
Flicking the switch

Are electric utilities prepared for a low carbon future?

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The CDP Quarterly Sector Research series provides investors with the best and most tailored environmental data in the market. Each quarter CDP's team of analysts takes a detailed look at one high-emitting sector. The first report, **No room for passengers: are auto manufacturers reducing emissions quickly enough?**, was published in February 2015. Further sectors include: materials, metals and mining, oil and gas and consumer goods.

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Linking emissions-related metrics to earnings for European electric utilities

-  We launch our Super-League Table for European electric utilities, ranking the utilities based on a number of emissions-related metrics which in aggregate could have a material impact on company performance.
-  Leaders are: Iberdrola, Centrica and Verbund.
-  Laggards are: RWE, EnBW and SSE.

Overview

This report is the second in a series of quarterly reports covering six high-emitting sectors (transport, electric utilities, materials, metal & mining, oil & gas, and consumer goods). In February, we published our first report in the series, covering the global auto manufacturers and launching our new Super-League Table (SLT) approach. The CDP Super-League Table ranks companies in an industry grouping on a number of environmental metrics relevant to that industry, which in aggregate could have a material impact on company earnings and therefore impact investment decisions.

In this report, we launch a Super-League Table for European electric utilities. We rank those companies that responded to CDP's Climate Change questionnaire, which account for c80%¹ of electricity produced by European electric utilities, based on a number of different emissions-related metrics. When taken in aggregate, we believe these metrics could have a material impact on a company's earnings in a European electric utility market where the regulator seeks to cut greenhouse gas (GHG) emissions in the EU by 40% by 2030 (and 80% by 2050) from 1990 levels. To meet this target, more than 45% of European electricity generation would need to come from renewable energy sources (renewables) by 2030, up from 25% in 2013; and a switch from coal back to gas generation would also be required. Additionally, this would require a functional carbon market, with a carbon price significantly higher than today's price² under the EU Emissions Trading Scheme (ETS).

It would also require a market that encourages investment in technologies that support a transition to intermittent renewables, including energy storage and also (clean) power generation technologies that can rapidly adjust

output when there is a drop in supply from renewables. In recent years, coal-fired generation has been replacing cleaner gas generation due to the continued low carbon price under the EU ETS and increased spreads between gas and coal commodity prices.

We highlight those companies that are best positioned to benefit from regulatory change and those that will struggle without adapting their existing business models. In addition, we calculate the carbon cost exposure of the utilities and the impact on earnings under different carbon price scenarios.

Scope of report: emissions

Our SLT focuses on four key areas:

-  **Carbon risk:** we assess the carbon emissions exposure of the utilities in our study and the impact on earnings under different carbon price scenarios.
-  **Renewable energy sources (renewables):** we assess the renewables portfolios for the utilities in our study, including the attractiveness of the markets they are each exposed to.
-  **Coal exposure:** coal and lignite are the power generation technology with the highest emissions intensity. As the carbon price increases, so does the risk of these assets becoming stranded. We assess the utilities' exposure to these generation sources.
-  **Water risk:** worsening water security may constrain the growth of water-intensive electric utilities both directly and indirectly via the supply chain. We assess utilities' exposure to water risk and how they react to mitigate these risk.

Most of the emissions-related metrics in this report consider both scope 1 and 2 emissions³; however, we note that on average scope 1 emissions account for more than 95% of total emissions (scope 1 and 2) for the utilities in our study.

Scope of report: why Europe?

Our report covers European electric utilities, as European companies provide the most comprehensive responses to CDP's 2014 questionnaire. By market cap, 85% of European electric utilities responded to our questionnaire, compared to 45% of US electric utilities and 25% of electric utilities outside of Europe and the US. The current lack of responses outside of Europe makes these datasets less useful.

On average, the European utilities in our study produce 75% of their electricity in Europe, including 50% in their domestic market. The remaining electricity production is split between LatAm (10%), Russia (6%), US (4%) and

rest of the world (5%). In this report, our SLT covers the global assets of the European electric utilities. However, we assess the carbon exposure and impact on earnings based only on the utilities' European assets, as the EU is one of only a few regions with a carbon trading market.

Condensed summary of the Super-League Table (SLT) for European electric utilities

SLT Rank	Company	Country	Overall SLT score	Market share in 2013 (i)	Carbon risk grade	Renewables grade	Coal exposure grade	Water risk grade	CDP performance band (2014)
1	Iberdrola	Spain	2.15	4.7%	A	A	B	A	A
2	Centrica	UK	2.55	0.8%	A	C	A	B	A
3	Verbund	Austria	4.02	1.2%	A	D	A	n/a	A
4	Enel	Italy	5.50	9.9%	B	B	C	B	B
5	EDP	Portugal	5.75	2.1%	C	A	C	B	B
6	EDF	France	5.95	24.7%	B	D	B	C	B
7	Fortum	Finland	6.75	2.3%	B	E	B	E	B
8	GDF Suez	France	7.30	11.7%	C	C	C	C	A-
9	E.ON	Germany	8.25	8.5%	C	B	D	D	B
10	Endesa	Spain	9.15	4.6%	D	E	C	C	A
11	SSE	UK	9.90	1.3%	D	B	E	E	A
12	EnBW	Germany	10.40	2.0%	E	C	D	n/a	A
13	RWE	Germany	11.60	7.5%	E	D	E	D	A
14	CEZ	Czech Republic	n/a	2.3%					
14	Public Power Corp	Greece	n/a	1.3%					
14	PGE (ii)	Poland	n/a	1.9%					
Responders:				81.1%					
Total:				86.6%					
Weighting in determining overall SLT score:					50%	20%	15%	10%	5%

Notes:

(i) In terms of global electricity generation for European utilities (GWh).

(ii) Polska Grupa Energetyczna

Source: CDP

1 Derived from Bloomberg data, comprising the 37 largest European utilities, which generated 2,900 TWh of electricity in 2013. Modelled for the utilities in our study based on CDP data and company data

2 Average carbon price to date in 2015 = EUR7.0

3 Scope 1 emissions include GHG emissions from fossil fuels burned on site, electricity transmission and distribution (T&D) losses from owned T&D systems, and SF6 used for insulation and current interruption in T&D equipment. Scope 2 emissions include indirect emissions from purchased electricity for on-site consumption.

Leaders and laggards

10 of the top 12 European electric utilities⁴ responded to CDP's 2014 questionnaire. In total, our study comprises 13 European electric utilities, which account for c80%⁵ of electricity produced by European electric utilities and together represent EUR350 billion (US\$380 billion) in market cap. The highlights of our analysis are as follows (see condensed SLT below);

- ▼ The largest non-responders to CDP's 2014 questionnaire were: CEZ, the largest utility and biggest public company in Central and Eastern Europe, Polska Grupa Energetyczna (PGE), the largest power producer in Poland with significant exposure to coal and lignite generation sources, and Public Power Corp SA, the largest electric utility in Greece. These companies came bottom of our SLT.
- ▼ The SLT gives some clear results. Iberdrola is ranked top place (with an overall SLT score of 2.15). It is significantly ahead of the nearest major electric utility, Enel, which is ranked fourth (overall SLT score of 5.50). Iberdrola is the only utility to achieve A and B grades in all areas of our analysis. It is a world leader in renewables (26% of production in 2013) and has one of the lowest exposures to coal (9% of production in 2013). It has been reducing both gas and coal production over the last few years and replacing it with renewables.
- ▼ The two smallest utilities by electricity production, Centrica and Verbund, are ranked second and third. They are both leaders in emissions intensity and have the lowest coal exposure (Centrica has no coal assets, and Verbund has 7%). In both cases their intensity is low due to zero-emission assets other than wind, solar, biomass and geothermal. Centrica produced 48% of its electricity in 2013 from nuclear and 48% from relatively low-emission Combined Cycle Gas Turbines (CCGT). Verbund produced 87% from hydro⁶.
- ▼ Enel is ranked fourth, just ahead (based on overall SLT score) of EDP and EDF, which are ranked fifth and sixth. Along with Iberdrola, EDP is a world leader in renewables. However, unlike Iberdrola, EDP has been replacing its reduced gas production (47% pa over 2010-13) with increased coal production (18% pa over 2010-13) (as well as some renewables production). This caused an increase in EDP's emissions intensity over 2010-13 and costs it a top three rank. Enel also performed well in our renewables metrics.
- ▼ GDF Suez is ranked eighth, not far from its French utility peer, EDF (ranked sixth). EDF and GDF Suez are the two largest European utilities with a 25% and 12% share respectively of all power generated by European utilities. GDF was consistently average, achieving a C-grade across all areas in our study.
- ▼ Although EDF is the largest coal plant owner in our study (with 24GW of capacity), it has been running its portfolio of coal plants at a significantly lower capacity than some of its peers, leaving its coal exposure relatively low at 8% by production.
- ▼ EDF has one of the lowest emissions intensities (due to its 74% nuclear production in 2013) but only achieves a B-grade in our carbon risk analysis. This costs EDF a higher position in the SLT, and is because our carbon cover metric, which has the highest weighting in the SLT⁷, is based purely on emissions falling within the EU ETS; and EDF has one of the highest exposures to the EU at 95% (by production) compared to a sector average of 75%.
- ▼ The three German utilities are all in the bottom five. RWE, E.ON and EnBW all have a high exposure to coal and therefore carbon cost exposure. Even at a very low carbon price of EUR4.35 in 2013, RWE's carbon cost was EUR680m. This equates to 10% of its remove EBIT⁸ in 2013.
- ▼ We note that E.ON is expected to spin off its fossil fuel and nuclear generation business in 2016 and focus on renewables. This will create a successor company keeping the E.ON brand, which will focus on renewables, electricity distribution networks and services for customers. The spin-off company will combine conventional generation, global energy trading and exploration and production. RWE has indicated that it has no plans to pursue the same strategy.

Impact of carbon exposure on EBIT

- ▼ Sandbag, the coal divestment lobbying NGO, considers a carbon price of EUR18 necessary for: a large-scale switch from coal back to gas production⁹. At this carbon price, the bottom three utilities in our SLT would all have 18% or more of their EBITs at risk. RWE would have the highest exposure, with 43% of EBIT at risk (see table next page).

4 By global electricity production (GWh), data sourced from Bloomberg.

5 Derived from Bloomberg data, comprising the 37 largest European utilities, which generated 2,900 TWh of electricity in 2013.

6 Hydro received a lower weighting than other renewables in our renewables grade as there is significantly less opportunity for growth in hydro capacity and hence for reducing exposure to fossil fuels and carbon risk.

7 The carbon cover metric carried a 50% weighting in the carbon risk analysis (and therefore a 25% weighting in the overall SLT score).

8 EBIT is adjusted for exceptional/non-recurring items and the carbon cost.

9 Based on a EUR16/MWh gas price – with a USD75/tonne coal price and EUR6/tonne carbon price.

Scenario analysis for carbon cost exposure and impact on earnings

Company	Adjusted EBIT 2013 (i)	Adjusted EBIT margin 2013 (i)	Carbon cost at EUR4.35			Carbon cost at EUR18		
			Carbon cost (EURm)	Carbon cover (ii)	Carbon cost as % EBIT (i) (ii)	Carbon cost (EURm)	Carbon cover (ii)	Carbon cost as % EBIT (i) (ii)
RWE	6,561	13%	680	9.6	10%	2,815	2.3	43%
EnBW	1,432	7%	96	14.9	7%	397	3.6	28%
E.ON	5,946	5%	265	22.4	4%	1,098	5.4	18%
SSE	2,059	6%	87	23.6	4%	361	5.7	18%
Endesa	4,436	14%	134	33.0	3%	556	8.0	13%
EDP	2,200	14%	57	38.7	3%	235	9.4	11%
EDF	9,668	13%	245	39.5	3%	1,013	9.5	10%
GDF Suez	8,028	9%	200	40.1	2%	828	9.7	10%
Enel	11,891	15%	289	41.1	2%	1,198	9.9	10%
Iberdrola	4,345	13%	66	65.6	2%	274	15.8	6%
Verbund	943	29%	11	82.1	1%	48	19.9	5%
Fortum	1,620	27%	13	124.1	1%	54	30.0	3%
Centrica	2,977	10%	11	260.2	0%	47	62.9	2%

(i) We have adjusted EBIT for exceptional/non-recurring items and the 2013 carbon cost (at EUR 4.35)

(ii) Carbon cover is number of times the company can pay its carbon cost through EBIT

Source: CDP data, company data

Linking our findings to investment choices

We recognise that investment decision are based on a multitude of different factors and that some of these factors can be misaligned with emissions reduction.

Our SLT rankings are not intended as definitive winners and losers for investment purposes; however, it is more a proxy for business-readiness in an industry where a significantly higher carbon price is required to meet stringent long-term emissions-reduction targets.

We would flag that companies towards the bottom of our SLT are possibly higher risk investments than those towards the top.

Methodology

We score each electric utility based on a number of different metrics which are first ranked and then graded A to E. A is the best grade and E is the worst. The metrics can be categorised into four key areas:

1) Carbon risk: we analyse carbon risk for the utilities based on their global assets (on average the utilities generate 75% of their electricity in Europe).

We use metrics based on carbon intensity and assess emissions-reduction targets set by the utilities against science-based targets¹⁰. We estimate the carbon exposure and impact on earnings for each utility based on its European assets.

2) Renewable energy sources: we assess utilities' renewables generation portfolio based on their generation from hydro and other renewables in 2013 and the changes in installed capacity over 2010-2013. In order to assess how well utilities capture the opportunity of renewables in various markets, we compare their growth rate of renewables production with that of their domestic markets, and assess the attractiveness of the markets they are exposed to.

3) Coal exposure: we perform a detailed review of the generation portfolio of coal and lignite of each utility. We consider the production from coal and lignite in 2013, the reduction of installed capacity over 2010-2013, and the percentage of subcritical coal plant (i.e. the least efficient and the most carbon intensive coal-fired power

generation) in utilities' coal fleet. In view of the clear regulatory drive to clean up coal and ultimately eliminate coal from power generation, this metric allows us to assess the coal risk facing each utility.

4) Water risk: we evaluate water risk facing utilities based on their water strategy, supply chain management, risks and opportunities, water use intensity and targets and goals¹¹.

Each of the above focus areas has a separate chapter within this report and the precise methodology for how we rank and grade each metric is outlined in the relevant chapter.

In addition to the four key areas, we also include CDP's annual climate performance band for 2014 in the SLT. It scores the 1,749 companies that respond to CDP's main questionnaire based on their climate change readiness. A high score can infer a well-run business with a forward looking management team, not just focused on the short term.

The table (next page) summarises the key areas of the SLT and the weightings we have assigned to each area, according to our sense of potential impact on company performance. In determining the overall SLT score, we apply these weightings to the ranks achieved by the companies in each area.

A summary of key areas, associated metrics and relative weighting within the Super-League Table

Area in super-league table	Link to company earnings	Metrics	Weighting
Carbon risk	Exposure to carbon is directly linked to cost of meeting regulatory demands.	i) Carbon cover ii) Emissions intensity (in 2013) iii) Reduction in emissions intensity (over 2010-13) iv) Progress towards emissions reduction targets	50%
Renewable energy sources	Assessment of utilities' renewables portfolio to capture the opportunity of renewables.	i) Production from renewables ii) Change in installed capacity from renewables (over 2010-13) iii) Change in installed capacity of renewables versus domestic market iv) Attractiveness of renewables markets	20%
Coal exposure	Exposure to coal, especially inefficient coal, and the risk of stranded coal assets.	i) Production from coal (in 2013) ii) Reduction in installed capacity from coal (over 2010-13) iii) Percentage of subcritical coal plants by production and by capacity	15%
Water risk	Potential physical risks may constrain the growth of the power generation business.	i) Water assessment ii) Supply chain management iii) Water risk and opportunity iv) Water accounting v) Targets and goals	10%
CDP performance band	A good annual CDP score is a proxy for a generally well-run company. Well-run companies are better placed to succeed in a changing marketplace.	i) CDP annual performance band	5%

For further study

Interesting areas for further investigation include:

Utilities based in other geographies, including the US, LatAm and China

The impact of electric vehicles and decentralised power generation on the traditional utility business model

Advanced modelling on carbon pricing scenarios. As the carbon price moves higher, the economics of gas improves relative to coal. At a certain price level, utilities which own both these power generation sources would start to switch from coal back to gas, lowering their emissions intensity; thus the utilities' carbon cost exposure would increase at a slower rate than the carbon price and in a non-linear fashion.

Utilities' participation in research, development and deployment of digital grid technology

10 Target setting methodology in line with a 2 degree decarbonization scenario

11 Verbund and EnBW were not targeted by CDP's water questionnaire in 2014 so they are not assessed in the water risk metrics. We calibrate the percentage of the other three key areas in order to have a fair assessment.

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