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What forms of co-operation and investment incentives are necessary to create a single EU energy grid?

Two prevalent myths are that the electricity market is unique so that (1) customers need protection from evil market-abusing suppliers and (2) it is better to use electricity within your own national border than to sell it.

The first idea probably originates from the idea that the use of electricity is a human right and as such does not fit a free market setting. The unfortunate consequence of (1) is that we still see areas with regulated prices, even though liberalized electricity markets have in many ways proved efficient (International Energy Agency (2005), Damsgard and R Green (2005), E. Amundsen and L. Bergman, (2006), K. Gustafsson, R. Lundmark & M. Nilsson (2007)). The second “fact” above is underlined by many countries’ refusal to adopt a regional perspective in respect of infrastructure development.

Background

In the early phase of electrification, before World War II, there were sub-national regional networks with a diversity of ownership structures: private, municipal, and state. After the War and from the beginning of the 1950’s, the first 400 KV lines were built, exploiting economies of scale. The first 400 kv line in the world, 1000 km, was built from Northern to middle Sweden to allow an economic use of the hydropower in the north. In most countries, it was decided that one transmission system operator (TSO) would be sufficient. Large vertically integrated utilities were created, e.g. France and UK. In Sweden and Norway the 400 grid was in the hands of one company. Germany had several 400 KV grid owners.

With market liberalization, beginning in the 1990’s, one early initiative was to separate the transmission grid from the rest of the market. This happened in the UK, the Nordic countries and the Netherlands. Most other

European countries opted not to change the ownership of the TSO.

From sub-national to national markets

The move from sub-national network companies to national grids (TSOs) was mainly because some of the investment and infrastructure decisions required a larger income while cost transfers across larger geographical areas were favourable. With very little trade between countries, the need for transnational decision-making was small. As trade has developed, we now have regional wholesale markets but the infrastructure operations and development are still at best national. We must question if it is still optimal to have investment and operational decisions concerning regional, and in the long run European electricity markets taken at a local level.

Increase in wholesale market trading

One criterion to use when considering welfare changes is the Pareto criterion. What this criterion says is that a new policy initiative is justifiable if everyone is made better off without anyone being made worse off. Thus, we should make an improvement if, and only if, there is a clear win-win situation for all stakeholders.

There is clear evidence that this principle was used for trade that took place in the pre-liberalization era. In the liberalized era, un-hindered trade took place whenever there was a price difference. However, the current process for development of the grid seems to imply that any interest group can veto trade improvements, if it does not lead to gains for them. Trade improvements only rarely involve clear short-run benefits for all parties. It is on the other hand very difficult to find cases when trade is harmful in the long run.¹ ▲

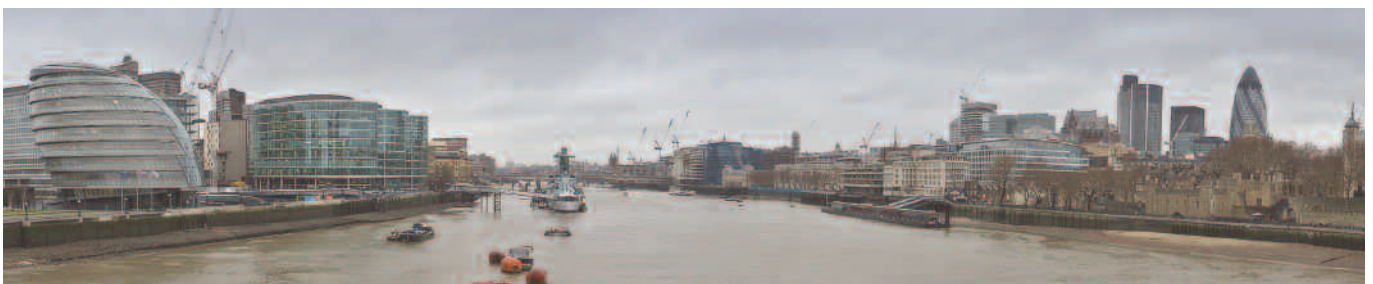
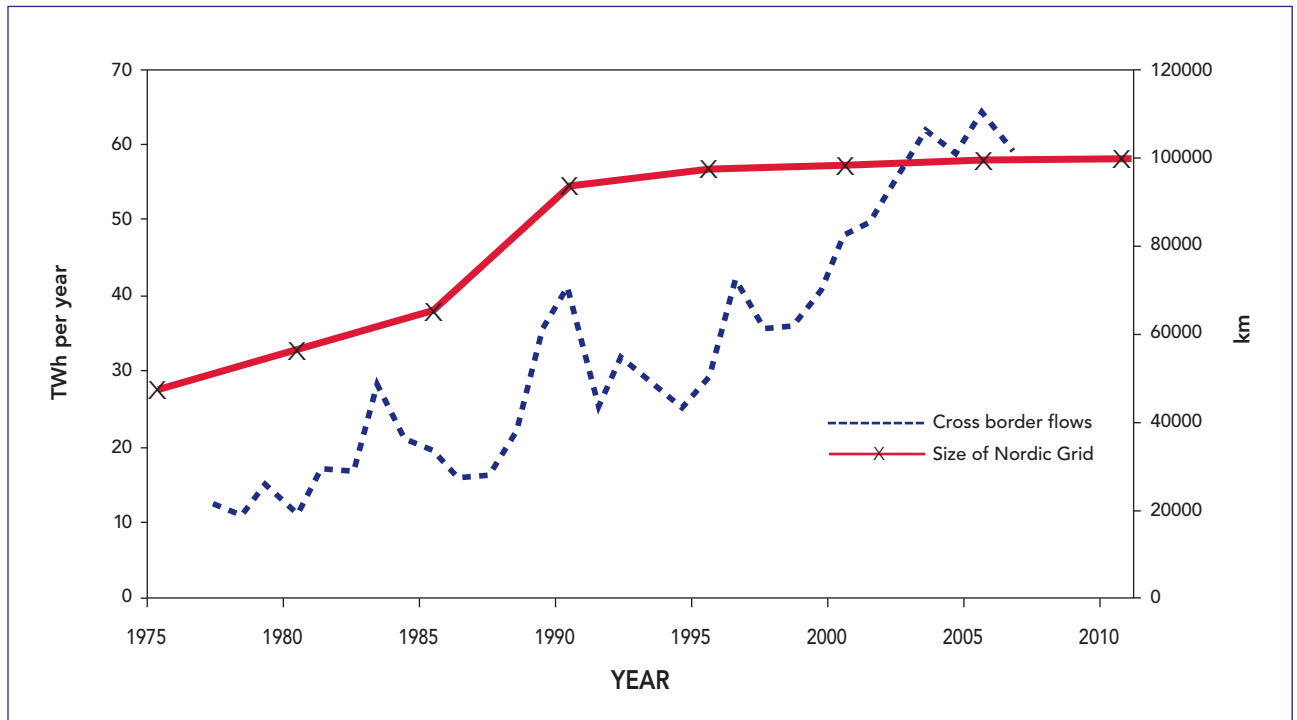


Figure 1 – Annual cross border flows between the Nordic and bordering markets (left axis) and size of Nordic transmission grid (right axis)



Source: The World's T&D Systems and Markets for Transmission and Distribution Equipment 2006 - 2011 & Nordel's annual statistics.

Applying the Pareto criterion strictly is likely to lead to a deadlocked situation where changes cannot occur. Someone is likely to lose in the short run. Thus protectionist measures will always be in some stakeholder groups' interest.

Some constraints on the benefits of network markets are determined by the current infrastructure and how this develops. As **Figure 1** shows, little investment has taken place since the mid 1980's. Figure 1 also illustrates that development in the use of cross border capacity, since the late 1970's, initially was supported by investment in transmission capacity, but during the last 15 years investment has fallen behind.

TSO incentives

Cost benefit analysis has to rely on forecasting and sometimes involves making heroic assumptions. For example, we may need to forecast changes in size and structure of demand, how the structure and size of production at different locations will (or should) change. Changes in demand and supply are not only influenced by market fundamentals, e.g. the expected large expansion of wind power is strongly influenced by policy measures. Market benefits are in general recognized in principle by the TSO's, but are often over-shadowed by political and regulatory issues. **Table 1** summarizes the benefits. ▲

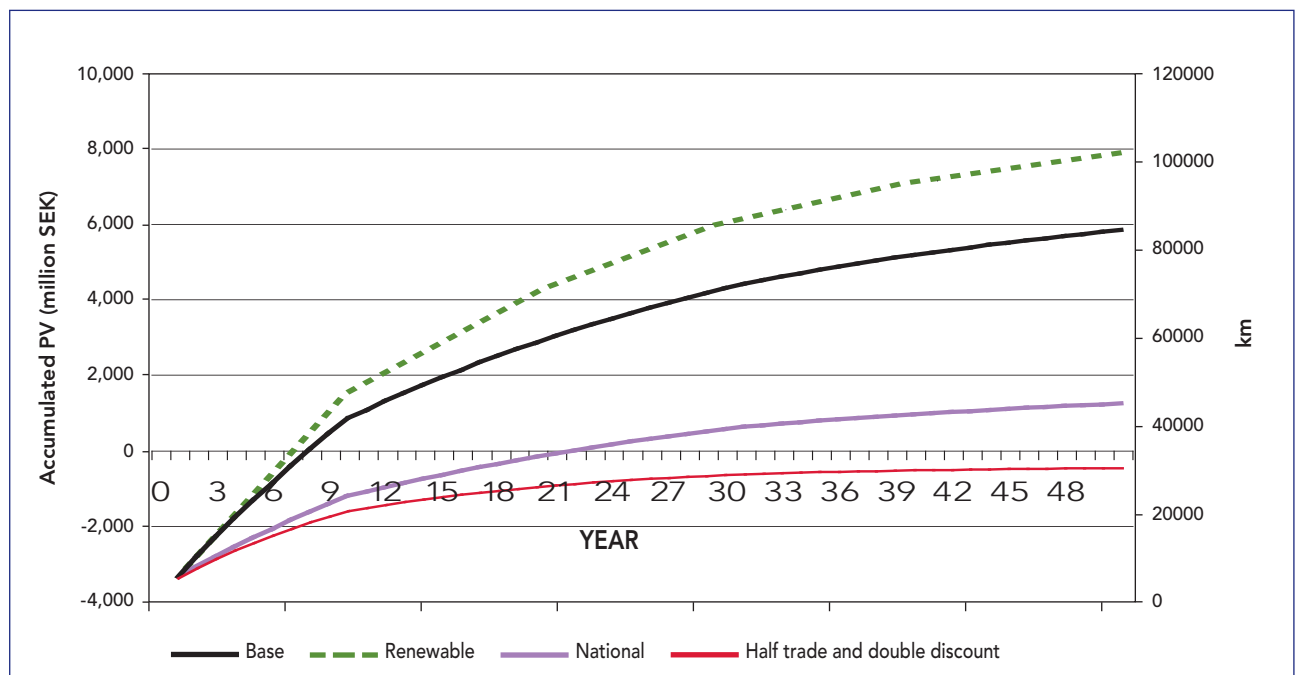
Table 1 – Benefits of increased transmission capacity

Description	Category
Benefits from trade	Market
Sharing of reserves	Market
Operational security	Technical
Efficient operation	Technical
Integration of markets	Political
Security of Supply	Political
Renewable energy	Political
Greenhouse gases	Political

Source: Gustafsson, K. and M. Nilsson (2008) "Incentive structures to support infrastructure investments" Working paper to be presented at the IEEE-conference in Lisbon, May 2008.

¹ A perverse version of the infant industry argument is sometimes occurring where customers of electricity wish to prevent international trade as this may raise prices locally. Such barriers to international trade, would not only be costly from a global social economic perspective, but could impede the long run dynamics for investments.

Figure 2 – Accumulated present value under four different assumptions



Source: Gustafsson and Nilsson (2008)

The difference in benefits is best seen in **Figure 2** which illustrates the impact of strengthening one part of the Swedish grid until all bottlenecks have disappeared.

The chart shows two important things. The benefits to Sweden of strengthening the transmission grid is about 25% of the real value of the benefits for the Nordic market (Base). Furthermore, if environmental benefits are added there would be more regional benefit. In this case, strengthening the grid makes more transport of hydropower possible, and facilitates the expansion of wind power.

To create a real incentive for the TSOs to build and operate the networks rationally we may need to incentivize trading. There is some experience with mechanisms allocating costs, eg. the *Inter TSO Compensation (ITC)*.¹ The ITC defines a mechanism which allows the development of an internal market for electricity in which producers and consumers are given access to the entire European market by paying a one charge for access to the network. In this way, it is possible for international electricity trading to be conducted without having to take account of transport routes between sellers and buyers of electricity, which has hitherto been the case. The purpose of the ITC mechanism is to serve as a link between the cost of international flows, referred to as *transit*, within the EU and the *electricity network tariffs* that electricity producers and electricity consumers pay.

The basic principle of ITC is that each TSO should be compensated for the costs incurred by the transit flow in their own network, whereas other TSOs are in turn compensated for the costs incurred by the TSO in other

networks. In practice, discussions on the ITC mechanism have come to focus on payment for existing infrastructure, which today is (partially) used by cross-border flows.

In order for a fully integrated European electricity market to become a reality, a considerably more forward-looking payment system is required that supports investments in new transmission capacity. It is also worth noting that the annual total payment levels that are today transferred in the temporary ITC mechanism (EUR 395 million [Gustafsson, K. and M. Nilsson (2007b)]) can be assumed to be in this context an almost marginal amount in relation to the investments that are expected to be required for the goal of a joint EU common electricity market.

Creating Regional Independent System Operators, (RIOs), can solve issues concerning cost and benefit allocations if a proper regional regulation is implemented. A Nordic RIO with a Nordic mandate would be less prone to rent-seeking activities from sub-regional interests. This set-up would also encourage more transparency, as similar entities in the US have shown.

How can ownership unbundling help?

The idea of ownership unbundling is to prevent a monopoly entity from abusing market power either by using an asymmetrical information advantage or by planning investments to maintain high scarcity rents. Thus in areas where this is a problem, ownership unbundling may help. On the other hand, the problems of cross-border trade, and regional infrastructure investment are not made better or worse by ownership ▲

¹ The information on ITC is found in Gustafsson, K. and M. Nilsson (2007b)



unbundling. The Nordic market clearly demonstrates that ownership unbundling does not stimulate market integration, and that the scope of network planning is the real problem.

Suggestions for further development

Currently, the European electricity market suffers from a regulatory gap – there is no one with the governance over cross-border trade. The European Commission has proposed a European regulatory entity with such a responsibility. ACER is part of the answer but the Commission's current proposal as of October 2007 allows for an asymmetric power structure between ETSO and ACER. The real question to be answered is how much self-regulation should we give the association of monopoly entities? The experience of a self-regulating TSO entity in Sweden suggests unfortunately a lack of transparent procedures and accountability result from not having a Nordic perspective and pursuing short term self interests.

The EU Commission's suggestion to create a European regulatory body to regulate and monitor cross-border investments as well as daily operations is a reasonable approach to the regulation of cross-border trade in electricity. However, the idea of giving ETSO far reaching self regulatory powers may delay, at best, or stop, at worst, infrastructure development in Europe.

For example, we could consider the failure of ETSO to agree upon a method to allocate the cross border compensation "fund." Despite the fact that the monetary values at stake were rather small it has up until now been impossible to find a long-term agreement on a fair procedure (see Gustafsson, K. and M. Nilsson (2007b). Currently, at a stage where infrastructure investments are needed, self-regulation has turned into non-transparent process.

A RIO with its regional structure would act to maximize socio-economic welfare for the whole region. What is needed is to marry the RIO concept with a regional approach to regulation, either by regional subcommittees within ACER or by regional boards of national regulators. A more developed cross-border regulatory regime implemented in national laws could be the basis for regional regulation.

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