

# FINGRID

Corporate magazine  
Fingrid Oyj  
1/2006

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ON THE BORDERS** *page 3*

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celebrated at Fingrid**  
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# Movement on the borders



Ten years ago, the main electricity transmission grid in Finland was owned by Imatran Voima Oy, the state-owned power company, and Pohjolan Voima Oy owned by private industries. When the present transmission system operator in Finland was being established, private industries relinquished their grid on condition that the private sector should have a share majority in the new operator so

that direct state ownership would not have too great an effect on the operation of the company. If Finland had done as Sweden and Norway, state would have a direct impact both on the largest electricity producer and on the transmission system operator.

The European Union has assessed the independence of transmission system operation in different countries. The EU considered that state-owned transmission system operators are formally separated, but the goal should be complete separation from the largest state-owned power producer. The EU regarded that besides Finland, transmission system operation has been completely separated in only a few other countries.

The long traditions of electricity trade between Finland and Sweden have created solid cross-border transmission connections between the two countries. Grids dimensioned in accordance with shared engineering principles and requirements imposed on the connecting parties have ensured a technically uniform power system in these countries. These were the main features of the transmission system which enabled a swift transition to an inter-Nordic electricity market. On the other hand, electricity exports from Norway were restricted for a length of time. Heavy-duty cross-border connections to the neighbouring countries were not constructed. The development of the grid in Norway was dominated by a regional approach and relying on the other parts of the Nordic grid, partly due to extensive construction costs. Unlike in Finland and Sweden, no uniform main grid was created in Norway.

Separated transmission system operation commenced in Finland, Sweden and Norway almost simultaneously in the early 1990s. The approach adopted in Finland has made it possible that the transmission capacity on the border between Finland and Sweden has almost doubled thanks to capital expenditure by Fingrid. There have not been nearly as extensive grid projects on the borders between the other Nordic countries. In Norway in particular, capital expenditure in the grid has been very small since the 1990s. This is why the congestions in the Nordic market are primarily located between Norway and Southern Sweden and at the Danish straits.

Nordel, the co-operation organisation of the Nordic trans-

mission system operators, published a development programme concerning five priority cross-sections in the Nordic countries in 2004. One of these, the expansion of the sea cable link between Finland and Sweden together with Svenska Kraftnät, has been in progress since the beginning of 2005, while the other projects still await their launch.

The Nordic Council of Ministers ordered a report from the Norwegian consultant Econ concerning the organisation of Nordic transmission system operation. The report suggests the establishment of a shared capital expenditure company in the Nordic countries. This model is well suited to the execution of the Norwegian capital expenditure programme of more than 1,000 million euros. There are no reasons why the Finnish national economy, after having attended to its responsibilities concerning its own infrastructure in an efficient and appropriate manner, should have to pay for these grid reinforcements and cross-border connections which have now been found to be urgent in Norway.

Voluntary co-operation within Nordel has created a well-functioning electricity market in the Nordic countries. Most of the other parts of Europe are still nowhere near this situation. Nordel also has its own development programme. The five priority cross-sections must be carried out, and congestion revenues must be used for the related capital expenditure. A shared view exists of the harmonisation of system responsibility and of the transparency of its financing. Development of transmission management, harmonisation of balance service model, and complementing the engineering and operating principles of the grid are included in the development programme.

Nordel's opportunities to promote the development projects are complicated by the differences in legislation in the various Nordic countries. Moreover, the promotion of market mechanisms is crucially influenced by the different types of energy policy approaches in the various countries. The views expressed by the Norwegian Government emphasise a national standpoint. Finland considers it important to develop the Nordic market on the basis of shared benefits. National objectives have also gained more emphasis in the efforts of Nordel. Finland must not forget these, either. From the viewpoint of Finnish market players, Fingrid considers it important that, for example, Finland and Sweden become separate price areas as seldom as possible. Moreover, the present condensing power capacity in Finland must be kept operational. The need for this was highlighted during the very cold week in January, when restrictions in electricity imports had to be covered by starting condensing power plants.

Fingrid has kept to the basic duties of transmission system operation and optimised its operating models accordingly. As a result, Fingrid is undisputedly in the top league of transmis-

sion system operators globally. Fingrid's customers, who pay for Fingrid's work, are presently very satisfied with the decreasing price and high quality of electricity transmission. Fingrid has carried out capital expenditure projects for the cross-border transmission connections, anticipating the needs of the market. The strategies and financial outlook of the company consolidate the continuation of this trend. Indeed, it is difficult to perceive some other operating model which would lead to a better outcome.

Imports of electricity from Russia also have long traditions in Finland. Initially, electricity was imported from hydropower plants connected to the Finnish grid. The imports grew in the early 1980s when a direct current link was completed between the Finnish and Russian grids. Fingrid has increased the import capacity further. Up until recent years, imports have been based on contracts between Finnish and Russian enterprises, and the benefits have hence been shared between them both. At the moment, the cross-border transmission capacity is primarily reserved by Russian enterprises or enterprises with a Russian background, which deliver electricity to the Nordic market. In this way, Russian market players can obtain the full market price for the electricity without middlemen and without any of the related obligations that the Nordic market players have. In practice, transmission connections via Finland are the only and fastest route for Russians to also utilise the European market.

In line with increasing electricity price, the financial interests of the Russian parties are clearly visible in the means with which the new sea cable project from Sosnovyi Bor in Russia to Kotka in Finland has been justified. The organisers of the project build their case on very inadequate technical analyses and vague implications, and use the media for pushing their project forward. The number of newspaper articles and repeated one-sided argumentation in national media in Finland show that the organisers have succeeded in their objective.

Fingrid has examined the project purely on the basis of system responsibility imposed on the company. Fingrid must make sure that the planned connection can be connected to the Finnish power system. For this purpose, when the company learned about the project, it launched technical analyses and discussions with Federal Grid Company, which is responsible for the Russian grid and export connections. Based on its analyses, Federal Grid Company has stated that it is clearly impossible to increase exports of electricity into Finland due to the increasingly negative power balance in the St Petersburg region. The St Petersburg region absolutely needs more electricity generation capacity especially because it cannot receive support from the Moscow direction since that area also suffers from a corresponding deficit in power balance. Even now, consumption in the St Petersburg region cannot always be covered during a very cold period without interfering with exports. These problems were highlighted in January this year, when exports into Finland were restricted and loads in the St Petersburg region were disconnected.

The planned cable project would almost double the imports of electricity from Russia into Finland from the present level. Sudden omission or significant restriction of imports during a peak load situation in the St Petersburg region would easily lead to a serious electricity shortage in Finland and jeopardise the operating capability of the entire power system in Finland. This would also be the case in less critical load situations, for example during a potential extensive grid disturbance in the St Petersburg region. The possibility of black-out in Finland would multiply, and the dimensioning and operation of the Nordic power system would become dependent on faults in the Russian power system.

An obligation has been placed on Fingrid to promote the Nordic electricity market, and the company has assessed the impacts of additional electricity imports from this basis. Most of the imports from Russia would be transmitted from Finland further to the west. The transmission capacity between Finland and Sweden is not sufficient to transmit this volume of electricity, which means that Finland would be separated into a price area of its own in the Nordic market. On an average hydropower year, the restricted period would grow to more than one fifth, and in a dry year to approximately half of the time. Finland would be separated from the Nordic market during all this time. This would mean a return to a market which only covers the area of Finland, where the Russian market player – with basic operating conditions greatly different from those of the Nordic players – would have control of almost one quarter of the market.

In its statement submitted to the Finnish Ministry of Trade and Industry, which serves as the permit authority, Fingrid has pointed out the above confirmed impacts of the cable project and proposed that the project not be granted a construction permit.

As a result of a long history of cross-border electricity trade and Fingrid's capital expenditure which anticipates the needs of the market, Finland presently has solid cross-border transmission connections to its neighbouring countries. The transmission capacity of these connections equals approximately one quarter of the electricity use in Finland during a peak load. The main grid in Finland can transmit these volumes of electricity. On a European level, there is a general objective that a transmission possibility of 10 per cent should exist between neighbouring countries. Excessive dependence on imports will increase the risks. In difficult situations, national interests always get the upper hand. It is important that Finland retains self-sufficiency in electricity production in the future also and that the market players have proper basic conditions for constructing new power plants.



Timo Toivonen is Fingrid Oyj's President.

*The teams replacing the aluminium towers progress at a speed of one or two towers a day per team. Harri Niemelä of Empower Oy at work.*



The replacement of aluminium towers in Northern Finland did not get into full speed until the cold weather came in January. Mobile cranes and other heavy-duty machinery could not traverse the soft terrain earlier. Unfavourable weather conditions have also been the main reason why the entire replacement project is almost two years behind original schedule.

## Cold weather in January speeded up **REPLACEMENT OF ALUMINIUM TOWERS IN NORTHERN FINLAND**

TEXT AND PHOTOGRAPHS BY Leni Lustre-Pere

In early March, the replacement work is in progress in Kiiminki north of Oulu. Some 100 towers are still to be replaced on the Petäjäsoski - Pyhänselkä line, but weather forecasts suggest that weather will be favourable for the work.

Juhani Ahonen, Fingrid's Line Supervisor in Northern Finland, puts on a smile when looking at the thermometer: minus 20 degrees Celsius will make the work run as planned.

"This is a good weather. On the other hand, when the temperature goes below



*The contractor reports the progress of the work to the customer daily.*



*The conductors are lowered before the aluminium tower is turned over.*

minus 25 degrees, there is a risk of hydraulics failures in the machinery.”

According to Juhani Ahonen, this winter has been more favourable in terms of weather than the previous ones. The replacement of aluminium towers in Northern Finland started in 2002, and it was originally scheduled to take place during two winters. The warm first winter and difficult availability of operational outages on the lines, required by the work, only kicked off project.

“We continued with the same problems in the next winter. This was also the case in the winter of 2004 - 2005, when the failure of the Fenno-Skan sea cable

also messed up the schedules. This winter is still a mystery as a whole. We are now making speedy progress to achieve what we can, and the rest must be postponed. If the temperature is above zero for a couple of days and it rains, the whole thing stops there.”

#### **Mobile phone bodies after melting**

A snowplough is a frequently used machine at Fingrid’s site in Northern Finland. There is a metre of snow in the terrain, and cranes and other machinery cannot get to the towers if their drive-

ways are not ploughed.

The teams of Eltel Networks Oy and Empower Oy progress at a speed of one or two towers a day per team. A team consists of four transmission line mechanics and two mobile cranes with drivers.

A new steel tower weighs approximately five tonnes, and it is erected as close to the dismantled tower as possible. The contractor clears the dismantled towers from the terrain.

The aluminium material which turned out to be problematic in transmission line towers is usable in other applications. The material is melted and recy-



*The current conductors (3 x 2 Finch) were not replaced. Only worn or damaged conductor accessories were replaced.*

The problem was apparently caused by errors in the heat treatment of the aluminium alloy, as a result of which a stress corrosion phenomenon started in some of the towers. The damage caused by the corrosion in the towers is random, and it is very difficult – if not impossible – to detect the damage.

After analyses carried out by the Materials Technology Department of the Technical Research Centre of Finland, Fingrid decided to change all aluminium towers just to be on the safe side. The total costs of the replacement project are approx. 32 million euros.

cluded in articles where there is no mechanical stress. “Like mobile phone bodies,” Juhani Ahonen guesses.

### **All aluminium towers will be replaced – just to make sure**

The aluminium towers replaced date from the 1970s. At that time, the grid was reinforced over a distance of 600 kilometres between Eastern Finland and Sweden, and some 1,300 aluminium alloy towers were used alongside steel towers. The first signs of problems encountered in the aluminium alloy used were noticed in the early 1980s, and some 100 towers were replaced or strengthened then.

**When aluminium towers are being replaced by steel towers,** the line must be dead. The impacts of this on the grid are verified by means network calculation. The calculation is based on a situation where the power system must withstand faults conforming to the design rules during the switching situation. So that the system security of the grid is retained at the agreed level, it may be necessary to restrict the power transmitted.

The voltage level of the line in question and its location in the transmission grid has a great impact on the transmission capacity of the grid. Cross-border lines and north-to-south lines have significance in terms of transmission capacity.

Aluminium towers have been replaced on these lines, which is why it has been necessary to restrict transmissions in order to retain the system security of the grid. The goal is always to schedule grid work at a time which is favourable in view of transmissions. However, this cannot be achieved every time. Matters having bearing on the execution of the actual replacement work also need to be taken into account. These include the fact that the terrain can bear the heavy machinery only in the winter when the ground is frozen.

Fingrid’s Power System Operation unit is responsible for switching and transmission limits.

*There will be four licence training sessions this spring: two for Empower Oy's and two for Eltel Networks Oy's inspectors. The photograph shows Empower's employees in the first training session arranged in Hämeenlinna on 13 - 14 March.*



Uniform inspection data is a

## **QUALITY FACTOR IN MAINTENANCE MANAGEMENT**

Licence training of transmission line inspectors launched

TEXT BY Ari Levula PHOTOGRAPHS BY Ari Levula and Eija Eskelinen

**All those carrying out inspections in the Finnish main grid will have a two-day training course this spring in the form of licence training arranged by Fingrid. Those who pass the examination at the end of training obtain the right to inspect Fingrid's transmission lines. The objective of the training is to ensure and improve the quality of maintenance management in the Finnish grid.**



The quality of inspection data is a crucial factor in the maintenance management of transmission lines. It is a great challenge to obtain inspection data which is uniform irrespective of various geographical areas or individual inspectors.

Some 15,000 new inspection observations and updates of existing data are accumulated annually in the inspections of the main grid. These concern the condition of structures, vegetation in the transmission line areas, new crossings, and other issues and events relating to the operational reliability of the transmission lines.

In other words, the inspections not only gather information on faults requiring immediate repairs, but most of the inspection observations describe the present condition of structures and the remaining life time of transmission lines.

The uniformity and high quality of inspection data are equally as important both in the planning of maintenance and in assessing the need for grid modernisation.

A very small proportion of the faults detected call for immediate action; most of the maintenance work can be scheduled for future years in a systematic manner. As approx. 10,000 repairs are performed in the Finnish main grid annually, the principle is not to attend to each and every need for repairs as soon as it is found, but the necessary work is compiled into larger entities for individual transmission lines so that the entire line is put right in one go.

The management of this much data and obtaining an overall view of the present condition of the extensive grid and of its maintenance needs require that the inspection data is of a specific format, properly categorised, and allocated precisely on the basis of the rel-

evant structural parts. Such quality requirements concerning the inspection data can in practice only be fulfilled by using a computerised data compilation system, where the data is recorded into the system at the actual tower locations in the terrain.

When an action is recorded as having been repaired, the data is not deleted but transferred into historic data. Modern hand-held PCs also enable the recording of repair data into the data base at the tower location.

The oldest historic data on inspections in the Finnish main grid date from 1989. The development of a computerised data compilation system has an equally long history.

The development work on how to inspect the grid and how to record the data has been going on for decades, and the results of this work have been put together into inspection guidelines. The scope and details of these guidelines are unique globally. The guidelines can now be found in a manual for transmission line inspectors (Voimajohtotarkastajan käsikirja).

However, mere guidelines and systems



*“The goal of licence training is to achieve interaction between the customer and supplier,” says Hannes Maasalo, Line Supervisor at Fingrid’s Petäjävesi area, who co-ordinates the training project. The photograph is from training arranged in Hämeenlinna.*

### Question number 11: which items should you record?



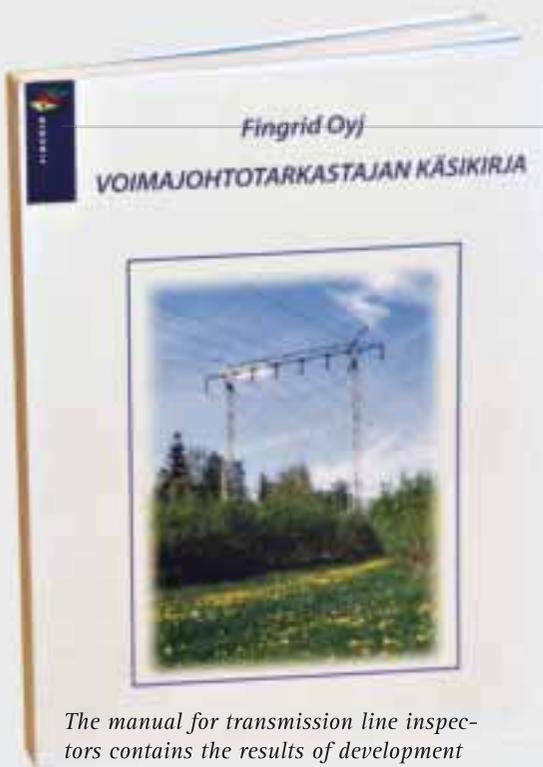
Other action:  
all faults requiring immediate repair (urgency 3) must be reported immediately to the customer orally and in writing.

Recorded in inspection data:

2115 Foundations Tower foundation Foundation Excavation

prt	no.	twr	lat	lth	wth	hgt	cat	urg	c/r/o	out	exp
								3	R	E	

*Example of an advance exercise with answers, included in the training.*



The manual for transmission line inspectors contains the results of development work for inspections accumulated over several decades.

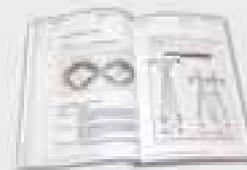
Those who have carried out regular inspections during this period will obtain an extension to their license in 2009 while others are arranged new license training and examination.

There will be four training sessions, and approximately 100 mechanics and foremen from Eltel Networks Oy and Empower Oy will participate in them. Fingrid's costs for the inspection licence training will total approx. 100,000 euros.

Since the same service suppliers inspect both the main grid and branch lines connected to it, it is in everyone's interests that both the main grid lines and the branch lines are inspected apply-

ing the same guidelines and the same data compilation system. For this reason, Fingrid has given a permission both to its customers and suppliers to use its guidelines in their own inspections. Eltel Networks and Empower can also invite their own customers to the licence training.

Those carrying out substation inspections will also be arranged similar, although more concise, licence training and examination.



Extract from the manual for transmission line inspectors.

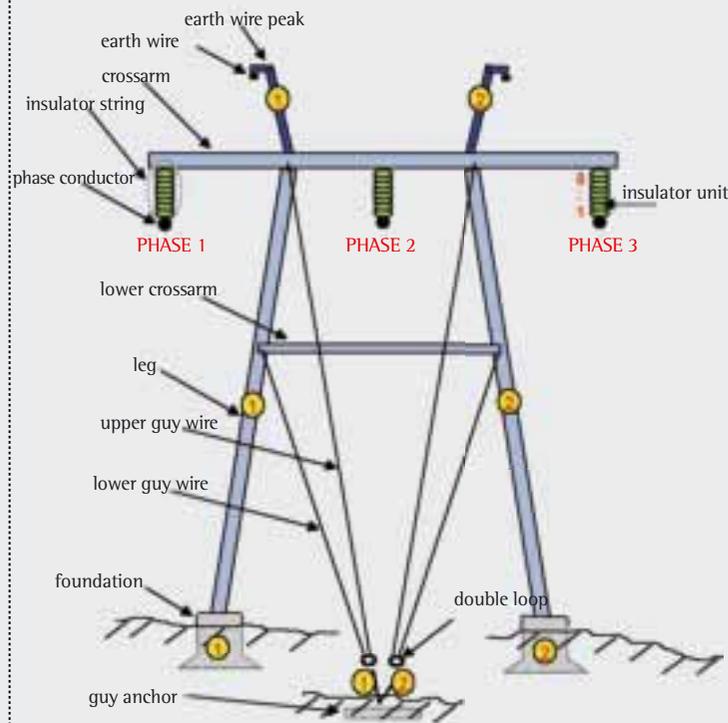
cannot ensure high quality, but constant training and quality control will also be required in the future. Fingrid has been arranging training for inspectors annually. The suppliers have also provided their inspectors with training.

When the new three-year contract period for maintenance management commenced, it was decided that Fingrid will arrange two-day license training and an examination for all those who carry out inspections in the main grid.

The training to be arranged in the spring of 2006 is the same for old and new inspectors. All participants will be sent the manual for transmission line inspectors and exercises in advance. Naturally, new inspectors are required more self study than the old hands.

At the end of training, there will be a license examination, and those who pass the examination obtain the right to inspect Fingrid's transmission lines. The license will be valid from 2006 to 2008.

## PARTS OF A TOWER AND NUMBERING OF PARTS



SEEN IN THE DIRECTION OF GROWING TOWER NUMBERING



## NEW MAINTENANCE MANAGEMENT CONTRACTS to ensure system security in 2006 - 2008

TEXT BY Timo Vienanlinna

Fingrid has signed new contracts concerning the maintenance management of substations and basic maintenance of transmission lines in 2006 - 2008. The total value of the contracts is approx. 14 million euros, of which the substation contracts account for 9 million euros and transmission lines 5 million euros.

The maintenance management contracts for substations were signed with five service providers. The contracts cover standby, local operation and basic maintenance management services for the substations in Fingrid's grid, the related materials, spare parts and subcontracting as well as basic maintenance management services for substation equipment at gas turbine plants owned by Fingrid.

The foremost change as compared to the earlier contracts is that the basic maintenance management and local operation contracts for substations have now been integrated in a single maintenance management contract for substations. Another change is the reduction in the number of work areas from nine to seven and changing the names of the work areas to better correspond to the present operating model (Figure 1).

**Basic maintenance for substations** has been subjected to open competitive bidding in periods of three years since 1997, i.e. during the entire existence of a single grid operator in Finland.

As a result of competitive bidding, the partners selected for the various work areas in 2006 - 2008 are Empower Oy, Fortum Power and Heat Oy, HelenService, Kemijoki Oy, and Voimatel Oy so

that Fortum obtained three work areas and the other four suppliers one work area each in accordance with the enclosed Figure 2.

The technical specifications for substation maintenance management, appended to the request for quotations, have also been made available to regional network operators. The goal is that in the future, all network operators would use the same documents in competitive bidding for services and that they would also develop the documents jointly. The first document package was sold to Turku Energia Sähköverkot Oy, which started operations at the beginning of 2006.

Fingrid's maintenance management responsibility covers more than 100 transformer and switching substations, some 150 disconnector stations, and 9 gas turbine power plants. The total value of the substation contracts during the entire contract period is approx. 9 million euros.

**Fingrid has approx. 14,000 kilometres** of transmission lines to be maintained, and the total value of the transmission line contracts over the next three years is approx. 5 million euros.

Basic maintenance of transmission lines comprises inspections of lines, ordinary maintenance work on the structures, and readiness for fault repairs.

Eltel Networks Oy and Empower Oy continue as the suppliers of transmission line maintenance services. Eltel Networks serves as the supplier in Southern, Eastern and Northern Finland and Empower in Western Finland.



Figure 1. Work areas for substation maintenance management.



Figure 2. Suppliers of substation maintenance management services.



## Teemu, curling, Turin – and silver medal!

The success of the Finnish curling team in the Olympic games in Turin raised curling to great popularity in Finland. The curling fever became something of a phenomenon. When the final matches were being played, people sat in front of their televisions as if under a spell.

**Teemu Salo**, IT Specialist in Fingrid's Data Systems unit and a member of the Finnish Olympic team, returned from the Olympics with a positive mind. A silver medal is a great achievement!

TEXT BY Leni Lustre-Pere PHOTOGRAPHS BY Paul Ahlgren and Eija Eskelinen



*Final phase of a throw. Olympic team members Kalle Kiiskinen (on the left) and Wille Mäkelä shown in the foreground, and Teemu Salo at the back.*

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**A**n extremely tactical sport," is how Teemu Salo described curling in Fingrid magazine four years ago. He said that he was fascinated not only by the tactical nature of curling but also because it is a gentlemen's sport and a team game. Curling is not suited for hotheads or for those wishing to squabble and argue.

### You cannot play it safe in a rapidly changing game

Despite the tactical nature of curling, the teams in Turin did not analyse their opponents or draw up exact preliminary plans. Those on the top in curling know all their opponents from before, and everyone knows the opponents' strengths and weaknesses.

"The game changes all the time, so there is no way of planning in advance how to play it safe," Teemu says.

He thinks that the strengths of the Finnish team include an aggressive approach and so-called hard takeouts.

### Nerves under control in all situations

Seen through television, the Finnish curling team appeared to be Taoistically calm no matter what happened on the ice.

"I don't know whether the others were nervous, I didn't notice that I was. We soon forgot about the television cameras and microphones during the games, and the viewers probably also noticed this from some of the comments that came out of our mouths," Teemu says.

The players also prepared for the games highly individually. During the early part of the Turin tournament, Team Finland had a game in the morning and afternoon every second day. The monotonous programme went on from day to day, and the players did not really have a chance to admire the sights of Turin.

The 45-minute drive from the accommodation quarters to Pinerolo was spent either by continuing the interrupted sleep or by shuffling the Rubik's cube for the team skip Markku Uusipaavalniemi and timing his performance. Then there was warm-up, training, stretching, picking suitable stones – and curling.



12 ▲  
*A cake in the shape of a curling rink decorated the coffee table when silver medallist Teemu Salo returned to work to Fingrid's Arkadiankatu office after a successful Olympic trip.*

*Wille Mäkelä has just released a stone on the move. Kalle Kiiskinen (on the left) and Teemu Salo sweeping the ice.*





Team skip Markku Uusipaavalniemi throwing.

### “Just another throw in Finland...”

Of course, the players also had some exciting moments. “The last shot against Scotland in the semi-finals. Sweeping can take the stone 2 to 4 metres farther, so basically we could have swept the draw too long. As Markku started his shot, I remember repeating to myself that this is just another throw in Finland – and then the stone was underway. And when the stone is on the move, the sweeper can only concentrate on sweeping, so I really didn’t have any time to be nervous at that point.”

This is how Teemu describes the unforgettable moment when many Finnish TV viewers were barely breathing.

### Most expert audience in Canada

Teemu thinks that as a curling tournament, the Olympics were pretty much like the World Championships. “However, curling is quite an unfamiliar sport in Italy, which was reflected in the atmosphere and expertise among the audience. When you’re playing for example in Canada, the atmosphere is totally different. The audience know what curling is about, and they know how to en-

courage good performance. In Italy, the local ‘football audience’ even distracted the opponent, which is really not suitable in curling. As a matter of fact, the Italian players apologised for the behaviour of the audience.”

In other respects, Teemu thinks highly of the Olympics. “It was an impressive and memorable experience with the opening and closing ceremonies. It was great to meet other athletes and see how they prepare themselves for the games. However, different sports had their own schedule, so even though we lived in the same building with the Finnish ice-hockey players, we did not see each other very much.”

When asked about the negative sides of the otherwise magnificent experience, Teemu mentions continuous security checks and certain cultural differences, which the punctual Finns found hard to get used to. “Uno momento” could sometimes take half an hour.

### World Championships right after the Olympics

When this article is being written, Teemu is getting ready for the World Championships to be arranged in Lowell in Bos-

ton from 1 to 9 April. Teemu says that he is facing some motivation problems as the two major tournaments are so close to each other.

“I think that the World Championships should not be arranged in an Olympic year. We try to train whenever we can find available space in curling rinks. We are under no pressure to do well, but only little practice and the condition of Markku’s hand cause some uncertainty.”

### Future is open

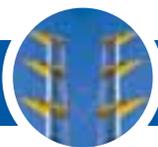
According to Teemu, his future in curling is still open.

“Let’s see how I feel when the ice melts. The sure thing is that I won’t stop playing altogether.”

He considers it important that curling attracts new, young players. “Maybe I could contribute there in some way.”  
Writer’s comment: the word “maybe” is just modesty.



IN



BRIEF

## Ensuring the reliability of the Finnish power system

Construction work for gas turbine power plant launched at Olkiluoto



*The contract has been signed. The persons in the photograph from the left: Jarmo Laine, Managing Director of Rakennus Vuorenpää Oy, Mauri Hannonen, Site Manager of TVO/OLKT, Kari Kuusela, Director of Fingrid, Jari Eskola, Group Manager of TVO, Martti Merviö, Project Director of Fingrid, Mauri Toivanen, Senior Specialist of TVO, and Mikael Wirén, Senior Specialist of Fingrid.*



■ Construction work for Fingrid's new gas turbine power plant has started at Olkiluoto in Western Finland. The company signed the agreement on the main building contract with Rakennus Vuorenpää Oy, part of the Skanska Group, on 31 March. The plant will be executed in co-operation with Teollisuuden Voima Oy.

The new gas turbine power plant of 100 megawatts will be needed for the management of power reserve obligations imposed on Fingrid. Fast production reserve is needed primarily to ensure the functioning of the power system in Finland in the event of failure at power plants or in the grid.

The new plant will also secure the supply of auxiliary electricity for Teollisuuden Voima's Olkiluoto nuclear power plants in the event of faults in the grid connections.

Teollisuuden Voima will pay 50 per cent of the costs of the plant project.

Preliminary earthwork at the site was carried out during the past winter, and actual construction commenced in early April.

The gas turbine plant will be ready in the summer of 2007. The main machinery will be supplied by the German company MAN TURBO AG. The total value of the plant project is approx. 50 million euros.

*Architect's views of the gas turbine plant to be constructed: above: view of the plant from the south, and on the left: south-east elevation of the plant, seen from the normal approach direction.*



Mutual neighbourhood help between Nordic TSOs

### ONE STEP CLOSER

■ Representatives of transmission system operators and maintenance companies in Finland, Sweden, Norway and Iceland discussed ways in which neighbouring countries could help each other in the event of extensive operating disturbances in the grid. The workshop hosted by Fingrid in early February was one step in efforts aiming to improve inter-Nordic contingency measures.

TEXT BY Maria Hallila PHOTOGRAPH BY Christer Pedersén

The two-day workshop attracted a total of 40 participants. In addition to transmission system operators and maintenance companies, there were also some representatives from regional network companies in the Nordic countries.

The meeting was arranged within Nordiskt Elberedskaps- och Säkerhetsforum (NEF), the Nordic forum for emergency matters regarding the energy sector, which has worked since the year 2000.

One of the task forces of NEF has thought about ways in which the Nordic transmission system operators could help one another in repair work in the

event of a major disturbance. The task force has analysed, for example, the possibility to borrow personnel and materials during disturbances.

The workshop arranged in Hämeenlinna presented the results of the work of the task force and compiled the participants' views.

Marcus Stenstrand, Fingrid's Development Manager, characterises the workshop as an important start especially in creating a personal-level network between the various organisations. "When you need help, it is important to know the key persons in the neighbouring countries' organisations, and their

areas of responsibility," Marcus Stenstrand says.

The workshop also surveyed the technical possibilities of providing and receiving help. "We went through equipment and material resources so that we could provide help in the event of a major disturbance," Marcus Stenstrand says.

The plans of the task force which surveyed assistance across national borders in crises also include an inter-Nordic fault exercise in the high-voltage grid. The plan was prompted by the meeting of the Nordic energy ministers in the autumn of 2003, after which a letter of intent was drawn up between authorities concerning the development of contingency planning for energy supply in co-operation between the Nordic countries.

According to Marcus Stenstrand, the arrangements of the exercise will progress one step at a time. "We started with the workshop. Next, we will have a tabletop exercise, and then a real exercise."

Nordiskt Elberedskaps- och Säkerhetsforum, NEF, is a Nordic forum for emergency matters regarding the energy sector. NEF aims to contribute to rational, cost-effective and joint

solutions being developed in those areas of contingency planning and security which are applicable to international energy co-operation.

NEF's efforts are described in report "Nordic Contingency Planning and Crisis Management", which is available at [www.huoltovarmuus.fi](http://www.huoltovarmuus.fi) and in a printed version from the National Emergency Supply Agency.



## Fingrid's THEME afternoon provided a concise information package



Customer aspects in the event were presented by Pentti Kalliomäki (on the left) and Jarkko Kohtala.

■ Fingrid's theme event, which has already become something of a tradition, attracted almost 100 representatives from the energy industry to Espoo for an afternoon. Topical issues in many fields were again on the agenda. In addition to Fingrid's specialists, representatives of Tampereen Sähköverkko Oy and Vattenfall Verkkö Oy also gave presentations in the event.

In his presentation, Timo Toivonen, President of Fingrid, dealt with the peak load situation during the past winter, procedures agreed for power shortage situations, and planned capital expenditure projects in the grid in the coming years. The latter issue also touched on the number one energy topic of the winter, plans for a new sea cable from Russia.

The other topics of the day were network planning of regional transmission networks, how to determine the transmission capacity of the main electricity transmission grid and notifying this to the market, measures carried out to increase transmission capacity, development of the Nordic grid, and fault statistics in the Nordel grid.

Customer aspects to regional network planning were provided by Jarkko Kohtala of Vattenfall Verkkö Oy and Pentti Kalliomäki of Tampereen Sähköverkko Oy. Jarkko Kohtala stated that technical co-operation with Fingrid is versatile, continuous and important in view of the development of the network.

The topics of regular contacts include regional network projects, outage arrangements, work of Network Control Centre, and readiness and contingency planning for power supply. Moreover, Vattenfall is represented in Fingrid's three committees.

"Our future challenges concerning issues such as supply security demand above all that we develop our own operations continuously, but it needs to be remembered that the grid with all its parts is an entity," Jarkko Kohtala pointed out. In his presentation, Pentti Kalliomäki also emphasised the importance of close co-operation between experts.



Photograph by Juhani Eskelinen

Audience in the seminar arranged by the Power and District Heat Pool. Some of those who gave presentations are shown in the front row (from the left): Mika Purhonen, Jaakko Rauramo and Heikki Hartikainen.

## Contingency planning in the energy sector as the topic in anniversary seminar

■ The Power and District Heat Pool, which manages detailed contingency planning in power supply in Finland, reached the age of 50 years in April 2006. This anniversary was celebrated in a seminar arranged in Helsinki on 5 April, discussing the present state and future outlook for emergency supply in the energy sector.

The seminar held at Hotel Crowne Plaza gathered some 100 invited guests who have actively contributed to and participated in the work of the Power and District Heat Pool over the years.

The event was opened by **Jaakko Rauramo**, Chairman of the National Board of Economic Defence. Lieutenant Colonel (retd) **Heikki Hartikainen**, who served as the Secretary of the Pool committee between 1986 and 2002, presented the phases of the Pool organisation over the past 50 years.

Major **Petteri Kajanmaa**, General Secretary of the Security and Defence Committee, presented the new threats to society and national defence.

**Mika Purhonen**, Director General of the National Emergency Supply Agency, gave an account of emergency supply and interdependence of critical infrastructures.

At the end of the seminar, **Tapio Kuula**, President of Fortum Power and Heat Oy, presented his views on the topic "Market economy and patriotism".

To celebrate the anniversary year, the Power and District Heat Pool has published a history of the phases of contingency planning in power supply. This publication in Finnish can be ordered from Fingrid Oyj, tel. +358 (0)30 395 5000, from Ella Käck.

### Upgrade of series capacitors at the Uusnivala and Vuolijoki substations

■ Fingrid Oyj and Nokian Capacitors Oy have signed an agreement on the upgrading of series capacitors at the Uusnivala and Vuolijoki substations in Northern Finland.

Five series capacitors at the substations will be expanded so that the compensation degree of the lines rises from 50 per cent to 70 per cent. Some of the capacitor equipment will be expanded and some will be renewed. Small changes will also be made to the protection and control system.

The total price of the contract due to be complete in April 2007 is approx. 3 million euros.

### Expansion of Fenno-Skan link to be launched

■ On 21 April, Fingrid signed a contract with the Swedish company Marin Mätteknik AB on the sea bed survey for the cable route required by the expansion of the Fenno-Skan cable.

The sea bed survey includes finding a suitable cable route and also for example location of cable crossings and taking of samples. The offshore section will be investigated using the m/v Franklin with a length of 56 metres.

The survey will begin once the ice has melted, and the research report is due to be ready at the beginning of August. Fingrid and Svenska Kraftnät will pay the costs of the survey in equal proportions.

## All in a day's **WORK**



In this column, Fingrid's employees write about their one day at work. This time, the column has been written by **PASITURUNEN**, who works as a Specialist in the Grid Management Unit.

The crow of the rooster took me by surprise this morning. Usually, I just roll in bed waiting for the alarm, wondering what the time is. And in that instance, as if reading the mind which is still half asleep, that ultramodern rooster in the mobile phone gives a crow. I'd like to press the drowse button, but I don't want to wake up to the crow again. So, I get up.

■ I woke up later than normal because our floorball team had a game in the firm league yesterday evening. My legs ache a little, which means that I forgot to stretch myself again. However, the evening sauna softened the muscles. It is always a great feeling after a game, you feel like you've really done something. The game was good and tight, but the opponent, who lead the series, won us. We are at the lower end of the series. That does not matter so much, the main thing is that it feels good.

■ I use the train for commuting this morning. The roads are congested before 8 o'clock, and the buses are either packed or late. I walk to the train station. When I lived in Lapland, I used a car to get from one place to another. We only used the train or bus if the length of the trip exceeded 200 kilometres, and even then it was considered carefully. I sometimes drive to our Arkadiankatu office when I start the day early enough.

■ At work. While turning on the computer and starting the applications, I have a second breakfast. I tend to take a sandwich with me from home. My mind becomes clear faster than the computer screen. It must be the coffee.

Suppliers of maintenance services for transmission lines have sent a number of reports of updated line profile drawings during the past month. I spend the morning going through the drawings. At present, suppliers transfer crossing survey updates compiled in the terrain directly into electronic line profile drawings. They have ordered the drawings to be updated from our electronic drawing archive. This procedure has changed thoroughly over the past two years. I have worked at Fingrid for almost 4 years, and I can remem-

ber well how an employee of a supplier came to our office to update the line profile drawings on paper by hand. The change may have been quite a big for many.

■ I browse through the drawings. Last year, when the electronic procedure was first introduced, it was more laborious to comment on the drawings. The effort I made then is rewarded now. The service suppliers have adopted the uniform updating procedure, which has been supported by means of instructions. The updates are of high quality; there is little need for requests for correction, only minor remarks. I tell the person responsible for the drawing archive that the updated drawings can be transferred into the archive for use by others. I also send a message to the supplier for work well done.

■ I have to miss coffee break this morning. Instead, I sit in the auditorium finding out about the new features and possibilities of the ProjectWise application. According to Bentley's representatives, the opportunities are almost limitless, naturally. The audience is mostly interested in the linking of documents through the Internet. As a surveying engineer, I am also interested in the possibility to expand the electronic archive with the features of location software. One future scenario is that we could approach the desired line profile drawings on a map.

■ After lunch, I am prepared to test the new functionality of ELNET's SAKA application and corrections made to it. The testing could have been done a week ago, but – like with many other things – this job also shifted to the end of the available time frame. The SAKA application, which concerns the basic information on transmission lines, has so many users among suppliers alone that the changes must be tested thoroughly. Faulty operation will certainly attract comments. The target with testing was achieved: the job was done well and mainly on schedule.

■ During the day, I have received several telephone calls and e-mail inquiries concerning the profile drawing updates and other ongoing development projects for the ELNET system. Contacts from others are a good indication of what job is currently at hand.

■ The hours after the mid-day coffee seem to be more energetic – maybe I'm not a morning person after all. On the other hand, the latter half of the day is usually filled with more random jobs, which makes the afternoon seem more active.

■ Before going home, I book some time for myself in the calendar so that I can concentrate on larger entities in the future. At least the planning of audits of transmission line maintenance in the summer calls for uninterrupted concentration. This and other ongoing or pending jobs have been in my mind recently. Today's topics were the profile drawings, crossing surveys and ELNET. There are also plans for more theme days.

■ I would like to go and play ice-hockey in the evening. However, my legs suggest that the smart thing is to go home and take it easy. Maybe it's best to leave something for tomorrow. While in the train, I make the decision: I'll watch a good film at home. A surprise. A classic perhaps, like a spaghetti Western with Clint in it.



Photograph by Tuula

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