Political risk and Europe's energy evolution

Change in Europe's power generation sector is forcing stakeholders to question the market basis on which to model investments. As the implications of the radical interventions of recent years become clearer, so too does the likelihood of further change. At the same time, smart grid technology offers a new wave of market disruption. **Simon Hobday**, partner at Pinsent Masons and Advisory Board Member for POWER-GEN Europe.

Market uncertainty has been a given in the European power industry for as long as the private sector has been involved. However, significant political uncertainty is relatively new to the energy business, resulting not only in a degree of reluctance to invest, but raising a number of questions about political risk that many in the industry never expected to see in Europe. A growing number of banks, for example, are questioning the market basis on which to model investments and hence their view of what constitutes a sound project. The whole mind-set has changed because political uncertainty has altered the dynamics of the industry time and again over the last five or six years.

Subsidies, for example, have been introduced, increased, reduced or even withdrawn with limited notice. There have been numerous changes of policy regarding the type and manner of generation incentivization. Stakeholders in many cases aren't clear whether they are going to be playing in the same game tomorrow as they are today, and with limited or no confidence in the business model being invested in, it is not surprising that they are reluctant to commit funds.

A question of incentives

By their very nature, subsidies are an intervention in the market. They distort what the market does and how it operates. Evaluating the effectiveness of the market model in terms of the delivery of the underlying product in an economic, efficient manner is skewed by the degree to which the subsidy is designed to achieve a social or political goal. Thus, when questions arise about the affordability of a subsidy, what is actually being questioned is whether the mechanism for achieving the socio-political goal, or indeed the goal itself, is valid given the costs incurred.

Over the past decade, subsidies in Germany have been incredibly successful in promoting renewable power and increasing the penetration in particular of solar and wind into the generation mix. However, questions are now being asked about the wider consequences in terms of the cost of energy for domestic consumers and potential impact for industrial users. The effect on the transmission system of a large amount of intermittent generation on the North German coast are also cause for concern. It is not clear that these effects were anticipated at the time the original subsidies were designed.

When one particular form of generation is promoted over another, there are inevitably unintended consequences. This is particularly evident with regard to the rising level of intermittent generation. The cost of intermittency isn't just the subsidy support for a particular technology, but also the consequential costs of grid reinforcement, congestion, potential maintenance of reserve capacity and the role of new technologies, such as storage, in the market.

Critically, the design of the initial subsidies – directed at generation capacity – did not address the contingent costs, nor provide financial incentives to invest in mitigating technologies. This is in part because the full cost of intervention in the market is only slowly being appreciated.

At the same time, the question of when a subsidy for a specific source of generation should be stopped is purely political. Certainly, it is essential to manage and reduce carbon emissions, given the detrimental impact unrestrained pollution has had across Europe over the last 50 years – the effects spanning acid rain to "dead" rivers and worse. But whether or not current incentives are producing the most efficient economic means of reducing carbon emissions is another matter.

Germany's experience

Moving away from a pure merit order dispatch model for generation and giving preference to certain technologies over others has consequences. But that does not change the reality that irrespective of where a plant is in the merit order, its survival depends on adequate cash flows and earnings.

In Germany, a large number of wind farms have been established across northern coastal areas, increasing the strain on the regional transmission system and the 'bootstrap' corridors either side. This strain is due to the way wind power generation works: where wind speed varies in a short period of time in northern Germany, the concentration of wind generation affects voltage control and grid stability, with knock-on effects and fluctuations in pricing.

For example, on Christmas Eve 2012, an unseasonably warm sunny period in southern Germany, combined with moderate levels of wind, saw power prices fall to about minus 200 €/MWh ($275/MWh). Given the increasing interconnection of European power markets, this type of fluctuation doesn't just affect Germany's power market, but those of surrounding countries, because power prices interact with and flow across neighboring countries and linked markets.

In addition, Germany's *Energiewende* has signposted the accelerated end of nuclear generation in the country, although the phase out had been a feature of national policy before the announcements of Spring 2011. The alternative to nuclear generation promoted through the *Energiewende* has been greater deployment of renewables.

This has given huge impetus to a range of renewable generation projects, which will continue to increase the level of intermittency. This has, in turn, given rise to questions about the economic viability of gas-fired plant without some form of capacity support.

In the meantime, the drive towards renewables is placing Germany (and bordering countries) at the forefront of a number of technological advances in dealing with intermittent generation, as well as in terms of market design. Other countries in Europe will be looking to draw reference from Germany's experience.

Capacity markets and interconnection

While Germany is exploring proposals for a capacity market, the more advanced nature of market reform in the UK mean there will be a natural tendency for other countries to see how these reforms work first. Capacity market mechanisms are designed to provide payments to cover fixed costs for generation plant in order to maintain flexible generation sources. The aim is to ensure security of electricity supply through retaining sufficient reliable capacity to meet demand when renewable generation proves inadequate.

However, an alternative is to transport power from surplus to deficit regions. This is one of the key aims of the move to a single European electricity market. To achieve this, two key requirements must be in place: first there must be sufficient physical transmission links – interconnectors – between member states for the flows of power. If the interconnections are insufficient, power flows between linked markets will not produce aligned market prices.

Second, there needs to be sufficient free capacity on the interconnectors to enable power trades across boundaries based on efficient market-based mechanisms, or fully-integrated control systems and market mechanisms across national boundaries.

A further issue is that legal and regulatory differences create barriers, as do technical standards. Barriers can also arise from localized vested interests, ranging from political and regulatory ones right the way through to commercial issues. For example, in a market dominated by one or a few primary suppliers, they may support change to retain a first mover advantage, or they may obstruct change to defend their dominance.

Finally, although greater interconnectivity is generally seen as improving security of supply, there is also a trade-off between it and energy independence. Where the balance is drawn between the two has both economic and political ramifications.

Optimizing technology

There are a number of elements that impact the objective of greater interconnection of Europe's power markets, while ensuring self-sufficiency and meeting targets on renewables. While hydrocarbons have many uses in today's industrial society, in practice, energy independence is generally viewed in terms of self-sufficiency in primary energy production rather than the actual use of hydrocarbons or other particular energy products as the base material for generation.

In addition, different power generation technologies have different operating characteristics. Wind as a technology is good in areas where there is an unobstructed wind flow with a degree of wind stability, which tends to mean coastal areas. Meanwhile, gas-fired generation is flexible, but the gas has to be piped to the location. Some countries around the North Sea area have indigenous gas, but others in Europe have to import it. Gas is also a much more environmentally friendly technology than burning oil, coal or brown coal.

Interconnectivity provides the ability to optimize the use of renewables in respect of local conditions (for example a good offshore wind resource, or high potential for solar PV) and spread the risk posed to security of supply by external events. At a basic level, if the level of interconnection is sufficient, power can be transported to where it is required should intermittency produce a deficit or surplus in one particular area.

The ability to draw in power from other areas will be limited in locations with limited or no interconnectivity. Thus if such areas have significant intermittent renewable penetration, they will need proportionately greater additional plant to be built to provide backup. Conversely, in larger well-connected areas, the risk is more distributed because alternative sources of supply are more readily available. Interconnectivity can therefore reduce the need for capacity markets.

On the cusp

With a number of blackouts or grid events in southern Germany, Italy and Switzerland in recent years being linked back to issues with grid stability, it could be argued that the risks posed by renewables have already materialized. As the share of renewables increases, inevitably there are changes in how the grids are required to operate, because of intermittency and voltage interruptions.

However, the industry is also on the cusp of a technological revolution through the deployment of smart grids. This encompasses the introduction of intelligent management of energy consumption and localized or distributed generation where it is economic to do so.

Control over end-point consumption will enable a form of profile shifting, so that where there is a peak in demand, it will be possible, instead of producing more power, to reduce demand to maintain system stability in real time and to earn income from the turn down. There is potentially a whole new disruptive model of energy networks and systems on the horizon, enabled by hooking up smarter controls, computing power, and realizing the value of power reductions and management rather than just wholesale generation.

The NINES (Northern Isles New Energy Solutions) project in the Shetland Islands is a good example of how different technologies can work together in this way. The aim of NINES is to intelligently manage heat and electricity demand on Shetland so that the planned replacement for the diesel-fired Lerwick power station can be reduced in size, while allowing more renewable generation to be connected to the system. There are other examples where even more radical ideas could be put into action.

These and other issues will be discussed at the POWER-GEN Europe conference, which takes place June 3-5 in Cologne. For more information see visit: www.powergeneurope.com or www.renewableenergyworld-europe.com