



Green Buildings & Construction

Energy efficiency: the best begins at home

- **Cheapest, easiest fight vs. global warming begins at home** Globally buildings are responsible for 40% of primary energy use and have the largest potential of any sector for greater energy efficiency and CO2 reduction. Energy use could be reduced up to 80% using a range of conventional technologies like more efficient insulation and windows or heating, cooling and lighting systems. **Energy efficiency measures come at little or even a negative cost** given the payback on initial investment and ensuing reinvestment as well as the positive economic and employment growth impacts. However, long lifetimes, slow replacement and corporate and stakeholder reticence on initial investment are all important barriers and obstacles.
- **The global buildings sector is and is likely to continue to be hit hard by the recession** and 2009e and 2010e will be significant challenges for companies in the sector. **Reducing cost is thus key in the current economic crisis** – and building-related energy efficiency helps tackle a broad swathe of challenges including rising energy costs and fuel poverty, maintenance costs for business and ordinary households and long-term energy security.
- **Regulation should drive renovation market** Increasingly stringent regulations on buildings and energy efficiency, such as the 2009 recast of the EU's EPBD, should result in billions of new capital investments. **Stimulus spending should have a positive effect.** We have identified some €300-400 billion in global public spending for buildings and construction, the majority of which is efficiency-focused and which should bring forward a number of planned energy efficiency investments and prevent a worst case scenario in the sector, although uncertainties remain as to amounts and timing.
- **We believe that a number of companies should benefit** via their involvement in energy efficient activities such as distribution, energy services, fuel poverty, insulation, lighting, HVAC, micro-CHP, solar PV and windows, among others. Energy efficiency exposure should act as a short-term growth driver during the current market slump and should create significant growth opportunities for investors on a 3-5 year investment horizon.

SG Green Buildings watchlist

	SGEEs	Cur.	Reco	Price	Target 12m	P/E 09e (x)	EV/EBIT 09e (x)	Div. yld 08e (%)	Energy efficiency comments
CRH	10%	EUR	Sell	16.0	9.7	10.6	8.9	3.0	Confidant on stimulus, clay & US public exposure
EAGA*	100%	GBP	NR	143.75	NR	10.9	7.53	0	Leading provider of UK fuel poverty solutions
Imerys	10%	EUR	Sell	26.47	25.0	7.3	7.8	7.2	Resistance of roofing renovation mkt., clay roofing growth
Kingspan*	75%	EUR	NR	2.718	NR	9.47	8.65	1.62	Well-rounded energy efficiency offer
Nippon Sheet Glass*	<30%	JPY	NR	205	NR	NA	47.9	1.45	Strong line-up of eco-glass, solar PV mkt.
Owens Corning*	36%	USD	NR	7.2	NR	19.03	NA	3.13	Insulation& HVAC: stimulus exposure, composites (wind)
Rockwool*	100%	DK	NR	339.5	NR	17.09	9.41	2.96	#1 stone wool insulation: renovation beneficiary
Saint Gobain	30%	EUR	NR	21.335	NR	7.17	6.84	1.95	Energy efficiency is ~30% of sales & 40% op. income
SIG PLC*	33%	GBP	NR	117.25	NR	1.64	6	2.39	1/3 sales from public sector
Steico*	100%	EUR	NR	1.06	NR	NA	NA	2.25	Environmentally friendly insulation (wood-fibre)
Uralita*	75%	EUR	NR	4.29	NR	11.03	8.47	3.2	Insulation, plasterboard, roof tiles, solar panels
Wienerberger*	50%	EUR	NR	5.5	NR	3.22	10.79	4.43	#1 hollow bricks



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* Not covered by SG: no reco, no TP, consensus data from Datastream. ** SGE of approximate current sales exposure to energy efficiency theme

Contents

4	Green buildings, the best begins at home
5	Buildings are the #1 source of CO2 emissions!
5	Heating & cooling are the biggest culprits
5	Need to focus on existing buildings (in)efficiency
6	Energy efficient buildings mean \$ and energy savings
6	Energy consumption is set to continue to rise
8	Regulators are driving energy efficiency
8	Major recipient of stimulus spending
10	Prominent and ambitious regulatory framework in Europe
13	Cost and CO2 savings - the lowest hanging fruit
13	Effective thermal envelope is the key
14	Current cost-effective technologies can save the day
15	Quick payback
16	Insulation, the single most effective strategy
16	Insulation market
17	Cost concerns driving more stringent insulation regulation
17	Better insulation could save 1.6Bt of CO2/y
18	€130 a year in lower energy bills
19	Glass windows, the weakest link
19	Glass windows market
20	Improving energy performance of windows
21	Regulation driving the move to efficient windows
22	Energy efficiency savings of up to 11%
23	Companies that stand to benefit
27	Annex 1 - Green stimulus packages

Green buildings, the best begins at home

SG Green buildings watchlist

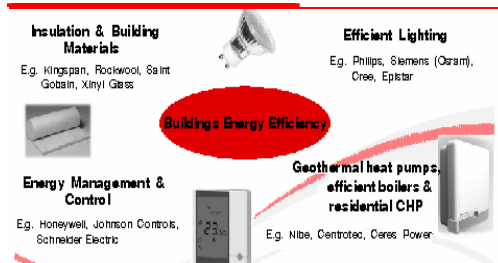
CRH
EAGA*
IMERYS
KINGSPAN*
NIPPON SHEET GLASS*
OWENS-CORNING*
ROCKWOOL*
SAINT-GOBAIN
SIG PLC*
STEICO*
SUPERGLASS PLC*
URALIA*
WIENERBERGER*

* Not covered by SG, no reco, no TP

Globally buildings are responsible for up to 40% of primary energy use in most countries and have the single largest potential of any sector for greater energy efficiency. Despite lacking the sexiness of renewables or hybrids, it goes without saying that the cheapest fight against global warming begins at home – as energy use in buildings could be reduced by up to 80% by using a range of existing, conventional technologies such as more efficient heating, cooling and lighting systems and insulation and windows. Such measures could reduce projected GHG emissions by 29% by 2030 (Source: IPCC) – at little or even negative cost given the payback on initial investment and ensuing reinvestment as well as the positive economic and employment growth impacts. However, long lifetimes and slow replacement rates mean that action is needed sooner rather than later.

While the global buildings sector is and is likely to continue to be hit hard by the recession through 2009, reducing building-related emissions is key in the current economic crisis to tackling a broad swathe of challenges including rising energy costs and fuel poverty, costs for business and ordinary households and long-term energy security. Moreover, we believe that stimulus spending will bring forward a number of energy efficiency projects and prevent a worst case scenario in the sector. In particular, we believe that a number of companies involved in energy efficient activities such as insulation, lighting, HVAC, micro-CHP, solar PV and windows, among others, are well-positioned to benefit from the green buildings theme in the long-term.

Energy efficiency measures for buildings



Source: SG Equity Research

Green buildings – companies that could benefit

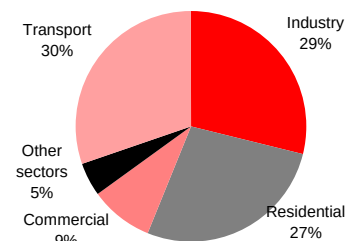
Theme		Impacted sub-sectors	Companies
Insulation	Glass wool	Building materials	Johns-Manville* (Berkshire Hathaway), Knauf*, Owens-Corning, Saint Gobain, Superglass, Uralita
	Stone wool	Building materials	Fibrex*, IIG (John Mansville*), Knauf*, Paroc*, Rockwool, Saint-Gobain
	Plastic foam	Building materials	BASF, CRH, Dow, Johns-Manville*, Kingspan, Metecno*, Owens-Corning, Recticel, Thyssen
Windows	Smart glass	Building materials	Asahi Glass, Deceuninck, Nippon Sheet Glass, Saint-Gobain, Superglass
Bricks	Clay bricks	Building materials, Minerals processing	Imerys, RDB, Wienerberger
Lighting	Efficient lighting	Electronic equipment, equipment, household electronics	Aixtron, Cree, Emcore, Epistar, GE, Nippon Sanso, Philips, Siemens (Osram Sylvania), Taiyo, Zumtobel
HVAC	Energy management & control (temperature, lighting, consumer monitoring)	Aerospace & defense, cyclical consumer goods, electrical equipment	ABB, Emerson, Honeywell, Ingersoll Rand (Trane), Johnson Controls, Lime Energy, Schneider Electric, Siemens, United Technologies (Carrier), Wavin
Next generation heating	Geothermal heat pumps, efficient boilers, micro/residential CHP	Technology	Centrotec, Ceres Power Holdings, Ceramic Fuel Cells Ltd, Nibe
Escos	Energy services, fuel poverty	Utilities	Ameresco*, APS Energy Services (Pinnacle West Capital Corporation), EAGA, Johnson Controls, Siemens
Smart meters	Smart meters / grid		See Green IT report
Distributors	Energy efficient building products	Construction, supplies & fixtures	BSS, SIG
Green buildings	High environmental standards, certification	Construction, property	Bouygues, Commonwealth Property Office Fund, Icade*, Klepierre, Mistubishi Estate, Sonae Sierra, Unibail-Rodamco, Vinci
Consumer Goods	Appliances, air conditioning	Appliances	Daikin, Electrolux, Emerson, Invensys, LG

Source: SG Equity Research, * Not listed

Buildings are the #1 source of CO2 emissions!

Contrary to common perception, it is not transportation or industry that is responsible for the highest levels of energy consumption and emissions, but buildings. Commercial and residential building stock accounts for up to 40% of global energy use. Moreover, energy consumption in the sector as well as associated CO2 emissions are set to rise by as much as 50% by 2030e. The fact that buildings have long lives means that acting on energy efficiency now for both new and existing building stock will have significant implications on energy use and CO2 emissions for the next 50-100 years. Positively, conventional and emerging technologies have the potential to significantly reduce building-related emissions and move us towards passive or zero-energy homes in as little as 10 to 15 years.

Energy use by sector



Source: IEA, SG Equity Research

CO2 profile of buildings

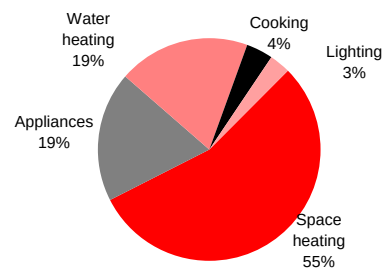
Energy consumption	CO2 emissions	Abatement opportunities	Implications
110 qBtu	8.2Gt	• 3.7GtCO2e of low-cost abatement by 2030e:	• 100% of abatement opportunities in the sector come at zero or negative cost
Residential: 76%	Residential: 63%	- 3.0Gt residential & 1.3Gt commercial	
Commercial: 24%	Commercial: 37%	- HVAC, windows & insulation: 2.3Gt	
BAU growth: +50% 2030e	BAU growth: +70% 2030e (14 Gt)	- Appliances & reducing standby losses: 1.1Gt	• All abatement measures maintain living standards at higher energy efficiency
	Developed world: 63%	- Lighting: 0.3Gt	
		• Additional potential of ~2Gt at <€40/tCO2 with more aggressive standards & programs	

Source: Vattenfall, SG Equity Research

Heating & cooling are the biggest culprits

The largest source of energy consumption is energy used for heating and cooling buildings, which accounts for two-thirds of of energy use in buildings. The energy use figure rises to 80-85% if other operational phase uses such as lighting, water heating and running appliances are also taken into account. The residential sub-sector accounts for well over two-thirds of energy use with 80% of energy consumption used in small buildings (< 1000 m2). In terms of who is using all of this energy, the biggest consumers (per capita) are developed countries with the US #1 followed by Australia and Canada.

Average household energy consumption (use)



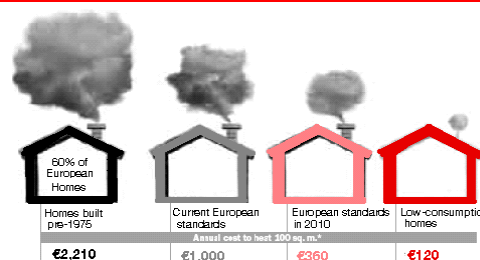
Source: IEA, SG Equity Research

Need to focus on existing buildings (in)efficiency

Due to better technology newer buildings are more energy efficient than they were 30 years ago. The greatest challenge lies in modernising existing buildings of varying levels of (in)efficiency to bring them up to code and stop wasting energy via outdated building components and systems.

Existing buildings account for 99% of the global building stock – with many of these buildings having been constructed before global warming became an issue. An estimated 75% of energy efficiency savings potential lies with buildings constructed before 1975 (Source: Ecofys). Within the EU there are roughly 150m dwellings – of these 32% were built before 1945, 40% between 1945 and 1973-5, and the remaining 28% built since then. Many of the older buildings were built to much less stringent energy efficiency criteria than present day building codes require. With new buildings representing on average 1% of the building stock, and a renovation cycle for existing buildings being 25-50 years, there is no time to lose in implementing more stringent building regulations for both new and existing buildings of all dimensions.

Annual costs to heat 100 sq m. home*: home built pre-1975 to low consumption home



Source: Saint-Gobain, SG Equity Research. * Based on oil at \$90.

Energy efficient buildings mean \$ and energy savings

For many home and business owners the investment required to improve energy efficiency can be daunting. However, countless studies reiterate that measures taken to improve energy efficiency in buildings more than pay for themselves over time. In Europe for instance, every citizen could gain more than €500 per year once all existing buildings have undergone modernisation to meet energy efficiency standards for insulation, windows and other modern technologies (Source: Ecofys). This is spurring governments to offer tax breaks, subsidies and other incentives for green building and retrofits.

Energy saving opportunities in residential & commercial building sectors have negative costs

Description		Residential		Commercial	
		Abatement potential (GtCCO2e)	Abatement cost (€/tCO2e)	Abatement potential (GtCCO2e)	Abatement cost (€/tCO2e)
Lighting	Low energy bulbs, fixtures, timers, LFLs	0.2	-89	0.1	-61
Appliances	Increased unit efficiency	0.6	-49	0.3	-30
Water heating	More efficient systems	0.4	-35	0.1	-104
A/C	More efficient systems	0.1	-48	0.2	-83
Heating & ventilation	Better insulation & improved heating/ventilation	1.2	-129	0.5	-123

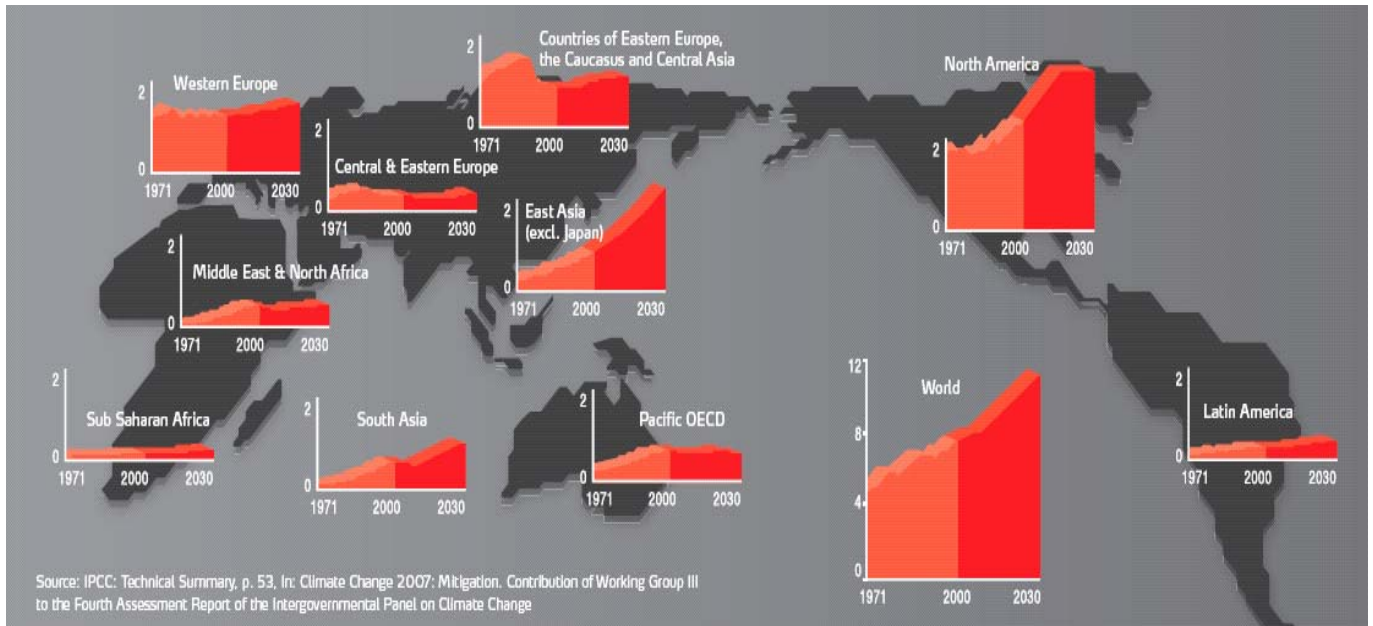
Source: Vattenfall, EPA, SG Equity Research

Energy consumption is set to continue to rise

Buildings' energy consumption has increased steadily since the 1960s – including +29% from 1990-2004 (Source: IEA) – and looks set to continue to increase because of a range of factors:

- Ageing housing stock in developed and developing countries
- Increasing average home size: +17% from 1990-2004 (Source: IEA)
- Additional lighting, heating, cooling, household appliances = increasing consumption
- Rising middle classes in developing countries
- Urbanisation: an additional 4bn people living in urban areas by 2050
- 2bn sq m of new construction p.a. in China to 2020 (will double): 7% annual growth

CO2 emissions (Gt) from buildings incl. emissions from the use of electricity: 1971, 2000, 2030e



Source: IPCC, SG Equity Research

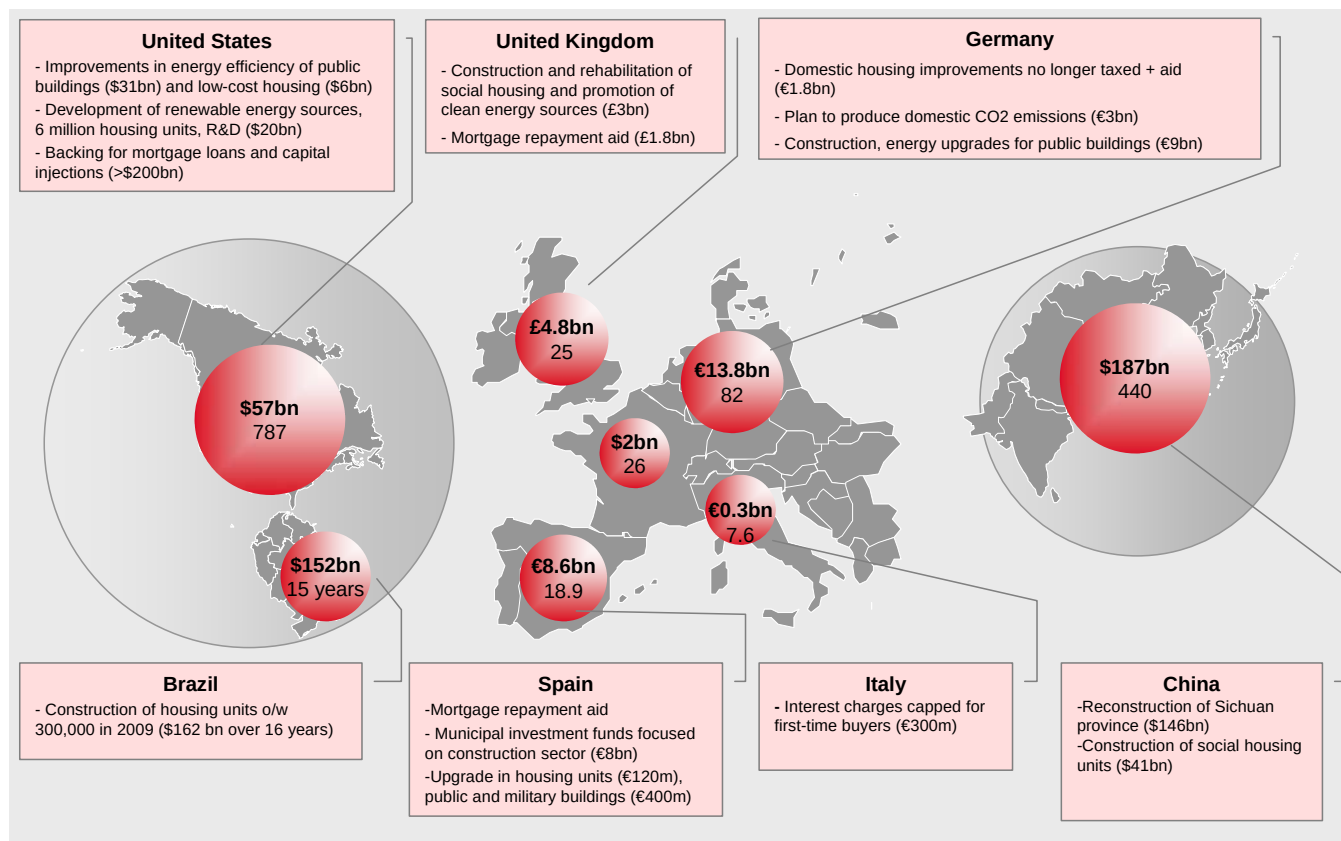
Regulators are driving energy efficiency

The building and construction sector employs over 110 million people worldwide – between 5-10% of the total workforce in many countries – and the downturn in construction markets is thus a major source of concern for regulators. Positively, as a part of the “Green New Deal”, many governments around the world are firming their commitment to reducing buildings’ energy consumption by stepping up existing building energy codes or creating new ones where none existed before.

Major recipient of stimulus spending

Buildings (including energy efficiency measures) are one of the biggest recipients of public stimulus funding. This funding could play a major role in reviving the sector, although we do not believe that it will reverse the slowdown in construction activity. It is important to note that stimulus spending is accelerating and moving forward investment in energy efficiency projects that would otherwise have been undertaken at a later date.

Construction stimulus packages: increased regulation on renovation & energy efficiency



Source: Saint-Gobain 2009, SG Equity Research

Focus on France, €2.5bn should prevent a worst case scenario for the sector

President Nicolas Sarkozy announced on 4 December 2008 a series of special measures to support the French construction sector in 2009 and 2010. Four major measures have been implemented to underpin new residential construction owing to the downturn in the property market, which the financial crisis has accelerated: a two-year programme to build 100,000

housing units, accelerating suburban renovation, doubling the interest free loan (PTZ) for the purchase of a new home in 2009, and an additional one-off for the purchase of single family homes (pass foncier). The government has also adopted a number of home renovation measures.

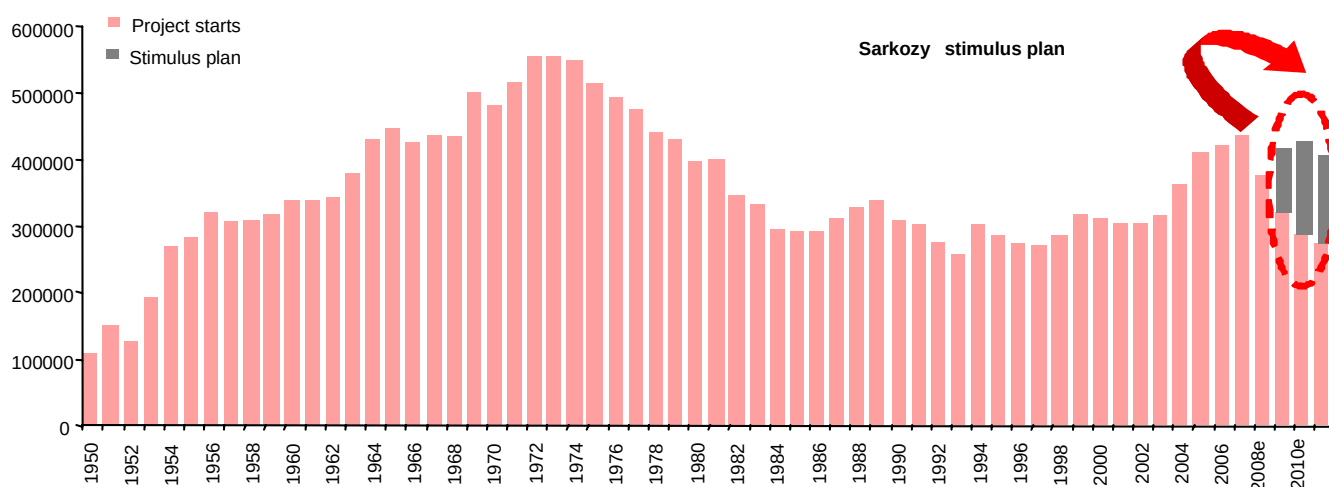
Up to €2.5bn of the €4bn exceptional French government rescue plan should underpin construction work

Activity	€bn	
Infrastructure and equipment	1.4	
o.w. roads	0.4	Maintenance and accelerating construction of roads planned
o.w. environment summit (Grenelle) infrastructure	0.5	Rail renovation, river and port maintenance, accelerating construction of new high-speed lines
o.w. daycare centres, retirement homes, hospitals	0.2	Accelerating construction in 2009
o.w. overseas territories	0.2	Exceptional investment fund for overseas territories
Government-owned buildings	0.6	
o.w. state buildings	0.2	Energy-efficiency renovation and government building maintenance, adapting buildings for handicapped people
o.w. historical buildings	0.1	Renovation of historical buildings
Research and higher education	0.7	Research and construction of universities
o.w. university buildings	0.2	Upgrading buildings to security and accessibility standards
o.w. Jussieu campus and student housing	0.3	Advancing on huge Jussieu project and construction of new student housing
o.w. Campus plan	0.1	Completing studies needed to accelerate the Campus plan as quickly as possible
Total potential construction work (SGe)	2.5	
Defence and security equipment	1.4	Accelerating the equipment programmes
Total	4.0	

Source: French economic stimulus plan, SG Equity Research estimates

The stimulus plan to be implemented by the government should in our view prevent a **construction industry collapse** in France and its potential fallout. It could stimulate 100,000 additional housing starts in 2009e and 50,000 in 2010e. We believe that the stimulus plan could reduce the overall decline in the construction sector by 1.9% in 2009 and by more than 6% in 2010. This should raise estimates for companies operating in the sector – with Vicat at the top of the pile, followed in order by Ciments Français, Saint-Gobain, Imerys and Lafarge.

Housing starts in France since 1950 and estimates for 2008 to 2011



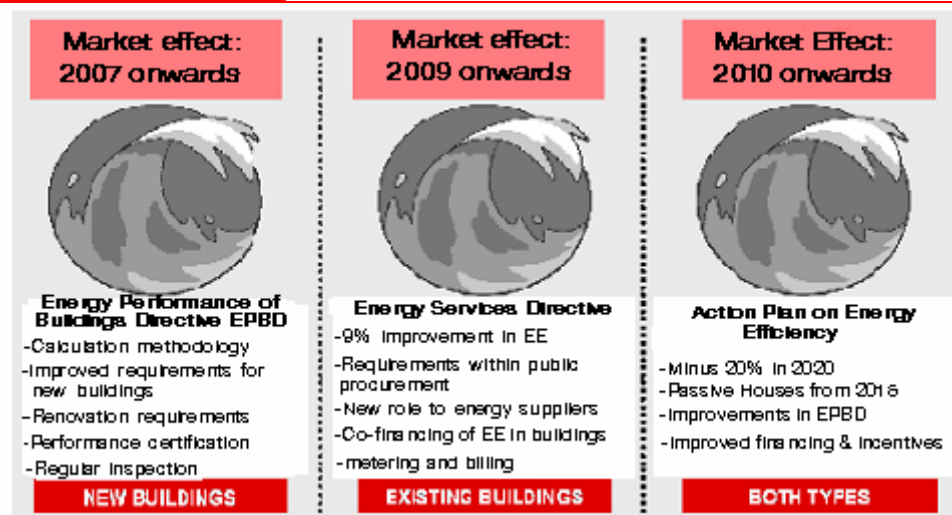
Source: Siclone/Sitadel historical data; Ministry for Ecology, Energy, Sustainable Development and Town & Country Planning (regional development), SG Equity Research estimates

Prominent and ambitious regulatory framework in Europe

The combination of the Energy Performance Building Directive, the Energy Services Directive, and the Action Plan on Energy Efficiency, provide EU member states with the world's most prominent and ambitious framework for energy efficient buildings – with a goal that member countries reduce energy use by 20% by 2020. The EPBD, in particular applies minimum requirements for:

- **All newbuilds >50m²** concerning average insulation levels, maximum U-values for windows as well as roofs, walls, and ceilings, maximum interior temperature and maximum levels of energy consumption per square meter.
- **Renovation of all existing buildings >1000m²** including the installation of new, greener, components and appliances such as systems for lighting, heating, cooling, energy production, insulation, ventilation, and glazing of walls and windows among other items.

Market effects of EU energy efficiency regulations for buildings



Source: Rockwool, SG Equity Research

It is estimated that full implementation of the EPBD could reduce EU building energy use by 28% and total EU energy use by 11%. However, we will need to see further progress when the Directive is revamped later in 2009, notably:

- Remove the current 1000 m² threshold for major renovations
- Enlarge the scope to include single-family houses and small apartments
- Establish minimum performance requirements for buildings and components
- Upgrade energy performance to investment-grade energy audit level
- Higher and more uniform qualifications and better training for building certifiers
- Consistent EU strategy for very low-energy or zero-net energy standards
- Timeframe and target for improving energy performance of existing buildings
- Transparent compliance mechanisms

A 2009 revamp in EPBD could remove the current 1000m² threshold for major renovations which would result in up to €8 billion in new capital investments, according to the Commission.

Overview of Building Energy Efficiency Improvement Targets

Country	EPBD Targets	EPBD New Buildings	EPBD Existing Buildings	Other plans/strategies	Passive / low energy houses
Belgium	18%				
Denmark	25-30%			+25-30% by 2010-11	-75% (2020)
Finland	30-40%			+20% by 2013	Low energy buildings (2015)
France	15%	15% by 2010 (compared to 2005)	For renovation >1,000 sq.m & >25% of building value, min. energy efficiency standards	+20% in 2010; Effinergie low-energy standard from 2012; double # of old buildings renovated/year starting w/ 800,000 public housing units; all public buildings to be renovated by 2015 (12% of existing building stock)	Energy positive buildings (2020)
Germany	0%	Max. primary energy demand, max. average U-value	Min. standards when renovation >20% of building elements in question	+30% in 2009; +30% in 2012; KfW-CO2-Gebäudesanierungsprogramm: refurbish 5% of pre-1978 housing stock p.a.	Buildings to operate without fossil fuels (2020)
Hungary	30%				0-emission buildings (2020)
Ireland		Limit heat loss via building fabric; limit CO2 emissions; controls for space heating & hot water systems, insulation of hot water storage vessels, pipes & ducts	Min. performance for building components used for renovation		Zero net CO2 buildings (2013)
Italy	15-20%	Annual energy consumption Installation of temperature control systems Predisposition for solar thermal and photovoltaic systems			
Netherlands	20% residential	Energy Performance Coefficient = 0.8 (down from 1.0 by 2006)		Residential: +25% in 2011 & +25% in 2015; non-residential; +15-20% in 2008; Voluntary "Schoon en Zuinig" aims for 30% energy savings in c.300,000 buildings per year.	Energy neutral buildings (2020)
Norway	20-25%				Passive house (2020)
Spain	20%	Max. U-values for components, solar for windows & skylights min. performance for thermal & lighting installations, min. natural light, min. solar & PV contribution	Same as new building if renovation area >1,000sq.m and >25% of the building shell		
Sweden	30% (when direct electric heating used)			Swedish million programme: 60% of 1940-60 housing stock renovated in next 10 years.	Na
UK	20% residential, 27% non-residential	Code for Sustainable Homes became mandatory in 2008: rating process for new homes to measure performance	Min. efficiency standards; further improvement when area >1,000 sq.m if technically & economically feasible	+25% 2010, +44% 2013 (vs. 2006); energy savings targets to be set in 2011 (x2 target, preference for insulation)	0-CO2 (heating, lighting, DHW & all appliances) (2016)

Source: Rockwool, EuroAce, SG Equity Research

Alarming lack of stringent standards in North America

Energy-efficiency standards in North America are quite low and there is a huge need there for improvement. In the US, efforts have been led by non-profit-making organisations such as the Green Building Initiative in cooperation with the EPA or the Department of Energy offering guidelines and benchmarks for greener buildings and appliances i.e. Energy Star, LEED (Leadership in Energy and Environmental Design) and the ICC International Code Council). But there is significant progress to be made with US Department of State Energy Efficiency and Renewable Energy reporting in January 2009 that there are still 11 states with no statewide

residential energy code, and an additional four states with codes older or less stringent than 1998 standards. They also reported nine states with no statewide energy code for commercial buildings and another three with outdated commercial energy codes. This is alarming as the US continues to lead the world in CO2 emissions from buildings and where close to 80% of the existing building stock is reportedly under-insulated.

Voluntary standards

Voluntary standards are also playing an increasingly important role in promoting energy efficiency. For instance, 21 countries have established one of more green building certification standards including: the UK (BREEAM), Japan (CASBEE), Australia and New Zealand (Green Star), Canada, India and the US (LEED), Australia, Germany and the UK (Passivhaus), Switzerland (Minergie) and France (Haute Qualité Environnementale). We are also seeing a move in Europe to consumer appliance-like energy efficiency labels and ratings for buildings (e.g. Germany, Ireland and the UK) as a means of providing buyers with information about a building's efficiency rates.

Ireland: energy cost based on energy ratings (250m2 bungalow, Dormer and two-storey house)

BER	Energy cost per m2 (approx.)	Energy cost saving (approx vs. C1)	CO2 emissions (kg/m2/yr)
A1	€2.00	80%	0
A2	€3.00	70%	9
A3	€5.00	50%	16
B1	€6.50	35%	20
B2	€7.50	25%	28
B3	€8.00	20%	31
C1	€10.00	NA	35

Source: Kingspan, SG Equity Research

Long-term vision of zero net energy buildings

Regulators long-term vision is a world in which buildings consume zero net energy. It is ambitious, but ambition is necessary to achieve the progress needed to address climate change and energy use. The UK government, for instance, anticipates dramatic energy reductions to achieve its goal that all new homes in England will be carbon neutral by 2016.

CO2 reduction potential for buildings in 2020e

Country groups	Countries / country groups reviewed	Measures covering the largest potential	Measures providing the cheapest mitigation options
Developed countries	Australia, Canada, EU-15, Japan, South Korea, UK, USA	1. Shell retrofit, inc. insulation, esp. windows and walls; 2. Space heating systems and standards; 3. Efficient lights, esp. shift to CFLs and efficient ballasts	1. Appliances such as efficient TVs and peripheries (both on-mode and standby), refrigerators and freezers, followed by ventilators and AC; 2. Water heating equipment; 3. Lighting best practices.
Economies in Transition	Croatia, Hungary, Poland, Russia & as a group (Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia)	1. Pre- and post- insulation and replacement of building components, esp. windows; 2. Efficient lighting, esp. shift to CFLs; 3. Efficient appliances such as refrigerators and water heaters.	1. Efficient lighting and its controls; 2. Water and space heating control systems; 3. Retrofit and replacement of building components, esp. windows.
Developing countries	Argentina, Brazil, China, Ecuador, India, Indonesia, Myanmar, Thailand, Pakistan, South Africa	1. Efficient lights, esp. shift to CFLs, light retrofit, and kerosene lamps; 2. Various types of improved cook stoves, esp. biomass stoves, followed by LPG & kerosene stoves; 3. Efficient appliances such as air-conditioners and refrigerators.	1. Improved lights, esp. shift to CFLs light retrofit and efficient kerosene lamps; 2. Various types of improved cook stoves, esp. biomass based, followed by kerosene stoves; 3. Efficient electric appliances such as refrigerators and air-conditioners.

Source: IPCC, SG Equity Research

Cost and CO2 savings - the lowest hanging fruit

The massive amount of energy used - and wasted - by buildings around the world does have an upside – it is the easiest and cheapest road to energy efficiency. Simple improvements in windows, insulation, lighting and appliances can contribute significantly to meeting global emissions targets. And in making these improvements thousands of jobs will be created in research and development of new energy efficient building components, product manufacturing, and in the construction sector. Increasing energy efficiency in buildings will create multiple benefits for the environment and the economy, not to mention energy and political security, making it a win-win-win approach.

Annual CO2 savings in Europe from building-related energy efficiency improvements: 2007-10e

Improvement measure	Sector of application	Annual savings 2007-10 MtCO2
Thermal insulation	Residential	98-120
	Commercial / public	20
	Industrial	56
Glazing standards	Residential	94
	Commercial / public / industrial	25
Lighting	All	50
Controls	Commercial / public	67
	Industrial	20
TOTAL	All	430-452

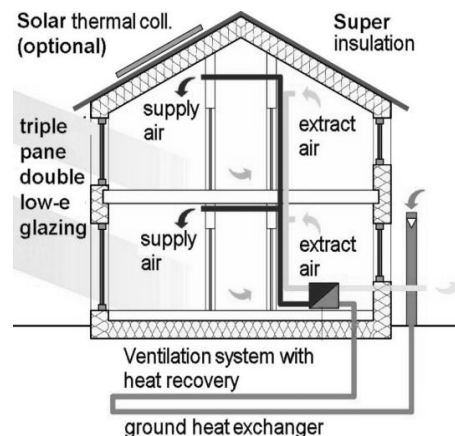
Source: EuroAce, SG Equity Research

Effective thermal envelope is the key

The key to energy efficiency in buildings is creating and maintaining an effective thermal envelope, which is a term used to describe the shell of a building acting as a barrier against heat transfer between the interior and exterior environments. A solid, reinforced thermal envelope can prevent the loss of heat from a building in a cold climate or inversely reduce heat infiltration from the external environment in a warm climate, considerably reducing the amount of energy needed to maintain comfortable internal conditions for the building's inhabitants. The effectiveness of the thermal envelope is dependent on the performance of its individual components including insulation

properties of walls, ceilings and floors as well as the thermal properties and air-tightness of windows and doors. Improvements in the thermal envelope can reduce heating requirements by 2-4x compared to standard practice, at a few percent of the total cost of residential buildings, and at little to no net incremental cost in commercial buildings when downsizing of heating and cooling systems is accounted for.

Creating an effective thermal envelope



Source: IEA

Energy efficiency details for a gas heated house: no insulation vs. full insulation

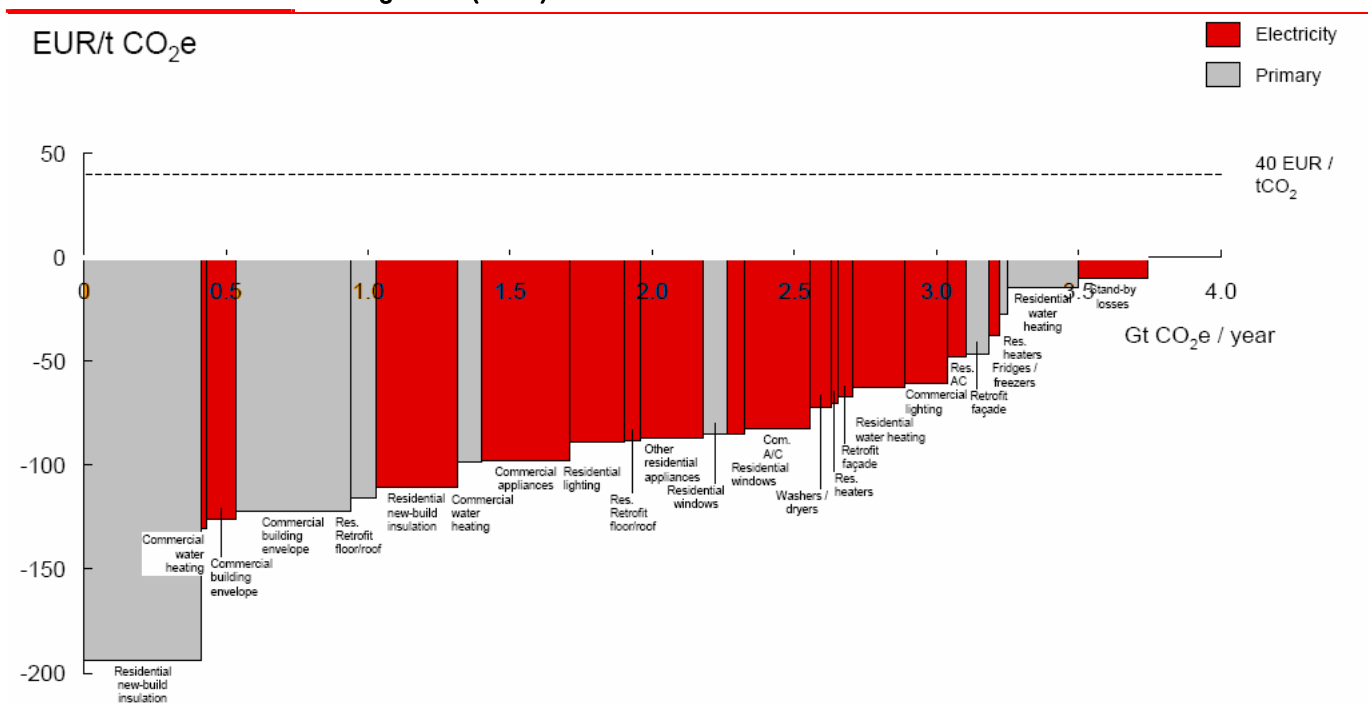
		Non-insulated house*	Fully insulated house°	
Heat loss	KwG/m2	2,269	0.426	
Primary energy consumption	kWh	69,924	12515	
End energy consumption all users (per sq/m)	Kw	518	87	
End energy consumption heating (per sq/m)	H/m2	467	56	
Heating costs	KwH/m2	100	12	
Environment indicator for heating	Cost index	95.7	11.4	
	Kg of CO2/m2			

Source: Source: Saint-Gobain, SG Equity Research. * = no insulation, single glazed windows; ° = Wall insulation (R-3.15) with 1400mm thickness, attic insulation = 5.5, floor insulation = 4cm thick under a floating screed and 4cm peripheral insulation under concrete on the foundation, 4/15/4 low emission double-glazed windows..

Current cost-effective technologies can save the day

Currently available, cost-effective technologies such as energy efficient insulation and windows could significantly reduce the energy consumption for residential and commercial buildings – but neither Europe nor the US is making adequate use of these measures. Employing current and emerging cost-effective energy efficiency measures in new and existing buildings would lower growth in energy demand by the building sector from the projected 0-30% to close to zero between now and 2030. Along with emerging technologies, widespread construction of cost-effective passive/zero-energy homes could be achieved within ten years – with widespread penetration possible in 15-25 years.

CO2 abatement cost for the building sector (2030e)



Source: Vattenfall, SG Equity Research

Quick payback

Despite an increasing knowledge and understanding of the need for carbon reduction through greener buildings, one obstacle to the widespread adoption of energy efficiency measures is its perceived cost. A recent survey found that the average guess for the additional cost of building green was 17% in new construction, while in reality it was as low as 2-10% (Source: WBCSD). In many cases improvements in building envelopes actually achieve cost savings for the owner – payback – in the short term. Following the initial payback period – costs become a negative cost as savings over time are greater than the initial investment.

Cost Effectiveness and Energy Savings from Investments in Energy Efficiency

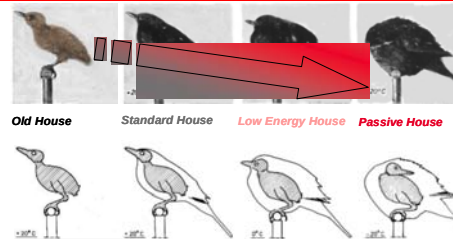
Climate type (EU 15)	Building component	U-value before (W/m ² °C)	U-value after (W/m ² °C)	Energy saved [kWh/m ² a]	Annual investment cost [€/m ²]	Cost of conserved energy [cent/kWh]	Simple payback time (years)
Warm Climate*	Walls	2.37	0.46	66.6 / 35.7%	1.32	2.0	2.8
	Roof	3.00	0.39	22.5 / 12.1%	0.17	0.8	1.1
	Floor	2.93	0.47	21.3 / 11.4%	0.18	0.9	1.2
	Windows	4.56	2.64	22.2 / 11.9%	0.93	4.2	5.8
	Package	2.93	1.85	132.6 / 71.0%	2.61	2.0	2.7
Moderate Climate**	Walls	1.61	0.46	77.7 / 32.7%	1.70	2.2	4.3
	Roof	1.46	0.27	17.2 / 7.3%	0.26	1.5	3.0
	Floor	1.79	0.21	18.4 / 7.8%	0.18	1.0	2.0
	Windows	3.38	1.77	39.2 / 16.5%	1.56	4.0	7.8
	Package	1.97	0.71	152.6 / 64.2%	3.70	2.4	4.8
Cold Climate***	Walls	0.91	0.27	62.7 / 27.7%	1.33	2.1	5.1
	Roof	1.66	0.22	31.0 / 13.7%	0.31	1.0	2.4
	Floor	0.89	0.29	12.9 / 5.7%	0.31	2.4	5.8
	Windows	2.87	1.41	41.6 / 18.4%	1.87	4.5	10.9
	Package	1.33	0.46	148.3 / 65.5%	3.82	2.6	6.2

Source: IEA, SG Equity Research. *Broadly representative of France, Greece, Italy, Portugal and Spain; **Broadly representative of Belgium, Ireland, Luxembourg, the Netherlands and the United Kingdom; ***Broadly representative of Austria, Denmark, Finland, Germany and Sweden.

Insulation, the single most effective strategy

Insulation measures for new and existing buildings offer the single most effective and simplest energy efficiency strategy. When properly installed insulation effectively keeps the cold out of buildings in the winter and prevents heat from entering during warmer weather, thus reducing the need for both space heating and air conditioning. Insulation in existing homes saves 48% of the energy that otherwise would have been consumed while insulation in existing commercial buildings saves at least 30% of total commercial energy consumption. The need for insulation is immense both in developed markets such as the US where it is estimated that 80% of houses are under-insulated and only 1% of the re-insulation market is being captured (Source: Owens-Corning) – as well as in developing markets such as China and India where building stock is growing fast. In the long run, installing more efficient building insulation should be cheaper than changing to low-energy light bulbs or more fuel efficient cars and far cheaper than nuclear, wind or solar power.

Comparative effect of insulation levels

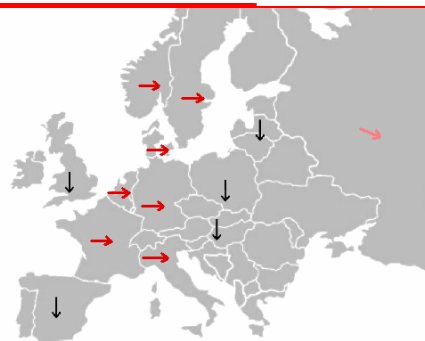


Source: Saint-Gobain, SG Equity Research

Insulation market

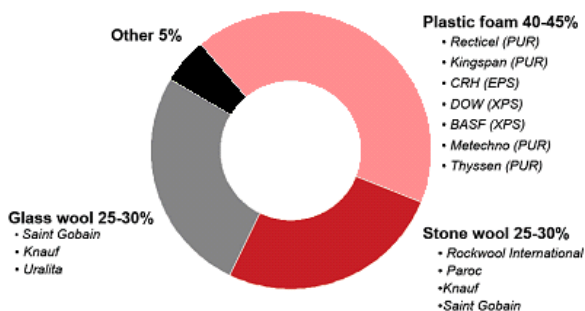
The financial crisis is having a major negative impact on business confidence and construction activities and as a result, on the insulation market. The insulation market is worth an estimated \$10 billion annually in Europe and \$45 billion in North America (Source: Rockwool). Thermal insulation materials – comprising glass wool, stone wool and renewable resource materials – should continue to see long-term growth in demand in buildings and industrial applications because of their strong thermal insulation qualities and the fact they also provide heat resistance, acoustic insulation and fire protection. Short-term, we expect the renovation market to be the market segment that sees most activity when it comes to energy efficiency measures, and the best performer in the insulation market.

European insulation market trends for 2009



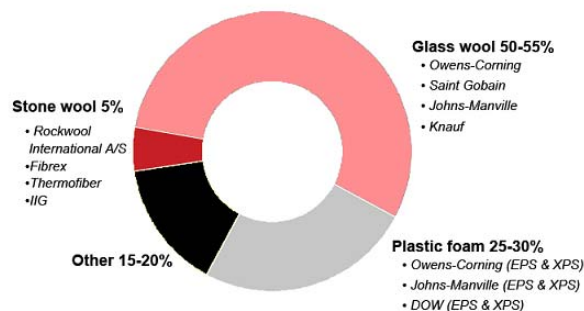
Source: Rockwool, SG Equity Research

European insulation market



Source: Rockwool, SG Equity Research. Market data at March 2008.

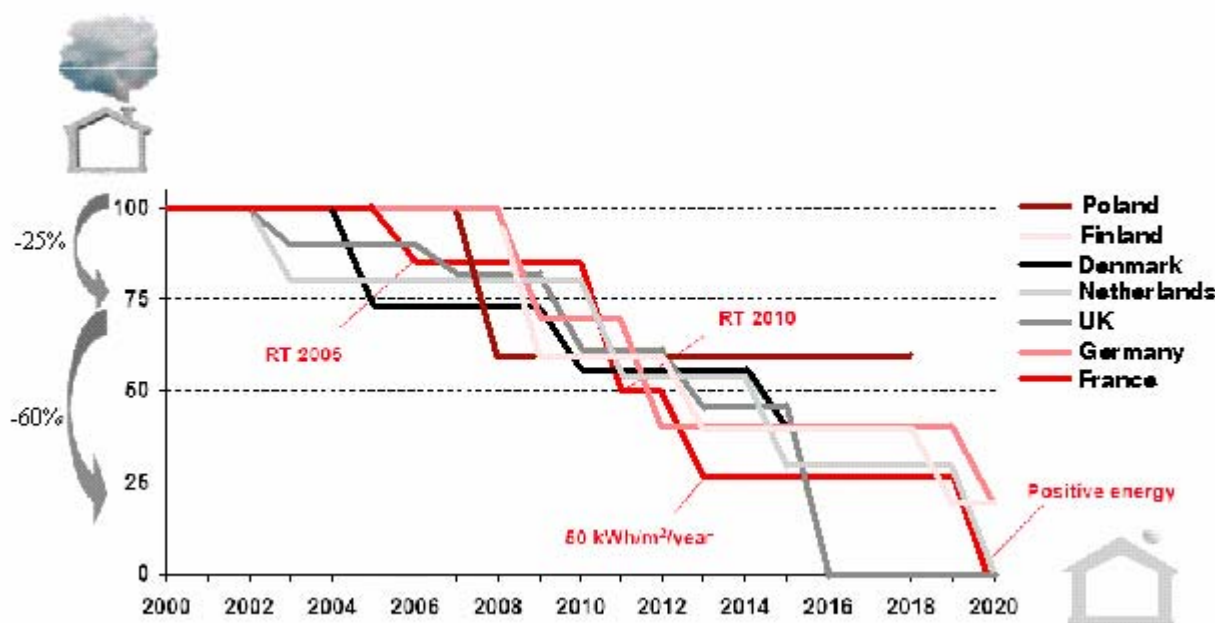
North American insulation market



Cost concerns driving more stringent insulation regulation

Regulation has played a pivotal role in the drive for better insulation – and the triple goal of cutting energy costs and emissions. Despite the recession, we anticipate that cost cutting will continue to drive the market, notably by pushing the regulators to pass more stringent u-Value standards. In Europe, the EPBD dictates minimum requirements for new buildings concerning average insulation levels, minimum U-values for roofs, walls, and ceilings, maximum interior temperature and maximum levels of energy consumption per square meter. We anticipate that the 2009 revamping of the EPBD should be relatively ambitious on insulation and we are also seeing positive developments in the US, with the passage of a tax credit bill in late 2008, whereby all home improvements for increased energy efficiency – including insulation and windows – from 1 January 2009 will qualify homeowners for tax credits.

Relative trends in thermal regulations: 2000-2020 (basis of 100 in 2000)



Source: Saint-Gobain, SG Equity Research

Better insulation could save 1.6Bt of CO2/y

Better insulation in new and existing buildings could result in savings of 185Mt CO2/y in Europe alone – the equivalent of a 20% reduction in heating energy use and approximately 5% of total EU CO2 emissions (Source: Euroace). The addition of thermal insulation to existing buildings in Europe could decrease current building energy costs and CO2 by some 42% and 350Mt respectively. Simple measures such as roof and wall insulation have the potential to:

- Reduce emissions by 460Mt/y or more than Europe's total Kyoto commitment;
- Reduce energy use by 3.3 million barrels of oil a day;
- Save Europe €270 billion a year in energy costs (Source: EURIMA).

Globally, it is estimated that improved insulation could save 1.6 billion tons of GHG a year, which is more than the industrial emissions of Japan (Source: ISovery).

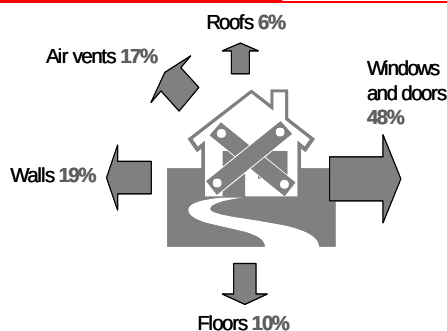
€130 a year in lower energy bills

Study after study has shown that insulation saves money and that building insulation is the single most profitable measure to fight global warming. The initial cost of installing insulation will be recovered via savings on heating and air-conditioning bills which will surpass the price paid for the insulation itself. Installing enough insulation to avert one ton of CO₂ emissions from a house also more than paid for itself by saving €130 (\$167.3) a year in lower energy bills. The North American Insulation Manufacturer's Association (NAIMA) estimates that the energy savings to energy investment ratio of mineral wool insulation is 12:1 after the first year alone. We also need to remember that these energy savings continue throughout the lifetime of the building without any further energy input.

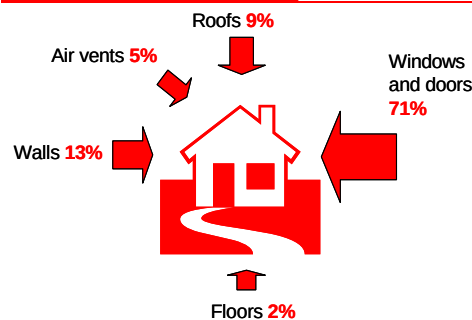
Glass windows, the weakest link

Despite comprising a relatively limited surface area, windows are a building's weakest link – offering less resistance to heat flows than ceilings, walls or floors. Windows are the area of greatest heat loss and gain and air leakage – accounting for up to 70% of the warmth that penetrates a residential building in summer and for close to 50% of the heat that escapes in winter. Energy loss via windows accounts for approximately 11% of total losses of energy in buildings, typically because of the type of glass used in their construction. Thus despite improvements in heating and cooling systems in recent years, related energy efficiency gains are largely irrelevant if a building is not equipped with energy efficient windows which incorporate multiple glazing layers, low-conductivity gases between glazing layers, low-emissivity coatings, and the use of low conductivity framing materials.

Windows' role in heat escape in winter



Windows' role in heat penetration in summer



Source: NSG Group, SG Equity Research

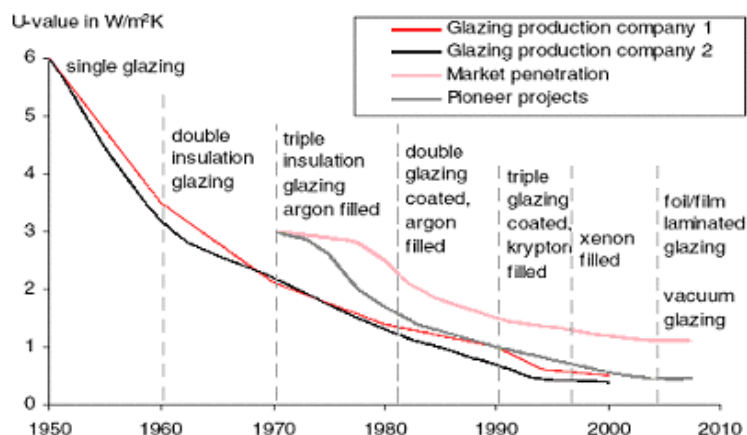
Glass windows market

The global market for flat glass in 2007 was approximately 50 million tons, which represents an annual value of around €21 billion for manufacturers. Of the total volume, around 70% is used to manufacture windows for buildings, 10% in glazing products for automotive applications and 20% used in furniture and other interior applications. Europe, China and North America together account for over 70% of global demand for glass. Europe is the most mature glass market and has the highest proportion of value-added products. Just four companies; NSG Group, Saint-Gobain, Asahi and Guardian, produce over 60% of the world's high quality float glass. Although windows have been hit by the recession, over the long term the market is growing in volume at around 3% per year – with demand growth focused on value added products and driven by economic growth but also by legislation and regulations concerning safety, noise attenuation and the realization of the growing need for energy conservation.

Improving energy performance of windows

The energy performance of a window is measured by its ability to resist heat flow or transfer (via conduction, convection or emissions - known as its insulating value (U-value)). The higher the U-value the poorer the energy efficiency of the window, as more heat will flow through it and vice versa.

Evolution of U-values for window glazing: 1950-2010e (in W/m²K)



Source: CERE, ETH Zurich, SG Equity Research

There are several methods to improve the efficiency of windows, including increasing the layers of glazing to double- or triple- glazing, coating the glass with special metals, or filling the space between glass plates with an inert gas or a vacuum to reduce heat transfer.

Overview of energy efficiency of windows

Glazing	U-values (W/M ² K)* Windows	U-values (W/M ² K)* Windows w/ frame	Description	Energy efficiency comments
Single	5.8	3.0 - 4.0	Glazing made out of one single pane of flat glass	While it allows the greatest light transmission, it has the highest level of heat loss in winter and heat gain in summer. Single glazing is no longer common for newbuilds although it can frequently be found in older buildings which continue to face the issue of inefficient heat penetration and loss.
Double	3.2	2.8	Glass unit consisting of a combination of 2 glass panes	The extra layer of glass as well as the layer of air between the two panes helps curb heat transfer to half that of single glazing, but it is still high. Thermal performance can also be further improved by filling the space between panes with argon, krypton or xenon gas which have lower heat conductivity, by adding a third plane (triple glazing: U-Values of up to 2.5 W/m ² K) or by using thermally improved edge spacers
Double Low-E	1.1	1.5 - 1.7	Glass with one pane having a special metallic or metal oxide coating (low-emissivity or low-E)	Allows high levels of light transmission while blocking or lowering heat transfer even further than double glazing. The further use of argon or krypton gas or low-E triple glazing offers U-values of as low as 0.7 W/m ² K – 1/8th the value of single glazing
Triple	2.5	2.2	Glass unit consisting of a combination of 3 glass panes	
Triple Low-E	0.7	1.0 - 1.2		
Vacuum glass	0.4		Layer of dry air between the 2/3 panes of Low-E glazing is replaced by a vacuum	The vacuum works better than a simple layer of dry air in curbing conductive and convection-related heat transfer.

Source: SG Equity Research. * U Value describes how much thermal energy, expressed in watts (W) is conducted through 1 square metre (M²) at a temperature difference of 1 Kelvin (K – K is equal to 1 deg C. So, W/(m²K).

A new generation of sophisticated, "smart windows" – most of which are at an R&D stage vis-à-vis residential and commercial buildings – hold the promise of significantly reducing energy demand and cutting air conditioning and heating loads in the future:

■ **Solar control windows:** allow sunlight to pass through a window while radiating and reflecting away a large degree of the sun's heat. The glass incorporates invisible layers of special materials which have the dual effect of allowing sunlight in, while repelling solar heat. Extensive use of solar control glass could account for 5%-25% of the building-efficiency goals already set by European policy-makers for 2020 (Source: Glass for Europe).

■ **Electrochromic Windows** use electricity to change between clear and colored transparent states as required (e.g. clear to fully darkened and every tint in between). Such windows could achieve savings of up to 60 percent in combined lighting and cooling costs, with more or less equivalent savings in greenhouse gas emissions.

Regulation driving the move to efficient windows

As with insulation, the primary driver for increased demand for more advanced, energy efficient windows is the increase in regulations for energy efficiency in buildings that require manufacturers and builders to uphold certain standards in production and construction – and require consumers to purchase products of a certain predefined standard. Another key driver has been rising energy prices in that consumers are more willing to invest in more advanced building materials, such as energy efficient windows, if it will save them money on heating and cooling bills in the long run. In the EU, once again the EPBD has led the way in member states tightening regulations on energy efficiency standards specific to windows.

Overview of energy efficiency standards for windows by country

Member state	# dwellings (m)	Window area/dwelling (m2)	Single glazing	Double glazing	Low-e double glazing	Years to full replacement	New build standard practice for glazing	Energy efficiency measures for windows
(Windows area: Million m2)								
Austria	3.60	20.0	-	26.00	46.00		Low-E double w/ argon	
Belgium	3.90	23.0	41.10	43.50	4.40	20	Double	
Denmark	2.60	13.3	0.13	29.13	5.30		Low-E double	Energy labeling
Finland	2.40	10.0	-	9.00	15.00		Low-E double	Energy labeling
France	27.50	14.2	170.40	213.00	7.10	32	Low-e triple w/ argon	
Germany	35.60	21.6	207.40	429.80	130.70	20	Low-E double w/ argon	Insulated glass mandatory in certain buildings
Greece	3.00	15.0	42.00	3.00	-		Low-E double w/ argon	
Ireland	1.25	18.0	14.04	8.10	0.36		Double	
Italy	27.30	15.5	306.00	97.50	6.00	100	Low-E double	Efficient, coated glass in newbuilds
Luxembourg	0.22	22.5	2.00	2.50	0.43			
Netherlands	6.55	21.0	59.40	66.40	11.60	20	Double	
Portugal	4.60	11.7	47.97	5.85	-			
Spain	20.00	15.0	247.50	51.75	0.75	60	Double	
Sweden	4.20	15.0	-	44.10	18.90		Low-e triple w/ argon	
UK	25.30	18.0	165.60	277.20	12.60	30	Low-E double	Energy labelling for 450+ units (U-value & air filtration); zero-carbon commitment for newbuilds by 2016
EU 15 Total	168.02	NA	1,303.54	1,306.83	259.13	-		
Australia								Energy labeling
Canada								Energy labeling
US								Energy labeling

Source: Glass for Europe, EuroAce, SG Equity Research

Energy efficiency savings of up to 11%

Installing energy efficient windows could save up to 11% of the current losses in energy in buildings. Replacing ordinary single or double glazing with low-e glass could reduce building emissions (765Mt CO₂ emitted/yr) by 140Mt for the EU25 alone (Source: Glass for Europe). Replacing standard windows with higher thermal quality windows such as those with double glazing or low-e coating can reduce heating and cooling requirements for buildings by 20%.

Benefits of upgrading all EU15 double glazed windows to low-e glazing (Annual savings)

	MGJ	M€	Mt CO ₂
Austria	9.39	139.47	0.69
Belgium	10.44	101.75	0.79
Denmark	9.68	228.19	0.69
Finland	3.69	39.22	0.33
France	52.42	743.35	4.29
Germany	128.84	1,320.23	8.64
Greece	0.49	7.89	0.04
Ireland	2.05	19.72	0.18
Italy	17.01	350.53	1.17
Luxembourg	0.57	4.84	0.04
Netherlands	14.96	143.42	0.85
Portugal	0.83	14.88	0.09
Spain	7.75	111.9	0.72
Sweden	15.25	237.66	1.68
UK	66.26	495.39	4.46
EU 15 Total	339.62	3,948.54	24.64

Source: Glass for Europe, EuroAce, SG Equity Research

Companies that stand to benefit

Based on their current exposure to energy efficiency and our long-term forecasts for future development, we believe the following themes and companies constitute a good way to invest in Green buildings through global equities:

- **Distribution companies** that sell efficient insulation, windows and windows systems.
- **Energy service companies** that develop, install and finance energy-efficiency projects for commercial, industrial and institutional clients.
- **Insulation:** long-term growth in all insulation markets with higher growth for premium products such as mineral and stone wools. We also anticipate that clay bricks and roof tiles companies should benefit.
- **HVAC and controls companies:** control systems to automate energy use in buildings and (design, construction, maintenance, and repair of heating, ventilating, and air conditioning systems) (See SG's *Green Capital Goods report*)
- **Lighting:** compact fluorescent bulbs, eco-classic bulbs (energy saving halogen), solid state lighting solutions (LEDs), electronic ballasts and energy efficient luminaries (See SG's *Green Capital Goods report*)

CRH The Irish company, Cement Roadstone Holdings, is the world's #2 building materials company and largest producer of foam thermal insulation (EPS) in Europe with #1 market positions in Ireland, the Netherlands, Nordic countries and Poland. Insulation falls under CRH's pan-European and Americas building products businesses – and the company produced 6.2 million cubic meters of insulation in 2007 (annualised volumes), saving approximately 1.2Mt of CO₂ per year cumulatively. In terms of energy efficiency, CRH also benefits from its clay products (insulation of brick kilns to minimise heat loss, etc.), high insulation values in its concrete sandwich panels, and a range of 'Platinum' insulation products used in concrete housing to achieve an "A" rating (<75kWh/m²/year of energy). CRH recently raised €1.24 billion from shareholders at the same time as its 2008 pre-tax profits fell 15% to €1.3bn. Although 2009 is seen as challenging, CRH should benefit from lower energy prices, cost reduction measures and US stimulus spending where it has significant public sector projects with fixed budgets.

EAGA is the UK's leading provider of residential energy efficiency solutions for utility companies under the EEC (Energy Efficiency Commitment) and CERT (Carbon Emissions Reduction Target), the leading deliverer of UK fuel poverty programmes, a leading installer of residential insulation and is rapidly growing as a supplier in the £10bn/year UK social housing sector. eaga has helped lift several million vulnerable people out of fuel poverty by installing energy efficiency measures into five million UK homes. The company is well-positioned in the short to medium-term with visibility on the UK government's 'warm front' funding programme to 2011, confirmation of 2008-11 CERT targets, a Scottish Power outsourcing contract, acquisitions in installations services, and securing the Digital Switchover Help Scheme contract. It has a 5Y pipeline to 2013 of £2.0bn and a bid pipeline of £1.1bn. Rather than being hit by the recession, it reported a 10% rise in revenues in the six months to November 30, 2008. Furthermore we believe that rising unemployment will continue to further UK fuel poverty levels.

IMERYS is the #1 French player in clay roof tiles, bricks, chimney blocks and natural slates with 18% of sales exposed to new construction and 15% to renovation. The group is the world leader in the conversion of industrial minerals with strong position for many minerals (andalusite, bauxite, alumino-silicate, diatomite, kaolin, perlite etc.). Imerys has a strong portfolio of energy efficiency products including Monomur bricks, Optibric insulation, PV roof tiles, hot water thermal tiles and has developed the Labelhome clay building energy saving standard (50kWh/M2). In building materials (clay bricks and roof tiles), Imerys' business slumped significantly in H2 2008 with a -15% decline in French housing starts. However, thanks to the resistance of roofing market linked to renovation and to further penetration by clay bricks gaining speed in tertiary buildings and small collective housing, sales volumes in France were down only -6.8% for clay roof tiles and -2% for clay bricks. We believe that the energy efficiency push on renovations will continue this relatively positive trend.

Kingspan Group PLC The Irish company is a leader in high performance building materials (e.g. timber frames) and insulation solutions: #1 in UK and Ireland thermal insulation with a 25% market share and a market leader in core insulated panels in the CEE (c.25% market share), Belgium and Germany (c.15%), Canada (c.70%) and Australia and New Zealand (>60%). In addition to its insulated panels business (40% of sales), it also derives 16% of sales from renewables, hot water systems (including solar water systems which saw +60% sales growth in 2008), fuel storage and pollution controls. The company has been hit by a slowdown in UK and Irish construction markets (particularly for newbuilds), with pre-tax profits falling 70% in 2008 (although insulated panels only fell 5%). While these markets should remain depressed, the company's energy efficient products should position it for long-term growth, while Kingspan also intends to focus on developing its insulation and renewable product lines internationally, including in North America.

Nippon Sheet Glass (XXX) NSG is a global glass leader with the tightest focus on flat glass of all the industry majors (trading as Pilkington following the 2006 acquisition by NSG). Pilkington has strong market positions in building products and automotive OE and automotive glass replacement sectors. In FY08, 47% of Group sales were generated by building products with the EU its largest market. The group has a strong line-up of eco-glass from double glazing through to low-e, vacuum and solar control glass – which offer up to 8x the thermal insulation of single glazing. NSG also stands to benefit from growth in the solar PV market (company est. 40% growth for next 5 years in low iron rolled and AR for crystalline PV), TCO coated glass for thin film PV (>70% market share), low iron float for concentrated solar (est. 3°% growth) – and with 43% of sales coming from the auto sector, NSG is also a market leader in solar-control glazing for cars.

Owens Corning The US company is present in 26 countries and industry leader in glass fiber insulation and reinforcement, roofing and asphalt. In all 36% of its sales come from insulation products and it has leading positions in the North American market (89% of its insulation sales) – plastic foam products for the residential, commercial and industrial segments – as well as insulated ducts for more efficient HVAC solutions. It has increased recycled content in its flagship PINK insulation to 40% and is also actively looking to create and develop the re-insulation market – targeting the 80m under-insulated US homes. While the company does not anticipate an immediate turnaround in US construction – seeing a 2008 loss of \$839m – it hopes to see sales improvements via tax credits for energy efficiency and stimulus spending. OC is also a global leader in fiberglass composites (c. \$2.36bn in 2008 sales) which are up to 50% lighter than steel and key to lightweighting-related energy efficiency gains in a number of sectors (such as autos, aerospace and defence). It could also

benefit via stimulus spending on renewables as it is the leading provider of glass fibre for wind blades (c.10% of composite sales) – and hence it could be one of the least obvious but biggest beneficiaries of wind power expansion in the US.

Rockwool International A/S (CPH: ROCK-B) The Danish company is the world's #2 in insulation and #1 in stone wool products – with insulation accounting for 85% of sales and systems for 15%. It has 23 factories in 15 countries and c.8,500 employees in 35 countries – and is in the process of expanding in Russia (three plants) and investing in India (new green-field factory). The company has been hit by higher energy costs, lower sales prices and lower capacity utilization, while delays in construction projects continue in many countries. However, it should continue to benefit from higher activity in the refurbishment segment with mineral wools taking the lion's share of many regulatory (EPBD2) and government energy efficiency schemes, particularly for smaller buildings.

Saint-Gobain Founded in 1655, the French company is the world's largest manufacturer and distributor of building materials, and a leader in the production of high performance materials and glass containers. Energy efficiency accounts for around 30% of the Group's sales and around 40% of operating income (2008e). SGO is the world #1 on high-performance stone and rock wool insulation with high thermal resistance and in layered glass. It is also well positioned on energy efficiency themes, including a) low-E glass (with U-values as low as 1.0W/22K), b) producing solar power modules via AVANCIS (a JV with Shell, using technology based on applying thin films of type CIS to a glass substrate and also developing glass and glass-based substrates for other photovoltaic technologies), c) lighting, supplying sapphire substrates used in LEDs and OLEDs, and new forms of "electronic lighting" offering superior energy efficiency and longer life, and d) producing particulate filters for diesel engines that capture 99.99% of car particle emissions. It is also innovating on solid oxide fuel cells that produce usable electricity and heat, with installations capable of producing up to 1 kW (for domestic use) or several megawatts (power station rated), depending on how many basic units are combined together. Beyond the economic cycle, Saint-Gobain's positioning in energy saving and environmentally friendly materials constitutes a real growth driver, in our view, and we think this is where it will continue to expand in the long term.

SIG plc SIG is an international supplier of insulation, exteriors, interiors and specialist construction products. The Group operates across Europe in 15 countries. It is the #1 European supplier of insulation materials which account for over one-third of sales. Demand from ever-stricter building regulations on energy efficiency such as the UK's CERT and goal of zero-carbon homes – means that retrofit-driven growth should continue to outpace its sector even if there is a delayed impact at play - it typically takes at least two years for the full effects of new laws to take hold. With residential construction accounting for only 20% of sales, the effect of the slowdown should be moderate. Moreover, SIG should benefit from the fact that one-third of sales come from the public sector, and from increased, long-term spending on schools and hospitals.

Steico AG The German company is positioned as a system provider for environmentally friendly insulation materials (wood-fibre based insulation: 62% of sales) and is moving towards being a system provider for ecological construction materials, for example by using natural fiber boards (30% of sales) for I-Joists. Its product portfolio consists of insulation solutions for roof, dry walls, ceiling and floor constructions and it is the EU market leader for wood-fiber insulation materials (c. 40% market share). Its environmental credentials are further reinforced by FSC® certificate (Forest Stewardship Council) for all wood-fiber insulation materials and

also natureplus®- seal for its key product range. Despite difficult market conditions – with the company predicting a possible loss in 2009 – Steico should continue to hold a stable niche position for ecological insulation materials.

Superglass Holdings PLC (LSE: SPGH) is a leading manufacturer and supplier of glass wool thermal insulation products – rolls, slabs and blowing wool. It is the #2 player in the UK market with a c.23% market share for these segments. It also manufactures insulation products for heating and plumbing applications through its Central Convertors Division. The company's low exposure to new-builds (c.15-25% of sales) and focus on retrofits should allow it to continue to benefit from the UK's energy efficiency schemes (EEC2, CERT etc.). Superglass has also developed a small export market and products can be supplied into this market during periods of lower domestic demand.

Uralita The Spanish building materials group is focused on four core competencies: insulation materials (50.5% of sales), gypsum (22.9%), pipes (18%) and roofing (8.5%). It operates 39 production facilities throughout Europe, and is the market leader for insulation materials in Spain (47% of sales) and #3 European manufacturer. It stands to benefit both from energy efficiency for housing (insulation, plasterboard, roof tiles and solar panels) as well as greater efficiency in insulating water pipes. The decline of the Spanish (23% of sales), UK and CEE construction sector is taking its toll. The company announced a €60m profit for 2008 on sales which fell 8% to €1bn. The company is majority owned by Nefinsa SA

Wienerberger (VIE:WIE) The Austrian company is the world's #1 producer of hollow bricks (wall) and European #2 for roof tiles. Hollow bricks accounted for 38% of 2007 revenues, facing bricks (façade) for 33% and roof tiles for 21%. The company has a history of high margins for its hollow bricks resulting from its strong gains of market share in Western Europe, rollout and growing presence in CEE countries and limited competition – with Wienerberger the only major multinational player in the field (ex-CRH and Hanson for facing bricks in some markets). WIE saw 2008 revenues fall 2% to €2.4bn and anticipates a difficult market environment for 2009, particularly for its emerging Europe business. It estimates a 10% fall in revenues for 2009 and plans to continually adjust capacity to reflect market conditions.

Annex 1 - Green stimulus packages

Summary of global economic stimulus plans with green measures

	Overall economic package	% of 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 disbursed 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

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