EUROPE HAS A DREAM

Green policies & 'traditional' generation: can they live together?

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Europe has a vision: to achieve 80-95% emissions reduction by 2050 compared to 1990

The famous “20 20 20” calls for a 20% reduction in emissions by 2020, but note that this translates into a 34% reduction in the Power sector.

To get to the 2050 target, all sectors must contribute. However, less effort is required in Transport while the Power sector has to reach near zero emissions.

Europe’s planned GHG emission cuts (%)

<table>
<thead>
<tr>
<th>Sector</th>
<th>2005</th>
<th>2030</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>-7%</td>
<td>-54% / -68%</td>
<td>-93% / -99%</td>
</tr>
<tr>
<td>Industry</td>
<td>-20%</td>
<td>-34% / -40%</td>
<td>-83% / -87%</td>
</tr>
<tr>
<td>Transport*</td>
<td>30%</td>
<td>'-20% / -9%</td>
<td>-54% / -67%</td>
</tr>
<tr>
<td>Residential and Services</td>
<td>-12%</td>
<td>-37% / -53%</td>
<td>-83% / -87%</td>
</tr>
<tr>
<td>Agriculture**</td>
<td>-20%</td>
<td>-36% / -37%</td>
<td>-42% / -49%</td>
</tr>
<tr>
<td>Other non-CO2 emissions</td>
<td>-30%</td>
<td>-72% / -73%</td>
<td>-70% / -78%</td>
</tr>
</tbody>
</table>

**TOTAL**                         | -7%  | -40% / -44% | -79% / -82% |

*Source: SG Cross Asset Research/Equity, Datastream. (*) including CO2 aviation but excluding maritime. (**) Non CO2
IT’S NOT JUST ABOUT CLIMATE CHANGE

- €270bn p.a. capex – to achieve 2050 infrastructures, CCS, industrial processes and electrification
- Energy bill savings of €175-350bn p.a. (e.g. efficiencies, fuel switch)

Source: SG Cross Asset Research/Equity
RENAWABLES & THERMAL CAN COEXIST

Capacity mix in the three pathways to full decarbonisation (GW)

Source: SG Cross Asset Research/Equity, ECF
IMPACT ON POWER PRICES IS AFFORDABLE

Yearly energy balance – 80% RES, 20% demand response (DR)...

Levelised costs of electricity by 2050 (€/MWh)

Variable costs by technology in 2050 (€/MWh)

Source: SG Cross Asset Research/Equity, ECF

Source: SG Cross Asset Research/Equity; ECF
WE SHOULD HAVE KNOWN BETTER

High levels of subsidies have led to a wave of new RES installations across Europe

It was so big that it took most governments by surprise

Germany and Spain are the classic examples

Subsidies are being cut BUT installation costs are falling faster… the wave doesn’t stop

And this at a time when electricity demand is falling

There is not a single generation market in Europe that is not oversupplied

Source: SG Cross Asset Research/Equity, Platts.
MORE EMPHASIS ON GRIDS IS NEEDED

100 main bottlenecks in Europe

Source: SG Cross Asset Research/Equity, ENTSO-E
WELCOME TO THE SUN...

GERMANY

Volumes (MWh) in Low season* 2011...

Source: SG Cross Asset Research/Equity; (*) Low refers to temperatures and include the months of November, December, January and February.

Volumes (MWh) in High season* 2011...

Source: SG Cross Asset Research/Equity; (*) Low refers to temperatures and include the months of November, December, January and February.

Lower residual demand

High Season is June to September, Medium all other months.

High Season is June to September, Medium all other months.
...BUT WASN’T GAS THE BALANCING FACTOR?

Volumes (MWh) Low season* 2011...

Volumes (MWh) High season 2011...

Source: SG Cross Asset Research/Equity

Flexible coal?!

High Season is June to September, Medium all other months.

Source: SG Cross Asset Research. (*) Low refers to temperatures and includes the months of Nov., Jan. and Feb.
MORE INTERCONNECTION HELPS BOTH

German power prices with higher interconnection (€/MWh)

Source: SG Cross Asset Research/Equity

Spanish power prices with higher interconnection (€/MWh)

Source: SG Cross Asset Research/Equity

German CDkS with higher interconnection (€/MWh)

Source: SG Cross Asset Research/Equity

Spanish CDkS with higher interconnection (€/MWh)

Source: SG Cross Asset Research/Equity
THE ECLIPSE OF AN INDUSTRY…

Business segmentation of the major European generators

<table>
<thead>
<tr>
<th>TECHNOLOGY/FUEL</th>
<th>EON</th>
<th>RWE</th>
<th>EVN</th>
<th>ENEL (1)</th>
<th>EDF (2)</th>
<th>GDF</th>
<th>IBERDROLA</th>
<th>GAS NATURAL</th>
<th>ENDESA</th>
<th>SSE</th>
<th>CENTRICA</th>
<th>DRAX</th>
<th>EGP</th>
<th>EDPR</th>
</tr>
</thead>
<tbody>
<tr>
<td>COAL TRADITIONAL</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
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</tr>
<tr>
<td>LIGNITE</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
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<td>NO</td>
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<td>NO</td>
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</tr>
<tr>
<td>GAS</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>DIESEL OIL</td>
<td>YES*</td>
<td>YES*</td>
<td>NO</td>
<td>YES*</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
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<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>NUCLEAR</td>
<td>YES**</td>
<td>YES**</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>

RENEWABLES

| WIND | YES | YES | YES | NO | YES | YES | YES | YES | NO | YES | YES | NO | YES | YES | YES |
| HYDRO | YES | YES | YES | YES | YES | YES | YES | YES | NO | NO | NO | NO | NO | NO | NO |
| SOLAR | NO | NO | NO | ? | NO | YES | NO | NO | NO | NO | NO | NO | NO | NO | NO |
| GEOTHERMAL | NO | NO | NO | YES | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO |
| BIOMASS | YES | YES | NO | NO | YES | YES | NO | NO | NO | NO | NO | NO | NO | NO | NO |

(1) excluding ENDESA and Enel Greenpower
(2) excluding EDF Énergie Nouvelle
(*) mostly in cold reserve
(**) closing in 2020-2022 due to current German laws

1YR forward baseload power prices (€/MWh)*

![Market has grown in an ‘uncoordinated fashion](image1)
Generation margins deteriorated
CO₂ prices hitting gas instead of coal
Capacity payments / stranded costs
Oversupply in almost every European country

Source: SG Crossasset Research/Equity, ECF; (***) 80% RES, 10% CCS, 10% nuclear.
Most utilities were caught unprepared by the bursting of the commodity bubble in July 2008

After a season of Capex expansion and M&A, utilities were loaded with debt while the lower power prices and higher taxes were eating away most of their free cash flow

Repeated rounds of cost-cutting, disposals and capex reduction were undertaken.

Sadly, Utilities remain the most indebted sector in Europe (ex-financials)

From ‘necessary’ to ‘unnecessary’ evil: but can Europe afford the disappearance of ‘traditional’ utilities and ‘traditional’ generation?

<table>
<thead>
<tr>
<th>Company</th>
<th>Cost cutting € bn</th>
<th>Capex now (€ bn) Now</th>
<th>Capacity closures MW</th>
<th>Disposals € bn</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSZ</td>
<td>€3.5bn by 15E</td>
<td>€15.9bn in 3YRS</td>
<td>2.7GW 12A + 5.6GW 13E</td>
<td>€11.0bn by 14E</td>
</tr>
<tr>
<td>EON</td>
<td>€2.0bn by 15E</td>
<td>€18.9bn in 3YRS</td>
<td>3.3GW 12A + 5.3GW 13E*</td>
<td>€17.0-20.0bn by 14E</td>
</tr>
<tr>
<td>RWE</td>
<td>€1.5bn 12A + €1.0bn 14E</td>
<td>€18.0bn in 3YRS</td>
<td>4.3GW + 1.5GW 16E*</td>
<td>€7.0bn 13E + €4.0bn 14E</td>
</tr>
<tr>
<td>ENEL</td>
<td>€4.0bn by 17E</td>
<td>€30.8bn in 5YRS</td>
<td>6.0GW 17E</td>
<td>€6.0bn by 14E</td>
</tr>
<tr>
<td>Iberdrola</td>
<td>€0.5-1.0bn by 15E</td>
<td>€16.7bn in 3YRS</td>
<td>None</td>
<td>€2.0bn by 14E</td>
</tr>
<tr>
<td>TOTAL</td>
<td>€11.0-11.5bn</td>
<td>€100bn 3YRS</td>
<td>28.7GW</td>
<td>€47.50bn by 14E</td>
</tr>
</tbody>
</table>

Source: SG Cross Asset Research/Equity; CMD presentations 2013 and 2011; (*) excludes retirement of nuclear capacity old and new; (**) under review
COMPANIES MENTIONED
E.ON (EONGn.DE, Sell)
Enel (ENEI.MI, Buy)
GDF Suez (GSZ.PA, Hold)
Iberdrola (IBE.MC, Hold)
RWE (RWEG.DE, Sell)

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APPENDIX

Historical Price: E.ON (EONGn.DE) 2011/2012

<table>
<thead>
<tr>
<th>Date</th>
<th>Change</th>
<th>2013/2014 Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>08/08/11</td>
<td>New Rating: Hold</td>
<td>28/01/13 New Target: 13.0</td>
</tr>
<tr>
<td>08/08/11</td>
<td>New Target: 20.0</td>
<td>01/07/13 New Target: 12.0</td>
</tr>
<tr>
<td>10/08/11</td>
<td>New Target: 19.0</td>
<td>18/09/13 New Rating: Sell</td>
</tr>
<tr>
<td>02/04/12</td>
<td>New Rating: Buy</td>
<td>08/11/13 New Target: 10.5</td>
</tr>
<tr>
<td>02/04/12</td>
<td>New Target: 21.0</td>
<td></td>
</tr>
<tr>
<td>14/11/12</td>
<td>New Rating: Hold</td>
<td></td>
</tr>
<tr>
<td>14/11/12</td>
<td>New Target: 14.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: SG Cross Asset Research

Historical Price: Enel (ENEI.MI) 2011/2012

<table>
<thead>
<tr>
<th>Date</th>
<th>Change</th>
<th>2013/2014 Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/09/12</td>
<td>New Rating: No Reco</td>
<td>11/03/13 New Target: 3.2</td>
</tr>
<tr>
<td>19/09/12</td>
<td>New Rating: Buy</td>
<td>08/05/13 New Rating: Hold</td>
</tr>
<tr>
<td>19/09/12</td>
<td>New Target: 3.5</td>
<td>02/08/13 New Rating: Buy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>02/08/13 New Target: 2.9</td>
</tr>
</tbody>
</table>

Source: SG Cross Asset Research
Historical Price: GDF Suez (GSZ.PA)

2011/2012 Change 2013/2014 Change
27/07/11 New Target: 32.5 09/08/13 New Rating: Hold
28/10/11 New Target: 31.0 09/08/13 New Target: 16.0
07/11/11 New Target: 28.0 10/02/12 New Target: 25.0

Source: SG Cross Asset Research

Historical Price: Iberdrola (IBE.MC)

2011/2012 Change 2013/2014 Change
30/09/11 New Target: 6.1 04/03/13 New Target: 4.8
26/01/12 New Target: 5.3 26/07/13 New Target: 4.4
29/03/12 New Target: 4.9 31/10/13 New Rating: Hold
11/05/12 New Target: 4.6 31/10/13 New Target: 4.6
18/06/12 New Target: 4.1 09/10/12 New Target: 4.3

Source: SG Cross Asset Research
Historical Price: RWE (RWEG.DE)
All pricing information included in this report is as of market close, unless otherwise stated.

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- #1 Research in Base Metals
- #1 Research in Coal

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* Euromoney - Primary Debt Poll