



TRUCOST<sup>PLC</sup>

# sector briefing

April 2010

## OVERVIEW

79 power generators could face carbon costs totalling US\$56 billion.

Carbon costs could equate to almost 12% of revenues on average.

Energy-intensive companies could be exposed to environmental costs passed on by utilities in their supply chains.

Equity funds could be exposed to falls in returns from carbon-intensive assets.

## POWER UTILITIES: WHO'S HOT?

Electricity firms are paying rising costs for pollution. This will have a knock-on effect for their investors and clients. Investors need to control risks to fund returns from power generators with poor environmental performance. Companies need to measure and manage risks from environmental costs passed on by electricity providers and other suppliers.

Trucost has measured the environmental performance of over 107 electricity firms worldwide. This briefing examines their emissions of greenhouse gases, sulphur dioxide (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>), nuclear waste, and process water. Trucost analysed exposure to environmental costs and; in this report, ranked power generators on carbon intensity.

### ENVIRONMENTAL ISSUES CREATE OPPORTUNITIES AND RISKS FOR POWER FIRMS

Regulators and market drivers are making environmental performance a major business issue for electricity companies. Pollution abatement and cleanup costs are rising as regulators in major economies step up pollution controls. Efficiency is vital to deal with volatile fuel prices and fluctuating demand.

Electricity firms are central to delivering a low-carbon economy. Their ability to change the way that energy is generated, distributed and used will drive competitiveness. Electricity suppliers that deliver low-carbon power efficiently will be well positioned. Risks will be greatest for firms most dependent on fossil fuel-based energy sales.

### BUSINESSES WILL SWITCH TO SUPPLIERS WITH LOWER ENVIRONMENTAL COSTS

As electricity companies pass on environmental costs in higher energy prices, energy-intensive sectors such as aluminium, industrial gases, cement and iron and steel will be most exposed to rising input costs. Businesses in all sectors will want to manage financial exposure to these costs being passed through their supply chains.

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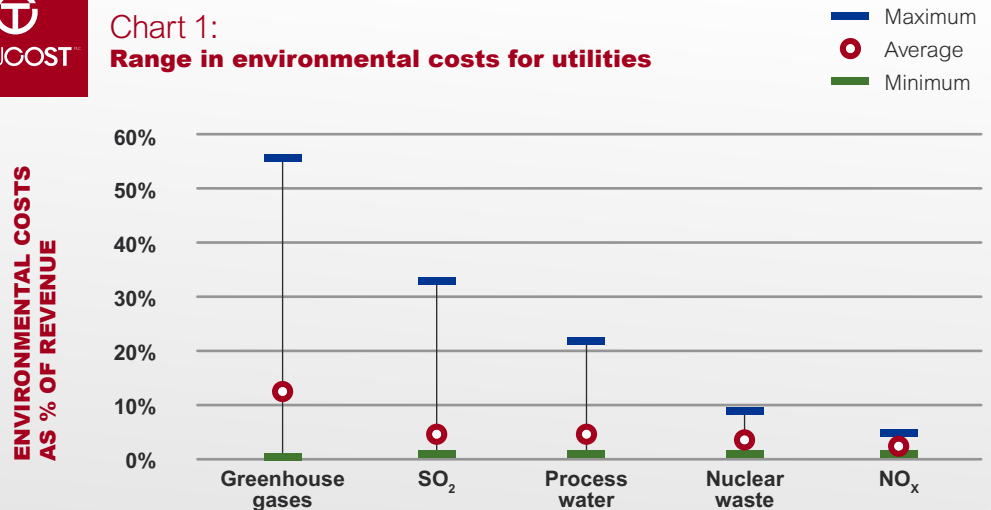
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Chart 1:  
Range in environmental costs for utilities





“Most industries have significant supply chain impacts from their electricity purchases.”

**INVESTORS NEED TO UNDERSTAND HOW FIRMS ARE POSITIONED**

Carbon-intensive utilities covered by cap-and-trade programmes will find it harder to raise money from capital markets and retain market share. The ability of power companies to manage exposure to carbon and other environmental costs will influence their market position. Investors will want to manage risks to fund returns from carbon-intensive electricity firms and investments in other energy-intensive sectors.

**POWER FIRMS ARE EXPOSED TO FUTURE CARBON COSTS**

Greenhouse gas (GHG) emissions are the most significant environmental impact of electricity companies (see Chart 1). Together the 107 publicly listed power generators and electricity distributors analysed directly emit over 3.4 billion tonnes of GHGs, measured as their carbon dioxide equivalent (CO<sub>2</sub>e) emissions. Twenty-one companies listed in the EU emit over 0.5 billion tonnes of CO<sub>2</sub>e.

Power plants in western Europe under the EU Emission Trading Scheme (EU ETS) will have to purchase allowances for all of their emissions from 2013. Emission trading schemes are also planned in countries including the United States, Canada, Japan, Australia, South Korea and New Zealand.

While carbon prices will vary nationally until global carbon trading is in place, Trucost used the average carbon price under the EU ETS over three months to 4 January 2010 (US\$19.23) to model potential exposure to carbon costs worldwide. If the 79 power generators were to pay US\$19.23 for each tonne of CO<sub>2</sub>e emitted, their carbon costs would total over US\$56 billion. This equates to an average of 12% of company revenues in 2008.

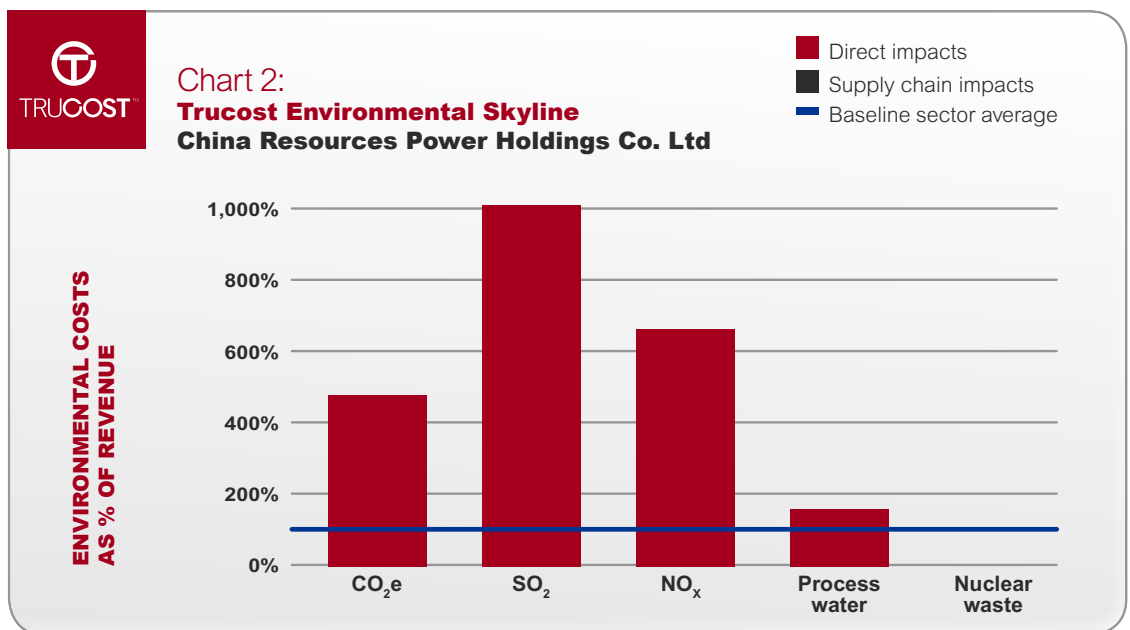
**SULPHUR DIOXIDE EMISSIONS COULD ADD TO ENVIRONMENTAL COSTS**

To see how significant the firms’ other environmental impacts are, Trucost applied environmental external costs to quantities of pollutants emitted, process water used and nuclear waste generated. These costs were measured relative to revenue for each conventional and renewable power generator. Findings show that SO<sub>2</sub> is the next greatest environmental externality, followed by process water use, nuclear waste and NO<sub>x</sub>. The direct impacts of electricity providers represent major supply chain environmental impacts for most other industries.

**SO<sub>2</sub> and NO<sub>x</sub>:** Combined environmental external costs from these emissions, which contribute to smog and acid rain, equate to almost 4% of revenues on average. Abatement costs are rising for ageing coal-fired power plants as regulators strengthen emission controls in the EU, North America and Asia.

**Process water:** On average, over 3% of combined revenues could be at risk from environmental costs linked to water use. Trucost only included process water in this analysis, which has a higher environmental external cost than cooling water used by power utilities. Water prices are rising in many industrialised areas with growing competition for resources and escalating water treatment costs. Where climate change increases rainfall variability and drought, water scarcity could threaten energy security.

**Nuclear waste:** External environmental costs from nuclear waste represent 1% of revenues on average. Because nuclear power is relatively low carbon, it is frequently categorised as “clean” energy, alongside renewable energy. However, nuclear power generates significant amounts of hazardous waste that is difficult and costly to dispose of. Countries including the US plan to store spent nuclear fuel and high-level waste in geological repositories for thousands of years.<sup>1</sup>



<sup>1</sup> Nuclear Waste Management, Key Attributes, Challenges, and costs for the Yucca Mountain Repository and Two Potential Alternatives, United States Government Accountability Office, November 2009 <http://www.gao.gov/new.items/d1048.pdf> accessed 11 March 2010.



“China Resources Power is over 1,000 times more carbon intensive than CPFL Energia S.A.”

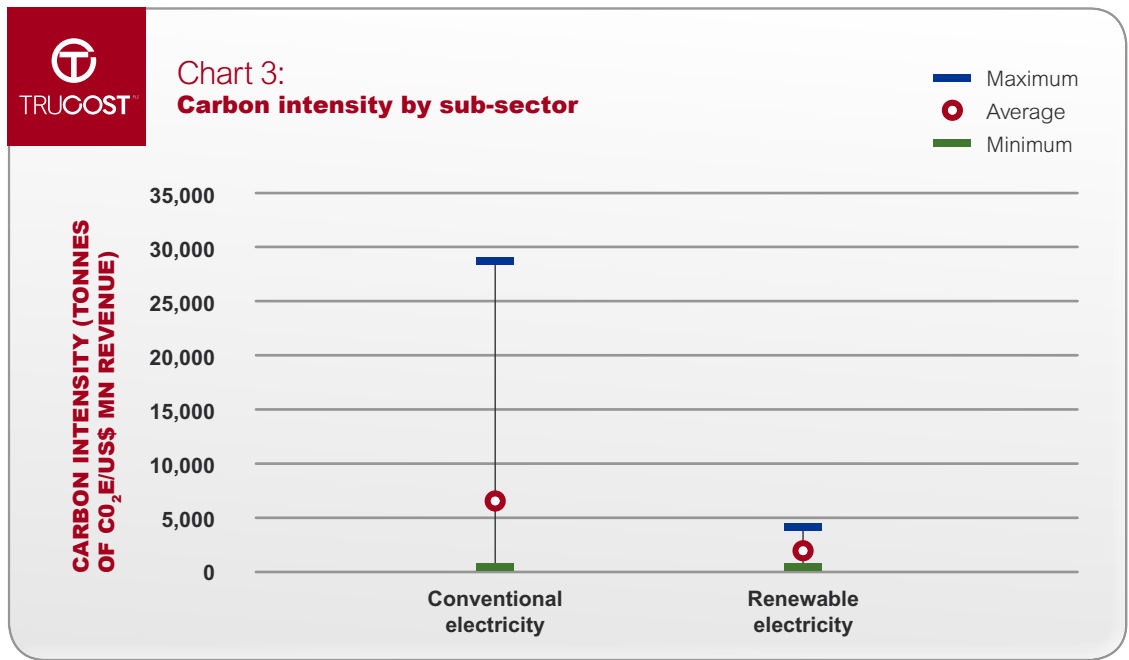
**SOME FIRMS ARE MORE EXPOSED TO ENVIRONMENTAL COSTS**

Financial exposure to environmental costs varies most for greenhouse gas emissions, SO<sub>2</sub>, and process water. Carbon costs represent almost 55% of revenue for the company that would be most exposed to carbon costs under cap-and-trade programmes (see Chart 1). For 25 companies, revenue could be more exposed to carbon costs than the average for sector peers. Electricity companies that are more exposed to environmental costs than sector peers could find it more difficult to pass these on to customers in higher prices.

Unsurprisingly, renewable power generators have the lowest exposure to costs for CO<sub>2</sub>e, SO<sub>2</sub> and NO<sub>x</sub>. However, several conventional power generators have lower exposure to process water costs, reflecting varied fuel types, generation processes and efficiency within the sector. More than half of the energy produced from conventional power stations is generally wasted during generation and transmission. On environmental intensity, China Resources Power Holdings Co. Ltd is ranked bottom out of 79 electricity generators. Its environmental costs as a percentage of revenue relative to the baseline sector average (100%) for each impact are shown in Chart 2 on page 2.

**CARBON INTENSITY VARIES DRAMATICALLY**

In the absence of a carbon price, emissions can be measured relative to revenue to compare the carbon intensities of companies in any industry. Trucost analysed the carbon intensity of 107 electric utilities in two sub-sectors (see Chart 3).



The highest-carbon conventional electricity firm is over 1,000 times more carbon intensive than the lowest-carbon power generator, reflecting varied exposure to carbon costs. Some of the companies classed as conventional power generators also produce electricity from renewables. The renewable power generator with the highest carbon intensity (Edegel S.A.A.) generates electricity from fossil fuels as well as hydroelectric power. The lowest-carbon conventional power generator produces some hydroelectricity (CPFL Energia S.A.).

Different electricity prices in different markets affect revenues per Megawatt hour of electricity generated, with knock-on effects on the carbon intensity of electricity providers and their ability to absorb carbon costs. Energy-intensive companies that source electricity from carbon-intensive suppliers could face the greatest financial risk from carbon costs applied to their Scope 2 emissions.

**CARBON PERFORMANCE WILL AFFECT COMPETITIVENESS**

Power firms that are less carbon-intensive than sector peers could gain a competitive advantage. If a company’s carbon intensity is much lower than its peers, the rise in costs will be lower, and might be easier to pass on to customers. Trucost has ranked 10 companies with the highest and lowest carbon intensities (see Table 1). The analysis is based on direct (Scope 1) emissions relative to revenue (tonnes of CO<sub>2</sub>e/US\$ mn).

EDF Energies Nouvelles S.A. has the lowest carbon intensity of all 79 power generators analysed, while China Resources Power Holdings Co. Ltd has the highest. Both are among seven companies whose carbon performance improved between 2007 and 2008 – their carbon intensities fell year-on-year.

Many of the most carbon-intensive power firms operate in China, where coal dominates the country’s energy mix. China’s Government aims to cut carbon dioxide emissions per unit of GDP by



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**Table 1:  
Ranking of electricity generators on carbon intensity**

Company name	Subsector	Rank in sector (79)	Change in carbon performance 2007-08
<b>TOP</b>			
EDF Energies Nouvelles S.A.	Renewable	1	↑
Infigen Energy	Renewable	2	↑
Energy Development Corporation	Renewable	3	↓
Canadian Hydro Developers Inc. (acquired by TransAlta in 2009)	Renewable	4	↑
Clipper Windpower Plc	Renewable	5	↑
<b>BOTTOM</b>			
Huadian Power International Corp. Ltd	Conventional	75	↓
Datang International Power Generation Co. Ltd	Conventional	76	↑
Neyveli Lignite Corporation Ltd	Conventional	77	↓
China Power International Development Ltd	Conventional	78	↑
China Resources Power Holdings Co. Ltd	Conventional	79	↑

40%–45% from 2005 levels by 2020, using measures including economic policies to drive mitigation. As companies in OECD countries locate plants in China or outsource manufacturing to suppliers in the region, the high-emitting electricity providers could present a major carbon “hotspot” in their supply chains.

## Next steps

Looking for more information on specific utilities? Ask for Trucost’s Company Briefing on the utility of your choice. Investors and companies can use Trucost data to address risks and opportunities from environmental issues, quickly and cost effectively.

### Companies can:

1. Measure environmental risks across their supply chains.
2. Identify high risk suppliers and environmental issues.
3. Compare the environmental performance of suppliers to understand opportunities to reduce risk.

### Investors can:

1. Identify which power firms are most exposed to environmental costs from emissions, water use and nuclear waste.
2. Measure financial risks to returns driven by the environmental performance of utility companies held in funds.
3. Compare the carbon performance of energy-intensive companies in all sectors against peers and investment benchmarks.

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