

# TASK XIII: MARKETPLACE OVERVIEW. FINLAND DRAFT 1

## **Background:**

In October 2003, the Executive Committee of the International Energy Agency (IEA) Demand Side Management Program approved a new project, entitled Task XIII. Twelve countries agreed to participate in the project, with the United States (via the US Department of Energy) in a lead role.

The objective of the project is to deliver necessary methodology, business processes, infrastructure, tools and implementation plans that will facilitate robust demand side participation in participating country electricity markets. The project will produce a “State of the Practice” database, economic valuation tools, and methods to enable participating countries to implement demand response into their market structures.

The objectives of the IEA DRR project are to:

1. Identify and develop the country-specific information needed to establish the potential for demand response.
2. Perform the market and institutional assessments within participating/member countries needed to set realistic goals for the contribution of DRR to sector objectives.
3. Mobilize technical and analytic resources needed to support the implementation of DRR programs within participating/member countries and track their performance.

## **Marketplace Overview Form Objective:**

The enclosed questionnaire will provide the Operating Agent with a brief overview of each participating county’s marketplace structure and demand response history. This will help the Operating Agent better understand the similarities and differences amongst the countries participating in Task XIII. This request is not intended to be an in depth research project. It is simply intended to be a brief overview to provide basic facts and understanding that can orient the project team and help share basic information across participants.

The Operating Agent will use the information develop thoughtful and thought provoking questions during the data gathering phase of the project.



### **Marketplace Overview Form Organization:**

The following Marketplace Overview Form is organized utilizing a question and answer format. We have attempted to provide sample responses to each question so that you can see the type and depth of information desired.

There are three categories of questions:

1. **Electric Industry:** Basic overview of market structure and market actors.
2. **Demand Response:** Basic overview of demand response efforts.
3. **Market Transactions:** Basic overview of electricity market transactions.

We have provided a form with sample answers to guide you as complete the document.

### **Marketplace Overview Process:**

**Step 1:** Please complete the enclosed form and email it to [rmalme@retx.com](mailto:rmalme@retx.com) by May 31, 2004. We realize that some questions may ask for data that are not readily available, and that some questions may not apply to certain countries. In this step 1, we are requesting that you fill out the "market overview" as best as you can, then in Step 2 we will contact you by phone to discuss any missing elements or questions that were difficult to interpret.

**Step 2:** We will schedule a brief telephone call with each country expert to review your response to ensure understanding. These calls will take place during the first two weeks in June.

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**Section I: Electric Industry**

1. Does your country operate as one national electricity marketplace or do you have multiple regional electricity marketplaces?

Finland belongs to the Nord Pool marketplace which is a Scandinavian marketplace including Finland, Denmark, Norway and Sweden. Each of these countries has their own TSO.

Nord Pool is not compulsory market place, and only part of electricity is traded through Nord Pool. Market place offer both physical and financial products

2. If you have multiple regional marketplaces, how many exist in your country? Please explain.

3. What market actors perform the following functions in your marketplace:  
(Please list and briefly describe)

In Finland, distribution is unbundled from the generation and sales of electricity. Quite often also sales are separated from generation.

a. Generation:

Total number of generation plants was 419 in 2002 and total production 71.6 TWh.

- i. Local utilities owned 139 units (12.5 TWh) which mainly are CHP plants in cities producing district heat for heat distribution and electricity.
- ii. Power companies owned 208 generating units (50 TWh). There are two dominant power companies, mainly state owned Fortum and Industrial owned PVO.
- iii. Third major generation owner is industry, mainly wood processing industry, owning directly 65 generating units (9 TWh) in CHP plants producing steam to industrial processes and electricity. In spite of this industry own large share of generation through the abovementioned PVO company

b. Transmission:

- i. National grid (400 and 220 kV) is owned and operated by the system operator Fingrid.
- ii. Part of 110 kV networks are owned by regional or local network companies

c. Distribution:

All distribution networks are owned and operated by local distribution network owners which are natural monopolies in their areas. In 2003 there were 93 network companies:

- i. 14 of them were part of municipalities,
- ii. 46 share holding companies where municipalities owned majority of shares,
- iii. 26 were other share holding companies and
- iv. 7 were electricity cooperatives

d. Retail customer services:

In Finland there is full competition in retail market. All customers including the small ones can select their suppliers. If the customer don't want to compete in the market, then the local dominant supplier have to sell electricity with public sales tariffs

e. Reliability management:

Fingrid has the responsibility for the system reliability at the national level. From the operational point of view Fingrid takes care on the national balance during the operation hour. Each market player has responsibility on his own balance. So called balance responsible parties are adjusting their balances with system operator by selling or buying unbalances settled after operating day. The price of balance energy is in principle based on regulating power market price.

Fingrid is managing the system by operating regulating power market as a part of Nordic regulating power market and by buying ancillary services from the other actors with the market-based rules.

f. Other (please describe):

4. What market actors' work directly with the retail consumers (e.g. distribution company, competitive suppliers, energy service companies, etc)? Please provide brief description of their roles.

- a. All customers must have an agreement with local distribution network owner on network services, and they have to pay on these services according to the public tariffs of that specific network company (these tariffs include also transmission services and electricity taxes).
- b. Large customers may buy electricity directly from NordPool. In addition to that or alternatively they usually have bilateral contract with competitive suppliers.
- c. Small customers can select their suppliers.
  - i. In case they don't want to be in competition they have to buy electricity from the local dominant supplier with their public tariffs. They can also return to this contract from the competitive suppliers. The local dominant supplier has to sell electricity to all customers in the geographical area of the local distribution network owner.
  - ii. All customers can also buy electricity from the competitive suppliers. In the case of small customer no extra metering is needed. The balance settlement is based on predefined hourly profiles. Large customers (over 45 kW) buying electricity from the competitive market must have hourly meter which is daily remotely read for the balance settlement purposes.
  - iii. There are several types of competitive suppliers in the market: local utilities may have separate sales department who sell electricity in the whole country, there are separate retailing companies which may be owned by one or several local utilities or there are separate retail companies owned by large power companies like Fortum or Vattenfall. There are also traders who just collect a group of customers and ask bids from suppliers helping customers in competition.

5. Please list key regulatory players and their roles.

In Finland there are three main actors in regulatory sector:

- i. Ministry of Trade and Industry and the Parliament is responsible for developing energy market and its legislation. It also takes care of the harmonization of the national legislation with the directives of the European Union
- ii. The Energy Market Authority acts as a regulator. It is an expert body subordinate to the Ministry of Trade and Industry. The goal of The Energy Market Authority is to promote healthy and efficient competition in the electricity and in the natural gas market, and to secure reasonable and equitable service principles in electric and in gas network operations.

The principle task of the Energy Market Authority is to supervise the pricing of transmission, distribution and other network services. The Energy Market Authority monitors that the pricing of network services produced by distribution and regional network operators and national grid is reasonable and non-discriminatory. Supervision takes place case by case afterwards. Cases are brought up either through complaints, or on the initiative of the Energy Market Authority.

The Energy Market Authority also promotes efficient competition in the electricity and in the natural gas trade, by intervening in the terms and prices of the network services that are considered to restrict competition. The Energy Market Authority produces and publishes real-time information on the pricing of both electric energy and its distribution. In the future the Energy Market Authority will start to publish same kind of information on the pricing of natural gas. Efficient competition requires that information on the prices and suppliers of electricity and natural gas is easily available. In addition to this, electricity and natural gas users must be informed about competitive tendering and the potential benefits to be gained from it.

Electric and natural gas network operation is subject to licence. The Energy Market Authority grants network licences to organizations and utilities engaged in network operations, and building permits for constructing power lines of 110 kV and higher voltages.

- iii. The Finnish Competition Authority is supervising competition in electricity market as a part of general market control. Its objective is to protect sound and effective economic competition and to increase economic efficiency by promoting competition and abolishing competition restraints.

6. Please list key industry stakeholder groups (e.g. large customer associations, reliability organizations, trade associations, etc.)

Large customers

- i. The Confederation of the Finnish Industry and Employers
- ii. The Finnish Real Estate Federation

Small customers:

- i. The Association of the Finnish Home Owners
- ii. The Finnish Consumers' Association

Energy Companies

- i. Finnish Electricity Association SENER
- ii. Finnish Energy Industries Federation FINERGY
- iii. Finnish District Heating Association SKY
- iv. The Association of the Energy Employers ENERTA
- v. The above mentioned four organizations will be merged in the beginning of 2005

Technology Companies

- i. Technological Industry Association

Environmental interests

- i. The Finnish Association of the protection of the Nature

7. How many commercial, industrial and residential customers exist in your marketplace (add additional customer classes, e.g. agricultural, as needed)?

Customer Class	Number of Customers	Summer Peak Demand (MW)	Winter Peak Demand (MW)	Annual TWHs
Process industry	some	N/A	3600	32.4
Other industry	30 000	N/A	2600	10
Public	57 000	N/A	1200	4.8
Service	142 000	N/A	1400	8.6
Agriculture	144 000	N/A	600	2.5
Residential with electric heating	580 000	N/A	1100	8.1
Residential without electric heating	2 007 000	N/A	1700	8.7
Totally without losses	2 960 000	About 8000	12100	75.0

The figures above are based on estimates for the year 1999. Rough figures are still quite the same. In 2002 the total number of customers was 3 059 000. Summer peak is not problem in Finland: it is about 2/3 of the winter peak

8. How many distribution companies operate in your marketplace? Please list the top five largest distribution companies.

Number of Distribution Companies: 93 in 2003, the number is slightly decreasing

The following figures are from the year 2002

<b>Largest Distribution Companies</b>	<b>Number of Customers</b>	<b>Summer Peak Demand</b>	<b>Winter Peak Demand MW</b>
Fortum Distribution	285 000		1322
Vattenfall Distribution	330 000		1106
Helsinki Energy	324 000		987
Espoon Sähkö	123 000		414
ATRO	100 000		401

9. If you have retail competition, how many competitive suppliers exist in your marketplace?

The number is not known, but it is probably less than the number of distribution companies. The estimate of the Energy Market Authority is about 75.

10. If you have retail competition, what percentage of the summer and winter peak demands do competitive suppliers supply?

The number is not known, but basically all consumers are under competition. In practice all industry, public and service have competitive suppliers, and also some share of small customers. This means that 80 – 90 % of winter peak demand is supplied by competitive suppliers



11. What is the forecasted peak demand growth rate in your marketplace?

The electricity consumption is estimated to grow from 2002 to 2010 by 1.8 %/a. Peak load consumption is highly dependent on weather conditions. The estimate is the growth from the present peak (1.2.2003) 14000 MW to 16300 in 2010 (average growth from 2000 to 2010 is estimated to be 2.5 %/a)

12. What is the projected supply (capacity) growth rate in your marketplace?

The capacity is estimated to grow from the present 15835 MW (2003) to 17818 in 2010 (including 1600 MW new nuclear capacity in 2009). Average growth is 1.8 %/a.

## Section II: Demand Response

13. Has demand response been attempted in your market? If so, please provide brief description of relevant successes and challenges.

Main activities until now are

- i. Time-of use tariffs are in common use both in network tariffs and in supply tariffs. They are beneficial for residential customers with electric heating as well as larger customers. They are resulted in technical solutions in electric heating where the share of day-time consumption quite small (20-30 %)
- ii. In larger customers there are also demand charges aiming to decrease their peak load
- iii. Direct load control of electric heating load by utilities has been in use long time. In tariffs the lower fixed charge is applied to customers accepting that. After the introducing the competition (since 1995) the use of that is decreased
- iv. Some utilities have had special contracts on using customer-owned diesel-generators in special cases
- v. Also first attempts to apply dynamic pricing based on spot prices are going on
- vi. In regulating power market loads above 10 MW can be bidded to market, but experiences are still very rare
- vii. TSO (Fingrid) is using disconnectable load in industry in ancillary services, the total capacity of those is about 1000 MW

14. Which market actors might be most supportive of demand response in your marketplace? Please explain why.

- i. The Ministry of Trade and Industry has responsibility for the energy policy and legislation. Their interest is to support of the use of DR to secure the electricity system to increase competition in market
- ii. TSO (Fingrid) has the system responsibility of the Finnish electricity system and its balance. Their interest is mainly in peak load situations and in managing disturbances
- iii. The competitive suppliers can use DR in their risk management (by developing new products and services like dynamic pricing) and in differentiation from the competitors
- iv. The Distribution Network owners have some interest in avoiding peaks in the networks (TOU-tariffs, load control)

15. Which market actors would be the most likely to offer demand response services to the consumer? Please explain why.

- i. TSO through ancillary service and regulating power market (mainly to large customers)
- ii. Customers, especially large ones, if they have incentives to do that
- iii. Competitive suppliers mainly through pricing to manage their risks.
- iv. Network owners to manage network operation and investments
- v. In the future probably also aggregators/ESCOs to develop new business opportunities

16. Can demand response resources participate in electric market transactions today? If so, how?

- i. In Nord Pool like generators
- ii. In regulating power market (minimum load in Finland is 10MW at the moment)
- iii. In ancillary services

17. What are the most important objectives for demand response? Please explain.

- i. In Finland and in Nordic countries the most important objective is to handle peak load situations especially in dry years. The lack of capacity can be seen in dry years
- ii. The another objective related to the above one is the stabilizing the market prices in cases there is a scarcity in capacity. Price spikes mean high risks for suppliers buying electricity from pool and balancing market and selling it with predefined prices.

18. Do energy consumers see different electricity prices at different times of the day?  
(Please explain in terms of how many and by class or size)

TOU-tariffs are in common use in Finland both in network tariffs and in supply tariffs. For customers larger than 10 – 15 MWh/year is usually beneficial to select TOU-tariffs (depending on the share of day/night use of electricity). Customer can freely select to use TOU or fixed price tariffs.

TOU-tariffs can include 2, 3 or 4 time zones. Usually there are 2 zones with high prices in day-time in working days. In spite of that there can be seasonal variations (winter/summer) in prices.

New products of suppliers are based on spot-prices in day-ahead market. Prices are known in the afternoon day before the consumption day.

19. Have any energy efficiency and/or a demand response market potential studies been completed in your marketplace in the last ten years? YES / NO

NO, only very rough estimates

## **Section III: Market Transactions**

20. What type of electricity products traded in your marketplace (e.g. 5-minute spinning reserve, 30-minute non-spin, day ahead, capacity, hourly energy/spot, etc.)?

- i. Frequency controlled spinning reserves and fast disturbance reserves are based on voluntary agreements with TSO and suppliers/customers. About 1000 MW disconnectable loads are in agreements.
- ii. TSO is managing regulating power market in co-operation with other Nordic TSOs. 15 minutes bids are accepted until 30 minutes before the operating hour. Minimum bid in Finland is 10 MW
- iii. ELBAS in Nord Pool, hourly bids until one hour before the operating hour
- iv. ELSPOT, hourly day-ahead market, bids accepted until 12 am before the day of delivery
- v. Several financial markets until 4 years ahead
- vi. No capacity market

21. Do you have a central trading exchange in your marketplace?

Yes, Nord Pool

22. How are reserve margin targets established in your marketplace? Please explain.

No predefined reserve margins at national level. Finland belongs to the Nordic market and it is the question on how much capacity is needed nationally and how much can be relied on Nordic system and import possibilities outside Nordic system. In practice the generation capacity in Finland is about 10 % higher than national peak demand. In addition to that there are some long term import agreements with Russian actors.

The reserve margins needed for frequency control and disturbances are defined on Nordic basis and the common needs are divided between Nordic countries on the basis of production capacities in each country.

23. What is the current reserve margin target in your marketplace?

See above

24. Does your market currently exceed or fall short of the current reserve margin target?  
Please explain.

See the questions 11 and 12.

In dry years the lack of capacity can be seen in Nordic market. Same is valid also in longer term due to the small amount of investments into production capacity in Nordic countries at the same time as Sweden is planning to close down the nuclear production in longer term (which is 50 % of Swedish generation capacity)

Inside Finland some probability for the shortage of capacity may exists before the starting of new nuclear unit in 2009 if national capacity and peak demand are compared.