CARBON DISCLOSURE PROJECT

Electric Utilities Report 2009
Carbon Disclosure Project

Report written for Carbon Disclosure Project by:

RiskMetrics Group

Report Sponsor:

CALSTRS
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Carbon Disclosure Project
info@cdproject.net
UK: +44 (0) 20 7970 5660
U.S.: +1 (212) 378 2086
www.cdproject.net

Carbon Disclosure Project 2008

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Sponsor's Letter
Carbon Disclosure Project Electric Utilities Report
March 16, 2009

As one of the first institutional investors to support the Carbon Disclosure Project, the California State Teachers' Retirement System is strongly committed to the Project's mission. For the second year in a row, the Teachers' Retirement Board has made climate risk management one of its signature initiatives in its corporate governance program. We at CalSTRS are working hard to improve our portfolio companies' climate risk awareness and management. CDP data is essential to enhance shareholder value through our corporate governance engagement efforts.

We understand that metrics matter as our country grapples with a national energy policy and as the global discussion continues on carbon trading. These challenging economic times have shown the need for increased attention to corporate risk management. Accurate data is the means to help mitigate risk for the pension security of the teachers and other public employees who depend on institutional investors such as CalSTRS. Prudent investment management requires that shareholders know what actions corporations are taking to assess and manage climate-related risks.

CalSTRS chose to sponsor the Electric Utilities Report because climate change risk management within this sector is of key importance to investors. As the most carbon-intensive sector, electric utilities must be at the forefront of reporting and mitigation efforts to avoid exposure to potential regulation and litigation costs.

We applaud the Carbon Disclosure Project and its signatories in producing the Electric Utilities Report. This report opens the way for consistent and comparable measurements, which are the bedrock of responsible public policy and informed investment decisions.

Jack Ehnes
Chief Executive Officer
California State Teachers' Retirement System

Executive Summary

Since 2000 the Carbon Disclosure Project (CDP) has, on behalf of institutional investors, challenged the world's largest companies to measure and report their greenhouse gas (GHG) emissions and other information as to how climate change will affect their businesses.

In 2008 (CDP6), CDP wrote to the world's largest 249 publicly traded electric utilities globally by market capitalization requesting this information on behalf of 385 investors with US$57 Trillion of assets. This report presents an analyses of the responses received.

The world's electric power industry is poised at a transformational moment. Within two decades, it must complete a thorough overhaul of its power generation system and transmission network. In the coming era of carbon emission constraints, electric utilities must reduce their dependence on coal and other fossil fuels that at present produce 40% of the world's carbon dioxide emissions from energy-related sources. This will require a "rapid transformation to a low-carbon, efficient and environmentally benign system of energy supply," according to the latest outlook from the International Energy Agency (IEA). "What is needed is nothing short of an energy revolution."[1]

This revolution will play out in slow motion. Power plants are highly capital-intensive and built to last. With long operating lifetimes, power plants lock in a flow of GHG emissions to the atmosphere for many decades. The only way to halt the build-up from existing plants is to make costly retrofits to capture the carbon or retire them early. An alternative would be to halt construction of new carbon-emitting plants. But even this radical option would reduce emissions from the electric power sector by only 25% in 2020, relative to base-case forecasts, due to ongoing emissions from existing fossil-energy plants still in operation.[2] This combination of factors argues for much greater investment in energy efficiency and demand-side management programs to reduce demand for power from new and existing plants alike.

1 "World Energy Outlook: 2008," International Energy Agency, Paris, 2008.

2 Put another way, three-quarters of the projected output of electricity worldwide in 2020 (and more than half in 2030) will comes from power stations already operating today, under baseline forecasts.

On the regulatory side, global momentum for an energy revolution is now in full swing. In the US, the year opened with the launch of the Regional Greenhouse Gas Initiative (RGGI), the country's first mandatory cap-and-trade system for fossil-fuel fired power plants. Utilities companies in ten Northeast and Mid-Atlantic states are now getting their first taste of climate change regulation, with roughly 225 power plants covered under the emissions trading scheme.

The global economic crisis has also thrust the electric power sector into the spotlight. Less than a month into his first term, President Obama signed into law a stimulus package that puts clean energy and energy efficiency at the center of economic recovery plans. The package – 13% of which is devoted to climate and energy issues – includes nearly US$41 Billion in funding for renewable energy research and development, energy efficiency and building retrofit programs, smart grid development, a loan guarantee program for rapid deployment of clean technology, carbon capture and storage (CCS) demonstration and green job training. The stimulus also extends the "production tax credit" for wind energy by three years and includes tax credit extensions for biomass, geothermal, landfill gas and some hydropower projects.

Europe, too, is moving quickly on new climate and energy policy. The EU Emissions Trading Scheme (EU ETS) came into force in 2005 and set caps on emissions for over 12,000 sites owned by approximately 5,000 companies. But Brussels has not stopped there. In January 2009 – just three days after the inauguration of President Obama in the US – the European Commission put forward its Climate and Energy package, outlining its strategy to achieve a 20% reduction in GHG emissions below 1990 levels by 2020 and ramp up renewable energy production to make up 20% of the EU's energy use. As the European Commission formulates its position for the next phase of the Kyoto Protocol, regulations for electric utilities are at the center of the debate. With many observers concerned that carbon prices alone do not provide a strong enough signal to alter utility investment decisions, several policy alternatives are being considered.

In early March 2009, 44 members of the European Parliament proposed an amendment to the Industrial Emissions Directive to introduce an emission limit of 350 grams CO_2 per kWh electricity produced for any new power plants. The limit would be applicable from 2020 for new plants and from 2025 for existing plants. Such an emissions performance standard would effectively rule out any new coal-fired plants as well as older, single cycle gas-fired plants without carbon capture and storage. While the amendment has garnered significant support and is being supported by various NGO groups, it is still unclear if it can clear a plenary vote.

Other countries around the globe are following suit and forming climate change policies that will profoundly reshape the electric power sector.

- Australia has announced the details of its Carbon Pollution Reduction Scheme (CPRS), which includes the implementation of a GHG emissions trading scheme by January 2010. While the plan includes provisions to give A$3.9 Billion of free permits to coal-fired generators over the first five years of the system, Standard and Poor's has forecasted that the details of the plan "are likely to influence the investment decisions and ultimately the credit profile of the Australian utilities sector."[3] At the same time, the government is under increasing pressure from industry groups to delay the launch of carbon trading due to the current economic downturn.
- Japan has launched a voluntary cap and trade scheme, and the electric power sector has voluntarily pledged to reduce its GHG emissions intensity (per kilowatt-hour) by 20% below 1990 levels over five years.
- China has passed a series of climate-related laws due to come into force at the end of 2009. Goals include reducing energy consumption per unit of GDP by 20%, doubling renewable energy capacity and monitoring the environmental performance of carbon-intensive industries.[4]
- Russia has set a goal to reduce the country's energy intensity per unit of GDP by at least 40% from 2007 levels by 2020. In January 2009, the government also approved targets to generate 4.5% of energy from renewable sources by 2020, although details on how this will be achieved are not yet clear.[5]
- India is also adopting new regulations for its utilities sector in an effort to cut GHG emissions. As a part of the national action plan on climate change, the government has announced a new renewable energy standard for utilities; companies will be required to purchase 5% of their power from renewable sources by 2010, after which the minimum standard will be increased by 1% for the next 10 years.

3 "Australia's Carbon Plan Offers Mixed Bag for Local Corporates." Standard & Poor's Commentary Report, Jan. 27, 2009.

4 "Global Climate Change Regulation Policy Developments: July 2008-February 2009." DB Advisors, Deutsche Bank Group, Feb. 2009.

5 Ibid.

With all of these policy developments, there is little doubt that 2009 is shaping up to be a pivotal year for the global electric power sector. This report offers an in-depth analysis of the responses of 110 global, publicly-traded electric utilities to the CDP6 (2008) Questionnaire. It is the second iteration of such a sector-specific CDP report; the first was published in 2006. This report provides details on the level of climate change disclosure offered by this critical sector to investors and other key stakeholders, as well as an analysis of the responding utilities' emissions intensities, generation fuel mixes and investments in emerging technologies and services. While it appears that an increasing number of utilities are addressing these issues in their CDP disclosure, more improvement is needed in key areas, such as reporting on generating capacity and production by fuel type as well as specifics around emissions forecasting and reduction planning.

Key Findings

- **Response Rates** – The overall response rate for electric utilities has improved, with 53% of utilities invited answering the CDP6 (2008) Questionnaire in comparison to just 44% in 2006. Response rates were highest for a relatively small sample of companies from Australia/New Zealand, while the response rate for US companies increased markedly, from 48% in 2006 to 67% in 2008. Notably lacking were responses from three key GHG-emitting countries: only three Chinese, one Indian and no Russian electric utilities responded to the latest questionnaire. In total, 110 unique responses were analyzed for this report.
- **Carbon Disclosure Leadership Index (CDLI)** – A new CDLI scoring system was introduced for CDP6 (2008) to evaluate companies across sectors on the extent and quality of their climate change disclosure. The highest scoring electric utilities for CDP6 (2008) are **Endesa**, **Iberdrola**, and **AGL Energy** with 85, 82 and 81 points, respectively, out of 100 total possible points. These utilities are providing comprehensive descriptions of company-specific climate change risks and opportunities as well as their strategies to integrate climate change into core business strategies.
- **Quantitative Emissions Reporting** – Out of the 110 electric utility responses analyzed for this report, 93 companies (or 85%) provided quantitative GHG emissions data (either direct Scope 1 or indirect Scope 2 emissions) in their CDP6 responses. Fewer companies reported on standard metrics of emissions intensity (emissions released per unit of output). 90% of European companies reported emissions intensity figures, whereas only 52% of North American and 31% of Asian companies did so. For those companies that reported emissions intensity figures in metric tonnes of carbon dioxide-equivalent per Megawatt-hour (CO_2-e/MWh), **American Electric Power** and **TransAlta Corp**. are among those with the most carbon emissions-intensive generation, while **Entergy Corp.** and **FPL Group** have some of the least intensive electricity production, due to their use of nuclear power and renewables.
- **Generation Fuel Mix** – Just under half of the CDP6 (2008) electric utility respondents disclosed current capacity and production figures by fuel type. This is a critical factor for investors to determine the extent to which a utility may be exposed to climate regulations as well as the company's future competitive positioning – yet, disclosure in this area is still dramatically lacking. 62% of European companies provided current capacity and production data, but only 14 out of the 110 respondents provided data on forecasted capacity and production.
- **Emissions Reduction Planning & Investments** – Out of the 110 unique responses analyzed for this report, 61% of respondents say they are forecasting future GHG emissions and 59% say they have an emissions reduction plan in place – both encouraging signs. Forty-eight companies also provided specific details on the baseline years and target strength of their emissions reduction targets. Finally, numerous companies included disclosure on a range of investment opportunities from renewable energy installations and demand side management (DSM) programs to facility upgrades, fuel switching and research and development of carbon sequestration and storage (CCS).

Contents

1

Introduction

The Carbon Disclosure Project is the largest investor coalition in the world. Last year more than 385 signatory investors, with a combined asset base of US$57 Trillion, signed CDP6 (2008) – our sixth annual request for information – which was sent to over 3,000 companies worldwide. On February 1st 2009, a further request was sent on behalf of 475 investors with US$55 Trillion in assets to over 3,700 companies globally.

The CDP Questionnaire covers four major areas:

1. The risks and opportunities that climate change presents to the business;
2. Greenhouse gas emissions accounting;
3. Management's strategy to reduce emissions/minimize risk and capitalize on opportunity; and
4. Corporate governance with regard to climate change.

The corporate data received in response to CDP's annual requests provides investors with vital information regarding the current and prospective impact of climate change on their portfolios, and represents an important resource for investment decisions. The fact that CDP's requests are made on behalf of investors serves to raise the awareness of senior management that climate change is a business issue that requires serious strategic focus. After eight years of consecutive growth, CDP currently runs projects in more than 20 countries, with new projects launched in China, Korea, Latin America, the Netherlands and Spain in 2008.

CDP is pleased to report that it received a record number of company responses to its 2008 annual request – more than 1,550 in total. This demonstrates an increased understanding by the world's largest corporations of the importance of climate change and its relevance to business strategy and shareholder value. And as both signatory investors and corporate responses to CDP have risen, in most cases the quality of responses has also vastly improved in comparison to previous years.

Since 2007, CDP has also expanded its work into a number of new programs. The CDP Supply Chain project is designed to assist companies in understanding the emissions and risks and opportunities that climate change presents to their supply chains. For some sectors this is

larger than the direct operations of the company. This work has also been applied to public spending through the CDP Public Procurement program. CDP is also the secretariat for The Climate Disclosure Standards Board (CDSB) which is developing a globally accepted framework, based on existing standards, for corporate reporting on climate change.

Why Electric Utilities?

When negotiators gather in Copenhagen, Denmark, at the end of 2009 to hammer out an agreement to extend and expand the terms of a global agreement to reduce GHG emissions, their first-order challenge will be to address a key policy question: What limits should be set to stabilize atmospheric emissions in order to mitigate the effects of climate change?

While the answer is far from simple, it is clear that the stakes are high. According to the latest analysis from the Intergovernmental Panel on Climate Change:[6]

- The world is on course to double the concentration of carbon dioxide equivalent (CO_2-e) in the atmosphere to 700 parts per million (ppm) by the end of this century.
- This concentration would lead to an eventual average temperature increase of up to 6 degrees Centigrade (6˚C), or nearly 11 degrees Fahrenheit, with catastrophic environmental consequences for the globe.
- Holding the concentration to 550 ppm might reduce the eventual temperature to a more tolerable 3˚C increase.
- A more ambitious goal of holding the concentration to 450 ppm might limit the temperature increase to a safer level of a 2˚C. While a challenging target, this is the target that many scientists, politicians and NGOs have said we should not exceed in order to avoid potentially disastrous feedbacks in the climate system.

None of these stabilization targets come with any climate guarantees, however, and while a consensus around the 2˚C target is emerging there is ongoing debate among scientists and policymakers as to which stabilization target is most prudent and achievable. Even a 2˚C warming would lead to permanent ecosystem changes including loss of coral reefs, mountain glaciers and onset of ice sheet melting which produces substantial sea level rise over time. Few policymakers seem willing to consider targets beyond 3˚C of warming that portend far more serious consequences for the world's coastlines, freshwater and agricultural resources.

Yet even the higher 550 ppm target, with the greater environmental risks it entails, presents a huge challenge for the world's energy producers and electric utilities in particular. According to the latest baseline outlook from the International Energy Agency (IEA) that extends through 2030:[7]

- World primary energy demand and related CO_2 emissions are forecast to grow by 45%, to 41 gigatonnes (GT) annually by 2030, equal to 1.6% growth per year. China, India and the Middle East are expected to account for three-quarters of this increase.
- Fossil fuels in 2030 still are projected to account for 80% of the world's primary energy mix, down only slightly from today.
- In this baseline forecast, US$26 Trillion of cumulative energy-sector investments will be required in 2007-2030 (in 2007 dollars), with the power sector accounting for 52% (US$13.2 Trillion) of this total. Slightly over half of the energy sector investment will be simply to maintain fossil energy infrastructure and current supply capabilities.

World primary energy demand and related CO_2 emissions are forecast to grow by 45%, to 41 gigatonnes (GT) annually by 2030, equal to 1.6% growth per year.

6 Intergovernmental Panel on Climate Change, Fourth Assessment Report, Geneva, 2007.

7 This forecast takes into account national energy policies adopted as of mid-2008.

To alter this business-as-usual forecast in favor of a plan to achieve a 550 ppm stabilization target, the IEA estimates:

- Growth in world primary energy demand would have to be cut to 32% through 2030, equal to 1.2% per year.
- Energy-related CO_2 emissions would have to fall to 33 GT annually by 2030 or 19% less than the baseline forecast.
- The price of CO_2 as a tradable commodity would reach US$90 per metric ton.
- US$1.2 Trillion extra would have to be invested in power plants, mainly in industrialized countries as defined by the Organization for Economic Cooperation and Development (OECD).
- US$2.9 Trillion extra would have to be invested in more energy-efficient equipment and appliances.
- This added US$4.1 Trillion investment (equal to 0.24% of projected annual world GDP) would yield US$7 Trillion in energy savings over the period.
- Coal plants with an installed capacity of 160,000 megawatts (MW) would be equipped with carbon capture and storage (CCS) technology by 2030 to make them carbon neutral. (Notably, CCS capacity is negligible in the baseline forecast.)

The 450 ppm stabilization target would involve even stronger, broader and quicker policy goals that, if technologically achievable, "would certainly be unprecedented in scale and speed of deployment," according to the IEA. In the 450 ppm scenario:

- Growth in energy-related CO_2 emissions follows the same trajectory as in the 550 ppm scenario through 2020, but then falls much more quickly as renewable energy technologies are deployed on a massive scale.
- By 2030, hydropower, biomass, wind and other renewables would account for 40% of total generation worldwide, almost double the baseline forecast.
- Energy-related CO_2 emissions in OECD countries would be almost 40% lower than today, while other major economies would limit their future growth in emissions to 20%.
- The price of CO_2 would reach US$180 per metric ton by 2030.
- US$3.6 Trillion extra would be invested in power plants, mainly after 2020.
- US$6.6 Trillion extra would be invested in more energy-efficient equipment and appliances.
- This added US$9.2 Trillion investment (equal to 0.55% of projected annual world GDP) would yield US$5.8 Trillion in energy savings over the period, with higher electricity costs outpacing the value of the energy savings.
- Coal plants with an installed capacity of 350,000 MW would be equipped with CCS, more than double the amount in the 550 ppm scenario.

If the 450 stabilization target were to be achieved, global energy-related CO_2 emissions would be held to 25.7 GT annually by 2030; that is less than projected now for just developing (non-OECD) countries in 2030. This means industrialized (OECD) countries could not bring about this global target on their own, even if their emissions were to fall to zero. It also means that developing countries must play an active role as their emissions start to catch up to those of OECD nations, even if they never match them on a per-capita basis, even after 2030.

Electric Utilities and the Carbon Disclosure Project

For the first time in 2008, the Carbon Disclosure Project included supplementary sector-specific questions in addition to the standard CDP Questionnaire to address the unique challenges facing the electric utilities sector. The Electric Utilities supplementary questions to the Carbon Disclosure Project's sixth annual Information Request are based on a reporting framework developed by the Institutional Investors Group on Climate Change (IIGCC), Ceres, and the Australia/New Zealand Investor Group on Climate Change (IGCC). CDP is very grateful to these organizations for developing this framework. The supplementary questions seek to address some of the core issues facing the world's major investor-owned electric utilities:

- How much carbon dioxide and other GHG emissions are utilities emitting today, and what are their projections for the future?
- What mix of power plants is producing these emissions, and how might these emissions be reduced?
- To what extent are utilities making use of non-carbon generating sources like wind, solar and nuclear power, and how much do they intend to increase their use?
- How much do they rely on coal, the most-carbon intensive fuel, and what efforts are they making toward deployment of carbon capture and storage technologies?
- What steps are they taking to promote more efficient use of electricity and a "smarter grid" to support more renewable energy development and demand-control programs?
- Are they assuming a price for carbon dioxide emissions in their planning forecasts?

The following sections provide a summary of the CDP6 (2008) Utility Sector Supplement findings.

2

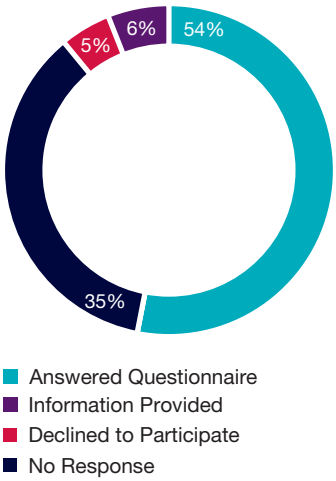
Analysis of CDP6 Electric Utilities Responses – Sample and Response Rates

Overview

The Carbon Disclosure Project invited the 249 largest publicly traded Electric Utilities globally by market capitalization in 2008 to respond to the CDP6 (2008) Questionnaire along with the Electric Utilities supplementary questions. RiskMetrics Group was commissioned by CDP and California State Teachers' Retirement System (CalSTRS) to analyze the company responses. The overall response rate for electric utilities improved from previous years, with 53% of utilities invited answering the CDP6 (2008) Questionnaire in comparison to 44% in 2006. In addition, 23 utilities that did not answer the CDP5 (2007) Questionnaire were new respondents in 2008. A further 6% of utilities provided some information. However, 35% of contacted utilities did not respond to the questionnaire and another 5% formally declined to participate.

In total, 110 unique responses were analyzed for this report due to parent/subsidiary relationships among some respondents. Of these 110 responses, 15 companies elected not to make their responses publicly available.

Fig. 1: Electric Utilities 250 CDP6 Response Status



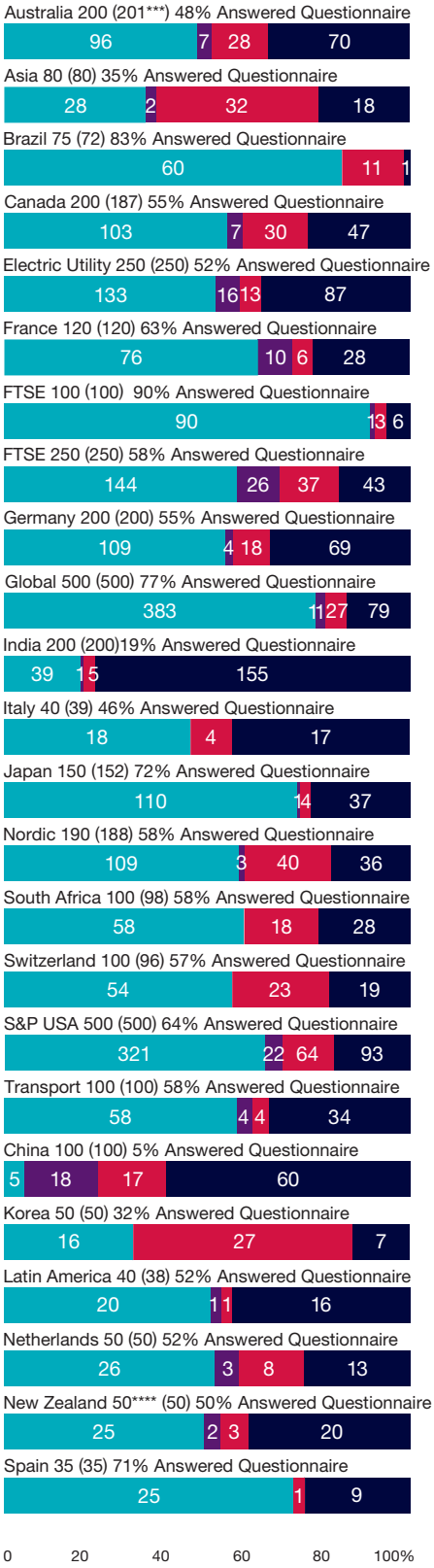
Key Trends from CDP Global Samples

This sixth iteration of the CDP Questionnaire sought greater overall coverage than in previous years, with information being requested from more than 3,000 companies worldwide. In 2008, CDP expanded to cover 21 geographical areas (up from 16 in 2007) and two sector samples (Electric Utilities and Transport). The corporations' responses and reports analyzing findings from these samples will be posted on the CDP website as they are launched worldwide. (See www.cdproject.net for further details.)

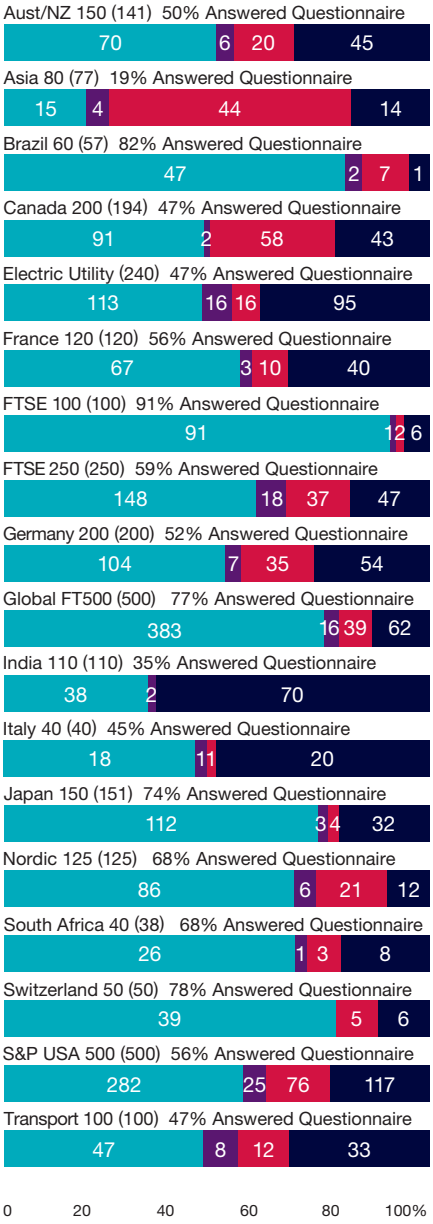
Response rates across the vast majority of samples are above 50%, with an average response rate of 55%. The FTSE 100 had the highest response rate with 90 companies (90%) responding. By comparison, the Electric Utilities 250 sample response rate of 53% is slightly below the average, ranking 11th out of the combined 23 geographic and sector samples. The Electric Utilities' response rate is also slightly below that of the Transport sector, although in that case only 100 companies were surveyed.

Responses to the CDP6 (2008) Questionnaire have been classified in the same way as in past years: Answered Questionnaire (AQ), Provided Information (IN), Declined to Participate (DP) and No Response (NR).

Fig. 2: CDP6 Response by sample*



CDP5 Response by sample**



Sample (number of companies)

- Answered Questionnaire
- Provided Information
- Declined to Participate
- No Response

* Response rates calculated at 31 July 2008; numbers may differ from local report that calculated response rates before or after this date.

** Response rate as published in CDP5 Report.

*** The first listing is the official sample name, the number in brackets is the actual number of companies that were included in CDP6 for that sample.

**** New Zealand is included as an individual sample for the first time, having previously been combined with Australia.

Historical Overview

The response rate for the Electric Utilities 250 sample has been steadily improving since its introduction in 2006. This is despite the fact that 36 companies, or 14% of the sample, were invited for the first time in 2008. Companies that have not been invited in the past are less familiar with the CDP process and may be under less pressure from investors to report on climate change risks. Countries that were added to the CDP6 (2008) Questionnaire sample but not represented in the CDP5 (2007) Questionnaire include Argentina, Colombia, Bosnia-Herzegovina, Turkey, Vietnam and the United Arab Emirates. The Russian questionnaire sample was also significantly increased from four to 19 companies for CDP6 (2008), though none responded.

In addition, 23 companies that did not respond to the CDP5 (2007) Questionnaire or only provided some information responded to the CDP6 (2008) Questionnaire. New companies responding to CDP for the first time came from Colombia and Japan, demonstrating the growing recognition of CDP around the world.

Geographic Trends

In terms of geographic trends, Australia/New Zealand had the highest response rate, at 80%; however, this is based on the smallest survey universe of only five utilities. The United States/Canada, South America and Europe followed closely, with response rates of 65%, 64% and 58%, respectively. The increasing likelihood of federal climate legislation in the United States makes it not surprising that the response rate for US utilities increased from 48% in 2006 to 67% in 2008. More surprising is that a greater percentage of European utilities did not respond, especially given that many are already required under the EU ETS to report their GHG emissions.

Meanwhile, the response rate of Asian utilities was only 31%. This is partly attributable to the increase in the Asian questionnaire sample from 53 companies in 2007 to 74 in 2008; smaller companies that are less familiar with the CDP tend to be less likely to respond. As in 2007, all Japanese utilities receiving the questionnaire again responded in 2008. Japanese utilities are increasingly coming under pressure to deliver on the country's emissions reduction targets under the Kyoto Protocol. In October 2008, Japan launched a voluntary emissions trading scheme in which companies can set their own caps. Japanese electric utilities have pledged to reduce the carbon intensity of electricity production by 20% below 1990 levels by 2012.

Elsewhere in Asia, only three of 11 Chinese utilities invited, and one of 11 Indian utilities, responded to CDP6 (2008). While these countries have rapidly growing GHG emissions and are at the forefront of negotiations between developed and developing countries leading up to the December 2009 COP-15 talks in Copenhagen, electric utilities in Asia still lag behind in critical disclosure of GHG emissions and reduction strategies. However, a few Asian utilities are setting disclosure best practice standards, including Hong Kong-based **CLP Holdings**, which received one of the highest Carbon Disclosure Leadership Index scores for the sector.

Interestingly, utilities in Annex 1 countries saw a decrease in responses for 2008, when compared to response rates for CDP4, when the last Electric Utilities supplement report was written. (Annex 1 countries have ratified the Kyoto Protocol and adopted emissions reduction targets.) Utilities located in these countries had a 59% response rate in 2006, but only a 54% response rate in 2008. However, this minor shift is mainly due to additional Russian utilities included in the 2008 questionnaire sample that provided no response. (None of the 19 Russian utilities invited responded to the CDP6 (2008) Questionnaire.

Fig. 3: Electric Utilities Response Rate

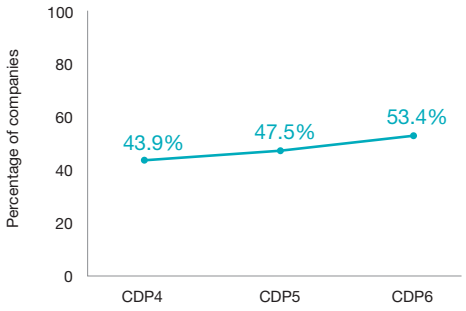
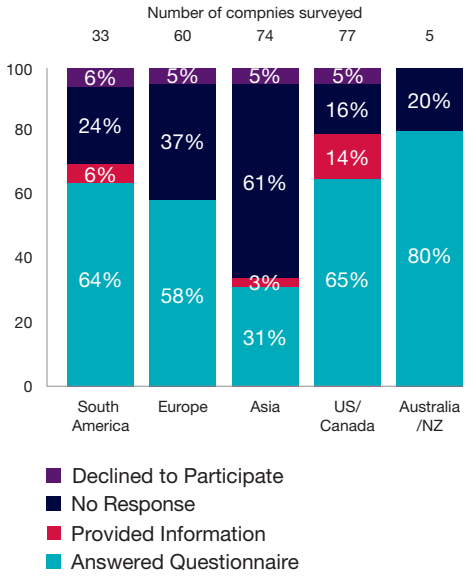


Fig. 4: Response Rates by Region



However, this may be due to the restructuring through 2007 and 2008 of the state-owned Unified Energy System of Russia [RAO UES] – which responded to CDP in 2005 – to create several smaller state-owned and private electric utilities.) Within the Annex 1 sample, disclosure remains high across Europe and Japan, with all electric utilities invited from the United Kingdom and Japan responding to the CDP6 (2008) Questionnaire.

Also of note is the increase in the US response rate. For CDP4, American and Australian utilities were combined into an "Annex 1 Not Ratified" group, with a 48% response rate. (Australia has since ratified the Kyoto Protocol.) Separating out the US utilities for CDP6 (2008) has resulted in a 67% response rate. Several US utilities that did not respond or only provided some information to the CDP5 (2007) Questionnaire were new respondents for CDP6 (2008). These include **Ameren Corporation**, **CH Energy Group**, **Dominion Resources**, **Dynegy**, **Idacorp**, **OGE Energy Corporation** and **Pepco Holdings**. These companies are likely responding to growing US investor pressure for climate disclosure. All of these companies except CH Energy and Pepco have received shareholder proposals requesting information about their GHG reduction plans.

The large questionnaire sample of 77 North American utilities and high response rate from US/Canada means that 44% of all analyzed responses come from this geographic region. This concentration should be kept in mind when comparing trends in quantitative emissions reporting, fuel mix forecasts and emissions reduction planning. However, when responses are analyzed according to United Nations Framework Convention on Climate Change (UNFCCC) status (i.e., whether a country has ratified the Kyoto Protocol and whether or not it has accepted emissions reduction targets), the focus shifts to Annex 1 utility respondents that make up 46% of the questionnaire sample. This represents the key pool of countries with existing emissions reduction targets that are expected to set increasingly stringent targets for their electric utilities. Unfortunately, the complete lack of participation among Russian utilities holds down the Annex 1 response rate. Despite Russia's ratification of the Kyoto Protocol in 2004 that brought the treaty into force, there is still much progress to be made in Russia and in other critical Annex 1 countries to increase their response rates.

The analyzed response sample also includes eight Brazilian electric utilities and one Colombian company. Accordingly, the South American sample is focused mainly on Brazil. While there were 21 South American utilities that technically answered the CDP Questionnaire, several from Peru, Venezuela, Chile and Argentina referenced parent company responses, such as from **Endesa** and **Suez**. For analysis of responses throughout this report, only parent companies are considered.

Fig. 5: Response Rates by UNFCCC Status

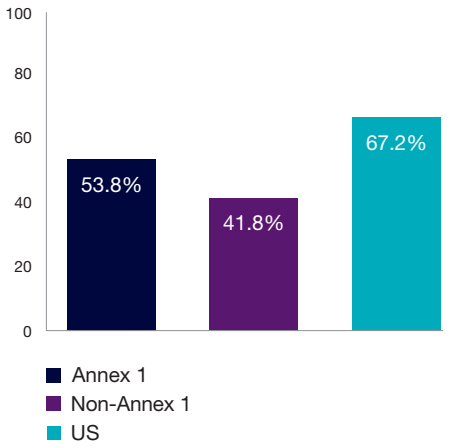


Fig. 6: Region of Analyzed Responses

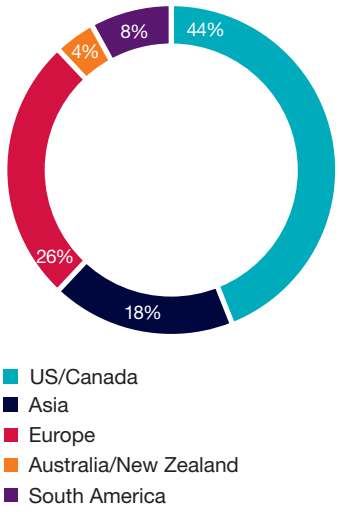
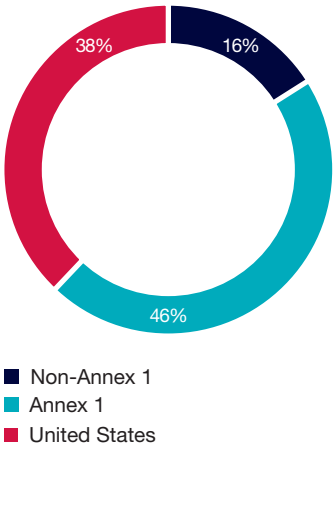


Fig. 7: UNFCCC Status of Analyzed Responses



3

Carbon Disclosure Leadership Index – Electric Utilities

The Carbon Disclosure Leadership Index (CDLI) highlights the leading CDP6 (2008) respondents. The CDLI scoring system has been applied to the electric utilities sector to identify companies providing public, high-quality disclosure through the CDP Questionnaire.

As institutional investors look to companies for disclosure on climate change that will help inform investment decisions, a growing number of companies are following best practice by providing comprehensive high-quality responses to the CDP Questionnaire. These companies are using the CDP reporting process to publicly identify climate change risks and opportunities, describe climate change strategies, and offer quantitative data to help investors assess the potential financial impact of climate risks.

The CDLI scoring system is designed to highlight companies taking the lead on climate change disclosure. This scoring system has been applied to respondents in the Electric Utilities 250 to identify 12 leading CDP6 (2008) respondents who demonstrate effort, thought, clarity and detail in their public CDP responses. Any CDP6 (2008) company response that is “not public” is not eligible for inclusion in the CDLI because, by definition, that company is not demonstrating disclosure best practice.

It should be noted that while the CDLI score is a good indicator of how well a company has responded to the CDP6 (2008) Questionnaire, it does not fully reflect company performance in climate change management, nor does it account for absolute emissions, reduction achievements, carbon intensity or governance practices in awarding the rating. In general, a high score can be achieved by following the guidance issued by CDP and providing a comprehensive description of activities. A company without a climate change strategy and associated measurement systems and targets will not score highly. The best responses are both company-specific and detailed.

The highest scoring electric utilities companies in CDP6 (2008) are **Endesa**, **Iberdrola**, and **AGL Energy**, with 85, 82 and 81 points, respectively. These three companies are employing best practice by providing high quality responses with comprehensive descriptions of company-specific climate change risks and opportunities as well as their strategies to integrate climate change into core businesses. These three leading utilities all provide quantitative data for their Scope 1, 2 and 3 GHG emissions and calculate the emissions intensity of their operations according to standard financial metrics (see box on page 21 for definitions of emissions scopes). Furthermore, these CDLI leaders detail specific emissions reduction targets and outline their strategies to achieve these targets.

A low score may be attributable to one or more of the following reasons:

- The respondent did not fully answer the question asked
- The respondent did not relate the answer specifically to the company's circumstances
- The respondent did not provide relevant data or specific information to support the statements being made

For further details about the CDLI scoring system, please refer to Appendix II of the online version of this report at www.cdproject.net.

To maintain consistency between the electric utilities' CDLI scores and that of other global and regional CDP6 (2008) assessments, answers to electric utility-specific questions in the CDP6 (2008) Utility Sector Supplement were not evaluated in determining their scores. These questions were evaluated for other company analysis in this report, however.

Table 1: CDLI: Top 12 Scoring Electric Utilities

Company	CDLI Score	Scope 1 Emissions*	Emissions Intensity**	Region
Endesa	85	86,298,248	3,671	Europe
Iberdrola	82	37,769,059	1,578	Europe
AGL Energy	81	335,872	113	Australia/NZ
CLP Holdings	79	35,340,000	5,429	Asia
Scottish & Southern Energy	78	22,724,211	742	Europe
Exelon Corporation	78	11,000,000	588	US/Canada
FPL Group	77	50,000,000	3,276	US/Canada
Canadian Hydro Developers	75	599	10	US/Canada
Consolidated Edison	75	6,378,481	486	US/Canada
NiSource	74	27,096,053	3,398	US/Canada
Fortum	74	7,730,000	1,259	Europe
Centrica	74	9,561,717	292	Europe

Table 2: CDLI: Top Scoring Electric Utilities by Region

Region	Company	CDLI Score	Scope 1 Emissions*	Emissions Intensity**
Asia	CLP Holdings	79	35,340,000	5,429
	Hong Kong Electric Holdings	56	9,110,000	5,676
	Chugoku Electric Power	54	40,800,000	4,191
Australia/ New Zealand	AGL Energy	81	335,872	113
	Origin Energy	68	3,664,000	746
	Contact Energy	65	2,477,000	1,816
Europe	Endesa	85	86,298,248	3,671
	Iberdrola	82	37,769,059	1,578
	Scottish & Southern Energy	78	22,724,211	742
South America	Cia. Energetica de Minas Gerais – CEMIG	51	203,236	41
	CPFL Energia SA	48	2,666	0.55
United States/ Canada	Exelon Corporation	78	11,000,000	588
	FPL Group	77	50,000,000	3,276
	Canadian Hydro Developers	75	599	10
	Consolidated Edison	75	6,378,481	486

* Company-reported Scope 1 (direct from owned or controlled sources) GHG emissions only (most recent reporting year, CO_2-e Metric Tonnes)

** Calculated by RiskMetrics Group. Company-reported Scope 1 emissions, Mt CO_2-e/2007 Revenue (US $ Million)

Fig. 8: Average CDLI Scores by Region

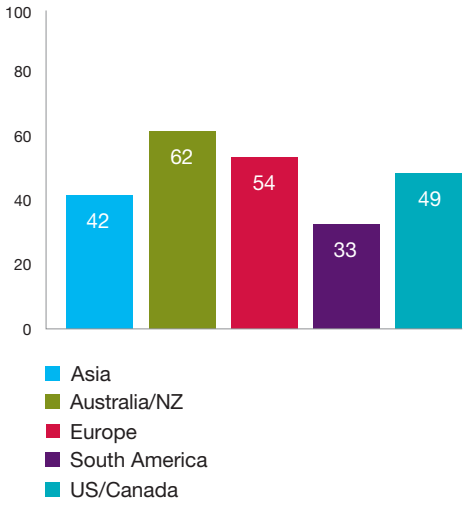
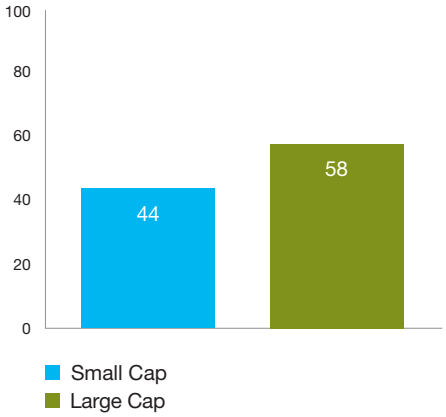


Fig. 9: Average CDLI Scores – Small Cap vs. Large Cap Companies



Regional Variation

Utilities in the Australia/New Zealand region had the highest average CDLI score, although only four companies from this region provided responses to CDP6 (2008) Questionnaire. The average score for this region was boosted by **AGL Energy**, an Australian utility with one of the highest scores among all CDP6 (2008) electric utility respondents. European companies also scored comparatively well, with an average of 54 points, boosted in part by top-scoring companies **Endesa** and **Iberdrola**. This is not surprising given that the majority of European utilities are regulated under the EU ETS, for which GHG emissions reporting is mandatory. These companies face immediate regulatory risk from their GHG emissions, making them more likely to assess and disclose climate change impacts and their carbon management strategies.

North American and Asian utilities followed with average CDLI scores of 49 and 42 points, respectively. The scores for companies in these regions ranged widely, however. The US/Canada scores had a 69-point range from high to low, and the scores of Asian utilities had a 76-point range. Utilities from South America had the lowest average score, although there were only nine respondents from this region from Brazil and Colombia, all of which were small cap companies.

Size Variation

Not surprisingly, larger utilities tended to receive higher scores for their disclosure. The average CDLI score for large cap companies was 58.2, compared to 44 for small cap utilities. One explanation for this variation is that larger companies tend to have greater access to resources to quantify their GHG emissions, develop carbon management strategies and pursue climate-related business opportunities. These utilities may also face greater regulatory risk if they have high-emissions profiles and are more likely to face investor pressure to address this risk. However, there is only a small positive correlation between the amount of a company's Scope 1 absolute emissions and its CDLI score, and a low negative correlation between the level of a company's emissions intensity and its CDLI score.

4

Quantitative Emissions Reporting

Greenhouse gas emissions disclosure is a core element of the CDP6 (2008) Questionnaire. This data is increasingly being used by investors to quantify the financial risk of GHG emissions under various carbon pricing scenarios and to compare companies' climate change performance relative to their peers.

In the absence of an international GHG emissions registry, CDP serves as the single most comprehensive global database of self-reported corporate GHG emissions.

In response to demand from its signatories for investment grade emissions data, CDP is now improving its reporting capabilities for companies for launch in 2010. This major upgrade of CDP's IT systems will allow corporations to submit more detailed emissions data following a standard protocol, based on the GHG Protocol. The project is currently in development and CDP will be able to share more information later in 2009.

Through the CDP6 (2008) Questionnaire, companies are asked to publicly disclose their GHG emissions inventory through the GHG Protocol format, which defines direct and indirect emissions according to three "scopes," or emissions reporting boundaries. Electric utilities responding to CDP6 (2008) are also asked to report a number of sector-specific emissions data. In addition to breaking out total GHG emissions by country and Kyoto regulatory status (i.e. Annex B countries), electric utilities are also asked to report emissions by generation fuel type. The 2008 CDP6 (2008) Questionnaire is the first to ask utilities for this kind of industry-specific data.

Quantitative emissions reporting has increased significantly in the past two years.

Out of the 110 CDP6 (2008) utility respondents, 93 companies (85% of the utility questionnaire sample) provided quantitative emissions data. Response rates for quantitative emissions reporting grew 15% between 2005 and 2007, up from 70% for CDP4. Despite this significant increase in emissions reporting, there continues to be discrepancies in reporting formats, however. Of the 93 utilities that provided quantitative emissions data, more than one-fifth (20 utilities) did not report according to the requested CDP6 (2008) format, choosing instead to include emissions data in separate

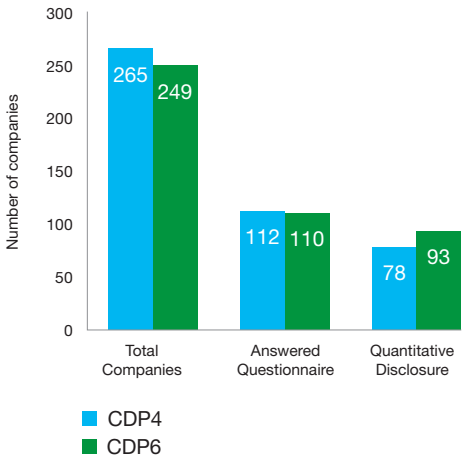
In the absence of an international GHG emissions registry, CDP serves as the single most comprehensive global database of self-reported corporate GHG emissions.

attachments. Furthermore, there continues to be inconsistencies in GHG reporting metrics and boundaries (i.e. ownership). Such reporting irregularities complicate comparison of emissions data.

For CDP6, 40% of respondents cite the GHG Protocol as the methodology they use to calculate their emissions inventory, while 49% report using "other" methodologies. However, of the companies not using the GHG Protocol, many indicated they use methods consistent with the GHG Protocol, such as the International Standards Organization's ISO 14064 GHG reporting standard, which has been adopted by the US Environmental Protection Agency's (EPA) Climate Leaders Program.

In addition to following a standard protocol for calculating emissions, companies are also encouraged to externally verify their emissions through a third party audit. External verification is becoming increasingly important with the emergence of GHG emissions regulation. Many companies are verifying their emissions with government agencies, such as the US EPA, as well as through voluntary state registries. Altogether, 61 utilities in the CDP6 Questionnaire have reported that their GHG emissions inventory is externally verified. For the electric utilities sector, Scope 1 emissions make up the majority of companies' emissions profiles as most control their own generation assets. Therefore, it is not surprising that CDP6 (2008) utility respondents are far more likely to disclose direct emissions than indirect emissions. Of the 93 utilities that provided quantitative emissions data, every respondent except one provided Scope 1 emissions, whereas under half of these respondents (43 companies) provided data for Scope 2 emissions. Scope 2 reporting is less common as these emissions may be limited to power purchased for resale, for example, or electricity used in corporate offices. Scope 3 reporting was even scarcer; just 23 utilities disclosed data for Scope 3 emissions, which include emissions from employee business travel, external distribution/logistics, use/disposal of products and services, and/or the company's supply chain.

Fig. 10: Quantitative Emissions Reporting: Response Rates



GHG Protocol

The GHG Protocol is the international accounting tool for government and business leaders to understand, quantify and manage greenhouse gas emissions. Developed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD), the Protocol aims to establish a global, standardized method for GHG emissions reporting.

To help companies define emissions reporting boundaries, the GHG Protocol identifies three "scopes" of emissions:

Scope 1 is defined as a company's direct emissions, i.e. emissions that occur from sources directly owned or controlled by the company. In the electric utilities sector, Scope 1 emissions make up the majority of companies' emissions profiles, as all emissions from company-owned power generation are considered direct emissions.

Scope 2 includes indirect emissions from the generation of purchased electricity consumed by the company in its owned or controlled operations. Some utilities purchase electricity as part of their generating mix.

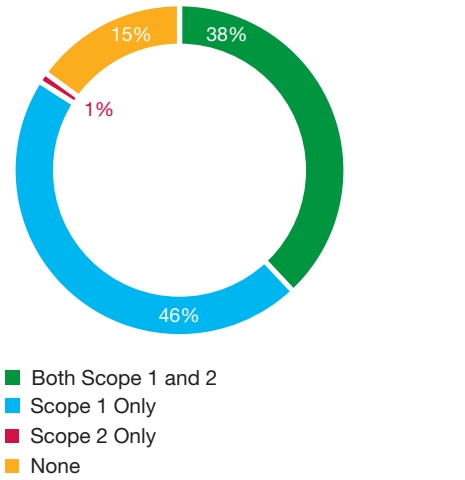
Scope 3 refers to all other indirect emissions. For the CDP6 questionnaire, this includes emissions generated by employee business travel, external distribution/logistics, use and disposal of company products, and the company's supply chain. This is typically a minor source of emissions for electric utilities.

Variation by Annex

The rate of quantitative emissions reporting did not vary significantly across the Annex 1, Non-Annex 1 and US respondents. Utilities from Annex 1 countries had the highest response rate, with 88% of companies providing quantitative emissions data. The US utilities followed closely behind, with 86% supplying data; however, a lower percentage of companies in this region provided both Scope 1 and Scope 2 data. 72% of Non-Annex 1 companies supplied quantitative emissions data. This is a significant increase from 2006, when only 8% of non-Annex 1 countries quantified their emissions in their CDP4 responses. This finding is particularly notable given that, unlike the Annex 1 group, most of the non-Annex 1 utilities do not face regulatory requirements to report their GHG emissions.

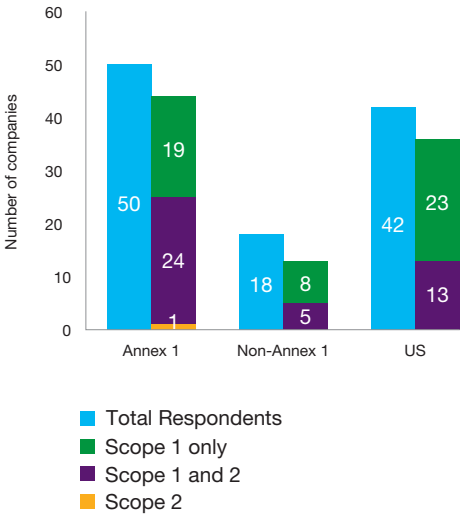
Despite this large increase in GHG emissions reporting by non-Annex 1 utilities, only one company from India and three from China (including two from Hong Kong) are among this group of respondents. China and India comprise the bulk of GHG emissions from non-Annex 1 countries. China surpassed the United States as the world's largest GHG emitter in 2006. Between 2001 and 2007, it built as much new generating capacity as all of the power installed in Latin America. The country's total GHG emissions are expected to double in less than a decade.[8] Meanwhile, population growth and economic development in India has put that country on track to become the world's third-largest GHG emitter by 2030.[9] Because only two electric utility companies in India and mainland China responded to CDP6 (2008), GHG emissions data from these countries are grossly underrepresented in the questionnaire sample.

Fig. 11: Percentage of Companies Reporting Scope 1 and 2 Emissions



Total Reported Emissions of Analyzed Respondents
(metric tonnes CO_2-e)

Fig. 12: Quantitative Emissions Reporting: Response Rates



"AGL has developed three approaches or 'footprints' to measure the annual greenhouse impact of our operations as an energy company:

- An 'AGL Footprint', which accounts for emissions associated with fully owned assets and activities over which we have operational control (including our corporate operations);
- An 'Equity Footprint', which sets out the emissions associated with businesses invested in by AGL; and
- An 'Energy Supply Footprint', which examines the emissions associated with the entire value chain of the electricity and natural gas sold to AGL customers."

AGL Energy Ltd.

8 Maximilian Auffhammer, Richard T. Carson. "Forecasting the path of China's CO_2 emissions using province-level information." *Journal of Environmental Economics and Management,* Volume 55, Issue 3, May 2008, Pages 229-247.

9 International Energy Agency (2007). *World Energy Outlook 2007: China and India Insights.* Paris: OECD/IEA.

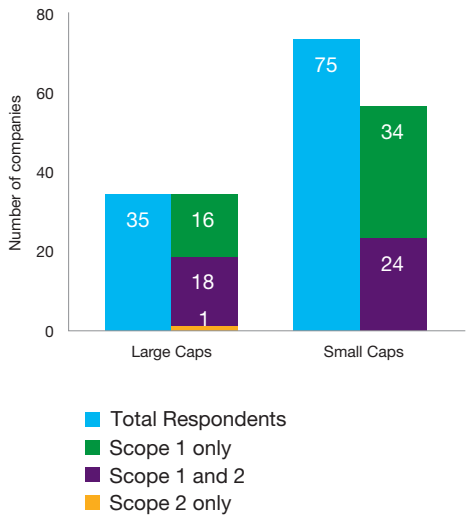
"The intensity of CO_2 emissions from CECONY and Con Edison Development generating stations would best be described by a metric tonnes CO_2-e/MW hour equivalent (MWhe) rate which takes into account the thermodynamic benefit of CECONY's cogeneration system. Steam sendout from the cogeneration units can be converted to MWhe by multiplying the amount of steam sendout by the BTU content of the steam, and then utilizing a thermodynamic conversion factor in BTU/MWh."

Consolidated Edison

Variation by Size

Quantification of emissions varied significantly by company size. All large cap utilities that responded to CDP6 (2008) provided quantitative emissions data, compared to 77% of small cap utilities. Furthermore, half of the large cap utilities provided both Scope 1 and 2 emissions data, whereas just under a third of the small cap utilities provided data for both direct and indirect emissions. This difference is most likely explained by the fact that larger companies have more available resources to calculate their emissions inventories and are more susceptible to institutional shareholder scrutiny. In addition, larger utilities are more likely have larger GHG emissions profiles that put them at greater regulatory risk.

Fig. 13: Quantitative Emissions Reporting by Company Size



Emissions Intensity

With Phase II of the EU ETS in full swing, and the US, Japan and Australia preparing to follow suit, GHG emissions trading is fast becoming the modus operandi for climate change regulation. Under an emissions trading scheme, much of the focus rests on a company's absolute GHG emissions and its preparedness to meet emissions caps through reductions or purchasing allowances. On the other hand, investors are also turning to emissions intensity data as a useful tool to compare company performance and preparedness for emission cuts.

Emissions intensity is becoming an increasingly important metric for utilities as well, especially as the European Parliament is considering introducing emissions performance standards for new power plants that would limit carbon emissions per unit of electricity output. The US Climate Action Partnership (USCAP), an industry lobbying group, also recently suggested an emissions performance standard for new coal and other solid fueled power plants in its Blueprint for Legislative Action. Facilities emitting more than 10,000 tons of CO_2 per year would be limited to no more than 1,100 pounds of CO_2 per MWh if permitted after 2014 and no more than 800 pounds of CO_2 per MWh if permitted after 2019. USCAP is recommending that these standards are only put into place if there is sufficient federal funding for CCS technologies as well as the necessary permitting for carbon transport and storage. USCAP members include **Duke Energy**, **Exelon Corp.**, **FPL Group** and **PG&E Corp.**, all of which responded to the CDP6 (2008) Questionnaire.

The CDP6 (2008) Questionnaire asks companies to report the GHG emissions intensity of their operations according to the company's "own appropriate metric" as well as two standard financial metrics. Of the 93 utilities that identified a "most appropriate measurement of emissions intensity," 64 companies (69%) chose to report their emissions intensity as CO_2-e (Mt, short tons, lb, or kg) per unit energy output (MWh or kWh). Fifty-six of these companies also provided quantitative emissions intensity data according to their own self-determined metrics. European companies had the highest response rate, with 90% reporting such emissions intensity data. Utility respondents in US/Canada and Asia followed, with response rates of 52% and 31%, respectively. Just two of the nine South American utilities responding to CDP6 (2008) reported emissions intensity data according to their own metrics.

Of the 56 utilities that supplied emissions intensity data according to their "own appropriate metric," 16 reported their emissions intensity as metric tonnes of CO_2-e per MWh of energy output. These self-reported emissions intensities are compared in the table below (excluding two companies whose CDP6 (2008) responses were not made public).

Fig. 14: Emissions Intensity Reporting according to "Own Appropriate Metric": Response Rate by Region

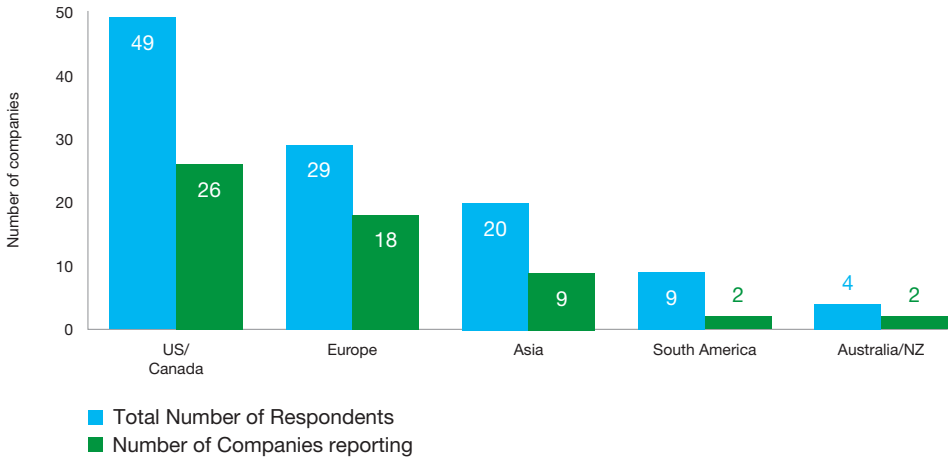


Table 3: Self-reported Emissions Intensity, Mt CO_2-e/MWh

Company	Country	Emissions Intensity (Mt CO_2-e /MWh)
Entergy Corporation	USA	0.28
FPL Group, Inc.	USA	0.35
Endesa	Spain	0.44
EVN AG	Austria	0.44
Union Fenosa SA	Spain	0.47
E.ON AG	Germany	0.50
Duke Energy Corp.	USA	0.61
Hong Kong Electric Holdings Ltd.	Hong Kong	0.74
DTE Energy Co.	USA	0.79
Pepco Holdings, Inc.	USA	0.84
RWE	Germany	0.86
Emera Inc	Canada	0.87
TransAlta Corp.	Canada	0.88
American Electric Power	USA	0.88

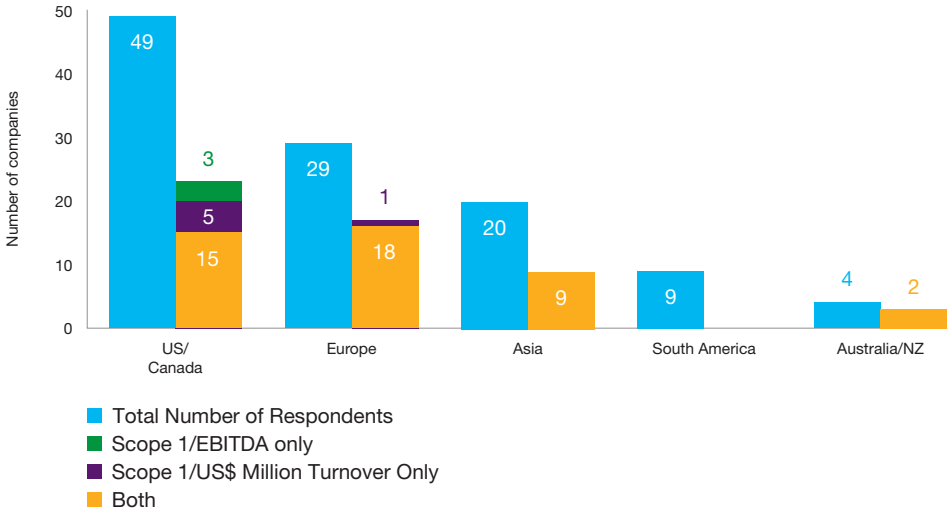
72%

of Non-Annex 1 companies supplied quantitative emissions data. This is a significant increase from 2006, when only 8% of non-Annex 1 countries quantified their emissions in their CDP4 responses.

European utilities were most likely to measure and disclose emissions intensity data using such financial metrics, with 51% of responding utilities providing this information.

The CDP6 (2008) Questionnaire also asked respondents to report emissions intensity data according to two standard financial metrics, EBIDTA and revenue. However, disclosure related to financial data was relatively low. Less than half of the respondents supplied such data; 47 utilities reported their Scope 1 GHG emissions intensity by revenue, and 43 provided emissions data according to EBITDA. European utilities were most likely to measure and disclose emissions intensity data using such financial metrics, with 51% of responding utilities providing this information. Three of the four respondents from the Australia/New Zealand region also supplied such data. No South American company disclosed emissions intensity data using financial metrics.

Fig. 15: Emissions Intensity Reporting according to Financial Metrics: Response Rate by Region



The wide range of the reported data – due in part to reporting irregularities as well as significant variation in generation assets – makes it difficult to discern any regional trends. Utilities in US/Canada, for example, had the highest average emissions intensity measured by CO_2-e per EBITDA, but they also had the widest range of reported intensity data. **Canadian Hydro Developers**, whose generation portfolio is comprised entirely of hydroelectric and wind power, reported an emissions intensity of 0.0002 Mt CO_2-e/EBITDA. **TransAlta Corporation**, on the other hand, reported an emissions intensity of 148,499 Mt CO_2-e/EBITDA; this Canadian utility has predominately coal- and gas-fired generating assets. In the Asian sample, **Korea Electric Power** has the highest reported emissions intensity, and **CLP Holdings** the lowest, based on the turnover metric. Australia/New Zealand was not compared to the other regions due to the small sample size of respondents.

Utilities in US/Canada had the highest average emissions intensity measured by CO_2-e per EBITDA, but they also had the widest range of reported intensity data.

Fig. 16: Company-reported Emissions Intensity by Region: Average & Range[10]

Scope 1 MtCO_2-e/US $ Millions turnover

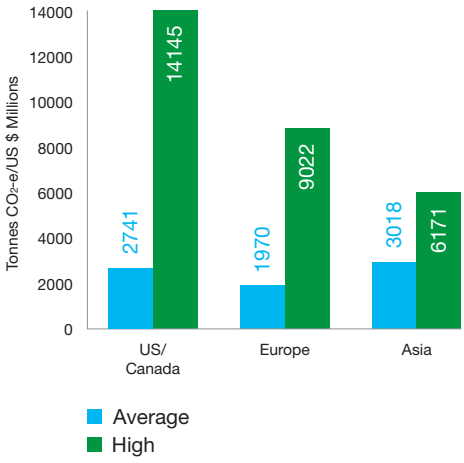


Fig. 17: Company-reported Emissions Intensity by Region: Average & Range[11]

Scope 1 MtCO_2-e/EBITDA

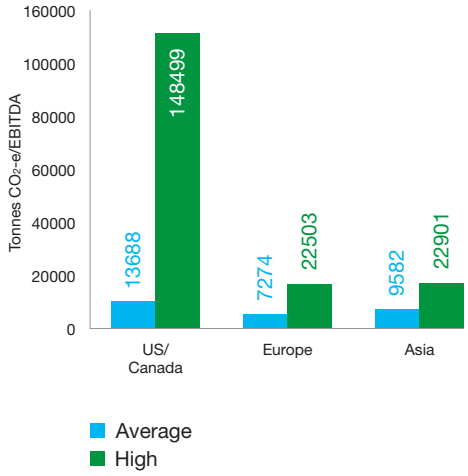


Table 4: Electric Utilities with Highest and Lowest Emissions Intensities by Region (company reported emissions only)

Region	Highest Emissions Intensity (CO_2-e/US $ Million Turnover)	Lowest Emissions Intensity (CO_2-e/US $ Million Turnover)
Asia	Korea Electric Power	CLP Holdings
Australia/New Zealand	Contact Energy Ltd.	Energy Developments Ltd.
Europe	Actelios SpA*	ACEA SpA
United States/Canada	Canadian Hydro Developers	TransAlta Corp.
South America	No respondents	No respondents

*Excluding two companies with non-public CDP6 (2008) responses.

10 Emissions intensity data for Electricite de France excluded, due to assumed reporting inaccuracies.

11 Emissions intensity data for Electricite de France excluded, due to assumed reporting inaccuracies.

5

Generation Fuel Mix Trends

Generation fuel mix is a critical component to determining electric utilities' GHG emissions intensity and potential exposure to climate regulation.

Overview

In general, coal-fueled power plants are more carbon intensive than oil- and gas-fired plants, but the emissions of coal plants also depend on the type of coal being burned. (For example, lignite coal produces more emissions per unit of output than bituminous coal.) By contrast, plants burning natural gas typically produce one-third fewer emissions per kilowatt-hour of generation than coal-fired plants. But the newest and most highly efficient gas-fired plants with combined cycle gas turbines (CCGT) can achieve emissions rates that are virtually half that of conventional pulverized coal plants.

The following table outlines emissions factors by fuel type in grams of carbon dioxide per kilowatt-hour.

Table 5: Emissions by Fuel Type

Fuel Type[12]	G CO_2/kWh
Coal	950
Petroleum	893
Gas	599
Other Fuels[13]	625

12 US Department of Energy/Environmental Protection Agency. Based on data from 1999. Note that there can be variation in the estimation of emissions that arise from different fuels. Variations are mainly due to differences in generation efficiency and the age of the power plant.

13 Other fuels include municipal solid waste, tires, and other fuels that emit anthropogenic CO_2 when burned to generate electricity.

Coal under Increasing Pressure

Coal is the most abundant, widely distributed and lowest-cost fuel for power generation in many parts of the globe. According to the World Coal Institute, coal supplies about 40% of the world's total electricity requirements. Through 2030, coal-fired power generation is expected to grow faster in absolute terms than for any other non-renewable source, averaging 2% a year. The International Energy Agency forecasts that about 85% of this increased demand will come from China and India alone.[14] China has been bringing new coal plants on-line at the rate of two 500 MW plants per week in recent years.[15]

The United States is also a major producer and consumer of coal. The US holds one of the world's largest coal deposits, accounting for 27% of identified reserves, and half of the country's electricity is generated from coal. Looking forward, that percentage contribution is expected to remain about the same. According to forecasts from the US Energy Information Administration, coal-fired plants will still supply 49% of the nation's electricity needs in 2030 if natural gas prices remain low, and as much as 57% if natural gas prices rise to much higher levels.[16]

At present, coal accounts for about 80% of total CO_2 emissions from the US electric utility sector and contributes a similar percentage worldwide. As such, planning decisions around coal present one of the single largest challenges for the electric power industry in terms of addressing global warming. As natural gas prices spiked in the late 1990s and early in this decade, utilities' interest in coal for new capacity saw a surge in interest.[17] As of 2008, some 65,000 MW of coal-fired capacity was in development in the United States, including 16,500 MW (29 plants) under construction.[18]

As momentum builds for controls on GHG emissions, however, some utilities – and the government agencies regulating them – are having second thoughts. In the US, permits for a total of 10,400 MW of coal-fired power plants have been denied since late 2005, while applications for another 8,300 MW have been withdrawn. In 2007 alone permits were denied or applications withdrawn for 59 US coal-fired power plants, with several others being contested in court.[19] This includes the denial of permits for four cleaner-burning Integrated Gasification Combined Cycle (IGCC) plants (total capacity of 2,500 MW) because regulators did not regard these plants as having sufficient plans to store carbon dioxide emissions, which can be easily extracted from such new plant configurations.

IGCC technology, which first gasifies coal to produce a synthesis gas (syngas), offers the potential for higher efficiency rates, better environmental performance and ready carbon capture. However, higher capital costs and ongoing technological challenges may make it difficult for IGCC plants to compete with traditional coal-fired units. At present, four IGCC demonstration plants are operating commercially in the US and Europe. **Duke Energy**, one of the largest US electric utilities, recently obtained approval for a new 630 MW IGCC plant to be built in Indiana that the company says will emit 45% fewer CO_2 emissions per kilowatt-hour than the existing facility on the site.[20] However, the new plant will also cause a substantial increase in local electricity rates.

According to forecasts from the US Energy Information Administration, coal-fired plants will still supply 49% of the nation's electricity needs in 2030 if natural gas prices remain low, and as much as 57% if natural gas prices rise to much higher levels.

14 "World Energy Outlook: 2008," International Energy Agency, Paris, 2008.

15 Massachusetts Institute of Technology, "The Future of Coal," 2007.

16 "Annual Energy Outlook: 2008," U.S. Energy Information Administration, Washington, DC, 2008.

17 Massachusetts Institute of Technology, "The Future of Coal," 2007.

18 National Energy Technology Laboratory – "Tracking New Coal Fired Power Plants", June 30, 2008.

19 "U.S. Moving Toward Ban on New Coal-Fired Power Plants." Earth Policy Institute, Feb. 14, 2008. Rejections have occurred in Delaware, Florida, Idaho, Illinois, Iowa, Kansas, Kentucky, Maine, Minnesota, Oklahoma, South Carolina and Washington.

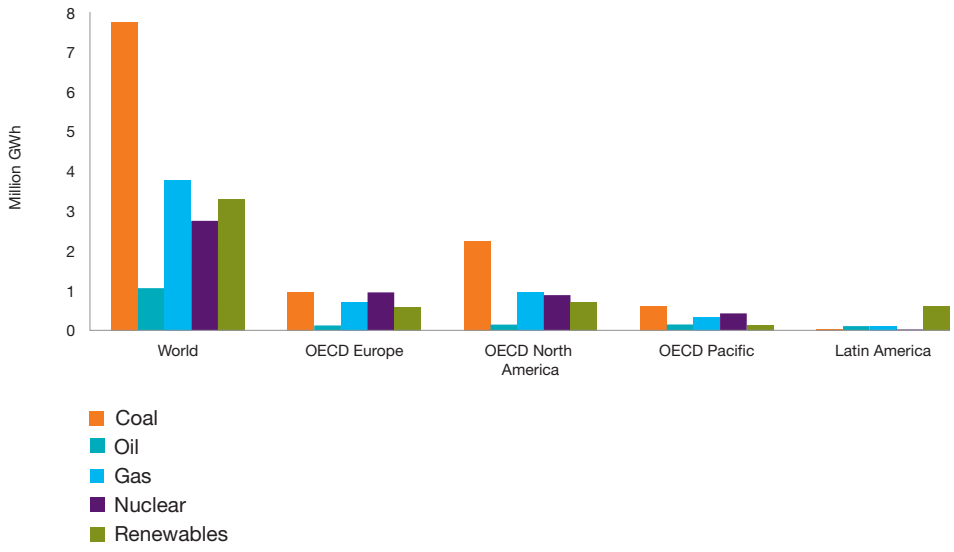
20 "Indiana Utility Regulators Approve Updated Costs, Carbon Capture Study for Clean Coal Gasification Plant." PRNewswire-FirstCall, Jan. 7, 2009.

Other state-level regulatory actions and the establishment of regional GHG trading schemes bolster prospects for advanced coal-fired plants, while creating higher hurdles for new plants using traditional coal-burning methods.

Other state-level regulatory actions and the establishment of regional GHG trading schemes bolster prospects for advanced coal-fired plants, while creating higher hurdles for new plants using traditional coal-burning methods:

- In the United States, 10 Northeastern states have adopted a Regional Greenhouse Gas Initiative that applies to all fossil energy plants producing more than 25 MW of power. Emissions are capped at 2005 levels from 2009-2015, and then will decline to achieve a goal of a 10% reduction below 2005 levels by 2019.
- In the North American West, seven states as well as four Canadian provinces have adopted a similar cap-and-trade program known as the Western Climate Initiative (WCI). (Six other western states, one Canadian province and six Mexican states along the US border are observers to this agreement.) Although the WCI covers industries beyond electric power, one key restriction is that electricity imported into the region from other states is subject to CO_2 controls. The first compliance period will begin in 2012, with a target to achieve a 15% emission reduction from 2005 levels by 2020.
- These cap-and-trade programs join the EU Emissions Trading Scheme, which has been in effect since 2005, and ones that are scheduled to go in effect shortly in Australia and Japan.
- California and Washington have also passed legislation that precludes power purchases from new coal-fired plants that are not equipped with carbon capture and storage (CCS) technology.
- Canada also plans to ban construction of coal plants without CCS capability after 2012.

Fig. 18: Electricity Production by Fuel Type (2006) in million GWh



Carbon Capture and Storage

Prospects for carbon capture and storage (CCS) have huge implications not only for coal-dominated utilities in various locales but also for global CO_2 stabilization targets. The International Energy Agency projects that 160,000 MW of coal-fired capacity would need to be equipped with CCS to achieve a 550 ppm stabilization target by 2030 and that an additional 190,000 MW would need CCS if the target was further reduced to 450 ppm. At present, no commercial-scale coal-fired plant is equipped with this technology.

Conventional pulverized coal plants can be retrofitted to add CCS capabilities in the post-combustion phase. However, this decreases thermal efficiency and thus increases the necessary coal feed rate. For these plants, it is generally more economical to rebuild the core of the plant with a super-critical or ultra-supercritical boiler that burns coal at higher temperatures and operating efficiencies. Another post-combustion approach is to install an air separation unit that allows pulverized coal to burn at super-critical temperatures in 95% pure oxygen. This "oxy-fuel" approach produces a flue gas that is ready for capture of carbon dioxide. However, the air separation unit also reduces the plant's efficiency.

For new plants, integrated gasification combined cycle (IGCC) technology is a more appealing option. IGCC plants to operate at a higher efficiency and with improved environmental performance. CCS is readily available by siphoning CO_2 from the stream of syngas created by heating rather than burning coal. However, IGCC also comes with higher installed capacity and operating costs than conventional coal plants, making power generation more expensive.

The abandonment of a federally funded "FutureGen" program in the United States, which aimed to build a commercial scale IGCC plant with CCS technology by 2012, has left investor-owned electric utilities to fill the breach. **Duke Energy** has a $2.35 Billion, 630 MW IGCC plant under construction in Indiana. The Indiana Utility Regulatory Commission recently approved the company's $17 Million request to study capturing a portion of the plant's CO_2 emissions. If completed, the plant would be the first major new coal-fired power plant in Indiana (a highly coal-dependent state) in more than 20 years, and would raise customer rates by an average of 18%. With an installed capacity cost of $3,730 per MW, Duke's prototype IGCC plant rivals the cost of new nuclear power plants that traditionally have been much more expensive to build.[21]

American Electric Power is installing CCS technology at its existing Mountaineer coal plant in West Virginia. Captured carbon dioxide will be liquefied and then injected into the ground – a first for existing plants. Yet of the 8.5 million metric tons of CO_2 emitted annually by the plant, only 100,000 to 300,000 tons will be removed with the new technology, at a projected cost of $100 Million for AEP and technology-maker Alstrom.[22]

Outside of the United States, Powerfuel, a company owned by mining entrepreneur Richard Budge, recently received approval to build a 900 MW IGCC power plant in the United Kingdom. This plant, too, would be equipped with CCS eventually. The first stage is expected to cost around £900 Million with the second CCS conversion stage costing up to £1 Billion ($2.75 Billion total cost). If completed, Powerfuel claims its plant would be the first and largest plant in the world equipped with CCS technology.[23]

21 "Indiana Utility Regulators Approve Updated Costs, Carbon Capture Study for Clean Coal Gasification Plant," Duke Energy Corp. press release, Jan. 7, 2009.

22 "Is America Ready to Quit Coal?" *The New York Times,* Feb. 15, 2009.

23 Robin Pagnamenta, "Powerfuel was granted approval by the Government to build a 900 megawatt power station at Hatfield in Yorkshire," *The Times,* Feb. 6, 2009.

While nuclear power emits virtually no carbon dioxide, questions persist about plant safety, nuclear proliferation, permanent disposal of highly radioactive waste and CO_2 emissions in the supply chain of nuclear build.

A New Life for Nuclear Power?

Rising concerns over climate change and recent natural gas supply disruptions in Europe are prompting many countries to rethink the nuclear power option. Countries from Japan and Korea to Germany, the UK and Sweden are building new nuclear plants or reconsidering policies that have led to new plant moratoriums. While nuclear power emits virtually no carbon dioxide, questions persist about plant safety, nuclear proliferation, permanent disposal of highly radioactive waste and CO_2 emissions in the supply chain of nuclear build. Nevertheless, nuclear power may be on the verge of a revival. Whether or not this revival comes to fruition may depend on some other fundamental issues that continue to face the industry, such as the high capital cost of nuclear plants, long permitting and activation times, the supply of enriched uranium and community opposition to new plants.

At present, Europe has 196 nuclear plants in operation that supply about 35% of the European Union's electricity, making it the region's biggest source of electricity. (Coal is second and gas is third.)[24]

- France gets an estimated 77% of its electricity from nuclear power – the highest proportion in Europe – and recently ordered its 61st reactor.
- Britain decided in 2008 to replace its aging nuclear reactors with new ones and create new sites.
- Finland is presently building the largest reactor in the world, which is expected to open in 2011.
- Poland wants to build its first nuclear plant by 2020.
- Sweden is debating whether to reverse a 1980 voter referendum to phase out nuclear power by 2010; at present it supplies an estimated 46% of the country's electricity needs. Sweden has some of the most ambitious GHG targets in the world. It wants to abolish fossil fuels as a heating source by 2020 and derive half of its energy from renewable sources by 2030. Sweden also wants to become carbon neutral by 2050. Current government leaders believe, however, that renewable sources are not being developed fast enough to meet these targets, and support new nuclear development. Main opposition parties oppose this government plan, which still must receive approval from parliament.[25]
- The German government is also having second thoughts about an eight-year old voter referendum to phase out nuclear power by 2021. Nuclear energy contributes a third of all power generation in Germany. Coal-fired generation, providing 50% of the nation's electricity supply, is under pressure as a result of decision by the European Union to exact a high price on coal-fired emissions after 2013 under the EU ETS. Russia's recent dispute with Ukraine over the transport of natural gas, which contributes 10% to Germany's electricity grid, has raised additional supply concerns. Meanwhile, renewable operators that supply 7% of Germany's primary energy are seeing their investment plans crimped in the current credit crunch, despite generous subsidies for existing plants. A majority of German voters still favor the nuclear phase-out law. The next federal election is scheduled for later in 2009.[26]
- In Asia, two of Japan's largest electricity producers, **Kyushu Electric Power Co.** and **Chubu Electric Power Co.**, recently announced plans to build two new nuclear power plants at a cost of approximately 540 Billion Yen (US$5.8 Billion) per reactor. Mitsubishi Heavy Industries is the only Japanese firm that can build the proposed pressured water reactors and is seen as the frontrunner to lead construction.[27]

24 David Charter, "Sweden to swap green plan for nuclear plants," www.euronuclear.org, Feb. 10, 2009. This article also provides statistics on nuclear power in other European countries.

25 Ibid.

26 "Gas row may trigger new look at German nuclear," Reuters, Jan. 8, 2009.

27 Osamu Tsukimori, "Japan's Kyushu Elec aims to build new nuclear unit," Jan. 8, 2009.

- South Korea has plans to build 12 new nuclear power reactors as part of a proposed US$28.5 Billion investment in new generating capacity through 2022. (The plan also calls for seven new coal-fired units and 11 liquefied natural gas units.) This expansion would raise South Korea's output from nuclear power to 48% in 2022, compared with 34% today. The country already has 20 operating nuclear units, with eight more under construction or on order, all due to start up between 2010 and 2016.[28]
- India's state-run nuclear power company and France's Areva Group recently signed a memorandum of understanding to build at least two and as many as six nuclear power reactors, each with a capacity of 1,650 MW. At present, India has 17 nuclear power plants with a total installed capacity of 4,120 MW in operation, and five others with 2,660 MW of capacity under construction. The Indian government plans to grow increasingly dependent on nuclear energy to boost its growing economy and has technical agreements with France, Russia, the United States, Canada and Britain to build reactors at coastal locations throughout the country.[29]
- The United States has canceled all nuclear reactors ordered since 1974 and no new reactor has come on-line since 1992. The Energy Independence and Security Act of 2007 provides many incentives for new reactor construction, however. In 2008, the Nuclear Regulatory Commission received 13 new plant license applications for 19 reactors totaling almost 27,000 MW of generating capacity. At present, 104 operating reactors provide approximately 20% of US electricity supply.[30]

The recent surge in interest in nuclear power and new reactor orders could lead to an upward revision in the annual forecast issued by the International Energy Agency. In 2008, the IEA projected that the nuclear share of global electricity output would decline from 15% today to just 10% by 2030. This would be despite projected growth in absolute increases in nuclear power generation in all major regions of the globe outside of Western Europe.[31]

Wind Power and Other Renewables

Wind power, a carbon-free, renewable energy resource, has assumed a primary role in new electricity generation. The Global Wind Energy Council estimates that global wind capacity grew by nearly 30% in 2008 to reach total global installations of more than 120,800 Megawatts.

Wind power now contributes to the energy mix of some 70 countries around the globe:

- In 2008, more wind power was installed in the European Union than any other generating source, including gas, coal and nuclear power. The 8,484 MW of wind capacity installed equaled 43% of all new electric generating supply in the European Union, with investments totaling €11 Billion. The European Wind Energy Association estimates that 160,000 workers are employed directly and indirectly in the sector and that the total wind capacity of nearly 65,000 MW is enough to supply about 4.2% of the EU's electricity demand in a normal wind year.[32]
- The United States has surpassed Germany as the world leader in new wind power installations in 2008. Capacity added totaled 8,358 MW, increasing the nation's total wind capacity to 25,170 MW.[33]

Fig. 19: Global Electricity Generation in GWh from Renewables (excluding hydro power - 3,120,614 GWh) in 2006

Source: International Energy Agency

28 "Nuclear in South Korea's climate plans," World Nuclear News, Jan. 8, 2009.

29 "India inks MOU with French company to set up 2-6 nuclear reactors," Japan Economic Newswire, Feb. 4, 2009.

30 "U.S. Nuclear Power Plants Achieved Near-Record Level of Electricity Production in 2008," Nuclear Energy Institute, Feb. 3, 2009.

31 "World Energy Outlook: 2008," International Energy Agency, Paris, 2008.

32 "Wind now leads EU power sector," http://www.insnet.org/ins_headlines.rxml?id=37633&photo

33 "US, China & Spain lead world wind power market in 2007," Global Wind Energy Council, Brussels, Feb. 6, 2008.

"The key issue for each generator at a point in time is the greenhouse intensity of the asset, the carbon price and greenhouse intensity of the market. Where the individual plant greenhouse intensity is lower than the market average, pool prices increase beyond the cost increase for [the] individual plant and existing renewable generation is the biggest winner in an emissions trading scheme."

AGL Energy Ltd.

- Germany and Spain continue to be the leaders in Europe – but Italy, France and the UK also saw significant growth in 2008. Germany has the world's third largest installed wind capacity, with 23,903 MW as of year-end 2008, followed by Spain, with 16,754 MW.
- China's wind capacity doubled for the fourth year in a row, giving the country the fifth spot in total capacity at 12,210 MW. Looking forward, China is also on track to pass Germany and Spain in total wind capacity by 2010 and meet its 2020 target of 30,000 MW ten years ahead of schedule.[34]
- India ranks sixth in wind capacity, with 9,645 MW as of year-end 2008. As a part of a national action plan on climate change, the Indian government will require that power utilities buy 5% of their power from wind and other renewable energy sources by the end of 2010. Then the minimum purchase requirement will increase 1% each year for the next 10 years, reaching 15% by 2020.[35]

Sometime after 2010, renewable energy technologies are expected to become the world's second-largest source of installed generating capacity, behind coal. This includes conventional hydropower, which currently provides 16% of the world's power generation and like coal is a base-load supplier. Modern renewable technologies such as wind and solar are more intermittent and without advances in battery storage technologies will not provide as much generation. Nevertheless, these renewable resources along with geothermal, tide and wave energy are expected to grow faster worldwide through 2030 than any other electricity generating source, at a 7.2% annual rate, according to the International Energy Agency. In industrialized countries, the increase in renewable-based installed capacity is expected to exceed that of fossil-based and nuclear power generation combined.[36]

To maintain the momentum in renewable energy development and bring down production costs, supporting regulation and incentives are critical. The European Union has committed to source 20% of its energy from renewables by 2020. The new US administration of Barack Obama has also voiced support for a federal renewable portfolio standard (RPS). Currently, 33 US states have a mandatory RPS or renewable energy goal in place. In February 2009, the US Senate began hearings on a federal RPS that would require up to 20% renewables in the continental US by 2021, similar to the goal set in Europe.

CDP6 Responses: Current Capacity and Production

Disclosure of current and forecasted capacity and production provides essential information to investors on electric utilities' regulatory risk exposure and potential future competitiveness. Accordingly, utility respondents to CDP6 (2008) were asked to give historic, current and forecasted installed capacity in Megawatts, and production output in gigawatt-hours, by energy source and country.

Despite the importance of this question, just under half of the utilities that answered the CDP6 (2008) Questionnaire disclosed their current capacity and production by fuel type. Fifty-one respondents provided capacity breakdowns, while 46 provided energy production information. Four other companies reported the information in other formats that were not comparable with the CDP fuel type designations.[37]

Disclosure of current fuel mix also varied significantly by region. European utilities most frequently provided capacity and production data, with 62% breaking down their current installed capacity. About half of the responding utilities based in North America and Australia/New Zealand also provided this information. However, only one South American company disclosed current capacity and production by fuel type, **Cia. Energetica de Minas Gerais (CEMIG)** of Brazil, which derives 97% of its generation from hydro power.

34 http://www.gwec.net

35 "India sets renewable minimum for utilities," upi.com, Jan. 5, 2009.

36 "World Energy Outlook: 2008," International Energy Agency, Paris, 2008.

37 Some companies reported information for dual- or multi-fuel facilities but did not provide proportional use data for these facilities. This information was not considered in the analysis.

In terms of the fuel mix breakdowns for current capacity, Europe and US/Canada have the most balanced fuel mixes on average, with European respondents leading in combined cycle gas turbine technology (31% of installed capacity) and the US/Canada leading in coal (40%). These numbers are skewed relative to the larger set of utilities operating in these regions, however. Natural gas generation in Europe is closer to 20%, while US coal generation is approximately 50%. Similarly, although six Asian respondents report an average coal mix of 35%, actual non-OECD Asian reliance on coal is about 67%, according to estimates from the IEA. Wind and solar make up a small percentage of reported installed capacity among respondents in all regions – with Australia/New Zealand and U.S./Canada reporting 4% average wind capacity, and only **AGL Energy**, **Endesa**, **ENEL**, **RWE** and **Union Fenosa** reporting any solar capacity.

Taking a closer look at coal's contribution to current capacity reveals that 16 utility respondents have more than 50% of their reported capacity in coal. On the following page are companies that reported coal capacity ranked by its percentage of total reported current capacity (hard and lignite coal figures were added to arrive at a total coal percentage). As discussed, companies with particularly high reliance on coal may need to invest in carbon capture and storage technologies as they become commercially available or shift investments to less carbon-intensive fuels as climate legislation takes hold. The Nordic region's largest utility group **Vattenfall** succinctly identified this risk in its CDP6 (2008) response: "A delay in the development of CCS technology would put substantial financial pressure on **Vattenfall**, assuming that there is a price on CO_2 after 2020."

Fig. 20: Percentage of Companies that Answered CDP6 Questionnaire Reporting Current Capacity and Production by Fuel Type

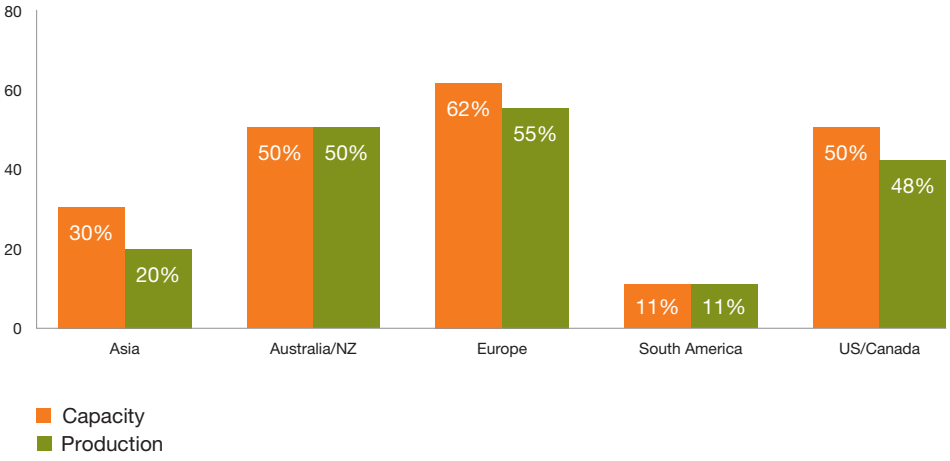


Table 6: Regional Averages for Companies Reporting Current Capacity by Fuel Type

	Asia	Australia/NZ	Europe	South America	US/Canada
Number of Companies Reporting	6	2	18	1	24
Coal	35%	0%	24%	0%	40%
Oil	16%	0%	5%	2%	5%
Gas	6%	22%	4%	0%	22%
CCGT	21%	17%	31%	0%	8%
CHP	0%	2%	2%	1%	3%
Biomass	0%	1%	1%	0%	0%
Nuclear	8%	0%	15%	0%	12%
Hydro	10%	45%	15%	97%	4%
Wind	0%	4%	2%	0%	4%
Solar	0%	0%	0%	0%	0%
Other Renewables	4%	8%	1%	0%	2%

Table 7: Company-reported Current Coal Capacity*

Company	Total Installed Capacity - coal hard (MW)	Total Installed Capacity - coal lignite (MW)	% of Total Reported Capacity
NiSource Inc.	3,179		81.2%
Allegheny Energy Inc.		7,529	78.2%
CLP Holdings	6,142	1,480	67.1%
American Electric Power	24,100	900	67.0%
Hong Kong Electric Holdings Ltd.	2,500	–	66.6%
DTE Energy Co.	6,900		66.5%
Integrys Energy Group	1,352		66.1%
Alliant Energy Corporation	3,198		64.8%
Ameren Corporation	10,045		61.3%
CEZ	2,867	5,724	60.1%
TransAlta Corporation		4,523	57.3%
FirstEnergy Corporation	7,439		54.8%
Emera Inc.	1,243		53.9%
Xcel Energy Inc.	8,562		52.2%
RWE	7,457	10,738	51.4%
Duke Energy Corporation	17,041	–	48.1%
Vattenfall Group	13,500	10,600	45.7%
Scottish & Southern Energy		4,000	38.1%
E.ON AG	17,657	1,314	37.9%
Progress Energy Inc.	7,533	–	34.6%
Chugoku Electric Power Co Inc.	5,282		34.4%
Constellation Energy Group	2,826		32.2%
Reliant Energy Inc.	4,901	–	30.0%
Pinnacle West Capital	1,741		28.3%
Shikoku Electric Power Co Inc.	2,270		26.6%
British Energy Group	1,960		18.1%
Public Service Enterprise Group Inc.	2,834		17.7%
Union Fenosa SA	1,484	563	17.5%
Suez	5,897	–	14.2%
Chubu Electric Power	4,100		12.6%
Iberdrola		4,709	11.3%
Entergy Corporation	2,422		8.4%
Exelon Corporation	1,441		5.8%

*Two companies that reported coal capacity did not make their CDP6 (2008) responses public and are not included on this list.

CDP6 Responses: Forecasted Capacity and Production

Compared to the number of utility respondents that disclosed current capacity and production figures, far fewer disclosed figures for forecasted capacity and production. For a growing number of investors, this is seen as a critical piece of forward-looking information. As the regulatory landscape shifts and investments in new fossil-energy plants face growing legal and public scrutiny, planning for a cost-effective and environmentally friendly mix of power generation is of material value.

Investors are not ignoring these potential risks despite the ongoing financial crisis. In December 2008, Credit Agricole, HSBC, Munich Re, Standard Chartered and Swiss Re announced their adoption of the "Climate Principles," a set of best practices for managing climate risks. Along with addressing several other areas of finance, such as investment banking and asset management, the Climate Principles request that project finance clients disclose GHG emissions and seek emissions reductions for any new projects that release 100,000 tons or more of CO_2-e per year. (To put this in perspective, the largest power plants emit about 20 million tons of CO_2 per year.)

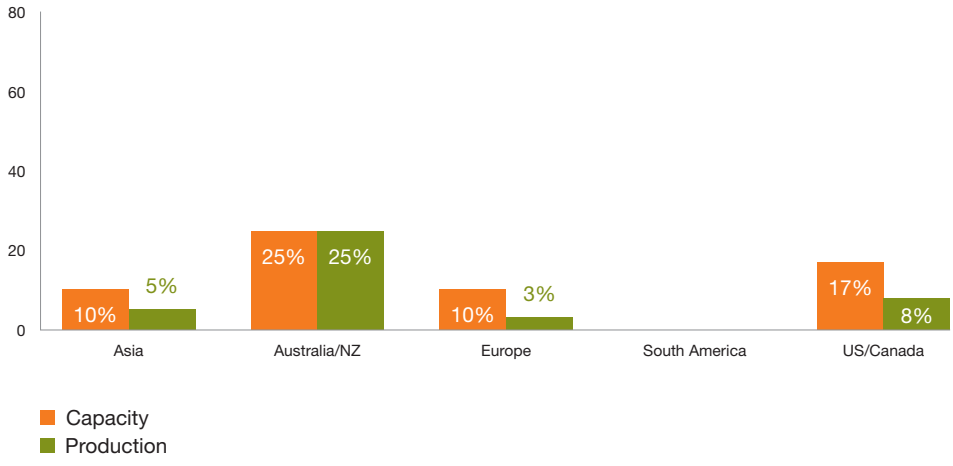
The Climate Principles build on an earlier initiative called the Carbon Principles, launched in February 2008 by three American banks – Citigroup, JPMorgan Chase and Morgan Stanley. (Bank of America, Credit Suisse and Wells Fargo have since joined this initiative.) The Carbon Principles are narrower in scope, however, both geographically and in terms of sector focus. They provide a due diligence framework to address carbon risks in financing of the US power sector only. Nevertheless, the Carbon Principles urge consideration of efficiency and renewable energy alternatives before moving forward with any new conventional coal-fired or other carbon-intensive power plants.

For the CDP6 (2008) Questionnaire, only 14 out of 110 utility respondents provided data on forecasted capacity, while only seven gave estimates of future production by fuel type. Several other companies cited this as proprietary or commercially sensitive information. Others chose not to disclose actual figures but outlined their overall investment plans in other parts of the questionnaire. In total, no South American utility, one Australia/New Zealand utility (**Contact Energy**), two Asian utilities (**Chubu Electric Power** and **Shikoku Electric Power**) and three European utilities gave capacity forecasts. By comparison, seven US utilities and one Canadian utility (**Canadian Hydro Developers**) made such disclosures, which is not surprising given that they must typically submit resource plans to regulatory authorities for the markets they serve. Even these disclosures were quite limited, however, with forecasts ranging from 2008 to 2013. In fact, the majority of companies answering this question offered projections only through 2008, the current year of generation as the CDP6 (2008) Questionnaire was completed.

"Origin believes that a responsible approach to reduce Australia's greenhouse gas emissions requires a portfolio of low emission and renewable generation options to supply energy. We believe the best fuel to transition away from reliance on coal is natural gas, supplemented with investment in renewable energy developments."

Origin Energy Ltd.

Fig. 21: Percentage of Companies that Answered CDP6 Questionnaire Reporting Forecasted Capacity and Production by Fuel Type



"Entergy's base load requirement for its regulated utility is growing at about 2% per year. Over the 2006-2015 planning horizon we see the need to add 3,000 MW of base load capacity to meet the Utility's supply requirements. Base load capacity can be provided by nuclear, coal or other solid fuels such as petroleum coke or biomass. Entergy also sees the need to add 2,0000-5,000 MW of load following capacity within the 2006-2015 planning horizon. Load following capacity can be provided by natural gas Combined Cycle Gas Turbines (CCGT)."

Entergy Corp.

Given that disclosure in this area is still quite low, the below analysis examines only the forecasted capacity for the eight responding North American utilities. While most fuels remain consistent between current and forecasted capacity, wind capacity sees the biggest gains. On average, wind capacity is expected to rise from 4 to 11% among this North American sample. This is mainly due to projected capacity additions from **Canadian Hydro**, **Entergy Corp.** and **OGE Energy Corp**.

Fig. 22: Current Installed Capacity Reported by 8 Companies in US/Canada

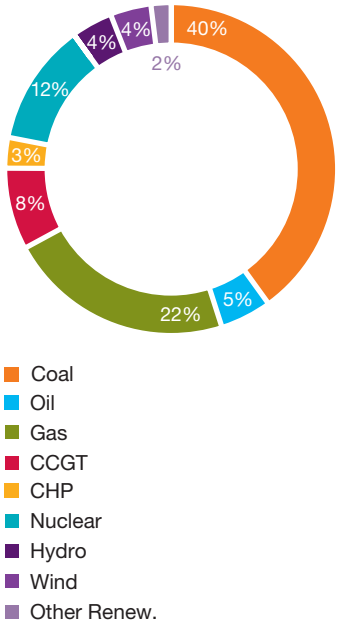
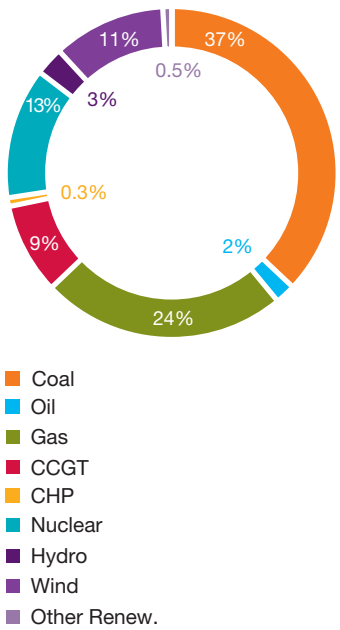


Fig. 23: Forecasted Capacity Reported by 8 Companies in US/Canada



(with 10 companies forecasting to 2008 and 4 companies forecasting to 2012)

6

Emissions Reduction Planning and Investments

Reporting current GHG emissions and generation fuel mixes is only part of the equation; it is also critical that electric utilities disclose to investors their plans for future emissions reductions and investments in next-generation environmentally friendly technologies.

Of the 110 utilities analyzed for this report, 61% say they are forecasting future GHG emissions and 59% say they have an emissions reduction plan in place. Forecasting emissions allows investors to incorporate a carbon price and potential future compliance costs into companies' long term generation planning. Likewise, setting an emissions reduction target offers transparency and accountability that helps hold utilities to account to deliver results.

Forecasting Emissions

Australia/New Zealand leads in forecasting emissions, with 75% of respondents saying they do so, although this is based on a sample of only four responding utilities. More significantly, 72% of European utility respondents are forecasting their emissions, which is not surprising given that these utilities are subject to the EU ETS and need to project future emissions against allowances for the Phase II 2008-2012 period. In some respects, emissions management for European utilities has become as much a cash flow issue as an environmental performance issue. Swedish utility **Vattenfall**, for example, reportedly spent SEK5.9 Billion (US$700 Million) on the purchase of carbon allowances in 2008.

34 http://www.gwec.net

35 "India sets renewable minimum for utilities," upi.com, Jan. 5, 2009.

36 "World Energy Outlook: 2008," International Energy Agency, Paris, 2008.

37 Some companies reported information for dual- or multi-fuel facilities but did not provide proportional use data for these facilities. This information was not considered in the analysis.

"To forecast future generation and CO_2 emissions, PSEG uses models based on both fundamentals and on forward prices. Forward-based models dispatch the generation fleet against power prices that are derived from forward power prices observable in traded markets, and using forward fuel and emission prices. Fundamental models dispatch generating units to meet total power demand hour by hour based on commonly accepted forecasts of supply, demand, and prices for fuel and emission allowances."

Public Service Enterprise Group

Company size also makes a difference in whether or not respondents say they are forecasting future emissions. 89% of large-cap utilities report they are doing so, compared to only 48% of small-cap respondents. This is partly due to regional differences between the jurisdictions of small and large cap utilities, but limited staff resources of small cap utilities is also a likely factor.

Some respondents indicate that their methodologies for collecting and estimating emissions data are still under development. In addition, utilities whose generating mix is already dominated by hydropower or other forms of renewable energy may see less need to forecast their negligible amounts of carbon emissions.

Fig. 24: Number of Analyzed Respondents Forecasting GHG Emissions - by Region

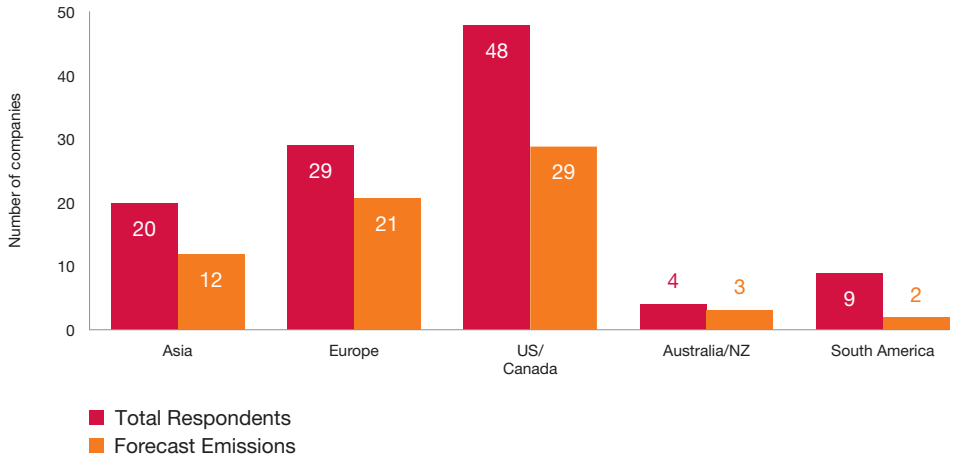
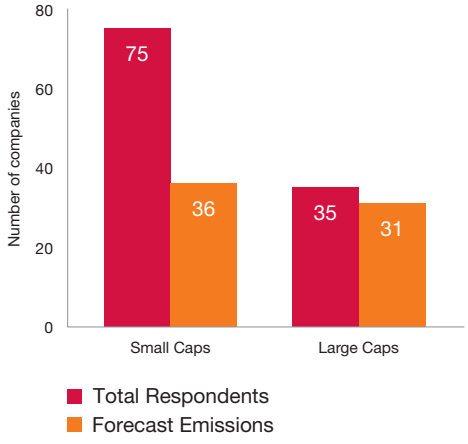


Fig. 25: Number of Analyzed Respondents Forecasting GHG Emissions – by Company Size



Exelon Corporation is the largest electric and gas utility in the United States. It details how the company attaches a business value to carbon to enable its emission reduction goals. The company has a goal to reduce, offset or displace more than 15 million metric tons of GHG emissions per year by 2020.

- **CO_2, Fuel and Electricity Market Price Forecast:** On a semi-annual basis, a Climate Policy Assumption is incorporated into Exelon's market price forecast. The Climate Policy Assumption is based on a then-current review of proposed federal legislation plus existing state regulation, such as Regional Greenhouse Gas Initiative that started in January 2009. The company's current assumption is that a mandatory national carbon cap and trade program will be implemented by 2012. The result is production of 20-year forward price curves for CO_2, fossil fuels and electricity as well as various sensitivity cases.
- **Long Range Plan (LRP):** The market price forecast is rolled into the development of Exelon's LRP. Projected carbon emissions calculations are prepared based on projected generation output. The carbon emissions calculation is shared with Exelon Corporate Environment, Health & Safety Department, which then prepares an assessment of the projected performance against Exelon's GHG commitment. Corporate EH&S can then make recommendations for program modifications, including budget and funding requests, if needed, in a timeframe consistent with the annual budget preparation process.
- **Asset Optimization Studies:** A periodic review of generation investments is conducted on an asset-by-asset basis. This review is done to assess the continued profitability of the asset's operations when compared to other alternative future uses of the assets and the associated invested capital. A carbon cost is included in these studies.
- **Business Case Analysis:** Modeling includes a carbon calculation and resulting impact. The "Environmental Impact" section of a business case memo discusses the carbon impact (benefit or detriment) of the business case.
- **Alternative Long Term Forecast (20 year forward look):** Exelon has incorporated carbon emissions calculations parameters into other financial modeling, including for projected electricity generation. Projected carbon emissions can be compared to a projected carbon emissions cap, an available allowance or credit pool, an Exelon-held allowance inventory and an inventory of Exelon's internally generated GHG reductions.

Exelon has incorporated carbon emissions calculations parameters into other financial modeling, including for projected electricity generation. Projected carbon emissions can be compared to a projected carbon emissions cap, an available allowance or credit pool, an Exelon-held allowance inventory and an inventory of Exelon's internally generated GHG reductions.

75% of Australian/New Zealand respondents say they have an emissions reduction plan in place, while 69% of European utilities have taken this step. An impressive 65% of Asian respondents also say that they have emissions reduction plans in place.

Emissions Reduction Planning

Similar to emissions forecasting, the number of utilities providing GHG emissions reduction plans varies by jurisdiction. Three of the four (75%) Australian/New Zealand respondents say they have an emissions reduction plan in place, while 69% of European utilities have taken this step. An impressive 65% of Asian respondents also say that they have emissions reduction plans in place. However, not all responding companies disclosed their plans in detail.

On a market-cap basis, the percentage of small cap companies with emissions reduction plans is similar to the percentage that currently forecast emissions. For large cap utilities, a slightly lower percentage have emissions reduction plans (80%) compared to those large cap companies who say they are forecasting emissions (89%). This disparity may be attributed to a group of respondents that recognize the need to track and reduce their GHG emissions but are still finalizing their targets.

Fig. 26: Percentage of Analyzed Respondents with Emissions Reduction Plans – by Region

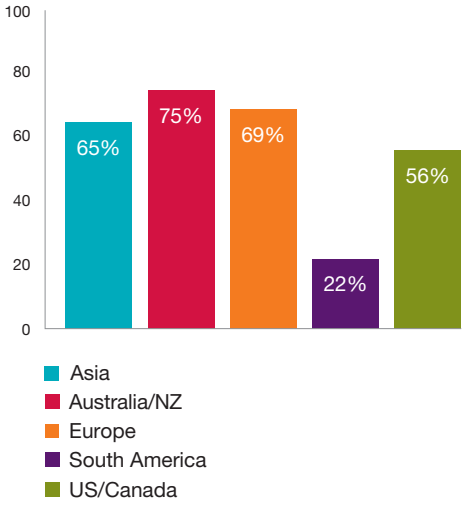


Fig. 27: Percentage of Analyzed Respondents with Emissions Reduction Plans – by Company Size

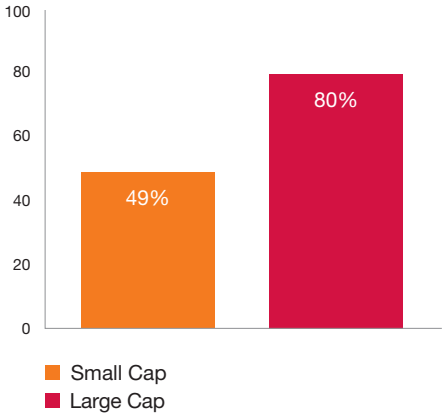


Table 8: Absolute Emissions Reduction Targets*

Company	Baseline Year	Target Year	Reduction Target
ACEA SpA	2006	2012	190,000 metric tonnes reduction in Scope 1 emissions (additional 370,000 tonne reduction through energy efficiency programs)
AGL Energy Limited	2000	2010	6% CO_2-e reduction for 2 major power stations
American Electric Power	Ongoing	2010	Reach an annual emissions reduction target of 6% by 2010
BG Group	2006	2012	Generate ongoing GHG reductions of 1 million tonnes compared to a 'no-action' base case
CEZ	2005	2020	15% emissions reduction
CLP Holdings	1990	2050	60% emissions reduction for TRUenergy in Australia (operations in other countries have intensity targets)
Consolidated Edison	1996	2007	Annual SF6 and methane emissions reductions
Duke Energy Corporation	2006	2014	Reduce, avoid and/or sequester at least 10 million tons C CO_2-e over the period 2007-2014
ENEL	2007	2020	Generate energy at low cost and zero emission
Entergy Corporation	2000	2010	20% CO_2-e reduction
Exelon Corporation	2001	2008	8% CO_2-e reduction
Hawaiian Electric Industries	1990	2020	15% emissions reduction
RWE	2006	2015	37% reduction in emissions (approx. 63 million tonnes CO_2-e)
Union Fenosa SA	2004	2010	27% reduction in emissions from coal plants and 4% reduction in emissions from thermal generation
Vattenfall Group	1990	2030	50% emissions reduction (also carbon neutral by 2050)
Xcel Energy Inc.	2005	2020	15% CO_2 emissions reduction

*Three companies that reported absolute targets did not make their CDP6 (2008) responses public and are not included on this list.

Table 9: Emissions Intensity Reduction Targets*

Company	Baseline Year	Target Year	Reduction Target
Ameren Corporation	2002	2010-2012	3-5% reduction in emissions intensity
ATCO Ltd.	2006	2010	18% reduction in emissions intensity in Canada
Centrica	2007	2012	Reduce power generation carbon intensity to 380 g CO_2/kWh
Chubu Electric Power	1990	2008-2012	20% average reduction in emissions intensity
Chugoku Electric Power Co Inc.	1990	2008-2012	20% average reduction in emissions intensity
CMS Energy	2000	2012	3-4% reduction in emissions intensity
DTE Energy Co.	2000-2002	2012	3-5% carbon intensity reduction from average of 2000-2002 levels
E.ON AG	1990	2030	50% reduction in carbon intensity
Electric Power Development Co.	2002	2010	10% reduction in emissions intensity
Endesa	2007	2020	50% reduction in emissions intensity
Fortum	Rolling	2020	Keep 5-year average electricity emissions intensity below 80 g CO_2/kWh
FPL Group, Inc.	2001	2008	18% reduction in US emissions intensity
Hokkaido Electric Power Co Inc.	1990	2008-2012	20% average reduction in emissions intensity
Hokuriku Electric Power Co Inc.	1990	2008-2012	20% average reduction in emissions intensity
Iberdrola	2001	2010	42% reduction in emissions intensity
Kansai Electric Power	1990	2012	20% average reduction in emissions intensity over 2008-2012
NiSource Inc.	2001	2012	Improve the company's and customers' energy efficiency by 7% (equivalent to 1.9 million tons CO_2-e)
NRG Energy Inc.	-	2025	Reduce carbon intensity from 0.7 to 0.5 short tons/MWh
Origin Energy Ltd.	2007	2020	Reduce emissions intensity of electricity supply chain to 10% less than the National Electricity Market
Pinnacle West Capital	2000	2010	10% reduction in carbon intensity from APS owned power plants and APS purchased renewable generation
Public Service Enterprise Group Inc.	2000	2008	18% reduction in average emissions intensity
Scottish & Southern Energy	2005/6	2019/20	50% reduction in carbon intensity
Shikoku Electric Power Co Inc.	1990	2012	20% average reduction in emissions intensity over 2008-2012
Tepco	1990	2012	20% reduction in average emissions intensity
Tohoku Electric Power Co Inc.	1990	2012	20% reduction in 5-year average emissions intensity
TransAlta Corporation	2003	Ongoing	12% reduction in emissions intensity starting in 2007 and annually thereafter

*Two companies that reported intensity targets did not make their CDP6 (2008) responses public and are not included on this list.

"It is a challenge to reach required rate of return on our investments in renewable electricity and heat production.
In the long term we see that the relative financial attractiveness of renewable energy will increase as the production costs will come down, and at the same time fossil fueled generation will get higher production costs due to the price of CO_2."

Vattenfall

Investment Planning

Electric utilities are investing in an array of projects to reduce GHG emissions on either an absolute or relative basis. The sector's CDP6 (2008) responses include numerous disclosures on installations, acquisitions or investments in renewable energy and nuclear power. Other frequently mentioned initiatives include customer energy conservation and demand-side management (DSM) programs, power plant upgrades, fuel switching, external carbon offset programs, and research and development of carbon capture and storage. (See Table 10 for a sample of the quantitative investments that electric utilities participating in the CDP6 (2008) Questionnaire are making to reduce GHG emissions.)

Only 48 utility respondents disclosed quantitative investment information, equal to about 44% of the questionnaire sample. Several utilities stated that such capital expenditure information is confidential, while a small number direct readers to the company's integrated resource plan or securities filings. Many more utility respondents discuss investments in non-financial metrics such as Megawatts of non-carbon generation installed or Megawatt-hours of electricity saved, without providing dollar figures.

Nevertheless, utilities are increasingly incorporating climate change considerations into their investment planning, especially if operating in a jurisdiction where carbon has a clear price. Even in these instances, however, few firms have modified their capital expenditure requirements to account for investments in low-emissions and carbon-free technologies. For example, Germany's **RWE** states, "Investment in renewable energies as well as any other investment are submitted to the same assessment process as any other investment. The business plans submitted have to demonstrate that the projects comply with Group wide minimum requirements for profitability." CEGEDEL Cie Grand Ducale d'Electricite du Luxembourg similarly notes that "Every investment project has to pass an in-depth NPV [net present value] analysis. If the internal rate of return is higher than our WACC [weighted average cost of capital], green light is generally given."

Energy efficiency investments, whether through power plant upgrades or customer conservation and demand side management (DSM) programs, are common to utility emissions-reduction programs. Among other things, DSM programs encourage energy users to reduce electricity use at times of high-cost, peak demand, and lower overall electricity consumption through energy audits, home weatherization, and rebates and low-interest loans on energy-efficient equipment. The net result reduces customers' electricity demand and helps utilities deter plans for more costly new generation. But this also means that utilities need to earn a competitive rate of return on these investments so as to compensate them for the loss of kilowatt-hours sold, in regulatory treatment known as "decoupling." The Edison Electric Institute, an association of US investor-owned utilities, reports that US utilities spent US$30 Billion on DSM between 1989 and 2005, saving sufficient energy to offset the need for 100,000 MW of new generating capacity that would have cost US$100 Billion or more to build.

Smart Grid and Smart Meters

The proliferation of wind power and other renewable energy technologies, while addressing the need to reduce GHG emissions, also poses a new set of challenges. Renewable generating sites are often located far from urban centers, where more than two-thirds of world's electricity is consumed. Existing transmission lines typically aren't designed to handle this renewable power, which peaks and ebbs according to changing weather conditions.

New "smart grids" are better able to moderate fluctuations in supply and demand for renewable electricity. Moreover, at the end of the line, new smart meters can control electricity demand by turning down lights and air conditioners and cycling the operation of other appliances like dishwashers to make better use of affordably priced electricity. (Most new dishwashers, for example, already come with a chip that allows for this type of remote dispatch.)

Smart grids will require a sizeable investment, however. In the United States, it will cost up to $100 Billion to lay 15,000 miles of new extremely high voltage transmission lines from the Great Plains and Midwest – where the bulk of the nation's wind resources are located, for example – to major load centers on the East Coast. This is in addition to the $720 Billion required, by some estimates, to build enough wind turbines to raise the supply of renewable electricity in the US to 20% over the next 15 years. Altogether, this investment is roughly equal in size to the current US stimulus package, though it would be financed primarily by utilities and investors over a period of years.

As of 2007, about 7% of US electricity supply came from renewable sources, including less than 1% from wind, according to the Energy Information Administration. The stimulus bill passed by Congress includes $11 Billion in smart grid incentives: $6.5 Billion in credit to federal agencies for building new power lines in remote areas where renewable energy sources are best placed, and $2 Billion in loan guarantees to companies for power lines and renewable energy projects. The bill also includes $4.4 Billion for the installation of smart meters and $100 Million to train workers to maintain the grid. Such investments in a smart grid could cut US energy use by 2 to 4%, according to Obama administration estimates.[38]

Smart meters, in addition to regulating appliance electricity demand, could be a boon to highly fuel-economical plug-in hybrid vehicles. Recharging batteries in these vehicles could double electricity demand of an average small household; smart meters could determine the most economical times for recharging during the day or night. Smart meters could also recognize where the car is being plugged in (much like a cell phone network recognizes a mobile phone when it is turned on) and bill the owner's account accordingly. Even companies like Google are getting in on smart metering. It has developed a free Web service called PowerMeter that allows consumers to track energy use in their house or business as it is consumed.[39]

Similar investments will be required in Europe and throughout the world in order to meet renewable energy and GHG reduction goals. General Electric, which is making a major investment in smart grid technology, reports that trials in the US have shown that smart meters in homes can reduce domestic energy consumption by 10%, and as much as by 15% at peak times, while initial results from the UK show savings of 8%.[40]

"PSEG has consistently expressed our willingness to invest patient capital in renewable energy and energy efficiency improvements. Because PSEG is a regulated utility, such investments require approval and their financing depends upon our ability to earn a regulated rate of return. Pending approval by the NJ Board of Public Utilities (BPU), PSEG stands ready to seize opportunities to make investments that would be beneficial to our company, electricity consumers, and society as a whole."

Public Service Enterprise Group

38 Rebecca Smith, "New Grid for Renewable Energy Could Be Costly," The Wall Street Journal," Feb. 7, 2009. The article references a recent study by organizations responsible for electric-system reliability in the eastern United States.

39 Matthew Wald and Miguel Helft, "Google Taking a Step Into Power Metering," The New York Times, Feb. 10, 2009.

40 "Smarter grids 'crucial' for delivery of EU climate goals," EurActiv.com, Jan. 9, 2009.

Table 10: Selected Company Investments in Renewable Energy, Energy Efficiency and Research & Development
*Total investment figures were converted to USD (exchange rates as of May 30, 2008) for comparability. Description details are in local currencies. Investment examples are based on CDP6 (2008) company disclosure only, and investment totals do not necessarily reflect a company's entire expenditure in these areas.

Company	Investment*	Timeframe	Type	Description
ACEA SpA	$945 Million	2009-2012	Renewable Energy	Renewable Energy: about 72 Million Euros within 2009 for wind plants and about 120 Million Euros by 2012 in photovoltaic plants. Waste-to-energy production: about 415 Million Euros by 2012.
AGL Energy	Almost $2.3 Billion	2005-present	Acquisitions	Since 2005, AGL has invested over $2 Billion in hydro, wind, solar and biomass projects. Invested AUD$1.425 Billion in acquiring the zero emission assets of Southern Hydro (645 MW); Invested AUD$250 Million in the Bogong hydroelectric power station (140 MW); Invested AUD$70 Million to acquire four cogeneration and biomass generation facilities (43 MW); Invested AUD$417 Million to acquire the Torrens Island peaking and intermediate gas-fired generation facility (1280 MW).
AmerenCorporation	$144 Million	2008-2015	Energy Efficiency/DSM	In 2007, the Ameren Illinois Utilities filed an electric energy efficiency and demand response plan with the Illinois Commerce Commission. The spending limit under this plan for 2008, 2009 and 2010 program years is $14 Million, $29 Million and $45 Million, respectively. In Missouri, AmerenUE is investing $14 Million in 2008 and $24 Million in 2009 on energy efficiency programs and ratcheting up that annual investment until it reaches $56 Million by 2015.
ATCO	$1.2 Million	One time investment	R&D	Under the Northern Alberta Institute of Technology (NAIT) Fuel Cell program, ATCO Gas invested $1.2 Million to develop viable commercial applications for power and waste heat generated in Canada's first high-voltage, fully operational fuel cell.
British Energy Group	$1-1.2 Billion	2007-2009	Facility Upgrades	British Energy has an ongoing investment program in the operation of its nuclear stations to increase reliability and thus output. British Energy expects to invest £250m - £280m in its power stations in the period 2007/08 and another £280m - £305m in the period 2008/09.
Centrica	$2.9 Billion	5 years	Renewable Energy	Centrica has committed to invest £1.5 Billion in developing wind generation capacity in the UK over the next five years.
CEZ	$935 Million	2008-2012	Renewable Energy Energy Efficiency/DSM CO_2 Credits/External Offsets	Renewable energy sources €228 Million Reducing emissions intensity €317 Million Energy conservation €21 Million Carbon financing of projects €35 Million
China Shenhua Energy Company	$144 Million	2008-2009	Facility Upgrades	China Shenhua plans to invest 116 Million RMB on 3 power generators that will save 160,000 tons standard coal by 2010. China Shenhua's power business invested 530 Million RMB for "energy-economizing & pollution-reducing", and plans to further invest approximately RMB 3 Billion from 2008-2010, and reach an energy saving target of 0.309 million tonnes CO_2 by 2010.

Company	Investment*	Timeframe	Type	Description
Cia. Energetica de Minas Gerais - CEMIG	Nearly $185 Million	2002-2009	Energy Efficiency/DSM Facility Upgrades	Energy efficiency programs in 2007: R$43.5 Million. CEMIG has invested approximately R$250 Million in plant upgrades from 2002 to 2009. The modernization and revitalization of these plants direct the investments to renewable energy, reducing the necessity of new generation plant construction.
Contact Energy	$1.96 Billion	Next 5 years	Renewable Energy	Contact plans to invest more than NZ$1 Billion into a major wind farm that will be close to significant load centers. It is also planning an investment of more than NZ$1 Billion into renewable geothermal generation in the central North Island, and gas storage and gas-fired peaking projects to support greater penetration of renewables.
Endesa	$70 Billion (Renewables) $75-125 Million/year (CCS and other R&D)	2008-2030	Renewable Energy R&D	Establishment of Newco Renovables Company (2008) which aims to become one of the world's leading renewables companies (6,700 MW) with a planned investment effort of €18 Billion in 2008-2012 and €27 Billion in 2013-2020. Leadership in CO_2 CCS projects with the participation in several European and national research projects and a current annual investment of €50 Million into CCS.
ENEL	$6.4 Billion	2008-2011	R&D	In December 2006, ENEL launched its Environment and Innovation Project, which provides for a total investment of €4.1 Billion by 2011, with the goal of developing research and innovation in the field of renewable energy sources and the application of advanced technologies.
Entergy Corporation	$20.1 Million (energy efficiency) $7.1 Million (R&D)	2008 (R&D) 2002-2007 (energy efficiency)	Energy Efficiency/DSM R&D CO_2 Credits/External Offsets	Energy Efficiency: The Entergy Gulf States Energy Efficiency program has from 2002-2007 invested $20.1 Million to achieve 30.8 MW of peak energy demand and energy savings of 91,809 MWh. For 2008, Entergy has invested $7.1 Million for collaborative research with the Electric Power Research Institute. $828K of that total is direct funding for CO_2 capture, coal fleet of tomorrow and climate policy. Additional investments cover more efficient generation and advanced nuclear generation and transmission systems. Through the end of 2007, Entergy had invested $6.2 Million from its Environmental Initiative Fund to complete 17 external offset projects that will achieve 3.9 million tons of CO_2-e offsets.
Exelon Corporation	$6.475 Million/year	Annual	Energy Efficiency/DSM	[Exelon subsidiary] PECO's Low Income Usage Reduction Program (LIURP) provides energy efficiency, conservation and weatherization services as well as energy education to customers. The program assists approximately 8,000 low- and fixed-income customers each year. With an annual budget of $6.475 Million, homeowners and renters learn how to reduce their energy usage.

Company	Investment*	Timeframe	Type	Description
Fortum	$15.6 Billion $373 Million (automatic meter management)	2002-2007 Ongoing	Renewable Energy Energy Efficiency/ DSM	Investments in carbon free production during 2000-2007 have totaled 7 Billion Euros and the ongoing investment program worth 3 Billion Euros will result in additional carbon free electricity production of 9 TWh. Fortum also invests in automatic meter management (AMM) enabling customers to monitor their consumption in real-time. The total value of the AMM procurement agreement is about EUR 240 Million.
Hong Kong Electric Holdings	Over $250,000	2006-2008	R&D	Since 2006, HK Electric has sponsored a total of 24 local academic projects developing renewable energy applications in Hong Kong with total funding of over HK$2 Million under the HK Electric Clean Energy Fund.
Iberdrola	$13.4 Billion	2008-2010	Renewable Energy	The 2008-2010 Strategic Plan calls for dedicated investments in organic growth, in the amount of 17.8 Billion Euros, broken down in the following way: 48% for the development of renewable energy; 32% for regulated activities; 15% for traditional power generation, and 5% for other businesses. The majority of the investment (8.6 Billion Euros) is intended for renewable energy, with the goal of increasing from the 7,700 MW of wind power currently installed to 13,600 MW by the year 2010.
Korea Electric Power	$740 Million	2006-2008	Renewable Energy	According to the Renewable Portfolio Agreement with the government in 2005, KEPCO has invested US$740 Million on building renewable energy facilities with the capacity of 332MW for the last 3 years. Also, the company is putting funds into R&D to replace fossil fuels with green energy.
NRG Energy	$4.98 Million	2007	Acquisitions	Plasma Gasification Technology: In 2007, NRG purchased approximately 2.2 million shares in Alter NRG Corporation, a Canadian company that provides alternative energy solutions using plasma gasification, a process that converts carbon-containing materials into synthetic gas.
Pinnacle West Capital	$26.9 Million 25 Million/year thereafter	2006-2007	Energy Efficiency/DSM	APS has committed to spend a minimum of $16 Million per year on DSM programs, more than double previous expenditures. APS spent a total of $8.4 Million for DSM in 2006. That increased to $18.5 Million in 2007, and APS plans to increase spending to $25 Million per year going forward.
PPL Corporation	$600 Million	Next 5 years	Renewable Energy	Over the next five years, PPL is expected to invest at least $100 Million in new renewable energy projects, including solar, landfill gas and biomass plants. In addition, PPL is investing more than $500 Million to add 156 megawatts of hydroelectric capacity at existing facilities in Maine, Montana and Pennsylvania.
Public Service Enterprise Group	$45 Million (energy efficiency) $105 Million (loans for solar) $3 Billion (NGCCC)	Next 4 years	Renewable Energy Energy Efficiency/ DSM	PSEG has invested over $3 Billion to build new efficient natural gas combined cycle power plants. In addition, PSEG plans to loan up to $105 Million to support solar installations and invest up to $45 Million to make energy efficiency improvements over the next 4 years.

Company	Investment*	Timeframe	Type	Description
RWE	$1.5 Billion/year	2007-2020	Renewable Energy CO_2 Credits/ External Offsets	In 2007, RWE reconsidered its strategic position and decided to invest heavily in renewable energies in the coming years, mainly in new wind farms. A budget of more than 1 Billion Euros per year is now provided for investment in renewable energies. The target is to expand renewables capacity to 4.5 GW by 2012 and to 10 GW by 2020.
Scottish & Southern Energy	$5.9 Billion	Next 5 years	Renewable Energy & R&D	A commitment to investing over £2.5 Billion in renewable energy in the UK and Ireland and a further £500 Million in renewable energy in new markets and technologies over the next five years. This includes investment in the world's largest offshore wind farm at Greater Gabbard in the outer Thames Estuary. During 2007/08, SSE invested £6.3 Million in a number of innovative research and demonstration projects, including clean coal technologies, carbon capture and storage, and novel fuel processing techniques. Other projects have focused on climate change, energy efficiency, energy storage and advanced renewable energy technologies.
Southern Company	$78 Million	2007	Energy Efficiency/DSM	In 2007 alone, Southern Company invested some $78 Million to promote energy efficiency. To date, demand-side management programs at the company's retail operating companies have avoided the need for nearly 3,000 MW of generating capacity.
Suez	$7.8 Million/year	Ongoing	Renewable Energy & R&D	SUEZ and Electrabel began in late 2005 to develop a joint multi-year research and demonstration program on the capture and storage of CO_2. This program will receive financing of about 5 Million Euros per year. Over the next five years, Electrabel will invest over 5 Billion Euros in Benelux, France and Germany in a combination of the most modern technologies using fossil fuels, wind, hydraulic and solar energy, as well as nuclear energy.
Tohoku Electric Power Co.	$20 Million	2008-2012	CO_2 Credits/ External Offsets	Tohoku purchases CO_2 credits by utilizing the Kyoto Protocol mechanisms. The planned investment period is from 2008 to 2012. The company's investment in The World Bank Prototype Carbon Fund Program is $10 Million and in The Japan GHG Reduction Fund (JGRF) is $10 Million.

7

Conclusion

Utilities are disclosing more to investors about their climate change risks and strategies to address them. But only a small number are setting and disclosing absolute emissions reduction targets.

Several questions remain on how electric utilities will make the transition to a lower-carbon future while also meeting growing electricity demand:

- Will wind power and renewables emerge as major contributors to the world's electricity supply?
- Will "smart grids" support renewables and limit demand growth?
- Will nuclear power have a global revival and replace coal as the main source of base load power generation?
- Or will coal remain a mainstay of the electric utility industry, aided by advancements in carbon capture and storage technology?

Of particular importance will be technologies to control the carbon emissions of new and existing fossil-energy plants, and demand-side management programs that reduce electricity use overall. Under business-as-usual forecasts, the International Energy Agency expects that three-quarters of electricity output worldwide in 2020 (and more than half in 2030) will come from power plants already in operation today. This underlines the importance of policies that put a price on carbon, slow electricity demand growth, and encourage faster turnover of power generating capital stock.

The good news is that the CDP6 (2008) response rate for electric utilities improved from 44% to 53% between 2006 and 2008. In addition, a growing number of utilities are setting GHG emissions reduction targets and making investments in the next generation of clean energy and energy efficiency technologies.

Nevertheless, only a small number of utilities are setting and disclosing absolute emission reduction targets; a higher percentage are setting intensity targets that still allow growth in overall GHG emissions. This raises the question of how much utilities are willing to pay to cut their emissions – or pass costs onto customers – as emissions trading schemes and/or carbon taxes come into play. Improved disclosure on forecasted capacity and production would help investors to better assess exposure to such carbon limits at this pivotal time in national and global climate regulation.

8

Appendix I

Scores and Emissions by Company

Key:

AQ: answered questionnaire*

NP: answered questionnaire but response not made publicly available

IN: did not answer questionnaire but provided other information e.g. sent copy of CSR report. This was not analyzed

DP: declined to participate

NR: no response

SA: see another – please refer to parent or subsidiary response

X: company not in sample that year

Reported emissions have been rounded to the nearest 1000 metric tons. To view the exact figure please check the company response at www.cdproject.net

*Where a company has a CDLI score this means they were AQ for CDP6 (2008). Where a company refers to a parent company's response this is marked as 'see parent company'.

CDLI scores and emissions

Company	CDLI Score	Scope 1*	Intensity**	CDP5 (2007)	CDP4
A2A SpA	53	2,102	219	AQ	X
Aare Tessin AG fur Elektrizitat	DP	-	-	DP	NR
Aboitiz Equity Ventures	DP	-	-	NR	NR
Abu Dhabi Water and Electric Authority	NR	-	-	X	X
ACEA SpA	69	508	147	AQ	AQ
Acegas-Aps SpA	NR	-	-	NR	NR
Actelios SpA	59	582	4,689	DP	AQ
AES Corporation	9	84,000	6,182	AQ	AQ
Aes Elpa SA – see AES Corporation	SA	-	-	SA	X
AES GENER SA – see AES Corporation	SA	-	-	AQ	X
AES Tiete SA – see AES Corporation	SA	-	-	SA	AQ
AGL Energy Ltd.	81	336	113	AQ	AQ
Algonquin Power Income Fund	42	472	2,632	IN	NR
Allegheny Energy, Inc.	45	40,865	12,357	AQ	NR
Allete Inc.	IN	-	-	IN	IN
Alliant Energy Corporation	54	21,918	6,376	AQ	IN
Ameren Corporation	69	68,189	9,036	DP	IN
American Electric Power Company, Inc.	53	156,300	11,682	AQ	AQ
Aquila, Inc.	IN	-	-	IN	IN
AS Arendals Fossekompani	12 (NP)	-	-	DP	AQ
ATCO Ltd.	59	11,200	4,127	IN	X
Avista Corporation	42	2,274	21,911	AQ	AQ
Banpu Public Co Ltd.	NR	-	-	AQ	AQ
Bashkirenergo OAO	NR	-	-	NR	DP
BF Utilities	NR	-	-	NR	X
BG Group	70	9,401	567	AQ	AQ
BKW FMB Energie AG	NR	-	-	NR	NR
Black Hills Corporation	NR	-	-	AQ	NR
Boralex Power Income Fund	DP	-	-	NR	X
British Energy Group	66	7,889	1,398	AQ	AQ
C.A. La Electricidad de Caracas	SA	-	-	NR	X
Calpine Corporation	37 (NP)	-	-	AQ	AQ
Canadian Hydro Developers, Inc.	75	0.60	10.1	AQ	AQ
Canadian Utilities – see ATCO Ltd.	SA	-	-	NR	X
Capex SA	NR	-	-	X	X
CEGEDEL SA	19	-	-	AQ	NR
Centrais Elet Matogrossenses SA (CEMAT)	NR	-	-	AQ	AQ
Centrais Eletricas Brasileiras S/A ELETROBRAS	37	9,006	778	AQ	AQ
Centrais Eletricas de Santa Catarina SA CELESC	9	-	-	AQ	IN
Central Puerto SA	SA	-	-	X	X
Centralschweizerische Kraftwerke AG	NR	-	-	DP	NR
Centrica	74	9,562	292	AQ	AQ
CESC Ltd.	19	-	-	AQ	AQ
CEZ	36	46,913	5,520	AQ	AQ
CH Energy Group Inc.	42 (NP)	-	-	NR	NR
Chilectra SA	NR	-	-	SA	X
China Power International Development Ltd.	NR	-	-	NR	NR
China Resources Power Holdings	NR	-	-	NR	NR

* Thousand metric tonnes CO_2-e

** Reported Scope 1 metric tons per million US$ revenue, based on 2007 revenue figures and calculated by RiskMetrics Group

CDLI scores and emissions

Company	CDLI Score	Scope 1*	Intensity**	CDP5 (2007)	CDP4
China Shenhua Energy (H)	3	-	-	NR	NR
Chubu Electric Power	53	63,780	2,984	AQ	AQ
Chugoku Electric Power Co., Inc.	54	40,800	4,191	AQ	AQ
Cia Energetica de Sao Paulo - CESP	35	-	-	AQ	AQ
Cia Paranaense de Energia COPEL	32	800	296	IN	X
Cia Transmissao Energia Eletrica Paulista – CTEEP	19 (NP)	-	-	AQ	DP
Cia. Energetica de Minas Gerais – CEMIG	51	203	41	AQ	DP
CIR SpA	NR	-	-	AQ	AQ
CITIC Pacific	DP	-	-	NR	NR
Cleco Corporation	33	-	-	AQ	AQ
CLP Holdings	79	35,340	5,429	AQ	AQ
CMS Energy Corporation	34	-	-	AQ	NR
Colbun SA	IN	-	-	DP	NR
Companhia de Eletricidade do Estado da Bahia COELBA	NR	-	-	AQ	X
Compania General de Electricidad SA	NR	-	-	NR	NR
Consolidated Edison, Inc.	75	6,378	486	AQ	AQ
Constellation Energy Group, Inc.	52	22,272	1,051	AQ	AQ
Contact Energy Ltd.	65	2,477	1,816	AQ	NR
Covanta Energy Corporation	38	5,484	3.83	AQ	NR
CPFL Energia SA	48	2.67	0.55	AQ	AQ
Dniproenerho	NR	-	-	X	X
Dominion Resources, Inc.	45	56,056	3,576	IN	IN
Donbasenerho VAT	NR	-	-	X	X
DPL Inc.	NR	-	-	AQ	AQ
Drax Group	52 (NP)	-	-	AQ	X
DTE Energy Company	55	43,600	5,126	AQ	AQ
Duke Energy Corporation	61	103,600	8,145	AQ	AQ
Duke Energy International Geracao Paranapanema SA	SA	-	-	SA	X
Dynegy Inc.	33	32,900	10,710	IN	IN
E.ON AG	68	121,261	1,287	AQ	AQ
Edegel SAA – see Endesa	SA	-	-	NR	NR
EDF Energies Nouvelles SA	NR	-	-	X	X
Edison International	47 (NP)	-	-	AQ	IN
Edison SpA	38	24,704	2,178	AQ	NR
EDP – Energias de Portugal SA	15 (NP)	-	-	NR	AQ
EDP – Energias do Brasil SA	46	6.6	2.84	AQ	AQ
EEPSA Empresa Electrica de Piura	SA	-	-	X	X
El Paso Electric	40	-	-	DP	X
Elecnor SA	NR	-	-	NR	X
Electrabel – see Suez	SA	-	-	SA	AQ
Electric Power Development Co., Ltd. (J-POWER)	32	45,360	8,785	X	X
Electricite de France (EDF)	51 (NP)	-	-	AQ	AQ
Electricite de Strasbourg SA	NR	-	-	SA	X
Electricity Generating Public Co., Ltd.	NR	-	-	NR	NR
Elektrim SA	NR	-	-	NR	NR
Elektrizitats Gesellschaft Laufenburg AG	39	780	162	DP	NR
Eletropaulo Metropolitana Eletricidade de São Paulo S/A – see AES Corporation	SA	-	-	SA	AQ

* Thousand metric tonnes CO_2-e

** Reported Scope 1 metric tons per million US$ revenue, based on 2007 revenue figures and calculated by RiskMetrics Group

CDLI scores and emissions

Company	CDLI Score	Scope 1*	Intensity**	CDP5 (2007)	CDP4
Emera Inc.	61	10,154	8,552	AQ	AQ
Empire District Electric Co.	IN	-	-	DP	DP
Empresa Electrica Pehuenche SA	NR	-	-	IN	X
EnBW Energie Baden-Württemberg	48 (NP)	-	-	AQ	AQ
Endesa	85	86,298	3,671	AQ	AQ
Endesa-Chile – see Endesa	SA	-	-	IN	X
ENEL	58	71,604	1,224	AQ	AQ
Energiedienst Holding AG	NR	-	-	DP	NR
Energisa SA	DP	-	-	AQ	X
Energosbyt Rostovenergo OAO	NR	-	-	NR	X
Energy Developments Ltd.	36	792	5,689	AQ	NR
Energy East Corporation	47	1,384	267	AQ	AQ
Enersis SA	NR	-	-	IN	NR
Enersur - Energia del Sur SA – see Suez	SA	-	-	NR	X
Entergy Corporation	61	32,522	2,832	AQ	AQ
Epcor Power LP	NR	-	-	NR	AQ
ERG SpA	NR	-	-	AQ	NR
Eszak-Magyarorszagi Aramszolgaltato Rt – see RWE	SA	-	-	NR	AQ
EVN AG	49	-	-	AQ	AQ
Exelon Corporation	78	11,000	588	AQ	AQ
First Gen Corporation	53 (NP)	-	-	AQ	X
First Philippine Holdings Corporation – see First Gen Corporation	SA	-	-	SA	DP
FirstEnergy Corporation	43	46,142	3,610	AQ	AQ
Fortis Inc.	IN	-	-	NR	NR
Fortum	74	7,730	1,259	AQ	AQ
FPL Group, Inc.	77	50,000	3,276	AQ	AQ
Genting Berhad	IN	-	-	DP	X
Glow Energy Public Company Ltd. – see Suez	SA	-	-	SA	X
GMR Infrastructure Ltd.	DP	-	-	NR	X
Great Lakes Hydro Income Fund	NR	-	-	SA	AQ
Great Plains Energy, Inc. – see Aquila	SA	-	-	NR	IN
Hafslund ASA	NR	-	-	DP	NR
Hawaiian Electric Industries	45	5,559	2,192	AQ	AQ
Hokkaido Electric Power Co., Inc.	51	15,080	3,023	AQ	AQ
Hokuriku Electric Power Company	40	18,510	4,409	AQ	AQ
Hong Kong Electric Holdings Ltd.	56	9,110	5,676	AQ	AQ
Huadian Power International Corporation Ltd.	NR	-	-	NR	X
Huaneng Power International (H)	IN	-	-	NR	NR
Hub Power Company Ltd. – see International Power	SA	-	-	SA	SA
Iberdrola	82	37,769	1,578	AQ	AQ
Idacorp Inc.	15	-	-	IN	NR
Integrys Energy Group, Inc.	49	9,517	925	AQ	AQ
International Power	52	65,695	14,119	AQ	AQ
Iride SpA	NR	-	-	NR	X
Irkutskenergo	NR	-	-	NR	AQ

* Thousand metric tonnes CO_2-e

** Reported Scope 1 metric tons per million US$ revenue, based on 2007 revenue figures and calculated by RiskMetrics Group

CDLI scores and emissions

Company	CDLI Score	Scope 1*	Intensity**	CDP5 (2007)	CDP4
Isagen	21 (NP)	-	-	X	X
Jaiprakash Hydro-Power Ltd.	NR	-	-	NR	X
JP Elektroprivreda HZHB d.d Sarajevo	NR	-	-	X	X
Kansai Electric Power	46	49,800	2,108	AQ	AQ
KEC International Ltd.	NR	-	-	AQ	X
KESC – Karachi Electric Supply Corporation Ltd.	NR	-	-	DP	NR
Kogeneracja SA – see EDF	SA	-	-	NR	X
Korea Electric Power (Kepco)	47	172,307	5,509	AQ	AQ
Kot Addu Power Co., Ltd.	NR	-	-	AQ	X
Kuzbassenergo OAO	NR	-	-	X	X
Kyivenerho VAT	NR	-	-	NR	NR
Kyushu Electric Power Co., Inc.	49	-	-	AQ	AQ
Lanco Infratech	NR	-	-	X	X
Lechwerke AG	NR	-	-	NR	X
Luz del Sur SA	NR	-	-	NR	NR
MDU Resources Group Inc	IN	-	-	NR	DP
MGE Energy Inc.	IN	-	-	AQ	IN
Minera Valparaiso SA – see Colbun	SA	-	-	NR	NR
Mirant Corporation	NR	-	-	DP	IN
Mosenergo OAO	NR	-	-	NR	X
Moskovskaya obyedinennaya elektrosetevaya kompaniya OAO	NR	-	-	X	X
MPX Mineracao e Energia SA	DP	-	-	X	X
MVV Energie AG	44 (NP)	-	-	AQ	NR
National Thermal Power (NTPC)	NR	-	-	AQ	AQ
Neyveli Lignite Corporation	NR	-	-	NR	X
NiSource Inc.	74	27,096	3,398	AQ	AQ
Northeast Utilities Inc.	NR	-	-	DP	NR
Northland Power Income Fund	NR	-	-	NR	NR
Northwestern Corporation	DP	-	-	DP	DP
NRG Energy Inc.	36	68,000	11,354	AQ	DP
NV Energy	NR	-	-	NR	NR
OGE Energy Corporation	50	19,391	5,106	NR	NR
OGK-1 OAO	NR	-	-	X	X
OGK-2	NR	-	-	X	X
OGK-3	NR	-	-	X	X
OGK-5	NR	-	-	X	X
OGK-6	NR	-	-	X	X
Okinawa Electric Power Company, Inc.	36 (NP)	-	-	AQ	AQ
Origin Energy Ltd.	68	3,664	746	AQ	AQ
Ormat Technologies Inc.	27	-	-	AQ	AQ
Otter Tail Corporation	IN	-	-	NR	NR
Pepco Holdings, Inc.	51	4,309	460	IN	IN
PG&E Corporation	51	863	65	AQ	AQ
Pha Lai Thermal Power	NR	-	-	X	X
Pinnacle West Capital Corporation	60	17,671	5,015	AQ	AQ
PNM Resources, Inc.	NR	-	-	NR	AQ

* Thousand metric tonnes CO_2-e

** Reported Scope 1 metric tons per million US$ revenue, based on 2007 revenue figures and calculated by RiskMetrics Group

CDLI scores and emissions

Company	CDLI Score	Scope 1*	Intensity**	CDP5 (2007)	CDP4
Portland General Electric	DP	-	-	X	X
PPL Corporation	54	28,500	4,386	AQ	AQ
Progress Energy Inc.	66	53,063	5,797	AQ	AQ
Public Power Corporation SA	NR	-	-	NR	NR
Public Service Enterprise Group Inc.	69	24,682	1,920	AQ	AQ
Puget Energy Inc.	22 (NP)	-	-	AQ	IN
Qatar Electricity & Water Company	DP	-	-	NR	AQ
Raetia Energie AG	NR	-	-	NR	NR
Ratchaburi Electricity Generating Holdings Public Co., Ltd.	11	10,210	7,857	AQ	AQ
Reliance Infrastructure	DP	-	-	NR	NR
Reliant Energy Inc.	40	30,235	2,697	AQ	AQ
RiTE Ugljevik a.d. Ugljevik	NR	-	-	X	X
RWE	67	152,500	2,710	AQ	AQ
Saha-Union Public Company	NR	-	-	X	X
Sarawak Energy Berhad	33	3,537	9,216	NR	NR
Saudi Electricity	NR	-	-	AQ	AQ
SCANA Corporation	IN	-	-	IN	NR
Scottish & Southern Energy	78	22,724	742	AQ	AQ
Scottish Power – see Iberdrola	SA	-	-	AQ	AQ
Séchilienne-Sidec	NR	-	-	X	X
Semapa – Sociedade de Investimento e Gestao SGPS SA	DP	-	-	DP	DP
Sempra Energy	45	-	-	AQ	AQ
Sherritt International	NR	-	-	NR	AQ
Shikoku Electric Power Co., Inc.	53	10,360	1,908	AQ	AQ
Solaria Energia y Medio Ambiente SA	NR	-	-	X	X
Suez	62	82,870	5,024	AQ	AQ
Sumitomo Corporation	47 (NP)	-	-	AQ	NR
Sverdlovenergo AO	NR	-	-	NR	X
Taiwan Cogeneration Corporation	NR	-	-	NR	NR
Tanjong PLC	NR	-	-	X	X
Tata Power Co.	31 (NP)	-	-	NR	NR
TECO Energy, Inc.	IN	-	-	IN	AQ
Tenaga Nasional Bhd	NR	-	-	AQ	AQ
Tepco (Tokyo Electric Power)	37	126,500	2,628	AQ	AQ
Terna	36	58	102	AQ	AQ
TGK-1	NR	-	-	X	X
TGK-4	NR	-	-	X	X
TGK-5	NR	-	-	X	X
TGK-6	NR	-	-	X	X
TGK-8	NR	-	-	X	X
The Southern Company	41	151,000	9,835	AQ	AQ
Tianjin Binhai Energy & Development Company Ltd.	NR	-	-	NR	NR

* Thousand metric tonnes CO_2-e

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CDLI scores and emissions

Company	CDLI Score	Scope 1*	Intensity**	CDP5 (2007)	CDP4
Tohoku Electric Power Co., Inc.	45	34,130	2,155	AQ	AQ
Torrent Power	NR	-	-	X	X
Tractebel Energia SA – see Suez	SA	-	-	SA	AQ
TransAlta Corporation	58	39,031	15,040	AQ	AQ
TransCanada Corporation	32	15,200	1,841	AQ	AQ
Trustpower Ltd.	IN	-	-	NR	IN
UGI Corporation	NR	-	-	NR	NR
Unified Energy System	NR	-	-	NR	NR
Union Fenosa SA	65	23,748	2,883	AQ	AQ
Vattenfall Group	57	-	-	AQ	NR
Vectren Corporation	24	-	-	AQ	AQ
Verbund	52	3,407	702	AQ	AQ
Volzhskaya TGK OAO	NR	-	-	X	X
Westar Energy, Inc.	NR	-	-	NR	NR
Westmoreland Coal Company	IN	-	-	X	X
Wisconsin Energy Corporation	36 (NP)	-	-	AQ	AQ
Xcel Energy, Inc.	66	56,450	5,626	AQ	AQ
YTL Corporation	NR	-	-	NR	NR
ZEAG Energie AG – see EnBW Energie Baden-Württemberg	SA	-	-	AQ	X
Zhejiang Southeast Electric Power Co., Ltd.	NR	-	-	X	X
Zorlu Enerji Elektrik Uretim AS	NR	-	-	X	X

* Thousand metric tonnes CO_2-e

** Reported Scope 1 metric tons per million US$ revenue, based on 2007 revenue figures and calculated by RiskMetrics Group

Appendix II

CDP6 Questionnaire, CDLI Methodology and Glossary of Key Terms

The CDP Questionnaire has been developed over six years through consultation with signatory investors, corporations and other stakeholders. The CDP6 (2008) Questionnaire represents a best practice framework for the information companies should measure and report regarding the impact of climate change on their business. The Questionnaire along with the Electric Utilities supplementary questions and the CDLI methodology are available online at www.cdproject.net.

Glossary of Key Terms

CCGT	Combined Cycle Gas Turbine
CCS	Carbon Capture and Storage
CDLI	Carbon Disclosure Leadership Index
CDM	Clean Development Mechanism – Kyoto Protocol carbon reduction facility
CDP	Carbon Disclosure Project
CDSB	Climate Disclosure Standards Board
CO_2-e	carbon dioxide equivalent
CPRS	Carbon Pollution Reduction Scheme
DSM	Demand Side Management
EC	European Community
EU ETS	European Union Emissions Trading Scheme
GHG	Greenhouse Gases
GT	gigatonne
IEA	International Energy Agency
IIGCC	Institutional Investors Group on Climate Change
IGCC	Integrated Gasification Combined Cycle
IPCC	Intergovernmental Panel on Climate Change
JI	Joint Implementation – Kyoto Protocol carbon reduction facility
kWh	kilowatt-hour
MWh	megawatt-hour
NGOs	Non-Government Organizations
OECD	Organization for Economic Cooperation and Development
R&D	Research & Development
RGGI	Regional Greenhouse Gas Initiative
RPS	Renewable Portfolio Standard
UNFCCC	United Nations Framework Convention on Climate Change
USCAP	US Climate Action Partnership
WCI	Western Climate Initiative

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Headquartered in New York with 19 global offices, RiskMetrics Group serves some of the most prestigious institutions and corporations worldwide. For more information about this report or RiskMetrics Group's climate solutions, please visit www.riskmetrics.com or email climate@riskmetrics.com

Report Authors

Doug Cogan
Megan Good
Geri Kantor
Emily McAteer

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CDP Contacts

Carbon Disclosure Project
40 Bowling Green Lane
London, EC1R 0NE
United Kingdom
Tel: +44 (0) 20 7970 5660

Carbon Disclosure Project
c/o RPA, 6 W 48th Street
10th Floor
New York, NY10036
United States of America
Tel: +1 (646) 270 3675

Paul Dickinson
Chief Executive Officer
paul.dickinson@cdproject.net
Tel: +44 (0) 20 7415 7112

Paul Simpson
Chief Operating Officer
paul.simpson@cdproject.net
Tel: +44 (0) 20 7415 7112

Sonal Mahida
Vice President, CDP USA
sonal.mahida@cdproject.net
Tel: +1 (212) 378 2086

Daniel Turner
Head of Disclosure
daniel.turner@cdproject.net
Tel: +44 (0) 20 7970 5675

James Howard
Senior Project Officer
james.howard@cdproject.net
Tel: + 44 (0) 20 7970 5667

RiskMetrics Group Contacts

Doug Cogan
Director, Climate Risk Management
Tel: +1 (603) 675 9274
doug.cogan@riskmetrics.com

Megan Good
Tel: +1 (646) 778 4184
megan.good@riskmetrics.com

Geri Kantor
Tel: +1 (301) 556 0437
geri.kantor@riskmetrics.com

Emily McAteer
Tel: +1 (646) 778 4183
emily.mcateer@riskmetrics.com

CDP Board of Trustees