Transparency and monitoring of security and adequacy of supply

David Newbery
Nils-Henrik von der Fehr
Eric van Damme

August 25, 2003

Introduction

The long-run performance of the electricity market relies on the behaviour of individual market participants, including investors (incumbents as well as entrants), consumers, traders and the financial community. In order for these market participants to make rational economic decisions they should have access to reliable information on the fundamental drivers for the market and how these evolve. Improving access to information is particularly important for decisions that involve long-term commitments, such as investment in new generation facilities.

The Market Surveillance Committee (MSC) has been asked to advise on how market transparency can be increased in order to improve supply security and adequacy. In this report we discuss the need for transparency from the point of view of the market participants. We also present which information is made public in other electricity markets. We point out that, in addition to increasing transparency for market participants, there is also a need for adequate market monitoring by authorities. It may be necessary to change current rules and regulations to ensure that information is made available to both the relevant authorities and the market.

Information needs

From an economic efficiency point of view, security of supply is optimised if, at the margin, the costs of reducing forced rationing are balanced against the benefits of such reductions (including lowering of social costs associated with major interruptions to power supplies). Adequacy of supply is optimised if the costs of capacity expansions are aligned with the willingness to pay for the associated increases in supply capacity.

To assess optimal supply security and adequacy, one would therefore need to monitor:

- The value of supply security to consumers, or inversely, the cost of forced rationing, e.g. as “value of lost load” estimates;
- The frequency with which involuntary load-shedding is expected to occur on the basis of system characteristics, including statistical data and estimated development of both system load and the availability of generation and transmission capacity;
- The cost of preventing such rationing through system operation, including the cost of administering balancing markets, availability of reserves, costs (prices) of reserves, voluntary load-shedding arrangements and the like;
- Electricity prices, including prices obtained in forward contracts and/or projections of spot-price developments;
• The cost of new facilities, including fuel infrastructure (e.g. gas transport contracts) and the costs of and time required for obtaining the relevant permits. In short, monitoring security and adequacy of supply requires detailed information on physical entities as well as market development.

While all of this information may be of interest to market participants as well, they will mainly be concerned with the elements that directly affect their business decisions. Their primary interest will be with prices and the underlying market fundamentals that drive demand and supply and hence determine market price development. This type of information is important to investors because it provides insight into the likely profitability of new investments. Transparency is particularly important for new investors in generation facilities, as incumbent generators are able to obtain some relevant information from their participation in the market place and ownership of physical assets. Consequently, improving transparency reduces the risk that asymmetric access to information may discourage efficient entry of new market participants and thereby helps to establish a more ‘level playing field’.

Information is important to other market participants as well, such as consumers, who have to make long-term decisions that affect their electricity needs, and traders, who have to make long-term decisions on contractual positions. Market transparency is also particularly important for financial institutions that are outsiders to the industry, but may be asked to finance new investment. Lack of transparency raises risk premiums for investors and financiers alike and thereby reduces incentives for capacity expansion.

**Usefulness of information**

In order to improve the basis for market participants’ decision making, information must be both reliable and understandable.

There are at least two reasons why information may not be relied upon. First, the information itself or its source may be uncertain. For instance, information about future intended investment is inevitably uncertain. Similarly, projections of market development are based on assumptions and are, at best, only imperfect estimates of future market conditions. Even when information is based on the best of sources and is collected, treated and presented with the utmost care it is impossible to achieve complete accuracy.

Another reason why information may not be considered reliable is that it may be (or be perceived to be) deliberately distorted. Generators wanting to pre-empt capacity expansion by competitors may state immediate (albeit untrue) plans to undertake such investments themselves. Similarly, consumers (or their suppliers) who worry about tighter market conditions and associated increases in prices may overstate their needs in order to further new investment. The problem is not so much whether such strategic responses do in fact occur, but rather whether interpreters of the information believe that such behaviour may have taken place. Careful design of questionnaires, cross checking with alternative sources of
information and openness about how the information has been collected may reduce this problem.

The reliability problem may also be reduced by publishing information in a format that is easily understandable and can easily be traced back to physical data (generation facilities, number of consumers). Synthetic information, derived from model calculations based on data from many different sources, is generally difficult to interpret for parties who have little or no insight into the underlying data-processing methods. For example, model simulations of reserve margins, or future price development, are generally received with a certain degree of scepticism as observers realise that results are sensitive to modelling assumptions and methods, but do not understand exactly how and to what extent. Unless recipients have strong confidence in the institutions responsible for such reports, they cannot be expected to act upon the resulting information.

Information should therefore be presented that allows market participants themselves to interpret the content. To the extent that aggregated, synthetic information is provided, great care should be taken in explaining how raw data was aggregated and interpreted. In addition, the sources on which the published information is must be given.

**Role of the system operator**

Considerable amounts of information are available to market participants already from a variety of sources. While it may be efficient to collect publicly available information in a single place, such as a report by the system operator or his web site, it is more important that the system operator provides data that is not already available elsewhere. This should include information about the physical transmission grid, interconnectors with neighbouring countries, and market mechanisms operated by the system operator himself, i.e. the balancing market and tenders for system reserves.

If we distinguish between *i)* factual data, *ii)* synthetic, derived or analytical information, and *iii)* forecasts, the system operator may most usefully concentrate his efforts on factual information. The system operator may not have any specific expertise for producing these forecasts not equally available elsewhere (consultants, strategy departments in power companies, academics). The system operator may however have specific expertise in making analyses relating to his legal tasks and responsibilities, such as calculating system reserve margins and loss of load probabilities, and should be encouraged to do so in a manner that creates analytical information useful for outsiders.

The calculation of system reserve margins and loss of load probability requires an in-depth analysis of the functioning of the electricity market. This includes availability of generation and transmission capacity, development of demand, performance of market institutions, and the responsiveness of consumption and generation to varying market conditions (i.e. prices). The system operator may have to make these analyses anyhow in order to decide on the
procurement of system reserves and other measures required for system operation, but the results will have considerable uncertainty. Results will further be dependent on the choice of evaluation method, and may be difficult to interpret for outsiders who do not have insight into, or experience with, this chosen methodology. Therefore, notwithstanding the usefulness of such analyses for the system operator, results may be of limited value to other market participants.

Moreover, even the system operator may be viewed with a certain element of distrust. Given that the system operator will inevitably be held responsible for adequate levels of supply security, he may have an incentive to encourage capacity expansions even when such measures are not, strictly speaking, required. By developing a record for reliable information provision, for instance by providing comparisons of actual developments with previous forecasts, the system operator may, over time, reduce any distrust with which his information is received.

Factual data, however, is extremely relevant for market participants. Important pieces of information that are readily available to the system operator are not available to the market. This includes data on:
  - Generation capacity and reliability;
  - Transmission;
  - Balancing and reserves, and
  - Imports and exports of electricity.
Such information should ideally be provided as raw, detailed data. In particular, information on individual generation facilities, including location, capacity, age, technology, and fuel type, should ideally be available to the market. The same applies to detailed information on the topology and characteristics of the transmission systems.

Information should be provided in an easily accessible format. In practice, this means that data should, to the largest possible extent, be available in their original form (i.e. as raw data) and in a standardised electronic format (i.e. as spreadsheets). Access to such information will allow market participants – as well as independent analysts – to undertake the modelling and forecasting of market development themselves.

**Information available in other countries**
In various (foreign) markets, the information described above is made publicly available. In the table below relevant information items are presented and the check boxes indicate if information items are available in those markets.
Table 1. Actual updated market electricity information that is available to the public - selected markets

<table>
<thead>
<tr>
<th>Country</th>
<th>AUS</th>
<th>GER</th>
<th>DFNS</th>
<th>FR</th>
<th>NLD (1)</th>
<th>UK (2)</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Nord Pool</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
</tbody>
</table>

### Spot (day-ahead) price (currency/MWh)
- Market clearing price
- Market clearing volume

### Installed generation capacity
- Total installed capacity (MW)
- Unit name (plant level)
- Unit owner (plant level)
- Capacity (plant level)
- Primary fuel type (plant level)
- Secondary fuel type (plant level)
- Location in the grid (plant level)
- Maintenance (plant level)
- Technical life or age (years) (plant level)
- Net imports (interc level) (4)

### Transmission
- Outages
- Maintenance

### Demand
- Total system load
- Load forecast

### Others
- Historical data series (5)
- Environmental characteristics

Source: This table has been compiled based on a number of web sites. The table includes information that is made available free of charge only.

Note:
1. In the Netherlands actual updated information is difficult to obtain. For instance, it is unclear where to find updated information on CHP, which constitutes almost 40 percent of the installed generation. Data on system load has become available on Tennet’s web site, but this does not include the total load.
2. Scotland at present operates under different trading arrangements than England and Wales, and Northern Ireland is only weakly connected to Scotland.
3. PJM ensures the reliability of the largest electric grid in North America by co-ordinating the electricity system in all or parts of Delaware, Maryland, New Jersey, Ohio, Pennsylvania, Virginia, West Virginia and the District of Columbia.
5. Of most of the above information items.

Collusion
As a rule, the more information made available, the better. However, apart from the administrative burden of collecting data and making it available, there is the possibility that information provided to market participants facilitates collusion to undermine competition and hence is harmful to the performance of the market. It is well understood that under certain market conditions potential competitors refrain from competing. Such a situation need not
require explicit co-operation (which is generally illegal), but tacit collusion may arise from the understanding that aggressive competition will be mutually harmful. For example, realising that price discounts to favoured customers may prompt a competitive response, a generator may refrain from offering such discounts.

A collusive outcome is more likely if price determination is transparent and competitors meet frequently. This allows a quick response to any deviations from collusive behaviour. Collusion is however more likely to be a problem for (spot) pricing, where participants revise their strategies daily and individual behaviour may be relatively easily inferred, than with respect to capacity expansion and investment behaviour. Power markets therefore tend to be anonymous (APX, balancing market, OTC brokers) and the transparency requirements suggested in the previous chapters do not include data on commercial transactions or individual companies’ pricing strategies. Transparency on capacity availability and expansion is essential however, to facilitate new entry and thereby undermine collusive behaviour among incumbents through the competitive threat of entry.

**Data responsibilities**
The entity responsible for market monitoring should be vested with the necessary powers to obtain the information warranted. This may require some careful thinking about exactly what information is required and who should be the recipient. In any case, a clear legal basis should be established that ensures that the required market monitoring is not hampered by lack of information.

Some participants may refuse to provide this information voluntarily for fear that publication will harm their commercial operations. Information should be presented in a format that trades off the need to provide the market with useful information against the potential commercial harm to individual participants.

A possible objection to providing more detailed information about participants in the Dutch market is the potential harm to the competitive position of these players in relation to their competitors in neighbouring markets. Dutch authorities may have to make a trade-off here between the desire to establish ‘a level playing field’ *within in Netherlands*, and the desire to protect power generation companies in the Netherlands from foreign competition due to a lack of level playing field *between The Netherlands and neighbour countries*. Given the importance to Dutch consumers of competitive prices and high supply security, authorities may decide to give a higher priority to consumer interests, and therefore strive for increased transparency.

In any case, concerns over security of supply should prompt efforts to reach an agreement with neighbouring authorities and/or TSOs to create a high level of transparency on all interconnected systems. Such efforts would seem to be warranted given the importance of imports for the performance and supply security of the Dutch market and would surely be an
important element of creating a single electricity market. The Dutch government may take a lead in furthering such transparency requirement at the European level.

Conclusion
Improving transparency reduces the risk that asymmetric access to information may discourage efficient entry of new market participants and so helps to establish a more ‘level playing field’ on the Dutch market. Lack of transparency raises risk premiums for investors and financiers and reduces incentives for capacity expansion.

In this report the MSC has identified what information, i.e. generation location, capacity, age, technology and fuel type of individual plants, as well as the topology and characteristics of the transmission systems, should become available to the public as raw data in an easily accessible electronic standard format.

Considerable amounts of information are already available to market participants from a number of different sources. While it may be useful to have such information collected in one place, it is particularly important that the system operator provides information that is not already available elsewhere.

Under specific conditions, there may be a possibility that information provided to market participants facilitates collusion to undermine competition. However, with respect to capacity expansion and investment behaviour it seems that these conditions are not met. Indeed, since the competitive threat of entry is crucial for undermining potential collusive behaviour among incumbents, it is essential that transparency is created to facilitate new entry.

Recommendation
The system operator should be given the legal responsibilities and means to compile and make available to the public information relevant for assessing the security of supply of the Dutch power system. This information should include:

- Data on physical transmission grids and interconnectors with neighbouring countries;
- The functioning of balancing markets and tenders for system reserves;
- Generation capacity and reliability of individual plants, including location, capacity, age, technology and fuel type;
- Imports and exports of electricity.