GS SUSTAIN

Change is coming: A framework for climate change – a defining issue of the 21st century

An emerging investment theme

Population growth and economic development are resulting in increasing pressure on the environment and climate. We are approaching a tipping point at which the issue's importance to business performance and investors will escalate. The equity market is only just beginning to reflect the magnitude of change that lies ahead.

Competitive positioning will be impacted

Technologies exist to achieve most of the emission reductions required to minimize the threat of dangerous temperature rises. However, implementing them will require a significant change in operating performances and investment strategies across industries, and dramatically higher penalties for carbon emissions are likely to be needed to incentivize them. Those changes will feed through the value chains of every industry, resulting in a redistribution of value between better and worse placed companies. Even assuming targeted reductions are achieved, past emissions will require adaptation to a warmer climate.

Objective analysis of performance

We have assessed the performances of ~800 global companies with a market cap over US$3 bn across the areas of performance key to their industries. We find that while many companies acknowledge the challenges climate change presents (68% report climate-related performance in this area, 60% have established Board or senior management responsibility for climate change performance), there are significant differences in the extent to which companies are taking action. Differences in the effectiveness of response across industries create opportunities to lose or establish competitive advantage, which we believe will prove increasingly important to investment performance.

We highlight leaders in three groups

Our objective analysis of companies' performances relative to peers highlights leaders in three areas: Abatement Leaders in carbon-intensive industries, Adjustment Leaders in less intensive industries, and Solutions Providers exposed to growth opportunities.

GS SUSTAIN RESEARCH

GS SUSTAIN research identifies the implications to investors of the key structural trends facing the global economy, environment, societies and industries. The GS SUSTAIN framework applies objective measures to identify companies well-placed to sustain competitive advantage and superior returns on capital over the long term (3-5 years). Further details and research are available at:

https://360.gs.com/gs/portal/research/teams/sustain/

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See the Financial Advisory Disclosure section of this document for important disclosures about transactions in which The Goldman Sachs Group, Inc. or an affiliate is acting as financial advisor.

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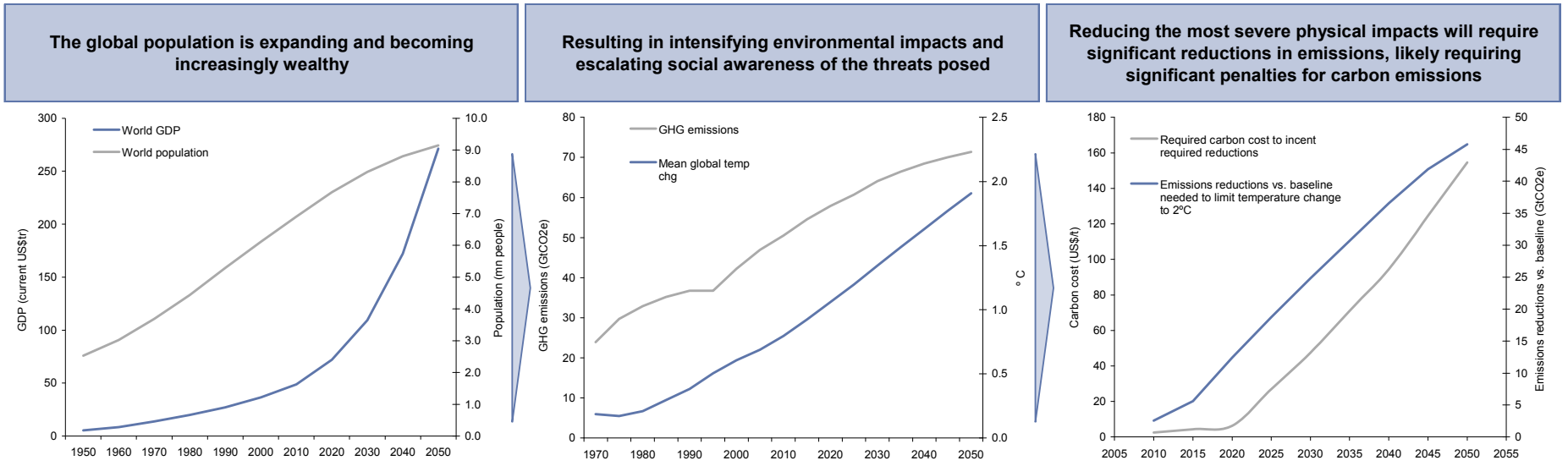
We are approaching a tipping point

Population growth and economic development are placing mounting pressures on the global environment. Climate change is the highest profile of those pressures. Society's awareness of the threats climate change presents, its causes, and willingness to take action to drive the changes needed to avert the worst effects – whether directly or through support for political intervention – are strengthening quickly. Many companies have recognized the importance of climate change to their long-term success. Our analysis of ~800 global companies with a combined market capitalization equivalent to ~90% of the MSCI World shows that 60% of those companies have established board or senior management responsibility for climate change performance. In contrast, we believe the equity market is only beginning to recognize the magnitude of impact the transition to a low carbon global economy will have on companies' competitive positions and long-term valuations.

Technologies exist to achieve the reductions in greenhouse gas emissions required to limit the risks of temperature rises to manageable levels, but their adoption must accelerate in coming years. Operating performances and investment strategies of large swathes of established industries must be changed dramatically. Creating the incentives to do so is likely to require a rapid escalation in the penalties for carbon emissions – whether through direct costs or incentives for investments in alternative technologies. Our analysis implies that a value of US$60/t placed on all direct carbon emissions would result in ~20% of the cash flow of carbon intensive industries moving from less- to more- carbon efficient companies. The secondary effects of higher input costs on industries reliant on carbon intensive materials or energy will prove very significant as they feed through industry value chains, as will the changing end-demand pressures companies face.

Exhibit 1: Significant change lies ahead for global industries



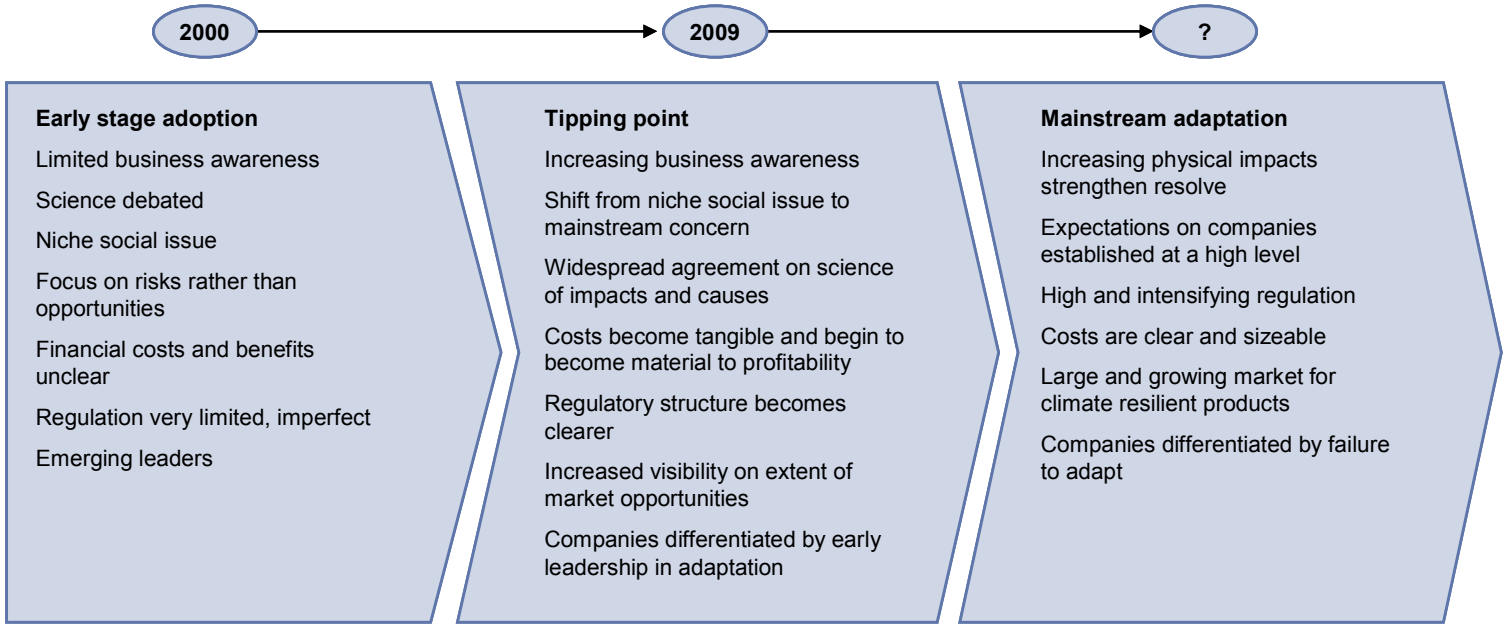
Source: OECD, UN Population Division, Factiva, Goldman Sachs Research.

Over a relatively short period, the climate change debate has moved from "are man-made emissions resulting in temperature changes?" to "what can be done to avert the worst threats it poses?". Social acceptance that climate change is occurring, is the result of man-made greenhouse gas emissions, and can be minimised, has established the issue as a mainstream social concern. As a result, governments have been given a mandate to regulate companies' performances and investment plans, and there is increasing evidence they are taking up that mandate.

Looking forward, the UN-organised Copenhagen Conference of Proceedings in December 2009 has provided a focus for action by the major global economies. Whether that event will provide a concrete, binding global agreement on the path to a low carbon economy is unclear. However, it has provided a focus for international discussion and debate on the issue, which itself is likely to create pressure and catalyze action.

In our view, the result will be an acceleration in the pace of change forced on industries. The relatively slow speed with which most organizations are able to redesign operations and reposition their business models will provide a window of competitive advantage to those that have taken early action.

Exhibit 2: We are close to a tipping point



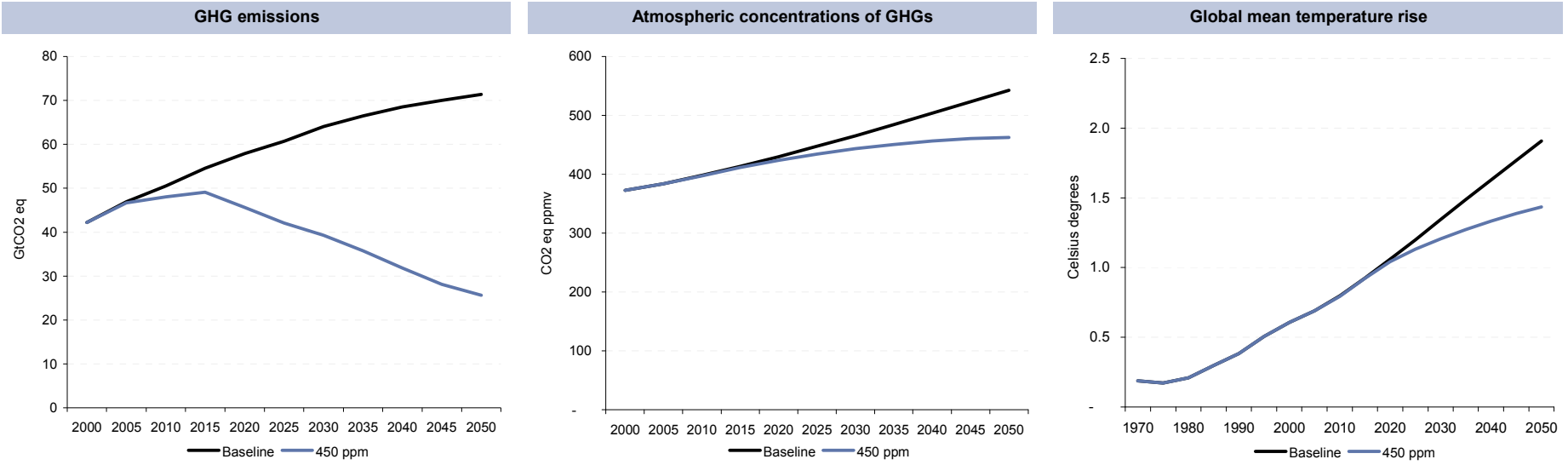
Source: Acclimatise, Goldman Sachs Research.

We believe scientific and social consensus has aligned on the understanding that the climate is changing, that man-made greenhouse gas (GHG) emissions are responsible, and that action can be taken to avoid its worst effects. Assessments of climate change typically involve a bewildering array of potential greenhouse gas emission pathways and temperature change scenarios. In this report, we have focused on two: 1) one in which emissions continue to rise without significant policy or behavioral change ("baseline" scenario), and 2) one in which action is taken to stabilize atmospheric GHG concentrations around 450 parts per million (ppm), limiting temperature rises to ~2 degrees Celsius ("450 ppm" scenario).

Comparison of these two scenarios captures the change that will be required to reduce the risks of significant environmental disruptions to acceptable levels. They imply a reduction in emissions of greenhouse gases of ~60% by 2030, relative to the level they would reach without action or a global average reduction of ~70% per capita. Even if those reductions are achieved, the impact of emissions made in the past means temperatures will continue to rise. The 450 ppm scenario, itself requiring a significant reduction in carbon emissions, implies a 2 degree Celsius rise in global average temperatures and the physical impacts this will cause.

Industries therefore face adaptation to both 1) the social and political response to climate change as well as 2) the physical impacts of climate change itself.

Exhibit 3: Significant reduction in annual emissions is needed to minimize the risks of significant environmental disruption
Projected trends in GHG emissions, atmospheric concentrations and global mean temperatures under baseline and 450 ppm scenarios



Several gases have greenhouse effects. They are typically aggregated into a single measure, represented in carbon dioxide equivalent terms (CO2e)
Annual emissions are commonly measured in Giga tonnes (Gt) and atmospheric concentration levels in parts per million (ppm) or parts per million volume (ppmv)

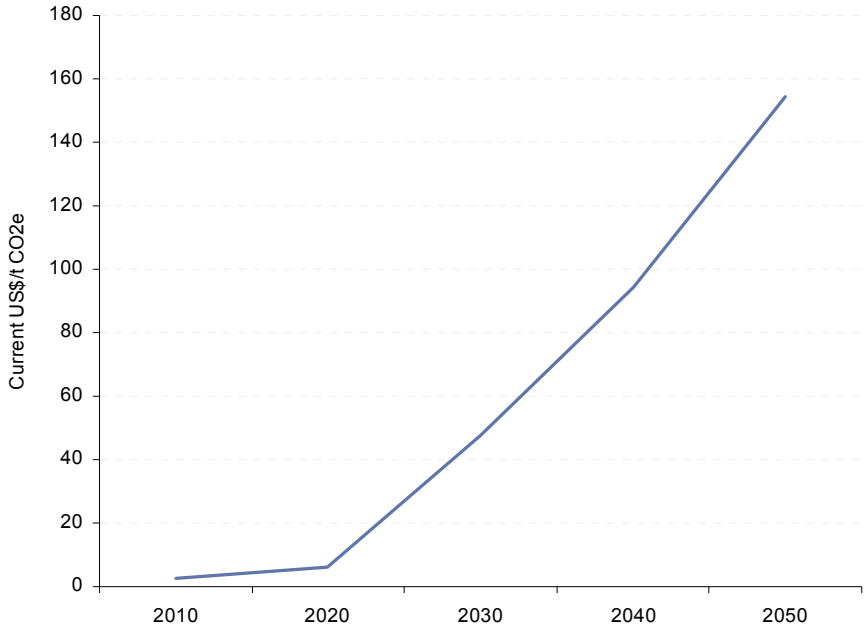
Source: OECD, Goldman Sachs Research.

Value impacts are significant; carbon will become increasingly valuable

The penalties required to incentivize the emissions reductions needed to stabilize concentrations of greenhouse gases – whether through cap-and-trade schemes, carbon taxes, incentives or the abolition of carbon intensive operations – are likely to be far higher than recent market prices on existing exchanges. We have used work by the OECD to assess the value that must be placed on carbon emissions to incentivize the reductions necessary to stabilize atmospheric concentrations at 450 ppm (Exhibit 4). This projection assumes the most economically attractive abatement opportunities available globally are implemented to achieve the necessary reductions; the costs will almost certainly be higher, given the policy distortions to implementing the most attractive investments. It is notable, for instance, that regulation is likely to prove more difficult to co-ordinate in fragmented industries such as construction – which we estimate contributes ~10% of the emissions of listed companies but under 2% of their market capitalization.

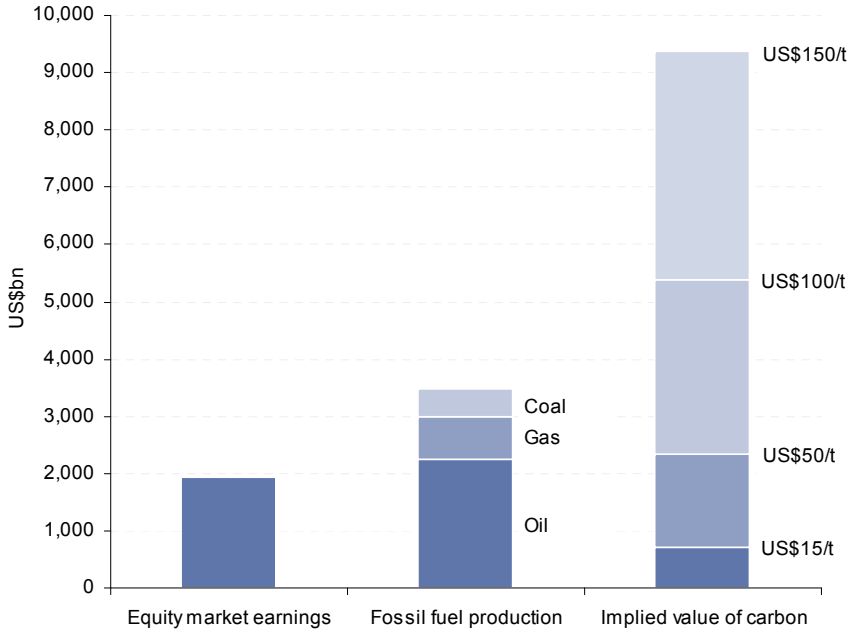
Relative to either the value of current fossil fuel production or the earnings of listed companies globally, it is clear – and logical – that carbon (or its abatement) will become increasingly valuable and a far more important investment consideration. At US$150/tonne, the total value of global carbon emissions represents more than five times the aggregate earnings of publicly listed corporations across the globe and ~15% of global GDP.

Exhibit 4: Penalties – direct or via subsidies for alternatives – for carbon emissions likely to rise significantly
Minimum carbon emission penalty required to incentivize emissions reductions required to stabilize global temperature



Source: OECD, Goldman Sachs Research.

Exhibit 5: Carbon emissions could be worth as much as 5x the earnings power of global companies
Implied value of carbon emissions vs. comparator markets at different carbon costs

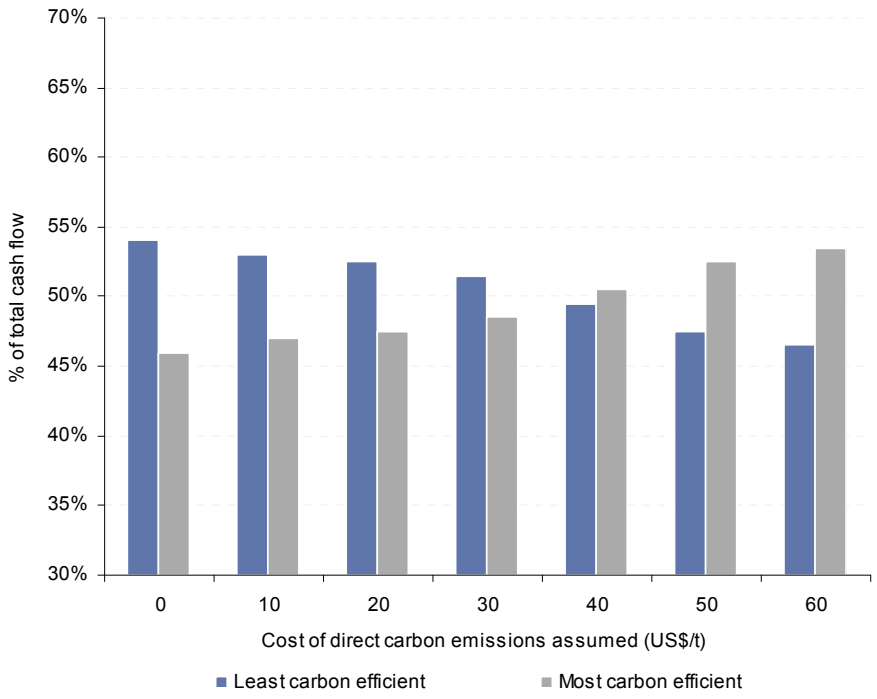


Source: Goldman Sachs Research estimates.

We have assessed the impact of carbon costs to companies' cash flow generation across sectors using scenario analysis at different carbon price assumptions. First, we calculate the implied increase in operating expenses for each company based on reported emissions data. Second, we evaluate the additional cash flow generation required for each industry to maintain return on capital at the same aggregate level forecast before carbon costs. Third, we assume prices rise equally across each industry to achieve those constant returns, so that all players benefit in proportion to their sales.

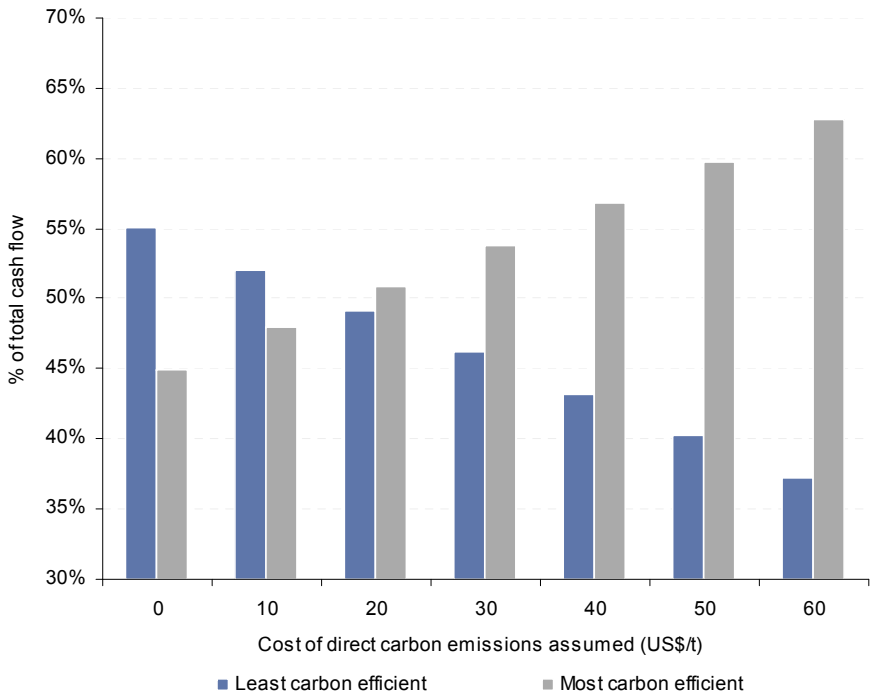
At a carbon cost of US$60/tCO2e, we find that as much as 10% of the total cash flow of listed companies could be transferred from companies with below-average carbon efficiency to those with above-average efficiency. The result of this analysis is shown in Exhibit 6. Some 90% of this cash flow transfer – from more to less carbon efficient companies – occurs in just a handful of sectors: oil & gas, airlines, other transport, chemicals, mining, steel & aluminum, power utilities and non-power utilities (Exhibit 7). Given our analysis implies carbon costs may rise significantly higher than US$60/tCO2e, it is clear the impact on industry structures will be significant.

Exhibit 6: For the market as a whole, 15% of total cash flow could be transferred from high to low emission companies by US$60/t carbon prices
Estimated share of total cash flow accruing to companies with higher/lower carbon efficiency than sector average, total market aggregate



Source: Goldman Sachs Research estimates.

Exhibit 7: … with a more significant impact on the most carbon intensive industries
Estimated share of total cash flow accruing to companies with higher/lower carbon efficiency than sector average, most carbon intensive industries



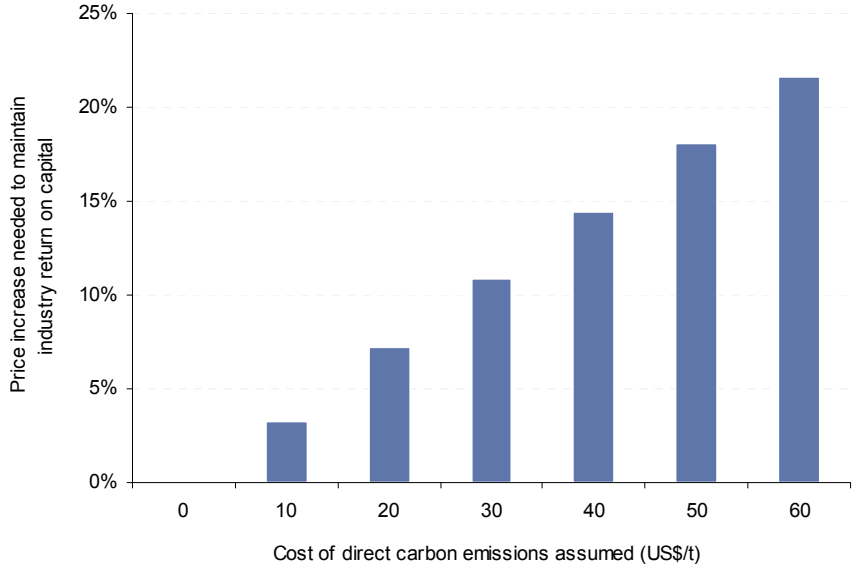
Source: Goldman Sachs Research estimates.

Rising carbon costs will prove inflationary

Rising costs of carbon emissions will also impact companies without significant direct emissions. For instance, rising costs in the utilities industry implies higher power prices will be needed to maintain a constant sector-average return on capital; Exhibit 8 shows the magnitude of increase implied under a range of carbon cost scenarios. Energy costs in turn represent a significant proportion of cash flow in many industries with relatively limited direct carbon emissions (Exhibit 9) and rises in those input costs will force a realignment in competitive positions within those industries. Similar cost increases will feed through different value chains, ultimately reaching the end consumer in the form of inflation.

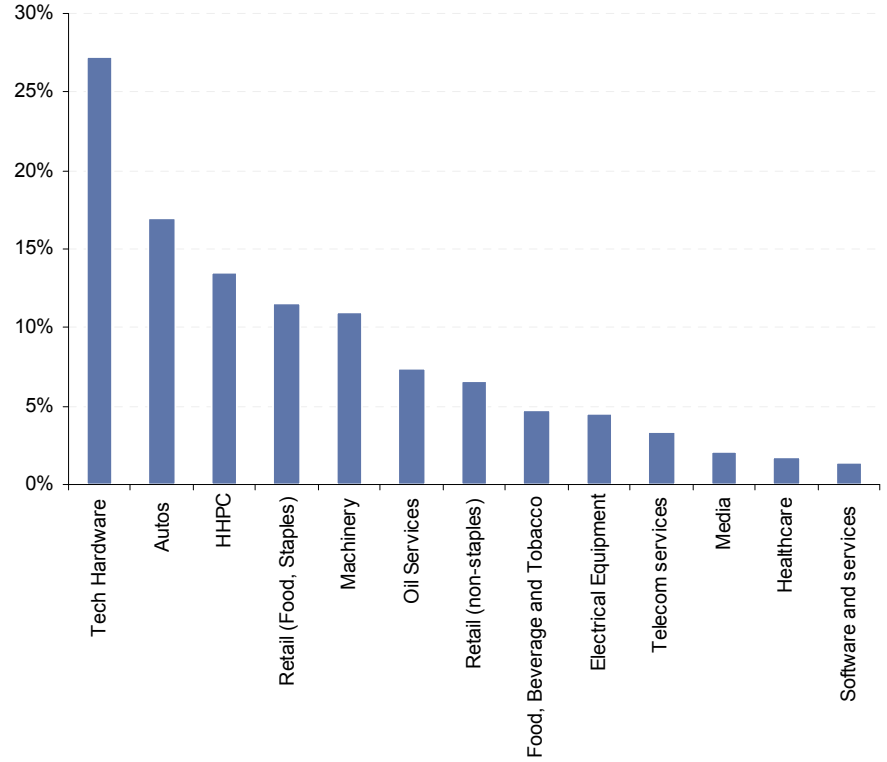
Beyond the impact cost increases will have on companies' relative profitabilities, changing end demand for products based on their climate change impacts and regulation of product markets are likely to provide a further source of differentiation in many industries.

Exhibit 8: Utilities revenues would need to rise substantially to maintain constant returns on capital …
Price increase needed to sustain constant sector-average returns on capital at different carbon costs for the global utilities industry



Source: Goldman Sachs Research estimates.

Exhibit 9: …impacting industries with significant energy costs
Energy costs as a % of debt-adjusted cash flow in less carbon intensive sectors

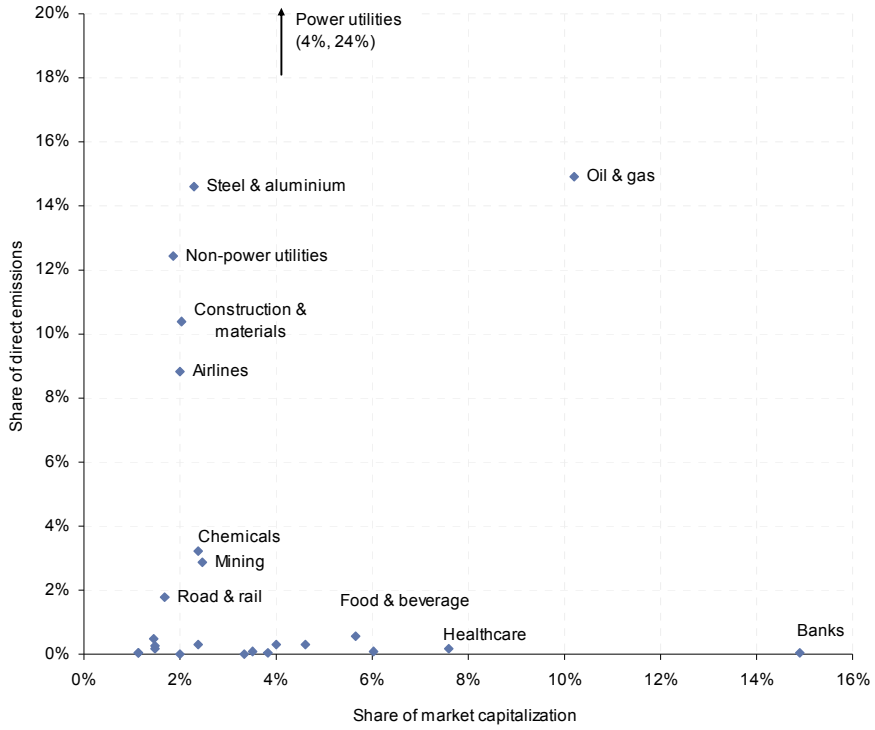


Source: Carbon Disclosure Project, Goldman Sachs Research estimates.

Impacts will vary across industries

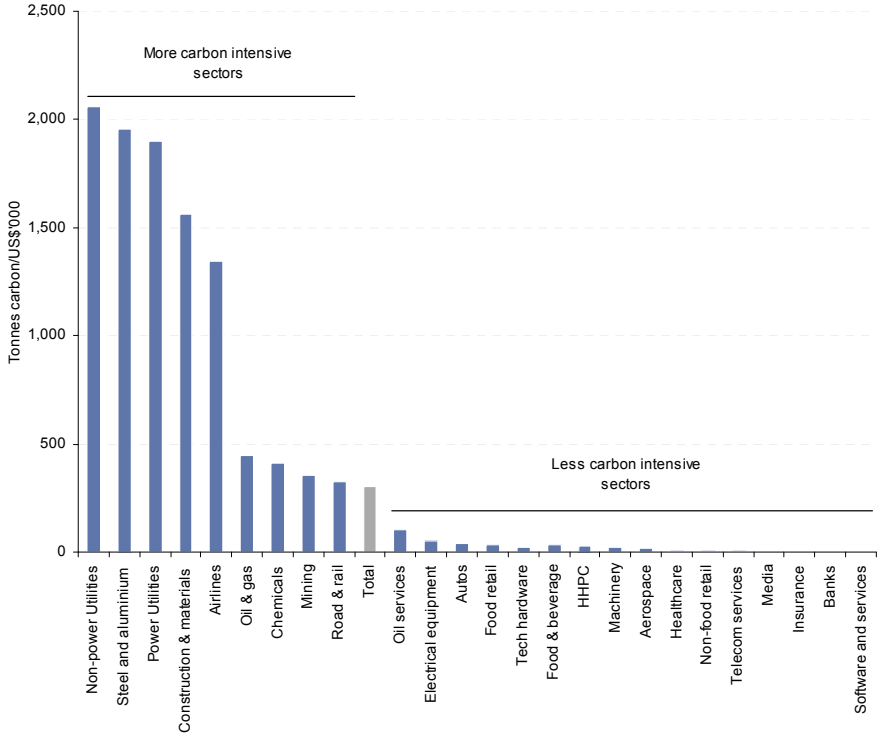
Exhibit 10 compares the contribution of different sectors to global market capitalization with their estimated share of the total emissions of all listed companies. In more carbon intensive sectors, effectively reducing emissions will be the key to sustaining competitive advantage as the value of carbon emissions escalate. Less carbon-intensive industries will also be affected but in less direct ways, for instance through the impacts on their supply chain or product development. Reflecting these different drivers, we assess companies in each group using different measures of performance.

Exhibit 10: Direct emissions shares of industries vary from market importance
Share of total market capitalization vs. share of direct GHG emissions



Source: Carbon disclosure project, Goldman Sachs Research estimates.

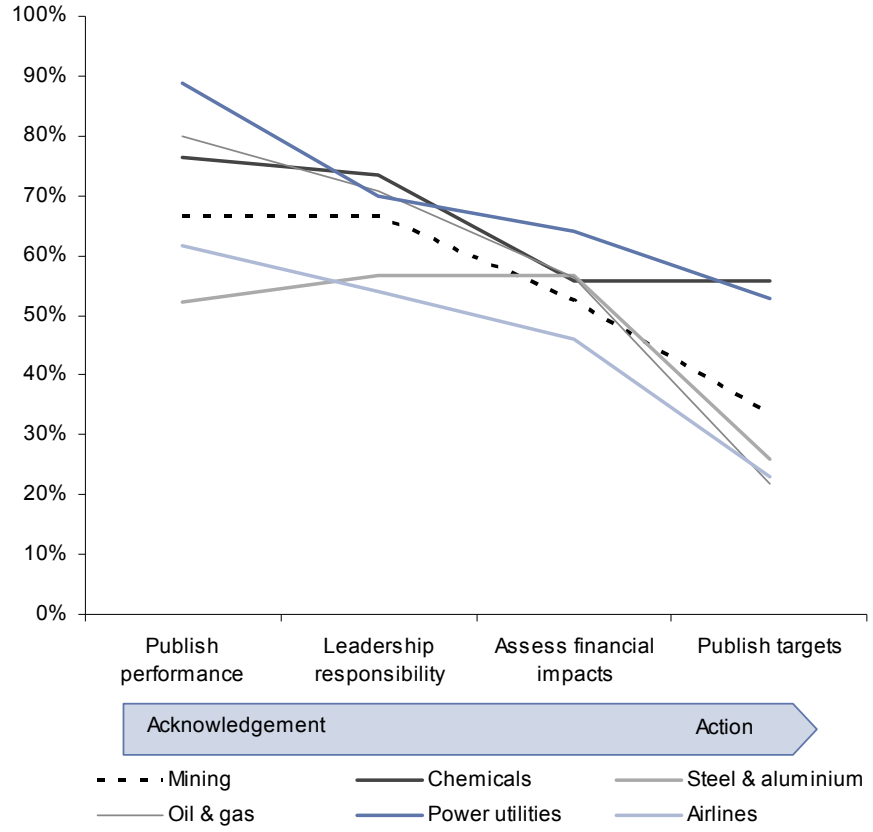
Exhibit 11: Significant differences in market value exposures of industries to direct carbon emissions
Direct GHG emissions relative to market capitalization



Source: Carbon disclosure project, Goldman Sachs Research estimates.

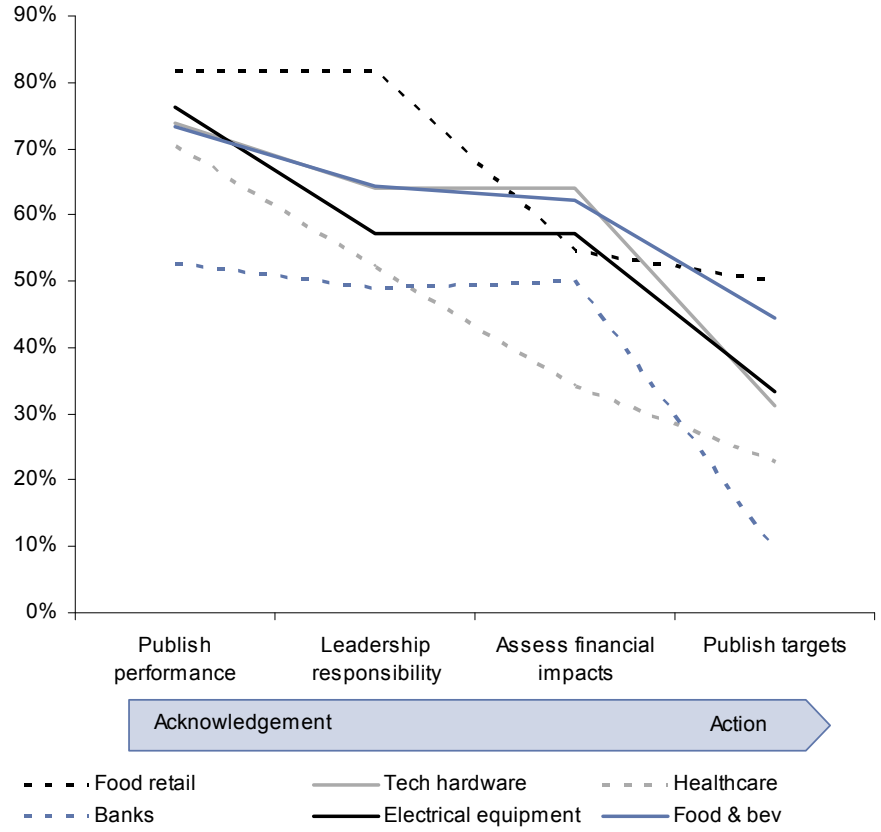
The responses of companies to the challenges and opportunities climate change will present vary across industries. In aggregate, an average of 68% of companies have acknowledged the importance of the issue to their business through public reporting of performance and 60% have also assigned responsibility for climate change performance to members of their Board or senior management. In carbon-intensive industries, in particular, many follow this with actionable steps and targets (Exhibit 12). In less carbon-intensive industries, the proportion of companies acknowledging the issue is similar, but the proportion taking this to actionable change drops off quickly in many sectors. We see this discrepancy as an indication of the relative immaturity both of the issue in corporate strategy and the challenges companies see in taking action against a backdrop of uncertain regulation and effects. Going forward, we expect further increases in the number of companies acknowledging the issue and a greater proportion of those companies to take this to actionable change.

Exhibit 12: Proportion of companies assessed taking action in different steps: Major carbon intensive industries
% of companies in each industry with policies at different levels of action



Source: Carbon Disclosure Project, Goldman Sachs Research.

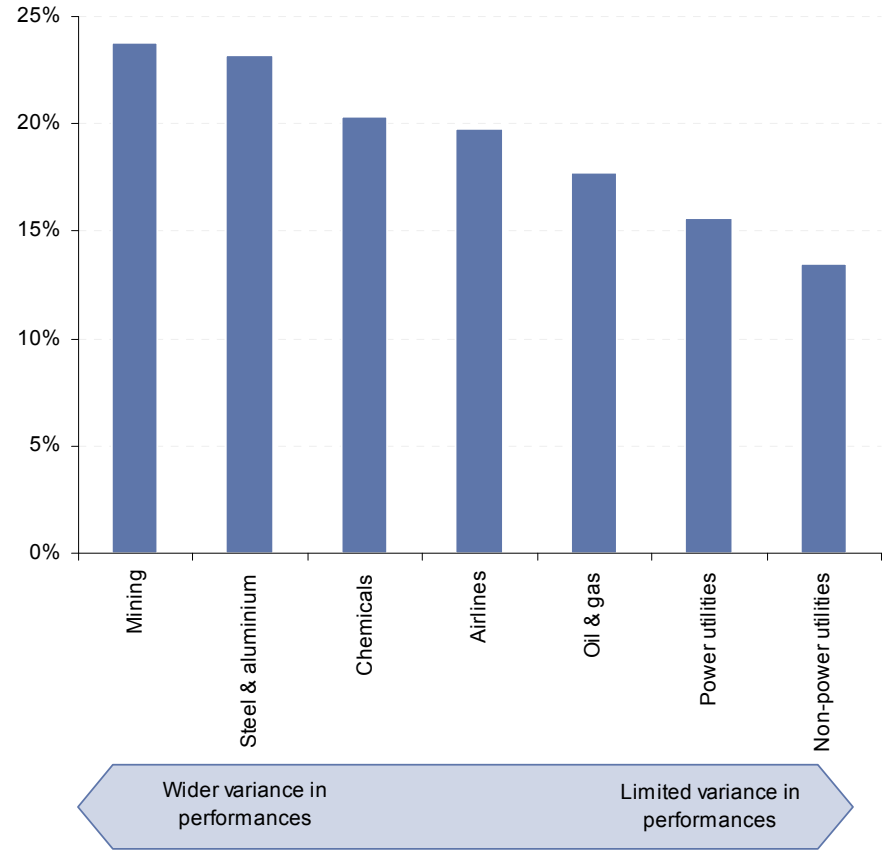
Exhibit 13: Proportion of companies assessed taking action in different steps: Less carbon intensive industries
% of companies in each industry with policies at different levels of action



Source: Carbon Disclosure Project, Goldman Sachs Research.

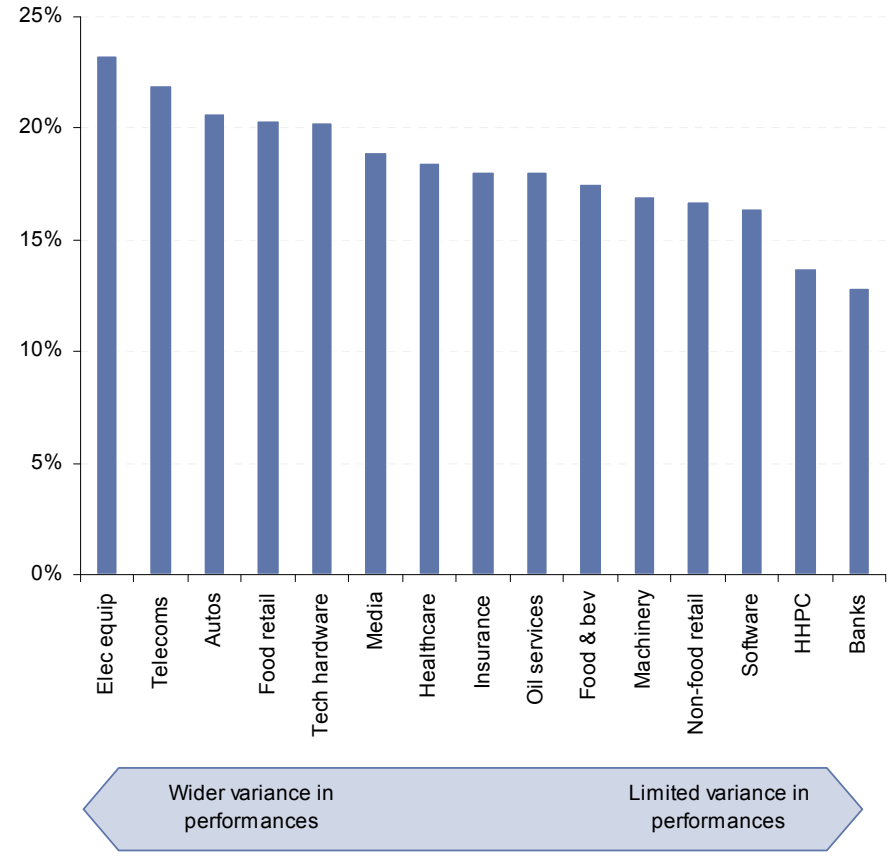
The extent to which companies' performances differ within industries is a key element of the ability of individual players to distinguish themselves in establishing competitive advantage through their management of climate change pressures. Exhibits 14 and 15 show the degree of variance in the effectiveness of companies' responses to climate change within industries. In those industries in which the range of performances is narrow (e.g. Utilities), companies are at significant risk if they fail to take steps to adapt. In contrast, in industries in which there are wider ranges of performance (e.g. Mining), companies have an opportunity to differentiate themselves in creating competitive advantage through their management of climate change pressures.

Exhibit 14: Some industries provide greater opportunities for differentiation through effective climate change performance
Standard deviation of overall climate change scores within more carbon-intensive industries



Source: Carbon Disclosure Project, Goldman Sachs Research.

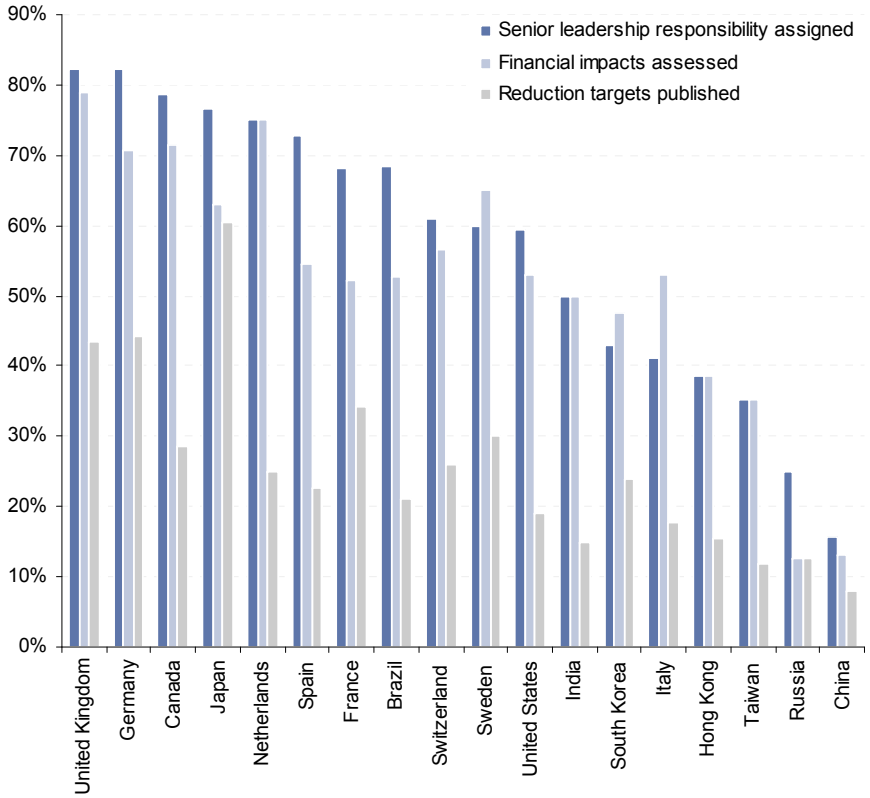
Exhibit 15: Some industries provide greater opportunities for differentiation through effective climate change performance
Standard deviation of overall climate change scores within less carbon-intensive industries



Source: Carbon Disclosure Project, Goldman Sachs Research.

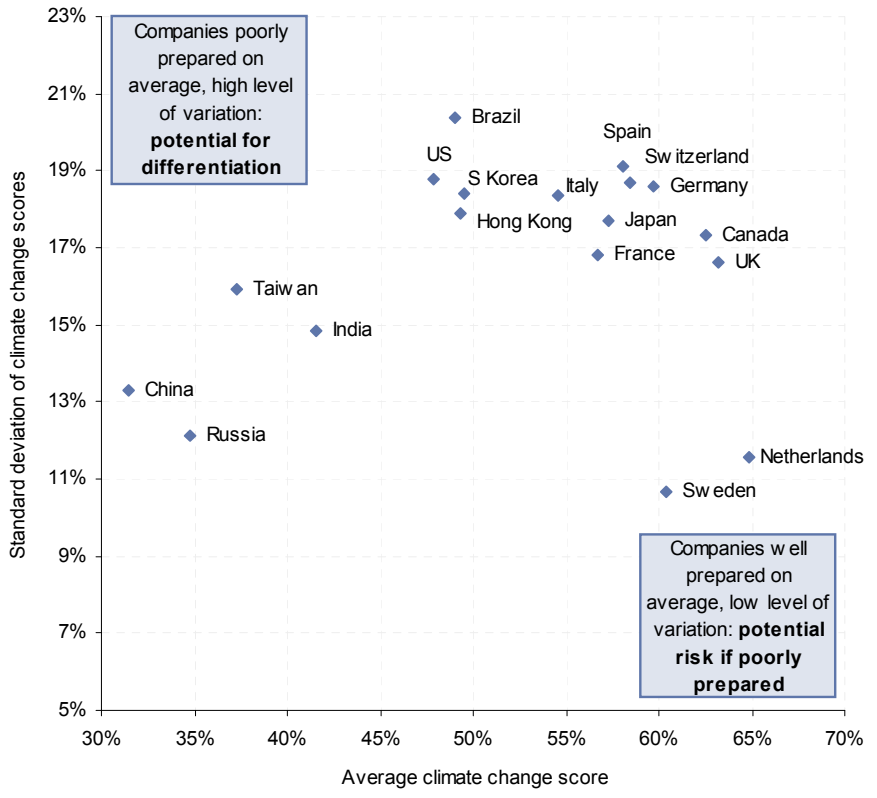
Regional differences in the effectiveness with which companies are addressing the challenges and opportunities climate change presents are also significant. Exhibit 16 shows, for all countries in which we have assessed at least 10 companies, the proportion of companies 1) which have established Board or senior management responsibility for climate change performance and 2) report assessing the financial impacts of climate change on their business. Companies based in emerging economies are typically less advanced in their public acknowledgement of climate change than developed country peers. Those countries in which the differences in preparedness vary substantially offer opportunities for leaders to differentiate themselves, whereas in countries for which the range of performances is low, the risks are more that companies fall behind peers (Exhibit 17).

Exhibit 16: Regional recognition of climate change as a business issue varies substantially
% of companies reporting assigning responsibility for climate change performance to Board/senior management, assessing financial implications of climate change, by country (only countries with >10 companies included)



Source: Carbon Disclosure Project, Goldman Sachs Research.

Exhibit 17: Companies in some countries are generally prepared; others offer more scope for differentiation
Average climate change score vs. standard deviation of score, country averages



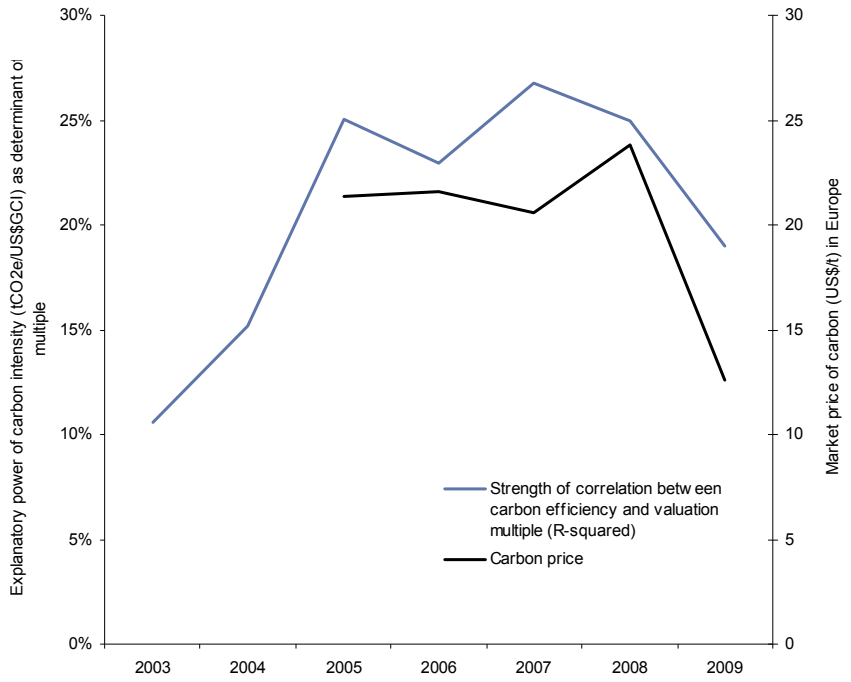
Source: Carbon Disclosure Project, Goldman Sachs Research.

The equity market is only just beginning to react

The equity market typically focuses on issues with quantifiable and near-term (around 12 months) impacts on financial performance. Most environmental and social changes are gradual, unclear in their direct impact, and imply diverse direct and indirect effects on companies' performances. The introduction of carbon emissions trading, initially in Europe and more recently in other regions, has provided investors with a basis for assessment of the impacts of climate change on financial performance in carbon-intensive industries, which has begun to be reflected in valuation multiples. Exhibit 18 shows the strength of the relationship between the valuation multiples (EV/EBITDA) awarded to companies and their carbon efficiency (tCO2e of assets) in recent years across the utilities sector; while the relationship has strengthened, it remains relatively weak compared to the potential impact higher carbon emission penalties will have on sector profitability.

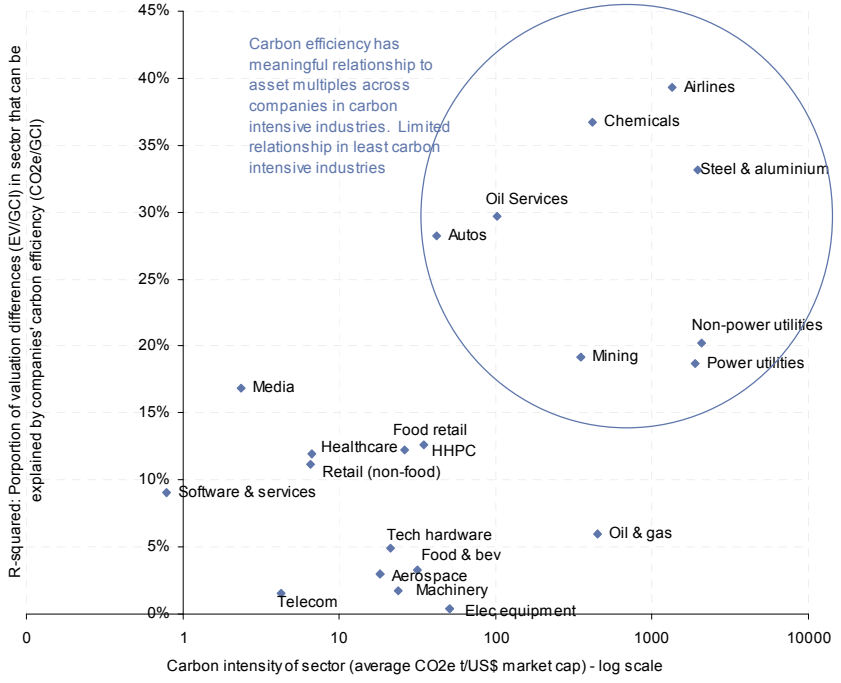
Going forward, as regulation toughens and expands to a wider range of sectors, and as the financial impacts of factors other than costs of carbon emissions become more evident, we expect this relationship to strengthen in carbon intensive sectors and become increasingly evident in less carbon intensive industries.

Exhibit 18: In the utilities sector, the importance of carbon efficiency in explaining valuation differences (R-squared) has risen in recent years…
Explanatory power of carbon efficiency (CO2e t/assets US$) as a determinant of valuation multiples (EV/EBITDA), global power utilities



Source: Carbon Disclosure Project, Quantum database, Goldman Sachs Research.

Exhibit 19: … but currently remains relatively weak in most sectors
Explanatory power of carbon efficiency (CO2e t/assets US$) as a determinant of valuation multiples (EV/EBITDA), all sectors



Source: Carbon Disclosure Project, Quantum database, Goldman Sachs Research.

As a result of their different exposures and business models, the impacts of climate change will vary substantially across sectors. Exhibit 20 summarizes the analysis we have done to identify the key elements of performance in each of the 24 sectors we have examined.

Exhibit 20: Framework for assessing impacts of climate change across sectors

	Energy	Transport	Industry	Consumer	Finance
Stock market sectors included	Oil services Oil & gas Electrical equipment Electric utilities	Autos Aerospace & defense Airlines Road Rail	Machinery Chemicals Mining Steel & aluminium IT services & software Non-electric utilities Building	Media Retail (non staples) Retail (staples) Food & beverage H'hold products & personal care Technology hardware Telecom services Healthcare	Banks Insurance
% of total market cap	27.4%	5.8%	12.1%	41.5%	13.2%
% of emissions of listed companies	66.9%	2.92%	27.8%	2.36%	0.05%
Implications of climate change transition	Accelerating transition from fossil fuels to alternative sources of power Focus of environmental legislation Blurring of distinction between transport and power fuels Increasing distribution of power generation as small scale technologies develop Increasing pressure and incentives to promote energy efficiency	Increasing regulation of product emissions Increasing funding and demand for electric / hybrid vehicles Technological shift required to sustain air travel	Increasing regulation of direct environmental impacts Rising competition across global industries with regulation introduced at differing rates Environmental performance an increasingly important aspect of "license to operate"	Increasing global consumer awareness of environmental performance of products Increasing upstream supply chain risks – water, agricultural commodities, chemicals Freight costs likely to increase Prospective employees increasingly motivated by environmental performance	Significant funding required by other industries to implement carbon abatement opportunities Environmental impacts an increasing risk factor in capital allocation decisions Prospect of increasing regulation has likelihood of incorporating environmental targets
Changed drivers of competitive advantage in established industries eg	Rising direct costs to carbon emissions Rising value to low carbon power generation technologies	Increasing value to energy & carbon efficient transport Reduced demand for freight intensive products	Increasing value to energy & carbon efficient industrial equipment Redistribution of competitive advantage reflecting asymmetric introduction of carbon costs geographically	Rising value to products with lower lifecycle emissions Brand perceptions increasingly driven by perceived environmental performance	Increasing demand for environmentally targeted investment products Increasing value to environmental risk management
Modal shifts in demand eg	Increasing investment in alternative & nuclear power generation, declines in fossil fuel Shift from fossil fuel transport to electricity in transport	Shift from petroleum to electric / hybrid power trains Transition from carbon intensive transport modes (eg air) to alternatives (eg marine)	Replacement of energy and carbon intensive materials with alternatives	Increased sourcing of local products	Increased demand for financing of low carbon technologies, reduction in fossil fuel based sources
Opportunities for growth industries eg	Biofuel crops Biofuel refiners Alternative & nuclear energy equipment & services Alternative & nuclear energy generators Carbon capture & storage	Electric vehicles Battery & fuel cell technologies High speed trains Electricification infrastructure Biofuel aerospace & automotive engines	Energy efficient industrial automation	Green advertising agencies Videoconferencing Tropical disease medicines	Environmental risk management tools "Green" consumer finance ESCOs (capital providers for energy efficiency investments) Venture capital investment in alternative technologies

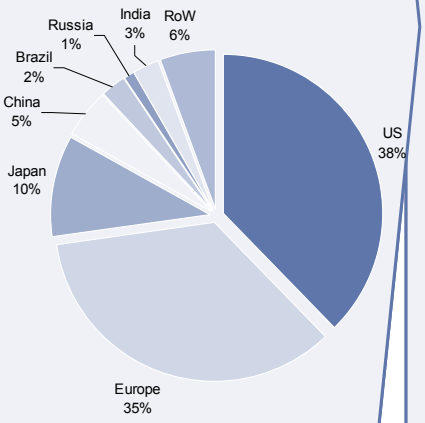
Source: Goldman Sachs Research.

We have applied a consistent and objective framework of comparison across ~800 global companies, the combined market capitalization of which equates to ~90% of the value of the MSCI World index, spanning major industry groups, to identify the best placed companies in each sector. Using company-reported information, we have assessed the effectiveness with which each is addressing the challenges and opportunities climate change will present to its industry.

Exhibit 21: Our analysis applies objective measures of performance to assess ~800 global companies with market capitalizations >US$3 bn

Universe of ~800 global companies with market cap >US$3bn, with market value equivalent to ~90% of MSCI World

Geographic breakdown of companies assessed by market cap



20-25 data points collected for each company from companies' public reporting

Data sourced from companies' public reporting including submissions to the Carbon Disclosure Project, Sustainability reports and other public disclosures

Scores calculated in 10-12 indicators based on objective, transparent definitions of scores

10-12 indicators combining common and industry-specific measures in four categories:
1) Leadership & transparency
2) Management of own operations
3) Supply chain management
4) Product development

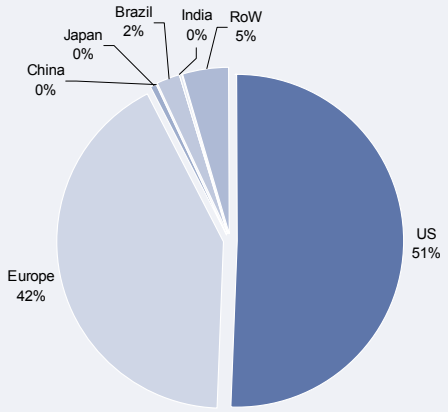
Indicators combined into an overall climate change management score for each company

Weights applied to indicators to align the significance of each indicator in the overall score with each industry's business models and exposures to climate change issues

Companies with first quartile climate change performances and above-average return on capital highlighted

Leaders highlighted in four categories:
- 24 Abatement Leaders in carbon intensive industries
- 65 Adjustment Leaders in less intensive industries
- 19 Solutions Providers in fast growing new markets

Geographic breakdown of leaders identified by market cap



Source: Goldman Sachs Research.

Many of the climate change leaders identified are GS SUSTAIN leaders

GS SUSTAIN research identifies the implications to investors of the key long term, structural trends facing the global economy, environment, societies and industries. The GS SUSTAIN framework has not yet been applied to all companies assessed in this report but of the 110 climate change leaders our analysis identifies, 23 are included amongst GS SUSTAIN mature industry leaders (42% of the total) and an additional eight Solutions Providers are GS SUSTAIN emerging industry leaders. These 31 companies offer the prospect of both long term industry leadership on the range of issues facing their industries and also strong management of the specific business impacts stemming from climate change

The GS SUSTAIN framework identifies, through objective and quantifiable analysis, the companies best positioned to sustain industry leadership and superior returns on capital relative to peers over the long term (3-5 years). The GS SUSTAIN focus list highlights the leaders identified through analysis of 1) return on capital, 2) industry positioning and 3) management quality with respect to the range of environmental, social and governance (ESG) issues relevant to their industry. That framework is designed to identify those companies best positioned to thrive against the diverse structural challenges and opportunities facing their industries.

Exhibit 22: 33 climate change leaders are highlighted as long-term industry leaders on the GS SUSTAIN focus list

GS SUSTAIN mature industry	Company	Return on capital	Weighted average climate change score	Industry positioning	Management quality
		2009-11E ave cash return	Percentile	Overall positioning on key industry drivers (percentile)	Overall management of ESG issues (percentile)
Energy	BG Group	17%	90%	91%	92%
Basic Materials	Vale	18%	100%	76%	66%
	BHP Billiton	17%	85%	73%	100%
	Monsanto	24%	24%	70%	63%
Media	Reed Elsevier	13%	83%	89%	88%
Consumer Staples	Colgate-Palmolive	28%	100%	81%	65%
	Reckitt Benckiser	20%	78%	57%	80%
	Diageo	15%	100%	45%	80%
	Nestle	13%	88%	88%	80%
	Coca-Cola	21%	77%	70%	93%
Healthcare	Johnson & Johnson	22%	87%	50%	96%
	Roche	20%	87%	93%	71%
	Novo Nordisk	27%	85%	85%	50%
Banks	BBVA	12%	94%	55%	80%
	HSBC	10%	96%	52%	100%
Insurance	AXA	35%	92%	57%	60%
	Allianz SE	12%	100%	50%	96%
Technology hardware	IBM	26%	90%	65%	94%
	Cisco Systems	13%	88%	53%	76%
	Hewlett-Packard	17%	95%	67%	97%
Utilities	Exelon Corp.	12%	100%	49%	83%
	Centrica	16%	94%	68%	98%
	Fortum	8%	92%	54%	90%

GS SUSTAIN emerging industry	Company	Ticker	Growth	
			2008-11E sales growth ($ terms)	2008-11E EBITDA growth ($ terms)
Alternative energy	Aveva Group	AVV.L	na	na
	Energy Resources of Australia	ERA.AX	12%	21%
	EDF Energies Nouvelles	EEN.PA	4%	28%
	Iberdrola Renovables	IBR.MC	17%	18%
	Vestas Windsystems	VWS.CO	13%	16%
	EDP Renovaveis	EDPR.LS	28%	30%
	REC	REC.OL	31%	26%
	Gamesa	GAM.MC	4%	14%
	Hansen Transmission	HSNT.L	16%	20%
Consumer pref.	Natura	NATU3.SA		

For Centrica, we have used 2005-07 average CROCI. Goldman Sachs & Co., and/or one of its affiliates is acting as Financial Adviser and Corporate Broker to Centrica and as such is an associate of Venture Production for the purpose of the Takeover Code.

Source: Goldman Sachs Research.

We highlight climate change leaders across three categories

We consider financial strength to be key to companies' abilities to maintain investment in developing their businesses and therefore combine the climate change scores calculated with our analysts' forecasts of return on capital to identify leading companies in each sector.

In total, we highlight 110 companies our objective and transparent analysis show to be well positioned, relative to industry peers, on the measures of climate change we apply to each sector. Abatement leaders (24 leaders in sectors with above-average carbon intensity) and Adjustment leaders (67 leaders in sectors with below-average carbon intensity) achieve first quartile climate change scores and have first or second quartile returns on capital (cash return on cash invested). All quartiles are determined based on comparison with sector peers. Solutions providers comprise 19 companies with strong positions in industries we expect to benefit from significant growth in investment stemming from climate change pressures. GS SUSTAIN focus list leaders are shown in bold.

Exhibit 23: Abatement Leaders and Solutions Providers

Abatement Leaders

Sector	Name	Ticker	Return on capital (CROCI)		Climate change score	
			Percentile rel to sector	09-11E ave	Percentile rel to sector	% of max
Utilities	**Exelon Corp.**	**EXC**	**92%**	**12%**	**100%**	**85%**
	Centrica	**CNA.L**	**98%**	**16%**	**94%**	**75%**
	Fortum	**FUM1V.HE**	**75%**	**8%**	**92%**	**73%**
	Verbund	VERB.VI	59%	8%	88%	68%
	Entergy Corp.	ETR	61%	8%	75%	65%
Non-power utilities	National Grid	NG.L	54%	7%	81%	68%
Steel & aluminium	POSCO	005490.KS	50%	7%	95%	82%
Airlines	Deutsche Post	DPWGn.DE	66%	9%	100%	75%
Chemicals	Syngenta	SYNN.VX	75%	11%	93%	85%
	Givaudan	GIVN.VX	56%	9%	90%	83%
	Praxair Inc.	PX	71%	10%	84%	77%
	PPG Industries, Inc.	PPG	53%	9%	78%	71%
	Sigma-Aldrich Corp.	SIAL	84%	14%	81%	75%
Mining	**Vale**	**VALE**	**89%**	**18%**	**100%**	**86%**
	BHP Billiton	**BLT.L**	**73%**	**17%**	**85%**	**82%**
	Sterlite Industries	STRL.BO	94%	21%	80%	74%
Oil & Gas	EnCana Corp.	ECA	68%	13%	100%	83%
	Chevron Corp.	CVX	55%	12%	98%	80%
	Suncor Energy Inc.	SU	72%	14%	90%	74%
	BG Group	**BG.L**	**88%**	**17%**	**90%**	**74%**
	Exxon Mobil Corp.	XOM	87%	16%	83%	72%
	Hess Corp.	HES	77%	14%	79%	70%
	PTTEP	PTTE.BK	94%	18%	75%	68%
Road & rail	Burlington Northern Santa Fe	BNI	90%	11%	100%	70%

Solutions Providers

Sector	Name	Ticker	Mkt cap	Sales growth	EBITDA growth	Return on capital (CROCI)
			US$mn	2008-11E CAGR	2008-11E CAGR	2009-11E ave
Alternative energy	**Aveva Group**	**AVV.L**	**632**	**na**	**na**	**75%**
	Energy Resources of Australia	**ERA.AX**	**2905**	**12%**	**21%**	**14%**
	Shaw Group	SGR	3948	9%	14%	16%
	EDF Energies Nouvelles	**EEN.PA**	**3273**	**4%**	**28%**	**9%**
	Gamesa Corp.	**GAM.MC**	**5127**	**4%**	**14%**	**11%**
	Hansen Transmissions	**HSNT.L**	**1562**	**16%**	**20%**	**10%**
	Iberdrola Renovables	**IBR.MC**	**19208**	**17%**	**18%**	**7%**
	Vestas Windsystems	**VWS.CO**	**13773**	**13%**	**16%**	**16%**
	EDP Renovaveis	**EDPR.LS**	**8179**	**28%**	**30%**	**6%**
	Q-Cells	QCEG.DE	2946	20%	18%	7%
	REC	**REC.OL**	**4652**	**31%**	**26%**	**10%**
	SMA Solar	S92G.DE	2261	5%	-1%	30%
Energy efficiency	SFC Smart Fuel Cell	F3CG.DE	58	15%	-44%	-10%
	Ceres Power Holding	CWR.L	128	80%	-14%	-55%
	eaga	EAGA.L	498	-5%	-4%	24%
	Kingspan Group	KSP.I	957	-16%	-27%	6%
Alt. transport	BYD	0285.HK	1474	19%	14%	34%
Agriculture	**Monsanto**	**MON**	**48182**	**10%**	**13%**	**24%**
	Novozymes	NZYMb.CO	4635	4%	8%	13%

For Centrica, we have used 2005-07 average CROCI. Goldman Sachs & Co., and/or one of its affiliates is acting as Financial Adviser and Corporate Broker to Centrica and as such is an associate of Venture Production for the purpose of the Takeover Code.

Source: Quantum Database, Goldman Sachs Research

Exhibit 24: Adjustment Leaders

Adjustment Leaders													
Sector	Name	Ticker	Return on capital (CROCI)		Climate change score		Sector	Name	Ticker	Return on capital (CROCI)		Climate change score	
			Percentile rel to sector	09-11E ave	Percentile	% of max				Percentile rel to sector	09-11E ave	Percentile	% of max
Elec. equip.	Siemens AG	SIEGn.DE	63%	12%	89%	86%	Technology hardware	Philips Electronics	PHG.AS	62%	14%	96%	89%
Oil services	Noble Corporation	NE	100%	22%	85%	57%		**Hewlett-Packard Co.**	**HPQ**	**74%**	**17%**	**95%**	**85%**
	Halliburton Company	HAL	78%	15%	78%	56%		**International Business Machines**	**IBM**	**88%**	**26%**	**90%**	**82%**
	Schlumberger, Ltd.	**SLB**	**92%**	**18%**	**78%**	**49%**		**Cisco Systems, Inc.**	**CSCO**	**61%**	**13%**	**88%**	**79%**
Autos	Hyundai Motor	005380.KS	65%	7%	91%	82%		EMC Corporation	EMC	96%	54%	87%	78%
	BMW	BMWG.DE	82%	9%	78%	72%		Juniper Networks, Inc.	JNPR	72%	16%	83%	78%
Machinery	Komatsu	6301.T	80%	13%	100%	85%		Intel Corp.	INTC	66%	14%	77%	75%
	Alfa Laval	ALFA.ST	72%	12%	84%	76%	Telecom services	SK Telecom	017670.KS	64%	13%	81%	74%
	ITT Corp.	ITT	68%	12%	84%	76%		Telefonica	TEF.MC	50%	11%	79%	73%
Software & IT services	Microsoft Corp.	MSFT	77%	39%	100%	76%	Healthcare	**Johnson & Johnson**	**JNJ**	**74%**	**22%**	**87%**	**73%**
	Autodesk Inc.	ADSK	94%	81%	85%	54%		**Roche**	**ROG.VX**	**66%**	**20%**	**87%**	**73%**
	Google Inc.	GOOG	62%	29%	77%	51%		**Novo Nordisk**	**NOVOb.CO**	**89%**	**27%**	**85%**	**66%**
	SAP	SAPG.DE	54%	23%	88%	56%		Bristol-Myers Squibb Company	BMY	79%	23%	83%	65%
Non-food retail	Inditex	ITX.MC	57%	16%	94%	69%		Lundbeck	LUN.CO	76%	22%	77%	64%
	Hennes & Mauritz	HMb.ST	77%	20%	80%	57%		Merck & Co., Inc.	MRK	61%	19%	77%	64%
	Target Corporation	TGT	51%	14%	85%	60%		Schering-Plough Corporation	SGP	53%	18%	75%	63%
Food retail	Sysco Corp.	SYY	95%	30%	76%	71%		AstraZeneca	AZN.L	58%	18%	95%	81%
	Wal-Mart Stores, Inc.	WMT	80%	16%	76%	71%	Insurance	Aviva plc	AV.L	78%	15%	97%	79%
Media	Jupiter Telecommunications	4817.Q	91%	20%	100%	75%		Munich Re	MUVGn.DE	92%	19%	94%	75%
	Reed Elsevier	**REL.L**	**78%**	**13%**	**83%**	**68%**		**AXA**	**AXAF.PA**	**100%**	**35%**	**92%**	**74%**
	Time Warner Inc.	TWX	86%	16%	79%	68%		Trygvesta A/S	TRYG.CO	97%	20%	87%	69%
	Wolters Kluwer	WLSNc.AS	73%	12%	75%	64%		The Allstate Corp.	ALL	71%	13%	76%	63%
HHPC	**Colgate-Palmolive Company**	**CL**	**85%**	**28%**	**100%**	**78%**		**Allianz SE**	**ALVG.DE**	**50%**	**12%**	**100%**	**90%**
	Natura	**NATU3.SA**	**100%**	**52%**	**92%**	**68%**	Commerical & retail banks	**HSBC**	**HSBA.L**	**52%**	**10%**	**96%**	**78%**
	Reckitt Benckiser	**RB.L**	**64%**	**20%**	**78%**	**61%**		Grupo Santander	SAN.MC	57%	11%	93%	73%
Food & beverage	**Diageo**	**DGE.L**	**75%**	**15%**	**100%**	**79%**		**Standard Chartered Bank**	**2888.HK**	**73%**	**15%**	**88%**	**70%**
	Brown-Forman Corp.	BF__B	70%	14%	97%	73%		**BBVA**	**BBVA.MC**	**65%**	**12%**	**94%**	**75%**
	Unilever (plc)	ULVR.L	81%	16%	93%	70%		BNP Paribas	BNPP.PA	62%	12%	82%	64%
	Nestle	**NESN.VX**	**63%**	**13%**	**88%**	**70%**		Nedbank Group Ltd	NEDJ.J	88%	20%	80%	63%
	Anheuser-Busch InBev	INTB.BR	52%	11%	86%	69%		Fortis	FOR.BR	50%	10%	76%	60%
	Imperial Tobacco	IMT.L	59%	13%	81%	67%	Investment banks	UBS	UBSN.VX	85%	19%	87%	68%
	Novozymes	NZYMb.CO	61%	13%	84%	67%		Credit Suisse	CSGN.VX	80%	17%	87%	68%
	The Coca-Cola Company	**KO**	**97%**	**21%**	**77%**	**63%**		Deutsche Boerse AG	DB1Gn.DE	97%	28%	79%	62%
								Julius Baer Holding Ltd	BAER.VX	59%	11%	90%	70%

Source: Quantum Database, Goldman Sachs Research

Details of the performances of the large cap companies assessed on each area of their performance, as well as more comprehensive lists of companies with exposure to the growth trends we have identified are included in the larger report, also published today (*Change is coming: A framework for climate change – a defining issue of the 21st century*; May 20, 2009).

Reg AC

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