



Green Electrical Equipment

T&D looks best placed to profit from Energy Efficiency

Underweight

Stock selection

Preferred

Siemens

Least preferred

Emerson

- **Energy Efficiency at a cross roads:** Ever-increasing energy prices up until mid-2008 acted as a key incentive for industry to invest in energy efficiency measures during the upcycle. However since their peak, Oil and Gas prices have fallen by two-thirds. Against the backdrop of a deep recession, the pure economic incentive to invest in energy efficiency measures has obviously diminished with project payback periods lengthening from typically two years to three years and beyond. But, energy efficiency has not disappeared. Political targets such as the EU's goal to cut CO2 emissions by 20% by 2020 will focus the economy's attention to be more efficient in its energy usage. In this report we examine the entire electrical chain from light bulbs to power plants to identify the key beneficiaries.
- **T&D looks best placed:** Industries exposed to direct policy influence through regulation and legislation should benefit most, in our view. From this perspective, the Transmission & Distribution industry stands out. The main investment driver for T&D is a regulated tariff used to ensure returns. More importantly, stimulus packages in the US, Europe and China have all highlighted the power grid as being a key area where energy efficiency investments will be implemented. Obama's plan, for example, looks to spend \$11bn on the power grid.
- **Automation and Power Generation to lose a support:** We see little support in 2009 for purely market-orientated segments such as Industrial Automation or Power Generation. Despite the attraction of long term savings, the collapse in energy prices combined with the economic recession is likely to see discretionary capex projects delayed or cancelled.
- **Top picks:** We reiterate our Buy rating on ABB, the no 1 player in the T&D market, which accounts for 50% of group sales. We remain more cautious on Alstom, the no 1 Power Generation player, and Schneider, the company most exposed to Building and Industry spending. We continue to see Siemens as our top pick, largely due to its cost cutting potential.

Key recommendations

	Reco	Price 18/03	Target 12m	P/E 10e (x)	EV/EBIT 10e (x)	EV/Sales 10e (%)	Comments
ABB	Buy	SF15.6	SF18	12.7	7.4	0.87	T&D business is best placed industry in our view
Siemens	Buy	€43.9	€55	8.3	6.2	0.49	T&D and Lighting to get some support
Schneider	Hold	€49.0	€48	10.8	9.0	0.97	Lengthening paybacks may delay projects
Philips	Hold	€11.8	€12	10.5	8.1	0.47	Lighting will get some support from legislation
Alstom	Hold	€40.7	€43	8.8	5.9	0.50	Traditional Power Generation to get little boost in our view
Sector average	-	-	-	10.5	7.4	0.74	



Colin Campbell
(44) 20 7762 5609
colin.campbell@sgcib.com



Gerard Moore
(33) 1 42 13 99 76
gerard.moore@sgcib.com



Gael de-Bray
(33) 1 42 13 84 14
gael.de-bray@sgcib.com



Roderick Bridge
(44) 20 7762 5086
roderick.bridge@sgcib.com

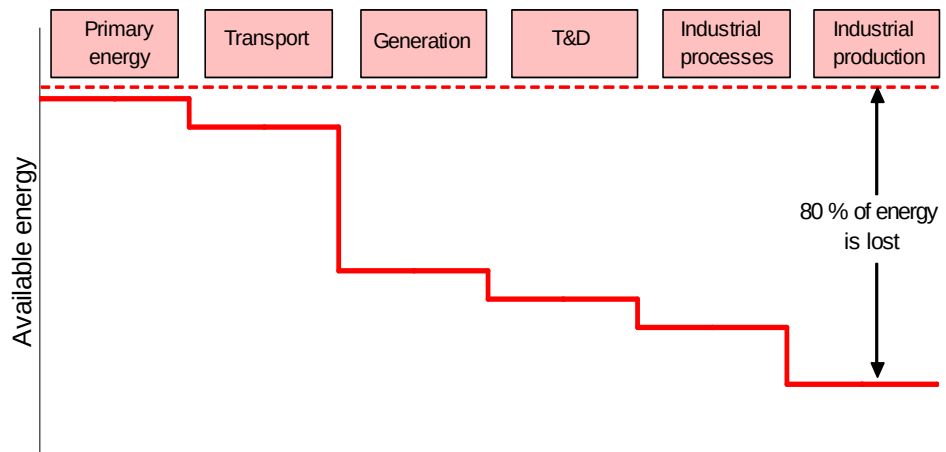
Contents

4	Energy efficiency across the whole sector
4	Long term drivers for energy efficiency are striking
6	2009 will be a crossroads for Energy Efficiency
9	Lighting: legislative support will be a driver
9	The lighting business
9	Toward environmentally friendly and energy-saving products
10	Legislation should play a crucial role in realising energy savings potential
12	Philips and Siemens control 39% of the traditional bulb market
15	Building Automation to see little support before 2010
16	Siemens and Schneider are best placed in Europe
18	Industrial Automation likely to delay investments
19	Energy efficiency is at the core of Automation
19	Automation projects likely to get scrapped
20	Siemens is No 1 in Automation
22	T&D a clear winner from stimulus packages
22	The grid currently loses around 7% of all electricity transported
23	Stimulus packages to act as real support
24	Cross border initiatives provide an additional support
24	Connecting renewable energy will also boost demand for T&D
25	T&D looks better placed than Power Generation
26	The Big Three T&D players
29	Power Generation to face the brunt of capex cuts
29	Efficiency is key for a power plant
30	Strong needs for retrofit and environment systems
32	The Big Three PG players
35	Appendix - Green stimulus packages

Energy efficiency across the whole sector

High energy prices, rising environmental concerns and more stringent regulations about more energy efficient buildings and industrial processes have been fuelling demand for energy efficiency solutions. Growth has also been driven by the need for quality and reliable power supply due to rising concerns regarding power grid efficiency. At present 80% of energy is lost by the time the end user actually consumes it, so the scope for savings is huge.

Energy lost throughout the entire chain

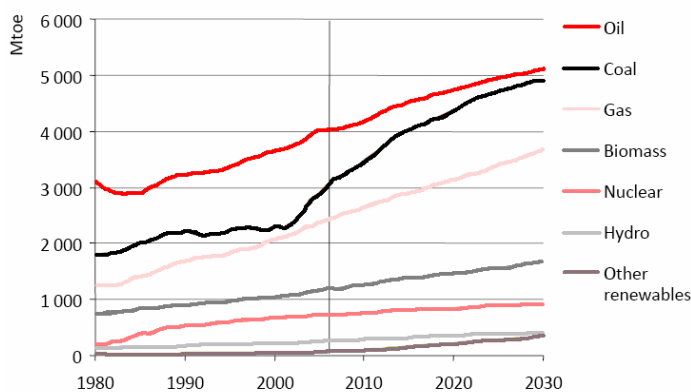


Source: ABB

Long term drivers for energy efficiency are striking

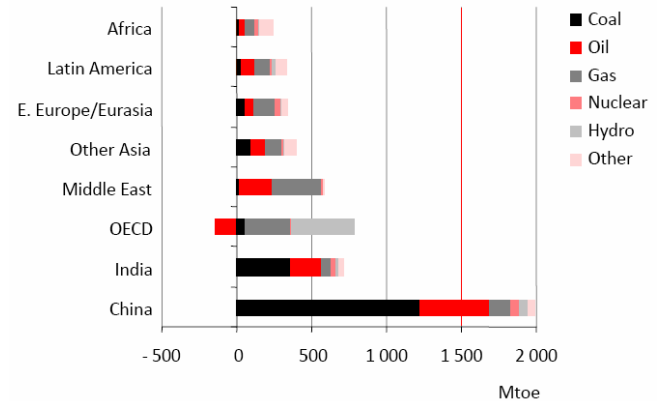
Electricity production is responsible for 32% of global fossil fuel use and 40% of energy-related CO2 emissions. Global electricity demand is expected to double by 2030 with coal remaining the most widely used fuel, accounting for up to 90% of new power generation in China for example (Source: EIA, IEA). Even with the increasing use of renewables and low-carbon energy, there's a huge need to improve generation, transmission and end user efficiency to avoid serious climatic damage.

World primary energy demand: reference scenario growth energy source to 2030e



Source: IEA World Energy Outlook, SG Equity Research

Incremental primary energy demand (reference scenario): 2006-2030e

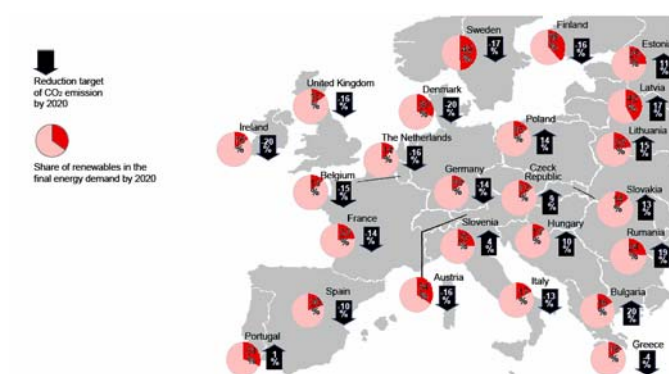


Source: IEA World Energy Outlook - SG Equity Research

Regulators are sticking to their guns on CO2 and renewables targets

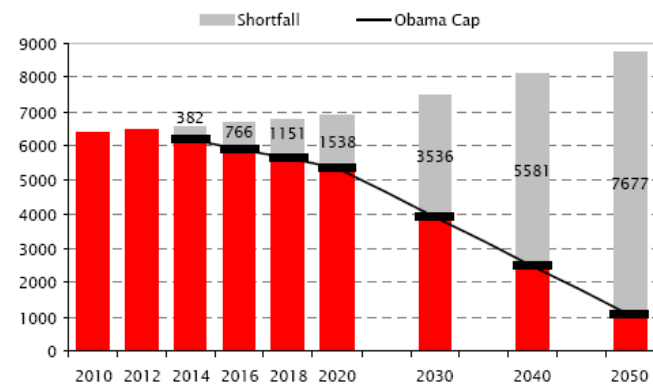
Carbon pricing's role as a driver has weakened as EU carbon prices have fallen in concert with other markets and asset classes from levels close to €23/t in early October 2008 to €13/t in Q1 2009. SG Commodities' view remains however that emissions will still be higher than the quotas distributed until at least 2012. So far the EU is sticking to its guns on stringent emissions reduction targets – 20% by 2020 – and the post-2013 effect of auctioning also needs to be factored in. In the medium-term, SG Commodities see EUA prices climbing back towards €20/t and CER at €18-19/t – prices which should be sufficient to spur companies to push for emissions reductions in a new “less is more” economy. Moreover, they suggest that U.S. legislation could be passed in 2010 and a new carbon trading system could begin in 2013 with the first forward trades occurring in 2011. This would cover around 87% of the US economy, setting a target of 1990 levels by 2020 and 80% below 1990 levels by 2050. An average of 50% of allowances would be auctioned at the start with a 95% auction rate by 2020. SG Commodities believes that the impact will no doubt be significant, as transactions in the first year of the cap could exceed US\$ 100 billion and reach US\$ 1 trillion by 2020.

National CO2 savings targets & share of renewables by 2020



Source: EU Commission

Potential Obama cap



Source: SG Commodities

Energy efficiency is a better solution than new capacity

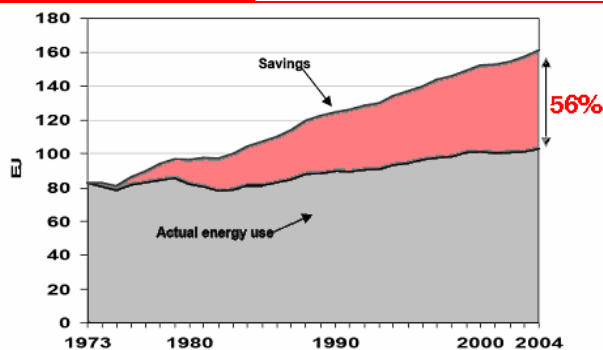
Energy efficiency is also a much better way than adding new power capacity to satisfy growing demand.

- **Energy efficiency is cleaner and cheaper** than adding capacity since 1 unit of electricity saved at home or in the workplace equals 3 units of saved power production. The global electricity generation amounts to 17,400 TWh while the global electricity end use is just 5,742 TWh.
- **Energy efficiency is also quicker** as it is a shorter term investment with a quick payback. Technology is also readily available.
- **Energy efficiency reduces dependence on energy imports** as it does not require other countries' electricity generation.

Massive CO2 savings potential

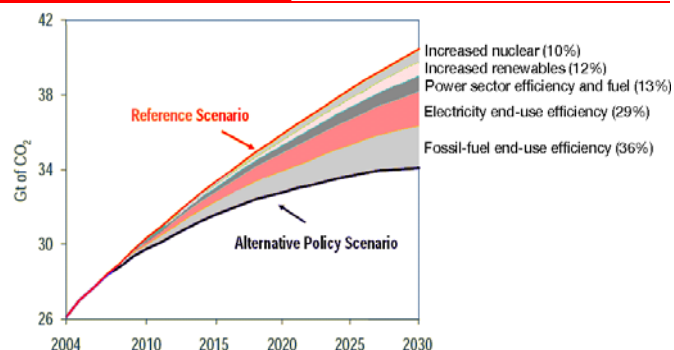
Improved power sector and end-use efficiency has accounted for up to two-thirds of avoided emissions, and we expect this trend to continue to 2030.

Role of energy efficiency in energy savings: 1970-2004



Source: IEA, SG Equity Research

Improved end-use efficiency: 2030e in the Alternative Power Scenario



Source: IEA, SG Equity Research

End use efficiency gains are possible through a combination of more efficient devices, and the better usage of electricity installation and devices and monitoring programs. This is where capital goods companies can garner opportunities.

Up to 30% energy savings are possible

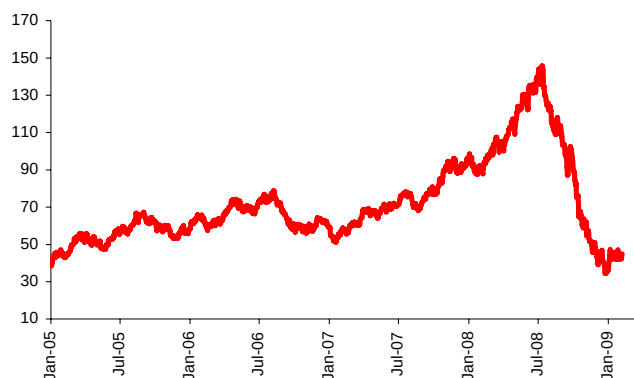
	Pot. energy savings	Comments
Efficient devices and installation	10 to 15%	Low consumption devices Insulated buildings
Optimised usage of installation and devices	5 to 15%	Turn off devices when not needed Regulate motors or heating at the optimised level
Permanent monitoring and improvement program	2 to 8%	Maintenance program Measure and react in case of deviation

Source: Schneider

2009 will be a crossroads for Energy Efficiency

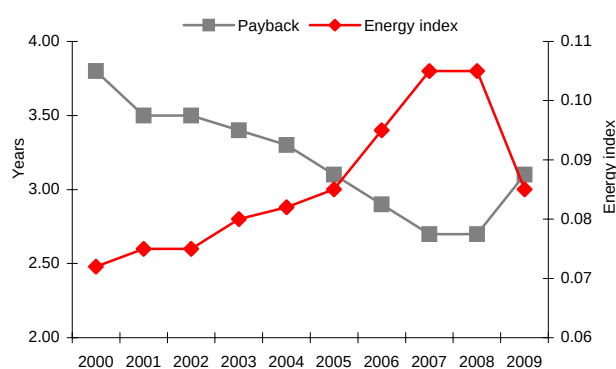
While the long-term arguments in favour of energy efficiency are clear and the technology already exists, we believe the current recession is likely to significantly dampen demand for such solutions. Energy prices have fallen by two-thirds since their peak last summer, meaning that potential savings have diminished and payback periods have stretched out.

Oil prices have fallen from their peak (\$/barrel)



Source: Datastream

Leading to lengthening payback periods



Source: SG Research and Schneider

More precisely, we believe that the theme of energy efficiency has reached a crossroads. On the one hand, we expect legislative steps and public spending to support certain industries, most noticeably the T&D industry.

T&D looks best placed industry

The T&D industry remains a largely regulated market and as such policymakers can have a greater influence on investment decisions. More precisely, we believe that the theme of energy efficiency has reached a crossroads. On the one hand, we expect legislative steps and public spending to support certain industries, most noticeably the T&D industry. Higher tariffs for specific regions or projects can be used to stimulate investment. Moreover, stimulus plans in the EU, Europe and China are all targeting this industry. In the US, the federal fiscal stimulus program will spend \$11bn on smart-grid related technologies for the T&D market. In Europe, France will increase spending by 20% on the power grid in 2009 as part of its stimulus package, while China has indicated that it will accelerate an already ambitious investment programme.

Legislation to give Lighting some support

Legislation should also support the Lighting Industry. In Europe, the EU has proposed a ban on incandescent light bulbs. EU member states are currently in the process of implementing legislation on the back of this proposal. France and Italy for example are looking to ban incandescents by 2010, the UK by 2011 and the Netherlands by 2012.

Power Generation and Automation less so

On the other hand we expect this theme to diminish in importance for end markets such as Industrial Automation, Power Generation and the Building Industry. These largely liberalised industries, with predominantly market orientated investment decisions are likely to focus on the growing payback period such projects achieve against the face of falling energy prices and as such cancel and delay investments. Public buildings should achieve support from the various stimulus packages, but the private sector remains vulnerable, in our view.

ABB looks the best placed company

From this top-down perspective, we feel that ABB is the best placed stock in the sector to benefit from Energy Efficiency, given that it achieves 49% of sales from the T&D industry. As mentioned above, the T&D industry will benefit from the regulated nature of the market structure and the fact that we are already seeing stimulus packages focusing on this industry. The table below summarises sales by end market for some of the key stocks in our sector.

Sales by end market for select Capital Goods companies

Sales by end market	Siemens	Schneider	Legrand	ABB	Phillips	Alstom
Power Generation	17%	0%	0%	0%	0%	67%
Transmission & Distribution	11%	10%	0%	49%	0%	0%
Industry	28%	29%	0%	46%	0%	0%
Building	7%	48%	100%	5%	0%	0%
Transportation	7%	0%	0%	0%	0%	33%
Lighting	5%	0%	0%	0%	27%	0%
Critical power	0%	13%	0%	0%	0%	0%
Other	25%	0%	0%	0%	73%	0%
As a % of group sales	100%	100%	100%	100%	100%	100%

Source: SG Equity Research

Capital goods – Exposure to energy efficiency solutions

	% of sales derived from energy efficiency	Main products and services
ABB	35%	Smart grid systems, HVDC systems, efficient transformers, variable speed drives
Siemens	21%	A wide range of products and solutions encompassing all the above and below
Schneider	20%	Energy meters, lighting control systems, drives, energy management software, cooling systems
Alstom	20%	Retrofit and upgrade of power plants
Philips	14%	Energy savings bulbs (CFLs, LEDs), electronic ballasts
Legrand	5%	Timers, dimmers, home automation, etc

Source: SG Equity Research

Lighting: legislative support will be a driver

Lighting accounts for 19% of electricity use worldwide according to the IEA, out of which 31% is for residential lighting and 69% for commercial, industrial and outdoor lighting. Philips estimates that up to 75% of all lighting currently installed is old and inefficient. Potential energy savings could be up to 40% with available technology, corresponding to a reduction of around €106bn in electricity costs per year (40% savings @ €10cts/KWh) and 555 million tonnes of CO2 emissions per annum worldwide.

The lighting business

The lighting business can be broken down between five main segments.

- **General lighting** This includes the production of light bulbs (traditional incandescent bulbs, halogen, fluorescent and high-intensity discharge bulbs). The general lighting market represents around €12bn, with Philips and Osram controlling 20% and 19% respectively of the global market.
- **Ballasts** are the electronic control gear systems, which regulate the current flow and help save energy and resources. The lighting electronics market is worth around €5bn, with Philips and Siemens controlling 15% and 6% of the market respectively.
- **Automotive lighting** includes headlights, brake lights, indicators and instrument panels. The range goes from classical bulbs to Xenon systems or LEDs. The market is worth about €2.3bn, with Siemens representing 32% and Osram 29% of the global market.
- **Opto semiconductors** The most well-known opto semiconductors are LED modules, which are primarily used today for special-effect lighting and for illuminating façades. It will take time before LEDs become established in general room lighting. It depends on how manufacturers can reduce their manufacturing costs. The overall market is worth around €1.5-2bn. Osram and Philips have market shares of 25% and 15% respectively according to our estimates.
- **Luminaires** are light fixtures including spotlights, outdoor lights and desk lamps. The global luminaire market represents around €36bn and remains highly fragmented.

Toward environmentally friendly and energy-saving products

Many countries have now established energy conservation programmes, including China, one of the largest markets for energy-saving bulbs. Steady progress has already been made in the recent past as shown in the table below.

Examples of energy saving improvement over the past 15 years (worldwide)

Area of lighting	Energy improvement over the last 15 years	CO2 savings per bulb per year
Road lighting	225%	110 kg
Shop lighting	400%	166 kg
Office & Industrial lighting	300%	140 kg
Home lighting	500%	100 kg

Source: SG Equity Research

The industry's product offering to reduce energy consumption is impressive:

- **LEDs already generate five times as much light as a conventional incandescent bulb** for the same energy input. According to the US Energy Agency, the use of LEDs could cut the amount of energy consumed for lighting by 50% by 2025.
- **Electronic ballasts are noted for their minimised power consumption.** For example, in car parks, safety standards require a certain level of lighting at all times. A dimmable control gear can be used in tandem with a presence detector. As soon as a presence is detected a high level of illuminance is restored. As a result, energy consumption can be cut by 30%.
- **Luminaires can also be energy efficient** because the light can be directed to where it is needed, on the back of its design and light-directing materials. Energy consumption can also be reduced by equipping luminaires with light sensors and presence detectors.

Overview of lighting technologies

Lighting technology	Description, applications	Typical efficiency (lm/W)	Typical Lifetime (Hours)	Typical price (€/K/m)
 Standard incandescent lamp	Used for general, local, ambient and spot lighting (with reflector); not suitable for high light levels; dimmable	10-15	~1,000	16-16
 Halogen lamps	Small lamps, highly directable light beam; Dimmable. Primarily used for spot lighting	15-33	2,000-6,000	7-7
 Compact fluorescent lamp (CFL)	Direct substitute for incandescent light; dimmable only w/ special dimmer; performance based on whether ballast is integrated (poor) or external (good)	35-80 60-80	5,000-15,000 10,000-20,000	5-7
 Linear fluorescent lamp (LFL)	Highly applicable for even indoor illumination; not suitable for spot lighting; dimmable only w/ special dimmer	60-100	7,000-20,000	1.3-3
 High intensity discharge (HID)	Used for e.g., street lighting & shop window displays; medium to high warm-up time; not dimmable	50-120	5,000-30,000	0.1-1
 Light emitting diode (LED)	LCD display backlighting; automotive & traffic lights; mood lighting; dimmable	40-100*	50,000-100,000	<2

Source: IEA, LED Magazine, Vattenfall, SG Equity Research. * Expected to increase to ~170lm/w by 2025

Legislation should play a crucial role in realising energy savings potential

Numerous energy efficient products already exist in nearly all segments of the lighting industry such as bulbs, luminaires and controls. Current market renovation rates are however too slow (3% a year in street lighting, 7% a year in office lighting).

Philips is currently lobbying the European commission to underline the cost and CO2 savings of using new lighting sources. According to Zumtobel, 60% of all Europe's lighting uses

energy-inefficient technology. In Europe approximately 2.1 billion energy inefficient bulbs are sold every year mainly for homes, and other commercial uses while there are 3.6 billion such inefficient bulbs in use. According to CELMA, 75% of office and industrial lighting systems are inefficient while 30% of all road lighting is over 20 years old, based on technology dating from the 1960s. Many countries have introduced energy efficient lighting legislation as summarised in the table below.

Overview of energy efficient lighting legislation

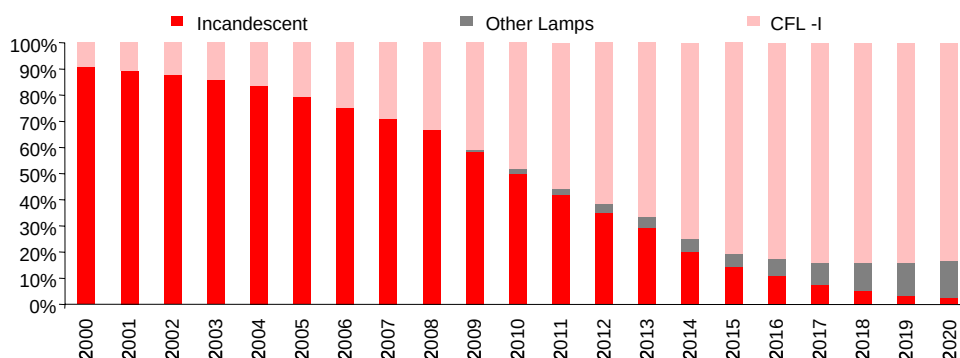
Country	Action date	Measures undertaken
Australia	2008-9	Phase out 87m incandescents in favour of CFLs: import of non compliant lighting (incl. incandescents) will be banned from 2008, from 2009 the retail sale of non compliant lighting (incl. incandescents) banned. According to current proposals, all regular lightbulbs sold from October 2009 will have to meet new minimum energy performance standards
Brazil	2005	Phase out the use of incandescent light bulbs
Canada	2012	Already use LEDs in electrically-illuminated emergency exit signs & to be used in traffic-signal applications. Ontario to ban incandescent bulbs by 2012. Federal government to phase-out inefficient light bulbs in Canada by 2012, although this will not mean the banning of any existing technology such as incandescent light bulbs (saving C\$3-4bn).
China	NA	Commitment to phase out incandescents in favour of compact fluorescent bulbs (500MT GHG savings)
Cuba	2007	Exchanged all incandescent light bulbs to CFLs and banned import and sales of incandescent light bulbs
EU	2008-10	Proposed a ban on incandescents, planned to come into effect in the near future, but this will not affect existing incandescent bulbs, only the production of new bulbs. EU Member States are currently in the process of developing the details of EU policy on this topic: Belgium (to be banned, would like ban included in post-Kyoto agreement), France, Ireland (ban in 2009), Italy (ban by 2010), Netherlands (ban by 2012), Portugal and UK (ban by 2011)
Japan	2012	Announced the replacement policy for Incandescent to CFLs by 2012
Mexico	1995-8	Replaced 1m compact fluorescent bulbs in households
Philippines	2010	Presidential call for a ban of incandescent light bulbs in favor of more energy-efficient fluorescent bulbs
Switzerland		Bans all light bulbs of the Energy efficiency class F & G from 2009
United States	2012-18	Clean Energy Act of 2007: effectively bans (by Jan. 2014) incandescent bulbs that produce 310- 2600 lumens of light. Bulbs outside this range (<40 Watts or >150Watts) are exempt from the ban: 25% efficiency for light bulbs, phased in from 2012 through 2014 (effectively bans the sale of most current incandescents), +200% efficiency for light bulbs by 2020. All lighting in Federal buildings to use Energy Star products. The Act is agnostic as to what technology is used but CFLs are seen as the new standard that will be adopted – but assuming incandescent bulbs can be doubled in efficiency by 2020, they may remain the standard form of lighting in the years to come.
Venezuela	2005	Phase out the use of incandescent light bulbs

Source: SG Equity Research

Complete phase out of incandescents by 2020

Philips expects a complete phase-out of the incandescent bulbs installed base by 2020 which simultaneously stimulate demand for energy saving solutions such as by compact fluorescent bulbs, eco-classic bulbs (energy saving halogen) and solid state lighting solutions (LEDs).

Phase out of incandescent lamps park



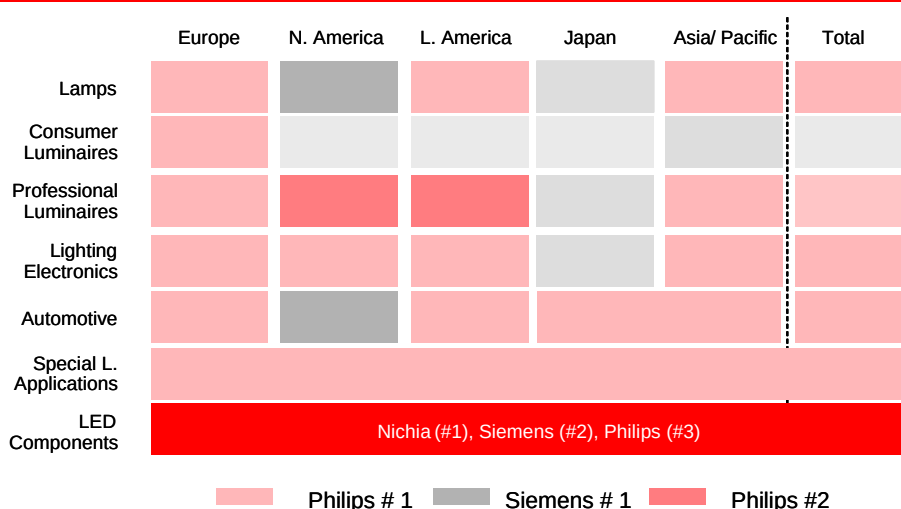
Source: Philips

Philips and Siemens control 39% of the traditional bulb market

With the exception of the luminaires segment, the lighting industry is highly consolidated with the three largest companies Philips (20% market share), Siemens (19% market share) and GE (12% market share) controlling around half of the world market.

In the US, we estimate Osram (Siemens) holds the number 1 position in bulbs (with the Sylvania brand) and automotive lighting. In Europe (including Eastern Europe), Philips holds a clear #1 position ahead of Siemens. In Japan, the top market positions are held by domestic players. Siemens is however well represented with a #3 position thanks to its partnership with Mitsubishi. In emerging markets, the traditional players hold very strong positions too, with Philips claiming to control 41% of the Indian lighting market for example.

Market positioning per business per region



Source: Philips, SG

Philips and Osram are well positioned to reap the benefits of increasing demand for energy efficiency lighting solutions as they both provide attractive offerings in this respect. In particular, Philips' CosmoPolis street lighting system enjoys a great commercial success.

Siemens' examples of energy saving technology

Area of lighting	Old technology	New technology	Energy savings	CO2 savings per lamp per year
Road lighting	High Pressure Mercury	High Pressure Sodium	-40%	130 kg
Shop lighting	HALOSTAR	Ceramic metal halide	-80%	210 kg
Office & Industrial lighting	Fluorescent with Halophosphate	Fluorescent with 3-band phosphate	-80%	140 kg
Home lighting	Incandescent	Compact fluorescent	-80%	30 kg

Source: Siemens

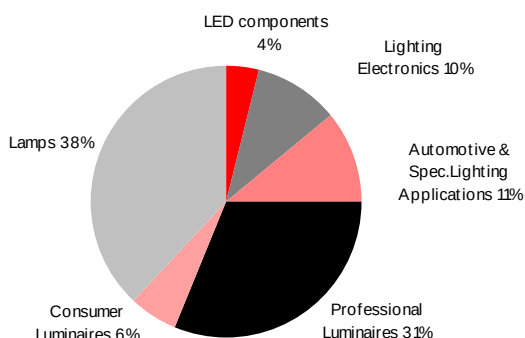
Philips' examples of energy saving technology

Area of lighting	Old technology	New technology	Energy savings	CO2 savings per lamp per year
Road lighting	High Pressure Mercury	CosmoPolis	-57%	109 kg
Road lighting	High Pressure Sodium	Cosmopolis	-10%	na
Shop lighting	Halo	CDM	-80%	115 kg
Office & Industrial lighting	T8 fluorescent	T5 fluorescent	-61%	77 kg
Home lighting	Incandescent	Compact fluorescent	-85%	34 kg

Source: Philips

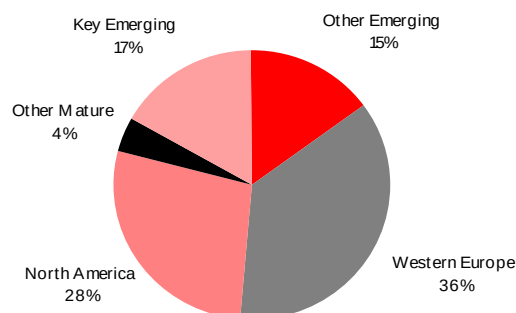
Philips Lighting is the no 1 player in the market. Philips Lighting accounts for 27% of the group's sales. The company sells a complete range of products and as shown in the chart above tends to be the no 1 player in most segments. "Green Lightning" has been an important growth driver of late and is likely to act as a support. Philips' Green Lighting offering now accounts for 50% of sales.

Philips Lighting – Sales distribution by region



Source: Philips

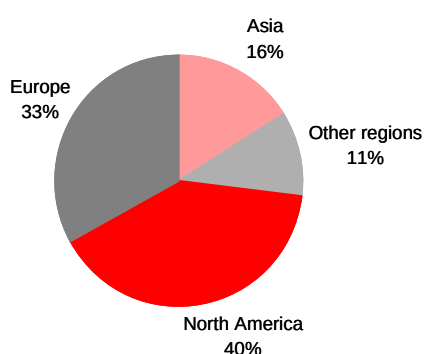
Philips Lighting – Sales distribution by business



Source: Philips

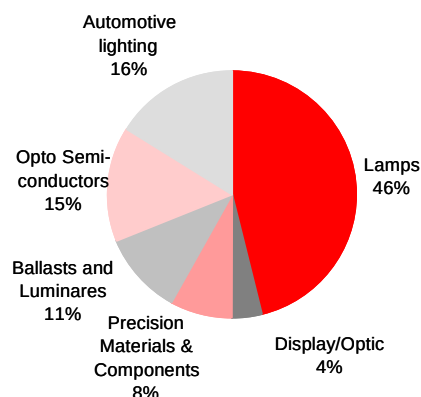
Siemens is the No 2 player: Operating under the brand name Osram (5% of group sales), Siemens sells an extensive product portfolio of lamps, opto-electronic semiconductor light sources such as light emitting diodes (LEDs), LED systems and LED luminaires, relevant electronic equipment, and lighting management systems. The company also sees green lighting as being an important growth driver. In particular LED bulbs are driving growth (15% in 2008). LEDs now account for 14% of Lighting sales (vs 4% at Philips Lighting) with strong prospects primarily from 2010 onwards.

Siemens Osram – Sales distribution by region



Source: Siemens

Osram – Sales distribution by business



Source: SG Research

GE slipping behind: GE is the no 3 player in the lighting market, but appears to be less committed to the industry than its major rivals. The Lighting business unit, as part of the Consumer and Industrial division, has been put into discontinued operations and management is looking to dispose of the business.

Pure play niche players also likely to benefit

■ **Cree (Nasdaq: CREE, no rating)** is the US market leader for the semiconductors used in LED solid-state lighting, wireless and power applications with a leadership position in DiC and GaN LEDs. Its LEDs cuts costs and energy consumption in lighting for everything from buildings and street lighting to video displays, laptops, digital cameras, traffic signals. Technological advances have helped its bright white LEDs to achieve 100 lumens per watt and its LR6 product uses 6w and can operate for 50,000 hours at only \$60 (vs 100w and \$325 for the average incandescent). It also stands to benefit from solar growth with SiC transistors for inverters designed for solar PV generators.

■ **Epistar Corporation (TAI: 2448, no rating)**: The Taiwanese company is focused on developing, manufacturing and marketing LED products using its own proprietary Metal Organic Vapor Phase Epitaxy (MOVPE) technology; 92% of its revenues come from LED chips.

Building Automation to see little support before 2010

The Buildings sector is one of the biggest energy consumers (39% of total energy consumed worldwide, of which 21% related to residential and 18% related to tertiary, industrial and infrastructure buildings). This segment consists of products to measure, control, detect faults and report information (sensors, actuators, controllers, etc.), combined with software to analyse and help operators to manage building functionalities and costs. Siemens estimate that the Building Automation market is worth around €85bn. Renovation and the use of more efficient HVAC, lighting and integrated building systems can yield up to 30% of energy savings.

Available energy efficiency products and solutions

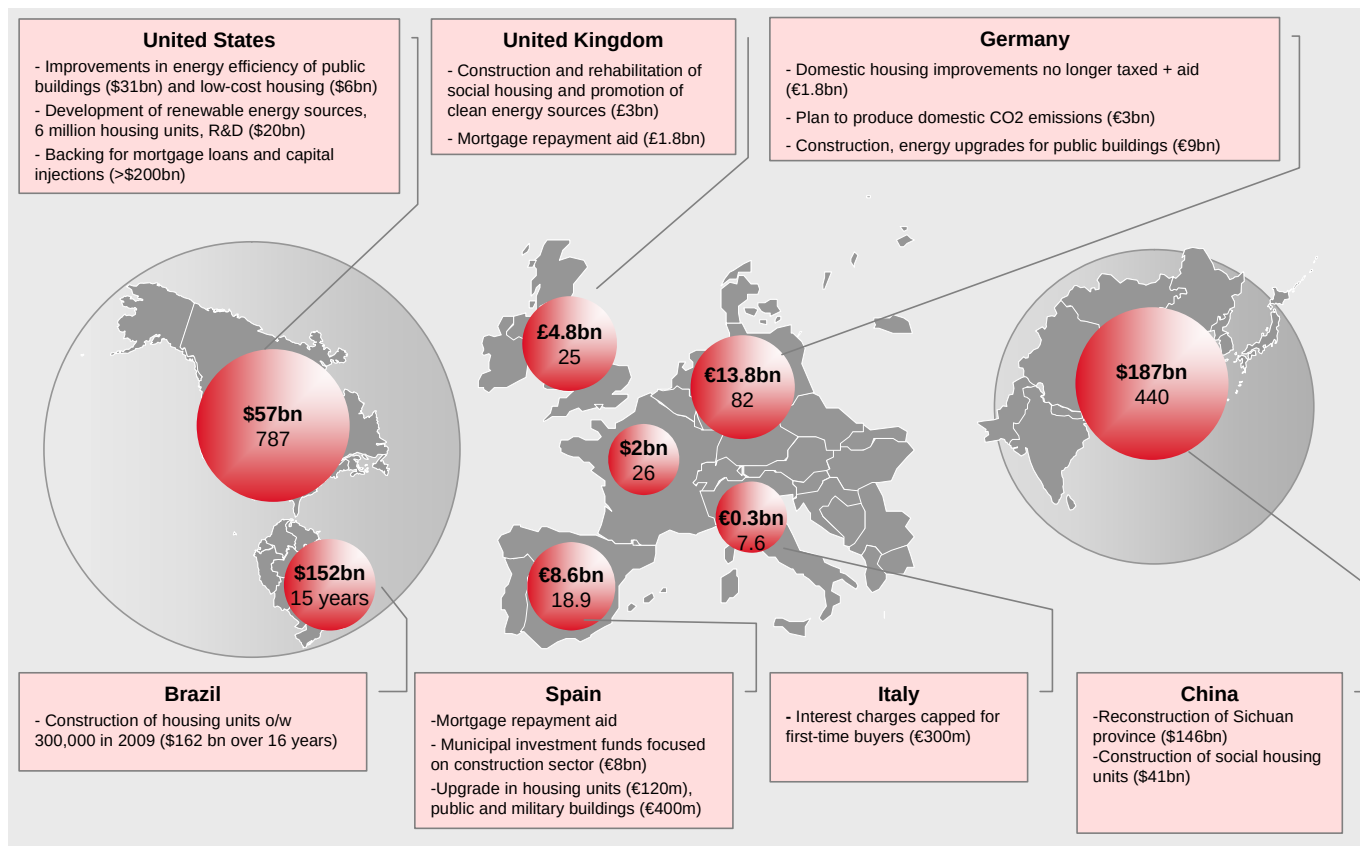
Energy efficiency products	Management systems	Services
Dimmers, timers, presence detectors	Building management systems	Site audits
Thermostat, floor heating control	Power monitoring and analysis	Data collection and analysis
Variable speed drives for HVAC, pumps, fans, motors		Financial analysis and ROI validation
		Planning of improvement plan
		Remote monitoring and optimisation

Source: SG Equity Research

■ **Falling energy prices lengthen payback periods:** As energy prices fall, the commercial payback period for many construction projects is likely to be extended from 2 years towards 3 years and beyond. We fear that in the current liquidity constraint environment this will lead to many projects being cancelled or delayed, as companies look to scale back investments and preserve their cash reserves.

■ **Benefits from the stimulus plan to come in 2010:** As described earlier, stimulus packages in China, Europe and the US are likely to provide a clear boost to the industry. Obama's plan for example in the US contains \$31bn for improvements in the energy efficiency of public buildings and another \$6bn for low-cost housing. We consider that the majority of this investment will be materialised in 2010 onwards.

Construction stimulus packages: increased regulation on renovation & energy efficiency



Source: Saint-Gobain 2009, SG Equity Research

Siemens and Schneider are best placed in Europe

At a global level, this market remains highly fragmented. Local presence is a key competitive factor and from this perspective Europe is dominated by Siemens and Schneider, while Honeywell and Johnson Controls are the main players in the US. The table below shows Honeywell's competitive landscape analysis:

Competitive landscape

	Building controls	Sensing	Security	Fire systems	Building solutions
Siemens	✓	✓	✓	✓	✓
Honeywell	✓	✓	✓	✓	✓
GE		✓	✓	✓	
Johnson Controls	✓				✓
Schneider	✓	✓	✓		✓
Tyco			✓	✓	
UTC	✓		✓	✓	✓

Source: Honeywell, and SG Research

Schneider's energy efficiency offering now represents around 20% of group sales. Schneider today has solutions to cope with 72% of worldwide end user energy consumption (basically in all buildings and industries except for transportation) and claims that its existing technologies can save up to 30% of energy with the use of low consumption devices, energy meters, lighting control systems, variable speed drives, energy management software, etc.

Siemens Building Technologies division (7% of sales) also has a very strong established presence in the Building Automation market. The business has worked on more than 1,500 energy projects and 7,500 updates since 2004, achieving €1.5bn in total savings for its customers and 700,000 tons of CO2 emissions on an annual basis. Siemens is aiming to double its sales related to energy efficiency over the next four years.

US companies also look well positioned to benefit from energy efficiency. Schneider indicates that Honeywell is the No 1 player and Johnston Controls the no 3 in the Building Automation market. Honeywell's Building Automation division accounts for just 21% of group sales. For Johnston Controls, its Building Efficiency division accounts for 37% of group sales, half of which comes from outside of North America.

Market positioning in Building Automation

Honeywell	No 1
Siemens	No 2
Johnson	No 3
Schneider	No 4

Source: Schneider

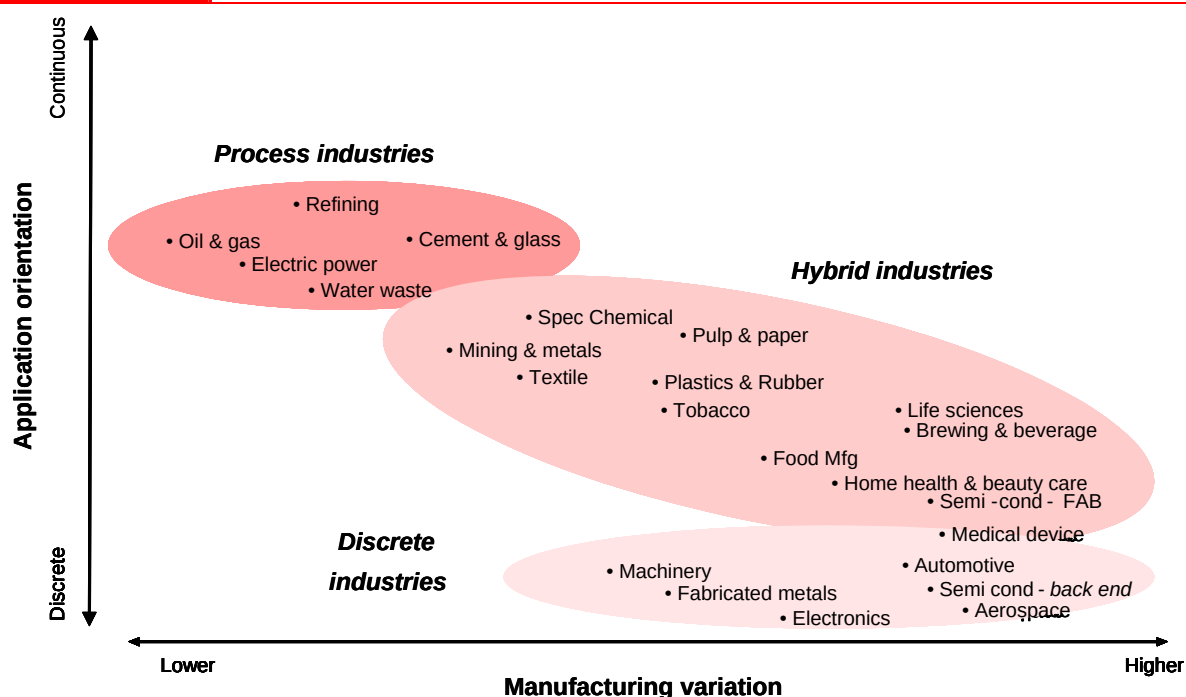
In December 2008, the Department of Energy (DOE) in the US awarded 16 Indefinite Delivery Indefinite Quantity Savings Performance Contracts (ESPCs) that could result in up to \$80bn in energy efficiency, renewable energy, and water conservation projects at federally owned buildings and facilities. Amongst the 16 companies who will participate in this programme are Siemens, Schneider, Johnston Controls and Honeywell.

Industrial Automation likely to delay investments

Industry accounts for 39% of the world's energy consumption. The potential for energy savings is extremely significant, especially around motors. Energy costs represent 25% to 50% of production costs on average and motors account for over 65% of the electricity usage. Schneider estimates that an average facility can reduce its energy consumption by 10 to 20%.

Automation encompasses all the products and systems used to automate the production of goods. Siemens estimate that the total Industrial Automation market is worth close to €100bn. It can be broken into three categories, namely Process, Hybrid and Discrete automation. We highlight in the chart below, what are commonly considered to be the main industries in the three types of industrial automation markets.

Automation business and breakdown between processes



Source: Rockwell Automation

■ **Discrete automation** deals with the control of manufacturing processes involving the assembly of component parts to construct products that can be measured in units such as automobiles, household appliances or computer systems. The main associated industries are automotive (around a third of the market), machinery and electronics/semis.

■ **Process automation** corresponds to the automation and control of production processes involving the blending and treatment of raw materials that leads to production of a continuous stream of products such as chemicals, pulp and paper, oil and gas. Process automation typically takes place under high temperatures and pressure.

■ **Hybrid automation** systems typically integrate a process part (weighing, mixing and heating) and a discrete part (packaging, robotics and material handling). The main associated industries are pharmaceuticals and food & beverages.

Energy efficiency is at the core of Automation

The underlying objective of the Automation market has always been to make industrial processes more efficient and profitable. Energy efficiency can therefore be seen as an integral part of this objective.

According to Siemens, the potential for energy savings in industrial production (led by petrochemicals, steel and paper-making) is as great as in the residential building, trade and transportation sectors combined. For example, electrical motors account for 65% of electricity consumed by industry, and on each \$1 spent to purchase a motor another \$100 is spent on energy costs throughout its life. The potential savings are extremely large. The annual saving from switching to high efficiency motors and drives in the EU for example would cut electricity consumption by 202bn kWh, the equivalent of 40 large power stations. This in turn would yield €10bn in reduced electricity costs, according to ABB.

Potential electricity savings from switching to energy efficient motor systems ((billion kWh/year)

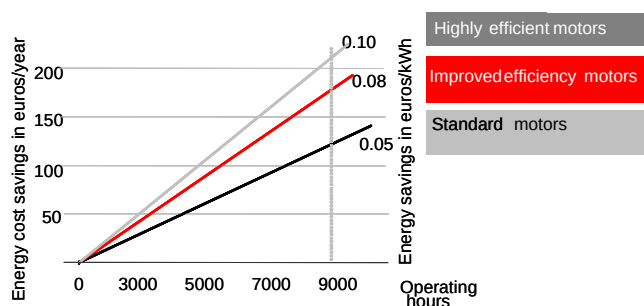
	EU-15	EU-25	France	Germany	Italy	UK
High efficiency motors	24	27	4	6	4	3
Variable speed drives	45	50	8	10	7	6
Applications (pumps, fan, compressors)	112	125	19	26	17	15
Total	181	202	31	42	28	24

Source: ABB, SG Equity Research

Automation projects likely to get scrapped

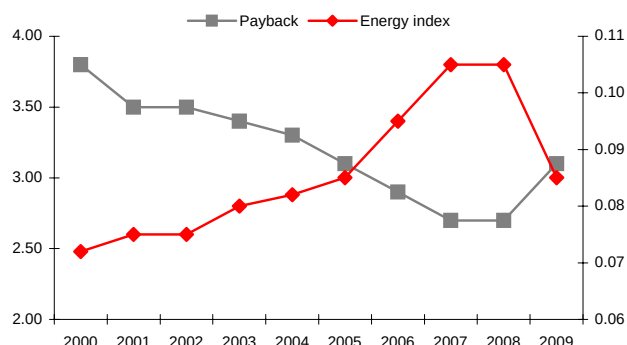
In the current environment, we are particularly concerned that the Automation market will suffer from its exposure to general industrial capex trends. Industrial investments, which receive no state funding or legislative support are most sensitive to the payback of a project. As shown in the chart below on the left hand side, the higher the cost of energy, the greater the savings a typical variable speed drive can achieve. The opposite of course is true. While rising energy prices shortened payback periods and stimulated energy efficiency investment up until 2008, falling energy prices will work in the opposite sense during 2009 as shown in the chart below.

Energy savings from a variable speed drive



Source: Siemens

Payback period as energy prices fall (in years, L/H axis)

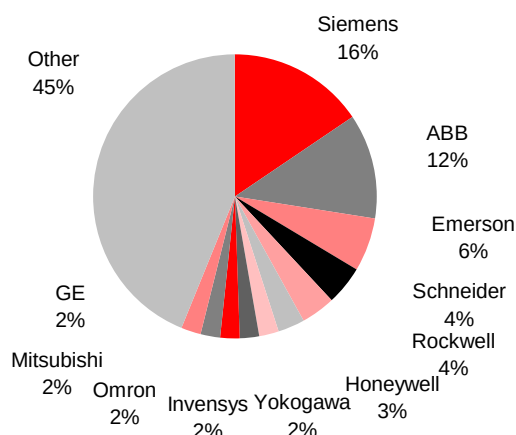


Source: Schneider

Siemens is No 1 in Automation

There are numerous players in the automation market, with only Siemens controlling more than 15% of the total market. However, historically most companies have competed within specific sub-segments (discrete, process, etc.) of the overall automation market and with the help of closed systems, barriers to competition remained high, supporting profitability.

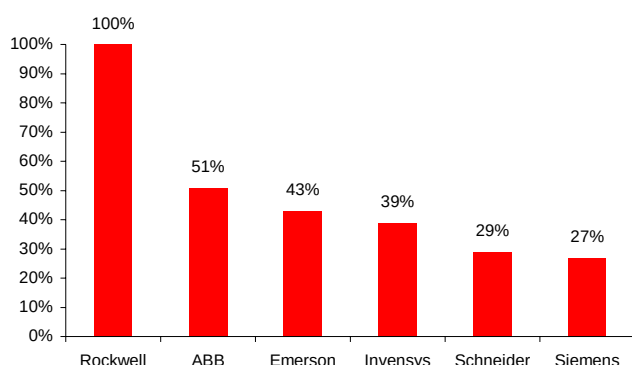
Industrial automation's largest players, 2007



Source: SG Equity Research, Company data, ControlGlobal

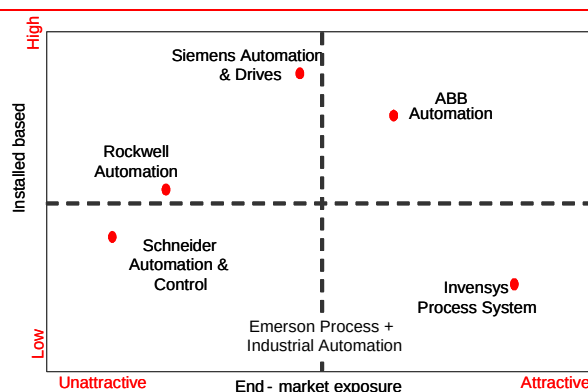
Below, we highlight the competitive situation of key automation players in both the process industry and discrete industry, using two main axes: 1) ability to execute and 2) completeness of vision.

Percentage of sales derived from automation activities for our sample of automation stocks



Source: SG Equity Research, Company data

Competitive situation for our sample of automation stocks



Source: SG Equity Research

We summarise below, the energy saving credentials of the main automation players:

- **Schneider's** energy efficiency offering now represents around 20% of group sales, covering both its automation and electrical distribution activities, with solutions ranging from variable speed drives to energy audits and remote monitoring controls. In particular, the group holds the no 3 position in drives.
- **Siemens'** offering to reduce energy requirements brings together its Automation and Electrical experience through the offering of Total Integrated Automation (TIA) and Total

Integrated Power (TIP). In particular, the acquisitions of Flender and Robicon have recently added to Siemens' drive portfolio with a full range of applications from drive controls to motors and gears. Apart from selling more efficient motors and variable speed drives Siemens also highlights its software capabilities such as SinaSave, which enables users to model their electricity needs and savings over the internet. Siemens also offers a full energy management service through the Siemens Demand Side Energy Management (DSEM) offering, where Siemens specialists would carry out an energy audit focusing not just on electricity usage but also other energy forms such as steel, compressed air, natural gas etc. The potential reduction in energy consumption is 12-15%.

- **ABB** also has a strong energy efficiency offering. In particular ABB Automation Products is the #1 player worldwide for motors and drives ahead of Siemens. For example, the replacement of an ABB fixed speed fan with AC driver control saved 5,500,000 kWh per year for Cruz Azul a cement plant in Mexico and had a payback of 6 months. Within the Process Automation division, 40% of orders come from Services, which are inherently designed to improve efficiency and reduce energy costs.

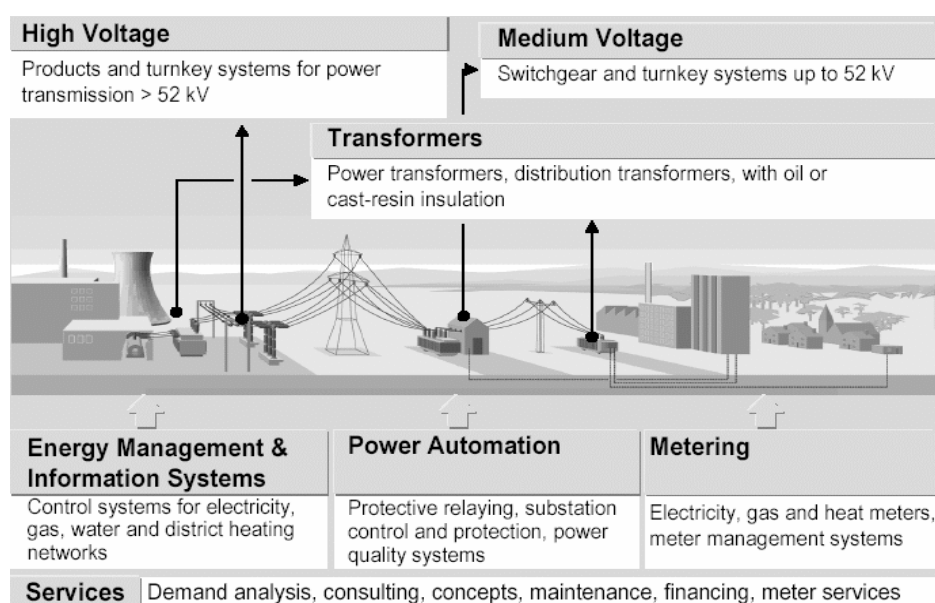
- **Emerson** is the leading US automation company. It believes it can address 82% of possible energy efficiency gains within an industrial context ranging from more efficient motors to lower consuming heating. It is also present in the Building market, where it estimates it can address 80% of residential energy efficiency savings and 36% of commercial savings.

T&D a clear winner from stimulus packages

The T&D market supplies equipment, systems and services to medium and high voltage energy markets. The first step of the power transmission and distribution process involves transforming power generated by a power plant to a high voltage that can be transported efficiently over long distances along overhead lines or underground cables. This occurs at or near the site of the power plant, and requires transformation, control, transmission, switching and protection systems.

During the second stage of the process, the power passes through one or more substations, which use distribution switchgear to control the amounts delivered plus circuit breakers and surge arresters to protect against hazards in transmitting the power. At this stage, transformers step down the voltage to a medium level at which it can be safely distributed in populated areas. In the final stage of the process, distribution transformers step down the voltage again to a level usable by end-users and metering systems measure and record the locations and amounts of power transmitted.

Transmission and distribution market: scope of supplies and services

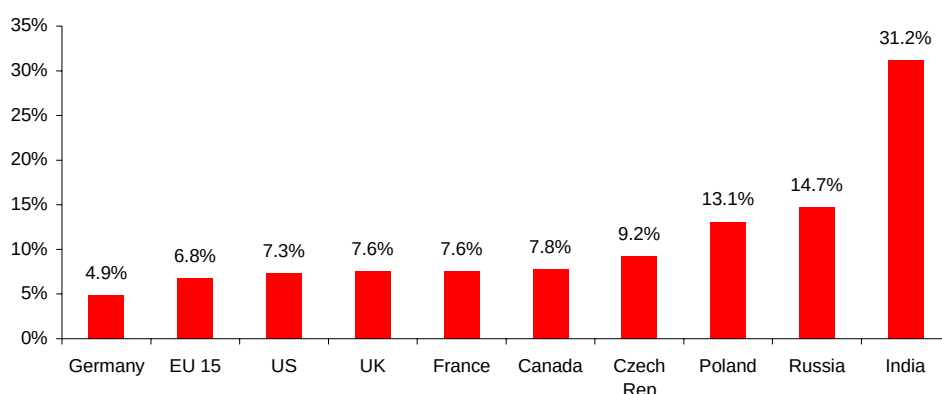


Source: Siemens

The grid currently loses around 7% of all electricity transported

Energy efficiency can be considered as a smart way to satisfy growing electricity demand, rather than adding new power capacity. It is cleaner and cheaper since one unit of electricity saved at home or in the workplace equals three units of saved power production. The Transmission & Distribution (T&D) industry is particularly well placed to deliver energy efficiency gains in our view. At present, about 7% of the electricity transported over the grid is lost in mature regions such as the US and EU. In emerging markets it can be as high as 31%.

Energy losses in the grid



Source: Areva

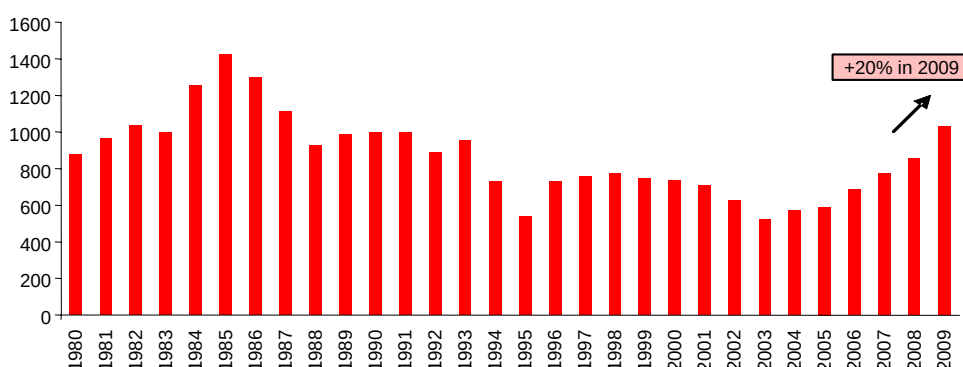
The T&D industry can offer products and solutions that will reduce these energy losses by using some of the following products and techniques:

- High voltage direct current (HVDC) lines used to transport electricity over long distance can reduce electricity losses by threefold.
- Efficient transformers.
- Automation tools such as ABB's Flexible Alternating Current Technology (FACTS) can increase transmission capacity by 20%-40% through existing lines.
- Subsea links can enable offshore Oil & Gas platforms to be connected to the national grid and thus avoid expensive and polluting onsite power sources (oil-fuelled generators). Typical savings by connecting an oil platform to the national grid would be about 130,000 tons of CO₂ emissions per year.

Stimulus packages to act as real support

The T&D market is set to be a clear beneficiary of government stimulus packages. In Europe, France has already indicated for example that as part of its stimulus package, the grid operator RTE will increase spending by 20% to €1bn in 2009. In the US, President Obama's stimulus package looks to attribute \$11bn in funding for the electricity grid. A second element of the plan is to provide \$8bn in loan support for renewable energy and transmission loan guarantees, which if successful is expected to support more than \$80bn in loans. China has also indicated that it will accelerate an already ambitious investment programme.

Annual investment in the power grid in France 1980-2009e



Source: RTE

Cross border initiatives provide an additional support

As Europe seeks to put in place a more efficient single electricity market, a key requirement is to have the necessary infrastructure that will facilitate cross-border electricity flows, i.e. interconnections. The EU considers that a minimum of 10% interconnection level is sufficient to introduce effective competition across borders. At present, France, Spain, Portugal, the UK, Ireland, Italy and Poland are all below this level. This political goal should support T&D in the coming years. The European Investment bank recently indicated its plans to boost lending for energy projects to €18bn a year from 2009 onwards. Its four priority areas are renewable, energy efficiency, research and security of supply, which includes interconnection projects. On top of this, the European Commission has indicated that it wants to divert €5bn from its agricultural subsidies budget to support trans-European infrastructure, including energy interconnection investments in 2009 and 2010. Numerous projects in Europe are still to be launched, as shown in the table below.

Planned European Interconnection projects

Countries	Interconnection project	Expected date	Capacity increased
BE - FR	Moulain-Aubange 225kV	2009	400 MW
UK - NL	Brit NedHVDC link	2010	>1000 MW
CZ - AT	Slavetice - Durnrohrtie-line	2008-2009	900 MW
ES - PT	Aldeadavilla-Lagoaça 400kV	2009	n.a.
GR - TK	N. Santa-Babaeski 400IV	2008	n.a.
FR - ES	Baixas-Bescano 400kV	2011-2012	1200 MW
SI - IT	Italy with Slovenia 380kV	2013	500 MW
NO - DK	Skagerrak4 submarine cable	2012	600 MW
FI - SE	Fennoscan submarine cable	2011	550 MW

Source: SG Equity Research and Cap Gemini

In the US, federal authorities have also tried to put in place legislation to boost T&D investment. Under the US Energy Bill there has been the creation of priority corridors in order to improve the interstate grid, so called National Interest Electric Transmission Corridors (NIETC). Since 2000 for example the Federal Energy Regulatory Commission (FERC) has allowed a higher ROE for the areas over which it has direct regulatory jurisdiction. In October 2007, for example, the DOE announced two new 'corridors' in the mid-Atlantic and the Southwest. On the back of this decision, utilities have been able to appeal local planning decisions that have previously hindered their projects.

Connecting renewable energy will also boost demand for T&D

In both Europe and the US there is a significant change in the energy mix now being installed. In particular, the growing amount of wind energy will require additional and more sophisticated transmission requirements. In 2007 wind power in the US made up 20% of new capacity announcements. While in Europe; 43% of new capacity additions in 2008 were for Wind farms. Wind farms tend to be located in remote areas far away from the end user, especially off-shore wind farms, and thus require more T&D investment. The Edison Electric Institute estimates, for example, that for every 10 miles of additional transmission requirements (assuming the cost is \$3m for one mile of 345-kV link) an additional investment of \$30m is needed.

Ideally, the grid operator looks for a solid load factor across the grid. Wind energy however produces an intermittent power supply. When the wind blows strongly, the frequency of electricity produced increases, which left unchecked would create imbalances within the grid.

This changing frequency needs to be adjusted with the help of hardware such as a frequency converter. Moreover, when the wind stops blowing, the operator needs to be able to quickly switch to other energy sources such as Gas. As such the operator requires more sophisticated automation equipment and grid technology that will enable it to manage the overall grid with more flexibility.

T&D looks better placed than Power Generation

To highlight the importance of energy efficiency the Edison Electric Institute recently indicated that, through the implementation of "realistically achievable" energy efficient and demand response programmes, the US would require 81 GW less power capacity compared to its reference scenario of 214 GW out to 2030. In such a scenario, spending on power generation would be nearly \$200bn less than in its reference scenario, while spending on T&D would remain steady at \$880bn and that additional spending on advanced metering and energy efficiency as well as demand reduction programmes would amount to \$85bn, i.e. 10% of the T&D budget.

Power outlook to 2030 with energy efficiency scenario

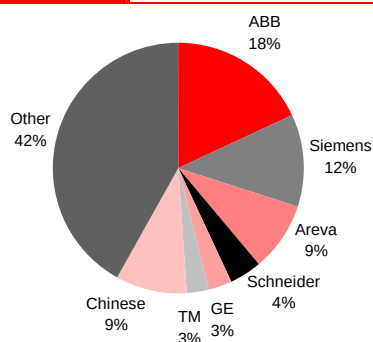
	Reference scenario	Reasonably achievable efficiency base case scenario
Total new capacity (GW)	214	133
Generation (\$bn)	697	505
Transmission (\$bn)	298	298
Energy efficiency and demand reduction investments (\$bn)	0	85
Distribution (\$bn)	582	582
Total capital investment (\$bn)	1,577	1,470

Source: EEI

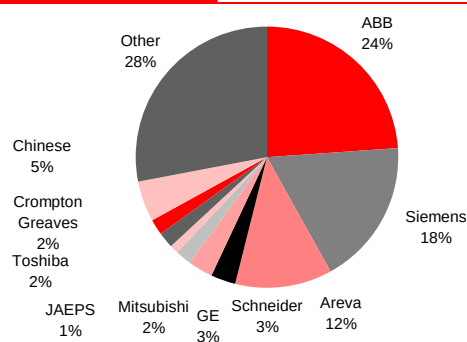
Overall, we consider that the trend towards energy efficiency is extremely positive for T&D players that can offer smart grid technologies, more efficient transformers to reduce transmission losses, and metering services to reduce final electricity demand (See further SG's *Green IT* report). On the other hand, the trend represents a significant threat for the Power Generation industry as the more energy that is saved by the final consumer, the less necessity there is to build new capacity.

On a company basis, we expect the three major T&D players will benefit from these investments given that they all have a complete product offering and engineering expertise. As shown by the two charts below we can see that the major three players have been taking market share in the recent past and we expect this trend to continue. In 2003 the top 3 T&D players held 39%, while in 2007 they held 54%.

T&D market share 2003



T&D market share 2007



Source: SG Equity Research

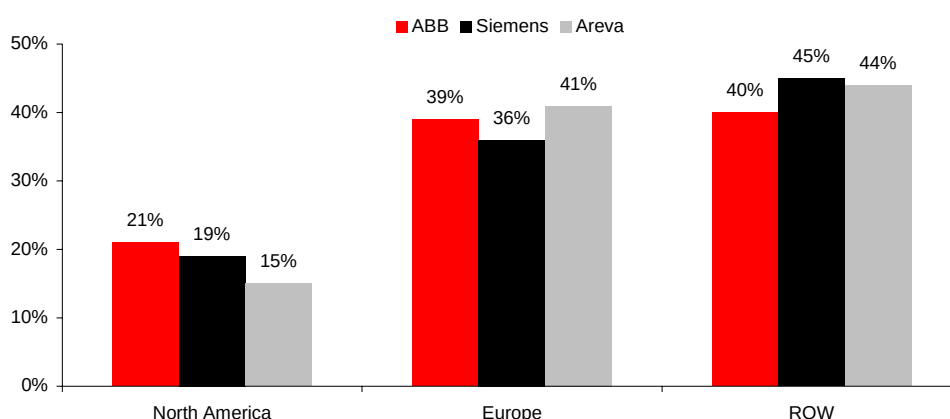
The Big Three T&D players

Focusing on the three major players in the market, we note that:

ABB has rich product content: ABB's business mix is biased towards high EBIT margin products compared to lower margin project solutions. In 2007 for example its T&D business generated 63% of revenue from product sales compared to Areva and Siemens, which both achieved less than 50% of revenue from product sales.

All players have high exposure to emerging markets In terms of geographical exposure there are no major differences among the top three players. All three have more than 40% of sales coming from emerging markets, although ABB is the No. 1 player in both China and India.

Geographical exposure for the Big 3 T&D players



Source: SG Equity Research

ABB and Siemens are considered to be the leading technological players. As an example, ABB has supplied more than half of the HVDC converter stations in the world and has more than 50 HVDC projects commissioned or under construction in all parts of the world, while Siemens' Transmission business filed 150 patents in 2007.

We summarise the key differences between the Big Three players in the table below and afterwards give more details on the individual players.

T&D – Key industry differences

	Siemens	ABB	Areva
Installed base	++	+++	+
Technology	+++	+++	++
Global presence	+++	+++	+++
Solutions provider	+++	+	++
Product range	+++	+++	++
Main differentiating factor	Higher exposure to low margin systems business	Higher exposure to high margin products business	Fast improving player but still behind top 2

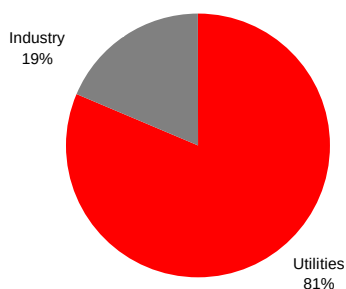
Range from + to +++, with + being the weakest and +++ the strongest, Source: SG Equity Research

ABB Power is the clear leader

ABB's business can be split between Power Products (31% of group sales) and Power Systems (18% of group sales). The Power Products arm manufactures and sells a broad range of power products such as high and medium voltage switchgear, circuit breakers, and power and distribution transformers. It is the No. 1 player in High Voltage products with 33%

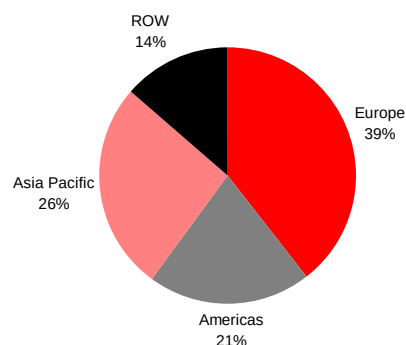
market share, No. 1 in Power Transformers with 37% market share and No. 1 in Distribution products with 19% share. Power Systems is an engineering business for grid systems, power generation systems, network management solutions and substations. ABB is the second largest player, with 23% of the market.

ABB Power sales by end market



Source: ABB

ABB Power sales by region



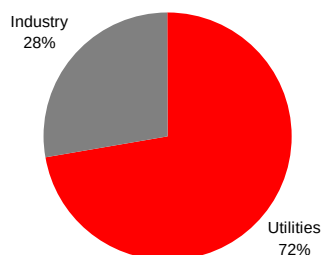
Source: ABB

Siemens T&D is among best in class

Siemens is the No. 2 player in the market. Its T&D activities represent 11% of group sales. The business was recently split into two divisions, with Transmission accounting for 63% of sales and Distribution accounting for 37%. The Transmission business sells high voltage products, transformers and builds high voltage sub stations for predominantly Utility customers (85% of sales). Siemens, along with ABB is seen as the technology leader within the industry, filing 150 patents in 2007 for example. It is also the No. 1 player in the technology advanced €3.2bn HVDC market, which is used to transport electricity over very long distances.

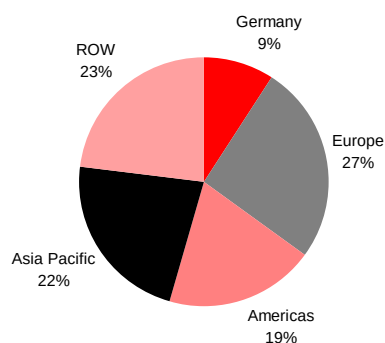
The Distribution business generates 50% of its sales from the utility sector with the balance coming from infrastructure and industries. In terms of end markets, Siemens is the No. 1 player servicing the Utilities market, while in terms of regions it is the No. 1 player in Europe. Siemens' strategy is to strengthen the product business, aiming for an even split between products and solutions. There is also a clear focus on shifting material sourcing and manufacturing to low cost countries (LCCs), with the creation of global sourcing hubs in LCCs.

Siemens T&D sales by end market



Source: SG Equity Research and Siemens

Siemens T&D sales by region

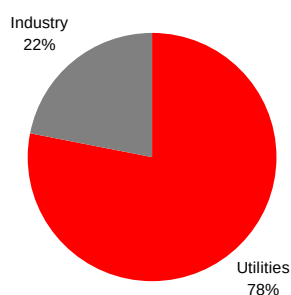


Source: Siemens

Areva T&D catching up

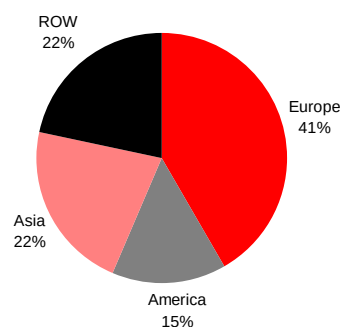
Areva T&D is the No. 3 player in the market. Previously the division was part of Alstom, but when Alstom was under financial pressure in 2004 it sold the operation to Areva. Since then, the business has been turned around, with margins rising from 1.0% in 2004 to 11.1% in 2008. The company now plans to focus more and more on emerging markets, with Asia for example expected by the group to deliver 27% of sales in 2009 vs 22% in 2007 and 17% back in 2003. Investment spending rose from €200m over 2004-2006 to €290m for 2007-2009, with 50% spent on capacity increases or new products.

Areva T&D sales by end market



Source: Areva

Areva T&D sales by region

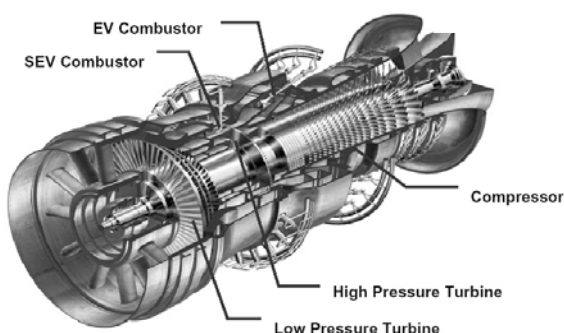


Source: Areva

Power Generation to face the brunt of capex cuts

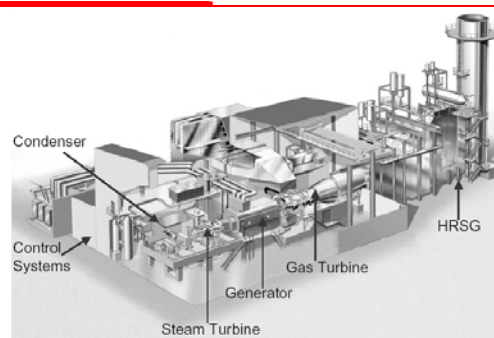
The power generation market provides a full range of equipment necessary for the conversion of energy into electricity. It offers a broad array of power plant technology, including the development and manufacture of equipment, the planning, engineering and construction of new power plants, as well as services.

Main component of a gas turbine



Source: Alstom

A combined-cycle power plant



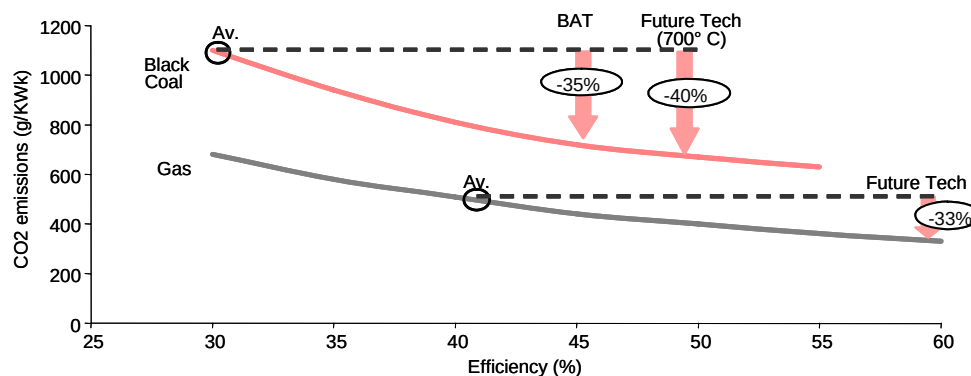
Source: Alstom

All thermal power plants generate electricity from heat. Different types of plants use different heat sources, ranging from burnt fuel (natural gas, oil, coal, industrial waste) to a nuclear reaction. The heat source is used to heat a fluid (often water), which is converted to a gas (steam). This vapour is used to drive a turbine, coupled to a generator that converts the mechanical energy of the turbine into electrical energy.

Efficiency is key for a power plant

The more efficient a power plant is the less fuel it requires to produce an equivalent amount of power and thus the more profitable and less polluting it is. The leading power generation companies are all looking to increase efficiency, with each percentage point reducing CO2 emissions and delivering a competitive advantage. Compared to the traditional installed base, the Power Generation industry is targeting a 40% cut in CO2 emissions for Coal power plants and a 30% reduction for Gas power plants. **Alstom is the company most exposed to this trend in our universe.**

CO2 reductions through efficiency gains

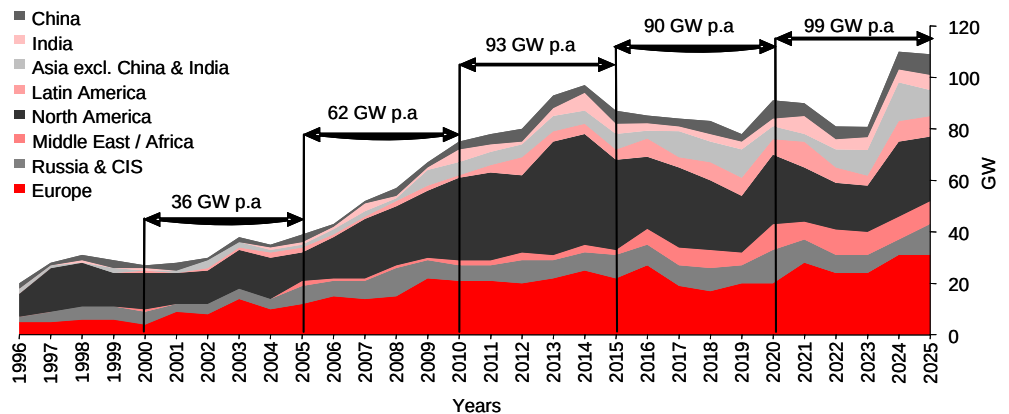


Source: Alstom

Strong needs for retrofit and environment systems

The volume of plants reaching over 40 years of age in the world is growing very quickly, creating significant growth potential for the retrofit market. It is often a captive market for the original supplier. Besides, risks are much lower than for large installation contracts and market volatility is also much lower.

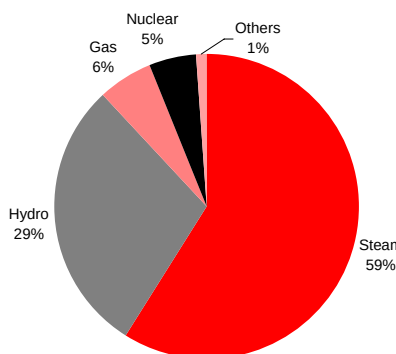
Evolution of installed base reaching 40 years (GW)



Source: Alstom

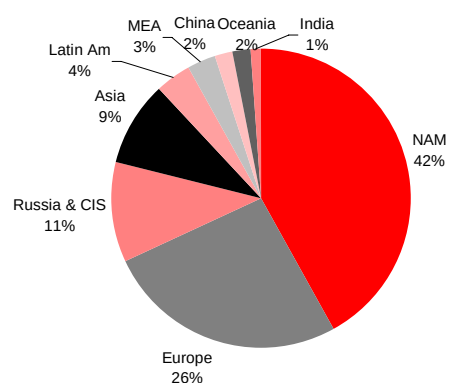
Based on the installed base, North America has the largest proportion of power plants over 30 years old. This is mainly due to the several installations throughout the post-war period.

Technological distribution of >30yr power plants



Source: Alstom

Geographical distribution of >30yr power plants

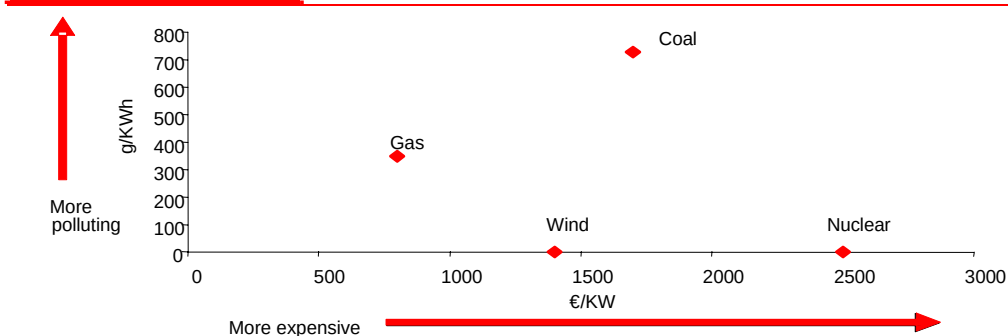


Source: Alstom

Power generation priorities

Within the power generation market we believe that Utilities in the short term are likely to focus on the most essential projects, namely those projects that ensure the lights don't go out. Beyond this, we expect CO2 free technologies to gain ground within the energy mix.

Attractiveness of Power Generation technologies



Source: SG Equity Research, EDF and Eurelectric

Most utilities tend to use coal or nuclear for base load requirements, while gas is used more to deliver extra flexibility for the overall power network, especially to ensure peak demand. Base load power plants however require a large upfront investment (roughly €4bn for Nuclear, €1.7bn for Coal compared to c. €640m for Gas) and in our view are most likely to be delayed. South Africa for example has already indicated that it will cancel phase one of its Nuclear build-out programme (3,000 MW) as it indicated it could no longer afford the magnitude of the initial investment.

As Utilities focus more on reducing CO2 emissions, coal power plants are likely to fall out of favour, while a mixture of wind energy and gas solutions should grow in popularity. In January 2008, the EU Energy and Climate Change Package set explicit targets for reducing greenhouse gas emissions, namely a 21% reduction in emissions by 2020 when compared to 2005 levels. As part of this plan the renewable energy directive forces each member state to increase its share of renewable energies in line with specific objectives, with the objective of boosting the EU's share of energy origination from renewable energy sources to be at 20% in 2020 vs 9.2% in 2006.

Against this backdrop, we expect traditional coal power plants to be particularly at risk and for alternative energy forms such as Wind and Nuclear to grow in the energy mix. Note that in 2008, 43% of European capacity additions were for Wind.

Alstom falling behind in the Gas market

Both Siemens and GE are investing heavily to develop a new H class gas turbine, while Alstom has focused on improving its existing F class turbine. These future gas turbines are likely to achieve an efficiency level of 60%. This additional 1 percentage point in efficiency means that the new turbines could achieve operational savings of \$2m per year, or \$16m on an NPV basis according to GE.

Comparison of leading gas turbines

		Frequency (Hz)	Output (MW)	Efficiency (%)
F class				
Alstom	GT 26	50	588	58
Alstom	GT 24	60	386	55
GE	MS7001FB	50	413	58
GE	MS7001FB	60	280	57
Siemens	SGT5 4000F	50	416	58
Siemens	SGT5 4000F	60	391	59
H class				
GE	S109H	50	520	60
GE	S107H	60	400	60
Siemens	SGT5 - 8000H	50	530	60

Source: SG Equity Research

■ **Alstom:** Over the last six years, Alstom has been tackling the problems and dealing with the financial consequences of the GT 24/26 technical failure. In terms of cash flow this problem has cost Alstom €3.2bn, the equivalent to R&D expenditure over the last seven years. Rather than launching a heavy R&D program, Alstom instead has focused its efforts on improving the performance of the F class GT 26. In an integrated solution Alstom already has a plant offering with 858 MW net output and 58% net efficiency. Alstom is aiming to reach 60% efficiency with the existing engine platform.

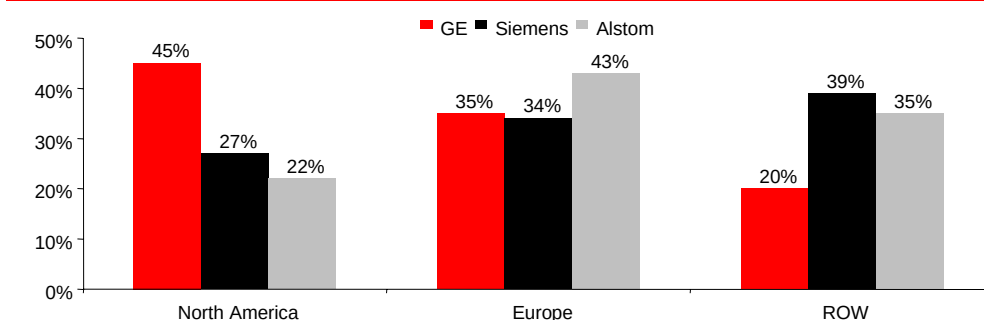
■ **Siemens:** is currently developing the SGT5-8000H for the 50-Hz market, which in a combined cycle will have an output of +530 MW and an efficiency level exceeding 60%. Through a hosting arrangement the prototype engine will be tested initially in a single cycle and afterwards in a combined cycle. No fixed date has been set for its commercial launch as Siemens is taking a prudent approach in order to minimise the risk of product failure.

■ **GE** appears to be leading the development race with its latest turbine, the 7H Frame. GE has actually been working on the H-frame since the early 1990s, borrowing technologies from its jet engine development. The H frame in a combined cycle is capable of breaking the 60% efficiency barrier. The latest model is currently being commercially tested at the Inland Empire Energy Centre in California. GE has financed and owns the plant, while Calpine Power Services is managing the plant construction. After an extended period Calpine will take full ownership of the plant.

The Big Three PG players

In terms of geographical exposure the two European majors have a significantly higher exposure to emerging markets than GE. Both Siemens and Alstom generate already more than 30% of sales from markets outside of Europe and North America, while for GE this exposure is just 20%.

Geographical exposure for the Big Three Power Generation players



Source: SG Equity Research and company data

We summarise the key differences between the Big Three players in the table below.

Power Generation – Key industry differences

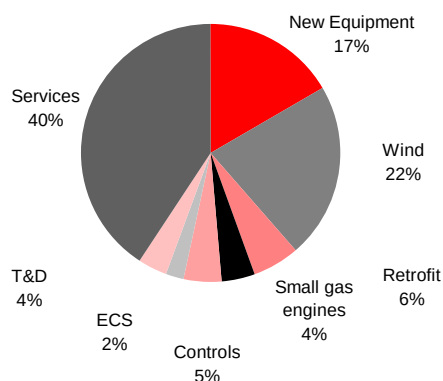
	Siemens	GE	Alstom
Installed base	+	++	+++
Technology	++	+++	++
Global presence	+++	+++	+++
Solutions provider	++	+	+++
Product range	+++	+++	++
Presence in emerging markets	+++	+	+++
Main differentiating factor	Moving to the “GE” business model.	Pure component supplier and service provider.	Core competence is project management.

Source: SG Equity Research

GE Energy is the market leader

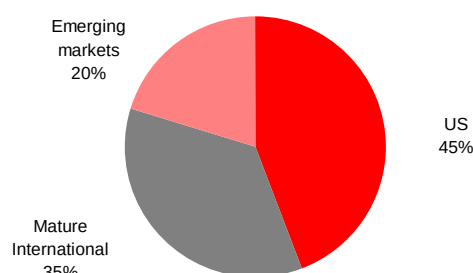
GE Energy accounted for 21% of group sales and reported a margin of 15.7% in 2008. Within this division GE provides power generation equipment to utility and industrial clients. Based on reported revenue, GE is the largest power generation company in the world. In particular it holds the No. 1 position in the lucrative Gas market. GE has also expanded heavily into the Wind market, which now represents 22% of divisional sales.

GE Energy sales by business



Source: GE

GE Energy sales by region

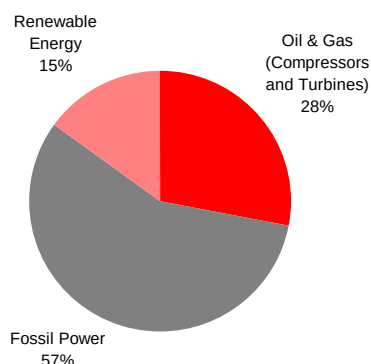


Source: GE

Siemens is changing its business model

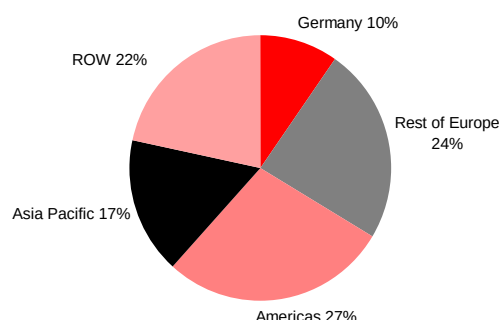
Siemens total Power Generation business achieved sales of €14.3bn in FY 2008, accounting for 17% of group sales. Like GE and Alstom, Siemens is active in all major technologies, holding the no 2 spot in Gas and Coal. The company has a limited presence in Nuclear and Hydro through joint ventures. It is a major player in the Wind market. Siemens' strategy is to build and expand capacities (Wind, Gas turbines, T&D), reduce its exposure to turnkey projects, while growing its service and product businesses to reduce the risk profile. In essence, it is looking to follow the GE business model.

Siemens Power Generation sales by end market



Source: Siemens

Siemens Power Generation sales by region

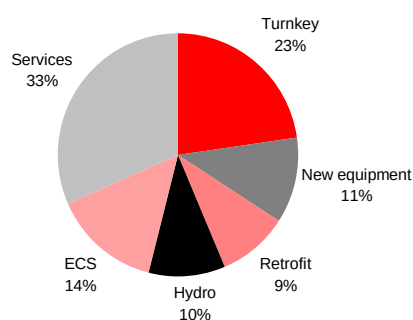


Source: SG Research

Alstom's broad portfolio

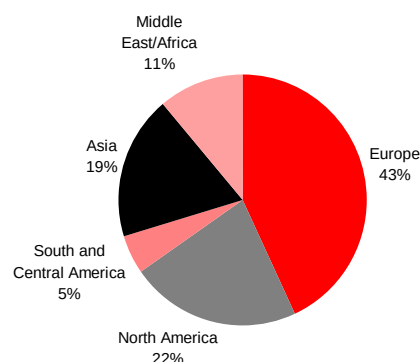
Alstom's strategy is to have a well diversified portfolio of products to take account of shifts in demand. The company believes that no single energy source will prove to be the dominant source, but rather the world will rely on a blend of technologies. While Alstom missed out on the US gas bubble at the beginning of the decade, the current balanced demand make-up is more favourable for the company as it exploits its leading position in Steam, Hydro and renewed presence in Gas.

Alstom Power sales by business segment



Source: SG Equity Research

Alstom Power sales by region



Source: Alstom

Appendix - Green stimulus packages

Summary of global economic stimulus plans with green measures

	Overall eco. package	%GDP	Priorities	Green component (% of GDP)	Energy Efficiency	Auto	Renewables	Infrastructure
EU	€200bn (\$253bn) incl. €30bn from EU funds	1.5%	Economic stimulus, green jobs, infrastructure, energy efficiency	€12bn (\$15bn) from EU funds (0.1%)	€2.2bn (\$2.8bn) for energy efficient homes & factories; lower VAT for energy efficient products & buildings	€5bn (\$6.3bn) on green R&D	€3.5bn (\$4.48bn) for renewables & incentives to meet 2020 targets.	
France	€26bn (\$33bn)	1.3%	Auto, building / construction	€900m (\$1.1bn) (0.005%)	€200m (\$253m) fund for energy efficient homes	€200m (\$253m) to encourage people to buy new cars and scrap polluting ones		€500m (\$632m) in infrastructure projects
Germany	€84bn (\$106bn)	1.3%	Auto, infrastructure	NA	Funding to KfW (€15bn/\$18bn) for loans for household energy efficiency. €3bn (\$3.8bn) in 2009/10 to reduce building emissions. Tax deduction for housing repairs & modernisation increased to €1,200 (\$1,500) per household.	€53bn (\$67bn) subsidy for the auto industry to make it the world leader in green vehicles. 1-2 year tax exemption for "low emission" cars (Euro 5 & 6 norms)	Lending from KfW for solar PV in 2009 with attractive loan rates	€1bn (\$1.27bn) in 2009-10, expansion of rail & waterways
UK	€24bn (\$30.3bn)	1.4%	Tax cuts, energy efficiency in buildings, renewables	€481m (\$608m) for energy efficiency, rail transport & environmental protection	Additional €113m (\$143m) for the "Warm Front" scheme (low income insulation) and €68m (\$85m) for the "Decent Homes" program (reduce building emissions)		Extension of renewables obligation by 10 years to 2037 (incl/ offshore wind investments)	Additional €339m (\$428m) to accelerate the extension of rail network capacity
US	€623bn (\$787 bn)	Up to 5%	Infrastructure, healthcare and energy	Up to €79bn (\$100bn) for projects to fight climate change	€28.3bn (\$26.86bn) for energy efficiency initiatives. €700m (\$1bn) to help weatherize 1m homes. Green renovations for public building & schools.	€1.9bn (\$2.4bn) in incentives to scrap polluting cars and buy environmentally friendly models	€3.8bn (\$4.8bn) in renewable energy bonds for consumer utilities. €26bn (\$32.8bn) in funding for clean energy projects	Link sunniest & windiest regions to the national grid. Electric efficiency superhighway. Emphasis on development of public transit systems.
Australia	€22.2bn (\$28 bn)	1.3%	Payments to low and middle income families, investments in schools	€261m (\$329m) renewable energy fund.			€261m (\$329m) renewable energy fund to be dispersed over 18 months.	Investment in bicycle paths
Canada	€25.4bn (\$32bn)	2.4%	Tax cuts, worker training, infrastructure, renewables	€7.6bn (\$9.6bn) for infrastructure & renewables (0.7%)			€635m (\$800m) to boost sustainable energy sources.	
China	€445bn (\$560bn)	7%	Transport infrastructure, post disaster reconstruction, environmental protection, water & sanitation	Up to €115.9 (\$146bn) for environmental protection. (1.8%)			€75.8bn (\$95.5bn) for expansion of nuclear energy projects.	€55.6bn (\$70bn) on electricity grid. €15.9 (\$20bn) on water infrastructure & conservation projects
Japan	€85bn (\$107bn)	2.5%	Families, tax breaks/relief for small business	Tax cuts & incentives for environmentally friendly businesses		Tax cuts for low-emission cars		
South Korea	€30bn (\$37.87bn)	3.7%	Green transport networks, 960,000 new green jobs	€18.3bn (\$23bn) on forest expansion, river improvements, green transport networks. (2.3%)				€6.35bn (\$8bn) for green transport infrastructure incl. low carbon railways, energy efficient public transport, special roads for cyclists.

Source: SG Equity Research

IMPORTANT DISCLOSURES

Alstom	SG is a lender to Alstom Group.
Areva	SG is acting as financial advisor to Areva
EDF	SG acted as joint-lead manager and joint-bookrunner of EDF Energies Nouvelles capital increase
EDF	SG acted as Mandated Lead Arranger and Bookrunner of the acquisition facilities set up by EDF for the acquisition of British Energy
EDF Energies Nouvelles	SG acted as joint-lead manager and joint-bookrunner of EDF Energies Nouvelles capital increase
RTE	SG acted as joint bookrunner in the RTE EDF Transport's senior bond issue (5.125% 12/09/2018 EUR).
Saint-Gobain	SG is acting as Senior Co-Lead Manager of Saint-Gobain's right issue
Saint-Gobain	SG acted as joint bookrunner in the Saint-Gobain's senior bond issue (8.25% 28/07/2014 EUR).
Schneider Electric	SG acted as joint bookrunner in the Schneider Electric's senior bond issue (6.75% 16/07/2013 EUR).
Vattenfall	SG acted as joint-lead manager in the Vattenfall senior bond issue (6.75% 31/01/2019 EUR & 5.75% 05/12/2013 EUR).

US THIRD PARTY FOREIGN AFFILIATE RESEARCH DISCLOSURES:

SG and its affiliates beneficially own 1% or more of any class of common equity of Alstom, Capgemini, EDF Energies Nouvelles, Philips, Saint-Gobain, Schneider Electric, Siemens, Total.

SG or its affiliates act as market maker or liquidity provider in the equities securities of ABB, Alstom, Capgemini, Philips, Saint-Gobain, Schneider Electric, Siemens, Total.

SG or its affiliates expect to receive or intend to seek compensation for investment banking services in the next 3 months from Alstom, Areva, Capgemini, EDF, EDF Energies Nouvelles, Legrand, Saint-Gobain, Schneider Electric, Siemens, Total.

SG or its affiliates have received compensation for investment banking services in the past 12 months of Areva, EDF, EDF Energies Nouvelles, National Grid, RTE, Saint-Gobain, Schneider Electric, Total, Vattenfall.

SG or its affiliates managed or co-managed in the past 12 months a public offering of securities of EDF, National Grid, RTE, Saint-Gobain, Schneider Electric, Total, Vattenfall.

IMPORTANT DISCLAIMER: The information herein is not intended to be an offer to buy or sell, or a solicitation of an offer to buy or sell, any securities and including any expression of opinion, has been obtained from or is based upon sources believed to be reliable but is not guaranteed as to accuracy or completeness although Société Générale ("SG") believe it to be clear, fair and not misleading. SG, and their affiliated companies in the SG Group, may from time to time deal in, profit from the trading of, hold or act as market-makers or act as advisers, brokers or bankers in relation to the securities, or derivatives thereof, of persons, firms or entities mentioned in this document or be represented on the board of such persons, firms or entities. Employees of SG, and their affiliated companies in the SG Group, or individuals connected to them, other than the authors of this report, may from time to time have a position in or be holding any of the investments or related investments mentioned in this document. Each author of this report is not permitted to trade in or hold any of the investments or related investments which are the subject of this document. SG and their affiliated companies in the SG Group are under no obligation to disclose or take account of this document when advising or dealing with or for their customers. The views of SG reflected in this document may change without notice. To the maximum extent possible at law, SG does not accept any liability whatsoever arising from the use of the material or information contained herein. This research document is not intended for use by or targeted at retail customers. Should a retail customer obtain a copy of this report they should not base their investment decisions solely on the basis of this document but must seek independent financial advice.

Important notice: The circumstances in which materials provided by SG Fixed & Forex Research, SG Commodity Research, SG Convertible Research, SG Technical Research and SG Equity Derivatives Research have been produced are such (for example because of reporting or remuneration structures or the physical location of the author of the material) that it is not appropriate to characterise it as independent investment research as referred to in European MIF directive and that it should be treated as a marketing material even if it contains a research recommendation (« recommandation d'investissement à caractère promotionnel »). However, it must be made clear that all publications issued by SG will be clear, fair, and not misleading.

Analyst Certification: Each author of this research report hereby certifies that (i) the views expressed in the research report accurately reflect his or her personal views about any and all of the subject securities or issuers and (ii) no part of his or her compensation was, is, or will be related, directly or indirectly, to the specific recommendations or views expressed in this report.

Notice to French Investors: This publication is issued in France by or through Société Générale ("SG") which is authorised by the CECEI and regulated by the AMF (Autorité des Marchés Financiers).

Notice to UK investors: This publication is issued in the United Kingdom by or through Société Générale ("SG") London Branch which is regulated by the Financial Services Authority ("FSA") for the conduct of its UK business.

Notice To US Investors: This report is intended only for major US institutional investors pursuant to SEC Rule 15a-6. Any US person wishing to discuss this report or effect transactions in any security discussed herein should do so with or through SG Americas Securities, LLC ("SGAS") 1221 Avenue of the Americas, New York, NY 10020. (212)-278-6000. THIS RESEARCH REPORT IS PRODUCED BY SOCIÉTÉ GÉNÉRALE AND NOT SGAS.

Notice to Japanese Investors: This report is distributed in Japan by Société Générale Securities (North Pacific) Ltd., Tokyo Branch, which is regulated by the Financial Services Agency of Japan. The products mentioned in this report may not be eligible for sale in Japan and they may not be suitable for all types of investors.

Notice to Australian Investors: Société Générale Australia Branch (ABN 71 092 516 286) (SG) takes responsibility for publishing this document. SG holds an AFSL no. 236651 issued under the Corporations Act 2001 (Cth) ("Act"). The information contained in this newsletter is only directed to recipients who are wholesale clients as defined under the Act.

IMPORTANT DISCLOSURES: Please refer to our website: <http://www.sgresearch.socgen.com>
<http://www.sgcib.com>. Copyright: The Société Générale Group 2009. All rights reserved.