

# Climate Change



Sustainability Research

## Utilities vs. Carbon: Act III

### CO<sub>2</sub> risks beyond the 2013 quota cliff

#### ■ Review of climate change risks for the sector

We update our analysis of the overall risks and opportunities related to climate change regulation and to CO<sub>2</sub> mitigation efforts in the sector in the light of new challenges for European utilities.

#### ■ Sustained CO<sub>2</sub> price revival seen starting in 2011

The CO<sub>2</sub> price recently broke through its two-year price channel (EUR12-16/t) on the current nuclear crisis. We have carried out an in-depth review of our CO<sub>2</sub> price scenario. Should the shock wave from Japan dissipate, we would still see CO<sub>2</sub> demand from utilities post-2012 hedging tightening the market balance enough to push prices up to EUR25/tCO<sub>2</sub> in 2013E.

#### ■ An additional hit for the electricity utilities sector

The phase-out of free CO<sub>2</sub> rights in 2013 is already set to increase sector CO<sub>2</sub> costs up to EUR17.6bn p.a. at current CO<sub>2</sub> prices (vs. EUR2.3bn in 2010E). A EUR10/t hike in the CO<sub>2</sub> price would raise the bill to EUR27.5bn p.a. PPC and Edison are the most exposed with 64% and 29% of EBITDA 2012E at stake, respectively.

#### ■ Playing low-carbon players again?

The outperformance of a basket of low-carbon power generators shows a strong positive correlation to CO<sub>2</sub> prices since 2006. Although Verbund and Fortum are logical CO<sub>2</sub> plays, their market premiums would imply a EUR50/t CO<sub>2</sub> price to justify their EV/EBITDA multiples from a CO<sub>2</sub> impact perspective.

#### ■ CO<sub>2</sub> intensities are down, but so are green investments

The sector has cut its CO<sub>2</sub> intensity over the past three years. However, we show that planned capex in renewable energies has been revised down sharply for 2011/2012 (by 30% for Iberdrola, 22% for EDP, and 12% for RWE) with Enel being an exception.

#### ■ Next CO<sub>2</sub> risk is downstream: energy-saving obligations

France, Italy and the UK have already placed demand-side energy saving obligations on electricity and gas suppliers creating a risk of: 1) costs and penalties for non-compliance; and 2) demand destruction. The European Commission is to push member states to adopt similar schemes. Companies with strong energy services businesses (GDF Suez) appear best positioned in this environment.

#### ■ Partnership with the IIGCC on carbon disclosure

This report includes an in-depth assessment of carbon reporting standards of European utility companies, benchmarked against the disclosure requirements of the **Institutional Investor Group on Climate Change**.

**Erwan Créhalet**

Carbon Analyst  
ecrehalet@cheuvreux.com  
(33) 01 41 89 75 18

## Summary

### We expect CO<sub>2</sub> prices to be 26% higher in 2011E than in 2010

The CO<sub>2</sub> price was stuck in a tight price channel (EUR12-16/t) for two years until the recent nuclear crisis propelled it to EUR16.4/t on the back of higher gas prices and the German decision to impose a three-month shutdown for seven of the oldest nuclear reactors. In this report, we review the fundamentals of the CO<sub>2</sub> price and estimate that surplus quotas still held by cement and steel companies along with early auctions of phase III CO<sub>2</sub> rights are likely to fall short of CO<sub>2</sub> demand from utilities post-2012 hedging. Therefore, we see a tight market balance in 2011E, and expect a CO<sub>2</sub> price of EUR18/tCO<sub>2</sub> (FY 2011E) followed by EUR20/tCO<sub>2</sub> (FY 2012E). Of course permanent closure of seven nuclear reactors in Germany creates upside to this scenario, while the key downside risk lies in the outcome of the legal challenge of the inclusion of non-European airlines in the EU ETS. We are leaving our long-term price forecast unchanged at EUR30/tCO<sub>2</sub>.

### Carbon impact on electricity utilities

We show that the outperformance of a basket of low-carbon power generators (Fortum, Verbund, EDF, GDF-Suez, Iberdrola) against a basket of high-carbon companies has shown a strong positive correlation to CO<sub>2</sub> prices since 2006. We assess groups' EBITDA sensitivity to CO<sub>2</sub> prices. Verbund and Fortum are the best positioned to benefit from higher CO<sub>2</sub> prices thanks to their low CO<sub>2</sub> cost base and high leverage on CO<sub>2</sub> prices. We model that a EUR10/t hike in CO<sub>2</sub> price increases their EBITDA (2012E) by 16% and 12% respectively. Conversely, Edison is adversely affected under such a scenario (by 5%) while any rise in CO<sub>2</sub> prices will challenge PPC's capacity to recover CO<sub>2</sub> costs (29% of EBITDA 2012E at stake for +EUR10/tCO<sub>2</sub>) through increases in regulated tariffs. Valuation-wise, we show that Fortum and Verbund are already trading at significant premiums to sector multiples and that a EUR50/tCO<sub>2</sub> price would be needed to bring their EV/EBITDA, restated for post-2012 CO<sub>2</sub> impacts, in line with those of sector peers.

### CO<sub>2</sub>-intensities are down, but so is planned capex in renewable energies

The sector has shown a good track record so far in decreasing its overall CO<sub>2</sub> intensity. We show that M&A activity has played a significant role in this trend for some companies. Looking forward, however, we show that planned capex in renewable energies has been revised down significantly (by 30% at Iberdrola, 22% at EDP, and 12% at RWE). Enel is an exception. Apart from EDP and Iberdrola, the EBIT contribution of renewable businesses remains well below the increase in CO<sub>2</sub> costs in 2013E.

### The next carbon risk is downstream

The new EU Energy Roadmap released by the European Commission in March is focused on energy efficiency. One of the proposed objectives is to have member states impose demand-side energy saving mandates on energy suppliers. We have analysed existing energy-saving obligation schemes for electricity and gas suppliers in France, Italy and the UK, where regulators have significantly raised targets (e.g. 4.7x higher in France than during the previous phase), creating a risk of: 1) costs and penalties for non-compliance; and 2) demand destruction. We believe companies with strong energy services businesses (e.g. GDF Suez) are best positioned in this environment. Centrica and Edison have just created from scratch new business units to provide energy efficiency services.

### Reporting standards: a contribution to the IIGCC initiative

We benchmark the disclosure standards of European electricity utilities against the requirements of the IIGCC (as expressed in the IIGCC Disclosure Framework, see link below). We believe carbon reporting has improved dramatically since 2007 and has reached a satisfactory level overall to enable CO<sub>2</sub> risk analysis. We see room for improvement in terms of clarification of the scopes considered for their emission reduction targets and reporting of CO<sub>2</sub> allowance allocation for instance.

URL link here:

[http://www.iigcc.org/\\_data/assets/pdf\\_file/0016/268/Globalelectricutilitiesdisclosureframework.pdf](http://www.iigcc.org/_data/assets/pdf_file/0016/268/Globalelectricutilitiesdisclosureframework.pdf)

# IIGCC

Institutional Investors Group on Climate Change

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## ■ CHEUVREUX'S CARBON TEAM

**Erwan Crehalet** (coord.) France (33)-1-41 89 75 18 ( Direct ) [ecrehalet@cheuvreux.com](mailto:ecrehalet@cheuvreux.com)

**Stéphane Voisin** France (33)-1-41 89 74 69 ( Direct ) [svoisin@cheuvreux.com](mailto:svoisin@cheuvreux.com)

**Robert Walker** UK (44)-207-621 51 86 ( Direct ) [rwalker@cheuvreux.com](mailto:rwalker@cheuvreux.com)

The average CO<sub>2</sub> price in 2010 fell slightly short of our EUR15/t forecast...

## I— CO<sub>2</sub> price recovery: power generators have yet to pull the post-2012 hedging trigger

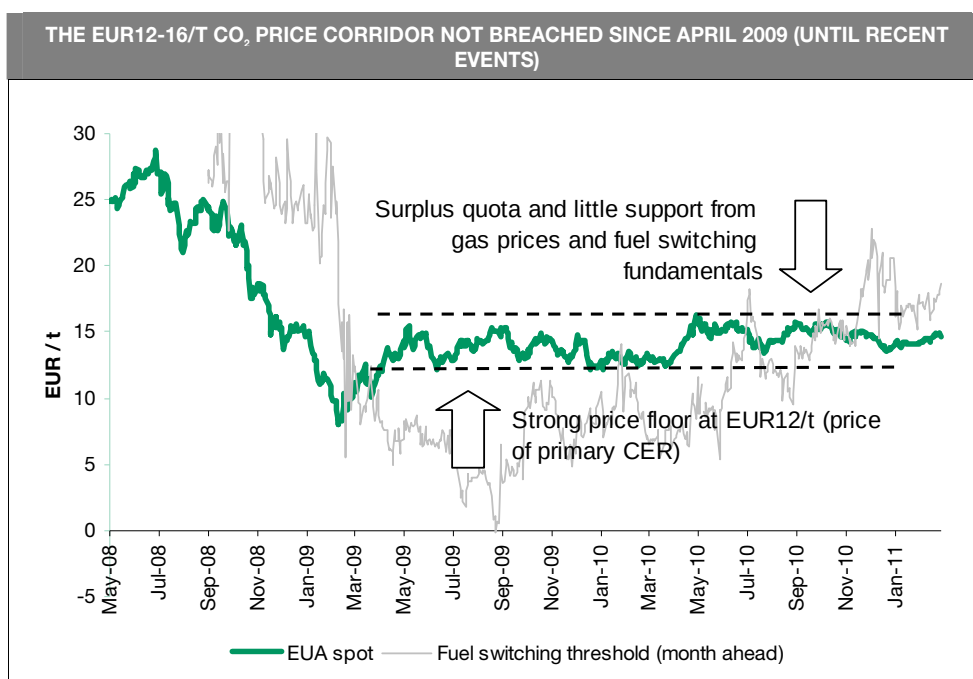
### ■ Looking in the rear-view mirror

#### Our price scenario worked rather well...

CO<sub>2</sub> has been stuck in a tight EUR12-16/t price corridor since April 2009.

Comparing with our previous price scenario set in March 2009 in our report "CO<sub>2</sub> price: Rumours of my death have been exaggerated", the average CO<sub>2</sub> price for FY 2009 was EUR13.1/t (versus EUR12/t expected) and EUR14.3/t for FY 2010 (versus EUR15/t expected).

The price of primary offset carbon credits (CER) effectively acted as a strong price floor when the coal-to-gas fuel switching threshold (the CO<sub>2</sub> price level that equalises the power generation margins of coal-fired and gas-fired plants) fell into negative territory in 2009 (-EUR3/tCO<sub>2</sub>).



Source: CA Cheuvreux, Reuters

#### ...but lacked momentum in H2 2010 to reach EUR15/t

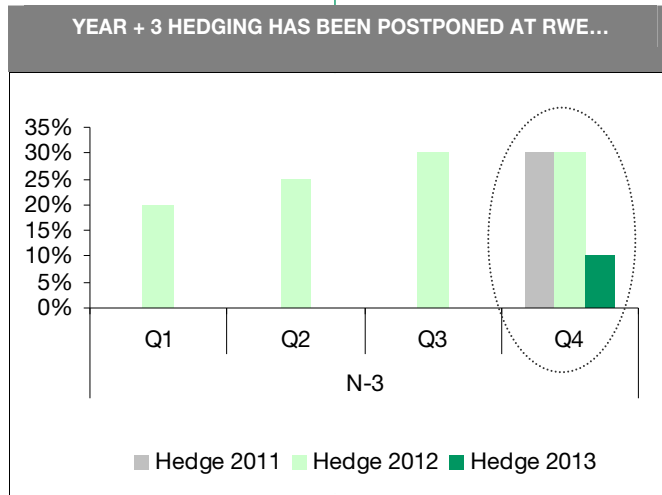
While the fuel switching threshold recovered to above EUR15/t in Q4 2010, we see two main reasons for the continued weakness in the carbon price in Q4 2010.

**1) Industrials and especially cement companies offloaded most of their annual surplus quotas in Q4 2010** (see right-hand chart below);

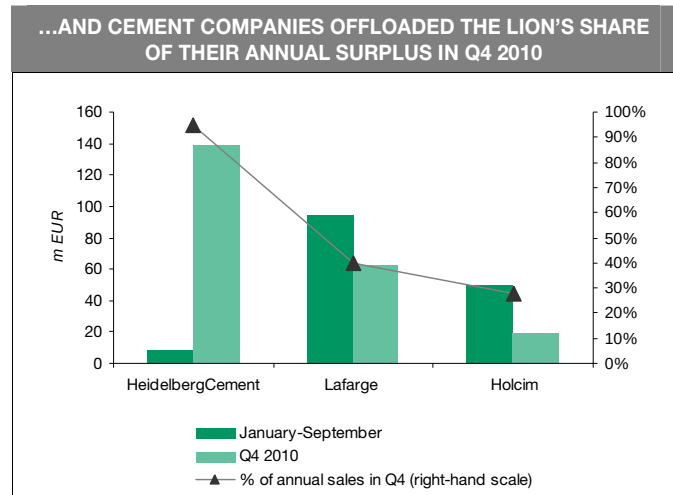
**2) Electricity utilities have postponed their hedging for 2013** due to power generation margins at historic lows. In our scenario, the demand for CO<sub>2</sub> allowances from the post-2012 hedging needs of electricity utilities is a key driver. Although we could have expected post-2012 hedging to soar as early as 2010, power generators such as RWE have postponed their hedging to avoid locking in their power generation margins of coal-

...due to the postponed take-off in post-2012 hedging by utilities

based plants at depressed levels (clean dark spreads are at historic lows). See left-hand chart below.



Source: RWE, CA Cheuvreux



Source: CA Cheuvreux, company data

**The EU carbon market is long until 2017E...**

Where do we go from this point? We revisit our CO<sub>2</sub> price scenario below.

## ■ Revisiting our price scenario and emissions forecasts

### Fundamentals are weak, but this is no surprise

We have further enhanced some parts of our model (notably for emissions forecasting in the refining and power sectors) and revised our emissions forecasts down for both the short term (to take into account the continued slump in cement production volumes, for instance) and the long term (change in the power generation energy mix).

Overall, market fundamentals are weak. We estimate that the EU ETS will be fundamentally long of EUAs until 2014 annually and until 2017 cumulatively. After the use of offset credits (CERs), the market is long until 2022.

### BALANCE ON THE EU EMISSIONS TRADING SCHEME

| (mt CO <sub>2</sub> )                  | 2008A | 2009A | 2010E | 2011E | 2012E | 2013E | 2014E | 2015E | 2016E | 2017E | 2018E | 2019E | 2020E  |
|----------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| <b>DEMAND SIDE</b>                     |       |       |       |       |       |       |       |       |       |       |       |       |        |
| Regulated emissions                    | 2 120 | 1 884 | 1 911 | 1 947 | 2 216 | 2 299 | 2 319 | 2 334 | 2 359 | 2 360 | 2 354 | 2 369 | 2 374  |
| of which airlines                      |       |       |       |       | 238   | 243   | 250   | 256   | 262   | 269   | 275   | 282   | 289    |
| of which sectors opted-in in phase III |       |       |       |       |       | 95    | 96    | 96    | 97    | 97    | 98    | 98    | 99     |
| <b>SUPPLY SIDE</b>                     |       |       |       |       |       |       |       |       |       |       |       |       |        |
| Emissions cap                          | 2 003 | 2 051 | 2 059 | 2 069 | 2 297 | 2 299 | 2 261 | 2 224 | 2 186 | 2 148 | 2 110 | 2 073 | 2 035  |
| of which free allocation               | 1 957 | 1 967 | 1 991 | 2 000 | 2 196 | 1 113 | 1 065 | 1 017 | 970   | 922   | 874   | 827   | 779    |
| of which auctioned                     | 46    | 84    | 69    | 69    | 101   | 1149  | 1159  | 1169  | 1179  | 1189  | 1199  | 1209  | 1219   |
| <b>MARKET BALANCE</b>                  |       |       |       |       |       |       |       |       |       |       |       |       |        |
| Balance before offsets                 | -117  | 167   | 148   | 121   | 80    | 0     | -58   | -110  | -173  | -212  | -244  | -296  | -339   |
| Cumulative balance before offsets      | -117  | 51    | 199   | 320   | 400   | 400   | 342   | 232   | 59    | -152  | -396  | -692  | -1 031 |
| Cumulative balance after offsets       | -34   | 215   | 485   | 746   | 966   | 1 086 | 1 148 | 1 158 | 1 105 | 1 014 | 890   | 714   | 495    |

Source: CA Cheuvreux

At this stage of the reasoning, the market balance points to a CO<sub>2</sub> price equilibrium at the level of the CER production cost (~EUR12/tCO<sub>2</sub>), i.e. the price level experienced in 2009 at the height of the economic crises.

**...but market and price dynamics are much more complex**

**Post-2012 hedging by utilities has yet to start**

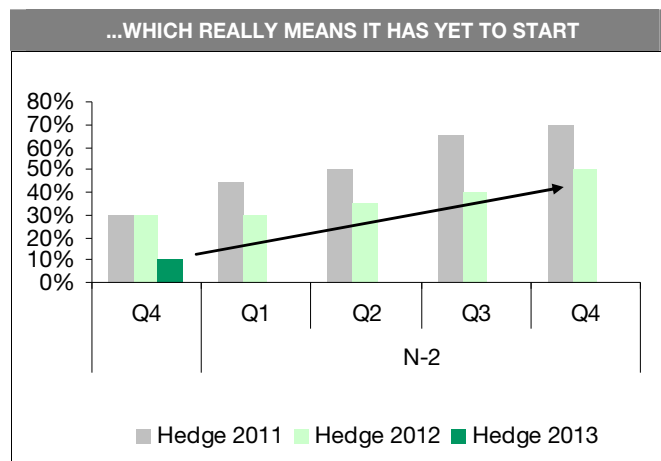
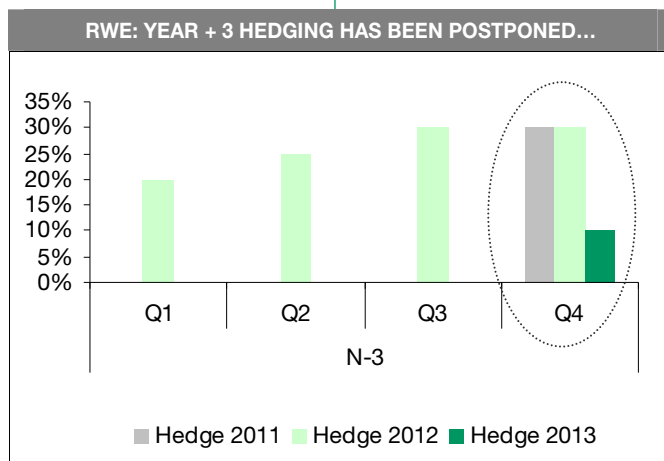
However, the balance on the CO<sub>2</sub> market is far more flexible than suggested by the table above. More parameters, and especially an analysis of the upcoming flows of sales and purchasing, have to be integrated in order to refine this analysis.

### However, utility hedging has yet to distort annual market balances

What has not been achieved remains to be done. We estimate that by end Q3 2011, hedging for 2013 will create demand for 426 million CO<sub>2</sub> allowances.

We see several reasons to believe that large power generators will start increasing their hedging:

- For risk policy reasons. If we consider the hedging for forward contracts Year + 2, the proportion hedged by the largest producers in Europe was more or less constant at the end of Q3.
- Utilities usually buy CO<sub>2</sub> rights as and when they sell forward electricity contracts. We highlight this quote from RWE's annual report: "With respect to forward sales, we generally purchase or hedge the prices of the fuel required to generate the electricity when we enter into the agreements. This also holds true for the purchase of emission allowances."
- We note that some of the main emitters have ultimately started hedging 2013. Vattenfall and RWE reported hedged volumes for 2013 for the first time at the occasion of their FY 2010 results.
- In addition, the recent hike in gas prices (a consequence of higher gas demand from Japan) and the decision by the German government to shut down seven of the oldest nuclear reactors for at least three months, is pushing electricity prices higher. Clean dark spreads have recovered slightly from the historical low which could create a window of opportunity for power generators to hedge coal generation margins for 2013 (i.e. sell electricity and buy coal and CO<sub>2</sub> with delivery contracts in 2013)



**We estimate demand for 364m CO<sub>2</sub> allowances by Q4 2011...**

We estimate (see table below) that power generators will have to buy forward 364 million CO<sub>2</sub> allowances by end Q3 2011 in order to cover their 2013 forward electricity sales.

## HEDGING OF MAIN EUROPEAN POWER GENERATORS

|                                                                      | Hedged production (% of total) at end of Q3 of year N-2 |      |                        | Expected CO <sub>2</sub> hedging by end of Q3 2011 |                                                   |
|----------------------------------------------------------------------|---------------------------------------------------------|------|------------------------|----------------------------------------------------|---------------------------------------------------|
|                                                                      | 2011                                                    | 2012 | 2013E (avg. 2011-2012) | Emissions – mtCO <sub>2</sub> (2009)               | CO <sub>2</sub> to be hedged (mtCO <sub>2</sub> ) |
| Enel (Italy)                                                         | 0                                                       | 23   | 11                     | 37.1                                               | 4                                                 |
| Enel (Spain)                                                         | 0                                                       | 0    | 0                      | 31.5                                               | 0                                                 |
| Iberdrola                                                            | 0                                                       | 0    | 0                      | 24.2                                               | 0                                                 |
| Gas Natural                                                          | 30                                                      | 0    | 15                     | 8.5                                                | 1                                                 |
| EDP                                                                  | 20                                                      | 0    | 10                     | 20.0                                               | 2                                                 |
| E.ON (Central Europe)                                                | 60                                                      | 60   | 60                     | 83.1                                               | 42                                                |
| E.ON (Nordic)                                                        | 70                                                      | 60   | 65                     | 1.7                                                | 1                                                 |
| RWE                                                                  | 65                                                      | 40   | 53                     | 158.2                                              | 83                                                |
| Vattenfall (Contin. Europe)                                          | 25                                                      | 40   | 33                     | 82.0                                               | 16                                                |
| CEZ                                                                  | 40                                                      | 36   | 38                     | 37.2                                               | 11                                                |
| Fortum                                                               | 35                                                      | 35   | 35                     | 2.0                                                | 1                                                 |
| GDF Suez                                                             | 70                                                      | 70   | 70                     | 52.8                                               | 37                                                |
| <i>Subtotal</i>                                                      |                                                         |      |                        | 538                                                | 197                                               |
| <b>Total (excl. free CO<sub>2</sub> rights in Eastern countries)</b> |                                                         |      |                        | <b>992.6</b>                                       | <b>364</b>                                        |

Source: CA Cheuvreux, CITL, company data

...and 1,214m by the end of 2012E

Industrials have already sold a significant share (26-54% est.) of phase II surpluses...

By the end of 2012E, following the same methodology, we estimate that the hedging requirements of power generators will generate demand for 1,214 million CO<sub>2</sub> allowances.

### Supply side likely to fall short of this demand boost by end 2011

There are several sources of supply of CO<sub>2</sub> rights. However, summing up these sources' capacity and their likelihood of delivering CO<sub>2</sub> rights, we find that 2011 is short of EUAs. We review the different sources of supply below.

#### Surplus EUAs held by industrials: a significant share has already been sold

Due to the drop in production volumes in 2009 (continued in 2010 for some sectors), the CO<sub>2</sub> emissions of industrial sectors have fallen well below their emissions cap. These sectors are thus net sellers on the carbon market.

In order to assess how much they can supply in the future, it is necessary to assess how much they have already sold. To do so, we have carried out a bottom-up analysis of the revenues raised by steel and cement companies (which hold the lion's share – 80% in 2010E – of surplus emissions allowances) over 2008-2010. The table below summarises our findings.

## ESTIMATE OF SURPLUS EUAs STILL IN THE HANDS OF INDUSTRIALS

| Sector | Sample of companies                                                 | % of sector emissions | Accumulated surplus by end 2012E | Already sold (abs / %) | Estimate of phase II surplus still available for sale (sector) | View on phase III constraint                                                                                                         | Assumption of phase II surplus carried over into phase III (%) |
|--------|---------------------------------------------------------------------|-----------------------|----------------------------------|------------------------|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| Steel  | ArcelorMittal, ThyssenKrupp, Voestalpine, Ruukki, Salzgitter, SSAB  | 66%                   | 101.5                            | 26 / 26%               | 114                                                            | Sharp recovery of production volumes and challenging allocation benchmarks. Phase III shortage: 105 million                          | 50%                                                            |
| Cement | Lafarge, HeidelbergCement, Italcementi, Holcim, Buzzi Unicem, Cemex | 52%                   | 160                              | 86 / 54%               | 143                                                            | Production volumes down since 2008. Downbeat outlook for 2011. Industry satisfied with allocation benchmark. Phase III surplus: 170m | 0%                                                             |

Source: CA Cheuvreux, company data

...while early auctions  
of phase III  
allowances will not  
really start until 2012

The catch-up in CER  
issuance has come to  
an end

*Methodological note:* On the steel sector, the six steel producers have reported income from CO<sub>2</sub> sales of more than EUR300m over 2008-2010. At the average market price, we estimate that ~25% of the sector surpluses would have already been sold (26m out of 103mtCO<sub>2</sub>). By extrapolation to the whole sector, we estimate a remaining accumulated surplus available for sale of 116m out to end 2012. Interestingly, the bottom-up analysis reveals that steel companies are less long on CO<sub>2</sub> rights than suggested by the sector emissions data published by the European Commission. This is due to the fact that steel producers have to transfer for free a portion of their free allocation when they sell blast furnace (waste) gas to third-party power and heating stations. For SSAB, this represented more than 30% of the group's emission cap in 2008. Voestalpine is even likely to be short of CO<sub>2</sub> allowances over 2008-2012. SSAB stopped selling its surpluses in 2010 despite its continuous long position on the market.

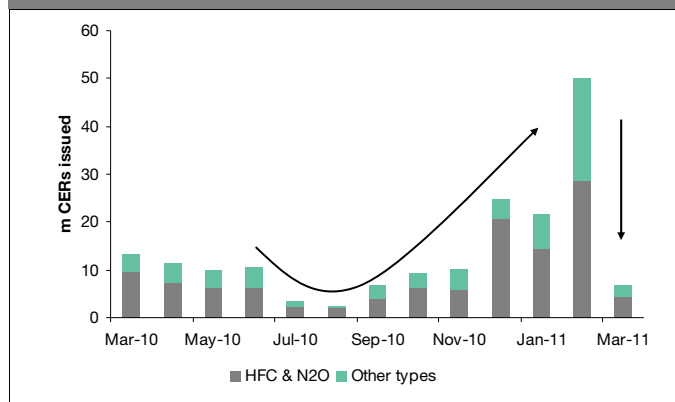
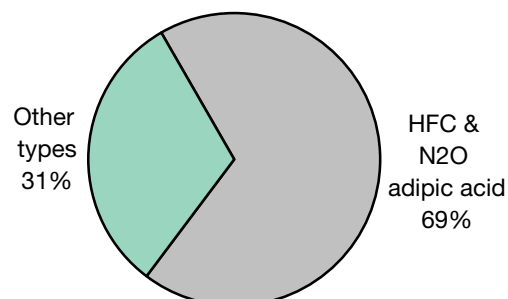
**Unused phase II New Entrant Reserves:** Member States have set aside some CO<sub>2</sub> rights intended to be allocated to new capacities. However, due to the economic recession, a portion of these reserves will remain unused by end 2012. Member States are likely to sell these surpluses on the market. We believe it is more likely for this supply to hit the market in 2012, but Greece, for instance, had plans to sell 10 million surplus EUAs as early as January 2011. We estimate that some 300m CO<sub>2</sub> rights from NERs will be unused by the end of phase II and are therefore available for sale on the market.

**Reserve set aside for funding of carbon capture & storage (CCS) projects:** The European Investment Bank is in charge of raising money from the sale of 300m phase 3 emission allowances, notably in order to fund CCS projects. The bank recently announced that it will sell 200m in H1 2012 and the remainder by the end of 2012. As a result, we do not expect this supply to meet utilities' demand in 2011. Nevertheless, this supply is likely to compress carbon prices in 2012.

**Early auctions of phase 3 quotas:** Member States will have 1,117m in allowances to auction for 2013E. Since the European Commission recognises the need to meet the demand of utilities for hedging post-2012 positions, the DG Climate Change has proposed to auction off 120 million EUAs by the end of phase 2. A decision by the Council should not be expected before the summer, though, so we do not expect such auctions to take place before 2012. Germany, the UK and Poland, which have opted out of the common auction platform, will carry out their early auctions separately. In all, we assume a supply of 200 million allowances drawn from phase 3 by the end of 2012.

**Offset carbon credits (CERs/ERUs):** The use of offset carbon credits (CERs/ERUs) allows industrials to increase their supply of EUAs thanks to swap contracts, and utilities to erase a part of their demand for EUAs. Industrials already used 66 million offsets for compliance in 2008 and 2009. We expect them to use 60m for compliance annually over 2010-2012E, thus raising the amount of EUAs freed up to 126m potentially available for sale in 2011, and 246m by the end of 2012. Regarding utilities, they already used 98m offsets over 2008-2009 and we expect them to significantly increase the use of CERs for compliance by end 2012E as they will rush to use HFC and N<sub>2</sub>O adipic acid offset credits from their portfolios of CDM projects before the ban on these credits takes effect in 2013. This also means that these credits (69% of the CERs supplied so far) cannot meet demand for EUAs related to post-2012 hedging. The availability of issued non-chemicals CERs remains limited, and while there has been an increase in deliveries of CERs in the past few months, the catch-up effect in CER deliveries by the UN seems to have run out of steam. The average monthly issuance over 2010-2011 was just 1.7mt higher than in 2008-2009.

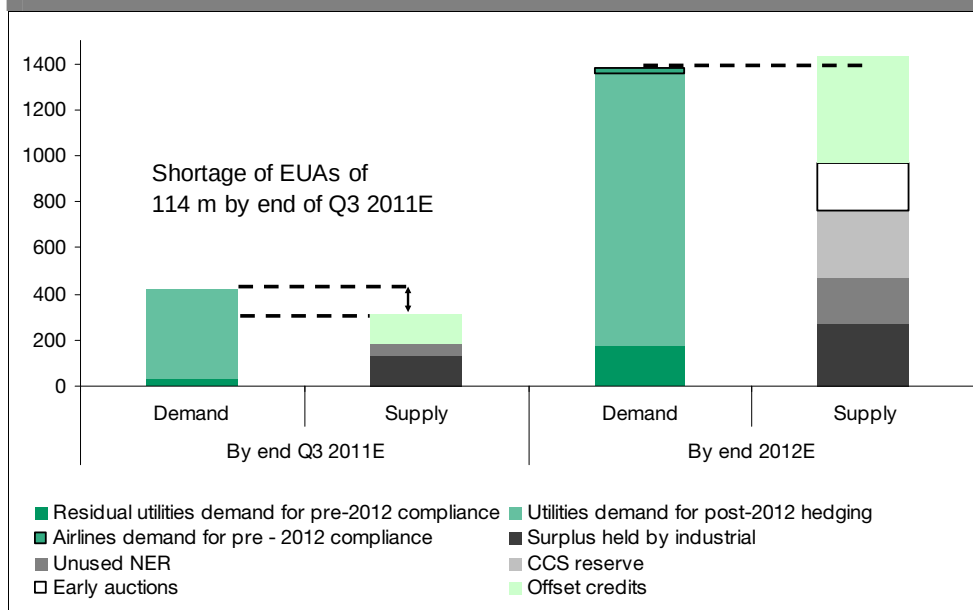
## MONTHLY ISSUANCE OF CERs BY TYPE

SHARE OF HFC AND N<sub>2</sub>O ADIPIC ACID CERs  
(OUT OF 553 MILLION ISSUED CREDITS)

## Conclusion: Our new price scenario is barely changed

In the following chart, we present the results of our modelling of expected flows of supply and demand for carbon credits.

## EXPECTED BALANCE ON THE CARBON MARKET BASED ON A FLOW ANALYSIS



The market balance is expected to be short by 114 m EUAs by end Q3 2011

Overall, we expect the market balance to be tight in 2011 before easing in 2012/2013 notably due to the inflow of EUAs from the CCS special reserve and early auctions of phase III emissions allowances, before tightening again in 2013.

## EXPECTED BALANCE ON THE CARBON MARKET BASED ON A FLOW ANALYSIS

| (allowances in millions) | by end Q3 2011 | by end 2012 | by end 2013 |
|--------------------------|----------------|-------------|-------------|
| Cumulative balance       | -114           | 16          | -14         |
| Annual change            |                | +131        | -31         |

Source: CA Cheuvreux

**This should push the CO<sub>2</sub> price back up to fuel switching threshold levels**

**Early auctions in 2012 are likely to cap a further price increase**

### Effects for the CO<sub>2</sub> price

The temporary shortage of EUAs is likely to push CO<sub>2</sub> prices back up to the coal-to-gas fuel switching threshold, in our view, in order to reduce tension on the market.

We believe that fuel switching potential is currently, limited as gas-fired power stations already have higher-than-usual load factors, and we expect the rise in gas prices to significantly increase the CO<sub>2</sub> price benchmark at which gas-fired power stations are incentivised to operate before coal-fired ones (i.e. the coal-to-gas fuel switching threshold). The uptrend in gas prices is also likely to provide some support and to sustain any increase in the price of CO<sub>2</sub>, in our view.

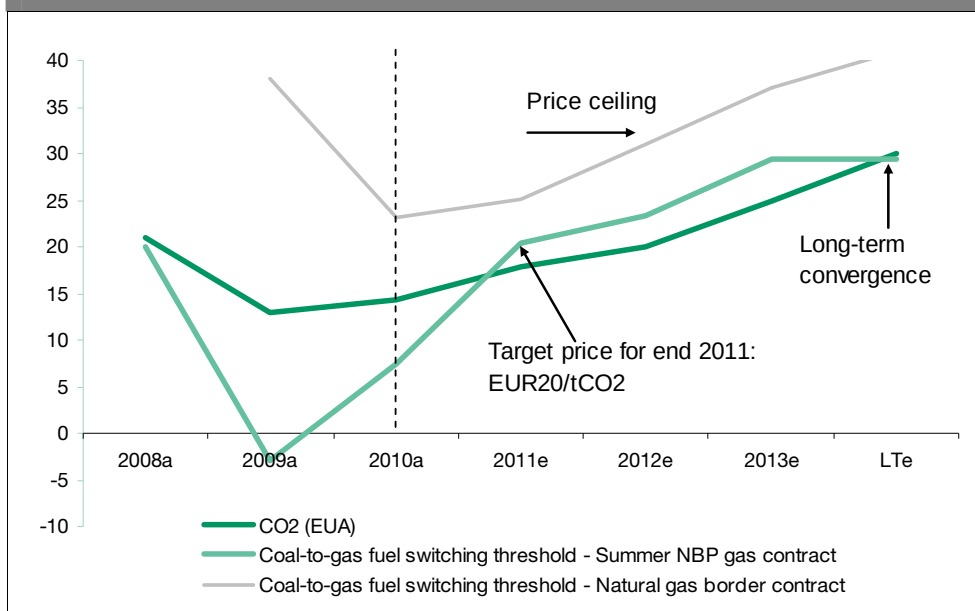
### OUR NEW CARBON PRICE SCENARIO

|                                            | 2010R     | 2011E   | 2012E   | 2013E | LT est. | Unit                   |
|--------------------------------------------|-----------|---------|---------|-------|---------|------------------------|
| CO <sub>2</sub> (EUA)                      | 14.3 (15) | 18 (18) | 20 (23) | 25    | 30 (30) | EUR / tCO <sub>2</sub> |
| Fuel switching threshold – summer          | 8         | 20      | 23      | 29    | 29      | EUR / tCO <sub>2</sub> |
| Fuel switching threshold – border contract | 23        | 25      | 31      | 37    | 41      | EUR / tCO <sub>2</sub> |
| Nat. gas – border contract                 | 7.8       | 9.7     | 10      | 10.5  | 11      | USD / MMBtu            |
| Nat. gas – summer NBP contract             | 6.2       | 9.2     | 9.2     | 9.7   | 9.8     | USD / MMBtu            |
| Coal (delivery in Europe)                  | 92        | 120     | 115     | 113   | 114     | USD / tonne            |

Source: CA Cheuvreux

Compared to our previous scenario, we have revised down our price forecast for 2012 to take into account the effect of the sales of the CCS reserve. We have added a full-year forecast for 2013 at EUR25/tCO<sub>2</sub> and have left our long-term price forecast unchanged at EUR30/t.

### FORECAST TREND IN CARBON PRICES AND THE COAL-TO-GAS FUEL SWITCHING THRESHOLD



Source: CA Cheuvreux

**A sluggish/moderate rebound in production volumes except in the steel and paper sectors in 2010**

**Rise in emissions from power generation limited by the increase in CO<sub>2</sub>-free power**

## ■ Forthcoming events and key risks to our scenario

In this section, we give a preview for the release of 2010 verified emissions data, and our view of the key risks to our benchmark carbon price scenario.

### The 2010 emissions true-up: we expect a slight 1.4% rebound in EU ETS emissions in 2010E

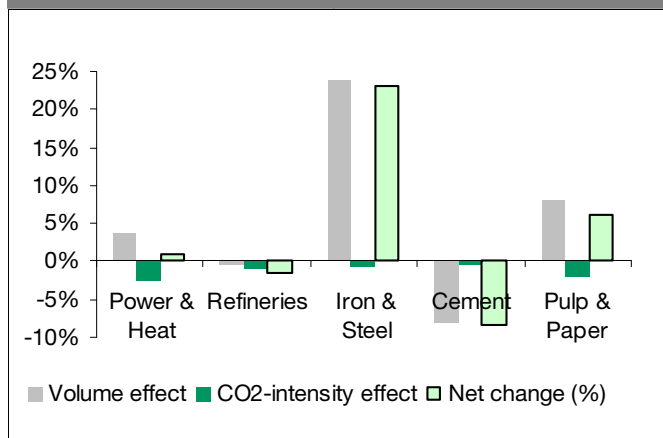
The figures for CO<sub>2</sub> emissions in 2010 will be released as from 1 April. Although we do not expect the released figures to surprise the consensus considerably, this event remains key for CO<sub>2</sub> prices, as this is the only annual true-up.

CO<sub>2</sub> emissions dropped by 11.1% in 2009, pushed down by a sharp cut in production volumes in all regulated sectors, along with a significant reduction in the average carbon intensity of the EU-27 power generation energy mix (an estimated 4.4% decline).

For 2011, we expect only a moderate rebound, as the recovery in production volumes was rather sluggish in most of the regulated sectors apart from steel (est. +24%) and paper production (est. +8%). Production volumes for refineries and cement plants declined even further compared to 2009.

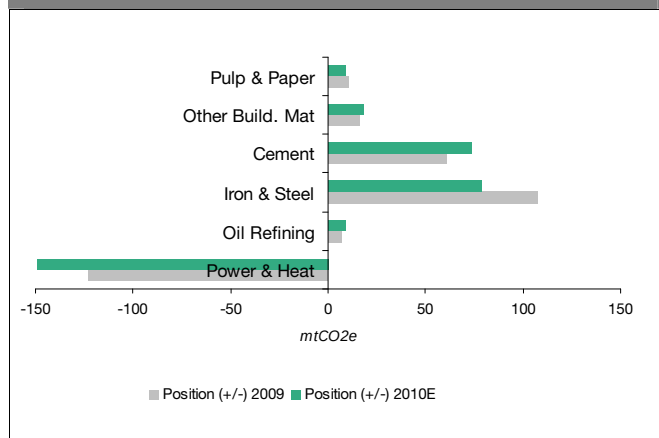
Power generation accounts for 74% of total regulated emissions and is therefore a critical sector when it comes to forecasting CO<sub>2</sub> emissions, and also the most difficult to predict. Based on our analysis of power generation data at end October 2010 for all 27 EU Member States and FY 2010 data for Germany, we estimate a low 1% rebound in CO<sub>2</sub> emissions for the sector. Despite a +3.6% (est.) increase in power production, we expect that the change in the energy mix, and especially the increase in carbon-free power generation (wind, solar, biomass and hydro), is likely to have cut the average carbon intensity by 2.6%.

FORECAST TREND IN EMISSIONS BY SECTOR



Source: CA Cheuvreux, CERA, BDEW, CEPI, Eurofer, IEA

ESTIMATED POSITION OF SECTORS AGAINST THEIR EMISSIONS CAPS



Source: CA Cheuvreux

**A released figure below 1.9bn could put downward pressure on the CO<sub>2</sub> price**

In all, we expect the system to be long on emissions allowances by 70mtCO<sub>2</sub> in 2010E (139mt including amounts released in auctions).

### Versus consensus

2010 emissions forecasts vary from 1.87 to 2.01bn tCO<sub>2</sub>, and average 1.95bn tCO<sub>2</sub> according to a poll by Reuters and released on 9 February 2011 and adjusted for more recent forecasts made by two specialised consulting firms. Our estimate falls in the low range of emissions forecasts, and we believe that the consensus may adjust its figures down in March.

**Uncertainty over inclusion of non-European airlines creates a much greater risk for CO<sub>2</sub> prices in the long term...**

**...as almost half of total demand for CO<sub>2</sub> rights comes from the airlines sector over 2012-2020E**

### CONSENSUS OF EMISSIONS FORECASTS FOR 2010

|                       | 2010 emissions forecast (bn tonne CO <sub>2</sub> ) |
|-----------------------|-----------------------------------------------------|
| High-end              | 2.010                                               |
| Average               | 1.945                                               |
| CA Cheuvreux estimate | 1.911                                               |
| Low-end               | 1.874                                               |

Source: CA Cheuvreux, Reuters

### Legal challenge over inclusion of non-European airlines in the EU ETS: the main downside risk to our scenario

We note that the main risk for CO<sub>2</sub> price fundamentals comes from the still-pending decision by the EU Court of Justice over the legitimacy of the EU to cap emissions of US (and more generally non-EU) airlines. Airlines are expected to be a major source (~49% in our model) of CO<sub>2</sub> demand over 2012-2020.

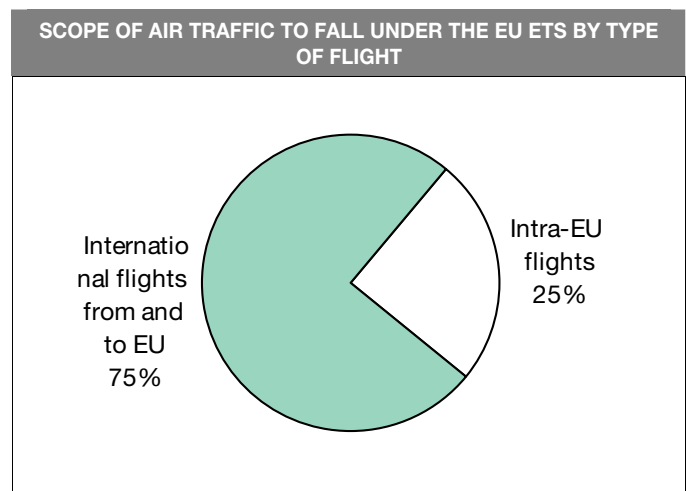
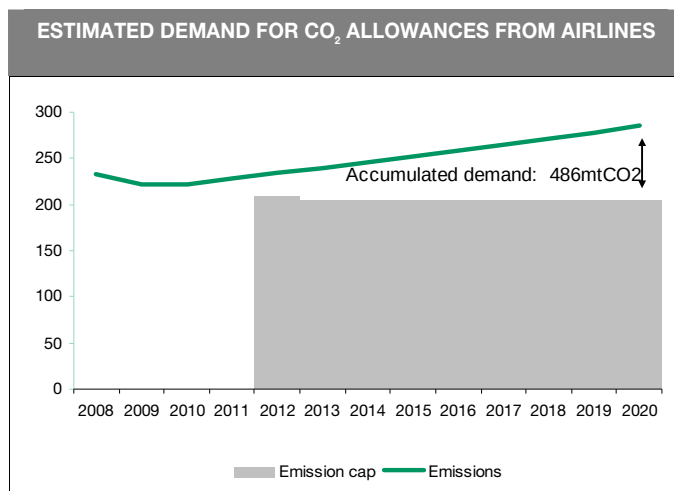
**Background:** The Air Transport Association of America (ATA) and three of its members initiated legal action against the EU in December 2009, claiming that the EU ETS Directive violates the principles of international conventions and agreements governing international aviation (the Chicago Convention, the Open Skies agreement between the EU and the US, and the Kyoto Protocol's provisions).

The decision of the European Court of Justice (ECJ) is still pending, with no visibility on the timing of a decision. In addition, many non-EU countries stated at the ICAO Assembly that they would ignore the existence of the EU ETS.

It is difficult to predict the final judgement of the European Court of Justice. Still, if the ECJ judgement highlights flaws in the EU Directive, and if legally feasible, the EU could be inclined to 'recalibrate' the EU ETS in such a way that the legal requirements of the ECJ are met.

If the ECJ finds that the EU is not allowed to include any or all inbound and outbound international flights operated by non-European airlines in the EU ETS, we believe that the European Commission is likely to apply the same rules to EU carriers in order to maintain a level playing field.

The exclusion of international flights would have a dramatic impact on the projected market balance within the EU ETS, as airlines represent 49% of total demand for CO<sub>2</sub> rights over 2012-2020E and international flights account for 75% of the sector's CO<sub>2</sub> emissions.



**Security concerns  
have raised  
reputational risks  
rather than pricing  
risk... so far**

Apart from the legal challenge, the Association of European Airlines (AEA) voiced its continued support for the EU ETS in February 2011, but warned on 12 key issues to be resolved by the end of the year if inclusion is to take place in January 2012. These include technical issues: some Member States have not yet transposed the Directive, and the emissions baseline has not yet been published by the European Commission.

### Security concerns: reputational rather than operational and pricing risks... so far

After VAT frauds in 2009, and the scandal of recycled CERs in 2010, the EU carbon market recently faced thefts of CO<sub>2</sub> allowances. These thefts highlight security loopholes in the system and create a serious reputational issue for the carbon market (technical security solutions have obviously yet to be implemented), as well as legal risks for operators as long as there is not a full transparency on the list of stolen EUAs. The fear of holding stolen EUAs has been paralysing the spot market, as we are seeing low volumes associated with a small price discount on spot contracts compared to contracts with forward delivery. Since most of the transactions historically occur on the forward market, the overall impact is limited in our view. We note that the amount of emission allowances stolen represents just a tiny portion (less than 0.5%) of the total annual allocation of CO<sub>2</sub> rights, and the suspension of carbon registries only impacted emission spot markets, while total traded volumes in February were up 11% compared to January according to PointCarbon.

However, if the security problems are not fixed by the end of the year say, there is a risk of contamination of reduced confidence over the legal origin of the CO<sub>2</sub> allowances to the forward market (at the time of physical delivery when contracts expire).

In addition, the shutdown of several spot markets might have temporarily prevented industrials from offloading their surplus quotas. The reopening of the ICE platform spot market might therefore temporarily weigh on the CO<sub>2</sub> price.

### New climate & energy plan: a +EUR11/tCO<sub>2</sub> option in our long-term price forecast

Draft leaks of the European Commission's new energy and climate strategy revealed that the Commission intends to focus on demand-side energy-saving measures that would put Europe on the path to a 25% reduction in greenhouse gases, instead of pushing for a switch to a 30% reduction target.

**Cutting phase III supply by 5-8% through set-aside reserves could push the CO<sub>2</sub> price up to EUR41/t**

In addition, the European Commission uses the argument that further energy-saving measures would cut CO<sub>2</sub> emissions regulated under the EU ETS (e.g. lower demand for electricity & heat) to propose a corrective measure in the form of postponing the auctioning of 500 to 800 million CO<sub>2</sub> allowances initially planned to be allocated in phase 3. These figures have been removed from the European Commission's final proposal.

This would (but maybe just temporarily?) reduce the supply of auctioned CO<sub>2</sub> rights by 5% to 8%. However, we believe that Member States are likely to resist any attempts to reduce their revenues from CO<sub>2</sub> auctions, which help them to fund subsidies for renewable energies.

### German decision on nuclear phase-out

The German government has suspended the lifetime extension of nuclear plants in order to have more time to analyse the situation. Although we doubt there will be a full cancellation of the lifetime extension, the government has imposed a three-month shutdown for seven of the oldest nuclear reactors.

Two of the oldest nuclear plants might be permanently shut down (EnBW's Neckarwestheim and potentially RWE's Biblis A). Assuming a load factor of 80%, we estimate that replacing the annual power output of these two plants by thermal capacity (a mix of gas and coal) would increase CO<sub>2</sub> emissions, hence demand for CO<sub>2</sub> rights, by some 8.6mt p.a. In the same manner, we estimate that permanent closure (still hypothetical at this stage) of all the German nuclear plants with a shutdown date initially planned before end 2012 could increase demand by up to 31mtCO<sub>2</sub> (see table below).

### POTENTIAL INCREASE IN DEMAND FOR EUAS IN CASE OF PERMANENT SHUTDOWN OF OLDEST GERMAN NPPS

| Power plant                                          | Neckar 1 | Biblis A | Isar 1 | Biblis B | Unterweser | Brunsbüttel       | Philippsburg 1 |
|------------------------------------------------------|----------|----------|--------|----------|------------|-------------------|----------------|
| Operator                                             | EnBW     | RWE      | E.ON   | RWE      | E.ON       | Vattenfall / E.ON | EnBW           |
| Capacity (MW)                                        | 785      | 1167     | 878    | 1227     | 1345       | 771               | 890            |
| Initial estimated date of shutdown                   | 2010     | 2011     | 2011   | 2012     | 2012       | 2012              | 2012           |
| Annual production (TWh)                              | 5.5      | 8.2      | 6.2    | 8.6      | 9.4        | 5.4               | 6.2            |
| Potential increase in CO <sub>2</sub> emissions (mt) | 3.5      | 5.2      | 3.9    | 5.4      | 5.9        | 3.4               | 3.9            |
| Cumulative (mtCO <sub>2</sub> ) Quaterly basis       | 0.9      | 2.2      | 3.1    | 4.5      | 6.0        | 6.8               | 7.8            |
| Cumulative (mtCO <sub>2</sub> ) Annual basis         | 3.5      | 8.6      | 12.5   | 17.9     | 23.9       | 27.3              | 31.2           |

Source: CA Cheuvreux, RWE Factbook 2010

The news has also pushed up the wholesale electricity price in Germany and so-called clean dark spreads (margins that coal-fired power plants can lock at market prices) from historically low levels. This may create a more favourable environment incentivising electricity utilities to hedge their post-2012 CO<sub>2</sub> needs.

Should the German government decide to permanently shut down these plants, we may slightly increase our CO<sub>2</sub> price forecasts for 2011, and especially 2012.

### PRICE IMPLICATIONS OF KEY UNCERTAINTIES

|                          | By end Q3 2011 | By end 2012 | By end 2013 | Price implications                                                                                                                                                                                                                                                                                                |
|--------------------------|----------------|-------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Balance                  | -114           | 17          | -14         | Benchmark price scenario                                                                                                                                                                                                                                                                                          |
| Balance, 650m set aside  | -114           | 17          | -95         | The market balance becomes short of EUAs (after use of CERs) annually in 2014 (instead of 2016 in the base case) and cumulatively in 2020 (2022). This could push the CO <sub>2</sub> price up to the upper fuel switching threshold and add EUR8-13/tCO <sub>2</sub> to our base case scenario in the long term. |
| Balance without airlines | -114           | 42          | 46          | Airlines to represent 47% of net demand by 2020E with an accumulated shortage of 486m over 2012-2020. This might cap the CO <sub>2</sub> price at EUR20/t by 2020.                                                                                                                                                |

Source: CA Cheuvreux

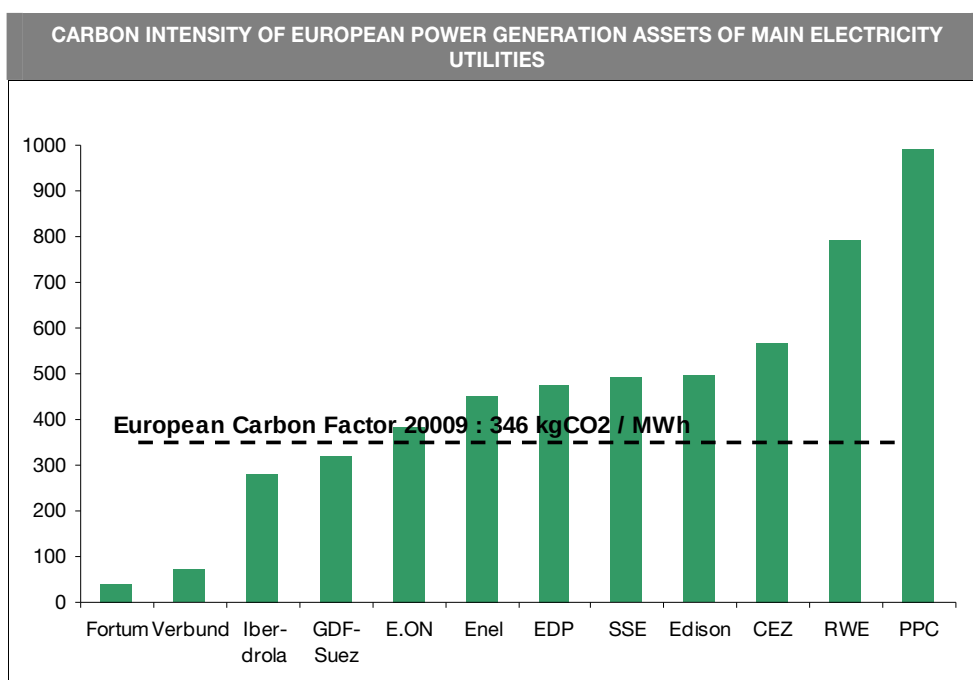
## II – Carbon impact on electricity utilities

We show that the outperformance of a basket of low-carbon power generators (Fortum, Verbund, EDF, GDF-Suez, Iberdrola) against a basket of high-carbon companies has shown a strong positive correlation to CO<sub>2</sub> prices since 2006. We assess groups' EBITDA sensitivity to the CO<sub>2</sub> price. Verbund and Fortum are the best positioned to benefit from higher CO<sub>2</sub> prices thanks to their low CO<sub>2</sub> cost base and high leverage on CO<sub>2</sub> prices. We model that a EUR10/t hike in CO<sub>2</sub> price increases their EBITDA (2012E) by 16% and 12% respectively. Conversely, Edison is adversely impacted under such a scenario (by 5%) while any rise in the CO<sub>2</sub> price will challenge PPC's capacity to recover CO<sub>2</sub> costs (29% of EBITDA 2012E at stake for +EUR10/tCO<sub>2</sub>) through increases in regulated tariffs. Valuation-wise, we show that Fortum and Verbund are already trading at significant premiums to sector multiples and that a EUR50/tCO<sub>2</sub> price would be needed to bring their EV/EBITDA multiples, restated for post-2012 CO<sub>2</sub> impacts, in line with those of sector peers.

### ■ Low-carbon: an outperforming play?

We have created two baskets of stocks based on the respective carbon intensities of electricity utility companies. Those with a carbon intensity higher than 346kgCO<sub>2</sub>/MWh (close to the European average) are in the high-carbon basket, while the others are in a low-carbon basket. Companies in each basket are equally weighted.

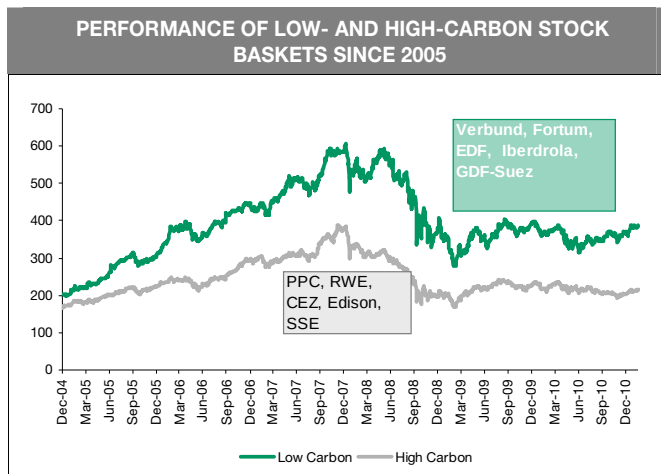
- Low-carbon basket: Verbund, Fortum, EDF, Iberdrola, GDF Suez;
- High-carbon basket: PPC, RWE, CEZ, Edison, Scottish & Southern Energy.



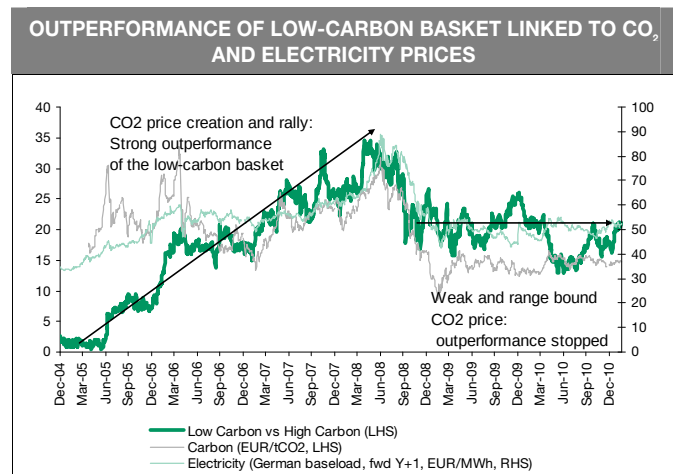
Source: PWC Carbon Factor 2010

**The basket of low-carbon stocks outperformed when the CO<sub>2</sub> price rose over 2006-May 2008**

The low-carbon basket outperformed the high-carbon one from 2005 until May 2008. This period corresponds to the creation of the CO<sub>2</sub> price signal and the rally of energy commodities, including CO<sub>2</sub> prices, which culminated at EUR32.9/t on 1 July 2008.



Source: CA Cheuvreux



Source: CA Cheuvreux

We find that correlation factors have been high between the relative outperformance of low-carbon stocks and CO<sub>2</sub> / electricity prices since 2005. There is also an extremely strong correlation between CO<sub>2</sub> prices and German electricity prices.

Correlation factors:

- CO<sub>2</sub> and low-carbon outperformance: 0.76 since 2007
- Power and low-carbon outperformance: 0.75 since 2005
- CO<sub>2</sub> and power: 0.86

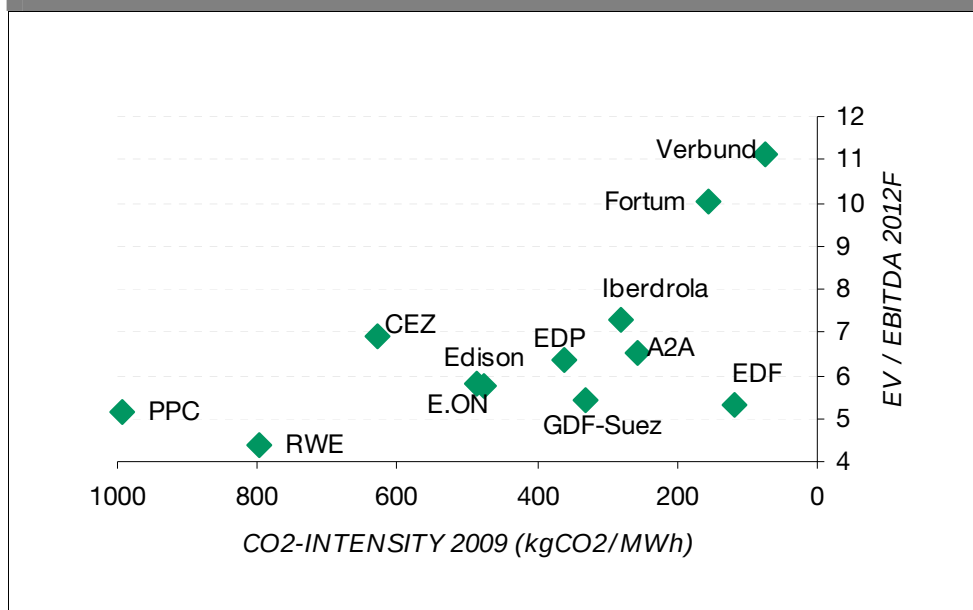
### ■ Restating valuation multiples for post-2012 CO<sub>2</sub> impacts

Although once could be tempted to play the full low-carbon basket to gain exposure to our scenario of a CO<sub>2</sub> price recovery, we remain cautious on the fundamental valuation of some low-carbon stocks. In addition, the market played a price deregulation story for EDF in 2007/2008, but this is now obviously over.

Four low-carbon stocks (Acciona, Fortum, Iberdrola and Verbund) are trading at multiples above the sector average (6.7x), whereas among high-carbon stocks, only SSE and CEZ are trading at a premium.

**Five low-carbon stocks are already trading at multiples above the sector average**

## VALUATION MULTIPLES VERSUS CARBON INTENSITY OF EUROPEAN POWER GENERATORS



Source: CA Cheuvreux, FactSet, company data

**2012 EBITDAs not representative of the phase III carbon pressure**

However, EBITDA forecasts for 2012 are not fully representative, as they do not integrate the sharp increase in CO<sub>2</sub> costs linked to the phase-out of free CO<sub>2</sub> rights for power generators in western European countries in 2013.

### The quota gap in 2013: tracking residual free CO<sub>2</sub> rights

It is now well known that 2013 will mark the end of free CO<sub>2</sub> rights for power generators. However, there are some exceptions to this rule.

**Residual free CO<sub>2</sub> rights for...**

#### District heating and the heating portion of CHP production

Heat production remains eligible for free CO<sub>2</sub> rights from 2013 onwards, but the allocation follows complex rules. We would simplify them as follows. 1) District heating plants and the heating portion of Combined Heat and Power (CHP) plants will receive free CO<sub>2</sub> rights up to 80% of the historical emissions level, multiplied by a benchmark value (62.3tCO<sub>2</sub> / TJ); 2) unless the heat consumer is regulated under the EU ETS. In the latter case, the consumer receives free CO<sub>2</sub> rights associated with heating.

**...heat generation...**

Assuming that heat producers for EU ETS-regulated clients will be able to pass on extra CO<sub>2</sub> costs, we estimate that the effect of these rules is equivalent to maintaining free CO<sub>2</sub> rights of ~4.1m in 2013E for Fortum, 3.9m for GDF Suez, 7.7m for Vattenfall and 11m for Veolia Environnement.

#### Transitional regime for power generation in eight eastern European countries.

The Czech Republic, Poland, Hungary, Romania, Bulgaria and the three Baltic countries are allowed to continue to provide their electricity utility companies with free CO<sub>2</sub> rights from 2013 onwards (from 70% down to 0% in 2020).

**...and power generation in eastern Europe...**

Apart from local companies such as CEZ or PGE, we also expect EDF and GDF Suez (in Poland), RWE (Hungary) and Enel (Bulgaria) to continue to receive free CO<sub>2</sub> rights for their operations in eastern European countries. This post-2012 free allocation is still a risk, though, as many governments of the countries concerned have yet to announce whether they intend to benefit from this transitional regime, and if so, to what extent.

...depending on  
governmental  
decision

e.g. CEZ hit by the  
Czech government's  
decision to speed up  
the phase-out of free  
CO<sub>2</sub> rights

Watch out!  
Allowances reported  
are not always given  
as per financial  
consolidation  
methods

For instance, in October 2010, the Czech Republic decided to sell up to CZK45bn in carbon credits between 2013 and 2020 instead of granting them for free to electricity utilities. The money raised would be used to subsidise the development of solar power and to curb a steep rise in electricity prices.

The government had initially planned to fully benefit from the transitional regime and grant free CO<sub>2</sub> rights with a value of CZK68bn over 2013-2020. The new proposal will therefore only leave one-third of this amount available for power generators for free. As CEZ emits ca. 35mtCO<sub>2</sub> on average (2007-2009) in the Czech Republic, we estimate that the new proposal has cut the amount of free CO<sub>2</sub> rights CEZ could have expected in 2013 by ca. 16m. At the current CO<sub>2</sub> market price of EUR15.8/t, this points to a EUR259m additional CO<sub>2</sub> compliance cost for CEZ in 2013E. We see no possibility of passing this extra CO<sub>2</sub> cost on in electricity prices (free market prices already integrate the full CO<sub>2</sub> opportunity cost). CEZ faces CO<sub>2</sub> costs as early as 2011, as the government also decided to tax 32% of the free allocation for 2011-2012 (at market price). In all, assuming CEZ has to pay CO<sub>2</sub> costs of EUR163m in 2011E and 2012E, we estimate that the increase in CO<sub>2</sub> costs in 2013 will be ca. EUR222m (at current CO<sub>2</sub> market prices).

#### ESTIMATED IMPACT OF ACCELERATED PHASE-OUT OF FREE CO<sub>2</sub> RIGHTS FOR CEZ

| CEZ – Czech Rep.                                        | 2013E |
|---------------------------------------------------------|-------|
| CO <sub>2</sub> emissions (mtCO <sub>2</sub> e)         | 35.1  |
| Free CO <sub>2</sub> rights if normal gradual phase-out | 24.6  |
| Free CO <sub>2</sub> rights under new proposal          | 8.2   |
| Differential in CO <sub>2</sub> costs (EUR m)           | -259  |

Source: CA Cheuvreux, CITL

The Czech proposal could inspire other eastern European countries to better arbitrage how many carbon credits they grant for free to utilities and how much they sell through auctions to raise cash over 2013-2020. If Poland were to accelerate the phase-out of free CO<sub>2</sub> rights, we estimate this could cost PGE EUR500m of CO<sub>2</sub> rights in 2013.

#### Consolidation issues

We also warn that the data on CO<sub>2</sub> rights provided by companies do not follow group financial consolidation rules. We have therefore restated data provided by Acea, EDF and Edison, and applied the same consolidation percentages as for financial consolidation.

In addition, we have consolidated or deconsolidated the emissions allowances of acquired or divested assets (e.g. GDF – IP, RWE – Essent, EDF – EnBW). Therefore, while emissions allowances of the acquired company may not be in the figures reported in 2009, they are integrated into our models.

## THE 2013 FREE ALLOCATION GAP FOR MAIN ELECTRICITY UTILITIES

|                      | Regulated emissions | Free CO <sub>2</sub> rights (2012E) | Residual free CO <sub>2</sub> rights in 2013 |                                | 2013 allowance gap | Cost at EUR15/tCO <sub>2</sub> |
|----------------------|---------------------|-------------------------------------|----------------------------------------------|--------------------------------|--------------------|--------------------------------|
|                      | mtCO <sub>2</sub>   | mtCO <sub>2</sub>                   | Heat CO <sub>2</sub> rights 2013             | East E. CO <sub>2</sub> rights | mtCO <sub>2</sub>  | (EUR m)                        |
| A2A                  | 2.2                 | 4.1                                 |                                              |                                | 2.2                | 34                             |
| ACEA                 | 1.7                 | 2.1                                 |                                              |                                | 1.7                | 25                             |
| Centrica             | 8.9                 | 6.1                                 |                                              |                                | 6.1                | 89                             |
| CEZ                  | 37.2                | 41.9                                |                                              | 11.5                           | 25.7               | 222                            |
| E.ON                 | 89.9                | 74.6                                |                                              |                                | 74.6               | 1 119                          |
| EDP                  | 20.0                | 16.1                                |                                              |                                | 16.1               | 122                            |
| EDF                  | 60.5                | 50.8                                |                                              | 8.1                            | 42.7               | 641                            |
| ENEL                 | 76.1                | 66.4                                |                                              | 3.5                            | 62.9               | 1112                           |
| Fortum               | 7.7                 | 5.5                                 | 4.1                                          |                                | 1.4                | 21                             |
| GDF Suez             | 62.9                | 53.4                                | 3.9                                          | 3.9                            | 45.6               | 684                            |
| Iberdrola            | 24.0                | 18.7                                |                                              |                                | 18.7               | 281                            |
| MVV Energie          | 3.4                 | 2.3                                 |                                              |                                | 2.3                | 35                             |
| RWE                  | 152.6               | 113.2                               |                                              | 4.3                            | 108.9              | 1 633                          |
| Vattenfall           | 90.0                | 61.0                                | 7.7                                          |                                | 53.3               | 800                            |
| Veolia Environnement | 14.1                | 16.4                                | 11.3                                         |                                | 5.2                | 78                             |
| Verbund              | 4.6                 | 2.5                                 |                                              |                                | 2.5                | 32                             |
| PPC                  | 49.7                | 44.2                                |                                              |                                | 44.2               | 663                            |
| Edison               | 22.3                | 20.0                                |                                              |                                | 20.0               | 299                            |

Source: CA Cheuvreux, company data, CITL

### The CO<sub>2</sub> effect on the top line depends on the structure of electricity markets

### The CO<sub>2</sub> price effect: positive or negative for operating results?

Apart from the impact of the phase-out of free CO<sub>2</sub> rights in 2013, the financial results of power generators are also sensitive to CO<sub>2</sub> prices, both at the top line (through the electricity price) and the bottom line (higher compliance costs) levels.

In order to model the CO<sub>2</sub> price effect on the top line, we made the following assumptions:

- Coal-fired power stations with a carbon intensity of 0.73tCO<sub>2</sub>/MWh set the electricity price in central and eastern Europe and the Nordic countries;
- 0.36x the CO<sub>2</sub> price is reflected in electricity prices in the UK, Spain and Italy, where gas-fired power stations provide the marginal MWh to balance supply and demand on the network;
- No CO<sub>2</sub> pass-through on regulated markets, or for electricity sold under special regimes (e.g. feed-in tariffs, regulated tariffs).

These assumptions have been applied to the electricity sales structure of power generators. We provide an example in the following table.

### BREAKDOWN OF ELECTRICITY SALES BY TYPE OF ELECTRICITY MARKET

| (TWh) | Coal at the margin | Gas at the margin | Price fixed under special regime |
|-------|--------------------|-------------------|----------------------------------|
| E.ON  | 138                | 58                | 9                                |
| EDF   | 9.3                | 92                | 441                              |
| RWE   | 182.1              | 35.4              | 7.8                              |

Source: CA Cheuvreux, company data

Any increase in CO<sub>2</sub> prices also raises CO<sub>2</sub> compliance costs for emissions not covered by residual free CO<sub>2</sub> rights.

### ESTIMATED EFFECT OF A EUR5/TCO<sub>2</sub> PRICE INCREASE ON GROUP OPERATING RESULTS (AFTER 2012)

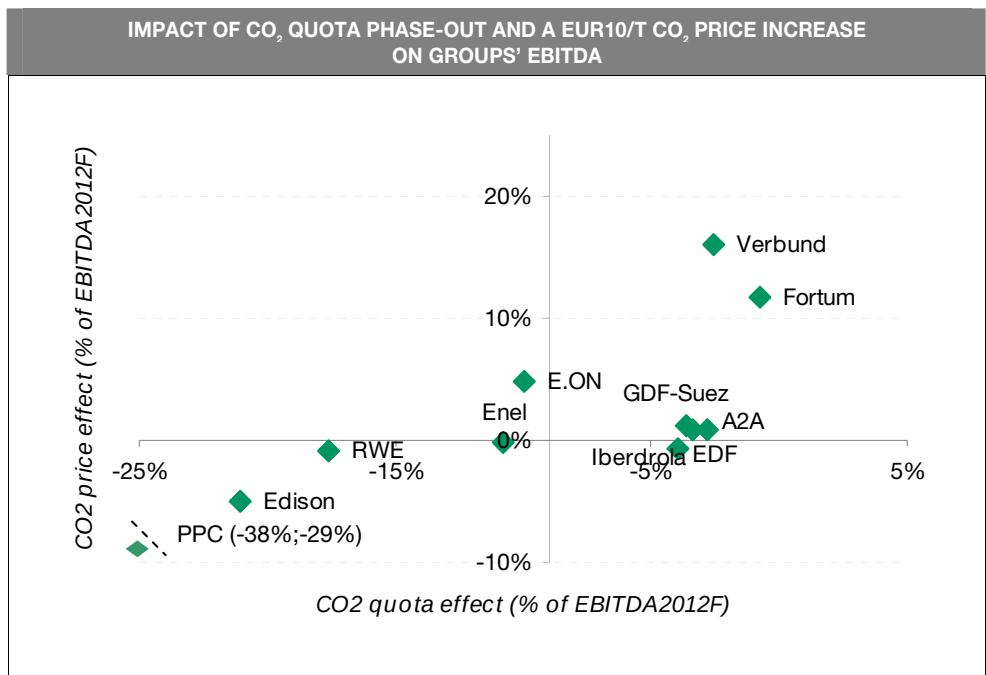
| (EUR m)   | Top-line effect | Cost effect | Net effect |
|-----------|-----------------|-------------|------------|
| Centrica  | 69              | -55         | 15         |
| CEZ       | 237             | -128        | 109        |
| E.ON      | 608             | -324        | 284        |
| EDF       | 199             | -262        | -63        |
| ENEL      | 347             | -363        | -16        |
| Fortum    | 176             | -18         | 158        |
| GDF Suez  | 388             | -276        | 112        |
| Iberdrola | 165             | -129        | 35         |
| RWE       | 728             | -769        | -41        |
| Verbund   | 110             | -10         | 99         |
| PPC       | 0               | -249        | -249       |
| Edison    | 76              | -111        | -36        |

Source: CA Cheuvreux

**Verbund and Fortum  
are set to benefit the  
most from a CO<sub>2</sub> price  
increase...**

### Conclusion

The matrix below reflects the CO<sub>2</sub> risks and opportunities better than a simple analysis of the groups' carbon intensity as it also captures the effects of CO<sub>2</sub> prices on the top line. This helps explain the difference between the CO<sub>2</sub> profiles of Verbund and Fortum versus EDF, GDF Suez and Iberdrola, hence part of the spreads in valuation multiples to a certain extent. This clearly suggests that CO<sub>2</sub> issues are already priced in by the market.

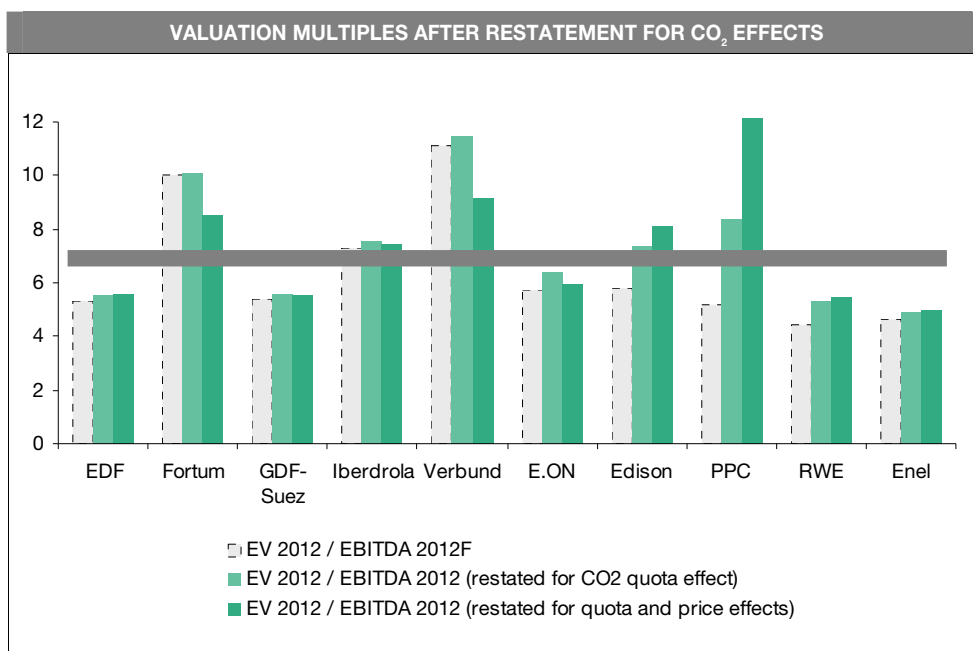


Source: CA Cheuvreux

The following chart shows the impact on valuation multiples after restating 2012 EBITDA forecasts for: 1) additional CO<sub>2</sub> costs in 2013, assuming a constant CO<sub>2</sub> price of EUR15/t; and 2) additional phase 3 CO<sub>2</sub> costs and a CO<sub>2</sub> price increase of EUR15/tCO<sub>2</sub> (corresponding to our EUR30/tCO<sub>2</sub> long-term price forecast for the third trading period).

The aim of such an analysis is to understand what share of the discounts or premiums in valuation multiples can be explained by various exposures to CO<sub>2</sub> effects. Of course many other factors influence the premiums or discounts on company valuations.

Fortum and Verbund clearly appear to remain expensive despite the high CO<sub>2</sub> leverage potential for their top lines. We find that – all else being equal – a CO<sub>2</sub> price of EUR50/tCO<sub>2</sub> would be needed to boost Verbund's and Fortum's EBITDA to such an extent that EV/EBITDA multiples fall in line with the sector average. Other factors such as the level of sovereign risk and local regulatory risk can explain the ongoing residual premium and a more comprehensive analysis for each company is needed to come to investment conclusions (see the table below).



Source: CA Cheuvreux

**PPC's current valuation is challenged by CO<sub>2</sub> costs...**

**...but PPC still has some potential to pass through extra CO<sub>2</sub> costs in electricity prices**

RWE and Enel are trading at low multiples. In the case of RWE, the analysis shows that the CO<sub>2</sub> issue alone cannot explain the current discount on multiples.

PPC is the most challenged by CO<sub>2</sub> risks. The current valuation clearly suggests that the market believes in the company's ability to negotiate an increase in regulated electricity prices in order to pass through the surge in CO<sub>2</sub> costs in 2013. The higher the CO<sub>2</sub> price, the greater the challenge for PPC.

We believe that PPC could obtain a 14% increase in electricity tariffs, corresponding to a 60% recovery of emissions costs (management guidance calls for recovery of between 50% and 100%). Over the 50-year history of PPC, such a rise would correspond to the largest increase carried out in the past (in Dec. 2007/June 2008) without disruptions from the public. Additional arguments for the feasibility of this pass-through are the following:

- Electricity tariffs in Greece are low. Based on the EU-27 September 2010 data on electricity tariffs, Greek household tariffs stand 28% lower than the European average, at the low end of the range. For the industrial sector, Greek tariffs were also 6% below the EU-27 average.
- Electricity tariffs still account for less than 2% of disposable income for low-income consumers; thus, any increase will not have a significant impact on their financial situation despite the economic crisis.
- Greece is located at the edge of Europe with limited interconnections (at present), which limits competition from other countries.

Conversely, the adverse impact on Edison (5% of EBITDA 2012E at stake for a EUR10/t CO<sub>2</sub> price increase) is not offset by the CO<sub>2</sub> price pass-through in electricity prices.

## INVESTMENT RECOMMENDATIONS IN THE UTILITY SECTOR

|                       | 2012E EV/EBITDA<br>(x, restated for CO <sub>2</sub> ) | Rating                            | Comment on investment case                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------|-------------------------------------------------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Enel                  | 4.9                                                   | 2/Outperform                      | Despite >EUR1bn CO <sub>2</sub> cost burden in 2013E, the CO <sub>2</sub> impact appears relatively low at the group level. We have a 2/Outperform rating because deleveraging has been completed, and dividend and capex are sustainable going forward. Discount to the sector is no longer justified by low growth and high leverage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| RWE                   | 5.4                                                   | 2/Outperform                      | We regard the company's 2013 guidance as a bear case scenario. Most importantly, management has not incorporated a full reversal of the burden from the gas-to-oil spread into its forecasts, despite the fact that management is already in advanced-stage negotiations for more than 70% of its contracts. Also, management has assumed a base-load electricity price of EUR52 per MWh vs. the current forward price of EUR54 per MWh. In addition to this, we see upside potential stemming from the use of CO <sub>2</sub> emissions reduction certificates, additional cost-cutting after 2012 and higher commodity prices. We thus believe RWE stands a strong chance of generating EBITDA of EUR9bn in 2013E, even after disposals, vs. the current guidance of EUR8bn. Trough valuation shows that the stock's minimum fair value should be in the mid-EUR40's. |
| EDF                   | 5.6                                                   | 2/Outperform -<br>Sector Top Pick | Low exposure to CO <sub>2</sub> effects overall. EDF is uniquely positioned in the sector, as it offers a defensive profile on regulatory issues, combined with upside potential on the electricity front.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| GDF Suez              | 5.5                                                   | 2/Outperform –<br>Sector Top Pick | The integration of International Power is likely to increase group's global carbon intensity. Group exposure to CO <sub>2</sub> costs in Europe is relatively low thanks to its diversified portfolio. In addition, we consider GDF Suez to be an attractive play in light of its sovereign and regulation risks and financial leverage. While GDF Suez is not a pure play on an electricity price recovery, it is not trading at a premium to peers despite its above-average resilience to sector risks.                                                                                                                                                                                                                                                                                                                                                              |
| E.ON                  | 5.9                                                   | 3/Underperform                    | E.ON expects additional CO <sub>2</sub> costs of EUR0.9bn between 2011 and 2013 (assuming EUR17/tCO <sub>2</sub> ). We expect the group's earnings to be positively impacted by a rise in CO <sub>2</sub> prices.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Fortum                | 8.6                                                   | 3/Underperform                    | We fail to see the rationale for buying Europe's second-most expensive utility at a peer premium close to its historical high. As support from recently favourable weather conditions (i.e. low hydro reservoir levels and cold temperatures) is likely to fade, we believe the shares will underperform the market. Also, the comparison base, given high spot prices, will become much tougher and Fortum's single most important profit driver, i.e. the average achieved electricity price, is set to remain flat over the coming years.                                                                                                                                                                                                                                                                                                                            |
| Edison                | 8.1                                                   | 3/Underperform                    | CO <sub>2</sub> burden in 2013E puts restated valuation multiples above the sector average. Our 3/Underperform rating is based on ongoing pressure on gas and electricity margins and high leverage. In our view, the speculative appeal of the potential buyout of minorities following the likely reshuffle of shareholding is priced in, and we do not expect any takeover at a price much above the current share price.                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Verbund               | 9.2                                                   | 3/Underperform                    | Verbund's results are positively correlated to CO <sub>2</sub> prices but Verbund is the most expensive utility, and we show that it would need a EUR50/tCO <sub>2</sub> to bring its EV/EBITDA restated for post-2012 CO <sub>2</sub> effects in line with peers. Its domestic and foreign subsidiaries/participants do not yield an appropriate RoE. High capex over next years will squeeze FCF generation.                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| PPC                   | 27.9                                                  | 2/Outperform                      | PPC has decommissioned one lignite unit in Megalopolis in 2010, with a full-year benefit as from 2011. Assumption for 2012 emissions stand at ca. 43mt CO <sub>2</sub> . PPC's pass-through could be ca. 14%, i.e. for 60% recovery of the emissions costs (management guidance calls for a 50-100% recovery rate).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Sector average</b> | <b>6.7</b>                                            |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

Source: CA Cheuvreux

## III – Carbon reduction plans: are they paying off?

*Almost all European electricity utilities have set carbon emissions reduction targets. In this section, we compare the carbon mitigation ambitions of the companies. We also point out that investments in renewable energy capacities (and wind especially) have been significantly revised down.*

### ■ Performance against emission reduction targets

Most of companies (except Fortum due to expansion in Russia, Vattenfall and EnBW) have reduced their CO<sub>2</sub>-intensity over the past few years. EDP has the most constant and impressive track record in this respect with an average annual decrease of 9%.

#### TREND IN CARBON-INTENSITY OF MAIN EUROPEAN ELECTRICITY UTILITIES

| kgCO <sub>2</sub> /MWh     | 2006 | 2007 | 2008 | 2009 | 2010 | Average annual trend (%) |
|----------------------------|------|------|------|------|------|--------------------------|
| Centrica                   | 394  | 390  | 379  | 371  |      | -2.0%                    |
| CEZ                        | -    | -    | -    | 630  |      | N/A                      |
| E.ON                       | 490  | 500  | 484  | 476  |      | -1.0%                    |
| EDP                        | 485  | 457  | 387  | 362  |      | -9%                      |
| EDF                        | -    | -    | 133  | 117  |      | -12%                     |
| EnBW                       | 240  | 254  | 235  | 241  | 299  | +11.6%                   |
| Enel                       | 488  | 465  | 437  | 413  |      | -5%                      |
| Fortum                     | -    | 64   | 134  | 155  | 189  | 43%                      |
| GDF Suez                   | -    | -    | 381  | 366  |      | N/A                      |
| Iberdrola                  | -    | 309  | 289  | 279  |      | -5%                      |
| RWE                        | 797  | 866  | 768  | 796  | 730  | -4.3%                    |
| Scottish & Southern Energy | -    | 496  | 491  | 494  |      | -0.2%                    |
| Vattenfall                 | -    | 429  | 426  | 434  |      | 1%                       |
| Edison                     | -    | 545  | 524  | 486  |      | -6%                      |

Source: Company data, CA Cheuvreux

External factors to the group strategies, such as hydro conditions or the level of demand, can also have a strong influence on the trend in carbon intensities on a year-on-year basis. This is particularly true for companies located in Nordic countries (e.g. Fortum) and in the Iberian Peninsula (e.g. Iberdrola), where hydro conditions have a large influence on the total energy mix used.

In addition, M&A moves can greatly influence the carbon intensity of a group and speed up the achievement of targets.

■ Centrica: In 2009, Centrica reached a deal with EDF to purchase a 20% stake in **nuclear power** generator British Energy and to offtake 20% of available power for GBP2.3bn. We estimate that Centrica's carbon factor is likely to have declined to 293kgCO<sub>2</sub> per MWh (from 370kgCO<sub>2</sub> per MWh) due to the consolidation of British Energy.

■ GDF Suez – International Power: The weight of coal in the mix will increase following the integration of International Power (to ~14% of gross capacity) with the effect of increasing the group's carbon intensity, from 0.33tCO<sub>2</sub>/MWh (GDF Suez) to 0.43tCO<sub>2</sub>/MWh (estimate for GDF Suez + IP).

■ RWE – Essent: RWE's CO<sub>2</sub> intensity came from 796kgCO<sub>2</sub> per MWh in 2009 down to 730 kgCO<sub>2</sub> per MWh in 2010. We estimate that the integration of Essent contributed to ca. 30% of the improvement.

**M&A deals drive the biggest leaps in CO<sub>2</sub> intensity**

**Enel and Edison have no quantified emissions reduction target at all**

### EFFECT OF THE INTEGRATION OF ESSENT ON RWE'S CARBON INTENSITY

| 2009                               | Essent | RWE (excl. Essent) | RWE (incl. Essent) | Change |
|------------------------------------|--------|--------------------|--------------------|--------|
| TWh                                | 16.9   | 187.2              | 204.1              | +16.9  |
| CO <sub>2</sub> (mt)               | 9.4    | 149.1              | 158.5              | +9.4   |
| CO <sub>2</sub> intensity (kg/MWh) | 557    | 796                | 776.7              | -19.3  |

Source: RWE

### Emissions reduction targets and distance from targets

Companies with no emission reduction targets at all are now the exceptions (Enel, Edison). Some groups, such as EDF and GDF Suez, have not set group-wide reduction targets, but key business divisions have adopted targets. Increasingly though, European utilities have both mid-term (before 2015) and long-term (2020 and thereafter) carbon reduction targets.

### EMISSION REDUCTION TARGETS OF EUROPEAN POWER GENERATORS

| kgCO <sub>2</sub> / MWh | 2009              | 2012 (forecast) | Mid-term target (before 2015)                                                                           | Long-term target (after 2015)                                            | Implied avg. reduction target p.a. |
|-------------------------|-------------------|-----------------|---------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------------------------|
| RWE                     | 813 (730 in 2010) | 771             | 670 in 2013 (incl. use of CDM/JI credits)                                                               | 450 by 2020<br>Generation mix set to be 75% "zero or low carbon" by 2025 | -2.8% to 2013; -4.7% to 2020       |
| CEZ                     | 630               | -               | 530 by 2015<br>Absolute CO <sub>2</sub> emissions will increase by 2015                                 | 350 in 2020                                                              | -2.8% to 2015 and -5.2% to 2020    |
| Edison                  | 558               | -               | -                                                                                                       | -                                                                        | N/A                                |
| SSE                     | 491               | -               | -                                                                                                       | 300 by 2020                                                              | -4.4%                              |
| E.ON                    | 476               | -               | 360 in 2013 (Europe only; vs. 391 in 2010)                                                              | 310 by 2020 (Europe only)                                                | -2%                                |
| ENEL                    | 427               | -               | -                                                                                                       | -                                                                        | N/A                                |
| EDP                     | 362               | 254             | 270 by 2012                                                                                             | 120 by 2020                                                              | > 9%                               |
| GDF Suez                | 366               | -               | Target for Electrabel Belgium only (-1.7mtCO <sub>2</sub> cumulated reduction until 2015 based on 2007) |                                                                          | N/A                                |
| A2A                     | 295               | -               | -                                                                                                       | 20% reduction in absolute emissions in 2020 (vs. 1995)                   | N/A                                |
| Centrica                | 293               | 217             | 270 by 2012                                                                                             | 260 by 2020                                                              | -2.7%                              |
| Iberdrola               | 287               | 247             | -                                                                                                       | 220 by 2020                                                              | -2.4%                              |
| Fortum                  | 155 (189 in 2010) | 198             | <80 as a 5-year average in the EU                                                                       |                                                                          | Target currently met (69)          |
| EDF                     | 126               | -               | -                                                                                                       | EDF France: 31.5 in 2020<br>EDF Energy: -60% in 2020 vs 2006             | France: -2.3% to 2020              |
| Verbund                 | 74                | 126             | -50% by 2015 (CO <sub>2</sub> intensity of thermal capacities)                                          | -                                                                        | N/A                                |

Source: CDP 2010, CA Cheuvreux

### Emission forecasts

Within the electricity utilities framework designed by the Institutional Investors Group on Climate Change (IIGCC), electricity utilities are asked to give guidance on their future emissions regulated under the EU ETS.

50% of the companies in the sample below provided guidance on their emissions to 2012 in their answer to the sector-specific reporting framework integrated into the Carbon Disclosure Project questionnaire.

The largest emission cuts by 2012 are expected by EDP (-9% vs. 2009) and Iberdrola (-6%), while the largest increases are forecast at Verbund (+108%), and Centrica (+21%).

At Verbund and Centrica, the increase in CO<sub>2</sub> emissions corresponds to an increase in the emissions allowance allocation, meaning that new thermal capacities are expected to come on stream.

We note, however, that the results below come from our aggregation of data provided country by country, and that in some cases, the total amount of emissions does not match the data provided in the main questionnaire.

### EMISSIONS REGULATED UNDER THE EU ETS – CDP DATA

|                            | Main questionnaire | Electric utilities Module - Country aggregation |       |       |       |
|----------------------------|--------------------|-------------------------------------------------|-------|-------|-------|
|                            | 2009               | 2009                                            | 2010  | 2011  | 2012  |
| A2A                        | 2.2                |                                                 |       |       |       |
| ACEA                       | 7.6                | 7.6                                             | 7.6   | 7.6   | 7.6   |
| Centrica                   | 7.9                | 7.4                                             | 8.9   | 8.9   | 8.9   |
| CEZ                        | 37.2               | 37.2                                            |       |       |       |
| E.ON                       | -                  | 84.8                                            |       |       |       |
| EDP                        | 20.0               | 22.0                                            | 18.0  | 18.0  | 20.0  |
| EDF                        | 83.0               |                                                 |       |       |       |
| ENEL                       | 76.1               | 76.0                                            |       |       |       |
| Fortum                     | 7.7                | 6.2                                             | 6.4   | 6.1   | 6.1   |
| GDF Suez                   | -                  |                                                 |       |       |       |
| Iberdrola                  | 25.9               | 25.5                                            | 25.0  | 24.8  | 24.0  |
| MVV Energie                |                    |                                                 |       |       |       |
| National Grid              | 0.6                | 0.6                                             | 0.7   | 0.8   | 0.8   |
| RWE                        | 149.1              | 149.0                                           | 149.5 | 150.5 | 143.5 |
| Scottish & Southern Energy |                    | 19.3                                            | 22.7  |       |       |
| Vattenfall Group           | 90.0               |                                                 |       |       |       |
| Veolia Environnement       | 14.1               |                                                 |       |       |       |
| Verbund                    | 2.1                | 2.2                                             | 3.0   | 3.3   | 4.6   |

Source: CDP 2010

NB: When the forecast change in emissions volume corresponds to a change in the allocation of emissions allowances, the change refers to additional capacities coming on stream or mothballing.

### ■ Looking forward: green capex has been revised downwards

Total capex plans have been revised down since most emission reduction targets were set, and capex planned in renewable energies have particularly suffered from this trend.

Although the cost of wind turbines has significantly decreased since 2008 (by 7% to 13% according to Iberdrola), we estimate that these spending cuts are likely to reduce the

**Planned spending in renewable energies sharply revised down**

annual capacity in wind power installed by European electricity utilities: one of the main levers for achieving reductions in group CO<sub>2</sub> intensity.

The table below presents the trend in capex plans for the main European utilities and the trends in investment in renewable energies.

### TREND IN CAPEX PLANS FOR THE MAIN EUROPEAN ELECTRICITY UTILITIES

| (EUR m)   | Previous plan |                  | New plan  |                  | Trend  |      | Comment on investments in renewables                                                                                                                                                   |
|-----------|---------------|------------------|-----------|------------------|--------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|           | Period        | Cumulated amount | Period    | Cumulated amount | Abs.   | %    |                                                                                                                                                                                        |
| CEZ       | 2010-2014     | 15 253           | 2010-2014 | 12 081           | -3 172 | -21% | ca. EUR250m p.a. Decreasing. No capex planned after 2013                                                                                                                               |
| E.ON      | 2010-2012     | 24 000           | 2011-2013 | 20 000           | -4 000 | -17% | EUR1bn p.a. on average, but downward trend from 2011. Annual spending cut by half between 2010 (EUR1.4bn) and 2012E (EUR0.7bn)                                                         |
| EDF       | 2008-2010     | 36 000           | 2008-2010 | 36 000           | -      | -    | Capex of EDF EN peaked in 2009 at ca. EUR1.3bn. Expected just above EUR0.9bn in 2012E                                                                                                  |
| EDP       | 2010-2012     | 9 000            | 2010-2012 | 7 200            | -1 800 | -20% | EDPR capex down 22% compared to previous plan. Capex in US wind revised downwards for 2011 and 2012                                                                                    |
| Enel      | 2009-2013     | 32 625           | 2010-2014 | 30 870           | -1 755 | -5%  | Enel Green Power listed in 2010. Planned capex increased by 23% (from EUR5.2bn to EUR6.4bn over 2010-2014)                                                                             |
| GDF Suez  | 2008-2010     | 30 000           | 2008-2010 | 30 000           | -      | -    | Most investments directed to two large hydroelectric dam projects in Brazil                                                                                                            |
| Iberdrola | 2010-2012     | 16 000           | 2010-2012 | 13 400           | -2 600 | -16% | -EUR2.2bn (30% cut) from Iberdrola Renovables. Lower investments mainly in the US and Spain cap 2012 investment additions at 750MW in 2012E (vs. 1.45GW in 2011E, and +1.78GW in 2010) |
| RWE       | 2010-2013     | 28 000           | 2011-2013 | 19100            | -1 900 | -9%  | Capex cut by EUR0.2bn p.a. on average. Slightly more than total capex (-12% versus -9%). Trough in 2012 with EUR1bn planned.                                                           |

NB: RWE figures excl. portfolio divestments

Source: Company data, CA Cheuvreux

The chart below presents a mapping of electricity utilities based on their CO<sub>2</sub> risk profile and the share of total investments dedicated to renewable energies (excl. large dams in the case of GDF Suez). The size of the bubble reflects the total average annual amount to be spent on renewables.

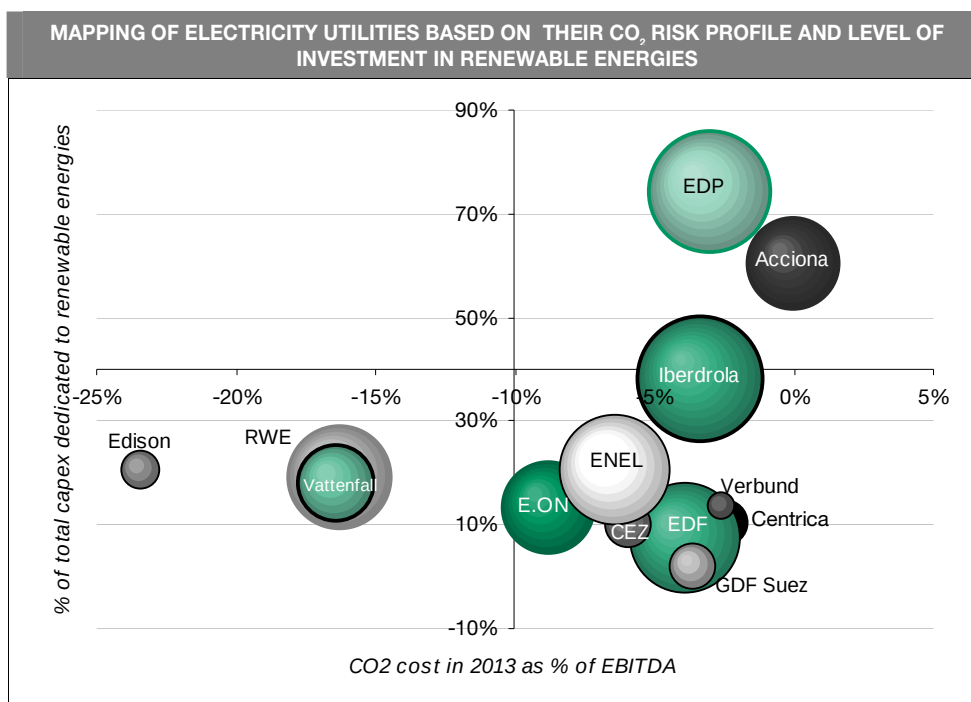
We see three categories:

■ Early movers seizing the opportunity of the favourable regulatory environment for renewable energies: EDP, Iberdrola, Acciona. They currently have a significant portion of their EBIT coming from the renewable business, but have sharply cut planned spending on the back of less attractive policy support for renewable energies.

■ Companies with high exposure to CO<sub>2</sub> costs such as RWE and Edison, and to a lesser extent E.ON and Enel. They are relatively late movers but now dedicate substantial amounts of their capex to the development of renewable capacities (between 14% and 19% of total capex). The aim is not only to benefit from feed-in tariffs and secure revenue flows of wind activities, but also to offset the adverse impact of the increase in renewable energy in power generation energy mixes, which weighs on the load factors of thermal assets. The cut in renewable capex at RWE has been relatively lower than for Iberdrola and EDP. Enel has increased the planned capex for Enel Green Power.

■ Companies with a low CO<sub>2</sub> risk such as Fortum and GDF Suez, which dedicate much less than 10% of their total capex programme to renewable energies (excl. large hydro).

**With the sharpest cuts made by Iberdrola**



**Renewable business made up less than 1% of RWE's op. profit in 2010**

### Contribution of renewable energy units to group results

The EBIT contribution of the renewable business is far from offsetting the adverse effect of CO<sub>2</sub> costs expected in 2013 for RWE and E.ON.

For companies like RWE and E.ON focused on offshore wind in Europe, the large upfront investment costs tend to postpone the build-up in the contribution of renewable energies to group operating results.

### CONTRIBUTION OF RENEWABLE BUSINESS TO OPERATING PROFITS

| (EUR m)   | Contribution of renewables to group EBIT | Group EBIT | Renewable business EBIT | Comments                                                                                                                                    |
|-----------|------------------------------------------|------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| E.ON      | 2.5%                                     | 9 454      | 240                     | Targets renewables to contribute 8.5-11.5% of group EBITDA in 2013 (EUR1.1bn-1.5bn)                                                         |
| EDF       | 3.9%                                     | 7 889      | 306                     | We expect 62% growth in EDF EN's EBIT by 2012E. Contribution should rise to above 5% of EDF's EBIT                                          |
| EDP       | 14.1%                                    | 2 063      | 290                     | EDP holds 77.5% of EDP Renovaveis, No. 3 wind operator worldwide. >50% of capex spent on wind power since 2005                              |
| ENEL      | 8.6%                                     | 11 258     | 966                     | Enel Green Power includes historical small hydro and geothermal capacities. Contribution of EGP to Enel's EBIT seen rising to 8.9% in 2012E |
| Iberdrola | 14.2%                                    | 4 830      | 688                     | Largest wind capacities in Europe. Renewables to make 22% of group EBITDA in 2012E                                                          |
| RWE       | 0.9%                                     | 7 681      | 72                      | Targets EUR500m op. profit from Innogy in 2014E. Upfront investment costs in wind offshore postpones the rise in EBIT                       |

Source: CA Cheuvreux, company data

**New EU energy  
roadmap to 2050  
focuses on energy  
savings**

**France has increased  
the obligation for  
electricity and gas  
suppliers 4.7x**

## IV – The next carbon risk is downstream

*While the market has focused so far on the EU ETS burden for the power generation business of electricity utilities, in this section, we note the risks for the T&D divisions raised by the growing challenge of demand-side energy-saving targets.*

### ■ Energy-saving obligations: the next challenge

The European Commission is to ask EU member states to set up national trading systems for energy certificates to help the bloc meet its 2020 energy efficiency goal.

As energy suppliers, electricity and gas utilities also face regulations forcing them to propose energy efficiency services to their clients and to deliver demand-side energy savings. Such regulations already exist in Italy, the UK, France, Belgium, Ireland and Denmark.

While the objectives have generally been easily met by obligated parties so far, new compliance phases in France and the UK are more challenging.

The risk for gas and electricity suppliers under such systems is twofold, with: 1) a risk of financial penalties in case of non-compliance with the target; and 2) a reduction in the energy consumption of their clients.

### Increasingly challenging energy-saving targets in France, the UK and Italy

The table below gives an overview of the design and targets of the national energy efficiency schemes in France, the UK and Italy. Similar schemes also exist in Denmark and Belgium.

Although the targets were easily overshoot in the previous compliance period, the targets for current phases ending in 2012/2013 are significantly higher. In the UK, the target to deliver 185mtCO<sub>2</sub> of energy savings by March 2011 has been revised up to 293mtCO<sub>2</sub> (+58%) and the compliance deadline extended to December 2012. In France, the target for the new compliance period is 4.7 times higher than in the previous phase.

#### KEY FEATURES OF MAIN NATIONAL ENERGY SUPPLIER OBLIGATION SCHEMES

|                                       | UK                                                                                                                | France                                                                    | Italy                                                       |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------|
| Current target                        | 293mtCO <sub>2</sub> , lifetime in 2012 (eq. to 1,015TWh)                                                         | 345TWh (lifetime discounted)                                              | 22.4mt oil equivalent (260TWh) over 2005-2012               |
| Current phase                         | 2008-2012                                                                                                         | 2011-2013                                                                 | 2005-2012 (annual targets)                                  |
| Achievement of previous phase target  | Yes, overachieved by 44%                                                                                          | Yes, overachieved by 20%                                                  | Yes                                                         |
| Annual end-use energy savings (TWh)   | 3.5 (evaluation of 2005-2008)                                                                                     | 1.3                                                                       | 4.5 (evaluation of 2005-2008)                               |
| Obligated parties                     | Electricity and gas suppliers. The Big 6: Centrica, EDF Energy, RWE npower, E.ON, Scottish Power (Iberdrola), SSE | Electricity, gas, and petroleum fuel suppliers, e.g. EDF, GDF Suez, Total | Electricity and gas distributors, e.g. Enel Distribuzione   |
| Sector coverage for eligible projects | Residential consumers only                                                                                        | All except sectors under EU ETS                                           | All consumers                                               |
| Trading                               | Possible between obligated parties                                                                                | Trading of white certificates                                             | Certificate trade. Spot market and OTC                      |
| Penalty for non-compliance            | As high as 10% of the supplier's sales, but according to the extent of underperformance                           | EUR20/MWh cumac                                                           | Fixed by the regulator taking into account diverse criteria |

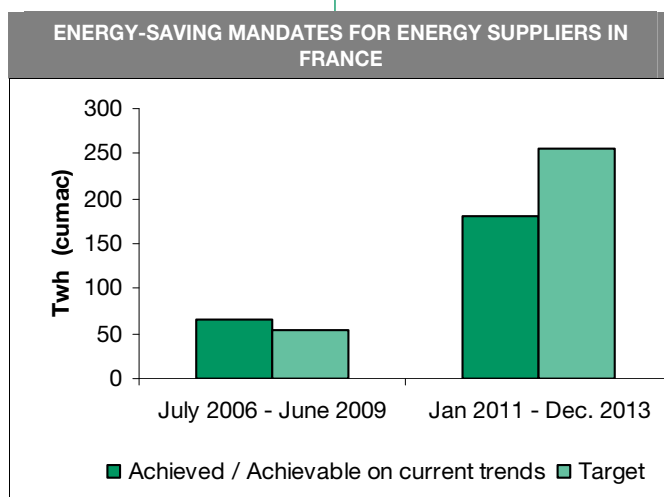
Source: European Commission (ACEEE Summer Study on Energy Efficiency in Buildings), CA Cheuvreux

### France Energy Saving Certificate system: a five-fold increase in pressure

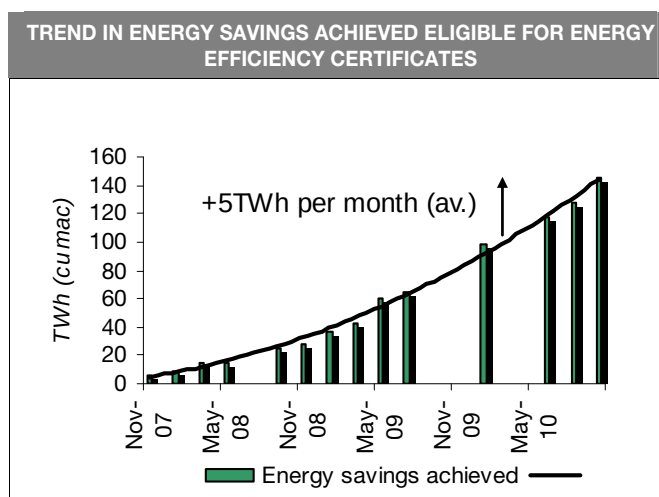
Since 2006, energy suppliers in France have faced a quantified obligation to reduce final energy consumption. The target for the first commitment period of the energy efficiency certificate scheme (2006-2009) was overshoot by 20% (65TWh reduction achieved vs. a 54TWh target), although obligated parties were still lagging behind the target two months before the end of the period.

A new target was made official in December 2010. The target has been aggressively increased 4.7 times to 255TWh of demand-side energy savings to be achieved by historical participants of the scheme over 2011-2013.

The overall target is challenging, in our view, and looks achievable at the current rate of 5TWh of additional energy savings per month (180TWh cumulated over 36 months) only if the energy savings realised over the transition period (July 2009-December 2010) can be carried over for compliance purposes (~80TWh).



Source: CA Cheuvreux, MEEDDM



Source: CA Cheuvreux, MEEDDM

**Obligations for EDF and GDF Suez over 2011-2013 create estimated liabilities of EUR716m and EUR315m, respectively**

Nevertheless, we estimate that these mandates create a significant liability for EDF and GDF Suez.

EDF and GDF Suez bore 80% of the national obligation in the first phase, and we estimate that their energy reduction commitments have been raised to 143TWh (compared to 30TWh over 2006-2009) and 63TWh (vs. 13.5), respectively, for the new period. If energy suppliers fail to achieve the target on their own (by providing energy saving services), they can either buy energy saving certificates on the market (traded at a price of between EUR3 and EUR10 per MWh in 2008) or pay a EUR20 per MWh penalty to achieve compliance.

We estimate that this obligation creates liabilities for EDF and GDF Suez of EUR716m and EUR315m, respectively, assuming a market price for energy-saving certificates of EUR0.5c per KWh.

## ESTIMATE OF THE ENERGY-SAVING MANDATE FOR 2011-2013 IN FRANCE – EXAMPLE OF GDF SUEZ

|                                                                                    |             | Unit               | Comment                                           |
|------------------------------------------------------------------------------------|-------------|--------------------|---------------------------------------------------|
| <b>Mandate – phase 1</b>                                                           | <b>13.5</b> | <b>TWh (cumac)</b> | <b>Achieved</b>                                   |
| <b>Scope of energy sales falling under the regulation</b>                          |             |                    |                                                   |
| - Sales of natural gas in France (residential and public distribution to business) | 214         | TWh                | Obligation = 0.095KWh saved for each KWh of sales |
| - Sales of electricity in France (retail)                                          | 4           | TWh                | Obligation = 0.168KWh saved for each KWh of sales |
| <b>Our estimate of the mandate for GDF Suez for 2011-2013</b>                      |             |                    |                                                   |
| <b>Mandate – phase 2 (estimate)</b>                                                | <b>63</b>   | <b>TWh (cumac)</b> | <b>4.7x higher than phase 1</b>                   |
| <b>Liability at EUR0.5c per KWh</b>                                                | <b>315</b>  | <b>EUR m</b>       |                                                   |

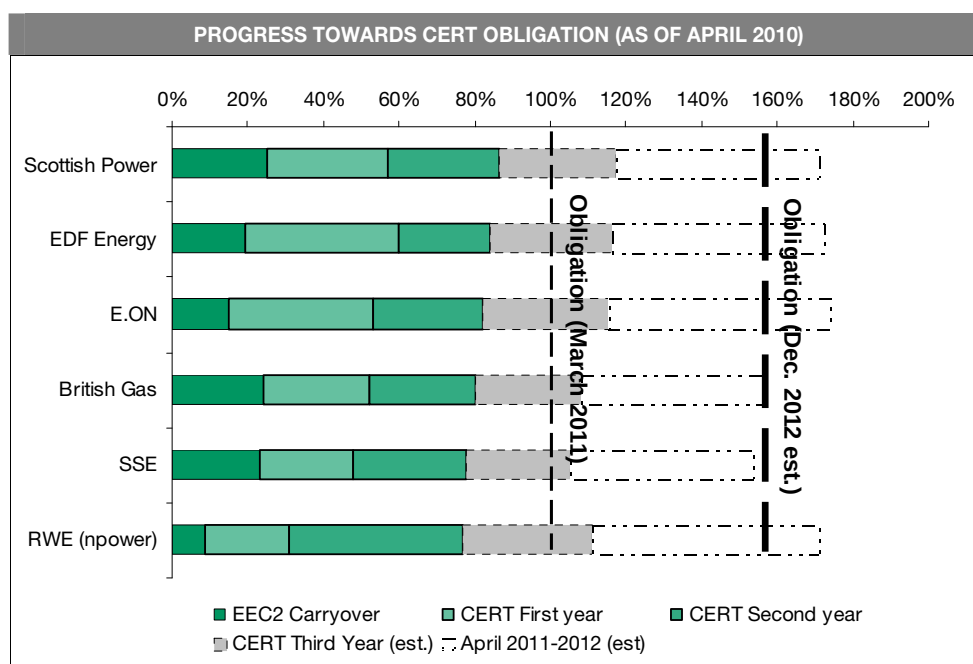
Source: CA Cheuvreux, GDF Suez

**The 2012 target (58% above the March 2011 target) is seen challenging for BG and Scottish & Southern Energy**

### Similar systems exist in the UK and in Italy, with increasingly demanding targets

In the UK, an Energy Efficiency Commitment (EEC) scheme has applied to energy suppliers since 2002. Over 2005-2008, the obligation to provide energy savings of 130TWh was exceeded by 44%. The Carbon Emission Reduction Target (CERT) has replaced the EEC since then, and has set even more challenging obligations for six energy suppliers for the period 2008-2011: British Gas (Centrica), EDF Energy, E.ON, npower (RWE), Scottish Power (Iberdrola), and Scottish and Southern Energy.

As of March 2010, most obligated companies were on track to achieve and even overshoot their March 2011 obligation.



Source: CA Cheuvreux; Ofgem

However, assuming companies sustain the progress made over the first two years of the scheme until December 2012, we find that Scottish Southern Energy and Centrica would still fall slightly short of their extended mandate.

EDF Energy and RWE npower have shown the most irregular progress over the first two years, which creates more uncertainty in forecasting future progress. Indeed, applying the worst year in terms of delivering energy-saving services, we find that EDF Energy and

### A GBP5.5bn cost for energy suppliers, according to the UK government

### Enel missed its 2008 target in Italy

RWE could miss their 2012 targets by 5% and 19%, respectively. RWE npower shows better momentum in delivering on its targets sequentially than EDF Energy.

Penalties for non-compliance are not clearly set. While they could theoretically be as high as 10% of the supplier's sales, the penalty rate applied would probably be modulated based on the level of underperformance compared to the target.

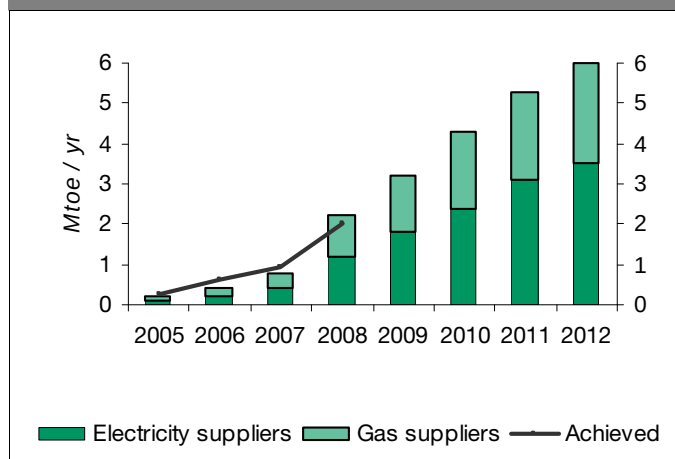
Applying a reasoning where 10% of revenues are at stake for penalty costs if no improvement at all has been achieved against the target, a 5% miss at EDF Energy could lead to penalties of ca. GBP50m (5% of 10% of EDF Energy sales of GBP9.8bn).

Overall, the UK government estimates that the scheme could cost GBP5.5bn over 2008-2012 – a cost which can be ultimately passed on to customer bills on a liberalised market.

**In Italy**, electricity and natural gas suppliers have faced energy efficiency obligations since 2005 and must deliver an increasing quantity of demand-side energy savings each year. The targets were revised up in 2007 and the national obligation was not reached in 2008. Enel Distribuzione, which bears ~50% of the obligation on electricity suppliers, missed its target by 10%.

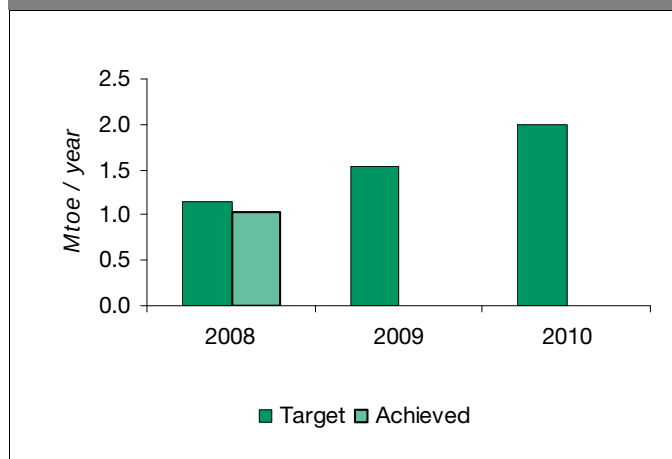
Energy efficiency certificates have been traded at ca. EUR90 per tonne of oil equivalent and the maximum penalty for non-compliance is set at EUR155m. Once the energy efficiency target is met, cancelling the Energy Efficiency Certificates triggers repayment by the administration from special funds created by a distribution tariff surcharge. According to A2A's Head of Design for the District Heating Department, distributors have doubts on how they can achieve compliance with targets in the next few years.

ANNUAL ADDITIONAL ENERGY-SAVING TARGETS FOR ENERGY SUPPLIERS IN ITALY



Source: CA Cheuvreux, A2A

ENERGY-SAVING OBLIGATIONS FOR ENEL DISTRIBUZIONE



Source: CA Cheuvreux, ENEL

### Corporate reporting on these targets looks weak

We have carried out a review of what obligated parties report in their communication to the financial community (either through annual reports, sustainability reports or investor presentations). Centrica and Snam Rete Gas appear as the most transparent on this issue, in our view, as they disclose their performance compared to their targets and the costs related to the scheme.

## STATUS OF REPORTING ON ENERGY-SAVING OBLIGATIONS AND ACHIEVEMENTS COMPARED TO TARGETS

|                            | Achievements                                                                            | Target                                                 | Cost                                   |
|----------------------------|-----------------------------------------------------------------------------------------|--------------------------------------------------------|----------------------------------------|
| A2A                        | 29ktoe savings through internal projects                                                | N/A                                                    | N/A                                    |
| Centrica                   | 17.87mtCO <sub>2</sub> (2008), KPI                                                      | 14.6mtCO <sub>2</sub> (2010)                           | GBP200m a year obligation              |
| EDF                        | UK: 90,000 loft insulations<br>France: 29.8 TWh cumac at end of first phase (June 2009) | France: "EDF met its obligations"                      | UK: GBP250m mobilised over three years |
| Edison                     | N/A                                                                                     | N/A                                                    | N/A                                    |
| ENEL                       | 1.04mtoe (2008), KPI                                                                    | 50% of national total (2010)                           | N/A                                    |
| E.ON                       | N/A                                                                                     | N/A                                                    | N/A                                    |
| GDF Suez                   | N/A                                                                                     | France: 4.45TWh for 2008/2009. Targets met for phase I | N/A                                    |
| RWE                        | 11.8mtCO <sub>2</sub>                                                                   | N/A                                                    | GBP157m (2009)                         |
| Scottish Power (Iberdrola) | 6.64mtCO <sub>2</sub>                                                                   | N/A                                                    | N/A                                    |
| Snam Rete gas              | 90% purchase of certificates, 10% internal projects                                     | 0.35mtoe                                               | Income from sale of certificates EUR4m |
| SSE                        | 274 homes insulated in 2009 (KPI)                                                       | N/A                                                    | N/A                                    |

Source: Company data, CA Cheuvreux

### Gas consumption by residential customers hit in the UK

Investors could therefore legitimately expect that companies should disclose their energy saving mandates, and periodically and consistently report on their progress towards achieving these targets.

### Reducing energy demand: a top-line threat

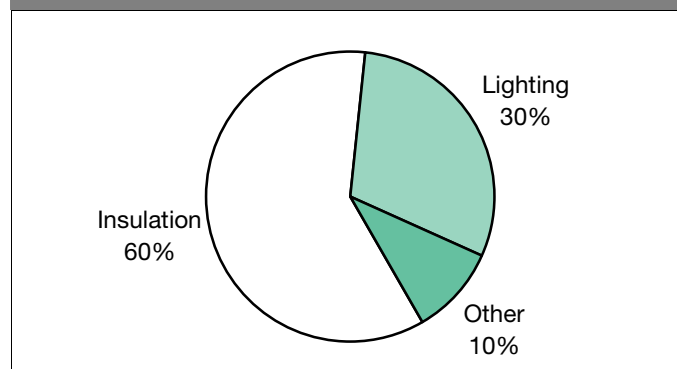
Most of the actions undertaken in the UK, France and Italy concern residential buildings. This includes insulation measures, efficient lighting, efficient boilers and heat pumps.

The target for France is to cut energy intensity by 2% by 2015 and 2.5% by 2030. In the UK, we estimate that gas consumption by residential customers decreases by an average 5% per year mainly because of progress achieved in energy efficiency.

### Saving electricity or natural gas?

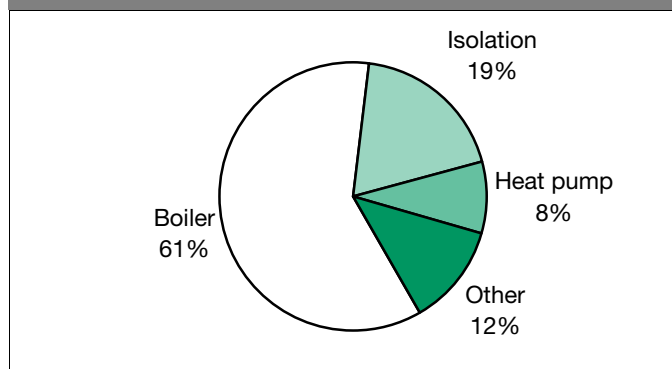
In the UK, the special focus given to insulation measures leads to a situation where most of the energy savings (ca. 59%) comes from savings of natural gas. The opposite situation prevails in Italy, where 78% of energy savings actually came from electricity over 2005-2007.

SOURCES OF ENERGY SAVINGS IN THE UK CERT (2008-2010)



Source: Ofgem

CONTRIBUTION OF THE 10 MOST FREQUENT MEASURES IN FRANCE



Source: MEEDDM

**Natural gas also  
helped by energy  
efficiency regulations  
in France**

In France, the reporting on measures accomplished does not enable us to determine whether electricity or natural gas is saved. Interestingly, GDF Suez has reported gains in natural gas market share in new buildings in France due to new energy efficiency regulations.

#### INCREASED MARKET SHARE OF NATURAL GAS (NG) IN NEW BUILDINGS

| '000                              | 2008 | 2009 | 2010E |
|-----------------------------------|------|------|-------|
| New housing units in NG areas     | 259  | 237  | 229   |
| New housing units in non-NG areas | 99   | 85   | 75    |
| NG market share in NG areas (%)   | 29%  | 32%  | 43%   |

Source: GDF Suez

#### Opportunities to move into energy efficiency services

Notably in the UK and France, electricity utilities have developed energy efficiency service offers in order to internalise the revenue opportunity of delivering the service.

GDF Suez – via its energy services subsidiary COFELY – is a European leader in energy and environmental efficiency. The division generated 6% of group EBITDA in H1 2010 (16% of revenues). GDF Suez has been developing an dedicated energy efficiency range of services addressed to the final consumer since 2008, notably in France. We believe that this historical positioning in energy efficiency services is likely to help the group achieve the demand targets imposed by the French government.

There are some examples of companies having launched a new business unit from scratch in order to capture business opportunities of selling energy efficiency services:

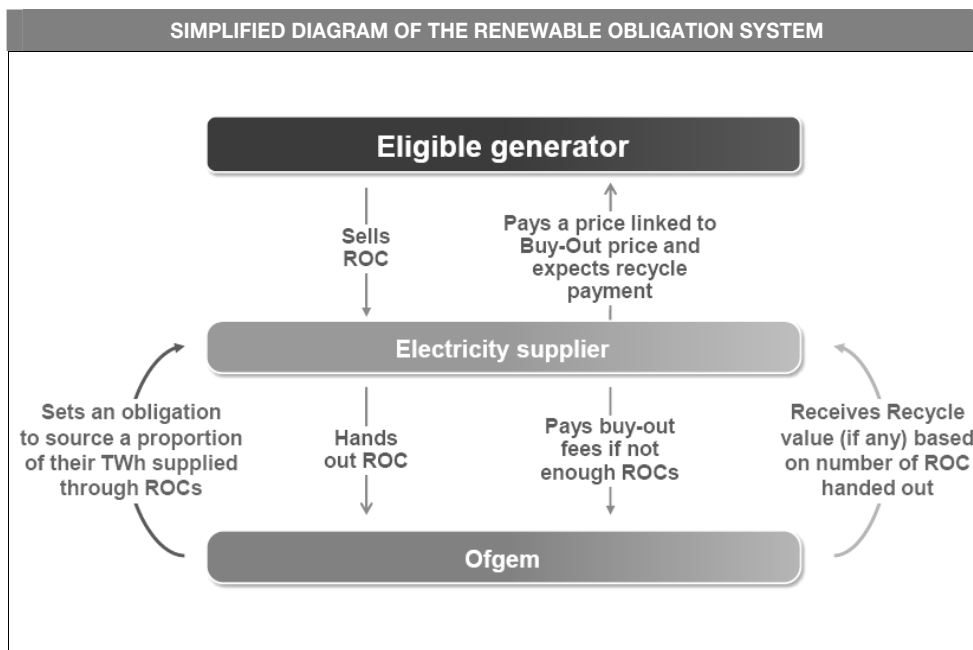
- Centrica is building up a New Energy business and targets GBP30m EBIT in 2012E.
- Edison created a dedicated business unit in 2009 to help its customers "adopt a rational approach to the use of energy".

Other companies have developed new energy efficiency services within the group (e.g. EDF's Bleu Ciel offer), but without creating a dedicated business unit.

#### ■ Renewable obligation certificates in the UK

The **Renewable Obligation in the UK** requires electricity suppliers to source an increasing percentage (11.4% in 2011) of electricity supplied to end-users from renewable energy sources. If they fail to surrender enough Renewable Obligation Certificates (ROCs) to comply, suppliers pay a buy-out price set at GBP38.69 per ROC for the year 2011-12, up 4.6% from last year. Costs incurred to purchase ROCs (market price GBP46/MWh) are partially refunded since the buy-out fund is redistributed to those companies having surrendered ROCs.

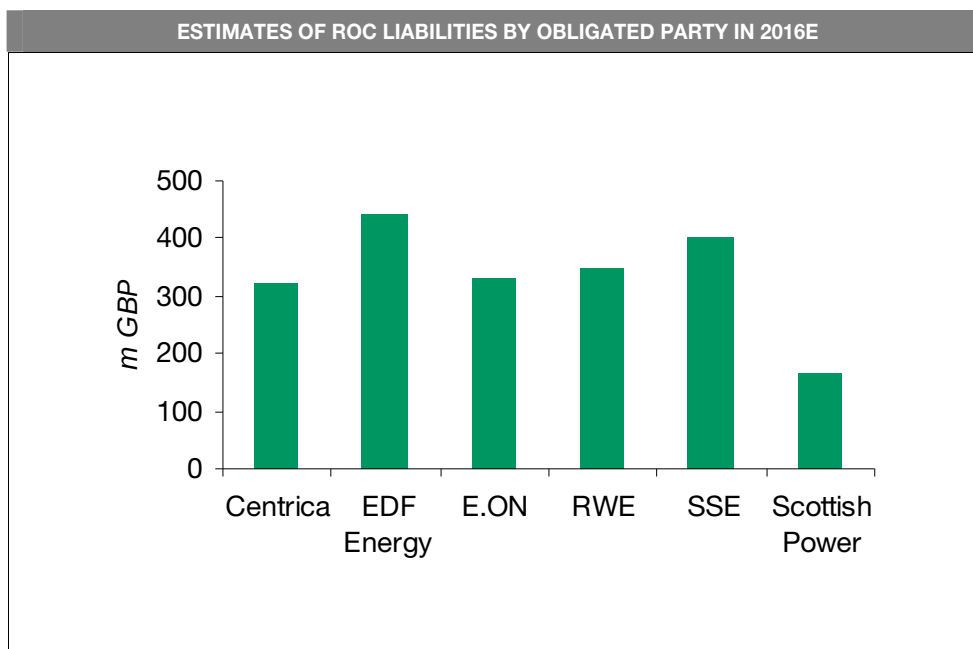
**The ROC regulation  
creates a GBP2.2bn  
liability for electricity  
suppliers**



Source: EDF

EDF estimates that the cost of the renewable obligations to suppliers in 2016 will be ca. GBP2.2bn and that the related costs represent ca. 3% of a typical consumer's bills.

In practice, since obligated parties receive a recycle value from Ofgem only for the ROCs handed out (and not for the buy-out payments), those relying mostly on buy-outs to comply with their ROC targets face the risk of: 1) losing clients as they have to increase their electricity prices to offset their compliance cost; or 2) internalising the compliance costs with an adverse impact on margins.



Source: EDF Energy

Higher transparency of companies on: 1) the percentage of renewables in their electricity sourcing; and 2) the mix of ROCs and buy-out payments used for compliance would help to assess the constraint.

## V – Carbon reporting standards: as high as the risks?

*We review below the level of transparency of companies on carbon risk related metrics using as a benchmark the Reporting Framework developed by the Institutional Group on Climate Change (IIGCC) for the electric utilities. The results are derived from our review of main communication channels of companies on such issues (Carbon Disclosure Project, annual reports, sustainability reports, presentations to investors) and are based on our best effort to find such information. We give our view on whether or not the communication of companies is in line with the requirements of the IIGCC.*

### Emission reduction targets

IIGCC Reporting Framework:

*"Companies should specify their greenhouse gas emission targets at group level and where applicable at subsidiary/divisional levels. These targets should be expressed in specific terms (i.e. emissions per unit of electricity generated) and should include specification of the baseline against which performance is being measured. Companies should also provide targets in absolute terms (i.e. total emissions) where possible."*

**IIGCC**

Institutional Investors Group on Climate Change

### DISCLOSURE OF EMISSIONS REDUCTION TARGETS

|                            | Compliance with IIGCC guidelines | Comment                                                                           |
|----------------------------|----------------------------------|-----------------------------------------------------------------------------------|
| A2A                        | N                                | Target for absolute emissions only. Base year data not provided.                  |
| ACEA                       | N                                | Target for absolute emissions only. Base year data and track record provided      |
| Centrica                   | Y                                | For UK only but UK represents 78% of group emissions                              |
| CEZ                        | Y                                | Warns that absolute emissions will increase by 2015                               |
| E.ON                       | Y -                              | For Europe only (58% of group emissions)                                          |
| Edison                     | N -                              | No target                                                                         |
| EDP                        | Y +                              | Best practice. Group-wide mid and long-term targets                               |
| EDF                        | N                                | No group-wide target but targets for EDF France and EDF Energy                    |
| EnBW                       | N                                | To stay below the German average in specific CO <sub>2</sub> -emission            |
| ENEL                       | N -                              | No target. Previous one expired in 2006.                                          |
| Fortum                     | Y -                              | For Europe power generation only (scope is <38% of group emissions only)          |
| GDF Suez                   | N                                | Absolute target for Electrabel Belgium only                                       |
| Iberdrola                  | Y                                | All generation facilities worldwide covered                                       |
| MVW Energie                | N                                | Compliance with German emission reduction targets                                 |
| PPC                        | Y                                | Guidance on CO <sub>2</sub> -intensity (0.9tCO <sub>2</sub> /MWh) in 2015E        |
| RWE                        | Y +                              | Group-wide mid and long-term targets. Target includes the use of offsets          |
| Scottish & Southern Energy | Y                                | -                                                                                 |
| Vattenfall                 | Y +                              | Guidance on CO <sub>2</sub> -intensity until 2030. Target for absolute emissions. |
| Verbund                    | N                                | No group-wide target. Target for thermal capacities only                          |

Source: CA Cheuvreux, company disclosure

**Our view:** We identify as a best practice, companies that provide both a long-term target (beyond 2015) and a mid-term target (or guidance) for CO<sub>2</sub>-intensity or absolute emissions. It is indeed helpful to know at what time emission reduction actions are expected to deliver. For several companies, this shows that CO<sub>2</sub>-intensities are expected to decrease the most in the second half of phase III of the EU ETS.

## Emissions inventories: trusting the data

### IIGCC Reporting Framework

"Companies should publish detailed CO<sub>2</sub> emissions inventories that cover historic and current emissions. Ideally, historic figures should go back to 2000 thereby allowing investors to detect any significant trends.

Companies should provide CO<sub>2</sub> emissions in both specific terms (tonnes of CO<sub>2</sub> per MWh) and absolute terms (total tonnes of CO<sub>2</sub>).

Companies should disclose the methodology they used to calculate their CO<sub>2</sub> emissions.

Companies should also provide: an explanation of how they ensure data accuracy. This can be in the form of a verification statement of CO<sub>2</sub> emissions from a third party auditor that describes the scope and findings of the verification process."

### DISCLOSURE OF EMISSIONS INVENTORIES

|                                     | CO <sub>2</sub> -intensity<br>(kgCO <sub>2</sub> /MWh) | Absolute<br>emissions<br>(mtCO <sub>2</sub> ) | Country<br>breakdown | Consolidation approach                                                                                                                                                                                                                                           | Verification<br>by third<br>parties |
|-------------------------------------|--------------------------------------------------------|-----------------------------------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| A2A                                 | 295                                                    | 4.4                                           | Y                    | Companies over which operational control is exercised                                                                                                                                                                                                            | > 80%                               |
| ACEA                                | 458                                                    | 1.5                                           | Y                    | Companies over which financial control is exercised per consolidated audited financial statements                                                                                                                                                                | > 80%                               |
| Centrica                            | 293                                                    | 11.6                                          | Y                    | Companies over which operational control is exercised                                                                                                                                                                                                            | > 80%                               |
| CEZ                                 | 630                                                    | 37.2                                          | Y                    | Companies over which financial control is exercised per consolidated audited financial statements                                                                                                                                                                | > 80%                               |
| E.ON                                | 476                                                    | 159.6                                         | Y                    | Companies over which financial control is exercised per consolidated audited financial statements                                                                                                                                                                | > 80%                               |
| Edison                              | 486                                                    | 20.8                                          | N                    | As per IAS/IFRS international accounting principles                                                                                                                                                                                                              | N/A                                 |
| EDP                                 | 362                                                    | 20.0                                          | Y                    | EDP reports from companies in which it exercises both financial and operational control                                                                                                                                                                          | > 80%                               |
| EDF                                 | 126                                                    | 78.2                                          | Y                    | Companies over which financial control is exercised per consolidated audited financial statements                                                                                                                                                                | > 80%                               |
| EnBW<br>Energie                     | 241                                                    | 16.9                                          | N                    | Companies over which operational control is exercised                                                                                                                                                                                                            | > 80%                               |
| ENEL                                | 413                                                    | 122.3                                         | Y                    | Companies over which control or influence is exercised (refers to GRI)                                                                                                                                                                                           | N/A                                 |
| Fortum                              | 155                                                    | 22.1                                          | Y                    | Companies over which operational control is exercised                                                                                                                                                                                                            | >20% ; <40%                         |
| GDF<br>Suez                         | 366                                                    | 97.4                                          | Y                    | Companies over which operational control is exercised                                                                                                                                                                                                            | >40% ; <60%                         |
| Iberdrola                           | 279                                                    | 41.0                                          | Y                    | Operational control+ equity in the companies they do not control                                                                                                                                                                                                 | > 80%                               |
| MVV<br>Energie                      | N/A                                                    | 3.4                                           | Y                    | GHG emissions are reported for companies over which financial or operational control is exercised or in which an equity share is held.                                                                                                                           | N/A                                 |
| PPC                                 | N/A                                                    | 49.7                                          | N                    | PPC's 31 power plants under the EU ETS                                                                                                                                                                                                                           | Yes                                 |
| RWE                                 | 796                                                    | 149.1                                         | Y                    | Companies over which financial control is exercised per consolidated audited financial statements                                                                                                                                                                | > 80%                               |
| Scottish<br>&<br>Southern<br>Energy | 491                                                    | 22.7                                          | N                    | Contractual output - The emissions which they report through this contracted output method include all the electricity which Scottish and Southern Energy generates itself and power it acquires under asset-specific contracts with other electricity companies | > 80%                               |
| Vattenfall                          | 434                                                    | 90.5                                          | Y                    | Companies over which financial control is exercised per consolidated audited financial statements                                                                                                                                                                | > 80%                               |
| Verbund                             | 74                                                     | 2.2                                           | Y                    | Companies over which operational control is exercised                                                                                                                                                                                                            | > 80%                               |

Source : CA Cheuvreux, company disclosure

**Our view:** In general, there is a high level of transparency of emissions data within the sector. Companies such as EnBW, Scottish & Southern Energy and PPC, which do not provide a breakdown of their emissions data by country, have no or very limited activity in power generation outside their home country. Due to the high standards of verification applied to EU ETS data (site-by-site verification), more than 80% of emissions data (scope 1) are verified by third parties. Fortum has the lowest reported verification rate. In our

view, this is due to the recent expansion in Russia, which represents almost two-thirds of Fortum's group emissions.

## Emissions allowances and credits from participation in CDM/JI Projects

### The IIGCC Framework

#### **"Amount of Free Emission Allowances and Allocation Methodologies**

*For existing and new operations covered by European Allowances or EUAs, companies should disclose:*

- *the quantity of EUAs they received for Phase I of the EU ETS for each of the countries in which they operate*
- *the quantity of EUAs they received for Phase II (2008-2012). If not available, companies should indicate the assumptions they are making regarding the number of allowances that they expect to receive in Phase II in the EU countries in which they operate*

*If companies operate in countries outside of the EU, they should specify:*

- *if they participate in any emission trading schemes*
- *the potential CO<sub>2</sub> emission reduction targets that are likely to be required of them*

#### **Participation in CDM/JI Projects: Expected Use of CERs/ERUs for Compliance**

*For Joint Implementation (JI) and/or Clean Development Mechanism (CDM) projects, companies should disclose the number of CO<sub>2</sub> credits they expect to receive or purchase by 2012.*

*Specifically, this includes:*

- *The total amount of Kyoto credits (Emissions Reduction Units (ERUs) for JI projects and Certified Emissions Reductions (CERs) for CDM projects)*
  - *the amount of credits from direct participation in JI/CDM projects*
  - *the amount of credits from carbon funds*
- *Credits expected from HFC projects"*

## DISCLOSURE OF ALLOCATED EMISSION ALLOWANCES AND REGULATED EMISSIONS UNDER THE EU ETS

|                            | Regulated emissions | Allocation | Use of offsets | Comment                                                                                                                           |
|----------------------------|---------------------|------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------|
| A2A                        | Y                   | Y+         | Y +            | -                                                                                                                                 |
| ACEA                       | Y++                 | Y+         | N/A            | Data do not follow the consolidation approach as per financial statements                                                         |
| Centrica                   | Y ++                | Y+         | Y +            | -                                                                                                                                 |
| CEZ                        | Y +                 | Y+         | N              | Offsets: CEZ stopped building up a carbon portfolio in 2009                                                                       |
| E.ON                       | Y +                 | Y+         | Y+             | Allowance and emissions data include capacity operated by E.ON for others                                                         |
| Edison                     | N                   | N          | Y -            | Has EUR50m invested in carbon fund (offsets)                                                                                      |
| EDP                        | Y++                 | Y+         | Y +            | -                                                                                                                                 |
| EDF                        | Y                   | Y          | Y              | No country breakdown. Data in 2009 includes capacity operated by not owned plants (in the UK).                                    |
| EnBW                       | N                   | N          | N              | -                                                                                                                                 |
| ENEL                       | Y+                  | Y+         | Y -            | Offsets: 105 projects with direct participation. But size of the portfolio is given for 2005-2020. No clear view on share of HFCs |
| Fortum                     | Y++                 | Y+         | Y +            | -                                                                                                                                 |
| GDF Suez                   | Y                   | Y          | N              | Offsets: "several projects under way"                                                                                             |
| Iberdrola                  | Y++                 | Y+         | Y +            | -                                                                                                                                 |
| MVV Energie                | N                   | N          | N/A            | Offsets: answer to CDP reviewed only                                                                                              |
| PPC                        | Y                   | Y          | N              | Offsets: Part of 23 mt credits was secured by contracted CERs in 2009                                                             |
| RWE                        | Y++                 | Y+         | Y+             | Best practice for CER portfolio disclosure. Unrisked portfolio                                                                    |
| Scottish & Southern Energy | Y++                 | Y+         | N/A            | Emissions forecasts for year + 1 only;                                                                                            |
| Vattenfall                 | Y                   | Y+         | Y +            | -                                                                                                                                 |
| Verbund                    | Y++                 | Y+         | Y +            | -                                                                                                                                 |

Source: Ccompany information, CA Cheuvreux

**Our view:** In the table above, we flag with a Y or N the level of disclosure of companies on these issues. For regulated emissions, we indicate a "Y+" when the company provides details by country and "Y++" when the company also provides forecasts/guidance up to 2012.

For allocation, "Y+" also means that allocation of emission allowances for phase II is provided on a country-by-country basis.

Regarding the use of offsets, "Y+" appears when the company discloses the exposure of its carbon portfolio to CERs or ERUs from HFC destruction projects. "Y-" signals that the company discloses investments in carbon funds but not on the amount of offsets expected.

### Capacity and Production Data

#### The IIGCC Framework:

*"Companies should provide a detailed description of their historic, current and planned total installed capacity by fuel type. Projections should take the form of a year-by-year plan over a five year horizon that accounts for the following:*

- *New generation equipment, including capital expenditures associated with new investments and expected completion dates for new facilities.*
- *Plans for fuel switching at existing plants*
- *Closure of existing plants*

*For each country where they have substantial operations, companies should disclose historical, current and future installed capacity (in megawatts, MW). Production output (in gigawatt hours, GWh) should be disclosed on a historic basis."*

## DISCLOSURE OF ENERGY MIXES

|             | Energy mix | Country/Divisional breakdown | Guidance / forecast | Comment                                                                                                                                            |
|-------------|------------|------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| A2A         | Y          | Y                            | Y -                 | Guides on 2014E energy mix but only 3 items (hydro/thermal/ other)                                                                                 |
| Centrica    | Y          | Y                            | Y                   | Estimates for years ahead and objective for 2020E energy mix                                                                                       |
| CEZ         | Y          | Y -                          | Y                   | Provides view on 2015E energy mix (capacity breakdown). Data by country mixes all thermal sources (no distinction is made between gas and coal)    |
| E.ON        | Y          | Y                            | Y                   | Detailed volume assumption by fuel source for 2013E. Outlook for the generation portfolio for 2015 and 2030.                                       |
| EDP         | Y          | Y                            | Y                   | Quarterly reporting on the energy mix. Guidance on the evolution of the energy mix.                                                                |
| EDF         | Y          | Y -                          | N                   | -                                                                                                                                                  |
| EnBW        | Y          | N                            | N                   | Investments in renewables higher than conventional capacities. No clear outlook on future energy mix.                                              |
| ENEL        | Y          | Y                            | Y                   | Outlook for technological mix for 2015E in key divisions                                                                                           |
| Fortum      | Y          | Y                            | N                   | No clear view on the energy mix. Capex programme for Europe focused on 100% CO <sub>2</sub> -free capacities                                       |
| GDF Suez    | Y          | Y                            | N                   | No outlook on the energy mix but information provided allows to assess the energy mix post integration of International Power                      |
| Iberdrola   | Y          | Y                            | Y -                 | Provides guidance Y+1 by key division                                                                                                              |
| MVV Energie | Y          | N                            | N                   | Low level of detail. Only three types of energy sources (52% comes from "other electricity generation")                                            |
| RWE         | Y          | Y                            | Y                   | -                                                                                                                                                  |
| SSE         | Y          | Not applicable               | Y                   | -                                                                                                                                                  |
| Vattenfall  | Y          | Y                            | Y                   | Provides a energy mix outlook until 2030                                                                                                           |
| Verbund     | Y          | Y                            | Y                   | -                                                                                                                                                  |
| PPC         | Y          | N                            | Y                   | Guidance on energy mix (installed capacity and power generation) for 2014E. No regular update on energy mix. We use Greece's energy mix as a proxy |
| Edison      | Y          | Y                            | Y                   | Low level of disaggregation (thermoelectric). Outlook for energy mix for 2014E in 2009-2014 business plan                                          |
| ACEA        | Y          | Not applicable               | Y                   | -                                                                                                                                                  |

Source: Company information, CA Cheuvreux

**Our view:** All companies provide details of their energy mix, most of the time both in terms of capacity installed and electricity generation. Their reporting standards differ however in terms of frequency and level of precision (number of fuels). For instance, PPC discloses its energy mix on a yearly basis while EDP reports on a quarterly basis.

### Insight into qualitative information requested in the IIGCC Framework

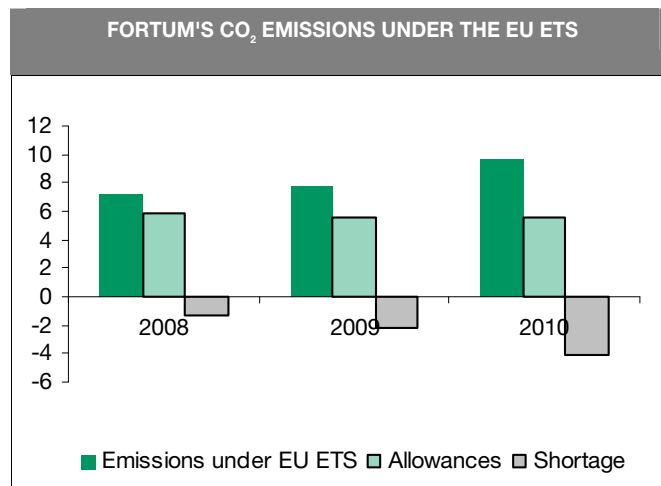
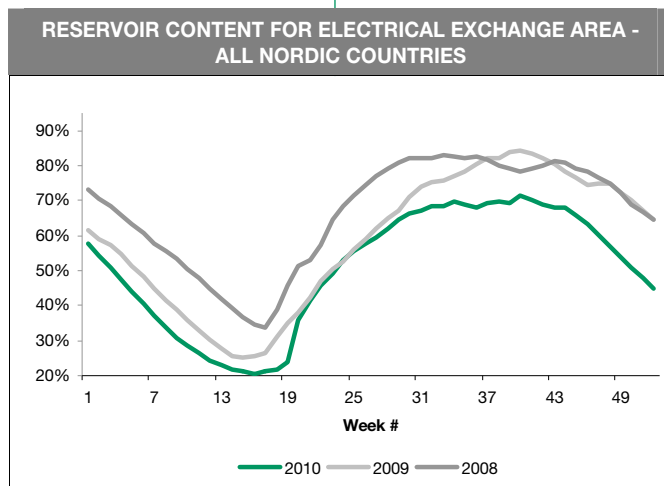
Although we did not systematically review the disclosure of companies against the requirements of the IIGCC Framework regarding qualitative information, we provide a few examples to show why this information matters when it comes to analysing CO<sub>2</sub> risks for a company.

#### How weather can impact the CO<sub>2</sub> position of a company

The IIGCC Framework: *Companies should describe how extreme weather events have affected or may in future affect generating capacity and production and resulting financial implications. This should include the impact of flooding and droughts (hydro-electricity), storms (wind farms), heatwaves (nuclear power) and the impacts from broader changes in weather patterns. Companies should also explain what measures are in place for dealing with changes in weather conditions (e.g. insurance, hedging, investments in new technologies).*

We show in the charts below how the deterioration of hydro reservoir content in Nordic countries over 2008-2010 has pushed a company like Fortum to rely more on thermal capacity for power generation with the consequence of increasing group CO<sub>2</sub> emissions

hence the shortage of emission rights. Over 2008-2010, the group's CO<sub>2</sub>-intensity (power generation in the EU only) increased from 41kgCO<sub>2</sub>/MWh to 84kgCO<sub>2</sub>/MWh and hydropower generation decreased from 22.9TWh down to 22TWh.



### Consolidation approaches: comparing data on equivalent scopes

ACEA communicated on group CO<sub>2</sub> emissions of 1.5mtCO<sub>2</sub> in 2009 but at the same time 8.6mtCO<sub>2</sub> regulated under the EU ETS. We estimate that the gap comes from the fact that the 8.6mt figure consolidates Tirreno Power and ACEA Electrabel at 100%, while these companies are consolidated in financial statements with stakes of respectively 15% and 50%. Companies that fail to provide clear views on consolidation approaches applied to data on CO<sub>2</sub> rights create a risk of misleading carbon risk analysis since such figures can be compared to financial results (e.g. EBITDA).

### Assessment of the Likely Implications of Climate Policy

IIGCC Framework: *Companies should discuss the financial and strategic implications of current and anticipated national and international climate change policy and regulations in each of the countries (EU and ex-EU) in which they operate. With respect to national/international targets on energy efficiency and demand management, companies should disclose their views on how these measures could impact the growth in demand for electricity and the opportunities these measures may present for the company (e.g. revenue implications from energy services business units). With respect to renewable energy, companies should disclose their views on any opportunities that may result from policies on renewable energy (e.g. current/planned investments in renewable energy sources).*

For a view on how companies report on their energy efficiency mandates and planned investments in renewable energies, please refer to the tables and charts on pages 26-27 and page 32 of this report.

### Conclusion

Overall, we consider that the level of transparency on basic carbon data has dramatically increased in the sector since the publication of the IIGCC Framework in 2007 and the toughening of carbon regulation in Europe. In our view, carbon disclosure has reached a satisfactory level which allows observers to carry out carbon risk analysis in the sector.

Nevertheless, among the points where there is still room for improvement in our view, we highlight:

- When reporting their CO<sub>2</sub> emissions regulated under the EU ETS and their CO<sub>2</sub> allowances, companies should clearly specify that these data are consolidated as per financial statements.
- Carbon portfolio: When disclosing the size of their portfolio of carbon offsets (CER/ERU), disclosure of both contracted volume and the company's own assessment of a risk-adjusted volume would help investors assess the potential for companies to use primary CERs to limit compliance costs within the EU ETS. Best practice : RWE.
- Emission reduction targets: Companies should improve the clarity on the scope of their operations to which the emissions reduction targets apply (e.g. European operations only for Fortum, E.ON). We also identify as a best practice the emission reduction path adopted by RWE, which clearly identifies how far each key CO<sub>2</sub> reduction action is expected to help reach the emissions reduction targets.

## RESEARCH & DISTRIBUTION CENTRES

### AUSTRIA

CRÉDIT AGRICOLE CHEUVREUX – VIENNA BRANCH OFFICE  
 5TH FLOOR, OPERNRING 3-5  
 1010 VIENNA  
 TEL: +43 1 22 712 70 00  
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### BENELUX

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 1071 DC AMSTERDAM  
 TEL: +31 20 573 06 66  
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### FRANCE

CRÉDIT AGRICOLE CHEUVREUX S.A.  
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 TEL: +33 1 41 89 70 00  
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### GERMANY

CRÉDIT AGRICOLE CHEUVREUX – FRANKFURT BRANCH  
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### GREECE

CRÉDIT AGRICOLE CHEUVREUX - ATHENS BRANCH  
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 FAX: +30 210 373 4001

### ITALY

CRÉDIT AGRICOLE CHEUVREUX – MILAN BRANCH  
 VIA BRERA 21  
 20121 MILAN  
 TEL: +39 02 80 62 83 00  
 FAX: +39 02 86 46 15 70

### SPAIN

CRÉDIT AGRICOLE CHEUVREUX ESPAÑA S.V. S.A.  
 PASEO DE LA CASTELLANA 1  
 28046 MADRID  
 TEL: +34 91 495 16 48  
 FAX: +34 91 495 16 60

### SWEDEN

CRÉDIT AGRICOLE CHEUVREUX NORDIC AB  
 REGERINGSGATAN 38  
 10393 STOCKHOLM  
 TEL: +468 723 5100  
 FAX: +468 723 5101

### SWITZERLAND

CRÉDIT AGRICOLE CHEUVREUX – ZURICH BRANCH  
 BAHNHOFSTRASSE 18  
 8001 ZURICH  
 TEL: +41 44 218 17 17  
 FAX: +41 44 218 17 87

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CRÉDIT AGRICOLE CHEUVREUX MENKUL DEGERLER A.S.  
 BUYUKDERE CAD. YAPI KREDİ PLAZA C BLOK KAT:15  
 LEVENT 34330 - ISTANBUL  
 TEL: +90 212 371 19 00  
 FAX: +90 212 371 19 01

### UNITED KINGDOM

CRÉDIT AGRICOLE CHEUVREUX INTERNATIONAL LIMITED  
 12TH FLOOR  
 MOORHOUSE - 120 LONDON WALL  
 LONDON EC2Y 5ET  
 TEL: +44 207 621 5100  
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## DISTRIBUTION CENTRES

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CHEUVREUX  
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 MINATO-KU  
 TOKYO 105-0021  
 TEL: +81 3 4580 8522  
 FAX: +81 3 4580 5534

### UNITED STATES

CRÉDIT AGRICOLE CHEUVREUX NORTH AMERICA, INC.

#### NEW YORK

1301 AVENUE OF THE AMERICAS 15TH FLOOR  
 NEW YORK, NY 10019  
 TEL: +1 (212) 492 8800  
 FAX: +1 (212) 492 8801

#### SAN FRANCISCO

50 CALIFORNIA STREET, Suite 860  
 SAN FRANCISCO, CA 94111  
 TEL: +1 (415) 255 9802  
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