: Energy efficiency benefits of data centre infrastructure management

Energy efficiency measure	Overview/benefits
DCIM	Software technology that can allocate power, cooling and space to individual assets in real time; enables operators to visualise, model, plan, control, report and estimate energy use

Source: BofA Merrill Lynch Global Research, company and government sources

Need to better understand KPIs

Power Utilization Effectiveness (PUE) has been promoted by industry – and by multi-stakeholder initiatives such as the Green Grid – as the best-practice KPI (key performance indicator) to measure a facility’s energy efficiency. PUE is a ratio of all the electricity that a facility consumes to the electricity used by the IT equipment it houses. A PUE of 1.0 indicates that a data centre’s lighting, power, and cooling systems consume no power and its power distribution system is perfectly efficient (vs. most data centres, which have a PUE of 2.0-3.0 – i.e. ancillary systems and losses consume more electricity than the servers). While it is an excellent measure of facility-related efficiency, there is also a move to understand IT asset-/environment-related efficiency via measures such as:

Asset efficiency can be measured by:
Work per kw = realised business output per asset / energy consumed by asset

IT efficiency can be measured by:
PUE of IT = IT load / business output load

- Asset efficiency – comparing CPU utilization vs. power usage at the individual device level, to determine which asset is delivering business value at the highest efficiency.
- IT efficiency – comparing the energy going into business-related IT assets such as servers vs. non-business related assets such as storage and switches (Source: WWPI)

Table 125: New green data centres in 2011

Company	Location	PUE	Energy efficiency overview
Facebook	Prineville, Oregon, USA	1.05 to 1.10	- Free cooling (cool dry eastern Oregon desert air); evaporation room (dry air for low low-power evaporative cooling when outside temperatures are high)
FedEx	Colorado Springs, Colorado, USA	1.28	- Free cooling (cool, dry Rocky Mountain air) for 5,000 hours/y or 57% of time
Google	Hamina, Finland	1.14*	- Uses seawater for cooling: heat exchangers cool the servers, and the warm wastewater is mixed with seawater before it's returned to the Gulf of Finland to minimise thermal pollution
Harris Corporation	Harrisonburg, Virginia, USA	1.36	- Recycles cooling water to irrigate the data centre's 4.5 acre grounds (closed-loop condenser cooling system uses UV light & electrical pulses rather than chemicals to control corrosion, scale and biological contamination).
Hewlett-Packard	Fort Collins, Colorado, USA	1.15	- Free cooling and evaporative cooling; environmental sensors that feed a data analytics system for resource management; plastic sheets above server racks prevent cold air fed into the servers from mixing with hot air exhausted from the servers
IBM	Auckland, New Zealand	1.6**	- Uses environmental monitoring and a power management system that measures power, water and diesel use in real time; free cooling: outside air and rainwater captured in cooling towers
Tieto	Espoo, Finland	1.2 to 1.3	- Uses waste heat to heat 1,500 area homes via neighbouring cogeneration power plant
Vantage	Santa Clara, California, USA	1.29	- LEED Platinum certification
Verne Global	Reykjanesbaer, Iceland	1.2***	- Carbon-neutral operations: powered by geothermal & hydroelectric energy; free cooling (cool dry Icelandic air)

Source:Wired, companies, *average of Google's 5 MW and larger data centers; **annual maximum level; ***testing phase data

[Cross Reference - for further information on the cloud, see our Server & Enterprise Software's teams research](#)

2012 Software Year Ahead

[Server & Enterprise Software, 09 January 2012](#)

The Cloud Wars Part IV: on Cloud Nine

[Technology, 12 May 2011](#)

Cloud computing

We are bullish on cloud computing and remain vocal about its significance, market opportunity and energy efficiency credentials as it heads to the mainstream. In a nutshell, cloud computing refers to applications and services offered over the internet – with services provided from data centres all over the world, which are collectively referred to as the "cloud". It delivers computing applications, platforms and infrastructure as a service rather than a product and our Tech team’s bottom-up analysis shows that it has become a US\$117bn addressable market. We anticipate that a growing number of players will look to outsource their data centre-related activities to the cloud, whose potential large scale and energy efficiency best practice adoption in data centres could reduce energy use and CO2 emissions by 30-90%.

While the current balance is 70:30 in favour of owning your own data centre, the picture is changing: the theoretical breakeven point for building your own versus outsourcing is 400 or more physical servers or 10,000 virtual servers (Source: C4L)

The lay of the cloud: three main segments

Three distinct market segments are enabled by the cloud: apps (called either OnDemand or SaaS for Software-as-a-Service), platforms and infrastructure. In addition, other technology companies act as enablers. Some technology vendors fall into multiple cloud segments as well. Google and Microsoft are notable for being in all three cloud segments, while Amazon is in two (platform and infrastructure), as is Salesforce.com (apps and platform). IBM and EMC are in one segment, infrastructure, but are also enablers.

1) Apps as a Service

On Demand Application (aka Application as a Service and Software as a Service) is an application delivery model where software code and associated data are hosted centrally in the cloud and are accessed by users typically through a web browser over the internet. There are two essential criteria:

- It is paid for on a subscription basis; and
- The software is hosted by the vendor and accessed by the customer over the internet.

On Demand has become a common delivery model for enterprise applications, including Customer Relationship Management, Human Resource Management, Accounting and Finance, and Collaboration.

The pure OnDemand business model, which involves *both* subscription pricing *and* hosted deployment, is the opposite of the traditional software model. Prominent players include Salesforce.com, RightNow, Taleo, NetSuite, Concur, Omniture, and Google Apps. Arguably the market leader, Salesforce.com, emphasizes that it is not about selling software. OnDemand is often also referred to Software-as-a-Service, or SaaS, but using the word software in descriptions of the OnDemand model can be misleading, in our view. OnDemand is really about providing a service, not selling software.

2) Platforms as a Service

Some OnDemand companies initially started out providing apps as an OnDemand service, but have since built platforms that can be used to deploy new apps, provided either by partners or the customers themselves.

Notable platform vendors include Salesforce.com and NetSuite, which have both deployed platforms over the past couple of years. Salesforce.com's platform is called Force.com, and the company has encouraged a whole ecosystem of developers which have developed multiple apps that are available on the Salesforce.com infrastructure, deployed over the internet. NetSuite has something similar, called SuiteCloud.

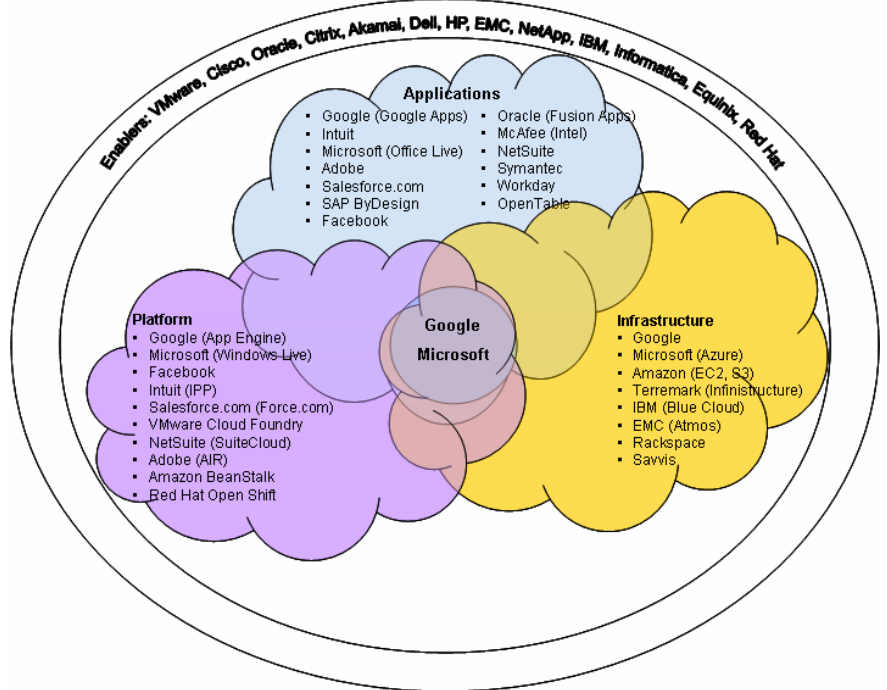
Other large vendors – Google with its App Engine, Amazon with its EC2, VMware with Cloud Foundry and Microsoft with Windows Azure – have also deployed platforms. Smaller vendors, such as Bungee Labs and Corent, provide cloud-based development tools to create apps that are deployed over the internet.

3) Infrastructure as a Service

Infrastructure vendors provide raw physical capacity for cloud computing. This may include any combination of hosting, a development environment, and/or storage. As an example, with managed hosting (e.g., through IBM, RAX, Savvis or Terremark), customers get all their infrastructure provided to them and are responsible only for the apps sitting on top, relieving them of the infrastructure

burden. Other alternatives are vendors (e.g., Google) which allow you to build your own apps using their development environment, and then have them hosted on their service through the cloud. Similarly, Amazon provides cloud storage with its S3 offering.

Chart 102: Cloud vendors currently fall into three core categories



Source: BofA Merrill Lynch Global Research

Expecting cloud to further spread across tech food chain

Cloud computing as a new technology paradigm has crossed the chasm and reached the mainstream. In 2011, Salesforce.com diversified its SaaS offering beyond CRM (Customer Relationship Management) to HCM (Human Capital Management) through the acquisition of Rypple. Oracle acquired SaaS company RightNow and announced public cloud offerings based on Fusion apps for CRM and HCM to be launched in early 2012. SAP acquired HCM leader SuccessFactors while IBM acquired retail SaaS provider DemandTec. RedHat made a number of technology acquisitions which formed the basis of its own IaaS (Infrastructure as a Service) and PaaS (Platform as a Service) offerings. VMware also entered the PaaS market with its CloudFoundry initiative.

We expect cloud computing adoption to continue to accelerate in 2012. Competition in both the SaaS and PaaS arenas should escalate with more acquisitions, as well as new entrants and new products emerging.

Cloud computing caters to companies' need to service the growth in data traffic but keep expenses in check. It allows users to access computer programs through a web browser without installing them on a PC. It also enables companies to lease capacity from external cloud providers, instead of building it locally. This is enabled by advancements in virtualization, parallel processing and multi-core, and requires a new breed of products that innovate at all segments (Software, Hardware, Networking and Internet). We identify the best-positioned companies in the software sector as: Salesforce.com, Microsoft, Rackspace, Red Hat, Intuit, and VMware.

Bottom-up analysis points to US\$117bn addressable market

We have conducted a bottom-up approach to sizing the cloud computing market, taking into account the various buckets of cloud spend – Applications as Service, Infrastructure as Service and Platform as Service. We estimate that application software consisting of various categories (like email, HR, T&E, finance, CRM, security, analytics and collaboration) has a target addressable market (TAM) of US\$51.2bn. We estimate the TAM for the infrastructure market at US\$39.2bn and the platform software market at US\$27bn. Taken together, our bottom-up approach values the overall cloud market at approximately US\$117bn.

Salesforce.com, Microsoft and Google appear well positioned in all three buckets. Large addressable segments and key players are collaboration (US\$18bn; Salesforce.com), email (US\$9.6bn; Microsoft, Google), human capital (US\$3bn; SAP/SuccessFactors, Taleo, Workday), finance (US\$1.3bn; Intuit), infrastructure services (US\$10bn; Amazon, Rackspace), and platforms (US\$26bn; Salesforce.com, Microsoft)

Chart 103: Using a bottom-up approach, we estimate the total Cloud TAM at ~US\$117bn

Software Category	Sub-Category	TAM est	Description	Potential Winners
		(\$ billions)		
Applications			We have looked at several categories of Application software and identified a TAM for each category.	
	Collaboration	\$19.1	- Social Networking and collaboration tools like Chatter, GoToMeeting	Salesforce.com, Citrix
	Email + Office Productivity Apps	\$10.0	- Cloud based email offerings like Gmail and office productivity apps like Office WebApps	Microsoft, Google
	CRM	\$9.6	- Cloud based CRM applications like Sales Cloud and Service Cloud from Salesforce.com and customer service from RightNow	Salesforce.com, RightNow
	Security	\$4.9	- Security as a Service offerings	Symantec, Qualys
	HCM	\$3.6	- Cloud based HR, talent management, performance management and recruiting tools	SuccessFactors, Taleo, Workday
	Finance & Accounting	\$1.5	- Cloud based financial and accounting apps like QuickBooks Online or Business ByDesign	Intuit, Oracle
	Analytics	\$1.2	- Web Analytics software that mines user data	Adobe (Omniure)
	Travel & Expense	\$1.4	- Cloud based Travel and Expense management tools	Concur
Total		\$51.2		
Infrastructure			We have split the Cloud based Infrastructure opportunity in two buckets	
	Private Cloud Infrastructure	\$29.2	- Complete stacks offerings by infrastructure companies to deploy Private Clouds within their internal data centers	Cisco, IBM, VMW, EMC, Red Hat
	Infrastructure as a Service	\$10.0	- Includes managed hosting service offerings from providers	Amazon, Microsoft, Rackspace
Total		\$39.2		
Platform			Given that the Platform Cloud offering is still nascent, we have used the estimate from our top-down analysis here	Google, Salesforce.com, Microsoft
	Total		\$27.0	
AGGREGATE TOTAL CLOUD TAM (\$bn)			\$117.4	

Source:BoFA Merrill Lynch Global Research

Notes: Please see below for details on estimates for each category

Nine themes for cloud computing

We identify nine overarching themes that we believe will become key trends over the next few years as cloud computing matures from an early concept into a meaningful disruptive shift. These themes are closely linked to the growing data use and resulting energy use and emissions that we have discussed earlier. We also highlight companies that we believe may emerge as beneficiaries of these trends.

Table 126: We highlight nine key themes and likely beneficiaries within each theme

Key Themes	Main Takeaways	Likely Beneficiaries
Theme 1 Platform Cloud	PaaS will likely be the most strategically important market segment for cloud computing. We are at the early stage of development, and competition is heating up. The trend is to make PaaS more open and flexible. The priority is to gain developer support and adoption, while monetization will follow further down the road.	CRM, MSFT, GOOG, VMW, RHT
Theme 2 Infrastructure Cloud	IaaS is not only providing cost savings, but also lowering the hurdle for creating new businesses and tapping into powerful computing infrastructure. Telcos are entering the space with many acquisitions.	AMZN, RAX, EQIX
Theme 3 Social Cloud	Social computing is an integral fabric of both enterprise and CRM. Companies are becoming more collaborative, leveraging social software, and marketing and customer engagement are being transformed by social networks.	CRM
Theme 4 Media Cloud	Traditional media distribution channels are ripe for "reintermediation". Netflix is becoming the reigning champ of the video cloud. Amazon is looking to be the king of all cloud-based digital media.	NFLX, AMZN
Theme 5 Database Cloud	Cloud-based database will become a fertile ground for innovations attracting both incumbents and new entrants. Alternative data management solutions (NoSQL) and data as services will become increasingly important for developers of next-generation cloud applications.	CRM, ORCL, MSFT, AMZN
Theme 6 Big Data Cloud	Huge amounts of data generated by cloud applications and social networks provide opportunities for companies to derive valuable insights into building new products and business models. Data analytics is becoming the source of competitive differentiation.	CRM, ORCL, IBM, INFA, TIBX, TLEO
Theme 7 Open Source Cloud	Lower cost, flexibility and extensibility make open source software components key building blocks for both public and private clouds. They are also embraced by developers. Key cloud players are leveraging open source model to achieve critical mass and market adoption for their offerings.	RHT
Theme 8 Mobile Cloud	Rapid proliferation of mobile devices is driving location-based services and mobile transaction capabilities using Smartphones.	GOOG, INTU, EBAY
Theme 9 Data Center Cloud	Data centres are undergoing transformations as well, with new networking architectures, virtualized networking, mega-bandwidth and more intelligent networks, virtualized storage and cloud-based storage.	EMC, JNPR, VMW

Source:BofA Merrill Lynch Global Research

Lower energy use & CO2 emissions reduced by 30-90%

While the growth of cloud computing means a near-term increase in data centres, the cloud has huge potential to facilitate greater energy efficiency within data centres via large-scale implementation of practices such as dynamic provisioning, multi-tenancy, server utilisation and data centre efficiency. While large organisations can implement these efficiency drivers in their own data centres, outsourcing to public cloud infrastructure providers offers greater economies of scale to reduce energy consumption, costs and GHG emissions.

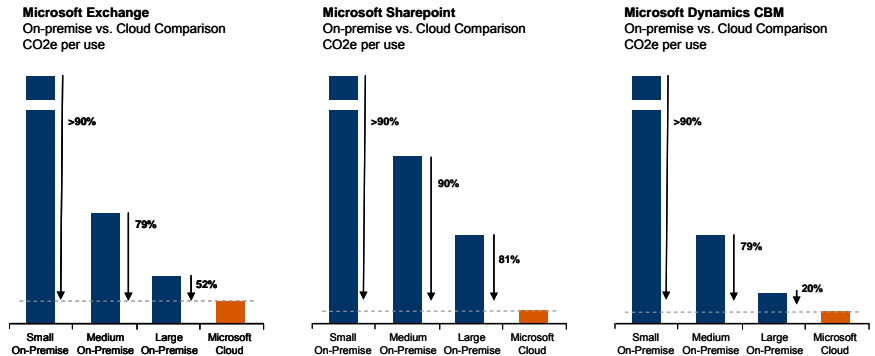
Table 127: Cloud's energy efficiency benefits

Cloud feature	Energy efficiency benefits
Reduce over-allocating of infrastructure (Dynamic Provisioning)	Forecasting and ongoing adjustment of allocated capacity avoids unnecessary over-allocation of resources and sizing close to actual usage (i.e. reduces wasted computing resources).
Share application instances between multiple organizations (Multi-Tenancy)	Sharing application instances between client organizations (tenants) flattens peak loads and reduces overhead for tenant onboarding and management.
Operate server infrastructure at higher utilization	Large deployments of virtualized server infrastructure serving multiple tenants can balance compute and storage loads across physical servers and thus be operated at higher utilization rates.
Improve data centre efficiency (PUE)	Industrialized data centre design at scale and optimized for power efficiency reduces power wasted on cooling, UPS etc. and allows for running servers at optimal utilization and temperature.

Source:Accenture-WSP

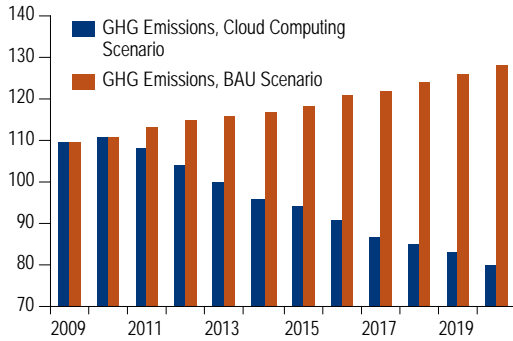
- Accenture-WSP study (2010) shows that for large deployments of 10k+ users, Microsoft's cloud solutions can reduce energy use & CO2 emissions by 30% when compared with their corresponding Microsoft business applications installed on-premise. The benefits were more impressive for small deployments (100 users), with potential for a 90%+ energy use and emissions reduction with a shared cloud service.

Chart 104: Comparison of CO2 emissions of cloud-based vs. on-premise delivery of 3 Microsoft applications* (↓ = estimated decrease with Microsoft Cloud)



Source:Source: Accenture-WSP. * The analysis focused on three of Microsoft's mainstream business applications—Microsoft Exchange®, Microsoft SharePoint® and Microsoft Dynamics® CRM. Each application is available both as an on-premise version and as a cloud-based equivalent. The analysis compared the environmental impact of cloudbased vs. on-premise IT delivery on a per-user basis and considered three different deployment sizes—small (100 users), medium (1,000 users) and large (10,000 users).

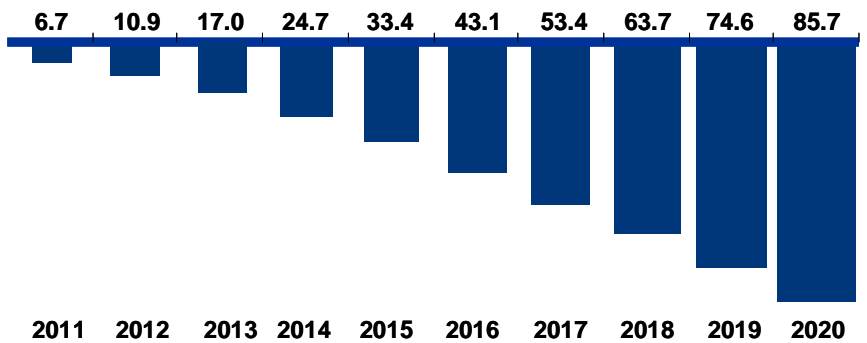
Chart 105: 39% reduction in data centre GHG emissions under a cloud scenario



Source:Pike Research

- The Carbon Disclosure Project study (2011) shows annual energy savings of US\$12bn in the US by 2020: It used case study evidence from 11 global companies and assessed the financial benefits and potential carbon reductions for a company opting for a particular cloud computing service. The results show that by 2020, US companies with annual revenues >US\$1bn/year that use cloud computing could achieve annual energy savings of US\$12.3bn and annual CO2 reductions of 85.7mn MT of CO2/y or 200mn boe (Source: CDP).

Chart 106: CDP model's derived net CO2 savings 2011-2020



Source:CDP

An April 2011 report by Greenpeace evaluated 10 cloud players and said that Akamai earned top-of-the-class recognition for transparency, Yahoo! had the strongest infrastructure siting policy, and that Google & IBM demonstrated the most comprehensive overall approach to reducing their carbon footprints to date

Green cloud vs. brown cloud

A number of stakeholders have been critical of the cloud's "green" credentials, arguing that data centre operators or cloud providers need to focus on lowering their own emissions footprints. We believe that the sector has made significant energy efficiency inroads – as discussed in the section on data centres – and is increasingly looking to raise the proportion of renewables in its energy mix. That said, stakeholders remain critical that companies are not sufficiently disclosing their energy footprints and efficiency strategies and that coal remains responsible for up to 50-80% of their energy mix.

Table 128: Greenpeace's clean cloud power report card*

Company	Clean Energy Index*	Coal Intensity	Transparency	Infrastructure Siting	Mitigation Strategy
Akamai	N/A	N/A	B	D	C
Amazon	26.80%	28.50%	F	D	D
Apple	6.70%	54.50%	C	F	C
Facebook	13.80%	53.20%	D	F	D
Google	36.40%	34.70%	F	C	B
HP	9.90%	49.40%	C	D	C
IBM	10.90%	51.60%	C	C	B
Microsoft	25%	34.10%	C	C	C
Twitter	21%	42.50%	F	F	F
Yahoo	55.90%	18.30%	D	B	C

Source: Greenpeace (*at April 2011 – cf. <http://www.greenpeace.org/international/Global/international/publications/climate/2011/Cool%20IT/dirty-data-report-greenpeace.pdf> for methodology)

Semiconductors, cheap as chips energy savings

Semiconductors have a key role to play in improving energy efficiency at all stages of the value chain from power generation, transmission and usage to intelligent and optimised energy use in industry and by consumers. Semi chips allow us to "do more, using less".

We expect it to be a key enabling technology to improve energy efficiency and reduce energy consumption worldwide for buildings, IT, and the transport sectors – as well as promoting the viability of renewables.

Enabled 1.2% to 2.1% decline in energy intensity

The family of semiconductor-enabled technologies has been one of the leading factors behind energy efficiency gains over the past 50+ years:

- US energy intensity declined by an average 1.2% p.a. between 1950 and 1995 and further to 2.1% p.a. between 1995 and 2008.
- Savings of c.775bn kWh of electricity in the US in 2006, the equivalent of US\$69bn in business and consumer savings and 479Mt of CO₂e abated (Source: American Council for an Energy-Efficient Economy (ACEEE)).
- Semis have helped to improve the efficiency of cars by 40%, passenger planes by 121%, lighting by 339%, and computer systems by nearly 3,000,000% since 1978 (Source: Tech CEO Council).

The energy savings from investing in semiconductor-enabled energy efficiency are about 2.7x the investment cost (Source: ACEEE)

Table 129: Semiconductor-enabled energy efficiency impacts

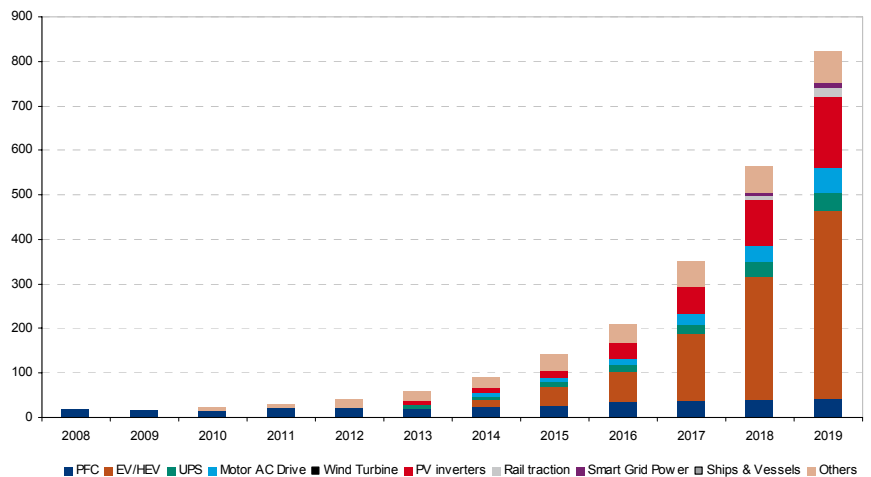
	Before semis	After semis	Energy efficiency impact(s)
Smarter lighting	Manual on/dim/off 5% energy-to-light (incand.) 85% energy-to-light (CFL) Low power factor (-e %) Single colour temperature	Condition-based on/dim/off 95% energy-to-light (LED) High power factor (+e %) Variable colour temperature	>40% monthly lighting energy savings on energy use
Smarter heating& cooling	Manual temp settings Single speed blowers Single zone setup Low power factor (-e %) Manual on/off	Programmed temp settings Variable speed blowers Multi zone setup High power factor (+e %) Demand response & mgmt	>40% monthly savings on energy use
Smarter laundry	Too much hot water Over-dried clothes Single speed motors Low power factor (-e %) Manual on/off	Just enough water... Perfectly-dried clothes Variable speed motors High power factor (+e %) Demand response & mgmt	> 50% monthly savings on laundry energy and water usage
Smarter Power Supplies	Always on supplies 70+% efficiency Single product supplies Transformer-based Fan-based supplies	No-load detect supplies 90+% efficiency Universal product supplies Transformer less-based No-Fan-based supplies	Up to 15% monthly savings on consumer electronics energy usage

Source:ARM, BofA Merrill Lynch Global Research

2% global energy saved & US\$1tn+ energy savings by 2030

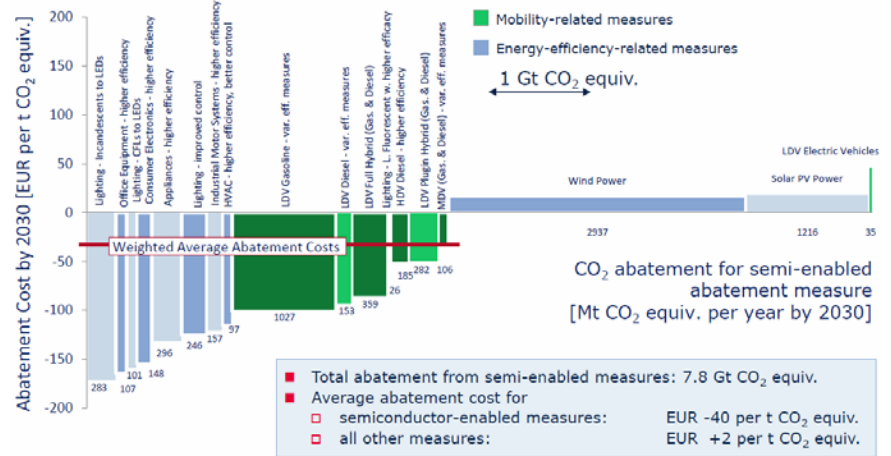
Going forward, semis will be one of the keys to reducing global power consumption, with the ability to save an estimated 27% of energy from now to 2030 (Source: EIA). It is estimated that semis could enable the US economy to expand by more than 70% through 2030 and still use 11% less electricity than it did in 2008. Between now and 2030, electricity bills could be reduced by US\$1.3tn assuming that the right investments (est. \$472bn) and policies are in place, eliminating the need for 296 power plants by the end of the period. Even accounting for the investment needed to drive those gains, the net savings would be an estimated US\$800bn (Source: ACEEE).

Chart 107: 10Y market forecasts for semis in power devices (\$M)



Source:ARM/ based on ole Developpement, BofA Merrill Lynch Global Research

CO2 abatement reduction potential



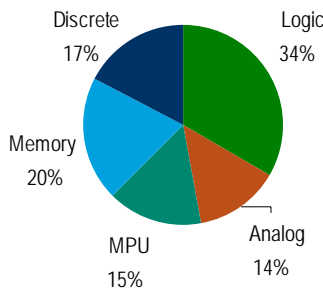
Source:Infineon, McKinsey, BofA Merrill Lynch Global Research. LDV = light duty vehicles, MDV = medium duty vehicles, HDV = heavy duty vehicles, CFL = compact fluorescent lamp, HVAC = heating, ventilation, air conditioning.

Cross Reference - for further information on the semi market see our Global Semiconductor team's [Semiconductors – Year Ahead, 09 January 2012](#)

Semi sales & growth forecast, upturn on the horizon

Our Global Semiconductors team anticipates that this c.US\$300bn sector will see 2012 revenue growth of 2.6% following 3.3% in 2011. It bases its global forecast on its top-down unit and ASP models in addition to bottom-up company/sector forecasts for integrated circuits (ICs), which include analog, microprocessors (MPU or CPU), memory (DRAM, NAND, and other memory), and logic (digital signal processors, microcontrollers, and MOS/Bipolar Logic); the forecast also covers discrete/optoelectronics semis, including LEDs.

Chart 108: 2011E semiconductor sales breakdown



Source:BoFA Merrill Lynch Global Research

- Lower 2011 units on slower inventory digestion – the team lowered its 2011 unit growth for ICs in its year ahead report (see margin) from 4.3% to 1.0% driven by weaker non-memory (from 3.6% to 0.2%) and memory (from 7.2% to 4.3%). The 2011 GDP forecast was unchanged since the Aug forecast, but inventory digestion was slower than expected, up about 9% from 4Q10 to 4Q11.
- 2012: Prefer logic over analog and memory – the team lowered its non-memory unit forecast from 8.8% to 1.3% driven mainly by a sharp cut in analog shipments from up 8% to down 2.2%. It trimmed its logic IC 2012 forecast from 10% YoY to 6.7% due to a lower 4Q11 base. It initiated 2013 with a growth rate of 11% for the global semi industry on essentially seasonal assumptions.
- YoY growth picks up finally in 3Q12 - the correlation between OECD LI and IC unit shipments remains high. Recent strength in the ISM data is pointing to stabilizing if not improving OECD in 4Q11. Other macro data out of the US and Dec hardware sales out of Taiwan are starting to lend support to the team's forecast for a bottom to YoY semi growth in 1Q12.
- Both YoY and QoQ growth acceleration are normally supportive to global semiconductor stocks. The team believes the cycle bottomed in Sept on peaking semiconductor inventory. Much of the gains in semiconductor stocks in Oct-Nov retracted in December. It views this as an excellent opportunity for investors to further increase exposure to semis. Ultra-conservative managements from up- to down-stream tech appear to be squeezing inventory out of the channels. The team believes chip orders are

due for a reasonably strong pick-up from 2Q12. Given the even-lower production rates at foundry/OSAT, it expects the group to see the strongest rebound, along with the highest operating leverage.

Table 130: BofAML semiconductor: Industry forecast summary

(Million)	2012E				2013E			
	Units	Y/Y %	Billings	Y/Y %	Units	Y/Y %	Billings	Y/Y %
Logic	46,650	6.5%	83,013	5%	54,077	15.9%	95,386	15%
Analog	90,131	-2.2%	40,638	-4%	98,943	9.8%	43,949	8%
MPU	571	5.9%	46,609	4%	619	8.3%	49,449	6%
Memory	37,305	3.3%	60,869	-1%	41,252	10.6%	68,669	13%
Total ICs	191,265	1.7%	251,845	2%	214,143	12%	281,256	12%
Total Semiconductors	649,768	-1.7%	302,811	1%	713,242	10%	335,909	11%

Source: BofA Merrill Lynch Global Research estimates

Semi-enabled energy efficiency opportunities

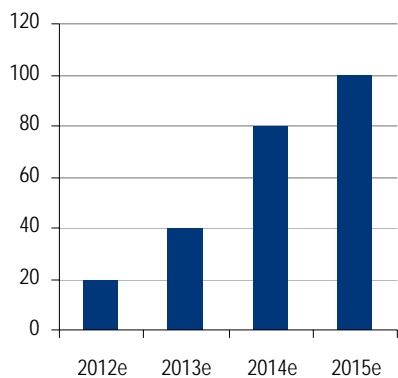
We anticipate that semis will be one of the biggest winners from energy efficiency. They are key to realising improved energy efficiency for the buildings, IT, power and transport sectors. Moreover, fundamentally for the sector, the value of semi components used in some of the solutions outlined below is set to increase by 5-60% – depending on the application – for each percentage point gained in efficiency (Source: Infineon).

a) Conversion efficiency

Electrical energy is converted many times between generation and reaching the end user with significant energy loss and cost implications. The efficiency at which AC is converted to DC power is key to overall power consumption and is being made more efficient by using power semi components that are capable of large-current, high-voltage electric power conversion:

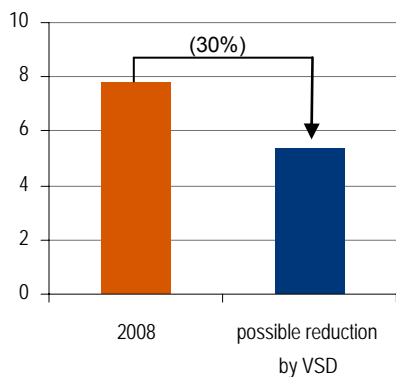
- **HVDC** is an increasingly attractive transmission alternative for long distances – and the converter stations used in HVDC transmission systems depend on high-power semis. The value of semis is €2-10mn per station depending on capacity (Source: Infineon)
- **Home appliances:** an Energy Star “Platinum” labelled appliance has an energy conversion efficiency greater than 90%. Over the past three years, the use of high(er) efficiency Energy Star labels has cut EU electricity consumption by 11tWh – a saving of €1.8bn in terms of electricity costs (Source: European Commission).

Chart 109: Market penetration of highly efficient Platinum-label power supplies (%)



Source: Infineon, climate saver computers

Chart 110: Energy consumption of electric motors (in tn kWh)



Source: Infineon, IEA

b) Variable-speed drives, efficient power conversion

Electric motors such as drives, fans, pumps and compressors account for 40% of total global electricity consumption (Source: IEA). Most motors run at a fixed speed, which means billions of dollars in wasted energy. In China alone, by 2020 industrial motors will consume >30% of electricity and provide >10% of carbon emissions – likely 1-2% of global emissions (Source: ARM). Variable speed drives (VSD) can reduce energy use by up to 30% by matching driver speed or motor output to the actual energy requirements of an application (i.e. load-dependent speed control).

Semis are a key enabler, with VSDs typically containing €4 worth of power semis per kW of motor power – and power semi content ranges from €5000/MW or €10-100k, depending on application. Each US\$1 spent on purchasing a more efficient electrical motor can save US\$100 in energy costs over the motor's lifetime (Source: Infineon). In addition to the cost benefits, VSDs are benefitting from increasing regulation of electric motors:

- The EU has stipulated since mid-2011 that electric motors in the 750-375kWh range must have electronic speed control, and more stringent regulations are set to follow in 2015 and 2017.
- Canada and the US have passed similar regulations.

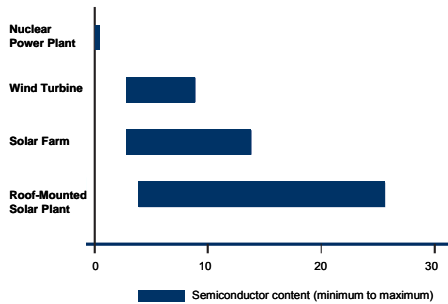
Efficient motors could save the US 2% of total electricity consumption, the EU 7%, and China 2-10% (Source: ARM).

c) Buildings, smarter lighting & appliances

Chips are beginning to have an impact on residential energy usage. For instance in the US, residential energy usage in 2009 was c.22% of the total energy pie, but it represented over a third of total US electricity consumption. From 2008-18, the number of households in the US is projected to increase by 11%, while total electricity consumption is forecast to rise by only 6% (Source: Semiconductor Industry Association). These developments are in large part due to semi-enabled advances such as:

- **Energy-efficient lighting** such as controlling the ballasts for CFLs and LEDs (LEDs themselves are a semi technology), as well as lighting control. These advances have seen a 21% decline in the energy used in lighting, one of the largest uses of residential electricity (Source: EIA Annual Energy Outlook 2009) and 40%+ in monthly lighting energy savings in developed market households (Source: ARM) (see further section on LEDs and Lighting).
- **Reducing energy for standby power for appliances** that are switched off, including the power drawn by external power supplies (e.g. transformers plugged into the wall to power appliances). Because standby power is drawing current 24 hours a day, and so many modern appliances consume standby power, it has been estimated that standby power is responsible for 5-10% of total residential electricity consumption (Source: IEA)
- **Enabling smart(er) buildings** with features such as microprocessor-controlled home appliances, garden/yard irrigation systems, heating and air conditioning, and motion-based lighting – which could be controlled via smartphones or tablets, for instance.

Chart 111: Semi content per GW of generated electric power (€mn/GW)



Source:Infineon

d) Renewables

Alternative energy markets are generating growing volumes for advanced high-voltage power semis to convert energy to electrical power. The higher the efficiency of conversion, the more energy that can be used productively. Semi chips help to facilitate this conversion or make it more efficient, with advanced chips demonstrating conversion efficiency of as high as 20-40% for solar.

High semi content in solar & wind

There is substantially higher content of semis per megawatt of installed solar or wind capacity than for many conventional energy sources.

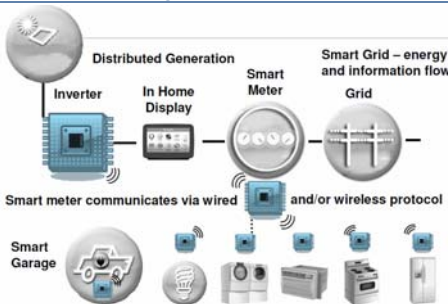
- A typical wind turbine can use up to €9,000 worth of semis per MW because of fluctuations in amplitude and frequency vs. €200 for coal or nuclear, where there are no such fluctuations and direct grid coupling is possible (Source: Infineon).
- Technological advances such as gearless and direct connect wind turbines also require more power semis than gear-based ones.
- Long-term R&D advances in areas such as nanomaterials, nanoscale devices and manufacturing should ultimately be leveraged by renewables manufacturers to reduce production costs.

Table 131: Annual wind & solar installations (MW)

	2008	2009	2010	2011E	2012E	2013E
Wind – total world installations	26927	36654	38665	37795	38500	43350
Y/Y	34%	36%	5%	-2%	2%	13%
Solar – total world						
Solar – total world installations	5,768	6,889	17,438	20,680	23,220	32,300
y/y growth	102%	19%	153%	19%	12%	39%

Source: BofA Merrill Lynch Global Research

Chart 112: Smart grid



Source:ARM

e) Smart grid, reducing distribution losses

Close to two-thirds of electrical power generated is lost in transmission and distribution – with inefficient grids’ poor reliability costing US\$200bn/year in the US alone (Source: Electric Power Research Institute). In terms of opportunity, semis are a key enabler for the smart grid programmes being launched around the world – facilitating the creation of the “Electrinet” via power management, wireless, microcontrollers, digital signal, multimedia and embedded processors and sensors, as well as the need for high-end power management semi technology. Among some of the significant changes that semis are expected to achieve are:

- **Greater visibility into the grid as and when problems occur:** use of sensor and processor chips, together with optimized systems and software, to identify problems and determine solutions for utilities.
- **“Self-healing networks”:** use of advanced chip (e.g. systems-on-chip (SoCs combine sensing, communication, memory and processing capabilities) and system-level optimisation to create networks that can diagnose and correct their own problems.

The potential for cost savings by switching to the smart grid is estimated by various companies with involvement be more than US\$100bn/year, and the energy savings could be many hundreds of Gigawatts – along with massive chip-enabled gains in terms of generation, distribution and end-use consumption.

f) Sustainable transport

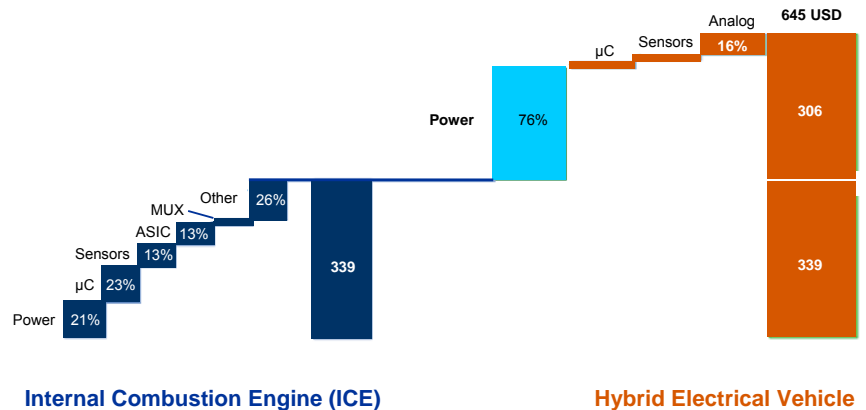
Chips are key to meeting government-mandated fuel efficiency and emissions requirements worldwide for the transport sector – aviation, rail and automobiles. Modern cars contain up to 100 chips – more than many high-end PCs – playing a role in anti-lock brakes, brushless fuel pumps, electric windows, GSP/SatNav, integrated starter and alternator, power steering (EPS), traction control and the electrification of drive train and sub-assemblies. Falling chip costs mean that the environmental and safety benefits are moving from premium to mass market cars – and sales revenues of automotive semis are expected to increase from US\$22.5bn in 2010 to US\$32.7bn by the end of 2015. (Source: GBI)

Chips are at the heart of enabling telecommuting via advanced ICT facilities. In the US, telecommuting saves the equivalent of 9-14bn kWh of electricity/year and reduced CO2 emissions by 14Mt/year (Source: Consumer Electronics Association)

Electrification of the fleet

Power chips are set to play a much larger role in the auto sector’s move towards HEVs (i.e. recuperation *à la* trains) and EVs, as they enable the energy stored in the battery to power the electric motor that drives the vehicle. Increasing the penetration of EVs will be driven by improved relative economics and technical advances, which increase the battery range – but they could see penetration as high as 7-25% by 2020 according to industry estimates (Source: JD Power, Nissan/Renault and Ford - cf. [Renewable Energy, 14 December 2011](#)). The semi content per car is generally US\$250-300 in ICE vehicles but rises to US\$600-700 for hybrids & EVs (Source: Infineon) – mostly power semis as battery-powered vehicles need the most efficient power transistors to achieve a decent range.

Chart 113: Three quarters of incremental semi content in hybrids by 2015 will be power



Source: Strategy Analytics

IT companies & energy efficiency

We have identified the following companies covered by BofA Merrill Lynch Global Research that have exposure to energy efficiency as a percentage of sales vis-à-vis their involvement as IT energy efficiency solutions. Although it is difficult to accurately gauge the link between such exposure and share price performance (as many factors outside the scope of this analysis play a role in short- and long-term price development), we still consider energy efficiency exposure as an important positive point to track.

Table 132: List of companies covered by BofAML involved in IT and Energy Efficiency

BBG Ticker	Company	Location	BofAML Ticker	Market Cap (US\$m)	Investment Opinion	EE Exposure
AMZN US	AMAZON	United States	AMZN	81945.3	Buy	Low
AMD US	AMD	United States	AMD	5505.4	Underperform	High
ARM LN	ARM HOLDINGS	UK	ARMHF	12544.0	Underperform	High
ASML NA	ASML	Netherlands	ASMLF	19122.5	Buy	High
CSCO US	CISCO SYSTEMS	United States	CSCO	108817.2	Buy	Medium
EMC US	EMC CORPORATION	United States	EMC	60525.9	Buy	High
EQIX US	EQUINIX INC	United States	EQIX	6504.8	Buy	High
GOOG US	GOOGLE	United States	GOOG	199064.0	Buy	Low
HPQ US	HEWLETT-PACKARD CO	United States	HPQ	64194.4	Buy	Low
IBM US	IBM (INT'L. BUSINESS MACHINES)	United States	IBM	226084.1	Buy	Low
INTC US	INTEL	United States	INTC	136988.3	Buy	High
INXN US	INTERXION	Netherlands	INXN	994.7	Buy	High
CRM US	SALESFORCE.COM	United States	CRM	22936.0	Buy	High
TCY LN	TELECITY GROUP	UK	TLCTF	2129.2	Buy	High
VMW US	VMWARE	United States	VMW	44206.4	Buy	High

Source: IQ. DataStream, BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency products, services, technologies and solutions

Table 133: Amazon.com - Key data

Analyst's Name	Post, Justin		
Analyst's Email Id.	justin.post@baml.com		
Analyst's Phone No.	+1 415 676 3547		
	2011	2012E	2013E
Revenues	48,077	62,056	79,264
Operating Profit	850	77	728
Operating Margin	3.3%	1.6%	2.2%
Y-o-Y Growth	-39.9%	-91.0%	850.1%
Net Profit	632	66	598
Net Margin	1.3%	0.1%	0.8%
Y-o-Y Growth	-45.2%	-89.6%	813.2%
EBIT	850	77	728
EBIT Margin	1.8%	0.1%	0.9%
EBITDA	1,933	1,567	2,302
EBITDA Margin	4.0%	2.5%	2.9%
Operating Cash Flow	3,925.0	4,934.7	5,603.3
Capex	1,810.0	2,420.0	2,700.0
Free Cash Flow	2,115.0	2,514.7	2,903.3
Net Debt/Equity	(89.6)	(107.7)	(115.7)

Source: Company data, BofA Merrill Lynch Global Research estimates

Amazon

Amazon.com is the world's largest online retailer with a global brand (presence in the UK, Germany, France, Japan, Canada and China). AMZN sells merchandise directly on its websites, on syndicated sites and on third-party sites powered by AMZN technology.

AMZN (low EE exposure) is an efficiency play on its third-party platform / cloud computing initiatives. It has stated its intention to be the leader of all cloud-based digital media, and its platform should be one of its biggest earnings growth drivers over the next three years. It is exposed to the infrastructure as a service segment of the cloud (including managed hosting service offerings from providers), which could be a US\$10bn addressable market. It provides cloud storage with its S3 offering, which had 262bn objects stored on it as at Q4-10 (vs. 2.9bn in Q4-06). It also has cloud exposure to platforms as a service. Amazon is an eCommerce leader with market share and margin growth potential stemming from its technology platform investment. The company's strategy is right for the internet, in our view, as low prices and positive customer experiences should win out in an age of low switching costs.

Table 134: Advanced Micro Devices, Inc - key data

Analyst's Name	Vivek Arya		
Analyst's Email Id.	vivek.arya@baml.com		
Analyst's Phone No.	+1 646 855 1755		
	2011	2012E	2013E
Revenues	6,568	6,650	6,933
Operating Profit	524	606	680
Operating Margin	8.0%	9.1%	9.8%
Y-o-Y Growth	-5.2%	15.6%	12.2%
Net Profit	374	432	539
Net Margin	5.7%	6.5%	7.8%
Y-o-Y Growth	3.9%	15.4%	24.9%
EBIT	524	606	680
EBIT Margin	8.0%	9.1%	9.8%
EBITDA	794	860	919
EBITDA Margin	12.1%	12.9%	13.3%
Operating Cash Flow	382.0	647.9	908.6
Capex	250.0	240.0	280.0
Free Cash Flow	132.0	407.9	628.6
Net Debt/Equity	72.1	35.1	4.0

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 135: ARM Holdings PLC - key data

Analyst's Name	Vivek Arya		
Analyst's Email Id.	vivek.arya@baml.com		
Analyst's Phone No.	+1 646 855 1755		
	2011	2012E	2013E
Revenues	492	550	635
Operating Profit	149	172	223
Operating Margin	45.1%	46.3%	49.1%
Y-o-Y Growth	39.3%	15.5%	29.7%
Net Profit	113	120	157
Net Margin	22.9%	21.8%	24.7%
Y-o-Y Growth	31.0%	6.6%	30.5%
EBIT	149	172	223
EBIT Margin	30.3%	31.3%	35.2%
EBITDA	162	187	238
EBITDA Margin	33.0%	33.9%	37.5%
Operating Cash Flow	193.8	183.5	221.7
Capex	12.1	13.0	17.0
Free Cash Flow	181.7	170.5	204.7
Net Debt/Equity	(2.6)	(12.2)	(21.4)

Source: Company data, BofA Merrill Lynch Global Research estimates

AMD

Advanced Micro Devices is one of the largest suppliers of PC microprocessors and graphics processors worldwide to computing OEMs. The company's main product lines are desktop, notebook and server processors and chipsets.

AMD (high EE exposure) is a play on energy efficiency Accelerated Processing Units (APUs) that power computers and servers. It has highlighted an attractive 2012-13 roadmap which is partly geared to the efficiency themes of the cloud. It also plans to address the Windows 8 tablet opportunity with low power versions of its x86 chips. While AMD is an intriguing restructuring story with an improved balance sheet and several new notebook and server products, it faces significant manufacturing execution risks at its primary fab (GlobalFoundries), management changes and a growing competitive threat from Intel and ARM-based competitors in 2H12 with the launch of Windows 8. Upside risks are faster-than-expected yield improvement, potential market share gains in the notebook and server markets, and gross margin upside from increased sales volumes.

ARM Holdings

ARM licenses microprocessor and cell-library intellectual property to semiconductor companies, which incorporate its designs into their integrated circuits. The company's designs have come to dominate the cellular phone chip market and it is expanding into other electronics markets. ARM charges an up-front licence fee and then generates royalties on each customer chip that contains ARM intellectual property.

ARM (high EE exposure) is an efficiency play on its chips, which are designed to economise on energy rather than maximise processing power. The company has 95% market share in the mobile phone market, where battery life is at a premium and high power chips are not an option. It is now looking to energy-efficient chips for smartphones, microcontrollers and real time devices, as well as servers for data centres via chips which are less powerful than competitors but use less energy and need less cooling. ARM could come under pressure as growth decelerates from higher exposure to low-value non-mobile end-markets, from semiconductor market cyclicalities, from its inability to penetrate new PC and server markets in a timely manner, and from pricing pressure in smartphone chips. Upside risks: 1) Potential for growth in new areas such as PCs and servers. 2) Ability to increase content/chip by licensing higher value-add IP. 3) Stability in smartphone pricing. 4) Long-term annuity-like growth model. 5) Upside to margins as the revenue mix shifts to royalties.

Table 136: ASML Holding N.V. - key data

Analyst's Name	Krish Sankar		
Analyst's Email Id.	krish.sankar@baml.com		
Analyst's Phone No.	+1 415 676 3552		
	2011	2012E	2013E
Revenues	5,651	4,853	5,885
Operating Profit	1,649	1,207	1,681
Operating Margin	29.0%	24.9%	28.6%
Y-o-Y Growth	32.7%	-26.8%	39.3%
Net Profit	1,467	1,049	1,463
Net Margin	26.0%	21.6%	24.9%
Y-o-Y Growth	43.6%	-28.5%	39.4%
EBIT	1,649	1,207	1,681
EBIT Margin	29.2%	24.9%	28.6%
EBITDA	1,814	1,368	1,842
EBITDA Margin	32.1%	28.2%	31.3%
Operating Cash Flow	2,070.2	1,264.8	1,770.4
Capex	301.0	375.2	375.2
Free Cash Flow	1,769.2	889.6	1,395.2
Net Debt/Equity	6.8	(7.9)	(22.2)

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 137: Cisco Systems - key data

Analyst's Name	Tal Liani		
Analyst's Email Id.	tal.liani@baml.com		
Analyst's Phone No.	+1 646 855 5107		
	2011	2012E	2013E
Revenues	43,218	46,306	49,130
Operating Profit	11,331	12,733	13,614
Operating Margin	26.2%	27.5%	27.7%
Y-o-Y Growth	-3.2%	12.4%	6.9%
Net Profit	6,490	8,149	8,957
Net Margin	15.0%	17.6%	18.2%
Y-o-Y Growth	-16.4%	25.6%	9.9%
EBIT	11,331	12,733	13,614
EBIT Margin	26.2%	27.5%	27.7%
EBITDA	13,817	14,886	15,637
EBITDA Margin	32.0%	32.1%	31.8%
Operating Cash Flow	10,079.0	10,986.9	12,096.4
Capex	1,174.0	1,372.3	1,719.5
Free Cash Flow	8,905.0	9,614.6	10,376.9
Net Debt/Equity	19.4	7.1	(9.6)

Source: Company data, BofA Merrill Lynch Global Research estimates

ASML

ASML is the world's largest supplier of lithography equipment to the semiconductor industry with market share of over 70%. Lithography is one of the key processes in the industry and is critical to migrating down the technology curve, accounting for over 20% of total fab equipment spend.

ASML (high EE exposure) is an efficiency play on making semis and thus electronics more energy efficient. It helps to make chips more energy efficient through "shrink" technology or miniaturisation – as its machines allow chip makers to image finer structures on silicon wafers, boosting computing power or memory capacity per chip while keeping costs roughly stable. Its feature shrink roadmap will enable DRAM power consumption reduction to a predicted 0.2 Watt/GB in 2015 (vs. 0.8 in 2010). It also helps to reduce the energy needed to produce one computational logic bit - as the manufacturing node shrinks (28 - 20 - 14 nm). It has set targets to improve the energy efficiency of chips through shrink technology by 20% per year. ASML is well positioned to benefit from early-cycle technology transitions as well as capacity additions, in our view. It should also benefit from rising ASPs, and eventually the adoption of EUV technologies. While this is a much longer-term opportunity, it is critical to extending Moore's law and should drive further ASP and market share gains for ASML.

Cisco Systems

Cisco Systems (CSCO) is a provider of data networking products using internet protocol technology. The company's solutions transport data, voice, and video within buildings, across campuses, and around the world. Product offerings fall into several categories: Routing, Switching, Advanced Technologies, Services and Other Products.

Cisco (medium EE exposure) is a broad energy efficiency play on how its network-based, integrated solutions enable more efficient use of business resources. In addition to its core business of network platforms which decrease TCO, its has a three-fold low carbon focus: 1) enabling better control and monitoring of energy-consuming systems through the network (EnergyWise, data centre virtualisation, smart grid); 2) reducing the need for business travel and commuting, and helping customers to use office space more efficiently (Unified Communications, TelePresence (433 rooms in 2011), and WebEx (23mn hours in 2011)); and 3) promoting low-carbon urban living and working (Connected Workplace, Smart connected Building, Smart+Connected Communities). It is also becoming a holistic cloud provider via its "Unified Computing System" (UCS), a hardware/software solution for the data centre. We believe that portfolio challenges are behind it, and see a stable to improving outlook for margins. The slower growth in switching and routing will cap Cisco's growth, but we believe that the company will be a beneficiary of growth within data centres, collaboration, telepresence and service providers with its architectural strategy.

Table 138: EMC Corp - key data

Analyst's Name	Scott Craig		
Analyst's Email Id.	scott.d.craig@baml.com		
Analyst's Phone No.	+1 646 855 2685		
	2011	2012E	2013E
Revenues	20,008	22,166	25,021
Operating Profit	4,784	5,385	6,219
Operating Margin	23.9%	24.3%	24.9%
Y-o-Y Growth	28.0%	12.6%	15.5%
Net Profit	2,394	2,733	3,327
Net Margin	12.0%	12.3%	13.3%
Y-o-Y Growth	25.9%	14.1%	21.7%
EBIT	4,784	5,385	6,219
EBIT Margin	23.9%	24.3%	24.9%
EBITDA	6,206	6,889	7,728
EBITDA Margin	31.0%	31.1%	30.9%
Operating Cash Flow	5,668.8	6,388.3	7,165.8
Capex	1,243.7	1,440.8	1,626.4
Free Cash Flow	4,425.1	4,947.5	5,539.4
Net Debt/Equity	(5.6)	(22.6)	(36.9)

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 139: Equinix Inc. - key data

Analyst's Name	David Barden		
Analyst's Email Id.	david.w.barden@baml.com		
Analyst's Phone No.	+1 646 855 1320		
	2011	2012E	2013E
Revenues	1,607	1,897	2,225
Operating Profit	310	391	520
Operating Margin	19.1%	20.6%	23.4%
Y-o-Y Growth	64.2%	26.1%	32.9%
Net Profit	83	134	237
Net Margin	5.2%	7.1%	10.7%
Y-o-Y Growth	126.0%	60.5%	77.2%
EBIT	310	391	520
EBIT Margin	19.3%	20.6%	23.4%
EBITDA	663	799	965
EBITDA Margin	41.2%	42.1%	43.4%
Operating Cash Flow	584.7	630.3	796.1
Capex	748.7	790.7	674.9
Free Cash Flow	(164.0)	(160.4)	121.2
Net Debt/Equity	139.6	133.8	111.4

Source: Company data, BofA Merrill Lynch Global Research estimates

EMC

EMC Corporation develops, delivers and supports information infrastructure technologies and solutions designed to optimize information-handling by both individuals and corporations. Its four main business segments are Information Storage, Content Management and Archiving, RSA Information Security and VMware virtual infrastructure.

EMC (high EE exposure) is an energy efficiency play on data centres and critical energy challenges such as power and cooling limitations, high-energy demands and costs, and outages from overburdened power grids. Its solutions include efficient storage platforms (consume less energy per terabyte than alternatives); virtualisation (increasing capacity utilisation and eliminating unnecessary infrastructure); data and file mobility (efficient tiered storage saves power); and backup, recovery and archiving (cost-effective, energy-efficient archives). EMC is the storage market leader and has a rich portfolio of leading-edge technologies.

Equinix Inc

Equinix, Inc. is the premier global data centre operator offering services to large enterprises, content providers and telecom carriers. The company manages 95 network-neutral data centres in 37 markets across the Americas, EMEA, and Asia.

Equinix (high EE exposure) is a pure play on the building, operating and running of energy-efficient data centres, where it is the market leader. Among the measures it has undertaken are: deploying water-side and air-side economizers; installing variable frequency drives (VFDs); deep lake water cooling (DLWC); cold aisle containment; LEED certification; supporting power usage effectiveness (PUE) metrics; retro-fitting IBXs with CFL bulbs and LED lights; and motion-activated light controllers. Equinix is well positioned in the data centre space based on its global footprint, incumbency and customer diversity, given the strong, visible and growing demand for network-neutral colocation, and EQIX's unique place in this market. Colocation demand is rising as enterprise data requirements expand and technological evolution encourages the use of outside suppliers. We believe there are strong barriers to replicating EQIX's central position in the market.

Table 140: Google Inc - key data

Analyst's Name	Justin Post		
Analyst's Email Id.	justin.post@bamf.com		
Analyst's Phone No.	+1 415 676 3547		
	2011	2012E	2013E
Revenues	29,097	35,523	42,194
Operating Profit	12,242	14,808	17,634
Operating Margin	48.9%	48.5%	48.5%
Y-o-Y Growth	17.9%	21.0%	19.1%
Net Profit	10,237	12,252	14,596
Net Margin	35.2%	34.5%	34.6%
Y-o-Y Growth	20.4%	19.7%	19.1%
EBIT	12,242	14,808	17,634
EBIT Margin	42.1%	41.7%	41.8%
EBITDA	14,093	17,110	20,366
EBITDA Margin	48.4%	48.2%	48.3%
Operating Cash Flow	14,565.0	16,820.5	20,123.1
Capex	3,438.0	4,074.4	4,595.9
Free Cash Flow	11,127.0	12,746.1	15,527.2
Net Debt/Equity	(11.6)	(17.0)	(24.6)

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 141: Hewlett-Packard Co - key data

Analyst's Name	Scott Craig		
Analyst's Email Id.	scott.d.craig@bamf.com		
Analyst's Phone No.	+1 646 855 2685		
	2011	2012E	2013E
Revenues	127,387	122,652	127,378
Operating Profit	14,270	11,942	14,129
Operating Margin	10.8%	9.3%	10.6%
Y-o-Y Growth	-3.9%	-16.3%	18.3%
Net Profit	7,532	6,675	8,534
Net Margin	5.9%	5.4%	6.7%
Y-o-Y Growth	-14.0%	-11.4%	27.9%
EBIT	14,270	11,942	14,129
EBIT Margin	11.2%	9.7%	11.1%
EBITDA	19,254	17,090	19,328
EBITDA Margin	15.1%	13.9%	15.2%
Operating Cash Flow	12,639.0	15,418.1	16,379.5
Capex	4,539.0	5,265.1	5,468.0
Free Cash Flow	8,100.0	10,153.0	10,911.5
Net Debt/Equity	75.2	48.4	48.4

Source: BofA Merrill Lynch Global Research estimates

Google

Google (GOOG) was founded in 1998 and went public on 18 August 2004 at US\$85/share. The company operates the most popular global search engine and generates over 90% of its revenues from online search advertising. Recently Google has been diversifying into new platforms (mobile, Google TV) and ad formats (display, video), driving incremental growth. It has roughly 40% US online advertising revenue share.

GOOG (low EE exposure) is primarily an efficiency play on the cloud, where it is well positioned in all three major segments: 1) Applications as a Service via its App Engine; 2) Infrastructure as A Service as a vendor – i.e. allowing you to build your own apps using their development environment, and then have them hosted on their service through the cloud; and 3) Platform as a Service via cloud-based email offerings like Gmail and office productivity. We also note that GOOG's data centres are among the most energy-efficient in the world – with an average PUE of 1.15 across its eight major data centres in 2011. The company has been carbon-neutral since 2007 and has been a longstanding sustainability and green IT champion. Google is a leader in Online advertising, and we expect growth above industry levels as the company gains traction in new categories. Google should generate significant revenues from display advertising, YouTube monetization, mobile search and Google Offers.

HP

Hewlett-Packard Co. (HPQ) provides computing and imaging systems for business and home. The company targets the enterprise and consumer market with a balanced mix of direct and indirect sales, providing a full portfolio of technology solutions, spanning PCs/servers to printers, augmented by IT services and software offerings. HP has five primary business segments: 1) Imaging and Printing Systems, 2) Enterprise Systems & Storage, 3) Personal Systems (PCs), 4) IT Services, and 5) Software.

HP (low EE exposure) is a broad efficiency play on computing. It has improved the energy efficiency of its products by 50% from 2005 to 2011 and has: over 280 PCs meeting Energy Star 5 specifications; 18 desktop PCs and 48 notebooks that meet the EPEAT Gold standard; and all new inkjet and LaserJet printer families have ENERGY STAR qualified offerings. Other areas of efficiency exposure include: data centres (VSD fans and cooling systems, designed 25 LEED data centres; leader in energy efficient modular data centre solutions (FlexDC)); servers (G7); networking and connectivity; storage; software to improve efficiency; and HP Visual Collaboration. We view HP as a large-cap, defensive investment, owing to its high portion of recurring sales, significant cost-cutting levers, strong balance sheet, top-notch management, and potential share gains. The EDS acquisition should provide revenue and cost synergy opportunities, outside of those opportunities within core HP. Longer term, we view HP as a consolidator of share in the IT hardware market, specifically in PCs, services and software, while maintaining its dominant share in printing.

Table 142: Intl Business Machines, Inc. - key data

Analyst's Name	Scott Craig		
Analyst's Email Id.	scott.d.craig@baml.com		
Analyst's Phone No.	+1 646 855 2685		
	2011	2012E	2013E
Revenues	106,913	108,311	113,360
Operating Profit	20,863	22,000	23,697
Operating Margin	19.5%	19.6%	51.2%
Y-o-Y Growth	14.7%	5.5%	7.7%
Net Profit	15,837	16,532	17,759
Net Margin	14.8%	15.3%	15.7%
Y-o-Y Growth	6.5%	4.4%	7.4%
EBIT	20,863	22,000	23,697
EBIT Margin	19.5%	20.3%	20.9%
EBITDA	24,427	25,510	27,415
EBITDA Margin	22.8%	23.6%	24.2%
Operating Cash Flow	22,004.3	21,722.8	22,078.4
Capex	4,244.9	4,352.3	4,555.2
Free Cash Flow	17,759.5	17,370.5	17,523.2
Net Debt/Equity	95.9	79.2	68.1

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 143: Intel Corporation - key data

Analyst's Name	Vivek Arya		
Analyst's Email Id.	vivek.arya@baml.com		
Analyst's Phone No.	+1 646 855 1755		
	2011	2012E	2013E
Revenues	53,999	56,754	61,023
Operating Profit	17,477	17,406	18,764
Operating Margin	32.4%	30.7%	30.7%
Y-o-Y Growth	12.1%	-0.4%	7.8%
Net Profit	12,942	12,464	13,478
Net Margin	24.0%	22.0%	22.1%
Y-o-Y Growth	12.9%	-3.7%	8.1%
EBIT	17,477	17,406	18,764
EBIT Margin	32.4%	30.7%	30.7%
EBITDA	23,974	25,476	28,452
EBITDA Margin	44.4%	44.9%	46.6%
Operating Cash Flow	20,192.0	20,509.7	23,490.7
Capex	10,764.0	12,500.0	10,500.0
Free Cash Flow	9,428.0	8,009.7	12,990.7
Net Debt/Equity	4.9	(2.6)	(14.5)

Source: Company data, BofA Merrill Lynch Global Research estimates

IBM

International Business Machines (IBM) is a leading provider of enterprise solutions, offering a broad portfolio of IT hardware, business and IT services, and a full suite of software solutions. The company integrates its hardware products with its software and services offerings to provide high value solutions. IBM comprises five major segments: 1) Global Technology Services, 2) Global Business Services, 3) Systems and Technology, 4) Software, and 5) Global Financing.

IBM (low EE exposure) is a broad IT software and services play on helping its customers to become more energy-efficient. It has a comprehensive "Smarter Planet" offer covering: buildings (facilities and energy management), infrastructure (infrastructure as a service cloud segment, data centres, energy management), intelligent systems (smart grid, transport, water management, and sustainability strategy (green IT, supply chain, procurement). Altogether, IBM's roadmap calls for revenues of US\$10bn in "Smarter Planet" and US\$7bn in cloud solutions by 2015 – with the former's revenue up 47% in 2011. We view IBM as a defensive investment given its high exposure to recurring sales, cost-cutting levers, solid balance sheet, potential share gains, and relatively stable margins. We believe the company will embark on further cost-cutting initiatives, given the slowdown in IT spending. We expect IBM to enhance its services and software offerings and add more growth to its current revenue profile through acquisitions. Longer term, we view IBM as a share gainer in the IT spending market.

Intel

Intel Corporation is one of the leading semiconductor companies worldwide, supplying advanced technology solutions for the computing industry. Its primary products are microprocessors, chipsets and motherboards.

Intel (high EE exposure) is an energy efficiency play on semis' contributions to energy savings in computing with its processors saving up to 26 terawatt-hours of electricity between 2006 and 2009, compared with the technology it replaced. Recent developments include: Hi-k metal gate transistors; XEON 5600 processors for servers which can increase performance by up to 40% per watt; a new Core processor family which can lower power consumption by 25% with 20-70% better performance. Intel is also a leader in hardware and software technologies that help measure and optimize energy use in computers and data centres. We note that Intel has been the largest voluntary purchaser of green power in the US for the past three years. We are positive on the company on the back of a stabilizing PC market, solid long-term growth in servers where it has 94% market share and which are being driven by emerging consumer cloud applications, and the incremental US\$20bn mobile opportunity where Intel's manufacturing lead could become a critical differentiator.

Table 144: InterXion Holding - Key data

Analyst's Name	David Barden		
Analyst's Email Id.	david.w.barden@baml.com		
Analyst's Phone No.	+1 646 855 1320		
	2010	2011E	2012E
Revenues	208	244	287
Operating Profit	46	56	66
Operating Margin	22.2%	22.8%	22.9%
Y-o-Y Growth	#VALUE!	20.6%	17.6%
Net Profit	15	22	31
Net Margin	7.0%	9.0%	10.7%
Y-o-Y Growth	#VALUE!	49.2%	39.6%
EBIT	46	56	66
EBIT Margin	22.2%	22.8%	22.9%
EBITDA	77	92	113
EBITDA Margin	37.1%	37.8%	39.3%
Operating Cash Flow	74.4	85.0	117.7
Capex	98.2	141.9	187.1
Free Cash Flow	(23.8)	(56.9)	(69.4)
Net Debt/Equity	103.5	23.4	36.8

Source: Company data, BofA Merrill Lynch Global Research estimates

InterXion

InterXion designs, builds and operates 28 carrier-neutral data centres in 11 countries across Europe, spanning more than 60,000 square metres. The company services more than 1,100 customers consisting of network providers, managed service providers, financial services companies, digital media and distribution companies, and Enterprises. InterXion completed its IPO on 28 January 2011, raising nearly US\$200mn.

InterXion (high EE exposure) is a pure play on the building, operating and running of energy-efficient data centres, allowing customers to reduce opex and capex costs. Its data centres all use free cooling and cold aisle containment, and have seen consistent PUE improvements. Other measures undertaken include Computational Fluid Dynamics, VFDs (Variable Frequency Drives), hot aisle containment, ground, sea and deep water cooling, smart lighting, and the recent implementation of closed loop energy recycling systems where the heat generated in the data centre is recycled for use elsewhere. Emissions have also been significantly reduced by obtaining the majority of power from renewables. Currently operating the broadest European carrier-neutral data center footprint, we expect InterXion to use the proceeds from its IPO to fund an accelerated data centre expansion plan and capitalize on rising demand within the data centre services segment. We believe INXN provides exposure to the strong, visible and growing demand for data centre services in Europe, with a long history as an established player.

Table 145: Salesforce.com, Inc - key data

Analyst's Name	Kash Rangan		
Analyst's Email Id.	kash.rangan@baml.com		
Analyst's Phone No.	+1 415 676 3540		
	2011	2012E	2013E
Revenues	1,657	2,258	2,907
Operating Profit	78	(54)	36
Operating Margin	14.3%	11.5%	12.4%
Y-o-Y Growth	-32.0%	-168.5%	-167.5%
Net Profit	64	(15)	27
Net Margin	3.9%	-0.7%	0.9%
Y-o-Y Growth	-20.1%	-123.9%	-273.4%
EBIT	78	(54)	36
EBIT Margin	4.7%	-2.4%	1.2%
EBITDA	154	93	192
EBITDA Margin	9.3%	4.1%	6.6%
Operating Cash Flow	459.1	526.8	623.6
Capex	91.4	152.1	114.1
Free Cash Flow	367.7	374.7	509.5
Net Debt/Equity	(1.9)	(16.6)	(35.9)

Source: Company data, BofA Merrill Lynch Global Research estimates

Salesforce.com

Salesforce.com is a provider of on-demand customer relationship management (CRM) services to business of all sizes and industries worldwide. It also offers a cloud computing platform, Custom Cloud, for customers and developers to build applications.

CRM (high EE exposure) is an energy efficiency pure play on its exposure to the cloud. It has strong positions in Applications as a Service (collaboration and CRM via Sales Cloud and Service Cloud) and Platforms as a Service. Salesforce.com estimates that its model is 64% more energy-efficient and 95% more carbon-efficient than private clouds, as well as offering lower upfront capital costs. The key measure is its multi-tenant architecture, which optimises resources across all of its customers (optimised runtime processing, optimised storage, predictable load balancing, continual analysis and energy improvement, energy-efficient servers, micro-energy management, optimised power consumption and standardised architecture). Salesforce.com has a PUE of 1.53, far better than the industry average of 1.91. Our thesis is that CRM is a long-term market share winner, benefiting from the structural shift to OnDemand. It has also added to its cloud portfolio with social HCM. Its long-term fundamentals and competitive position look strong even in the company of the big players – SAP, MSFT and ORCL. It also has multiple additional growth levers: Custom Cloud, Service Cloud and Chatter.

Table 146: Telecity Group - key data

Analyst's Name	Chandramouli Sriraman >>		
Analyst's Email Id.	chandramouli.sriraman@baml.co		
Analyst's Phone No.	m +44 20 7996 2602		
	2011	2012E	2013E
Revenues	240	292	349
Operating Profit	73	93	118
Operating Margin	30.5%	32.0%	33.9%
Y-o-Y Growth	26.1%	27.7%	26.7%
Net Profit	43	60	77
Net Margin	17.8%	20.7%	22.1%
Y-o-Y Growth	12.1%	41.6%	27.6%
EBIT	73	93	118
EBIT Margin	30.5%	32.0%	33.9%
EBITDA	109	133	164
EBITDA Margin	45.3%	45.4%	46.9%
Operating Cash Flow	106.6	112.7	128.8
Capex	131.7	144.5	136.6
Free Cash Flow	(25.2)	(31.8)	(7.8)
Net Debt/Equity	55.0	55.8	52.3

Source: Company data, BofA Merrill Lynch Global Research estimates

Telecity Group

Telecity is Europe's largest listed dedicated data centre provider, running data centres and offering hosted services in a number of key European cities including London, Amsterdam, Paris and Frankfurt. It currently has over 70,000 sqm of data centre space available and provides c.68MW of power. In 2011, it reported GBP240mn of revenues at a 42% EBITDA margin.

Telecity (high EE exposure) is a pure play on the building, operating and running of energy-efficient data centres. All new data centres benefit from free cooling, hot aisle/cold aisle designs and cooling-friendly containment, while a number use energy from renewables and re-use waste heat. It is also investing in the installation of energy-efficient capital equipment throughout existing data centres. We note that all of Telecity's data centres are accredited to the updated EU Code of Conduct for Data Centres; it is also the largest single contributor in terms of accreditations. Exploding demand and limited supply mean Telecity can earn excess ROIC from its data-centre investments. High entry barriers prevent excess returns from being competed away. This drives a 20%+ CAGR on a highly visible cash-rich earnings stream. Upside risks are stronger-than-expected demand or Telecity investing more aggressively while the market is strong.

Table 147: VMware Inc - key data

Analyst's Name	Kash Rangan		
Analyst's Email Id.	kash.rangan@baml.com		
Analyst's Phone No.	+1 415 676 3540		
	2011	2012E	2013E
Revenues	3,767	4,538	5,208
Operating Profit	670	715	878
Operating Margin	31.0%	30.0%	30.4%
Y-o-Y Growth	63.4%	6.7%	22.8%
Net Profit	600	600	737
Net Margin	15.9%	13.2%	14.2%
Y-o-Y Growth	70.8%	0.1%	22.8%
EBIT	670	715	878
EBIT Margin	17.8%	15.7%	16.9%
EBITDA	986	1,053	1,231
EBITDA Margin	26.2%	23.2%	23.6%
Operating Cash Flow	2,025.6	2,386.7	2,774.3
Capex	304.1	340.0	208.3
Free Cash Flow	1,721.5	2,046.7	2,566.0
Net Debt/Equity	(30.7)	(56.9)	(82.2)

Source: BofA Merrill Lynch Global Research estimates

VMWare

VMware is a provider of virtualization solutions for x86-based servers and desktops and technology designed to lower IT costs, provide more flexibility in choosing operating systems, and offer a more automated and resilient systems infrastructure. VMware was founded in 1998 and acquired by EMC in 2004. The company works closely with over 200 technology partners, including server, processor, storage, networking and software vendors.

VMware (high EE exposure) is a pure energy efficiency play on virtualisation, where it is the global market leader. Virtualisation increases resource utilisation, reduces ongoing maintenance and has become a platform for cloud infrastructure. Its software can dramatically increase the efficiency of hardware utilisation and reduce cost and complexity through server consolidation. On average, its customers save 50-60% in capex, reduce time spent on day-to-day maintenance tasks by one-third, and save up to 80% in data centre energy costs. VMware has emerged as a virtualization platform with vSphere serving as a new software platform, enabling customers to perform system management functions like VMotion, High Availability, and Distributed Resource Scheduling. We believe that VMW is likely to maintain its lead over MSFT for at least a year. A key risk remains a potential pause in the server refresh cycle as the impact of 12 core Nehalem on server unit demand is unknown. We expect VMW to benefit from server refresh, increasing SMB push and EA renewals.

01 March 2012

Table 148: List of other companies involved in IT & Energy Efficiency that we do not cover

BBG Ticker	Company	Location	BofAML Ticker	Market Cap (mn)	Local currency	Investment Opinion	EE Exposure
IFX GR	INFINEON TECHNOLOGIES	Germany	IFNNF	8218	EUR	NR	High
IRF US	INTERNATIONAL RECTIFIER	United States	NA	1592	USD	NR	High
STM FP	STMicroelectronics	France	STMEF	4871.5	EUR	NR	High

Source: Company, BBG, BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency related products, services, technologies and solutions

Table 149: Companies involved in IT & Energy Efficiency that we do not cover

Company	BBG ticker	Overview
INFINEON TECHNOLOGIES	IFX GR	Infineon is a broad range integrated semiconductor company. Its revenue base is split approximately 65% automotive/industrial/smartcard, and 35% communications chips, largely wireless. Infineon is exposed to efficiency via automotive semiconductor demand and the need for energy efficiency in industrial electronics. It is the world's No. 2 chip supplier to the automotive industry – supplying sensors, microcontrollers, power semiconductors and power modules – serving applications such as the car's powertrain (fuel efficiency and emissions), chips for hybrids, starter alternators, and electromechanical valve-trains), body and convenience (light control, HVAC), safety management and infotainment. For industry, it is a key enabler of efficient T&D across the energy chain, with its components managing the power supply for renewables, electrical drives, home appliances and lighting; it is the world No. 1 in power semiconductors.
INTERNATIONAL RECTIFIER	IRF US	International Rectifier Corporation designs, manufactures, and markets power semiconductors, including a metal oxide semiconductor field effect transistor (MOSFET). The company's products include power integrated circuits and advanced circuit devices, power systems, and power components. IRF is an energy efficiency pure play on semis' contributions to energy savings in appliances, consumer products, data centres, industrial applications and renewables. It is the world's No 1 in advanced power management technology with key efficiency products including digital Control ICs, high-Voltage ICs, IGBTs and IRAM Integrated Power Modules. It is thus a key enabler of efficiency for cars, motor controls, data centres, and lighting. It regards auto (including EVs) and GaN as long-term growth drivers.
STMICROELECTRONICS	STM FP	STMicroelectronics designs, develops, manufactures and markets a broad range of integrated and discrete semiconductors used in a wide variety of applications. Key divisions are Computer Peripheral, Telecom, Consumer and Automotive. Growth drivers are cellular phones, set-top boxes, smart cards and emerging digital consumer applications. ST is an energy efficiency play on semis' contributions to energy savings in residential, consumer and industrial end applications. It sees energy management and saving as a growth driver with an expected 2011-15 CAGRe of 8% for automotive, 9% for power and energy (power supply, lighting, motor control) and 10% for automation. Within power, it is focusing on emerging applications such as hybrids & EVs (2011-14 CAGRe 28%); lighting, building, automation & HVAC (6%) and industrial motor drives (7%). Other efficiency areas include home entertainment and smart consumer devices; and it is a pioneer in eco-design, with a 100% of new products target for 2015.

Source: Bloomberg, company sources

Table 150: BofAML Lighting & LED Energy Efficiency Stock List

Company	EE exposure
CREE INC	High
EPISTAR	High
EVERLIGHT ELECTR.	High
GENERAL ELECTRIC	Low
PHILIPS ELECTRONICS	Medium
SEMILEDS CORP	High
SEOUL SEMICONDUCTOR	High
SIEMENS	Medium
VEECO INSTRUMENTS	High

Source: BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency products, services, technologies and solutions

Lighting & LEDs

LEDs and lighting stand to be one of the major beneficiaries of energy efficiency in our view. Lighting consumes 19% of the world's electricity output and is extremely wasteful with 30% to 75% of lighting systems considered inefficient. New technologies can reduce electricity consumption by up to two-thirds. Moreover, energy efficiency lighting sources such as LEDs, luminaries, control gear and intelligent lighting control tools and concepts can thus make significant contributions to reducing electricity use and cutting CO2 emissions.

We anticipate strong growth for energy efficient lighting solutions, helping the global lighting market to grow from €55-60bn in 2011 to €80bn by 2015 (Source: Philips). While the picture in 2012 is challenging because of long payback periods and oversupply, long-term drivers include favourable legislation and a further reduction in costs with better performance. Short-term usage will be driven by mobile phones and TVs, with 60-70% of new TVs having LED backlighting. General lighting applications are gradually beginning to gain momentum and we anticipate that LEDs in lighting will emerge as the biggest growth opportunity after 2013.

We believe that a number of companies are well placed to benefit from the theme of energy efficiency in LEDs and lighting through their involvement in areas such as chips, CFLs, components, deposition equipment, LEDs, lighting management, lighting solutions, luminaries, MOCVD equipment, and process equipment, among others.

Lighting, 19% of electricity use worldwide

Lighting consumes 19% of global electricity usage or over 2,650 TWh. Of this amount, approximately a third is for residential lighting and two-thirds for commercial buildings, industry and exterior lighting (Source: IEA). The figures are even higher for developed markets such as the US, where lighting accounts for 22% of electricity consumption (Source: US EPA).

Without efficiency breakthroughs, it is estimated that electricity consumption by lighting will increase by 60% in the next 20 years (Source: UNEP).

Up to two-thirds of lighting is inefficient & outdated

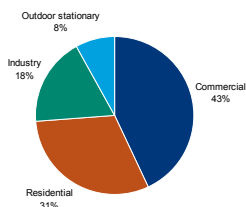
Up to two-thirds of the current global lighting installed base is considered to be inefficient, as:

- 75% of offices and industrials use outdated, inefficient lighting systems
- 67% of the installed residential lighting base uses incandescent lamps
- 30% of road light use technology dates back to the 1960s (Source: IEA).

Lighting accounts for 6-8% of global CO2 emissions

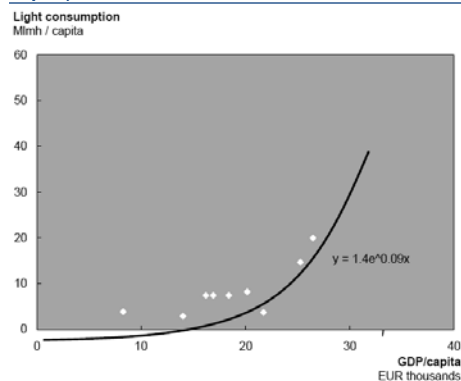
Globally, lighting is responsible for more than 1,900 Mt of CO2, or 6-8% of CO2 global emissions. Grid-based lighting is responsible for 81% of these emissions with fuel-based lighting (e.g. kerosene) and vehicle lighting accounting for the remainder (Source: IEA).

Chart 114: Lighting electricity consumption by sector



Source: IEA, BofA Merrill Lynch Global Research

Chart 115: Lighting consumption vs. GDP (per capita)



Dramatic energy & cost savings are possible via efficiency

The potential for energy efficiency gains is significant – particularly at the use phase, which is responsible for 90% of the energy consumed by a light source. Broadly speaking, 40% of future global energy demand for lighting could be avoided by switching to efficient light bulbs such as compact fluorescent (CFLs) or light-emitting diodes (LEDs) (Source: UNEP). A global move towards more efficient lighting technologies could result in:

- Energy savings of 406 TWh or 2% of global electricity consumption
- Direct financial savings of US\$47bn
- 246Mt in reduced CO2 emissions or c.1% of global emissions (Source: IEA).

Widespread adoption of LEDs could be a game changer

Assuming we saw widespread global adoption of LEDs – the savings could be even greater. Globally, an LED-enabled 40% efficiency improvement could result in over US\$150bn in reduced electricity costs (40% savings x US\$0.15/KWh) and a 555Mt cut of emissions p.a. (Source: Philips).

Table 151: Global energy & CO2 savings from converting to LEDs

Savings potential	EU	NA	Lam*	Asia-Pac	MEA	Global
Outdoor lighting						
€bn	2	3	1	3	1	10
MtCO2	52	8	15	3	18	52
Office						
€bn	5	5	5	2	7	22
MtCO2	16	28	6	43	21	114
Horeca**/Retail						
€bn	3	5	2	4	1	16
MtCO2	10	29	6	27	8	79
Home						
€bn	9	15	1	10	5	40
MtCO2	32	81	3	65	33	214
TOTAL						
€bn	19	28	9	19	14	88
MtCO2	110	146	30	139	80	459

Source: Philips * includes Mexico; ** Horeca = hotels/restaurants/cafés

Top 10 countries benefitting from moving to more energy efficient lighting

Electricity consumption savings	%
1. Cambodia	31
2. Madagascar	25
3. Laos	21
4. Nepal	20.8
5. Burundi	20
6. Nigeria	15
7. Algeria	14
8. Benin	11.6
9. Yemen	11.3
10. Senegal	11

Source:

Social impacts, the poorest will benefit most

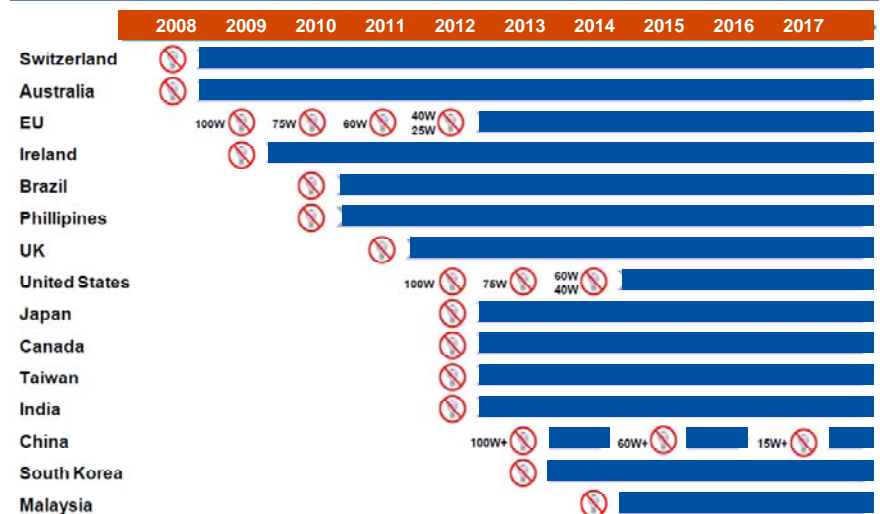
Emerging market citizens will be the biggest beneficiaries of the energy savings, and cost and CO2 reductions gained by moving to efficient lighting technologies. There will also be significant benefits for the estimated 1.6 billion people worldwide who do not have access to grid-based technology, who use over 77 billion litres of environmentally “unfriendly” and unsafe/unhealthy kerosene for lighting every year, emitting 190Mt of CO2 (Source: UNEP). This would, in turn, have positive impacts on productivity, job creation, education, and in reducing GDP losses caused by poor infrastructure.

Legislative trends are positive

Legislation is driving a shift towards more energy efficient lighting solutions as incandescent light bulbs – which are cheap and represent 50-70% of worldwide bulb purchases and are relatively inefficient. Up to 95% of the energy emitted by incandescents is heat, and their efficiency is inherently low, their lifespan far shorter, and reliability much poorer than the new generation of bulbs. As a result, many nations have banned or are moving to ban the sale of incandescent bulbs. While the

banning of incandescent lamps will not immediately benefit LED bulbs, we believe it will increase consumer awareness of LEDs.

Chart 116: Global phase out of incandescent bulbs



Source: VEECO, BofA Merrill Lynch Global Research

Lighting accounts for c. 12% of China's electricity use and the incandescent phase-out could save it 48bn kWh of power p.a. (Source: NDDRC)

- **EU is the long-standing leader:** An initial Europe-wide ban applied to general-purpose, non-directional incandescents began in 2009, with all clear bulbs over 100W having to be made of more efficient types. This limit will be moved down to lower wattages, and the efficiency levels raised by the end of 2012. The EU has also given the target of 2016 to phase out halogens.
- **China's 5Y phase-out:** In November 2011, China – the world's largest producer of energy saving and incandescent bulbs – announced a five-year phase-out of incandescent light bulbs with a ban on 100W+ bulbs from 1 October 2012, a ban on 60W+ bulbs from 1 October 2014, and a ban on 15W+ bulbs from 1 October 2016. Beijing plans to evaluate roll-out for one year beginning September 2015 and may adjust the last phase depending on results. Our checks suggest that Chinese subsidy is only likely to be a smaller-scale regional programme, rather than a nation-wide programme as anticipated by the market.
- **U.S. Energy Independence & Security Act:** this requires all general-purpose light bulbs (310–2600 lumens) to be 30% more energy efficient than current incandescent bulbs by 2012 to 2014. 100W incandescents are no longer manufactured for sale (as from 1 January 2012), by 2013 the rule will hit 75W bulbs, and by 2014 40W bulbs. By 2020, a second tier of restrictions could require all general-purpose bulbs to produce at least 45lumens/watt similar to current CFLs – although it is currently being challenged.

Table 152: Timetable of Chinese govt banning incandescent lamps

Period	Target
From 1 Oct. 2011 to 30 Sept. 2012:	Release the plan
From 1 Oct, 2012:	Impose sales and import ban on 100W+ (including 100W) general lighting incandescent bulbs
From 1 Oct, 2014:	Impose sales and import ban on 60W+ (including 60W) general lighting incandescent bulbs
From 1 Oct, 2015 to 30 Sep. 2016:	Assess and review the plan
From 1 Oct, 2016:	Impose sales and import ban on 15W+ (including 15W) general lighting incandescent bulbs

Source: BofA Merrill Lynch Global Research

Table 153: Timetable of global government banning incandescent lamps

Country	Legislation	Available Subsidies	Ban Target Date	GDP Rank
US	Yes	Yes	<2020	1
EU	Yes	Yes	<2012	2
Japan	Yes	Yes	2012	3
China	Yes	Yes	<2016	4
Canada	Yes	Yes	2012	5
Russia	Yes	Yes	<2014	7
Australia	Yes	No	2010	8
Korea	Yes	Yes	2013	10
Taiwan	Yes	Expired	2012	16

Source: Aixtron; BofA Merrill Lynch Global Research

CFLs have captured nearly 25% of the light sockets in US households today, a number sure to grow as energy efficiency regulations take effect (Source: GE Lighting)

Instead of materials that turn “incandescent” when heated, solid-state products rely on “electro luminescence” from light-emitting diodes (LEDs). When electricity is applied to an LED, light is emitted from the interface between two semiconducting materials. The LED is typically put into a ceramic/ plastic housing and sold as a finished package that can be connected to an electrical circuit (Source: GE)

Environmental challenges have not yet been tackled

We note that from an environmental perspective, some of the legislation fails to address problems associated with issues such as the disposal of energy-saving bulbs. For instance, CFLs contain small amounts of mercury (c.4.0mg per bulb). A broken bulb will release about 4% of its mercury content, causing some stakeholders to raise potential human health and safety concerns that have not yet been addressed by most of the legislation. No mercury is used in LEDs.

CFLs, the here and now solution

Compact fluorescent lamps (CFLs) are the first and most widely adopted alternative to incandescents and can save about 80% power compared with an incandescent bulb. Compact cold fluorescent (CCFL) lighting remains the low-cost energy efficiency solution over any different periods of ownership considered. Moreover, a CCFL bulb currently costs around a twentieth of the price of a comparable LED device.

The CFL industry is characterized by rapid demand growth due to rising public awareness, low entry barriers, rising capacity, and heated competition. China currently accounts for about 80% of CFP global production. However, Chinese brand recognition of Chinese products in overseas markets is poor, with about 50% of its output directed to OEM orders from foreign companies.

LEDs, the long-term solution

Light Emitting Diodes (LEDs) are electronic semiconductor components that emit light when a current flows through it. When used properly, LEDs can achieve a service life of 50,000 hours or more – which would mean a 17 year life-span when used 8 hours a day. LEDs thus need to be viewed as a long-term energy efficiency investment.

Significant advantages to traditional lighting

LEDs can be used for both general and special purpose lighting and have unique advantages to all previous light sources including:

4. low energy consumption and heat emission;
5. long service life of up to 50,000 hours;
6. availability in any colour;
7. turn on instantly and are unaffected by cycling on and off;

8. compact size opens up new design opportunities;
9. no toxic materials such as mercury and no infra-red/ultra-violet radiation;
10. less apt to break and not sensitive to vibration; and
11. low disposal and transport costs.

Table 154: LED bulb comparison

	Incandescent	CFL	LED
Life span (in hours)	1,500	10,000	30,000
Watts	60	14	6
Cost (US\$)	\$1.30	\$3.00	\$15.00
KWh of electricity used over 30k hours	1,800	420	180
Electricity cost (@ \$0.12 per KWh)	\$216.00	\$50.40	\$21.60
Bulbs needed for 30k hours of usage	20	3	1
Equivalent 30k hour bulb expense	\$26.00	\$9.00	\$15.00
Total 30,000 Hour Lighting Spend	\$242.00	\$59.40	\$36.60

Source: BofA Merrill Lynch Global Research

Significant hurdles to implementation

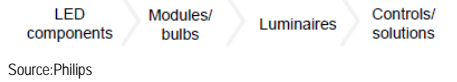
The LED market is currently characterised by very rapid growth and extremely short product life cycles. The short life cycles mean increased capex on R&D, production and marketing. Luminaries become uncompetitive after a relatively short time and have to be replaced by successor products. This speeds up activity in the lighting sector and ties up large amounts of capital and resources. Because costs are relatively high and volumes still comparatively low, LED light sources and luminaries are fairly expensive. LED adoption for luminaries varies strongly depending on the application:

- **Dominant in art, entertainment and retail display lighting, and retailer/hospitality** driven by effects not available in traditional lights
- **High LED penetration in street lighting** due to low total cost of ownership (TCO)
- **Limited adoption in office building and residential**, given principal-agent problem for office building and low TCO awareness in residential segment
- **Lack of consumer awareness** of new efficiency regulations with up to two-thirds unaware (Source: GE Lighting) as well as to installation and usage.

Costly but long-term payback will improve

High production costs and the price of LEDs are expected to drop in the medium term, thus making LED products even more attractive. Based on BofAML estimates, at an electricity price of US\$0.15/Kwh, LED lighting will cost less than incandescent lighting after about 16 years of usage. For LED to be widely used, the cost needs to fall significantly or the government has to legislate for its usage. Both are likely. The LED lamp we compare below is one of the first commercial 60W equivalent devices and we would expect prices of these to fall rapidly as production expands and technology matures. Please note that the comparison here excludes the cost of associated fixtures and fittings. LEDs can be implemented in a highly integrated manner, with minimal maintenance costs. This may prove an additional attraction to consumers.

Chart 117: Digital lighting value chain

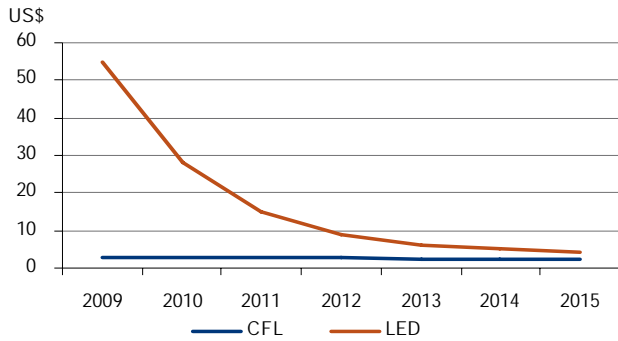


Source: Philips

Adoption of LED lighting is key to long-term growth

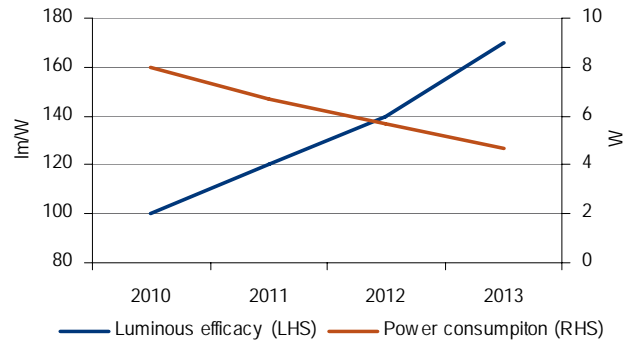
We believe that the pace of the adoption of LED lighting holds the key to the LED industry's long-term growth outlook once LED-TV demand is saturated. Factors currently holding back the widespread adoption of LED lighting include light quality and the high initial purchase cost for consumers. Currently, CFL is a mature technology and much cheaper than LED, so we think is likely to remain the dominant energy saving lighting solution in the foreseeable future. But LED's attractive features such as durability, reliability and high energy efficiency we think give it a chance to expand its market share once technology improves and costs come down.

Chart 118: Retail price – LED vs. CFL



Source: BofA Merrill Lynch Global Research

Chart 119: Luminous efficacy vs. power consumption (800 lm output)



Source: BofA Merrill Lynch Global Research

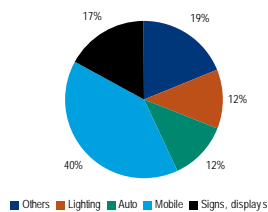
OLEDs

Organic Light Emitting Diodes (OLEDs) use different materials to LEDs: they use organic materials, which give a lower current density and lower luminance. In addition, OLEDs emit light over a large area.

Near-term LED growth from TVs

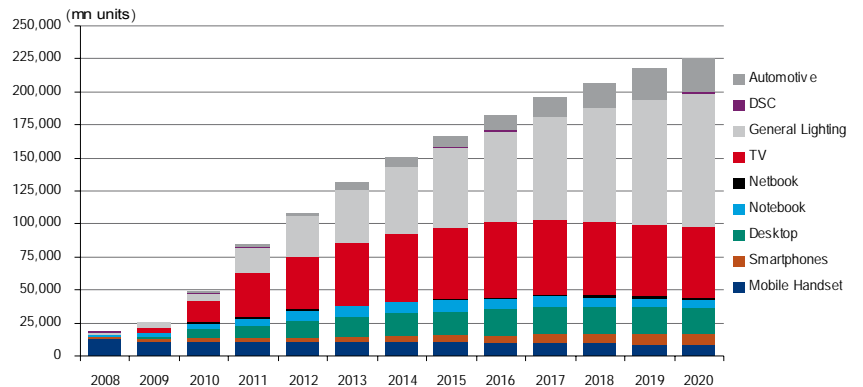
LEDs are used in many applications including mobile devices, automobiles, mid-to-large-sized LCD displays (notebook, PC monitor and TV etc.), and general lighting. At the moment, mobile phone and displays account for some 60% of total LED consumption (Chart 1.9). We expect the TV market to be the main driver of LED usage over the next few years, followed by the general lighting market.

Chart 1.9: LED market breakdown, 2010



Source: Strategies Unlimited

Chart 1.10: LED demand growth comes from TV (short term) and general lighting (long term)

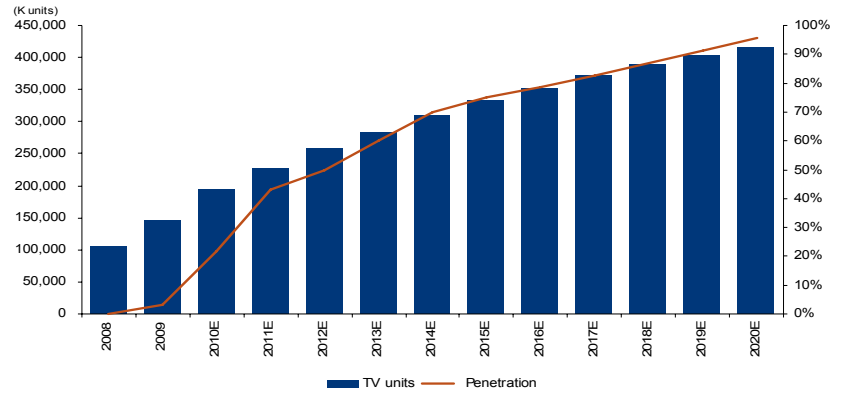


Source: BofA Merrill Lynch Global Research estimates

LED TV BLU (backlit unit): the fastest growing area

Traditionally, mobile phones accounted for the largest portion of the LED market (63% in 2008). In 2009, major TV makers started to actively launch LED-based TVs, boosting LED demand.

Chart 1.11: LED penetration in TV - ratio of LED to total LCD TV shipment

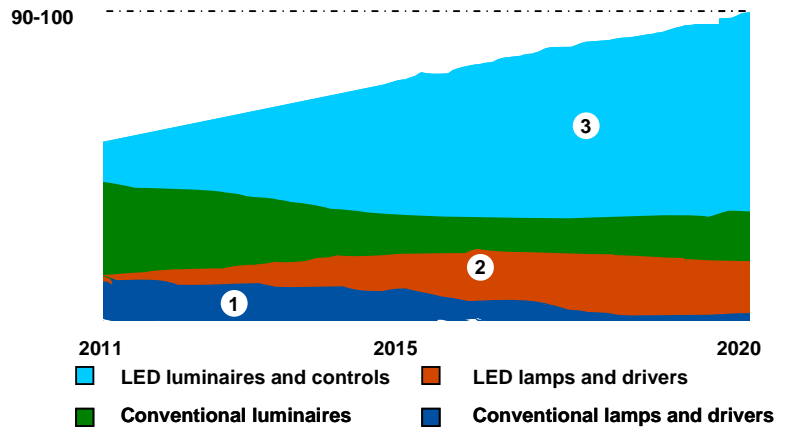


Source: BofA Merrill Lynch Global Research estimates

Long-term LED growth from lighting

LED component makers in the general lighting space have been suffering from significant pricing pressure, a result of weak demand, bulging inventories, and increased competition. We believe that this is a cyclical downturn and that the lighting market could see substantial growth in the medium-term driven by ongoing brightness / efficiency improvements and cost reductions.

Chart 120: Global general illumination market* (€bn)



Source: Philips. * Excludes automotive lighting and LED components

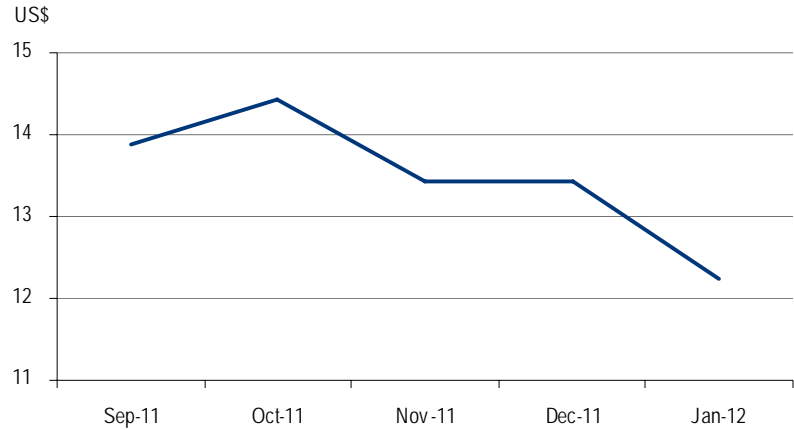
LEDs are an increasingly attractive option

The current retail price gap between LED and CFL has narrowed to 5x from over 10x in 2010. As the cost continues to come down, and LEDs enable electricity cost savings, it has become a more attractive lighting option, especially in regions where electricity costs are high. Recent data points from Japan suggest a rapid surge in LED light bulb sales – and China’s recent move to roll out a five year elimination of incandescents is set to be a major market growth driver. Cost parity is some years away, but we expect the market to grow rapidly when it arrives. In

the meantime, Philips' predictions of 50% LED penetration by 2015 and 80% by 2020 look aggressive to us.

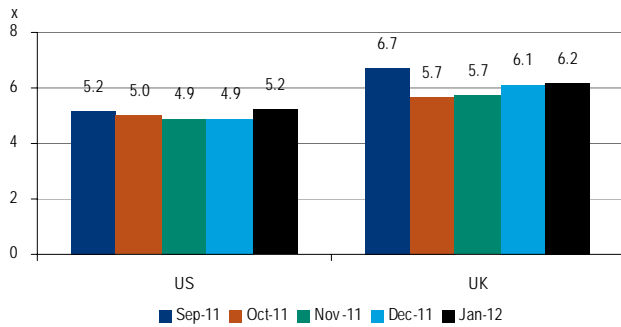
Recent views suggest a steady decline in the price for a 60W LED replacement bulb over the past few months to US\$12.2 in Jan. Our checks indicate it is on track to reach the sweet spot price of US\$10 by end-2012.

Chart 121: The retail price for 60W replacement LED bulb steadily declining



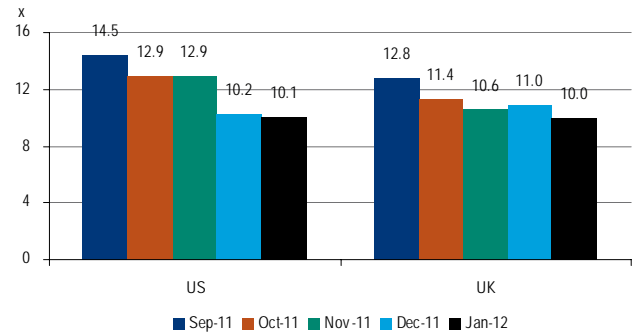
Source:BoFA Merrill Lynch Global Research

Chart 122: Price gap between non-brand CFL and LED for 40W replacement bulb narrows



Source:BoFA Merrill Lynch Global Research

Chart 123: Price gap between branded CFL and LED for 40W replacement bulb narrows



Source:BoFA Merrill Lynch Global Research

Commercial & industrial is the target market

General lighting is an estimated by industry to be an US\$100bn market, 20% bulbs and 80% fixtures. Commercial and industrial lighting is the largest target market – with residential bulbs only constituting about 10% of the total market. Opportunities should arise via:

- **Leasing/spec vs. owner occupied.** LEDs are a more attractive proposition to building owners that occupy their premises because they look at the full cost. A problem arises when the owner has leaseholders because the owner bears the capital cost and maintenance burdens but the lessee pays the electricity bills, so there is little incentive for owners in these circumstances to upgrade the lighting system. Consequently, retail chains, hospitals, and government buildings are likely LED buyers.

- **New construction vs. retrofit.** The new construction market is small today but we expect to be heavily LED-driven in future, and this is where new features are most easily introduced. Retrofit is the opportunity today and is ROI-based. A two-year payback is attractive and one year too good to pass up.

Improved state of affairs in 2013

With LEDs in oversupply today, prices are under pressure while adoption is modest. As (1) vendor capex falls, supply will decline or at least grow less quickly, and (2) as technology improves and prices fall, adoption will be spurred. We think this improved state of affairs is more likely in 2013 than this year.

Competition comes in three buckets

Competition in LED lighting is threefold. First are the incumbents – Cree, Philips, Nichia, Siemens' Osram, Toyoda Gosei – which have strong technology. Second are the mid-power players, the Koreans and Taiwanese. Taiwan is moving into general lighting but is still at a brightness disadvantage. While the best Chinese are okay at best, and many reactors are gathering dust, there is a risk that larger Asian players may be willing to bear consistent losses.

LEDs & lighting companies & energy efficiency

We have identified the following companies covered by BofA Merrill Lynch Global Research that have exposure to energy efficiency as a percentage of sales through their involvement in LEDs and lighting energy efficiency solutions. Although it is difficult to accurately gauge the link between such exposure and share price performance (as many factors outside the scope of this analysis play a role in short- and long-term price development), we still consider energy efficiency exposure as an important positive point to track.

Table 155: List of companies covered by BofAML involved in LEDs & Lighting and Energy Efficiency

BBG Ticker	Company	Location	BofAML Ticker	Market Cap (US\$mn)	Investment Opinion	EE Exposure
CREE US	CREE INC	United States	CREE	3310.7	Underperform	High
2448 TT	EPISTAR	Taiwan	EPIPF	2235.9	Underperform	High
2393 TT	EVERLIGHT ELECTRONICS	Taiwan	EVLEF	952.7	Underperform	High
GE US	GENERAL ELECTRIC	United States	GE	198804.8	Neutral	Low
PHIA NA	PHILIPS ELECTRONICS NV	United States	PHGFF	19869.9	Underperform	Medium
LEDS US	SEMILEDS CORP	United States	LEDS	102.8	Underperform	High
046890 KS	SEOUL SEMICONDUCTOR	South Korea	SLSOF	1332.3	Underperform	1High
SIE GY	SIEMENS	Germany	SMNBF	87089.3	Neutral	Medium
VECO US	VEECO INSTRUMENTS	United States	VECO	1085.2	Neutral	High

Source: IQ, DataStream, BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency products, services, technologies and solutions

Table 156: Cree, Inc. - key data

Analyst's Name	Steven Milunovich		
Analyst's Email Id.	steven.milunovich@baml.com		
Analyst's Phone No.	+1 646 855 1272		
	2011	2012E	2013E
Revenues	988	1,195	1,432
Operating Profit	169	56	118
Operating Margin	17.1%	4.7%	8.3%
Y-o-Y Growth	-14.6%	-66.7%	110.9%
Net Profit	147	54	99
Net Margin	14.8%	4.5%	6.9%
Y-o-Y Growth	-3.7%	-63.0%	82.2%
EBIT	169	56	118
EBIT Margin	17.1%	4.7%	8.3%
EBITDA	277	186	251
EBITDA Margin	28.1%	15.6%	17.5%
Operating Cash Flow	251.4	224.5	276.9
Capex	237.1	136.0	156.4
Free Cash Flow	14.3	88.5	120.4
Net Debt/Equity	(17.3)	(7.1)	(10.9)

Source: Company data, BofA Merrill Lynch Global Research

Table 157: Epistar Corp - key data

Analyst's Name	Robin Cheng >>		
Analyst's Email Id.	robin.r.cheng@baml.com		
Analyst's Phone No.	+886 2 2376 3733		
	2010	2011E	2012E
Revenues	20,888	21,502	21,982
Operating Profit	5,507	702	1,672
Operating Margin	26.4%	3.3%	7.6%
Y-o-Y Growth	229.2%	-87.3%	138.1%
Net Profit	5,767	946	1,664
Net Margin	27.6%	4.4%	7.6%
Y-o-Y Growth	209.2%	-83.6%	75.9%
EBIT	5,507	702	1,672
EBIT Margin	26.4%	3.3%	7.6%
EBITDA	7,902	4,356	7,006
EBITDA Margin	37.8%	20.3%	31.9%
Operating Cash Flow	9,388.1	4,032.5	2,146.2
Capex	5,722.7	9,388.8	7,200.0
Free Cash Flow	3,665.4	(5,356.3)	(5,053.8)
Net Debt/Equity	(22.3)	6.5	16.9

Source: Company data, BofA Merrill Lynch Global Research

Cree

Founded in 1987, Cree (CREE) develops and manufactures semiconductor materials and devices based on silicon carbide (SiC), gallium nitride (GaN), and related compounds. The company focuses primarily on light emitting diodes (LEDs), with high-quality products in chips, components, and lighting solutions. Cree is based in Durham, NC.

Cree (high EE exposure) is a market leader in energy efficient lighting-class LEDs. The company is reorienting from chips to higher-value components and fixtures. Superior technology and lower cost of ownership suggest that LED adoption will occur as the world moves away from incandescent lighting. Although we deem LED adoption to be a secular trend, we are concerned by the recent pause in demand growth/inventory build and wait for a better opportunity to become more constructive. Upside risks are: (1) a sharp uptick in demand for efficient lighting solutions, leading to higher fab utilization, increased pricing and expanding margins, (2) an accelerated transition to 6-inch wafer capacity which would help the company improve manufacturing costs more rapidly and increase throughput, (3) increased government and regulatory support for environmentally friendly lighting solutions, and (4) declining competitive forces surrendering to Cree's proven superior efficacy products.

Epistar

Founded in 1996, Epistar is involved in the upstream production of LED chips and is the leader in high brightness LEDs. Applying its proprietary Metal Organic Vapor Phase Epitaxy (MOVPE) technology, Epistar manufactures high brightness LEDs with low power consumption, a long lifespan and small form factor as their key criteria.

Epistar (high EE exposure) is an efficiency play on LEDs in lighting (35% of 2012E sales), LCD TVs (24%) and handsets (13%) and has a leading market position in Asia. LED lighting adoption in commercial/industrial usage should kick off in 2H12, and we expect residential demand to pick up in 2013 with a 60W LED replacement bulb price likely to hit US\$10 by end-2012. Several governments will start banning incandescent lamps in 2012, but the subsidy programme for LEDs has not yet been finalised. While we expect the TV business to remain solid with 10% YoY growth, general lighting will be the key swing factor for 2H recovery, in our view. The key upside risk is the pending announcement of the Chinese government's LED lighting subsidy. However, our checks suggest that the subsidy is only likely to be a smaller-scale regional programme, rather than a nation-wide programme as anticipated by the market.

Table 158: Everlight Electronics Co., Ltd - key data

Analyst's Name	Jasmine Wei >>		
Analyst's Email Id.	jasmine.wei@baml.com		
Analyst's Phone No.	+886 2 2376 3801		
	2010	2011E	2012E
Revenues	17,471	18,130	19,356
Operating Profit	2,230	1,480	1,622
Operating Margin	12.8%	8.2%	8.4%
Y-o-Y Growth	32.6%	-33.6%	9.6%
Net Profit	2,323	1,441	1,542
Net Margin	13.3%	7.9%	8.0%
Y-o-Y Growth	28.9%	-38.0%	7.0%
EBIT	2,230	1,480	1,622
EBIT Margin	12.8%	8.2%	8.4%
EBITDA	3,582	3,182	3,701
EBITDA Margin	20.5%	17.6%	19.1%
Operating Cash Flow	5,573.8	2,978.1	2,683.9
Capex	4,225.9	2,088.1	2,000.0
Free Cash Flow	1,347.9	890.0	683.9
Net Debt/Equity	(5.7)	2.9	4.4

Source: Company data, BofA Merrill Lynch Global Research

Table 159: Philips Electronics NV - key data

Analyst's Name	Mark Troman >>		
Analyst's Email Id.	mark.troman@baml.com		
Analyst's Phone No.	+44 20 7996 4194		
	2011	2012E	2013E
Revenues	22,576	23,006	23,371
Operating Profit	(270)	1,135	1,433
Operating Margin	-1.2%	4.9%	6.1%
Y-o-Y Growth	-113.1%	-520.3%	26.2%
Net Profit	(1,295)	611	862
Net Margin	-5.7%	2.7%	3.7%
Y-o-Y Growth	-189.6%	-147.2%	41.0%
EBIT	(270)	1,135	1,433
EBIT Margin	-1.2%	4.9%	6.1%
EBITDA	1,678	1,617	1,866
EBITDA Margin	7.4%	7.0%	8.0%
Operating Cash Flow	2,045.3	1,573.1	1,875.8
Capex	828.0	729.4	745.4
Free Cash Flow	1,217.3	843.7	1,130.4
Net Debt/Equity	5.8	4.6	1.2

Source: Company data, BofA Merrill Lynch Global Research

Everlight Electronics

Established in 1983, Everlight Electronics Co., Ltd. is one of the leading LED downstream packagers in Taiwan, focusing on designing, marketing, and licensing LED packages. The company purchases LED chips from upstream chip makers and packages these into different forms for various applications. Everlight acquired Fairchild's LED division and benefited from the latter's international customer base.

Everlight Electronics (high EE exposure) is a pure efficiency play on LEDs. LED lighting proliferation is gradually gaining traction and Everlight is aggressively promoting its own-brand lighting (Everlight in Asia and Zenaro in Europe). While an own brand may lead to a higher dividend in the long term, execution and the impact on the current OEM business bears watching. Our checks suggest that the Chinese LED lighting subsidy will likely be a smaller scale regional programme, rather than nationwide as the market anticipated. Overall, we believe that LED lighting adoption in commercial/industrial usage should kick off in 2H12, and that residential demand should pick up in 2013. In the near term, we expect the overall sales and earnings outlook to decelerate in 2011 and 2012 amid increasing competition from in-house vertical integration at LCD panel makers. While we remain positive on LED lighting proliferation over the longer-term, Everlight has limited exposure to the fast growing lighting and LED TV market, while competition for the CE and handset applications looks set to intensify. Upside risks are stronger-than-expected LED-TV demand and an earlier-than-expected pick-up in general lighting.

Philips Electronics NV

Philips Electronics of the Netherlands is a leading global Medical Device company with a core focus on in-vivo diagnostics. The company also holds strong positions in lighting, consumer electronics and domestic appliances. Philips has significant non-consolidated holdings and joint ventures and retains a 20% stake in its former semiconductor business NXP.

Philips (medium EE exposure) is primarily an energy efficiency play on lighting, which accounts for 34% of sales. Philips is the no. 1 global lighting company including in LEDs, which account for 18% of lighting sales and grew at 70% for FY2011 (ex-Lumileds). We think it is difficult to gauge where steady state margins are likely to be given the change to LED involves rapid volume growth, large price declines and significant investment commitment. That said, LEDs are an attractive long-term growth prospect and Philips is committed to being one of the global players within the lighting industry (unlike Siemens and arguably even GE). More broadly, Philips has efficiency exposure via its healthcare and Consumer Lifestyle divisions – and green product sales represented over 39% of sales in 2011 (vs. 35% in 2010). By 2015 Philips aims to invest €2bn in green Innovation to accelerate sustainable business across the company's three sectors - and is on track for green product sales to reach 50% of revenues by 2015. Philips's three business divisions face structural and cyclical challenges as we enter an anaemic growth environment – with pricing in Lighting likely to remain difficult given capacity. The restructuring programme is not strong enough to compensate for the macro economic headwinds to the group's portfolio. We expect that austerity measures in developed economies and tougher competitive environment will continue to weigh on growth and margins.

Table 160: SemiLEDs Corp. - key data

Analyst's Name	Steven Milunovich		
Analyst's Email Id.	steven.milunovich@bamf.com		
Analyst's Phone No.	+1 646 855 1272		
	2011	2012E	2013E
Revenues	34	42	79
Operating Profit	(12)	(17)	1
Operating Margin	-34.6%	-39.4%	1.1%
Y-o-Y Growth	-205.5%	41.8%	-105.4%
Net Profit	(16)	(21)	(2)
Net Margin	-47.7%	-49.7%	-2.1%
Y-o-Y Growth	-250.3%	29.9%	-92.0%
EBIT	(12)	(17)	1
EBIT Margin	-34.6%	-39.4%	1.1%
EBITDA	(5)	(7)	12
EBITDA Margin	-14.8%	-17.4%	14.9%
Operating Cash Flow	(2.1)	(33.8)	1.3
Capex	21.5	9.5	24.5
Free Cash Flow	(23.5)	(43.3)	(23.2)
Net Debt/Equity	(48.3)	(25.1)	(7.1)

Source: Company data, BofA Merrill Lynch Global Research

Table 161: Seoul Semiconductor - key data

Analyst's Name	David Min >>		
Analyst's Email Id.	david.min@bamf.com		
Analyst's Phone No.	+82 2 3707 0518		
	2010	2011E	2012E
Revenues	839,016	730,428	744,167
Operating Profit	109,947	35,361	37,770
Operating Margin	13.1%	4.8%	5.1%
Y-o-Y Growth	150.2%	-67.8%	6.8%
Net Profit	94,083	37,759	38,150
Net Margin	11.2%	5.2%	5.1%
Y-o-Y Growth	233.1%	-59.9%	1.0%
EBIT	109,947	35,361	37,770
EBIT Margin	13.1%	4.8%	5.1%
EBITDA	141,532	66,258	71,936
EBITDA Margin	16.9%	9.1%	9.7%
Operating Cash Flow	35,512.7	29,367.2	58,177.6
Capex	109,857.7	93,099.0	59,300.0
Free Cash Flow	(74,345.1)	(63,731.8)	(1,122.4)
Net Debt/Equity	(19.6)	4.0	7.1

Source: Company data, BofA Merrill Lynch Global Research

SemiLEDs Corp

SemiLEDs Corp. develops, manufactures, and sells (LED) Light Emitting Diode chips and LED components primarily for general illumination applications. The company sells blue, green and ultraviolet (UV) LED chips under its own brand primarily to customers in China, Taiwan and other parts of Asia.

SemiLEDs (high EE exposure) is a pure play on LEDs and becoming a regional HB-LED leader, offering substantial earnings growth and high ROIC. Based on a unique copper alloy technology, SemiLEDs' high-efficacy products are well suited to capitalize on the strong growth in LED-lighting applications in the PacRim. Following a disappointing reset to revenue growth and profitability targets, we are concerned that pricing headwinds will persist over the intermediate term. Upside risks are: (1) an uptick in demand for LEDs, leading to higher fab utilization, increased pricing, and expanding margins, (2) an accelerated transition to larger-sized wafer capacity, which would help improve manufacturing costs and increase throughput, (3) increased government and regulatory support for environmentally-friendly lighting solutions, (4) declining competition from established players and new entrants, and (5) favourable patent litigation.

Seoul Semiconductor

Seoul Semiconductor, set up in 1987 and listed in 2002, is one of the largest LED vendors in Korea. Its LED chips are used in handsets, LCD, lighting and automobile products. Key customers include Samsung and various domestic and overseas OEMs. Seoul Semi is eyeing vertical integration (chip production) through its affiliate, Seoul Optodevice, and a JV in Taiwan.

Seoul Semiconductor (high EE exposure) is well placed to be a LED beneficiary because it is Korea's largest pure LED name. While we acknowledge the long-term growth potential of the LED sector, we are worried about intense price competition, particularly from two major local companies – Samsung and LG – that plan to increase their LED production capacity by more than three times in 2011 vs. 2008. Upside risks: (1) Unexpected shortage of LED supply following robust LED demand from general lighting and LCD (PCs and TVs), (2) government policies favouring LED adoption in general lighting by replacing conventional bulb or fluorescent lighting, and (3) better execution of cost reduction measures.

Siemens

See *Industrials & Integrated Plays*.

Table 162: Veeco Instruments - key data

Analyst's Name	Krish Sankar		
Analyst's Email Id.	krish.sankar@baml.com		
Analyst's Phone No.	+1 415 676 3552		
	2011	2012E	2013E
Revenues	979	552	701
Operating Profit	270	63	122
Operating Margin	27.4%	11.1%	17.2%
Y-o-Y Growth	-6.8%	-76.6%	94.1%
Net Profit	154	41	77
Net Margin	15.7%	7.5%	11.0%
Y-o-Y Growth	-42.1%	-73.1%	86.8%
EBIT	270	63	122
EBIT Margin	27.6%	11.4%	17.5%
EBITDA	290	83	142
EBITDA Margin	29.6%	15.0%	20.3%
Operating Cash Flow	110.4	104.2	76.0
Capex	60.0	40.0	20.0
Free Cash Flow	50.4	64.2	56.0
Net Debt/Equity	(64.4)	(70.5)	(70.3)

Source: Company data, BofA Merrill Lynch Global Research

Veeco Instruments

Veeco provides process equipment for the data storage, semiconductor, HB-LED/wireless, and scientific research markets. Veeco's products enable advancements in the fields of nanoscience, nanobiology and other areas of scientific and industrial research. In the process equipment segment, it markets ion beam etch, IBD, PVD, ALD, DLC, MOCVD, and MBE deposition tools.

Veeco (high EE exposure) is primarily an efficiency play on LED manufacturing equipment for LEDs and CPV solar (c.85% of sales), although it is also exposed to the IT efficiency theme via data storage (c.15%). The long-term potential of the LED industry is intact, driven by growth opportunities in general lighting. However, until general lighting ramps up in a meaningful manner, Veeco could be affected near-term by a slowdown in demand from China, ongoing weakness in the backlighting market, and a weak macro backdrop that results in near-term caution from customers. Until the utilization rates in the demand driven regions such as Korea and Taiwan pick up meaningfully, it is hard to envisage orders improving materially. Veeco's management has cut costs and is focusing on the long-term drivers of LEDs and data storage manufacturing equipment.

Table 163: List of other companies involved in LEDs and lighting & energy efficiency

BBG Ticker	Company	Location	BofAML Ticker	Local currency	Market Cap (mn)	Investment Opinion	EE Exposure
AIXA GR	AIXTRON SE NA	Germany	NR	EUR	1246.4	NR	High
LSCG US	LIGHTING SCIENCE	United States	NR	USD	266	NR	High
N US	RUBICON TECHNOLOGY INC	United States	NR	USD	213.3	NR	High
ZAG AV	ZUMTOBEL	Austria	NR	EUR	586.6	NR	High

Source: Company, BBG, BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency related products, services, technologies and solutions

Table 164: Companies involved in LEDs and Lighting & Energy Efficiency that we do not cover

Company	BBG ticker	Overview
AIXTRON	AIXA GR	AIXTRON is a leading provider of deposition equipment used in the production of LEDs and other compound semiconductor components. Customers include Philips Lumileds, OSRAM, Samsung and Epistar. AIXTRON has around a 60-70% share of the metal organic chemical vapour deposition (MOCVD) market and competes with Veeco, Nippon Sanso, Jusung Engineering and Applied Materials. It has significant efficiency exposure with an over 50% share of the key equipment segment for LED production, which should benefit from long-term growth in LED demand. AIXTRON's new G5 tool could help reverse recent market share loss to Veeco, and enable customers to bring the cost of LED lighting solutions down to help stimulate the market (e.g. price points for 60W eq. LED lamps from Korean customers are now in the US\$14-17 range). Over 50% of total equipment order intake now relates to general lighting.
LIGHTING SCIENCE GROUP	LSCG US	Designs, develops, manufactures and markets LED lighting solutions. The company offers retrofit LED lamps in form factors matching those of traditional lamps or bulbs, and LED luminaires for a range of applications including public and private infrastructure for both indoor and outdoor applications.
RUBICON TECHNOLOGY INC	RBCN US	RBCN develops, manufactures, and sells monocrystalline sapphire and other crystalline products. The company's products are used in Light-Emitting Diodes ("LEDs"), radio frequency integrated circuits ("RFICs"), blue laser diodes, and optoelectronics and other optical applications. LED chip manufactures are transitioning to larger diameter substrates to reduce costs (e.g. 6" substrates in 2011, 8" substrates as soon as 2012) and Rubicon has leading capabilities in producing large volumes of high quality, large diameter polished wafers from raw material. It has a 70% LED market share for large diameter and 20% for all diameter. The company expects the global LED market to nearly double to approximately \$14.3bn by 2013 - and that sapphire is one of the fundamental building blocks of LEDs.
ZUMTOBEL AG	ZAG AV	ZAG Provides lighting systems, luminaires, lighting management, and components for indoor and outdoor applications. The company's core business is the professional lighting market where it is the European market leader - selling its products to architects, lighting designers, contractors and wholesalers via the Thorn, Zumtobel and Trodonic brands. Only Ledon, its new LED brand, targets consumers. It is no. 2 in Europe and no. 4 worldwide in lighting components.

Table 164: Companies involved in LEDs and Lighting & Energy Efficiency that we do not cover

Company	BBG ticker	Overview
		<p>ZAG is an energy efficiency play on commercial buildings and exterior lighting. It is active across the entire professional lighting value chain - LED light source / module, control gear (dimming), luminaires (optimised efficiency), lighting management (savings of up to 80%), and lighting solutions. The company regards LEDs and energy efficiency as its two primary growth drivers. 2011 saw LED-based revenues grow +52.2% to over €100mn. ZAG is targeting 10% revenue growth per year and increasing its EBIT margin to >10% to 2014/15.</p>

Source: Bloomberg, company sources, BofA Merrill Lynch Global Research

Smart grid & energy storage, the ElectriNet

Table 165: BofAML Smart Grid & Energy Storage Stock List

Company	EE exposure
A123 SYSTEMS INC	High
AMERESCO INC	High
ELSTER GROUP SE	High
ENERNOC INC	High
ITRON	High
SAFT	High
SQM	Low

Source: BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency products, services, technologies and solutions

The smart grid represents the main segment of growth in the grid management industry for the next decade. In our view, by 2020 it is estimated to represent a global market of up to €50bn (Source: Alstom). Key market drivers include improved grid reliability and stability, maximising CO2-free energy, increasing energy efficiency, and reducing CO2 emissions. The smart grid should also facilitate and improve prospects for greater energy efficiency in buildings, IT and transport.

Longer-term, we believe that harnessing the ability to store electrons at grid scale could be a ground-breaking technological breakthrough that could change how energy is produced, consumed, and valued. Electricity storage is the ultimate goal of cleantech because it enables (1) the electrification of transportation, (2) the smoothing of renewable intermittency, and (3) the elimination of spatial and temporal price disparities. High cost remains an inhibitor to adoption near term, with utilities considering grid storage in demonstration projects, but we believe investors should become familiar with grid storage technologies and vendors.

We believe that a number of stocks are well placed to benefit from the theme of energy efficiency via the smart grid and energy storage from their involvement in areas such as advanced metering infrastructure (AMI), automatic meter reading (AMR), batteries for grid storage, customer-side systems, distributed grid management, electric vehicle (EV) charging infrastructure, ICT integration, li-ion batteries, renewables integration, and wide area monitoring and control.

Smart grid, a €50bn market by 2020

Today's electrical grids face many constraints from booming energy demand to ageing infrastructure, to lack of capacity, to hooking up distributed sources of generation. The network is under pressure to evolve into a high-performance electrical infrastructure, which integrates the energy T&D grid with embedded control, IT and telecommunication capabilities. Such a "smart grid" would ensure a better balance between energy production and consumption in a more complex operating environment.

Smart grid definition

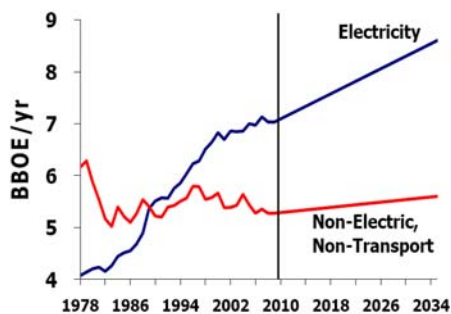
According to the IEA, a smart grid is an electricity network that uses digital and other advanced technologies to monitor and manage the transport of electricity from all generation sources to meet the varying electricity demands of end-users. Smart grids co-ordinate the needs and capabilities of all generators, grid operators, end-users and electricity market stakeholders to operate all parts of the system as efficiently as possible, minimising costs and environmental impacts while maximising system reliability, resilience and stability.

Traditional grid vs. smart grid

Factor	Traditional grid	Smart grid
Communication	One-way	Two-way
Interaction with consumers	Minimum	Extensive
Meters	Mechanical	Digital
Management	Manual	Automated
Supported power generation	Concentrated generation	Concentrated + distributed generation
Reliability	Prone for failure	Automated protection
Recovery	Manual	Self-healing
Shape of the grid	Emission pattern	Net pattern

Source: BofA Merrill Lynch Global Research

Chart 124: US energy consumption (ex-transport; BBOE/yr)



Source: U.S. Department of Energy, Energy Information Administration

Smart grid technologies could enable 0.7-2.0Gt of net annual CO2 emissions reductions by 2050

Drivers for the smart grid

Smart grids have the potential to be a game changer in terms of reducing peak demand, better managing generation from both variable and dispatchable sources, and reducing the potential increases in capex costs. Operating savings can come from decreased costs for maintenance, metering and billing, and fuel savings through increased efficiencies and other areas.

Energy consumption in the form of electricity has risen 75% in the past 30 years. IEA and U.S. EIA forecasts that the trend will continue for another 30 years.

Below we show the advantages of a smart grid in the context of rising electricity usage:

- **Accommodates all generation and storage options:** from large centralised power plants to customer-sited, intermittent distributed energy resources (renewables, CHP, energy storage, EVs).
- **Optimises asset utilization and operating efficiency:** applies the latest technologies to optimize the use of its assets (e.g., optimised capacity via dynamic ratings, maintenance efficiency via condition-based maintenance).
- **Ensures grid reliability and stability:** the ability to react to unexpected events such as blackouts, disturbances, attacks and natural disasters, by isolating problematic elements while the rest of the system is restored to normal operation.
- **Provides power quality for a range of needs:** according to varying grades and prices of power (i.e., residential customers vs. commercial enterprises).
- **Informed participation by customers:** modifications in the way consumers use and purchase electricity as a result of having choices that motivate different purchasing patterns and behaviour.
- **Enables new products, services and market:** creating an opportunity for consumers to choose among competing services via variables such as energy, capacity, location, time, rate of change and quality.

Huge scope for efficiency & emissions improvements

Smart grid technologies are key potential enablers of a more efficient T&D grid and reduced CO2 emissions:

- **Direct CO2 emissions reductions:** through feedback on energy usage, lower line losses, accelerated deployment of energy efficiency programmes, continuous commissioning of service sector load, and energy savings from peak load management.
- **Indirect benefits:** arise from smart grid support for the wider introduction of EVs and variable renewable generation.

Under the IEA's ETP Blue Map Scenario, electricity generation would only contribute 21% of global CO2 emissions (vs. 40% today), representing an annual reduction of over 20 Gt of CO2 by 2050. Smart grids offer the potential to achieve net annual emissions reductions of 0.7 Gt to 2.1 Gt of CO2 by 2050. North America shows the highest potential for CO2 emissions reduction in the OECD, and China among non-OECD countries.

Smart grid technologies

Smart technologies span the entire grid, from generation through transmission and distribution to various types of electricity consumers – industrial, residential and consumers.

Some of the technologies are actively being deployed and are considered mature in both their development and application, while others require further development and demonstration. In terms of the companies that stand to benefit, they include large diversified conglomerates with T&D and smart grid activity (Alstom, GE and Siemens), smart meter/grid pure play companies, and companies looking to link into to smart grid technology (auto, buildings, IT).

Table 166: Overview of smart grid technology chain

Technology	Hardware	Software	Grid impact	Maturity	Development
Wide-area monitoring and control	Phasor management units (PMU), sensor equipment	Supervisory control and data acquisition (SCADA), Wide area monitoring systems (WAMS), Wide-area adaptive protection control and automation (WAAPCA), Wide-area situational awareness (WASA)	Generation, transmission	Developing	Fast
Information and communication technology integration	Communication (power line carrier, WIMAX, LTE, RF mesh network, cellular), routers, relays, switches, gateway, servers	Enterprise resource planning software (ERP), customer information system (CIS)	Generation, transmission, distribution, industrial, service, residential	Mature	Fast
Renewable & distributed generation integration	Power conditioning equipment for bulk power and grid support, communication & control hardware for generation and enabling storage technology	Energy management system (EMS), distribution management system (DMS), outage management system (OMS), workforce management system (WMS)	Generation, transmission, distribution, industrial, service, residential	Developing	Fast
Transmission enhancement	Superconductors, FACTS, HVDC	Network stability analysis, automatic recovery systems	Transmission	Mature	Moderate
Distribution grid management	Automated re-closers, switches & capacitors, remote controlled distributed generation & storage transformer sensors, wire & cable sensors	Geographic information system (GIS), DMS, OMS, WMS	Distribution	Developing	Moderate
Advanced metering infrastructure (AMI)	Smart meter, in-home displays, servers, relays	Meter data management system (MDMS)	Distribution, industrial, service, residential	Mature	Fast
Electric vehicle (EV) charging infrastructure	Charging infrastructure, batteries, inverters	Energy billing, vehicle-to-grid charging (V2G), discharging V2G methodologies	Distribution, industrial, service, residential	Developing	Fast
Customer side systems	Smart appliances, routers, in-home display, building automation systems, thermal accumulators, smart thermostat	Energy dashboard, energy management systems, energy applications for smart phones and tablets	Industrial, service, residential	Developing	Fast

Source: Companies, BofA Merrill Lynch Global Research

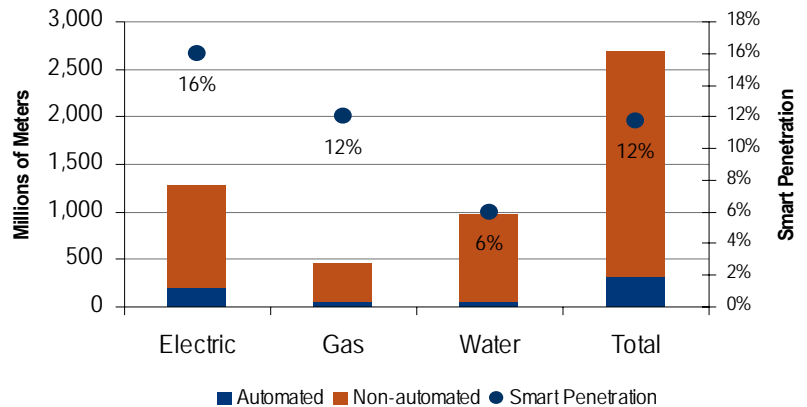
Cross Reference

Elster Group SE, 19 December 2011

AMI, “Internetization” of utility services

An important element of the smart grid is advanced metering infrastructure (AMI), including the roll-out of smart electric, gas and water meters. Of the combined 2.7 billion electric, gas, and water meters worldwide, just 12% are automated. Penetration rates vary widely across segments and geographies, led by North America’s electric meter market at 20%.

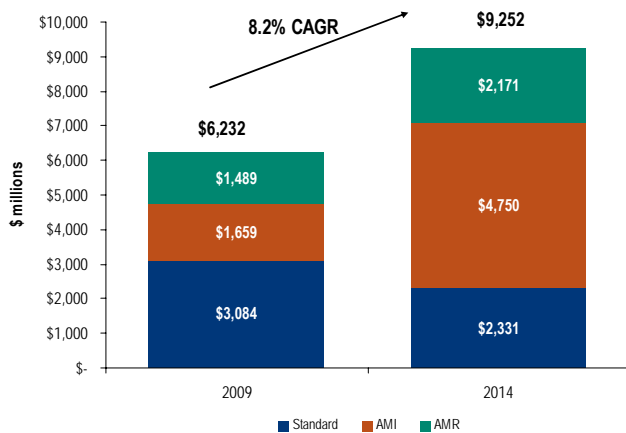
Chart 125: Meter installations worldwide



Source: Company reports, Itron, BofA Merrill Lynch Global Research

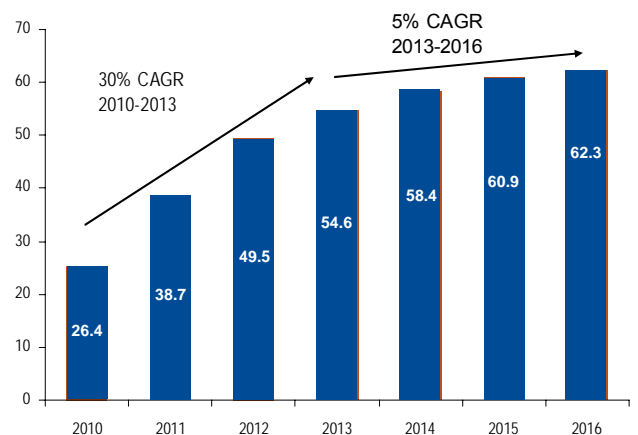
According to L.E.K. Consulting, demand for all meters and related communications is expected to reach over US\$9bn by 2014, driven primarily by growth in Advanced Metering Infrastructure (AMI). North America is expected to remain a leader, achieving 50% smart electric meter penetration by 2015, according to Pike Research, though opportunities in emerging markets provide significant upside as well.

Chart 126: Meter demand by technology



Source: L.E.K., Company reports

Chart 127: US AMI installations



Source: BofA Merrill Lynch Global Research, BNEF

Drivers for smart meter installation

Historically, the primary impetus for the installation of smart gas, electric, and water meters has been to reduce the cost of manual meter reading. A key driver of the next phase of metering, especially in developed markets, will be distribution

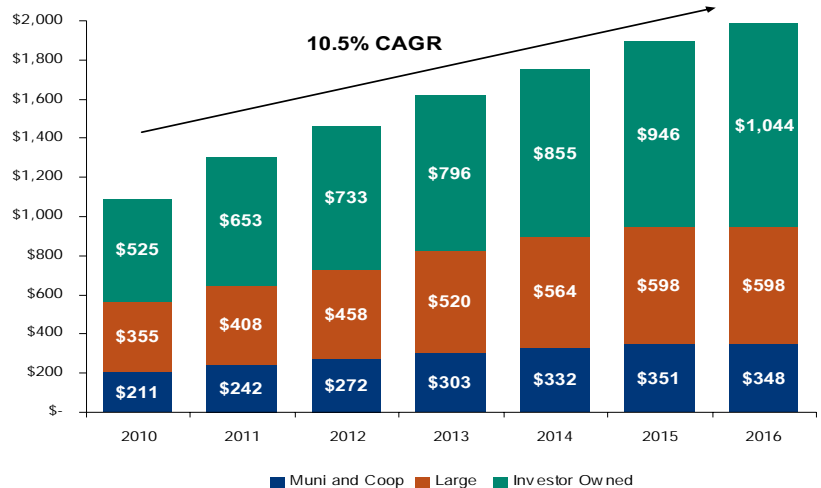
automation (DA), the ability of a utility to extend communication and intelligent control capabilities to the transmission and distribution grid. DA allows utilities to influence electricity – and feasibly gas and water – flows and usage without entering a customer’s home or business. This should prove especially popular in countries where a backlash over smart metering safety and security concerns has slowed adoption. We also expect energy conservation and peak consumption reduction to be important drivers as time-of-use pricing becomes more prevalent.

150 million meters in traditional markets by 2018

Smart grid activity to date has focused primarily on North America, Western Europe, and East Asia. Industry estimates are that 95% of the world’s metering base is installed across those three markets, representing a significant replacement and upgrade business for incumbent metering companies. Based on announced projects alone, we expect more than 150 million meters to be installed in traditional markets by 2018, which does not even include large markets such as China (China has closed its residential meter market to foreign vendors but C&I sales are possible).

North America moved first with the DOE grants provided in the fall of 2009. That led to a flurry of activity but more recently a slowdown as consumers and public utility commissions question the value of smart meters and their initial cost. The European Union has a mandate to upgrade 80% of electric meters by 2020 (Sweden and Italy are done). We expect some announcements in 2012 and for major installation activity to begin in 2013-14.

Chart 128: US utility spending on distribution automation (\$ millions)



Source: BNEF, BofA Merrill Lynch Global Research

Potential for 406 million global installations by 2020

Substantial opportunities also exist outside of traditional markets. In a study of 25 emerging smart meter markets, Northeast Associates found potential for 406 million meter installations by 2020. Some 28% of that total is legislatively mandated, meaning a minimum market of 115 million meters across countries in Eastern Europe, the Middle East, Southeast Asia, and Latin America ex-Brazil.

Table 167: Smart grid roadmaps for incumbent metering markets

Country/Utility	2011	2012	2013	2014-2018	2019+
UK					50m by 2019
British Gas		Rollout begins*			
Scottish/Southern			Rollout begins*		
Spain				100% 2018 mandate	
Endesa				13m meters by 2018	
Iberdrola	300k deployed by	Q1 2012	1m by early 2013	10.5m meters by 2018	
France				35m by 2018	
Japan				Trials	Rollout
Korea		Pilots determined		AMI rollout	100% nationwide AMI begins
China	AMR rollout	AMI transition begins		AMI rollout	
India		Pilots determined		AMI rollout	
Brazil		65m meter rollout begins			65m meters by 2019
Light SA	20k rollout*				
Electrobras	14.5k rollout				
Mexico	6m meter rollout begins				
TOTAL					150m+ meters by 2018

* Denotes projects to which Elster will provide meters and/or communications and networking
Source: BofA Merrill Lynch Global Research, BNEF, Industry sources

Table 168: Smart grid investments

Country /region	Forecast Smart Grid investments (€/\$)	Funding for Smart Grid development (€/\$)	Number of smart meters deployed and/or planned
EU	€56bn by 2020	€184mn, €200mn from ERF, ERDF, EERA National funding: NA	45 million already installed, 240 million by 2020
USA	US\$338-476bn (€238-334bn) by 2030	US\$7bn (€4.9bn) in 2009	8 million in 2011, 60 million by 2020
China	US\$101bn (€71bn)	US\$7.3bn (€5.1bn) in 2009	360 million by 2030
South Korea	US\$24bn (€16.8bn) by 2030	US\$824mn (€580) in 2009	500,000 in 2010, 750,000 in 2011, 24 million by 2020
Australia	NA	US\$360mn (€253mn) in 2009	2.4 million by 2013 in State of Victoria
India	NA	NA	130 million by 2020
Brazil	NA	US\$204mn (€143.6) in 2009	63 million by 2020
Japan	NA	US\$849mn (€143.6mn) in 2009	n/a

Source: JRC Reference Reports, European Commission

Enel's €500mn in annual cost savings demonstrates the value of a large-scale, integrated deployment of smart grid technologies

Enel's success demonstrates the value of a large roll-out

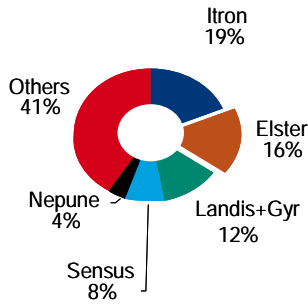
The Telegestore project, launched in 2001 by Enel in Italy remains the largest and most successful AMI and smart grid project to date. Enel installed 33 million smart meters (including system hardware and software architecture) and automated 100,000 distribution substations, while also improving management of the operating workforce and optimising asset management policies and network investments. The project has resulted in fewer service interruptions and its €2.1bn investment has led to actual cost savings of over €500mn/year.

Table 169: Benefits of AMI roll-out

Stakeholder	Opportunities	Challenges
Utilities	Potential to reduce peak demand, better manage generation from variable and dispatchable sources – thus reducing capex costs Opex cost savings via decreased costs for maintenance, metering and billing, fuel savings via efficiencies	Deployment of nextgen (e.g. variable generation) and end-use technologies (EVs) could increase capex costs
Consumers	Help manage energy use by taking advantage of lower off-peak prices, for example	Behavioural aspects of electricity usage have not been sufficiently researched

Source: BofA Merrill Lynch Global Research

Chart 129: Global metering market share



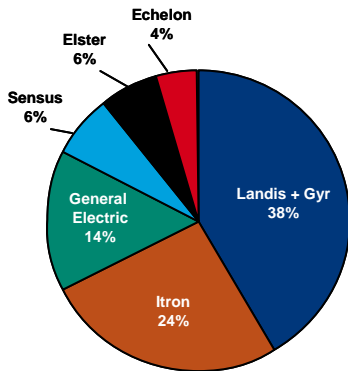
Source: Company reports

AMI/AMR competitive landscape

There is quite a variety of smart meters to smart software, and a large and rapidly growing constellation of small and large companies entering the fray. They are all in a race to be major players in the enormous market to add communications, sensors, computing, and software muscle of the digital age to enable a 21st century electrical age:

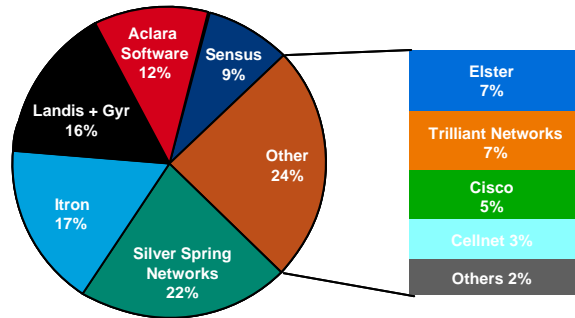
- **Manual and AMI/AMR meter manufacturers** include General Electric, Itron, Elster, Landis+Gyr (now part of Toshiba), and Sensus. On the electric meter communications front, independents include Silver Spring Networks, Trilliant, and SmartSynch.
- **Electricity metering** market includes Itron, Landis+Gyr and Elster, as well as GE, Silver Spring, and Sensus in the North American smart meter space.
- **Gas meter market** includes the market leader Elster (c.30% market share), Dresser and Emerson at the high end, Honeywell in utilization, and Itron and Toshiba in residential. We note that customer relationships in the gas segment are particularly sticky as a result of the serious safety concerns associated with gas extraction, storage, transmission, and use.
- **Water meters** – Elster is the global market leader. There is long-term potential for water, in our opinion

Chart 130: Vendor choices for North America smart meter projects



Source: BNEF, BofA Merrill Lynch Global Research

Chart 131: AMI communications vendor market share



Source: BNEF, BofA Merrill Lynch Global Research

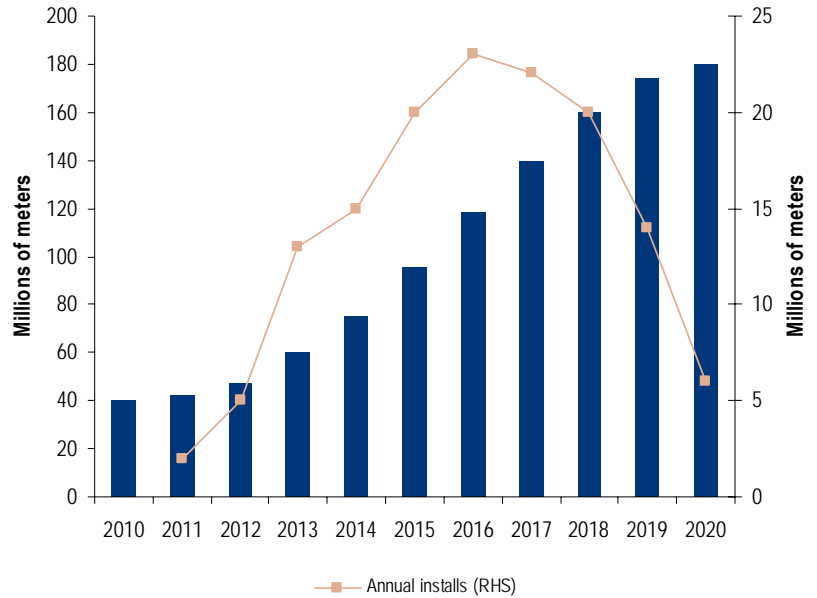
Cross Reference

[Elster Group SE, 19 December 2011](#)

European picture brightens towards end-2012

The European electricity picture brightens toward the end of 2012. We conservatively forecast 2% YoY growth as we expect greater upside in 2013 as meter rollouts in Europe gain momentum. Dual-fuel projects with the UK's two biggest utilities, British Gas and Scottish Energy, should have meaningful deployment in 2H/12 and into 2013. Iberdrola will announce vendors for its 10.5-million meter project as part of Spain's major rollout in early 2012, with installations starting within a year. In addition, as a result of its French biogas win and existing installed meter base in country, we are confident that French utility EDF, will move on its 35-million meter rollout during 2012 though installations aren't slated to occur until 2013.

Chart 132: EU-15 smart electric meter deployments increase in 2013-14

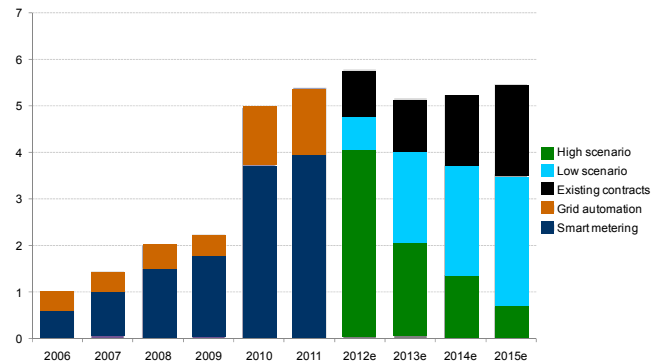


Source: Bloomberg New Energy Finance (BNEF), BofA Merrill Lynch Global Research

US expectations remain bearish

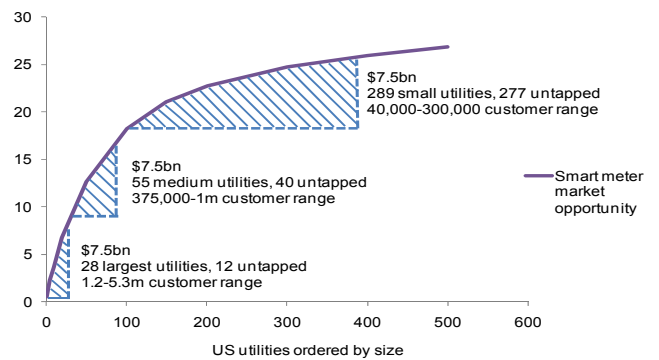
Our expectations for North American electricity are more bearish. The electricity meter market in the US has peaked in value, with most of the opportunities involving small to medium-sized cooperative and municipal utilities. However, we question the investment appetite of co-op and municipal utilities and their ability to contribute meaningful revenue growth to the electricity segment until initial peer project results are confirmed.

Chart 133: North American electricity market peaking (\$bn)



Source: BNEF

Chart 134: Smart meter opportunity shifting to smaller utilities



Source: BNEF

The 2012 outlook for water meters looks grim. We expect the segment to remain flat and anticipate a particularly difficult year in North America as state and local budgets face well-documented deficits.

2013 and beyond

Industry growth should accelerate in 2013, especially in electric metering in Europe.

EU, all signs suggest programmes will proceed

We acknowledge that under existing macro circumstances it is unrealistic to assume that the EU will achieve its target of 80% smart electricity meter coverage by 2020. Still, all the indications are that these programmes will proceed. When the French rollout is complete, for instance, the country will have exceeded the Eurozone target. We believe there is substantial opportunity for a European company with a large footprint on the continent at present to capitalize on the 100 million meters the European Commission expects to be installed by 2015.

Brazil & Russia, substantial opportunities

Outside Europe there are substantial electricity metering opportunities as well. Russia is planning to replace 48 million residential meters before 2020. In Brazil, there are 10 electric utilities that suffer 15% or greater non-technical losses and are vocal advocates of the government's 65-million smart meter rollout slated to occur over the next ten years. In fact, Northeast Associates estimates the emerging market [opportunity] at 115 million smart meters on the low end, exclusive of Russia and Brazil.

Water scarcity & quality will spur replacement & upgrades

We expect draught and water quality issues to spur regulatory action with a focus on conservation and improving quality standards to spur meter replacement and upgrades. For example, Saudi Arabia recently announced US\$66bn worth of water and wastewater projects to occur over the next eight years. China also plans to invest in water conservation (US\$12.5bn). Frost and Sullivan estimates the smart water meter market in Europe will be worth US\$20bn by 2020.

Many challenges remain

- **Business case** The transition to automated meter reading (AMR) was relatively smooth given the tangible benefits of wireless reading. The case for Advanced Meter Infrastructure (AMI) has been less clear. IOUs, which are heavily regulated, need revenue decoupling for upgrades to be attractive. Public power companies, however, generally are not generators and find AMI more compelling. Some benefits of AMI's two-way capability include gaining outage information, allowing for disconnects, and providing prepayment capability (popular not just among low income households).
- **Capex requirements:** Despite the potential cost savings and [good] ROI, smart grid implementation does require significant capital spending, which some already-pressed utilities could hold back on if the current economic climate does not improve.
- **Consumer adoption and rates:** For many consumers who have never heard of the smart grid, their only concern lies in the costs of deploying the smart grid, and utility retail rate increases.
- **Data management:** With a smart grid, utilities will have a never-ending stream of data. The question remains as to whether such data can/will be used to optimise the grid or will simply overwhelm utilities and their customers.
- **Emerging markets:** While smart grids can play an important role in deploying new electricity infrastructure by enabling more efficient operation and lower costs, we must remember that many EM grids do not operate consistently 24-7 (or lack electricity infrastructure). This necessitates tailoring grids, for example via small "remote" systems in rural areas.

- **Partnerships:** Utilities will increasingly be seen as clean energy system integrators but merging smart grid infrastructure with legacy grids will be challenging and involve partnerships across the grid.
- **Return on investment.** Analysing the cost-benefit equation for the smart grid can be difficult. Estimates for cost savings are plentiful, but the actual deployments and ROI theories do not always line up.
- **Security.** Smart grids will be networked, which means cyber attacks are possible.
- **Standards and interoperability:** Different smart grids use different national, regional or industry standards, creating a pressing need for interoperability standards across all key interfaces so that utilities can buy functional equipment from any vendor.
- **Uphill battle for a disruptive technology:** We consider demand response one of the most disruptive approaches to cleantech given the attractive economics of efficiency. This approach, however, can attract criticism from traditional generators, who are sometimes trying to slow demand response penetration.

[Cross Reference - Grid Storage Primer](#)

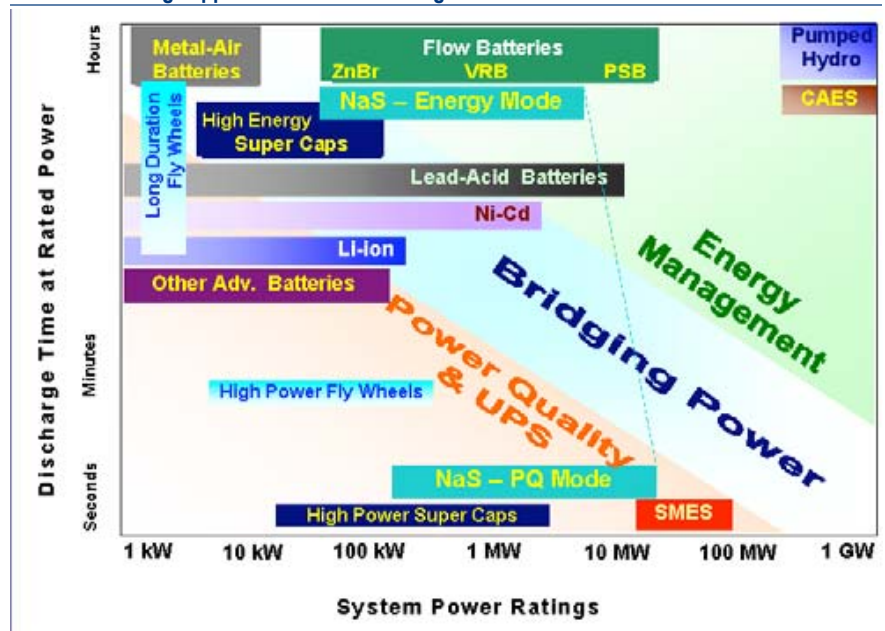
A comprehensive overview of the issues raised in this section can be found in our "Grid Storage Primer" report [Alternative Energy, 04 August 2010](#)

Grid storage, missing piece of the ElectriNet

The balancing of electricity demand and supply is becoming more difficult. With structural changes in how we consume and generate power, including intermittent renewables and electric vehicles, the development of grid-scale electricity storage will be an essential component in building the smart grid of the future.

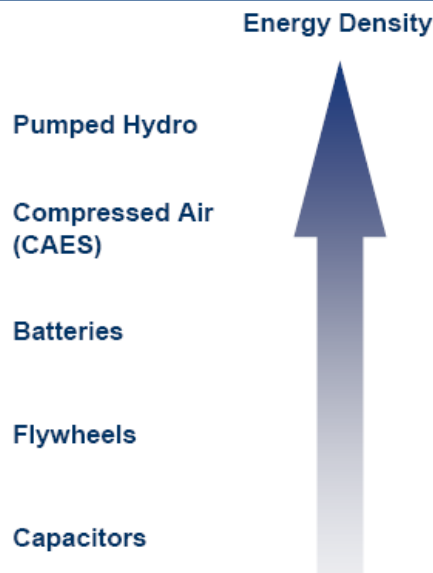
Recent technological and manufacturing advances in capacitors, batteries, and flywheel storage have spurred increased investment in the space. While it is early days and costs are high, the market opportunity for these technologies could be well over US\$10bn according to industry estimates.

Chart 135: Storage applications and technologies



Source: U.S. Department of Energy

Chart 136: Storage technologies by density



Grid storage needed for cleantech to realize its potential

Harnessing the ability to store electrons at grid scale has the potential to mark a technological breakthrough that could change how energy is produced, consumed, and valued. Many consider electricity storage to be the ultimate goal of cleantech because it enables:

- **Electrification of transportation** - i.e., vehicle-to-grid (V2G) technology which will enable electric vehicle (EV) owners to sell demand response services to grid operators through their vehicle's battery when plugged into a charging system.
- **Smoothing of renewable intermittency**, for utility-scale storage projects, particularly relating to wind where with system penetration rates of 20%, intermittency becomes a real threat to overall system stability that only storage can address.
- **Elimination of spatial and temporal price disparities.**

High cost remains an inhibitor to adoption in the near term, with utilities considering grid storage in demonstration projects. However, we believe investors should become familiar with grid storage technologies and vendors.

Storage facilitates the management of electricity

Storage was the unsung hero of the Internet revolution and likewise we think will play a critical role in establishing the "ElectriNet," making the smart grid a reality. Batteries will be found at four levels of the network: neighbourhoods, local loop (microgrids), substations, and head-end (generation).

Distributed storage offers advantages over centralized storage

We think distributed, or Community Energy Storage (CES), offers an advantage over centralized storage. Local capture and discharge of electricity (1) reduces line losses, (2) promotes targeted and efficient dispatch capability, (3) provides greater flexibility in handling multiple applications, and (4) enables on-site/parallel management of intermittent renewables and electric vehicles.

Multiple levels of storage applications

Energy storage applications fall into five categories: electric supply, ancillary services, grid system, end user, and renewables integration.

Table 170: Energy storage applications

Category	Applications
Electric Supply	Electric Energy Time-Shift Electric Supply Capacity
Ancillary Services	Load Following Area Regulation Electric Supply Reserve Capacity Voltage Support
Grid Systems	Transmission Support Transmission Congestion Relief T&D Upgrade Deferral Substation On-site Power
End User	Time-of-use Energy Cost Management Demand Charge Management Electric Service Reliability Electric Service Power Quality
Renewables Integration	Renewables Energy/Time Shift Renewables Capacity Firming Wind Generation Grid Integration

Source: Sandia National Lab (U.S. Dept of Energy)

Ancillary services, the most immediate revenue opportunity

The most immediate revenue opportunity appears to be in ancillary services, which cover the functions performed by grid operators to ensure reliability of control areas and the interconnected transmission system. Examples include load following, area regulation, and voltage support, which deliver 10-20% of electricity output, equating to billions of dollars. Ancillary services vary in terms of required power and energy density by application. Reserve capacity and load following can require considerable power and energy density qualities, similar to the energy supply category. By contrast, area regulation and voltage support can be served by storage assets with a fraction of the aforementioned capability.

Grid system, end user support and, eventually, renewables integration should follow. We believe that integration of intermittent renewables should begin within the decade. Pure market pricing arbitrage, eliminating the price gap between on-peak and off-peak periods, is likely to be many years away and will require significant technology advances.

Technologies must be matched to the right use

Since there is no single storage technology winner, matching solutions to their appropriate use will likely be important. Is the goal improved power quality and uninterrupted power supply, bridging power, or energy management? Similarly, system balance among energy and power, cycling, and usage cost is important. Pumped hydro and compressed air storage can time-shift at the generation level. Batteries and flywheels, though expensive today, offer quick response times for frequency regulation and renewables integration. Flow batteries and ultracapacitors also have roles to play.

Overview of grid storage technologies

Technology	Overview	Deployment & cost
Pumped hydroelectric energy storage (PHES)	During off-peak periods when energy prices are low, water is pumped from a lower reservoir to another reservoir at a higher elevation. When energy demand is high, water is discharged from the upper reservoir then passes through turbines that convert the gravimetric energy into electricity.	Widely deployed storage technology with 38 facilities in the US with a combined 22GW of capacity Most cost-effective means of storing large amounts of electrical energy on an operating basis, but capital costs and the environmental impact are critical decision factors.
Compressed air energy storage (CAES)	Purchase electricity during off-peak periods, store the output in a produced physical form, and then release physical energy to recreate electricity at higher value, on-peak periods. CAES systems compress and pump surface air underground typically to naturally occurring aquifers, solution-mined salt caverns, and constructed rock caverns. Subsequently, the air is released and heated using a small amount of natural gas. The heated air flows through a turbine generator to produce electricity	Two commercial-scale facilities; third approved. For a typical development, total costs, including equipment, installation and grid connectivity, are estimated to be US\$2.0-2.5mn per MW; low operational costs near 0.7¢/kWh.
Flow batteries	Three systems that work to store and release energy through a reversible electrochemical reaction between two electrolytes: (1) cell stacks, (2) electrolyte tanks, and a (3) control system. In most flow batteries, two electrolytes flow from the separate holding tanks to the cell stack where a reaction occurs in one electrolyte and an oxidation reaction occurs in the other. Within the cell stack, liquid electrolytes flow past solid electrodes that are separated by an ion exchange membrane, which allows one of the charged species to move back and forth between the two electrodes (one direction of movement corresponds to discharge and the other to charging). After the reaction, the spent electrolytes are returned to the holding tanks; during recharging the process is reversed.	Four types are currently commercial: (1) Vanadium redox batteries ; (2) Zinc bromine batteries; (3) Polysulfide bromide batteries; (4) Cerium zinc
Lead-acid batteries	LA's can be two standard types: flooded and valve regulated. Flooded batteries are found in cars and serve industrial uses as a deep charge battery. The younger valve regulated (VRLA) technology was developed to be longer lasting than the flooded technology and serve in industrial tool applications and as a source of backup power.	Widely deployed. Low cost makes it an attractive technology in the storage space, its price does not reflect the full cost of ownership that includes loss of battery life.
Sodium batteries	Employ sodium (Na) at the negative electrode (cathode), sulphur at the positive electrode (anode), and beta alumina as a solid electrolyte. During the discharge phase, molten metallic sodium acts as the anode, separated by a beta alumina cylinder from a sulphur container made from an inert metal acting as the cathode. The sulphur is absorbed in a carbon sponge. Alumina is a good conductor of Na ions but a bad conductor of electrons, avoiding self discharge. When Na gives off an electron, the Na ⁺ ion migrates to the sulphur container. The electron travels through the molten Na to the contact and through the electric load to the sulphur container.	Because NaS batteries operate at high temperatures typically greater than 300°C, systems are only suitable for large-scale, stationary applications.
Lithium-ion batteries	Use chemical reactions between primary elements of a battery cell to create a flow of electrons. The battery discharges when lithium ions carry electric current from the cell's anode to its cathode through a non-aqueous electrolyte. An external electrical power source capable of applying a higher voltage than that produced by the battery forces the process to reverse itself during charging.	High energy-to-weight ratio and significant energy density makes them compatible with many applications, from consumer electronics to EVs. Round-trip efficiency of 80-90% and are durable up to 1,200 cycles.
Flywheel energy storage	Store energy in the form of the kinetic energy of a spinning mass. A flywheel is basically a spinning disc with a hole in the middle to be used for rotation. Flywheels generally consist of three parts: (1) rotor, a mass that can be rotated to store energy, (2) bearing system, the mechanism that supports the rotating mass, and (3) motor/generator. Energy is stored in proportion to the speed at which the wheel spins, which can require a small but persistent input of energy to the motor. Energy is extracted by reversing this process and using the motor as a generator, which in turn decreases the speed of the motor.	Depending on material composition related to bearing system choice, flywheels have applications for uninterruptible power supply, transportation, grid ancillary services, and bulk energy storage. Low lifetime cost of ownership due to easier maintenance and high reliability make the technology attractive as a source of backup and uninterrupted power to data centers.
Ultracapacitors	Capacitors draw their name from the energy property that allows them to hold their charge, called capacitance (the ratio of the magnitude of the charge on two oppositely charged plates at either end of a cell to the voltage between the plates). The closer the	Low energy density but high power density and a cycle life above 10,000. Traditional application is power assist capacity, although newer functions include consumer electronics, automotive power

two plates are to one another, the greater the capacitance. Ultracapacitors are distinguished from standard capacitors by the enormous surface area of plates relative to the distance between them.

Thermal energy storage Use a building's cooling system to make cold water during off-peak cooling hours and then use it to provide cooling load support during peak hours.

Source:BoFA Merrill Lynch Global Research

assistance, and industrial applications.

Well-established storage technology that is typically deployed on a building-level scale to reduce peak-cooling loads for C&I firms.

There might be winning technologies within a particular segment, but we do not see a single storage technology that is likely to dominate grid storage.

Table 171: Technological issues with storage technologies

Issue	Overview
Discharge time and system power	Typically, shorter discharge times and lower system power ratings meet power quality and reliability demands. Technologies with greater system power and longer discharge time enable bridging power to support applications such as renewable integration and T&D asset deferral – and enable energy arbitrage opportunities.
Power rating	The difference between energy and power is the difference between time of charge and discharge (energy is measured in kWh) and rate of charge and discharge (power is measured in kW or MW). For some technologies, the relationship between the two is fixed. In order to deploy batteries to discharge lots of power over a long time, they must be strung together in great quantity. For other technologies like the flywheel, however, the relationship between power and energy can be manipulated by altering the materials and design of the conversion component (i.e. a motor for the flywheel).
Ability to charge/ discharge repeatedly	The cycle life of a battery deteriorates to a greater degree during deep discharges than does that of a flywheel.
Ownership cost	In addition to upfront capital cost, ownership cost refers to operational economics and lifespan. Materials and system design are chief determinants of ownership cost, which can be broken down among costs that scale with storage capacity, conversion, and balance of systems. Balancing upfront and lifetime costs is important.
Ways energy can be harnessed	Fossil fuels like NG and crude oil release energy through the excitement of chemical bonds, pumped hydro releases energy by means of gravitational energy, batteries release energy electrochemically through the separation of ions, and flywheels rely on the inertia of a rotating mass that unleashes kinetic energy. Each of these approaches exhibits varying energy density and power properties as well as dispatch capability and mobility. Pumped hydro and compressed air energy storage offer significant energy density but require specific geographic characteristics, where transmission needs to be brought in. Batteries, flywheels, and capacitors are not nearly as energy dense but are more modular and have exceptionally quick response time.

Source:BoFA Merrill Lynch Global Research

Li-ion looks like the most promising technology

For newer technologies to be economic, storage projects need to serve multiple applications, have a long life, meet strict reliability standards, and have lower capital costs. Lithium-ion battery technology appears to be most promising as battery makers can leverage the same technology and manufacturing progress used for automotive storage:

- Li-ion batteries have round-trip efficiency of 80-90% and are durable up to 1,200 cycles.
- Their high energy-to-weight ratio and significant energy density makes Li-ion batteries compatible with many applications, from consumer electronics to electric vehicles.
- In adequate temperature ranges, they also have low self-discharge rates.
- There are questions surrounding safety and battery shelf life.

Ascribing value to non-generating assets

Greater adoption of energy storage technologies would require increased regulatory support. Monetization of efficiency gains, transition from simplified rate structures, and premiums for dispatchability are areas where regulation can have an impact on the economic viability of storage projects. Based on our discussions with industry executives, the most important task for regulators is to define the value of storage.

Smart grid & energy storage companies

We have identified the following companies covered by BofA Merrill Lynch Global Research that have exposure to energy efficiency as a percentage of sales through their involvement as manufacturers, suppliers or service providers of smart grid and energy storage-related energy efficiency solutions. Although it is difficult to accurately gauge the link between such exposure and share price performance (as many factors outside the scope of this analysis play a role in short- and long-term price development), we still consider energy efficiency exposure as an important positive point to track.

Table 172: List of companies covered by BofAML involved in Smart Grid, Batteries & Energy Storage and Energy Efficiency

BBG Ticker	Company	Location	BofAML Ticker	Market Cap (US\$m)	Investment Opinion	EE Exposure
AONE US	A123 SYSTEMS INC	UNITED STATES	AONE	234.2	Buy	High
AMRC US	AMERESCO INC	UNITED STATES	AMRC	578.5	Buy	High
ELT US	ELSTER GROUP SE	GERMANY	ELT	1645.0	Buy	High
ENOC US	ENERNOC INC	UNITED STATES	ENOC	249.6	Underperform	High
ITRI US	ITRON	UNITED STATES	ITRI	1847.1	Underperform	High
SAFT FP	SAFT GROUPE SA	FRANCE	SGPEF	750.8	Neutral	High
SQM US	SQM	UNITED STATES	SQM	15723.6	Neutral	Low

Source: IQ, DataStream, BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency products, services, technologies and solutions

Table 173: A123 Systems Inc. - key data

Analyst's Name	Steven Milunovich		
Analyst's Email Id.	steven.milunovich@baml.com		
Analyst's Phone No.	+1 646 855 1272		
	2010	2011E	2012E
Revenues	97	162	361
Operating Profit	(149)	(213)	(155)
Operating Margin	-153.7%	-131.2%	-42.9%
Y-o-Y Growth	74.9%	42.3%	-27.2%
Net Profit	(151)	(219)	(157)
Net Margin	-155.8%	-134.8%	-43.6%
Y-o-Y Growth	76.4%	44.3%	-28.0%
EBIT	(149)	(213)	(155)
EBIT Margin	-153.7%	-131.2%	-42.9%
EBITDA	(141)	(210)	(149)
EBITDA Margin	-145.3%	-129.5%	-41.2%
Operating Cash Flow	(127.8)	(244.9)	(207.6)
Capex	177.2	156.7	53.5
Free Cash Flow	(305.0)	(401.7)	(261.1)
Net Debt/Equity	(45.2)	(6.8)	1.0

Source: Company data, BofA Merrill Lynch Global Research estimates

A123 Systems Inc

A123 Systems Inc. designs, develops, manufactures and sells advanced, rechargeable lithium-ion batteries and battery systems for use in electric vehicles and electric grid storage.

A123 (high EE exposure) is an efficiency play as it is a leading vendor of lithium-ion batteries for transportation, grid, and portable applications, and is well-positioned at cell, module and system level. For EVs, A123's business momentum seems to be improving – with quoting activity appearing to be growing in all segments, and OEM programmes apparently on track despite the adverse news on the Chevy Volt. We note that the company is “handcuffed” by its customers in disclosing future business to investors (such as revealing a scenario in which it would need to increase capacity in 2012 to meet 2013 demand). However, it is looking to improve transparency when it comes to quantifying its pipeline and the development of new programmes. With regard to primary grid storage, its partner AES has proposed several significant grid-scale storage systems (100MW, 400MW, and 200 MW (1MW≈\$1M)) and says it expects a decision on these RFPs in 1H/12. We see the company at an inflection point with accelerating second-half revenue and improving profitability prompting a favorable risk/reward as more automotive customers begin to introduce vehicles using its iron phosphate technology and grid storage sales gain traction. Storage is critical to general cleantech product adoption, which we don't think is fully reflected in the stock's valuation. With adequate funding for its next stage of growth, we see A123 emerging as a regional cost and technology leader.

Table 174: Ameresco Inc. - Class A - key data

Analyst's Name	Steven Milunovich		
Analyst's Email Id.	steven.milunovich@bamf.com		
Analyst's Phone No.	+1 646 855 1272		
	2010	2011E	2012E
Revenues	618	728	828
Operating Profit	46	52	69
Operating Margin	7.4%	7.1%	8.3%
Y-o-Y Growth	81.8%	12.2%	33.4%
Net Profit	28	37	44
Net Margin	4.6%	5.1%	5.3%
Y-o-Y Growth	42.8%	30.2%	19.6%
EBIT	46	52	69
EBIT Margin	7.4%	7.1%	8.3%
EBITDA	58	65	85
EBITDA Margin	9.4%	9.0%	10.2%
Operating Cash Flow	22.9	19.6	75.3
Capex	39.6	43.1	40.0
Free Cash Flow	(16.8)	(23.5)	35.3
Net Debt/Equity	83.3	91.9	67.7

Source: Company data, BofA Merrill Lynch Global Research estimates

Ameresco Inc

Ameresco is the largest independent energy services company in the US, focusing on energy efficiency and renewable energy. Its principle markets include federal, state and local governments where its energy efficiency contract offerings, aimed at reducing energy consumption, are typically self-funding. About 20% of the company's revenues are from renewables projects, mostly landfill gas and biomass.

Ameresco (high EE exposure) is a broad efficiency play across energy infrastructure and renewables, including upgrades to a facility's energy infrastructure and the development, construction and operation of renewable energy plants. We believe demand for energy efficiency improvements in the government sector should grow strongly, and that Ameresco should benefit as the largest independent ESCO. An 80% increase in RFPs year to date should boost the awarded backlog, which later turns into revenue. We forecast long-term revenue and earnings growth of near 20%. Investor confusion over whether Ameresco is an energy efficiency or construction company provides an opportunity, in our view.

Table 175: Elster Group SE - Key data

Analyst's Name	Steven Milunovich		
Analyst's Email Id.	steven.milunovich@bamf.com		
Analyst's Phone No.	+1 646 855 1272		
	2011	2012E	2013E
Revenues	1,869	1,894	2,062
Operating Profit	176	144	195
Operating Margin	10.1%	9.4%	10.2%
Y-o-Y Growth	0.1%	-18.3%	35.1%
Net Profit	101	75	118
Net Margin	5.4%	3.9%	5.7%
Y-o-Y Growth	48.0%	-25.9%	57.9%
EBIT	176	144	195
EBIT Margin	9.4%	7.6%	9.4%
EBITDA	260	231	298
EBITDA Margin	13.9%	12.2%	14.4%
Operating Cash Flow	191.8	152.6	208.5
Capex	48.3	53.9	58.6
Free Cash Flow	143.5	98.8	149.9
Net Debt/Equity	69.0	42.4	18.5

Source: Company data, BofA Merrill Lynch Global Research estimates

Elster Group SE

Elster is a German manufacturer of electricity, gas, and water meters, as well as gas utilization products. The company can trace its roots back 170 years, and currently serves customers in 130 different countries.

Elster (high EE exposure) is a pure play on short and long term gas meter opportunities and long-term electricity and water meter opportunities. We expect modest revenue and earnings growth in 2012 despite the flattening of orders and margin weakens in electric and water metering. Results should improve in 2013 as electric meter growth increases and Elster begins to reap the benefits of its cost cutting. We like that Elster derives 60% of revenue from highly-profitable gas meter sales. Increasing use of nat gas should be a boon to Elster, particularly in its upstream commercial and industrial utilization business and with shale gas benefits yet to come. A strong safety record and deep customer relationships have resulted in an industry leading 30% gas market share. We believe to the company will achieve accelerating growth in 2013-14 with drivers including; beneficiary of the golden age of gas; and geographic, product and customer diversity.

Table 176: EnerNOC Inc. - key data

Analyst's Name	Steven Milunovich		
Analyst's Email Id.	steven.milunovich@baml.com		
Analyst's Phone No.	+1 646 855 1272		
	2010	2011E	2012E
Revenues	280	292	308
Operating Profit	11	(5)	(19)
Operating Margin	4.0%	-1.7%	-6.1%
Y-o-Y Growth	-322.3%	-143.7%	279.3%
Net Profit	10	(9)	(22)
Net Margin	3.4%	-3.0%	-7.2%
Y-o-Y Growth	-240.8%	-191.8%	151.3%
EBIT	11	(5)	(19)
EBIT Margin	4.0%	-1.7%	-6.1%
EBITDA	27	18	8
EBITDA Margin	9.7%	6.2%	2.7%
Operating Cash Flow	45.1	67.2	39.1
Capex	19.4	19.2	23.0
Free Cash Flow	25.8	48.0	16.1
Net Debt/Equity	(67.8)	(44.7)	(46.0)

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 177: Itron Inc. - key data

Analyst's Name	Steven Milunovich		
Analyst's Email Id.	steven.milunovich@baml.com		
Analyst's Phone No.	+1 646 855 1272		
	2010	2011E	2012E
Revenues	2,259	2,434	2,249
Operating Profit	175	(470)	136
Operating Margin	8.2%	-18.9%	6.3%
Y-o-Y Growth	659.4%	-368.4%	-129.0%
Net Profit	105	(510)	93
Net Margin	4.6%	-21.0%	4.1%
Y-o-Y Growth	-4758.5%	-586.9%	-118.2%
EBIT	175	(470)	136
EBIT Margin	7.7%	-19.3%	6.1%
EBITDA	306	(340)	280
EBITDA Margin	13.6%	-14.0%	12.5%
Operating Cash Flow	254.6	252.4	319.7
Capex	62.8	60.1	66.1
Free Cash Flow	191.8	192.3	253.6
Net Debt/Equity	30.9	35.2	13.6

Source: Company data, BofA Merrill Lynch Global Research estimates

EnerNOC Inc.

EnerNOC, Inc. develops and provides clean and intelligent power solutions to commercial, institutional and industrial customers, as well as electric power grid operators and utilities. Through its network centres the company remotely manages electricity consumption across a network of end-use customer sites.

EnerNOC (high EE exposure) is an energy efficiency play on demand response (DR). Although we see a breakout in 2013 and 2014, resulting from better PJM pricing and increased traction in non-DR business, a lack of earnings momentum on recently-lowered 2011 and 2012 estimates leaves us waiting for a better entry time. Increased scrutiny from industry participants and potential regulatory headwinds also leave us concerned over the near term. Upside risks are: (1) increased peak load demand leading to increased demand for emergency and price responsive DR, (2) increased government and regulatory support for DR and energy efficiency solutions, (3) M&A activity, (4) lack of competitive pricing pressure leading to stable and/or expanding gross margins, and (5) improving pricing and demand in open market reliability programmes.

Itron

Itron is a leading technology provider to the global energy and water industries. It is the top provider of intelligent metering, data collection, and utility software solutions, serving nearly 8,000 utilities worldwide. Products include electricity, gas, water and heat meters, data collection and communication systems, including automated meter reading (AMR) and advanced metering infrastructure (AMI), meter data management and related software applications.

Itron (high EE exposure) is pure play on efficiency via smart electric, gas, and water meters. In the near term, a significant decline in 2012 earnings looks less likely and a potential upturn in 2013 looms. Also, we like the acquisition of SmartSynch, which takes a cellular network approach that gives Itron technology differentiation to market. Backlog and near-term European sales are risks as backlogs are down year-over-year at low levels. We credit Itron for strength in its non-AMI business and for the credibility that the returning CEO is bringing to the story. He more clearly communicates Itron's direction and provides a balanced view. We remain concerned that weak backlog portends some revenue risk and that pricing pressure could make the company's gross margin expectation a bit aggressive. Upside risks are: (1) New government stimulus programmes aimed at increasing smart meter deployment, (2) increased growth for smart meters in emerging markets, (3) improved cost reductions stemming from company restructuring effort, and (4) increased smart meter interest from global utilities.

Table 178: SAFT - key data

Analyst's Name	Caroline Cohen >>		
Analyst's Email Id.	caroline.cohen@baml.com		
Analyst's Phone No.	+33 1 53 65 59 26		
	2010	2011E	2012E
Revenues	591	629	685
Operating Profit	79	76	89
Operating Margin	13.3%	12.1%	13.0%
Y-o-Y Growth	15.6%	-3.2%	16.9%
Net Profit	36	31	56
Net Margin	6.2%	4.9%	8.2%
Y-o-Y Growth	27.7%	-15.0%	81.6%
EBIT	79	76	89
EBIT Margin	13.3%	12.1%	13.0%
EBITDA	109	111	123
EBITDA Margin	18.4%	17.7%	17.9%
Operating Cash Flow	83.3	74.2	88.9
Capex	69.6	66.5	36.7
Free Cash Flow	13.7	7.7	52.3
Net Debt/Equity	40.0	15.9	1.7

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 179: Sociedad Quimica y Minera de Chile S.A. - key data

Analyst's Name	Fernando Ferreira		
Analyst's Email Id.	fernando.ferreira@baml.com		
Analyst's Phone No.	+1 646 855 2455		
	2010	2011E	2012E
Revenues	1,830	2,218	2,733
Operating Profit	516	771	1,140
Operating Margin	29.9%	35.4%	41.7%
Y-o-Y Growth	22.1%	49.6%	47.9%
Net Profit	382	555	833
Net Margin	20.9%	25.0%	30.5%
Y-o-Y Growth	16.8%	45.2%	50.0%
EBIT	516	771	1,140
EBIT Margin	28.2%	34.8%	41.7%
EBITDA	661	954	1,352
EBITDA Margin	36.1%	43.0%	49.5%
Operating Cash Flow	540.4	621.7	957.5
Capex	336.0	463.3	430.0
Free Cash Flow	204.4	158.4	527.5
Net Debt/Equity	45.1	45.3	28.0

Source: Company data, BofA Merrill Lynch Global Research estimates

Saft Groupe SA

SAFT is a global leading manufacturer of high-performance batteries. The group addresses various industries through its rechargeable and non-rechargeable batteries: military/defence/space, transport, oil and gas, industries and telecom networks.

Saft (high EE exposure) is an energy efficiency play on rechargeable batteries including EVs and energy storage: (1) Energy storage (Utilities) includes grid stabilisation power generated by renewables, PV for residential use and back-up for telecom stations/relays: 10MWh of contracts were booked in 2011, 90% in backlog, first contracts in France, and smart grid involvement in the US. With a new plant under construction, management expects to be at breakeven in 2013 and generate €200mn sales and a 15% EBITDA margin in 2015; (2) Other li-ion: batteries for Peugeot's electric scooters are to be launched in 2012, fork-lift trucks with Linde, Still First in marine, Keolis electric ferry; and (3) Automotive: sale of shares in JC-S in September 2011 gives Saft the option to re-enter the market and a strategic review of options is underway. Saft offers a high level of recurring revenues – 40% of group sales – driven by the retrofit segment and the 60% of sales generated by customized products. We expect these trends to last. Saft's leadership in niche markets has led to a high and durable level of profitability.

SQM

SQM is a nitrate-based specialty chemicals producer and the largest supplier of iodine, lithium and specialty plant nutrients, with market shares of 33%, 30% and 49%, respectively, and total capacity of 1.7 million tons. These products are derived from two minerals: caliche ore and salar brine, of which the company has long life reserves, full integrated logistics and low average costs.

SQM (low EE exposure) is an efficiency play on lithium, for which it is the world's principal producer. CAGR in global demand for lithium was 6-7% from 1997-2010 and total lithium demand is expected to reach 240-270 KMT-LCE (2020) and 450-500 KMT-LCE (2030). SQM believes that e-cars (HEV-PHEV-EV) using li-ion batteries will be a further driver – generating an estimated 10% of total new car production by 2020. SQM has a high-quality asset base in Chile to produce potash, potassium nitrate, lithium, iodine and sodium nitrate. We continue to see SQM as an excellent long-term story, given its: (1) dominant position in most of its business lines, (2) significant growth in potash, and (3) long life reserves. However, we are more cautious in the short term given our view of declining fertilizer prices in 2012 and slowdown in demand given macroeconomic uncertainties.

Table 180: List of other companies involved in Batteries, Grid & Energy Storage that we do not cover

BBG Ticker	Company	Location	BofAML Ticker	Local currency	Market Cap (mn)	Investment Opinion	EE Exposure
ACPW US	ACTIVE POWER	United States	NR	USD	60.10	NR	High
ABAT YS	ADVANCED BATTERY TECH.	United States	NR	USD	39.70	NR	High
ALTI US	ALTAIR NANOTECHNOLOGIES	United States	NR	USD	48.50	NR	High
BONQ US	BEACON POWER	United States	NR	USD	0.76	NR	High
ELON US	ECEHLON	United States	NR	USD	218.60	NR	High
HEV	ENER1	United States	NR	USD	2.20	NR	Medium
ENS	ENERSYS	United States	NR	USD	1,617.00	NR	Low
ESE US	ESCO TECHNOLOGIES INC	United States	NR	USD	969.70	NR	High
XIDE US	EXIDE TECHNOLOGIES	United States	NR	USD	241.10	NR	High

01 March 2012

Table 180: List of other companies involved in Batteries, Grid & Energy Storage that we do not cover

BBG Ticker	Company	Location	BofAML Ticker	Local currency	Market Cap (mn)	Investment Opinion	EE Exposure
private	INT.L BATTERY CORPORATION	United States	NR	USD	NA	NR	Medium
MXWL US	MAXWELL TECHNOLOGIES	United States	NR	USD	251.10	NR	High
5333 JP	NGK INSULATORS	Japan	NR	JPY	375,029.40	NR	Medium
PPO US	POLYPORE INTERNATIONAL INC	United States	NR	USD	1,879.50	NR	Medium
Private	PREMIUM POWER	United States	NR	USD	NA	NR	High
Private	PRIMUS POWER	United States	NR	USD	NA	NR	High
Private	SECO	United States	NR	USD	NA	NR	Medium
Private	SUSTAINX	United States	NR	USD	NA	NR	High
VLNC US	VALENCE TECHNOLOGY	United States	NR	USD	168.30	NR	High
Private	XTREME POWER	United States	NR	USD	NA	NR	High
Private	44 TECH	United States	NR	USD	NA	NR	High

Source: Company, BBG, BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency related products, services, technologies and solutions

Table 181: Companies involved in Batteries, Grid & Energy Storage that we do not cover

Company	BBG ticker	Overview
ACTIVE POWER	ACPW US	Designs, manufactures and markets flywheel energy storage systems to deploy in conventional power quality installations. The company's flywheel energy storage system provides an alternative to lead-acid batteries – and provides uninterrupted power supply for institutional clients in over 42 countries around the world. The company claims to have: saved over US\$55mn in energy costs; displaced more than 6,000 tons of lead; and eliminated more than 430,000 tons of CO2 emissions
ADVANCED BATTERY TECHNOLOGIES	ABAT US	Develops, manufactures and distributes rechargeable polymer lithium-ion batteries used in automobiles, motorcycles, cell phones, computer, and other consumer electronic products.
ALTAIR NANOTECHNOLOGIES	ALTI US	Global owner and supplier of proprietary nanocrystalline technology and advanced lithium-ion energy storage systems. Rather than use graphite materials typically found in lithium-ion batteries, Altairnano employs nano-structured lithium titanate to increase cycle life and operating temperature ranges, and decrease self-discharge. The ALTI-ESS Energy Storage is deployed in grid capacity, renewable integration, UPS, military, and transportation applications.
BEACON POWER	BCON US	Designs and develops commercial flywheel energy storage products and services to provide emissions-free frequency regulation services on transmission grids around the world. The storage systems are designed to help utilities match supply with varying demand by storing excess power in arrays of 2,800-pound (1,300 kg) flywheels at off-peak times for use during peak demand.
ECHELON	ELON US	Develops, markets, and supports a wide range of hardware and software products and services that enable OEMs and systems integrators to design and implement open, interoperable, distributed control networks. For the electric utility industry, the company has developed a "smart grid" solution called the Networked Energy Services (NES) system, which provides a two-way information and control path between the utility and its customer, which enables utilities to reduce operating costs; improve customer service; offer multiple tariff plans, including time-of-use metering and prepay metering; promote energy efficiency; better utilize distribution assets; improve grid quality and reliability; control loads and reduce peak demand; and respond more rapidly to changing customer and regulatory requirements.
ELSTER GROUP	ELT US	Provides gas, electricity and water meters and related communications, networking and software solutions. The company's products and solutions are used to measure gas, electricity and water consumption and enable energy efficiency and conservation. It is an energy efficiency play on Advanced Metering Infrastructure (AMI) and integrated metering and utilisation solutions to the gas, electricity and water industries. It has deployed over 200 million metering devices over the last 10Y and utilities accounted for 57% of 2010 sales. 2Q11 results saw revenues up 12.4% y-o-y and contracted future revenues at US\$1.08bn.
ENER1	NYSE: HEV	Develops lithium-ion batteries for automotive, military, and other industrial applications through its subsidiary EnerDel. Through subsidiaries EnerFuel and EnerNano, the company develops fuel cell technologies and nanotechnologies.
ENERNOC		Develops and provides energy management applications and services for commercial, institutional, and industrial customers, as well as electric power grid operators and utilities. It chiefly provides demand response services that maintain a real-time balance between electricity supply and demand. Its energy management services and software promote energy efficiency, reduce greenhouse gas emissions, and offer consulting services for energy supply management. It is the market leader in demand response.
ENERSYS	NYSE: ENS	Manufactures, markets and distributes industrial lead-acid batteries and provides after-market and customer-support services. Its products are primarily used in service power, motive power, defense, and specialty functions. The company also manufactures, markets, and distributes a full line of battery accessories. Its EcoSafe battery product line (use lead, nickel and lithium technologies) have been developed specifically for renewable energy storage applications, including solar power, wind power and other electricity-generation alternatives.

Table 181: Companies involved in Batteries, Grid & Energy Storage that we do not cover

Company	BBG ticker	Overview
ESCO TECHNOLOGIES	ESE US	Supplies special purpose communications systems for electric, gas, and water utilities, including hardware and software to support advanced metering infrastructure (AMI) and applications. The company also provides engineered filtration products to the aviation, space and process markets worldwide. It is an energy efficiency play on AMI for electric, gas and water utilities via its Aclara and Doble technologies. Esco expect its mid-term growth projections will be led by the largest AMI gas project in North America, supplemented by international AMI opportunities, and expected domestic growth.
EXIDE TECHNOLOGIES INTERNATIONAL BATTERY CORPORATION	NASDAQ: XIDE Private	Produces and recycles lead-acid batteries that are used primarily in industrial, transportation and network applications. Claims to be the first domestic developer and manufacturer of true large-format lithium-ion battery cells in the US. By using a water-based process, it is also a green battery manufacturer.
MAXWELL TECHNOLOGIES	NASDAQ: MXWL	Develops, manufactures, and markets products and services for energy storage and power delivery solutions. Proprietary BOOSTCAP Ultracapacitor cells and multi-cell packs provide reliable power for C&I, transportation, and telecommunication customers. The company also offers high-voltage grading and coupling capacitors as well as power modules and single board computers for aerospace applications.
NGK INSULATORS	Tokyo: 5333 JP	Manufactures and sells electrical insulators, industrial ceramic products, environmental systems, and electronic parts. Its focus in the energy storage space is on the development of sodium-sulfur (NaS) batteries in conjunction with Tokyo Electrical Power Company (TEPCO), one of the world's largest fully-integrated utility companies. NGK's ceramic expertise was put to use in developing its NaS battery's key technology, an electrolyte made of Beta alumina solid. Its product is primarily used for load levelling and emergency and uninterrupted power supply in the United State and Japan.
POLYPORE INTERNATIONAL INC	PPO US	Develops, manufactures, and markets specialized polymer-based membranes used in separation and filtration processes. It has two business segments: energy storage and separations media. The company serves customers globally with manufacturing facilities in North America, Europe, and Asia. PPO is an efficiency play on energy storage which accounts for approximately two-thirds of its total sales. It produces different types of membranes that function as separators in lead-acid batteries used in transportation and industrial applications (72% of 2010 sales) and lithium batteries used in electronics applications and EVs (21%). Polypore believes that it is well positioned to capitalise on the growing and sustainable demand associated with mobile and portable energy and purity as it relates to high performance filtration.
PREMIUM POWER	Private	Manufactures grid scale flow batteries based on proprietary zinc bromide battery technology called Zinc-Flow. The company focuses deployment of its technology for utility infrastructure and asset deferral, renewable resources generation, demand management, and mission critical infrastructure. As part of recent grid storage stimulus grants, Premium was awarded US\$7.3mn to develop multi-megawatt, long-duration flow battery storage for utility grid applications. Duke Energy's apparent interest in the project would increase funding to US\$31mn.
PRIMUS POWER	private	Develops MW-scale flow battery systems designed for grid, solar, and wind applications. The company is backed by Canadian VC fund Chrysalix, which was attracted to the company by its low-cost operation. Primus was recently awarded a US\$143mn DOE grant to deploy a 25-75MW flow battery farm to provide grid stability for area wind power.
SECO	Private	Develops advanced lithium-ion batteries using a solid polymer electrolyte material capable of transporting lithium ions safely and stably. The company's proprietary electrolyte and cell technologies were developed over ten years at Lawrence Berkeley National Labs, and the company received the bulk of its funding from Khosla Ventures.
SUSTAINX	Private	Develops compressed air energy storage (CAES) technology that is differentiated from typical CAES technology because it does not need to be paired with an external heat source. Electricity is generated directly from the expansion of the compressed air in the storage system. Industrial-grade, off-the-shelf gas cylinders also eliminate siting and permitting constraints to which historical underground CAES is subject.
VALENCE TECHNOLOGY	NASDAQ: VLNC	Designs, develops, manufactures and markets rechargeable lithium polymer batteries for use mostly in mobile communication devices. Valence recently partnered with Electric Vehicles International (EVI) to provide that company's EVs with its battery technology.
XTREME POWER	Private	Vertically integrated developer and manufacturer of power management and storage systems ranging from 500kW to 100MW. Its high energy and power capacity PowerCell, a derivation of a battery technology shelved by the Ford Motor Company, contains no liquids and employs a combination of lead and other chemistries. Each cell is highly uniform, which enables it to be stacked into large parallel and series cell matrices in order to provide hundreds of megawatts of power.
44 TECH	Private	Engaged in advanced battery research, development and manufacturing with a focus on stationary energy storage markets. Spin-off from Carnegie Mellon University that is using an initial stimulus grant of US\$5mn to commercialize its sodium-based battery technology.

Source: Bloomberg, company sources

Table 182: BofAML Transport – Rail, Bus & Shipping Stock List

Company	EE exposure
ALSTOM SA	Medium
ANSALDO STS SPA	High
BOMBARDIER INC	Medium
CAF SA	High
CANADIAN NTNL. RAIL.	High
CHINA RAILWAY CONST.	Medium
CHINA RAILWAY GROUP	High
CSR CORPORATION	High
FIRSTGROUP PLC	High
GO-AHEAD GROUP PLC	High
GUANGSHEN RAILWAY	High
NATIONAL EXPRESS	High
STAGECOACH GROUP	High
VOSSLOH	High
YANGZJIANG SHIP.	Low
ZHUZHOU CSR	High

Source: BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency products, services, technologies and solutions

Transport - rail, bus & shipping

The transport sector accounts for 23% of global emissions – i.e., 6.5 billion tonnes of CO₂ – or the equivalent of 1t of CO₂ per inhabitant of the planet. The carbon footprint of transport is linked to the fact that almost 20% of the world’s total delivered energy is used in the sector, where liquid fuels are the dominant source (i.e., gasoline, diesel and LPG on roads, kerosene in the air, and fuel oil for shipping). Transportation alone accounts for more than 50% of world consumption of liquid fuels, and this share is forecast to increase to over 60% by 2035 (Source: International Union of Railways). This means growing pressure in terms of fuel costs and energy efficiency.

The long-term environment for rail, bus and coach and shipping is the most positive it has been in years. High fuel prices, energy security concerns, rising household bills, traffic congestion and environmental concerns are all leading to greater investments in rail and bus in particular. They are seen as solution providers, transporting more people further and faster, with lower emissions and congestion impacts. While changing mobility behaviour will be key to realising the efficiency opportunity, rail is set for strong growth, with the accessible market set to reach €148bn by 2015-16E (Source: UNIFE). Bus and coach is also seeing a CAGR of 4.2% from 2009-14E (Source: Fredonia). Finally, changing regulations should see efficiency emerge as a major opportunity in the shipping sector.

We believe that a number of stocks are well placed to benefit from the theme of energy efficiency in rail, bus and shipping via their involvement in areas such as locomotives, passenger rail operators, rail services, railway signalling and control systems, rail transport for freight, public bus and coach operators, rolling stock and fuel efficient shipbuilders.

Rail, €148bn market by 2015-16

The accessible rail market was estimated to be worth €125.5bn worldwide in 2009 (vs. €86bn in 2007), with rolling stock and services the two most important segments (Source UNIFE).

Chart 137: Forecast accessible market by region (2 year average market 2015-16)



Source: Bombardier

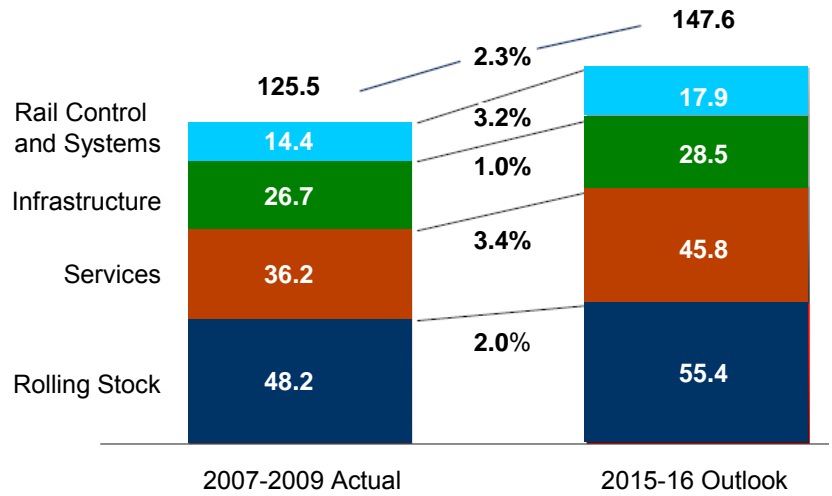
Table 183: Portfolio of rail products & services

Rolling stock		Services	Systems & Solutions	
Passengers	Locomotives & equipment		Systems	Rail control solutions
Light rail vehicles	Locomotives	Fleet management	Automated people movers	Integrated control systems
Metros	Bogies	Spare parts	Advanced rapid transit	Onboard computer systems
Commuter trains	Traction converters	Logistics management	Light rapid transit	Automatic train protection & operation
Regional trains	Auxiliary converters	Vehicle refurbishment & overhaul	Automated monorail	Wayside interlocking & equipment
Intercity trains	Drives/traction motors	Component repair & overhaul	eMobility solutions	
High-speed trains	Train control & communication	Technical support	Operations & maintenance	
Very high-speed trains			Transit security	

Source: Bombardier

By 2015-16, the market is expected to grow to €147.6bn (Source UNIFE).

Chart 138: Accessible rail industry market by segment



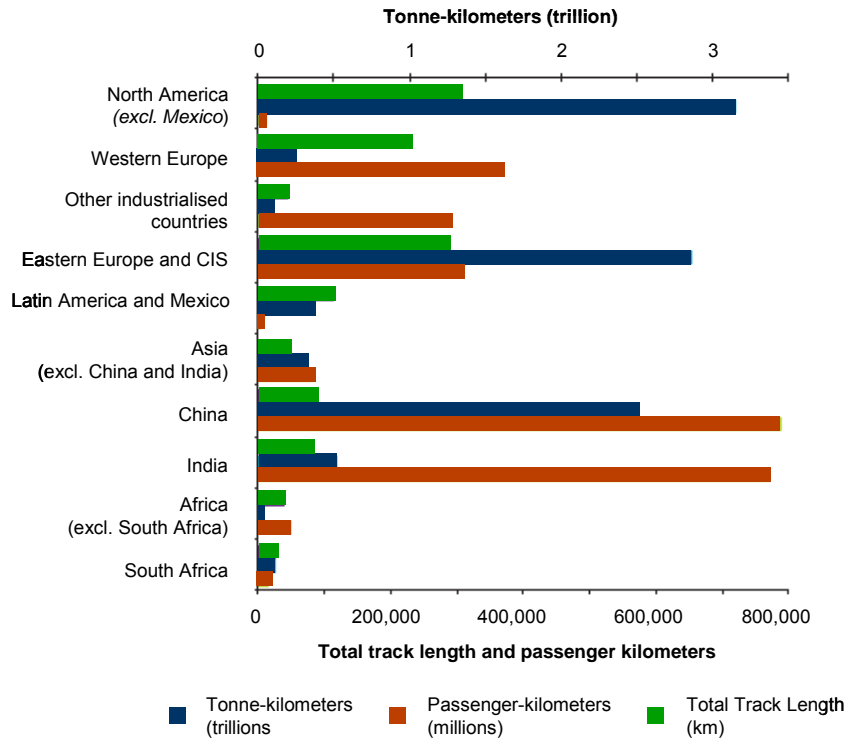
Source: Bombardier based on UNIFE 2010 Study. Values converted based on exchange rate EUR/USD of 1.3202

U.S. public transit ridership, and public transport in general, is growing faster than car mileage (Source: American Public Transport Association).

2.3% CAGR to 2015/16

From 2012, there is strong potential for growth in the rail market – a 2.3% CAGR globally from 2007/9 to 2015/16. Services are expected to see the fastest pace at a 3.4% CAGR, followed by rail control and systems (3.2%), rolling stock (2.0%) and infrastructure (1.0%). By 2015/16, the accessible rail market is expected to grow to €147.6bn market. (Source: UNIFE 2010.)

Chart 139: Railway development (as at 2008)



Source: International Union of Railways

In the near-term, the market is becoming more open, more fragmented and open to competition. Traditionally closed or non-railway markets are opening their doors (i.e., Algeria, Russia, US, Venezuela), product demand is changing, moving away from a “high-tech” focus to quality at a reasonable price and there is a growing focus on safety, notably after the July 2011 HSR accident in Wenzhou China.

Table 184: Favourable regional rail trends

Market	Major drivers	Country drivers
Western Europe	<p>Largest accessible market</p> <p>Significant investment in rail control upgrades are expected</p> <p>Increased outsourcing of services by operators</p>	<p><u>France</u></p> <p>Sustained government support (Grenelle emphasised rail)</p> <p>Île de France region opportunities (RER E+ Grand Paris project)</p> <p>Option opportunities</p> <p><u>Germany</u></p> <p>Light Rail Vehicles (Karlsruhe, Dusseldorf or Bremen)</p> <p>Regional and commuter trains – regional trains will be bulk of market (Rhein-Neckar & Rhein-Main); upcoming opportunities in commuter (S-Bahn Berlin & Hamburg); options for double-deck trains</p> <p>Intercity transportation</p> <p>Locomotive opportunities</p> <p><u>Other</u></p> <p>Crossrail project in the UK</p> <p>Metro in Stockholm</p> <p>Brussels driverless metro in Belgium</p> <p>ERTMS level 2 signalling project in Denmark</p> <p>High speed tilting cars in Switzerland</p> <p>Passenger locomotives in Hungary</p> <p>Light Rail project in Dublin</p>

Table 185: Favourable regional rail trends

Market	Major drivers	Country drivers
Asia-Pacific	<p>India and China continue to drive the growth in urban ROS, intercity and freight fleets in line with infrastructure expansions and economic growth</p> <p>Development of mass transit in the entire region (e.g. Vietnam and Malaysia)</p>	<p><u>China</u></p> <p>Urban mass transit networks are expected to total more than 6,000 km</p> <p>Very High Speed (VHS) rail to reach its target of 20,000km of VHS lines</p> <p>Development of intercity is further expected throughout the development of HS lines</p> <p>Mass transit market will continue to grow with the introduction of LRV and commuter products</p> <p><u>India</u></p> <p>2009 plan to order 800 electric twin-locomotives and 1,000 diesel locomotives over the next 10 years, and outsource the maintenance for a period of approximately 25 years</p> <p>Will begin phase III of the Delhi Metro, and is expected to develop LRV & commuter systems</p> <p>50 urban areas w/ 1mn+ inhabitants expected by 2015, demonstrating potential for a HS network</p>
North America	<p>Introduction of Positive Train Control (PTC) will create a rail control boom in the medium term</p> <p>Plans of high speed and mass-transit systems could drive further growth</p>	<p>Rail control with US\$11bn project budget driven by national rollout of Positive Train Control (PTC) in US</p> <p>Mass transit: large tenders in urban mass transit (e.g. San Francisco's BART, Ottawa Light Rail)</p> <p>HS Rail: potential 220mph Dallas to Houston route being explored by the FRA; 130 inter-city bi-level coaches to be awarded by July 2012 (Midwest & California); 40 additional Acela coaches with requested delivery by early 2015 (Amtrak)</p>
South America	-	<p>Very high speed line in Brazil</p> <p>Mass transit projects in Argentina, Chile, Venezuela and Brazil</p>
MEA	-	<p>Very high speed lines in Saudi Arabia and in Morocco</p> <p>Mass transit projects in the Arabic peninsula and in Northern Africa</p>
Russia	-	<p>Double-deck passenger cars</p> <p>Diesel locomotives</p>

Source: Bombardier, Alstom, BofA Merrill Lynch Global Research

China is rolling out a HSR network with many self-developed technologies (see further - [Rail equipment/construction - Greater China, 31 October 2011](#))

China & high-speed railway

High-speed railway is listed as a key development area of high-end equipment. In our opinion, growth of China's railway construction may have peaked given the high base, but locomotives, railcars and parts have more room to grow given the lag in capex and export potential.

Exhibit: 3: Exhibit 4.2: China's high speed railways



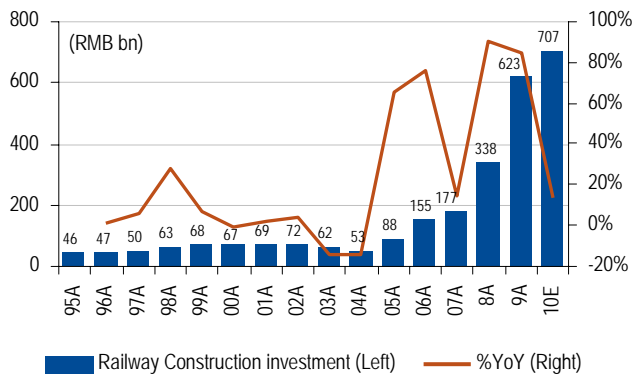
Source: BofA Merrill Lynch Global Research

Infrastructure investment may have peaked

Partly prompted by the need for economic stimulus during the global financial crisis, the Chinese government has approved many mega high-speed railway projects since 2009. Most of these have already commenced construction, and are scheduled for completion from 2011 to 2014.

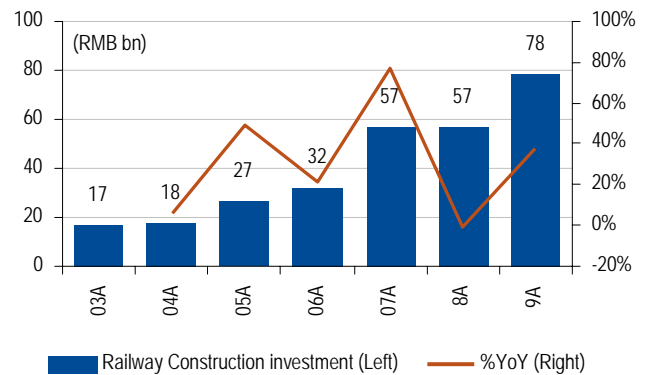
China has budgeted spending on railway construction at 400bn yuan (US\$63.2bn) in 2012, a cut of about 15% vs. 2011. Rail construction spending was estimated at 469bn yuan in 2011 and 709bn yuan in 2010. We believe that the growth rate is set to decelerate sharply, although total investment may continue to rise moderately for a short while. As a result, we suggest investors focus on equipment and service suppliers rather than contractors for future growth potential. We think Rmb400bn is a conservative target set by new MOR minister and see some upside if the economy falters.

Chart 140: Chart 4.11: China's railway investment



Source: MOR, BofA Merrill Lynch Global Research

Chart 141: Chart 4.12: China's railcar investment



Source: MOR, BofA Merrill Lynch Global Research

Leading technology

China is the first and only country so far to have a commercialized high-speed train service on conventional rail lines that can reach 350 km/h. On 3 December 2010, trains on the Beijing-Shanghai high speed rail reached a top speed of 486.1 km/h during a test run, a new world record, showcasing China's strength in railway technology. The train used in this test, CRH380B, is made by Changchun Railway Vehicles. China's earlier high speed trains were built largely under technology transfers from foreign manufacturers including Siemens, Bombardier, Alstom and Kawasaki Heavy Industries but it has since developed many of its own in recent years.

Efficiency needs to be balanced with safety

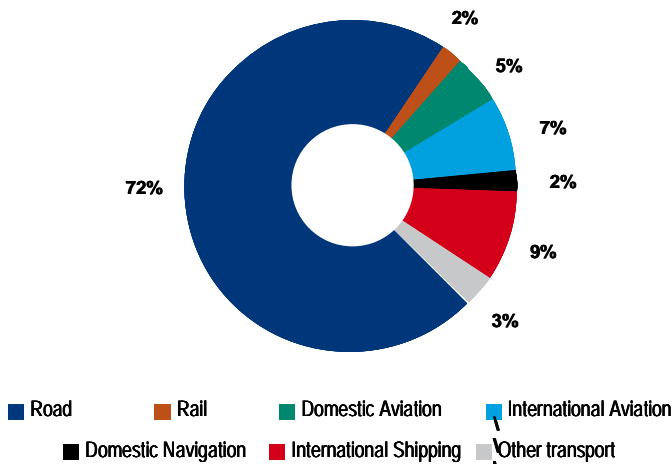
The HSR crash in the eastern province of China in July 2011 highlighted the need to balance efficiency with safety concerns, with design flaws, equipment failure and poor management all being cited as explanations for the crash. In addition to a reduced budget, the government has placed a greater focus on safety with the Ministry of Railways telling local units to slow down HSR by up to 50kph, to complete emergency response plans, recall faulty equipment, and improve work-safety training.

Rail is an environmentally friendly form of transport

Rail transport should see sustained medium to long-term growth on the back of its environmental credentials. Rail is the most energy-efficient method of moving passengers or freight on land and only accounts for c.2% of emissions generated by the transport sector:

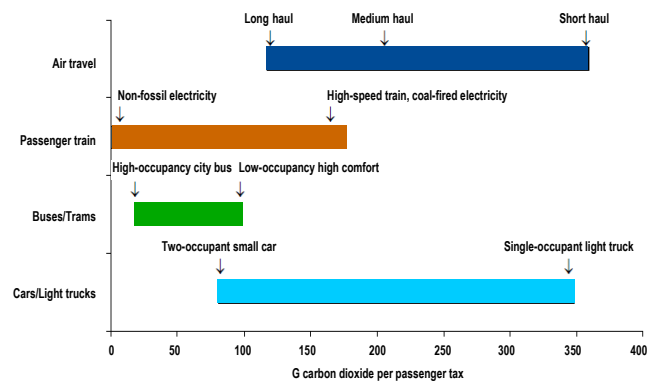
- Rail is on average 2-5x more energy efficient than road, shipping and aviation
- Rail is on average 3-10x less CO2 intensive than road or air transport
- With 7-10% of market share, rail still contributes less than 2% of the EU transport sector's CO2 emissions
- Through approaches including eco-driving, use of new rolling stock, light weighting, regenerative braking, optimisation of load factors, driver training and operational measures, railways are looking to improve energy efficiency by 30-50% by 2030 in Europe, for instance.

Chart 142: Transport CO2 emissions



Source:UIC

Chart 143: CO2 intensity of passenger transport

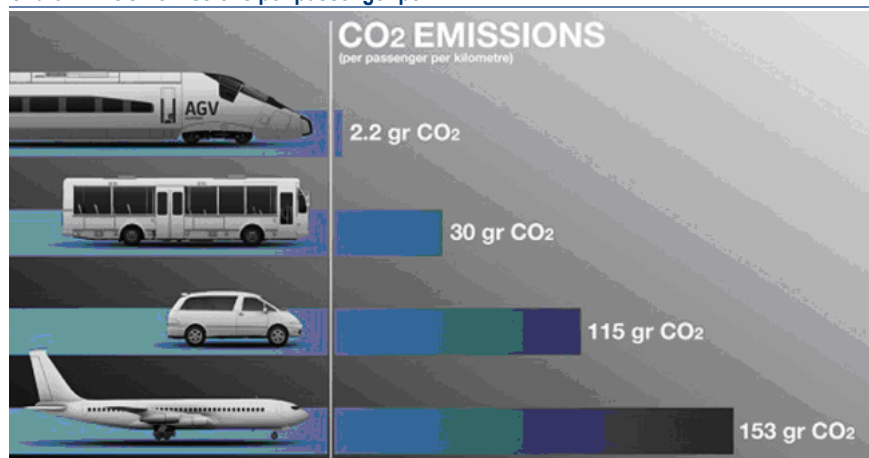


Source:UN IPCC

HSR beats all other forms of public transport

HSR – depending on the underlying energy source – has the potential to be the most environmentally benign form of public transport. For example, Alstom's AGV consumes the equivalent of only 0.4 litres of fuel per 100 km, or three times less than a bus (1.2 litre per 100 km), eight times less than a car (2-3 litres per 100 km), and fifteen times less than a plane (5-7 litres per 100 km).

Chart 144: CO2 emissions per passenger per km*



Source: Alstom. * AGV = Automotrice Grande Vitesse

Cross Reference

[Airlines - China, 02 June 2011](#)

Demand inflexion point for rail vs. air is 800-1,000km

As rail gains increasing traction globally, it is important to understand the inflexion point which can influence a consumer's choice to take a train rather than a plane. Drawing on conclusions from a review of Japan's market south of Tokyo – one of the most dynamic passenger rail markets – the key inflexion point in demand between air transport and railways is on rail routes of between 800km to 1,000km (roughly 600-800km by air).

- **Train wins below 800km:** Rail dominates travel patterns on routes below 800km. However, the Japan-Osaka route still sees 18% of passengers fly despite a distance of only 553km. For Okayama (733km) the market share for air travel rises to 33% despite relatively infrequent flights.
- **800km-1000km - rail and air are equally matched:** The big drop in rail usage starts from the Tokyo-Hiroshima route (894km) where almost half (42%) of passengers travelling between the two cities go by air.
- **Air travel clearly preferred for rail routes longer than 1,000km:** On the Tokyo-Fukuoka route (1,175km), which takes almost five hours, air travel dominates with a 90% market share.

Another example of the above illustration is evident from the new high speed line in Spain between Madrid and Seville (c.400km), which increased its market share from 19% to 53% (source UIC).

Long-term trends are favourable

Rail should see sustained long-term growth on the back of some of the following sustainability trends, which we expect to spur the development of both rail and rail equipment:

- **Favourable regulatory frameworks:** Rail will be essential to realising long-term transportation targets such as the European Commission's goals of a 60% reduction of GHG emissions from the transport sector by 2050 (vs. a 1990 baseline), achieving CO2-free city logistics in major urban centres by 2030, and optimizing infrastructure utilisation and interoperability across borders.

The global urban population is set to grow from 3.5 billion today to 4.6bn by 2025 (Source: UN)

- **Emerging market urbanisation:** Emerging markets need new railway infrastructures to support economic growth. They also host a large number of fast-growing cities (>1 million inhabitants) that have limited or no installed transit systems (e.g., in China). The transportation needs of these new urban hubs are translating into increasing demand for first implementation of turnkey transit systems.
- **Globalisation and interoperability:** Increasing global trade of goods is creating demand for railway transport systems for raw materials (USA, China, Russia, India, Australia, etc.). Interoperability requirements, such as the development of the ERTMS standard are also spurring growth in Europe and elsewhere.
- **Replacement of ageing rail equipment:** The ageing infrastructure and the increased traffic density on networks will require modernisation and upgrade efforts in the years to come. For example, 65 metro systems were built before 1980 and 23 before 1950 – with the busiest ones being among the oldest (i.e., London, NYC, Paris).
- **Increasing focus on safety,** reliability and efficiency will mean growing investments in signalling systems, the most efficient way to enhance the safety and capacity of the lines
- **Traffic congestion costs:** Traffic delays from road and air congestion mean huge wasted costs in terms of lost fuel and productivity. Estimates of the costs of congestion range from US\$119bn/year and 3.9 billion gallons of wasted fuel in the US (Source: Texas Transportation Institute) to £22bn/year in the UK by 2025 (Source: UK government).

Doubling the use of bus and coach transport in Europe alone would
 -reduce CO2 emissions by 50Mt/year+
 -reduce road fatalities by 3k+/y
 -reduce car traffic by 10-15%
 -create 4 million new jobs
 (Source: Bus & Coach Smartmove)

Bus & coach, part of the solution

Buses and coaches offer an important solution to a range of mobility challenges including climate change, road safety, connectivity, social inclusion and congestion, among others. Rising gas prices - and rising usage in densely populated corridors on the back of low-cost fares and improving services (i.e. free Wi-Fi and curbside pick up) are playing an important role in an increasing number of consumers looking to bus and coach for inter-city transport.

4.2% CAGR to 2014

Demand for buses worldwide will expand 4.2% annually from 403,700 units in 2009 to 496,000 units in 2014 and 601,000 units in 2019 (source Fredonia).

Table 186: World bus demand

	2004	2009	2014	2019	% 04-09	% 09-14
World population (bn)	6.4	6.8	7.2	7.5	1.2	1.1
Buses/mn	58	60	69	80	-	-
World bus demand	372,000	403,700	496,000	601,000	1.6	4.2
North America	55,000	44,150	57,350	70,600	(4.3)	(5.4)
US	41,300	34,800	42,500	50,400	(3.4)	4.1
Canada & Mexico	13,700	9,350	14,850	20,200	(7.4)	9.7
W. Europe	31,000	31,445	31,150	38,400	0.3	2.3
Asia-Pac	230,100	260,460	319,800	390,700	2.5	4.2
China	149,600	173,000	215,000	265,000	2.9	4.4
Japan	10,350	7,540	8,100	8,400	(6.1)	1.4
Other	70,150	79,920	96,700	117,300	2.6	3.9
Other regions	55,900	67,645	83,700	101,300	3.9	4.4
Central & S. America	28,250	34,720	44,550	54,100	4.2	5.1
E. Europe	14,900	16,550	18,850	21,200	2.1	2.6
Africa & Mid. East	12,750	16,375	20,300	26,000	5.1	4.4

Source: Fredonia

Table 187: Public transport passenger trips

City	Trips
New York	3.2bn
Chicago	0.52bn
Los Angeles	0.48bn
Washington	0.44bn
Boston	0.37bn

Source: 2009 Public Transportation Fact Book

Average passenger car occupancy rates are falling across the world. In the EU, in some cases the rate is as low as 1.1-1.2 in short distance commuting. Even for family trips, these range between 1.4 and 1.7 (Source: Bus & Coach Smartmove)

Favourable growth drivers

In addition to the environmental advantages over other forms of travel described below – and government strategies to reduce emissions from surface transport – bus and coach has a number of favourable long-term growth drivers:

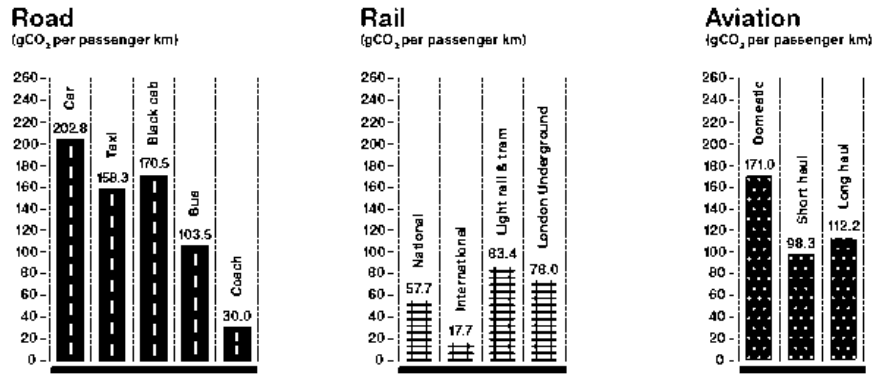
- **Changing U.S. consumer attitudes** Coach has become the fastest growing form of long-distance transport in the U.S. with inter-city bus travel growing by 7.1% in 2011, compared with 1.5% for air and 1.16% for rail (Source: DePaul University).
- **Policy and regulatory push:** As governments look to strike a balance between competitive transport systems that fuel economic growth and employment, and environmental and energy security concerns, more opportunities will arise for an increase in the modal share of bus and coach. The recession and focus on energy prices have made bus and coach an increasingly attractive option with the American Recovery and Reinvestment Act (2009) providing up to US\$6bn for bus purchases and Canada investing up to one-quarter of its transit infrastructure budget on bus transport.
- **Emerging market economies:** The general economic expansion and urbanisation taking place in emerging markets is requiring workers to travel further, usually by bus, to reach jobs. China, for instance, has become both the largest market for buses and the largest producer, and is expected to be one of the fastest growing bus markets going forward.
- **Fighting congestion:** Buses and coaches are an asset in reducing congestion and, as a result, air pollution and road accidents. In Europe, one coach can replace up to 30 cars in terms of average occupancy rates, while one full coach has the potential to remove 55 cars from the road in the US. This is resulting in a greater focus on policy measures such as priority lanes and other such schemes.
- **Environmental concerns are increasingly driving customer behaviour** according to research by bus and coach companies. Closer cooperation with customers and local governments will be key to marketing buses as a green alternative to car use.
- **Establishment of dedicated and sometimes guided “busways”** in key cities across Australia, Europe and Central and South America.

Among the most environmentally friendly modes of travel

Buses, like trains, produce significantly less carbon emissions per passenger than the car – and are the most environmentally friendly form of road transport. According to Bus & Coach Smartmove – a multi-stakeholder initiative – bus and coach has significant advantages over rail, car and air:

- **Up to 10x more fuel efficient** to carry one passenger over 100km, buses and coaches need, on average, between 0.6 and 0.9 litres of diesel fuel whereas, on average, a diesel car will consume 5.9l of fuel, a gas-powered car 7.6l, an airplane 6.6l, and high-speed trains 2.6l.
- **Up to 4-6x lower CO2 emissions:** UK data show that coaches emit 0.03 kg of CO2 per passenger-kilometre. This is half that of trains and radically smaller than the amount emitted by cars (0.11) and airplanes (0.18).

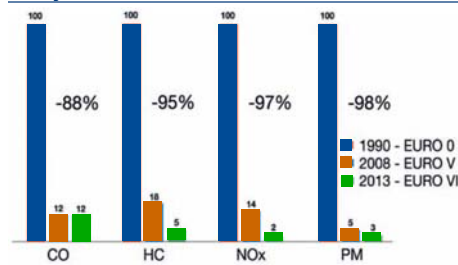
Chart 145: CO2 emissions per passenger km: road vs. rail vs. aviation



Source: Stagecoach

- Lowest external costs:** the external costs (related to noise, accidents, congestion and pollution) of buses and coaches are 26% lower than those of trains. This includes the externalities resulting from building, maintenance and land coverage of the necessary infrastructure, as well as particulates emitted by roll resistance and braking.
- Ongoing environmental improvements** as manufacturers and operators renew 10% of the bus and coach fleet every year in many countries, using the latest available environmental technologies. This has resulted in significant improvements in noxious emissions reduction for heavy commercial vehicles, including buses and coaches. Emissions such as carbon monoxide, hydrocarbons, nitrogen oxides and other particles have been reduced by up to 98% in Europe over the past 20 years – and we are seeing increasing use of ultra low sulphur diesel fuel. Changes to driver behaviour are also helping to lower fuel consumption.

Chart 146: Noxious emissions reduction for heavy commercial vehicles

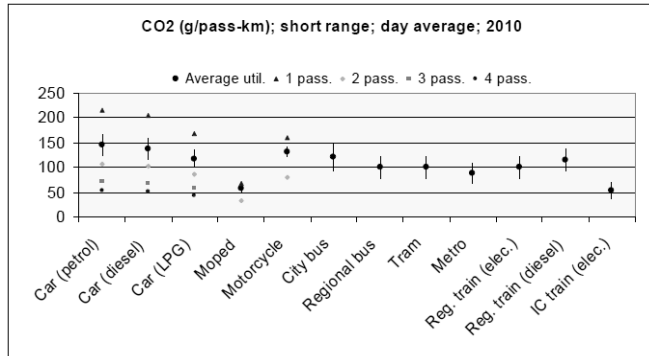


Source: European Commission

Occupancy rates are key

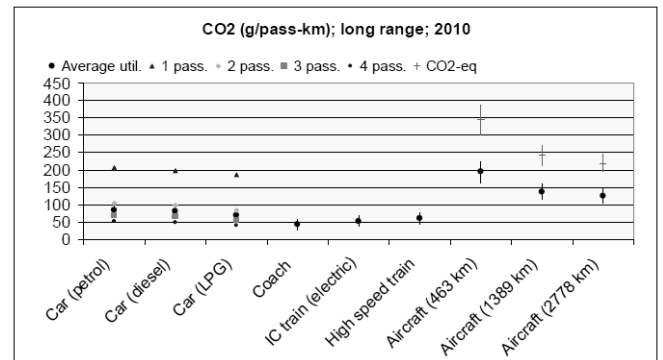
We note that for buses and coaches – as well as for other forms of transport – environmental performance is sensitive to the occupancy rate. Public transport buses with low occupancy rates almost perform at the same level as cars, while buses with high occupancy rates have a much better relative environmental performance.

Chart 147: gCO2 per passenger km – short range



Source:STREAM, CE (2008)

Chart 148: gCO2 per passenger km – long range

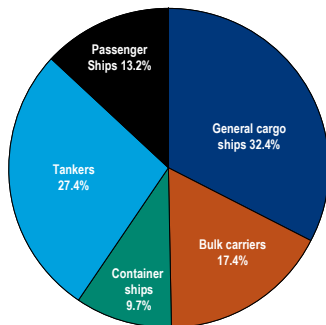


Source:STREAM, CE (2008)

Shipping, an emerging opportunity

Roughly 50,000 ships carry 90% of the world's trade cargo every year – with cargo ships being anywhere from three to thirty-five times more efficient from a gCO2/t-km perspective than trucks or air freight, respectively. However, ships are responsible for a growing level of CO2 emissions – and we anticipate that regulators will be looking to act in the coming years, as seen by the IMO's recent game changing decision on energy efficiency. Regulation, along with fuel costs, should push companies to seek efficient solutions thus creating new energy efficiency opportunities for the 50,000+ ships in the global fleet

Chart 149: Total number of ships in world fleet



Source:International Chamber of Shipping

50,000+ ship's in the global fleet

As of 31 October 2010, the world's fleet was made up of 50,054 ships, including general cargo ships, tankers, bulk carriers, passenger ships and container ships (source: International Chamber of Shipping).

CO2 emissions could triple by 2050

Ships are responsible for approximately 2.7% of global carbon emissions – with the extensive use of heavily polluting bunker fuel oil a major factor. China and the US were the largest CO2 emitters at around 6Gt – followed by Russia, India and Japan (source: OCEANA). The global CO2 figure could double or even triple by mid-century if no action is taken.

IMO decision to regulate on efficiency a game changer

The UN International Maritime Organization (IMO) has decided to regulate seafaring cargo and transport vessels to meet new energy efficiency and emissions guidelines. Unlike in other sectors, this new set of rules will be applied equally to all UN countries regardless of whether they are industrialised or developing. The new rules will force all ships over 400 tonnes that are built after 2013 to improve their efficiency by 10% by 2020, then 20% by 2020 to 2024, and 30% after 2024.

The IMO has also developed a package of measures for reducing emissions:

- A system of energy efficiency design indexing (EEDI) for new ships similar in concept to the ratings applied to cars and electrical appliances.
- A template for a Ship Energy Efficiency Management Plan (SEEMP) for use by all ships. The SEEMP allows companies and ships to monitor and improve performance with regard to various factors that may contribute to

CO2 emissions. These include: improved voyage planning; speed management; weather routing; optimising engine power, use of rudders and propellers; hull maintenance and use of different fuel types.

30Mt of CO2 reductions by 2030

According to a study conducted by the IMO in November 2011 on the impact of mandatory energy efficiency measures for international shipping, by 2020 an average of 151.5Mt of annual CO2 reductions can be achieved. By 2030 the CO2 savings could increase to an average of 330Mt annually. Compared with Business as Usual (BAU), the average annual reductions in emissions and fuel consumed are estimated between 13% and 23% by 2020 and 2030, respectively (Source: Lloyds Register-DNV).

US\$200bn in fuel cost savings by 2030

The estimated reductions in CO2 emissions for combined EEDI and SEEMP, from the world fleet translate into a significant annual fuel cost saving of about US\$50bn in 2020 and US\$200bn by 2030, using fuel price increase scenarios that take into account the switch to low-sulphur fuel in 2020 (Source: Lloyds Register-DNV).

EU may also include shipping in the ETS

For several years the EU has been calling on the shipping industry to address rising greenhouse gases (GHGs). However, for the moment, it appears that the Commission is waiting to see what progress will be made with the IMO's efforts before it decides to incorporate shipping into the ETS, including the possibility of pulling in international shipping, much like it is planning to do with airlines.

Industry looking to improve efficiency

The shipping industry consensus is that it may be possible to reduce CO2 emitted per tonne of cargo transported one kilometre (tonne/km) by up to 15% to 20% to 2020, through a combination of technological and operational developments such as ship hydrodynamic and main engine optimisation, as well as the introduction of new and bigger ships.

Transport and energy efficiency

Rail, bus & shipping companies

We have identified the following companies covered by BofA Merrill Lynch Global Research that have exposure to energy efficiency as a percentage of sales through their involvement in public transport as providers of bus, rail and rail equipment, and shipping-related energy efficiency solutions. Although it is difficult to accurately gauge the link between such exposure and share price performance (as many factors outside the scope of this analysis play a role in short- and long-term price development), we still consider energy efficiency exposure as an important positive point to track.

Table 188: List of companies covered by BofAML involved in Public Transport and Energy Efficiency

BBG Ticker	Company	Location	BofAML Ticker	Market Cap (US\$mn)	Investment Opinion	EE Exposure
ALO FP	ALSTOM SA	FRANCE	AOMFF	12685.9	Buy	Medium
STS IM	ANSALDO STS SPA	ITALY	ASDOF	1399.0	Buy	High
BBD/B CN	BOMBARDIER INC	CANADA	YBBD B	8417.7	Underperform	High
CAF SM	CAF SA	SPAIN	CAUXF	1875.6	Buy	High
CNI US	CANADIAN NATIONAL RAILWAY	CANADA	CNI	33889.9	Neutral	High
1186 HK	CHINA RAILWAY CONSTRUCTION	HONG KONG	CWYCF	9640.4	Underperform	Medium
390 HK	CHINA RAILWAY GROUP LIMITED	HONG KONG	CRWOF	8706.3	Neutral	High
1766 HK	CSR CORPORATION	HONG KONG	CSRGF	1050.3	Underperform	High
FGP LN	FIRSTGROUP PLC	UK	FGROF	2237.3	Underperform	High
GOG LN	GO-AHEAD GROUP PLC	UK	GHGUF	878.3	Neutral	High
525 HK	GUANGSHEN RAILWAY CO LTD	HONG KONG	GNGYF	2785.8	Neutral	High
NEX LN	NATIONAL EXPRESS GROUP PLC	UK	NXPGF	1784.8	Buy	High
SGC LN	STAGECOACH GROUP PLC	UK	SAGKF	2746.7	Buy	High
VOS GR	VOSSLOH	GERMANY	VOSSF	1416.7	Underperform	High
YZJ SP	YANGZIJANG SHIPBUILDING	SINGAPORE	YSHLF	4123.8	Buy	Low
3898 HK	ZHUZHOU CSR	HONG KONG	ZHUZF	2768.2	Neutral	High

Source: IQ, DataStream, BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency products, services, technologies and solutions

A) Rail & rail equipment

Alstom

See *Industrials & Integrated plays*.

Ansaldo STS

Ansaldo STS is an Italy-based supplier of railway signalling and control systems for passenger and freight, including high-speed and commuter trains and mass transit (metro tram, suburban). With two main divisions (Signalling and Transportation Solutions), it also offers operation and maintenance (O&M) services and turnkey, integrated railway projects.

ANSTS (high EE exposure) is a leading energy efficiency pure play in advanced technologies (e.g., ERTMS/ETCS) in the global railway signalling field. Its signalling systems are installed on over 50% of high speed lines globally (ex-Japan). ANSTS is a top-quality play in a strategic and fast-growing railway segment with positive fundamentals (e.g., rail capacity increase and security). While 2012 appears to be a bridge year in the absence of a Libyan contract renewal, visibility on 2013-14E earnings is strong thanks to the current backlog. With a growing hard backlog, a sound balance sheet (key to engaging in PPP projects), an attractive pipeline driven by frame agreements with key railway operators, and growing exposure to emerging markets (mainly MENA, Russia/CIS and Far East/China), ANSTS should remain a leading provider of equipment, operation & maintenance and turnkey railway solutions.

Table 189: Ansaldo STS SPA - key data

Analyst's Name	Unai Franco >>		
Analyst's Email Id.	unai.franco@baml.com		
Analyst's Phone No.	+44 20 7996 0904		
	2010	2011E	2012E
Revenues	1,284	1,212	1,268
Operating Profit	137	116	120
Operating Margin	10.7%	9.6%	9.5%
Y-o-Y Growth	9.6%	-15.4%	3.8%
Net Profit	95	80	80
Net Margin	7.4%	6.6%	6.3%
Y-o-Y Growth	8.2%	-16.1%	0.8%
EBIT	137	116	120
EBIT Margin	10.7%	9.6%	9.5%
EBITDA	150	129	133
EBITDA Margin	11.7%	10.6%	10.5%
Operating Cash Flow	73.0	28.8	53.6
Capex	7.0	13.9	14.6
Free Cash Flow	66.0	14.9	39.0
Net Debt/Equity	(38.7)	(26.3)	(22.2)

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 190: Bombardier Inc - key data

Analyst's Name	Ronald J. Epstein		
Analyst's Email Id.	r.epstein@baml.com		
Analyst's Phone No.	+1 646 855 5695		
	2011	2012E	2013E
Revenues	17,892	17,970	18,406
Operating Profit	1,205	1,140	1,184
Operating Margin	6.7%	6.3%	6.4%
Y-o-Y Growth	9.7%	-5.4%	3.8%
Net Profit	754	773	740
Net Margin	4.2%	4.3%	4.0%
Y-o-Y Growth	6.7%	2.5%	-4.3%
EBIT	1,205	1,140	1,184
EBIT Margin	6.7%	6.3%	6.4%
EBITDA	1,576	1,476	1,684
EBITDA Margin	8.8%	8.2%	9.1%
Operating Cash Flow	1,692.0	(288.9)	1,085.1
Capex	1,146.0	1,500.0	800.0
Free Cash Flow	546.0	(1,788.9)	285.1
Net Debt/Equity	29.6	191.1	124.4

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 191: CAF - key data

Analyst's Name	Unai Franco >>		
Analyst's Email Id.	unai.franco@baml.com		
Analyst's Phone No.	+44 20 7996 0904		
	2010	2011E	2012E
Revenues	1,576	1,700	1,790
Operating Profit	155	171	183
Operating Margin	9.8%	10.0%	10.2%
Y-o-Y Growth	14.3%	9.9%	7.3%
Net Profit	130	135	143
Net Margin	8.2%	8.0%	8.0%
Y-o-Y Growth	4.2%	4.4%	5.5%
EBIT	155	171	183
EBIT Margin	9.8%	10.0%	10.2%
EBITDA	194	209	224
EBITDA Margin	12.3%	12.3%	12.5%
Operating Cash Flow	(23.7)	143.0	159.5
Capex	48.7	58.0	58.7
Free Cash Flow	(72.4)	85.0	100.8
Net Debt/Equity	(16.8)	(18.7)	(21.3)

Source: Company data, BofA Merrill Lynch Global Research estimates

Bombardier Inc

Bombardier designs, manufactures and sells commercial and business jets, as well as rail transportation equipment, systems and services. In aerospace (46% of 2011E sales), it is a global leader in business and commercial aircraft. In rail (56% of 2011E sales), it has no. 1 market positions in light rail vehicles, commuter trains, regional trains, VHS/HS/intercity trains, electric locomotives, bogies, propulsion & controls, services, systems, and a no. 3 position in metro cars.

BBD (high EE exposure) is primarily an energy efficiency play on rail, where it is the no. 1 industry actor with a 19% market share of 2008-10 order intake and strong positions in rolling stock, services and systems and signalling. In rail, it has positive fundamentals including emerging market growth, while order intake hit a record US\$14.3bn in new orders in FY2011. BBD will benefit from continued growth and margin expansion opportunities in the train market. However, our financial analyst still sees potential downside risk in the train segment linked to declining tax revenues as a result of economic downturn, which could negatively affect BBD's rail transport business if governments decrease related spend. Its commercial aerospace portfolio is also aligned with efficiency trends and its C series offers 2.3l of fuel/100km (vs. 3.4 for a Smart / 4.3 for a Prius), assuming 100% load. The segment should benefit from a rebounding cycle, particularly growth in the bizjet market.

CAF

CAF engineers, produces and maintains railway equipment and components (high speed, locomotives, commuter trains, electric motorcars, Metro Units Trains and Streetcars and light rail trains) and components worldwide. It also offers turnkey railway solutions (e.g., BOT concessions). Its strategy is based on tailor-made solutions and superior levels of supervision of every project, while keeping a high degree of internal standardisation of products and processes, in order to stay efficient. It has plants in Spain (6), USA (1) and Brazil (1).

CAF (high EE exposure) is an energy efficiency pure play on rail equipment. A record order backlog – worth 3+ years of revenues – is testament to CAF's strong international credentials, a competitive and appealing product portfolio, rising prospects in high-margin BOT concessions and the operation/maintenance (services) business, and top-notch execution and technological competence. It has a strong new order pipeline with key regions being Europe (ex Spain), Brazil/LatAm, the Gulf area and USA. We think that 'services' could generate up to 40-50% of pre-tax profits in 2013E vs. less than 15% in 2011. We expect CAF to continue to benefit from a rich pipeline of new and lucrative contracts.

Table 192: Canadian National - key data

Analyst's Name	Ken Hoexter		
Analyst's Email Id.	ken.hoexter@baml.com		
Analyst's Phone No.	+1 646 855 1498		
	2011	2012E	2013E
Revenues	9,028	9,675	10,228
Operating Profit	3,296	3,673	3,994
Operating Margin	36.5%	38.0%	39.0%
Y-o-Y Growth	9.0%	11.4%	8.8%
Net Profit	2,467	2,375	2,636
Net Margin	27.3%	24.5%	25.8%
Y-o-Y Growth	28.4%	-3.7%	11.0%
EBIT	3,296	3,673	3,994
EBIT Margin	36.5%	38.0%	39.0%
EBITDA	4,180	4,569	4,901
EBITDA Margin	46.3%	47.2%	47.9%
Operating Cash Flow	2,976.0	3,486.3	3,902.5
Capex	1,625.0	1,670.0	1,670.0
Free Cash Flow	1,351.0	1,816.3	2,232.5
Net Debt/Equity	60.6	43.1	28.5

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 193: China Railway Construction Corporation Limited - key data

Analyst's Name	Edmond Huang >>		
Analyst's Email Id.	edmond.huang@baml.com		
Analyst's Phone No.	+852 2161 7807		
	2010	2011E	2012E
Revenues	456,339	466,923	498,918
Operating Profit	6,562	9,980	11,591
Operating Margin	1.4%	2.1%	2.3%
Y-o-Y Growth	-14.1%	52.1%	16.1%
Net Profit	4,246	6,663	6,804
Net Margin	0.9%	1.4%	1.4%
Y-o-Y Growth	-35.7%	56.9%	2.1%
EBIT	6,562	9,980	11,591
EBIT Margin	1.4%	2.1%	2.3%
EBITDA	14,367	19,290	20,393
EBITDA Margin	3.1%	4.1%	4.1%
Operating Cash Flow	6,252.6	(16,744.2)	(2,822.1)
Capex	16,188.1	7,535.1	4,983.9
Free Cash Flow	(9,935.5)	(24,279.3)	(7,805.9)
Net Debt/Equity	(43.1)	4.4	23.2

Source: Company data, BofA Merrill Lynch Global Research estimates

Canadian National

Canadian National is a nationwide railroad with a network that stretches from Halifax on the east coast to Vancouver and Prince Rupert on the west coast of Canada, and south into New Orleans in the US. Via alliances with other carriers, CNI has extended its reach into Mexico. It generates 23% of revenues domestically, 57% of revenues within the US or trans-border and 20% from international traffic.

CNI (high EE exposure) is an efficiency play on rail transport for freight. It is the best railroad operator in North America, as evident in its mid-60s operating ratio which is 800bp better than the industry average. From an efficiency perspective, we also note its Precision Railroading approach, which means fewer railcars and locomotives to ship the same amount of freight. It is also moving to incorporate a collaborative customer approach and integrate their supply chains, and is continuing to improve efficiency, including optimizing fuel (it is 15% more efficient than peers on GTM/gallon basis), its efficient breaking limits wear and its use of distributed power locomotives. We believe the company will continue to aggressively refine operations and obtain positive pricing to offset its high fixed cost structure, but we prefer rails where there are operating leverage gains above and beyond pricing and volume growth.

China Railway Construction Corporation Limited (CRCC)

China Railway Construction is the largest Chinese constructor in terms of market capitalization or construction revenue in 2009. It ranked 4th among the Top 225 Global Contractors and 252th among the Fortune Global 500 companies in 2009. It has strong positions in project design and construction fields in plateau railways, high-speed railways, highways, bridges, tunnels and urban rail traffic. Although CRCC generates most of the revenue (>93%) in mainland China (market share of over 60% on the survey and design business in the domestic railway market), it has worldwide footprints in over 60 foreign countries and regions, including recent projects in Israel, Algeria, and Saudi Arabia.

CRCC (medium EE exposure) is an energy efficiency play on rail and rail equipment in China, as the leading construction player for domestic railway construction projects, with an over 60% market share in surveying and design (i.e., urban rail transport and HSR). With the absence of a material change in the MOR's growth model, we remain cautious on the Chinese railway construction sector. We are also cautious on CRCC given slowing railway investment, a lack of meaningful margin expansion and the execution risk of overseas business. Diversification towards mining and commodities exposure could also suggest potential cost overruns and disappointing returns on the diversification away from the main construction business.

Table 194: China Railway Group Limited - key data

Analyst's Name	Edmond Huang >>		
Analyst's Email Id.	edmond.huang@baml.com		
Analyst's Phone No.	+852 2161 7807		
	2010	2011E	2012E
Revenues	456,102	449,581	506,611
Operating Profit	11,755	10,971	15,192
Operating Margin	2.6%	2.4%	3.0%
Y-o-Y Growth	14.8%	-6.7%	38.5%
Net Profit	7,490	5,310	6,839
Net Margin	1.6%	1.2%	1.3%
Y-o-Y Growth	8.8%	-29.1%	28.8%
EBIT	11,755	10,971	15,192
EBIT Margin	2.6%	2.4%	3.0%
EBITDA	16,846	16,994	22,315
EBITDA Margin	3.7%	3.8%	4.4%
Operating Cash Flow	963.0	(27,303.9)	(4,781.1)
Capex	19,224.0	11,766.5	7,933.6
Free Cash Flow	(18,261.0)	(39,070.3)	(12,714.7)
Net Debt/Equity	35.6	93.3	114.2

Source: Company data, BofA Merrill Lynch Global Research estimates

China Railway Group

China Railway Group is one of the largest multi-functional integrated construction groups in China and Asia. It is the second largest construction contractor in the world and ranks 242nd in the Fortune Global 500. It engages primarily in infrastructure construction, but also in survey, design and consulting services, and engineering equipment and component manufacturing. Other activities are property development and mining. Railway construction accounts for almost 50% of group revenue.

CRG (high EE exposure) is an energy efficiency play on rail in China, with a leadership position in the domestic railways and rapid transit (>50% in terms of TCM capacity). We expect rapid transit to add new growth when railway investment plateaus. We have concerns over a lack of growth and margin expansion when transport FAI (especially rail) is decelerating from a high base and higher-than-peer property exposure. In the absence of any material change in the MOR's growth model, we remain cautious on the Chinese railway construction sector.

Table 195: CSR Corporation Ltd. - key data

Analyst's Name	Edmond Huang >>		
Analyst's Email Id.	edmond.huang@baml.com		
Analyst's Phone No.	+852 2161 7807		
	2010	2011E	2012E
Revenues	63,912	79,467	90,514
Operating Profit	3,279	5,115	5,092
Operating Margin	5.1%	6.4%	5.6%
Y-o-Y Growth	47.7%	56.0%	-0.5%
Net Profit	2,531	3,573	3,387
Net Margin	4.0%	4.5%	3.7%
Y-o-Y Growth	50.8%	41.2%	-5.2%
EBIT	3,279	5,115	5,092
EBIT Margin	5.1%	6.4%	5.6%
EBITDA	4,371	6,434	6,603
EBITDA Margin	6.8%	8.1%	7.3%
Operating Cash Flow	3,716.2	(15,094.6)	784.1
Capex	5,072.5	5,500.0	4,500.0
Free Cash Flow	(1,356.3)	(20,594.6)	(3,715.9)
Net Debt/Equity	(15.9)	66.6	78.2

Source: Company data, BofA Merrill Lynch Global Research estimates

CSR Corporation

CSR is principally engaged in the business of R&D, manufacture, sales, refurbishment and leasing of rolling stock equipments, namely locomotives, passenger carriages, freight wagons, multiple units (MUs), rapid transit vehicles and other key related components. Leveraging its proprietary rolling stock technologies, the company has successfully expanded its new business, including wind power, high-powered semi components, EVs, automotive parts, marine crankshafts and diesel engines, etc.

CSR (high EE exposure) is an energy efficiency play on rail equipment in China, with an effective duopoly on the domestic market with CNR on rolling stock and solutions. CSR should continue to benefit from strong demand in HSR, inter-city rails and metros. We agree with CSR's vision on overseas expansion but see some risks. We are cautious on the profitability and growth momentum given: (1) no more positive surprises on new orders after the Wenzhou train crash, and hence (2) limited margin expansion, and (3) lack of earnings momentum. We are less optimistic on CSR in 2H11-2012E as we expect a normalized railway investment with no more rush schedule. Upside risks would come from stronger-than-expected order flow, better profitability and significant breakthroughs in overseas markets.

Table 196: Guangshen Railway - Key data

Analyst's Name	Mandy Qu >>		
Analyst's Email Id.	mandy.qu@baml.com		
Analyst's Phone No.	+852 2536 3425		
	2010	2011E	2012E
Revenues	13,146	13,600	13,899
Operating Profit	2,072	2,089	1,828
Operating Margin	15.8%	15.4%	13.2%
Y-o-Y Growth	9.3%	0.8%	-12.5%
Net Profit	1,486	1,478	1,275
Net Margin	11.3%	10.9%	9.2%
Y-o-Y Growth	10.7%	-0.6%	-13.7%
EBIT	2,072	2,089	1,828
EBIT Margin	15.8%	15.4%	13.2%
EBITDA	3,477	3,546	3,337
EBITDA Margin	26.4%	26.1%	24.0%
Operating Cash Flow	3,331.5	2,660.5	2,892.8
Capex	1,158.4	1,200.0	1,200.0
Free Cash Flow	2,173.1	1,460.5	1,692.8
Net Debt/Equity	3.4	0.5	(4.1)

Source: Company data, BofA Merrill Lynch Global Research estimates

Guangshen Railway

Guangshen Railway, a key operator in Guangdong province, owns and operates three key rail lines (Canton-HK Railway, Gaungzhou-Shenzhen High Speed Railway and Guangping Railway) covering 481km in aggregate. Passenger rail transportation accounts for over 60% of the company's total revenue in 2009/1H10. Its main shareholder, Guangzhou Railway Group (Company) owns a 37% stake in Guangshen.

Guangshen (high EE exposure) is an energy efficiency play on passenger rail in China. There is some risk that Guangshen's three railways could face passenger traffic diversion to the parallel Beijing-HK High Speed Train that will start operation from 2011/13. However, we believe that the actual impact of any diversion is likely to be moderate given the accidents on the Beijing-Shanghai HSR, which may have had a negative impact on passenger willingness to take HSR. However, we expect few positive catalysts for Guangshen in the short term. Upside risks are: (1) less severe traffic diversion to high speed train than expected, (2) potential M&A, (3) passenger tariff hike uncertainty.

Table 197: Vossloh AG - Key data

Analyst's Name	Roller, Claus		
Analyst's Email Id.	claus.roller@baml.com		
Analyst's Phone No.	+44 20 7996 4193		
	2010	2011E	2012E
Revenues	1,351	1,218	1,273
Operating Profit	151	91	105
Operating Margin	11.2%	7.5%	8.2%
Y-o-Y Growth	9.4%	-39.6%	15.1%
Net Profit	97	54	60
Net Margin	7.2%	4.5%	4.7%
Y-o-Y Growth	11.0%	-44.2%	10.7%
EBIT	151	91	105
EBIT Margin	11.2%	7.5%	8.2%
EBITDA	190	130	149
EBITDA Margin	14.1%	10.7%	11.7%
Operating Cash Flow	148.5	137.9	88.8
Capex	144.5	77.8	79.3
Free Cash Flow	4.0	60.1	9.5
Net Debt/Equity	25.6	20.9	23.6

Source: Company data, BofA Merrill Lynch Global Research estimates

Vossloh

Vossloh is a pure play rail equipment supplier with world leading positions in fastening systems, switch systems, diesel locomotives (diesel-electric and -hydraulic locomotives) for freight and electrical components for trams, metros, and trolleybuses.

Vossloh (high EE exposure) is an energy efficiency pure play on rail equipment. It has a strong balance sheet but its seemingly defensive business model is being tested by the current sovereign crisis. Vossloh's guidance assumes growth in both rail infrastructure and transportation in 2012. Yet we believe there is room for negative surprises from further price pressure in switches and fastening systems and a cyclical downturn in freight-related switching and locomotives. Downside risks are related to the business performance of the company's industrial customers, rising raw material prices and increasing pressure from financially stronger competitors. Upside risks are: value-enhancing acquisitions, better-than-expected order intake and a potential takeover by Mr Thiele who owns more than 15% of Vossloh.

Table 198: Zhuzhou CSR Times Electric Co. Ltd. - key data

Analyst's Name	Edmond Huang >>		
Analyst's Email Id.	edmond.huang@baml.com		
Analyst's Phone No.	+852 2161 7807		
	2010	2011E	2012E
Revenues	5,831	7,063	7,584
Operating Profit	938	1,256	1,211
Operating Margin	16.1%	17.8%	16.0%
Y-o-Y Growth	56.2%	33.9%	-3.6%
Net Profit	852	1,101	1,057
Net Margin	14.6%	15.6%	13.9%
Y-o-Y Growth	60.5%	29.2%	-4.0%
EBIT	938	1,256	1,211
EBIT Margin	16.1%	17.8%	16.0%
EBITDA	1,050	1,393	1,372
EBITDA Margin	18.0%	19.7%	18.1%
Operating Cash Flow	754.3	(557.9)	467.9
Capex	229.9	400.0	400.0
Free Cash Flow	524.4	(957.9)	67.9
Net Debt/Equity	(23.7)	3.4	9.8

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 199: FirstGroup Plc - key data

Analyst's Name	Mark Manduca >>		
Analyst's Email Id.	mark.manduca@baml.com		
Analyst's Phone No.	+44 20 7995 8263		
	2011	2012E	2013E
Revenues	6,439	6,522	6,117
Operating Profit	309	405	414
Operating Margin	4.8%	6.2%	6.8%
Y-o-Y Growth	-15.1%	30.9%	2.3%
Net Profit	103	172	185
Net Margin	1.6%	2.6%	3.0%
Y-o-Y Growth	-21.9%	66.7%	7.5%
EBIT	309	405	414
EBIT Margin	4.8%	6.2%	6.8%
EBITDA	673	745	709
EBITDA Margin	10.5%	11.4%	11.6%
Operating Cash Flow	555.7	464.8	386.0
Capex	210.3	277.2	299.7
Free Cash Flow	345.4	187.6	86.3
Net Debt/Equity	211.6	188.7	179.6

Source: Company data, BofA Merrill Lynch Global Research estimates

Zhuzhou CSR Times Electric Co Ltd

CSR Times Electric is the leading train-borne electrical system provider and integrator for the PRC railway industry. It is engaged in developing, manufacturing and selling train power converters, auxiliary power supply equipment and control systems for trains for urban rail systems. It also designs, manufactures and sells electrical components for the PRC railway industry, urban railway industry and non-railway applications.

ZZ CSR (high EE exposure) is a near pure energy efficiency play on rail equipment in China and further afield (exports account for >10% of sales). It is a leader in systems: power converters/controls, train operation safety equipment, and controls for large railway maintenance vehicles (79% of sales); and controls: semis, sensors, and other devices (21% of sales). It is also an efficiency play in that it has made strides to expand technology for converter systems into the area of industrial converters and develop inverters for on-grid connection of new energy. But with the absence of material change in the MOR's growth model, we remain cautious on the Chinese railway construction sector.

B) Bus FirstGroup PLC

FirstGroup plc is an international passenger group with bus and rail operations. In the UK it is the no. 1 bus operator with a 21% market share; and in rail it operates Great Western, Capital Connect, Scotrail and TPE. In North America, it is the no. 1 operator of student buses with an 11% market share, and also operates Greyhound, passenger transit and fleet services.

FGP (high EE exposure) is an energy efficiency pure play on bus and rail, transporting some 2.5 billion people every year. It has solid rail franchises with high revenue support and little exposure to the London commuter. However, First Students base business has continued to experience pricing pressure and volume weakness, due to a tough start to the new school year. The most prominent issues are in school bus (government budget pressures; high level of staff unionisation at the cost base), UK rail (franchise expirations), UK bus (budget pressures) and Greyhound (fierce competition). Moreover, the peripheral charter business, with its high margins, continues to deteriorate.

Table 200: Go-Ahead Group Plc - key data

Analyst's Name	Mark Manduca >>		
Analyst's Email Id.	mark.manduca@baml.com		
Analyst's Phone No.	+44 20 7995 8263		
	2011	2012E	2013E
Revenues	2,297	2,366	2,440
Operating Profit	105	104	99
Operating Margin	4.6%	4.4%	4.0%
Y-o-Y Growth	14.8%	-0.8%	-5.0%
Net Profit	67	52	48
Net Margin	2.9%	2.2%	2.0%
Y-o-Y Growth	291.9%	-23.0%	-6.8%
EBIT	105	104	99
EBIT Margin	4.6%	4.4%	4.0%
EBITDA	164	166	163
EBITDA Margin	7.2%	7.0%	6.7%
Operating Cash Flow	113.0	147.2	146.5
Capex	56.4	64.5	61.4
Free Cash Flow	56.6	82.7	85.1
Net Debt/Equity	208.6	26.3	(20.6)

Source: Company data, BofA Merrill Lynch Global Research estimates

Table 201: National Express Group Plc - key data

Analyst's Name	Mark Manduca >>		
Analyst's Email Id.	mark.manduca@baml.com		
Analyst's Phone No.	+44 20 7995 8263		
	2010	2011E	2012E
Revenues	2,126	2,223	1,782
Operating Profit	86	172	160
Operating Margin	4.0%	7.7%	9.0%
Y-o-Y Growth	-1173.8%	100.3%	-6.8%
Net Profit	61	107	99
Net Margin	2.9%	4.8%	5.6%
Y-o-Y Growth	-214.8%	74.4%	-7.5%
EBIT	86	172	160
EBIT Margin	4.0%	7.7%	9.0%
EBITDA	243	332	328
EBITDA Margin	11.4%	14.9%	18.4%
Operating Cash Flow	213.5	303.8	219.8
Capex	51.9	166.7	165.7
Free Cash Flow	161.6	137.1	54.0
Net Debt/Equity	66.8	58.5	71.9

Source: Company data, BofA Merrill Lynch Global Research estimates

Go-Ahead Group PLC

Go-Ahead Group PLC provides a range of public transportation services including urban bus services in the North East of England, Brighton, Oxford and London. It is the largest London operator, with a 21% market share. It has a 65% stake in Govia, a rail JV with Keolis which operates Southern, South Eastern and London Midlands.

GOG (high EE exposure) is an energy efficiency pure play on bus and rail, transporting an average of 1.6 million bus passengers per day in the UK and responsible for nearly 30% of UK passenger rail journeys. The company has the youngest and greenest bus fleet of major UK operators and has set itself a 5Y group goal of a 20% reduction in CO2 emissions per passenger journey. Go-Ahead is the most exposed as a percentage of EBITA to UK budgetary pressures. Moreover, with 40% of Go-Ahead's earnings exposed to rail, the company is at risk of both franchise expiration and diminishing longer-term returns from reform.

National Express Group PLC

National Express provides mass passenger transport services including express coaches, buses, and trains. Every year more than 700 million journeys are made on its buses, trains, light rail services and coaches. It is the No. 1 UK coach operator and No. 5 bus operator (with a dominant position in the West Midlands), No. 1 coach and bus operator in Spain (c.15% market share) and the No. 2 school bus operator in North America (5% market share). It also operates 2 UK rail franchises, c2c and East Anglia.

NXT (high EE exposure) is an energy efficiency pure play on bus and rail with congestion and environmental issues key growth drivers. Coach is one of the most fuel efficient forms of travel, followed by trains (its trains are significantly better than the industry average) and then buses. NXT has set 2010-2013 targets for the UK and Spain to further improve bus and coach fuel economy by 5% and 3% respectively, reduce electricity use of trains by 3% and adopt new buses and coaches and driver training. US targets are also being set. We continue to believe that the company will deliver on its cost savings in UK bus and see the Spanish bus business returning to stable top-line growth. National Express's Spanish division appears well-positioned to maximise on the long-term growth opportunity in the Spanish bus market (primarily via deregulation).

Table 202: Stagecoach Group Plc - key data

Analyst's Name	Mark Manduca >>		
Analyst's Email Id.	mark.manduca@baml.com		
Analyst's Phone No.	+44 20 7995 8263		
	2011	2012E	2013E
Revenues	2,390	2,591	2,735
Operating Profit	225	232	224
Operating Margin	8.0%	7.7%	7.3%
Y-o-Y Growth	25.6%	3.3%	-3.7%
Net Profit	176	151	141
Net Margin	7.4%	5.8%	5.1%
Y-o-Y Growth	57.9%	-14.4%	-6.8%
EBIT	225	232	224
EBIT Margin	9.4%	9.0%	8.2%
EBITDA	315	323	317
EBITDA Margin	13.2%	12.5%	11.6%
Operating Cash Flow	231.8	274.1	261.8
Capex	156.7	157.6	150.1
Free Cash Flow	75.1	116.6	111.7
Net Debt/Equity	120.3	9,895.4	471.9

Source: Company data, BofA Merrill Lynch Global Research estimates

Stagecoach Group PLC

Stagecoach provides and operates public transport services in the UK, US and Canada. It operates bus, coach, rail, and tram services in regulated and deregulated markets. It is the second largest UK bus operator, with a 14% market share. In North America, its bus segment operates scheduled commuter, school and charter buses and has a sightseeing JV. In UK rail, it operates South West Trains and East Midlands (until 2017 & 2015), has a 49% stake in Virgin Rail Group (Cross Country and West Coast) and operates the Sheffield Supertram.

SGC (high EE exposure) is an energy efficiency pure play on bus and rail and is actively marketing itself as providing greener smarter travel for 2.5 million customers a day across its networks in the UK and North America. It has high exposure to UK rail and could benefit from the potential rail reform. It also has a significant growth opportunity in North America via Megabus. We are positive on SGC vis-à-vis the sector and we feel this is justified by the improving fundamentals in the US business, the potential opportunity to benefit from rail reform and the best in class margins in UK bus.

Table 203: Yangzijiang Shipbuilding - key data

Analyst's Name	Wee Lee Chong >>		
Analyst's Email Id.	wee.lee.chong@baml.com		
Analyst's Phone No.	+65 6678 0403		
	2010	2011E	2012E
Revenues	12,923	13,766	17,895
Operating Profit	2,780	3,765	4,356
Operating Margin	21.5%	27.3%	24.3%
Y-o-Y Growth	26.3%	35.4%	15.7%
Net Profit	2,955	4,026	4,450
Net Margin	22.9%	29.2%	24.9%
Y-o-Y Growth	29.1%	36.2%	10.5%
EBIT	2,780	3,765	4,356
EBIT Margin	21.5%	27.3%	24.3%
EBITDA	2,948	3,944	4,588
EBITDA Margin	22.8%	28.6%	25.6%
Operating Cash Flow	3,656.0	3,672.3	2,901.1
Capex	158.8	1,550.0	1,750.0
Free Cash Flow	3,497.2	2,122.3	1,151.1
Net Debt/Equity	(32.9)	(25.3)	(14.0)

Source: Company data, BofA Merrill Lynch Global Research estimates

C) Shipping

Yangzijiang Shipbuilding (Holdings) Ltd

Yangzijiang Shipbuilding is the largest privately-owned listed Chinese shipyard. Yangzijiang currently operates three shipyards along the Yangtze River. The mainstream products of the company range from large and medium-sized containerships, large bulk carriers to medium multi-purpose ships. The group's current core competencies are the construction of 4,250 TEU containerships, and 92,500dwt dry bulk carriers.

Yangzijiang (low EE exposure) is an energy efficiency play on fuel efficient ships, with the company having completed the designs of environmentally friendlier and more fuel-efficient 4,800 TEU and 10,000 TEU containerships as its lead designs for the future (10%+ cargo capacity with 20%+ reduced fuel consumption). The company should be a key beneficiary of high fuel costs and IMO and governmental moves to legislate on shipping emissions – and is already winning orders for these ships (i.e. with Seaspan and Peter Dyle). We like Yangzijiang as a shipyard that constantly succeeds in improving an already-high productivity level, which sustains its above-industry-average profit margins. The two-year order-book visibility offered by YZJ is also favoured, while its high exposure to containership construction is expected to benefit from sustained new orders from 2H11. The strong balance sheet could provide upside M&A surprises to investors, as the shipyard repositions for the next upturn.

01 March 2012

Table 204: List of other companies involved in Transport - Bus, Rail & Shipping

BBG Ticker	Company	Location	BofAML Ticker	Local currency	Market Cap (mn)	Investment Opinion	EE Exposure
601299 CH	CHINA CNR CORP LTD	China	NR	CNY	39,342.00	NR	High
1900 HK	CHINA ITS HOLDINGS	CHINA	NR	HKD	2,387.00	NR	Medium
LEY FP	FAIVELEY	France	NR	EUR	775.10	NR	High
HOLI US	HOLLYSYS AUTOMATION TECH.	United States	NR	USD	624.90	NR	Medium

Source: Company, BBG, BofA Merrill Lynch Global Research. * EE exposure = BofAML estimates of current sales derived from energy efficiency related products, services, technologies and solutions

Table 205: Companies involved in Transport - Bus, Rail & Shipping & Energy Efficiency that we do not cover

Company	BBG ticker	Overview
CHINA CNR	601299 CH	One of China's biggest manufacturers in the locomotive and rolling stock industry. With its 20 wholly owned subsidiaries, CNR designs and manufactures electric locomotives, diesel locomotives, passenger coaches as well as electric and diesel multiple units, and provides related overhaul and maintenance services. It has been taking a leading position in locomotives, freight wagons and light rail and subway segments with over 50% market share in China.
CHINA ITS	1900HK	It is an energy efficiency play on rail and rail equipment in China, accounting for upwards of two-thirds of revenues. China ITS (intelligent transportation system) Holdings Co. Ltd is a leading transportation infrastructure technology services provider in China, providing turnkey, specialized and value-added services. It is concentrated on three major sectors including expressway, railway and urban traffic. It is the largest service provider in the China ITS market, measured on total contract value in 2009, according to OC&C. CIC provides turnkey services in 25 provinces and specialized services in all provinces of China, and is starting to expand into the overseas market with the first completed project in Angola.
FAIVELEY TRANSPORT	LEY FP	CIC is an energy efficiency play on rail and rail equipment in China, accounting for upwards of one-third of group revenues. Designs and produces systems and equipment for trains, metros and tramways. The company's products include couplers, air conditioning units, inter-circulation gangways, access doors, pantographs, high-voltage switches, auxiliary converters, master controllers, odometry/tachometry systems and event recorders, anti-skid systems, brakes, and platform screen doors.
HOLLYSYS AUTOMATION TECHNOLOGIES	HOLI US	Leading providers of automation and control technologies and applications for the industrial, railway and nuclear industries in China. It is only certified domestic ACS provider to the nuclear industry. It is also one of the few approved providers by China's Ministry of Railways that specialises in 200-250km as well as 300-350km HSR segment. It is an energy efficiency play on rail and rail equipment in China, with rail representing 31% of revenues and subway 17%.

Source: Bloomberg, company sources

Table 206: Energy Efficiency Exposure Stock List - Multiples

Company	Ticker	P/E				Gross Yield				FCF Yield				EV/EBITDA				Price Book
		2010	FY11a	FY12e	FY13e	2010	FY11a	FY12e	FY13e	2010	FY11a	FY12e	FY13e	2010	FY11a	FY12e	FY13e	
Autos																		
Aquarius Platinum	AQPBF	13.13	7.50	70.32	20.82	2.76	3.68	NA	NA	1.97	7.14	3.27	3.97	9.93	6.37	16.75	8.32	1.22
BorgWarner	BWA	27.27	18.82	14.63	12.24	NA	NA	NA	NA	2.68	3.21	4.72	5.54	12.17	9.15	7.66	6.44	3.99
Clean Energy	CLNE	NM	NM	NM	NM	NA	NA	NA	NA	(4.07)	(4.74)	(14.88)	(12.04)	89.84	NM	NM	67.68	2.79
Continental AG	CTTAF	23.18	10.91	12.84	9.43	NA	NA	1.48	2.96	6.71	3.83	6.34	7.12	5.68	5.02	5.32	4.67	1.91
ErlingKlinger AG	EGKLF	22.11	15.32	18.86	14.30	1.42	1.83	2.44	2.84	(1.25)	1.50	3.60	3.22	8.98	7.23	7.85	6.66	2.70
Faurecia	FURCF	11.08	6.16	7.52	5.64	1.21	1.69	1.93	2.41	8.45	11.99	12.17	18.87	4.04	3.37	3.55	3.15	1.98
Johnson Controls	JCI	16.72	13.80	12.32	9.12	1.56	1.92	2.10	2.31	3.26	(1.10)	2.96	6.10	10.10	8.59	7.62	6.13	2.05
Johnson Matthey	JMPLF	11.08	18.65	15.79	15.01	1.67	1.96	2.36	2.48	2.27	(0.88)	5.37	4.48	14.48	11.19	9.99	9.71	3.55
Lanxess	LNXSF	16.72	8.71	10.49	8.62	1.23	1.67	2.11	2.55	0.08	0.34	5.45	7.10	7.45	5.75	6.38	5.59	2.28
Magna Intl	MGA	26.85	10.56	9.87	7.81	0.90	2.13	2.56	3.07	9.65	3.09	5.71	7.03	4.96	4.62	4.29	3.44	1.29
Michelin	MGDDF	12.00	6.31	6.95	5.96	3.45	4.07	4.26	4.45	4.54	(5.12)	4.14	4.24	5.36	4.95	4.61	4.03	1.15
LKQ Corp.	LKQX	10.73	21.56	17.61	14.74	-	-	-	-	2.10	2.70	3.45	4.80	16.91	13.59	11.00	9.37	2.83
Solvay	SVYSF	7.53	15.82	10.05	8.59	3.40	3.40	3.64	3.70	4.40	2.85	4.04	10.06	19.02	11.42	5.75	5.42	1.19
Tesla Motors	TSLA	27.57	NM	NM	16.09	NA	NA	NA	NA	(4.75)	(8.82)	(10.61)	1.46	NM	NM	NM	12.60	15.81
Toray	TRYIF	16.16	15.85	14.81	15.20	0.87	1.30	1.73	1.73	11.55	8.30	1.57	2.12	12.77	8.61	8.18	8.51	1.59
Valeo	VLEEF	NM	7.06	7.27	6.36	2.99	3.49	3.74	3.99	17.28	7.17	9.54	10.16	3.81	3.51	3.44	3.15	1.56
Victrex	VTXPF	NM	15.93	16.26	15.16	5.58	3.14	3.08	3.30	6.51	5.07	4.65	5.43	12.65	10.30	10.14	9.37	5.07
Westport Innovations	WPRT	8.26	NM	NM	NM	NA	NA	NA	NA	(1.03)	(4.11)	(4.50)	(2.49)	NM	NM	675.80	57.67	13.41
Buildings																		
CSR Ltd	CSRLF	NM	10.85	12.82	11.61	13.18	26.98	5.17	5.17	8.12	0.08	8.73	9.78	4.32	4.38	5.84	5.61	0.79
Honeywell Intl.	HON		14.74	14.05	12.44	2.03	2.29	2.50	2.75	10.40	4.36	7.73	9.50	13.99	15.88	9.69	8.76	4.32
Ingersoll-Rand	IR	5.09	14.30	12.56	10.59	0.69	1.14	1.59	1.90	4.04	6.44	9.10	8.74	10.06	8.67	8.33	7.48	1.80
Johnson Controls	JCI	20.80	13.80	12.32	9.12	1.56	1.92	2.10	2.31	3.26	(1.10)	2.96	6.10	10.10	8.59	7.62	6.13	2.05
Kingspan	KGSPF	17.16	24.94	20.51	15.48	1.24	1.61	1.99	2.48	1.65	0.94	1.22	1.89	14.00	10.54	9.63	8.22	1.93
Kone OYJ	KNYJF	16.72	17.83	19.10	17.07	2.00	3.12	3.23	3.34	6.17	4.47	6.59	5.57	13.52	13.05	11.81	11.19	5.66
Nippon Sheet Glass	NPSGF	27.53	1,084.62	9.09	8.37	4.26	4.26	4.26	4.26	(15.33)	23.40	(3.77)	7.22	14.42	9.21	9.13	8.34	0.59
Rinnai Corp	RINIF	21.39	18.81	18.50	15.40	0.72	0.82	0.96	1.09	7.06	6.94	4.41	5.91	8.33	7.46	6.84	6.26	2.09
Saint Gobain	CODGF	NM	14.55	11.71	10.24	3.24	3.48	4.33	4.94	9.94	5.77	6.72	8.47	7.36	7.22	6.66	6.23	1.06
United Tech	UTX	26.66	15.23	14.42	12.97	2.03	2.22	2.30	2.42	6.64	7.39	8.43	8.33	10.26	9.28	8.74	7.94	3.33
Industrials																		
ABB Ltd.	ABLZF	17.64	14.50	13.67	12.49	2.77	3.55	3.58	3.84	5.48	8.64	6.84	7.85	9.37	7.47	6.86	6.41	3.02
Alfa Laval	ALFVF		17.36	16.99	15.74	2.25	2.44	2.61	2.79	6.45	5.33	5.35	6.23	11.07	10.42	10.42	9.79	3.73
Alstom	AOMFF	18.01	20.63	11.41	9.59	3.85	1.93	2.49	3.11	1.99	(5.45)	(2.19)	10.09	3.73	3.94	4.16	3.68	2.33
Atlas Copco	ATLKF	18.12	16.10	15.86	14.90	2.33	2.91	3.49	3.66	4.54	2.94	6.25	6.97	13.95	11.37	10.97	10.48	7.24
Crompton Greaves	CPGZF	7.67	10.25	17.46	12.50	1.55	1.55	1.69	1.83	9.32	(0.72)	(3.79)	6.01	7.44	7.07	10.20	7.79	2.78
Eaton Corp	ETN	21.08	13.18	11.75	10.05	2.07	2.61	2.91	3.26	5.03	3.85	6.40	9.52	12.55	9.68	8.58	7.44	2.35
Electrolux	ELUXF	10.25	20.54	12.47	11.47	4.56	4.56	4.91	5.25	8.45	4.45	7.39	6.15	5.63	8.74	6.64	5.96	1.98
GEA	GEAGF	19.48	15.78	12.31	10.95	1.57	2.16	2.36	3.14	3.76	1.51	6.20	9.00	13.39	9.05	8.39	7.92	2.21
Hexagon AB	HXGBF	17.03	17.86	15.04	13.25	0.97	1.13	1.33	1.59	3.01	1.91	7.97	7.17	35.39	13.43	11.76	10.76	2.11
Honeywell Intl.	HON		14.74	14.05	12.44	2.03	2.29	2.50	2.75	10.40	4.36	7.73	9.50	13.99	15.88	9.69	8.76	4.32
Invensys	IVNSF	22.88	9.97	14.51	10.13	1.42	1.90	2.09	2.19	5.77	4.81	(6.90)	6.94	7.41	7.12	9.92	7.19	3.32
Metso	MXTOF	20.80	14.71	12.55	11.84	4.44	4.87	5.01	5.01	8.20	6.69	6.12	8.06	10.18	8.53	7.63	7.30	2.47
Nexans	NXPRF	14.04	NM	11.73	9.07	2.11	2.11	2.56	3.31	(7.78)	1.54	9.67	17.26	7.44	5.59	4.96	4.31	0.79
Phillips	PHGFF	20.34	NM	24.34	17.26	4.73	4.73	4.73	4.73	7.79	8.08	5.69	7.62	5.88	8.66	8.38	7.79	1.22
Prysmian	PRYMF	17.72	15.32	9.83	7.23	1.30	1.30	1.98	3.25	6.21	5.52	6.59	12.32	8.40	5.89	5.19	4.38	2.21
Rexel	RXLSF	10.38	13.94	12.49	11.59	2.42	3.93	4.24	4.54	8.43	7.59	7.05	7.06	10.25	8.95	7.93	7.45	1.15
Rockwell	ROK	15.38	16.97	15.34	13.78	1.48	1.80	2.12	2.33	3.43	3.86	4.78	6.87	17.41	12.04	10.48	9.45	6.58
Schneider	SBGSF	19.11	14.89	13.42	12.16	3.21	3.41	3.61	4.01	6.23	5.01	6.69	7.37	10.68	9.95	9.31	8.62	1.69
Siemens	SMAWF	26.66	9.51	12.65	11.80	3.64	4.04	4.04	4.45	9.42	6.57	5.10	6.82	8.09	7.42	7.77	7.24	2.05
Siemens Ltd	SMNBF	15.24	32.20	32.23	30.53	0.65	0.78	0.81	0.84	2.73	(1.42)	1.67	3.81	21.31	21.73	19.63	18.35	7.13
SMC	SMECF	16.39	19.96	17.33	15.13	0.72	0.79	0.86	0.86	3.34	6.59	0.18	5.34	21.60	8.65	7.87	7.36	1.78
Spirax-Sarco	SPXSF	32.91	16.82	16.40	15.15	2.06	2.35	2.40	2.54	3.32	4.08	4.98	4.85	11.67	10.63	10.37	9.77	3.90
Vallourec	VLOUF	48.65	14.47	15.73	10.03	2.46	2.30	2.12	3.32	(7.45)	(9.22)	(0.35)	5.15	8.93	8.66	7.99	6.03	1.20

01 March 2012

Table 206: Energy Efficiency Exposure Stock List - Multiples

Company	Ticker	P/E				Gross Yield				FCF Yield				EV/EBITDA				Price Book
		2010	FY11a	FY12e	FY13e	2010	FY11a	FY12e	FY13e	2010	FY11a	FY12e	FY13e	2010	FY11a	FY12e	FY13e	
Information Technology																		
Amazon.com	AMZN	14.19	73.47	112.99	63.08	NA	NA	NA	NA	3.06	2.58	3.07	3.54	28.46	26.83	28.66	21.44	10.56
ARM Holdings	ARMHF	NA	46.19	40.19	33.07	0.50	0.60	0.68	0.76	2.16	2.29	2.15	2.59	42.26	33.16	28.94	23.89	7.46
ASML NA	ASMLF	52.66	10.04	13.74	9.84	0.58	1.16	1.34	1.34	5.71	12.39	6.23	9.77	10.45	8.11	10.71	7.95	4.14
Cisco Systems	CSCO	61.62	12.45	10.90	10.03	NA	0.59	1.38	1.59	8.42	8.18	8.84	9.54	8.65	8.60	7.98	7.60	2.30
EMC Corp	EMC	14.74	18.31	16.18	13.58	NA	NA	NA	NA	6.28	7.31	8.17	9.15	12.26	9.70	8.73	7.79	3.19
Equinix	EQIX	12.53	81.46	49.39	27.86	NA	NA	NA	NA	(4.84)	(2.52)	(2.47)	1.86	17.94	13.23	11.19	9.40	3.22
Google	GOOG	22.09	16.90	14.20	12.10	NA	NA	NA	NA	3.55	5.59	6.40	7.80	14.71	12.04	9.91	8.34	3.42
Hewlett-Packard	HPQ	167.82	5.45	6.65	5.59	1.22	1.22	1.22	1.22	12.13	12.62	12.70	18.37	5.67	5.86	6.72	6.12	1.63
IBM	IBM	20.58	14.64	13.26	11.83	1.16	1.37	1.72	1.92	6.80	7.86	7.68	7.75	11.75	10.50	10.37	4.16	11.17
Intel	INTC	5.74	11.25	11.35	10.63	2.35	3.02	3.12	3.42	8.38	6.88	5.85	9.48	5.46	4.72	4.44	3.98	2.98
InterXion	INXN	17.10	35.83	25.47	20.84	NA	NA	NA	NA	(3.17)	(7.42)	(9.35)	2.86	9.67	7.97	6.66	5.63	2.26
Salesforce.com	CRM	13.38	117.50	105.40	90.16	NA	NA	NA	NA	0.95	1.60	1.92	2.31	83.40	71.24	53.30	41.51	17.97
Telety	TLCTF	36.91	28.27	21.91	17.27	NA	NA	0.91	1.16	1.98	(1.88)	(2.37)	(0.58)	17.96	14.06	11.53	9.33	4.49
VMware Inc	VMW	124.65	46.29	39.24	34.52	NA	NA	NA	NA	2.19	3.89	4.63	5.80	39.24	28.42	24.79	21.73	9.27
Lighting and LEDs																		
Cree, Inc.	CREE	66.53	16.78	27.85	20.64	NA	NA	NA	NA	2.48	0.43	2.67	3.64	10.99	11.41	16.98	12.63	1.46
Epistar	EPIPF	NA	70.50	40.08	26.96	5.77	0.85	1.50	2.23	5.54	(8.10)	(7.64)	4.93	8.78	15.92	9.90	8.18	1.27
Everlight	EVLEF	16.78	19.61	18.32	17.42	5.34	3.32	3.55	3.73	4.79	3.16	2.43	7.90	7.72	8.69	7.47	6.98	1.85
Genl Electric	GE	10.88	13.92	12.30	10.59	2.41	3.20	3.57	4.20	13.07	11.41	12.91	14.53	25.01	21.01	21.69	19.41	1.73
Philips	PHGFF	12.13	NM	24.34	17.26	4.73	4.73	4.73	4.73	7.79	8.08	5.69	7.62	5.88	8.66	8.38	7.79	1.22
SemiLEDs	LEDS	17.03	NM	NM	377.00	NA	NA	NA	NA	(1.24)	(22.87)	(42.08)	(22.56)	4.48	NM	NM	5.97	0.66
Seoul Semiconductor	SLSOF	10.38	43.45	38.06	22.57	1.22	0.46	0.50	0.89	(4.94)	(4.24)	(2.29)	2.29	10.98	26.57	21.66	14.99	2.47
Siemens	SMAWF	7.39	9.51	12.65	11.80	3.64	4.04	4.04	4.45	9.42	6.57	5.10	6.82	8.09	7.42	7.77	7.24	2.05
Veeco Instr.	VECO	15.98	6.33	24.13	13.65	NA	NA	NA	NA	24.77	4.65	5.91	5.16	1.72	1.86	6.61	3.83	1.43
Smart grid and energy storage																		
A123 Systems	AONE	6.49	NM	NM	NM	NA	NA	NA	NA	(130.23)	(171.49)	(111.49)	(41.46)	NM	NM	NM	NM	0.65
Ameresco Inc.	AMRC	NA	16.28	13.44	10.81	NA	NA	NA	NA	(2.90)	(4.07)	6.11	7.71	14.63	13.06	10.06	8.22	2.42
EnerNOC Inc.	ENOC	NM	41.26	NM	10.91	NA	NA	NA	NA	10.32	5.57	0.23	8.53	6.51	16.75	NM	4.54	1.01
Itron Inc.	ITRI	19.22	10.52	11.57	10.35	NA	NA	NA	NA	10.38	10.41	13.71	13.38	7.53	NM	8.29	6.62	2.04
SAFT	SGPEF	9.78	18.55	10.32	9.16	3.11	3.18	3.88	4.37	2.77	1.38	9.33	9.15	7.24	6.66	6.18	5.87	1.44
SQM	SQM	11.60	28.31	18.91	22.21	1.13	1.91	2.12	3.18	1.30	1.01	3.36	4.37	23.69	16.94	12.13	14.45	8.38
Transport - rail, bus & shipping																		
Rail																		
Ansaldo STS SPA	ASDOF	NA	13.11	13.00	11.02	3.22	3.22	3.22	3.22	6.32	1.43	3.73	3.08	6.47	7.57	7.32	6.31	2.48
Bombardier Inc.	YBBD B	NA	11.50	11.20	11.78	1.63	2.07	2.08	2.07	(3.38)	6.66	(21.31)	3.39	5.26	5.33	5.69	4.99	5.64
CAF	CAUXF	11.00	10.35	9.81	9.54	2.82	3.18	3.26	3.70	(5.17)	6.07	7.20	13.62	5.89	5.47	5.09	4.95	2.12
Canadian Natl	CNI	11.62	15.55	14.36	12.98	1.40	1.69	1.95	2.18	3.78	3.99	5.36	6.59	12.19	11.25	10.29	9.59	3.17
CRCC	CWYCF	18.64	9.06	8.90	8.03	0.99	3.24	3.30	3.66	(16.61)	(40.57)	(13.04)	(15.21)	4.14	3.09	2.92	2.81	0.96
CRG	CRWOF	NA	9.95	7.74	6.93	2.12	2.51	3.23	3.61	(34.50)	(73.77)	(24.01)	(22.00)	8.06	7.99	6.08	5.10	0.75
CSR	CSRGF	N/A	16.06	16.98	15.01	0.79	1.17	1.10	1.25	(2.36)	(35.81)	(6.46)	(5.86)	19.41	13.18	12.85	11.14	2.57
Guangshen Railway	GNGYF	7.38	11.58	13.45	14.03	3.56	3.46	2.97	2.85	12.67	8.52	9.87	9.55	4.80	4.71	5.01	5.07	0.68
Vossloh	VOSSF	5.09	19.44	17.56	14.62	3.15	3.15	3.78	3.78	0.36	5.68	0.90	3.14	6.32	9.26	8.06	7.42	1.86
Zhuzhou CSR	ZHUZF	12.04	15.28	15.96	13.85	1.88	2.54	2.43	2.80	3.11	(5.68)	0.40	1.26	16.46	12.41	12.60	10.82	3.26
Bus																		
FirstGroup Plc	FGROF	20.64	7.13	7.29	7.77	7.09	7.60	8.13	8.13	17.63	24.69	13.31	7.53	5.01	5.32	4.81	5.05	1.51
Go-Ahead Group	GHGUF	xx	9.56	8.96	9.76	6.27	6.27	6.69	6.87	14.67	10.21	14.91	15.35	3.73	4.04	4.07	4.13	32.42
National Express	NXPGF	7.42	8.22	8.73	8.11	2.72	4.35	4.56	4.79	14.36	12.18	4.80	13.44	5.81	5.33	5.39	5.05	1.14
Stagecoach Group	SAGKF	10.07	11.40	10.51	10.19	2.42	2.65	20.35	2.94	6.57	3.90	6.72	7.24	8.53	7.33	7.19	7.39	7.82
Shipping																		
Yangzijiang	YSHLF	14.48	5.99	5.60	5.54	2.56	5.01	5.36	5.41	14.03	8.51	4.62	(0.90)	5.80	4.34	3.73	3.63	1.87

Source:BoFA Merrill Lynch Global Research estimates

01 March 2012

Table 207: Energy Efficiency Exposure Stock - Price Performance

Company	Ticker	Recommendation	QRQ	Market Cap		Free float %	EV FY1		Share Price Performance		
				LC mn	USD mn		LC mn	USD mn	-1w Abs	-3m Abs	YTD Abs
Autos											
Aquarius Platinum	AQPBF	BUY	C-1-9	644.7	1,021.2	100	1,040.2	1,393.3	146.6	150.0	405.0
BorgWarner	BWA	BUY	C-1-9	9,792.8	9,792.8	NA	7,611.1	10,195.1	80.3	63.1	77.6
Clean Energy	CLNE	BUY	C-1-9	1,493.0	1,493.0	NA	1,133.9	1,518.9	17.2	12.0	14.0
Continental AG	CTTAF	NEUTRAL	B-2-9	13,524.4	18,115.9	39.9	21,387.7	28,648.8	69.1	49.2	61.4
Elringklinger AG	EGKLF	UNDERPERFORM	B-3-7	1,559.3	2,088.7	44.6	1,780.9	2,385.5	24.9	17.1	24.1
Faurecia	FURCF	NEUTRAL	C-2-7	2,286.4	3,062.6	42.57	3,848.6	5,155.1	20.8	14.9	28.2
Johnson Controls	JCI	BUY	C-1-7	22,623.6	22,623.6	NA	20,182.7	27,034.7	35.1	29.1	40.8
Johnson Matthey	JMPLF	NEUTRAL	A-2-7	5,031.0	7,969.7	100	6,885.5	9,223.1	2,333.0	1,809.0	1,855.0
Lanxess	LNXSF	BUY	B-1-7	4,729.1	6,334.6	100	6,567.1	8,796.6	57.0	39.1	54.1
Magna Intl	MGA	BUY	C-1-7	11,275.8	11,275.8	NA	7,061.6	9,459.1	44.8	33.7	49.4
Michelin	MGDDF	BUY	B-1-7	9,495.1	12,718.7	100	14,246.3	19,083.0	55.0	45.0	59.0
LKQ Corp.	LKQX	NEUTRAL	B-2-9	4,648.5	4,648.5	NA	4,255.3	5,699.9	32.4	28.6	23.8
Solvay	SVYSF	BUY	B-1-7	7,330.0	9,818.5	70	11,656.5	15,613.9	89.7	67.0	85.0
Tesla Motors	TSLA	BUY	C-1-9	3,540.5	3,540.5	NA	2,918.0	3,908.7	34.5	32.6	23.9
Toray	TRYIF	BUY	B-1-7	941,364.5	11,699.8	71	13,627.9	18,254.6	572.0	562.0	619.0
Valeo	VLEEF	BUY	B-1-7	3,012.7	4,035.6	100	4,347.8	5,823.8	40.5	30.8	45.1
Victrex	VTXPF	NEUTRAL	C-2-7	1,123.1	1,779.1	100	1,250.0	1,674.4	1,350.0	1,120.0	1,306.0
Westport Innovations	WPRT	BUY	C-1-9	2,110.3	2,110.3	NA	1,646.4	2,205.3	45.6	27.2	18.4
Buildings											
CSR Ltd	CSRLF	UNDERPERFORM	B-3-8	979.0	1,050.3	100	783.6	1,049.6	1.9	2.1	3.5
Honeywell Intl.	HON	BUY	B-1-7	46,685.4	46,685.4	NA	42,834.0	57,376.1	59.9	51.7	57.9
Ingersoll-Rand	IR	BUY	B-1-7	12,772.5	12,772.5	NA	12,650.4	16,945.2	41.0	30.8	45.3
Johnson Controls	JCI	BUY	C-1-7	22,623.6	22,623.6	NA	20,182.7	27,034.7	35.1	29.1	40.8
Kingspan	KGSPF	BUY	C-1-7	1,339.5	1,794.3	70	1,512.1	2,025.4	7.6	6.3	7.0
Kone OYJ	KNYJF	BUY	A-1-7	11,472.7	15,367.7	75	10,756.1	14,407.8	45.4	40.4	39.6
Nippon Sheet Glass	NPSGF	NEUTRAL	B-2-7	127,400.7	1,583.4	68.4	5,337.0	7,148.9	139.0	140.0	234.0
Rinnai Corp	RINIF	BUY	B-1-7	287,493.6	3,573.1	36.6	2,238.0	2,997.8	5,720.0	5,770.0	5,010.0
Saint Gobain	CODGF	BUY	B-1-7	18,706.4	25,057.2	100	30,504.4	40,860.7	36.7	29.3	43.3
United Tech	UTX	BUY	B-1-7	75,894.2	75,894.2	NA	65,432.1	87,646.3	84.0	73.1	83.5
Industrials											
ABB Ltd.	ABLZF	BUY	B-1-7	42,818.8	47,602.9	100	31,538.5	42,245.9	19.0	16.3	22.1
Alfa Laval	ALFVF	UNDERPERFORM	B-3-7	55,955.9	8,476.7	82	6,505.5	8,714.1	134.4	122.0	129.3
Alstom	AOMFF	BUY	B-1-7	9,470.6	12,685.9	88	8,201.6	10,986.1	30.9	24.1	43.2
Atlas Copco	ATLKF	NEUTRAL	B-2-7	208,397.8	31,569.9	100	25,209.8	33,768.5	172.6	134.8	154.5
Crompton Greaves	CPGZF	UNDERPERFORM	C-3-7	91,059.7	1,849.9	58.21	1,440.2	1,929.2	161.9	129.4	244.7
Eaton Corp	ETN	BUY	B-1-7	17,642.1	17,642.1	NA	16,070.7	21,526.6	51.9	42.3	55.4
Electrolux	ELUXF	NEUTRAL	B-2-8	40,598.2	6,150.2	0.91	6,256.5	8,380.5	146.0	108.8	158.8
GEA	GEAGF	BUY	B-1-7	4,675.9	6,276.7	100	6,305.0	8,463.5	25.3	21.8	22.3
Hexagon AB	HXGBF	BUY	B-1-7	46,915.6	7,107.2	65	7,186.3	9,626.0	137.2	93.9	139.7
Honeywell Intl.	HON	BUY	B-1-7	46,685.4	46,685.4	NA	42,834.0	57,376.1	59.9	51.7	57.9
Invensys	IVNSF	BUY	C-1-7	1,711.2	2,710.7	100	2,376.1	3,182.8	214.1	191.5	355.4
Metso	MXTOF	NEUTRAL	C-2-7	5,232.5	7,009.0	73.9	6,342.5	8,495.8	35.8	28.3	37.5
Nexans	NXPRF	NEUTRAL	B-2-7	1,493.7	2,000.8	100	2,067.7	2,769.7	53.1	40.7	65.6
Phillips	PHGFF	UNDERPERFORM	B-3-8	14,833.8	19,869.9	NA	15,945.8	21,359.4	16.2	14.0	23.7
Prysmian	PRYMF	BUY	C-1-8	2,743.9	3,675.5	100	3,251.9	4,355.9	13.4	9.5	15.3
Rexel	RXLSF	NEUTRAL	C-2-8	4,399.7	5,893.4	NA	6,137.9	8,221.7	16.5	12.1	17.5
Rockwell	ROK	BUY	C-1-7	11,506.1	11,506.1	NA	9,512.6	12,742.1	83.5	71.0	87.7
Schneider	SBGSF	BUY	B-1-8	26,820.0	35,925.5	100	35,470.0	47,512.1	47.8	39.1	60.0
Siemens	SMAWF	NEUTRAL	B-2-7	65,016.3	87,089.3	100	80,904.3	108,371.3	74.8	71.1	97.5
Siemens Ltd	SMNBF	UNDERPERFORM	C-3-8	272,262.3	5,531.0	25	3,906.0	5,232.1	827.3	706.0	847.4
SMC	SMECF	BUY	A-1-7	953,373.2	11,849.0	55.7	7,447.1	9,975.4	13,780.0	12,460.0	13,856.2
Spirax-Sarco	SPXSF	NEUTRAL	C-2-7	1,601.2	2,536.4	100	1,992.9	2,669.5	2,044.0	1,812.0	1,808.0
Vallourec	VLOUF	UNDERPERFORM	C-3-8	5,809.5	7,781.9	96	7,736.6	10,363.2	56.1	45.0	75.1

Table 207: Energy Efficiency Exposure Stock - Price Performance

Company	Ticker	Recommendation	QRQ	Market Cap		Free float %	EV FY1		Share Price Performance		
				LC mn	USD mn		LC mn	USD mn	-1w Abs	-3m Abs	YTD Abs
Information Technology											
Amazon.com	AMZN	BUY	C-1-9	81,945.3	81,945.3	NA	53,206.8	71,270.5	182.3	182.4	177.2
ARM Holdings	ARMHF	UNDERPERFORM	C-3-7	7,918.7	12,544.0	NA	9,210.6	12,337.6	582.0	553.0	608.0
ASML NA	ASMLF	BUY	B-1-7	14,275.9	19,122.5	NA	14,648.0	19,621.0	35.2	28.1	31.5
Cisco Systems	CSCO	BUY	B-1-7	108,817.2	108,817.2	NA	88,731.5	118,855.9	20.4	18.0	18.6
EMC Corp	EMC	BUY	C-1-9	60,525.9	60,525.9	NA	44,916.7	60,165.9	27.3	22.5	27.2
Equinix	EQIX	BUY	B-1-9	6,504.8	6,504.8	NA	7,295.3	9,772.0	134.8	98.0	86.4
Google	GOOG	BUY	C-1-9	199,064.0	199,064.0	NA	144,448.6	193,488.9	614.0	588.2	613.4
Hewlett-Packard	HPQ	BUY	B-1-7	64,194.4	64,194.4	NA	81,320.4	108,928.7	29.4	26.5	43.6
IBM	IBM	BUY	B-1-7	226,084.1	226,084.1	NA	191,563.0	256,598.7	193.4	182.2	161.9
Intel	INTC	BUY	B-1-7	136,988.3	136,988.3	NA	84,497.4	113,184.3	27.2	23.5	21.5
InterXion	INXN	BUY	C-1-9	994.7	994.7	NA	766.3	1,026.4	15.0	12.8	14.7
Salesforce.com	CRM	BUY	C-1-9	22,936.0	22,936.0	NA	16,663.6	22,320.9	127.6	111.2	132.3
Telety	TLCTF	BUY	C-1-7	1,344.1	2,129.2	84.2815	1,807.6	2,421.3	681.0	590.5	476.3
VMware Inc	VMW	BUY	C-1-9	44,206.4	44,206.4	NA	31,448.9	42,125.9	98.1	94.0	83.7
Lighting and LEDs											
Cree, Inc.	CREE	UNDERPERFORM	C-3-9	3,310.7	3,310.7	NA	2,363.3	3,165.7	29.9	24.8	52.7
Epistar	EPIPF	UNDERPERFORM	C-3-7	66,106.6	2,235.9	70	1,751.0	2,345.4	74.8	59.3	101.5
Everlight	EVLEF	UNDERPERFORM	C-3-8	28,169.2	952.7	70	697.9	934.9	65.8	47.0	83.2
Genl Electric	GE	NEUTRAL	B-2-7	198,804.8	198,804.8	NA	490,269.2	656,715.8	19.4	14.8	20.9
Philips	PHGFF	UNDERPERFORM	B-3-8	14,833.8	19,869.9	NA	15,945.8	21,359.4	16.2	14.0	23.7
Semileds	LDS	UNDERPERFORM	C-3-9	102.8	102.8	NA	52.6	70.4	3.8	3.1	15.7
Seoul Semiconductor	SLSOF	UNDERPERFORM	C-3-7	1,504,279.3	1,332.3	63.8478	1,027.5	1,376.3	27,850.0	21,900.0	42,150.0
Siemens	SMAWF	NEUTRAL	B-2-7	65,016.3	87,089.3	100	80,904.3	108,371.3	74.8	71.1	97.5
Veeco Instr.	VECO	NEUTRAL	C-2-9	1,085.2	1,085.2	NA	400.1	536.0	28.9	23.5	47.6
Smart grid and energy storage											
A123 Systems	AONE	BUY	C-1-9	234.2	234.2	NA	180.8	242.2	2.2	2.1	9.5
Ameresco Inc.	AMRC	BUY	C-1-9	578.5	578.5	NA	635.2	850.9	14.1	10.4	14.3
EnerNOC Inc.	ENOC	UNDERPERFORM	C-3-9	249.6	249.6	NA	132.1	177.0	9.7	9.5	19.3
Itron Inc.	ITRI	UNDERPERFORM	B-3-9	1,847.1	1,847.1	NA	1,773.6	2,375.7	46.8	33.5	56.7
SAFT	SGPEF	NEUTRAL	C-2-7	560.5	750.8	97	784.6	1,050.9	23.0	20.8	27.7
SQM	SQM	NEUTRAL	C-2-7	15,723.6	15,723.6	NA	12,244.4	16,401.3	59.5	54.6	53.0
Transport - rail, bus & shipping											
Rail											
Ansaldo STS SPA	ASDOF	BUY	B-1-7	1,044.4	1,399.0	60	972.5	1,302.6	7.5	7.1	8.7
Bombardier Inc.	YBBD B	UNDERPERFORM	C-3-8	8,418.9	8,417.7	NA	6,267.3	8,395.0	4.7	3.8	6.1
CAF	CAUXF	BUY	B-1-7	1,400.2	1,875.6	50.38	1,141.3	1,528.8	410.0	386.4	398.9
Canadian Natl	CNI	NEUTRAL	B-2-7	33,889.9	33,889.9	NA	35,102.4	47,019.6	76.6	74.7	73.3
CRCC	CWYCF CRWO	UNDERPERFORM	B-3-7	74,765.5	9,640.4	16.8291	7,159.7	9,590.4	6.2	4.2	8.7
CRG	F	NEUTRAL	B-2-7	67,521.0	8,706.3	19.7531	16,305.5	21,841.2	3.2	2.4	5.0
CSR	CSRGF	UNDERPERFORM	B-3-7	72,105.6	9,297.6	42.43	10,156.8	13,634.0	6.0	4.7	8.6
Guangshen Railway	GNGYF	NEUTRAL	C-2-8	21,604.8	2,785.8	39	2,027.1	2,715.3	3.0	2.7	2.9
Vossloh	VOSSF	UNDERPERFORM	B-3-8	1,057.6	1,416.7	66	1,205.1	1,614.3	80.2	74.0	93.0
Zhuzhou CSR	ZHUZF	NEUTRAL	B-2-7	21,468.3	2,768.2	42.06	2,116.9	2,835.6	18.3	17.3	26.1
Bus											
FirstGroup Plc	FGROF	UNDERPERFORM	B-3-8	1,412.3	2,237.3	80	4,233.5	5,670.8	302.2	311.6	364.8
Go-Ahead Group	GHGUF	NEUTRAL	B-2-7	554.4	878.3	90	796.9	1,067.5	1,319.0	1,221.0	1,407.0
National Express	NXPFG	BUY	B-1-7	1,126.7	1,784.8	60	2,088.7	2,797.8	225.9	204.5	248.0
Stagecoach Group	SAGKF	BUY	B-1-7	1,733.9	2,746.7	70	2,863.5	3,835.7	268.0	245.3	210.1
Shipping											
Yangzijiang	YSHLF	BUY	C-1-7	5,180.1	4,123.8	44.5	2,151.6	2,882.1	1.4	0.9	1.8

Source: BofA Merrill Lynch Global Research estimates

Table 208: Energy Efficiency Exposure Stock - Index

Company	Ticker	CRNY	EPS				EPS				DPS				EBITDA (in mn)				EBITDA			
			2011	2012E	2013E	2014	4y CAGR	2011	2012E	2013E	2014E	4y CAGR	2011	2012E	2013E	2014E	4y CAGR	2011	2012E	2013E	2014E	4y CAGR
Autos																						
Aquarius Platinum	AQPBF	USD	0.29	0.03	0.10	0.23	9.65	0.08	0.00	0.00	0.00	-100.00	218.86	83.19	167.39	247.02	15.16					
BorgWarner	BWA	USD	4.39	5.65	6.75	7.90	27.07	0.00	0.00	0.00	0.00	NA	1101.10	1311.37	1526.71	1735.11	20.73					
Clean Energy	CLNE	USD	-0.49	-0.69	-0.40	NA	NA	0.00	0.00	0.00	NA	NA	-3.10	-16.69	22.44	NA	NA					
Continental AG	CTTAF	EUR	6.20	5.27	7.17	NA	NA	0.00	1.00	2.00	NA	NA	4164.62	3911.44	4466.75	NA	NA					
Elringklinger AG	EGKLF	EUR	1.61	1.30	1.72	NA	NA	0.45	0.60	0.70	NA	18.92	246.49	226.73	267.24	NA	NA					
Faurecia	FURCF	EUR	3.37	2.75	3.67	4.33	23.37	0.35	0.40	0.50	0.60	18.92	1083.00	1025.61	1159.94	1263.48	8.33					
Johnson Controls	JCI	USD	2.41	2.70	3.65	4.55	22.97	0.64	0.70	0.77	0.85	10.31	3087.10	3520.19	4384.71	5143.85	18.53					
Johnson Matthey	JMPLF	GBP	125.55	148.36	156.03	174.29	18.89	46.00	55.20	58.08	64.87	10.47	520.20	583.83	600.43	650.85	12.67					
Langess	LNXSF	EUR	6.53	5.42	6.60	7.06	10.51	0.95	1.20	1.45	1.55	19.97	1166.49	1028.82	1175.53	1226.31	8.34					
Magna Intl	MGA	USD	4.44	4.75	6.00	NA	NA	1.00	1.20	1.44	NA	36.07	2036.18	2192.88	2736.87	NA	NA					
Michelin	MGDDF	EUR	8.19	7.43	8.67	9.54	8.60	2.10	2.20	2.30	2.50	6.62	2877.82	3089.38	3532.30	3905.28	10.07					
LKQ Corp.	LKQX	USD	1.47	1.80	2.15	2.50	21.43	0.00	0.00	0.00	0.00	NA	419.48	518.35	608.22	696.50	19.89					
Solvay	SVYSF	EUR	5.70	8.97	10.50	11.53	19.90	3.07	3.28	3.34	3.40	2.16	1021.00	1787.82	2110.22	2217.57	37.91					
Tesla Motors	TSLA	USD	-2.21	-2.03	2.09	4.11	NA	0.00	0.00	0.00	0.00	NA	-234.61	-215.58	248.21	515.81	NA					
Toray	TRYIF	JPY	36.41	38.97	37.96	43.37	NA	7.50	10.00	10.00	10.00	18.92	170566.00	179500.00	172500.00	185600.00	12.71					
Valeo	VLEEF	EUR	5.68	5.52	6.30	6.85	8.99	1.40	1.50	1.60	1.70	7.46	1238.00	1237.51	1341.60	1403.02	5.94					
Victrex	VTXPF	GBP	84.44	82.73	88.73	92.15	9.39	42.22	41.37	44.37	46.08	-12.30	102.60	104.28	112.85	119.13	9.27					
Westport Innovations	WPRT	USD	-1.27	-0.69	-0.17	0.19	NA	0.00	0.00	0.00	0.00	NA	-23.11	1.66	36.24	75.40	NA					
Buildings																						
CSR Ltd	CSRLF	AUD	0.18	0.15	0.17	0.23	-11.93	0.52	0.10	0.10	0.14	-20.87	308.00	240.76	243.09	282.00	-14.27					
Honeywell Intl.	HON	USD	4.05	4.25	4.80	NA	NA	1.37	1.49	1.64	NA	7.90	3119.45	5918.73	6546.83	NA	NA					
Ingersoll-Rand	IR	USD	2.82	3.21	3.81	4.48	17.50	0.46	0.64	0.77	0.88	28.69	1954.10	2034.04	2264.27	2549.66	10.92					
Johnson Controls	JCI	USD	2.41	2.70	3.65	4.55	22.97	0.64	0.70	0.77	0.85	10.31	3087.10	3520.19	4384.71	5143.85	18.53					
Kingspan	KGSPF	EUR	0.32	0.39	0.52	NA	NA	0.13	0.16	0.20	NA	18.92	143.52	156.99	184.00	NA	NA					
Kone OYJ	KNYJF	EUR	2.52	2.35	2.63	2.85	7.95	1.40	1.45	1.50	1.62	13.62	864.30	862.42	932.87	1003.25	6.69					
Nippon Sheet Glass	NPSGF	JPY	0.13	15.52	16.85	20.84	NA	6.00	6.00	6.00	6.00	0.00	62462.00	63000.00	69000.00	77500.00	18.07					
Rinnai Corp	RINIF	JPY	311.52	316.74	380.61	420.58	17.61	48.00	56.00	64.00	72.00	11.10	33283.00	35120.00	37610.00	40620.00	8.76					
Saint Gobain	CODGF	EUR	2.44	3.04	3.47	3.90	15.58	1.24	1.54	1.76	2.00	11.18	4223.92	4580.80	4897.66	5172.31	5.69					
United Tech	UTX	USD	5.49	5.80	6.45	7.00	10.24	1.86	1.92	2.02	2.12	4.41	9446.00	10023.66	11042.28	11876.74	8.59					
Industrials																						
ABB Ltd.	ABLZF	USD	1.38	1.52	1.66	1.73	11.70	0.74	0.74	0.80	0.85	8.51	5662.00	6155.95	6590.28	6785.57	10.69					
Alfa Laval	ALFVF	SEK	7.68	7.85	8.48	9.30	6.03	3.25	3.48	3.72	3.98	5.53	5520.80	5522.85	5872.94	6301.06	4.93					
Alstom	AOMFF	EUR	1.56	2.82	3.36	3.67	-3.31	0.62	0.80	1.00	1.20	-5.24	1529.00	1881.84	2126.58	2265.21	2.24					
Atlas Copco	ATLKF	SEK	10.68	10.85	11.54	12.20	10.58	5.00	6.00	6.30	6.62	12.03	20082.00	20861.46	21801.80	22600.42	8.33					
Crompton Greaves	CPGZF	INR	13.85	8.13	11.35	15.40	2.68	2.20	2.40	2.60	2.80	4.26	13437.80	9314.26	12184.51	14549.44	3.32					
Eaton Corp	ETN	USD	3.96	4.44	5.19	5.63	18.24	1.36	1.52	1.70	1.87	12.05	2223.00	2508.71	2892.84	3153.05	16.44					
Electrolux	ELUXF	SEK	6.94	11.43	12.43	12.74	-5.84	6.50	7.00	7.49	7.94	3.61	6190.00	7432.47	8379.77	8464.01	-0.85					
GEA	GEAGF	EUR	1.61	2.07	2.32	2.61	40.33	0.55	0.60	0.80	0.88	18.92	646.46	726.26	771.14	816.04	NA					
Hexagon AB	HXGBF	EUR	0.84	1.00	1.14	1.29	19.01	0.17	0.20	0.24	0.26	13.09	535.09	611.11	667.74	734.20	37.84					
Honeywell Intl.	HON	USD	4.05	4.25	4.80	NA	NA	1.37	1.49	1.64	NA	7.90	3119.45	5918.73	6546.83	NA	NA					
Invensys	IVNSF	GBP	21.16	14.54	20.84	23.13	11.37	4.00	4.40	4.62	5.08	11.40	303.00	245.96	320.15	343.47	4.23					
Metso	MXTOF	EUR	2.38	2.78	2.95	3.25	17.34	1.70	1.75	1.75	1.75	3.08	743.80	831.43	868.86	923.24	10.32					
Nexans	NXPRF	EUR	-6.20	4.44	5.74	NA	NA	1.10	1.33	1.72	NA	11.84	88.00	416.56	479.40	NA	NA					
Philips	PHGFF	EUR	-1.35	0.65	0.92	1.22	-5.52	0.75	0.75	0.75	0.75	0.00	1678.00	1616.89	1865.77	2127.51	-4.45					
Prysmian	PRYMF	EUR	0.84	1.30	1.77	NA	NA	0.17	0.25	0.42	NA	25.81	232.70	542.09	712.36	NA	NA					
Rexel	RXLSF	EUR	1.18	1.32	1.43	1.60	16.70	0.65	0.70	0.75	0.80	17.02	686.02	773.69	824.14	862.18	9.54					

Table 208: Energy Efficiency Exposure Stock - Index

			EPS				EPS		DPS			DPS		EBITDA (in mn)			EBITDA	
Rockwell	ROK	USD	4.79	5.30	5.90	NA	NA	1.47	1.72	1.90	NA	11.97	1058.40	1215.48	1347.81	NA	NA	
Schneider	SBGSF	EUR	3.35	3.72	4.10	4.34	7.29	1.70	1.80	2.00	2.20	5.74	3465.00	3788.00	4095.95	4267.29	6.73	
Siemens	SMAWF	EUR	7.80	5.87	6.29	6.62	9.96	3.00	3.00	3.30	3.60	5.14	10896.54	10407.67	11173.14	11584.94	3.76	
Siemens Ltd	SMNBF	INR	24.02	23.99	25.33	28.06	4.54	6.00	6.25	6.50	6.50	6.78	11850.62	13116.99	14032.13	15606.85	6.61	
SMC	SMECF	JPY	696.35	801.90	918.54	1020.60	37.48	110.00	120.00	120.00	120.00	4.66	92774.00	102000.00	109000.00	119500.00	33.91	
Spirax-Sarco	SPXSF	GBP	123.84	127.02	137.46	150.41	8.11	49.02	50.00	53.00	56.71	5.37	158.49	162.52	172.48	186.73	5.59	
Vallourec	VLOUF	EUR	3.65	3.36	5.26	5.26	9.06	1.22	1.12	1.75	2.04	7.79	893.70	968.16	1282.07	1282.07	10.29	
Information Technology																		
Amazon.com	AMZN	USD	2.43	1.58	2.83	NA	NA	0.00	0.00	0.00	NA	NA	1933.00	1566.58	2301.54	NA	NA	
ARM Holdings	ARMHF	GBP	12.46	14.32	17.40	20.31	21.43	3.48	3.90	4.37	4.89	10.77	162.14	186.53	237.65	282.57	22.15	
ASML NA	ASMLF	EUR	3.42	2.50	3.49	3.68	12.10	0.40	0.46	0.46	0.46	23.15	1813.80	1367.88	1841.85	1932.05	8.50	
Cisco Systems	CSCO	USD	1.62	1.85	2.01	2.12	7.12	0.12	0.28	0.32	0.32	NA	13817.00	14886.32	15636.86	15741.59	3.46	
EMC Corp	EMC	USD	1.52	1.72	2.05	NA	NA	0.00	0.00	0.00	NA	NA	6205.64	6889.32	7728.08	NA	NA	
Equinix	EQIX	USD	1.71	2.82	5.00	6.79	69.12	0.00	0.00	0.00	0.00	NA	662.64	799.38	965.43	1120.67	25.46	
Google	GOOG	USD	36.06	42.90	50.35	58.13	18.37	0.00	0.00	0.00	0.00	NA	14093.00	17109.88	20366.11	23872.37	19.32	
Hewlett-Packard	HPQ	USD	4.82	3.95	4.70	NA	NA	0.32	0.32	0.32	NA	0.00	19110.24	16771.19	18387.55	NA	NA	
IBM	IBM	USD	13.49	14.90	16.70	18.37	12.30	2.70	3.40	3.80	4.20	13.37	24427.32	25509.88	27415.19	29079.87	7.41	
Intel	INTC	USD	2.39	2.37	2.53	2.72	7.86	0.81	0.84	0.92	1.00	9.90	23973.81	25475.82	28451.64	29995.83	9.68	
InterXion	INXN	EUR	0.33	0.45	0.55	NA	NA	0.00	0.00	0.00	NA	NA	92.28	112.65	133.75	NA	NA	
Salesforce.com	CRM	USD	1.22	1.36	1.59	2.13	16.66	0.00	0.00	0.00	0.00	NA	154.16	109.87	65.66	228.40	7.91	
Telecity	TLCTF	GBP	24.07	31.06	39.41	48.73	22.45	0.00	6.21	7.88	9.75	NA	108.71	132.58	163.85	196.22	23.23	
VMware Inc	VMW	USD	2.17	2.56	2.91	NA	NA	0.00	0.00	0.00	NA	NA	985.91	1053.26	1231.38	NA	NA	
Lighting and LEDs																		
Cree, Inc.	CREE	USD	1.71	1.03	1.39	1.59	-1.80	0.00	0.00	0.00	0.00	#DIV/0!	277.40	186.45	250.72	287.63	-0.05	
Epistar	EPIPF	TWD	1.11	1.95	2.89	NA	NA	0.66	1.17	1.74	NA	-21.19	4355.77	7005.74	8473.61	NA	NA	
Everlight	EVLEF	TWD	3.44	3.68	3.87	NA	NA	2.23	2.39	2.51	NA	-8.58	3182.26	3700.79	3961.00	NA	NA	
Genl Electric	GE	USD	1.37	1.55	1.80	NA	NA	0.61	0.68	0.80	NA	14.84	31263.30	30276.43	33834.17	NA	NA	
Philips	PHGFF	EUR	-1.35	0.65	0.92	1.22	-5.52	0.75	0.75	0.75	0.75	0.00	1678.00	1616.89	1865.77	2127.51	-4.45	
SemiLEDs	LEDS	USD	-0.57	-0.69	0.01	NA	NA	0.00	0.00	0.00	NA	NA	-5.03	-7.33	11.80	NA	NA	
Seoul Semiconductor	SLSOF	KRW	593.77	677.85	1143.11	NA	NA	119.00	130.00	230.00	NA	-7.56	58487.50	71756.97	103684.91	NA	NA	
Siemens	SMAWF	EUR	7.80	5.87	6.29	6.62	9.96	3.00	3.00	3.30	3.60	5.14	10896.54	10407.67	11173.14	11584.94	3.76	
Veeco Instr.	VECO	USD	4.42	1.16	2.05	3.62	-4.27	0.00	0.00	0.00	0.00	NA	289.81	82.85	142.24	236.94	-6.51	
Smart Grid & Energy Storage																		
A123 Systems	AONE	USD	-1.70	-1.13	-0.42	NA	NA	0.00	0.00	0.00	NA	NA	-209.95	-148.53	-73.51	NA	NA	
Ameresco Inc.	AMRC	USD	0.85	1.03	1.28	NA	NA	0.00	0.00	0.00	NA	NA	65.17	84.59	103.57	NA	NA	
EnerNOC Inc.	ANOC	USD	0.23	-0.63	0.87	1.52	11.88	0.00	0.00	0.00	0.00	NA	10.56	-7.16	38.94	66.44	25.06	
Itron Inc.	ITRI	USD	4.29	3.90	4.36	NA	NA	0.00	0.00	0.00	NA	NA	-340.33	280.09	352.23	NA	NA	
SAFT	SGPEF	EUR	1.22	2.18	2.46	NA	NA	0.72	0.87	0.98	NA	8.91	111.43	122.68	132.32	NA	NA	
SQM	SQM	USD	2.11	3.16	2.69	2.73	17.14	1.14	1.27	1.90	1.61	29.43	954.33	1351.64	1135.31	1155.59	15.01	
Transport - rail, bus & shipping																		
<i>Rail</i>																		
Ansaldo STS SPA	ASDOF	EUR	0.57	0.57	0.68	0.71	1.24	0.24	0.24	0.24	0.25	0.00	128.53	132.91	154.12	162.40	1.95	
Bombardier Inc.	YBBD B	USD	0.42	0.43	0.41	0.46	4.21	0.10	0.10	0.10	0.10	7.93	1576.00	1476.37	1683.79	1795.01	2.98	
CAF	CAUXF	EUR	39.48	41.64	42.80	38.42	0.40	12.99	13.30	15.11	13.06	7.07	208.74	224.17	230.71	215.99	2.74	
Canadian Natl	CNI	USD	4.95	5.36	5.93	NA	NA	1.30	1.50	1.68	NA	11.68	4180.00	4568.61	4901.11	NA	NA	
CRCC	CWYCF	CNY	0.53	0.55	0.60	0.58	17.83	0.16	0.16	0.18	0.17	37.25	19289.66	20393.38	21158.16	21195.85	10.21	
CRG	CRWOF	CNY	0.25	0.32	0.36	0.36	0.37	0.06	0.08	0.09	0.09	13.03	16994.01	22314.98	26603.72	28870.65	14.42	
CSR	CSRGF	CNY	0.30	0.29	0.32		NA	0.06	0.05	0.06		10.91	6433.53	6603.35	7615.57		-14.27	
Guangshen Railway	GNGYF	CNY	0.21	0.18	0.17	0.17	-4.55	0.08	0.07	0.07	0.07	-6.42	3546.44	3336.94	3298.18	3343.56	-0.97	
Vossloh	VOSSF	EUR	4.08	4.52	5.43	7.12	1.84	2.50	3.00	3.00	3.00	4.66	130.12	149.44	162.52	194.20	0.52	
Zhuzhou CSR	ZHUZF	CNY	1.02	0.97	1.12	NA	NA	0.39	0.38	0.44	NA	9.33	1393.07	1371.93	1597.68	NA	NA	

Table 208: Energy Efficiency Exposure Stock - Index

			EPS		EPS		DPS		DPS		EBITDA (in mn)		EBITDA				
<i>Bus</i>																	
FirstGroup Plc	FGROF	GBP	40.86	39.97	37.50	38.99	-0.17	22.12	23.67	23.67	22.48	3.47	673.20	744.84	709.18	713.96	-0.02
Go-Ahead Group	GHGUF	GBP	135.16	144.27	132.38	131.59	0.63	81.00	86.46	88.70	92.11	2.30	164.30	165.69	163.06	167.64	2.28
National Express	NXPGF	GBP	26.88	25.30	27.24	29.05	5.43	9.60	10.08	10.58	11.11	15.25	331.56	327.65	349.66	364.35	10.68
Stagecoach Group	SAGKF	GBP	23.53	25.54	26.32	22.44	4.90	7.10	54.60	7.90	7.86	4.99	315.30	322.93	316.91	301.46	2.70
<i>Shipping</i>																	
Yangzijiang	YSHLF	CNY	1.05	1.16	1.17	1.15	10.65	0.31	0.35	0.35	0.35	19.88	3944.03	4588.39	4708.22	4592.97	11.72

Source:BoFA Merrill Lynch Global Research

01 March 2012

Table 209: Companies mentioned in this report

Company	BofAML Symbol	Recommendation	Q-R-Q	Price
Autos				
Aquarius Platinum	AQPBF	BUY	C-1-9	USD 136
BorgWarner	BWA	BUY	C-1-9	USD 82
Clean Energy	CLNE	BUY	C-1-9	USD 19
Continental AG	CTTAF	NEUTRAL	B-2-9	EUR 69
Eirringklinger AG	EGKLF	UNDERPERFORM	B-3-7	EUR 24.83
Faurecia	FURCF	NEUTRAL	C-2-7	EUR 21.31
Johnson Controls	JCI	BUY	C-1-7	USD 33.19
Johnson Matthey	JMPLF	NEUTRAL	A-2-7	GBP 2336.00
Lanxess	LNVSF	BUY	B-1-7	EUR 57
Magna Intl	MGA	BUY	C-1-7	USD 47
Michelin	MGDDF	BUY	B-1-7	EUR 53
LKQ Corp.	LKQX	NEUTRAL	B-2-9	USD 32
Solvay	SVYSF	BUY	B-1-7	EUR 91
Tesla Motors	TSLA	BUY	C-1-9	USD 34
Toray	TRYIF	BUY	B-1-7	JPY 578
Valeo	VLEEF	BUY	B-1-7	EUR 41
Victrix	VTXPF	NEUTRAL	C-2-7	GBP 1353
Westport Innovations	WPRT	BUY	C-1-9	USD 44
Buildings				
CSR Ltd	CSRLF	UNDERPERFORM	B-3-8	AUD 2
Honeywell Intl.	HON	BUY	B-1-7	USD 59
Ingersoll-Rand	IR	BUY	B-1-7	USD 40
Johnson Controls	JCI	BUY	C-1-7	USD 33
Kingspan	KGSPF	BUY	C-1-7	EUR 8
Kone OYJ	KNYJF	BUY	A-1-7	EUR 46
Nippon Sheet Glass	NPSGF	NEUTRAL	B-2-7	JPY 144
Rinnai Corp	RINIF	BUY	B-1-7	JPY 5800
Saint Gobain	CODGF	BUY	B-1-7	EUR 36
United Tech	UTX	BUY	B-1-7	USD 84
Industrials				
ABB Ltd.	ABLZF	BUY	B-1-7	USD 19
Alfa Laval	ALFVF	UNDERPERFORM	B-3-7	SEK 135
Alstom	AOMFF	BUY	B-1-7	EUR 32
Atlas Copco	ATLKF	NEUTRAL	B-2-7	SEK 173
Crompton Greaves	CPGZF	UNDERPERFORM	C-3-7	INR 149
Eaton Corp	ETN	BUY	B-1-7	USD 52
Electrolux	ELUXF	NEUTRAL	B-2-8	SEK 140
GEA	GEAGF	BUY	B-1-7	EUR 25.4
Hexagon AB	HXGBF	BUY	B-1-7	EUR 134
Honeywell Intl.	HON	BUY	B-1-7	USD 59.27
Invensys	IVNSF	BUY	C-1-7	GBP 212
Metso	MXTOF	NEUTRAL	C-2-7	EUR 35.81
Nexans	NXPRF	NEUTRAL	B-2-7	EUR 53
Phillips	PHGFF	UNDERPERFORM	B-3-8	EUR 16
Prysmian	PRYMF	BUY	C-1-8	EUR 13
Rexel	RXLSF	NEUTRAL	C-2-8	EUR 17
Rockwell	ROK	BUY	C-1-7	USD 83
Schneider	SBGSF	BUY	B-1-8	EUR 51
Siemens	SMAWF	NEUTRAL	B-2-7	EUR 75
Siemens Ltd	SMNBF	UNDERPERFORM	C-3-8	INR 792
SMC	SMECF	BUY	A-1-7	JPY 13840
Spirax-Sarco	SPXSF	NEUTRAL	C-2-7	GBP 2086
Vallourec	VLOUF	UNDERPERFORM	C-3-8	EUR 54
Information Technology				
Amazon.com	AMZN	BUY	C-1-9	USD 179
ARM Holdings	ARMHF	UNDERPERFORM	C-3-7	GBP 574
ASML NA	ASMLF	BUY	B-1-7	EUR 35
Cisco Systems	CSCO	BUY	B-1-7	USD 20.14
EMC Corp	EMC	BUY	C-1-9	USD 27.52
Equinix	EQIX	BUY	B-1-9	USD 138.79
Google	GOOG	BUY	C-1-9	USD 609.90

01 March 2012

Table 209: Companies mentioned in this report

Company	BofAML Symbol	Recommendation	Q-R-Q	Price
Hewlett-Packard	HPO	BUY	B-1-7	USD 27
IBM	IBM	BUY	B-1-7	USD 198
Intel	INTC	BUY	B-1-7	USD 27
InterXion	INXN	BUY	C-1-9	EUR 15
Salesforce.com	CRM	BUY	C-1-9	USD 144
Telecity	TLCTF	BUY	C-1-7	GBP 682
VMware Inc	VMW	BUY	C-1-9	USD 101
Lighting and LEDs				
Cree, Inc.	CREE	UNDERPERFORM	C-3-9	USD 29
Epistar	EPIPF	UNDERPERFORM	C-3-7	TWD 78
Everlight	EVLEF	UNDERPERFORM	C-3-8	TWD 67
Genl Electric	GE	NEUTRAL	B-2-7	USD 19
Philips	PHGFF	UNDERPERFORM	B-3-8	EUR 16
SemiLEDs	LEDS	UNDERPERFORM	C-3-9	USD 4
Seoul Semiconductor	SLSOF	UNDERPERFORM	C-3-7	KRW 25300
Siemens	SMAWF	NEUTRAL	B-2-7	EUR 75
Veeco Instr.	VECO	NEUTRAL	C-2-9	USD 29
Smart grid and energy storage				
A123 Systems	AONE	BUY	C-1-9	USD 2
Ameresco Inc.	AMRC	BUY	C-1-9	USD 14
EnerNOC Inc.	ENOC	UNDERPERFORM	C-3-9	USD 10
Iltron Inc.	ITRI	UNDERPERFORM	B-3-9	USD 45
SAFT	SGPEF	NEUTRAL	C-2-7	EUR 23
SQM	SQM	NEUTRAL	C-2-7	USD 60
Transport - rail, bus & shipping				
Railway				
Ansaldo STS SPA	ASDOF	BUY	B-1-7	EUR 8
Bombardier Inc.	YBBD B	UNDERPERFORM	C-3-8	USD 5
CAF	CAUXF	BUY	B-1-7	EUR 408
Canadian Natl	CNI	NEUTRAL	B-2-7	USD 77
CRCC	CWYCF	UNDERPERFORM	B-3-7	CNY 6
CRG	CRWOF	NEUTRAL	B-2-7	CNY 3.06
CSR	CSRGF	UNDERPERFORM	B-3-7	HKD 6.0
Guangshen Railway	GNGYF	NEUTRAL	C-2-8	CNY 2.98
Vossloh	VOSSF	UNDERPERFORM	B-3-8	EUR 80
Zhuzhou CSR	ZHUZF	NEUTRAL	B-2-7	CNY 19
Bus				
FirstGroup Plc	FGROF	UNDERPERFORM	B-3-8	GBP 295
Go-Ahead Group	GHGUF	NEUTRAL	B-2-7	GBP 1290
National Express	NXPGF	BUY	B-1-7	GBP 222
Stagecoach Group	SAGKF	BUY	B-1-7	GBP 268
Shipping				
Yangzijiang	YSHLF	BUY	C-1-7	CNY 1

Source: BofA Merrill Lynch Global Research

Price objective basis & risk

Toray (3402)

Our JPY670, which is about 1.73x our FY3/12 BPS forecast. We derive our price objective from past correlation between ROE and P/B. However, the P/B we apply is discounted 10%, reflecting the effects of reduced demand and price-softening risks for ordinary products in the carbon fiber industry. Our JPY670 price objective is equivalent to EV/EBITDA of about 9.3x, about the average of the range over the past 10 years. It also equates to a P/E of 17.6x. Excluding outliers, Toray's adjusted P/E has ranged between 12x and 37x over the past 10 years. While this is a high valuation compared with industry peers, we believe a premium of this level is appropriate in light of the company's technological strengths and growth potential as a cutting-edge materials maker. Our adjusted FY3/13 ROE forecast is 10.6%.

In addition to larger-than-expected forex and raw material/fuel cost fluctuations, risks to our price objective are (1) production trouble with Boeing 787 deliveries or a major delay in scheduled production of 10 units per month, (2) further drops in carbon fiber prices due to harsher competition, (3) a change in the company's commitment to cost control, and (4) an unexpected sudden change in LCD-related demand. In addition, when capex increases, investment in low-return fields would also constitute a risk.

Nippon Sheet Glass (5202)

Our price objective of JPY155 is about 0.85x our end-March 2012 BPS estimate. This multiple is based on our FY3/13 ROE estimate of 9.2%, the historical correlation between ROE and P/B, and the balance between ROE and P/B for comparatives. Our BPS estimate reflects current exchange-rate levels, and the P/B multiple we use is a 10% discount to that based on the historical correlation between ROE and P/B, in light of macroeconomic uncertainties and exchange-rate risks. Our new price objective works out to an FY3/12E P/E of 10.0x and an EV/EBITDA of 7.9x.

The risks to our price objective are in addition to larger-than-expected changes in exchange rates and energy costs, 1) heightened expectations of the company's glass for photovoltaic power generation because of renewed interest in renewable energy resulting from the nuclear reactor problem (an upside risk), 2) stronger-than-expected demand for building glass in Europe (an upside risk), 3) negative effects on construction and auto production from tighter policies in emerging countries (a downside risk), and 4) investments in businesses with low returns, and so on. The company's huge amount of currency translation adjustments on the balance sheet, owing to locations of plants and facilities, could make BPS very volatile.

Rinnai Corp (5947)

We set our PO for Rinnai at Y6,500, based on a P/E of about 16x our FY3/13 EPS estimate. We derive this from adding the premium value of cash-cow business to average P/E of housing equipment sector by also taking into account P/B and ROE correlation. We also value the stock based on EPS growth forecast up to FY3/14, and over 12% ROE. Though trading at a premium on P/B, we expect strong ROE to be maintained on: (1) stable domestic shipments supported by replacement demand, (2) a strong lead in terms of technology and patents, constituting high global barriers to entry and thus a weak competitive threat, (3) an expected slight trend back to gas and move away from all-electric homes due to energy-saving requirements, and (4) growth in domestic gas equipment in emerging markets. Risks are sharp price declines due to excessive price

competition, a slump in housing starts, protracted delays in restoring the supply chain to normal, high copper prices, and a slow response to any gas equipment accidents.

SMC (6273)

Our price objective for SMC (6273) is JPY16,000, which corresponds to an EV/EBITDA of around 8x (7x including insurance reserves) and P/E of 17x based on our FY3/13 estimates. We have taken into account the low end of the EV/EBITDA range during the previous period of earnings expansion and the share price valuation the last time earnings peaked.

Downside risks to the share price are: lower capex by the semiconductor/LCD and auto industries, which are the company's main clients, and a shift in forex rates towards a stronger yen.

A123 Systems (AONE)

Our price objective of \$4 is supported by two valuation metrics: (1) price-to-sales multiple of 2.5x based on our 2012 estimated sales which we think is likely to materialize as the company ramps production, and (2) a discounted cash flow analysis with a WACC of 12.9%, a terminal EV/EBITDA multiple of 7.0x, and an additional 40% adjustment to account for increased execution risk.

Downside risks to our price objective are: (1) the company's key auto relationships with various OEMs may fail to evolve, (2) the company's patent litigation may result in a higher-than-expected royalty fee, (3) the electric vehicle industry could develop later than expected or not at all, and (4) Asian companies with more battery experience and greater resources could dominate the battery market.

ABB Ltd. (ABLZF)

Our Price Objective of CHF23/USD25.56 is based on applying our sector average 2013E target sector EV/EBIT multiple of 10x. This is in line with the through cycle sector average. We believe that growth for ABB should be at least as strong as the sector average given its higher than average exposure to emerging markets.

Risks to our price objective are a rapid slowdown in power infrastructure spending and/or a marked slowdown in industrial investment.

Alfa Laval (ALFVF)

Our SEK 130 price objective is based on applying a target 2013 EV/EBIT multiple of 10x to our 13e operating profit. We think this multiple is appropriate given Alfa Laval's strong growth outlook and resilient margins, but lower demand visibility.

Downside risks to our price objective would come from a collapse in commodity prices or a weakening of emerging market growth. Upside risks would be stronger margin execution.

Alstom (AOMFF)

Our Price Objective of Eur 41 is based on our sum-of-parts valuation. At our price objective Alstom would trade on a calendar 2013E EV/EBIT of 8.0x, a 20% discount to our sector multiple. We believe a discount is fair given the Eur46bn order backlog and late cycle earnings. Our expectation is that 2011/12 is likely to be trough earnings for Alstom.

Risks to our price objective would be a lack of recovery in Power orders and poor execution on long term contracts.

Amazon.com (AMZN)

Our price objective for Amazon is \$235, representing 1.4x 2013E sales, within the historical forward P/S range of 0.8-2.0x. We think Amazon can maintain approx. 30% growth in 2012/2013, justifying its premium relative multiple. Risks to our price objective are a consumer spending slowdown, the digitization of media, loss of customer confidence due to the AWS outage, and margin pressure from competitive pricing actions, tablet strategy and technology investment. The stock has been subject to heavy volatility in the past, based on margin trends, and this volatility could increase due to economic uncertainty.

Ameresco Inc. (AMRC)

Our price objective of \$15 is supported by three valuation metrics: (1) EV/EBITDA target multiple of 11x our 2012 EBITDA estimate of \$86 million, representing a 15% premium to a select group of smart grid and efficiency related comparables, (2) forward P/E target multiple of 15x on our 2012 adjusted EPS estimate of \$1.05, corresponding to a blended average of efficiency and renewable project developers, and (3) a discounted cash flow analysis supporting a \$18-19 valuation with a WACC of 13.2% and a terminal EV/EBITDA multiple of 6x. We expect that investors will begin to focus more on the energy efficiency aspect of the story and less on the construction side over time.

Risks to our price objective: (1) softness in the credit markets, resulting in difficulty in getting projects financed, (2) increased competitive focus in the energy services business from large equipment manufacturers, (3) a reversal in supportive governmental policy and stimulus for increasing energy efficiency measures, and (4) lack of backlog growth that is the well for future revenue growth.

Ansaldo STS SPA (ASDOF)

Our 12M price objective of EUR8.2 is based on a weighted DCF model (WACC at 9.5%) for 2012E and 2013E, which assumes three stages: 1) three years with sales growing at a 6.7% CAGR and an EBIT margin converging to 10.2%, 2) two years with sales growing by 3.1% at a stable 10.2% EBIT margin, 3) a final stage with EBIT growing at a terminal rate of 2%.

The risks to our price objective are: 1) Government fiscal constraints and deleveraging trends may affect the pipeline of new projects and growth prospects, 2) competition for volumes from large conglomerates such as Alstom, Siemens and Bombardier, and lower-cost Asian competition, could lead to price pressure, 3) the company could fail to deliver on its ambitious cost-cutting programme, 4) execution and delay risk as turnkey projects gain relevance and orders get bigger, 5) rising international exposure could put pressure on resources and margins, and 6) currency risks may affect profitability and competitiveness (especially if the euro appreciates significantly vs other currencies).

Aquarius Platinum (AQPBF)

Our price objective of GBp195/sh is based on our DCF valuation (WACC:10%, no terminal value). This would place Aquarius on around a 1.8x P/NPV multiple, still towards the lower end of the group's recent trading range of 1.5-2.4x NPV. Risks to our price objective are that our forecasts on the rand exchange rate and/or PGM prices prove to be incorrect, unplanned power disruptions lead to further

production downgrades in South Africa and unforeseen operating problems at the mines.

ARM Holdings PLC (ARMHF)

We rate ARM Underperform with a price objective of 475 pence (GBP 4.75) or \$22.79/share. Our price objective is based on a ten year discounted cash flow model to reflect ARM's long-term licensing and royalty business. We assume 10% weighted average cost of capital and 4% terminal growth rate in line with the broader semiconductor market annual unit growth.

Downside risks: 1) Pressure on royalty per chip as mix shifts to non-mobile applications and lower-priced emerging market smartphones, 2) Lumpiness in signing licensing contracts, 3) Competitive risks from Intel x86 and MIPS architectures and from internal R&D teams at customers developing their own intellectual property rather than licensing from ARM, 4) Impact of macroeconomic weakness on the semiconductor industry revenues, 5) Premium valuation makes stock vulnerable to any disappointments.

Upside risks: 1) Potential for growth in new areas such as PCs and servers. 2) Ability to increase content/chip by licensing higher value-add intellectual property. 3) Stability in smartphone pricing as high-end sales offset emerging market drag, 4) Long-term annuity like growth model could sustain premium valuation for considerable period of time. 5) Upside to margins as revenue mix shifts to royalties.

ASML Holding N.V. (ASMLF)

ASML is one of the leading providers of lithography equipment with over 70% market share. The company's systems enable chip manufacturers to advance down the technology curve, and is considered one of the most critical equipment in a semiconductor fab. Due to this, ASML's lithography equipment benefit from the secular trend of rising ASPs which in turn leads to increasing lithography intensity. EUV (Extreme Ultra Violet) is a long term product opportunity. We expect ASML to trade at a premium due to its technology lead and strong market share position. With front-end peers trading at 13x CY12 EPS, we conservatively apply a 15x multiple on CY12E EPS of EUR2.50 and add back excess cash to arrive at our PO of EUR39. Our US\$ price objective is \$51 (ADR).

Risks to our price objective are a cyclical downturn in semiconductor capital spending, a weaker than expected macroeconomic backdrop, execution risks associated with progress on EUV development and/or an unfavorable correlation of the Euro to JPY impacting ASML's margin profile. Given the company's high market share, there could be potential pressure from competitors, especially if they develop a technologically equivalent system at the leading edge nodes.

Atlas Copco (ATLKF)

Our SEK 175 price objective (A share) based on applying a 10 % sector premium to our 2013e target sector EV/EBIT multiple of 10.0x to forecast 2013 operating profits. We think a sector-premium is warranted, given a strong track record for cash generation and growth.

Risks to our price objective would come from renewed weakness in pricing trends or a further pullback in commodity prices (which would impact equipment demand).

Bombardier Inc. (YBBD B)

We arrive at our price objective of C\$4.85 on the basis of a 12x CY12E PE multiple and a 1.0143 USD/CAD exchange rate. Our 12x CY12E multiple is

based on where peer aerospace and defense mid and small cap companies are trading.

Risks are: Higher oil prices would likely derail air traffic growth and, therefore, aircraft demand, resulting in a downturn in commercial aviation. A downturn in commercial aviation, due to an exogenous factor, such as a terrorist attack or natural business cyclicalities, could adversely impact BBD's financial results. If the commercial aerospace and business jet upturns are better than we are forecasting, earnings could fare better than our projections and the stock could perform better. If margins fare better than we are forecasting, there could also be upside to our valuation. Risk also exists with new aircraft development, such as the Learjet 85 and the C-series. Declining tax revenues, resulting from an economic downturn, could negatively affect BBD's rail transport business if governments consequently decrease related spend.

BorgWarner (BWA)

Our \$100 price objective is based on an EV/EBITDA of about 9x using our 2012 estimates. In our view, BWA possesses all three tenets of a successful supplier, namely proprietary technology, a relatively solid balance sheet, and customer diversification. At 9x EBITDA, BWA's shares would command a slight premium to historical averages, which we believe is warranted considering OEMs are likely to focus on fewer, well capitalized suppliers. Downside risks to our objective 1) an extreme drop in gas prices coupled with relaxed fuel efficiency regulation 2) increased competition in the turbo industry 3) a downdraft in volumes 4) an even more severe than expected increase in raw material costs.

CAF (CAUXF)

Our 12M price objective of EUR495 is based on a weighted DCF model (WACC at 9.5%) for 2011E and 2012E, which assumes three different, consecutive stages: 1) a three year phase with revs growing at 6% CAGR and a stable EBIT margin of 10%, 2) three years with sales at a 3% CAGR and 9% EBIT, 3) and a terminal stage with stable 2.5% EBIT growth. We have not subtracted from our resulting EV any advanced payments, given that such payments are modelled following our order backlog estimates and thus their positive or negative effect is reflected in our cash flow model.

The risks to our price objective are: 1) competition from large engineering companies (eg, Alstom, Siemens), 2) currency risks, especially the US dollar, 3) Kutxa, CAF's second-largest shareholder could choose to reduce its shareholding in the open market, 4) Spain's deep recession might compromise prospects in the domestic market, 5) a deterioration of the economic environment and credit conditions could slow or freeze new project awards, cause price wars and/or worsen payment collection.

Canadian National (CNI)

Our \$83 price objective is based on a 15.5x multiple on our 2012 EPS estimate of US\$5.36 (C\$5.42), above the mid-point of the company's 10-17.2x 15-year historical trading range. We believe this is an appropriate multiple given the ongoing upside in rail volume growth, the potential for better-than-expected operating leverage, and the continued positive pricing at the rails. Risks to our estimates and price objective are slower-than-expected economic growth, higher-than-historical-average fuel costs and those costs outpacing fuel surcharges, potential disruptions from a highly unionized (79%) labor force, volume or pricing softness, regulatory changes (such as retroactive grain rate adjustments), a surge

in the Canadian dollar relative to the U.S. dollar, and external factors (such as weather) impacting operations. Disruptive rail re-regulation that limits the company's ability to earn proper returns on its investments would also be a downside risk.

China Railway Construction (CWYCF)

We use a P/B valuation approach given CRC's weak earning outlook. We think CRC should trade below its book value due to a sharp slowdown of rail contract. Our PO of HK\$5.3 is based on 0.8x 2012E PB. We think CRC should trade at a higher target PB than CRG (0.7x 2012E PB) because of CRC's relatively higher ROE and better margin.

Risks to our PO:

1. FAI slowdown is quicker and deeper than our expectation, and the slowdown will reduce the new contract secured and affect the revenue and earnings stream for 2012E onwards.
2. Raw materials price and labor costs inflate more rapidly than expected, resulting in margin squeeze.
3. Recent measures by the Chinese government to cool down property markets may reduce construction work available on residential buildings and hence increase competition on infrastructure works.

China Railway Group (CRWOF)

We use a P/B valuation approach given its weak earnings growth momentum. We think CRG should trade below its book value due to a sharp slowdown of rail contract. Our PO of HK\$3.25 is based on 0.75x 2012E PB, as we roll over our valuation basis to 2012 and the new order and cash flow outlook is improving. We think CRG should trade at a lower target PB than CRC because of CRG's relatively low ROE and margins.

Risks to our PO:

1. A quicker and deeper FAI slowdown than we expect, reducing new contracts secured and affecting the revenue and earnings stream for 2012E onward.
2. Raw materials prices and labor costs inflate more than expected, resulting in a margin squeeze.
3. Recent measures by the Chinese government to cool down the property market may reduce construction work available on residential buildings and thus increase competition on infrastructure works.

Cisco Systems (CSCO)

Our \$24.00 PO is based on 11.5x our CY2013 EPS estimate of \$2.06. This target represents a discount to the historical 2-year forward multiple of 13x, reflecting our view that Cisco's long-term revenue growth rate going forward is likely to slow to the 5-7% range, down from historical trends of low-to-mid double digits range.

Risks to our price objective are: (1) deterioration in the spending environment, (2) lack of recovery in public spending, a vertical that Cisco dominates, (3) downside risk to gross margin stemming from pricing and competitive pressures (4) technological changes that would adversely impact high profit switching and routing segments, (5) inability to drive technological innovation in its core and new growth segments, and (6) change in customer behavior that would result in revenue pressure in services and other key areas.

Clean Energy Fuels Corp. (CLNE)

Our price objective is \$21. Our valuation is based on a discounted cash flow analysis with a WACC of 13% and a terminal EV/EBITDA multiple of 8.5x, which is consistent with the median high growth cleantech multiple and reflects the potential growth in demand we expect for Nat Gas Vehicles (NGVs).

Risks to our PO are: (1) a weakening economy could reduce fuel demand, (2) a lower oil price could slow adoption of natural gas fuel, (3) large fleets may choose to meet the clean air standard by going to clean diesel trucks rather than natural gas, (4) other technologies such as vehicle electrification and biofuels gain in prominence, (5) increased competition from established fuel retailing companies pressuring margins, and (6) increased shareholder dilution arising from future offerings and warrant expirations.

Continental AG (CTTAF)

Our EUR65/US\$83.8 price objective is primarily based on our SoP analysis of the company, which now suggests a EUR67.6 theoretical fair value estimate for the shares, based on our 2012 estimates applying a 15% discount for the shareholding structure and high leverage. We also look at the close correlation between short-term margin prospects and EV/Sales multiples and use DCF as a back-up. At EUR65, Continental shares would trade on 66% EV/sales 2012E, a multiple that would better reflect the sustainable level we expect for Continental's operating margin - close to 10%.

Risks to our PO are industry-related for auto parts companies: volatility in light-vehicle production and mix deterioration, rising raw material costs, a potential price war in the tyre industry, pricing pressure from customers, increased R&D transfers from OEMs, recalls (implying potential warranty claims) and exchange rates volatility.

Continental's specific risks relate to a high leverage, refinancing needs in 2014, potential changes in the regulatory environment on automotive safety, as well as risk from Schaeffler's own debt situation that could lead to potential shares flowback.

Short-term risks for minority holders are also the possible terms of a potential merger between Schaeffler's operating assets and Continental in 2012 - multiples applied and additional debt.

Cree, Inc. (CREE)

Our price objective of \$22 per share is based on target P/E multiples of 21x our FY2012 adjusted EPS estimate of \$1.03 and 16x our FY2013 adjusted EPS estimate of \$1.39. At these levels the stock would trade near its historical trough, which we see as appropriate given the company's declining operating leverage. Our DCF suggests a similar level, reflecting Cree's solid free cash flow and the potential growth of the LED market. Our DCF incorporates a weighted average cost of capital of 13.3% and a terminal EBITDA multiple of 9.0x, which is in line with similar high-growth category leaders.

Upside Risks to our PO are: (1) sharp uptick in demand for efficient lighting solutions leading to higher fab utilization, increased pricing and expanding margins, (2) an accelerated transition to 6-inch wafer capacity which would help the company improve manufacturing costs more rapidly and increase throughput, (3) increased government and regulatory support for environmentally friendly lighting solutions, and (4) declining competitive forces surrendering to Cree's

proven superior efficacy products.

Downside Risks to our PO are: (1) increasing competition and associated pricing pressure, (2) the gross margin peaking, (3) customer hesitancy due to the high upfront bulb cost, and (4) manufacturing glitches as capacity ramps up.

Crompton Greaves (CPGZF)

Our PO of Rs139 is based on SOTP. We assign a 10x P/E (40% discount to the 5-year average of 17x) to Sept 2013 earnings for core operations. We value Crompton's 28.8% stake in Avantha Power on a DCF basis, at Rs8/sh (Rs4.6bn). In addition, we also assign a DCF value of Rs4/sh for Crompton's Jalgaon Distribution franchise. Price recovery in the domestic power segment, a pick-up in ordering activity for international subsidiaries and faster-than-estimated benefits from management's new strategy are key risks to our call.

Downside risks to our PO are continued pressure on pricing in domestic transformer segment and further losses booked on orders in international subsidiaries.

CSR (CSRLF)

Our price objective of \$2.10 is broadly in line with our fundamental valuation (\$2.22) which is based on a weighted average valuation of DCF (\$2.52 - WACC 9.4%), Sum of the Parts (\$2.04 - 20 pct weighting) and PE relative (\$1.85- 30 pct weighting).

The discount is due to placing more weight to current earnings drivers given our concerns over Australian housing starts, aluminium prices and potentially currency.

The upside risks to our PO are a steep recovery in Australian housing and large recovery in aluminium prices. The downside risks to our PO are a further Australian housing decline and appreciation in the A\$.

Eaton Corp (ETN)

Our PO of \$62 is based on applying a 12x multiple to our '13E EPS of \$5.19. 12x is below the historical average P/E of 14x, but in line with multiples achieved in the later stages of industrial recovery. We also think ETN might achieve higher multiples in the next cycle due to more consistent execution.

Risks to our price objective are: 1) A worse-than-expected global industrial recession, particularly a commercial construction downturn, could derail EPS recovery, 2) More active M&A strategy is inherently risky as it relies on the availability of accretive synergistic targets and the company's ability to integrate, 3) ETN's low tax rate could be unsustainable, 4) Antitrust lawsuit with ArvinMeritor could be an overhang on the cash flow.

Electrolux (ELUXF)

Our SEK140/ADR:US\$41.6 price objective is based on applying an EV/Sales multiple of 0.40x to our 2013 forecasts. This implies a through cycle margin of 5.5%, which is just below Electrolux's stated target, which seems reasonable given the likelihood of additional restructuring costs. At this price Electrolux would trade on a 2013e EV/EBIT of 7.7x, which we see as appropriate given pricing risks and lower growth prospects.

Downside risks to our price objective are deterioration in pricing and any

significant rise in raw material costs. Upside risk would be a stronger economic rebound.

ElringKlinger AG (EGKLF)

We have a price objective of EUR15, based on our fundamental view on the company's prospects over the next 18 months and its relative valuation versus its peer group in European auto components. Our valuation primarily relies on the high correlation between operating margin and EV/Sales multiples. We use a DCF valuation as a back-up (assuming 8.5% discount rate, 3% long-term growth assumption) that suggests EUR13.4 as fair value.

At our price objective, ElringKlinger would trade on 11.5x earnings on our 2012 estimates to reflect superior earnings growth, 5.1x EV/EBITDA and 106% EV/Sales, premium multiples reflecting accurately the company's growth and margin prospects, in our view.

Upside/downside risks: Industry-related risks for auto parts companies are volatility in light-vehicle production, rising/falling raw material costs, pricing pressure from customers, increased R&D transfers from OEMs, recalls (implying potential warranty claims) and exchange rates volatility.

EK's specific risks relate to its relatively high exposure to Western Europe, high level of expectations and the execution risk on potential acquisitions. EK's shareholding structure means that it could be a take-over play should the controlling family decide to sell. We view this possibility as unlikely in the near-term given EK's large valuation premium versus its peers and the family's participation in a recent rights issue.

EMC Corp (EMC)

Our 12-month PO of \$33 is based on 15x our C2012E NOPAT/share (excluding FAS123) of \$1.96 plus net cash of \$3.40/share. 15x non-GAAP is at the mid range of its historical range of 10-19x.

Risks to our price objective are: (1) VNXe uptake (new market), which could limit revenue upside, (2) increasing competition from stack players (HP, Dell, Oracle, etc.) who have added to their storage portfolios, (3) potential degradation of VMware share price, which has been highly correlated in the past. and (4) Continued Japan supply chain issues could impact revenue/margins

Emerson (EMR)

We derive our \$56 P.O. by applying roughly 14.5x (forward) P/E to our FY13 EPS estimate of \$3.85. Our 14.5x target forward multiple is toward the bottom of EMR's historical valuation range. While this valuation appears conservative, we believe the market is likely to be unwilling to assign a higher value toward Emerson's shares until a greater degree of economic and fundamental clarity begins to emerge.

Risks to our price objective are: deterioration of the global economy, lack of recovery in U.S. consumer markets and rapidly rising raw material costs that could impact the company's margins.

EnerNOC Inc. (ENOC)

Our \$9.0 price objective is 6.0x our 2013 EBITDA estimate, which corresponds to smart grid multiples, discounted back two years at a 15% discount factor. Our

discounted cash flow analysis points to a similar value, applying a WACC of 18% and a terminal EBITDA multiple of 6.0x.

Upside Risks to our PO are: (1) increased peak load demand leading to increased demand for emergency and price responsive DR, (2) increased government and regulatory support for DR and energy efficiency solutions, (3) M&A activity, (4) lack of competitive pricing pressure leading to stable and/or expanding gross margins, and (5) improving pricing and demand in open market reliability programs.

Downside Risks to our PO are: (1) electricity demand could be weak, reducing DR needs, (2) EnerNOC could experience pricing pressure in open market auctions, where the majority of the company's megawatts under management are obtained, (3) rising competition, including possible disintermediation by utilities, (4) high overhead and lack of profitability, and (5) increased regulatory scrutiny and/or negative rulings affecting treatment of curtailment capacity and pricing.

Epistar (EPIPF)

Given the extreme cyclical nature of earnings and high fixed cost as percentage of cost, we use P/B to derive our PO. Our PO of NT\$69 is based on 1.1x 2012 P/B, the low end of its historical trading range.

Upside risks to our price objective are 1) faster adoption of LED-TVs and LED general lighting, and 2) increased outsourcing from global LED players to Epistar. Downside risks are 1) faster entrance into LED production by panel makers or downstream competitors, and 2) IP litigation from global participants and weakening consumer end-demand.

Equinix, Inc. (EQIX)

Our \$155 price objective is based on DCF analysis. Our analysis assumes a 7x terminal EBITDA multiple and WACC of 7.7%, based on a 6% marginal interest cost. Our price objective implies a 10x '13E EBITDA multiple, reasonable, we believe, in the context of mid-teens EBITDA growth and yet still below its historical average of 17x.

The risks to our price objective are: 1) a prolonged downturn in Enterprise IT spending, 2) meaningful exposure to the financial industry, 3) fluctuating FX rates, and 4) the company deciding to definitively not convert to a REIT.

Everlight (EVLEF)

Our PO of NT\$47.3 is based on 12x 2012 EPS, trough cycle valuation vs. its 8-27x range in the past cycles due to less exposure in backlights and lighting, as well as the rising competition in handsets. We believe Everlight will face fundamental headwinds due to a weaker LCD panel customer base and the delayed ramp-up in general lighting until 2012. Longer term, the competition in LED packaging is set to intensify as most LCD panel makers will have their own in-house LED vertical integration, especially in downstream packaging.

Upside risks to our price objective are stronger-than-expected LED-TV demand and an earlier-than-expected pick-up in general lighting. Downside risk is worse-than-expected oversupply in LED industry.

Faurecia (FURCF)

We have a price objective of EUR22, based on our view that margins should

remain higher than history in 12E-13E but that net debt should remain largely unchanged due to a peak in capex and capitalized R&D. We forecast underlying margins at 3.7% in 2012E and 4.2% in 2013. At our PO, Faurecia would trade on 3.9x EV/EBITDA 12E and 24% EV/Sales at a discount to sector multiples reflecting Faurecia's high leverage and the risk to see a potential flow-back of shares should Peugeot decide to cut their stakes. Faurecia would trade on 8x reported 12E.

Industry-related risks for auto parts companies are volatility in light-vehicle production, rising raw material costs, pricing pressure from customers, increased R&D transfers from OEMs, recalls (implying potential warranty claims) and exchange rates volatility.

Faurecia-specific risks relate to its relatively high exposure to steel and plastic costs, as well as to contract management. Risk to our PO derives from potential potentially lower cost-saving benefits than anticipated, a 'double dip' in European volumes, a potential deal in Seats that could be dilutive for shareholders or the possible partial or complete sale of main shareholder Peugeot's stake.

FirstGroup Plc (FGROF)

We use a DCF based SOTP methodology to achieve our PO of 285p. Our DCF uses a WACC of 7.8%. Our PO implies an EV/EBITDA of 5.2x and a P/E of 7.1x (FY12e), at a slight sector discount, which we believe to be justified given the limited growth prospects. Downside risks to our PO are: Higher than expected swings in the US dollar (c. 56% of operating profit has US exposure), a slowdown in transport volume growth, higher than expected fuel and wage inflation and a cut of the dividend.

Genl Electric (GE)

We realize our \$19 P.O. by deriving valuations for GE Industrial and GE Capital, individually. We apply a Price to Tangible Book Value (TBV) multiple just under 1.0x (an approximately 50% premium to GE Capital's large cap peers) to GE Capital's estimated TBV per share in 2013 to derive a valuation for GE Capital per share of roughly \$6. We apply a 13x target multiple to GE Industrial's 2013 EPS contribution to derive GE Industrial's valuation per share of roughly \$13. Collectively, the sum of GE Capital and GE Industrial valuations equates to roughly \$19. In turn, the imputed forward P/E for GE shares equates to a 10.5 times forward P/E on our 2013 EPS estimate.

Risks to our price objective are: further unforeseen losses/write-downs/impairments, higher-than-expected tax rates, and prospectively new restrictive policies under GE Capital's new regulator (the Federal Reserve). We also caution that if the financials were to further pull back, GE could trade down in sympathy.

Go-Ahead Group (GHGUF)

We use a DCF based SOTP to value Go-Ahead on a PO of 1,360p. Our DCF uses a WACC of 8.0%. Our PO implies an EV/EBITDA of 5.2x and a P/E of 10.0x (FY12e), at a premium to the sector, justified given its dominant market share positions in a number of UK bus territories and conservative international strategy. Downside risk is limited in our view given the current dividend yield. Risks to the upside/downside are: Higher/lower-than-expected transport volume and falling/rising fuel and wage inflation.

Google (GOOG)

Our price objective is \$710, representing 16x 2012E EPS of \$43. On an ex-cash basis, our PO represents 14x ex-cash EPS of \$42, plus \$125/share in cash. We believe Google will generate double-digit earnings growth over the next three years and the valuation multiple could expand as the company's mobile and display initiatives gain traction.

Risks to our PO are: 1) revenue growth pressure from competitor initiatives, 2) saturation of key markets given Google's dominant market share, 3) consumer cyclicality with general exposure to all economic verticals and 4) regulatory overhang. The stock has been subject to heavy volatility in the past based on revenue growth and margin trends and this volatility could increase due to economic uncertainty.

Guangshen Railway (GNGYF)

Our PO of HK\$3.2 is based on 3 stage DCF valuation with WACC of 11% (RFR of 3.5%, beta of 1.2) and terminal growth rate of -1%. Our PO implies 13x/15x for 2011E/12E earnings and a 3% prospective dividend yield, in line with the historical average.

Upside risks to our PO are: 1) traffic diversion from high speed train less severe than expected, 2) MOR reform to lead to potential M&A, 3) passenger tariff hike uncertainty. Downside risks is worse than expected traffic diversion.

Hewlett-Packard (HPQ)

Our PO of \$31 is based on approx 8 times our C2012E NOPAT/share estimate of \$4.60 less net debt of \$6. Our target multiple is below the average of the historical range of 11-15x, and could arguably be conservative, especially when end demand strengthens and given HP's track record of beating consensus EPS estimates.

Risks to our forecast and price objective are: (1) inability to realize targeted cost savings from initiatives and operating leverage implied in our estimates, (2) competitive pressure in enterprise servers and storage from IBM, Dell, Sun, EMC, NetApp, and others, (3) increased competition from Dell, Lenovo, Acer, Apple and others in PCs, (4) competition from Lexmark, Canon, Epson, Kodak, Xerox, and others in printing and imaging, (5) increased concern of waning consumer spending and tightening corporate IT budgets, and (6) unanticipated currency effects on revenue.

Hexagon AB (HXGBF)

Our price objective is SEK138. This is based on a DCF based valuation, which factors in 4.9% growth and 21% EBIT margins. These are above sector averages, but seem appropriate to us given recent performance and the acquisition of Intergraph.

This is equivalent to a 2013e PE of 13.8x. This represents a premium (debt adjusted) to our target sector multiple, reflecting higher growth rates beyond 2012, Intergraph synergies, a strong cash conversion and lower than average cyclicality.

Downside risks to our price objective would be a lower level of infrastructure spending in China or a failure of the Intergraph synergies to materialise.

Honeywell Intl. (HON)

We derive our \$70 PO by applying a 14.5x forward multiple to our 2013 EPS forecast of \$4.80. A 14.5x times forward multiple is consistent with the company's average multiple over the last 5 years. Moreover, we believe that Honeywell's margin runway (due in part to restructuring tailwinds) helps to insulate the company from macro-related risks. Risks to our recommendation and price objective are: acquisitions, specifically that Honeywell overpays for deals in the pursuit of diversifying and expanding its Automation and Control Solutions segment into new, faster-growing adjacent markets, and unforeseen future sales deceleration due to economic pressures (e.g., slowing global flying hours, lower-than-expected global auto production).

IBM (IBM)

Our PO of \$205 is based on 13 times our C2012E NOPAT/share estimate of \$14.42 (plus net cash of \$10.40). Our target multiple is within the historical range of 12-15x.

Risks to our forecast and price objective are (1) failure to execute on the company's EPS growth roadmap, (2) inability to realize expected cost savings from restructuring, (3) technology/competitor risk in hardware (enterprise servers and storage from Dell, Hewlett-Packard, Sun, EMC, NetApp, etc.), software, and services (Accenture, ACS, Hewitt Assoc, FDC, CSC, EDS, etc.), (4) unforeseen currency impacts on revenue and profits, (5) acquisition integration, given IBM's acquisitive nature, and (6) increased concern of waning consumer spending and tightening corporate IT budgets.

Ingersoll-Rand (IR)

Our PO of \$46 is based on applying a P/E multiple of 12x to our '13 EPS estimate of \$3.81. 12x is at a discount to the company's historical forward average P/E but in line with multiples achieved during later stages of cyclical recovery. \$46 would also put the company's '13E EV/Sales at 1.0x, which we think is appropriate at this point of the cycle. Risks to our PO are 1) a slower-than-expected economic recovery, particularly in the nonresidential construction activity, 2) lower-than-expected productivity improvement and cost synergies, 3) cash overhang from an ongoing tax dispute with the IRS.

Intel (INTC)

Our \$30 price objective reflects a 12.5x PE applied to our 2012 EPS estimate. The choice of PE is in between its large cap PC and tech comparables (10-11x) and 11-14x PE of Intel's direct semiconductor competitors.

Investment Risks: 1) 70% of revenues come from PCs, a market which faces a long-term threat from a variety of new tablet introductions, 2) Microsoft which has only supported Intel/AMD x86 architecture in PCs for over a decade has indicated that it plans to support the competing ARM architecture with the Windows 8 operating system, 3) New higher performance ARM processors expected in 2012 could begin to pressure its server market share, 4) Intel might find it difficult to enter the very competitive mobile apps processor market, 5) Successful making manufacturing process node transitions every 2 years, 6) Gross margins could drop significantly if PC demand ends up being worse than expected.

InterXion (INXN)

Our \$17 price objective implies an 8.6x 2012E EBITDA multiple, a discount relative to BofAML target valuation for peers EQIX and TCY, and supported by

DCF analysis (7x terminal EBITDA multiple, 10.1% WACC). Risks to our price objective are 1) a prolonged Enterprise spending downturn, 2) faster-than-expected competitive expansion, and 3) fluctuating currency exchange rates.

Invensys (IVNSF)

Our 275p/ADR US\$4.24 price objective is based on applying a 20% discount to our target sector 2013 EV/EBIT multiple of 10.0x. We think this discount is appropriate, given Invensys' growth outlook, but weak historic execution.

Risks to our price objective are (i) further sharp downturns in the US residential construction market, (ii) a failure to win orders in Process and (iii) a weaker US\$.

Itron Inc. (ITRI)

Our price objective of \$45 is supported by (1) a one-year forward P/E target multiple of 11x our 2012 adjusted EPS estimate of \$3.90, which we view as a reasonable 10% discount to comparable names, (2) a forward EV/EBITDA target multiple of 7x on our 2012 EBITDA forecast of \$300 million, and (3) discounted cash flow analysis with a WACC of 9.0% and a terminal EV/EBITDA multiple of 5.5x.

Upside risks to our price objective are: [1] New government stimulus programs aimed at increasing smart meter deployment, [2] increased growth for smart meters in emerging markets, [3] improved cost reductions stemming from company restructuring effort, and [4] increased smart meter interest from global utilities.

Downside risks to our price objective are: (1) AMR meter revenue falling offsets increases in AMI smart meters, (2) resistance from consumers seeing higher bills to implementation of smart meters, (3) increased competition from established and new entrants, (4) Itron's fast-follower strategy backfiring, and (5) failure to create value-added applications longer term.

Johnson Controls (JCI)

Our PO of \$44 represents an EV/EBITDA of approximately 10X using our 2012 estimates, which is within JCI's historical range. We believe an EV/EBITDA multiple within the historical range is warranted, given what we anticipate will be a solid cyclical recovery in automotive sales and production. We also expect JCI's Building Efficiency segment to gain momentum as the general economy continues to improve and municipal spending re-accelerates. Downside risks to achieving our price objective - 1) extreme underperformance in the Controls business as the economy slows, 2) worse-than-expected cost performance, 3) a rapid rise in raw material costs, most specifically steel.

Johnson Matthey (JMPLF)

Our PO of 2150p (ADR: US\$68.55) is based upon a DCF assuming NOPAT margins (excluding the value of metal prices) of 13% in 2012 and fading to 12.7% thereafter. We estimate capex trending down to 5.2% of sales long-term. Terminal growth is estimated at 3.5%, WACC being 8.5%. At our PO the stock would trade on c.14x for 2012E. Its premium EPS growth potential relative to the chemicals sector, and the long-term opportunities in emissions legislation are the reasons for the targeted premium rating relative to the sector.

Risks to our PO are: 1. A tepid recovery in truck and light vehicle production 2. Significant decline/increase in oil price which would impact growth in Process

Technologies 3. Pharmaceutical product failures or delays 4.
Deterioration/improvement in prospects for PGM prices.

Kingspan (KGSPF)

Our price objective is EUR7.75. This is the mid-point between estimates of fair value on the basis of DCF (assuming a WACC of 10.5%, equity risk premium of 8.5%, and long term growth rate of 2.0%) which gives theoretical fair value of EUR9.25 and on the basis of mid-cycle 2013E earnings, using a forward mid-cycle PE of 12x, giving theoretical fair value of EUR6.25.

At this EUR7.75 level the shares would stand at a 5% PE premium to December 2013E for the Building Products sector. We think this appears right for a group which, although exposed to short-term uncertainties, does have attractive long-term growth dynamics.

The upside risk to our price objective is that if the Industrial segment of demand (about 35% of revenues) experiences more robust demand than we anticipate, this may help EPS beat our forecasts. The downside risk comes from a slower recovery in housing-related demand, which would undermine our medium term projections.

Kone OYJ (KNYJF)

Our Eur 48 price objective is based on applying a 15% sector premium to our 2013e target sector EV/EBIT multiple of 10.0x to forecast 2013 operating profits. We think a sector-premium is warranted, given a strong track record for cash generation and growth, and the fact that 2012 would be the first recovery year for KONE.

Risks to our price objective are a sharper-than-expected increase in input costs, a sharp downturn in the Chinese market or a more sluggish rebound in US and European construction demand than we have modelled, and/or an expensive acquisition.

Lanxess (LNXSF)

At our PO of EUR52, the stock would trade on 9.6x 2012E PE. Our DCF valuation assumes average NOPAT margins of 7.1% 2012-14 and 6.1% in terminal year, terminal sales growth of 2.8% and a WACC of 8.6%.

Risks to our price objective are severe and prolonged customer de-stock/demand weakness, competitor capacity additions, a strong Euro and rising costs.

LKQ Corporation (LKQX)

Our PO of \$35 is based on EV/EBITDA and P/E multiples of roughly 11.5x and 19x, respectively, using our 2012e. LKQX's historical average EV/EBITDA and P/E ranges are from 9x-12x and 18x-24x, respectively. Upside risks: 1) acceleration in acquisition activity beyond our forecasts, 2) development of relationships with new customers, 3) a sustained increase in the trend of scrappage rates, 4) a sudden recovery in miles driven, or rapid aging of the US vehicle fleet. Downside risks: 1) further litigation against aftermarket parts, 2) difficulty integrating acquisitions, 3) failing to maintain and grow relationships with insurance companies, body shops, mechanical repair shops, and aftermarket parts manufacturers, 4) rapid and substantial fluctuations in scrap values, 5) disruption in operations that impair ability to repay debt, 6) emergence of other large competitors, 7) substantial and unexpected declines in miles driven and/or the age of the US vehicle fleet, 8) less stringent dismantling permit requirements

enacted.

Magna Intl (MGA)

We believe Magna is one of the highest-quality auto suppliers in our coverage universe, with proprietary technology, a relatively solid balance sheet, and good customer diversification. We also expect the company to be a consolidator and capitalize on weaker competitors by winning take-away business. Our PO of \$63 represents an EV/EBITDA of 6x using our 2012 estimates, which is above the historical range. We believe a higher-than-historical multiple is warranted given that MGA has recently completed several shareholder-friendly actions that should alleviate corporate governance concerns, which historically resulted in the stock trading at a discount to the group average of 4-6X. In addition, we view MGA as one of the best operators in the supply industry, and an important partner for OEMs with global platforms. Downside risks to our price objective: 1) a further decline in the auto sales cycle below our forecasts for US SAAR, 2) further stress in large customers, most notably the Detroit Three, 3) a rapid and substantial rise in steel and other raw material costs.

Metso (MXTOF)

Our Eur38 (USD49.40 ADR) price objective is based on applying a 15% discount to our target 2013E EV/EBIT multiple of 10.0x to our 13e operating profit. We think this is appropriate, given Metso's weaker and more volatile execution. Downside risks to our price objective are poor execution and margin performance in the Minerals division or a further leg down in the global economy. Upside risks would be a stronger rebound in orders than we assume.

Michelin (MGDDF)

Our EUR74 price objective primarily derives from our view on Michelin's short-term margin prospects in relation to its EV/sales multiples. We also look at Michelin's peer group (primarily Goodyear and Bridgestone) and at prospects of improvement in historical FCF generation and ROCE. Our EUR74 PO would put Michelin on about 89% EV/Sales on our 2012 estimates (83% 13E), at a small premium to its average between 1990 and 2011 (85%) for margins we expect to be higher in the next two to three years (9.9% and 10.6% in 2012E-13E against 7.4% historical average) and stronger balance sheet. At our PO, Michelin shares would be on about 10x 12E.

Michelin's specific risks relate primarily to its ability to pursue international expansion while progressively optimizing its assets in mature markets. A long-lasting decline in replacement demand, a prolonged recession in Europe, and potentially a price war between tyre makers, thought unlikely in the near future, could also be seen as threats for the company. Short-term risk derives essentially from a further rapid spike in oil and natural rubber prices or surprising weak replacement demand in coming months. Michelin may also participate in the next wave of consolidation of the tyre industry.

National Express (NXPGF)

We use a DCF based SOTP approach to derive a PO of 290p. We value each segment using a DCF analysis with an average WACC assumption of 7.8% and a 2% terminal growth rate. Our PO implies an EV/EBITDA of 6.7x and P/E of 11.9x (FY12), at a slight premium to the sector average, which we think is justified given the self-help opportunity. Risks to our PO are a slowdown in volume growth and rising fuel and wage inflation.

Nexans (NXPRF)

Our EUR53 price objective is based on the average mid-cycle multiple for EV/EBIT (8-9x) that we apply to our 2012 estimates. We have used a lower valuation multiple (7x) than the historical average to reflect the macro outlook and uncertainties on the exposure to Libya in particular.

While still cyclical, we think Nexans is better positioned than in the past to cope with an economic downturn given the reduction in fixed costs the company has been undertaking during the past years.

Downside risks to our price objective are (i) weakening demand (ii) price pressure (iii) execution issues in high-voltage. Upside risks to our price objective are volume & price increases and bolt-on acquisitions.

Philips (PHGFF)

Our Eur 17 (US\$23.29) price objective is based on applying a 15% discount to our target sector 2013E EV/EBIT multiple of 10.0x. We have not applied any discount to the sector multiple despite regular disappointments since consensus earnings estimates have been downgraded over 40% since their peak.

Downside risks would come from tough price pressure in consumer markets or slower healthcare growth. Upside risks would come from better restructuring on execution efforts.

Prysmian (PRYMF)

Our price objective of EUR13 is based on the high-end of the range of the average mid-cycle multiples for EV/EBIT (8-9x) observed for the cable industry in the last cycle (2003-05). We apply this on our 2012 estimates.

Downside risks to our price objective are (i) weakening demand (ii) ongoing price pressure (iii) additional unforeseen charges (iv) A longer and more difficult integration of Draka. Upside risks to our price objective are stronger volumes and price increases.

Rexel (RXLSF)

Our Eur 16 price objective is based on applying a 15% discount to our target 2013e EV/EBIT multiple of 10.0x.

We think this sector-multiple is appropriate, as Rexel's earnings have significant scope to recover beyond 2011 but to balance that, emerging market exposure is quite low.

In addition to weaker than expected industrial data, risks to our price objective are (i) a cyclical slowdown - in particular, US residential construction markets present an ongoing risk to growth over the next 12 months (ii) Rexel's sensitivity to any copper price falls would also present a near-term problem. Upside risks are stronger construction markets or a rising copper price.

Rockwell (ROK)

We derive our \$95 PO by applying roughly 16x forward multiple to our FY13 EPS forecast of \$5.90. Our valuation target would appear reasonable given ROK's average forward valuation multiple that exceeds 17x over the past 5 years. In addition, given heightened global economic uncertainties in the near-term, a discount vs. historical average valuation would appear appropriate, in our view. Still, we believe a robust North American industrial economy can drive Rockwell's

overall earnings higher in the coming quarters.

Risks to our price objective are a muted recovery that delays large-scale capex spending, unfavorable product mix that limits margin expansion and contraction in industrial P/E multiples.

SAFT (SGPEF)

Our PO of EUR22.5 reflects a 25pct discount that we apply on our EUR30 fair value. The discount takes into account uncertainties about group strategy on electric vehicles (do they want to come back on that market?) and risks attached to the new electricity storage business.

Our fair value is based on historical multiples that yield 6.5x EV/EBITDA and c9x EV/EBIT.

Upside risks: a quicker-than-expected announcement from Saft with regards to the electric vehicle market. Also, with a sound financial position, Saft could in our view return more cash to shareholders. Downside risks: pressure on margin from a dollar depreciation and nickel prices.

Saint Gobain (CODGF)

Our price objective for Saint Gobain is EUR44 and is based on a DCF to equity valuation of the consolidated group. The higher Price Objective reflects our increased forecasts in our main 2011-2012 forecast period. An extended recovery phase in 2013-16 is also used and we then calculate our residual value based on a 2pc perpetual growth rate and a normalised 2017 cash flow to equity (where capex equals depreciation). We have used average annual net profit growth of +18pc in 2010-16. From the resulting NPV, we deduct the pension liability (EUR3,458mn), glass cartel fine liability (EUR1,030mn), minorities (EUR302mn) and our estimate of the net present value of the asbestos liability (EUR581mn). In addition to these adjustments, we use a fully diluted number of shares. Our 12-month price objective results from capitalising the resulting fair value at a 9.5pc cost of equity. Risks to our price objective are economic growth (especially in France, UK, Germany and the US), lack of further cost saving delivery, and asbestos litigation in the US.

Salesforce.com (CRM)

Our PO of \$200 is based on an 8.6x EV/Rec rev multiple, roughly in line with what ORCL paid to acquire SEBL. The 8.6x multiple could be conservative given the faster growth of CRM. Our \$200 price objective is supported by our subscriber analysis. ASP, EV/Recurring revenues, required investor return/yr, and # subs are the key variables in our analysis. For our \$200 PO, we assume # subs reaches 5.4mn by 4Q:FY13. Our ASP assumption is \$53/month to account for the shift in new sub mix to lower editions.

Risks to achieving our price objective are: competition, pricing pressure, senior management turnover, failure to execute, continued and sustained data center outages that might limit customer adoption, failure to meet service level demands, adoption of new products, valuation, operating margins not scaling, inability to manage rapid growth, and failure to attract, develop and sustain valuable sales, marketing, and R&D talent.

Schneider (SBGSF)

Our Eur59 price objective is based on applying our target sector 2013 EV/EBIT

multiple of 10.0x. We think this multiple is appropriate, given strong returns, defensive earnings, a cyclical trough in construction markets and high emerging market exposure.

Upside risks to our price objective are stronger than expected restructuring execution and inexpensive future M&A. Downside risks are related to weaker than expected construction activity.

SemiLEDs Corp. (LEDS)

Our price objective of \$3.50 is based on a target P/E of 13.0x our CY13 adj EPS estimate of \$0.28. At this level the stock would trade at a 15-20% discount vs the primary comp, Cree. Our DCF suggests a slightly higher value of \$3.70 though we incorporate a haircut to account for litigation risks and potential for ramping hiccups. Our DCF incorporates a WACC of 20% and a terminal EBITDA multiple of 8.0x, which is in line with similar high-growth category leaders.

Upside Risks to our PO are: (1) uptick in demand for LEDs leading to higher fab utilization, increased pricing, and expanding margins, (2) an accelerated transition to larger-sized wafer capacity, which help improve manufacturing costs and increase throughput, (3) increased government and regulatory support for environmentally-friendly lighting solutions, (4) declining competition from established players and new entrants, and (5) favorable patent litigation.

Risks are (1) increasing competition, (2) the gross margin peaking as a result of increased pricing pressure and/or inability to reduce costs, (3) customer hesitancy due to the high upfront cost, (4) unfavorable patent litigation, (5) manufacturing glitches as capacity ramps up, (6) loss of control of the company's China operations and related technology licenses, and (7) decreased orders from packaging partners in response to SemiLEDs ramp in component production.

Seoul Semiconductor (SLSOF)

Our PO of W22,000 is derived from DCF (WACC 12%, terminal growth 6.5%) and mid-cycle fair value (eg, long-term margin assumptions 9%). Based on our 2011-12 earnings estimates, this suggests current multiples of over 82% higher than the local market average. While the LED theme provides a valuation premium, we believe that the company's huge premium should not be justified unless it can deliver earnings growth substantially higher than the market average (KOSPI) or tech sector. Our long-term forecast still shows single-digit EPS growth pa on average after 2010. But this does not merit a substantial valuation premium, in our view.

Upside risks to our PO: (1) unexpected shortage of LED supply following robust LED demand from general lighting and LCD (PCs and TVs), (2) government policies favoring LED adoption in general lighting by replacing conventional bulb or fluorescent lighting, and (3) better execution of cost reduction measures.

Downside risks to our PO: (1) market share loss to competitors (e.g., Samsung and LG affiliates) and newcomers, (2) price cut pressure from customers, particularly handset makers and LCD panel manufacturers, and (3) delay of LED deployment in general lighting and TV applications.

Siemens Ltd (SMNBF)

Our Price Objective of Rs615 is based on a target PE of 25x on our March 2013 earnings estimates. Our target multiple is at a 20% discount to its 3-year average

of 31x. We believe this discount is appropriate in view of lower earnings growth, margins and RoE's. Upside risks to our price objective are faster than estimated reversal in capex, and higher than estimated margins for the company's SMART products.

Downside risks to our PO would be continued pressure on EBITDA margins on account of execution of low margins orders, lower than estimated margins on SMART products.

Siemens (SMAWF)

Our Eur85 (US\$113.05/ADR) price objective is based on applying a 10% discount to our sector average multiple of 10.0x 2013e EV/EBIT on our 2013 forecasts. We think this sector-multiple discount is appropriate given risk of ongoing charges.

Downside risks to our price objective are (i) weakening demand (ii) poor operational execution and (iii) ongoing unforeseen charges and provisions.

Solvay S.A. (SVYSF)

Our price objective of EUR113 is based on both our SOTP and DCF models, now including the contribution from Rhodia. For our DCF, we assume a WACC of 8.4% and have terminal NOPAT margin of 8% and 2.5% terminal growth.

Risks to our price objective are: 1) if synergies from the Rhodia acquisition are not realised, 2) risks around a recovery in the construction market, 3) a weakening of general industrial production and 4) strengthening of the US\$ versus Euro

Spirax-Sarco (SPXSF)

Our 2190p price objective is based on applying a 10% premium to our target sector 2013 EV/EBIT multiple of 10.0x to our 13e operating profit. We think this premium is appropriate, due to Spirax's sector-leading growth and low cyclicality.

Downside risks to our price objective would come from unfavourable exchange rate moves, if energy prices collapsed, or from the substitution of hydraulic heat transfer mechanisms. Upside risks would be stronger restructuring savings.

SQM (SQM)

Our DCF-based price objective for SQM of US\$64/ADR is based on a 8yr DCF with a WACC of 9.3% in USD and 4% long term growth rate.

We assume that from 2010 to 2015, SQM should increase its 1) specialty fertilizers sales to 930k tons in 2015 from 790mn tons in 2010, 2) Potash sales to 1,800k tons from 1270k in 2010, 3) Lithium to 75ktons from 32ktons in 2010. We estimate potash prices at US\$500/mt in 2012, US\$560 in 2013 and US\$505/ton in the long term.

We derive our PO based on a DCF basis, given the long-term nature of SQM businesses.

Upside risks include: 1) stronger price scenario for potash on tight supply/demand scenario, and 2) Stronger demand for its products leading to further volume growth.

Downside risks to our price objective are: 1) Commodity price risk: reduction in potash prices, which would drag down SPN prices also, 2) Iodine and lithium markets are fairly small, posing a threat of new entrants/new supply: 3) Technology risk: New technologies could hurt the demand for

lithium/iodine/industrial nitrates, 4) Foreign exchange risk: 20% of costs are denominated in Chilean pesos, and 90% of sales are in USD

Stagecoach Group (SAGKF)

We use DCF-based SOTP to derive our PO of 325p. Our DCF uses a WACC of 7.38%. Our PO implies an EV/EBITDA of 7.3x and a P/E of 12.7x (FY12e). This is a slight premium to the sector which we feel is justified given the improving fundamentals in the US business, the potential opportunity to benefit from rail reform and the best in class margins in UK bus. Upside/Downside risks are: Higher/lower transport volume growth and falling/rising fuel and labour costs.

Telecity (TLCTF)

Our price objective of 700p is based on a DCF model which assumes 16% revenue CAGR out to 2015 driven by ongoing capex investments, and a gradual ramp down in revenue growth. Our DCF model assumes a terminal growth of 4%, terminal margins of 40% a weighted average cost of capital (WACC) of 10.3%.

Upside risks are that price increases are sustained longer than we assume or that Telecity makes further capital investment. Downside risks are that new entrants come into the market and compete away excess returns, or that Telecity is unable to find further investment opportunities as quickly as we forecast.

Tesla Motors Inc. (TSLA)

Our price objective of \$40 is supported by two valuation metrics: (1) EV-to-sales multiple of 1.2x and an EV-to-EBITDA multiple of 8.0x based on our 2014 estimates, comparable levels to similar growth and margin companies, and (2) a discounted cash flow analysis with a WACC of 12.5% and a terminal EV/EBITDA multiple of 7x, in line with European luxury automakers.

Downside risks to our price objective are: (1) the company experiences production issues as it scales to volume manufacturing, (2) Tesla fails to achieve pricing and manufacturing cost thresholds, preventing the company from turning profitable, (3) competitors with higher brand recognition and loyalty may crowd-out Tesla's offering, (4) tax credits and subsidies may disappear sooner than expected, curbing economic appeal, (5) the electric vehicle industry could develop later than expected or not at all, (6) the issue of range anxiety could be more persistent than thought, prompting consumers to favor plug-in hybrids, and (7) a decline in consumer luxury spending, which tends to be exacerbated during weak economic conditions.

United Tech (UTX)

Our \$110 PO is based on a DCF analysis using a discount rate of 9.7% and an implied growth rate of 2.7%. Risks are: Since UTX is exposed to late-cycle businesses, including commercial construction and commercial aviation, if the economy does not improve the company could be negatively affected. Should we see the dollar strengthen significantly, we could see a material negative impact to UTX's businesses given the company's exposure to non-US end markets. A downturn in commercial aviation due to the natural business cycle or an exogenous event such as a terrorist attack could negatively affect the company. A severe global economic slowdown would materially affect UTX's top-line growth as 60 percent of sales are generated outside the U.S. Any slowdown in China would materially affect Otis given the segment's success in China. The installed base of large civil aircraft with P&W engines continues to age and we expect

P&W aftermarket revenue to decline over time until the Geared Turbofan generates aftermarket business. UTX is dependent on raw materials, particularly metals. As raw material prices can be highly variable, depending on contractual agreements with customers, variations in raw materials can unfavorably affect operating margins. UTX could be materially affected should Sikorsky run into additional issues with its supply chain.

Valeo (VLEEF)

We have a price objective of EUR55 (ADR: USD36.41), based on fundamental view on the company's prospects and what we anticipate to be a progressive re-rating from currently depressed levels as the company delivers strong quarterly earnings with solid organic growth. We also account for management's ambitious restructuring plan and the likely further cost benefits of its reorganisation in 4 business units, as well as the mid-term strategy to focus the company on key core businesses through potential bolt-on transactions.

At our price objective, Valeo would trade on 7.4x EV/EBIT 12E, 10x earnings and 48% EV/Sales, still at a discount to long-term historical average but reflecting more accurately the company's growth and margin prospects, in our view. Our DCF analysis, used as a back-up (9% discount rate, 2.5% permanent growth rate), suggests significant upside potential with an implied fair value closer to EUR54.

Industry-related risks for auto parts companies are volatility in light-vehicle production, rising raw material costs, pricing pressure from customers, increased R&D transfers from OEMs, recalls (implying potential warranty claims) and exchange rates volatility. Valeo's specific risks relate to its relatively high exposure to Western Europe and the execution risk on potential acquisitions.

Vallourec (VLOUF)

We believe Vallourec should trade at lower multiples to the sector due to the volatility of earnings and macro outlook. We value Vallourec on 9x 12E PE, 5x EV/EBITDA and DCF using a WACC of 9.5%. Assigning equal weightings to each measure, our price objective is EUR 47.

Downside risks to our price objective: Competition: Possible increase in competition from new players in China and elsewhere. Industry activity levels: Our forecasts are based around an expectation that oil prices will continue to sustain a high level of activity for oilfield services from the oil companies. That said, there is currently a gap between the industry's cash generation and investment basis (USD40-60/bbl), a further fall in oil prices, in our view, would see industry spending patterns change significantly. Currency: Vallourec's cost base is largely denominated in EUR. However, its revenue is mainly USD denominated. A weakening USD will therefore squeeze the company's profit margins.

Upside risks to our price objective: Higher than anticipated oil prices could drive a stronger than expected activity level, increasing the demand for Vallourec products. Lower competition from new entrants could improve the pricing power of existing players such as Vallourec, supporting higher margins in the business.

Veeco Instruments (VECO)

As VECO's business units are on different growth trajectories, secular versus cyclical for LED and non-LED respectively, we value the company on a sum of the parts basis. We split VECO's 2012E earnings 65/35 between LED and non-LED and use peer multiples for each segment. Aixtron and CREE are the

comparables for the LED business and we use Seagate for the non-LED business of Data Storage. Applying a 10pct discount to the resultant LED and non-LED multiples due to lack of visibility, we use an approximate weighted average of around 15x P/E on our 2012 EPS estimate and add back cash to arrive at our \$30 PO.

Risks are a slowdown in LED demand in China, weakness in the LED backlighting market resulting in low utilization rates in Korea and Taiwan, the cyclical nature of core data storage and LED capital spending that could slow growth, execution on introduction and timing of adoption of new products, revenue recognition timing on new products, execution on the cost-reduction programs, and competitive and pricing pressure that could slow margin improvements.

Victrex (VTXPF)

Our price objective for Victrex is 1,450p. This is based upon a DCF valuation incorporating NOPAT margins of 31% this year, faded down to 30% until 2018, and normalising at 28% in our terminal year (terminal sales growth of 3% and a WACC of 8.7%). At our price objective Victrex would trade on a forward 2012E PE of 17.5x, which we consider justified, given its higher return on capital and stronger balance sheet.

Risks to our price objective are a prolonged and significant slowdown in global GDP growth, loss of market share to emerging competitors in the market for PEEK, and a substantial weakening/strengthening of Sterling vs the USD and Euro.

VMware Inc (VMW)

Our PO of \$104 is based on 2.0x PEG and 20% growth rate applied to CY12E EPS of \$2.56. We believe the premium multiple is justified given VMW's history of printing upside. Our PO implies 20x CY12 FCF estimate, a discount to CRM, at 30x, despite almost similar growth profiles. Our comfort level in VMW technology leadership and market opportunity remains high.

Risks to achieving our price objective are: Microsoft Hyper-V could pressure prices and margins, Oracle VM, if it gains broad adoption, could similarly put pressure on prices and margins, risks of economy slowing and IT spending contraction, potential slowing in server refresh cycle and license impact, potential impact of 12 core Nehalem on server unit demand, inability to hire, train, and retain talented development, sales and marketing professionals, potential management turnover, and control by EMC which owns 86% of VMware stock. Business transition to a recurring revenue (maintenance and support) model could limit upside to valuation multiples.

Upside risks are better-than-expected macro recovery, better sales execution, better-than-expected adoption of vSphere, upside earnings surprise.

Vossloh (VOSSF)

We set our price objective at EUR78 per share, based on DCF. We have a WACC of 8% and assume 3% intermediate growth and 2% terminal growth, and a 11.5% sustainable EBIT margin. The upside risks to our price objective and investment case are: value-enhancing acquisitions, better-than-expected order intake and a potential take-over by Mr Thiele who owns more than 15 percent of Vossloh. Downside risks to our price objective are related to the business

performance of the company's industrial customers, rising raw material prices and increasing pressure from financially stronger competitors.

Westport Innovations (WPRT)

We establish a price objective of \$52. Our valuation is primarily based on 11x EV/EBITDA multiple on our 2018 Adjusted EBITDA estimate, which is then discounted back 6 years at 13.5%. We are comfortable valuing the stock versus our longer-term expectations given the company's rapid growth profile, large market opportunity, and strong competitive position. Our target EV/EBITDA multiple represents an appropriate premium to trucking OEMs and is in line with other stocks exposed to the NGV and alternative vehicle theme. Also, a multiple of 11x is appropriate given the company's long-term growth profile, competitive positioning, capital efficiency, and the degree of investment scarcity. Our discounted cash flow analysis confirms our view on valuation when applying a similar terminal multiple and WACC.

Risks to our PO are: (1) the narrowing of the diesel-to-natural gas price differential, (2) a stall in the development of the NGV fueling infrastructure, (3) waning interest on the part of truck/auto OEMs to effectively price and/or allocate production capacity, (4) new regulations that increase shale-gas drilling costs leading to tighter supplies, (5) increased competition, especially in light-duty, (6) other technologies such as dual-fuel NGVs, electric vehicles, and biofuels gaining in prominence, and (7) increased shareholder dilution arising from future equity offerings.

Yangzijiang Shipbuilding (YSHLF)

We value Yangzijiang at a PO of S\$2.08, at 9x FY12 P/E. This is slightly below the 10x average forward P/E since listing in 2007. We believe the consistently above-average profit margins of Yangzijiang, good revenue visibility for the next three years, and proven strong cash flow management should justify a rerating of the stock toward the average share-price valuation of its peers.

The rerating of Yangzijiang's share price should come from its leadership of the Chinese yards' structural breakthrough for newbuild 10,000-TEU containerships in 2H11E, and possible inroads into rigbuilding. The yard has prepared for this via a staggered increase in shipbuilding capacity, and its development of new technological capabilities for the next industry upturn. Indeed, Yangzijiang has reinforced its in-house ship design abilities by taking a 40% stake in Shanghai Yangzijiang Ship and Marine Engineering R&D Center Co., Ltd for the provision of design services for shipbuilding and marine engineering projects. We expect Yangzijiang to collaborate with existing rigbuilders for its inroad into rigbuilding.

Downside risks to our PO are: (1) a sharp plunge in freight rates, which result in high cancellation risk on existing shipbuilding orders, (2) a steeper-than-expected increase in steel prices, and (3) an unexpected plunge in the Chinese stock market by more than 70% from current levels, which greatly reduces the collateral value for the financial investments of Yangzijiang.

Zhuzhou CSR (ZHUZF)

We rate Zhuzhou CSR at Neutral with PO of HK\$14.70, given 1) its competitiveness in railway component industry, 2) strong R&D capability, and 3) increasing power converter exposure to other industries but 4) dim orderbook outlook from MOR post the Wenzhou train crash.

We use PE multiple to value such a high growth company, cross checked by PB multiple. Our target PE multiple in 2012E is 12.4x, -1stdev to its historical trading average. It would suggest 2.3x P/B with 18.2% ROE for 2012. Valuation the company trades currently is fairly valued to us given the slowdown of orderbook and squeezing margin (due to product mix change). We still like the company for its strategic positioning and solid R&D, and expect earning to normalize in 2013.

Risks to the downside of our PO are policy risk from MOR, further railway FAI slowdown, high concentration of customers, warranties risk and currency risks. Risks to the upside include faster than expected railway investment recovery and resumption of high margin product orders from MOR.

Link to Definitions

Basic Materials

Click [here](#) for definitions of commonly used terms.

Consumer & Retail

Click [here](#) for definitions of commonly used terms.

Energy

Click [here](#) for definitions of commonly used terms.

Industrials

Click [here](#) for definitions of commonly used terms.

Media & Telecom

Click [here](#) for definitions of commonly used terms.

Technology

Click [here](#) for definitions of commonly used terms.

Analyst Certification

We, Sarbjit Nahal, Akiko Kuwahara, Alex Toms, CFA, Andrew Obin, Andrew Stott, Asuka Inami, Ben Chan, CFA, Ben Maslen, Caroline Cohen, Chandramouli Sriraman, Claus Roller, CFA, David Min, David W. Barden, CFA, Edmond Huang, CFA, Fabio Lopes, Fernando Ferreira, CFA, Fiona Maclean, Hideyuki Mizuno, Jasmine Wei, Jason Fairclough, John G. Inch, John Lovallo II, CFA, John Murphy, CFA, Jonas Bhutta, Julie Dollé, Justin Post, Kash Rangan, Ken Hoexter, Krish Sankar, Laurent Favre, CFA, Mandy Qu, CFA, Mark Hake, Mark Manduca, CFA, Mark Troman, Peter Christiansen, CMT, Robin Cheng, Ronald J. Epstein, Scott D. Craig, CFA, Steven Milunovich, CFA, Tal Liani, Thomas Besson, Unai Franco, Valery Lucas-Leclin, Vivek Arya and Wee Lee, Chong, CFA, hereby certify that the views each of us has expressed in this research report accurately reflect each of our respective personal views about the subject securities and issuers. We also certify that no part of our respective compensation was, is, or will be, directly or indirectly, related to the specific recommendations or view expressed in this research report.

Special Disclosures

BofA Merrill Lynch is currently acting as advisor to ABB Ltd in connection with its proposed acquisition of Thomas & Betts Corp, which was announced on 30 January 2012. The proposed transaction is subject to approval by shareholders of

Thomas & Betts Corp. This research report is not intended to (1) provide voting advice, (2) serve as an endorsement of the proposed transaction, or (3) result in the procurement, withholding or revocation of a proxy.

BofA Merrill Lynch is currently acting as financial advisor to Macquarie Global Opportunities Partners LP and Petermann management in connection with its proposed sale of Petermann Partners Inc to National Express Group PLC, which was announced on September 13, 2011.

In accordance with the SEBI (Foreign Institutional Investors) Regulations and with guidelines issued by the Securities and Exchange Board of India (SEBI), foreign investors (individuals as well as institutional) that wish to transact the common stock of Indian companies must have applied to, and have been approved by SEBI and the Reserve Bank of India (RBI). Each investor who transacts common stock of Indian companies will be required to certify approval as a foreign institutional investor or as a sub-account of a foreign institutional investor by SEBI and RBI. Certain other entities are also entitled to transact common stock of Indian companies under the Indian laws relating to investment by foreigners. BofA Merrill Lynch reserves the right to refuse copy of research on common stock of Indian companies to a person not resident in India. American Depositary Receipts (ADR) representing such common stock are not subject to these Indian law restrictions and may be transacted by investors in accordance with the applicable laws of the relevant jurisdiction. Global Depositary Receipts (GDR) and the Global Depositary Shares of Indian companies, Indian limited liability corporations, have not been registered under the U.S. Securities Act of 1933, as amended, and may only be transacted by persons in the United States who are Qualified Institutional Buyers (QIBs) within the meaning of Rule 144A under the Securities Act. Accordingly, no copy of any research report on Indian companies' GDRs will be made available to persons who are not QIBs.

DSP Merrill Lynch Limited

SEBI Regn no. : BSE - INB/INF 011348134 NSE – INB/INF 231348138

Address – Mafatlal Centre, 8th Floor, Nariman Point, Mumbai, India. 400021

Tel : +91 22 6632 8000

Korea imposes a capital gains tax on non-resident investors in Korean securities of the lesser of 27.5% of the gain or 11% of the sales proceeds unless the investor is either (1) resident in a country which has a double tax treaty with Korea that exempts the investor's capital gains from Korean tax or (2) the shares sold are sold through the Korea Stock exchange or KOSDAQ exchange and the seller (including related parties) has not owned 25% or more of the shares of the company at any time during the year of sale plus the 5 calendar years preceding the year of sale. Investors should seek their own tax advice.

Information on securities which are listed on the exchanges where ML Securities (Taiwan) Limited is not permitted to trade or solicit trades for clients is for informational purposes only and is not a recommendation or a solicitation to trade such securities. ML Securities (Taiwan) Limited will not execute transactions for nor accept orders from clients to trade such securities. Foreign investment in Taiwan securities is regulated and restricted. Currently, foreign investment in Taiwan securities is permitted by investment through: (1) global depository receipts, (2) convertible bonds, (3) mutual funds issued offshore of Taiwan, and (4) a special foreign institutional investors (FINIs) and foreign individual investors (FIDIs) program supervised by the Taiwan SFB whereunder FINIs/FIDIs may

apply for investment ID to invest in Taiwan securities by registration with Taiwan Stock Exchange. FINIs will additionally need consent from the foreign exchange authority, ie, the Central Bank of China. In addition to the limitations above, various industry-specific percentage-based limitations on foreign ownership of Taiwan companies (and in some cases prohibitions) may apply. Investments are subject to exchange rate and currency conversion restrictions and risks. Dividends and interest earned by foreign investors' Taiwan securities/instruments are generally subject to a 20% withholding tax. Ordinary shares are not available to ML private client accounts in the U.S.

This report is distributed in the Republic of China by Merrill Lynch Securities (Taiwan) Limited, which is regulated by the SFB of the Republic of China.

01 March 2012

APR - Autos, Industrials, Shipbuilding Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	China Communications Construction	CCCGF	1800 HK	Edmond Huang, CFA
	China State Construction	CCOHF	3311 HK	Jacqueline Li
	Dongfeng Motor	DNFGF	489 HK	Bin Wang
	Doosan Heavy Industries & Construction	DOHIF	034020 KS	Jay Yoo
	Doosan Infracore	DAOIF	042670 KS	Jay Yoo
	Hankook Tire	HKOKF	000240 KS	Andy Euisup Lee, CFA
	Harbin Power	HBPWF	1133 HK	Edmond Huang, CFA
	Hyundai Mobis	XHMDF	012330 KS	Andy Euisup Lee, CFA
	Hyundai Motor Company	HYMLF	005380 KS	Andy Euisup Lee, CFA
	Kia Motors Corporation	KIMTF	000270 KS	Andy Euisup Lee, CFA
	Lonking	LONKF	3339 HK	Jacqueline Li
	Mando	XNDF	060980 KS	Jay Yoo
	Sany Heavy Equipment International	XNHVF	631 HK	Jacqueline Li
	Shanghai Electric	SIELF	2727 HK	Edmond Huang, CFA
	Techtronic Industries	TTNDF	669 HK	Jacqueline Li
	Yuexiu Transport Infrastructure	GZITF	1052 HK	Mandy Qu, CFA
	Zhenglong Auto	CZASF	1728 HK	Bin Wang
	Zhongsheng Group	XGZHF	881 HK	Bin Wang
	Zoomlion	XTUHF	1157 HK	Jacqueline Li
NEUTRAL				
	Brilliance Auto	BCAUF	1114 HK	Bin Wang
	China High Speed	CHSTF	658 HK	Edmond Huang, CFA
	China Railway Group	CRWOF	390 HK	Edmond Huang, CFA
	Daewoo Shipbuilding & Marine Engineering	DWOSF	042660 KS	Andy Euisup Lee, CFA
	Guangzhou Auto	GNZUF	2238 HK	Bin Wang
	Hyundai Heavy Industries	HYHZF	009540 KS	Andy Euisup Lee, CFA
	Hyundai Mipo Dockyard Co. LTD	HYAIF	010620 KS	Andy Euisup Lee, CFA
	Hyundai Wia	XWHYF	011210 KS	Jay Yoo
	Samsung Heavy Industries Co. LTD	SMSHF	010140 KS	Andy Euisup Lee, CFA
	Sinotruk	SHKLF	3808 HK	Bin Wang
	Zhuzhou CSR	ZHUZF	3898 HK	Edmond Huang, CFA
UNDERPERFORM				
	BYD Co. Ltd.	BYDDF	1211 HK	Bin Wang
	China Railway Construction	CWYCF	1186 HK	Edmond Huang, CFA
	CSR	CSRGF	1766 HK	Edmond Huang, CFA
	Dongfang Electric	DNGFF	1072 HK	Edmond Huang, CFA
	Goldwind	XIGCF	2208 HK	Edmond Huang, CFA
	Rongsheng Heavy Industries	XGECF	1101 HK	Jacqueline Li
	Weichai Power	WEICF	2338 HK	Bin Wang

APR - Technology Hardware Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	AAC Technologies	AACAF	2018 HK	Jasmine Wei
	Asustek	AKCPF	2357 TT	Robert Cheng
	Cheil Industries	CLFUF	001300 KS	David Min
	Comba Telecom Systems Holdings Limited	COBJF	2342 HK	Sydney Zhang, CFA
	Lenovo Group	LNVGF	992 HK	Robert Cheng
	Lenovo Group	LNVGY	LNVGY US	Robert Cheng
	LG Electronics	LGEAF	066570 KS	David Min
	OCI Materials	SDFAF	036490 KQ	David Min
	Quanta Computer	QUCPF	2382 TT	Robert Cheng
	Radiant	ROPTF	6176 TT	Jasmine Wei
	Simplo Tech	SPLOF	6121 TT	Jill Su
	TPK Holdings	XGJGF	3673 TT	Robin Cheng
	ZTE Corporation	ZTCOF	763 HK	Sydney Zhang, CFA
NEUTRAL				
	Chicony Elect	CCNYF	2385 TT	Robin Cheng

01 March 2012

APR - Technology Hardware Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
	Coretronic	CCOCF	5371 TT	Jasmine Wei
	HTC Corp.	HTCXF	2498 TT	Robert Cheng
	Samsung Electro-Mechanics	SSEMF	009150 KS	David Min
	Wistron Corp.	WICOF	3231 TT	Jill Su
UNDERPERFORM				
	Acer, Inc	ASIYF	2353 TT	Robert Cheng
	AU Optronics	AUOPF	2409 TT	Robin Cheng
	AU Optronics	AUO	AUO US	Robin Cheng
	Catcher Tech	CHERF	2474 TT	Robert Cheng
	Chimei Innolux Corporation	INXDF	3481 TT	Robin Cheng
	Compal Electron	XLCPF	2324 TT	Jill Su
	Delta Electronics Inc.	DLTEF	2308 TT	Robin Cheng
	E Ink Holdings	PWWIF	8069 TT	Robin Cheng
	Epistar	EPIPF	2448 TT	Robin Cheng
	Everlight	EVLEF	2393 TT	Jasmine Wei
	Foxconn Tech	FXTCF	2354 TT	Robert Cheng
	Hon Hai Precision Industry	HNHAF	2317 TT	Robert Cheng
	Largan Precision	LGANF	3008 TT	Robin Cheng
	LG Display Co., Ltd.	LPHLF	034220 KS	Simon Dong-je Woo, CFA
	LG Display Co., Ltd.-A	LPL	LPL US	Simon Dong-je Woo, CFA
	LG Innotek	XLGQF	011070 KS	David Min
	Lite-On Tech	LOTZF	2301 TT	Robin Cheng
	Samsung SDI	SSDIF	006400 KS	David Min
	Samsung Techwin	SGTWF	012450 KS	David Min
	Seoul Semiconductor	SLSOF	046890 KS	David Min
	Shin Zu Shing	SZUSF	3376 TT	Jill Su
	Silitech	SLKCF	3311 TT	Jasmine Wei
	Unimicron Technology	XYBBF	3037 TT	Jill Su

APR - Transportation Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	Air China Ltd-H	AICAF	753 HK	YingYing Hou
	AirAsia BHD	AIABF	AIRA MK	Paul Dewberry
	Beijing Cap Airp	BJCHF	694 HK	YingYing Hou
	Cathay Pac Air	CPCAF	293 HK	Paul Dewberry
	China Eastern	CHEAF	670 HK	YingYing Hou
	China Shipping	CSDXF	1138 HK	Nathan Gee, CFA
	China Southern	CHKIF	1055 HK	YingYing Hou
	Daqin Railway	DAQIF	601006 CH	Mandy Qu, CFA
	Korean Air	KRNRF	003490 KS	Paul Dewberry
	Shanghai International Airport	XAISF	600009 CH	YingYing Hou
NEUTRAL				
	Guangshen Railway	GNGYF	525 HK	Mandy Qu, CFA
UNDERPERFORM				
	China Airlines	CHAWF	2610 TT	Paul Dewberry
	China COSCO-H	CICOF	1919 HK	Nathan Gee, CFA
	China Shipping Container Line	CITAF	2866 HK	Nathan Gee, CFA
	Eva Airways	EVAYF	2618 TT	Paul Dewberry
	Evergreen Marine	EVGQF	2603 TT	Nathan Gee, CFA
	Hainan Meilan	HMCTF	357 HK	YingYing Hou
	Hanjin Shipping Co Ltd	XHSJF	117930 KS	Nathan Gee, CFA
	Hutchison Port Holdings Trust	XHSFF	HPHT SP	Mandy Qu, CFA
	Neptune Orient Lines	NPTOF	NOL SP	Nathan Gee, CFA
	Orient Overseas (International) Limited	OROVF	316 HK	Nathan Gee, CFA
	Pacific Basin	PCFBF	2343 HK	Nathan Gee, CFA
	Singapore Air	SINGF	SIA SP	Paul Dewberry
	STX Pan Ocean	SPNOF	028670 KS	Nathan Gee, CFA
	U-Ming	UMGMF	2606 TT	Nathan Gee, CFA

01 March 2012

APR - Transportation Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
	Wan Hai Lines	WHILF	2615 TT	Nathan Gee, CFA
	Yang Ming Marine	YMGXF	2609 TT	Nathan Gee, CFA

ASEAN - Industrial Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	Bangchak Petroleum	XOOKF	BCP TB	Komsun Suksumrun
	Electricity Generating Company Ltd.	EYGGF	EGCO TB	Sirichai Chalokepunrat
	Ezion Holdings	NYTTF	EZI SP	Wee Lee, Chong, CFA
	Glow Energy	GWEFF	GLOW TB	Sirichai Chalokepunrat
	Keppel Corporation	KPELF	KEP SP	Wee Lee, Chong, CFA
	Perusahaan Gas N	PPAAF	PGAS IJ	Daisy Suryo
	PT Delta Dunia Makmur	XPDNF	DOID IJ	Daisy Suryo
	PTT pcl	PETTF	PTT TB	Komsun Suksumrun
	PTT pcl -F	PETFF	PTT/F TB	Komsun Suksumrun
	Sapuracrest Petroleum	SPBHF	SCRES MK	Wee Lee, Chong, CFA
	Sembcorp Marine	SMBMF	SMM SP	Wee Lee, Chong, CFA
	Siam Cement	SCVQF	SCC TB	Jiraporn Linmaneechote
	Siam Cement -F	SCVPF	SCC/F TB	Jiraporn Linmaneechote
	Thai Oil - L	TOIJF	TOP TB	Komsun Suksumrun
	Yangzijiang Shipbuilding	YSHLF	YZJ SP	Wee Lee, Chong, CFA
NEUTRAL				
	Ezra Holdings	EZRHF	EZRA SP	Wee Lee, Chong, CFA
	Indorama Ventures Public Company Limited	XIRDF	IVL TB	Komsun Suksumrun
	Sembcorp Industries	SCRPF	SCI SP	Wee Lee, Chong, CFA
	Tenaga Nasional	TNABF	TNB MK	Daisy Suryo
UNDERPERFORM				
	COSCO Corp Singapore	COIVF	COS SP	Wee Lee, Chong, CFA
	ESSO (Thailand)	XSOSF	ESSO TB	Komsun Suksumrun
	IRPC	IRPSF	IRPC TB	Komsun Suksumrun
	MMHE Holdings Berhad	XMLMF	MMHE MK	Wee Lee, Chong, CFA
	Ratchaburi Electricity Generating	RCHPF	RATCH TB	Sirichai Chalokepunrat
	United Tractors	PUTKF	UNTR IJ	Daisy Suryo
RSTR				
	Energi Mega	PEGIF	ENRG IJ	Daisy Suryo
	PTT Explor'n	PTXLF	PTTEP TB	Komsun Suksumrun

Australia - Industrials Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	Boart Longyear Limited	BOARF	BLY AU	Duncan Simmonds, CFA
	Colorpak Ltd	XBVVF	CKL AU	Ramanan Sooriyakumar, CFA
	Fletcher Building	YFLBF	FBU AU	Ben Chan, CFA
	Incitec Pivot Limited	ICPVF	IPL AU	Ben Chan, CFA
	James Hardie Industries	JHIUF	JHX AU	Ben Chan, CFA
	James Hardie-ADR	JHX	JHX US	Ben Chan, CFA
	Leighton Holdings Limited	LGTHF	LEI AU	Duncan Simmonds, CFA
	Nufarm Limited	NUFMF	NUF AU	Ramanan Sooriyakumar, CFA
	Onesteel	OSTLF	OST AU	Ben Chan, CFA
	Sims Metal Management	SMUPF	SGM AU	Ben Chan, CFA
NEUTRAL				
	Adelaide Brighton	ADBCF	ABC AU	Ben Chan, CFA
	Amcor	AMCRF	AMC AU	Ben Chan, CFA
	Bluescope Steel	BLSFF	BSL AU	Ben Chan, CFA
	Campbell Brothers	CBEBF	CPB AU	Duncan Simmonds, CFA
	DuluxGroup Limited	XDLXF	DLX AU	Anna Chen, CFA

01 March 2012

Australia - Industrials Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
	Orica	OCLDF	ORI AU	Ben Chan, CFA
UNDERPERFORM				
	Boral Ltd	BOALF	BLD AU	Ben Chan, CFA
	CSR	CSRLF	CSR AU	Ben Chan, CFA

EMEA - Autos & Auto Components Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	BMW	BAMXF	BMW GR	Fraser Hill
	Daimler	DDAIF	DDAIF US	Fraser Hill
	Daimler	XDMGF	DAI GR	Fraser Hill
	Michelin	MGDDF	ML FP	Thomas Besson
	Nokian Renkaat	NKRKF	NRE1V FH	Thomas Besson
	Porsche SE	POAHF	PAH3 GR	Fraser Hill
	Renault	RNSDF	RNO FP	Thomas Besson
	Valeo	VLEEF	FR FP	Thomas Besson
	Valeo	VLEEY	VLEEY US	Thomas Besson
NEUTRAL				
	Continental AG	CTTAY	CTTAY US	Thomas Besson
	Continental AG	CTTAF	CON GR	Thomas Besson
	Faurecia	FURCF	EO FP	Thomas Besson
	Fiat Industrial	FNDSF	FI IM	Fraser Hill
	Scania	SVKBF	SCVB SS	Fraser Hill
	Volkswagen AG	VLKAF	VOW GR	Fraser Hill
	Volkswagen AG	VLKAY	VLKAY US	Fraser Hill
	Volkswagen Pref	VLKPF	VOW3 GR	Fraser Hill
	Volvo	VOLVF	VOLVB SS	Fraser Hill
	VOLVO	VOLVY	VOLVY US	Fraser Hill
UNDERPERFORM				
	Autoliv	AUTVF	ALIV SS	Thomas Besson
	Autoliv	ALV	ALV US	Thomas Besson
	Elingklinger AG	EGKLF	ZIL2 GR	Thomas Besson
	Fiat SPA	FIATY	FIATY US	Fraser Hill
	Fiat SPA	FIADF	F IM	Fraser Hill
	Peugeot	PEUGF	UG FP	Thomas Besson
	Peugeot	PEUGY	PEUGY US	Thomas Besson
	Pirelli	PPAMF	PC IM	Thomas Besson

EMEA - Building, Construction & Cement Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	Barratt Dev.	BTDPF	BDEV LN	Mark Hake
	Bellway	BLWYF	BWY LN	Mark Hake
	Berkeley Group	BKGFF	BKG LN	Mark Hake
	Bilfinger Berger SE	BFLBF	GBF GY	Marcin Wojtal
	Bovis	BVHMF	BVS LN	Mark Hake
	CRH	CRHCF	CRH ID	Mark Hake
	CRH	CRH	CRH US	Mark Hake
	Ferrovial	FRRVF	FER SM	Marcin Wojtal
	Kingspan	KGSPF	KSP ID	Mark Hake
	Persimmon	PSMMF	PSN LN	Mark Hake
	Redrow	RDWFF	RDW LN	Mark Hake
	Saint Gobain	CODGF	SGO FP	Mark Hake
	Taylor Wimpey	TWODF	TW/ LN	Mark Hake
	Vinci	VCISF	DG FP	Marcin Wojtal
	YIT OYJ	YITYF	YTY1V FH	Mark Hake

01 March 2012

EMEA - Building, Construction & Cement Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
NEUTRAL				
	Balfour Beatty	BAFBF	BBY LN	Mark Hake
	Eiffage	FGLLF	FGR FP	Marcin Wojtal
	Geberit	GBERF	GEBN VX	Mark Hake
	OHL	OBSJF	OHL SM	Marcin Wojtal
	Wienerberger	WBRBF	WIE AV	Mark Hake
UNDERPERFORM				
	ACS	ACSAF	ACS SM	Marcin Wojtal
	Skanska	SKSBF	SKAB SS	Mark Hake
	Strabag	XSTBF	STR AV	Marcin Wojtal
RVW				
	Nexity	NXYAF	NXI FP	Mark Hake

EMEA - Chemicals & Paper Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	Air Liquide	AIQUF	AI FP	Andrew Stott
	Air Liquide	AIQUY	AIQUY US	Andrew Stott
	Arkema	ARKAF	AKE FP	Laurent Favre, CFA
	Arkema - A	ARKAY	ARKAY US	Laurent Favre, CFA
	Croda	COIHF	CRDA LN	Andrew Stott
	DS Smith Plc	DITHF	SMDS LN	Ross Gilardi
	DSM	KDSKF	DSM NA	Andrew Stott
	DSM	DSM	RDSMY US	Andrew Stott
	Lanxess	LNXSF	LXS GR	Andrew Stott
	Mondi Plc	MONDF	MNDI LN	Ross Gilardi
	Rexam	REXMF	REX LN	Ross Gilardi
	Rexam	REXMY	REXMY US	Ross Gilardi
	Smurfit Kappa Group	SMFTF	SKG LN	Ross Gilardi
	Solvay S.A.	SVYSF	SOLB BB	Laurent Favre, CFA
	Svenska Cellulosa AB (SCA)	SVCBF	SCAB SS	Ross Gilardi
	Syngenta	SYENF	SYNN VX	Andrew Stott
	Syngenta AG	SYT	SYT US	Andrew Stott
	Yule Catto	YULCF	YULC LN	Fabio Lopes
NEUTRAL				
	Akzo Nobel	AKZOF	AKZA NA	Laurent Favre, CFA
	Akzo Nobel	AKZOY	AKZOY US	Laurent Favre, CFA
	BASF	BFFAF	BAS GR	Laurent Favre, CFA
	BASF	BASFY	BASFY US	Laurent Favre, CFA
	Clariant	CLZNF	CLN VX	Andrew Stott
	Israel Chemicals Limited	ISCHF	ICL IT	Andrew Stott
	Johnson Matthey	JMPLF	JMAT LN	Andrew Stott
	Johnson Matthey	JMPLY	JMPLY US	Andrew Stott
	Linde	LNAGF	LIN GR	Laurent Favre, CFA
	Stora Enso	SEOFB	STERV FH	Ross Gilardi
	UPM-Kymmene	UPMKF	UPM1V FH	Ross Gilardi
	Victrex	VTXPF	VCT LN	Fabio Lopes
UNDERPERFORM				
	Givaudan	GVDBF	GIVN VX	Andrew Stott
	Holmen	HLMNF	HOLMB SS	Ross Gilardi
	K+S	KPLUF	SDF GR	Andrew Stott
	Lenzing AG	LNZNF	LNZ AV	Fabio Lopes
	Sappi Limited	SPPJF	SAP SJ	Ross Gilardi
	Symrise	SYIEF	SY1 GR	Laurent Favre, CFA
	Umicore	UMICF	UMI BB	Andrew Stott
	Yara	YRAIF	YAR NO	Laurent Favre, CFA

01 March 2012

EMEA - Engineering & Capital Goods Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	ABB	ABB	ABB US	Mark Troman
	ABB Ltd.	ABLZF	ABBN VX	Mark Troman
	Alstom	AOMFF	ALO FP	Mark Troman
	Cookson	CKSNF	CKSN LN	Alex Toms, CFA
	GEA	GEAGF	G1A GR	Ben Maslen
	Hexagon AB	HXGBF	HEXAB SS	Ben Maslen
	IMI	IMIAF	IMI LN	Alex Toms, CFA
	Invensys	IVNSF	ISYS LN	Alex Toms, CFA
	Invensys	IVNYY	IVNYY US	Alex Toms, CFA
	Kone OYJ	KNYJF	KNEBV FH	Ben Maslen
	Outotec	OUKPF	OTE1V FH	Michael Feniger
	Sandvik	SDVKF	SAND SS	Ben Maslen
	Sandvik	SDVKY	SDVKY US	Ben Maslen
	Schneider	SBGSF	SU FP	Mark Troman
	Weir Group	WEIGF	WEIR LN	Alex Toms, CFA
NEUTRAL				
	Atlas Copco	ATLKF	ATCOA SS	Ben Maslen
	Bodycote PLC	BYPLF	BOY LN	Alex Toms, CFA
	Electrolux	ELUXY	ELUXY US	Ben Maslen
	Electrolux	ELUXF	ELUXB SS	Ben Maslen
	Man	MAGOF	MAN GR	Ben Maslen
	Melrose plc	MLSPF	MRO LN	Alex Toms, CFA
	Metso	MXCYY	MXCYY US	Ben Maslen
	Metso	MXTOF	MEO1V FH	Ben Maslen
	Rexel	RXLSF	RXL FP	Mark Troman
	Rotork Plc	RTOXF	ROR LN	Alex Toms, CFA
	Siemens	SMAWF	SIE GR	Mark Troman
	Siemens	SI	SI US	Mark Troman
	SKF	SKFRY	SKFRY US	Ben Maslen
	SKF	SKUFF	SKFB SS	Ben Maslen
	Smiths Group	SMGKF	SMIN LN	Alex Toms, CFA
	Smiths Group	SMGZY	SMGZY US	Alex Toms, CFA
	Spectris	SEPJF	SXS LN	Alex Toms, CFA
	Spirax-Sarco	SPXSF	SPX LN	Alex Toms, CFA
UNDERPERFORM				
	Alfa Laval	ALFVF	ALFA SS	Ben Maslen
	Assa Abloy	ASAZF	ASSAB SS	Ben Maslen
	GKN	GKNLY	GKNLY US	Celine Fornaro
	GKN	GKNCF	GKN LN	Celine Fornaro
	Morgan Crucible	MCRUF	MGCR LN	Alex Toms, CFA
	Philips	PHG	PHG US	Mark Troman
	Philips	PHGFF	PHIA NA	Mark Troman
	SGL Group	SGLFF	SGL GR	Mark Troman

EMEA - Nonferrous Metals & Mining, Steel Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	African Minerals Ltd	AMLZF	AMI LN	Daniel Lian
	Anglo Amer plc	AAUKY	AAUKY US	Jason Fairclough
	Anglo American	AAUKF	AAL LN	Jason Fairclough
	Anglo Pacific Group Plc	AGPIF	APF LN	Jason Fairclough
	Antofagasta	ANFGF	ANTO LN	Jason Fairclough
	Aperam	XPMEF	APAM NA	Cedar Barnes, CFA
	Aquarius Platinum	AQPF	AQP LN	Jason Fairclough
	ArcelorMittal	AMSYF	MT NA	Cedar Barnes, CFA
	ArcelorMittal	MT	MT US	Cedar Barnes, CFA

01 March 2012

EMEA - Nonferrous Metals & Mining, Steel Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
	Centamin Egypt Limited	XCNEF	CEY LN	Daniel Lian
	Centamin Egypt Limited	YCEE	CEE CN	Daniel Lian
	Coal of Africa	XFAXF	CZA LN	Cedar Barnes, CFA
	Eurasian Natural Resources	EURNF	ENRC LN	Jason Fairclough
	Ferrexpo plc	FEEXF	FXPO LN	Jason Fairclough
	Gem Diamonds	GMDMF	GEMD LN	Jason Fairclough
	Glencore International PLC	XGNCF	GLEN LN	Jason Fairclough
	Glencore International PLC	XLGGF	805 HK	Jason Fairclough
	Hochschild Mining plc	HCHDF	HOC LN	Daniel Lian
	IRC	XLRCF	1029 HK	Jason Fairclough
	Kazakhmys	KZMYF	KAZ LN	Jason Fairclough
	Kenmare Resources	XKRMF	KMR LN	Cedar Barnes, CFA
	Kloekner	KLKNF	KCO GR	Cedar Barnes, CFA
	Nyrstar	NYRSF	NYR BB	Daniel Lian
	Petropavlovsk	PPLKF	POG LN	Jason Fairclough
	Randgold Resources	RGORF	RRS LN	Daniel Lian
	Randgold Resources	GOLD	GOLD US	Daniel Lian
	Rio Tinto Plc	RIO	RIO US	Jason Fairclough
	Rio Tinto Plc	RTPPF	RIO LN	Jason Fairclough
	Talvivaara Mining	XLVIF	TALV LN	Jason Fairclough
	Voestalpine	VLPNF	VOE AV	Cedar Barnes, CFA
	Xstrata Plc	XSRAF	XTA LN	Jason Fairclough
NEUTRAL				
	Acerinox	ANIOF	ACX SM	Cedar Barnes, CFA
	African Barrick Gold Plc	XAFBF	ABG LN	Daniel Lian
	BHP Billiton PLC	BHPBF	BLT LN	Jason Fairclough
	BHP Billiton PLC	BBL	BBL US	Jason Fairclough
	Fresnillo plc	FNLPF	FRES LN	Jason Fairclough
	International Ferro Metals	ITFMF	IFL LN	Jason Fairclough
	Petra Diamonds	PD MDF	PDL LN	Jason Fairclough
	Salzgitter	SZGPF	SZG GR	Cedar Barnes, CFA
	Vedanta	VDNRF	VED LN	Jason Fairclough
UNDERPERFORM				
	Aurubis	AIAGF	NDA GR	Cedar Barnes, CFA
	Boliden	BDNNF	BOL SS	Daniel Lian
	Eramet	ERMAF	ERA FP	Jason Fairclough
	Lonmin	LNMIF	LMI LN	Jason Fairclough
	Lonmin PLC	LNMIY	LNMIY US	Jason Fairclough
	New World Resources	XWNR F	NWR LN	Jason Fairclough
	Norsk Hydro	NHYDY	NHYDY US	Jason Fairclough
	Norsk Hydro	NHYKF	NHY NO	Jason Fairclough
	Outokumpu	OUTKF	OUT1V FH	Cedar Barnes, CFA
	Rautaruukki	RUKKF	RTRKS FH	Cedar Barnes, CFA
	SSAB	SSAAF	SSABA SS	Cedar Barnes, CFA
	ThyssenKrupp	TYEKF	TKA GR	Cedar Barnes, CFA
RSTR				
	European Goldfields	XUROF	EGU LN	Daniel Lian
	European Goldfields	EGDFD	EGU CN	Daniel Lian

EMEA - Oil Services Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	AMEC	AMCBF	AMEC LN	Fiona Maclean
	Lamprell	LMPRF	LAM LN	Fiona Maclean
	Petrofac Ltd	POFCF	PFC LN	Fiona Maclean
	Seadrill	SDRL	SDRL US	Fiona Maclean
	SeaDrill	SDRLF	SDRL NO	Fiona Maclean
	Subsea 7 SA	SUBCY	SUBCY US	Fiona Maclean
	Subsea 7 SA	ACGYF	SUBC NO	Fiona Maclean

01 March 2012

EMEA - Oil Services Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
NEUTRAL				
	Petroleum Geo	PGEJF	PGS NO	Fiona Maclean
	Petroleum Geo-Sv-ADR	PGSVY	PGSVY US	Fiona Maclean
	Saipem	SAPMF	SPM IM	Fiona Maclean
	SBM Offshore	SBFFF	SBMO NA	Fiona Maclean
	Technip	TNHPF	TEC FP	Fiona Maclean
	Technip	TKPPY	TKPPY US	Fiona Maclean
	Tecnicas Reunida	TNISF	TRE SM	Fiona Maclean
	Wood Group	WDGJF	WG/LN	Fiona Maclean
UNDERPERFORM				
	Aker Solutions	AKKVF	AKSO NO	Fiona Maclean
	Bourbon	BOUBF	GBB FP	Fiona Maclean
	CGG-Veritas	CGPVF	GA FP	Fiona Maclean
	CGG-Veritas-ADR	CGV	CGV US	Fiona Maclean
	Vallourec	VLOUF	VK FP	Fiona Maclean

EMEA - Small Caps Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	Ansaldo STS SPA	ASDOF	STS IM	Unai Franco
	BIC SA	BICEF	BB FP	Caroline Cohen
	Brembo SPA	BRBOF	BRE IM	Unai Franco
	CAF	CAUXF	CAF SM	Unai Franco
	CTS Eventim AG	CEVMF	EVD GR	Claus Roller, CFA
	De'Longhi	DELHF	DLG IM	Flavio Cereda
	Gemalto	GTOFF	GTO FP	Caroline Cohen
	Gerry Weber International AG	GRYIF	GW1 GR	Claus Roller, CFA
	GFK	GFKAF	GFK GR	Claus Roller, CFA
	Grenke Leasing	ZGKRF	GLJ GR	Claus Roller, CFA
	Ingenico	INGIF	ING FP	Caroline Cohen
	Kinghero AG	XKHGF	KH6 GR	Claus Roller, CFA
	KSB AG	KSVRF	KSB3 GR	Claus Roller, CFA
	MARR Spa	MRRFF	MARR IM	Flavio Cereda
	Monitise	MONIF	MONI LN	Caroline Cohen
	Natuzzi	NTZ	NTZ US	Flavio Cereda
	Neopost SA	NPACF	NEO FP	Caroline Cohen
	PFEIFFER	PFFVF	PFV GR	Claus Roller, CFA
	Piaggio	PIAGF	PIA IM	Flavio Cereda
	Prysmian	PRYMF	PRY IM	Caroline Cohen
	Rheinmetall AG	RNMBF	RHM GR	Claus Roller, CFA
	Safilo	SAFLF	SFL IM	Flavio Cereda
	Stroer	XHUYF	SAX GR	Claus Roller, CFA
	Yoox Group	XYOOF	YOOX IM	Flavio Cereda
NEUTRAL				
	A. Mondadori Editore SPA	MDEPF	MN IM	Flavio Cereda
	Centrotherm Photo	CPHVF	CTN GR	Claus Roller, CFA
	DELCLIMA	XSATF	DLC IM	Flavio Cereda
	Heidelberg	HBGRF	HDD GR	Claus Roller, CFA
	Krones	KRNNF	KRN GR	Claus Roller, CFA
	L'Espresso	GPEDF	ES IM	Flavio Cereda
	Luxtistica Group	LUX	LUX US	Flavio Cereda
	Luxtistica Group	LUXGF	LUX IM	Flavio Cereda
	Mobotix	XMBXF	MBQ GR	Claus Roller, CFA
	Nexans	NXPRF	NEX FP	Caroline Cohen
	Rational AG	RTLLF	RAA GR	Claus Roller, CFA
	Rubis	RUBSF	RUI FP	Caroline Cohen
	SAFT	SGPEF	SAFT FP	Caroline Cohen
	SEB	SEBYF	SK FP	Caroline Cohen
	SMA Solar	SMTGF	S92 GR	Claus Roller, CFA

01 March 2012

EMEA - Small Caps Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
	Vopak	VOPKF	VPK NA	Caroline Cohen
	Wincor	WNXDF	WIN GR	Claus Roller, CFA
UNDERPERFORM				
	Chantiers Beneteau	BTEAF	BEN FP	Caroline Cohen
	Fielmann	FLMNF	FIE GR	Flavio Cereda
	Mersen	CBLNF	MRN FP	Caroline Cohen
	Vossloh	VOSSF	VOS GR	Claus Roller, CFA
	Wacker Chemie	WKCMF	WCH GR	Claus Roller, CFA

EMEA - Technology Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	Atos	AEXAF	ATO FP	Chandramouli Sriraman
	Sage Group	SGGEF	SGE LN	Chandramouli Sriraman
	Telecity	TLCTF	TCY LN	Chandramouli Sriraman
NEUTRAL				
	Capgemini	CAPMF	CAP FP	Chandramouli Sriraman
	Logica	LGIAF	LOG LN	Chandramouli Sriraman
	SAP AG	SAPGF	SAP GR	Chandramouli Sriraman
	SAP AG	SAP	SAP US	Chandramouli Sriraman
	Software AG	SWDAF	SOW GR	Chandramouli Sriraman
UNDERPERFORM				
	Indra	ISMAF	IDR SM	Chandramouli Sriraman

EMEA - Travel & Leisure Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	Carnival Corporation	CCL	CCL US	Nicholas Thomas
	Carnival plc	CUKPF	CCL LN	Nicholas Thomas
	Compass Group	CMPGF	CPG LN	Simon Larkin
	Fraport	FPRUF	FRA GY	Mark Manduca, CFA
	IAG	XACDF	IAG LN	Mark Manduca, CFA
	IAG	BABWF	IAG SM	Mark Manduca, CFA
	Intercontinental Hotels Group	ICHGF	IHG LN	Simon Larkin
	Intercontinental Hotels Group	IHG	IHG US	Simon Larkin
	Kuehne + Nagel International	KHNGF	KNIN VX	Mark Manduca, CFA
	Ladbroke's Plc	LDBKY	LDBKY US	Roohi Siddiqui
	Ladbroke's Plc	LDBKF	LAD LN	Roohi Siddiqui
	Mitchells & Butlers	MBPFF	MAB LN	Nicholas Thomas
	National Express	NXPGF	NEX LN	Mark Manduca, CFA
	Ryanair	RYAAY	RYAAY US	Mark Manduca, CFA
	Ryanair	RYAOF	RYA ID	Mark Manduca, CFA
	Stagecoach Group	SAGKF	SGC LN	Mark Manduca, CFA
	TUI Travel	TTVLF	TT/ LN	Simon Larkin
	Whitbread	WTBCF	WTB LN	Simon Larkin
NEUTRAL				
	AirFrance KLM	AFRAF	AF FP	Mark Manduca, CFA
	AirFrance KLM	AFLYY	AFLYY US	Mark Manduca, CFA
	easyJet	EJETF	EZJ LN	Mark Manduca, CFA
	Edenred	EDNMF	EDEN FP	Nicholas Thomas
	Flybe	XYFLF	FLYB LN	Mark Manduca, CFA
	Go-Ahead Group	GHGUF	GOG LN	Mark Manduca, CFA
	Greene King	GRKGF	GNK LN	Nicholas Thomas
	Lottomatica	LTOMF	LTO IM	Roohi Siddiqui
	Marston's	MARZF	MARS LN	Nicholas Thomas
	OPAP	GRKZF	OPAP GA	Roohi Siddiqui

01 March 2012

EMEA - Travel & Leisure Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
	Sodexo	SDXOF	SW FP	Nicholas Thomas
UNDERPERFORM				
	Accor	ACRFF	AC FP	Simon Larkin
	ADP Aeroports de Paris	AEOFP	ADP FP	Mark Manduca, CFA
	Enterprise Inns	ETINF	ETI LN	Nicholas Thomas
	FirstGroup Plc	FGROF	FGP LN	Mark Manduca, CFA
	Intralot	IRLTF	INLOT GA	Roohi Siddiqui
	Lufthansa	DLAKY	DLAKY US	Mark Manduca, CFA
	Lufthansa	DLAKF	LHA GR	Mark Manduca, CFA
	Paddy Power	PDYPF	PWL ID	Roohi Siddiqui
	Panalpina Weltransport	PLWTF	PWTN SW	Mark Manduca, CFA
	Thomas Cook	TCKGF	TCG LN	Simon Larkin
	William Hill	WIMHF	WMH LN	Roohi Siddiqui

India - Engineering/Construction/Utilities Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	Essar Ports	ESHPP	ESRS IN	Deepak Agrawala
	Gujarat State Petronet Ltd	GJRSP	GUJS IN	Vidyadhar Ginde
	GVK Power & Infrastructure Ltd.	GVPWF	GVKP IN	Deepak Agrawala
	IL&FS Transportation Networks Ltd	XTPSF	ILFT IN	Deepak Agrawala
	IRB Infrastructure Developers Ltd.	XIRBF	IRB IN	Deepak Agrawala
	IVRCL Infrastruc	IIFRF	IVRC IN	Bharat Parekh
	Jaiprakash Associates Limited	JPRKF	JPA IN	Bharat Parekh
	Jaiprakash Power Ventures Ltd.	XJSHF	JPVL IN	Bharat Parekh
	Lanco Infratech Ltd.	LNIFL	LANCI IN	Deepak Agrawala
	Nagarjuna Const	NGRJF	NJCC IN	Bharat Parekh
	NCC-GDR	XAKUF	NJGR LX	Bharat Parekh
	Reliance Infrastructure	RCTDF	RELI IN	Bharat Parekh
	Suzlon Energy	XZULF	SUEL IN	Bharat Parekh
	Va Tech Wabag	XVWBF	VATW IN	Jonas Bhutta
NEUTRAL				
	Adani Enterprises Ltd.	ANIEF	ADE IN	Bharat Parekh
	Adani Ports & SEZ Ltd	XMANF	ADSEZ IN	Bharat Parekh
	Gujarat Inds	GUJIF	GIP IN	Bharat Parekh
	Larsen & Toub -G	LTORF	LTOD LI	Bharat Parekh
	Larsen & Toubro	LTOUF	LT IN	Bharat Parekh
	Tata Pwr. Co.	XTAWF	TPWR IN	Bharat Parekh
UNDERPERFORM				
	ABB	ABVFF	ABB IN	Bharat Parekh
	Adani Power Ltd.	XADPF	ADANI IN	Bharat Parekh
	Crompton Greaves	CPGZF	CRG IN	Jonas Bhutta
	GMR Infrastructure Ltd.	GMRLF	GMRI IN	Deepak Agrawala
	Neyveli Lignite	NEYVF	NLC IN	Bharat Parekh
	NTPC Ltd	NTHPF	NTPC IN	Bharat Parekh
	Siemens Ltd	SMNBF	SIEM IN	Jonas Bhutta
RSTR				
	Bharat Heavy	BHHEF	BHEL IN	Bharat Parekh
	Gail India	XGLAF	GAIL IN	Vidyadhar Ginde
	Gail Limited - G	GAILF	GAID LI	Vidyadhar Ginde

Japan - Cyclical Materials Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	Air Water	AWTRF	4088 JP	Takashi Enomoto
	Asahi Glass	ASGLF	5201 JP	Akiko Kuwahara

01 March 2012

Japan - Cyclical Materials Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
	Fujikura	FKURF	5803 JP	Takashi Enomoto
	Hitachi Metals	HMTLF	5486 JP	Takashi Enomoto
	Kuraray	KURRF	3405 JP	Akiko Kuwahara
	Miraial	MRLCF	4238 JP	Takashi Enomoto
	Mitsubishi Chemical Holdings	MTLHF	4188 JP	Takashi Enomoto
	Mitsubishi Gas Chemical	MBGCF	4182 JP	Takashi Enomoto
	Mitsui Chemicals	MITUF	4183 JP	Takashi Enomoto
	Mitsui Mining & Smelting	XZJCF	5706 JP	Takashi Enomoto
	MMC	MIMTF	5711 JP	Takashi Enomoto
	NGK Insulators	NGKIF	5333 JP	Akiko Kuwahara
	NOK	NNOKF	7240 JP	Takashi Enomoto
	Oji Paper	OJIPF	3861 JP	Akiko Kuwahara
	Rengo	RNGOF	3941 JP	Akiko Kuwahara
	Shin-Etsu Chem	SHECF	4063 JP	Takashi Enomoto
	Sumitomo Bakelite	SBKLF	4203 JP	Takashi Enomoto
	Sumitomo Chem.	SOMMF	4005 JP	Takashi Enomoto
	Sumitomo Electric Industries	SMTOF	5802 JP	Takashi Enomoto
	Toray	TRYIF	3402 JP	Akiko Kuwahara
	Yamato Kogyo	YMTKF	5444 JP	Takashi Enomoto
NEUTRAL				
	Daido Steel	DADSF	5471 JP	Takashi Enomoto
	Dowa Holdings	DWMNF	5714 JP	Takashi Enomoto
	Furukawa Electric	FUWAF	5801 JP	Takashi Enomoto
	Hokuetsu Kishu Paper	HKPMF	3865 JP	Akiko Kuwahara
	Kobe Steel	KBSTF	5406 JP	Takashi Enomoto
	Nippon Electric Glass	NPEGF	5214 JP	Akiko Kuwahara
	Nippon Paper Group	NPPNF	3893 JP	Akiko Kuwahara
	Nippon Sheet Glass	NPSGF	5202 JP	Akiko Kuwahara
	SMM	STMNF	5713 JP	Takashi Enomoto
	SUMCO	SUMCF	3436 JP	Takashi Enomoto
	Taiyo Npn Sanso	NOSPF	4091 JP	Takashi Enomoto
	Tokyo Steel	TOKSF	5423 JP	Takashi Enomoto
	Ube Industries	UBEIF	4208 JP	Takashi Enomoto
UNDERPERFORM				
	Asahi Kasei	AHKSF	3407 JP	Takashi Enomoto
	Daicel Corp	DACHF	4202 JP	Takashi Enomoto
	Fujimi	FUJXF	5384 JP	Takashi Enomoto
	Hitachi Chemical	HCHMF	4217 JP	Takashi Enomoto
	JFE Holdings	JFEF	5411 JP	Takashi Enomoto
	JSR	JSCPF	4185 JP	Takashi Enomoto
	Mimasu Semicon	TAAKM	8155 JP	Takashi Enomoto
	Nippon Steel	NISTF	5401 JP	Takashi Enomoto
	Nisshin Steel	NHISF	5407 JP	Takashi Enomoto
	Pacific Metals	PFMTF	5541 JP	Takashi Enomoto
	Showa Denko	SHWDF	4004 JP	Takashi Enomoto
	Teijin	TINLF	3401 JP	Akiko Kuwahara
	Tokuyama	TKYMF	4043 JP	Takashi Enomoto
	Toyo Seikan	TOSKF	5901 JP	Akiko Kuwahara
RSTR				
	Sumitomo Metal	SMMLF	5405 JP	Takashi Enomoto

Japan - Machinery / Plant Engineering Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	JTEKT	JTEKF	6473 JP	Hideyuki Mizuno
	Kawasaki Heavy	KWHIF	7012 JP	Takahiro Mori
	Komatsu	KMTUF	6301 JP	Hideyuki Mizuno
	Komatsu	KMTUY	KMTUY US	Hideyuki Mizuno
	Makita	MKEWF	6586 JP	Sho Fukuhara

01 March 2012

Japan - Machinery / Plant Engineering Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
	Mitsubishi Heavy	MHVYF	7011 JP	Takahiro Mori
	Nabtesco	NCTKF	6268 JP	Hideyuki Mizuno
	NSK	NPSKF	6471 JP	Hideyuki Mizuno
	NSK	NPSKY	NPSKY US	Hideyuki Mizuno
	SMC	SMECF	6273 JP	Hideyuki Mizuno
	Sumitomo Heavy	SOHVF	6302 JP	Takahiro Mori
	THK	THKLF	6481 JP	Hideyuki Mizuno
	Yaskawa Electric	YASKF	6506 JP	Hideyuki Mizuno
NEUTRAL				
	Chiyoda Corp	CHYCF	6366 JP	Takahiro Mori
	Hitachi Construction Machinery	HTCMF	6305 JP	Hideyuki Mizuno
	IHI	IHICF	7013 JP	Takahiro Mori
	Okuma	OKUMF	6103 JP	Sho Fukuhara
UNDERPERFORM				
	Amada	AMDWF	6113 JP	Hideyuki Mizuno
	Fanuc	FANUF	6954 JP	Hideyuki Mizuno
	JGC Corp	JGCCF	1963 JP	Takahiro Mori
	Kubota	KUBTF	6326 JP	Hideyuki Mizuno
	Kubota	KUB	KUB US	Hideyuki Mizuno
	Kurita	KTWIF	6370 JP	Hideyuki Mizuno
	Makino Milling	MKMLF	6135 JP	Sho Fukuhara
	Mitsui Engineering & Shipbuilding	MIESF	7003 JP	Takahiro Mori
	MODEC	MDIKF	6269 JP	Takahiro Mori
	Mori Seiki	MRSKF	6141 JP	Sho Fukuhara
	NTN	NTTBF	6472 JP	Hideyuki Mizuno

Japan - Real Estate / Construction Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	Aeon Mall	AMLLF	8905 JP	Yoshihiro Hashimoto
	Daito Trust	DITTF	1878 JP	Yoshihiro Hashimoto
	Daiwahouse Residential Investment	BLIFF	8984 JP	Toshiyuki Anegawa
	Frontier REIT	FOTRF	8964 JP	Toshiyuki Anegawa
	Japan Real REIT	JREIF	8952 JP	Toshiyuki Anegawa
	Kajima	KAJMF	1812 JP	Toshiyuki Anegawa
	Mitsubishi Estate	MITEF	8802 JP	Yoshihiro Hashimoto
	Mitsubishi Estate	MITEY	MITEY US	Yoshihiro Hashimoto
	Mitsui Fudosan	MTSFF	8801 JP	Yoshihiro Hashimoto
	Mori Trust REIT	MRGIF	8961 JP	Toshiyuki Anegawa
	Nippon Accommodations Fund	NIPPF	3226 JP	Toshiyuki Anegawa
	Nippon Bldg Fund	NBFJF	8951 JP	Toshiyuki Anegawa
	Obayashi	OBYCF	1802 JP	Toshiyuki Anegawa
	ORIX JREIT	ORXJF	8954 JP	Toshiyuki Anegawa
	Rinnai Corp	RINIF	5947 JP	Asuka Inami
	Shimizu	SHMUF	1803 JP	Toshiyuki Anegawa
	Sumitomo Osaka Cement	SUCEF	5232 JP	Asuka Inami
	Sumitomo Realty	SURDF	8830 JP	Yoshihiro Hashimoto
	Taiheiyo Cement	THYCF	5233 JP	Asuka Inami
	Taisei	TISCF	1801 JP	Toshiyuki Anegawa
	Yokogawa Bridge	YGWAF	5911 JP	Toshiyuki Anegawa
NEUTRAL				
	Daiwa House	DWAHF	1925 JP	Yoshihiro Hashimoto
	Daiwa House	DWAHY	DWAHY US	Yoshihiro Hashimoto
	Japan Excellent	JPXCF	8987 JP	Toshiyuki Anegawa
	Japan Prime Realty	JPRRF	8955 JP	Toshiyuki Anegawa
	Japan Retail Fund	JRFIF	8953 JP	Toshiyuki Anegawa
	Kandenko	KDKOF	1942 JP	Toshiyuki Anegawa
	Kinden	KNDEF	1944 JP	Toshiyuki Anegawa
	Nomura Real Estate Office Fund	NREOF	8959 JP	Toshiyuki Anegawa

01 March 2012

Japan - Real Estate / Construction Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
	Sekisui House	SKHSF	1928 JP	Yoshihiro Hashimoto
	Sekisui House	SKHSY	SKHSY US	Yoshihiro Hashimoto
	Tokyu REIT	TKURF	8957 JP	Toshiyuki Anegawa
UNDERPERFORM				
	Japan Hotel and Resort	JHOTF	8981 JP	Toshiyuki Anegawa
	JS Group	JSGCF	5938 JP	Asuka Inami
	PanaHome	NHIXF	1924 JP	Yoshihiro Hashimoto
	Sanki	SKIGF	1961 JP	Toshiyuki Anegawa
	Sumitomo Forestry	SMFRF	1911 JP	Yoshihiro Hashimoto
	Takasago	TKSNF	1969 JP	Toshiyuki Anegawa
	Tokyo Energy & Systems	TKDKF	1945 JP	Toshiyuki Anegawa
	Top REIT	TPRYF	8982 JP	Toshiyuki Anegawa
	TOTO	TOTDF	5332 JP	Asuka Inami

LatAm - Agribusiness and Food Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	Adecoagro	AGRO	AGRO US	Fernando Ferreira, CFA
	Brasil Foods	BRFS	BRFS US	Fernando Ferreira, CFA
	Brasil Foods	XBRFF	BRFS3 BZ	Fernando Ferreira, CFA
	Cosan Ltd	CZZ	CZZ US	Fernando Ferreira, CFA
	Cosan SA Ind Com	CSIDF	CSAN3 BZ	Fernando Ferreira, CFA
	Sao Martinho	SRTOF	SMT03 BZ	Fernando Ferreira, CFA
NEUTRAL				
	Fertilizantes Heringer	XFTLF	FHER3 BZ	Isabella Simonato
	Minerva	XMASF	BEEF3 BZ	Fernando Ferreira, CFA
	SLC Agricola	SLCJF	SLCE3 BZ	Fernando Ferreira, CFA
	Souza Cruz	SOZCF	CRUZ3 BZ	Fernando Ferreira, CFA
	SQM	SQM	SQM US	Fernando Ferreira, CFA
UNDERPERFORM				
	JBS	JBSAF	JBSS3 BZ	Fernando Ferreira, CFA
	M. Dias Branco	XDMIF	MDIA3 BZ	Fernando Ferreira, CFA
	Marfrig	XGFRF	MRFG3 BZ	Fernando Ferreira, CFA

US - Aerospace and Defense Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	BE Aerospace	BEAV	BEAV US	Ronald J. Epstein
	Boeing	BA	BA US	Ronald J. Epstein
	Crane Co	CR	CR US	Ronald J. Epstein
	Embraer	ERJ	ERJ US	Ronald J. Epstein
	General Dynamics	GD	GD US	Ronald J. Epstein
	Moog Inc.	MOGA	MOG/A US	Ronald J. Epstein
	Raytheon Co.	RTN	RTN US	Ronald J. Epstein
	Spirit AeroSys-A	SPR	SPR US	Ronald J. Epstein
	Textron	TXT	TXT US	Ronald J. Epstein
	Triumph Group	TGI	TGI US	Ronald J. Epstein
	United Tech	UTX	UTX US	Ronald J. Epstein
	Wesco Aircraft Holdings, Inc	WAIR	WAIR US	Ronald J. Epstein
NEUTRAL				
	Hexcel Corporation	HXL	HXL US	Ronald J. Epstein
	L-3 Comm	LLL	LLL US	Ronald J. Epstein
	Precision Cast	PCP	PCP US	Ronald J. Epstein
	TransDigm Group Inc.	TDG	TDG US	Ronald J. Epstein
UNDERPERFORM				
	Bombardier Inc.	YBBD B	BBD/B CN	Ronald J. Epstein

01 March 2012

US - Aerospace and Defense Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
	CAE Inc.	YCAE	CAE CN	Ronald J. Epstein
	DigitalGlobe Inc	DGI	DGI US	Ronald J. Epstein
	Huntington Ingalls Industries	HII	HII US	Ronald J. Epstein
	Lockheed Martin	LMT	LMT US	Ronald J. Epstein
	Northrop Grumman	NOC	NOC US	Ronald J. Epstein
	Rockwell Collins	COL	COL US	Ronald J. Epstein
	ViaSat	VSAT	VSAT US	Ronald J. Epstein

US - Alternative Energy Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	A123 Systems	AONE	AONE US	Steven Milunovich, CFA
	Ameresco Inc.	AMRC	AMRC US	Steven Milunovich, CFA
	Clean Energy Fuels Corp.	CLNE	CLNE US	Steven Milunovich, CFA
	Elster Group SE	ELT	ELT US	Steven Milunovich, CFA
	GCL-Poly	GCPEF	3800 HK	Joe Osha
	ReneSola	SOL	SOL US	Joe Osha
	Tesla Motors Inc.	TSLA	TSLA US	Steven Milunovich, CFA
	Trina Solar Limited	TSL	TSL US	Joe Osha
	Westport Innovations	WPRT	WPRT US	Peter Christiansen, CMT
	Yingli Green Energy	YGE	YGE US	Joe Osha
NEUTRAL				
	Covanta Holding Corporation	CVA	CVA US	Steven Milunovich, CFA
UNDERPERFORM				
	Cree, Inc.	CREE	CREE US	Steven Milunovich, CFA
	EnerNOC Inc.	ENOC	ENOC US	Steven Milunovich, CFA
	First Solar, Inc.	FSLR	FSLR US	Joe Osha
	Fuel Systems Solutions	FSYS	FSYS US	Peter Christiansen, CMT
	Itron Inc.	ITRI	ITRI US	Steven Milunovich, CFA
	JA Solar	JASO	JASO US	Joe Osha
	LDK Solar	LDK	LDK US	Joe Osha
	Ormat Technologies, Inc.	ORA	ORA US	Steven Milunovich, CFA
	SemiLEDs Corp.	LEDS	LEDS US	Steven Milunovich, CFA
	SunPower Corp.	SPWR	SPWR US	Joe Osha
	Suntech Power	STP	STP US	Joe Osha

US - Automotives Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	American Axle	AXL	AXL US	John Murphy, CFA
	Asbury Auto	ABG	ABG US	John Murphy, CFA
	BorgWarner	BWA	BWA US	John Murphy, CFA
	CarMax, Inc.	KMX	KMX US	John Murphy, CFA
	Cooper Tire	CTB	CTB US	John Murphy, CFA
	Delphi Automotive	DLPH	DLPH US	John Murphy, CFA
	Ford Motor	F	F US	John Murphy, CFA
	General Motors Company	GM	GM US	John Murphy, CFA
	Group 1 Auto	GPI	GPI US	John Murphy, CFA
	Johnson Controls	JCI	JCI US	John Murphy, CFA
	Lear Corp.	LEA	LEA US	John Murphy, CFA
	Lithia Motors A	LAD	LAD US	John Murphy, CFA
	Magna Intl	MGA	MGA US	John Murphy, CFA
	Penske Auto Group	PAG	PAG US	John Murphy, CFA
	Sonic Automotive	SAH	SAH US	John Murphy, CFA
	Tenneco	TEN	TEN US	John Murphy, CFA
	TRW Automotive	TRW	TRW US	John Murphy, CFA

01 March 2012

US - Automotives Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
	Visteon Corporation	VC	VC US	John Murphy, CFA
NEUTRAL				
	AutoNation, Inc.	AN	AN US	John Murphy, CFA
	Goodyear	GT	GT US	John Murphy, CFA
	LKQ Corporation	LKQX	LKQX US	John Lovallo II, CFA
UNDERPERFORM				
	Copart, Inc.	CPRT	CPRT US	John Lovallo II, CFA
	Gentex	GNTX	GNTX US	John Murphy, CFA
	Genuine Parts	GPC	GPC US	John Murphy, CFA
	KAR Auction Services	KAR	KAR US	John Murphy, CFA

US - Enterprise Hardware and Storage Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	Apple	AAPL	AAPL US	Scott D. Craig, CFA
	Arrow Electronics, Inc.	ARW	ARW US	Scott D. Craig, CFA
	Avnet Inc.	AVT	AVT US	Scott D. Craig, CFA
	Brocade Comm	BRCD	BRCD US	Scott D. Craig, CFA
	Dell Inc	DELL	DELL US	Scott D. Craig, CFA
	EMC Corp	EMC	EMC US	Scott D. Craig, CFA
	Hewlett-Packard	HPQ	HPQ US	Scott D. Craig, CFA
	IBM	IBM	IBM US	Scott D. Craig, CFA
	Seagate Technology	STX	STX US	Scott D. Craig, CFA
	SYNNEX Corp.	SNX	SNX US	Scott D. Craig, CFA
	Western Digital	WDC	WDC US	Scott D. Craig, CFA
NEUTRAL				
	Ingram Micro Inc.	IM	IM US	Scott D. Craig, CFA
	NetApp	NTAP	NTAP US	Scott D. Craig, CFA
	Tech Data Corp.	TECD	TECD US	Scott D. Craig, CFA
UNDERPERFORM				
	Emulex Corporation	ELX	ELX US	Scott D. Craig, CFA
	Lexmark International, Inc.	LXK	LXK US	Scott D. Craig, CFA
	QLogic Corporation	QLGC	QLGC US	Scott D. Craig, CFA

US - Enterprise Software Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	Adobe	ADBE	ADBE US	Kash Rangan
	Carbonite, Inc.	CARB	CARB US	Kash Rangan
	Informatica Corp.	INFA	INFA US	Mitesh Dhruv, CFA
	Intuit	INTU	INTU US	Kash Rangan
	Microsoft Corp	MSFT	MSFT US	Kash Rangan
	Oracle	ORCL	ORCL US	Kash Rangan
	Salesforce.com	CRM	CRM US	Kash Rangan
	TIBCO Software	TIBX	TIBX US	Kash Rangan
	VMware Inc	VMW	VMW US	Kash Rangan
NEUTRAL				
	Autodesk	ADSK	ADSK US	Kash Rangan
	Citrix Systems Inc	CTXS	CTXS US	Kash Rangan
	Rackspace Hosting, Inc	RAX	RAX US	Mitesh Dhruv, CFA
	Red Hat Inc.	RHT	RHT US	Kash Rangan
	Symantec	SYMC	SYMC US	Kash Rangan
UNDERPERFORM				
	Concur Tech Inc	CNQR	CNQR US	Kash Rangan
	Delltek	PROJ	PROJ US	Mitesh Dhruv, CFA
	VeriSign	VRSN	VRSN US	Jaimin Soni

01 March 2012

US - Enterprise Software Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
-------------------	---------	---------------------------	------------------	---------

US - Internet Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
-------------------	---------	---------------------------	------------------	---------

BUY	Active Network	ACTV	ACTV US	Nat Schindler
	Amazon.com	AMZN	AMZN US	Justin Post
	eBay	EBAY	EBAY US	Justin Post
	eHealth	EHTH	EHTH US	Nat Schindler
	Google	GOOG	GOOG US	Justin Post
	Groupon	GRPN	GRPN US	Justin Post
	LinkedIn	LNKD	LNKD US	Justin Post
	Pandora Media, Inc.	P	P US	Nat Schindler
	priceline.com	PCLN	PCLN US	Justin Post
	Take-Two Interactive	TTWO	TTWO US	Justin Post
	TripAdvisor	TRIP	TRIP US	Nat Schindler
	Yahoo!	YHOO	YHOO US	Justin Post

NEUTRAL	Activision Blizzard	ATVI	ATVI US	Justin Post
	Ancestry	ACOM	ACOM US	Nat Schindler
	Angie's List	ANGI	ANGI US	Justin Post
	Bankrate	RATE	RATE US	Justin Post
	Electronic Arts	EA	EA US	Justin Post
	Expedia	EXPE	EXPE US	Justin Post
	IAC InterActive	IACI	IACI US	Nat Schindler
	OpenTable, Inc.	OPEN	OPEN US	Justin Post
	QuinStreet	QNST	QNST US	Nat Schindler

UNDERPERFORM	Digital River, Inc.	DRIV	DRIV US	Nat Schindler
	Netflix, Inc.	NFLX	NFLX US	Nat Schindler
	Overstock.com	OSTK	OSTK US	Nat Schindler
	ReachLocal	RLOC	RLOC US	Nat Schindler
	THQ Inc	THQI	THQI US	Justin Post
	ZYNGA	ZNGA	ZNGA US	Justin Post

US - Machinery and Engineering and Construction Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
-------------------	---------	---------------------------	------------------	---------

BUY	AECOM Technology	ACM	ACM US	Andrew Obin
	Altra Holdings	AIMC	AIMC US	Anna Kaminskaya, CFA
	CNH Global	CNH	CNH US	Andrew Obin
	Deere & Co	DE	DE US	Andrew Obin
	Eaton Corp	ETN	ETN US	Andrew Obin
	Fluor Corp	FLR	FLR US	Andrew Obin
	Ingersoll-Rand	IR	IR US	Andrew Obin
	Jacobs Eng.	JEC	JEC US	Andrew Obin
	Oshkosh Corp.	OSK	OSK US	Andrew Obin
	PACCAR Inc	PCAR	PCAR US	Andrew Obin
	RBC Bearings Inc	ROLL	ROLL US	Anna Kaminskaya, CFA
	Ritchie Bros	RBA	RBA US	Anna Kaminskaya, CFA
	Rush	RUSHA	RUSHA US	Andrew Obin
	Terex Corp.	TEX	TEX US	Andrew Obin
	The Shaw Group	SHAW	SHAW US	Andrew Obin
	Timken Company	TKR	TKR US	Andrew Obin
	TMS International	TMS	TMS US	Andrew Obin

NEUTRAL	Actuant Corp	ATU	ATU US	Andrew Obin
----------------	--------------	-----	--------	-------------

01 March 2012

US - Machinery and Engineering and Construction Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
	AGCO Corp	AGCO	AGCO US	Andrew Obin
	Caterpillar Inc	CAT	CAT US	Andrew Obin
	Donaldson Co	DCI	DCI US	Andrew Obin
	Finning International Inc.	YFTT	FTT CN	Anna Kaminskaya, CFA
UNDERPERFORM				
	Generac Holdings Inc.	GNRC	GNRC US	Andrew Obin
	Kennametal Inc.	KMT	KMT US	Andrew Obin
	URS Corp.	URS	URS US	Andrew Obin

US - Multi Industry Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	Ametek Inc	AME	AME US	Elana Hordon Wood
	Danaher Corp	DHR	DHR US	John G. Inch
	Dover Corp	DOV	DOV US	John G. Inch
	Grainger W.W.	GWW	GWW US	John G. Inch
	Honeywell Intl.	HON	HON US	John G. Inch
	Illinois Tool	ITW	ITW US	John G. Inch
	Rockwell	ROK	ROK US	John G. Inch
	SPX Corp	SPW	SPW US	John G. Inch
	Tyco Intl	TYC	TYC US	John G. Inch
NEUTRAL				
	Emerson	EMR	EMR US	John G. Inch
	Genl Electric	GE	GE US	John G. Inch
	ITT Corp.	ITT	ITT US	John G. Inch
	MSC Industrial	MSM	MSM US	John G. Inch
UNDERPERFORM				
	3M Company	MMM	MMM US	John G. Inch
	Mistras Group	MG	MG US	John G. Inch
RSTR				
	Colfax Corp	CFX	CFX US	John G. Inch
	Thomas & Betts Corp	TNB	TNB US	Elana Hordon Wood

US - Semiconductor Capital Equipment Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	Advanced Energy	AEIS	AEIS US	Krish Sankar
	ASML Holding N.V.	ASMLF	ASML NA	Krish Sankar
	ASML Holding N.V.	ASML	ASML US	Krish Sankar
	Cadence Design Systems	CDNS	CDNS US	Krish Sankar
	Cymer Inc.	CYMI	CYMI US	Krish Sankar
	KLA-Tencor	KLAC	KLAC US	Krish Sankar
	Mentor Graphics Corp	MENT	MENT US	Krish Sankar
	Synopsys Inc	SNPS	SNPS US	Krish Sankar
	Ultratech	UTEK	UTEK US	Krish Sankar
NEUTRAL				
	Applied Material	AMAT	AMAT US	Krish Sankar
	Entegris Inc	ENTG	ENTG US	Krish Sankar
	GT Advanced Technologies	GTAT	GTAT US	Krish Sankar
	MEMC Electronic	WFR	WFR US	Krish Sankar
	Teradyne	TER	TER US	Krish Sankar
	Tessera	TSRA	TSRA US	Krish Sankar
	Veeco Instruments	VECO	VECO US	Krish Sankar
UNDERPERFORM				
	ATMI Inc.	ATMI	ATMI US	Krish Sankar
	Kulicke & Soffa	KLIC	KLIC US	Krish Sankar

01 March 2012

US - Semiconductor Capital Equipment Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
	Lam Research	LRCX	LRCX US	Krish Sankar
	MKS Instruments	MKSI	MKSI US	Krish Sankar
	Photronics	PLAB	PLAB US	Krish Sankar
RSTR				
	IPG Photonics	IPGP	IPGP US	Krish Sankar
	Novellus	NVLS	NVLS US	Krish Sankar

US - Semiconductors Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	Altera Corp.	ALTR	ALTR US	Vivek Arya
	Analog Devices Inc.	ADI	ADI US	Vivek Arya
	Avago	AVGO	AVGO US	Vivek Arya
	Broadcom Corp.	BRCM	BRCM US	Vivek Arya
	Intel	INTC	INTC US	Vivek Arya
	LSI	LSI	LSI US	Vivek Arya
	NXP Semiconductors NV	NXPI	NXPI US	Vivek Arya
	Skyworks Solutions, Inc.	SWKS	SWKS US	Vivek Arya
	Texas Instruments Inc.	TXN	TXN US	Vivek Arya
NEUTRAL				
	Marvell Technology Group Ltd.	MRVL	MRVL US	Vivek Arya
	Maxim Integrated Products Inc.	MXIM	MXIM US	Vivek Arya
	NVIDIA Corporation	NVDA	NVDA US	Vivek Arya
	Xilinx Inc.	XLNX	XLNX US	Vivek Arya
UNDERPERFORM				
	Advanced Micro Devices, Inc	AMD	AMD US	Vivek Arya
	ARM	ARMH	ARMH US	Vivek Arya
	ARM Holdings PLC	ARMHF	ARM LN	Vivek Arya
	RF Micro Devices	RFMD	RFMD US	Vivek Arya
	TriQuint	TQNT	TQNT US	Vivek Arya

US - Telecom and Data Networking Equipment Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
BUY				
	Adtran	ADTN	ADTN US	Eric A. Ghernati
	Allot Communications	ALLT	ALLT US	Tal Liani
	CIENA	CIEN	CIEN US	Tal Liani
	Cisco Systems	CSCO	CSCO US	Tal Liani
	F5 Networks	FFIV	FFIV US	Tal Liani
	Fortinet	FTNT	FTNT US	Tal Liani
	Mitel	MITL	MITL US	Tal Liani
	QUALCOMM	QCOM	QCOM US	Tal Liani
	RPX Corporation	RPXC	RPXC US	Eric A. Ghernati
	Sourcefire	FIRE	FIRE US	Tal Liani
NEUTRAL				
	Amdocs	DOX	DOX US	Tal Liani
	Check Point Software Technologies	CHKP	CHKP US	Tal Liani
	Harmonic Inc	HLIT	HLIT US	Tal Liani
	Juniper Networks	JNPR	JNPR US	Tal Liani
	Research in Motion	RIMM	RIMM US	Tal Liani
	Riverbed Technology	RVBD	RVBD US	Tal Liani
UNDERPERFORM				
	Meru Networks	MERU	MERU US	Tal Liani
	NeoPhotonics	NPTN	NPTN US	Tal Liani
	SMART Technologies	SMT	SMT US	Tal Liani
	Tellabs	TLAB	TLAB US	Tal Liani

01 March 2012

US - Telecom and Data Networking Equipment Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
-------------------	---------	---------------------------	------------------	---------

US - Telecom Services Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
-------------------	---------	---------------------------	------------------	---------

BUY				
	American Tower Corp.	AMT	AMT US	David W. Barden, CFA
	CenturyLink	CTL	CTL US	David W. Barden, CFA
	Clearwire-CL A	CLWR	CLWR US	Michael J. Funk
	Cogent	CCOI	CCOI US	Michael J. Funk
	Crown Castle International Corp.	CCI	CCI US	David W. Barden, CFA
	Equinix, Inc.	EQIX	EQIX US	David W. Barden, CFA
	InterXion	INXN	INXN US	David W. Barden, CFA
	Leap Wireless International Inc.	LEAP	LEAP US	David W. Barden, CFA
	SBA Communications Corporation	SBAC	SBAC US	David W. Barden, CFA
	Windstream Corporation	WIN	WIN US	David W. Barden, CFA
NEUTRAL				
	AT&T Inc.	T	T US	David W. Barden, CFA
	Cbeyond, Inc	CBEY	CBEY US	Michael J. Funk
	Cincinnati Bell Inc.	CBB	CBB US	David W. Barden, CFA
	Level 3	LVLT	LVLT US	Michael J. Funk
	Sprint Nextel Corp.	S	S US	David W. Barden, CFA
	TW Telecom	TWTC	TWTC US	Michael J. Funk
	Verizon Communications Inc.	VZ	VZ US	David W. Barden, CFA
UNDERPERFORM				
	Alaska Communications Systems Group Inc.	ALSK	ALSK US	David W. Barden, CFA
	Frontier Communications Corp.	FTR	FTR US	David W. Barden, CFA
	MetroPCS Communications Inc.	PCS	PCS US	David W. Barden, CFA

US - Transportation Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
-------------------	---------	---------------------------	------------------	---------

BUY				
	Con-way Inc.	CNW	CNW US	Ken Hoexter
	Costamare Inc.	CMRE	CMRE US	Ken Hoexter
	CSX Corporation	CSX	CSX US	Ken Hoexter
	FedEx Corp.	FDX	FDX US	Ken Hoexter
	J.B. Hunt Transport Services	JBHT	JBHT US	Ken Hoexter
	Kansas City Southern	KSU	KSU US	Ken Hoexter
	Kirby Corp	KEX	KEX US	Ken Hoexter
	Knight Transport	KNX	KNX US	Ken Hoexter
	Norfolk Southern	NSC	NSC US	Ken Hoexter
	Swift Transportation	SWFT	SWFT US	Ken Hoexter
	The Greenbrier Companies	GBX	GBX US	Ken Hoexter
	Union Pacific	UNP	UNP US	Ken Hoexter
	World Fuel Services	INT	INT US	Ken Hoexter
NEUTRAL				
	Arkansas Best Corporation	ABFS	ABFS US	Ken Hoexter
	C.H. Robinson	CHRW	CHRW US	Ken Hoexter
	Canadian National	CNI	CNI US	Ken Hoexter
	Canadian Pacific Railway	CP	CP US	Ken Hoexter
	Capital Product Partners	CPLP	CPLP US	Ken Hoexter
	Diana Containerships Inc.	DCIX	DCIX US	Scott Weber
	Golar LNG Partners LP	GMLP	GMLP US	Scott Weber
	Safe Bulkers, Inc.	SB	SB US	Ken Hoexter
	TAL International	TAL	TAL US	Ken Hoexter
	Werner Enterprises	WERN	WERN US	Ken Hoexter
UNDERPERFORM				
	Danaos Corp	DAC	DAC US	Ken Hoexter

01 March 2012

US - Transportation Coverage Cluster

Investment rating	Company	BofA Merrill Lynch ticker	Bloomberg symbol	Analyst
	DHT Holdings	DHT	DHT US	Ken Hoexter
	Forward Air	FWRD	FWRD US	Ken Hoexter
	Knightsbridge Tankers	VLCCF	VLCCF US	Ken Hoexter
	Navios Maritime Partners	NMM	NMM US	Ken Hoexter
	Seaspan Corp	SSW	SSW US	Ken Hoexter
	Teekay Tankers Limited	TNK	TNK US	Ken Hoexter
RSTR				
	UPS	UPS	UPS US	Ken Hoexter

Important Disclosures

Investment Rating Distribution: Aerospace/Defense Electronics Group (as of 01 Jan 2012)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	17	45.95%	Buy	14	87.50%
Neutral	11	29.73%	Neutral	10	100.00%
Sell	9	24.32%	Sell	7	77.78%

Investment Rating Distribution: Alternative Energy Group (as of 01 Jan 2012)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	9	52.94%	Buy	7	77.78%
Neutral	1	5.88%	Neutral	1	100.00%
Sell	7	41.18%	Sell	5	71.43%

Investment Rating Distribution: Autos Group (as of 01 Jan 2012)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	52	53.61%	Buy	37	82.22%
Neutral	23	23.71%	Neutral	17	85.00%
Sell	22	22.68%	Sell	13	72.22%

Investment Rating Distribution: Building Group (as of 01 Jan 2012)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	62	62.00%	Buy	28	48.28%
Neutral	20	20.00%	Neutral	13	72.22%
Sell	18	18.00%	Sell	9	52.94%

Investment Rating Distribution: Business Services Group (as of 01 Jan 2012)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	16	64.00%	Buy	10	66.67%
Neutral	3	12.00%	Neutral	3	100.00%
Sell	6	24.00%	Sell	4	66.67%

Investment Rating Distribution: Chemicals Group (as of 01 Jan 2012)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	46	42.99%	Buy	28	68.29%
Neutral	36	33.64%	Neutral	22	73.33%
Sell	25	23.36%	Sell	14	56.00%

Investment Rating Distribution: Consumer Products Group (as of 01 Jan 2012)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	39	62.90%	Buy	31	86.11%
Neutral	13	20.97%	Neutral	10	90.91%
Sell	10	16.13%	Sell	8	80.00%

Investment Rating Distribution: Electrical Equipment Group (as of 01 Jan 2012)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	18	52.94%	Buy	13	76.47%
Neutral	11	32.35%	Neutral	7	77.78%
Sell	5	14.71%	Sell	2	40.00%

Investment Rating Distribution: Electronics Group (as of 01 Jan 2012)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	34	41.46%	Buy	21	77.78%
Neutral	17	20.73%	Neutral	8	47.06%

01 March 2012

Sell 31 37.80% Sell 17 60.71%

Investment Rating Distribution: Energy Group (as of 01 Jan 2012)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	169	58.28%	Buy	128	82.05%
Neutral	70	24.14%	Neutral	44	77.19%
Sell	51	17.59%	Sell	31	70.45%

Investment Rating Distribution: Engineering & Construction Group (as of 01 Jan 2012)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	30	55.56%	Buy	21	77.78%
Neutral	12	22.22%	Neutral	8	72.73%
Sell	12	22.22%	Sell	8	66.67%

Investment Rating Distribution: Engineering Group (as of 01 Jan 2012)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	4	33.33%	Buy	2	50.00%
Neutral	4	33.33%	Neutral	2	66.67%
Sell	4	33.33%	Sell	2	50.00%

Investment Rating Distribution: Industrials/Multi-Industry Group (as of 01 Jan 2012)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	52	61.90%	Buy	38	86.36%
Neutral	20	23.81%	Neutral	14	82.35%
Sell	12	14.29%	Sell	9	81.82%

Investment Rating Distribution: Machinery/Diversified Manufacturing Group (as of 01 Jan 2012)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	39	48.75%	Buy	24	66.67%
Neutral	26	32.50%	Neutral	16	69.57%
Sell	15	18.75%	Sell	7	50.00%

Investment Rating Distribution: Non-Ferrous Metals/Mining & Minerals Group (as of 01 Jan 2012)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	104	59.09%	Buy	67	68.37%
Neutral	36	20.45%	Neutral	25	75.76%
Sell	36	20.45%	Sell	12	40.00%

Investment Rating Distribution: Technology Group (as of 01 Jan 2012)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	122	56.48%	Buy	87	77.68%
Neutral	50	23.15%	Neutral	35	76.09%
Sell	44	20.37%	Sell	20	48.78%

Investment Rating Distribution: Telecommunications Group (as of 01 Jan 2012)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	90	50.56%	Buy	50	66.67%
Neutral	49	27.53%	Neutral	34	80.95%
Sell	39	21.91%	Sell	22	64.71%

Investment Rating Distribution: Textiles/Apparel Group (as of 01 Jan 2012)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	15	53.57%	Buy	11	78.57%
Neutral	6	21.43%	Neutral	6	100.00%
Sell	7	25.00%	Sell	7	100.00%

Investment Rating Distribution: Transport/Infrastructure Group (as of 01 Jan 2012)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	80	49.69%	Buy	53	67.95%
Neutral	36	22.36%	Neutral	23	65.71%
Sell	45	27.95%	Sell	25	58.14%

Investment Rating Distribution: Global Group (as of 01 Jan 2012)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	2029	52.00%	Buy	1337	72.11%
Neutral	1009	25.86%	Neutral	657	71.34%
Sell	864	22.14%	Sell	487	60.20%

* Companies in respect of which BofA Merrill Lynch or one of its affiliates has received compensation for investment banking services within the past 12 months. For purposes of this distribution, a stock rated Underperform is included as a Sell.

FUNDAMENTAL EQUITY OPINION KEY: Opinions include a Volatility Risk Rating, an Investment Rating and an Income Rating. *VOLATILITY RISK RATINGS*, indicators of potential price fluctuation, are: A - Low, B - Medium and C - High. *INVESTMENT RATINGS* reflect the analyst's assessment of a stock's: (i) absolute total return potential and (ii) attractiveness for investment relative to other stocks within its Coverage Cluster (defined below). There are three investment ratings: 1 - Buy stocks are expected to have a total return of at least 10% and are the most attractive stocks in the coverage cluster; 2 - Neutral stocks are expected to remain flat or increase in value and are less attractive than Buy rated stocks and 3 - Underperform stocks are the least attractive stocks in a coverage cluster. Analysts assign investment ratings considering, among other things, the 0-12 month total return expectation for a stock and the firm's guidelines for ratings dispersions (shown in the table below). The current price objective for a stock should be referenced to better understand the total return expectation at any given time. The price objective reflects the analyst's view of the potential price appreciation (depreciation).

Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster*
Buy	≥ 10%	≤ 70%
Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

* Ratings dispersions may vary from time to time where BofA Merrill Lynch Research believes it better reflects the investment prospects of stocks in a Coverage Cluster.

INCOME RATINGS, indicators of potential cash dividends, are: 7 - same/higher (dividend considered to be secure), 8 - same/lower (dividend not considered to be secure) and 9 - pays no cash dividend. Coverage Cluster is comprised of stocks covered by a single analyst or two or more analysts sharing a common industry, sector, region or other classification(s). A stock's coverage cluster is included in the most recent BofA Merrill Lynch Comment referencing the stock.

Price charts for the securities referenced in this research report are available at <http://pricecharts.ml.com>, or call 1-800-MERRILL to have them mailed.

One or more analysts responsible for covering the securities in this report owns securities of the covered company: Google, Toray.

MLPF&S or one of its affiliates acts as a market maker for the equity securities recommended in the report: A123 Systems, Amazon.com, Ameresco Inc., Aquarius Platinum, BorgWarner, Canadian Natl, Cisco Systems, Clean Energy, Cree, Inc., Eaton Corp, ELRINGKLINGER AG, EMC Corp, Emerson, EnerNOC Inc., Equinix, Genl Electric, Go-Ahead Group, Google, Hewlett-Packard, Honeywell Intl., IBM, Ingersoll-Rand, Intel, Interxion Holding NV, Itron Inc., Johnson Controls, LKQ Corp., Magna Intl, National Express, Rockwell, Salesforce.com, SemiLEDs, SOQUIMICH-B, Spirax-Sarco, Telecty, Tesla Motors, United Tech, Veeco Instr., Victrex, VMware Inc, Westport Innovat.

MLPF&S or an affiliate was a manager of a public offering of securities of this company within the last 12 months: Alstom, Aquarius Platinum, Canadian Natl, Cisco Systems, Continental AG, Eaton Corp, Equinix, Genl Electric, Google, Hewlett-Packard, IBM, Intel, Johnson Controls, Prysmian, Rexel, Schneider.

The company is or was, within the last 12 months, an investment banking client of MLPF&S and/or one or more of its affiliates: ABB Ltd., Alfa Laval, Alstom, Amazon.com, Ameresco Inc., Ansaldo STS SPA, Aquarius Platinum, ARM Holdings, Atlas Copco, Bombardier Inc., BorgWarner, Canadian Natl, Cisco Systems, Clean Energy, Continental AG, Cree, Inc., Eaton Corp, Electrolux, EMC Corp, Emerson, Equinix, Faurecia, FirstGroup Plc, Genl Electric, Go-Ahead Group, Google, Hewlett-Packard, Hexagon AB, Honeywell Intl., IBM, Ingersoll-Rand, Intel, Interxion Holding NV, Invensys, Johnson Controls, Johnson Matthey, Kingspan, Kone, Lanxess, LKQ Corp., Magna Intl, Metso, Michelin, National Express, Nippon Sheet Gls, Philips, Rexel, Rockwell, Saint Gobain, Salesforce.com, Schneider, SemiLEDs, Siemens, Siemens Ltd, Solvay, SOQUIMICH-B, Spirax-Sarco, Stagecoach Group, Toray, United Tech, Valeo, Vallourec, Veeco Instr., VMware Inc.

MLPF&S or an affiliate has received compensation from the company for non-investment banking services or products within the past 12 months: A123 Systems, ABB Ltd., Alstom, Amazon.com, Ameresco Inc., ARM Holdings, ASML, Atlas Copco, Bombardier Inc., BorgWarner, Canadian Natl, Cisco Systems, Clean Energy, Continental AG, Cree, Inc., Eaton Corp, Electrolux, EMC Corp, Emerson, Equinix, Faurecia, FirstGroup Plc, Genl Electric, Google, Hewlett-Packard, Hexagon AB, Honeywell Intl., IBM, Ingersoll-Rand, Intel, Interxion Holding NV, Invensys, Itron Inc., Johnson Controls, Johnson Matthey, Kingspan, Kone, Lanxess, LKQ Corp., Magna Intl, Metso, Michelin, National Express, Nippon Sheet Gls, Philips, Rexel, Rockwell, SAFT, Saint Gobain, Salesforce.com, Schneider, Siemens, Siemens Ltd, SMC, Solvay, SOQUIMICH-B, Spirax-Sarco, Stagecoach Group, United Tech, Vallourec, Veeco Instr., VMware Inc.

The company is or was, within the last 12 months, a non-securities business client of MLPF&S and/or one or more of its affiliates: A123 Systems, ABB Ltd., Alstom, Amazon.com, Ameresco Inc., ARM Holdings, ASML, Atlas Copco, Bombardier Inc., BorgWarner, Canadian Natl, Cisco Systems, Clean Energy, Continental AG, Cree, Inc., Eaton Corp, Electrolux, EMC Corp, Emerson, Equinix, Faurecia, FirstGroup Plc, Genl Electric, Google, Hewlett-Packard, Hexagon AB, Honeywell Intl., IBM, Ingersoll-Rand, Intel, Interxion Holding NV, Invensys, Itron Inc., Johnson Controls, Johnson Matthey, Kingspan, Kone, Lanxess, LKQ Corp., Magna Intl, Metso, Michelin, National Express, Nippon Sheet Gls, Philips, Rexel, Rockwell, SAFT, Saint Gobain, Salesforce.com, Schneider, Siemens, Siemens Ltd, SMC, Solvay, SOQUIMICH-B, Stagecoach Group, United Tech, Vallourec, Veeco Instr., VMware Inc.

In the US, retail sales and/or distribution of this report may be made only in states where these securities are exempt from registration or have been qualified for sale: ABB Ltd., Alfa Laval, Alstom, Ansaldo STS SPA, Aquarius Platinum, ARM Holdings, ASML, Atlas Copco, Bombardier Inc., CAF, Continental AG, CRCC, CRG, Crompton Greaves, CSR Ltd, Electrolux, ELRINGKLINGER AG, Epistar, Everlight, Faurecia, FirstGroup Plc, Go-Ahead Group, Guangshen Railway, Hexagon AB, Invensys, Johnson Matthey, Kingspan, Kone, Lanxess, Metso, Michelin, National Express, Nexans, Nippon Sheet Gls, Philips, Prysmian, Rexel, Rinnai Corp, SAFT, Saint Gobain, Schneider, Seoul Semicon, Siemens, Siemens Ltd, SMC, Solvay, Spirax-Sarco, Stagecoach Group, Telecty, Toray, Valeo, Vallourec, Victrex, Vossloh, Yangzijiang, Zhuzhou CSR.

An officer, director or employee of MLPF&S or one of its affiliates is an officer or director of this company: Rexel.

MLPF&S or an affiliate has received compensation for investment banking services from this company within the past 12 months: ABB Ltd., Alstom, Amazon.com, Ameresco Inc., Bombardier Inc., BorgWarner, Canadian Natl, Cisco Systems, Clean Energy, Continental AG, Cree, Inc., Eaton Corp, EMC Corp, Emerson, Equinix, Faurecia, FirstGroup Plc, Genl Electric, Google, Hewlett-Packard, Honeywell Intl., IBM, Ingersoll-Rand, Intel, Interxion Holding NV, Invensys, Johnson Controls, Johnson Matthey, Kingspan, Kone, Lanxess, LKQ Corp., Magna Intl, Michelin, National Express, Nippon Sheet Gls, Philips, Rexel, Rockwell, Saint Gobain, Salesforce.com, Schneider, SemiLEDs, Siemens, Siemens Ltd, Spirax-Sarco, Stagecoach Group, United Tech, Valeo, Vallourec, VMware Inc.

MLPF&S or an affiliate expects to receive or intends to seek compensation for investment banking services from this company or an affiliate of the company within the next three months: ABB Ltd., Alfa Laval, Alstom, Amazon.com, Ansaldo STS SPA, Aquarius Platinum, ARM Holdings, Atlas Copco, Bombardier Inc., BorgWarner, Canadian Natl, Cisco Systems, Continental AG, Cree, Inc., Eaton Corp, EMC Corp, Emerson, Equinix, Faurecia, FirstGroup Plc, Genl Electric, Go-Ahead Group, Google, Hewlett-Packard, Hexagon AB, Honeywell Intl., IBM, Ingersoll-Rand, Intel, Invensys, Johnson Controls, Johnson Matthey, Kingspan, Lanxess, LKQ Corp., Magna Intl, Metso, National Express, Nippon Sheet Gls, Philips, Rexel, Rockwell, Saint Gobain, Salesforce.com, Schneider, Siemens, Siemens Ltd, Solvay, SOQUIMICH-B, Spirax-Sarco, Stagecoach Group, Toray, United Tech, Valeo, Vallourec, Veeco Instr., VMware Inc.

MLPF&S together with its affiliates beneficially owns one percent or more of the common stock of this company. If this report was issued on or after the 8th day of the month, it reflects the ownership position on the last day of the previous month. Reports issued before the 8th day of a month reflect the ownership position at the end of the second month preceding the date of the report: Amazon.com, BorgWarner, Eaton Corp, EMC Corp, Emerson, Equinix, Genl Electric, Honeywell Intl., IBM, Intel, LKQ Corp., Rexel, Rockwell, Saint Gobain, Salesforce.com, Siemens, Spirax-Sarco, United Tech, Veeco Instr., Victrex.

The country in which this company is organized has certain laws or regulations that limit or restrict ownership of the company's shares by nationals of other countries: Crompton Greaves, Epistar, Everlight, Siemens Ltd.

01 March 2012

MLPF&S or one of its affiliates is willing to sell to, or buy from, clients the common equity of the company on a principal basis: A123 Systems, Amazon.com, Ameresco Inc., Aquarius Platinum, BorgWarner, Canadian Natl, Cisco Systems, Clean Energy, Cree, Inc., Eaton Corp, ELRINGLINGER AG, EMC Corp, Emerson, EnerNOC Inc., Equinix, Genl Electric, Go-Ahead Group, Google, Hewlett-Packard, Honeywell Intl., IBM, Ingersoll-Rand, Intel, Interxion Holding NV, Itron Inc., Johnson Controls, LKQ Corp., Magna Intl, National Express, Rockwell, Salesforce.com, SemiLEDs, SOQUIMICH-B, Spirax-Sarco, Telecty, Tesla Motors, United Tech, Veeco Instr., Victrex, VMware Inc, Westport Innovat.

The company is or was, within the last 12 months, a securities business client (non-investment banking) of MLPF&S and/or one or more of its affiliates: Alstom, Amazon.com, Ameresco Inc., Bombardier Inc., BorgWarner, Canadian Natl, Cisco Systems, Eaton Corp, EMC Corp, Equinix, Faurecia, FirstGroup Plc, Genl Electric, Google, Hewlett-Packard, Honeywell Intl., IBM, Ingersoll-Rand, Intel, LKQ Corp., National Express, Nippon Sheet Gls, Philips, Rinnai Corp, Rockwell, Saint Gobain, Schneider, Siemens, Siemens Ltd, Solvay, Spirax-Sarco, Stagecoach Group, United Tech, Vallourec, VMware Inc.

BofA Merrill Lynch Research personnel (including the analyst(s) responsible for this report) receive compensation based upon, among other factors, the overall profitability of Bank of America Corporation, including profits derived from investment banking revenues.

Other Important Disclosures

The company is a corporate broking client of Merrill Lynch International in the United Kingdom: Aquarius Platinum, Invensys, Johnson Matthey, National Express, Spirax-Sarco.

Class B shares are subordinate voting: Bombardier Inc.

Officers of MLPF&S or one or more of its affiliates (other than research analysts) may have a financial interest in securities of the issuer(s) or in related investments.

BofA Merrill Lynch Global Research policies relating to conflicts of interest are described at <http://www.ml.com/media/43347.pdf>.

"BofA Merrill Lynch" includes Merrill Lynch, Pierce, Fenner & Smith Incorporated ("MLPF&S") and its affiliates. Investors should contact their BofA Merrill Lynch representative or Merrill Lynch Global Wealth Management financial advisor if they have questions concerning this report.

Information relating to Non-US affiliates of BofA Merrill Lynch and Distribution of Affiliate Research Reports:

MLPF&S distributes, or may in the future distribute, research reports of the following non-US affiliates in the US (short name: legal name): Merrill Lynch (France): Merrill Lynch Capital Markets (France) SAS; Merrill Lynch (Frankfurt): Merrill Lynch International Bank Ltd., Frankfurt Branch; Merrill Lynch (South Africa): Merrill Lynch South Africa (Pty) Ltd.; Merrill Lynch (Milan): Merrill Lynch International Bank Limited; MLI (UK): Merrill Lynch International; Merrill Lynch (Australia): Merrill Lynch Equities (Australia) Limited; Merrill Lynch (Hong Kong): Merrill Lynch (Asia Pacific) Limited; Merrill Lynch (Singapore): Merrill Lynch (Singapore) Pte Ltd.; Merrill Lynch (Canada): Merrill Lynch Canada Inc; Merrill Lynch (Mexico): Merrill Lynch Mexico, SA de CV, Casa de Bolsa; Merrill Lynch (Argentina): Merrill Lynch Argentina SA; Merrill Lynch (Japan): Merrill Lynch Japan Securities Co., Ltd.; Merrill Lynch (Seoul): Merrill Lynch International Incorporated (Seoul Branch); Merrill Lynch (Taiwan): Merrill Lynch Securities (Taiwan) Ltd.; DSP Merrill Lynch (India): DSP Merrill Lynch Limited; PT Merrill Lynch (Indonesia): PT Merrill Lynch Indonesia; Merrill Lynch (Israel): Merrill Lynch Israel Limited; Merrill Lynch (Russia): Merrill Lynch CIS Limited, Moscow; Merrill Lynch (Turkey): Merrill Lynch Yatirim Bankasi A.S.; Merrill Lynch (Dubai): Merrill Lynch International, Dubai Branch; MLPF&S (Zürich rep. office): MLPF&S Incorporated Zürich representative office; Merrill Lynch (Spain): Merrill Lynch Capital Markets Espana, S.A.S.V.; Merrill Lynch (Brazil): Bank of America Merrill Lynch Banco Múltiplo S.A.

This research report has been approved for publication and is distributed in the United Kingdom to professional clients and eligible counterparties (as each is defined in the rules of the Financial Services Authority) by Merrill Lynch International and Banc of America Securities Limited (BASL), which are authorized and regulated by the Financial Services Authority and has been approved for publication and is distributed in the United Kingdom to retail clients (as defined in the rules of the Financial Services Authority) by Merrill Lynch International Bank Limited, London Branch, which is authorized by the Central Bank of Ireland and is subject to limited regulation by the Financial Services Authority – details about the extent of its regulation by the Financial Services Authority are available from it on request; has been considered and distributed in Japan by Merrill Lynch Japan Securities Co., Ltd., a registered securities dealer under the Financial Instruments and Exchange Act in Japan; is distributed in Hong Kong by Merrill Lynch (Asia Pacific) Limited, which is regulated by the Hong Kong SFC and the Hong Kong Monetary Authority; is issued and distributed in Taiwan by Merrill Lynch Securities (Taiwan) Ltd.; is issued and distributed in India by DSP Merrill Lynch Limited; and is issued and distributed in Singapore by Merrill Lynch International Bank Limited (Merchant Bank) and Merrill Lynch (Singapore) Pte Ltd. (Company Registration No.'s F 06872E and 198602883D respectively) and Bank of America Singapore Limited (Merchant Bank). Merrill Lynch International Bank Limited (Merchant Bank) and Merrill Lynch (Singapore) Pte Ltd. are regulated by the Monetary Authority of Singapore. Merrill Lynch Equities (Australia) Limited (ABN 65 006 276 795), AFS License 235132 provides this report in Australia in accordance with section 911B of the Corporations Act 2001 and neither it nor any of its affiliates involved in preparing this research report is an Authorised Deposit-Taking Institution under the Banking Act 1959 nor regulated by the Australian Prudential Regulation Authority. No approval is required for publication or distribution of this report in Brazil. Merrill Lynch (Dubai) is authorized and regulated by the Dubai Financial Services Authority (DFSA). Research reports prepared and issued by Merrill Lynch (Dubai) are prepared and issued in accordance with the requirements of the DFSA conduct of business rules.

Merrill Lynch (Frankfurt) distributes this report in Germany. Merrill Lynch (Frankfurt) is regulated by BaFin.

This research report has been prepared and issued by MLPF&S and/or one or more of its non-US affiliates. MLPF&S is the distributor of this research report in the US and accepts full responsibility for research reports of its non-US affiliates distributed to MLPF&S clients in the US. Any US person receiving this research report and wishing to effect any transaction in any security discussed in the report should do so through MLPF&S and not such foreign affiliates.

General Investment Related Disclosures:

This research report provides general information only. Neither the information nor any opinion expressed constitutes an offer or an invitation to make an offer, to buy or sell any securities or other financial instrument or any derivative related to such securities or instruments (e.g., options, futures, warrants, and contracts for differences). This report is not intended to provide personal investment advice and it does not take into account the specific investment objectives, financial situation and the particular needs of any specific person. Investors should seek financial advice regarding the appropriateness of investing in financial instruments and implementing investment strategies discussed or recommended in this report and should understand that statements regarding future prospects may not be realized. Any decision to purchase or subscribe for securities in any offering must be based solely on existing public information on such security or the information in the prospectus or other offering document issued in connection with such offering, and not on this report.

Securities and other financial instruments discussed in this report, or recommended, offered or sold by Merrill Lynch, are not insured by the Federal Deposit Insurance Corporation and are not deposits or other obligations of any insured depository institution (including, Bank of America, N.A.). Investments in general and, derivatives, in particular, involve numerous risks, including, among others, market risk, counterparty default risk and liquidity risk. No security, financial instrument or derivative is suitable for all investors. In some cases, securities and other financial instruments may be difficult to value or sell and reliable information about the value or risks related to the security or financial instrument may be difficult to obtain. Investors should note that income from such securities and other financial instruments, if any, may fluctuate and that price or value of such securities and instruments may rise or fall and, in some cases, investors may lose their entire principal investment. Past performance is not necessarily a guide to future performance. Levels and basis for taxation may change.

This report may contain a short-term trading idea or recommendation, which highlights a specific near-term catalyst or event impacting the company or the market that is anticipated to have a short-term price impact on the equity securities of the company. Short-term trading ideas and recommendations are different from and do not affect a stock's fundamental equity rating, which reflects both a longer term total return expectation and attractiveness for investment relative to other stocks within its Coverage Cluster. Short-term trading ideas and recommendations may be more or less positive than a stock's fundamental equity rating.

BofA Merrill Lynch is aware that the implementation of the ideas expressed in this report may depend upon an investor's ability to "short" securities or other financial instruments and that such action may be limited by regulations prohibiting or restricting "shortselling" in many jurisdictions. Investors are urged to seek advice regarding the applicability of such regulations prior to executing any short idea contained in this report.

Foreign currency rates of exchange may adversely affect the value, price or income of any security or financial instrument mentioned in this report. Investors in such securities and instruments, including ADRs, effectively assume currency risk.

UK Readers: The protections provided by the U.K. regulatory regime, including the Financial Services Scheme, do not apply in general to business coordinated by BofA Merrill Lynch entities located outside of the United Kingdom. BofA Merrill Lynch Global Research policies relating to conflicts of interest are described at <http://www.ml.com/media/43347.pdf>.

Officers of MLPF&S or one or more of its affiliates (other than research analysts) may have a financial interest in securities of the issuer(s) or in related investments.

MLPF&S or one of its affiliates is a regular issuer of traded financial instruments linked to securities that may have been recommended in this report. MLPF&S or one of its affiliates may, at any time, hold a trading position (long or short) in the securities and financial instruments discussed in this report.

BofA Merrill Lynch, through business units other than BofA Merrill Lynch Global Research, may have issued and may in the future issue trading ideas or recommendations that are inconsistent with, and reach different conclusions from, the information presented in this report. Such ideas or recommendations reflect the different time frames, assumptions, views and analytical methods of the persons who prepared them, and BofA Merrill Lynch is under no obligation to ensure that such other trading ideas or recommendations are brought to the attention of any recipient of this report.

In the event that the recipient received this report pursuant to a contract between the recipient and MLPF&S for the provision of research services for a separate fee, and in connection therewith MLPF&S may be deemed to be acting as an investment adviser, such status relates, if at all, solely to the person with whom MLPF&S has contracted directly and does not extend beyond the delivery of this report (unless otherwise agreed specifically in writing by MLPF&S). MLPF&S is and continues to act solely as a broker-dealer in connection with the execution of any transactions, including trading transactions in any securities mentioned in this report.

Copyright and General Information regarding Research Reports:

Copyright 2012 Merrill Lynch, Pierce, Fenner & Smith Incorporated. All rights reserved. iQmethod, iQmethod 2.0, iQprofile, iQtoolkit, iQworks are service marks of Merrill Lynch & Co., Inc. iQanalytics®, iQcustom®, iQdatabase® are registered service marks of Merrill Lynch & Co., Inc. This research report is prepared for the use of BofA Merrill Lynch clients and may not be redistributed, retransmitted or disclosed, in whole or in part, or in any form or manner, without the express written consent of BofA Merrill Lynch. BofA Merrill Lynch Global Research reports are distributed simultaneously to internal and client websites and other portals by BofA Merrill Lynch and are not publicly-available materials. Any unauthorized use or disclosure is prohibited. Receipt and review of this research report constitutes your agreement not to redistribute, retransmit, or disclose to others the contents, opinions, conclusion, or information contained in this report (including any investment recommendations, estimates or price targets) without first obtaining expressed permission from an authorized officer of BofA Merrill Lynch.

Materials prepared by BofA Merrill Lynch Global Research personnel are based on public information. Facts and views presented in this material have not been reviewed by, and may not reflect information known to, professionals in other business areas of BofA Merrill Lynch, including investment banking personnel. BofA Merrill Lynch has established information barriers between BofA Merrill Lynch Global Research and certain business groups. As a result, BofA Merrill Lynch does not disclose certain client relationships with, or compensation received from, such companies in research reports. To the extent this report discusses any legal proceeding or issues, it has not been prepared as nor is it intended to express any legal conclusion, opinion or advice. Investors should consult their own legal advisers as to issues of law relating to the subject matter of this report. BofA Merrill Lynch Global Research personnel's knowledge of legal proceedings in which any BofA Merrill Lynch entity and/or its directors, officers and employees may be plaintiffs, defendants, co-defendants or co-plaintiffs with or involving companies mentioned in this report is based on public information. Facts and views presented in this material that relate to any such proceedings have not been reviewed by, discussed with, and may not reflect information known to, professionals in other business areas of BofA Merrill Lynch in connection with the legal proceedings or matters relevant to such proceedings.

This report has been prepared independently of any issuer of securities mentioned herein and not in connection with any proposed offering of securities or as agent of any issuer of any securities. None of MLPF&S, any of its affiliates or their research analysts has any authority whatsoever to make any representation or warranty on behalf of the issuer(s). BofA Merrill Lynch Global Research policy prohibits research personnel from disclosing a recommendation, investment rating, or investment thesis for review by an issuer prior to the publication of a research report containing such rating, recommendation or investment thesis.

Any information relating to the tax status of financial instruments discussed herein is not intended to provide tax advice or to be used by anyone to provide tax advice. Investors are urged to seek tax advice based on their particular circumstances from an independent tax professional.

The information herein (other than disclosure information relating to BofA Merrill Lynch and its affiliates) was obtained from various sources and we do not guarantee its accuracy. This report may contain links to third-party websites. BofA Merrill Lynch is not responsible for the content of any third-party website or any linked content contained in a third-party website. Content contained on such third-party websites is not part of this report and is not incorporated by reference into this report. The inclusion of a link in this report does not imply any endorsement by or any affiliation with BofA Merrill Lynch. Access to any third-party website is at your own risk, and you should always review the terms and privacy policies at third-party websites before submitting any personal information to them. BofA Merrill Lynch is not responsible for such terms and privacy policies and expressly disclaims any liability for them.

Subject to the quiet period applicable under laws of the various jurisdictions in which we distribute research reports and other legal and BofA Merrill Lynch policy-related restrictions on the publication of research reports, fundamental equity reports are produced on a regular basis as necessary to keep the investment recommendation current.

Certain outstanding reports may contain discussions and/or investment opinions relating to securities, financial instruments and/or issuers that are no longer current. Always refer to the most recent research report relating to a company or issuer prior to making an investment decision.

In some cases, a company or issuer may be classified as Restricted or may be Under Review or Extended Review. In each case, investors should consider any investment opinion relating to such company or issuer (or its security and/or financial instruments) to be suspended or withdrawn and should not rely on the analyses and investment opinion(s) pertaining to such issuer (or its securities and/or financial instruments) nor should the analyses or opinion(s) be considered a solicitation of any kind. Sales persons and financial advisors affiliated with MLPF&S or any of its affiliates may not solicit purchases of securities or financial instruments that are Restricted or Under Review and may only solicit securities under Extended Review in accordance with firm policies.

Neither BofA Merrill Lynch nor any officer or employee of BofA Merrill Lynch accepts any liability whatsoever for any direct, indirect or consequential damages or losses arising from any use of this report or its contents.