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Renewable Generation Strategies of Europe's Utilities, 2006–2011

March 2006

Excerpt

This document represents a short excerpt from the market study "*Renewable Generation Strategies of Europe's Utilities, 2006-2011*"

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Excerpt from *Renewable Generation Strategies of Europe's Utilities 2006-2011*

Spurred on by a rapidly evolving Pan-European market environment, more confidence in longer-term climate change incentives and genuine concerns over security of supply, Europe's utilities are, more than ever, incorporating renewable energy into their competitive strategies. With few exceptions, Europe's top-20 utilities have come to see renewable generation portfolios as key elements of their business plans, with most looking for new ways to compete by:

- prioritising different renewable technology solutions alongside their traditional business;
- leveraging renewables experience to enter new markets and broaden their presence;
- creating profitable business units to drive growth.

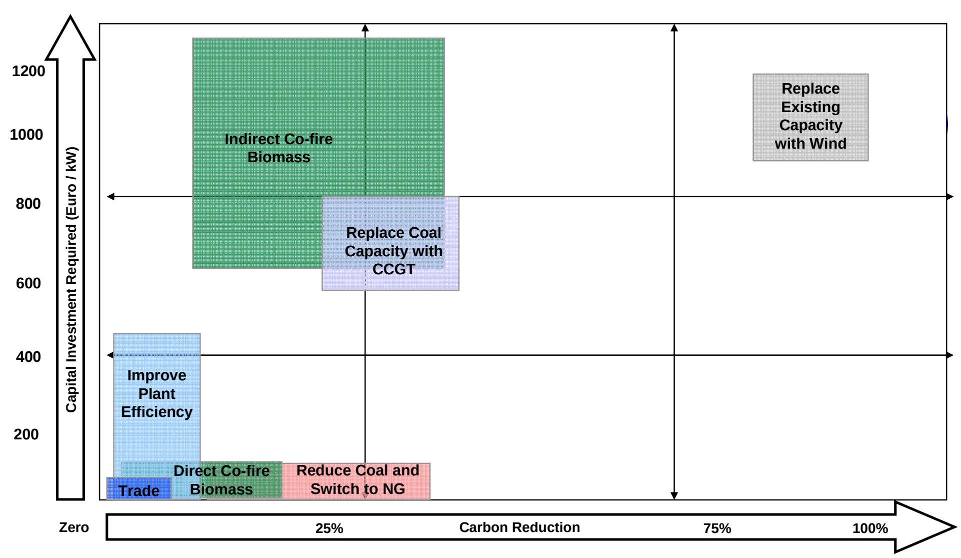
In this report recent European utility activity in key emerging renewable generation segments is reviewed. The study combines bottom-up analysis of utility portfolios by projects in wind, biopower, solar, small hydro, geothermal and ocean energy, with top-down evaluation of strategy trends and market growth. This includes looking at which technologies will follow wind as scalable additions to utilities' generation portfolios, assessing how much utilities plan to invest in renewable generation over the long term and tracking how are they executing these investment strategies.

Regulatory Drivers

To encourage a reduction in greenhouse gas emissions in accordance with Kyoto targets, the EU Commission enacted, in October 2003, the EU Emission Trading Scheme (ETS) (Directive 2003/87/EC). While it is still in its earliest phases, it appears that the ETS structure will ultimately have a profound impact on emissions control in Europe, and will be an important driver behind renewable energy development.

Fuel switching—either from coal to natural gas, or through incorporating biomass as a co-fuel in existing power plants—can be a low cost mechanism for achieving small to moderate percentage reductions in carbon emissions. It also allows utilities, particularly those with substantial coal-fired capacity, to remain flexible in their fuel procurement and generation strategies.

Exhibit 1-1: Investment Profile of Strategies for Complying with the EU-ETS



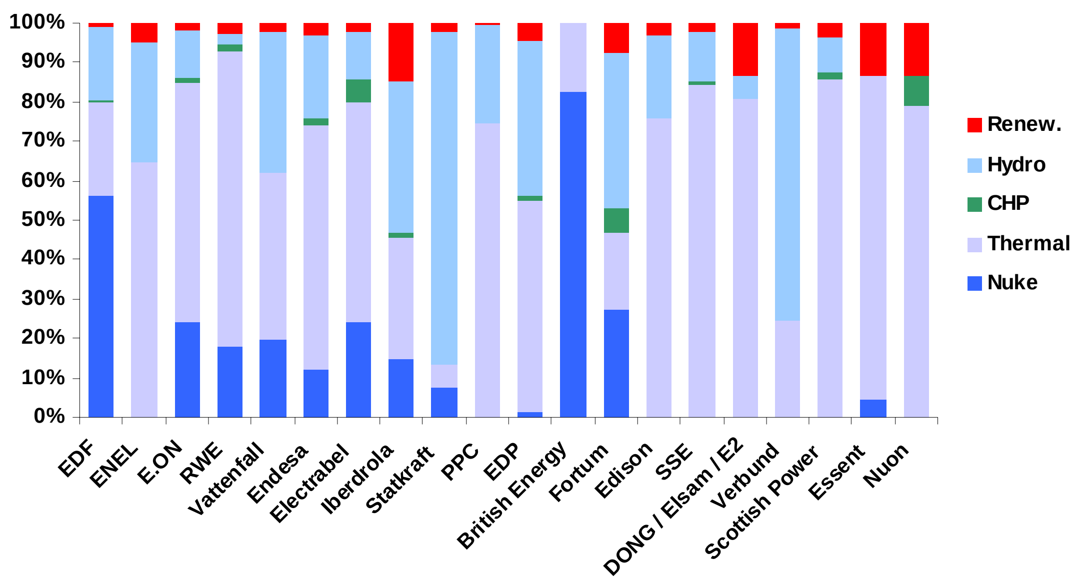
Source: Emerging Energy Research

Generation mix of Europe's top-20 utilities

Europe's utilities break into three major groups by total installed capacity size. In the group of 35 GW and larger, EDF leads with more than double its closest competitor with over 110 GW installed including minority stakes, followed by ENEL, E.ON and RWE. These four firms have multinational portfolios and Pan-European ambitions. The second group, with portfolios of 20 GW to 35 GW, includes Vattenfall, Endesa, Electrabel and Iberdrola, which possess domestic dominance and assets in neighbouring countries. The third group of utilities by size includes firms with under 20 GW installed based on a primarily domestic presence combined with one or two international markets.

All of these utilities, except for Statkraft, British Energy, Verbund, Iberdrola, Fortum and EDF, have thermal assets (coal, oil and gas) as the foundation of their portfolios, accounting for at least half of their generation capacities. Hydro is another key source of capacity, contributing at least 10% to most firms' portfolios. Nuclear is a key source for seven utilities, with EDF's nuclear generation base dwarfing all others. For a growing number of European utilities, renewable generation is becoming a key component of emissions-free production but doesn't exceed 15% of any utility's total generation portfolio, excluding large hydro.

Exhibit 1-2: European Generation Capacity by Utility (%), YE 2004



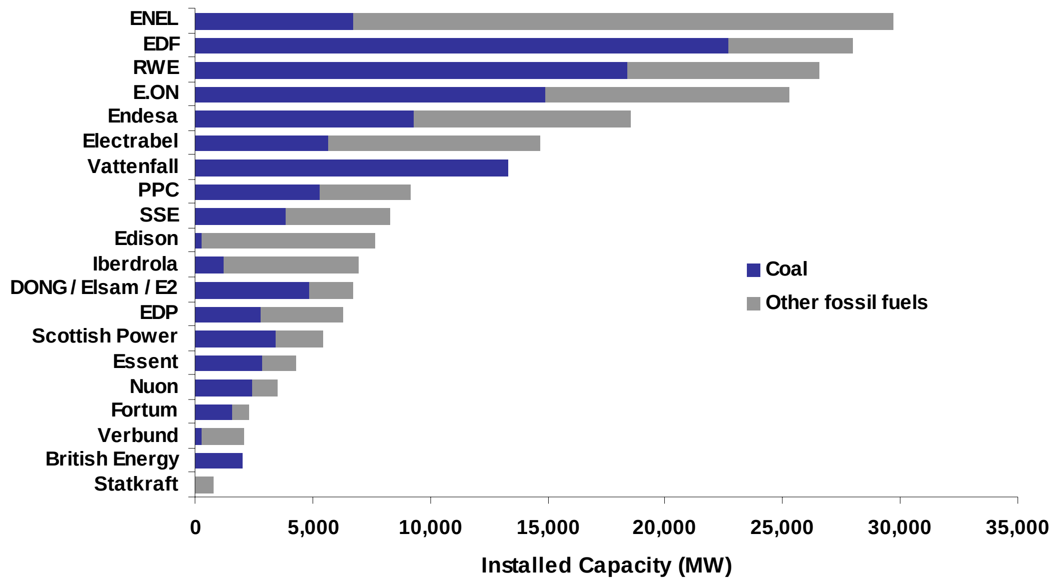
Note: Estimates net ownership including minority stakes

Source: Utilities, Emerging Energy Research

Sizing up emissions exposure

Nearly all firms are making the transition to CCGT plants to reduce their carbon output. RWE and ScottishPower now derive over 15% of capacity from natural gas for example. Utilities are also beginning to use co-firing of biomass as an important source of emissions reduction, particularly in the UK where co-firing accounted for around 10% of total renewables certificates in 2003 through 2004.

Exhibit 1-3: Ownership of Fossil Fuel-Fired Capacity by European Utility, YE 2004

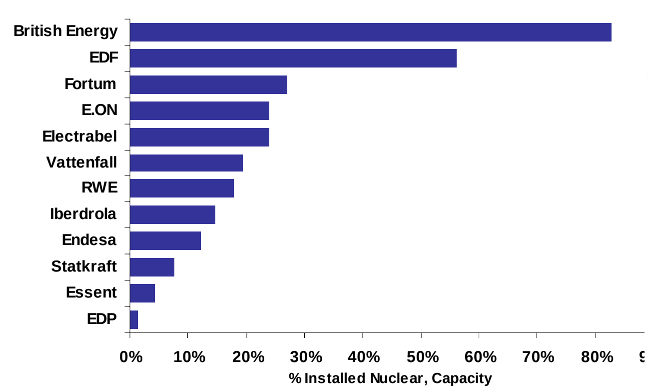


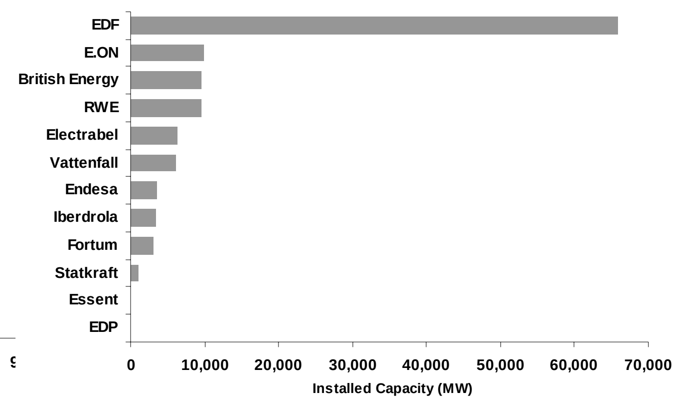
Note: Includes minority stakes such as Statkraft's participation in Sydkraft
Source: Utilities, Emerging Energy Research

Nuclear power policy environment

Nuclear energy remains a key component of utilities' generation strategies; however, its future is uncertain in Europe. Western Europe has not brought any new nuclear reactors on-line since the commissioning on an EDF reactor in France in 2002, and as recently as a few years ago there were widespread plans to decommission existing facilities in many countries including Germany, Sweden and the UK. But with the ETS providing a premium on GHG-free electricity, the debate is intensifying over whether to increase the rate of construction of new facilities and whether to extend the project life of existing ones.

Exhibit 1-4: Utility Nuclear Exposure in Europe, YE 2004



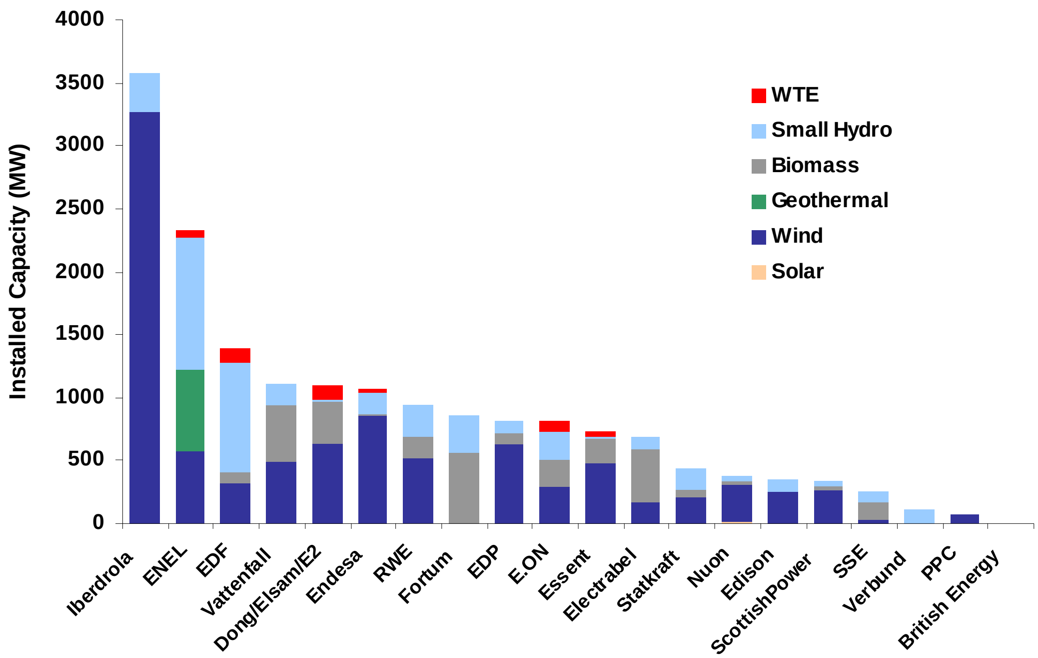


Source: Utilities, Emerging Energy Research

Renewable Generation Rankings

Among the leading utility companies reviewed in this report, Statkraft, Verbund and Iberdrola are the only three that rely on renewables for greater than 50% of their installed capacity base including large hydro.

Exhibit 1-5: Installed Renewable Capacity by European utility Excluding L. Hydro, YE 2005



Source: Utilities, Emerging Energy Research

Utility investments in renewables on the rise

Renewables investment plans have ranged from a few hundred million to several billion Euros, reflecting the strategic importance of renewables as a piece of the generation business. EDF, Iberdrola and Enel boast the most ambitious investment plans at over €1.5 billion each, while mega utilities E.ON and RWE have yet to unveil substantial funding for renewables. Wind is by far the chief target for these funds; however, solar, biopower and SHP also find their way into select utility strategy plans.

Utility Strategies in Renewable Generation

Renewable energy-based power is steadily finding its way into utility generation portfolios as companies must address a shifting set of strategy drivers in an increasingly competitive environment. The extent to which renewables are adopted depends largely on the specific market in which the utility operates, and its competitive positioning within that market. A common set of strategy drivers has impacted all utilities to some degree, which has forced them to evaluate their options in renewables based on the technologies available and where they can best be deployed.

Renewable generation investments can also serve to fulfill basic demand for power in some markets, particularly in the short term as wind power and other renewables have shorter lead times than baseload coal or combined cycle gas turbine (CCGT) capacity.

Exhibit 1-6: Strategy Considerations for Utility Renewable Generation

Strategy Drivers

- **Reduce emissions**
- **Increase supply**
- **Hedge generation costs**
- **Expand into new markets**
- **Improve corporate image**

Technology Options

- **Wind**
- **Solar** (PV, thermal)
- **Biopower** (co-fire, dedicated biomass, waste to energy, landfill gas)
- **Small Hydro** (new build, repower)
- **Marine** (wave, tidal)
- **Geothermal**

Market Focus

- **Domestic**
- **Regional**
- **Pan-European**

Source: Emerging Energy Research

Charting renewables on the utility value chain

Renewable energy adds value to utility strategies both upstream and downstream and is finding its way into utilities' core businesses. For electricity, most firms have initiated their renewable development activity separate from their core generation activity, creating or acquiring smaller developers independent from large power station development. Iberdrola's venture into wind development with EHN in the late 90s, EDF's minority stake in SIIF Energies and E.ON's use of a smaller energy projects division illustrate these players' small steps into renewables when the market was less mature and strategy drivers were less pressing.

Exhibit 1-7: Renewables in the Value Chain

Fully Liberalised
Not Liberalised
Partially Liberalised

Generation

- **Renewables unit placed within core generation business:**
  - Enel
  - RWE (Harpen Re-org)
  - Fortum
  - Vattenfall
  - Electrabel
- **Renewables as separate unit:**
  - EDF Energies Nouvelles
  - Endesa Cogeneration and Renewables
  - Iberdrola Renewables
  - E.ON Energy Projects

Transmission

- **Offtake and transport obligated for renewable energy**
- **EU mandates separate transmission operator**
- **Germany –** regional utilities also control transmission grid, responsible for offtake of renewable electricity
- **France, Greece, Ireland –** national utility also owns grid

Distribution

- **Local utilities with distribution networks serve as obligated renewable energy offtakers**
- **Renewables used as differentiator to capture clients with green electricity programs in distribution business**

Source: Emerging Energy Research

Europe's mega-utilities begin to take renewables seriously

As European gas and electricity markets open, three major utilities, EDF, E.ON and RWE have emerged as the most dominant and aggressive players in the pan-European market. Leveraging their significant asset base and geographic reach, these companies are all looking to expand their market presence in all aspects of the energy value chain, typically building generation portfolios in Europe's largest power markets, while pursuing growth opportunities in Central and Eastern Europe.

These firms windfall profits in 2005 have fuelled their war chests for further European expansion that may re-draw the map of utility competition. At best, renewable energy generation is a third or fourth priority for these firms. Mega utilities usually seek growth through strategic distribution acquisitions, backed up by conventional generation and then perhaps a renewable generation complement to diversify the installed base and reduce emissions obligations. However, renewables are gaining more protagonism. This trend signals increased renewables investment as Europe's biggest utility balance sheets earmark funds for wind, small hydro, biopower and other projects promising scale.

UK and Northern European utilities seek regional leadership

As mid-sized and smaller players in Europe, UK and Northern utilities have adopted renewable generation strategies strongly influenced by domestic regulatory policies, market sizes and regional growth opportunities. Renewable quotas in the UK have led to compliance-driven approaches from ScottishPower and Scottish and Southern Energy (SSE). Benelux players Nuon and Electrabel have sought to grow regionally earlier than most players due to their small domestic market size. While in the Nordic region, environmentally-oriented regulatory policies have spurred on DONG/Elsam/Energi E2 wind leadership and Fortum's biopower leadership. Vattenfall, on the other hand, has managed to establish a strong Baltic region presence in traditional power and is adopting a renewable strategy after government prompting.

The ten UK and Northern European utilities profiled in this study own approximately 19% of the total EU generation market and have varying renewable energy profiles that have been strongly influenced by local resources and incentives. Outside of the UK, most of the utilities in this region are smaller, consolidating utilities like Essent, DONG/Elsam/Energi E2, Fortum and Nuon that are seeking to stay profitable and defend local market share, while tapping into neighbouring opportunities when possible as liberalisation sinks in.

Southern European utilities target wind and sun

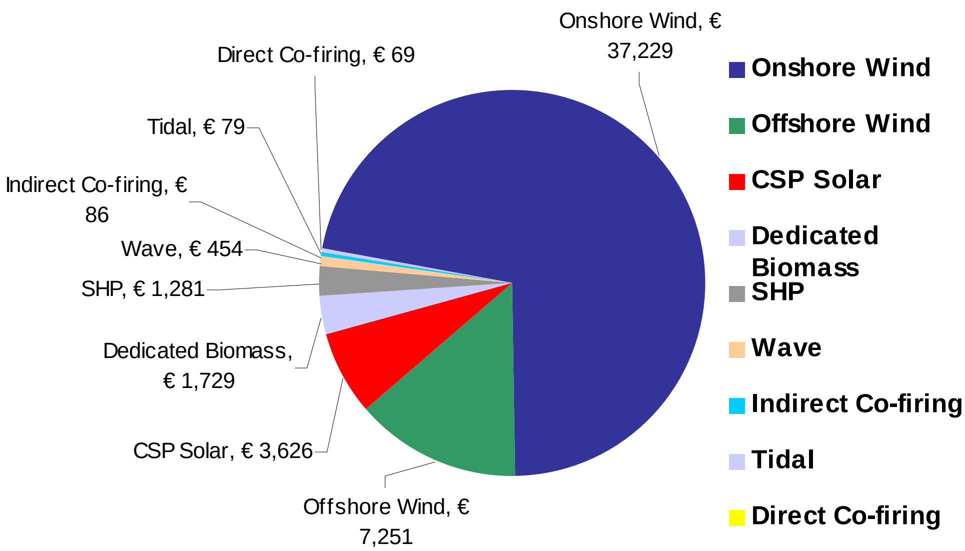
Southern European renewable generation markets have been large scale, utility-dominated affairs since their inception due to availability of relatively attractive incentives for bigger players. Southern Europe has seen a steady flow of large scale cross-border deals in renewables over the past two years, from Enel's acquisition of Union Fenosa Renovables, to EDF's wind expansion in Portugal and Endesa's Italian wind farm entry. Most of these deals contribute to firms' conventional generation presence rather than market entry, however, renewables are becoming standard add-ons to conventional power deals in Southern Europe.

The Southern European market has the fastest growing electricity demand profile in Europe. To meet this demand, southern utilities are building out combined cycle gas turbine (CCGT) capacity; Spain, Portugal, Italy and Greece had the highest demand growth in natural gas, respectively, of all European countries in 2005. However, renewable energy capacity is also growing quickly, particularly wind, with a few companies waiting for improved regulatory incentives before initiating large scale development plans to build CSP and possibly marine power projects.

Outlook

Looking ahead, the scaling of utility ownership of renewable energy will continue to grow rapidly over the next five years, both in terms of increased penetration in existing markets and diversification into new applications and markets. Overall, EER forecasts that the capital invested in utility-scale renewable capacity during 2006-2011 will exceed €50 billion. Of this amount, which will be primarily concentrated in onshore wind, it is expected that more than half will originate from Europe's 20 largest utilities, which have already earmarked more than €15 billion solely for renewable energy projects. This is a clear indication of the increasing role that utilities will play in the future of Europe's renewable energy sector.

Exhibit 1-8: Estimated Cumulative Investment in Utility Scale Renewable Energy in Europe (Million Euros), 2006-2011



Source: Emerging Energy Research

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