

The European Power Market

WHITE PAPER: AUTUMN 2015

Investment opportunities and risks
resulting from the restructuring of
the European power market



The European power market is in a state of flux, driven by a mixture of market fundamentals and resulting competitive pressure, political influence and regulatory mandates.

In examining the steps that have led to the present situation, this white paper explores why the market is in such a state of change, where it is heading, and what some of the resulting investment opportunities and risks are.

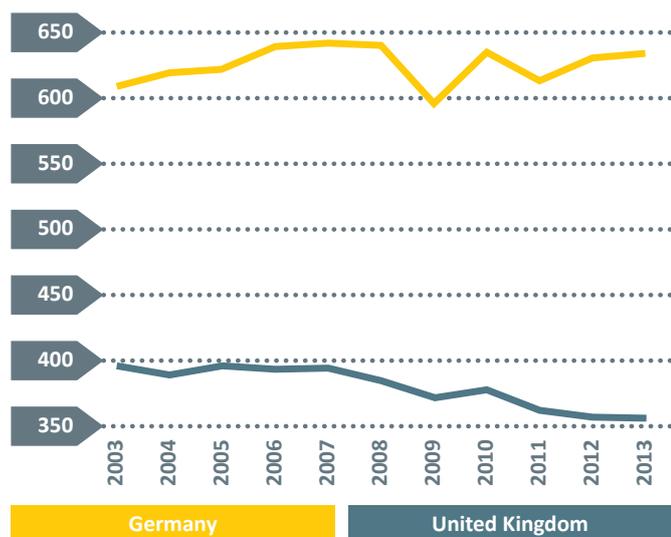
The European Power Market

WHITE PAPER: AUTUMN 2015

Market fundamentals

A proper understanding of the current situation cannot be achieved without first examining the underlying market fundamentals. Power demand in many European countries has been subdued in recent years. Recession-induced falling industrial demand has been compounded by the impact of energy efficiency policies and the growth of small-scale renewable generation, particularly solar - which acts like negative demand, as households that were traditional power consumers can now also generate it. Across the European Union (EU) power demand is set to grow slowly, but demand in the key German and UK economies is declining.

Annual Generation - UK vs Germany: GWh

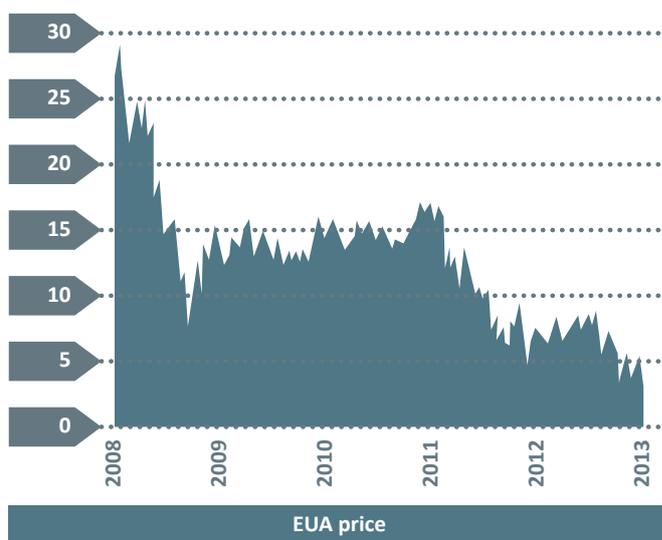


Coal has re-emerged in the EU as the conventional fuel of choice ahead of gas, driven by relatively low coal and carbon prices. Under the rules of the EU's carbon trading scheme to address climate change, carbon permits were allocated allowing a company to emit a tonne of carbon without penalty. Companies are allowed to bank excess permits to meet future obligations, or sell them for cash on the open market.

However, demand for these has plummeted in recent years, due partly to over-supply and partly to the recession. As such, carbon permit prices have dropped massively. Without multilateral EU agreement to reduce permit supply or increase demand by tightening carbon reduction targets, these will remain low for the foreseeable future.

This combination of low coal and carbon prices has resulted in coal-fired generation running hard at the expense of gas. Unlike coal, wholesale gas prices have been relatively stable since 2011, making it less competitive.

EU Emissions Trading Scheme: Euro/tCO₂



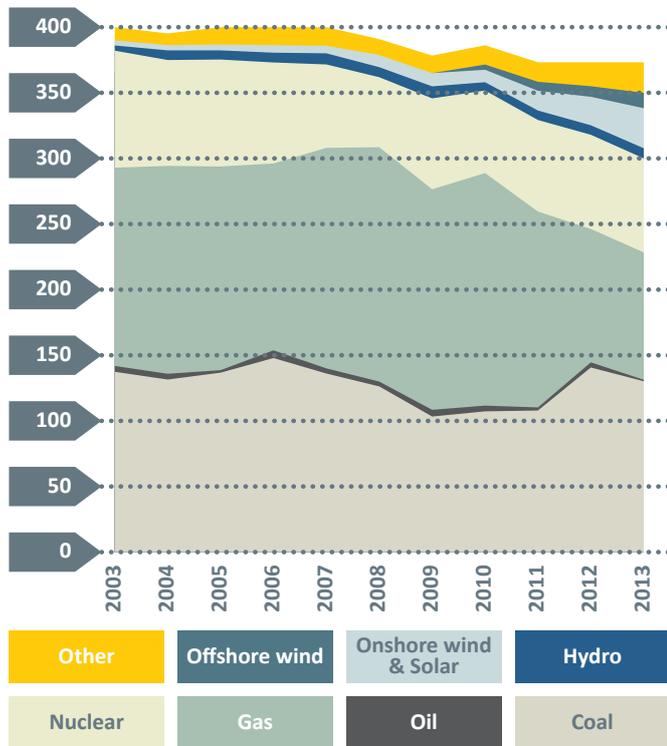
The subsidised rise of renewables

In addition, the contribution of renewable energy has grown significantly, fuelled by EU targets and resulting government subsidies. By 2020, EU member states need to reduce carbon emissions by 20%, improve energy efficiency by 20% and produce 20% of primary energy through renewable sources. As such, by the end of the decade, renewables are predicted to be the second largest component of the EU energy mix, accounting for around one third of total generation. While this is good news for the environment, increasing volumes of intermittent generation, such as solar and wind, present challenges for the industry, as conventional plant must flex and the network expand to accommodate it.

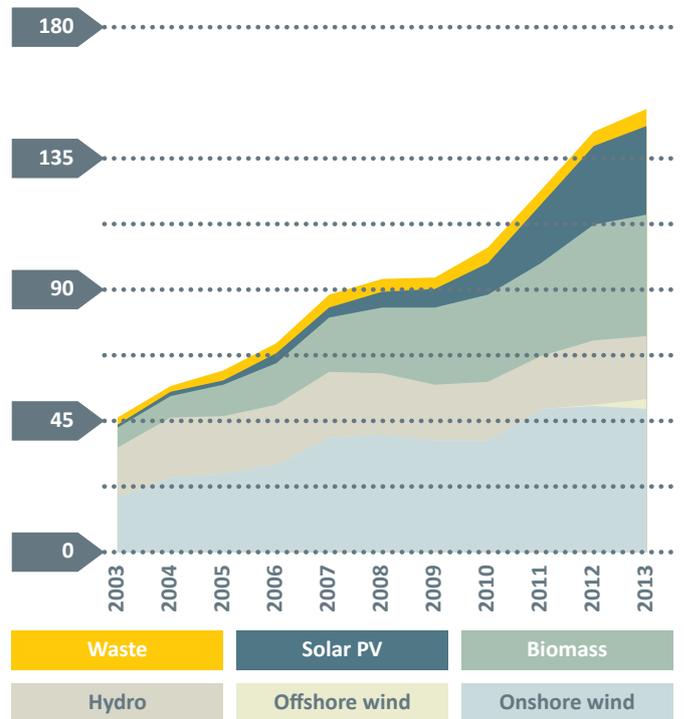
The European Power Market

WHITE PAPER: AUTUMN 2015

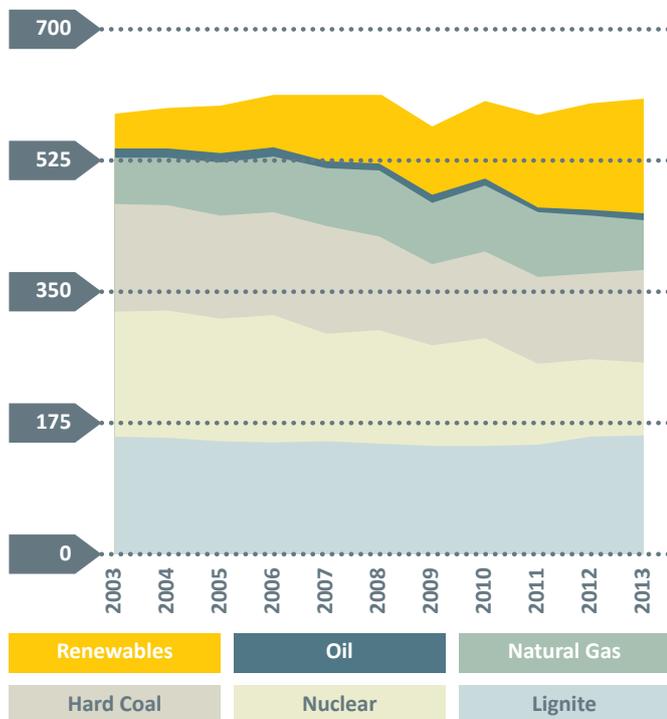
UK Generation Output: TWh



German Electricity Generated from Renewables: TWh



German Generation Output: TWh



This large growth in subsidised renewable generation has had a dramatic and paradoxical impact on the market. More renewables increase overall generation capacity and lower wholesale prices, thereby signalling an apparent reduction in demand for conventional generation. More intermittent renewable generation on the system needs highly responsive and predictable capacity to support it. Only gas-fired generation can provide the responsive capacity support needed. However, the combination of increased renewable capacity, and low coal and carbon prices, is squeezing relatively clean and responsive gas from the market.

As companies react with market exit plans, policy makers respond with alarm around 'security of supply', fuelled by concern that prices may rise, resulting in the erroneous conclusion that the market is not working. In reality, the market is working well – in that it is responding entirely normally to the fundamentals underpinning it – the real problem is that the fundamentals are highly subject to political intervention.

The European Power Market

WHITE PAPER: AUTUMN 2015

In a market characterised by subdued demand and low prices, it is odd that renewables continue to flourish - and so further compound lower prices. In a normally functioning market, as capacity leaves, prices will respond. However, the market entry of renewables is not driven by underlying fundamentals, but by politically-induced generous subsidy support aimed at reducing carbon emissions.

This perverse situation is compounded by electricity's uniquely difficult storability characteristics, and the need to have the right sort of responsive capacity to accommodate increasing volumes of intermittent renewable generation.

This is where a key difference becomes apparent between Germany and the UK, when it comes to renewables. While the UK operates on a relatively isolated grid, Germany - due to its geographical position - is highly interconnected to the rest of mainland Europe, and so can more easily manage its energy flows. The UK is looking to become more interconnected, and has changed its regulatory position to facilitate this. More interconnection will take time but provides an investment opportunity.

EU fragmentation and Member centralisation

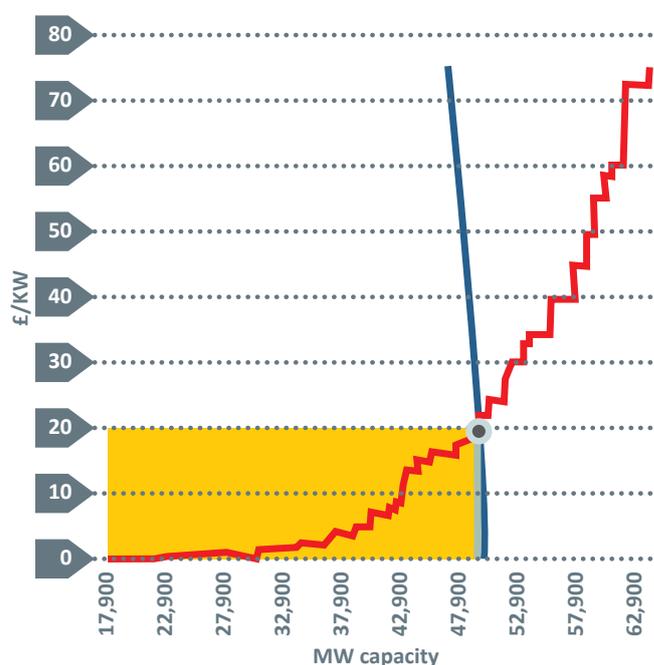
The EU carbon price was lauded as the central driving force to level the playing field between low carbon and conventional generation. However, the current permit price of around €7/te makes it entirely ineffective as a long-term investment influencing tool. With central, multilateral EU action to decrease permit supply/increase demand unlikely, EU energy policy is fragmenting, with individual Member States taking increasingly unilateral action to meet their own policy goals.

In the UK, an approaching lack of responsive gas-fired generation, as well as concern over security of supply and longer term price rises has also led to the reintroduction of a capacity mechanism, as part of the Electricity Market Reform. Its goal is to ensure adequate capacity within an electricity system that in future will rely increasingly on intermittent wind and inflexible nuclear generation.

Part of this saw the introduction of capacity auctions. These reverse auctions see electricity providers bid, promising that if they win a contract, they will be available to provide electricity when needed. In return, they receive a steady payment on top of the electricity that they sell.

The first capacity auction was uneventful, precisely because there is no overall capacity crunch - the problem is the right sort of capacity and a central auction predicated on total overall capacity cannot address this. Perversely, the auction for capacity delivery in 2018 has done nothing to secure short-term supply and prevent flexible capacity exiting the market, as it provides no support over the period to 2018. A single tool aimed at incentivising plant both to remain open in the short term, and provide a long-term investment incentive for new plant, was a little blunt.

Security of Supply - First Capacity Auction: Euro/kWh



The European Power Market

WHITE PAPER: AUTUMN 2015

This will lead to increased centralisation as the National Grid is informally charged with securing the right sort of capacity - which will inevitably be achieved via bilateral contracting and so the transparency of the market is ultimately shaded.

In Germany, utility giants such as Vattenfall, E.ON and RWE are lobbying for a similar capacity market in response to the German Government's 'Energiewende' or 'Energy Transition'. This has seen Germany committing to meet emissions targets while simultaneously aiming to shut down all nuclear plants by 2020. The result has been a huge push for renewables, which are in turn heavily subsidised - to the tune of €20 billion per year.

Going forward

The market has evolved into two distinct streams:

- Conventional thermal generation influenced by market fundamentals
- Low carbon generation - with very low marginal costs whose returns are driven by government policy subsidy support

E.ON has responded by announcing its plans to split in two and spin off its power generation, energy trading and upstream businesses into a separate entity, leaving E.ON to focus on renewables, distribution networks and energy efficiency services. As E.ON CEO Johannes Teysson said at the time: "We are convinced that it's necessary to respond to dramatically altered global energy markets, technical innovation, and more diverse customer expectations with a bold new beginning. E.ON's existing broad business model can no longer properly address these new challenges."

Fellow German energy giant RWE has not yet announced similar plans, but it is clearly feeling the same pressures and has predicted a further decline in profits during 2015.

Meanwhile, Danish power company Dong Energy, the world's largest operator of offshore wind farms, is also considering selling or splitting off part of its business as it struggles to find the right balance between its operations in wind, thermal power and oil and gas. A spinoff or sale of its oil exploration and production unit may fetch as much

as \$8 billion, according to Bloomberg Intelligence estimates. The Danish Government, Goldman Sachs and the other owners of Dong are currently reviewing potential options.

Renewables - expansion continues?

Although the growth in renewables has been consistent in much of Western Europe, the recession and resulting age of austerity has raised questions around continued affordability. The theory behind subsidising renewables is to allow technologies to develop and so in theory reduce costs and, when employed in conjunction with the EU carbon permit scheme, level the playing field. However, subsidies for renewables tend to be a regressive policy tool for two reasons - firstly they raise electricity bills, secondly, subsidies for small-scale domestic renewable generation tend to be taken up by the relatively wealthy who then disproportionately benefit.

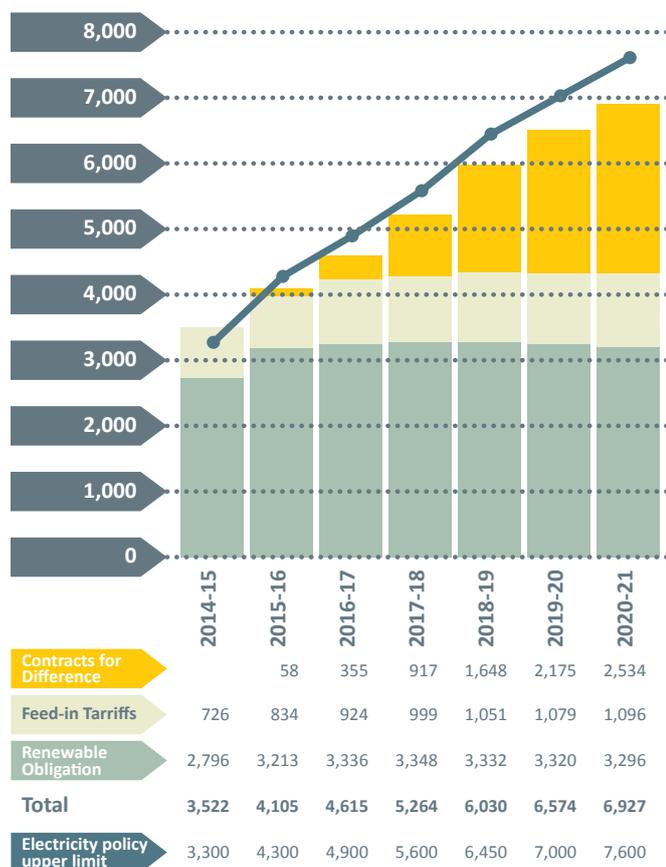
In the UK, concern over affordability and the impact on customers' bills has led to the introduction of an annual cap on the subsidy support for renewables - the Levy Control Framework (LCF). The LCF sets a limit on annual subsidy support for all low carbon generation, currently peaking at £7bn by 2020/21. In a drive to improve the cost effectiveness of renewable subsidy support, the UK has also introduced contract auctions for new renewables - with projects now competing against each other to secure a contract. However, the landscape is changing and the Department of Energy and Climate Change (DECC) recently confirmed it will scrap the Renewables Obligation (RO) support for onshore wind by April next year, one year earlier than planned. As yet, plans regarding further new contracts for onshore wind are uncertain, with the government suggesting the UK has enough to meet its 2020 targets.

Inevitably, such competition will favour those nearer to market technologies and larger developers, and so potentially reduce the unbridled growth rate of renewables. The risks associated with project development and failing to secure a contract will increase, and greater project scrutiny and economic evaluation will be required to maximise the potential of securing a subsidy contract.

The European Power Market

WHITE PAPER: AUTUMN 2015

The Levy Control Framework: £ million



The right kind of generation

Focus will instead shift to the need for responsive plant that can make an economic return operating on fewer overall hours, to operate in tandem with intermittent renewables. In the UK this has led to the reintroduction of a capacity market in an attempt to provide the right sort of generation with an additional income stream. Opportunities for reconfiguring existing plant and its contractual arrangements to provide the right type of capacity in the short term will arise.

In addition, the role of new gas-fired generation is likely to change - hitherto new, more efficient plant has displaced older plant to run as base-load generation, now the higher returns for new plant will be to operate flexibly. Marrying the engineering technicality of flexible operation with the economic requirement of optimum dispatch will be the challenge for many operators to exploit.

Regulatory risk and reward

Given that the returns of renewables and networks are dependent on policy developments and regulatory decisions, any change in policy sentiment and emphasis can have a profound impact, as witnessed by the Spanish government's withdrawal of subsidies for solar energy, and by Japan's apparent U-turn on re-introducing the use of nuclear power following the Fukushima disaster.

By 2020, the EU should be close to meeting its target of 20% of primary energy from renewables - at least the contribution of the electricity sector will be on target with renewables forecast to be contributing around one third of the EU electricity generation mix by the end of the decade.

Where next? While the cost of renewables has fallen, some technologies such as offshore wind will not be cost competitive with conventional generation by 2020. Others, such as wave, remain far from the market. If governments have met their targets, will they continue to subsidise costly renewables and the relatively expensive electricity network expansion to support it? For investors, picking the right project will require an understanding of the regulatory drivers underpinning it, and an appreciation for the fact that the rules of the game can change.

Such change can also provide opportunity. In the UK, the energy regulator Ofgem is looking at putting out to tender large transmission projects post 2021, in an attempt to secure more efficient delivery. Whether competitive tender will actually secure more efficient delivery is questionable - but opportunities for investment will arise.

To adapt to the combination of increasing volumes of small-scale generation and differing electricity use, such as electric vehicles, distribution networks will no longer be just passive one-way route for electricity. As such, smart grids will emerge as a key technology over the next decade. Major players such as General Electric and Siemens are already investing to make distribution grids smarter. Opportunities to exploit distribution network management will also be high, with regulatory returns increasingly geared towards rewarding the more innovative companies.

The European Power Market

WHITE PAPER: AUTUMN 2015

The Road Ahead

What does the future hold? Despite deregulation it is clear that electricity is not just like any other commodity - the risk of power failure has profound economic and social impacts. Therefore, the electricity market will remain highly influenced by policy makers and economic regulators. The era of unbridled expansion of high-cost, low carbon generation will slowly come to an end and only the most competitive projects will be developed - with higher subsidy support only available to develop longer-term technologies further from the market. Project versus project competition will increasingly influence the market, with subsequent developer/backer risk/reward.

Capacity markets will come back into fashion as power markets (and policy makers) adapt to cope with increased volumes of intermittent and variable renewable generation - with an additional market signal for flexible, conventional plant to enter the market/stay in it.

Balancing the technical and economic parameters driving the operation of conventional plant will be essential here to maximise return on investment.

Networks will also offer increasing opportunities, with short-term expansion of transmission to accommodate renewables, followed by smarter operation of distribution. Projects of this type are particularly well suited to investment from pension funds as they typically offer a long term and low risk stream of income and for this reason often command a premium. For example, Finnish state-controlled utility Fortum recently agreed to sell its local power distribution grid to a group of institutional investors led by First State Investments and Borealis Infrastructure for 2.55 billion Euros (\$3.5 billion).

Fundamentally, the current state of the market shows us that things move very quickly and, while this can present huge opportunity, it can also signal increased risk.

The ones to benefit will be those who diversify, adopt a multi-generational strateg, and garner a thorough understanding of not just how things are likely to evolve, but the resulting implications.

Contact

Chris Wilson, Vice President

Telephone: +44 (0) 207 420 1770

Email: chris.wilson@leighfisher.com