Goldman Sachs

Global Energy

Introducing the Goldman Sachs Energy Environmental and Social Index

Energy Environmental and Social Report

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Related research:

Global Energy: 50 projects to change the world, June 19, 2003

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Environmental and social issues count. While one-off events have limited share price impact, environmental and social issues will become increasingly important for oil and gas companies seeking to access the new legacy assets, which we view as the key driver of future performance and valuation. BP and RD/Shell stand out for their social and environmental track record, followed by Statoil and ExxonMobil 10% ahead of the pack.

UN request to analyse environmental and social issues in the oil and gas industry

This report follows a request from the UN Asset Management Working Group to analyse the environmental and social issues that are likely to be material for company competitiveness and reputation, and to identify their potential impact on valuation.

Introducing the GSEES Index: BP the outright winner, followed by RD/Shell, Statoil and ExxonMobil

The Goldman Sachs Energy Environmental and Social (GSEES) Index is based on an analysis of 30 environmental and social metrics in eight categories. We find that BP and RD/Shell stand out by some distance, followed by Statoil and ExxonMobil, which are 10% above Norsk Hydro, TOTAL, ChevronTexaco, BG and ENI, also notable performers.

Returns drive valuation; high GSEES Index scorers dominate next generation legacy assets

Economic return spreads drive valuations across the market. Environmental and social issues have limited impact on share prices unless they have a material impact on underlying returns, in our view. The companies with the best social and environmental track record, as measured by the GSEES Index, dominate the next generation legacy assets. In an increasingly complex world, we believe such issues are part of the relative quality of overall management performance needed to compete successfully. In this respect, social and environmental issues already appear to be playing a role in determining the relative winners within the industry.

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Overview: Environmental and social issues count

This report responds to an invitation from the Asset Management Working Group (AMWG) of the United Nations Environment Programme Finance Initiative (UNEP FI). The invitation was to identify specific environmental and social issues likely to be material for company competitiveness and reputation in the oil and gas industry and, to the extent possible, to quantify their potential impact on stock prices. We have attempted to analyse not only historical issues, but also those material to each company's future prospects. Our analysis breaks down into eight categories:

Environmental

- Climate change
- Pollution

Social

- Human rights
- "Corporate Management in the New World"
  - Management diversity and incentives
  - Investment in the future
  - Workforce
  - Safety
  - Transparency and vision

Introducing the Goldman Sachs Energy Environmental and Social Index

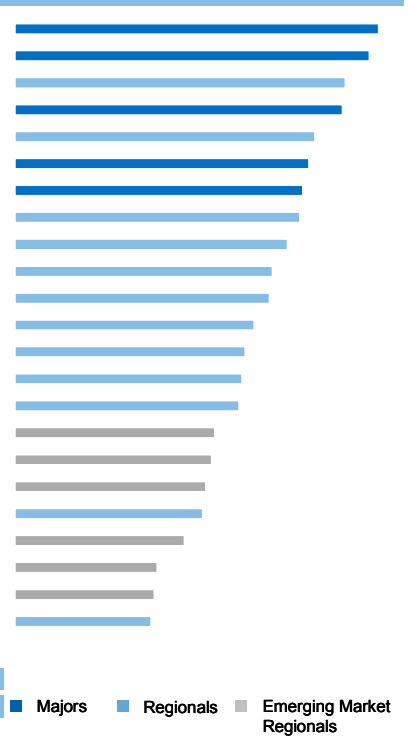
We have created the Goldman Sachs Energy Environmental and Social (GSEES) Index by scoring companies relative to each other on metrics within the above categories. There are 30 criteria, of which 28 are objective. We have not attempted to score the industry against other industries. We find significant differences in performance across categories, but some companies score consistently well, notably BP, RD/Shell, Statoil and ExxonMobil. BP and RD/Shell's scores are 8% higher than that of their nearest peer, ExxonMobil. Among the Regionals, Statoil is 10% higher than its nearest rivals, Norsk Hydro and BG, which also post noteworthy performances, as does ENI. Of the top ten companies in terms of GSEES scores, only OMV lacks material exposure to new legacy assets. Conversely, Marathon is the only company that scores well in terms of new legacy exposure but not in terms of GSEES. Exhibit 1 shows the relative positioning of all the companies we have analysed. We note that the data disclosed is not audited and is not consistent across the companies, and that many companies with GSEES Index scores below the average of 81 publish limited information on their social and environmental performance.

The GSEES Index summary scoreboard

A number of distinct groupings can be seen in the GSEES Index. BP and RD/Shell stand out together with Statoil and ExxonMobil in the first tier. A second group of similarly high scoring companies includes Norsk Hydro, TOTAL, ChevronTexaco and BG, closely followed by ENI. The remaining Regionals except MOL and CEPSA form a third tier with between 74 and 85 points. A fourth group is made up of the Emerging Market Regionals and MOL with scores between 56 and 66, while Yukos, Lukoil and CEPSA are at the bottom of the GSEES Index due to their very limited disclosure.

Exhibit 1: Company relative positioning on the Goldman Sachs Energy Environmental and Social Index

Company	Climate Change	Pollution	Human Rights	Management Diversity and Incentives	Investment in the Future	Workforce	Safety	Transparency and Vision	GSEES Index Overall Score (Max=142)
BP	23	3	11	20	6	22	21	14	120
RD/Shell	22	3	9	21	8	19	21	14	117
Statoil	18	7	11	18	5	19	18	13	109
ExxonMobil	13	3	8	18	8	23	23	12	108
Norsk Hydro	18	8	10	13	7	16	17	10	99
TOTAL	19	4	9	18	10	19	9	9	97
ChevronTexaco	14	3	10	20	8	19	13	8	95
BG	17	8	10	15	5	13	16	10	94
ENI	15	8	10	16	6	13	12	10	90
OMV	15	5	9	15	6	12	13	10	85
ConocoPhillips	12	6	9	20	7	11	8	11	84
Amerada Hess	14	5	10	15	2	11	11	11	79
Occidental	10	5	6	21	2	9	14	9	76
Marathon	5	3	6	20	2	15	17	7	75
Repsol	15	3	10	12	6	12	5	11	74
Petrobras	5	5	7	13	3	13	13	7	66
CNOOC	5	8	6	13	3	13	9	8	65
PetroChina	5	5	7	17	4	10	7	8	63
MOL	7	2	7	10	6	8	12	10	62
Sinopec	5	3	6	11	6	12	5	8	56
Yukos	7	4	7	10	2	7	5	5	47
Lukoil	5	4	6	12	2	8	5	4	46
CEPSA	5	2	5	13	2	9	5	4	45
Average	11.9	4.7	8.2	15.7	5.0	13.6	12.1	9.3	80.5
Maximum	25	8	12	23	10	25	25	14	142

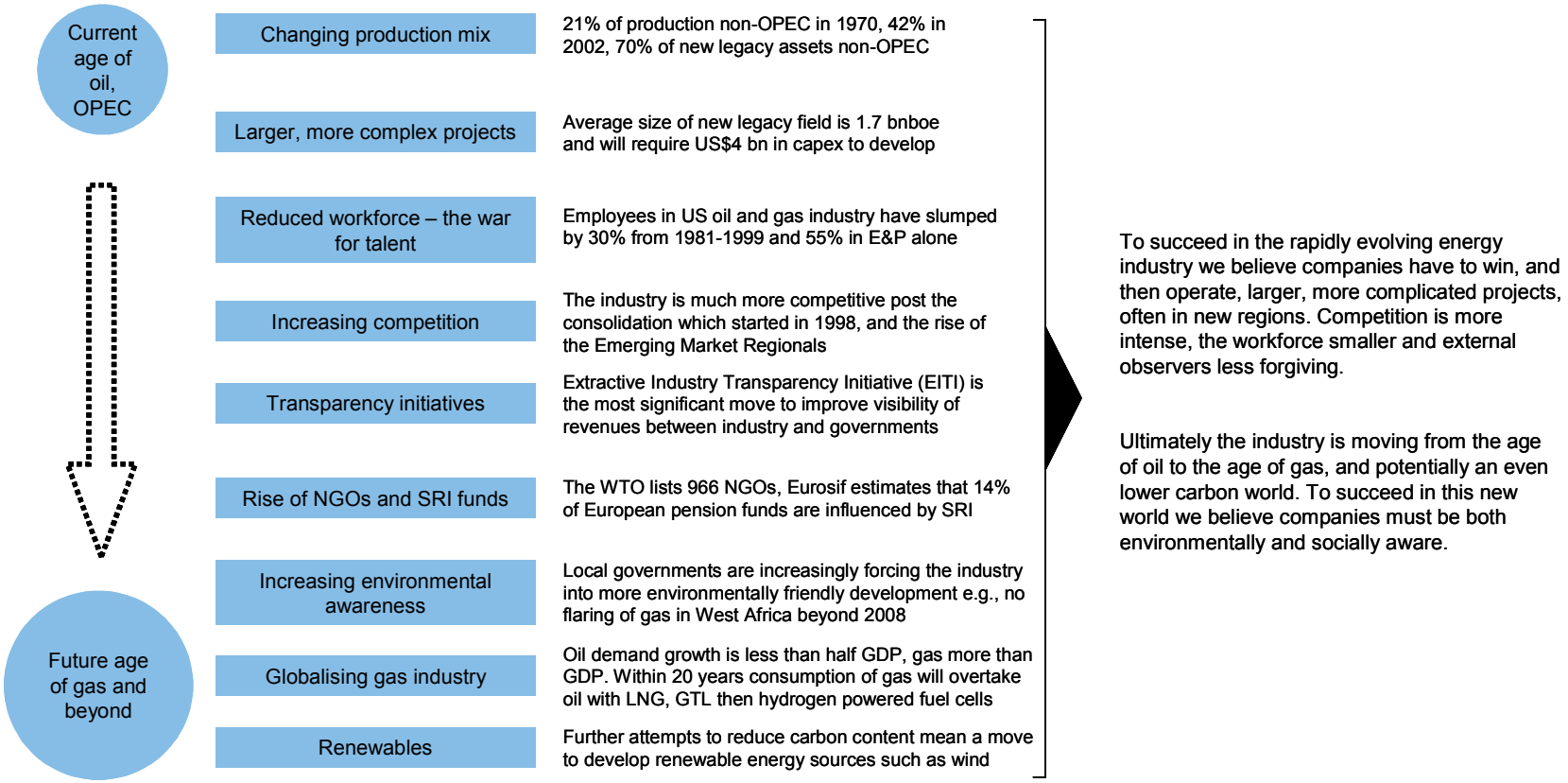


Source: Company data, Copal Partners, Goldman Sachs Research estimates.

Conclusion: In order to succeed, companies must be managed for the new world

While no company in the industry can be said to be incident free, one-off incidents do not have a significant impact on valuation and performance unless they have a material impact on a company's return outlook. The energy industry is undergoing profound structural change, as highlighted in Exhibit 2. In order to succeed consistently in gaining a dominant position in new projects, we believe that companies must be managed for the new world. In addition to traditional energy industry skills, that means managing a diverse workforce in a socially responsible and acceptable manner with a vision of the evolution of the industry towards the age of gas.

Exhibit 2: Goldman Sachs Energy Environmental and Social Conclusion

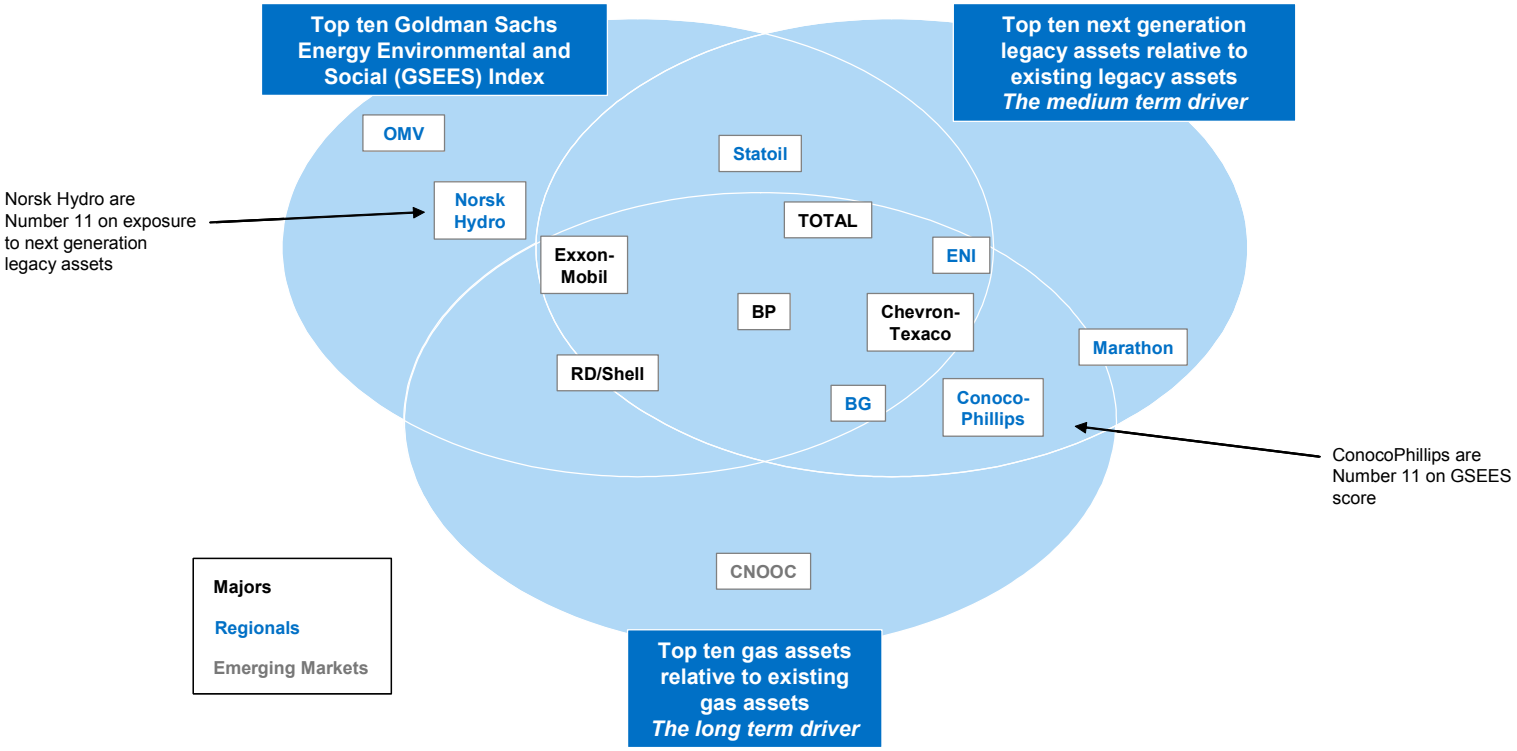


Source: Company data, Independent Petroleum Association of America, Goldman Sachs research estimates.

Majors the most advantaged, led by BP and RD/Shell; Statoil ahead of the Regionals

We believe that success in managing the issues outlined in our index is vital in the management of an energy company in the 21st century. It is no surprise that companies scoring well in the GSEES Index are also heavily exposed to next generation legacy assets (the key driver of medium-term performance) and gas projects (the long-term future). More than the Majors (which might be expected to dominate), it is the appearance of the Regionals that both score well in our Index and have strong asset exposure that highlights the importance of these issues in winning new projects. OMV (not really an upstream player), Marathon and CNOOC are exceptions to the rule.

Exhibit 3: Relative positioning of companies achieving top quartile performance across the GSEES Index, next generation legacy assets, and gas assets



Source: Company data, Goldman Sachs Research estimates.

Economic Return Spreads drive valuation; one-off issues do not impact share prices ...

In our report *Director's Cut* (September 11, 2003) we argued that Economic Return Spreads are the key driver for valuations across the market place, and that the oil sector is no different. One-off environmental and social issues have limited impact on share prices unless they have a material impact on the underlying returns of the company in question. A strong performance in social and environmental issues is no guarantee of stock market performance – both the FTSE4GOOD and DJ Sustainability Indices have underperformed the market since inception by 3% and 8% respectively.

... but social and environmental pressures are becoming increasingly important

In an increasingly complex world, social and environmental issues are having an increasing impact on companies' future project slates. We believe that this will have an increasing impact on future returns, and therefore valuation and share price performance. The increased focus on climate change and corporate governance, together with the rise of socially responsible investment (SRI)-managed money and non-governmental organisation (NGO) activity, is taking place at a time when the energy industry is undergoing profound structural changes: the globalisation of the gas industry, the ability to invest on a truly global basis, and the creation of a more competitive and complicated industry with the rise of a new world order of emerging market players. This could be seen as either a threat or an opportunity, and we believe the responses of the companies to these issues will have a growing impact on performance and valuation.

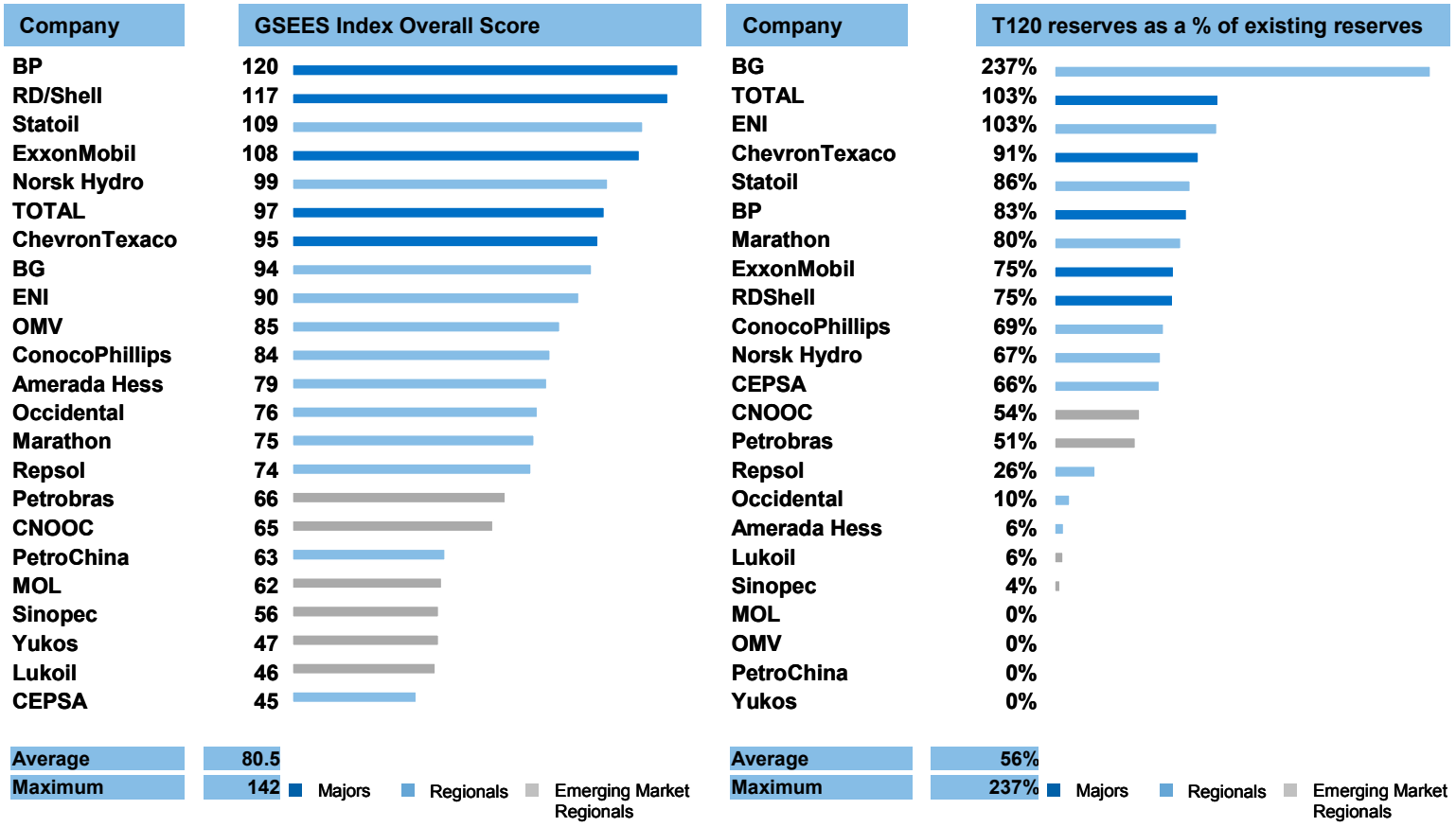
Socially and environmentally responsible companies dominate the industry's new legacy assets

On June 19, 2003, we published a report *50 projects to change the world*, pinpointing the projects that we believe form the next generation of legacy assets and will decide the relative winners within the industry. We have identified a further 70 projects to take this analysis to the Top 120 projects. Over 70% of these are in non-OECD countries and 42% of the peak production of 18 mboepd in 2012 is gas. Those companies with the best track record in terms of social responsibility and a vision of a low-carbon world for the future dominate the market share of new projects. It stands to reason that the best-managed companies deliver the best performance with regard to social and environmental issues and their interaction with the general business community. It is not surprising that they manage these issues as well as they manage the other more traditional success factors.

Companies with high GSEES Index scores dominate new legacy assets

Companies that score highly in the GSEES Index tend to have greater exposure to new legacy assets. Unsurprisingly, it is not a one-for-one relationship but, with the exception of Norsk Hydro and OMV, all the companies that score in the top 10 of the GSEES Index also score in the top 10 for exposure to new legacy assets as a percentage of existing reserves.

Exhibit 4: GSEES Index score versus Top 120 Projects reserves as a percentage of existing reserves



Source: Company data, Copal Partners, Goldman Sachs Research estimates.

Environmental and social issues facing the oil and gas industry

An increasing focus on reducing greenhouse gas emissions driven by Kyoto

The United Nations Framework Convention on Climate Change (UNFCCC) Kyoto Protocol is the main focus of attention with regard to the reduction of greenhouse gas emissions (GHGs), but it is not the only initiative with regard to climate change. There are now numerous initiatives on both sides of the Atlantic, and the impending system of fines, due to start in 2005 in Europe, appears to be concentrating the industry's thoughts on the subject of emissions and the move to a low-carbon world overall. The US may not have ratified the Kyoto treaty, but the US policy seeks to throw its weight behind the development of zero emissions energy technologies that will allow longer-term reductions in emissions while maintaining economic growth. Energy Secretary Spencer Abraham highlighted this in a statement on the Administration's climate change initiatives on February 13: "We have chosen the latter approach: the Bush Administration will spend approximately US$4 bn during this fiscal year on climate change science and technology R&D and ... supports more than US$4 bn in tax incentives to spur the use of clean, renewable energy and energy-efficient technologies." In the near term, the US has a national target to reduce greenhouse gases emitted per dollar of GDP by 18% between 2002 and 2012.

Embracing a move to a low-carbon world; gas and then renewables

In our opinion, the companies that have potential for creating significant value are those that have the most strategic options available to embrace a low-carbon world. Oil demand growth is less than half of GDP growth, while gas demand is growing at least the same rate as GDP. Gas is the lowest-carbon fossil fuel available and it is the most likely bridge between the current energy slate and one with a major share represented by renewables, which have a lower carbon content. At current growth rates, we estimate that gas consumption will overtake oil within the next 20 years, or maybe sooner, depending on the pace of the development of gas technologies, such as GTL (Gas to Liquids), and hydrogen-powered fuel cell vehicles. As such, we believe companies dominating the globalising gas industry in all its forms will be increasingly advantaged.

There is considerable momentum behind the renewables industry. It may not have the same impact as gas in the next 5-10 years, but its growing importance is highlighted by the UK government, among others, which is targeting 10% of all power generation to be fuelled by renewable sources by 2010.

Industry faces non-controllable environmental and social issues, both generic and government-mandated

In our view the environmental and social issues facing the industry fall into two categories: generic issues that impact all countries and companies, and those mandated by governments that may be country or company-specific.

- **Generic issues** include the impact of climate change, the rise of SRI funds, campaigns led by NGOs, and the inevitable one-off pollution incidents and other disasters. These events can result in lost production, boycotting by institutional shareholders, damage to company reputation and loss of assets, but in general one-off, non-controllable incidents do not materially impact shareholder value in our opinion.
- **Government-mandated issues** include petroleum product quality, bans on gas flaring and regulations for facility abandonment. In general, such initiatives are mandatory and unavoidable, and necessitate investments that are likely to provide low returns.

Generic issues: NGOs and the rise of SRI funds; pollution and climate change – limited impact

The rise of NGO-led campaigns and SRI funds

Of the 966 NGOs listed by the World Trade Organisation (WTO), Greenpeace is most widely recognised as having impacted the oil industry. One of the most notable incidents involving Greenpeace and the oil industry was its occupation of the Brent Spar in 1995 to protest at RD/Shell's plans to dispose of the platform. While Shell may have suffered damage to its reputation, its share price outperformed the sector by 2% over the course of the affair.

Investors became interested in SRI funds in the mid-1990s and these funds have now entered the mainstream fund management industry. European Sustainable and Responsible Investment Forum (Eurosif) estimates that 14% of European pension fund equity holdings are run either on a core SRI basis or influenced by SRI-based sector exclusions, e.g., tobacco. According to the Thompson Extel Survey of UK fund managers, 45% of respondents claim that more than 10% of their total assets are managed on an SRI basis and 92% of them expect this to increase in future. There is evidence that NGOs and SRI fund managers are increasingly working together in the way that Platform (an NGO focused on BP's Baku-Tblisi-Ceyhan pipeline project) is publicising UK fund manager Insight's displeasure (along with 12 other investors) with BP's management of the environmental and social issues facing the project.

One-off pollution incidents and other disasters do not materially impact shareholder value

The industry spilt an average of 320,000 barrels of crude and oil products per year during the 1980s and 1990s through tanker accidents. Tragedies are commonplace, with the recent notable example of the Prestige disaster last year. We have analysed the share price performance of four companies involved in major incidents and none underperformed the sector to any great extent in the aftermath of the disaster. An Oxford University research report by Dr R. Knight in 1996 entitled *The Impact of Catastrophes on Shareholder Value shows* that after an initial setback, natural disasters have minimal impact on the shareholder value of the companies involved. This is also the case in the oil sector, e.g., TOTAL in the wake of the Toulouse blast and Repsol following the Puertollano refinery explosion. We have found a similar situation for allegations of corruption: in September 2003 the so-called

"Irangate" affair rocked Statoil and led to the resignations of the Head of International E&P, the Chairman and ultimately the CEO. Statoil shares initially underperformed the sector, but recovered once the resignations had been announced, and there appears to be no overhang as a result of the allegations.

Increasingly volatile global weather conditions could interrupt oil & gas production, but limited impact to date

Global weather patterns are becoming increasingly more volatile. As an example, the Tropical Storm Risk (TSR) consortium has recorded an increasing level of tropical storm activity in the Gulf of Mexico, a major oil and gas producing region. In 2002 alone there were six named tropical storms and two hurricanes, one of which – Isidore – resulted in the loss of an estimated US$230 mn of production in a three-day period. BP, the company most exposed to the deep water Gulf of Mexico, lost an estimated US$70 mn due to weather-related incidents in the area in 2002. However, this is only some 0.4% of BP's annual cash flow, and the impact from such issues in general has been almost non-existent.

Government-mandated initiatives: Product quality requirements and the abolition of flaring – bigger impact

Initiatives on product quality, abandonment, pollution avoidance, flaring of gas and reduction of GHGs have been made mandatory by some governments and so are unavoidable. There is limited choice in terms of investment decision for the companies and the return on incremental investment is low. Penalties for not spending the money to comply with these initiatives could be material. The use of previously flared gas in Liquefied Natural Gas (LNG) export schemes or GTL projects and emissions trading activity represent the only real opportunities to create significant incremental value in this area in our view.

Petroleum product quality requirements

The reduction of pollution may have a relatively small impact on the environment in comparison with emissions overall, but there has been a constant series of initiatives both sides of the Atlantic since the early 1990s. The result is over a decade of significant refining capex (with minimal capacity forced out of the system), and continued downward pressure on downstream returns overall. GTL can produce low sulphur transportation diesel, which "is so clean that one expert said you could drink it without much more effect than eating a large packet of prunes" (*Financial Times*, December 9, 2003). The GTL industry is in its infancy, but announced capacity to date amounts to 2.2 mn bpd and represents 9% of global middle-distillate demand. Some 40% of output from a typical 100,000 bpd refinery is middle-distillate. Current announced GTL capacity effectively puts 55 average refineries at risk.

Abolition of gas flaring and increasing environmental awareness

Flaring of gas has a very negative impact on the environment. Nigeria and Angola alone account for approximately 15% of the gas flared in the world and to address this the west African governments have agreed to cease flaring of gas in 2008. Unless alternative uses for the gas can be found, the need to reinject gas will hit project economics. We estimate for the Akpo field in Nigeria the

reduction of flaring and subsequent need to reinject gas will reduce the project's IRR from 22% to 15%-16%. However, the rise of the global LNG industry means that Nigeria and Angola are planning some eight new LNG trains, which will result in the processing of 25 mtpa of LNG. The overall amount of gas flared could potentially support 16 mtpa of LNG exports worth US$1.5 bn pa. This is an excellent example of the industry turning a potential threat into an opportunity.

Even in regions with less stringent environmental regulations, the world is changing. In Kazakhstan, the giant Kashagan project has restrictions designed to protect the extremely fragile Caspian environment, with the result that development costs will be approximately US$2.2/boe, compared with average development costs for Russian oil companies Lukoil and Yukos of US$1.2/boe. If gas flaring had been allowed, we believe that the economics of Kashagan would have been improved considerably, but with a severe negative impact on the region's environment.

Abandoning production facilities in a safe and responsible way

The North Sea is a mature province with looming decommissioning liabilities. On average we estimate 19 platforms a year will need to be decommissioned in 2006-2017. The estimated cost for decommissioning the entire North Sea is US$24-30 bn, a significant amount compared with the North Sea's development spend of US$12 bn in 2002 and the industry's annual upstream capex of US$90 bn. Statoil has the greatest exposure in the region, followed by RD/Shell and ConocoPhillips. The expected cost is stimulating the industry to look at alternative uses for platforms, such as offshore wind and wave power generation facilities.

Greenhouse gas emissions, targets and trading; Europeans appear to be leading the industry

BP, RD/Shell and TOTAL have decreased their absolute levels of GHG emissions to more than 10% below 1990 levels. Adjusted for company size, the Majors all have relatively similar levels of emissions, with BP having made the biggest reductions and now having the lowest level of emissions. Even so the company is well behind industry leaders Norsk Hydro and Statoil, the bulk of whose operations are in a country that has had a carbon tax since 1991, and Amerada Hess in the US. Most of the other Regionals have emissions intensity relative to gross cash invested (GCI), which is somewhat higher than that of the Majors. BP and RD/Shell have publicly stated targets for GHG emissions with the baseline in 1990 and have already reduced emissions beyond their targets. TOTAL has also made significant reductions towards its target and BG, OMV and Repsol have decreasing emissions.

BP and RD/Shell are heavily involved in emissions trading already, and BG and TOTAL have had experience in emissions trading activity in the EU. Others such as ENI, Statoil and Norsk Hydro have no experience but plan to be involved in EU emissions trading programmes. In a June 2003 report by US-based NGO the Coalition for Environmentally Responsible Companies (CERES), which surveyed a number of major companies to produce a climate change checklist, BP and RD/Shell were the top-scoring companies from any industry, with a 100% success rate across all metrics used, while ConocoPhillips, ChevronTexaco and ExxonMobil were all in the fourth quartile.

Response to bribery and corruption; European industry signing up to the EITI

With 70% of the new projects in our analysis being sourced from non-OECD countries, many of which are classed by the World Bank as highly indebted poor countries (HIPCs), we believe that the potential for bribery and misappropriation of oil revenues is high. Six of the most oil-dependent countries in the world are classed as HIPCs, and in June 2003 the UK launched the Extractive Industry Transparency Initiative (EITI) to increase revenue transparency in countries dependent on these resources. Companies that have come out in support of the initiative include all the Majors, BG, Statoil and Repsol. The US government and US companies have lobbied for the initiative to remain voluntary whereas NGOs would like to see compulsory revenue declaration. BP likely remembers the Angolan government's anger following publication of licence bid values in 2002. Most companies have been associated with a scandal of one variety or another (most recently, and notably, Statoil), but only BP and RD/Shell publish data on employees dismissed for accepting bribes.

The changing world – a more complicated, competitive place

70% of next generation legacy production to come from non-OECD countries

In 1970, 21% of non-OPEC production came from non-OECD countries; by 2002 this proportion had doubled to 42%. On June 19, 2003, we published a report *50 projects to change the world*, in which we listed the 50 next generation legacy assets under development that we believe will form the backbone of the industry's production and profitability in coming years. On average each field has reserves of 1.8 bn boe, requiring US$4 bn of capex. We are expanding this analysis to a total of 120 projects including LNG, GTL and heavy oil schemes. We estimate these fields could produce 18 mn boepd by 2012, split roughly 60/40 between oil and gas, representing 13% of current world oil production and 19% of current gas production. Over 70% of the reserves and production from these new fields are in non-OECD countries.

Project size and complexity is far greater than in the past, and the bulk of the new projects are in more politically challenging areas. As such, we believe that a wider range of skills is required to win new legacy assets than in the past. This is exacerbated by increased competition for projects following the consolidation phase of the industry in the late 1990s and the emergence of giant competitors that were once NOCs (National Oil Companies) but are now genuine international competitors, e.g., TOTAL, the fourth-largest quoted oil company by market capitalisation, is now only the tenth-largest by reserve size!

An increasing number of environmental and social factors are involved in negotiating new oil and gas legacy assets

We believe that it is not sufficient for companies to excel in traditional areas such as geological estimates, technical considerations (in both construction and operation) and financial analysis. They must also be able to work with diverse partners, national oil companies, local as well as multi-national contractors, government officials in host governments and neighbouring countries lying on export routes, local communities and employees, and NGOs such as environmental and human rights activists. All of the above must be successfully negotiated in the glare of an unforgiving media spotlight, in a world where corporate governance and environmental, safety and ethical issues are high on the public's agenda. A recent example is Statoil's "Irangate" affair, although we note that there is no sign of the company being forced out of the South Pars 6-8 project as a result.

With an increasing number of projects taking place in non-OECD countries, and often involving multi-national co-operation, we believe that consistent success can only be achieved by those companies with the most skilled, motivated workforce. The number of employees in the oil industry has fallen consistently since the early 1980s, meaning that fewer employees are grappling with more complex challenges. The industry faces a stiff task in the war for talent. In our opinion, companies that have skilled, diverse workforces, managed in the most responsible manner, are the most successful in capturing market share of new legacy projects.

Social investments are small in comparison to R&D budgets; both are vital in the long run

Many companies invest in social projects and, although the sums may seem large in absolute terms, they are small relative to capex levels overall, with no company spending more than 1% of its 2002 capex budget on social investments. There is a narrow spread across the Majors in terms of investments and they are joined by BG and ENI in terms of relative spend. The companies spend much more in absolute terms on Research and Development (R&D) than they do on social investments, which is not surprising. TOTAL's spending on R&D is almost twice the average, which may reflect its specialty chemicals business. ExxonMobil and RD/Shell spent at this level in the past but have now retrenched to the average level. Statoil, OMV, Sinopec and Norsk Hydro are other notable investors in R&D.

As projects become more complicated, well managed and socially responsible companies more likely to succeed

The oil industry is struggling with a human resource crisis. The number of employees in the US oil industry is believed to have fallen from 1.87 mn at its peak in 1981 to 1.35 mn in 1999, with another 70,000 losing their jobs in that year alone. In upstream operations in the US the fall has been from 708,000 to 297,000 employees over the period 1982-1999.

With fewer employees charged with a greater number of more complicated projects, the best managed companies are likely to succeed from a financial and operational point of view. Host governments are increasingly keen to comply with environmental best practice and transparency initiatives, improve the skills base of NOCs and local contractors, the wealth of local communities, and improve the efficiency of their industrial base. We believe that only the best managed, most diverse, skilled and motivated workforce will be consistently successful, and then only if they are technology innovators, safe and reliable operators and partners that treat locals as equals, and are capable of helping the host government attain their goals. We have analysed a series of metrics in an attempt to encompass these issues.

Majors have similar relative employee levels; ExxonMobil's employees are the most expensive

With the exception of TOTAL, the Majors have a very consistent number of employees relative to their size, both against each other and over time. PetroChina and Sinopec stand out for their high level of employees relative to their GCI. TOTAL, along with Marathon and Norsk Hydro, also have abnormally high numbers of employees, only part of which can be attributed to their respective asset bases. There is more divergence in terms of payroll costs per employee, with ExxonMobil and BP, to a lesser extent, standing out as having high costs, and ENI, Repsol, PetroChina and Sinopec the outliers on the low side. Both BP and ExxonMobil utilise more of their cash flow in payroll costs than the other Majors, with the exception of TOTAL, which is the stand-out in the industry.

Limited disclosure on employee structure, with low levels of female employees across all levels

In the UK in 2002, 44% of all employees and 40% of professionals in the general workforce were women, while in the US the respective figures were 47% and 55%. The disclosure of the oil industry on this issue is remarkably poor. Only nine out of our sample of 23 companies gave any disclosure on the percentage of the workforce by gender; of these, only five reveal the data for the company as a whole. In all cases the percentage of women is highest at a graduate level, but even so the leader, BP, is only at 38%. At more senior levels the percentage drops sharply. Only BP and RD/Shell disclose the percentage of senior female leaders, at 13% and 8% respectively. The same two companies have 20% and 25%, respectively, at a senior executive level. Representation is somewhat higher at a Board level, and the industry does relatively well in terms of independent board structures.

The level of disclosure of ethnic minorities is even worse, and we do not feel comfortable in making a definitive judgment as to the relative merits of the companies on disclosed data. The majority of companies have either board or senior management responsibility for environmental and social issues, and approximately half disclose compensation links to such issues. Of the companies who disclosed data, only ChevronTexaco, Marathon and Repsol indicated that there was not a compensation link to performance on environmental and social issues.

Majors lead on safety, with a diverse performance across the industry

Analysing the respective safety records of companies in the industry is complicated by the fact that some companies disclose data for employees only, and some for employees and contractors together. In terms of the total recordable case (TRC) frequency, ExxonMobil and RD/Shell perform best, with TOTAL in particular lagging. In terms of lost time injury (LTI) frequency, BP, ExxonMobil and BG are the best performers, with Marathon and RD/Shell also of note (see Glossary on page 98 for description). Amerada Hess, ENI and OMV are notably poor performers on this metric. Another complication is that definitions of TRC and LTI frequency may not be consistent between companies.

Little difference among employees but the level of contractor fatalities divides the Majors

There is comparatively little difference between the companies in terms of the absolute level of fatalities with regard to company employees (with the exception of laggard TOTAL), although there is a considerable difference in terms of momentum, from BP's decline to RD/Shell's increase between 2000 and 2002. The greatest divergence across the industry is in terms of the number of fatalities among contractors working for the companies. While not much of an issue for the smaller players, there is a wide gulf between leaders (BP and ExxonMobil) and laggards (RD/Shell, PetroChina and TOTAL), who have a poor record in this respect relative to the rest of the industry. Across the companies analysed in this report, there was an average of one employee fatality for every three contractor fatalities during 2002 and 156 reported deaths in total.

The coming of the age of gas – the impact of vision and strategy

Low carbon intensity of natural gas will drive the globalisation of the gas industry

In our report *Picking winners in tomorrow's global gas industry*, June 15, 2001, we argued that the gas industry was set to globalise. In *The stone age didn't end for a lack of stones* (September 25, 2002), we forecast that consumption of gas will overtake oil within 20 years. These trends are accelerating. Gas demand is growing just below GDP growth while oil demand growth is less than half of GDP growth. An increasingly intense focus on climate change will accelerate moves to a gas-oriented energy world, since the carbon emission from natural gas is 25% less than oil and 50% less than coal. With non-OPEC reserve lives of 40 years for gas and 13 years for oil, we believe that these demand patterns will intensify as costs are reduced and infrastructure is built.

LNG, and now GTL, could drive gas to overtake oil within 15 to 20 years

LNG has been the focus of the gas industry so far, with newly announced plants expected to double current global capacity by 2007. Attention is now turning to GTL, where the pace of announcements increased in 2003 with Shell, Marathon and ConocoPhilips signing projects in Qatar. We expect global GTL capacity to reach 2 mn boepd by 2010. Capable of producing zero-sulphur transportation diesel with breakeven economics of around US$20/bl, GTL technology could accelerate the transition towards the age of gas. If a similar number of new plants are added annually to the number announced in 2003, gas could overtake oil as soon as 2015. Concerns over the climate and Middle East stability will further accelerate developments, as they will intensify focus on a part of the industry that has already seen a dramatic reduction in unit costs, and is only likely to become more competitive in time.

Industry spending heavily on gas; accumulated cash invested likely to double within five years

Over the next five years or so we forecast the amount of cash invested in the gas business will more than double. Many (7 out of 10) of the companies with a high GSEES score gain a substantial share of next generation gas legacy assets. BG is one of the leading Regionals, reflecting a clear integrated gas strategy. Among the Majors, RD/Shell's current exposure and vision is backed by its dominance of next generation gas assets.

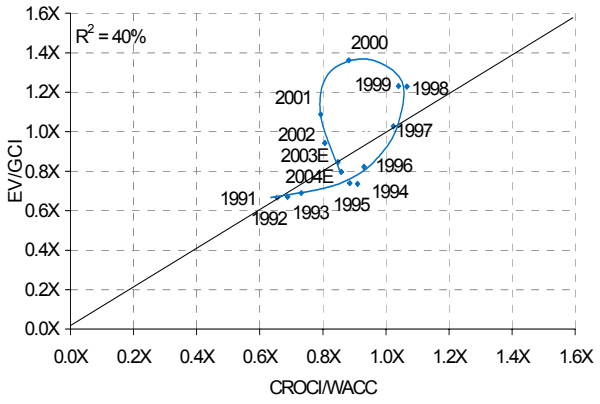
Beyond gas: The future lies in renewables; RD/Shell the most involved, followed by BP, Chevron and TOTAL

The future focus of development will be on hydrogen fuel cells (with hydrogen sourced from natural gas), wind, solar power, wave and biomass, in our view. Of these, only wind is remotely competitive currently, although the solar and hydrogen industries are both making great strides. The IEA (International Energy Agency) reported that renewable energy sources, including combustibles and waste sources, supplied 11% of global energy demand in 2001. As such we see them having a significant impact on the industry, but somewhat further out than gas. RD/Shell is the most involved company, with operations in wind, solar, biofuels and hydrogen, while BP, ChevronTexaco and TOTAL have operations in three of the four categories. The Majors plus ENI, Hydro and Statoil have made investments to develop hydrogen as a carrier fuel. Investments to date for all companies are insignificant relative to existing operations.

Valuation and the impact of environmental and social issues on the industry

Economic return spreads are the key valuation driver across the market

Exhibit 5: EV/GCI vs. economic return spread



In our view, economic return spreads are the key valuation driver for the market, across sectors and for the oil sector. Correlations of valuation to economic return spreads are very high for the market, across all sectors and for the oil sector. We find that no other valuation methodology comes close in terms of predictive power for share prices. In our report *Director's Cut: Returns win*, September 11, 2003, we argued that the bulk of the value (60%) of any company is determined by its long-run, or sustainable, returns, the next 20% by secular or cyclical change observed in the coming 12 months; and the remainder by longer term growth or other issues.

One-off issues have a limited impact on share prices. In our opinion, environmental and social issues will have an impact on share prices if they affect the long-term returns profile of a company.

Exhibit 6: EV/GCI vs CROCI/WACC, 2004E

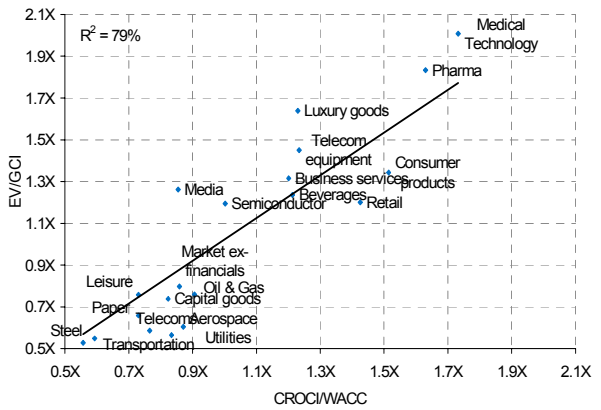


Exhibit 7: Annual R^2 across sector

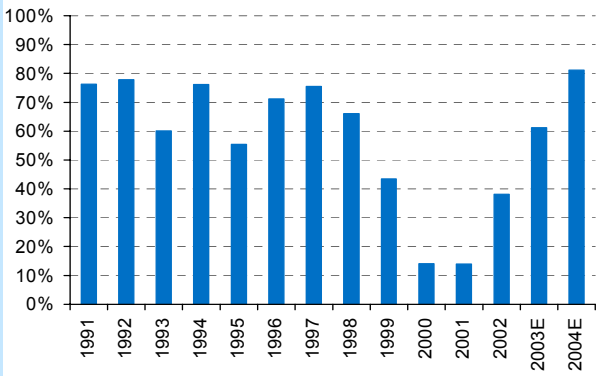
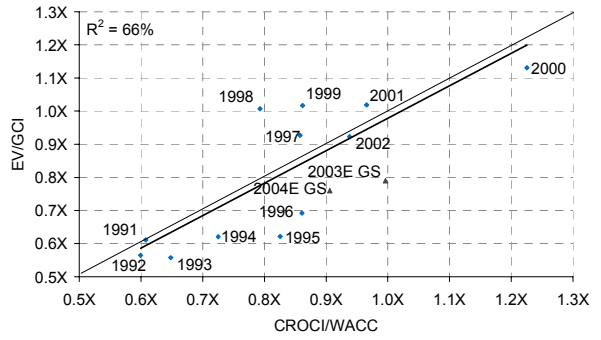


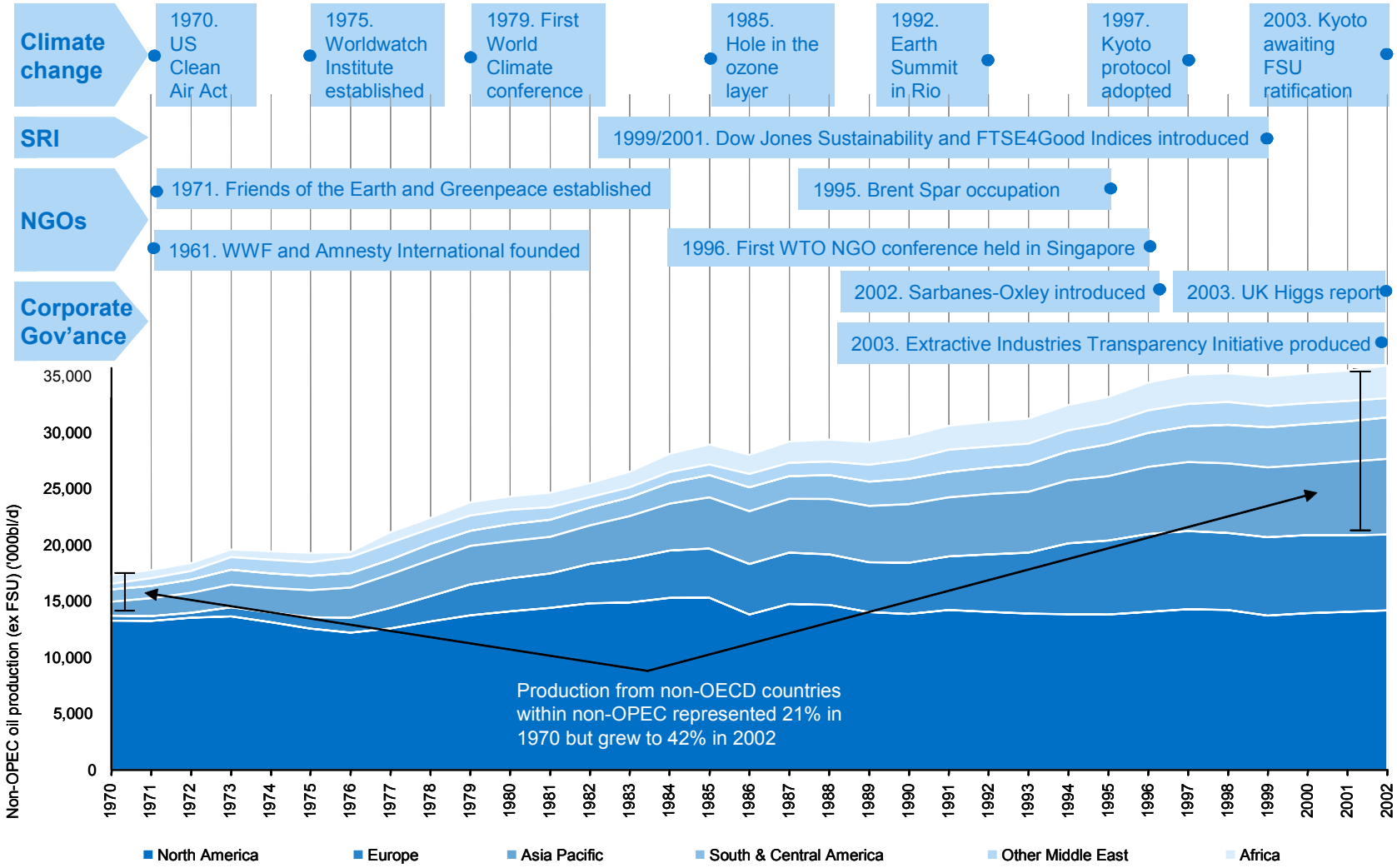
Exhibit 8: Oil and Gas EV/GCI vs. CROCI/WACC



Source: Goldman Sachs Research estimates.

Key trends in social and environmental issues

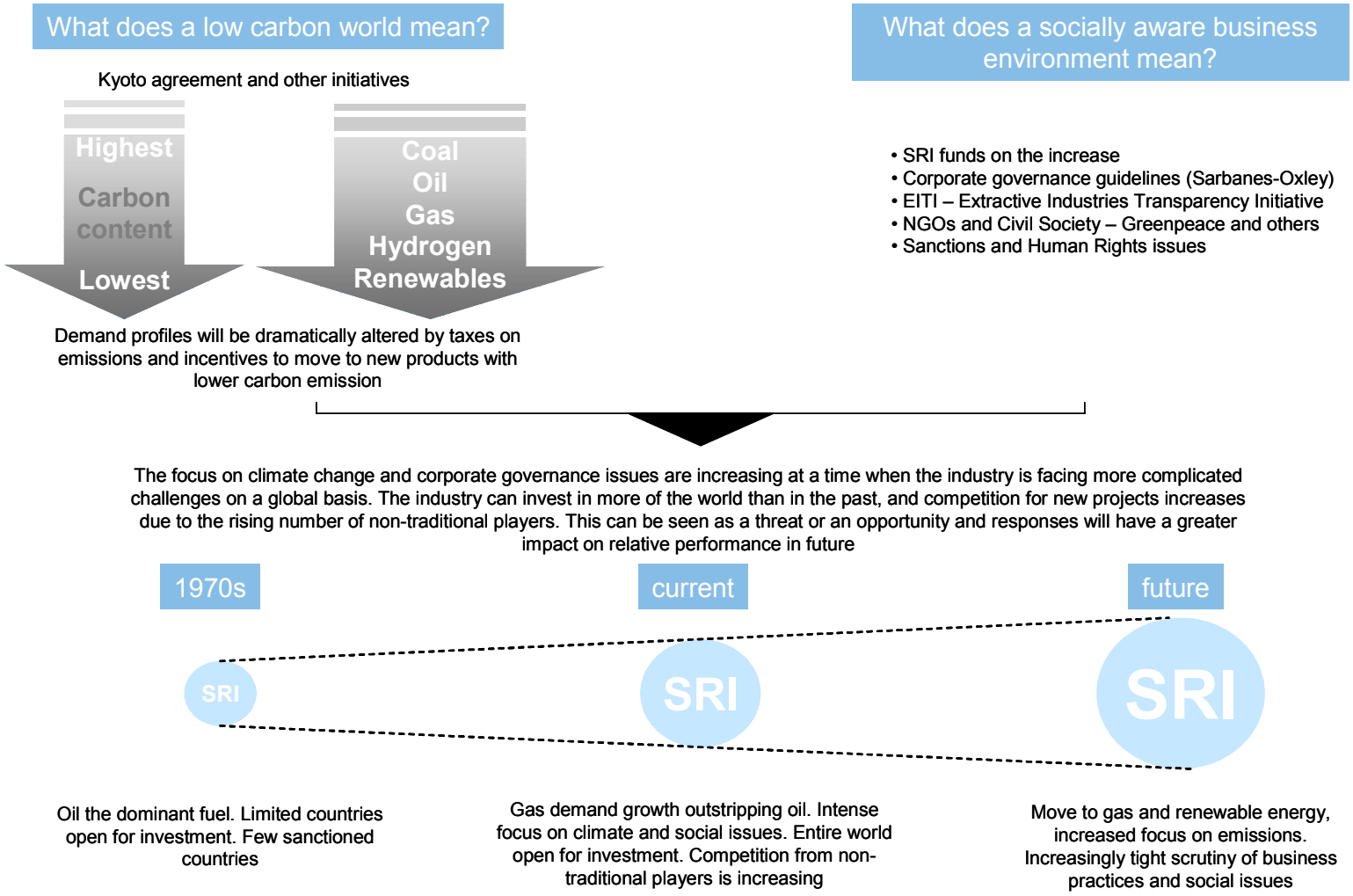
Exhibit 9: Timeline of environmental and social issues and the increasing dominance of non-OECD production



Source: BP Statistical Review of World Energy.

Impact of key trends on the oil and gas industry

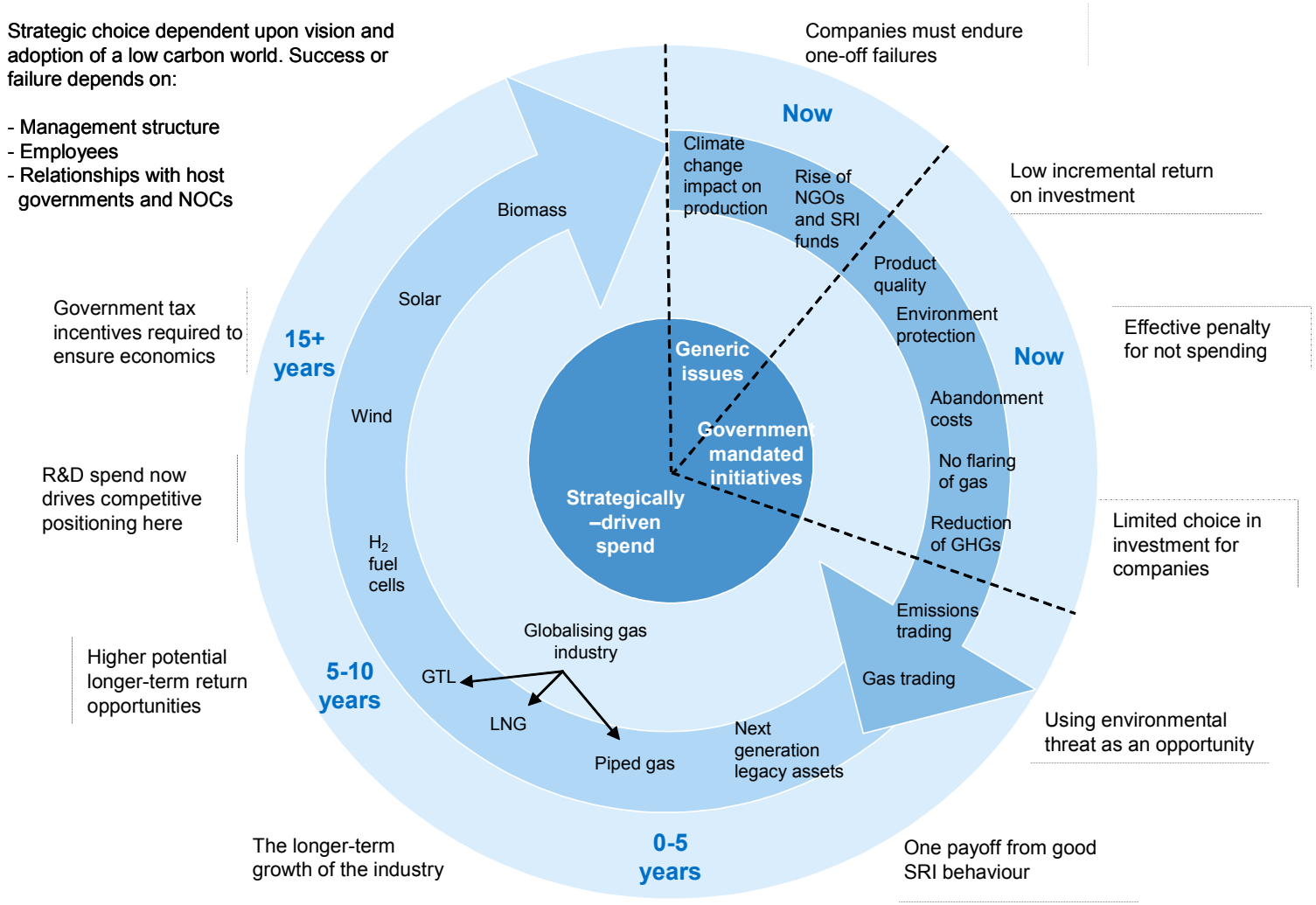
Exhibit 10: Increasing importance of social and environmental issues is both a threat and an opportunity



Source: Goldman Sachs Research estimates.

Environmental issues: from one-offs to drivers of strategic vision

Exhibit 11: Increasing impact of environmental issues



Source: Goldman Sachs Research estimates.

The Goldman Sachs Energy Environmental and Social Index

Ranking the companies: the Goldman Sachs Energy Environmental and Social Index

We have ranked all of the global oil and gas companies on their performance in eight broad environmental and social categories. There are 30 individual metrics on which the companies have been given a score from a minimum of 1 or 2 to a maximum of 4 or 5, depending on the metric. A detailed description of each metric, the criteria used to give each score and the results for each company are given in the Appendix, starting on page 99.

Environmental categories

- **Climate change:** including metrics for targets and performance; greenhouse gas (GHG) intensity levels; change in GHG emission levels; emissions trading; renewable energy (maximum possible score of 25).
- **Pollution:** including metrics for oil spills and other polluting activities; downstream asset exposure (maximum possible score of 8).

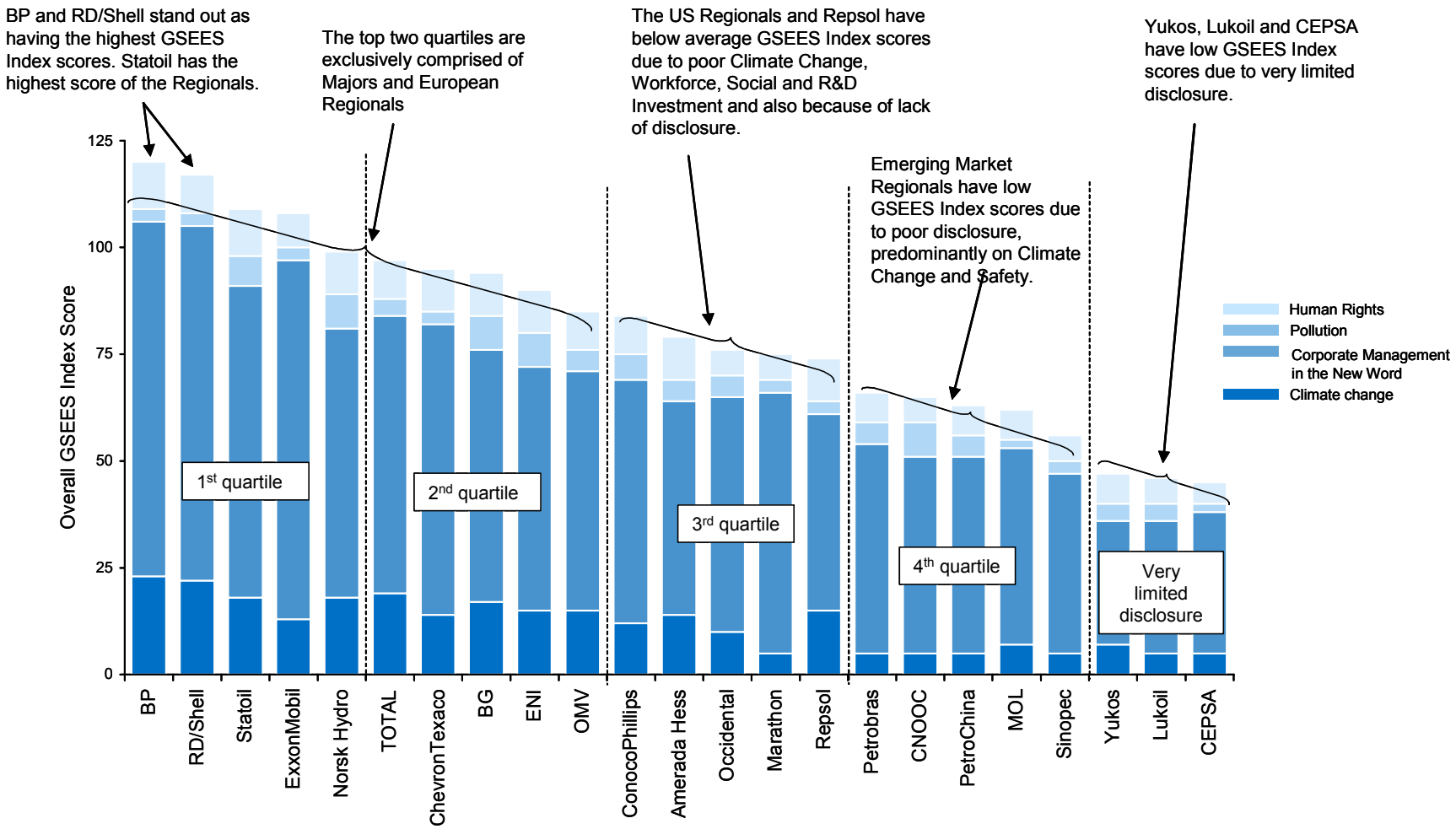
Social categories

- **Human rights:** including metrics for campaigns led by NGOs; policy for human rights; EITI participation (maximum possible score of 12).
- **Management diversity and incentives:** including metrics for Board diversity; senior management diversity; compensation disclosed and linked to social and environmental issues; clear statement on environment, safety, corporate governance and human rights; board member responsible for social and environmental issues (maximum possible score of 25).
- **Investment in the future:** including metrics for social investments as a percentage of capex; research and development as a percentage of cash flow (maximum possible score of 10).
- **Workforce:** including metrics for diversity disclosure; diversity performance; employee intensity; payroll as a percentage of cash flow; payroll per employee (maximum possible score of 25).
- **Safety:** including metrics for fatalities; LTI frequency; change in LTI frequency; TRC frequency; change in TRC frequency (maximum possible score of 25).
- **Transparency and vision:** including metrics for quality of disclosure; duration of publication; independent audit on data (maximum possible score of 14).

The GSEES Index overall score is the total of each company's score across the metrics and the maximum possible score is 142. BP achieves the highest GSEES Index overall score of 120, with RD/Shell close behind on 117.

BP, RD/Shell, Statoil and ExxonMobil lead in the GSEES Index

Exhibit 12: Company relative positioning in the GSEES Index



Source: Company data, Copal Partners, Goldman Sachs Research estimates.

28 **SRI managed money growing in importance, but performance has disappointed**

29 **Impact of SRI Funds on project management – BP and the BTC Pipeline**

30 **The impact of Non-Governmental Organisations on share prices has been limited**

31 **Climate change – the impact of harsh weather on oil and gas production is limited**

32 **Oil tanker spills; no discernable impact on share price performance**

33 **Catastrophes have a limited impact on shareholder value**

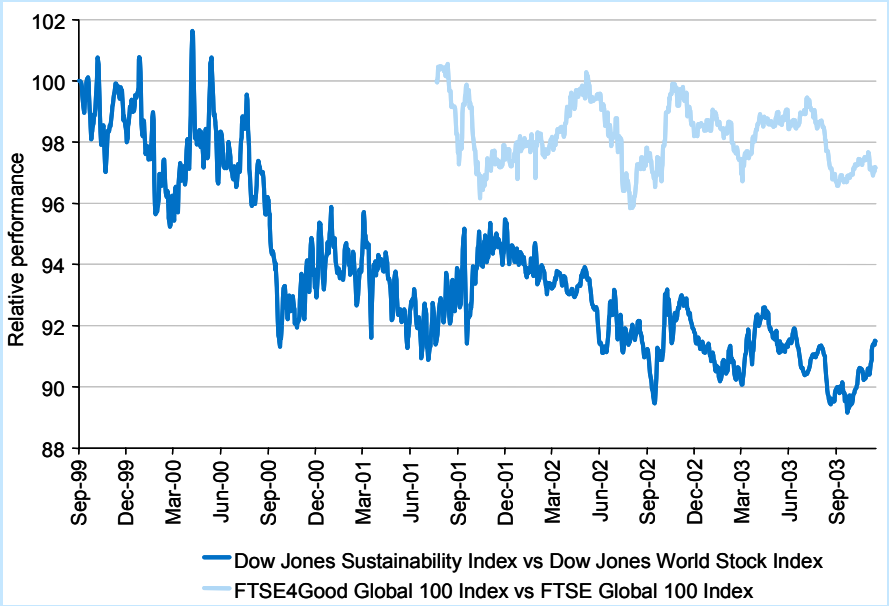
34 **Allegations of bribery and corruption – Statoil's "Irangate" affair**

35 **A snapshot of environmental issues relating to the oil industry at present**

Non-controllable generic issues; the rise of SRI funds and NGOs

SRI managed money growing in importance, but performance has disappointed

Exhibit 13: Relative performance of SRI indices



Source: European Sustainable and Responsible Investment Forum, Bloomberg, Dow Jones, FTSE.

Socially Responsible Investment (SRI) came into being in the mid-1990s. It has now entered the mainstream financial markets and is increasingly being accepted and adopted by the financial community. The European Sustainable and Responsible Investment Forum (Eurosif) estimates that 'core' SRI managed investments at the end of 2003 amounted to EUR34 bn and accounted for 2.1% of total European pension fund equity holdings.

There is, however, no single definition of SRI. Beyond the core SRI fund managers (such as Insight Henderson, Jupiter and ISIS), Eurosif estimates that simple screening measures – e.g., investors choosing not to invest in tobacco companies or companies with activities in Myanmar – result in the wider institutional SRI market in Europe being worth EUR218 bn, or 14% of total European pension fund equity holdings.

The Dow Jones Sustainability Index and the FTSE4Good Index allow fund managers to measure performance. These indices have underperformed their broader market peers by 8.5% and 2.8%, respectively, since their creation in September 1999 and July 2001.

However, the outlook for SRI is positive. In a recent Thomson Extel UKSIF survey of UK fund managers, 45% of respondents managed more than 10% of their total assets on an SRI basis. In the same survey, 92% of respondents expected their involvement on the SRI market to increase and 71% expected the percentage of their total broker commission devoted to SRI to increase in the coming years.

Oil and gas companies included in the DJ Sustainability Index are BG, BP, RD/Shell and Statoil, whilst BG, BP, ENI, TOTAL and RD/Shell are the only oil and gas companies in the FTSE4Good Index. BP is the energy sector leader in the DJ Sustainability Index. ConocoPhillips was removed from the DJ Sustainability Index in September 2003 as it failed to meet the criteria.

Impact of SRI Funds on project management – BP and the BTC Pipeline

Exhibit 14: BTC pipeline route

Source: BP, Insight.

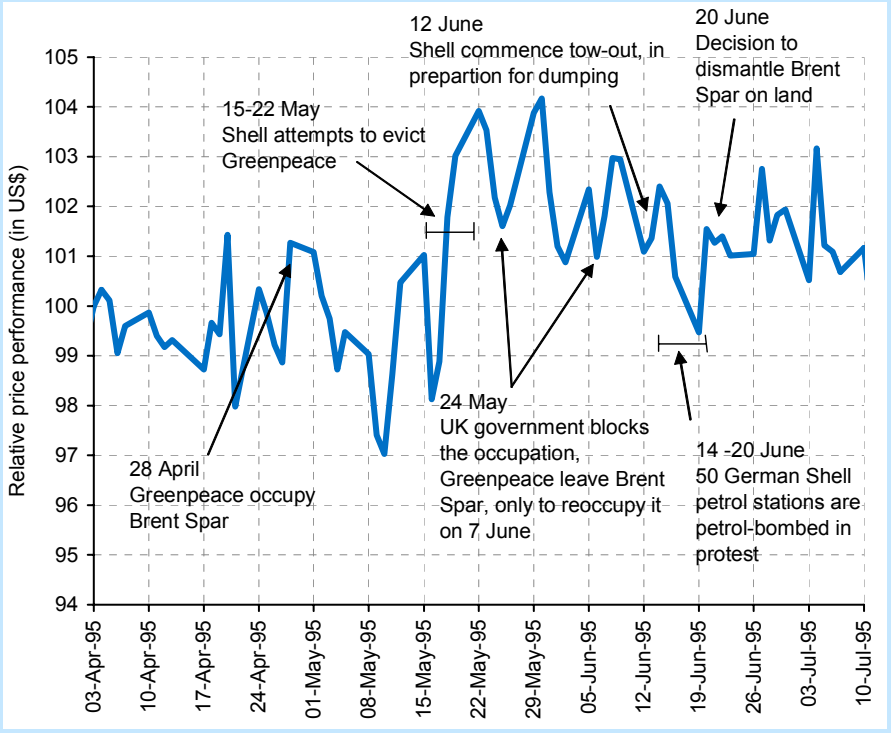
BP has been the subject of an NGO campaign and pressure from SRI fund managers over its BTC (Baku-Tbilisi-Ceyhan) pipeline which will export crude from the ACG (Azeri, Chirag, Guneshli) fields in the Caspian Sea through Azerbaijan, Georgia and Turkey to the Mediterranean coast. BP believes it has the potential to create 10,000 local jobs and US$26-63 bn in government revenues while decreasing environmental risk from shipping congestion in the Turkish Straits. Approval has been obtained from the governments and funding has been guaranteed by the World Bank IFC (International Finance Corporation) for US$310 mn (November 7, 2003) and the EBRD (European Bank for Reconstruction and Development) for US$250 mn (November 11, 2003) out of a total investment estimate of US$3.2 bn.

Insight Investment is a large institutional shareholder (£67 bn under management as at September 30, 2003) which is committed to encouraging companies to have high standards of corporate responsibility. As stated in its Autumn 2003 Investor Responsibility Bulletin, the BTC pipeline project has been the subject of "an extensive and long-running NGO campaign". On September 16, 2003, Insight hosted a meeting between BP and 12 institutional investors at which BP/BTC discussed the "BTC Human Rights Undertaking" in which the consortium cannot seek financial compensation if the local governments act to fulfil obligations of international treaties. Insight stated that "the meeting with BP was somewhat unsatisfactory, as BP was not able to fully answer many of the specific questions we raised about issues such as security, human rights and the environment". The investors and Insight have written a letter to BP requesting more information, to which they are awaiting a response.

A coalition of European NGOs, including Platform, recently (January 9, 2004) highlighted three legal challenges to the BTC project. These include the Host Government Agreement with Turkey, environmental permits in Georgia and a human rights complaint from Turkish citizens of Kurdish descent. Each case may have consequences that would cause the BTC project to be in default of its World Bank IFC loan agreements.

The impact of Non-Governmental Organisations on share prices has been limited

Exhibit 15: Shell T&T's relative share price performance during the Brent Spar incident



Source: Bloomberg, Greenpeace, World Trade Organisation.

There has been a sustained rise in the number of NGOs since the early 1970s, when Greenpeace and Friends of the earth were established.

The WTO lists 966 NGOs that were eligible to attend the Fifth WTO Ministerial Conference in Cancun, Mexico. The list includes globally recognised names such as Greenpeace, Amnesty International and Friends of the Earth as well as regionally focused and industry-specific associations.

Greenpeace is the most widely recognised NGO with regard to its impact on the oil industry, notably for the Brent Spar incident in 1995. Although Shell received very negative press as a result of its proposed dumping of the platform as a result of the Greenpeace pressure, Shell shares actually outperformed the European Oils by just under 2% between the first occupation (April 28, 1995) and decision to dismantle the Brent Spar on land (June 20, 1995).

Campaigns by NGOs can have a short-term effect on company share prices but, in general, these issues do not persist. Examples of other companies that have endured campaigns against their operations by NGOs are ExxonMobil and Occidental, for their Indonesian and Colombian operations, respectively.

Climate change – the impact of harsh weather on oil and gas production is limited

Exhibit 16: Growing levels of tropical storms

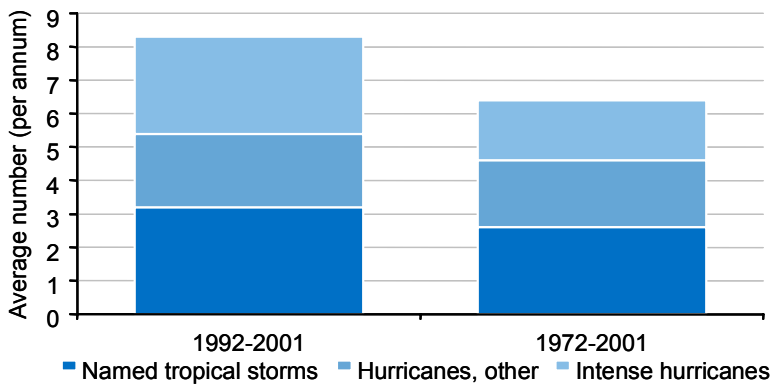
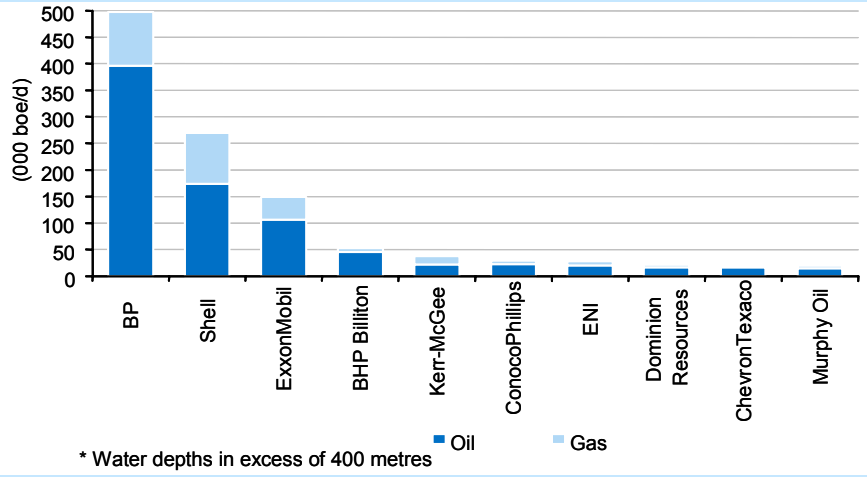


Exhibit 17: Company exposure to the deepwater Gulf of Mexico *



The Tropical Storm Risk Consortium (TSR) has recorded an increasing level of tropical storm activity in the Atlantic Main Development Region, Caribbean and Gulf of Mexico since the early 1970s. The rise of volatile weather conditions and the increasing focus on achieving production uptime have led to many oil and gas companies employing meteorologists to ensure access to the best quality data.

In 2002 six named tropical storms and two intense hurricanes (Lili and Isidore) impacted oil and gas production activities in the Gulf of Mexico. Issidore and Lili struck between October 14 and November 4, 2002 causing a three-day closure which stopped the flow of 45mnbls of crude and 25bcf of gas, corresponding to a loss of U$230 mn. Outside the oil sector, port closures and industrial losses were estimated at US$2 bn.

Harsh weather conditions can also materially impact drilling operations, delaying new field starts and forcing production shut-ins which could result in long-term reservoir damage.

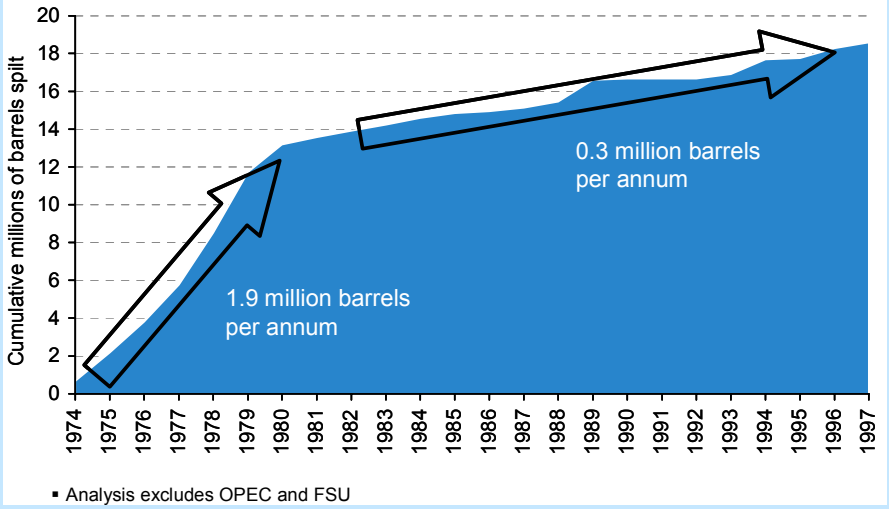
Of the world's oil and gas production regions, the Gulf of Mexico is the most prone to hurricanes and extreme weather. The deepwater area is the domain of the Super Majors, due to the technical challenges and capital required. BP is the most exposed to the region.

The Gulf of Mexico hurricanes in 2002 resulted in an immaterial average 20kboe/d production loss for BP during 2002, equivalent to c.US$70 mn of cash flow (or just 0.4% of corporate cash flow). However, the size and volatility of such non-controllable issues led BP, and subsequently many companies, to change from publishing production growth targets to focusing on production capacity targets.

Source: Company data, Tropical Storm Risk Consortium, Upstream Online, Carbon Disclosure project.

Oil tanker spills; no discernable impact on share price performance

Exhibit 18: Cumulative barrels split by the oil industry since 1974



Source: Company data, Bloomberg, Environmental Technology Centre Canada, International Tanker Owners Pollution Federation.

The oil and gas industry is widely seen as a polluter of the environment. Increasing levels of environmental awareness and responsibility stemmed the growth in oil and fuel products spilt by the industry since the early 1970s. Nonetheless, during the 1980s and 1990s, the industry spilt an average of 320,000 barrels per year, greater than the volume spilt in the Exxon Valdez disaster (see below).

We show the relative share price performance for companies following four of the most recent and most memorable oil tanker spills. On average, the companies underperformed their peer group by only 2% in the week and month following a spill. Beyond this period, we see no discernible negative impact on share prices.

One of the most memorable is the Exxon Valdez spill in 1989. Exxon has spent a total of US$3.5 bn as a result of the spill and still faces the prospect of punitive charges of US$4 bn. The initial cost, before any potential tax deductions, represented 6% of the company's market cap, yet its shares did not fully reflect the charge nor the prospect of punitive damages, suggesting other factors were more influential over the period.

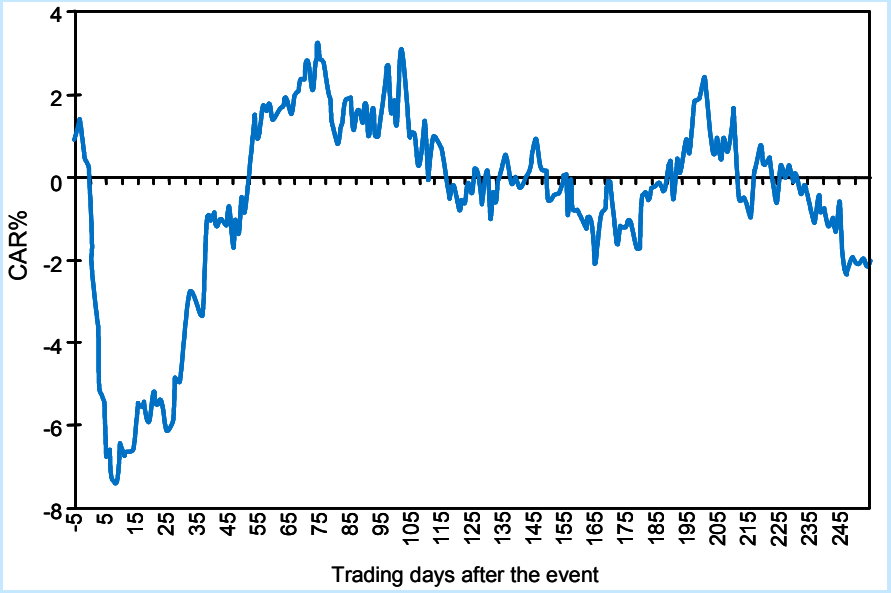
Exhibit 19: Relative share price performance of companies following oil tanker spills

				Sector relative share price performance				
Company	**Tanker**	**Date**	**Size (bls)**	**1 day**	**1 week**	**1 month**	**3 months**	**12 months**
Exxon	Valdez	24-Mar-89	275,000	-3%	-5%	-5%	-3%	-5%
Texaco	Sea Empress	15-Feb-96	535,000	-2%	0%	2%	-5%	-2%
TOTAL	Erica	12-Dec-99	149,000	-1%	-3%	-6%	13%	9%
CEPSA	Prestige	24-Jan-03	573,000	1%	0%	2%	4%	n/a
Average			**383,000**	**-1%**	**-2%**	**-2%**	**2%**	**1%**

Source: Company data, Bloomberg, Environmental Technology Centre Canada, International Tanker Owners Pollution Federation.

Catastrophes have a limited impact on shareholder value

Exhibit 20: Impact of catastrophes on shareholder value



Source: Company data, University of Oxford, Sedgwick Group, Bloomberg.

The impact of catastrophes on shareholder value was analysed in an Oxford Executive Research Report by Dr Rory F. Knight in 1996. Analysis of 15 corporate catastrophes indicates that, on average, a catastrophe did not affect long-term shareholder value. However, some companies' shares recovered well from such incidents whilst some did not recover at all.

It appeared that the market heavily penalised those disasters that resulted in large death tolls but rewarded those companies which effectively managed the disaster consequences. While companies in general have insurance cover, it appeared that the share price recovery was independent of the presence of insurance cover.

We have analysed the relative share price performance of five oil and gas companies following operational disasters. On average the companies suffered 4% relative share price underperformance versus the sector one month after the event. Both Phillips and TOTAL shares recovered strongly in the 12 months following disaster while Petrobras and Occidental took longer to recover, reflecting the importance of the assets lost in the disaster.

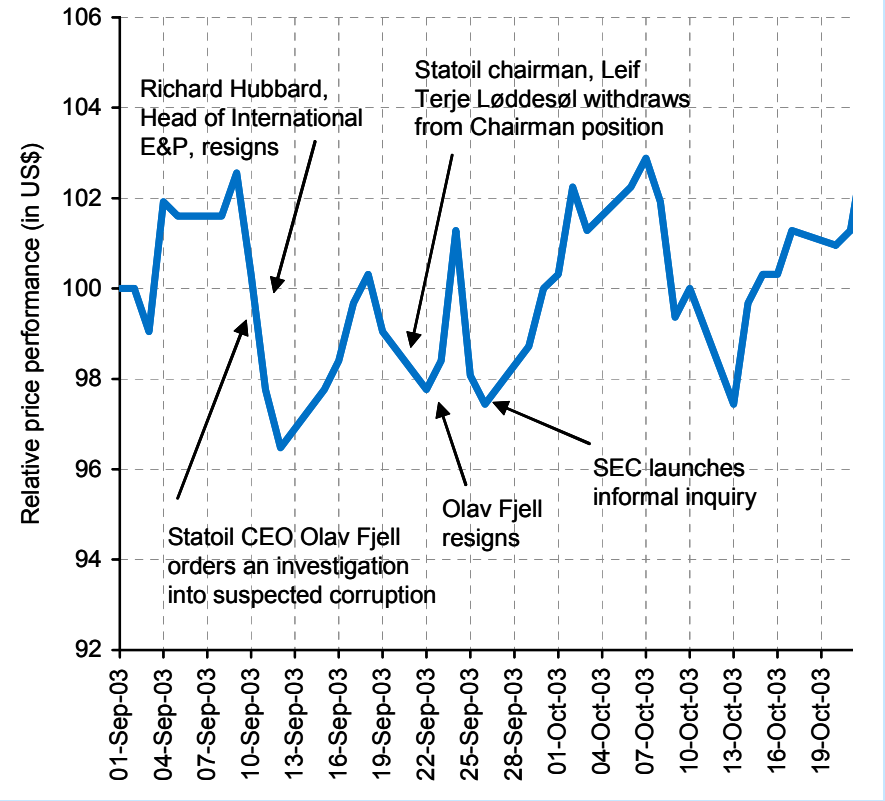
Exhibit 21: Relative share price performance of companies following catastrophes

					Sector relative share price performance				
Company	Disaster	Date	Estimated cost (US$mn)	Fatalities	1 day	1 week	1 month	3 months	12 months
Occidental	Piper Alpha explosion	06-Jul-88	1,400	167	-3%	-2%	-6%	0%	-12%
Phillips	Pasadena petchem explosion	23-Oct-89	1,300	23	-5%	-5%	-8%	-2%	11%
Petrobras	Sinking of P-36 platform	20-Mar-01	500	10	-4%	-6%	-9%	-16%	-24%
TOTAL	Toulouse refinery explosion	21-Sep-01	1,400	29	2%	2%	3%	7%	9%
Repsol	Puertollano refinery explosion	14-Aug-03	n/a	6	0%	2%	0%	3%	n/a
Average					**-2%**	**-2%**	**-4%**	**-2%**	**-4%**

Source: Company data, University of Oxford, Sedgwick Group, Bloomberg.

Allegations of bribery and corruption – Statoil's "Irangate" affair

Exhibit 22: Statoil's relative share price performance during the "Irangate" affair



Source: Company data, Bloomberg.

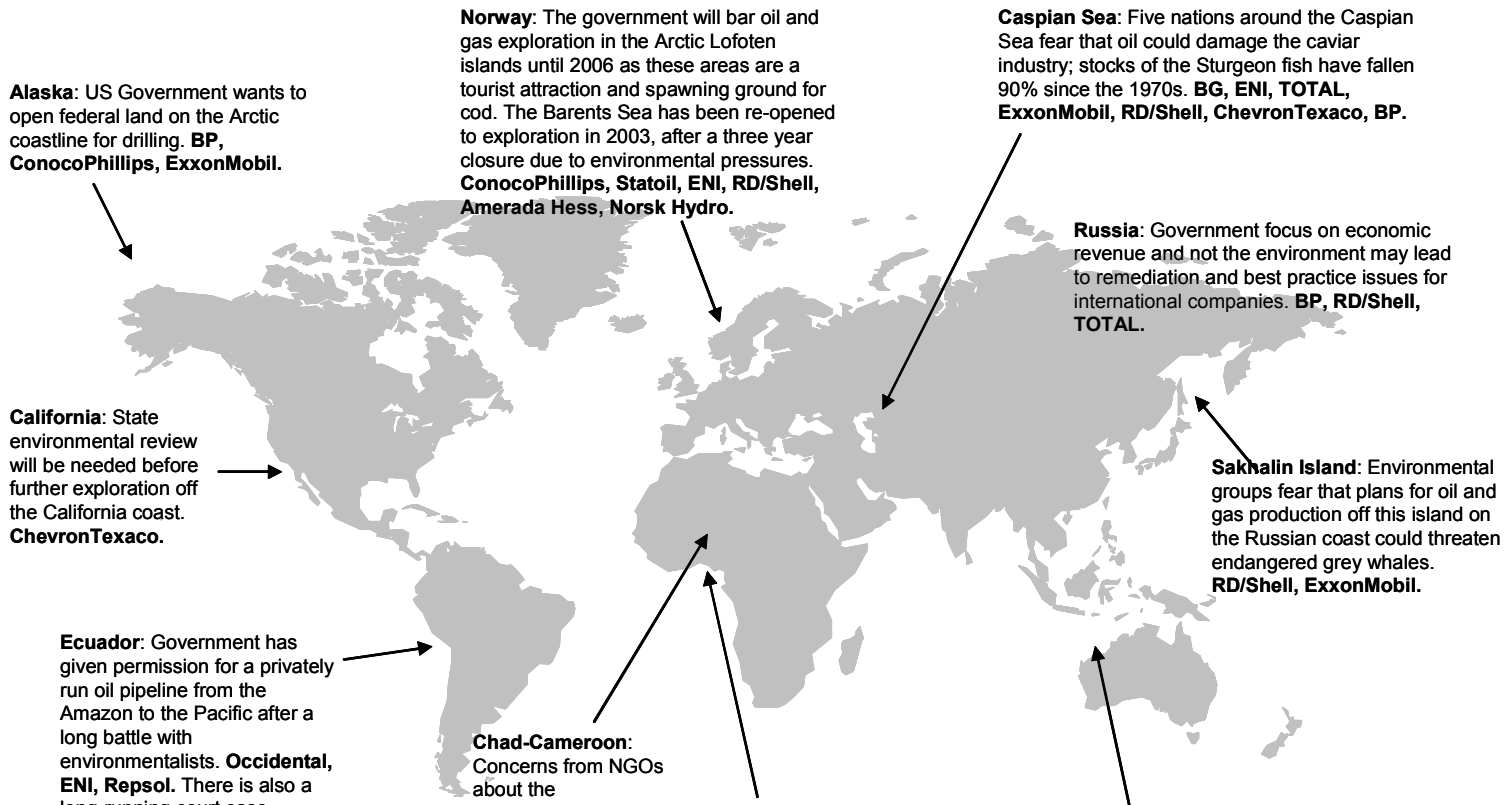
In September 2003 press reports alleging bribery and corruption over an Iranian consultancy agreement rocked Statoil. The allegations eventually forced the Head of International E&P, Richard Hubbard, to resign his post on September 12, the Chairman of the company, Leif Terje Løddesøl, to withdraw from his position on September 21 and ultimately the CEO, Olav Fjell, to resign on September 23.

Statoil shares initially underperformed the sector when the allegations came to light and Olav Fjell ordered an investigation. However, the shares recovered once the resignations had been announced and CFO Inge Hansen took over as acting CEO. In the month following these events, Statoil's shares recovered to their pre-crisis levels and there appears to be no overhang as a result of the allegations.

However, the impact of the affair may affect Statoil's competitive positioning in Iran in the longer term. Statoil continues to seek projects in Iran as part of its international E&P strategy, and continues to develop the South Pars 6-8 field.

A snapshot of environmental issues relating to the oil industry at present

Exhibit 23: Environmental issues around the world in relation to oil and gas production and exploration



Source: Company data, Reuters, Upstream Online, Copal Partners.

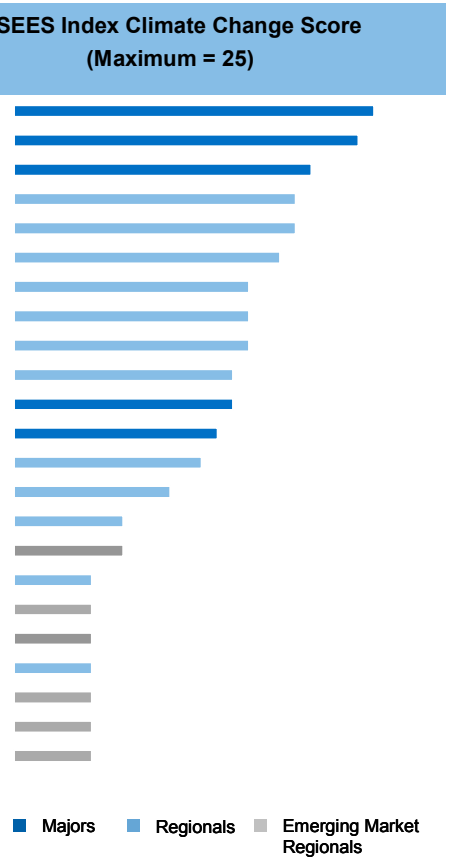
Climate change and pollution in the GSEES Index

The GSEES Index Climate Change score

BP is the outstanding company in terms of its GSEES Index Climate Change score (see Exhibit 24), followed by the European Majors and Regionals; Amerada Hess scores best among the US companies. No information is disclosed on GHG emissions by the Emerging Market Regionals and they are not involved in development of renewable energy sources. For a detailed description of the criteria used to give a score to the companies in each metric, please see page 99.

Exhibit 24: Company relative positioning in the GSEES Index Climate Change score

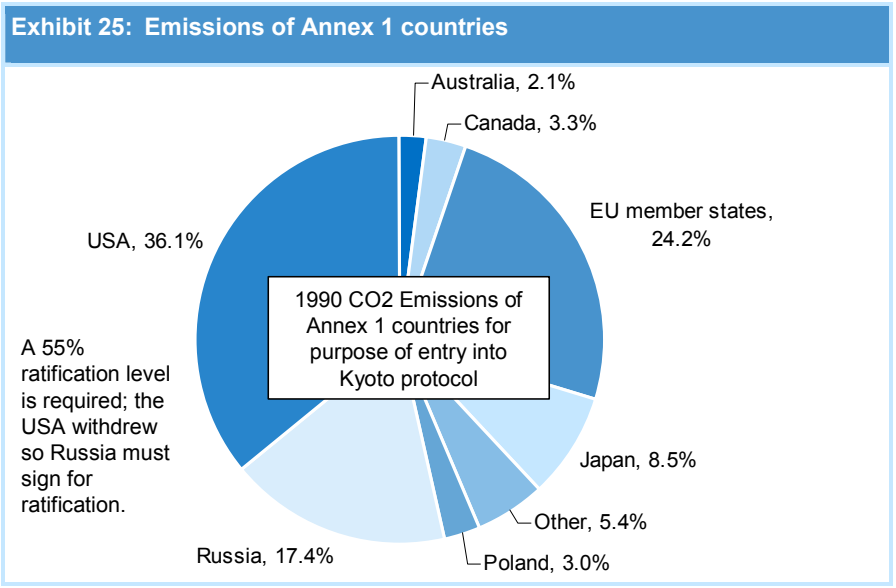
Company	Targets and performance	GHG levels relative to GCI	Change in GHG levels	Emissions trading	Renewables	GSEES Index Climate Change Score (Maximum = 25)
BP	5	4	5	5	4	23
RD/Shell	5	3	4	5	5	22
TOTAL	3	3	5	4	4	19
Norsk Hydro	2	5	4	4	3	18
Statoil	2	5	4	4	3	18
BG	3	4	5	4	1	17
ENI	2	3	4	4	2	15
OMV	3	3	4	3	2	15
Repsol	3	4	4	3	1	15
Amerada Hess	2	5	4	2	1	14
ChevronTexaco	2	3	2	3	4	14
ExxonMobil	2	3	4	2	2	13
ConocoPhillips	2	2	3	3	2	12
Occidental	2	2	3	2	1	10
MOL	1	1	1	3	1	7
Yukos	1	1	1	3	1	7
CEPSA	1	1	1	1	1	5
CNOOC	1	1	1	1	1	5
Lukoil	1	1	1	1	1	5
Marathon	1	1	1	1	1	5
Petrobras	1	1	1	1	1	5
PetroChina	1	1	1	1	1	5
Sinopec	1	1	1	1	1	5
Average	2.0	2.5	2.8	2.7	1.9	11.9
Maximum	5	5	5	5	5	25



Source: Company Data, Copal Partners, Goldman Sachs Research estimates.

What is the Kyoto Protocol?

Exhibit 25: Emissions of Annex 1 countries



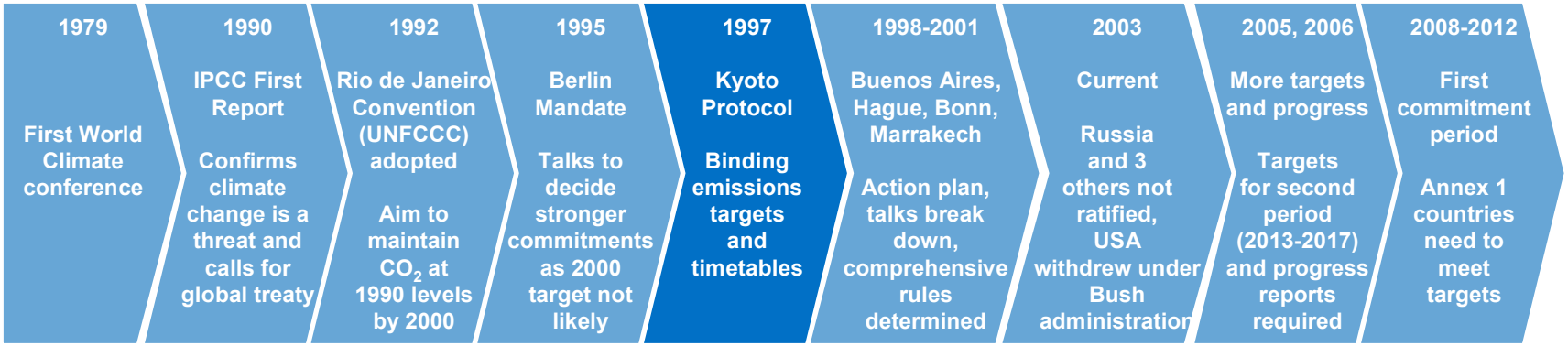
Source: UNFCCC (United Nations Framework Convention on Climate Change)

The objective of the United Nations Framework Convention on Climate Change (UNFCCC) Kyoto protocol is "to achieve stabilisation of atmospheric concentrations of GHGs at levels that would prevent dangerous anthropogenic (human-induced) interference with the climate system".

The science of the Intergovernmental Panel on Climate Change (IPCC) (2001) is that "an increasing body of observations gives a collective picture of a warming world" with "new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities". By 2100, the IPCC predicts atmospheric concentrations of CO_2 at 540ppm to 970ppm, 90%-250% above pre-industrial levels; in 1750 CO_2 concentration was 280ppm. Global mean surface temperatures and sea levels are expected to increase by 1.4-5.8°C and 9-88cm, respectively, from current levels.

The accounting for GHGs is that emissions of six gases are recorded and reported. CO_2 is the largest component (~80%), and the others are converted into CO_2 equivalents according to global warming potential.

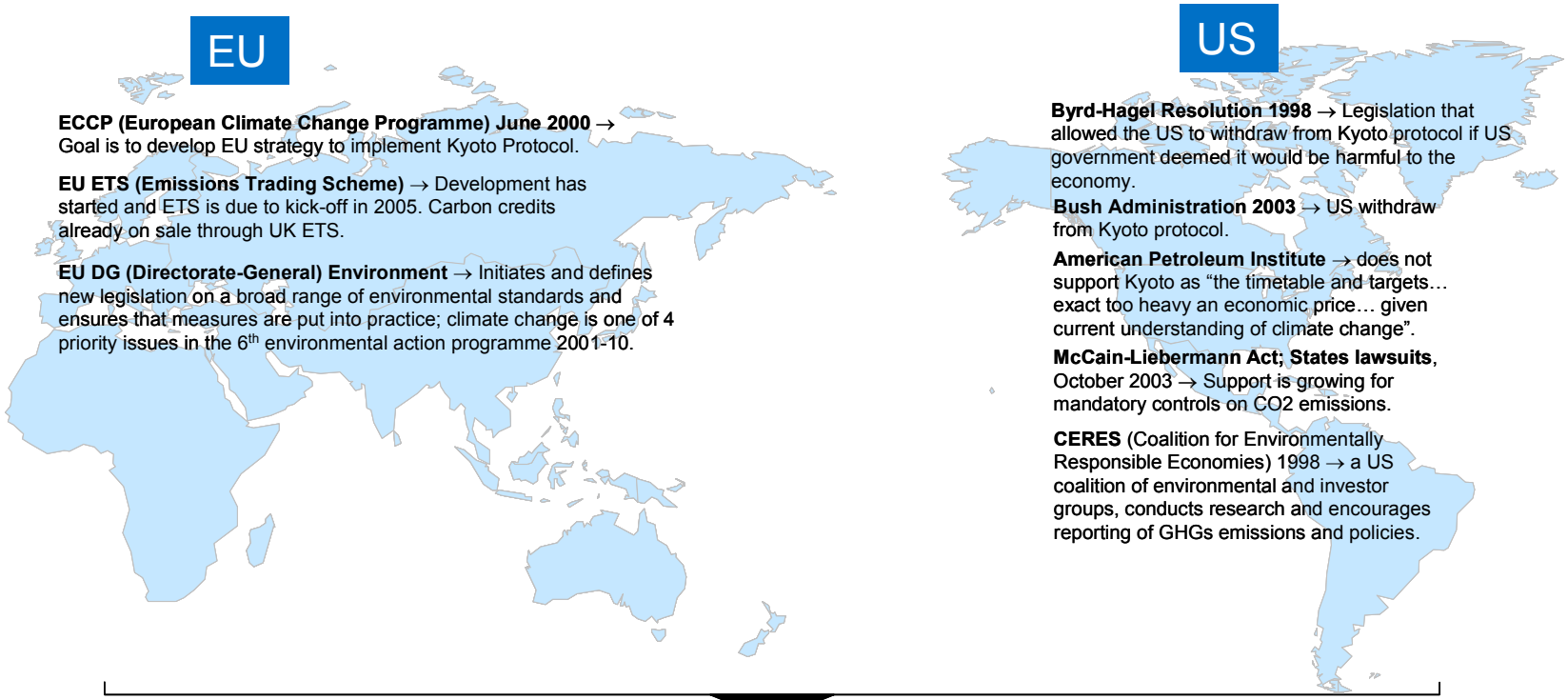
Exhibit 26: Kyoto timeline



Source: UNFCCC (United Nations Framework Convention on Climate Change).

Climate change: global, US and EU initiatives

Exhibit 27: Numerous climate change initiatives on both sides of the Atlantic



Source: UNFCCC, EU, IEA, Copal Partners.

Government-mandated product quality and clean fuels initiatives

GHG emissions in the production of energy represent approximately 10% of the total emissions generated in the end use of energy. Significant steps further down the energy chain, beyond production, must be taken to reduce emissions in the short, medium and longer term.

Exhibit 28: US and EU clean air initiatives

US clean air initiatives	EU clean air initiatives
1990 Clean Air Act → First law 1970, update 1990; covers Common Air Pollutants: SO2, NOx, CO, PM-10, lead, ozone (caused by VOCs and NOx).	**1993 Directive 93/12/EEC** → Lowers the maximum sulphur content permitted for diesel and gas oils across Europe.
1992 Federal Energy Policy Act → To reduce US dependence on imported petroleum; mandates the purchase of AFVs (alternative fuel vehicles).	**1998 Directive 98/70/EC** → Quality of petrol and diesel fuels; sulphur content to 50ppm and aromatics content to 35% by volume.
1992-93 Oxygenated Gasoline Program → Implemented in 39 areas and ongoing in 2001-02.	**2001 COM(2001) 547** → Proposals for obligatory blending and taxation incentives for biofuels, including 20% replacement of existing fuels with alternative fuels.
1993 Clean Cities → DOE initiative to support AFVs.	**2002 Lead** → All petrol sold in member states is unleaded.
1995-99 Reformulated Gasoline (RFG) Program → Phase 1 implemented. Phase 2 begins 2000.	**2003 Directive 2003/17/EC** → Amends 98/70/EC with target on diesel sulphur content brought down to 10ppm.
1996 Lead → All gasoline sold is unleaded.	**2003 Directive 2003/30/EC** → Bio fuels targets 2% and 5.75% market share in 2005 and 2010 respectively.
2000 EPA quality specifications → 2000 diesel reduction, 2004 sulphur reduction.	
Clear Skies Act 2003 → Mandatory reduction of SO2, NOx, Hg by ~70% in 2018 from 2000 levels through aggregate emissions levels or caps.	
2003 Energy Bill → Currently being debated in Senate, MTBE regulations on gasoline, renewable energy targets.	

Exhibit 29: GHG emissions across the chain

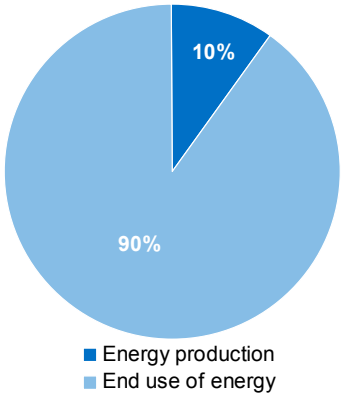
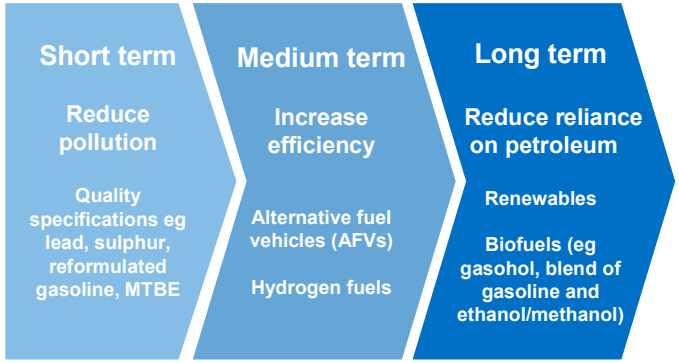


Exhibit 30: Reasons to reduce emissions



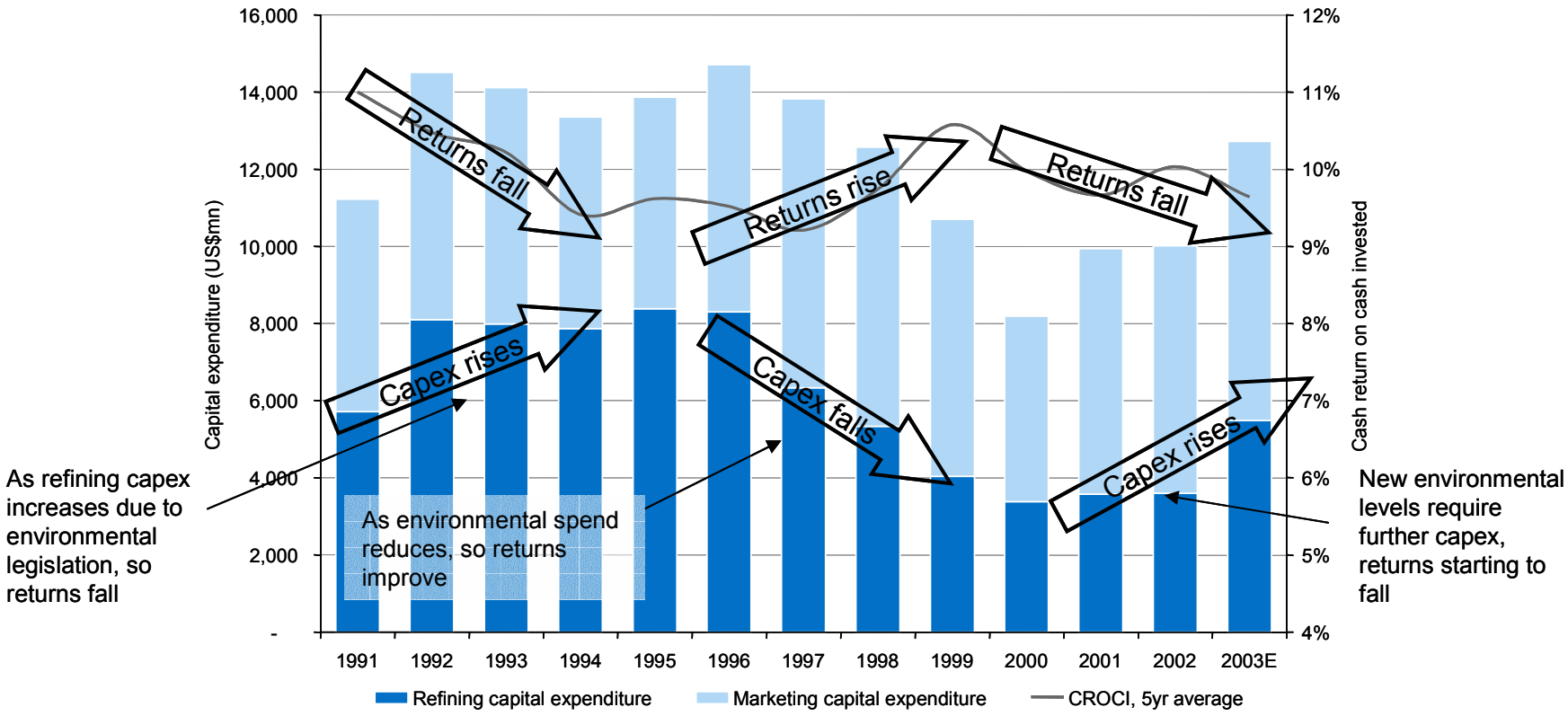
Source: Company data, US EPA, EU, Copal Partners.

Capex required in downstream to achieve clean air initiatives; impact on returns

Capital expenditure by the Majors on marketing operations has been relatively stable through the 1990s while capital expenditure on refining has varied depending on environmental requirements. As capex rose in the early 1990s, returns began to suffer. A reduction in capex led to improved returns at the turn of the decade but now capex is beginning to rise again. This capex spend has generated low returns.

Furthermore, the expansion of GTL technology, with 2.2mnbpd of new capacity likely by 2009, would make the middle distillate capacity of some 55 average refineries (100,000bpd) redundant, in our opinion. This growth will force either refining capacity closures or increased capex to achieve product quality upgrades.

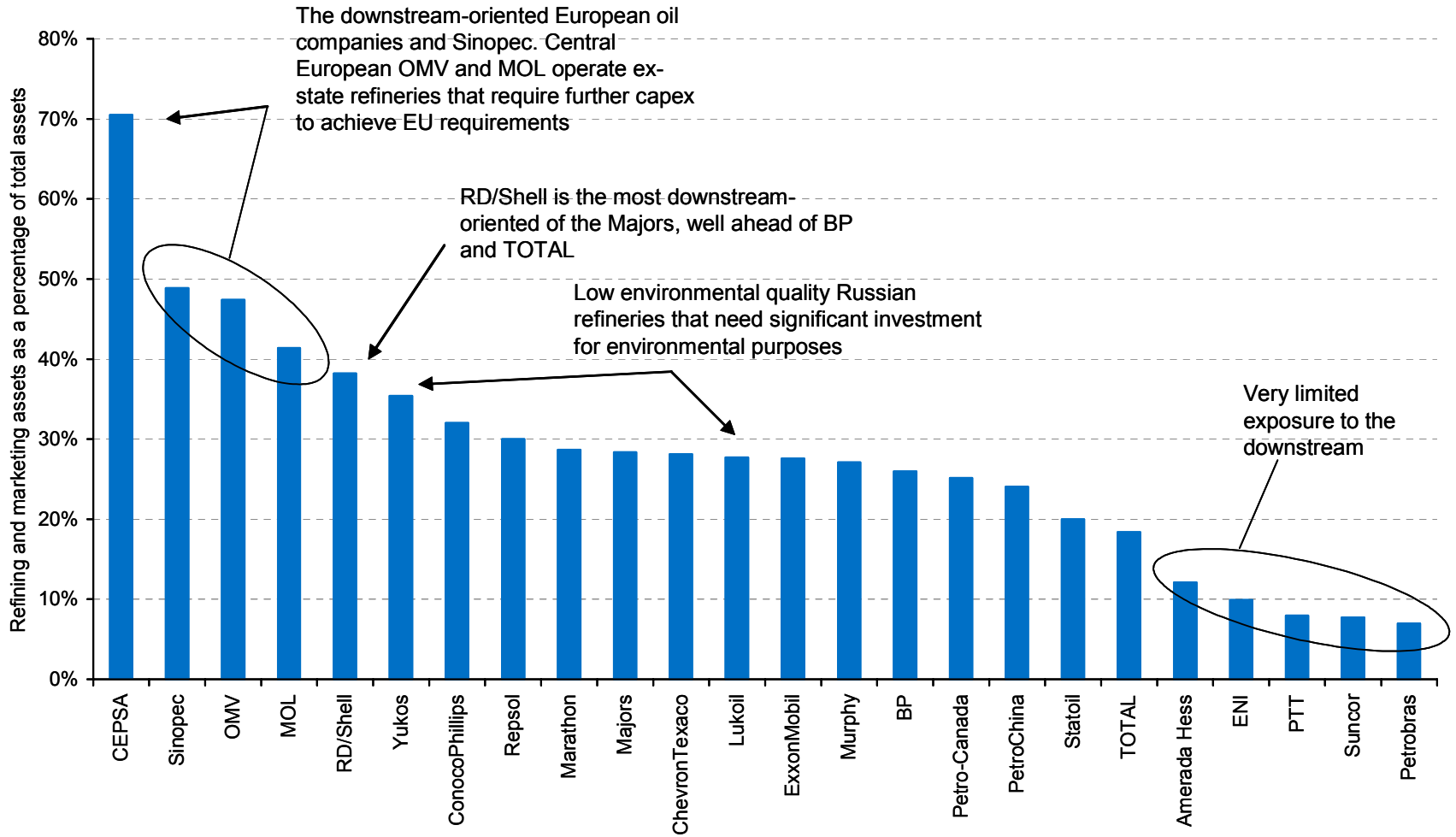
Exhibit 31: Majors' downstream (refining and marketing) capex and returns



Source: Company data, Goldman Sachs Research estimates.

Company relative exposure to refining and marketing operations

Exhibit 32: Refining and marketing assets as a percentage of total assets



Source: Company data, Goldman Sachs Research estimates.

The cost of gas flaring regulations – an example of the impact on returns

The industry flared or vented 1.8tcf of natural gas directly into the atmosphere in 2000; equivalent to 2% of global gas demand.

The decision to produce or reinject gas, rather than flare, has a significant impact on the development solution employed for any field. The development of TOTAL's Akpo field offshore Nigeria, one of the *50 Projects to Change the World* included in our report published on June 19, 2003, will be carried out with gas reinjection. We have provided the indicative economics of this project for three cases: gas rejection, gas production and gas flaring.

Exhibit 33: Indicative economics for the Akpo field under various gas utilisation scenarios

		Gas reinjection Base case	Gas production	Change vs base	Gas flared	Change vs base
Reserves	Oil (mnbls)	901	813	-10%	813	-10%
	Gas (bcf)	0	4,000		0	
	Total (mnboe)	901	1,480	64%	813	-10%
Capex	US$/boe	3.00	2.23	-26%	2.50	-17%
	Total (US$mn)	2,703	3,300	22%	2,033	-25%
Operating	US$/bl	-2.75	-3.00	9%	-2.50	-9%
IRR		16.2%	15.1%	-1.1%	21.7%	5.5%
P/I		1.42x	1.35x	-0.07x	1.50x	0.09x

Reinjection of produced gas maintains reservoir pressure and improves liquids recovery but per unit capital costs are higher. Producing the gas increases overall hydrocarbon recovery and reduces per unit capital costs. In the case of Akpo, gas reinjection could produce a slightly lower rate of return but this analysis is dependent upon the local demand and price for the produced gas. Simply flaring the gas is by far the most profitable solution as the development would be onstream quicker and per unit capital and operating costs would be lower.

Source: Company data, Goldman Sachs Research estimates.

New gas technologies such as LNG and GTL enable associated gas to be processed and utilised rather than flared. These technologies have had particular impact for Shell, TOTAL, ENI, ChevronTexaco, ExxonMobil and ConocoPhillips in Nigeria and we expect it to become a significant issue in Angola. In 2000, Nigeria and Angola alone flared over 300 bcf of gas, representing over 15% of all gas flared globally. Other areas that flare significant gas volumes include Venezuela, FSU and the Middle East.

By law, West African gas flaring must cease by 2008. Assuming all the previously flared gas is produced and exported, it would sustain 16mtpa of LNG export, worth US$1.5 bn pa at current prices. Currently Nigerian LNG has six trains planned whilst Angola LNG has two, representing a total of 25mtpa. The companies most exposed to these West African opportunities are Shell, TOTAL, ENI, ExxonMobil, BP and ChevronTexaco.

Kashagan: turning an environmental threat into an opportunity

The ENI-operated Kashagan field in the north Caspian is the biggest non-OPEC discovery of the last 20 to 30 years and the largest project in *50 Projects to Change the World* in our report published June 19, 2003. The field is located in a particularly environmentally-sensitive region in shallow waters with harsh and volatile temperatures. Management of sulphur produced with the hydrocarbons is a complicating issue, especially since the Kazakh government is demanding minimal discharge from the development.

The pressure on the ENI consortium to complete the development in an environmentally sensitive manner is significantly greater than that previously witnessed in the FSU or Caspian. Original development plans called for the production of both oil and gas but ENI is now planning to reinject the produced gas. Under a gas reinjection scenario, we estimate Kashagan development costs will be US$2.2/boe, significantly higher than the current three-year average development costs of Russian players, such as Lukoil and YUKOS of US$1.4/boe and US$1.0/boe respectively.

Exhibit 34: Indicative economics of Kashagan under gas production and gas reinjection scenarios

In this situation, the ENI consortium has turned the stringent environmental requirements into an opportunity rather than threat, by re-injecting the gas and maximising recovery of the more profitable liquids stream. The plan to undertake a technically more complex yet environmentally more sensitive development is expected to yield higher returns, in our opinion.

Oil & gas production	
Internal rate of return	10%
P/I ratio (disc)	1.1x
Oil price required	US$16.85 /bl
Reserves/production	40
Pay back (years)	13
Total capex	US$18,500 mn
Maximum capital at risk	US$5,738 mn
Oil reserves	7,000 mnboe
Gas reserves	3,000 mnboe
Total reserves	10,000 mnboe
Peak production	941 mboe/d
F&D cost	US$1.85 /bl
Tax rate	87%
Differential to Brent	US$8.70 /bl
Production cost	US$1.00 /bl

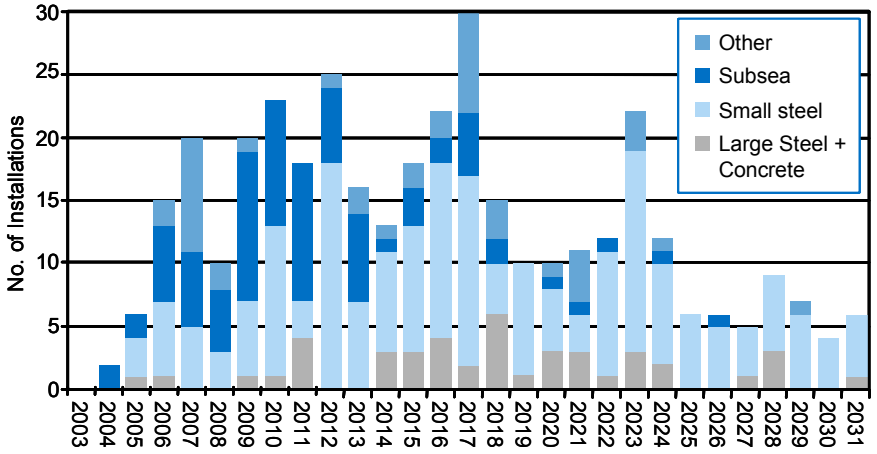
Gas reinjection	
Internal rate of return	>10%
P/I ratio (disc)	>1.1x
Oil price required	US$14.28 /bl
Reserves/production	31
Pay back (years)	14
Total capex	US$27,140 mn
Maximum capital at risk	US$7,381 mn
Oil reserves	12,868 mnboe
Gas reserves	0 mnboe
Total reserves	12,868 mnboe
Peak production	1250 mboe/d
F&D cost	US$2.15 /bl
Tax rate	75%
Differential to Brent	US$3.50 /bl
Production cost	US$3.00 /bl

Source: Company data, Goldman Sachs Research estimates.

Social and environmental solutions to facility abandonment

The oil industry is gradually maturing and is becoming increasingly aware of its decommissioning liabilities. In the UK alone, abandonment liabilities of the oil and gas industry are estimated to be between US$24 bn and US$30 bn (compared to North Sea development capex of US$12 bn in 2002 and annual industry worldwide upstream capex of US$90 bn). Delaying the abandonment date or reutilising offshore facilities for other purposes would materially reduce the expected bill.

Exhibit 35: Estimated decommissioning dates – weight adjusted

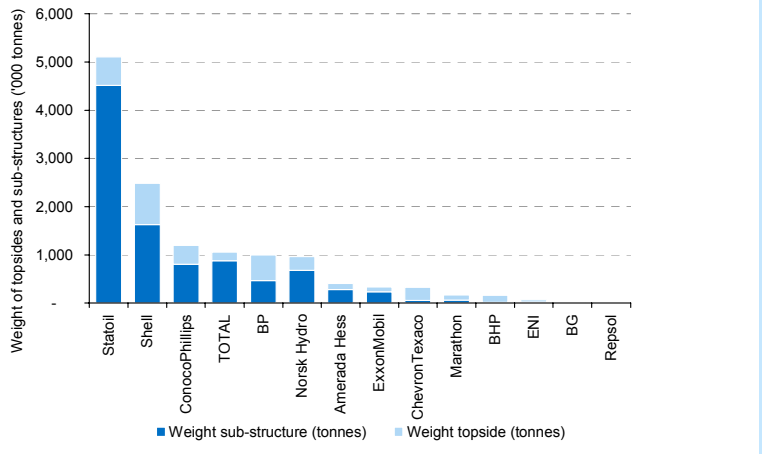


Source: UK Department of Trade and Industry.

We believe that the threat of decommissioning can be turned into an opportunity and, whilst some facilities will have to be decommissioned onshore, other decommissioning options could be available. In the UK BG's Rough gas field was converted into a gas storage reservoir and options to re-float and re-use ConocoPhillips' Maureen platform were considered. Proposals are currently being reviewed for some of Shell's offshore facilities to be converted in an offshore wind farm and Statoil is considering an idea to convert unused Norwegian platforms into tidal current driven power plants.

In Europe, Statoil operates production facilities with a combined weight of over 5 mn tonnes. This is the single greatest exposure of all the European companies. Three facilities alone (Troll, Statfjord and Sleipner) account for over 75% of the weight of Statoil's total operated facilities. Statoil has an equity stake of between 20% and 50% in these three facilities.

Exhibit 36: Estimated European decommissioning weights by operator



Source: OSPAR.

The industry is now moving towards floating production facilities in deeper waters with tanker offloading systems rather than sea bed pipelines. Larger companies are also selling ageing facilities to smaller oil and gas companies that wish to prolong production lives and maximise oil recovery.

Greenhouse gas emissions – targets and performance

Since the first IPCC report in 1990, BP, RD/Shell and TOTAL have set targets and have achieved significant reductions in their absolute and relative GHG emissions. OMV, Statoil and Amerada Hess also have targets, with OMV posting a good performance.

Exhibit 37: Summary of company GHG targets and performance

Specific, public reduction targets

Company	Target (reference dates)	Performance	Meeting targets?
Amerada Hess	Down 5% (2001 to 2005)	Up 31% (2001 to 2002)	×
BP	Down 10% (1990 to 2002 through 2012)	Down 13% (1990 to 2002)	✓
OMV	Down 9% (no dates)	Down 7% (1998 to 2001)	n/a
RD / Shell	Down 10% (1990 to 2002 through 2012)	Down 14% (1990 to 2002)	✓
Statoil	Down 18% (2000 to 2010)	Up 7% (2000 to 2002)	×
TOTAL	Down 20% on intensity basis (1990 to 2005)	Down 22% (1990 to 2002)	✓

Non-specific targets

Company	Target (reference dates)	Performance
Norsk Hydro	Expects down 15% (2000 to 2010) across the company	Up 18% (2000 to 2002) for Oil & Energy Division
ENI	Signed deal with Italy for down 6.5% (1990 to 2005)	Up 16% (1998 to 2002)

No targets

Company	Comment	Performance
BG	No targets; GHGs forecast to rise to 2006	Down 12% (2000 to 2002)
ConocoPhillips	No targets; committed to reduce emissions	Up 7% (1991 to 2001)
ChevronTexaco	No targets; committed to reduce emissions	n/a
ExxonMobil	No targets; committed to reduce emissions	Up 3% (2000 to 2002)
Occidental	No targets; committed to reduce emissions	n/a
Repsol	No targets; committed to reduce emissions	Down 7% (2001 to 2002)

No disclosure

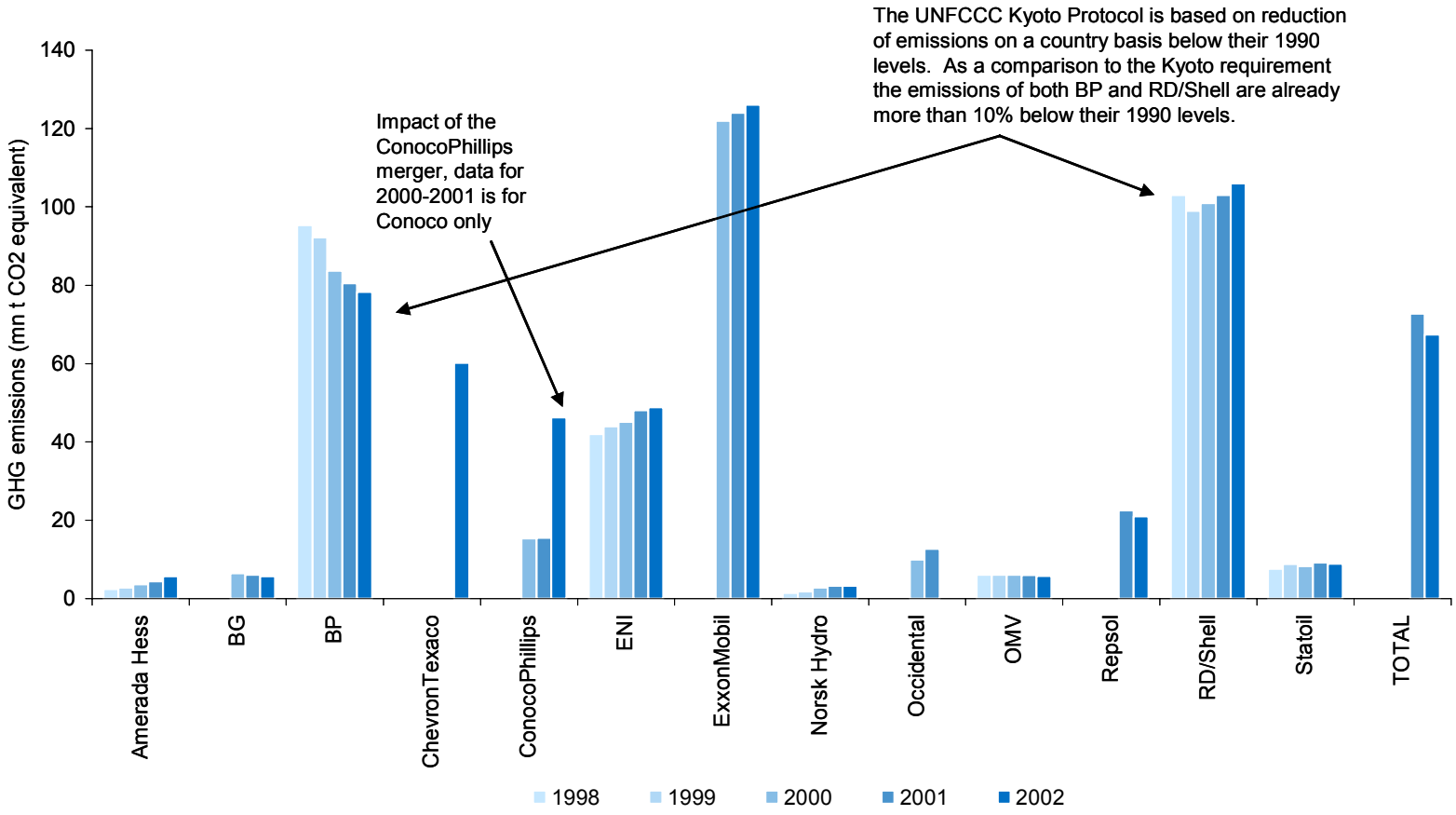
CEPSA, CNOOC, Lukoil, Marathon, MOL, Petrobras, PetroChina, Sinopec, Yukos

Source: Company data, Copal Partners.

The Majors, due to their scale, emit the most GHGs

ExxonMobil, because of its scale, is the largest emitter of GHGs on an absolute basis. RD/Shell and BP are second and third respectively, also as a result of their scale.

Exhibit 38: Absolute GHG emission levels

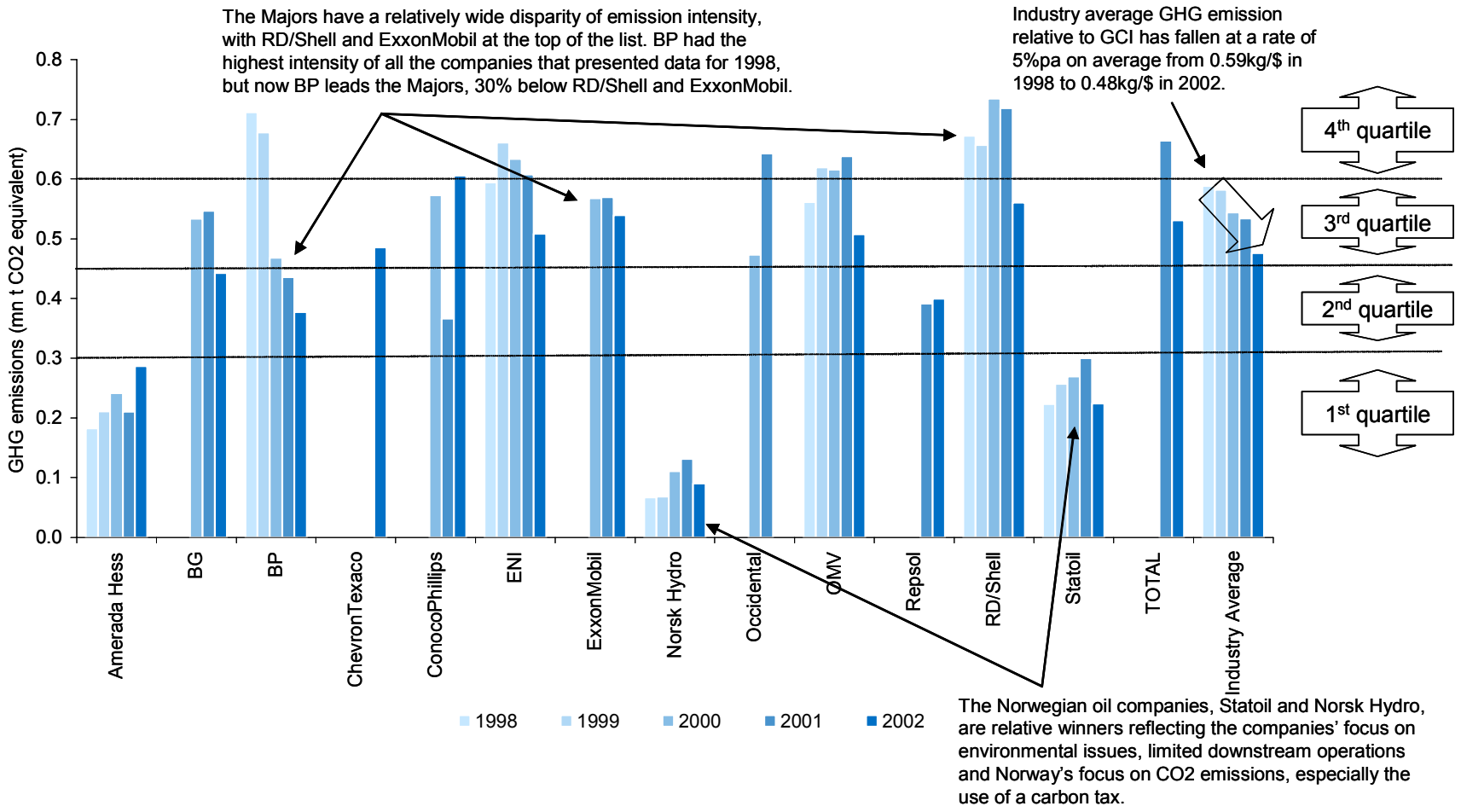


No data available for Cepsa, CNOOC, Lukoil, Marathon, MOL, Petrobras, PetroChina Sinopec, Yukos
Note: Norsk Hydro data is for its Oil & Energy Division only.

Source: Company data.

The Norwegians have the lowest GHG emission intensity

Exhibit 39: GHG emissions relative to corporate gross cash invested (mn t CO_2 equivalent per US$ million GCI)

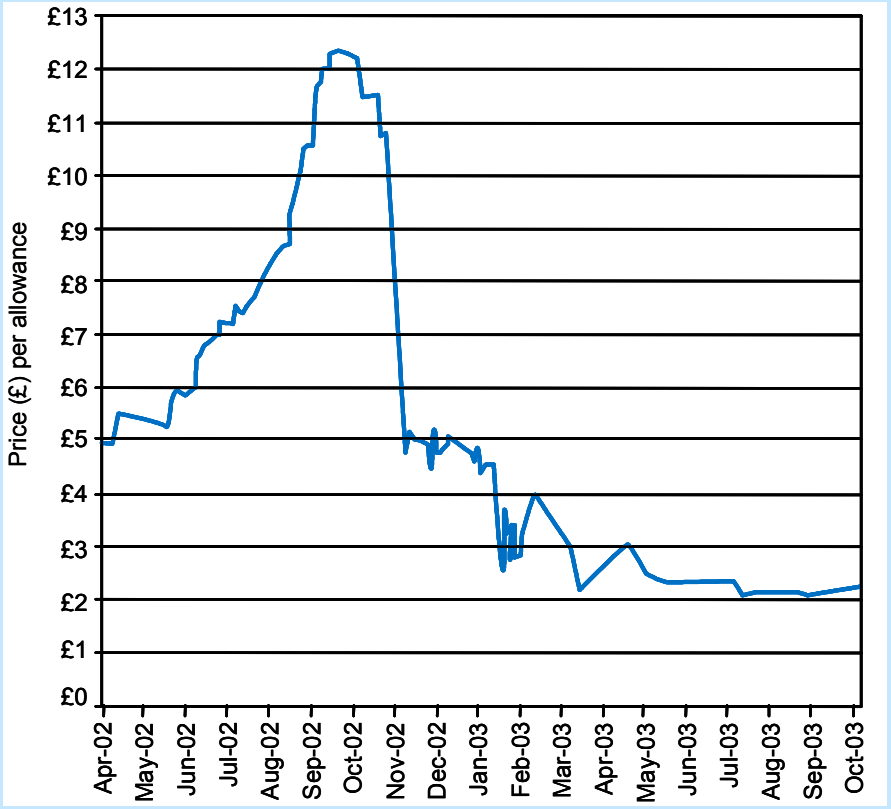


No data available for Cepsa, CNOOC, Lukoil, Marathon, MOL, Petrobras, PetroChina Sinopec, Yukos
Note: Norsk Hydro data is for its Oil & Energy Division only.

Source: Company data, Goldman Sachs Research estimates.

Meeting the cost of regulatory compliance – Emissions Trading Schemes

Exhibit 40: UK Allowance Spot Market Price Curve (Current Vintage)



Source: Natsource, Carbon Disclosure Project, EU.

The EU has committed to reduce GHG emissions by 8% on average between 2008 and 2012 from 1990 levels. Each country will be given a different target and will need to allocate emissions to its companies, who will then be faced with three options to meet their targets:

- reduce internal emissions at home
- reduce internal emissions abroad
- emissions trading schemes.

No other countries, including the US, have regulations in place to reduce GHG emissions.

At a cost of US$20/t CO_2 equivalent, the Carbon Disclosure Project estimates costs for companies in the Oil and Gas Industry to cut emissions by 10% below 2001 levels range from 0.4% to 2.5% of annual cash flow. Calculating the cost of carbon depends on:

- the market price of emissions
- the premium that a company is willing to pay for emissions credits to avoid government tax penalties or removal of operating licences.

The UK Emissions Trading Scheme (ETS) started in April 2002, and the price per 1t CO_2 equivalent allowance is shown in Exhibit 40. Dutch and Danish ETS are also in operation. Development of the EU ETS has started with the view to open the spot market for CO_2 equivalent emissions at the beginning of 2005. Natsource currently quote a forward bid/offer spread for 1t CO_2 equivalent credit allowance at EUR12.30-EUR12.80.

Emissions Trading Schemes (ETS) – competitive positioning

The European companies, in general, have significantly more experience or are significantly more in support of Emissions Trading Schemes than their US peers.

Exhibit 41: Summary of company ETS experience

Experience in ETS

Company	Comment
BG	Involved in development of UK and EU ETS but not allowed to participate in UK ETS.
BP	Participates in UK ETS, brokered first ever trade in April 2002 and has operated an internal ETS.
RDShell	Participates in UK ETS, also trades on Danish and US markets and has operated an internal ETS.
TOTAL	Participated in EU pilot ETS two years ago and will engage in EU emissions trading.

Supports ETS and preparing to enter EU ETS

Company	Comment
ENI	Supports Kyoto and intends to participate in EU emissions trading.
Norsk Hydro	Supports Kyoto and is setting up a business unit to handle emissions trading.
Statoil	Supports Kyoto and is preparing to handle emissions trading.

Supports ETS but no experience

Company	Comment
ChevronTexaco	"Support... mechanisms such as emissions trading" but not involved.
ConocoPhillips	"Support market-based approaches" to GHG emissions but no disclosure on emissions trading.
MOL	Supports Kyoto, will contribute to Hungary's target, no disclosure on emissions trading.
OMV	Supports Kyoto and is actively involved in Austria's strategy, no disclosure on emissions trading.
Repsol	Supports Kyoto and ready to collaborate with governments, no disclosure on emissions trading.

No disclosure

Amerada Hess, CEPSA, CNOOC, ExxonMobil, Lukoil, Marathon, Occidental, Petrobras, PetroChina, Sinopec, Yukos

Source: Company data, EU, Copal Partners.

Europeans top the CERES Corporate Governance and Climate Change survey

Exhibit 42: CERES 14-point checklist

1. Committee of directors for environmental affairs
2. Board level review of climate change
3. Chief Environmental Officer reports to CEO
4. Compensation linked to GHG performance
5. Clear climate change statement from CEO
6. Statement on climate change risks in 10-K report
7. Issue separate sustainability report
8. Calculate GHG savings from company projects
9. Record GHGs and report to shareholders
10. Establish GHG baseline > ten years ago
11. Set firm targets for future emissions
12. Certification from third party auditor
13. Participate in external emissions trading
14. Develop renewable energy sources

Source: CERES.

The Coalition for Environmentally Responsible Companies (CERES) is an NGO based in the US. It published a climate checklist in its recent report *Corporate Governance and Climate Change: Making the Connection*, published in June 2003, which compared companies across various sectors. The European Majors (BP and RD/Shell) scored at the top of the survey whilst the US Majors (ExxonMobil, ChevronTexaco and ConocoPhillips) fared poorly overall.

According to the CERES report, the European oil industry is more in touch with environmental issues than the rest of the market

Exhibit 43: CERES Company Positions

Company	Board		Management			Reporting		Emissions Data					Other		Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
	Committee	Review	Enviro Officer and CEO	Comp Link	Strategy	10-K includes Climate Change	Separate Report	GHG Savings	Record and Report GHGs	Establish GHG baseline	GHG targets	3rd Party Auditor	GHG emissions trading	Renewable energy	
BP	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**14**
RDShell	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**14**
Alcoa	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y		Y	12
DuPont	Y	Y			Y	Y	Y	Y	Y	Y	Y		**Y**	Y	12
AEP	Y	Y	Y		Y	Y		Y	Y		Y		**Y**	Y	10
IBM	Y	Y	Y				Y	Y	Y	Y	Y	Y		Y	10
Toyota	Y	Y			Y	Y	Y		Y	Y	Y			Y	10
Cinergy	Y	Y	Y		Y	Y		Y	Y	Y				Y	9
Ford Motor	Y	Y	Y		Y	Y	Y	Y	Y				**Y**	Y	9
General Motors	Y	Y	Y				Y	Y	Y	Y			**Y**	Y	9
Honda	Y	Y			Y		Y		Y	Y	Y			Y	9
Int'l Paper	Y	Y	Y				Y		Y				**Y**	Y	7
Southern			Y			Y		Y	Y	Y				Y	6
Xcel Energy	Y	Y	Y			Y		Y						Y	6
ChevronTexaco	**Y**	**Y**	**Y**					**Y**						**Y**	**5**
ConocoPhillips	**Y**	**Y**				**Y**		**Y**							**5**
DaimlerChrysler			Y			Y	Y		Y	Y					5
ExxonMobil	**Y**	**Y**	**Y**						**Y**						**4**
General Electric	Y	Y	Y											Y	4
TXU			Y			Y		Y						Y	4

Source: CERES.

Human Rights in the GSEES Index

The GSEES Index Human Rights score

BP and Statoil have the highest scores in Human Rights in the GSEES Index and both have comprehensive policies regarding the effect of their operations on human rights. The European Regionals dominate this category, along with Amerada Hess and ChevronTexaco, whereas ExxonMobil has a lower score due to NGO campaigns against them. A detailed description of the criteria used to give a score to the companies in each of the metrics is shown on page 101.

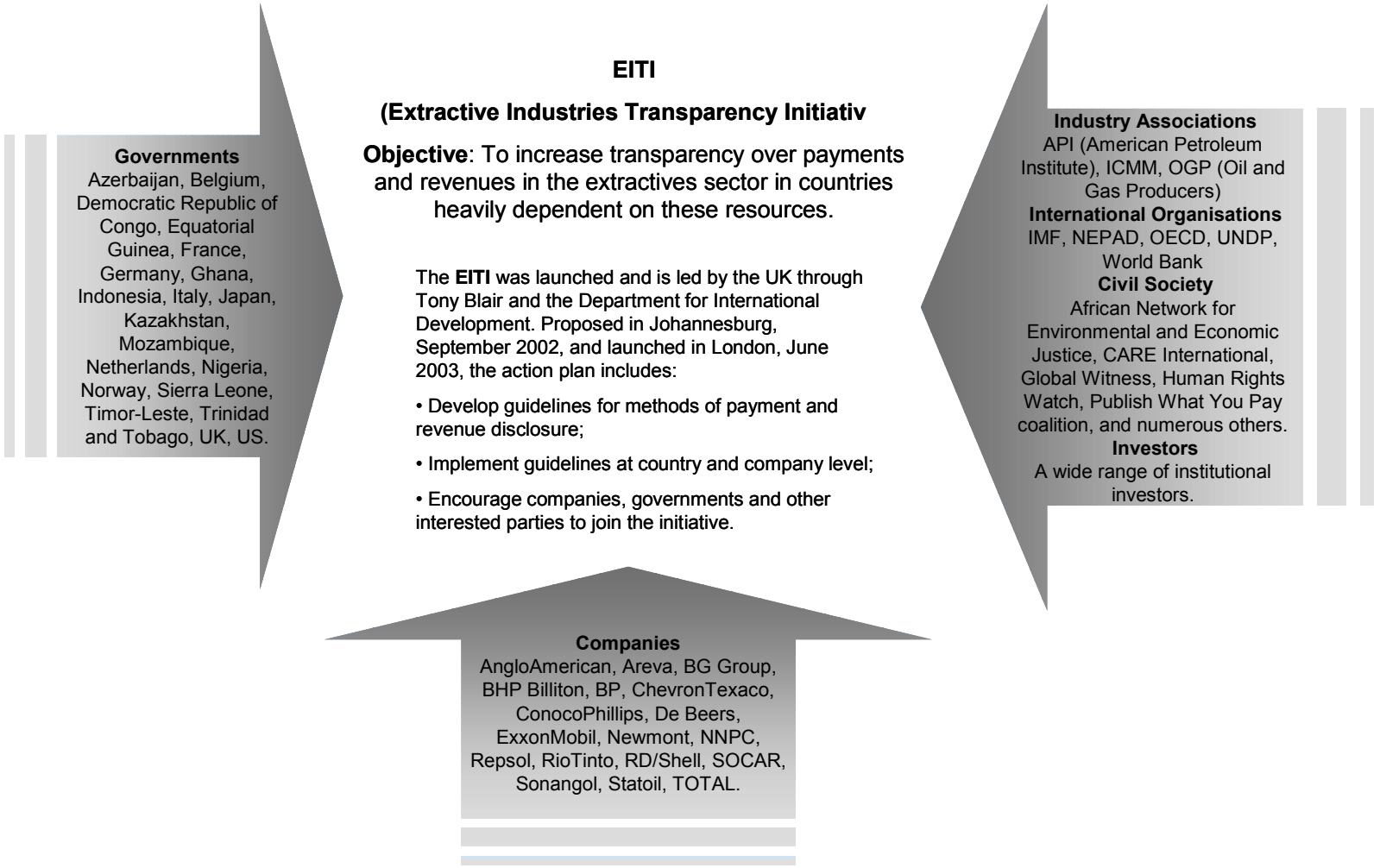
Exhibit 44: Company relative positioning in the GSEES Index Human Rights score

Company	Campaigns led by NGOs	Policy for Human Rights	Participate in EITI	GSEES Index Human Rights Score (Maximum = 12)
BP	3	4	4	11
Statoil	3	4	4	11
Amerada Hess	4	4	2	10
BG	2	4	4	10
ChevronTexaco	3	3	4	10
ENI	4	4	2	10
Norsk Hydro	4	4	2	10
Repsol	3	3	4	10
ConocoPhillips	2	3	4	9
OMV	4	3	2	9
RD/Shell	1	4	4	9
TOTAL	1	4	4	9
ExxonMobil	1	3	4	8
MOL	2	3	2	7
Petrobras	4	1	2	7
PetroChina	3	2	2	7
Yukos	2	3	2	7
CNOOC	2	2	2	6
Lukoil	2	2	2	6
Marathon	1	3	2	6
Occidental	1	3	2	6
Sinopec	2	2	2	6
CEPSA	2	1	2	5
Average	2.4	3.0	2.8	8.2
Maximum	4	4	4	12

Source: Company data, Copal Partners, Goldman Sachs Research estimates.

Oil and gas operations in developing countries

Exhibit 45: Extractive Industries Transparency Initiative



Source: UK Department for International Development, UN, EU, US Department of State.

Corruption in the oil and gas sector

Exhibit 46: Recent examples of corruption, revenue transparency and company disclosure

Company Scandals

ExxonMobil: Banker working for ExxonMobil was indicted in March 2003 for bribery in Kazakhstan.

Marathon: US$14mn transferred in July 2000 to Angolan companies.

TOTAL: Former head of Elf was sentenced to five years in prison and fined EUR375,000 for embezzlement of EUR300mn in the early 1990s.

Statoil: "Irangate" bribe and corruption allegations over an Iranian consultancy agreement. Chairman, CEO and divisional head resign

RD/Shell: Sustained campaigns from NGOs regarding pollution and corruption in Nigeria.

Revenue Transparency

Six of the most oil-dependent countries in the world are classed by the World Bank as Highly Indebted Poor Countries. As an example, Nigeria has received an estimated US$300 bn in oil revenues over the past 25 years, but still falls far below the UN's Development Indicators.

Oil revenues	Nigeria
% GDP	40
% Government revenue	70
% Exports	95

In June 2003, the EITI (Extractive Industry Transparency Initiative) was launched by the UK to increase revenue transparency in countries dependent on these resources.

Development Indicators	UN Target	Nigeria
GDP / capita (US$)	895	400
% population <US$2/day	0	60
Infant mortality / 1000	5	78
CO2 emissions (kg / US$1987 GDP)	0.3	2.7

The EITI is supported by Nigeria (among other developing countries) and BP but the US government, ExxonMobil and ChevronTexaco insist it must be voluntary.

Company Disclosure

BP and RD/Shell reported revenues paid in Angola and Nigeria respectively.

BP: In 2002, 132 staff were dismissed for unethical conduct. This included 14 incidents of bribery, five breaches of the HSE policy and 15 fraud cases.

We believe that this level of disclosure is positive and in our view BP and Shell lead the industry on corporate governance issues.

RD/Shell: Requires all businesses to report incidents of bribery (see below) but suspects that it only detects a fraction of incidents that occur.

	1998	1999	2000	2001	2002
Bribes by employees (US$ value)	1 (US$300)	1 (US$300)	0	0	0
Bribes by contractors (US$ value)	-	0	1 (US$4,562)	0	0
Bribes accepted by employees (US$ value)	4 (US$75,000)	3 (US$153,000)	4 (US$89,000)	4 (US$25,668)	4 (n/a)
Bribes accepted by contractors (US$ value)	-	1 (n/a)	0	1 (US$18,072)	0

Source: Company data, UN, World Bank, UK Department for International Development, Copal Partners.

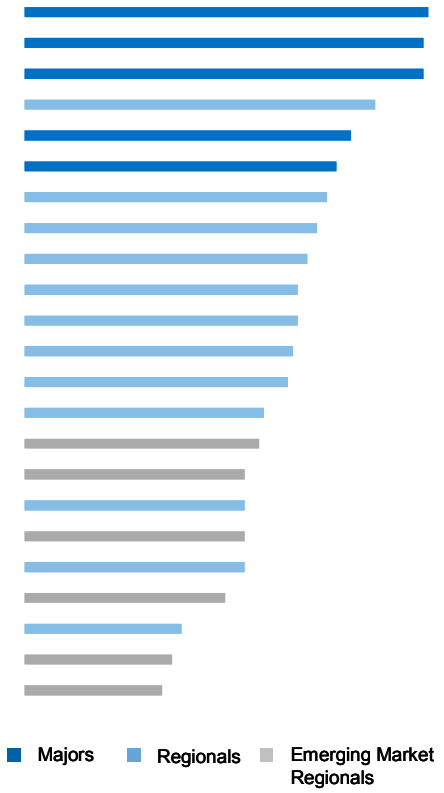
"Corporate Management in the New World" in the GSEES Index

The GSEES Index "Corporate Management in the New World" score

ExxonMobil leads the Majors and Statoil leads the Regionals in terms of scores in "Corporate Management in the New World" in the GSEES Index. The Regionals make up the second tier and US companies have slightly higher scores in general. CEPSA, MOL and Repsol are among the Emerging Market Regionals at the bottom of the pack.

Exhibit 47: Company relative positioning in the GSEES Index "Corporate Management in the New World" score

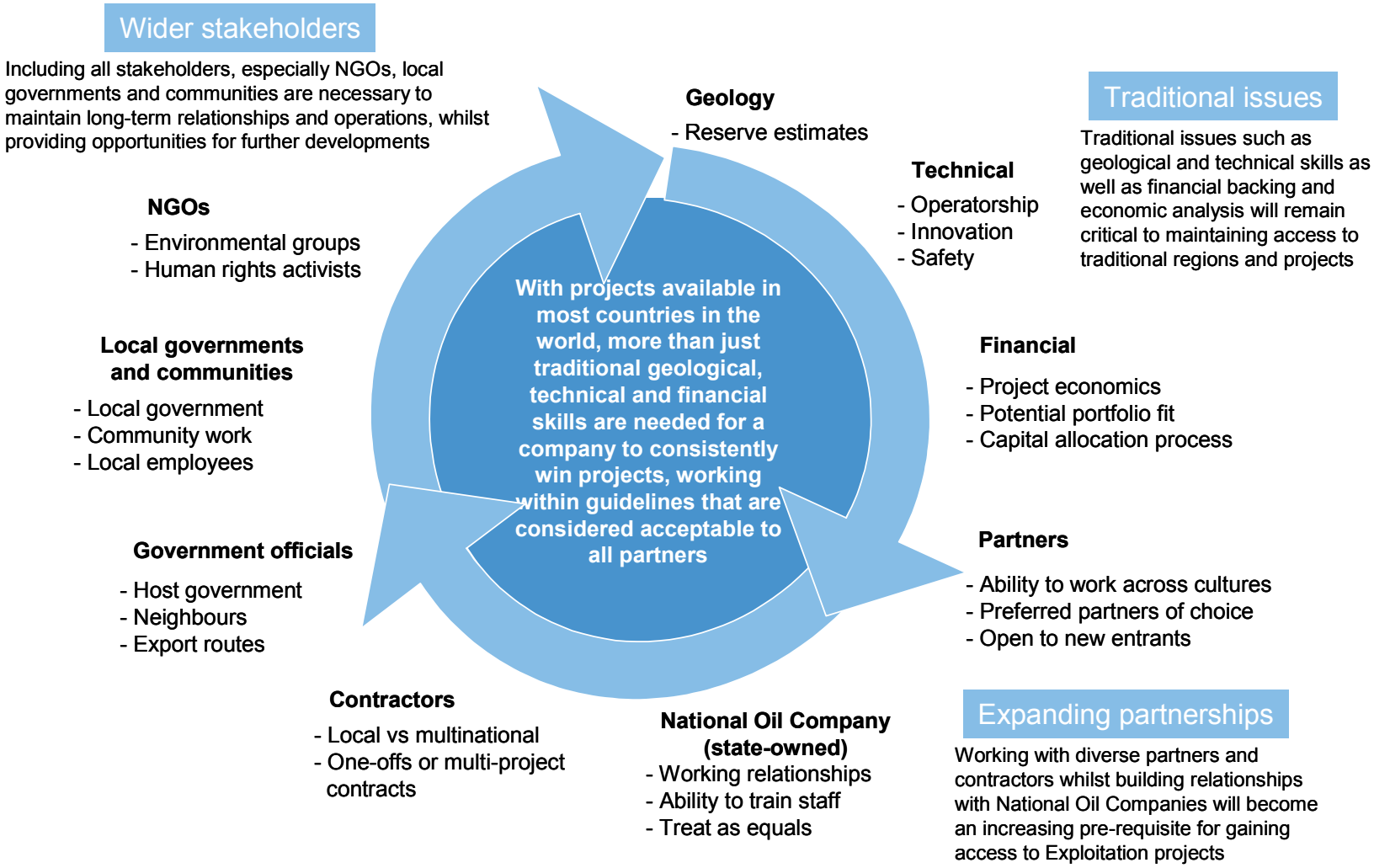
Company	Management Diversity and Incentives	Investment in the Future	Workforce	Safety	Transparency and Vision	GSEES Corporate Management in the New World Score (Maximum = 97)
ExxonMobil	18	8	23	23	12	84
BP	20	6	22	21	14	83
RD/Shell	21	8	19	21	14	83
Statoil	18	5	19	18	13	73
ChevronTexaco	20	8	19	13	8	68
TOTAL	18	10	19	9	9	65
Norsk Hydro	13	7	16	17	10	63
Marathon	20	2	15	17	7	61
BG	15	5	13	16	10	59
ConocoPhillips	20	7	11	8	11	57
ENI	16	6	13	12	10	57
OMV	15	6	12	13	10	56
Occidental	21	2	9	14	9	55
Amerada Hess	15	2	11	11	11	50
Petrobras	13	3	13	13	7	49
CNOOC	13	3	13	9	8	46
MOL	10	6	8	12	10	46
PetroChina	17	4	10	7	8	46
Repsol	12	6	12	5	11	46
Sinopec	11	6	12	5	8	42
CEPSA	13	2	9	5	4	33
Lukoil	12	2	8	5	4	31
Yukos	10	2	7	5	5	29
Average	15.7	5.0	13.6	12.1	9.3	55.7
Maximum	23	10	25	25	14	97



Source: Company data, Copal Partners, Goldman Sachs Research estimates.

The increasing environmental and social demands on oil and gas companies

Exhibit 48: Successful companies will face a wider range of stakeholders and expanding partnerships as well as traditional issues



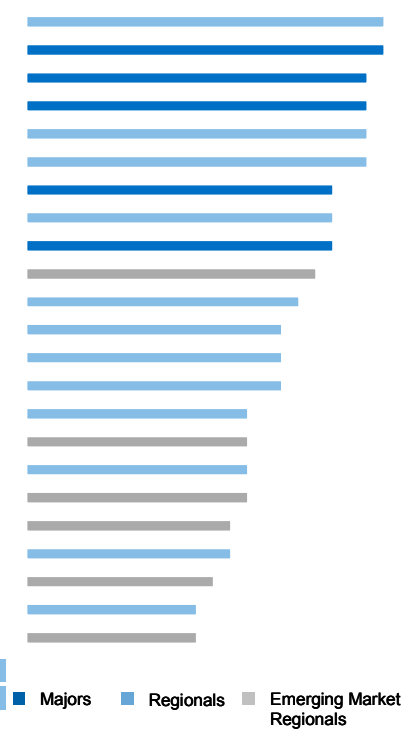
Source: Goldman Sachs Research estimates.

GSEES Index "Management Diversity and Incentives" score

The Majors and US Regionals perform best in the "Management Diversity and Incentives" category of the GSEES Index due to diversity at upper levels of Board and Management, and strategy linked to Health, Safety and the Environment (H,S&E). In the next tier, Statoil leads the European Regionals and PetroChina is also in this group. CEPSA, Norsk Hydro, Repsol and MOL and the remaining Emerging Market Regionals have the lowest scores. A detailed description of the criteria used to give a score to the companies in each of the metrics is shown on page 102.

Exhibit 49: Company relative positioning in the GSEES Index Management Diversity and Incentives score

Company	Board diversity	Senior management diversity	Management compensation disclosed and linked to HS&E	CEO Statement on HS&E	Senior management responsible for HS&E	GSEES Index Management Diversity and Incentives Score (Maximum = 23)
Occidental	5	3	5	4	4	21
RD/Shell	5	5	5	4	2	21
BP	4	3	5	4	4	20
ChevronTexaco	4	5	3	4	4	20
ConocoPhillips	5	3	5	3	4	20
Marathon	5	5	3	3	4	20
ExxonMobil	5	2	3	4	4	18
Statoil	3	3	5	3	4	18
TOTAL	3	2	5	4	4	18
PetroChina	3	2	5	3	4	17
ENI	2	2	5	3	4	16
Amerada Hess	3	2	3	3	4	15
BG	3	3	3	4	2	15
OMV	1	2	5	3	4	15
CEPSA	3	3	3	3	1	13
CNOOC	3	2	3	1	4	13
Norsk Hydro	3	3	3	2	2	13
Petrobras	3	2	3	3	2	13
Lukoil	2	3	3	3	1	12
Repsol	1	1	3	3	4	12
Sinopec	3	3	3	1	1	11
MOL	3	2	3	1	1	10
Yukos	3	2	2	2	1	10
Average	3.3	2.7	3.7	3.0	3.0	15.7
Maximum	5	5	5	4	4	23



Source: Company data, Copal Partners, Goldman Sachs Research estimates.

Diversity among the Board and senior executives

Exhibit 50: Company summary of Board and senior executive composition

Norsk Hydro and Statoil score best, reflecting Scandinavian diversity trends, whilst ExxonMobil, ConocoPhillips and RD/Shell are next best

RD/Shell, ChevronTexaco and BP stand out; Europeans ahead of the US on this metric

We could not find any link between HSE performance and compensation for ChevronTexaco, Repsol and Marathon

	Board							Senior Executives					Compensation		Specific Role
Company	No.	Females	%	Minorities*	%	Non-exec	%	No.	Females	%	Minorities*	%	Disclose	Link to E,H&S Performance	Board Member or Executive Role for E,H&S
Amerada Hess	11	1	9%	n/a	n/a	8	73%	13	0	0%	0	0%	✓	n/a	VP E,H&S
BG	14	1	7%	0	0%	8	57%	13	1	8%	0	0%	✓	n/a	×
BP	17	1	6%	1	6%	9	53%	10	2	20%	0	0%	✓	✓	Ethics
Cepsa	21	1	5%	n/a	n/a	16	76%	9	1	11%	0	0%	✓	n/a	No evidence
ChevronTexaco	14	1	7%	1	7%	12	86%	12	3	25%	1	8%	✓	×	VP E,H&S
CNOOC	8	0	0%	2	25%	3	38%	6	0	0%	0	0%	✓	n/a	H,S&E
ConocoPhillips	16	3	19%	1	6%	12	75%	12	1	8%	0	0%	✓	✓	VP E,H&S
ENI	8	0	0%	0	0%	5	63%	6	0	0%	0	0%	✓	✓	VP E,H&S
ExxonMobil	12	3	25%	1	8%	10	83%	4	0	0%	0	0%	✓	n/a	VP E,H&S
Lukoil	10	0	0%	0	0%	5	50%	19	1	5%	0	0%	✓	n/a	n/a
Marathon	11	1	9%	2	18%	9	82%	14	1	7%	2	14%	✓	×	VP E,H&S
MOL	11	1	9%	0	0%	8	73%	12	0	0%	0	0%	✓	n/a	n/a
Norsk Hydro	9	3	33%	0	0%	4	44%	12	1	8%	0	0%	✓	n/a	×
Occidental	12	1	8%	2	17%	10	83%	17	0	0%	1	6%	✓	✓	VP E,H&S
OMV	14	0	0%	n/a	n/a	9	64%	4	0	0%	0	0%	✓	✓	HSE representative
Petrobras	9	1	11%	0	0%	7	78%	7	0	0%	0	0%	✓	n/a	×
PetroChina	12	0	0%	1	8%	6	50%	8	0	0%	0	0%	✓	✓	n/a
Repsol	13	0	0%	n/a	n/a	9	69%	18	0	0%	n/a	n/a	✓	×	Corporate Director
RDShell	17	3	18%	2	12%	14	82%	8	2	25%	1	13%	✓	✓	×
Sinopec	13	1	8%	0	0%	9	69%	4	1	25%	0	0%	✓	n/a	n/a
Statoil	9	4	44%	0	0%	4	44%	16	1	6%	0	0%	✓	✓	VP E,H&S
TOTAL	18	1	6%	0	0%	16	89%	28	0	0%	0	0%	✓	✓	Senior VP E,H&S
Yukos	10	1	10%	0	0%	8	80%	7	0	0%	0	0%	×	n/a	n/a

n/a = not available

** In the case of CNOOC, PetroChina, Petrobras, PetroChina, Sinopec non-Nationals and non-Caucasian; for all others non-Caucasian*

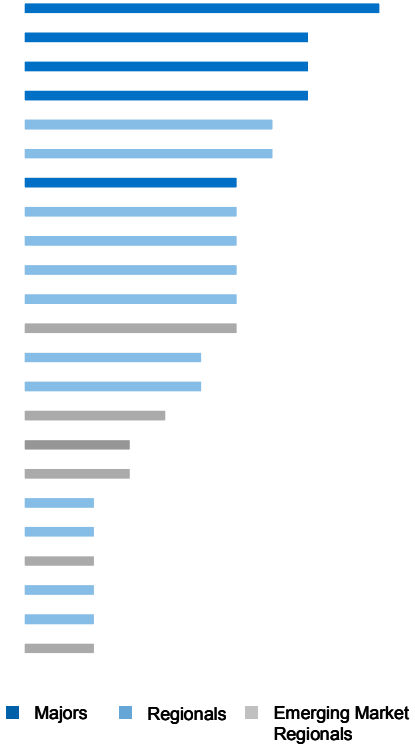
Source: Company data, Copal Partners.

GSEES Index "Investment in the Future" score

TOTAL has the highest score in this category, leading the Majors at the top. BP is an exception with relatively poor investment in both social projects and R&D, relative to capex and cash flow respectively. The Regionals are led by Norsk Hydro and Sinopec has the highest score amongst the Emerging Market Regionals. Many companies have a score of 2 points due to lack of disclosure. A detailed description of the criteria used to give a score to the companies in each of the metrics is shown on page 103.

Exhibit 51: Company relative positioning in the GSEES Index "Investment in the Future" score

Company	Social Investment	R&D Investment	GSEES Index Investment in the Future Score (Maximum = 10)
TOTAL	5	5	10
ChevronTexaco	5	3	8
ExxonMobil	4	4	8
RD/Shell	4	4	8
ConocoPhillips	3	4	7
Norsk Hydro	2	5	7
BP	3	3	6
ENI	3	3	6
MOL	5	1	6
OMV	1	5	6
Repsol	2	4	6
Sinopec	2	4	6
BG	3	2	5
Statoil	1	4	5
PetroChina	1	3	4
CNOOC	1	2	3
Petrobras	2	1	3
Amerada Hess	1	1	2
CEPSA	1	1	2
Lukoil	1	1	2
Marathon	1	1	2
Occidental	1	1	2
Yukos	1	1	2
Average	2.3	2.7	5.0
Maximum	5	5	10

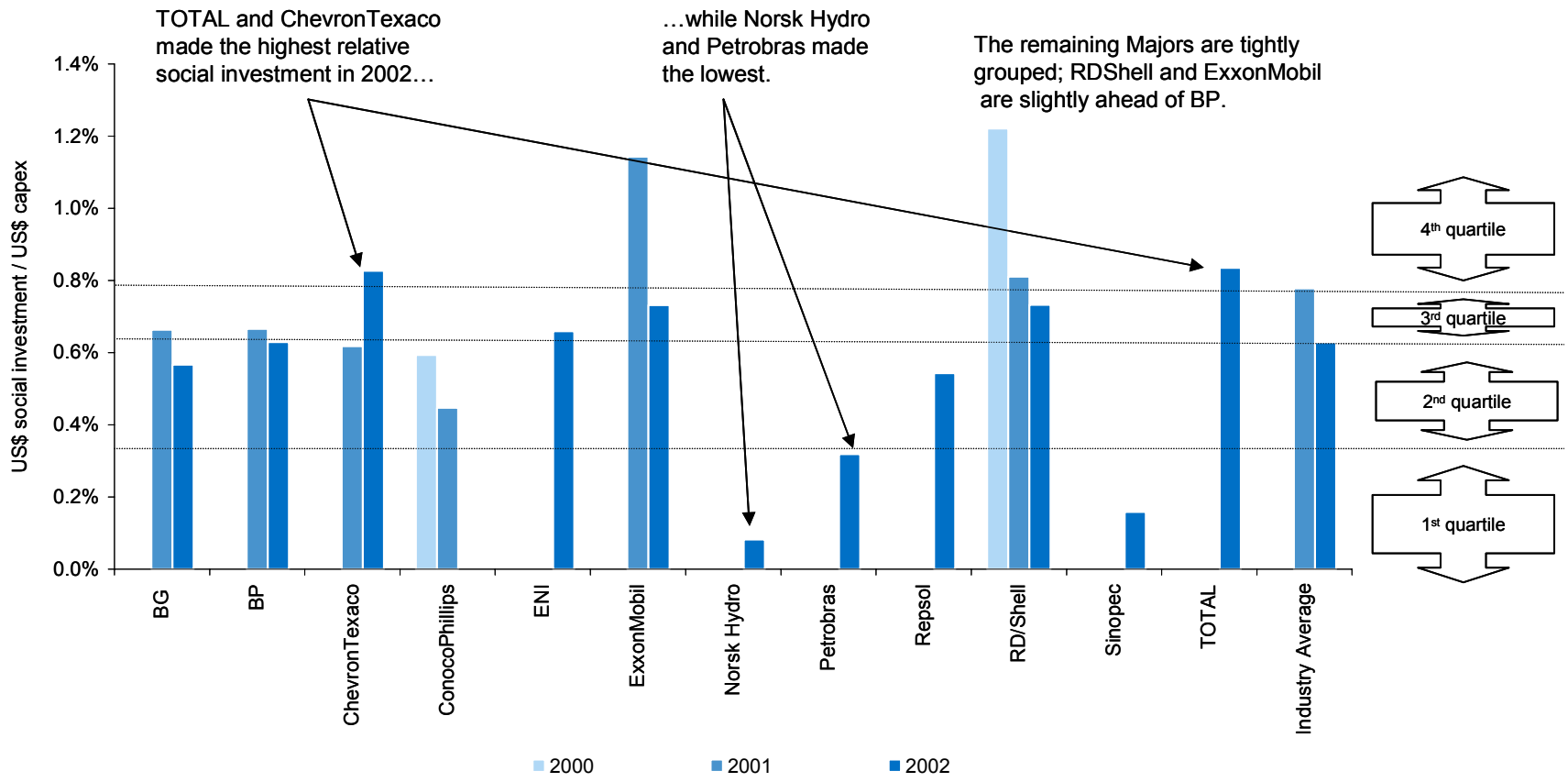


Source: Company data, Copal Partners, Goldman Sachs Research estimates.

The industry makes relatively small social investments

Social investments typically involve spending within local communities in countries in which the companies are producing oil and gas. Examples of the infrastructure and services provided include schools and education, hospitals and health services, roads, water, heating and electricity.

Exhibit 52: Social investments relative to capex

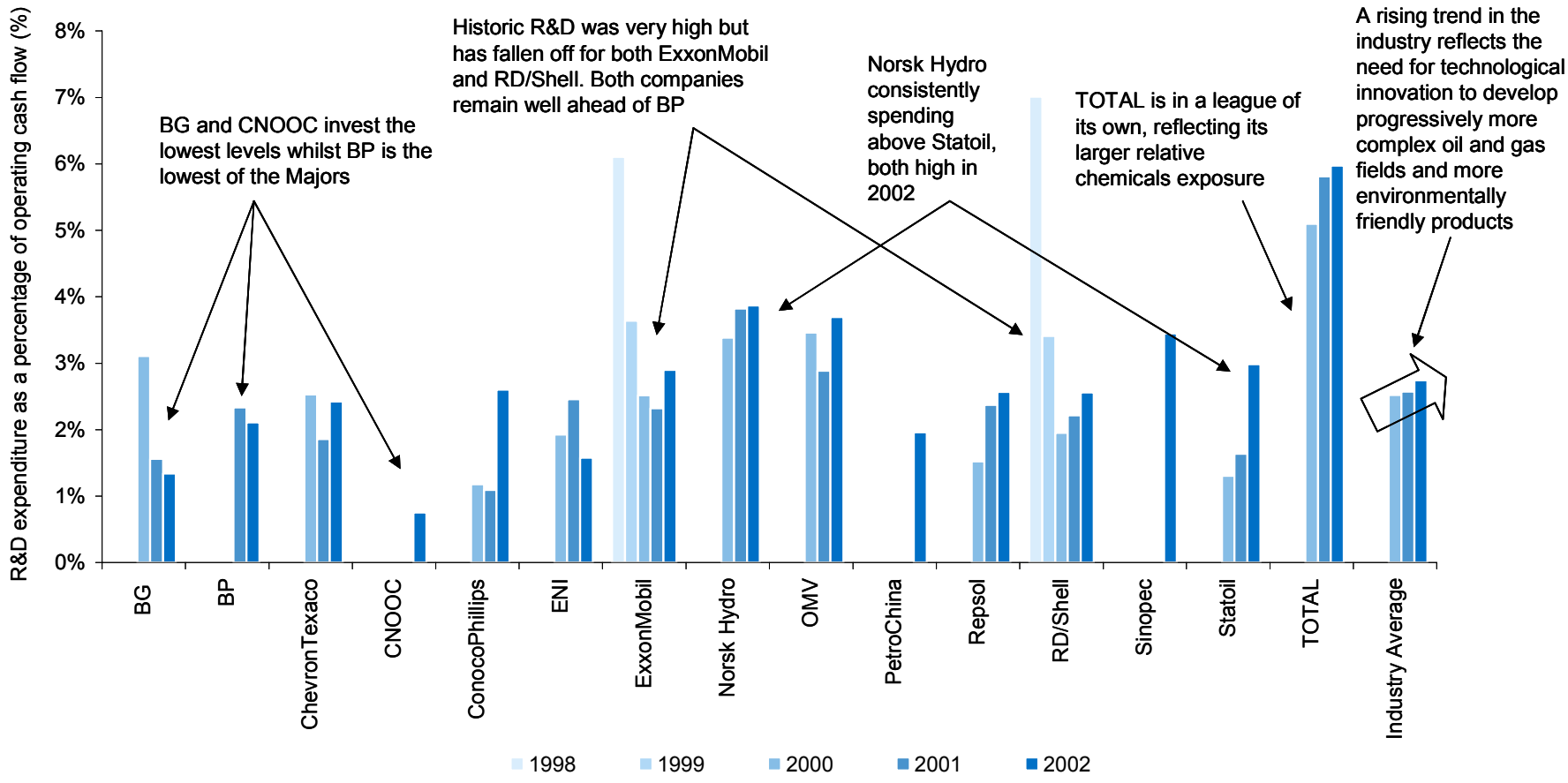


Group social investment data not available for Amerada Hess, Cepsa, CNOOC, Lukoil, Marathon, MOL, Occidental, OMV, PetroChina, Statoil, Yukos.
Note: Norsk Hydro data includes Aluminium and Agriculture Divisions.

Source: Company data.

TOTAL is a stand-out for R&D expenditure

Exhibit 53: Research and development expenditure as a percentage of cash flow



Group R&D investment data not available for Amerada Hess, CEPSA, Lukoil, Marathon, MOL, Occidental, Petrobras and Yukos.
Note: Norsk Hydro data includes Aluminium and Agriculture Divisions.

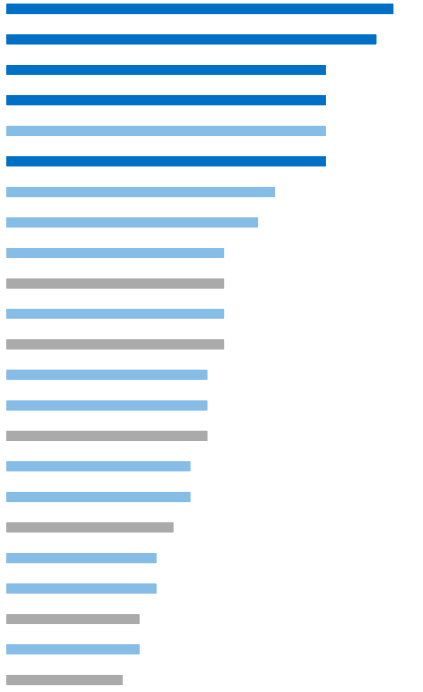
Source: Company data.

GSEES Index Workforce score

ExxonMobil leads the pack on Workforce score within the GSEES Index, with the other Majors and Statoil close behind due to diversity in the workforce, high wages and efficient use of employees. There is a significant jump down in scores to Norsk Hydro, leading the Regionals, and the Emerging Market Regionals, led by CNOOC and Petrobras. A detailed description of the criteria used to give a score to the companies in each of the metrics is shown on page 104.

Exhibit 54: Company relative positioning in the GSEES Index Workforce score

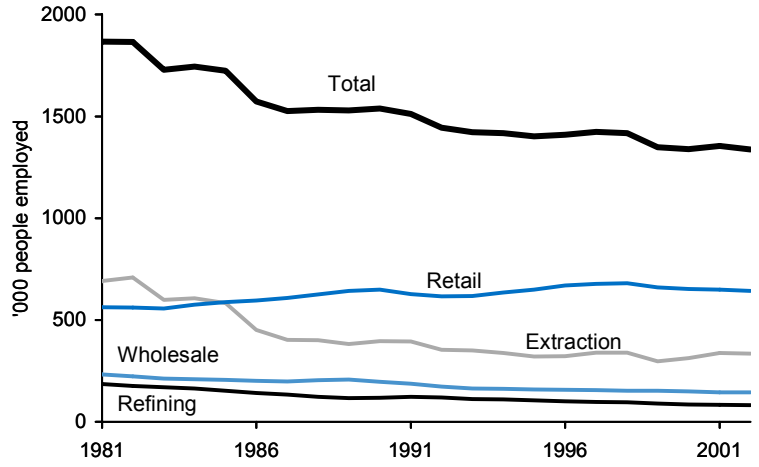
Company	Diversity disclosure	Diversity performance	Employees relative to GCI	Payroll relative to cash flow pre payroll	Payroll relative to employees	GSEES Index Workforce Score (Maximum = 25)
ExxonMobil	5	5	4	4	5	23
BP	4	5	5	4	4	22
ChevronTexaco	5	5	3	3	3	19
RD/Shell	4	3	5	4	3	19
Statoil	4	4	3	4	4	19
TOTAL	4	4	3	5	3	19
Norsk Hydro	2	3	2	5	4	16
Marathon	2	3	2	5	3	15
BG	2	3	3	2	3	13
CNOOC	2	2	2	2	5	13
ENI	2	2	4	3	2	13
Petrobras	4	3	2	2	2	13
OMV	3	3	4	1	1	12
Repsol	2	2	4	2	2	12
Sinopec	2	3	2	3	2	12
Amerada Hess	2	2	5	1	1	11
ConocoPhillips	2	3	4	1	1	11
PetroChina	2	2	2	2	2	10
CEPSA	2	3	2	1	1	9
Occidental	2	2	3	1	1	9
Lukoil	2	3	1	1	1	8
MOL	2	3	1	1	1	8
Yukos	2	2	1	1	1	7
Average	2.7	3.0	2.9	2.5	2.4	13.6
Maximum	5	5	5	5	5	25



Source: Company data, Copal Partners, Goldman Sachs Research estimates.

Diversity and size of labour force

Exhibit 55: Number of people employed in the oil and gas industry



The number of people employed in the oil and gas industry has decreased significantly over the past 25 years, according to the International Labour Organisation in a report published at the start of 2002. In the US, employment slumped from a peak in 1981 of 1.87 mn workers to 1.35 mn in 1999. Another 70,000 jobs were lost in 1999, even though oil prices rose to US$25/bl at the end of the year. Most of the decline in employment has come from the E&P (exploration and production) sector; in contrast the number of jobs in retail has stayed almost flat.

Oil and gas contractors are a large proportion of the workforce. For example, in the UK, around 60% of 382,000 jobs in the offshore oil and gas sector are contractors. These jobs are highly vulnerable to E&P industry consolidation and economic downturn. Although there are no world employment data for oil and gas production, historically millions have been employed and what data there are shows a marked downward trend.

Exhibit 56: Percentage of oil and gas employees that are female

Company	Senior Leaders	Managers	Supervisors / Professionals	All Employees	New Graduates
BP	13				38
Chevron		24	31	30	34
ExxonMobil		18	29	31	36
Norsk Hydro		15			
OMV				17	
Petrobras		8		12	
RDShell	8	10	19		
Statoil		23	31		33
TOTAL				24	30

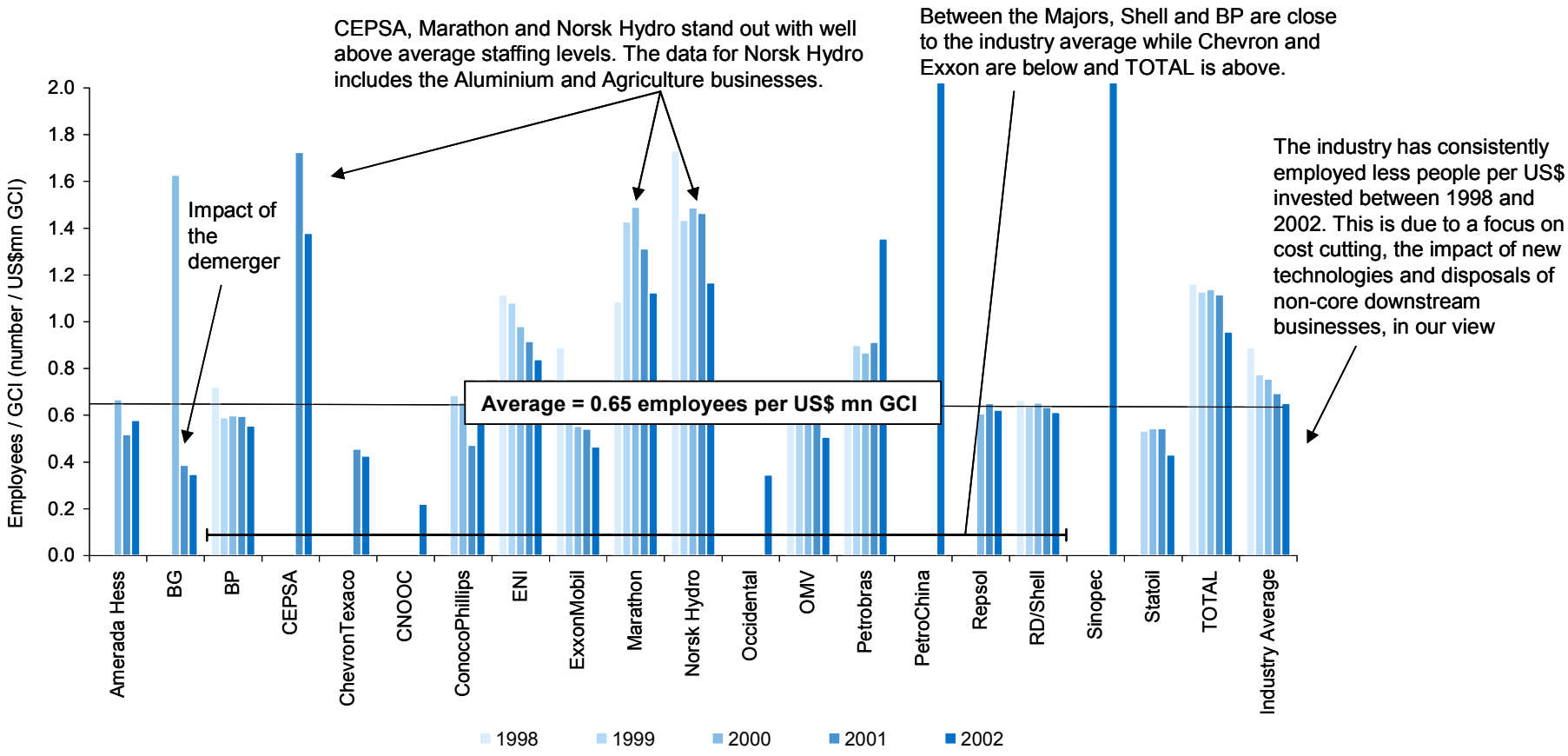
In the UK in 2002, 44% of all people employed in the general workforce, 29% of corporate managers and 40% of professionals were women. Of the professionals, 22% of those in science and technology were women, as were 25% of process, plant and machine operatives.

In the US in 2002, 47% of all people employed and 55% of all professionals were women. Of the professionals, 11% of engineers were women and 31% of mathematical and computer scientists were women. 27% of engineering and science technicians and 35% of machine operators were women.

Source: Company data, US Energy Information Administration, UK Labour Force Survey, US Bureau of Labour Statistics, Independent Petroleum Association of America, Goldman Sachs Research estimates.

The industry continues to employ fewer people relative to its assets

Exhibit 57: Number of people employed relative to asset base

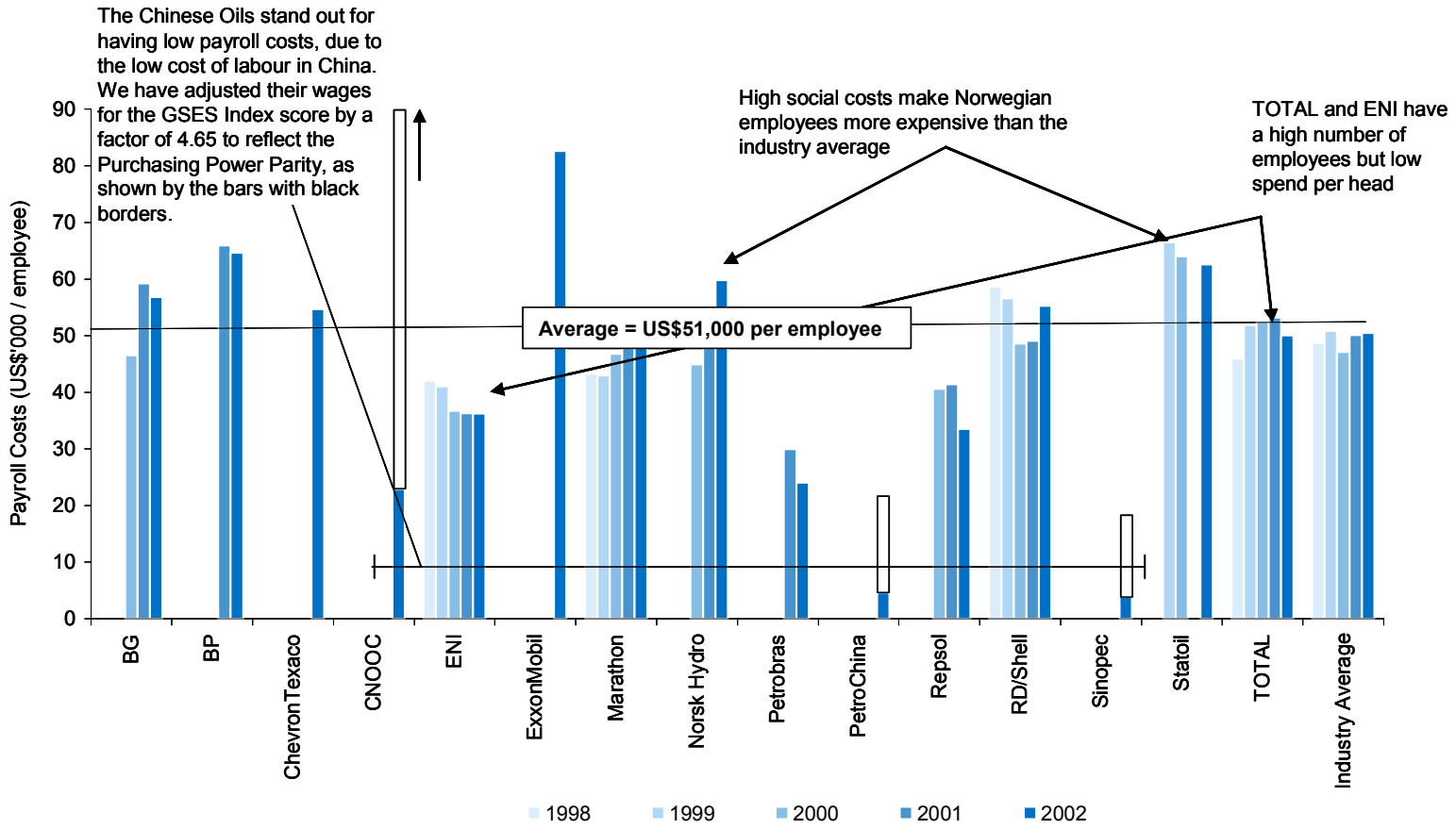


Companies rate well for being close to average, neither under- or over-staffed.
Group employee data not available for Lukoil, MOL and Yukos. PetroChina and CNOOC have 4.9 and 7.1 employees per million US$ of gross cash invested, respectively
Note: Norsk Hydro data includes Aluminium and Agriculture Divisions.

Source: Company data, Goldman Sachs Research estimates.

The average industry employee costs US$51,000 per annum

Exhibit 58: Payroll costs (US$ '000 per employee)

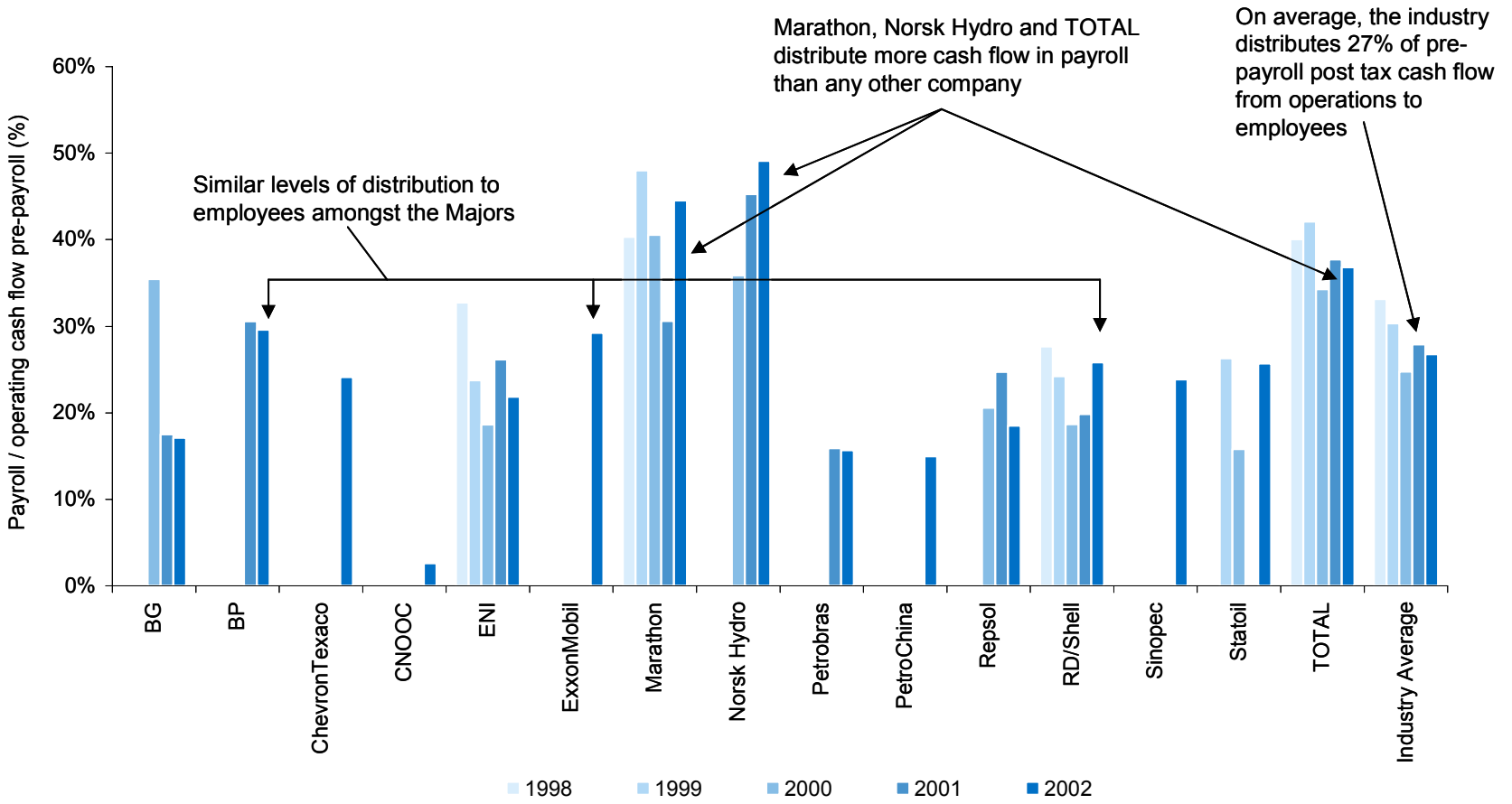


Data from company Annual Reports and includes all employee payroll costs (including wages and salaries, social security costs and pension costs)
Group payroll data not available for Amerada Hess, CEPSA, ConocoPhillips, Lukoil, MOL, Occidental, OMV and Yukos.
Norsk Hydro data includes Aluminium and Agriculture Divisions.
Industry average excludes PetroChina, Sinopec and ExxonMobil

Source: Company data, Goldman Sachs Research estimates.

Similar levels of distribution to employees among the Majors

Exhibit 59: Payroll costs as a % of cash flow pre-payroll



Group payroll data not available for Amerada Hess, CEPSA, ConocoPhillips, Lukoil, MOL, Occidental, OMV and Yukos.
Note: Norsk Hydro data includes Aluminium and Agriculture Divisions.

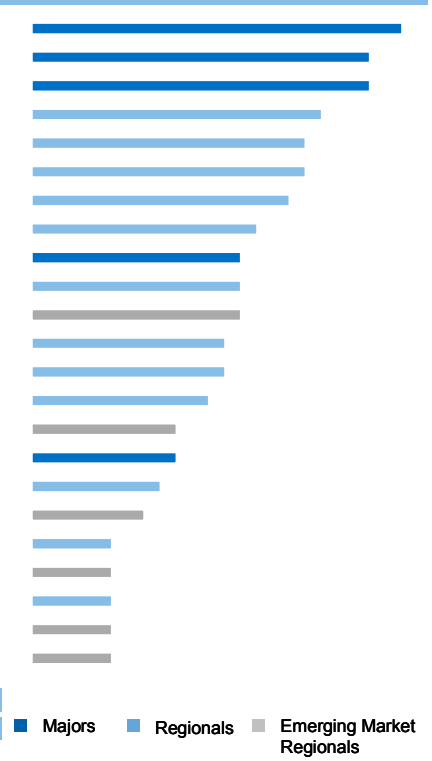
Source: Company data, Goldman Sachs Research estimates.

GSEES Index Safety score

ExxonMobil's score for Safety in the GSEES Index stands out, along with BP and RD/Shell. Conversely, TOTAL appears to have a very poor safety record, below some Emerging Market Regionals. The Regionals have mixed performances, with good scores for Marathon, Statoil and Norsk Hydro and low scores for Repsol, CEPSA and ConocoPhillips, mostly due to lack of disclosure. A detailed description of the criteria used to give a score to the companies in each of the metrics is shown on page 105.

Exhibit 60: Company relative positioning in the GSEES Index Safety score

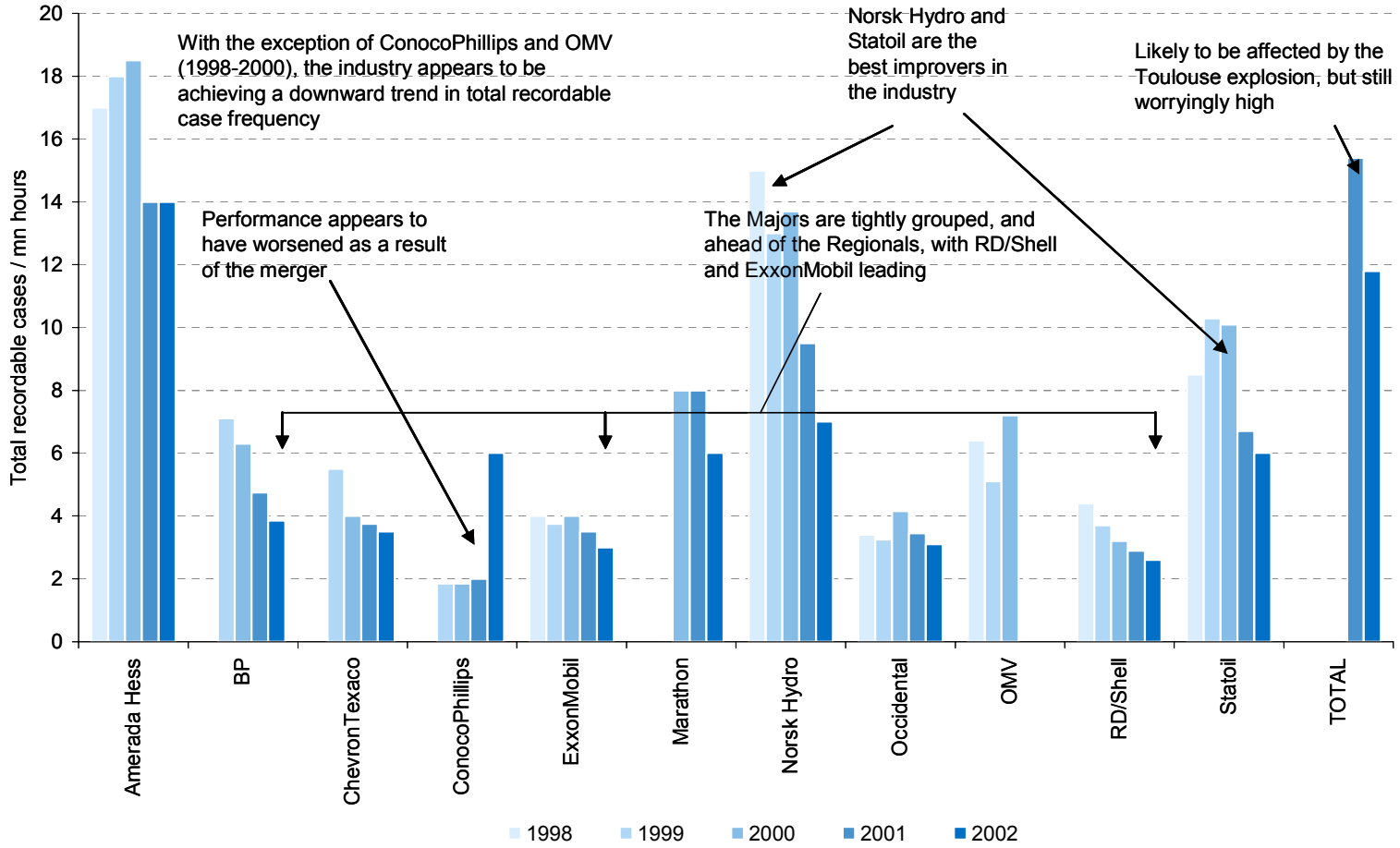
Company	Fatalities (employees & contractors)	LTI frequency	Change in LTI frequency	TRC frequency	Change in TRC frequency	GSEES Index Safety Score (Maximum = 25)
ExxonMobil	4	5	4	5	5	23
BP	3	5	5	4	4	21
RD/Shell	2	4	5	5	5	21
Statoil	4	4	4	3	3	18
Marathon	1	5	4	3	4	17
Norsk Hydro	4	4	2	3	4	17
BG	4	5	5	1	1	16
Occidental	1	4	2	4	3	14
ChevronTexaco	3	1	1	4	4	13
OMV	1	3	3	3	3	13
Petrobras	3	4	4	1	1	13
ENI	3	3	4	1	1	12
MOL	4	3	3	1	1	12
Amerada Hess	4	2	3	1	1	11
CNOOC	5	1	1	1	1	9
TOTAL	3	1	1	2	2	9
ConocoPhillips	1	1	1	3	2	8
PetroChina	3	1	1	1	1	7
CEPSA	1	1	1	1	1	5
Lukoil	1	1	1	1	1	5
Repsol	1	1	1	1	1	5
Sinopec	1	1	1	1	1	5
Yukos	1	1	1	1	1	5
Average	2.5	2.7	2.5	2.2	2.2	12.1
Maximum	5	5	5	5	5	25



Source: Company data, Copal Partners, Goldman Sachs Research estimates.

Majors tightly grouped on total recordable case frequency

Exhibit 61: Total recordable case frequency (total reportable cases = fatalities + lost workday cases + restricted workday cases + medical treatment cases)



Data for ChevronTexaco, ConocoPhillips, ExxonMobil, Marathon and Occidental cover only company employees, whilst other company data include contractors. In general, TRC frequency is higher for contractors than employees, hence we believe that the data for these companies are underestimates.

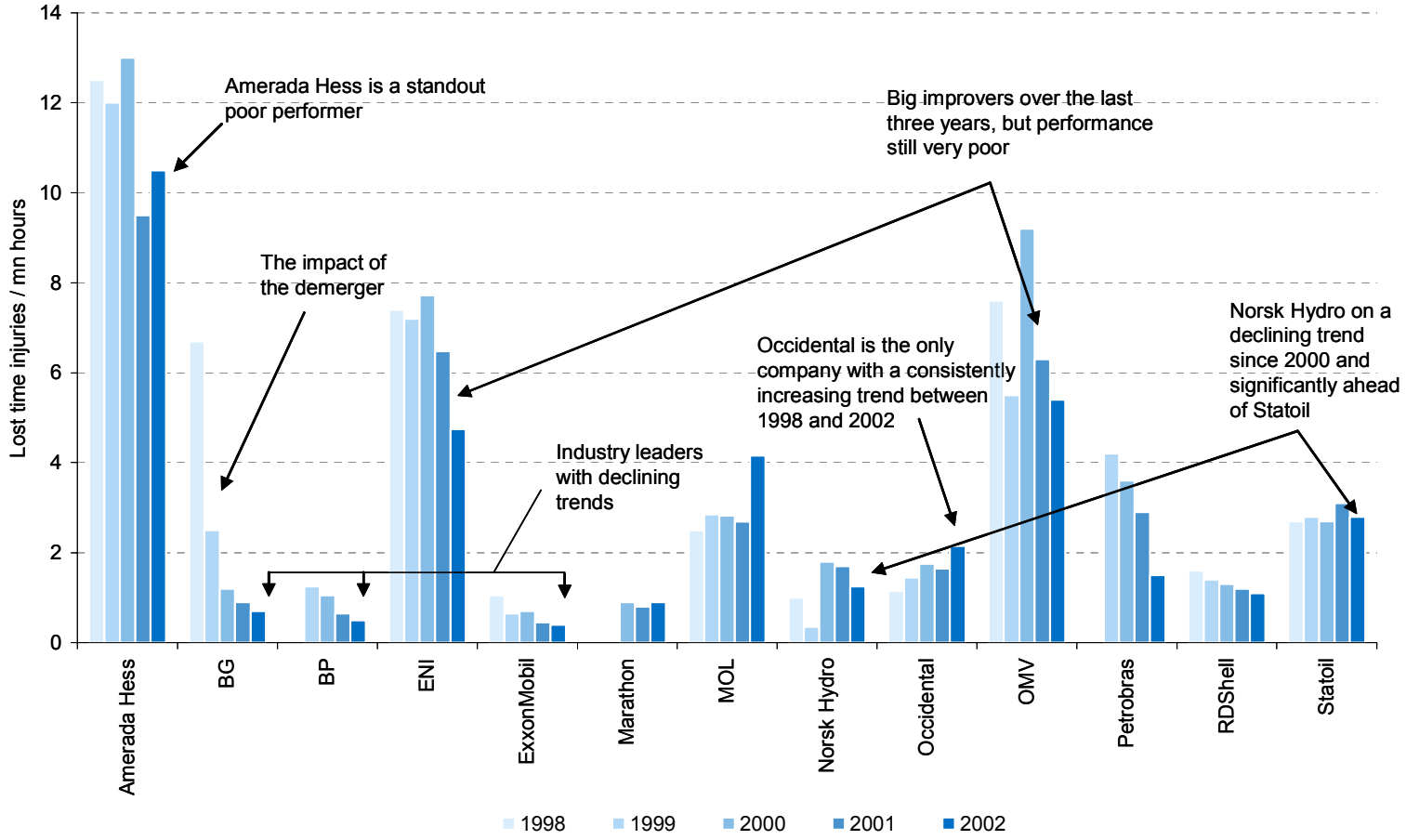
TRCF data not available for Amerada Hess, BG, CEPSA, CNOOC, ENI, Lukoil, MOL, Petrobras, PetroChina, Repsol, Sinopec and Yukos.

Note: Norsk Hydro data includes Aluminium and Agriculture Divisions.

Source: Company data, Goldman Sachs Research estimates.

BP, ExxonMobil and BG have the lowest lost time injury frequency

Exhibit 62: Lost time injury frequency (Lost time injuries = fatalities + lost workday cases)



Data for Amerada Hess, ExxonMobil, Marathon, Hydro and Occidental cover only company employees, whilst other company data include contractors. In general, LTI frequency is higher for contractors than employees, hence we believe that the data for these companies are underestimates. MOL's LTI is defined as an injury that requires greater than three days off work, whilst all other companies require only one day off work.

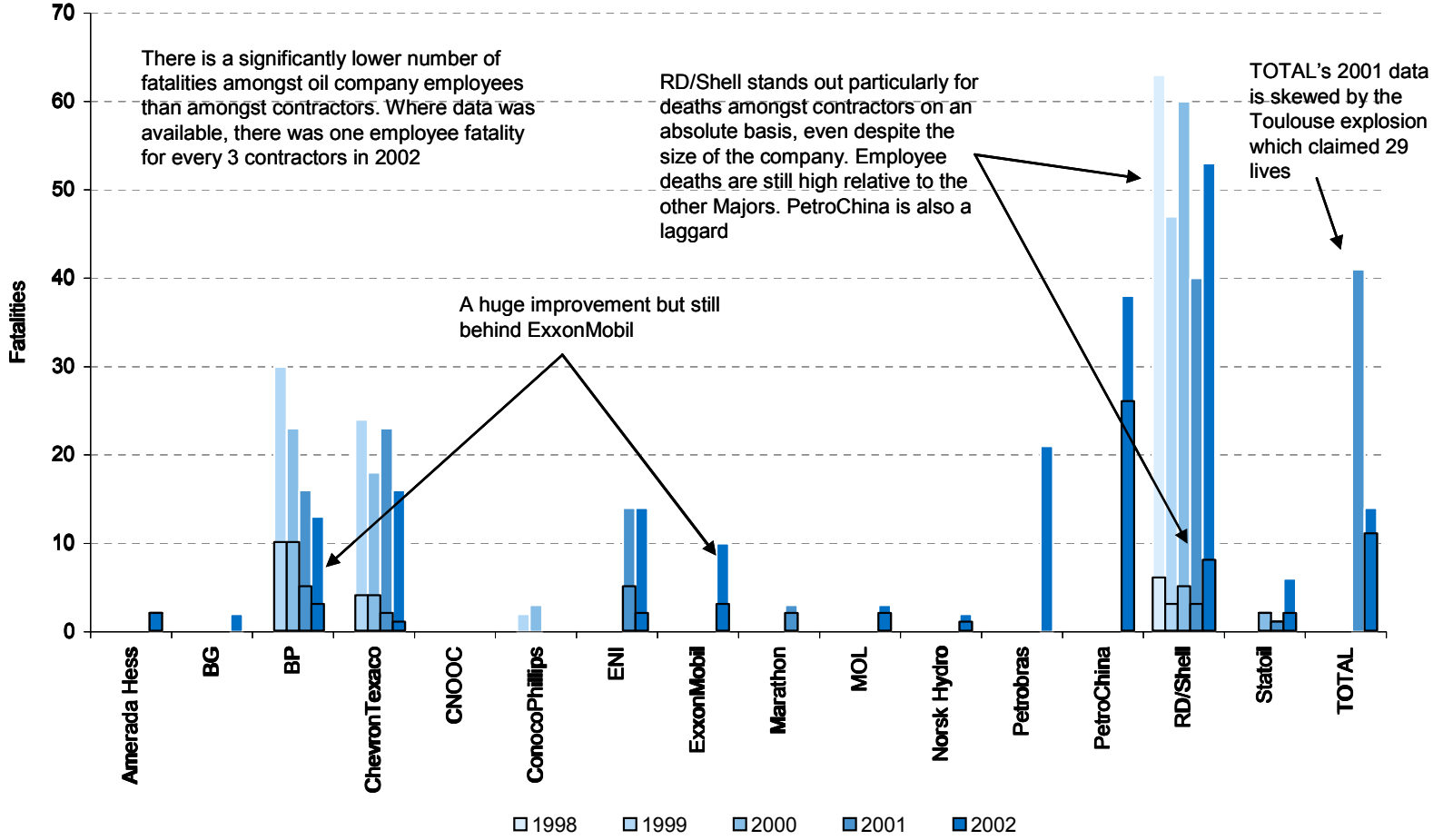
LTIF data not available for CEPSA, ChevronTexaco, CNOOC, ConocoPhillips, Lukoil, PetroChina, Repsol, Sinopec, TOTAL and Yukos.

Note: Norsk Hydro data is for the Oil & Energy Division only.

Source: Company data, Goldman Sachs Research estimates.

Shell stands out for a high level of fatalities versus its peers

Exhibit 63: Fatalities



Bars with black borders highlight, where the information is disclosed, the same statistic but for employees only, rather than employees plus contractors
Fatalities data not available for CEPSA, Lukoil, Occidental, OMV, Repsol, Sinopec and Yukos.
Note: Norsk Hydro data includes Aluminium and Agriculture Divisions.

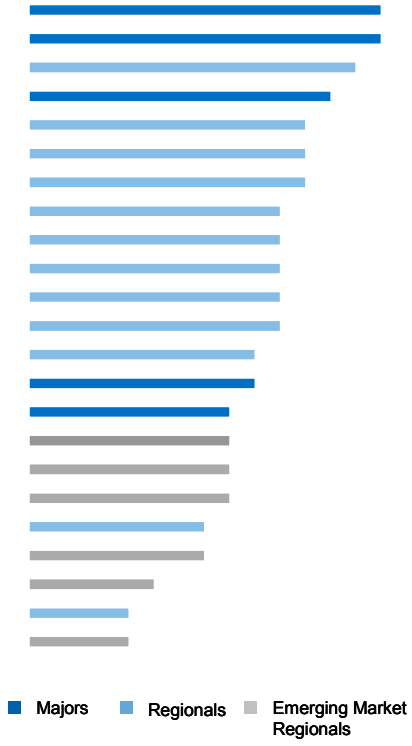
Source: Company data.

GSEES Index Transparency score

BP and RD/Shell have the maximum possible score for Transparency in our GSEES Index with exceptional performance on all metrics. Statoil and ExxonMobil follow close behind. In contrast TOTAL and ChevronTexaco are towards the bottom. The Emerging Market Regionals have the lowest scores along with Marathon and CEPSA. A detailed description of the criteria used to give a score to the companies in each of the metrics is shown on page 106.

Exhibit 64: Company relative positioning in the GSEES Index Transparency score

Company	Quality of HSE disclosure	History of HS&E report	Independent audit on HS&E report	GSEES Index Transparency Score (Maximum = 14)
BP	5	5	4	14
RD/Shell	5	5	4	14
Statoil	4	5	4	13
ExxonMobil	5	5	2	12
Amerada Hess	2	5	4	11
ConocoPhillips	3	4	4	11
Repsol	2	5	4	11
BG	3	3	4	10
ENI	3	3	4	10
MOL	3	5	2	10
Norsk Hydro	4	4	2	10
OMV	3	5	2	10
Occidental	2	5	2	9
TOTAL	4	3	2	9
ChevronTexaco	4	2	2	8
CNOOC	2	4	2	8
PetroChina	2	4	2	8
Sinopec	2	4	2	8
Marathon	2	3	2	7
Petrobras	3	2	2	7
Yukos	1	2	2	5
CEPSA	1	1	2	4
Lukoil	1	1	2	4
Average	2.9	3.7	2.7	9.3
Maximum	5	5	4	14



Source: Company data, Copal Partners, Goldman Sachs Research estimates.

Impact on gaining new legacy assets – The key differentiating factor in the medium term

120 projects to change the world: the key differentiating factor in the medium term

Exhibit 65: The next generation of legacy assets after the "Top 50 Projects"

The reserves of the Top 120 Projects are split roughly 60/40 between oil and gas. Over 80% of the reserves are located in non-OECD countries, with the FSU and Caspian representing over one third of the total reserves.

We expect that the Top 50 Projects will have finding and development (F&D) costs of US$2.3/boe, versus industry average F&D costs of US$4.6/boe

We can see eight new legacy zones developing; Canada heavy oil, Gulf of Mexico, Trinidad/Venezuela, offshore Brazil, West Africa, Middle East/Egypt, the Caspian and Australia

- Existing Top 50 Project
- Potential new Top 40 Project
- New LNG liquefaction project

The expansion reflects continuing exploration success, access to existing resource held by National Oil Companies and the commercialisation/development of new technologies such as LNG, GTL and heavy oil upgrading

Source: Source: Company data, Goldman Sachs Research estimates.

A total of 18 mnboepd of oil and gas in 2012 from 120 Projects

Exhibit 66: Production split by oil and gas

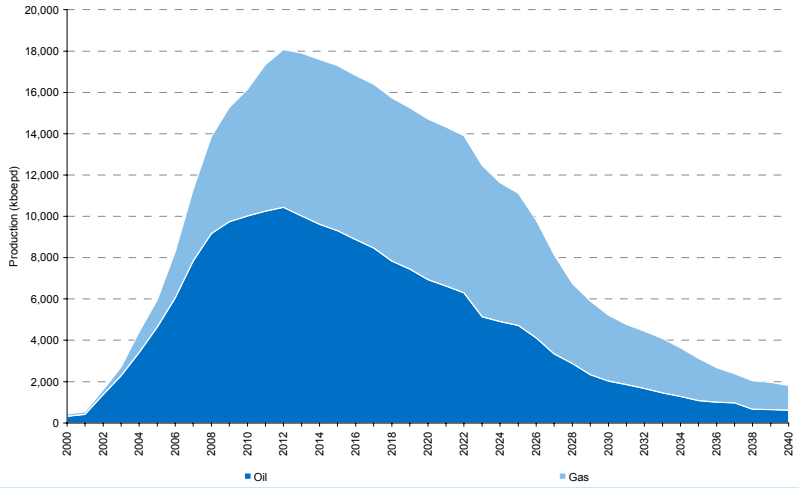


Exhibit 67: Production split by OECD / non-OECD

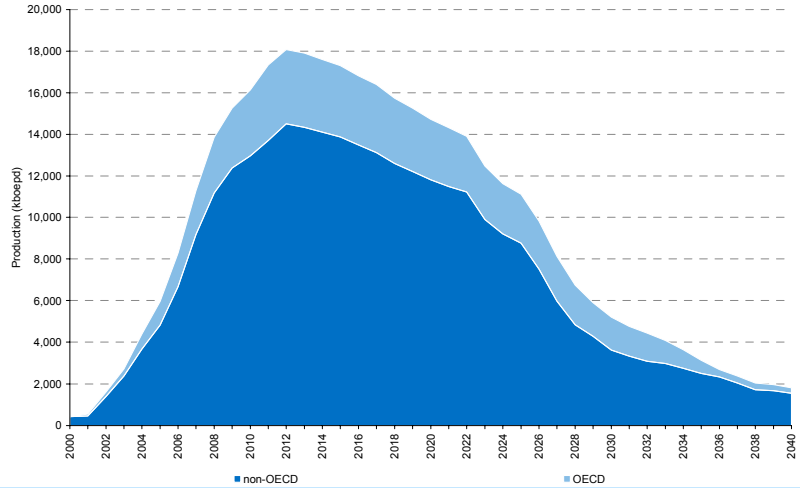


Exhibit 68: Production split by Win Zone

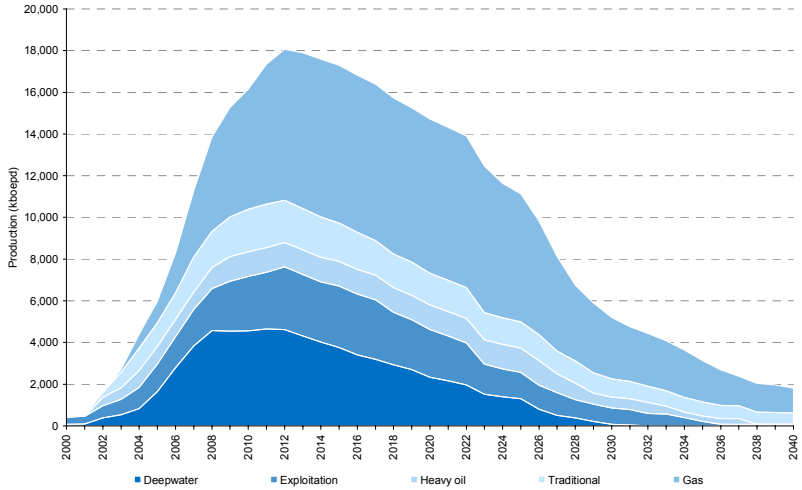
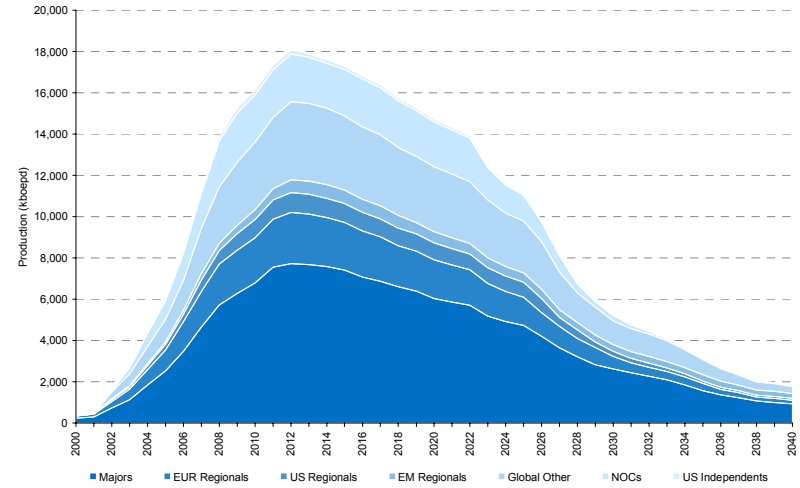


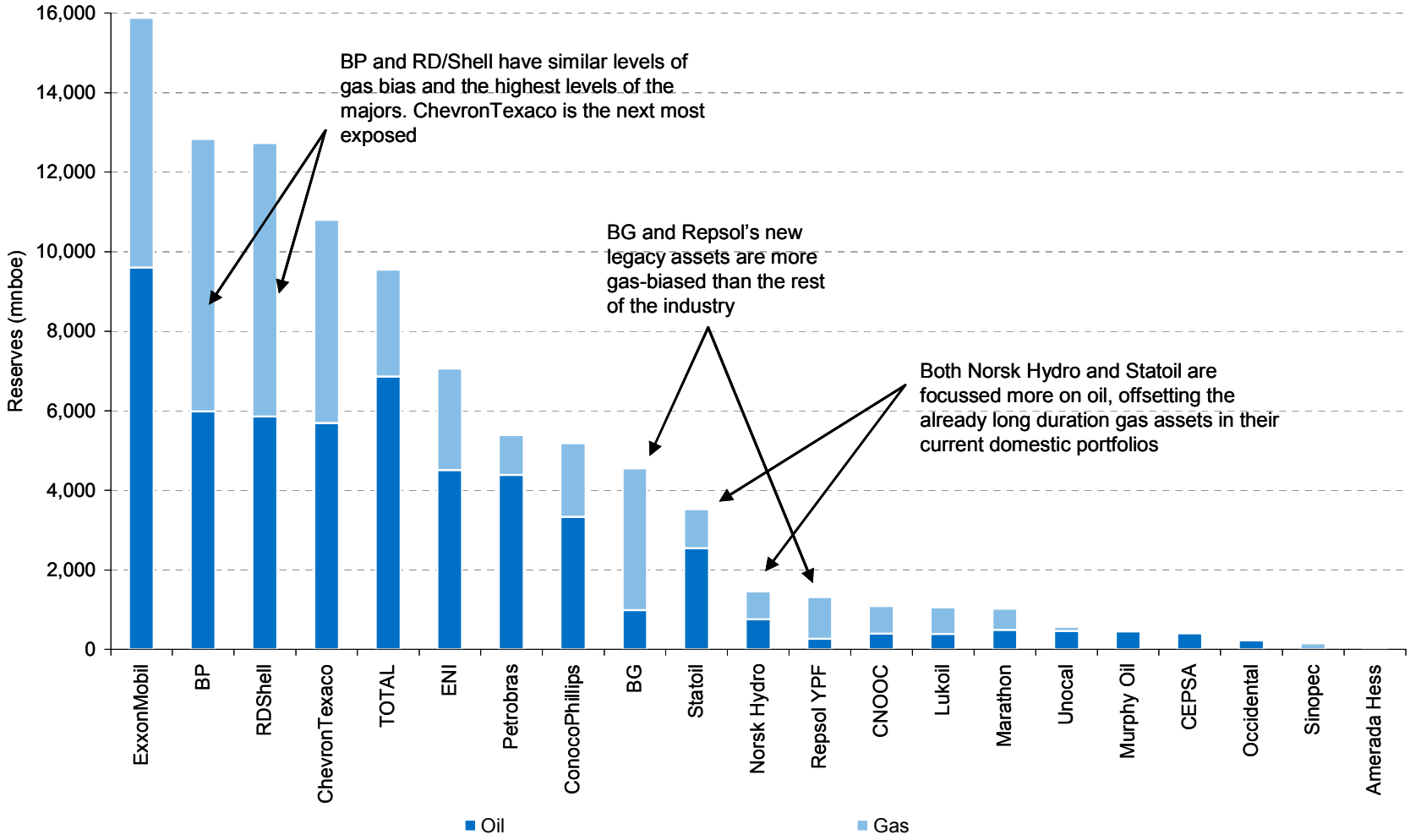
Exhibit 69: Production split by company type



Source: Company data, Goldman Sachs Research estimates.

Company share of Top 120 Projects oil and gas reserves

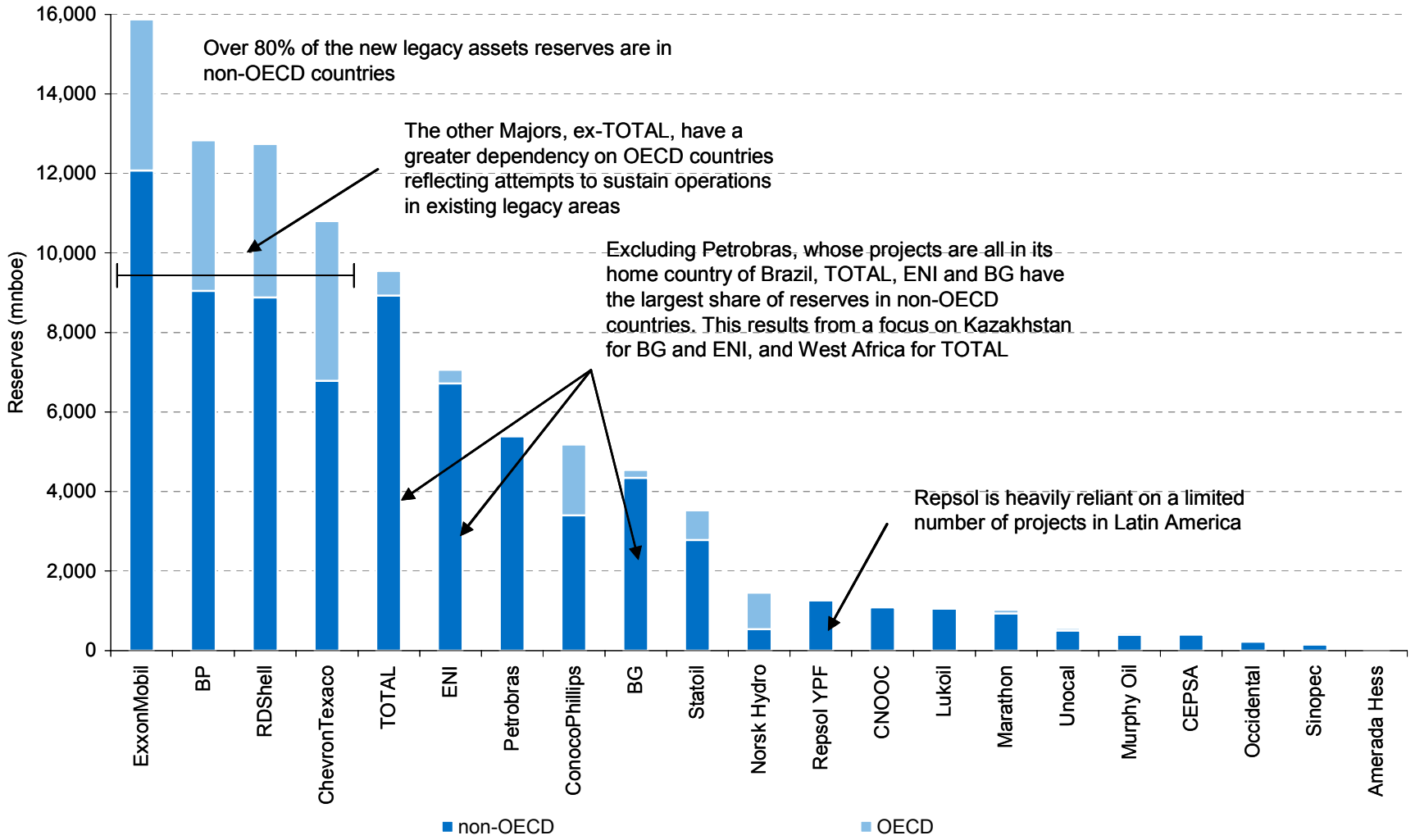
Exhibit 70: Company by company oil and gas reserves from the Top 120 projects



Source: Company data, Goldman Sachs Research estimates.

Company share of Top 120 Projects reserves in OECD / non-OECD

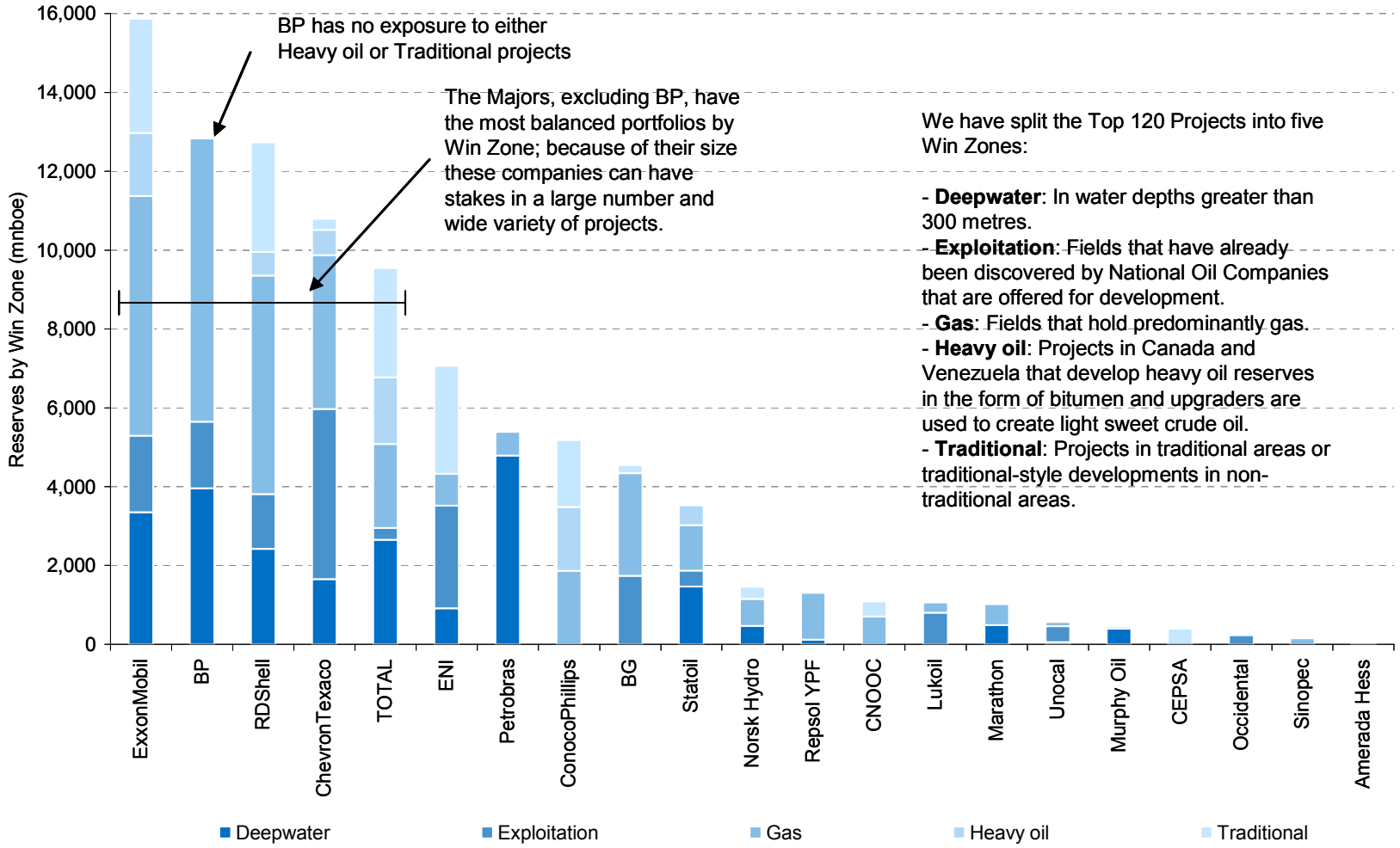
Exhibit 71: Top 120 Projects reserves split between OECD and non-OECD



Source: Company data, Goldman Sachs Research estimates.

Company share of Top 120 Projects reserves split by Win Zone

Exhibit 72: Top 120 Projects reserves split by Win Zone

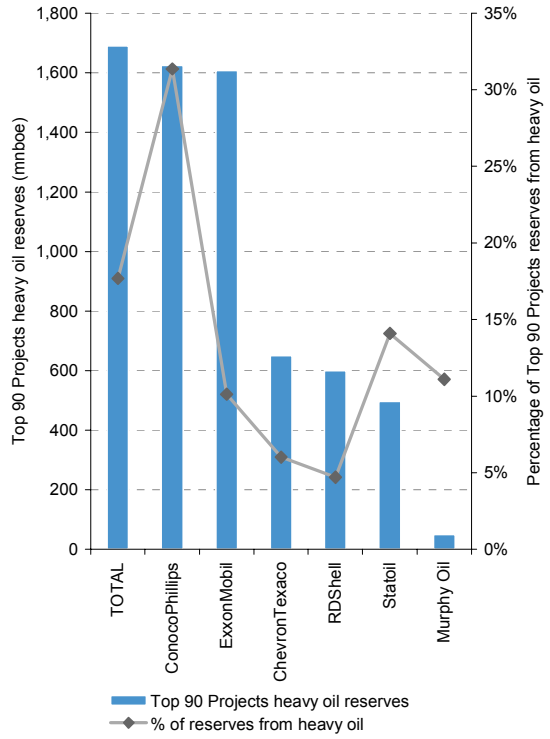


Source: Company data, Goldman Sachs Research estimates.

Heavy oil is not carbon friendly; ConocoPhillips and TOTAL most exposed

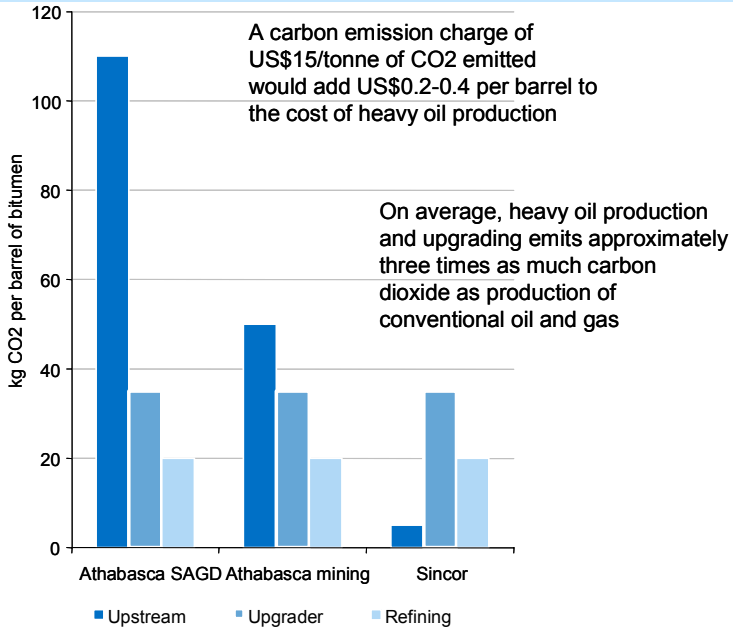
Canada and Venezuela dominate the world's heavy oil resources. Both hold about 300bnbls of recoverable reserves, similar in size to the recoverable reserves of Saudi Arabia. Developed reserves in both regions are about 10bnbls and are primarily in Venezuela's Orinoco belt and Athabasca in Canada.

Exhibit 73: Exposure to new heavy oil projects



TOTAL, ConocoPhillips and ExxonMobil have the largest exposure to the Top 90 Projects heavy oil reserves. On a relative basis, ConocoPhillips is most exposed to heavy oil projects

Exhibit 74: Heavy oil carbon emissions



Heavy oil reserves can be developed via either mining or drilling. In Venezuela, due to reservoir depths, drilling is the only option but in Canada both mining and drilling operations can be utilised.

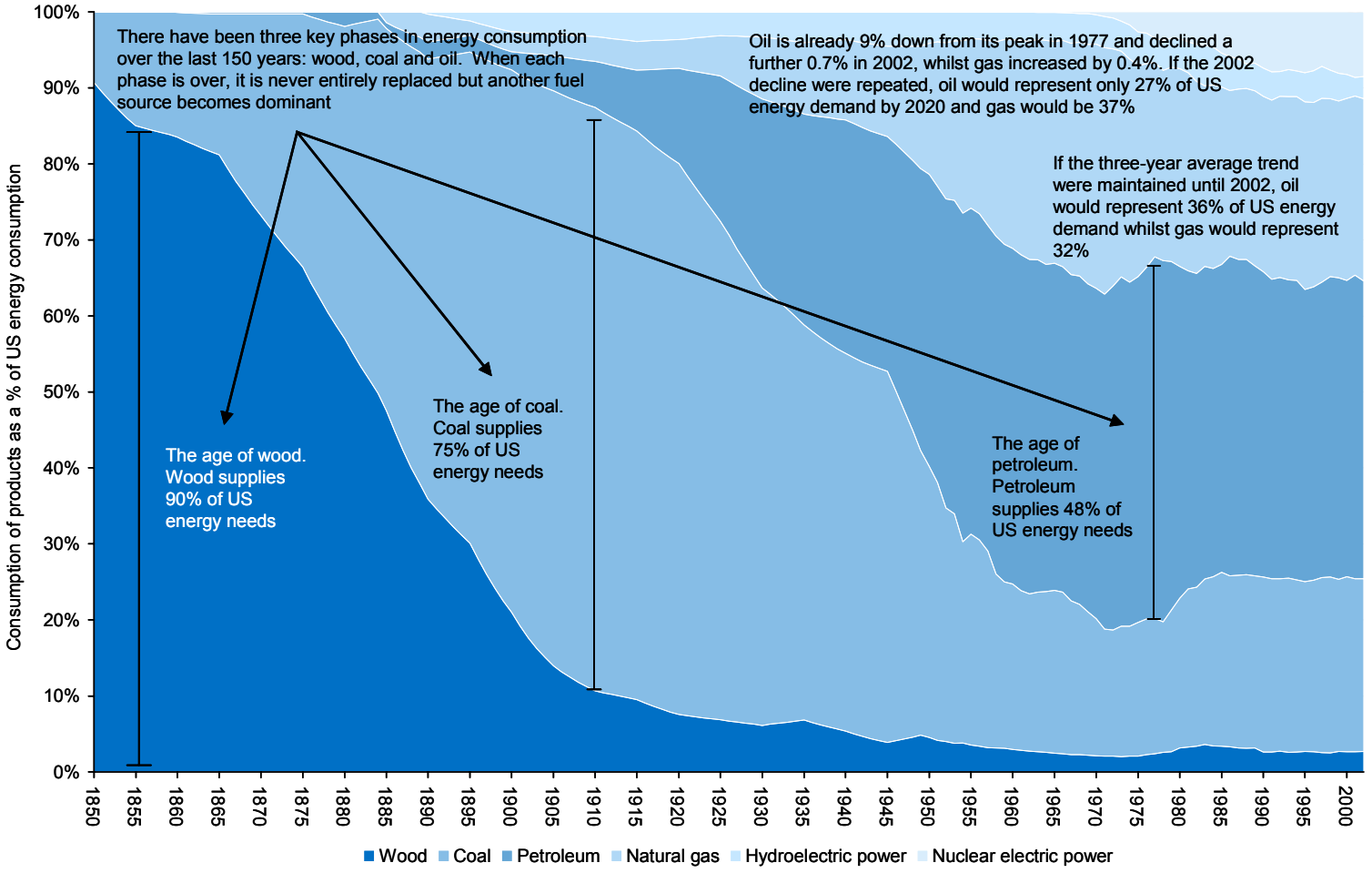
Drilling operations are the most environmentally friendly. Steam assisted gravity drainage (SAGD) drilling operations, which rely on the generation of 230 degree centigrade steam to improve the flow characteristics of the heavy oil, consume natural gas and generate the largest CO2 emissions.

Source: Company data, Goldman Sachs Research estimates.

Globalising gas and developing renewables – Strategic decisions for a low carbon world in the long term

The ages of wood, coal and oil are leading to the age of gas

Exhibit 75: US energy consumption by type



US gas consumption has been growing more rapidly than oil since the late 1980s.

It now accounts for 24% of world energy consumption, compared with oil's 39%.

We believe that at some point in the next 20 years, the absolute amount of gas consumed will overtake oil, resulting in the age of gas.

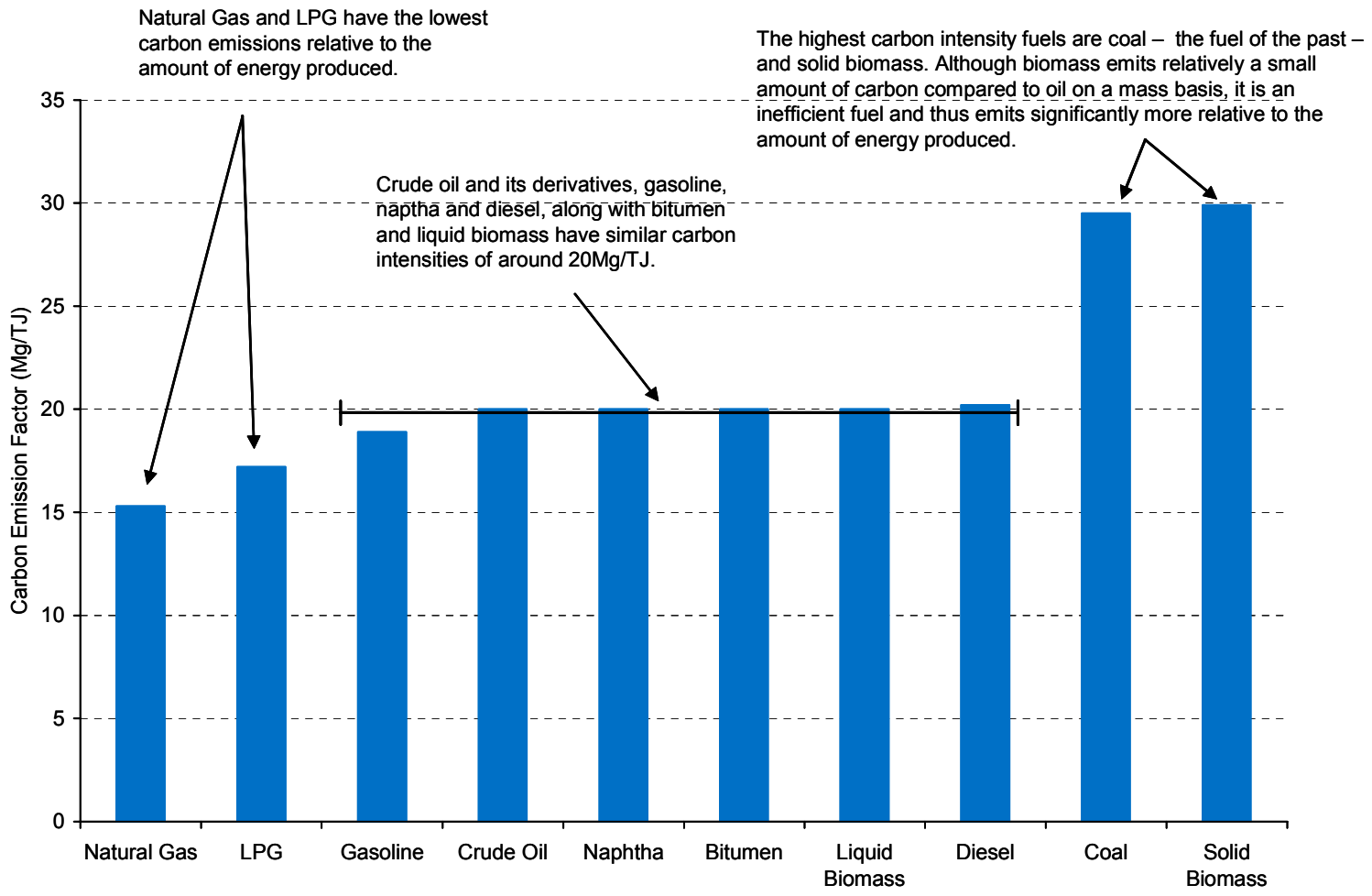
The reasons for this will be:

- substitution for power generation
- use in transportation
- Gas-to-liquids (GTL)
- base source for hydrogen powered fuel cells
- environmental pressures in general
- improved efficiency in oil usage.

Source: US Department of Energy.

Carbon emission factors

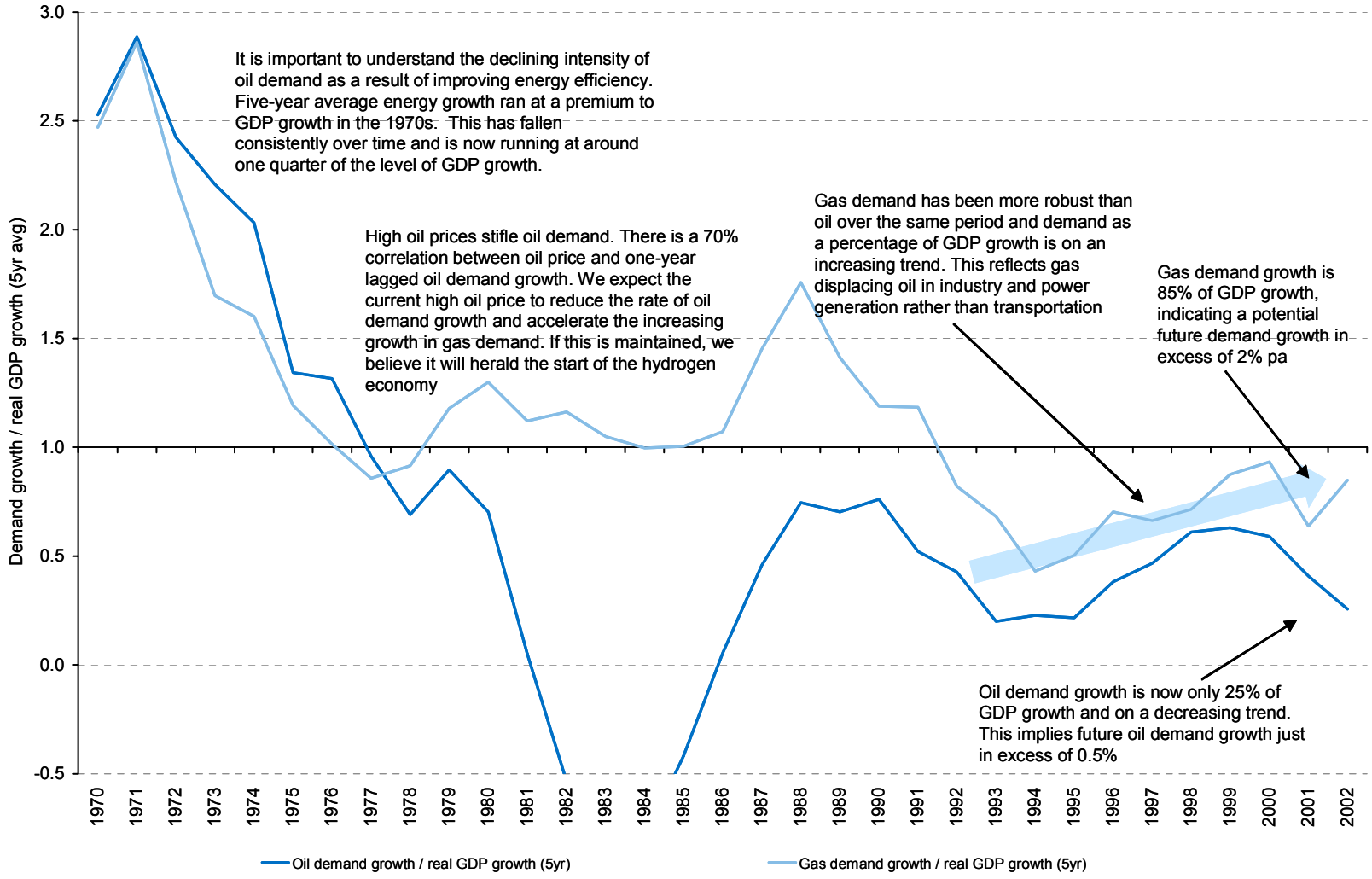
Exhibit 76: Gas emits 25% less carbon than oil



Source: IPCC.

The intensity of oil consumption is on a decreasing trend, gas is increasing

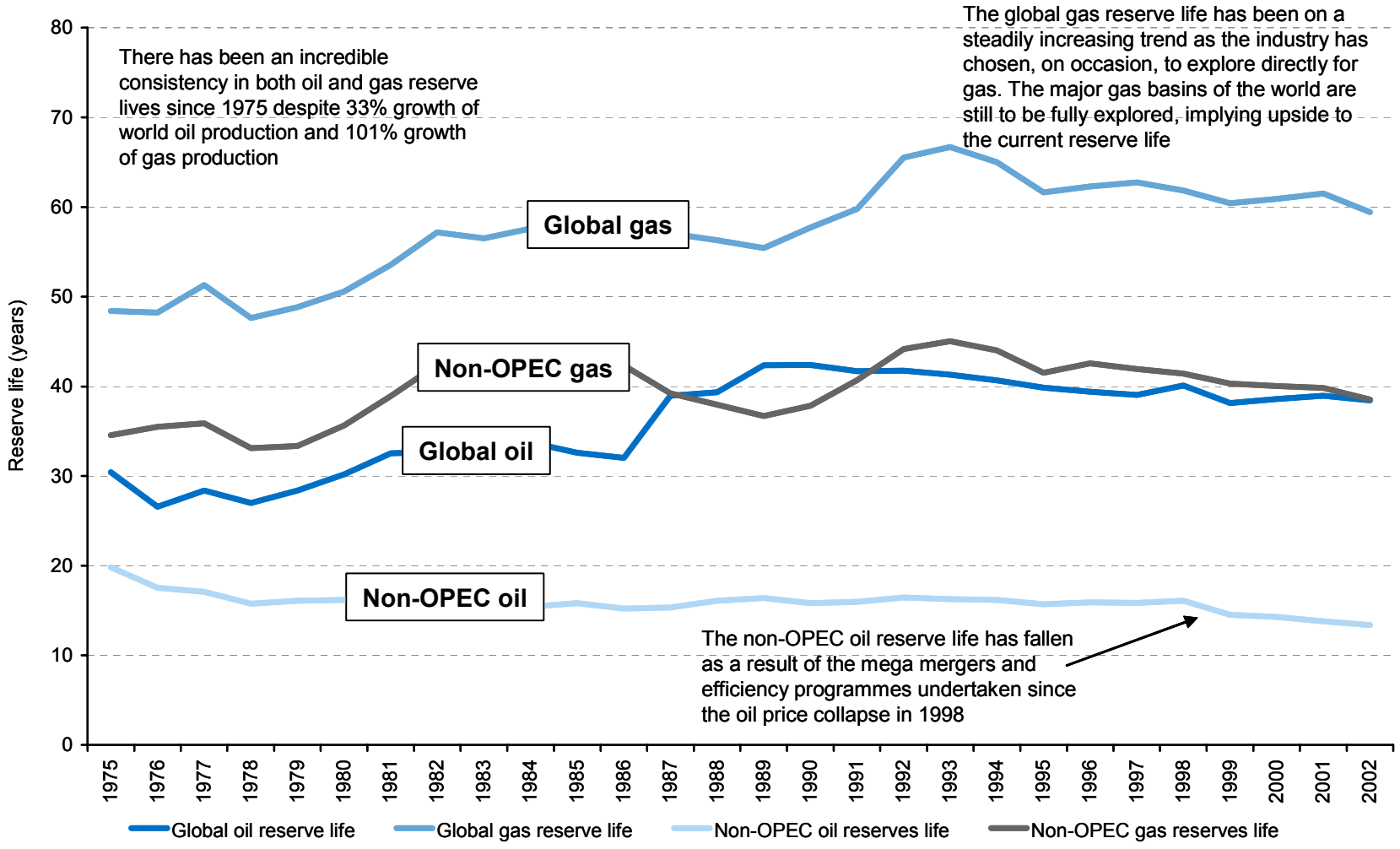
Exhibit 77: Growth in oil and gas demand relative to GDP growth



Source: US Department of Energy, Goldman Sachs Research estimates.

Oil and gas reserves are not running out; gas has the brighter future

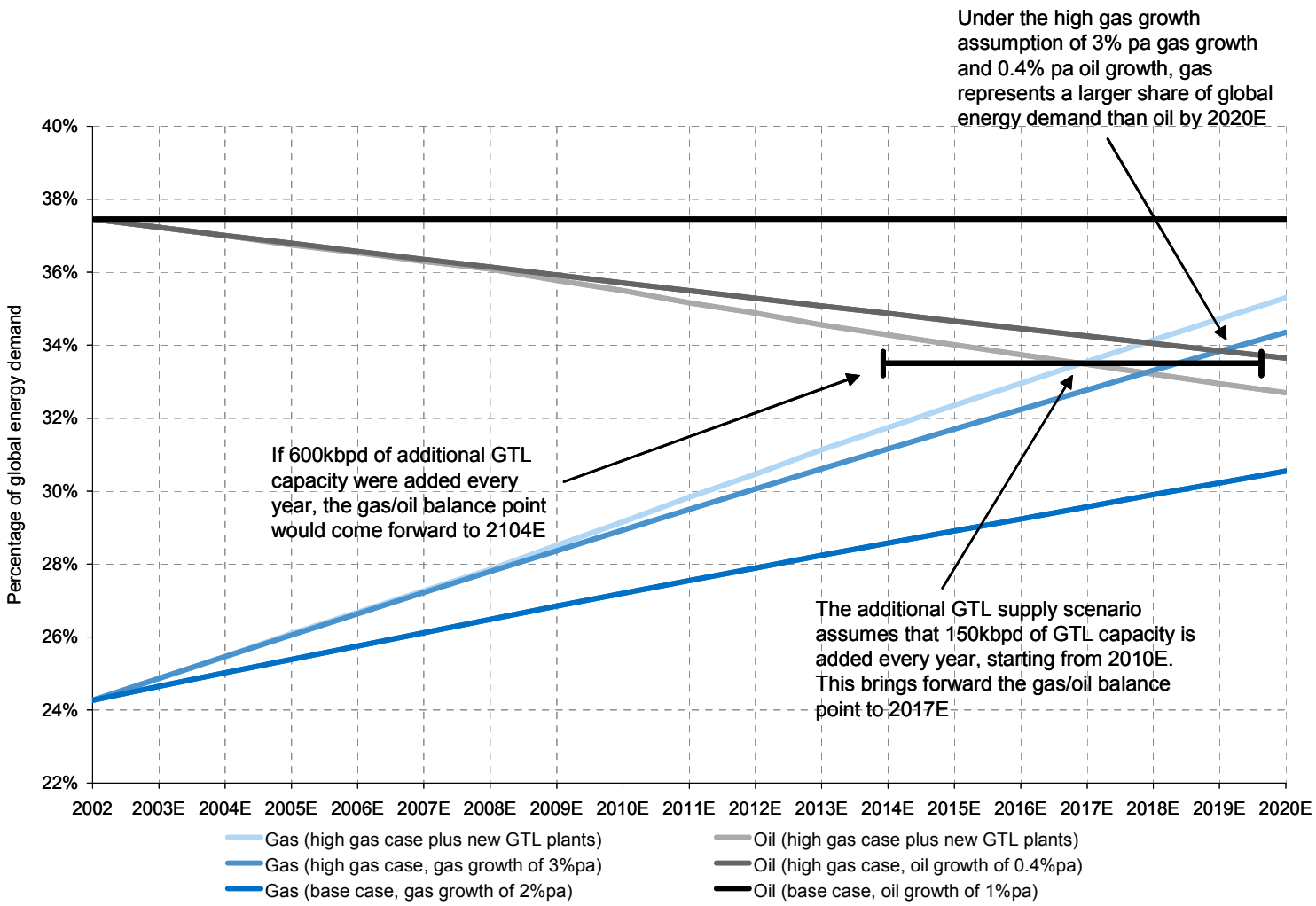
Exhibit 78: Non-OPEC and global oil and gas reserve lives



Source: BP Statistical Review of World Energy.

The age of gas is on the horizon

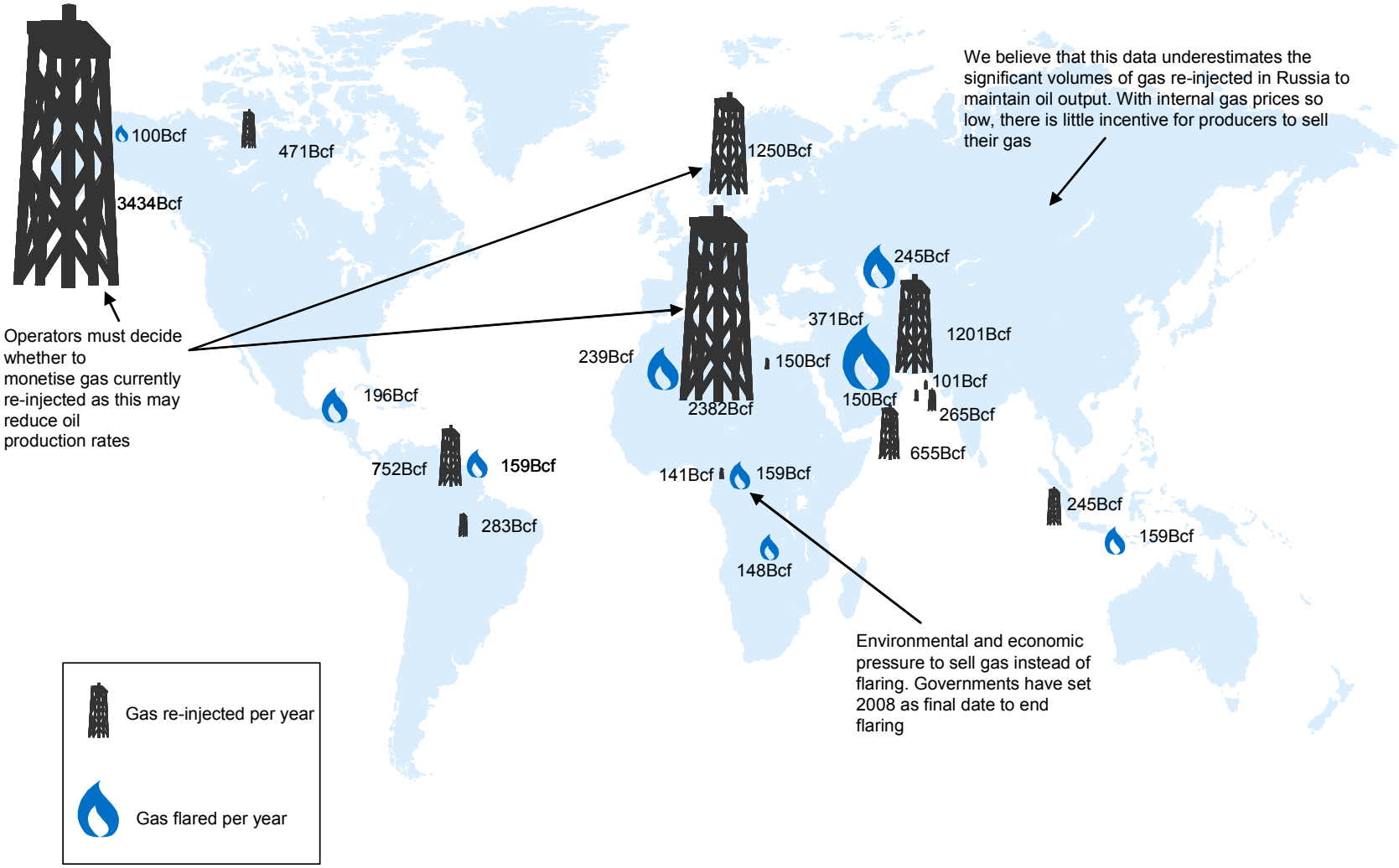
Exhibit 79: Forecast oil and gas demand as a percentage of global energy demand under high and base gas demand scenarios



Source: BP Statistical Review of World Energy, Goldman Sachs Research estimates.

Significant volumes of gas re-injected or flared

Exhibit 80: Flaring and re-injection from key areas of gas production around the world



Source: CERA.

Reduction in supply costs imply US$3/mcf equilibrium price

Exhibit 81: Historical costs to supply gas markets

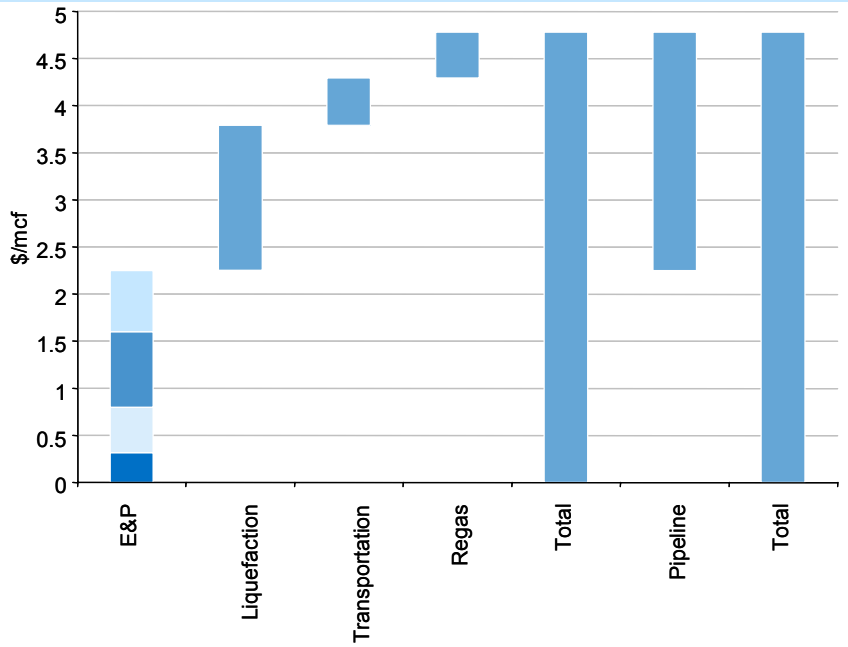
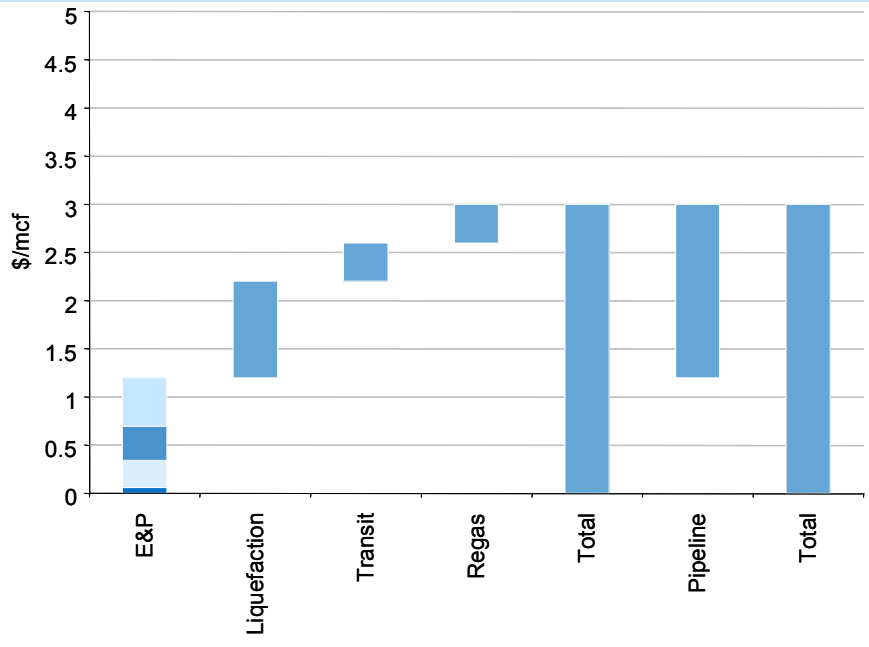


Exhibit 82: Current costs to supply gas markets



In the 1980s the full cost of gas from E&P through a typical cost LNG operation (with transport over 4,000 km) was around US$4.75/mcf, equivalent to US$28.50 boe.

A gas price of US$4.75/mcf would be economic for a pipeline project up to 7,200 km.

The upstream costs accounted for some 47% of the overall project costs, at US$2.25/mcf. This is based on the Majors' costs, which would have been lower than the average for the industry.

The 50% reduction in E&P costs and the 30% reduction in liquefaction costs have been the key drivers of improved economics since the 1980s.

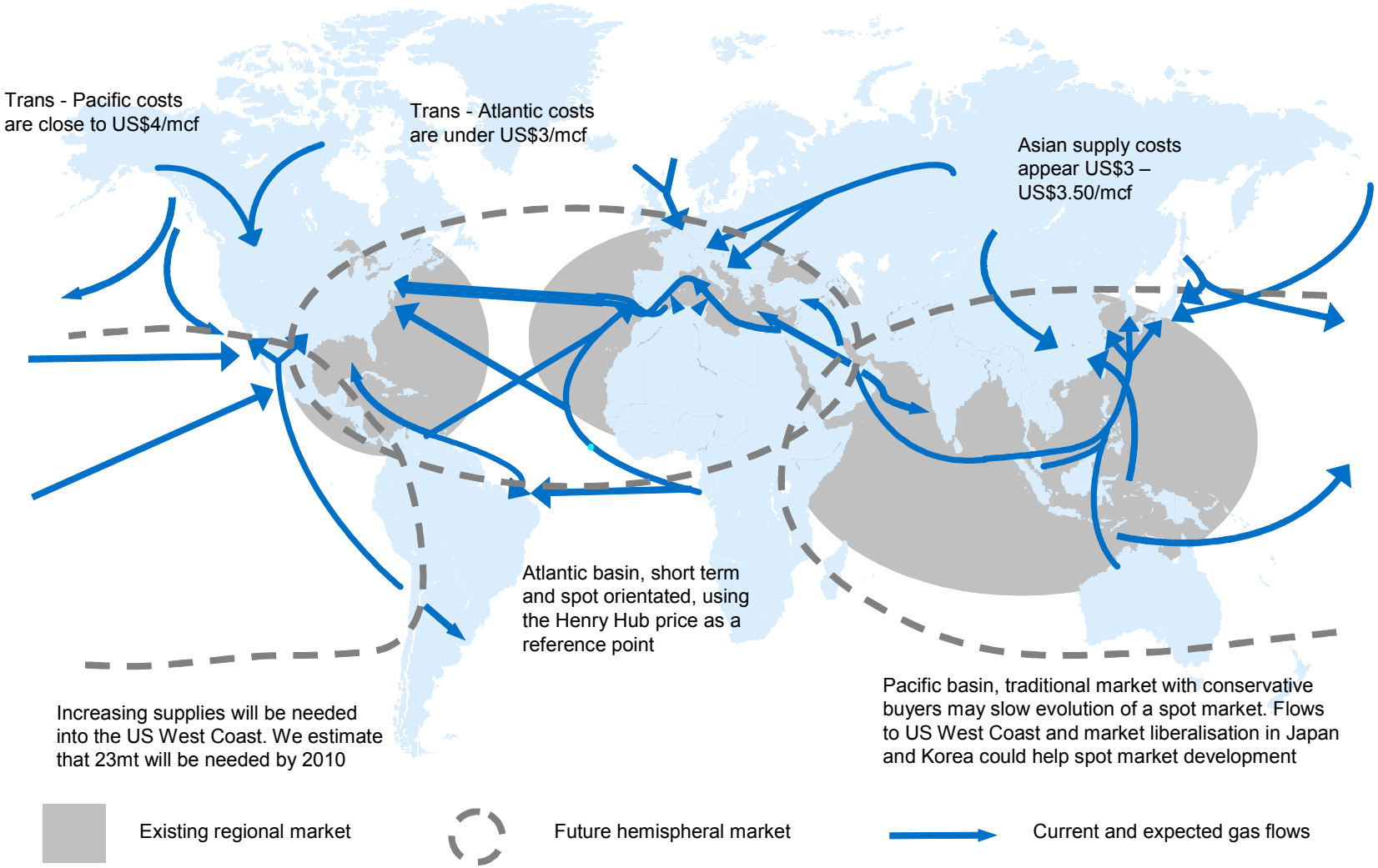
The full cost of an LNG scheme (4,000 km) is now down to US$3.0/mcf (US$18/boe), a 37% reduction from historical levels.

These LNG economics now equate to a pipeline project of 5,100 km.

Source: IEA, EIA, Goldman Sachs Research estimates.

Globalising trade and economics of gas flows

Exhibit 83: Direction of gas flows and location of markets



Source: Company data, Goldman Sachs Research estimates.

Economics of alternative sources: Gas to Liquids

Exhibit 84: Sensitivity of returns on GTL plants to capital costs and oil price

Equivalent oil price (US$/bl)	Project capital costs (US$mn per 10kb/d of capacity)										
	200	210	220	230	240	250	260	270	280	290	300
30.5	24%	23%	22%	21%	21%	20%	19%	19%	18%	18%	17%
28.5	22%	22%	21%	20%	19%	19%	18%	18%	17%	16%	16%
26.5	21%	20%	19%	19%	18%	17%	17%	16%	16%	15%	15%
24.5	19%	18%	18%	17%	16%	16%	15%	15%	14%	14%	13%
22.5	18%	17%	16%	15%	15%	14%	14%	13%	13%	12%	12%
20.5	16%	15%	14%	14%	13%	13%	12%	12%	11%	11%	10%
18.5	14%	13%	13%	12%	11%	11%	10%	10%	10%	9%	9%
16.5	12%	11%	10%	10%	9%	9%	9%	8%	8%	7%	7%
14.5	9%	9%	8%	8%	7%	7%	6%	6%	6%	5%	5%
12.5	7%	6%	6%	5%	5%	4%	4%	4%	3%	3%	3%
10.5	4%	3%	3%	2%	2%	2%	1%	1%	1%	1%	0%

Capital costs for GTL plants continue to fall. In 1999, SASOL estimated capital costs for 10,000b/d of facility was US$240 mn. A 15% reduction in capital costs could add 200bps to project returns.

The matrix shows the indicative profitability of a standard GTL plant under different capital cost and oil price scenarios. We have made the following assumptions:

- 3tcf of gas reserves, produced over 20 years
- US$0.5/mcf cost of gas supply
- US$3/bl differential between Brent crude and product prices
- 40% tax rate
- US$4/bl plant operating costs

With an oil price of US$18.5/bl and US$250 mn/10kb/d capacity capital costs, a typical project could provide an 11% nominal rate of return.

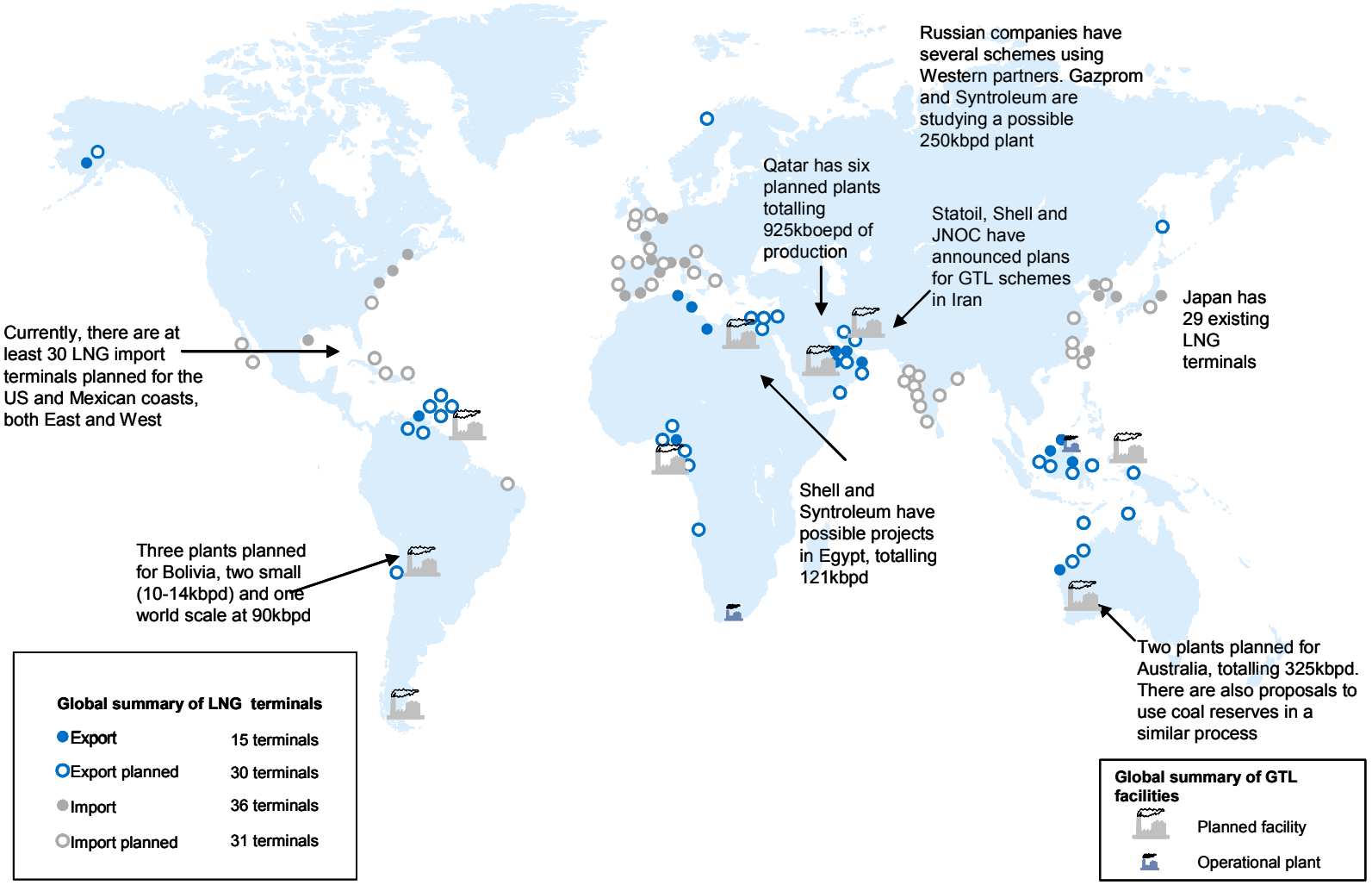
On our estimates, capital costs of US$200-220 mn per 10kb/d of capacity, together with a sustained nominal oil price of US$18.5/bl, would yield project returns of 13% after tax. If oil prices are sustained above US$18.5/bl, GTL technology becomes attractive and would start to choke-off crude demand. Shell has said that its recently announced Qatar GTL development will provide satisfactory returns even at oil prices well below US$20/bl.

The Nigerian SASOL/Chevron/NNPC GTL plant, expected to commence production in 2005, is estimated to have capital costs of US$290mn per 10kb/d. The SASOL/Chevron Qatar plant is estimated to have capital costs of US$240mn/10kb/d capacity. We believe that Shell's Qatar project has GTL construction costs of less than US$220mn/10kb/d capacity. GTL technology is developing at a rapid pace and we believe significant reductions in capital costs will be achieved.

Source: Company data, Goldman Sachs Research estimates.

A plethora of new LNG and GTL plants are being planned

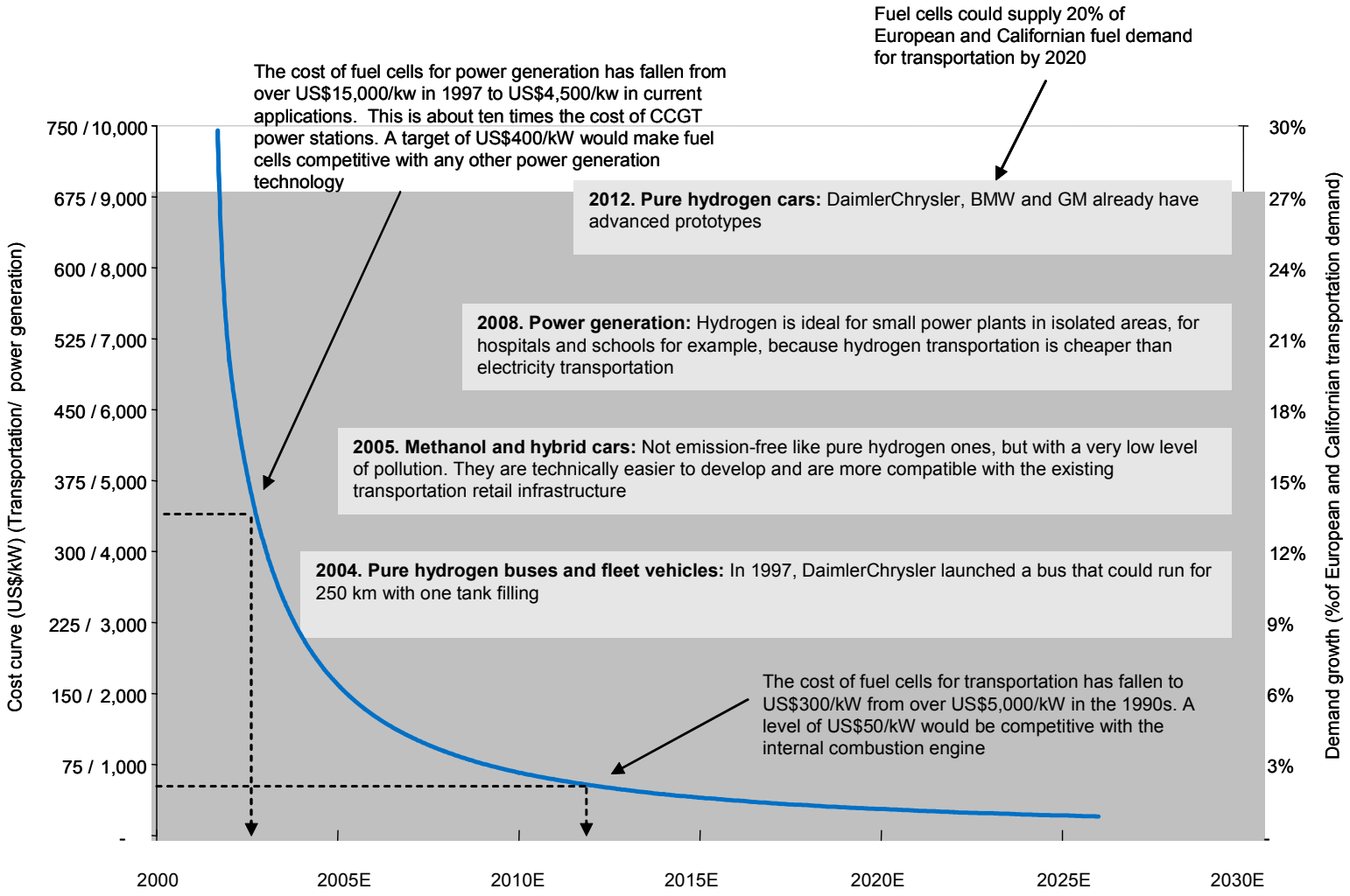
Exhibit 85: Significant number of LNG and GTL plants due to come on stream



Source: Company data, Goldman Sachs Research estimates.

Hydrogen power economics likely to improve along a technology-led curve

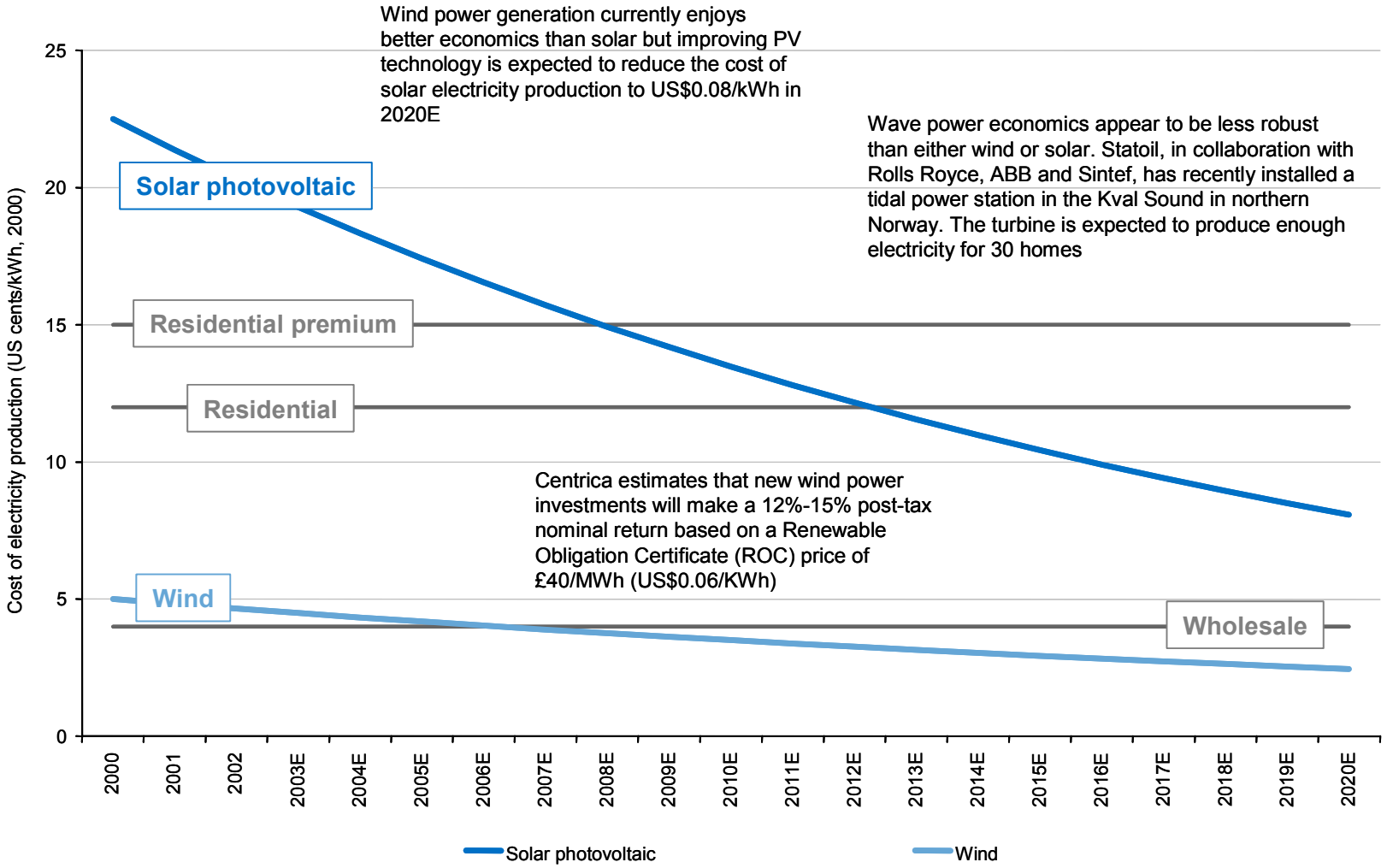
Exhibit 86: Hydrogen power economics



Source: Company data, Goldman Sachs Research estimates.

Solar and wind power economics

Exhibit 87: Solar and wind power economics



Source: Centrica, BP, Statoil.

Renewable energy sources; summary of company exposure

Exhibit 88: Exposure to renewable energy sources

Company	Wind	Solar	Biofuels	Hydrogen
Amerada Hess				
BG Group				
BP	Y	Y		Y
CEPSA				
ChevronTexaco	Y	Y		Y
CNOOC				
ConocoPhillips	Y			
ENI				Y
ExxonMobil				Y
Lukoil				
Marathon				
MOL				
Norsk Hydro	Y			Y
Occidental				
OMV			Y	
Petrobras				
PetroChina				
Repsol				
RD/Shell	Y	Y	Y	Y
Sinopec				
Statoil			Y	Y
TOTAL	Y	Y		Y
Yukos				

Source: Company data.

Companies that are highlighted in Exhibit 88 have programmes either to develop renewable energy sources or hydrogen as an energy carrier.

RD/Shell is most heavily invested in the renewable energy and hydrogen sector. Wind and solar are currently the largest renewable energy sources, with the economics of wind energy almost equal to that required for domestic energy use.

The Majors plus the European Regionals ENI, Norsk Hydro and Statoil have investments to develop hydrogen as an energy carrier.

Appendices:
Glossary and GSEES Index Criteria

GSEES Index Glossary

Term	Definition
Annex 1 Countries	All the OECD countries plus countries with economies in transition that have emission reduction or stabilisation targets under Kyoto Protocol.
Biofuel	A fuel produced from dry organic matter or combustible oils produced by plants, e.g., alcohol from fermented sugar, soybean oil.
Cash flow	Post-tax cash flow from operations = Cash flow from operations post tax, pre interest payment.
CO2 equivalent	Index describing the relative warming of a unit mass of a greenhouse gas in comparison to the same mass of carbon dioxide. For example, CH4 (methane) = 21*CO2. Also known as Global Warming Potential.
Climate change	A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability over comparable time periods. (UNFCCC definition).
E&P	Exploration and production of oil and gas reserves.
EPA	Environmental Protection Agency; US environmental regulatory agency.
Fossil fuels	Carbon-based fuels, including coal, oil and natural gas and their derived fuels such as gasoline, synthesis gas from coal etc.
GCI	Gross Cash Invested = Fixed assets and intangibles pre depreciation, plus non-depreciating assets and working capital.
Greenhouse effect	The trapping of heat by an envelope of naturally occurring heat-retaining gases.
GHGs	Greenhouse gases; a gas in the earth's atmosphere that absorbs and re-emits infrared radiation, thus contributes to increasing the insulating properties of the earth's atmosphere. The major GHG is water vapour; the six official GHGs according to UNFCCC are CO2, N20, CH4, ozone, CFCs and HFCs.
IPCC	Intergovernmental Panel on Climate Change.
Kyoto Protocol	The Protocol developed by the UNFCCC that requires individual countries to meet differentiated reduction targets for their GHG emissions relative to 1990 levels by 2008-2012.
LTIF	Lost time injury frequency = the number of incidents resulting in a person being unable to carry out normal duties for a period of at least one day, including fatalities, per million working hours.
NGOs	Non-Governmental Organizations including registered non-profit organizations, associations from business and industry, environmental groups, cities and municipalities, academics, social and activist organizations.
NOCs	National Oil Companies are state-owned and operated oil companies.
Renewables	Energy sources that are, within a short timeframe relative to the earth's natural cycles, sustainable, and include non-carbon technologies such as solar energy, hydropower and wind, as well as carbon-neutral technologies such as biomass.
SRI	Socially Responsible Investment.
TRCF	Total reportable cases frequency = the frequency of all safety cases, including fatalities or lost workday cases or restricted workday cases or medical treatment cases, per million working hours.
UNFCCC	United Nations Framework Convention on Climate Change. A treaty signed at the 1992 Earth Summit in Rio de Janeiro by more than 150 countries.
UN UDHR	United Nations Universal Declaration of Human Rights is the primary international standard of the fundamental and inalienable rights of all humans. Adopted by the United Nations General Assembly on December 10, 1948, the UDHR represents the first comprehensive agreement among nations as to the specific rights and freedoms of all human beings.

Source: UNFCCC, Goldman Sachs Research estimates.

GSEES Index Criteria – Climate Change

For each GSEES metric each company has been given a score with a minimum of 1 or 2 and a maximum of 4 or 5, depending on the metric. The criteria used to determine each category's score, along with the companies that received each score, are given in the following tables on pages 99-106.

Score	Criteria	Companies
	GHG Targets and Performance	
5	Targets with baselines and end dates and meeting them	BP, RD/Shell
4		
3	Absolute GHG levels trending down towards targets but incomplete information given	BG, OMV, Repsol, TOTAL
2	State that they want to reduce GHGs but absolute levels are increasing	Amerada Hess, ChevronTexaco, ConocoPhillips, ENI, ExxonMobil, Norsk Hydro, Occidental, Statoil
1	No disclosure	CEPSA, CNOOC, Lukoil, Marathon, MOL, Petrobras, PetroChina, Sinopec, Yukos
	GHG levels relative to GCI (avg = 0.48 kg/US$GCI)	
5	< 0.3kg / US$GCI	Amerada Hess, Norsk Hydro, Statoil
4	0.3 - 0.45 kg / US$GCI	BG, BP, Repsol
3	0.45 - 0.6 kg / US$GCI	ChevronTexaco, ENI, TOTAL, ExxonMobil, OMV, RD/Shell
2	> 0.6kg / US$GCI	ConocoPhillips, Occidental
1	No disclosure	CEPSA, CNOOC, Lukoil, Marathon, MOL, Petrobras, PetroChina, Sinopec, Yukos
	GHG change (avg = -5.1% pa)	
5	<-5%pa (<0.45kg/$GCI); <-10%pa (<0.6kg/$GCI)	BG, BP, TOTAL
4	-5% to +5% pa (<0.6kg/$GCI); <+15% pa (<0.3kg/$GCI)	Amerada Hess, ENI, ExxonMobil, Norsk Hydro, OMV, Repsol, RD/Shell, Statoil
3	>10% pa (all levels)	ConocoPhillips, Occidental
2	No historic data	ChevronTexaco
1	No disclosure	CEPSA, CNOOC, Lukoil, Marathon, MOL, Petrobras, PetroChina, Sinopec, Yukos
	Emissions trading	
5	Heavy involvement, started own scheme	BP, RD/Shell
4	Some involvement, e.g. helped start schemes	BG, ENI, Norsk Hydro, Statoil, TOTAL
3	Support emissions trading but not involved	ChevronTexaco, ConocoPhillips, MOL, OMV, Repsol, Yukos
2	Discloses GHGs but does not disclose emissions trading	Amerada Hess, ExxonMobil, Occidental
1	No disclosure	CEPSA, CNOOC, Lukoil, Marathon, Petrobras, PetroChina, Sinopec
	Renewable energy	
5	Involved in wind, solar, biofuels and hydrogen	RD/Shell
4	Involved in 3 of wind, solar, biofuels and hydrogen	BP, ChevronTexaco, TOTAL
3	Involved in 2 of wind, solar, biofuels and hydrogen	Norsk Hydro, Statoil
2	Involved in 1 of wind, solar, biofuels and hydrogen	ConocoPhillips, ENI, ExxonMobil, OMV
1	No renewable energy programmes	Amerada Hess, BG, CEPSA, CNOOC, Lukoil, Marathon, MOL, Occidental, Petrobras, PetroChina, Repsol, Sinopec, Yukos

Source: Company data, Copal Partners, Goldman Sachs Research estimates.

GSEES Index Criteria – Pollution

Score	Criteria	Companies
	Oil spills and other incidents	
5	No incidents	
4	Minor pollution <500bls	BG, CNOOC, ConocoPhillips, ENI, Norsk Hydro, OMV, Statoil
3	Some pollution <5000bls	
2	Nothing found	Lukoil, PetroChina, Sinopec, Yukos
1	Significant pollution >5000bls, continued pollution	Amerada Hess, BP, CEPSA, ChevronTexaco, ExxonMobil, Marathon, MOL, Occidental, Petrobras, Repsol, RD/Shell, TOTAL
	% Assets in downstream (average = 19%)	
5		
4	</= 15%	Amerada Hess, BG, CNOOC, ENI, Norsk Hydro, Occidental, Petrobras
3	16%-25%	PetroChina, Statoil, TOTAL
2	26%-40%	BP, ChevronTexaco, ConocoPhillips, ExxonMobil, Lukoil, Marathon, Repsol, RD/Shell, Yukos
1	>/= 40%	CEPSA, MOL, OMV, Sinopec

Source: Company data, Copal Partners, Goldman Sachs Research estimates.

GSEES Index Criteria – Human Rights

Score	Criteria	Companies
	Campaigns led by NGOs against company on Human Rights issues	
5		
4	Minor campaign found	Amerada Hess, ENI, Norsk Hydro, OMV, Petrobras
3	Multiple minor campaigns found	BP, ChevronTexaco, PetroChina, Repsol, Statoil
2	Nothing found	BG, CEPSA, CNOOC, ConocoPhillips, Lukoil, MOL, Sinopec, Yukos
1	Major campaign found	ExxonMobil, Marathon, Occidental, RD/Shell, TOTAL
	Policy for Human Rights	
5		
4	Upholds Univ. Decl. of HRs and has Code of Conduct	Amerada Hess, BG, BP, ENI, Norsk Hydro, RD/ Shell, Statoil, TOTAL
3	Supports another HR policy and has Code of Conduct	ChevronTexaco, ConocoPhillips, ExxonMobil, Marathon, MOL, Occidental, OMV, Repsol, Yukos
2	No commitment on HRs but follows local labour laws	CNOOC, Lukoil, PetroChina, Sinopec
1	No disclosure	CEPSA, Petrobras
	Participates in EITI	
5		
4	Yes	BG, BP, ChevronTexaco, ConocoPhillips, ExxonMobil, Repsol, RD/Shell, Statoil, TOTAL
3		
2	No	Amerada Hess, CEPSA, CNOOC, ENI, Lukoil, Marathon, MOL, Norsk Hydro, Occidental, OMV, Petrobras, PetroChina, Sinopec, Yukos
1		

Source: Company data, Copal Partners, Goldman Sachs Research estimates.

GSEES Index Criteria – Management Diversity and Incentives

Score	Criteria	Companies
	Board diversity	
5	Females >10%, non-Caucasian / non-nationals >5%	ConocoPhillips, ExxonMobil, Marathon, Occidental, RD/Shell
4	Both females and non-Caucasian / non-nationals >0%	BP, ChevronTexaco
3	Either females or non-Caucasian / non-nationals >0%	Amerada Hess, BG, CEPSA, CNOOC, MOL, Norsk Hydro, Petrobras, PetroChina, Sinopec, Statoil, TOTAL, Yukos
2	Neither females nor non-Caucasian / non-nationals >0%	ENI, Lukoil
1	No data	OMV, Repsol
	Senior management diversity	
5	Females >5%, non-Caucasian / non-nationals >5%	ChevronTexaco, Marathon, RD/Shell
4	Both females and non-Caucasian / non-nationals >0%	
3	Either females or non-Caucasian / non-nationals >0%	BG, BP, CEPSA, ConocoPhillips, Lukoil, Norsk Hydro, Occidental, Sinopec, Statoil
2	Neither females nor non-Caucasian / non-nationals >0%	Amerada Hess, CNOOC, ENI, ExxonMobil, MOL, OMV, Petrobras, PetroChina, TOTAL, Yukos
1	No data	Repsol
	Comp disclosed and linked to HSE	
5	Compensation disclosed and linked to HSE	BP, ConocoPhillips, ENI, Occidental, OMV, PetroChina, RD/Shell, Statoil, TOTAL
4		
3	Compensation disclosed but not linked to HSE	Amerada Hess, BG, CEPSA, ChevronTexaco, CNOOC, ExxonMobil, Lukoil, Marathon, MOL, Norsk Hydro, Petrobras, Repsol, Sinopec
2	Compensation not disclosed	Yukos
1	No data	
	CEO Letter to Shareholders in Annual Report contains clear statement on enviro, safety, corp gov and HR	
5		
4	Statement includes all aspects	BG, BP, ChevronTexaco, ExxonMobil, Occidental, RD/Shell, TOTAL
3	Statement includes 2/3 aspects	Amerada Hess, CEPSA, ConocoPhillips, ENI, Lukoil, Marathon, OMV, Petrobras, PetroChina, Repsol, Statoil
2	Statement includes 1 aspect	Norsk Hydro, Yukos
1	Statement includes none	CNOOC, MOL, Sinopec
	Board member / senior executive directly responsible for HSE	
5		
4	Yes	Amerada Hess, BP, ChevronTexaco, CNOOC, ConocoPhillips, ENI, ExxonMobil, Marathon, Occidental, OMV, PetroChina, Repsol, Statoil, TOTAL
3		
2	No	BG, Norsk Hydro, Petrobras, RD/Shell
1	No data	CEPSA, Lukoil, MOL, Sinopec, Yukos

Source: Company data, Copal Partners, Goldman Sachs Research estimates.

GSEES Index Criteria – Investment

Score	Criteria	Companies
	Social investment relative to capex (average = 0.63%)	
5	>0.80%	ChevronTexaco, MOL, TOTAL
4	0.67% - 0.80%	ExxonMobil, RD/Shell
3	0.40% - 0.66%	BG, BP, ConocoPhillips, ENI
2	< 0.40%	Norsk Hydro, Repsol, Petrobras, Sinopec
1	No data	Amerada Hess, CEPSA, CNOOC, Lukoil, Marathon, Occidental, OMV, PetroChina, Statoil, Yukos
	R&D expenditure relative to cash flow (average = 2.7%)	
5	>3.5%	Norsk Hydro, OMV, TOTAL
4	2.5% - 3.4%	ConocoPhillips, ExxonMobil, Repsol, RD/Shell, Sinopec, Statoil
3	1.5% - 2.4%	BP, ChevronTexaco, ENI, PetroChina
2	< 1.5%	BG, CNOOC
1	No data	Amerada Hess, CEPSA, Lukoil, Marathon, MOL, Occidental, Petrobras, Yukos

Source: Company data, Copal Partners, Goldman Sachs Research estimates.

GSEES Index Criteria – Workforce

Score	Criteria: Diversity disclosure	Companies
	Diversity disclosure (% females in each category)	
5	Data for three of senior leaders, managers, employees or new grads	ChevronTexaco, ExxonMobil
4	Data for two of senior leaders, managers, employees or new grads	BP, Petrobras, RD/Shell, Statoil, TOTAL
3	Data for employees	OMV
2	Data for one of board, senior execs, senior leaders, employees or new grads	Amerada Hess, BG, CEPSA, CNOOC, ConocoPhillips, ENI, Lukoil, Marathon, MOL, Norsk Hydro, Occidental, PetroChina, Repsol, Sinopec, Yukos
1	No data	
	Diversity performance (% females in each category)	
5	Senior execs >10%, employees >30%, new grads >30%	BP, ChevronTexaco, ExxonMobil
4	Senior execs >0%, employees >20%, new grads >30%	Statoil, TOTAL
3	Senior execs >0% or employees >15%	BG, CEPSA, ConocoPhillips, Lukoil, Marathon, MOL, Norsk Hydro, OMV, Petrobras, RD/Shell, Sinopec
2	0% for all levels disclosed	Amerada Hess, CNOOC, ENI, Occidental, PetroChina, Repsol, Yukos
1	No data	
	Employees / US$ GCI (avg = 0.65 emp/US$mn GCI)	
5	0.58 - 0.74 employee/US$mn GCI	Amerada Hess, BP, RD/Shell
4	0.46-0.57 and 0.75-0.86 employee/US$mn GCI	ConocoPhillips, ENI, ExxonMobil, OMV, Repsol
3	0.35-0.45 and 0.87-0.97 employee/US$mn GCI	BG, ChevronTexaco, Occidental, Statoil, TOTAL
2	<0.34 and >0.98 employee/US$mn GCI	CEPSA, CNOOC, Marathon, Norsk Hydro, Petrobras, PetroChina, Sinopec
1	No data	Lukoil, MOL, Yukos
	Payroll / Cash Flow pre Payroll (avg = 27%)	
5	>/= 35%	Marathon, Norsk Hydro, TOTAL
4	25% - 34%	BP, ExxonMobil, RD/Shell, Statoil
3	20% - 24%	ChevronTexaco, ENI, Sinopec
2	< 20%	BG, CNOOC, Petrobras, PetroChina, Repsol
1	No data	Amerada Hess, CEPSA, ConocoPhillips, Lukoil, MOL, Occidental, OMV, Yukos
	US$ Payroll / employee (avg = US$51,000/employee)	
5	>/= US$70,000	CNOOC, ExxonMobil
4	US$60,000 - US$70,000	BP, Norsk Hydro, Statoil
3	US$40,000 - US$60,000	BG, ChevronTexaco, Marathon, RD/Shell, TOTAL
2	</= US$40,000	ENI, Petrobras, PetroChina, Repsol, Sinopec
1	No data	Amerada Hess, CEPSA, ConocoPhillips, Lukoil, MOL, Occidental, OMV, Yukos

Source: Company data, Copal Partners, Goldman Sachs Research estimates.

GSEES Index Criteria – Safety

Score	Criteria	Companies
	Fatalities (all if available or employees only)	
5	0 deaths	CNOOC
4	< 13 deaths	Amerada Hess, BG, ExxonMobil, MOL, Norsk Hydro, Statoil
3	13-40 deaths	BP, ChevronTexaco, ENI, Petrobras, PetroChina, TOTAL
2	> 40 deaths	RD/Shell
1	No disclosure	CEPSA, ConocoPhillips, Lukoil, Marathon, Occidental, OMV, Repsol, Sinopec, Yukos
	LTIF (all if available or employees only*)	
5	< 1 LTI/mn hrs	BG, BP, ExxonMobil*, Marathon*
4	1-3 LTI/mn hrs	Norsk Hydro*, Occidental*, Petrobras, RD/Shell, Statoil
3	3-6 LTI/mn hrs	ENI, MOL, OMV
2	> 6 LTI/mn hrs	Amerada Hess*
1	No disclosure	CEPSA, ChevronTexaco, CNOOC, ConocoPhillips, Lukoil, PetroChina, Repsol, Sinopec, TOTAL, Yukos
	Chg in LTIF	
5	< -15% and <1 LTI/mnhrs	BG, BP, RD/Shell
4	< +2% (<1LTI) or <-6% (all others)	ENI, ExxonMobil, Marathon, Statoil, Petrobras
3	< 20% (1-3LTI) or -5% to 0% (all)	Amerada Hess, MOL, OMV
2	>10% (3-6LTI) or >-5% (>6LTI)	Norsk Hydro, Occidental
1	No disclosure	CEPSA, ChevronTexaco, CNOOC, ConocoPhillips, Lukoil, PetroChina, Repsol, Sinopec, TOTAL, Yukos
	TRCF (all if available or employees only*)	
5	< 3 TRC/mn hrs	ExxonMobil, RD/Shell
4	3-5 TRC/mn hrs	BP, ChevronTexaco*, Occidental*
3	5-7 TRC/mn hrs	ConocoPhillips*, Marathon*, Norsk Hydro, OMV, Statoil
2	> 7 TRC/mn hrs	TOTAL
1	No disclosure	Amerada Hess, BG, CEPSA, CNOOC, ENI, Lukoil, MOL, Petrobras, PetroChina, Repsol, Sinopec, Yukos
	Chg in TRCF	
5	< -10% (<3 TRC)	ExxonMobil, RD/Shell
4	< -10% (3-7 TRC)	BP, ChevronTexaco, Marathon, Norsk Hydro
3	< -5% (3-7 TRC)	Occidental, OMV, Statoil
2	> +25% (all) or <-25% (>7 TRC)	ConocoPhillips, TOTAL
1	No disclosure	Amerada Hess, BG, CEPSA, CNOOC, ENI, Lukoil, MOL, Petrobras, PetroChina, Repsol, Sinopec, Yukos

Source: Company data, Copal Partners, Goldman Sachs Research estimates.

GSEES Index Criteria – Transparency

Score	Criteria	Companies
	Data published for: GHGs, Fatalities, LTIs, TRCs, Workforce Diversity, Social Investment, R&D Investment	
5	Disclose all data in 7 categories	BP, ExxonMobil, RD/Shell
4	Disclose 6 categories	ChevronTexaco, Norsk Hydro, Statoil, TOTAL
3	Disclose 4 or 5 categories	BG, ConocoPhillips, ENI, MOL, OMV, Petrobras
2	Disclose 1, 2 or 3 categories	Amerada Hess, CNOOC, Marathon, Occidental, PetroChina, Repsol, Sinopec
1	Disclose no data	CEPSA, Lukoil, Yukos
	Number of years data published (Separate HSE Report or HSE Section in Annual Report)	
5	>/= 5 years	Amerada Hess, BP, ExxonMobil, MOL, Occidental, OMV, Repsol, RD/Shell, Statoil
4	3-4 years	CNOOC, ConocoPhillips, Norsk Hydro, PetroChina, Sinopec
3	2 years	BG, ENI, Marathon, Sinopec, TOTAL
2	1 year	ChevronTexaco, Petrobras, Yukos
1	No report	CEPSA, Lukoil
	External audit on HSE data	
5		
4	Yes	Amerada Hess, BG, BP, ConocoPhillips, ENI, Repsol, RD/Shell, Statoil
3		
2	No	CEPSA, ChevronTexaco, CNOOC, ExxonMobil, Lukoil, Marathon, MOL, Norsk Hydro, Occidental, OMV, Petrobras, PetroChina, Sinopec, TOTAL, Yukos

Source: Company data, Copal Partners, Goldman Sachs Research estimates.

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