

The Swedish Electricity Market: Current Issues

By Lars Bergman*

Background

The Swedish electricity market is an integrated part of the Nordic (Norway, Sweden, Finland and Denmark) electricity market¹ that emerged by the end of the 1990's as a result of regulatory reforms that opened up competition in generation and retailing. Although the Nordic countries are small in terms of population, the level of per capita electricity consumption is quite high, particularly in Norway and Sweden. Thus the total consumption of electricity in the area is around 390 TWh per annum (150 TWh in Sweden). This means that the Nordic electricity market is one of the major integrated electricity markets in Europe.

Electricity market reform in the Nordic countries (except Denmark) preceded the EU electricity market directive² and has been more far-reaching than prescribed by that directive. In particular, the reform in the Nordic countries has included both the elimination of border tariffs and the creation of a common power exchange, Nord Pool. In addition close cooperation between the transmission system operators (TSOs) in the four countries has been established, and similar rules for transmission pricing adopted. The EU directive, in contrast, only concerned the regulatory framework of national electricity markets within the union.

The initial experiences of electricity market reform in the Nordic countries are quite positive. First and foremost "the lights did not go out". In fact the electricity market has continuously cleared in spite of "supply shocks", resulting from significant variations in the supply of hydropower in Norway and Sweden. In addition to this basic achievement of the new market institutions electricity prices have fallen and, according to the scanty evidence that is available, productivity has increased in the electricity supply industry.

These observations suggest not only that competition, in fact, can produce increased efficiency and lower prices, but also that the new market institutions and regulations are well-designed and able to foster continued efficiency increases to the benefit of electricity consumers in the Nordic countries. However, there is also concern about problems so far hidden by the overcapacity in generation and transmission (being the legacy of the "old" regulatory system). In the following I will briefly comment on three issues, namely market power, the increasing scarcity of peak-load capacity, and the impact of "green certificate" trading that is about to be introduced.

Market Power

Entry barriers to the generation segment of the Nordic electricity market are significant. This is due partly to remaining overcapacity and partly to prohibitive constraints on the use of coal and natural gas for power production in Norway and Sweden. Thus the incumbent power companies are well protected from competition from new entrants. However, the integration of the national electricity markets to a large extent has diluted the market power that used to

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¹ See footnotes at end of text.

prevail on the quite concentrated national markets. Table 1 shows that the power companies that would be dominating on the national markets have rather modest shares of the integrated Nordic market.

Table 1
Production by Major Power Companies
2001 (TWh)

Company	Production TWh	Share of National Production %	Share of Nordic Production %
Plant located in Sweden			
Vattenfall	76.6	49	20
Fortum	29.6	19	8
Sydskraft	32.7	21	8
Sweden Total	157.8	100	41
Plants located in Norway			
Statkraft	33.3	27	9
Norsk Hydro	9.8	8	3
Norway Total	121.9	100	31
Plants located in Finland			
Fortum	40.4	56	10
Pohjolan Voima Oy	15.9	22	4
Finland Total	71.6	100	18
Plants located in Denmark			
Elsam	16.1	45	4
Energi E2	11.8	33	3
Denmark Total	36.0	100	9
Total in Nordic Countries	387.3		100

Source: Konkurrensen på elmarknaden (Competition on the Electricity Market. SOU 2002:7

Needless to say, the shares of the entire Nordic market are relevant only if inter-connector capacities are sufficient most of the time. So far bottlenecks in the transmission system have only temporarily divided the Nordic market into regional, more concentrated sub-markets. However, mergers and increasing cross-ownership relations between generators have re-established part of the market power that was diluted when the national markets were integrated, and concerns about abuse of market power are voiced with increasing frequency.

An issue that has been the subject of considerable discussion is the doubling of the average Nord Pool price level between 2000 and 2001. While 2000 was an extremely "wet" year, 2001 was "normal" from the precipitation point of view. Thus a price increase between 2000 and 2001 should be expected. But the price increase that actually took place exceeded what was generally expected, and there was a rather common view that the major generators somehow were able to raise prices above the competitive level. As a result of these sentiments a government committee was appointed to investigate the matter. In its report³ the committee came to the conclusion that the underlying factors were a combination of fuel price increases, reduced hydropower supply, increased demand and the phasing out of the Barsebäck 1 nuclear reactor. In other words the committee did not consider the price increase to be a result of the exercise of market power.

However, the development of Nord Pool prices exhibit significant "spikes" that may reflect the exercise of market power during short periods when transmission and/or generation capacity is scarce. A claim that the major generators

collude and systematically withdraw capacity from Nord Pool in order to increase spot market prices have recently been made, and the case is under investigation.

Peak Load Capacity

In January and early February 2000 very low temperatures were simultaneously experienced in all the Nordic countries, and power demand reached levels very close to the maximum capacity of the system. On one occasion the Swedish TSO appealed to the public to reduce their day-time consumption of electricity and thus help to maintain system stability. This incident drew attention to the peak-load capacity issue, more precisely to the fact that no capacity charges are paid to generators in Sweden⁴. In the current system the owners of peak-load capacity earn revenues only if the capacity is used for supplying power to the real-time (balancing) market. As some peak-capacity is demanded only a small number of hours per year, or perhaps only every second, third or even fifth year, the incentives to keep peak capacity available are weak unless the prices of balancing power may be very high when capacity is scarce and the owners are risk-neutral.

However, the generators have exhibited risk-aversion, i.e., they have chosen to close down some of the peak capacity rather than keeping it available for rare high-price periods. Thus as the maximum load on the system has increase by around 1 000 MW between 1996 and 2001, the total installed capacity in Sweden has decreased by 3 500 MW during the same period. Gradually it has become recognized that a redesign of the market institutions is called for, but the views on what the most efficient way of dealing with the peak-capacity problem differ. However, there is agreement that within a relatively wide margin the cost of temporary load reductions are lower than the cost of keeping seldom used generating capacity available.

Green Certificate Trading

As of January 2003, tradable “green certificates” will be introduced. Electricity based on renewable energy sources such as wind and biomass is considered to be “green”, while electricity from existing large-scale hydropower plants is not. The aim of the new system is to promote the use of renewable energy in order to keep carbon emissions low, and to increase fuel diversity in power production. Under the new system a generator will get a certificate, but no direct subsidies, for each unit of “green” electricity produced. The consumers, on the other hand, will have to buy a certain number of certificates per unit of electricity consumed. In 2003 only six certificates will be needed for each 100 MWh of electricity consumed, but the required number of certificates will gradually increase. The goal is that the production of “green” electricity in 2010 should be at least 10 TWh.

There are several concerns about the impact of “green” certificate trading on the electricity market. One is that the annual variations in the supply of wind power and (new) hydropower will make certificate prices quite volatile, and in the absence of hedging options investments in “green” generation capacity will be risky. Another is that the green certificate market will offer new possibilities to exercise market power. The basic concern, however, is that the “green” certificate system will seriously distort investment

and production decisions in the power industry.

The Perennial Nuclear Power Issue

In addition to the issues briefly discussed above the future of nuclear power remains a major issue in Swedish energy policy. In accordance with the latest “long term energy plan” one 600 MW reactor, Barsebäck 1, was closed down in 1999. The “sister” reactor Barsebäck 2 is due to be closed in 2003. However, the closing down of Barsebäck 2 is subject to stringent conditions (about energy conservation and the availability of new power) that few believe can and will be satisfied. Instead there is some interest in the “German model”, i.e. introducing a cap on the total life-time production of all the existing nuclear plants, and leave it to the power companies to decide which plants to close down and when. The nuclear power issue has been subject to heated debate for more than 20 years in Sweden. The decision to phase out all nuclear power plants has remained firm all the time. But the uncertainty about when the phasing out will take place is equally firm.

Footnotes

¹ For a more elaborated discussion of the design and experiences of the Nordic electricity market, see Bergman (2002).

² For a discussion of the EU electricity market directive see Bergman et.al. (1999). For a discussion of the earlier history of the Nordic electricity market, see Hjalmarsson (1996).

³ SOU 2002: 7.

⁴ In Norway payments to generators that keep peak capacity available for the TSO have recently been introduced.

References

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SOU 2002: 7, *Konkurrensen på elmarknaden* (Competition on the electricity market).

Future IAEE Events

June 5-7, 2003	26 th IAEE International Conference Prague, Czech Republic Dorint Don Giovanni Prague Hotel
October 19-21, 2003	23 rd USAEE/IAEE North American Conference Mexico City, Mexico Camino Real Hotel
April 30-May 3, 2004	27 th IAEE International Conference Tehran, Iran Venue to be Announced
April 19-23, 2005	28 th IAEE International Conference Taipei, Taiwan Venue to be Announced