

Securing Energy Supplies in a Liberalised Market

Serious blackouts in the USA, Italy and the UK have focussed attention on the risks to security of energy supply. However, Moffatt Associates' recent survey of market participants reveals a significant divergence of opinion on who should be responsible for ensuring supply and the role of the market in providing signals to ensure adequate investment in new capacity.

Security of energy supply has been in the headlines many times over the last few years. Serious blackouts in the USA, Italy and the UK focused attention on the risks of an inadequate energy supply, and the dangers resulting from a failure of the electricity grid system. In the early part of 2005, low temperatures in Europe caused problems in France, when demand peaks resulted in rolling power cuts on the island of Corsica, and led to France having to import 3% of national demand for the first time for 20 years. The key issues affecting security of supply in the power sector are the adequacy of generating resources, and the state of Europe's grid infrastructure.

In gas, meanwhile, recent increases in wholesale prices in the UK have raised concerns about the effect of declining indigenous gas supplies from the North Sea, and an increasing reliance on gas imports from the rest of Europe. Europe as a whole is facing a growing dependence on supplies located in potentially unstable regions, such as Russia and the Middle East. The long distances needed to transport these supplies also raise questions about investment in the European pipeline network.

Rising demand is placing an increasing strain on Europe's electricity system, and the changing nature of power generation, with smaller, decentralised units springing up across the continent, represents a new challenge for Europe's power sector. EU energy consumption is likely to increase by 44% between now and 2020, and decisions to close nuclear power capacity in Belgium, Germany and Sweden have raised questions about what will replace this.

Even before the two major power failures in Italy in 2003, the Commission had been working on new legislation designed to improve security of supply. A package of measures was produced in December 2003 aimed at strengthening the EU's energy independence. ▶



This included a directive (COM 2003 740) that aims to improve supply security and avoid blackouts in several ways. These include defining the roles and responsibilities of Transmission System Operators (TSOs), setting and ensuring network performance standards for TSOs and Distribution System Operators (DSOs), and facilitating transmission and distribution network investment and interconnector construction. The package also includes a directive on improving energy efficiency and energy services (COM 2003 739), which is also still under discussion.

The proposals attracted criticism from the European electricity industry because of plans to give governments the power to require TSOs to invest in transmission capacity. ETSO (European Transmission System Operators) called the plan "inappropriate, contradictory, overly bureaucratic and also potentially very counter-productive."

Environmental groups have also been critical of the focus on generation and infrastructure, believing that, despite the inclusion of the energy efficiency directive, the emphasis remains on building new capacity, and not enough on demand side management.

EU energy ministers subsequently made changes to the original proposal, deleting some of the most interventionist elements in the draft legislation, and simplifying the reporting requirements for TSOs. The directive has now been sent to the European Parliament for a first official reading.

The Trans-European Energy Networks initiative, which promotes the construction of a number of new electricity and gas interconnections across Europe, is also intended to strengthen the European grid network, although these are long-term projects.

A recent report by UCTE (Union for the Coordination of Transmission of Electricity), the association of TSOs in continental Europe, highlighted the precarious nature of Europe's grid system. The latest UCTE System Adequacy Forecast (2005-2015) aims to give early warning signals on system reliability. It concludes that, although no threat to network security in Europe is likely over the next three years, supply shortages will become an increasing problem after 2007 unless substantial new generating capacity is scheduled.

The UCTE's assessment is based on estimates of "Remaining Capacity" (RC) - the capacity that the system needs to cover the difference between the peak load of each country and the load of the UCTE synchronous reference time (so-called "margin against peak load"), as well as exceptional demand variation and longer term unplanned outages which the power plant operators are obliged to cover with additional reserves. ▶



For some countries, RC at peak load representing 5% of the national generating capacity is regarded as enough to provide a reliable supply. For other countries more vulnerable to factors such as load variations or unavailability of generation, RC should represent about 10% of national generating capacity. This level of remaining capacity plus the difference between peak load and reference load is the Adequacy Reference Margin (ARM).

The UCTE report warns that although RC represents 10%-15% for total generating capacity for the whole UCTE system between 2005 and 2010, this figure falls to only 5% in 2015. This means that new power plants will have to be built, over and above capacity that is already scheduled to be built.

The report claims that there should be adequate capacity on the system between 2005 and 2007 because of expected new generating capacity coming on-line, and strengthening of the national and international transmission grids. During the period in question, generating capacity is scheduled to rise by 6 GW, of which over half (3.7 GW) will be in Germany.



However, 5 GW of this 6 GW will come from renewable sources, and this could cause a problem, a fact mentioned by some members of our panel. Because of the reduced availability of renewable generation compared to other forms of generation, the RC is expected to decline from 35.5 GW in 2005 to 32.4 GW in 2007.

The tight supply situation in Italy is well-known, but problems could also occur in France where, despite its recent position as Europe's main power exporter, there could be difficulties in meeting peak demand from 2007 onwards. France's huge nuclear baseload needs to be complemented by the construction of smaller plants able to be called on at short notice to meet sudden power demand.

A lack of investment in power plants and in grid infrastructure was seen as the main threat to security of supply by some respondents to our survey. Congestion on the cross-border interconnectors and a general shortage of interconnector capacity in some regions was also identified as a major threat to security of supply. As Europe becomes a more integrated market, power flows across borders are likely to increase. This should in theory help security of supply since it enables the exploitation of different generation sources and different consumption patterns in order to meet demand. ►

However, difficulties in obtaining authorisation to build transmission lines have limited progress in this area in some countries. The project to strengthen cross-border lines between France and Spain, for example, has long been hampered by environmental objections.

Extreme weather conditions, similar to those experienced in much of Europe in the summer of 2003, are a concern for many respondents. If there were no extreme conditions, Europe's energy infrastructure could probably cope, but a repeat of the 2003 heatwave, or extremely cold weather, could have dire consequences for security of supply.

The rise in the use of wind power, particularly in Germany, poses a new challenge to Europe's grid operators. Wind power is intermittent, and there has to be backup generating capacity available for those times when the wind does not blow. The view of one of our panel members, that: "Renewables are not an answer, we have to look beyond this, it is not a controllable source", was shared by several other panel members.

The scattered nature of wind power has implications for the management of the grid system, but could also help with security of supply because wind turbines are relatively cheap and fast to build, certainly compared to the more traditional power plants.

The survey revealed a widespread acknowledgement of the role of nuclear power in the energy mix and the need for this to continue. As well as phase out plans, ageing nuclear power stations will start to close in the next 10-15 years, and with few countries, apart from France and Finland, planning to build new nuclear capacity, the question of replacements is becoming more urgent.

As well as public opposition, nuclear now has to contend with a lack of investment interest because of the economics of nuclear power in the liberalised market. Market liberalisation is a new challenge for security of supply, and the dynamics between the two are still evolving.

Liberalisation has led to the emergence of new generators in some markets, and this could be beneficial for supply security because it should stimulate the construction of new capacity. However, difficulties in market access in many Member States, and a lack of real investment incentives, have limited the number of new power plants being built. Much of the problem has been the inability of some of the new entrants to secure adequate financing for power plant construction. In addition, economic returns for generators to make their plant available to improve reserve margins are often not high enough. ►



Markets make the costs of security of supply more transparent. This leads to the question of whether consumers are willing to pay a premium for higher security of supply, or accept lower supply security in exchange for lower prices.

Liberalisation has to a certain extent shifted responsibility for security of supply to other market participants. Whereas in the past this was seen as the responsibility of national governments, the EU is increasingly the framework within which this issue is addressed, as the European dimension becomes more important.

National governments and regulatory bodies are important in terms of managing individual countries' security of supply, but because of increasing cross-border flows, the EU authorities and the European grid organisations are also crucial. Fully competitive markets reduce the potential for intervention by governments, but liberalisation can create incentives for firms to build new capacity. Much depends on whether prices will rise sufficiently to make investment attractive. Even if the market does work, however, there may still be occasions, for example to meet the highest demand, when governments may have to take further measures to ensure that adequate capacity is available.

Respondents were divided over who should be responsible for security of supply, although many believed that ultimately this should lie with the state. However, there was a widespread belief that all market players, including international institutions and business, should have a role in ensuring

security of supply, while some believed that the market would provide the right signals to ensure sufficient investment.

In the European gas sector, concerns over security of supply are mainly related to a growing reliance on potentially unstable sources of supply; in this case the Middle East and Russia. As with power, there is clearly a need for more investment in the gas grid across Europe, particularly in view of the distance that gas often has to be transported, but on the whole our respondents did not believe that this need was as urgent as it is for electricity.

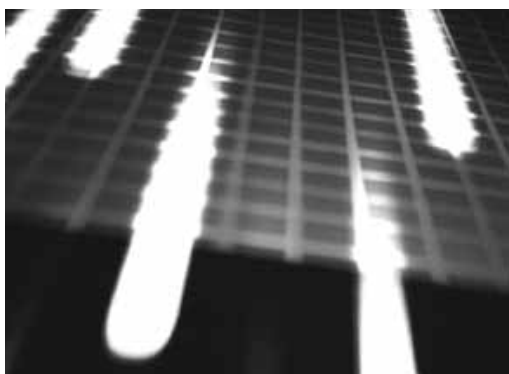
The UK, Europe's largest demand market for gas, is experiencing growing dependence on gas imports, as North Sea fields start to be depleted, and this is a key factor driving security of supply concerns at present. Britain's position at the end of the supply chain raises concerns for the future, particularly since gas currently provides 38% of power generation, and these concerns are certain to be addressed when the government conducts a review of its energy policy, assuming that it is re-elected in May. ▶



High wholesale gas prices have already been the subject of an investigation by the energy regulator Ofgem. The review concluded that these were the result of high oil prices feeding through to British prices, mainly via the pipeline link to the rest of Europe, as well as declining gas supplies. Although Ofgem did not believe that this fall undermined security of supply, it does mean that the UK will be more dependent on more expensive gas from other European markets to replace British supplies.

With this in mind, Ofgem and the government are stepping up the pressure on the European Commission to ensure that there is genuine market liberalisation in continental gas markets. The concerns are that prices should be more transparent, and that there are certain obstacles which may be preventing gas from flowing to the UK market.

In Europe as a whole, there are a number of challenges for security of supply in the gas sector. These include a greater dependence on supplies from outside Europe, which results in gas being physically transported over long distances. Investment in transmission infrastructure is therefore of prime concern here.



Within Europe itself, gas flows across borders are increasing. Over 65% of flows cross at least one border, compared to only 9% of electricity. Harmonisation of transit procedures should help to improve the situation still further, while the body representing gas transmission operators, the GTE (Gas Transmission Europe), also believes that in order to improve security of supply, there is a need for clear allocation of responsibilities between market players, as well as an incentivising investment climate for production and transmission.

As in electricity, the EU has taken steps to address growing concerns over security of supply, particularly in view of Europe's increasing dependence on gas supply sources from outside Europe. To this end, it has introduced Directive 2004/67, which entered into force on May 19 2004 and must be implemented by May 19 2006. The Directive is aimed at establishing a common framework within which Member States can define general security of supply policies. This leaves the responsibility for security of supply of gas at the national rather than at the European level.

In conclusion, recent events have focused attention on security of supply in the energy sector, and this issue will continue to dominate energy policy in the months and years to come. National governments and the EU are taking steps to address these concerns, while market involvement is also now a factor in the equation.

What the responses of our panel have shown, however, is that opinions are very much divided on the best way to secure Europe's energy supplies in the future. ■