



The Search for Energy Alternatives

A survey of leading companies and their business approach to climate change and energy efficiency

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Delivering sustainable solutions in a more competitive world



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Report written by:

Tanya Bamboat

For further information contact

Dr Tom Woollard
T: +44 (0) 207 465 7273
E: tom.woollard@erm.com

Why the search is on

Some of the world's leading multinational corporations are responding to the dual challenges of climate change and economic downturn either by implementing stringent energy efficiency improvement programmes or by investing in renewable energy alternatives – some are doing both simultaneously. The amount of money currently being invested by the world's leading companies in energy efficiency and renewable energy is staggering. As fuel prices soar, individual companies are committing to spend hundreds of millions and, in some cases, billions of dollars to become more energy efficient and to reduce their overall carbon footprint.

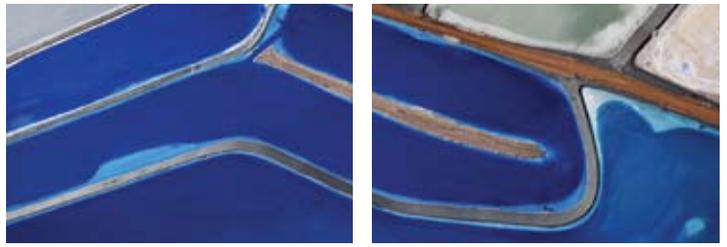
There is huge scope for improving energy efficiency and cutting carbon emissions. According to a recent article in The New York Times, the US wastes a staggering 66% of its energy, with 33% of all carbon dioxide emissions coming from electricity generation. If US industry recycled its waste heat and put waste gases to work instead of burning them, it could reduce greenhouse gases by 19% - as well as saving energy and cutting fuel bills.

In addition to seeking out energy efficiencies, the search for energy alternatives is now a major political imperative. The UK Government, for example, released its Renewable Energy Strategy in June 2008, stating that Britain needs to invest £100 billion (\$200 billion) to build up its clean power supply if it is to reach the EU-imposed target of generating 15% of the country's energy from renewable sources by 2020. To this end, says the Government, renewables must account for over 30% of electricity supply, 14% of heat supply and up to 10% of transport fuels by 2020.

ERM Survey

We decided to undertake a survey of FT Global 500 companies in order to see:

- what commitments large companies are making towards improving energy efficiency and investing in renewable energy;



- what kind of targets are being set (e.g energy intensity, CO₂e reduction etc) and over what time periods, and
- what scale of investment is being proposed over the coming years.

During July 2008, ERM undertook a website survey of the climate change and energy information provided by 21 companies in five industry sectors – Mining, Oil & Gas, Manufacturing, Retail and Utilities - all of whom feature in the FT Global 500. Companies selected are among the market leaders in each of the chosen industry sectors. The survey was based entirely on information which is publicly available via company websites, as such it may actually underestimate the total amount of effort and resources being applied to these areas.

Headline Findings

In all five of the sectors surveyed, climate change, coupled with steeply rising energy costs, is producing a multi-million dollar investment in energy alternatives, clean technology energy efficiency. The main findings from this survey are as follows:

- **Investment:** Leading companies are publicly committed to making huge investments in energy efficiency programmes, clean technology and renewable energy over the next five years – many of these running into billions of dollars;
- **Targets:** Most leading companies are setting ambitious carbon reduction and energy efficiency targets with realistic timescales and well funded investment programmes:
 - 86% of the companies surveyed have carbon reduction targets;
 - 31% of the companies surveyed have both carbon reduction and energy efficiency targets;
 - 50% of the companies surveyed have investment plans for both carbon reduction and energy efficiency;

- **Innovation:** Whilst there is considerable variation amongst the sectors surveyed regarding the kinds of targets being set and their associated timescales, there are plenty of innovative and progressive schemes and initiatives emerging.

It is clear that companies in energy intensive sectors have most to gain. Whilst the extractive and utility sectors clearly have major investment programmes as this is their core business, it is interesting to see how progressive some of the proposed programmes in the manufacturing and retail sectors are.

Among those surveyed, the mining company, Xstrata, is targeting a 5% reduction in carbon intensity by 2010 and a 3% reduction in energy intensity per tonne of product by 2012. For a company whose turnover in 2007 was more than \$14 billion, these are clearly big numbers. The electronics manufacturer, Philips, is investing \$1.75 billion over a five-year period to 2012 by which time it predicts that green products will account for 30% of sales.

As indicated by our project examples (see pages 9-10), companies across all the sectors surveyed are investing in major renewable energy projects. Figures published at the beginning of 2008 by New Energy Finance reveal that worldwide investment in the renewable energy sector increased by 35% in 2007 to more than £50 billion (\$100 billion). We see this trend continuing, despite the economic downturn.

Of the companies surveyed, almost 25% are investing considerable sums of money in renewable energy. For example, ENI expects to invest \$185 million over the next five years in solar energy and biomass. E.ON, driven partly by regulatory obligations, is investing \$9.5 billion in renewable energy projects up to 2010. Other companies do not stipulate how their investment is being spent, but it is safe to assume that a significant proportion is put towards renewable energy.

Summary of Data

All information has been taken from company websites and their CSR reports

Company		Future Targets		Future investment	
Mining Sector	Energy Reduction Targets	GHG/CO ₂ Targets	Miscellaneous Investment	Investment in Renewables	
BHP Billiton 2007 CSR report	13% reduction in energy intensity by 2012.	6% reduction in GHG intensity by 2012.	\$300m over the next five years.		
Rio Tinto/Alcan 2007 CSR report	Alcan: 10% reduction in on-site greenhouse gas emissions, per tonne of product, between 2005 and 2010.	Rio Tinto: 5% improvement in energy efficiency and 4% improvement in GHG emissions efficiency between 2003 and 2008.		A \$550m pilot plant is being built in Canada based entirely on clean, renewable hydroelectricity.	
Anglo American 2007 CSR report	15% improvement in energy efficiency by 2014 from 2004 baseline.	10% reduction in carbon intensity CO ₂ emissions per unit of production will be delivered by 2014.	Anglo Coal - \$2m in energy saving projects.		
Xstrata 2007 CSR report	3% reduction in energy intensity per tonne of product by 2012 over 2007 performance.	5% reduction in carbon intensity (GHGs per tonne of project) by 2010 over 2005 performance.	75m to clean coal technologies. \$28m for GHG abatement projects \$192m over the next decade to COAL21 (clean coal). \$25m to the \$1.5bn FutureGen project in the US (the world's first coal-fuelled, zero emissions power plant). \$2m over the next 5 years to the Cambrian College Sustainable Energy Centre in Canada.		
Oil & Gas Sector	Energy Reduction Targets	GHG/CO ₂ Targets	Miscellaneous Investment	Investment in Renewables	
Exxon Mobil 2007 CSR report	At least 10% improvement in energy efficiency between 2002 and 2012.		\$100m to Stanford University's Global Climate and Energy Project. \$4bn in gas utilisation and commercialisation projects to eliminate routine gas flaring in Nigeria. \$100m to complete the development and testing of an improved natural gas treating technology which could make carbon capture and storage more affordable.		
BP Alternative energy website		By 2015, BP aims to be producing enough low carbon power to have reduced projected greenhouse emissions by 24 million tonnes.		BP Alternative Energy plans to invest around \$8bn over 10 years in alternative and renewable energy technologies. It intends to invest \$1.5bn in 2008.	
Shell 2007 CSR report		Keeping GHG emissions from operations at least 5% below 1990 levels by 2010.	Shell is committed to ending continuous operational flaring by the end of 2008. In Nigeria, which on average accounts for two thirds of Shell's flaring, Shell has invested \$3bn and reduced flaring by a third since 2000.		Investing in joint ventures in Germany and Japan building thin-film solar plants. Shell WindEnergy has invested in a wind project in West Virginia, USA which aims to produce enough power for nearly 80,000 homes.
Chevron 2007 CSR report				\$2.5bn in developing alternative and renewable energy technologies and in energy efficiency services between 2007 and 2009.	
ENI Agip 2007 CSR report		The 2008-2011 plan includes interventions to allow approximately 500 kilotonnes per year of GHG emissions to be avoided, compared to 2007. Part of a sector plan to reduce CO ₂ emissions by 250 kilotonnes per year by 2011. Flaring down projects will allow a 50% reduction in flaring emissions by 2011.	\$2.3bn investment in flaring down projects expected for 2008-2011 to achieve gas flaring emission reduction of over 50%. Substantial investment in new lower emissions plastics products. \$100m investment between 2008-2011 in energy saving projects in the refining sector. \$4bn investment in implementation of new cogeneration combined cycles by 2010.		\$185m from 2008-2011 for the development of new technologies for the use of solar energy and of biomasses for photovoltaic cells. ENI has signed an agreement with the Massachusetts Institute of Technology to develop research programmes on solar energy, and will invest \$50m in the project.



Company		Future Targets		Future investment	
Manufacturing Sector	Energy Reduction Targets	GHG/CO ₂ Targets	Miscellaneous Investment	Investment in Renewables	
Philips 2007 CSR report	Improve energy efficiency of offices & production facilities by 25% by 2012.	Reduce operational carbon footprint by 25% in 2012.	\$1.5bn in Green Innovation.		
Unilever 2007 CSR report		Reduce CO ₂ from energy in manufacturing operations per tonne of production by 25% by 2012, against a baseline of 2004.	Ben & Jerry's is investing \$3.75m over 2007-2012 in reducing its impacts on climate change.		
Proctor & Gamble 2007 CSR report		Reduce CO ₂ emissions, energy and water consumption and disposed waste per unit of production by an additional 10% from 2007 to 2012, making a 40% reduction for the decade.	No investment details published on website or CSR report.		
Coca Cola 2006 CSR report		Reduce direct GHG emissions from its cooling equipment and to cut its indirect emissions, due to electricity use, by 40-50% by 2010.	\$3m to retool its Atlanta HQ to reduce CO ₂ emissions by 10,000 metric tonnes per year and increase energy efficiency by 23%.		
Monsanto 2007 CSR report		By 2010 Monsanto will reduce its own direct carbon emissions at major US manufacturing sites by 6% from its 2000 levels or purchase carbon emission offsets.	No investment details published on website or CSR report.		
Retail Sector	Energy Reduction Targets	GHG/CO ₂ Targets	Miscellaneous Investment	Investment in Renewables	
Carrefour 2007 CSR report	Reduce its energy consumption by 20% by 2020 compared with 2004 levels.		No investment details published on website or CSR report.		
Tesco 2007 CSR report	Use 50% less energy in its stores by 2010 against a baseline of 2000.	All new stores built between now and 2020 will emit, on average, at least 50% less carbon than an equivalent store built in 2006. Cut CO ₂ emissions by 50% on each case of goods delivered to its stores by 2012.		\$200m to develop renewable energy.	
Wal-Mart 2007 CSR report		Reduce greenhouse gases by 20% by 2012, against a baseline of 2005.	\$500m annually in sustainable technologies and innovations		
Utility Companies	Energy Reduction Targets	GHG/CO ₂ Targets	Miscellaneous Investment	Investment in Renewables	
E.ON Website		By 2030, E.ON aim to halve the amount of CO ₂ emitted for each kilowatt-hour of electricity generated compared with 1990 levels.	\$155m on continuing environmental protection. \$16bn (2007-2012) to enhance thermal efficiency of its conventional generation fleet, in renewables and in R&D.	\$9.5bn into renewable energy projects up to 2010.	
RWE Website		Cut CO ₂ emissions by 37% by 2015, compared with 2006.	\$1.5bn on research and development between 2008 and 2013, most of it on projects aimed at lowering CO ₂ emissions.		
EDF	EDF Energy, UK: reduce intensity of CO ₂ emissions from electricity production by 60% by 2020.		\$1.5m invested in R&D for the environment every three days		
Duke Energy 2007 CSR report		"2030 Scenario" - cut 2006 CO ₂ emissions in half - by approximately 50 million tonnes - by 2030.	\$23bn over the next five years (2007-2012).		

*all currency is given in US Dollars

Sector Findings



Mining Sector

- Targets set for reductions in both energy intensity and GHG intensity.
- The typical timescale for achieving targets is within the next five years.
- Investments run into hundreds of millions of dollars, many directed into industry coalitions, eg Futuregen and Coal21.

The mining industry is a heavy energy user for extraction, processing and transport. It is therefore not surprising that the world's leading mining companies are proactively setting targets for energy intensity and for GHG intensity reduction. Whilst intensity targets are a fairly good comparative measure of efficiency, they do not provide a clear picture of total impact on the environment.

Investments in energy/GHG reduction are substantial among all the mining companies surveyed and there is a significant amount of industry wide collaboration focusing on investment in new technologies with a specific focus on clean coal.

Oil & Gas

- Primarily, the targets are focused on reducing flaring, especially in Nigeria.
- The typical timescale for achieving targets is over the next five years.
- Investments run into billions of dollars.

It is interesting to see how many of the oil majors are focussing their efforts on addressing climate change by reducing flaring in developing countries. This is a relatively low cost option for upstream oil and gas which is manageable, measurable and can deliver some tangible improvements in the short term. Downstream, in refining, the options are more focused on fuel switching and carbon capture and storage. Several oil companies have energy reduction programmes in place, notably to address the huge amount of energy consumed in refining and other related processes.

Certain oil and gas companies are planning to invest more in renewable energy over the next five years than some of the major utility companies.

Sector Findings



Manufacturing

- The targets are more variable and there are some impressive examples – Philips and Unilever both targeted to reduce their operational carbon footprint by 25% by 2012.
- There were some interesting targets. For example Monsanto is considering offsetting and Toyota has linked CO₂ emissions with car sales.
- Investment figures are variable.

In the case of manufacturing companies, our survey reveals a much wider range of targets. Most of the manufacturing companies surveyed focus on GHG/CO₂ reduction targets rather than specific energy reduction. Whilst several companies link their corporate GHG/CO₂ reduction targets to units of production (eg an intensity or efficiency target), many have opted for locally driven initiatives such as the purchase of 'green' electricity and renewable installations in order to meet top down energy reduction targets.

In looking across the manufacturing sector we have seen that while there are innovative leaders setting very ambitious targets (eg Philips and Unilever) there are a significant number of companies not included in this report that are doing very little.

Retail

- There are some clear leaders and laggards.
- Tesco, Wal-Mart and Carrefour all have impressive targets and are each investing hundreds of millions of dollars.
- Many retailers do not appear to be setting any targets.

Customer facing retailers are under pressure to demonstrate their environmental credentials and are looking at a combination of ambitious energy and GHG reduction targets.

Market leaders are investing in innovative solutions to bring their carbon footprints down, including investment in renewable energy. In an era of sharply rising food prices retailers have a strong incentive to improve energy efficiency and keep costs down in an effort to become more competitive.

Sector Findings



Utilities

- Many of the companies surveyed have signed up to the “2030 Scenario” targeting a reduction of 50% by that year.
- Almost all of the companies surveyed have set reduction targets.
- Investment figures run into billions of dollars, with significant sums being fed into renewables and new technology research, especially carbon capture and storage.

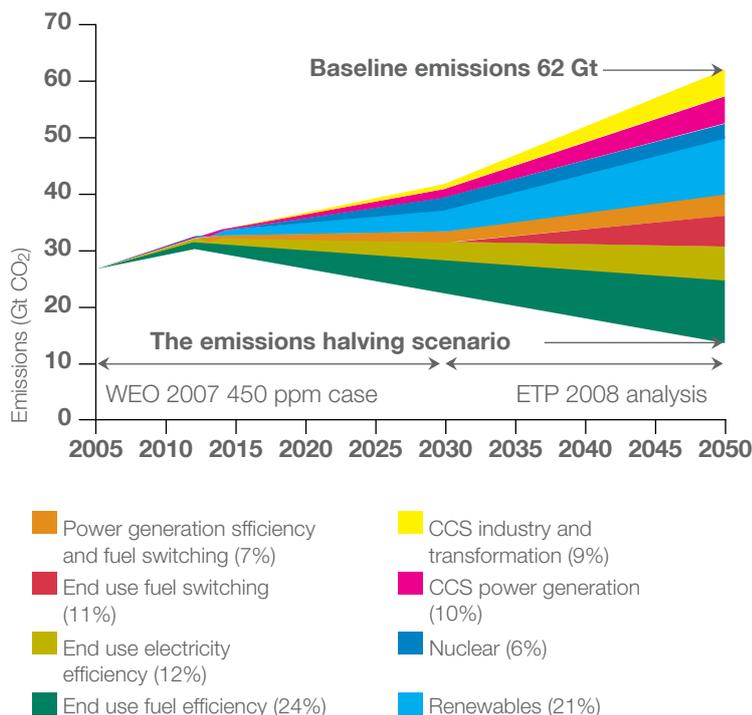
Most utility companies express their energy/climate change commitments in terms of CO₂ reduction per unit of electricity generated. The 2030 commitment may seem a laudable goal, however, given that the average lifespan of a corporation is 40 years and the number of company take-overs in this sector is so high, customers may view this as a rather ‘mystical target’.

What is most remarkable in this sector is the proposed massive investment in renewable energy. The surge towards renewable energy looks set to last given the imperative to reduce carbon emissions.

Pressure to reduce emissions

Pressure is mounting on all business sectors to reduce emissions and improve energy efficiency. Against this backdrop, the International Energy Agency (IEA) produced a support document for the G8 Summit, which looked at scenarios and measures for achieving a more energy efficient, low carbon global economy.

Reducing Global CO₂ Emissions by 50% by 2050



Source: IEA Energy Technology Perspectives 2008; IEA World Energy Outlook 2007.

Investing in Alternative Energy

The following section outlines some examples of current alternative energy projects which surveyed companies are publishing on their websites



BP and Tata: bright future in India

BP has teamed up with the Indian conglomerate Tata as part of a \$100 million solar power investment in India. The 300 MW plant will help to ensure that Tata BP Solar, already a leader in cell manufacture and the design of solar solutions, retains its position as the largest manufacturer of solar PV products in the Indian sub-continent. The company expects the total investment required to achieve the plant's full design potential to be in the order of \$300 million by 2010, generating a sizable number of jobs directly and many more indirectly.

The new production line has seen Tata BP Solar more than double its cell manufacturing capacity to reach some 50 MW per annum. The next phase of the expansion will see an additional 128 MW of cell manufacturing capacity added during 2007-8.

Anglo American: making a case for biodiesel

Anglo Coal Australia is exploring the use of alternative fuels to extract and process what has traditionally been one of the most widely used hydrocarbons. The Callide mine in Queensland is the site of a trial that is using a biodiesel blend to power on-site machinery and equipment. To date, Callide has achieved a 16% reduction in greenhouse gas emissions with no sacrifice to plant efficiency. If tests on additional equipment prove equally successful, Anglo Coal Australia will look into the potential for building a biodiesel facility run on locally-sourced methane gas.

The company believes that this will have a direct benefit on the environment, with further reductions to greenhouse gas and transport emissions. It will also serve the local community as a source of new jobs and a provider of alternative energy supplies.



Investing in Alternative Energy



Wal-Mart: 100% renewable target

In May 2007 Wal-Mart announced a major purchase of solar power from three solar power providers - BP Solar, SunEdison LLC, and PowerLight - for 22 combined Wal-Mart stores, Sam's Clubs and distribution centres in Hawaii and California. As part of a pilot project to determine solar power viability for Wal-Mart, the total solar power production from the 22 sites is estimated to be as much as 20 million kWh (kilowatt-hours) per year.

When fully implemented, the aggregate purchase could be one of the top-10 largest ever solar power initiatives in the US, if not the world. Wal-Mart's environmental goals include being supplied 100% by renewable energy.

Tesco: searching for alternatives

Tesco wants to find cost effective ways to reduce emissions by generating its own energy through renewables and low carbon technology. In 2006/07, Tesco invested £100 million towards the development of wind turbines, solar panels, gasification and trigeneration combined heat and power. Tesco is working with the Carbon Trust and Brunel University to develop trigeneration combined heat and power (CHP) technology for its stores and distribution centres, with the aim of saving over 10,000 tonnes of CO₂.

These units enable Tesco to capture and re-use heat created through power generation to reduce its overall carbon footprint



Conclusions



Conclusions

Climate change revolves around energy and, increasingly, companies which publish significant carbon reduction targets are also seeking to improve energy efficiency. This is the main conclusion from our snapshot survey.

Companies in each of the five sectors surveyed are using their websites to confirm concrete targets for greenhouse gas reduction and energy investment. Many are not only setting ambitious future targets in both these areas but they are also using the web to provide examples of current energy efficiency projects.

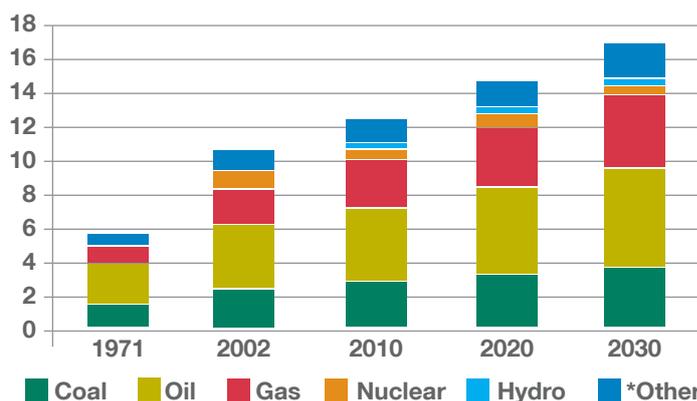
As we note in our comments on sector findings, there are some interesting variations in the way different sectors are approaching the climate change and energy issues. For a mining company, for example, operating in some of the most challenging parts of the world, energy efficiency and indeed energy security is paramount. At the same time, the leading miners have made very public commitments to a sustainable development agenda as part of their license to operate – hence the commitments made by our surveyed mining companies to greenhouse gas reduction.

Retailers, on the other hand are coming to terms with commercial/cost and customer facing pressures. Tesco, for example, recognizes the need to be seen as a green and ethical company while at the same time appreciating the potential financial benefits of hard-edged energy efficiency.

Web-based information on greenhouse gas reduction commitments is pretty well universal across all of the sectors surveyed; less consistent, bar the mining sector, are the future energy targets. It can be assumed that a number of companies have developed or are developing their own energy alternative and energy efficiency targets which are yet to be published on their websites. Utility companies, for example, are likely to provide stakeholders with more ambitious renewables targets in the future as the pressure on business to look for renewable alternatives continues to mount.

As the graph below indicates, the global demand for all types of energy will continue to rise – by at least 50% by 2030. There has never been a better time to be a green and energy efficient company.

Projected Future Energy Demand
Billion tonne oil equivalent



*Includes geothermal, solar, wind, heat, etc...

Source IEA 2008

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