

## **Background**

### **Earlier studies and statements**

Finnish Energy Industries (ET) has in its earlier statements emphasized the importance of a liberalized market and level playing field as preconditions for deeper market integration with surrounding electricity markets. One of the latest cases was the cable project of United Power. ET stated that the current production conditions in Russia are not of same level as in European Union with regard for example power plant security, environmental issues, ensuring the security of supply and reciprocity, and that the Russian actors would therefore have a distorting competitive advantage. The above issues would have needed to be solved before expanding import from Russia.

In its position with regard to market integration ET has welcomed market integration with neighbouring markets. However, as mentioned above, when increasing electricity exchange there has to be a non discriminatory market place with sufficient and equal rules and terms.

### **Workgroup**

The members of the work group were Jussi Hintikka (PVO), Tuomo Karhulahti (Solidus Oy), Esko Kytömäki (Energiameklarit Oy), Raimo Peltola (Fortum Power and Heat Oy), Pekka Salomaa (ET) and Petteri Haveri (ET).

## **Market integration with Baltic countries**

### **Current situation**

#### **Market integration**

The Baltic region is now linked to the Nordic power market with the Estlink cable which connects Finland and Estonia. The commercial capacity of the HVDC interconnector is 350 MW (NOR 2009) and the maximum capacity 365 MW (FIN 2009). The interconnector is in merchant commercial use possibly until year 2013. The capacity is used by the parties connected to the project according to the so-called use-it-or-lose-it principle. In addition, third parties have the possibility to buy transfer capacity for the next day from so-called free explicit capacity auction.

#### **Estonia**

A 35 % share of the Estonian market is opened in theory. However, power imports are in practice not possible due to rules favouring domestic power generation. In addition all consumers are allowed to purchase under regulated tariffs that have been rather low. It is essential to be able to truly liberalize the market and gradually remove regulated end-user tariffs. The opening of market is planned to be completed to the full extent by the year 2013. The most recent political progress enhances partial opening of the market.

The proposed amount of CO<sub>2</sub> emission allowances in Estonia for 2008-2012 is more or less sufficient to cover the domestic consumption. A core issue for Estonians is the future of power plants that use mainly oil-shale, with significant greenhouse gas emissions, as the primary energy source. Estonia has been permitted to give allowances for electricity production for the period 2013– too, but a question remains. What will the competitiveness of these plants be? The oil-shale, generation and supply prices are regulated currently. In generation and supply price the permitted return is calculated based on a regulatory asset base (KON 2008).

Imports are allowed from EU-countries only (CES 2009). For importing electricity to Estonia a licence is required. It is possible to get import licence for electricity produced in power stations under EU terms. (ARU 2008)

### Latvia

In principle the markets is open, but as all customers except the large enterprises are still entitled to purchase under regulated tariffs. The open market doesn't yet exist. There are plans to remove regulated tariffs.

Today producers lose subsidies when selling to the market (CES 2009). In general it is expected, that Latvia is rather well prepared for a liberalized market. However questions remain, for example the unbundling situation of the leading producer and the TSO. With regard to energy balance Latvia is a deficit area.

### Lithuania

Lithuania has an own small power exchange. In theory the market is open, but all customers are entitled to purchase under regulated tariffs. The open market doesn't yet exist. There are also restrictions to sell imported electricity directly to end-users.

Electric energy system is based on one dominant low cost generator, and other producers are supported to stay in the business. Today producers lose subsidies when selling to the market (CES 2009). After Ignalina power plant is shut down, the power balance in Lithuania will worsen remarkably.

### Baltic region

All three Baltic countries differ considerably and the structure of market is different in each Baltic country. A lot of work is needed also to integrate the electricity markets of Baltic countries.

## Expected development

### Multiregional planning project 2008

Baltso, Nordel and PSE Operator S.A. finalized their study on possible new interconnectors that would connect Baltic countries to surrounding countries. The result was that it is profitable to build all three interconnectors considered: FIN-EST, POL-LIT and SWE-BAL. The planned interconnectors and the existing transmission network are in the following picture.



**Picture 1. Planned interconnectors (Source: MUL 2008)****Estlink2**

Possible time table for Estlink2 is 2013–2018, and the European Commission has promised aid for the project, if the project is started rapidly. The capacity of Estlink2 is planned to be 650 MW. The prerequisite to go forward with the project is that there shall be a credible price reference in Estonia and an open market. In practice this means price area Estonia or at least price area Estlink. Nord Pool Spot (NPS) has done a profound study how a price area could be formed in south end of Estlink. A prerequisite for introducing a price area in Estonia is according to NPS that the Estonian market will be truly opened. In practise it means for example the denying large customers right to buy electricity under regulated tariff.

**Sweden–Lithuania connection**

Situation with the interconnector to connect Baltic region and Sweden is similar compared to Estlink 2. The European Commission has promised aid for the project, if the project is started rapidly and a prerequisite for the project is that there shall be a credible price reference in Lithuania and an open market.

**Other plans and remarks**

Other plans in Baltic region include the Lithuania–Poland interconnector and internal reinforcements. “Estonian transmission network development plan considers building of new 330 kV power ring Tartu–Sindi–Harku. Latvian transmission network development plan forecasts building of new 330 kV power ring in western part of Latvia: Riga (Imanta)–Tume–Ventspils–Grobina, and closing of 330 kV ring around Riga city by building power line Riga CHP-1–Imanta. Lithuanian transmission network development plan intends building 330 kV power lines Klaipeda–Telsiai, Panevezys–Musa, and double circuit line Kruonio HPSPP–Alytus in case of Poland interconnection.” (BAL 2008)

It is to be seen how the shut down of Ignalina will affect the Baltic transmission network. The Baltic region, on the whole, is expected to be a deficit area in terms of electric energy until ~2020. It is to be seen, whether a new nuclear power plant will be built. A project has been started in Lithuania and the first unit of a new nuclear plant planned to be in operation 2018.

Interesting is also how the Kaliningrad area is going to develop. There may be interest to build new capacity, also so, that Kaliningrad could be an electricity exporter to Lithuania and Poland.

**Important issues**

With regard to Finland and the Finnish market participants the most interesting plan is Estlink2. There are a number of prerequisites that have to be in place to go forward towards a common Baltic market and a market based coupling with the Finnish power market.

- common balance settlement procedures for the whole area, preferably similar as in the Nordic market
- credible price formation, preferably introduction of a new spot area
- rapid reduction in the use of regulated tariffs
  - o This is a prerequisite for the credible price formation. Otherwise the power exchange could suffer from a lack of buyers, and no credible price formation would take place
  - o reduction in the use of regulated tariffs would also lead to increased competition in retail market
- concerning transmission no firm capacity shall be given to any participant, but market coupling method should be implicit auction
- level playing field must be ensured

## Future possibilities and challenges

### Possibilities

The integration of Nordic and Baltic markets is a great possibility for both markets. Deeper integration may finally enable common markets:

- Nordic-Baltic day-ahead spot market
- Nordic-Baltic continuous intra-day market (elbas)
- Nordic-Baltic regulating power market
- Nordic-Baltic financial market

This should be done in parallel with true market liberalisation in all three Baltic countries, and most importantly in Estonia. The market rules need also to be reviewed as required by Nord Pool Spot. In addition to the deeper integration with Nordic market, the LIT–POL interconnector is an important project.

### Challenges

The biggest challenge is that the integration progress in Baltic countries slows down, and eventually freezes the integration development with surrounding markets. Political will is needed to push forward the needed market liberalisation. As this means that the possibility to proceed with regulated tariffs would end, some objection from end-users is expected. However to be able to get a credible and cost based price, the reform is essential. The Baltic countries are facing a worsening power balance. This calls for new investments in power generation. It is hard to imagine those to be realised without a reliable, market-based price formation. The Baltic countries have indicated that they are willing to go forward with the needed reforms within the BEMIP framework.

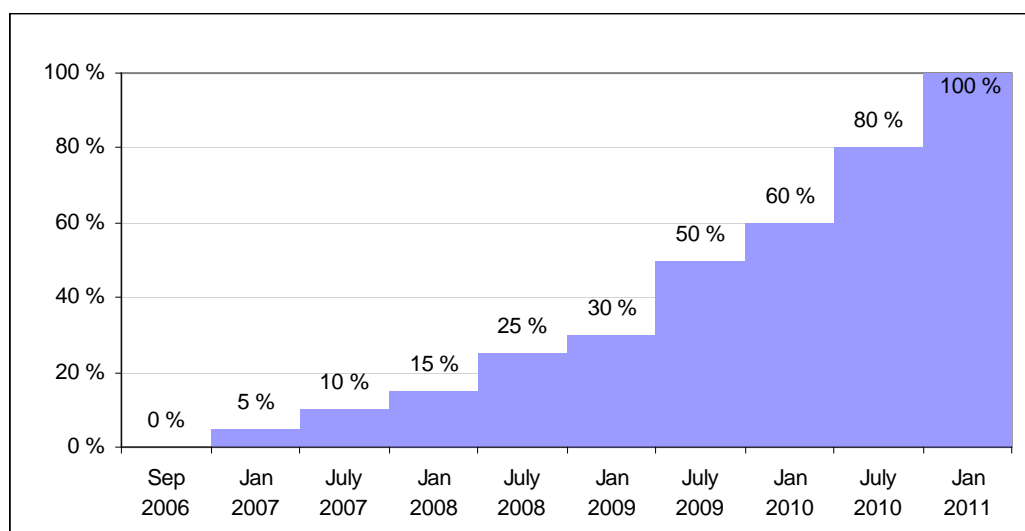
Another issue that needs to be considered when integrating deeper with Baltic region is that this inevitably increases dependence with BRELL (parallel operation of power systems Belarus-Russia-Estonia-Latvia-Lithuania). Possible grid disturbances in Russia would affect not only via interconnectors between Finland and Russia, but also via interconnectors connecting Russia to Baltics and further to Nordic market area. Fingrid or ENTSO-E should perform an analysis what outcome a blackout in Russia could do in Finland when taken into account the interconnectors Russia–Baltic and Baltic–Finland.

## Market integration with Russia

### Current situation of Russian Power Market

#### Introduction to Russian power market

Russian power industry has been under reform since 2001. The purpose was to create a competitive and functioning free market by separating natural monopolies from competitive entities of industry. The entire process was to be completed till 2011. Liberalization of market share (see picture 2) increases twice a year and it will be followed by partly synchronous domestic gas price liberalization steps. (RAO 2008) Anyhow, the power market liberalization will not apply to retail sector in near term.



**Picture 2. Planned Market liberalization share of Russian wholesale market (Source: RAO 2008 presentations)**

The market model implemented in Russia separates energy and capacity components. This is the main point where Russia differs from most of market designs used in Europe. Energy component is traded in power exchange and nodal pricing mechanism is applied. Capacity is traded separately at volumes covering consumer's peak demand including reserve margins. The latter component guarantees sufficient amount of available generation capacity for the power market. Respective models are more common in USA than in Europe, actually the Russian nodal market model is based on a theoretical framework developed in the USA.

One essential functionality, namely regulating power market, should be opened to competition in the future. In the target model there also is a derivatives market for electricity. (RAO 2008)

### **Restructuring industry**

Old vertically integrated power industry branch has been broken down by restructuring the ownership of different activities. Entities, which can be considered as natural monopolies belonging to infrastructural side of the market as Federal Grid Company, interregional distribution grid companies and System Operator (SO), are on majority state owned property by default.

Generation assets, sales and some other operations belong in sphere of competition. Most of these entities were gathered and held under holding company RAO EES of Russia, a vehicle for liberalization conduction. RAO EES of Russia ceased to exist after unbundling of thermal assets and other operations in 2008. The parts were spun off and sold to strategic investors. Exceptions in generation assets were large-scale HPP's and NPP's which belong to state owned companies. (RAO 2008)

Import and export operations were assigned to Inter RAO. It manages its imports/exports by taking part into the wholesale market as trading participant. Inter RAO posses few generation assets in the near proximity of state borders in Russia. It also has generation assets and sales operations in few other countries. The mayor owner of Inter RAO is state owned company Rosatom State Nuclear Energy Corporation & OJSC Energoatom Concern. (INT 2009) The company acts as an import and export monopoly for Russian power market.

### **Day Ahead Market and Electricity pricing**

Free market price for electricity in Russian Day-ahead Market (DAM) is defined separately for each node (bus). Pricing mechanism is called nodal or Locational marginal pricing. In this method power flows are optimized in the network and generation and consumption dispatches in the most economical way. Optimization process is about maximizing social welfare function and at the optimality it reveals prices for each node separately. These nodal prices differ from each other by cost of transmission losses plus cost of congestion. Prices are also called shadow prices and their interpretation would be the marginal price of energy at nodes if into the system was delivered one incremental unit of MWh.

It is worth noticing that the demand-supply based pricing mechanism has not been completely market based. In some predefined cases and periods when free market prices rise considerably

and quickly enough, price cutting mechanism has been applied. Anyhow, all dispatched suppliers ought to get at least according to their bid price. Generators' asks should reflect to variable costs of generation according to market rules.

During transition period certain share of energy in the wholesale market is sold on regulated tariffs and cross subsidies does exist. All new entrants are obliged to take part in the liberalized side of market after 2007. (ATS 2009, RAO 2008)

### **Capacity Market**

The main idea of capacity market is to guarantee required amount of generation capacity to the market. All consumers are obliged to buy capacity equal to their peak demand. Generators are bound to supply respective amount of capacity to the market. Reserve margins are included in aggregate figures. Generators' fixed costs should be covered by revenues from the capacity market. The market is about a physical forwards product, supply of generation capacity. At its best generators could use these long term capacity agreements in hedging and as collateral for their investments funding. In case of default and non fulfilments of capacity supply obligations, the physical consequences for the energy system could turn out to be severe.

First capacity auction was held in 2008. The original idea was to organize annual auction for long term delivery (4+ years) depending on capacity type, and to have corrective volume auctions as settlement approaches. The target model of capacity market hasn't been approved at the time of writing this paper. Therefore it is not relevant to go deep into the proposed details. Concepts which seem likely to be included in the final model are capacity auctioning and free flow zones. The latter are geographical "capacity balance" auctioning areas and were included already in 1<sup>st</sup> auction. (ATS 2009, RAO 2008 presentations) The free auction price of capacity is likely to be equal at least for the consumers. It is unclear if price cap will be set in the capacity auctions.

### **Regulation issues**

The hierarchy of regulation regarding to Russian power is organized in three levels. Ministries and respective federal organizations are at the top. Below them are bureaus responsible for market surveillance, tariffs, and environmental issues e.g. Federal Antimonopoly Service and Federal Tariff Service. Market authorities and organism responsible for market operation and development are located in the third level. Anyhow the role of last level is very essential in order to guarantee functioning market.

Russian market is centrally administrated if compared to e.g. Nord Pool. System Operator is responsible for reliability of electricity system, and its regional sub entities bear major responsibility for dispatching. SO will make preliminary dispatching calculations for Trade System Administrator's (ATS) for Day-Ahead Market calculations, operate the intra-day market and organise the system services. Federal Grid Company and interregional distribution grid companies are responsible for grid related issues and development. The market development and research related issues were assigned to Market Council after demolition of RAO EES of Russia. Market Council is the channel for market members to become heard in market and development related issues. (RAO 2008 presentations)

### **Barriers to entry**

A large industrial size consumer, sales company or generator is eligible to wholesale market membership under predefined conditions. The transmission network in Russia is relatively sparse and the physical location of connection point might anyhow turn to a restrictive qualification. In order to become direct wholesale market member, consumer must have its individual, registered connection point to HV grid. When the retail market would be opened to competition and this qualification would be modified by restructuring balance responsibility issues, the barrier to entry would lower.

The industry reform in Russia has been designed to lead to complete market liberalization in 2011. Although development guidelines are drawn much further including binding investment plans for designated generators and network operators till 2020. (GEN 2008) Strategic investors agreed to comply with these plans when buying stakes in unbundled companies. These plans are designed in central administration and confirmed in Federal organs. As a

consequence, the barrier to entry to the market for a new generator is high even if it technically is possible.

## **Expected development in cross border trade FI-RU**

Russia is a large exporter of power to Finland. Annual export volumes are considerable, in recent years on average about 11 TWh/a. The largest HV link between Finland and Russia is working only one directional towards Finland. There has been discussion between TSO's to expand the given line to work on both directions. This technical enhancement is not very large operation. During the June 2009 the bi-directional use will be tested. To start bi-directional use of the interconnectors changes to current contracts would be needed. A bi-directional transmission line is seen as requirement for more profound cross border trade and market coupling.

The long term industry development plan, General Scheme till 2020, includes major guidelines till 2020 and robust plans to 2030. This central plan paper includes mentions of possible power exports to Finland at the heights of Northern parts of Karelia. According to General Scheme exports to Finland would increase considerably before 2020. There is also reservation for further export increases by 2030 (GEN 2008). Such imports at the level of Pirttikoski would require reinforcements of Finnish transmission network. Anyhow, there hasn't been official discussion of given plans. These reinforcements are not prioritized in Fingrid's network development plans.

Import-export monopoly or clearly dominant respective position of a single market player distorts the competition and puts market entities into unequal positions with regard of cross border trading. Monopolies tend to decrease market transparency. Monopolistic market environment also decreases the socio-economic benefit and hinders deeper co-operation or market coupling between Russia and Finland. In order to create transparent and functioning cross border market, grid company owned transmission lines should be operated and handled in a non-discriminatory and transparent way i.e. by TSOs according to merit order dispatching.

## **Future possibilities and challenges**

Easy and beneficial way to expand cross border trading between Finland and Russia would be to co-operate in intra-day power market. Its implementation is rather simple if grid companies will supply real time information about available spare transmission capacity. One major challenge is that on Russian side of border it is the system operator who dispatches generation and makes all final decisions concerning balancing market. For example coupling of different dispatching procedures would be needed.

The bi-directional use of transmission lines could be expanded into day-ahead market after introducing intra-day power market. The use of Financial Transmission Rights (FTR's) should also be further investigated in order to introduce market-based allocation of the transmission capacity between Russia and Finland. Harmonized gate-closure is needed.

Deeper electricity market integration between EU and perimeter countries requires common non-discriminative market rules. Negotiations within EU and between EU and Russia are needed. Essential issues to be negotiated are:

- CO2
- harmonised emission limits for SO2 NOx and particles
- compatible nuclear safety standards

EU should strive for common procedures towards perimeter countries regarding these issues.

Great challenges may be expected due to the current economic situation which may have effect on import-export interests and market liberalization development. Rather technical barriers are the time-differences and differences in gate-closure/result reporting. To find a way to settle these is essential.

The ultimate threat is that the integration development stops

## Main conclusions and recommendations

### Market integration with Baltic

Integration of Baltic market with the Nordic market is very recommendable. The final target could be as far reaching as having common market for spot market, intra-day market, regulating power market and financial market. This requires the execution of Baltic ring investment plan and reliable market-based pricing mechanism in Baltic market.

### Market integration with Russia

Russia is not part of EU and different rules are applied in Russian market. When deepening market integration with Russia, the level playing field must be ensured. The rules are to be planned so, that they are non-discriminatory and ensure transparency.

It is strongly supported, that the market integration development is continued. Bi-directional use of interconnectors should be further investigated and developed. In the first phase co-operation in intra-day power market could be introduced. In the same time a reliable mechanism is needed in on the Russian side of the interconnector to ensure that power flows to right direction. This could be done by introducing a price area on the Russian side of the interconnectors connecting Finland and Russia.

Negotiations within EU and between EU and Russia are needed. It is essential that EU has common procedures towards perimeter countries regarding power production and power markets. A more far-reaching goal could be introducing in Russia similar environmental and safety standards as in EU.

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