POHJOLAN VOIMA Society and the Environment 2000

CONTENTS

PREFACE

Energy, particularly electricity, as a product holds an exceptional position in society: it is constantly present in both business operations and in the everyday life of the population. Indeed, society is widely interested in energy - not in the product itself, but in its production.

In this report, Pohjolan Voima describes its position, line of action and future outlook as a player in the energy sector in Finland. The report increasingly covers the Company's social aspect - this is even reflected in the name of the report, "Society and the environment 2000". The principal viewpoints include the Company's economic importance, co-operation with the interest groups and environmental aspects. Together they form a whole on the basis of which the Company's social significance and future can be assessed.

Pohjolan Voima's operations consist of the energy business areas and services, some of which are located abroad. This report describes the Group's operations in Finland. The report sections that describe the scope of operations and the key figures include all the Group's functions. In accordance with the essentiality principle, the section that describes environmental aspects only involves energy production and transmission.

Pohjolan Voima's nuclear power company, Teollisuuden Voima Oy, publishes its own environmental report. Teollisuuden Voima's environmental issues are therefore not covered in this report. Matters concerning Teollisuuden Voima's personnel are not dealt with in this report, either. However, the electricity generated by Teollisuuden Voima has been included in the calculation of environmental parameters shown in this report.

Pohjolan Voima considers it important that the various interest groups are aware of the environmental and social aspects linked with energy production. The Company has published an Environmental Report six times so far. The report is intended for Pohjolan Voima's principal interest groups, such as its owners, personnel, the national, regional and local authorities, and social decision-makers, as well as for other people interested in environmental issues. It is hoped that the wider scope of this report, together with Pohjolan Voima's Internet pages, will ever better fill the needs of the increasingly wide readership for information. Next time, the Company's social responsibility will be reported as part of Pohjolan Voima's annual reporting in the spring of 2002.

REVIEW BY THE PRESIDENT

The Bruntland Commission made the concept of sustainable development known as early as in 1987. The concept involves ecological, economic and social aspects. It is peculiar that the economic and social aspects are only now becoming concrete owing to the general trend of globalization. Companies are gradually being considered as an entity from the viewpoint of social responsibility in terms of their economic importance, people's welfare and the environment. Business activities are the basis for the well-being of society as a whole. If a company wishes to look after both people and the environment in a balanced manner, its business operations must be on a sound basis and economically viable.

Pohjolan Voima was established to generate electricity for the industry of a country ravaged by the Second World War. Competition has prevailed ever since in Finnish electricity production. Under the conditions of the deregulated electricity markets, Pohjolan Voima has assumed a role different from that of the other players in the market. Pohjolan Voima is making the biggest investment in electricity production in the Nordic countries and thus ensures that enough electricity is always available and the price is kept steady. When making its investments, Pohjolan Voima takes account of the requirements set for Finland to cut greenhouse gas emissions.

By pursuing wise and deliberate personnel policy, the Company has safeguarded economical and efficient operations and good readiness for changes. Indeed, Pohjolan Voima's personnel have adapted outstandingly to the great changes required by the present time, and in return the Company has been able to secure a job for everybody.

The level of environmental protection is high at Pohjolan Voima. The Company's entire production complies with a certified environmental management system.

In the approach to energy supply, not long ago the State played a key role, which it implemented through its own companies. Despite this, there have been better opportunities to conduct private energy business in Finland than in most other countries. The State has performed its basic functions well. The country's safety is not threatened, people's social security provision is fairly good and the level of education is high, the infrastructure is in order and there is no corruption. The legal protection of ownership is also good. The damages paid by the State to Pohjolan Voima serve as a good example of this. Owing to enactment of the Rapids Protection Act, the Company was not able to exploit the investments it had made.

In the drafting of legislation, the protection of property is not always sufficiently identified. The Rapids Protection Act cost the State many times the amount assessed at the time of enactment of the law. The estimation error seems to be repeated tenfold in the preparation of the national climate strategy in the event that the use of the currently operated coal-fired power plants will have to be limited as a result of the Kyoto process. Furthermore, as the strategy's expectations about the price of natural gas, which would replace coal, are highly optimistic, the economic consequences may be serious for society. The decision-makers must become aware of the weight of such costs as early as when working out political strategies and enacting laws.

Pohjolan Voima looks forward to the future with confidence. The Company's business model has well withstood the turbulence in the electricity market in recent years. Thanks to the good maintenance of the power plants and the new investments, the electricity production capacity has been secured for many decades. The Company also has the readiness to meet the growing need for electricity while also taking the environmental aspects into account. Pohjolan Voima continues to be ready to bear its responsibility for the development of Finnish society.

Timo Rajala
President

POHJOLAN VOIMA

Pohjolan Voima is a privately owned group of companies in the energy sector, which produces and supplies electricity and heat for its shareholders in Finland. The Company also offers services in its sector to its customers.

Pohjolan Voima's shareholders include Finnish companies in the export industry, towns and municipal electricity companies, and TXU Nordic Energy Oy, which is under American-British ownership.

BUSINESS OPERATIONS

In its business operations, Pohjolan Voima complies with two principles. Energy is generated in the production companies owned by the Group's parent company on the absorption principle. The service functions have been located at Empower, a subgroup operating on normal economic principles.

Pohjolan Voima's production operations began at the hydropower plants built on the Kemijoki and Iijoki Rivers. Over the years, the Company has developed its production structure so as to be highly versatile by building thermal power plants that use various fuels and nuclear power plants, alone and with co-operation partners. Production capacity has also been increased by purchases and through mergers. In the past decade, Pohjolan Voima has become the largest investor in power plants in the Nordic countries.

The Empower service companies provide the deregulated markets with services in the energy sector. The companies concentrate on the design and construction management of power plants and networks, environmental technologies, energy trading services, information systems, and the operation and maintenance of power plants. New partners and forms of co-operation are continuously being sought with a view to upgrading the service business.

GROUP STRATEGY

Pohjolan Voima's management system comprises the operating principles based on the business idea and the management tools for their application. All functions shall comply with Pohjolan Voima's values. In recent years, the importance of the operating principles pertaining to the environment, interest groups and personnel has increased enormously.

POHJOLAN VOIMA'S VALUES, OPERATING PRINCIPLES AND MANAGEMENT

STABILITY AND RELIABILITY - RESPONSIBILITY - COMPETENT PERSONNEL - PROFITABILITY

OPERATING PRINCIPLES:

(www.pohjolanvoima.fi)
To apply its business idea Pohjolan Voima (PVO)

4. recruits and employs competent personnel, to whom it offers challenging jobs, and creates the scope for development. The Company also seizes the opportunities offered by the cooperation partners for personnel development

→ PERSONNEL MANAGEMENT

6. upgrades and maintains its production machinery, aiming at an efficient and versatile production structure and good availability all the time

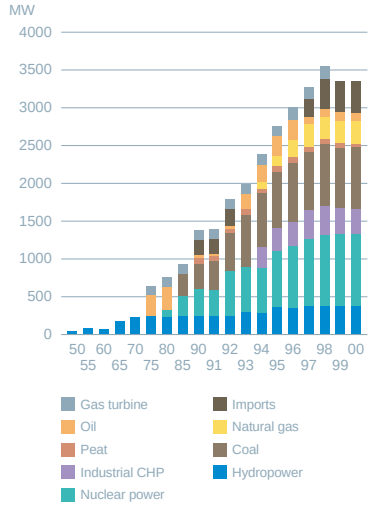
7. takes environmental, health and safety aspects into account in its operations in a responsible and anticipatory manner, and enhances its performance in these areas

8. values long-term and reliable relations with its interest groups

→ ENVIRONMENTAL POLICY:
(www.pohjolanvoima.fi)

- PVO is aware of the environmental effects of its operations.
- Efficient environmental protection is based on the management of all aspects.
- Personnel play a key role in environmental protection.
- PVO takes interest groups into account.
- PVO continues to develop its operations.

POHJOLAN VOIMA'S ELECTRICITY PRODUCTION CAPACITY



EMPOWER

Pohjolan Voima carries out service operations under the product name of Empower.

"SOCIETY AND THE ENVIRONMENT 2000" IN BRIEF

Pohjolan Voima aims to safeguard a sufficient supply and a steady and advantageous price of electricity for its shareholders. In fact, the Company is the largest investor in electricity generation in the Nordic countries. Through its basic values and operating principles, Pohjolan Voima has committed itself to bearing its social responsibility in its operations. While carrying out its operations, the Company focuses particular attention on the targets of Finland's environmental policy.

PRODUCTION INCREASED, ENVIRONMENTAL MANAGEMENT SYSTEMS FUNCTIONED

Pohjolan Voima's own electricity generation increased 6.5% and rose to 15.1 billion kWh. It represented nearly 23% of the electricity produced in Finland. The use of fuels increased 10% on the previous year. Despite this, the emissions increased only slightly, but sulfur emissions were even reduced. The targets set by the power plant organizations in their environmental management were achieved fairly well. The index that describes principal environmental parameters of thermal power generation shows a good level.

THE PERSONNEL'S READINESS FOR CHANGES IS GOOD

Nearly 450 employees transferred from the thermal power production organization to the operation and maintenance company established under the Service Group. The reorganization was implemented in co-operation with the personnel. With regard to personnel issues, the target set for the next few years is to systematize the management of health and safety issues. At the same time, studies are also focusing on the personnel's workload and their ability to cope with their jobs, and on the opportunities to bring about improvements.

SETTING OUR SIGHTS ON THE FUTURE

Pohjolan Voima is preparing for the future on the basis of the energy policy target programme drawn up in 1998. The starting point of the programme is to integrate the increasing electricity requirement with the need to reduce greenhouse gas emissions. In 2000, Pohjolan Voima continued construction of the biofuel-fired power plant launched in the previous year in Pietarsaari and took a decision to invest in four new biofuel-fired power plants. Pohjolan Voima's subsidiary, Teollisuuden Voima, submitted an application for a decision in principle on a new nuclear power plant unit. The Company promoted technological innovations, and a production company was established for new forms of energy.

SERVICES AND ENVIRONMENTAL BUSINESS IMPROVED

The range of services provided by Pohjolan Voima expanded. A new service form launched was the risk management and consulting services for electricity trading, which help customers protect themselves from fluctuations in the market price of electricity. PVO-Engineering Oy completed the first Finnish wind power plant concept and became a shareholder in Winwind Oy, which started construction of the first plant. It will be completed in spring 2001.

POWER PLANTS

- Hydropower plant
- Nuclear power plant
- Peat-fired power plant
- Biofuel-fired power plant
- Natural gas-fired power plant
- Coal-fired power plant
- Oil-fired power plant
- Power plant under construction

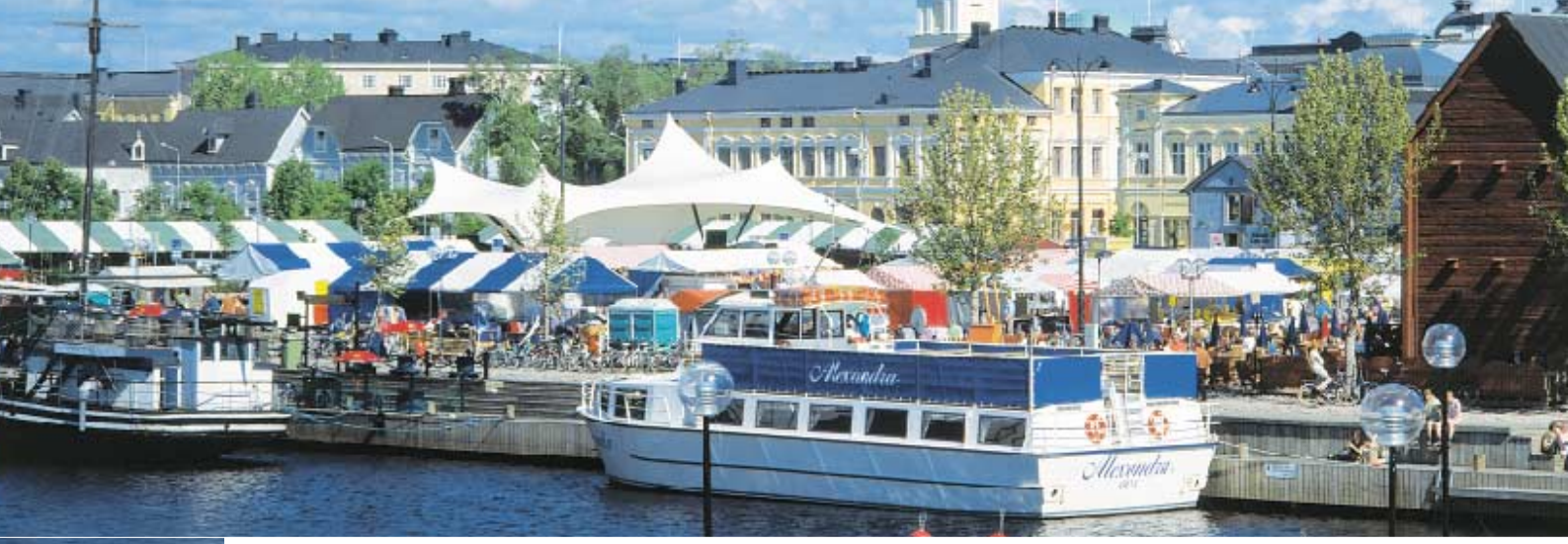
KEY EVENTS IN 2000

- Construction of the Alholma biofuel-fired power plant (240 MW of electricity, 160 MW of heat) in Pietarsaari continued
- The Company took decisions to invest in four biofuel-fired power plants:
  - Kuusankoski 76 MW of electricity, 180 MW of heat
  - Jämsänkoski 46 MW of electricity, 130 MW of heat
  - Kokkola 20 MW of electricity, 50 MW of heat
  - Ristiina 8 MW of electricity, 65 MW of heat
- Teollisuuden Voima submitted an application for a decision in principle on a new nuclear power plant unit
- The Council of State took a decision in principle on the final disposal of spent nuclear fuel at Olkiluoto
- A new Finnish wind power plant concept was completed
- An associated company, Winwind Oy, was established to implement the new wind power plant concept
- New gasification and gas cleaning technology was introduced for the energy use of refuse-derived fuels
- The Company established PVO-Innopower Oy, which concentrates on wind power production and other new energy sources
- The Company continued research into offshore wind power on an industrial scale off the town of Kokkola
- The operation and maintenance company, Power-OM Oy, was established; nearly 450 people from the production organizations transferred to the new company
- Power-Deriva Oy was established to provide risk management and consulting services for electricity trading

KEY FIGURES 2000 *

Turnover	EUR 508.1 million
Equity-to-assets ratio	51%
Total assets	EUR 2 160.0 million
Investments	EUR 55.5 million
Personnel	1 855 people
Electricity supply	24.0 TWh

* The figures include 100% of Teollisuuden Voima Oy and Eesti Elektrivõrkude Ehituse AS



POHJOLAN VOIMA AND SOCIETY

ENERGY FOR FINLAND

Through its basic values and operating principles, Pohjolan Voima has committed itself to bearing its social responsibility in its operations. The Company's operations bring stability to the deregulated electricity markets. While carrying out its operations, the Company focuses particular attention on the targets of Finland's environmental policy and co-operates with its interest groups. The level of environmental protection is high at Pohjolan Voima.

AIMING AT THE SUFFICIENT SUPPLY AND STEADY PRICE OF ELECTRICITY

The Ministry of Trade and Industry and the Finnish Energy Industries Federation FINERGY have assessed that, despite conservation measures, the annual electricity requirement in Finland will rise from the current level of some 80 TWh to well over 90 TWh by 2010. In recent years, plenty of electricity has been imported into Finland from Russia and the Nordic countries, where electricity generation has been abundant owing to exceptionally heavy rainfalls. In the future, the estimated additional need for electricity can no longer be satisfied by imports.

Upon deregulation of the electricity markets, the price of electricity has varied enormously in accordance with supply and demand. Companies in the electricity market seek to achieve as good a financial result as possible. This is furthered by an insufficiency in supply and the resulting increase in prices. In its energy business, Pohjolan Voima does not seek profits but aims to safeguard an advantageous and steady price of energy for its shareholders. Pohjolan Voima therefore continues to invest in new production capacity and increase the efficiency of its operations. At the same time, the Company has publicly committed itself through its environmental policy to good management and continuous improvement of the environmental issues, and was the first company in the Nordic countries to receive certificates for its environmental management systems that cover the Group's entire production.

POHJOLAN VOIMA'S SHAREHOLDERS PLAY AN IMPORTANT ROLE IN FINLAND

Pohjolan Voima supplies the electricity it has acquired to its shareholders. These include large Finnish companies in the export industry and electricity suppliers, most of whom are towns, municipalities or municipal electricity companies. With regard to the entire Finnish economy, the importance of the industrial shareholders is extremely high. All of them have committed themselves to sustainable development programmes and follow good environmental practice. The business operations of the electricity supplier shareholders are based on the supply of electricity to communities and the population.

Pohjolan Voima's shareholders consider it important that environmental issues are managed well at Pohjolan Voima. To this end, the board of directors has set up an environmental committee consisting of the representatives of Pohjolan Voima and its major shareholders to coordinate the environmental management. In addition to the committee, Pohjolan Voima reports on the most significant environmental issues to its shareholders in the board meetings, in the Environmental Review drawn up at fixed intervals, in the public Environmental Report published annually, and in supplementary reports that describe the environmental quality of electricity.

OPERATIONS ARE EFFICIENT

Pohjolan Voima produces energy on the absorption principle. The Company's competitiveness and profitability

cannot therefore be measured on the basis of the financial result. The efficiency of Pohjolan Voima's energy supply is based on overall optimization of the use of the Company's own and the shareholders' supply resources. Pohjolan Voima's operation model has proven to withstand the deregulation of the electricity markets.

Pohjolan Voima Oy's subsidiary, Teollisuuden Voima Oy, generates about half the electricity with nuclear power. In 1998, Teollisuuden Voima was granted a WEC Award for the best plant in the world on the basis of, e.g., its output and safety systems. In thermal power production, a wide range of energy sources, utilization of heat and optimization of the efficiency increase competitiveness. These forms of production combined with hydropower production, which can be regulated, and with electricity import contracts form an effective part of the Nordic electricity markets.

POHJOLAN VOIMA IMPLEMENTS THE KYOTO PROCESS

Fulfilment of the obligations imposed by the Kyoto Protocol (p. 22) is difficult for Finland. This issue is one of the top priorities in the present government's programme. Energy production and consumption play an essential role in the prevention of climate change. On the other hand, the technologies chosen will considerably affect economic growth and the enhancement of the national economy.

During the past ten years, Pohjolan Voima has made the biggest investment in electricity production in the Nordic countries. The implemented projects support the principle of sustainable development and prevention of climate change. In 1998, Pohjolan Voima drew up an energy policy target programme, whose starting point is to integrate the increasing electricity requirement of the shareholders with the need to reduce greenhouse gas emissions. This has provided a basis for a number of measures: extensive research and development activities (p. 14) and an extensive bioenergy programme (p. 12) have been launched, a decision to build five new power plants (p. 12) has been taken, an application for a decision in principle concerning the construction of a nuclear power plant has been submitted, and studies have been conducted into other power plant projects and opportunities for electricity supply (pp. 12, 13). Pohjolan Voima is investigating the scope to draw up a voluntary agreement with a view to cutting greenhouse gas emissions jointly by industry and energy producers (p. 22).

CHOICES ARE BASED ON THE RESPONSIBILITY FOR THE ENVIRONMENT AND SOCIETY

The growth of the economy has been widely accepted as the basis for the affluent Finnish society. According to mutually consistent estimates by several parties, this will mean a considerable increase in the need for electricity. In its energy policy target programme, Pohjolan Voima has sought to integrate the increasing electricity requirement with the need to reduce carbon dioxide emissions. For this reason, the Company has committed itself to an extensive programme to increase the use of biofuels and is investigating the opportunities to use new energy sources. Pohjolan Voima has found that only some of the additional need for electricity could be met by renewable energy sources (p. 12).

The experience obtained in the use of nuclear power in Finland has been favourable, and a high-class safety culture has been established here. Finnish nuclear power plants have operated efficiently and reliably. The risk of accidents has been minimized by multiple safety systems. Permanent nuclear waste management systems, including decommissioning of the power plants, will be implemented during the plants' life cycles, and responsibility for the waste will not be shifted to future generations. Final disposal systems for low- and intermediate-level waste have already been put into use. After controlled storage, the spent nuclear fuel will be disposed of in the bedrock at Olkiluoto, at a depth of about 500 metres, in accordance with the decision in principle by the Council of State. The more than two thousand million year-old bedrock will provide stable conditions for geological final disposal.

In Finland, there are different opinions about the construction of additional nuclear power, which are based on people's different values, knowledge level and view of life. In Pohjolan Voima's opinion, the use of nuclear power is careful, responsible and strictly controlled in operation throughout its life cycle. Owing to the threat of climate change, Pohjolan Voima does not consider it possible to generate the amount of electricity corresponding to the output of a nuclear power plant with fossil fuels. Teollisuuden Voima Oy, which is part of the Pohjolan Voima Group, has therefore submitted an application for a decision in principle on the construction of a new nuclear power plant unit in Finland to the Council of State. Industry, towns and municipalities all widely support the application for a decision in principle.

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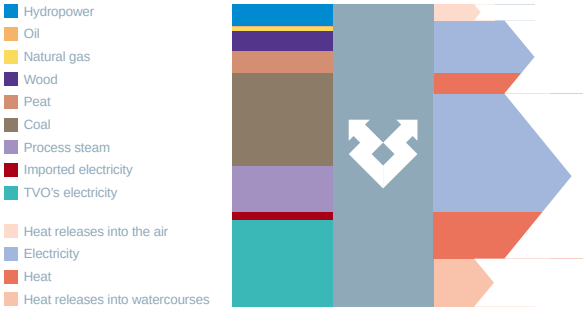
POHJOLAN VOIMA'S ENERGY BALANCE IN 2000



ELECTRICITY SUPPLIERS:

Etelä-Pohjanmaan Voima Oy, City of Helsinki, City of Kokkola, Kotkan Energia Oy, Kymppivoima Oy, City of Oulu, Perhonjoki Oy, City of Pori, Päijät-Hämeen Voima Oy, TXU Nordic Energy Oy, Vantaa Energy Ltd

EXPORT INDUSTRY SHAREHOLDERS:

Stora Enso Oyj, Kemira Oyj, Kyro Corporation, Oy Metsä-Botnia Ab, Metsä-Serla Corporation, Myllykoski Oyj, UPM-Kymmene Corporation, Ilmarinen Mutual Pension Insurance Company

POHJOLAN VOIMA'S ENERGY POLICY TARGET PROGRAMME (1998)

Basis:

Integration of the increasing electricity requirement with the need to reduce carbon dioxide emissions

Upgrading of the present capacity:

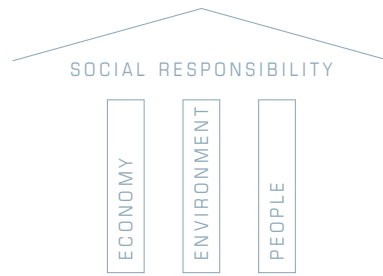
- Environmental management systems
- Energy conservation programme
- Optimization of electricity supply

Capacity increase programme:

- Biofuel-fired power plants
- Hydropower capacity increase
- Nuclear power
- Development of new energy forms
- Transmission connection to Estonia
- The Kyoto Mechanisms

Preconditions:

Long-term energy policy that offers flexibility in the use of competitive economy and different energy sources



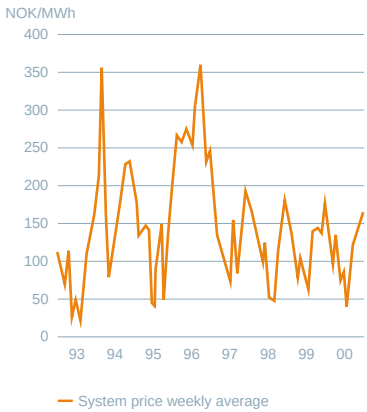
Source: Confederation of Finnish Industry and Employers (TT)

ELECTRICITY IMPORTS

In 2000, 7.4 TWh of electricity were imported from Sweden and 4.5 TWh from Russia to Finland. The production of hydropower electricity varies a great deal in the Nordic countries. The difference in production between a dry and a rainy year (74 TWh; Source: FINERGY) roughly corresponds to the annual electricity consumption in Finland. Under normal conditions, electricity production in Sweden and Norway is smaller than their own requirement. Transmission connections and the distance hinder electricity imports from Central Europe. With respect to Finland's supply reliability, energy imports from Russia have already become alarmingly large, particularly considering the imports of natural gas, in addition to electricity imports. For these reasons, the increasing electricity requirement in Finland cannot be met by imports. Neither do imports resolve environmental problems but shift them to other countries.

CROSS-BORDER TRANSMISSION CONNECTIONS (MW) IN THE NORDIC COUNTRIES IN 2000

SYSTEM PRICE OF NORD POOL'S SPOT ELECTRICITY



Source: Nordpool

WEC World Energy Council

Kyoto Protocol Protocol to the UN Framework Convention on Climate Change, by which the industrialized countries committed themselves to reducing greenhouse gas emissions

Low- and intermediate-level waste Waste produced during power plant maintenance, for example, plastic, paper, cloth

TWh = terawatt-hour = billion kilowatt-hours (kWh)
MWh = megawatt-hour = million kWh
NOK = Norwegian crown (krone)

CO-OPERATION WITH INTEREST GROUPS

Owing to their social significance, energy issues are being widely discussed in Finland both in public and at seminars and other events arranged by different parties. According to Finnish tradition, the discussion is fairly open. For this reason the players in the energy sector and their principal external interest groups - civic organizations, authorities and political decision-makers - are well aware of each other's views. The operating life of power plants is very long, even 60 years, and experience shows that the values of interest groups may greatly change over the years.

FROM COMMUNICATION TO INTERACTION

Pohjolan Voima's operations involve aspects in which various interest groups are interested and which are important to them. After the Second World War, the construction of hydropower in northern Finland, which was based on emergency laws and temporary permits, led to a dead end in the 1970s. At that time, the Company adopted active interaction in its interest group activities. Indeed, the Company places emphasis on interaction and co-operation instead of unidirectional communication.

Pohjolan Voima aims at rapid and two-way communication with its target groups. With regard to communications, the emphasis is currently placed on the development of network communications. The Company's Internet pages (www.pohjolanvoima.fi) give news about the Company and publish the magazines and brochures. A public inquiry connected with the Company's research into offshore power (p. 14) was implemented through the Internet.

Pohjolan Voima arranged a separate energy day, whose participants included political decision-makers and civil servants from the national and regional levels. Many of Pohjolan Voima's publications dealt with issues related to the environment and society. Pohjolan Voima played a prominent role in the Energy Day and the Energy Congress arranged in the city of Tampere, and the Company also took part in the Energy Fair organized at the same time.

According to a publicity study performed by Oy Observer Finland Ab, the Pohjolan Voima Group and its subsidiaries and associated companies got a total of 761 mentions in the Finnish press during the last five months of 2000. Pohjolan Voima's new building projects and research into offshore power received wide publicity. The application for a decision in principle on the construction of a new nuclear power plant made Pohjolan Voima more interesting as a whole. Newspapers in northern Finland dealt with the unusual regulation of the Suolijärvi Lakes and Lake Isojärvi. The biofuel programme aroused interest in international publications as well.

Pohjolan Voima was involved in arranging a country-wide series of seminars dealing with the new environmental protection legislation together with industry, the Regional Environment Centres, the Environmental Permit Authorities, the Association of Finnish Local and Regional Authorities, the Ministry of the Environment and the Finnish Environment Institute. A total of over 600 people, representing both companies and authorities, attended the seminars. With other companies in the energy sector, Pohjolan Voima co-operates mainly through the different organs of FINERGY. The Company's representatives took the floor several times during the seminars, and visits of interest groups were arranged to Pohjolan Voima's and FINERGY's facilities.

LOCAL INTEREST GROUPS ARE IMPORTANT

Pohjolan Voima has power plants or pursues business operations in 27 locations in Finland. In addition, Pohjolan Voima has minority shareholdings in companies operating in many other locations. In 2000, employees lived in a total of 90 municipalities. At the end of the year the Group had 1 473 employees in Finland, and the salaries paid amounted to EUR 56.5 million. Real estate taxes paid to the municipalities totalled EUR 5.2 million.

In addition to the direct earned income and tax revenue, power plant operations have plenty of indirect economic effects. With regard to the Finnish economy, the domestic energy sources (hydropower, peat and wood) are important. They are mainly exploited in such regions where economic activity is low and the unemployment rate is high.

The power plants in the Pohjolan Voima Group supplied district heat to the towns of Vaasa, Seinäjoki, Nokia and Kotka, and Pohjolan Voima also acquired the district heat required by the town of Kokkola. Upon completion of the power plants that are under design and underway, district heat deliveries will also begin for the towns of Pietarsaari, Kuusankoski and Kouvola.

Contacts with local interest groups are always linked, as far as possible, with the business conducted in the area concerned. The largest number of contacts related to

hydropower. In 2000, agreements relating to real estate signed on the environmental effects of hydropower production numbered 159. Several restoration projects for the aquatic environment are carried out in co-operation with the Regional Environment Centres and municipalities. The Company promoted in various ways an environmental management programme for the Iijoki River, the Kierikki project that makes use of the finds from the Stone Age in the municipality of Yli-Ii, and the fishing centre project at the mouth of the Kemijoki River. It also subsidized the whitefish hatchery project of the municipality of Ii and the local fishery associations. Voimalohi Oy, which is in charge of Pohjolan Voima's fish stock management, jointly arranged several events with the relevant authorities and research institutes. These included a seminar on fish farming in natural food ponds, an information meeting and discussion about the fish disease situation, and a visit to the Iijoki River arranged for the representatives and authorities of the Kemijoki River area. The Company continued co-operation with research institutes and authorities in the field of fish management to ensure the quality of stocked fish.

In recent years, Pohjolan Voima has implemented six environmental impact assessment (EIA) procedures. Pohjolan Voima has built a multi-level participation system to ensure interaction, and favourable experience has been gained with it. This operation model was also applied to Pohjolan Voima's research project concerning offshore power; the representatives of about thirty authorities and interest groups have been called to the project's monitoring group. Pohjolan Voima has sent the Company's publications to all parties involved in the EIA procedures, even after their termination.

FINANCIAL SUPPORT AFTER CAREFUL CONSIDERATION

Pohjolan Voima financially supports non-profit civic activities. Substantial support is allocated to a few but carefully chosen organizations. Pohjolan Voima now has an agreement of several years with the association Irti Huumeista ry (Free From Drugs).

Pohjolan Voima builds its company image by co-operating with sports associations in the power plant locations and by being one of the sponsors of the Lahti Symphony Orchestra in the Symphonically Together team. With regard to sports, principal co-operation partners have included Valkeakosken Haka, HIFK, Pori Jazz Festival, Pietarsaaren Jaro, Kotkan TP and the wrestlers of Oulun Pyrintö. The Company seeks to make long-term agreements with its partners.

THE SUBSUPPLIERS FOLLOW THE ENVIRONMENTAL POLICY

Pohjolan Voima's relations with its subsuppliers have been defined in the certified environmental management systems. This means that the organizations have committed themselves to informing the subsuppliers of the Group's environmental policy and requires in return that operations of the subsuppliers are in harmony with the policy. Separate site instructions have been drawn up for the subsuppliers that operate at power plants. It is required that coal suppliers should be aware of the environmental effects of their operations. The objective is to encourage coal suppliers to achieve good environmental management.

AN EXTENSIVE CO-OPERATION NETWORK IS NEEDED

From Pohjolan Voima's viewpoint, the most important organization that affects the operations of the EU is EURELECTRIC, the cooperative organization of European power companies (www.eurelectric.org); the Company is involved in its several working groups. At the national level, Pohjolan Voima gives priority to activities in FINERGY (www.energia.fi/finergy), in which Pohjolan Voima holds chairmanship of both the board and the environmental committee, and has many other representatives. The Company's representatives are also involved in the work of the board and several committees and working groups of the Confederation of Finnish Industry and Employers (TT) (www.tt.fi).

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Pohjolan Voima co-operates with the Lahti Symphony Orchestra.

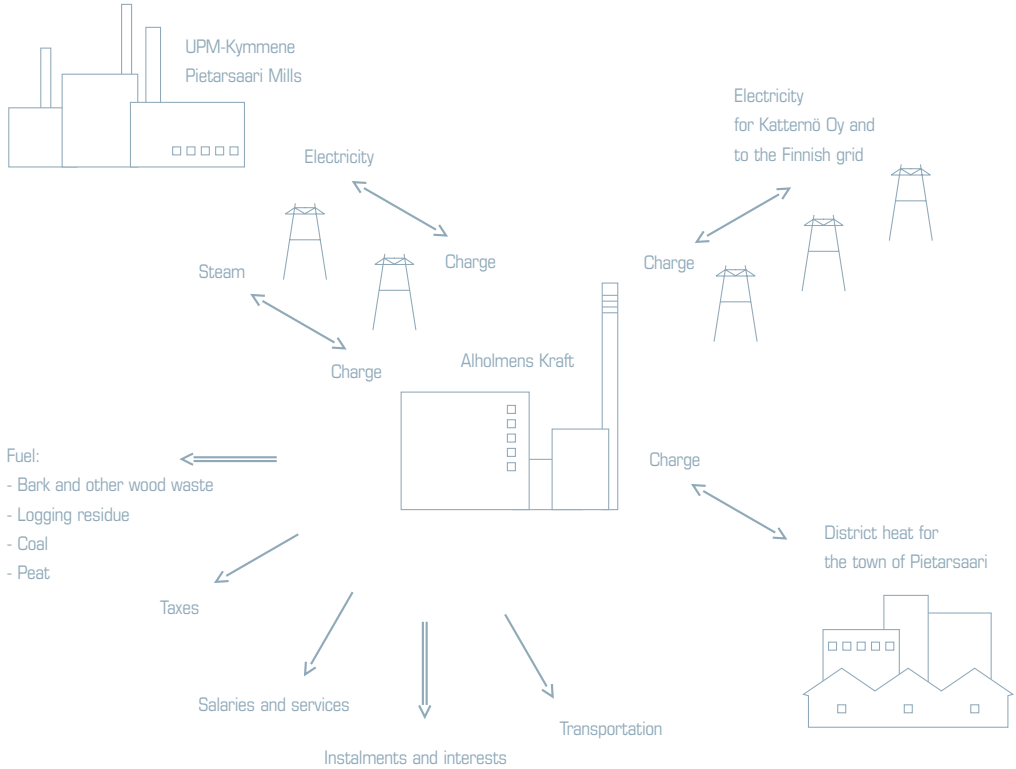
POHJOLAN VOIMA'S IMPORTANT INTEREST GROUPS

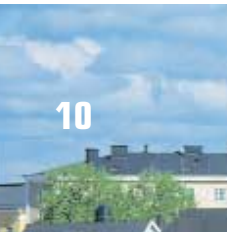
National and local political decision-makers
State authorities and authorities of the municipalities where the Company pursues operations
The media
Civic organizations
Organizations of industry and trade
Labour market organizations
Population and associations in the power plant locations
Local fishery associations
Subsuppliers and contractors
Co-operation partners
Research institutes
Personnel
Potential job applicants
Financiers
Owners

POHJOLAN VOIMA'S COMMUNICATION IN 2000

- Internet pages
  - www.pohjolanvoima.fi
- Pohjolan Voima, bulletin for the interest groups
  - 2 issues, edition 6 500 copies
- Empower Link, customer bulletin
  - 3 issues, edition 9 000 copies
- Virtaviesti (Flow information), bulletin for the interest groups linked with hydropower production
  - 1 issue, edition 16 000 copies
- Annual Report
  - edition 8 500 copies
- Environmental Report
  - edition 5 000 copies
- Voimavara (Resource), personnel bulletin
  - 3 issues, edition 1 500 copies
- Ympäristökatsaus (Environmental Review), in-house bulletin
  - 3 issues, edition 200 copies
- KotiRuutu, intranet pages

EXAMPLE OF A POWER PLANT'S PRODUCT AND CASH FLOWS
OY ALHOLMENS KRAFT AB





PERSONNEL

One of the four basic values of Pohjolan Voima is competent personnel. The concept integrates, on the one hand, the expertise and activity of the personnel and, on the other hand, the Company's duty to provide a motivating working environment. One of the operating principles included in the Group strategy defines the basis for personnel policy (p. 4). The principle can only be applied on the basis of mutual confidence and openness, in which every individual in the work community is valued and respected.

EVERYTHING IS BASED ON HIGH JOB SECURITY

In the past decade, the Pohjolan Voima Group underwent a major structural change. The personnel's starting points and cultural backgrounds vary a great deal. The adoption of a new operation model has set great requirements for flexibility of the personnel.

In the midst of great changes, the Company has succeeded well in personnel planning. Even difficult reorganizations have been handled in co-operation. In the most extensive reorganization in 2000, where nearly 450 people transferred from PVO-Lämpövoima Oy to Power-OM Oy, a company established in the Service Group, every employee was secured a job. During this reorganization, the representatives of the personnel were also involved in the planning of a new operation model.

MANAGEMENT OF HEALTH AND SAFETY ISSUES BEING SYSTEMATIZED

In 2000, a total of 5.8 occupational accidents per one hundred employees occurred in the Group. The trend in the past few years is pointing in the right direction. Accident indemnities in 2000 lowered to a third of the previous year's level. This was due to the decreased seriousness of the accidents. In 2000, the most serious accident was a fracture of the leg. Nearly half the accidents took place at two power plants. Special improvement projects are being planned for these plants. To systematize health and safety operations, Pohjolan Voima has begun to build a health and safety system, and the objective is to incorporate it into the existing environmental management systems.

Activities aimed to promote the fitness for work organized by the labour protection committees boast a long tradition. These activities have included a rehabilitation programme for older employees (called ASLAK), keep-fit campaigns and weekly exercises, and monitoring of the mental working capacity. In 1997, the concept of fitness for work was extended, and the working capacity promotion programme was chosen as one of the priorities in the Group strategy. The main objectives included development discussions, team work skills, internalization of self-development, financial matters and occupational training. Varied skills strengthen people's self-esteem while also enhancing the Company's performance. In addition, various projects concerned with change management were launched in several locations. In the next few years, studies will focus on issues connected with workload management and the maintenance of working energy, and on potential improvement measures.

In recent years, the scope of training subjects has been very wide. Besides actual professional training, training has also been given in environmental issues, occupational health and safety, fire protection and civil protection. Furthermore, fist aid training and, owing to internationalization of the operations, plenty of language training have been provided. The systematization of the training, compilation of related statistics and monitoring of the profitability of training need to be improved.

MALE-DOMINATION ON THE DECREASE

In accordance with Pohjolan Voima's equality plan, the most important thing is that everybody working at Pohjolan Voima can feel treated justly - age, sex, view of life, etc. must not lead to discrimination of any kind. The energy sector has always been male-dominated. Consequently, female employees account only for 19% of Pohjolan Voima's personnel. However, the proportion of female employees is gradually rising. With regard to employment begun in 2000, females represented 29%. In recruitment, the age scale has also widened, and in 2000 it ranged from 18 to more than 50 years old. With a view to future recruitment, the Company makes itself known by taking on plenty of summer helpers and trainees. In 2000, these employment relationships numbered 255. The Company makes joint efforts with FINERGY to increase the attractiveness of the energy sector.

The personnel turnover rate, which refers to the shifting of employees to Group-external labour markets,

Sports and recreation activities boast a tradition of several decades at Pohjolan Voima.

is low at Pohjolan Voima. Likewise, even though the average age of the Group personnel is rather high (47 years), fewer people than in industry on average retire on a disability pension and the age of retirement is higher. This is shown in the high competence and expertise of the personnel. The good situation is also reflected in decreased premiums.

PARTICIPATION OF THE PERSONNEL

At the Group level, a Group meeting consisting of 20 members provides a forum for information exchange between the Group's top management and the representatives of the different personnel groups. Co-operation committees function at the local level. The personnel have their representatives in the management groups of all Group companies. In almost all companies, the scope of the system used is much wider than required by law. Common seminars are arranged with the Company's elected officials, in which the management also takes part. The Company seeks good co-operation with labour market organizations.

In addition to the line organization, a wide variety of media is available for communication. The most up-to-date information is transmitted electronically. The Company's intranet system has enormously increased the availability of the system. Three issues of the personnel bulletin named Voimavara (Resource) were brought out in 2000. The Group's bulletins for interest groups, named Pohjolan Voima and Empower Link, the Annual Report and the Environmental Report are also distributed to the entire personnel. The rest of Group-external communications material is also available to the personnel.

Sports and recreation activities are common in the power plant locations whatever the subsidiary. The representatives of the personnel are in charge of the activities. A Group's common one-day sports event is arranged once a year either in winter or in summer. Contact is also maintained with retired employees in various ways. Annual meetings of the pensioners draw plenty of participants, who continue to be interested in the Company's affairs. Pensioners may also take part in some leisure activities, and they receive the personnel bulletin.

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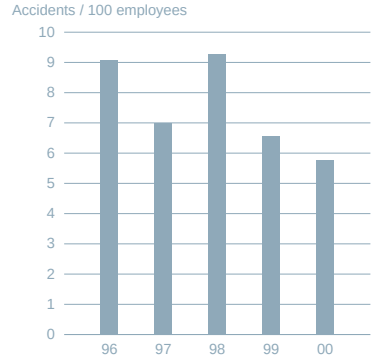
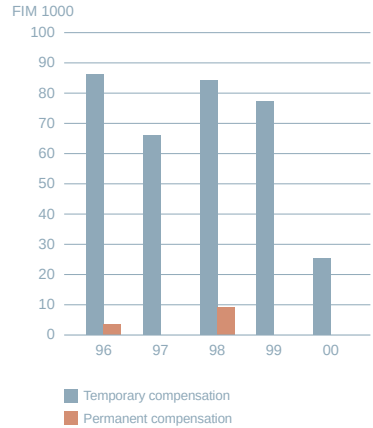
ACCIDENTS AT POHJOLAN VOIMA

(EXCLUDING TEOLLISUUDEN VOIMA'S PERSONNEL)



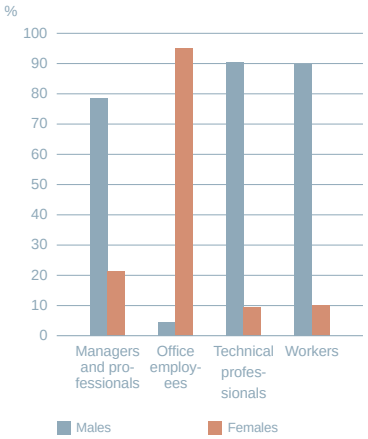
AMOUNTS OF COMPENSATION ON THE BASIS OF THE STATUTORY ACCIDENT INSURANCE AT POHJOLAN VOIMA

(EXCLUDING TEOLLISUUDEN VOIMA'S PERSONNEL)



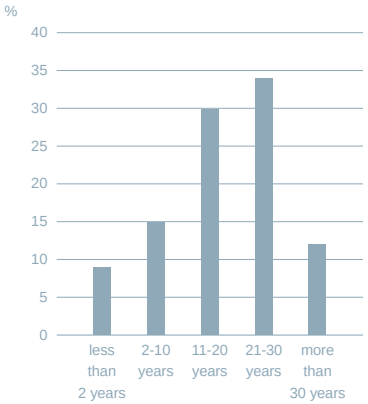
GENDER BREAKDOWN IN POHJOLAN VOIMA'S PERSONNEL IN 2000

(EXCLUDING TEOLLISUUDEN VOIMA'S PERSONNEL)



WORKING EXPERIENCE IN YEARS OF POHJOLAN VOIMA'S PERSONNEL IN 2000

(EXCLUDING TEOLLISUUDEN VOIMA'S PERSONNEL)



PERSONNEL TURNOVER RATE IN 2000

Turnover rate, out of the Company: 1.9%

= employees shifted to Group-external labour markets / average strength in per cent

Turnover rate, into the Company: 6.8%

= recruited / average strength in per cent

PROVISION FOR THE FUTURE

INVESTMENT PROGRAMME

Pohjolan Voima's operations are strongly oriented towards the future, which is particularly shown in the heavy investments. The value of the power plant investments made in 1996-1999 totals EUR 355 million. The investments on which a decision has been taken and which will be implemented in 2000-2002 are valued at EUR 400 million in all. The new investments are based on Pohjolan Voima's energy policy target programme, whose starting point is to integrate the increasing electricity requirement with the need to reduce carbon dioxide emissions.

POHJOLAN VOIMA INCREASES THE USE OF BIOFUELS MOST IN FINLAND

The Ministry of Trade and Industry has drawn up a programme to promote the use of renewable energy sources. The ambitious target of the programme is to increase the annual use of logging residue from the present 0.7 cubic metres to 5 million cubic metres by 2010. Wood consumption of the forest industry is also expected to increase 5 to 10 million cubic metres, and some of this will become energy. Pohjolan Voima estimates that a growth in the use of wood fuels in accordance with the above promotion programme and the national forest programme would increase electricity production by 2.2 TWh in this decade. If peat, which is used as support fuel, were included in the figures, the additional electricity production would rise to 3.7 TWh per year. This increase would cover 4% of Finnish electricity demand in 2010.

In 1999 and 2000, Pohjolan Voima took decisions to invest in five biofuel-fired power plants. By 2005, Pohjolan Voima's annual consumption of wood energy will rise from the current level of about 1 million cubic metres to not quite 3.5 million cubic metres. Some of this amount will replace the use of biomass at existing power plants of mills, while some will be completely new consumption. Logging residue will account for 0.7 million cubic metres of the increased consumption; this means that the use of logging residue will double in Finland.

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THE WORLD'S LARGEST BIOFUEL-FIRED POWER PLANT TO BE BUILT IN PIETARSAARI

The Alholma power plant in Pietarsaari will be completed in October 2001. Its electrical output will be 240 MW. In addition, the plant will generate steam for UPM-Kymmene's Wisaforest mills and district heat for the town of Pietarsaari of a total power of 160 MW. A target has been set to cover at least half the fuel requirement of the plant by wood energy. Peat will be used as the secondary fuel, and coal as an additional fuel, if necessary. The plant is owned by Oy Alholmens Kraft Ab, of which Pohjolan Voima's share ownership is 49.9%. The other shareholders are Graninge Finland Oy, Skellefteå Kraft AB, Revon Sähkö Oy, Oulun Seudun Sähkö and Perhonjoki Oy. Pohjolan Voima is in charge of the implementation of the plant.

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www.alholmenskraft.com

A BIOFUEL-FIRED POWER PLANT TO BE BUILT IN KUUSANKOSKI

A power plant with an electrical output of 76 MW will be built in Kuusankoski. The plant will generate steam for Kymi Paper Oy's paper mill and district heat for the

towns of Kouvola and Kuusankoski of a total power of 180 MW. The plant's primary energy sources will be wood fuels, while peat and natural gas will be used as additional fuels. The plant is owned by Kymin Voima Oy, of which Pohjolan Voima's share ownership is 76%. The other shareholder is Kouvolan Seudun Sähkö Oy. The plant will be commissioned in the autumn of 2002.

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A POWER PLANT TO BE BUILT IN JÄMSÄNKOSKI AS PART OF THE MILLS

The new power plant in Jämsänkoski will be built as part of UPM-Kymmene's mills. The plant will generate electricity of an output of 46 MW and 130 MW of steam for the paper mill. The plant will use peat and wood-based fuels as fuels. The plant is owned by Jämsänkosken Voima Oy, which is part of the Pohjolan Voima Group. The plant will be completed in the spring of 2002.

Further information:
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THE HEATING PLANT IN KOKKOLA NEARING COMPLETION

The new power plant of Kokkolan Voima Oy, a subsidiary of Pohjolan Voima, will be completed in autumn 2001. The plant will generate electricity of an output of 20 MW and district heat for the town of Kokkola of an output of 50 MW. The plant will use wood and peat as fuels.

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A NEW BIOFUEL-FIRED POWER PLANT TO BE BUILT IN RISTIINA WITH ANOTHER PLANNED FOR SAVONLINNA

A new power plant will be built as part of Schauman Wood Oy's mills in Ristiina; it will generate electricity of an output of 10 MW and 65 MW of process steam for the Pellos mills. The plant's primary fuels will be wood-based by-products from the mills. The plant is owned by Järvi-Suomen Voima Oy, of which Pohjolan Voima currently owns 70%. The other shareholder is Suur-Savon Sähkö Oy. The plant will be completed in spring 2002.

Järvi-Suomen Voima Oy is also planning to build a power plant in the town of Savonlinna. It is scheduled for completion by the end of 2004.

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ESTLINK STILL REMAINS UNDECIDED

Preparations aimed to combine the Estonian and Finnish grids through a direct-current connection (the Estlink project) continued throughout 2000. Studies of the land and sea cable routes were completed during the year, and technical readiness for implementation of the investment exists. However, a decision on implementation of the direct-current link has been delayed owing to the energy policy situation in Estonia and the low price level in the Nordic electricity market. In addition to Pohjolan Voima, the project involves Eesti Energia, Helsinki Energy and Graningeverkens AB. The project has been accepted in the TEN (Trans-European Networks) financial aid programme of the European Commission.

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A NEW COMPANY ESTABLISHED TO CONCENTRATE ON NEW ENERGY FORMS

Pohjolan Voima established PVO-Innopower Oy, which will concentrate on the generation of electricity with wind power and other new forms of energy. Operations will be launched during 2001.

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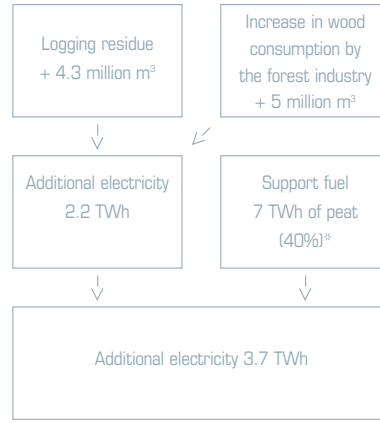
A biofuel-fired power plant will be completed in Pietarsaari in 2001.

POHJOLAN VOIMA'S RECENT POWER PLANT PROJECTS

Project	Fuel	Location	Electrical output MW	Commissioning
Raasakka, 3rd machinery	water	Iijoki	21	1997
Melo, renovation of the machinery	water	Kokemäenjoki	7	1999
Veitsiluodon Voima	wood, peat	Kemi	93	1996
Oulun Voima	wood, peat	Oulu	77	1997
Nokia, conversion	natural gas	Nokia	100	1997
Vaskiluoto, power upgrading	coal	Vaasa	35*	1998
Vaskiluoto, peak-load power plant	oil	Vaasa	160	1998
Olkiluoto, modernization	nuclear	Eurajoki	140*	1998
Pahkakoski, 2nd machinery, power upgrading	water	Iijoki	2	2000

*PVO's share

GROWTH IN ELECTRICITY PRODUCTION IN FINLAND ON THE BASIS OF PROGRAMMES AIMED AT INCREASING THE USE OF WOOD BY 2010 (POHJOLAN VOIMA'S ESTIMATE)



* net increase in peat 5.6 TWh

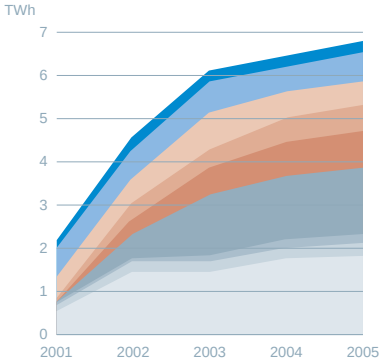
TWh (terawatt-hour) is a unit of energy

1 TWh is equivalent to
- 1 billion kWh (kilowatt-hours)
- 88 650 tonnes of heavy fuel oil
- 141 000 tonnes of coal
- 1 000 000 m^3 of milled peat
- 500 000 m^3 of logging residue
- 0.1 billion m^3 of natural gas

1 TWh of fuel yields 0.2 to 0.5 TWh of electricity, depending on the plant type and heat requirement.

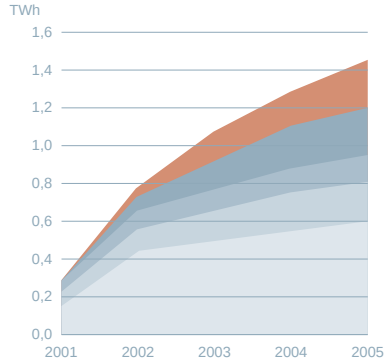
MW (megawatt) is a unit of power
1 MW (megawatt) = 1 000 kW (kilowatts)

PVO'S USE OF WOOD



- Kemijärven Voima Oy
- Veitsiluodon Voima Oy
- Oulun Voima Oy
- Järvi-Suomen Voima Oy
- Jämsänkosken Voima Oy
- Kymin Voima Oy
- Kokkolan Voima Oy
- SEVO, Seinäjoki
- Oy Alholmens Kraft Ab

PVO'S USE OF LOGGING RESIDUE



- Jämsänkosken Voima Oy
- Kymin Voima Oy
- Kokkolan Voima Oy
- SEVO, Seinäjoki
- Oy Alholmens Kraft Ab

BIOFUEL ACQUISITION AREAS OF POHJOLAN VOIMA'S NEW POWER PLANTS

TECHNOLOGY AND KNOW-HOW

In 1998, Pohjolan Voima worked out a technology strategy and drew up a technology programme, which is updated continuously. In its research and development operations, Pohjolan Voima seeks the most suitable partners for each project and co-operates with them closely and openly to achieve a good end result. The prevention of climate change plays a dominant role in Pohjolan Voima's research activities as well.

Companies in the energy sector also co-operate in the field of research in the Finnish Energy Industries Federation FINERGY's environmental research pool, which concentrates on topical environmental issues common to the sector. Pohjolan Voima's representative is chairman of the research pool.

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New wind power plant technology being tested.

RESEARCH IS AN IMPORTANT ELEMENT OF THE BIOFUEL PROGRAMME

Implementation of Pohjolan Voima's biofuel programme involves a number of new aspects that require extensive research. To this end, studies are currently underway concerning, for instance, the availability and acquisition techniques of logging residue, and related storage and environmental effects. In addition, biofuel reception and handling systems are being developed, and the use of biofuel ash as a fertilizer is being investigated. Since biofuels are more difficult to exploit than conventional fuels, a great amount of money and effort must be invested in the development of combustion technology and automation systems.

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KNOWLEDGE ABOUT OFFSHORE POWER ACCUMULATES

In 1999, Pohjolan Voima launched extensive studies into the opportunities of using offshore power on an industrial scale. The studies are aimed to provide insight into the technical and economic aspects and environmental effects of wind power as well as into its legal preconditions. An environmental impact assessment procedure will be launched concerning the project. It has already been found that a licensing procedure required under the valid legislation would be difficult in the case of large offshore wind farms. The Ministry of the Environment is likely to set up a working group to consider the matter.

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CLEAN GAS FOR POWER PLANTS FROM REFUSE-DERIVED FUELS

For two years now, Pohjolan Voima and Vapo Oy Biotech have been collaborating with VTT Energy in the development of new gasification and gas cleaning technology. The purpose is to employ the technology to produce clean gas from refuse-derived fuels. Plastics unsuitable for recycling, paper, paperboard and other combustible municipal and industrial waste could be used as fuel sources. The gas would be burnt in the existing fossil fuel-fired boilers. Further research is still needed to find a solution to the use of ash and to settle the issues of scale. The application of this technology is vital in achieving the targets set for the mitigation of climate change in Finland. The impact would be considerable owing to reduced methane emissions from dumps, on the one hand, and replacement of fossil fuels on the other hand.

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IMPORTS OF NATURAL GAS FROM NORWAY BEING STUDIED

With the help of financing from the EU, Pohjolan Voima is studying the opportunities to build a natural gas pipeline from Norway to Finland. The gas would be produced in the Haltenbanken area and come through Sweden to the western coast of Finland, near Kristiinankaupunki, for example. Studies are being conducted to assess the opportunities of replacing coal with natural gas at the existing power plants. The studies that are being carried out concern the economic, technical and environmental aspects. The studies also involve several parties in Sweden and Norway, and they will be completed in spring 2002.

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EMISSIONS TRADING AND GREEN CERTIFICATES TRADING BEING LEARNT

The technical and economic opportunities to combat climate change vary from country to country and from company to company. It is reasonable to take the measures in the order of their cost-efficiency. To this end, plans have been made to launch greenhouse gas emissions trading and trading of certificates for renewable energy sources between states and companies.

Pohjolan Voima has been involved in two emissions trading simulations (GETS 1 and GETS 2) organized by EURELECTRIC and in the test phase of renewable certificates trading initiated by the RECS (Renewable Energy Certificate System) group. The aim of the RECS project is to test a market-based mechanism for promoting renewable energy sources and to lay down international and national rules for this purpose.

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SERVICES

Pohjolan Voima carries out its service operations under the product name of Empower (www.empower.fi). The services include some interesting areas from the point of view of the environment and society. In 2000, the turnover of Empower's environmental business totalled some EUR 0.9 million.

PVO-Engineering Oy (www.pvo-engineering.fi) formed a business area that concentrates on environmental issues and renewable energy in 2000, and increased co-operation with Paavo Ristola Consulting Engineers. The services are linked with environmental studies and the licensing of biofuel-fired power plants and with wind power. A new modelling method was elaborated to assess the environmental effects of ash disposal areas. The Company became a founder shareholder in Winwind Oy, which began to implement the Finnish wind power plant concept developed at PVO-Engineering Oy. The basic strengths of Winwind Oy's business operations include life-cycle assessment, sustainable development and industrial scale production. Winwind Oy will supply the first wind power plant to the city of Oulu in spring 2001.

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Ramse Consulting Oy's (www.ramse.fi) environmental business centres on companies' energy economy and tools for environmental management, such as energy and environmental audits, integration of the systems and environmental management in the course of projects. In 2000, operations focused on company-internal environmental training and management of environmental issues in small and medium-sized enterprises. Ramse has also acted as a consultant in numerous development and investment projects with a view to increasing the use of environmentally benign technologies and biofuels in power production.

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Power-Deriva Oy (www.power-deriva.com) was established in 2000 to provide risk management and consulting services for electricity trading, which help customers protect themselves from fluctuations in the market price of electricity. Power-Deriva is the first Finnish energy trading service company to act as a broker for derivatives without being an electricity market participant itself. Its customers include energy companies and large industrial companies.

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Voimalohi Oy, of which PVO-Vesivoima Oy owns 50%, offers fish stock management and monitoring services, primarily to its shareholders, PVO-Vesivoima Oy and Kemijoki Oy. In 2000, the company reared, acquired and stocked 8.3 million fry and 63 000 kg of large-sized fish in the Kemijoki and Iijoki water systems and in the sea area at the mouth of these rivers. The company also monitored the results of fish stock management in the Kemijoki, Iijoki and Oulujoki water systems and in the sea area. Voimalohi Oy's turnover was EUR 3.25 million.

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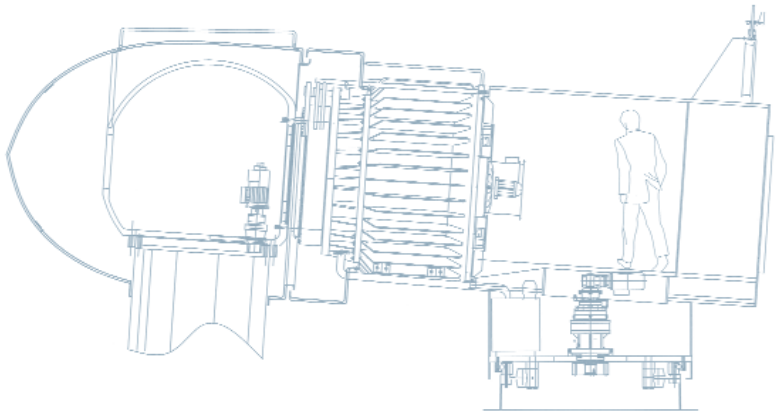
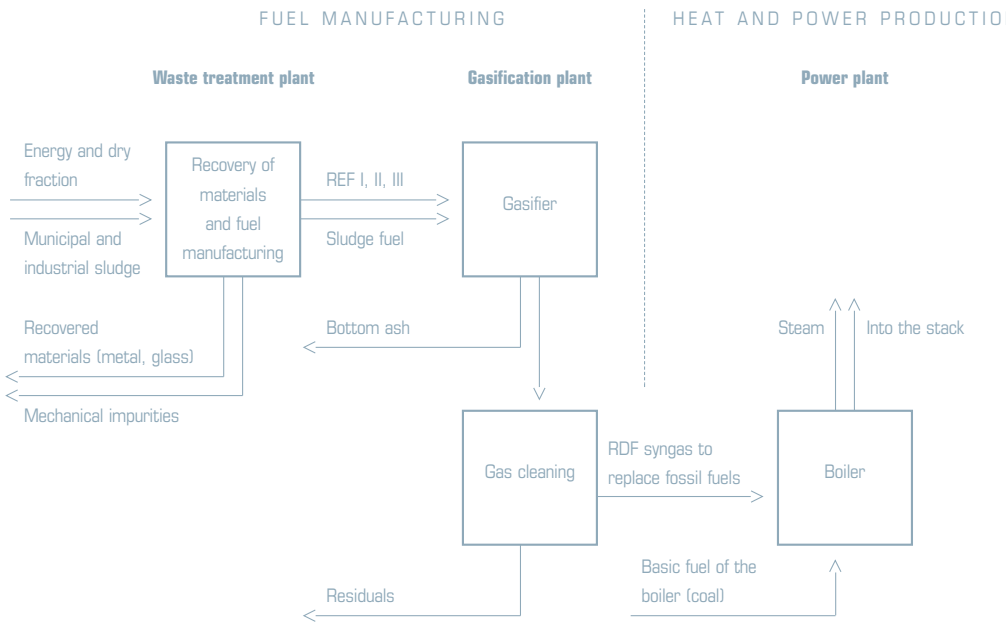
STUDIES WHOLLY OR PARTLY FINANCED BY FINERGY'S ENVIRONMENTAL POOL IN 2000

- Comparison of the valuation methods of environmental effects
- All types of ash for use - a migration model
- International companies and the Kyoto Mechanisms
- Emissions trading simulation GETS 2
- National BAT study of large combustion plants
- Health effects of fine particles contained in urban air
- Material flows of wood energy combustion
- Analysis of the non-CO2 greenhouse gas emissions from energy production
- Classification criteria for regulated lakes
- Mechanical clearing of power line zones and the effects of clearing on forest environment in the power line area
- Follow-up studies of the road made of ash in Knuters
- Ash properties and environmental effects of ash used as a fertilizer
- Effects of the large-scale wind power production on the Nordic electricity system
- Exposure to radiation in wood energy production
- BAT reference study concerning simultaneous emission control in Finland and the EU
- Experimental trading of certificates (RECS) for electricity generated by renewable energy sources
- Bases for the classification of regulated watercourses
- Study of the application and interpretation of the new Environmental Protection Act in some model cases

The operating system of the wind power plant developed by Winwind Oy consists of a single-stage planetary gear and a low-speed synchronous generator. Thanks to the low speed of rotation, for example, the plant's calculated lifetime is 30 years.



FLOW DIAGRAM OF REFUSE-DERIVED FUEL GASIFICATION



The technology involves the following characteristics:

- RDF syngas is a boiler fuel with known properties
- The gas can be used to replace coal, oil or natural gas
- It can also be used in biofuel boilers
- With the aid of gasification, the energy contained in waste material can be converted into a form in which it can be conducted to a high-efficiency power plant process
- Refuse-derived fuel is manufactured from dry municipal waste and industrial waste fractions
- Sludge fuel is manufactured from municipal and industrial sludges

ENERGY SUPPLY AND ITS ENVIRONMENTAL EFFECTS

Pohjolan Voima's electricity supply structure is highly versatile. In the Company's production machinery, each form of production has a specific function. The wide range of energy sources, the different properties of the power plants, electricity imports and utilization of the electricity market make it possible to optimize the most economical supply combination for each load situation.

NUCLEAR POWER

Nuclear power satisfies the continuous and even need for electricity, known as the base load. In the cost structure of nuclear power, variable costs are small, and it is therefore economical to operate the plants as much as possible.

DISTRICT HEAT AND PROCESS POWER

In the co-generation of electricity and heat, the energy contained in fuels is converted into electricity and heat at a high efficiency. The use of power plants is mainly determined on the basis of the heat requirement. Coal, peat, natural gas and wood are used as fuels.

HYDROPOWER

The principal task of hydropower is to rapidly regulate the output. The need for regulation results from both the continuous changes in load and variations in the price level in the electricity market.

CONDENSING POWER

At condensing power plants, as high a proportion of the fuel as possible is converted into electricity. The heat cannot usually be utilized owing to the lack of heat demand. Condensing power plants complement other production capacity and ensure the effective functioning of the electricity market under all conditions. Coal or natural gas is used as fuel. In the cost structure, the proportion of variable costs is high.

STANDBY AND PEAK-LOAD POWER

Standby and peak-load power plants are oil-fired condensing power plants. Their variable costs are high, and they are used in disturbance situations and when other capacity is in full use and the price of electricity is high.

ELECTRICITY IMPORTS

In 2000, Pohjolan Voima accounted for 100 MW of electrical output imported from Russia. In the beginning of 2001, Pohjolan Voima's share rose to 400 MW.

MARKET ELECTRICITY

The electricity markets are utilized effectively to optimize operation of the power plants as a whole. The Company can operate its power plants at the best possible efficiency and stop operating them when the price of electricity is low.

ELECTRICITY TRANSMISSION

Fingrid Oyj is in charge of the electricity transmission in the Finnish grid. Pohjolan Voima owns about 250 kilometres of transmission lines, along which electricity is transmitted from power plants to the grid.

THE PRODUCTION YEAR 2000

The Pohjolan Voima Group supplied a total of 24 000 GWh of electricity. This figure includes the entire production of Teollisuuden Voima, a subsidiary of Pohjolan Voima. Teollisuuden Voima supplied 6 500 GWh of electricity to its shareholders, excluding Pohjolan Voima. Pohjolan Voima supplied 15 115 GWh of electricity generated by its own resources to its shareholders. This was 6.5% more than in the previous year and accounted for nearly 23% of the electricity generated in Finland. For the third year in succession, the proportion of imported and market electricity of Pohjolan Voima's total supply increased, which was due to the abundant production of hydropower in Sweden and Norway. The Company's own hydropower production also increased by a fifth and was only slightly below the record figure for hydropower production in 1998. Fuel-based generation increased by about 15%. Electricity imports from Russia totalled 690 GWh, being at the previous year's level. Purchases from the electricity market doubled, amounting to 1 717 GWh. The proportion of electricity imports and market electricity rose to 13.7% of the electricity supplied by Pohjolan Voima to its shareholders.

CHARACTERISTICS OF THE YEAR 2000

The growth of the national economy and the high degree of utilization of industry continued to increase the consumption of electricity in Finland. This was also shown in the use of Pohjolan Voima's production resources. The bulk of the electricity generated by Pohjolan Voima is supplied to the needs of industry (p. 6).

Despite the abundant hydropower production in the Nordic countries, it was necessary to operate condensing power plants in Finland even in the summer. Condensing power production with coal ensured sufficient production in Finland, and effects of the great fluctuations in the market price of electricity could thus be avoided. In addition to supply and demand, the insufficient capacity of the Nordic transmission network affects the price.

The efficient production machinery helps achieve good profitability and minimize the risks of power plant failures and their harmful effects on the environment and on the functioning of the electricity market. Pohjolan Voima's production resources operated without interruption throughout the year.

The high degree of utilization of nuclear power production forms the basis for Pohjolan Voima's electricity supply. The co-generation capacity of electricity and heat corresponded to the needs for heat supply, and the proportion of this production form of Pohjolan Voima's electricity production increased. The condensing power plants met the requirements set for them, except for natural gas-fired plants. Natural gas has lost its price competitiveness in electricity production, and so the Mussalo gas turbine power plant was hardly operated in spite of its higher efficiency and better environmental properties than those of the rest of condensing power capacity. Operation of the natural gas-fired power plant in Nokia for combined heat and power production also remained considerably below the budgeted level.

THE MARKETS BENEFIT THE ENVIRONMENT

Owing to the heavy rainfalls in the Nordic countries, some 1 700 GWh of electricity was acquired from the market to replace the planned condensing power production. The use of fossil fuels could thus be reduced for the third year in succession. On the other hand, electricity generated by Pohjolan Voima and its shareholders was supplied to the markets to replace less efficient fossil supply resources. The markets were utilized in this way to optimize operation of the power plants as a whole while also cutting the environmental burden of production.

HEAT GENERATION INCREASES OVERALL EFFICIENCY

When only electricity is generated, the efficiency of a conventional condensing power plant is about 40%. The exploitation of heat at many of Pohjolan Voima Group's plants raised the overall efficiency of energy utilization at Pohjolan Voima's thermal power plants to 57%.

The power plants in the Pohjolan Voima Group generated 6 831 GWh of heat. The plants supplied heat to the towns of Vaasa, Seinäjoki, Kotka, Nokia and Kokkola, to Stora Enso Oyj's mills in Oulu, Kemi and Kemijärvi, and to the factories of Georgia Pacific Finland Oy in Nokia.

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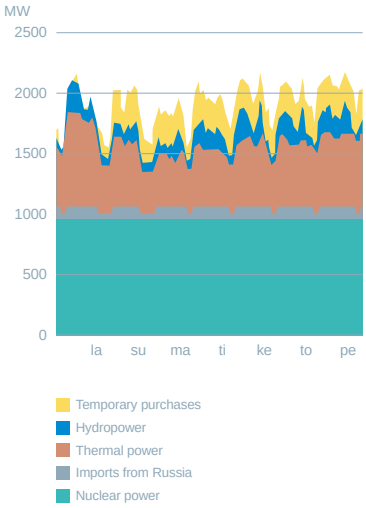
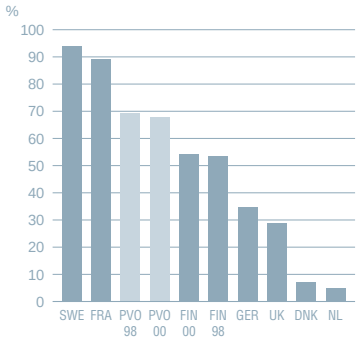
POHJOLAN VOIMA'S ELECTRICITY SUPPLY IN WEEK 37 / 2000



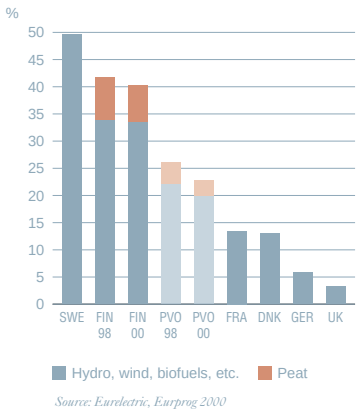
Pohjolan Voima utilizes the market for the overall optimization of electricity supply.

ELECTRICITY PRODUCTION STRUCTURE 1998 EMISSION-FREE (HYDRO, NUCLEAR, WIND ETC.)



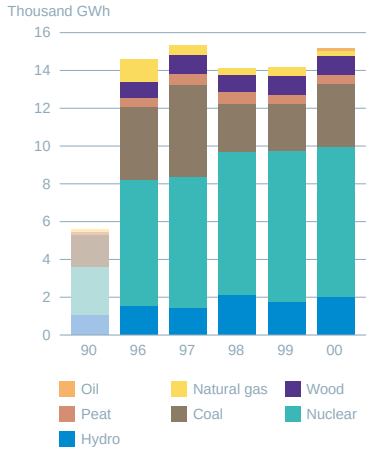
Source: Eurelectric, Eurprog 2000

ELECTRICITY PRODUCTION STRUCTURE 1998 RENEWABLES AND PEAT

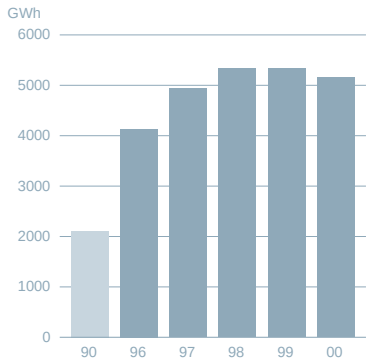


Source: Eurelectric, Eurprog 2000

ELECTRICITY PRODUCTION 2000

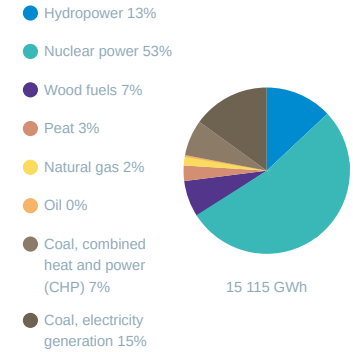


HEAT PRODUCTION



1 TWh (terawatt-hour) = billion kilowatt-hours (kWh)
1 GWh (gigawatt-hour) = million kWh
1 MWh (megawatt-hour) = thousand kWh

PVO'S ELECTRICITY PRODUCTION STRUCTURE 2000



Environmental management systems require that precautions be taken against emergencies. A fire and exit drill was arranged at Nokian Lämpövoima in November.

ENVIRONMENTAL MANAGEMENT

Pohjolan Voima produces electricity and heat in several separate subsidiaries and associated companies, which have their own management and organizations. The board of directors of each subsidiary, which mainly consists of the representatives of the Group's top management, makes decisions on the issues of the subsidiary and on implementation of the decisions taken by the Group's top management. This ensures that the entire Group operates in accordance with the established strategic policies.

The Environmental Division led by the Director, Environmental Affairs, which is part of the Group's parent company, is responsible for co-ordinating the Group's environmental issues. The Environmental Division is an expert organization, whose tasks include monitoring the operating environment and supervising the interests, updating the Group's environmental policy and strategy, and assisting the subsidiaries in matters related to the environment, such as data acquisition, licensing and development activities.

Pohjolan Voima's environmental policy (www.pohjolanvoima.fi) has been validated by the Group's top management. It emphasizes environmental issues as a part of the personnel's work. The companies that make up the Pohjolan Voima Group are in charge of environmental issues through their own organizations.

CERTIFIED ENVIRONMENTAL MANAGEMENT SYSTEMS ENABLE CONTINUOUS IMPROVEMENT

In 1999, organizations in the Pohjolan Voima Group received four certificates for compliance of the environmental management system in accordance with the ISO 14001 standard. When Teollisuuden Voima is also included, the certificates cover Pohjolan Voima's entire production and 30% of the electricity generated in Finland.

Besides formulation of the environmental policy, Pohjolan Voima's top management sets Group-level objectives, targets and policies, which the power plant organizations adopt into their own environmental programmes. The main part of the environmental programmes consists of the plants' own objectives and targets, which are based on the analysis of significant environmental aspects. The setting of their own targets is in agreement with Pohjolan Voima's environmental policy and vital to the commitment of the organizations.

The implementation of the environmental programmes is ensured with the aid of audits. These include internal auditing, audits by the certification authority, and reviews by Group management, which ensure the implementation of Group-level policies. The targets set for 2000 were achieved fairly well (pp. 22-30). In addition, accident drills were arranged at several plants. The setting up of auditing groups consisting of the representatives of different power plants promotes Group-internal learning and data transfer. We have also co-operated with holding companies in auditing issues.

The operation and maintenance of thermal power production was reorganized in the beginning of 2001. Most of the personnel in power plant organization transferred to the operation and maintenance company established in the Service Group. At the Group level, the target is to look after the environmental management systems, the documents that form their basis and follow the procedures in such a manner that the functioning and continuous improvement of the systems can be ensured. The result meters of a service agreement include, for example, indicators that are closely linked with the environmental aspects of production and occupational safety and health.

FUNCTIONAL NETWORK IS IMPORTANT

In developing strategically important issues, Pohjolan Voima's organization functions as a network. Permanent networks include functional management groups, of which the groups concentrating on technology development, the preparation of power plant projects, social relations and communication, and involvement in the Kyoto process are the most significant from the point of view of environmental affairs. Environmental issues are co-ordinated with the shareholders in Pohjolan Voima's environmental committee, which consists of the representatives of the Company and its largest owners.

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PERMITS AND REGULATORY COMPLIANCE OF THE OPERATIONS

All of Pohjolan Voima's power plants have valid licences. Regulatory compliance is systematically dealt with as part of the plants' environmental management systems (p. 18). In 2000, there were no serious deviations from regulatory compliance.

ALL THE THERMAL POWER PLANTS WILL APPLY FOR A NEW ENVIRONMENTAL PERMIT

The new Environmental Protection Act came into effect in March 2000. According to the Act, all the thermal power plants will have to apply for a new environmental permit in the next few years. Pohjolan Voima's first plants must apply for a permit by the end of 2001. All the plants will have to apply for a permit by the end of 2004 at the latest.

The new act did not actually change the preconditions for granting a permit or the bases for imposing the regulations. This means that no fundamental changes are to be expected in the contents of the decisions on the granting of a permit. According to the new act, all environmental effects of a plant are considered as an entity, and the regulations concerning them are imposed in the same decision.

PERMITS WERE APPLIED FOR NEW PLANTS

The most significant official issues in 2000 were the handling of permits applied for for several new power plants. The biofuel-fired power plants that are currently being built in Jämsänkoski and Kuusankoski were granted environmental permits. The emissions regulations of both permits are essentially based on the Government decisions on the guideline and limit values of emissions from power plant boilers. No appeals were submitted against the decisions. The biofuel-fired power plant in Pietarsaari was granted the Water Court's permit, against which an appeal was submitted to the Vaasa Administrative Court. The environmental permit for the Pietarsaari plant became legally valid as early as in 1999. An application for an environmental permit concerning the biofuel-fired power plant in Ristiina was submitted towards the end of the year.

APPEALS AGAINST THE NATURA DECISION WERE REJECTED

The Supreme Administrative Court of Finland rejected the appeals filed by Pohjolan Voima against the decision on areas to be included in the Natura 2000 network. The appeals concerned the area of the Kollaja reservoir planned in Pudasjärvi and the area of the shipping channel to Pohjolan Voima's port in Kristiinankaupunki. Pohjolan Voima has no short-term plans that would affect the above Natura areas.

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Recording level control equipment is used to monitor the water levels of regulated watercourses.

THE ENVIRONMENTAL YEAR 2000

Operation of Pohjolan Voima's thermal power plants increased slightly on the previous year. The emissions of carbon dioxide, nitrogen oxides and particles thus also grew. However, production and emissions continue to be small compared with the situation a couple of years ago. In 2000, sulfur dioxide emissions were smaller than in the previous year, despite the growth in production.

The use of ash increased slightly on the previous year. Despite the increased use of ash, Pohjolan Voima had to begin the planning of several large ash disposal areas.

In 2000, no serious environmental accidents occurred and there were no serious deviations from regulatory compliance.

THE CUSTOMERS ARE PROVIDED INFORMATION PER FORM OF PRODUCTION

In addition to the wholly-owned power plants, Pohjolan Voima's reporting takes account of the emissions from and production of the subsidiaries and associated companies on the basis of the Company's ownership. Likewise, the production of Fortum Oyj's Meri-Pori power plant and the emissions from the plant are taken into account in proportion to the electricity generated there for Pohjolan Voima on the basis of its participation in the power plant investment.

Pohjolan Voima defines the environmental parameters of the electricity generated for its customers per form of production. The electricity users can use this information, for example, in their life-cycle calculations.

USE OF NATURAL RESOURCES INCREASED SLIGHTLY

In 2000, Pohjolan Voima's use of fuels was as follows:

- coal	1.2 million tonnes
- wood fuels	0.9 million tonnes
- peat	2.5 million m^3
- natural gas	89 million m^3
- oil	0.01 million tonnes

Pohjolan Voima's direct use of fuels increased by about 10% on the previous year, but continued to be at a lower level than the average of the past five years.

The use of coal increased by some 30% on the previous year. About three quarters of the coal was imported from Russia and the rest mainly from Poland. Most of the coal purchased in 2000 came from the Kuznetski mines in western Siberia.

Wood fuels were mainly used at power plants of the forest industry, and as a result the fuel was available at the same mill site. Wood fuel was brought to the Seinäjoki power plant from the neighbourhood.

Most of the fuel peat was acquired from major suppliers in the field. In addition, peat was acquired from small suppliers and from the Company's own bogs using local subcontracting. Peat production has considerable effects on the nature and water conditions in the area concerned. In Finland, the area reserved for peat production accounts for about 1% of the total area of peatlands. Pohjolan Voima's peat consumption was about 10% of the use of fuel peat in Finland.

Natural gas was acquired from the gas network and oil from the market. Owing to the relatively small use of these fuels, their importance with regard to the use of natural resources is insignificant.

The decisions taken by Pohjolan Voima to invest in biofuel-fired power plants will increase the Company's acquisition of domestic fuels manifold. The Company

has made provision for the increase in its own peat production by applying for the necessary permits and by launching environmental impact assessment procedures. A study conducted by the Technical Research Centre of Finland VTT investigated the environmental effects of the acquisition of logging residue.

Compared with fuels, the use of other natural resources was small. The power plants consume some 680 million cubic metres of cooling-water. In terms of the environment, however, the impact of cooling-water intake is small. Furthermore, for example, lubricating oils and chemicals required for water purification and flue gas cleaning are used at the power plants. With regard to the volume, the most significant of these is limestone used for desulfurization; its use totalled 10 600 tonnes. The limestone was mainly acquired from Estonia.

MOST OF THE EMISSIONS FROM COAL TRANSPORTATION

The environmental effects of the transportation of fuels and by-products can be assessed on the basis of the transportation distances and the specific emission factors of the means of transportation that are known. The results show that transportation accounts for a large proportion particularly of the emissions of nitrogen oxides. With regard to carbon dioxide emissions, the proportion is in the order of a few per cent.

The transportation of coal represents well over 90% of the emissions from transportation. This results from both the large amount of coal used and the long transportation distances. The transfer of natural gas causes emissions owing particularly to leakages from long transfer pipes. In proportion to the use of natural gas, these emissions are rather high. Owing to its limited use, Pohjolan Voima's proportion of the emissions is small, however.

The covered articulated lorries used for the transportation of peat prevent the peat from dusting. In any case, the emissions from the transportation of peat and wood remain small owing to the short distances. Rather small amounts of oil and chemicals are used at Pohjolan Voima's plants, so the transportation of these substances does not involve any significant risk of an environmental accident.

THE ORIGIN OF PURCHASED ELECTRICITY CANNOT BE DEFINED

In addition to Pohjolan Voima's own production, the Company's electricity acquisition included imports of electricity from Russia and purchases from the market. Imports from Russia accounted for 4% and electricity purchased from the market for 10% of the electricity supplied to the shareholders.

It is not possible to define the exact origin and environmental quality parameters of this acquisition. The most significant energy sources of the electricity imported from Russia are natural gas and oil. The fairly large amount of electricity acquired from the market was due to the higher hydropower production than normal in the Nordic countries.

THE COMPANY'S OWN ELECTRICITY TRANSMISSION IS SMALL

At the end of 2000, the length of Pohjolan Voima's own regional grid was 250 kilometres. In 2001, the 110 kV transmission line, stretching about 160 km in length from Jumisko to Taivalkoski, will be replaced by a new line to Pirttikoski. The length of the new line will be 40 kilometres, 30 kilometres of which will be constructed along the old transmission line route and some 10 kilometres beside the existing line.

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THE ENVIRONMENTAL EFFECTS SIGNIFICANT AT GROUP LEVEL

are related to environmental effects with an extensive area of influence, such as

- climate change
- acidification

are important either locally or regionally, such as

- the use of hydropower
- effects of emissions on watercourses
- use and disposal of by-products and waste

may have effects on human health, such as

- particles
- heavy metals

EMISSION CALCULATION CRITERIA FROM 1998

When calculating Pohjolan Voima's emissions, PVO's shares in the different associated companies are taken into account.

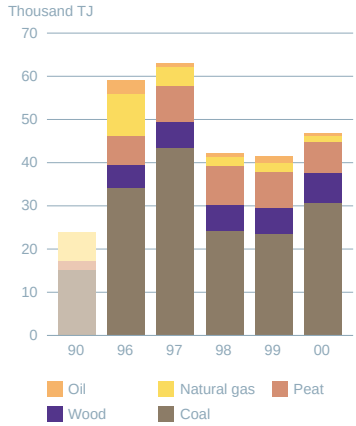
When calculating specific emissions, it is assumed that the efficiency of heat generation is 90%. The volumes of fuels and emissions pertaining to heat generation are calculated on this basis. The rest of the fuel consumption and emissions is allocated to electricity generation. A corresponding calculation method is used in FINERGY's recommendation for calculating the specification of electricity.

The plant-specific data at the end of this report has been given for the entire plant, taking no account of PVO's shares. The data on specific emissions has been defined per volume of energy fed into the boiler (mg/MJ). In general, the emissions regulations issued for the plants concern specific emissions. Annual quotas have been fixed for some plants.

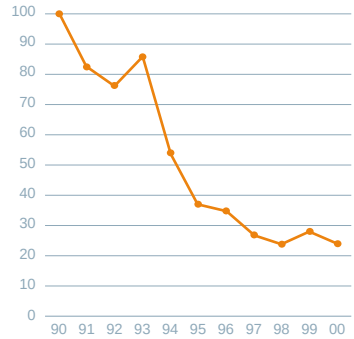
Carbon dioxide emissions include emissions from fossil fuels and peat, but not those from wood.

Emissions from 1990 to 1997 have also been recalculated using these calculation criteria.

FUEL CONSUMPTION



ENVIRONMENTAL INDEX OF THERMAL POWER 1990-2000



The environmental index of thermal power includes the specific emissions of carbon dioxide, sulfur dioxide, nitrogen oxides and particles, and the volume of by-products stored in disposal areas. All factors carry the same weight.

MONITORING OF ENVIRONMENTAL EFFECTS

Emissions into the air
- monitoring the quality of fuel
- monitoring of combustion
- measurement of emissions
- monitoring the condition of flue gas cleaning equipment
- monitoring the condition of measuring instruments and their calibration

Dispersion of emissions
- semi-permanent computer calculation

Air quality and effects on nature
- measurements of the content of harmful substances
- bio-indicator studies

Emissions into watercourses
- definition of the heat load
- monitoring of emissions

Effects on watercourses
- monitoring of the temperature
- monitoring of the water quality
- monitoring of the fish stock
- monitoring of eutrophication, aquatic flora and zoobenthos

By-products and waste
- quality of by-products
- monitoring the use of by-products
- monitoring the treatment and disposal of waste
- monitoring of environmental effects

Oils and chemicals
- risk surveys
- monitoring the condition of equipment

Noise
- semi-permanent noise measurements

ESTIMATED EMISSIONS FROM THE TRANSPORTATION OF FUELS USED IN 2000

	tonnes	**% of emissions from production**
sulfur dioxide	about 380	9%
nitrogen oxides	about 2 200	30%
greenhouse gases (in CO_2 equivalent)	about 130 000	4%

PREVENTION OF CLIMATE CHANGE

In accordance with the Kyoto Protocol, the EU's greenhouse gas emissions shall be 8% below the 1990 level in 2008-2012. The EU will implement its required emissions reductions in the form of what is called the 'EU bubble'. In accordance with the burden sharing within the EU, greenhouse gas emissions in Finland must not exceed the 1990 level.

NO AGREEMENT REACHED ON SPECIFICATION OF THE KYOTO PROTOCOL

The EU aims to ratify the Kyoto Protocol in 2002. The objective of the sixth Conference of the Parties to the Climate Convention (COP 6) held in The Hague was to define the principal issues of the Kyoto Protocol, such as the Kyoto Mechanisms, the calculation and acceptability of carbon sinks, compliance systems of the Protocol, and funding systems for the developing countries. The Conference was a failure owing to conflicting interests of the major industrialized countries, mainly the USA and the EU, and it will be resumed in summer 2001. Until now, none of the industrialized countries has ratified the Kyoto Protocol.

Scientific evidence of the existence of climate change caused by human activity has increased, and the harmful effects of weather disturbances have been realized. In its latest evaluation report, the Intergovernmental Panel on Climate Change (IPCC) confirmed that, in the long term, the amount of the necessary emissions reductions would be considerably higher than agreed on for the first commitment period (2008-2012).

The EU continued preparation of the European Climate Change Programme (ECCP). Despite the delay in the Kyoto process, the programme is scheduled for completion in autumn 2001. The European Commission also put forward a directive proposal for the promotion of the use of renewable energy sources in electricity production and contributed to the same objective by revising its quidelines on state aid. The Commission also published the Green Paper on emissions trading.

FINLAND'S CLIMATE STRATEGY BEING WORKED OUT

Background studies for Finland's national climate strategy were being conducted throughout the year under the direction of a specific ministerial working group.
The Government will submit the strategy in the form of a report to Parliament in spring 2001. The strategy is further based on the expected growth in economy and employment and the expected decrease in public debt included in the government programme. Since the rules for the Kyoto Mechanisms yet remain unestablished, the climate strategy will be based, at this stage, solely on domestic measures. The Government is outlining various steering instruments, such as taxation and financial support systems, statutes and regulations, research and development activities, and voluntary agreements. Measures would be required in energy production and consump-

The sixth Conference of the Parties to the UN Framework Convention on Climate Change (COP 6) was held in The Hague in November.

tion, transportation, the building sector and urban and regional planning, emission control of agriculture and forestry, and waste disposal.

The Government considers it clear that the action plan for renewable energy sources, completed in 1999, and the energy conservation programme, completed in 2000, will be implemented regardless of other measures. In the Government's opinion, electricity supply in Finland cannot be based, to a great extent, on coal power owing to the commitment to combat climate change. The Government is therefore pondering the opportunity of preventing the construction of new coal-fired power plants and of shutting down the existing plants. Limiting the operation of the existing coal-fired power plants would require the State to take on the liability for damages. The Government considers the role of natural gas significant. The additional costs incurred for Finland by fulfilment of the obligations imposed by the Kyoto Protocol amount to several billion Finnish marks a year. The cheapest and most efficient way to achieve the target is to increase the generation of nuclear power.

POHJOLAN VOIMA'S PROJECTS CONTRIBUTE TO FINLAND'S CLIMATE CONVENTION TARGETS

In 2000, Pohjolan Voima accounted for some 6% of the carbon dioxide emissions and some 5% of the total greenhouse gas emissions in Finland. Owing to the increase in fuel-based production, the carbon dioxide emissions grew by 13% on the previous year. Some of the planned condensing power production could be further replaced by electricity purchased from the market, which reduced the carbon dioxide emissions from the Company's own production by some 0.7 million tonnes.

In its energy policy target programme drawn up in 1998, Pohjolan Voima reported that the specific emissions from its own production would take a downward turn. The Group's decisions in recent years contribute to this target. The coal-fired power plant projects, which were underway, have been frozen. The investments implemented in recent years (power upgrading of hydropower and nuclear power plants, plants that use biofuels, fuel conversion of the Nokia power plant and increasing the efficiency of the Vaskiluoto power plant) have already changed the production structure towards lower emissions. These projects will help cut annual carbon dioxide emissions by about one and a half million tonnes.

The problems encountered in the UN negotiations have not affected the measures to tackle climate change in the Pohjolan Voima Group. In 1999 and 2000, the Company took decisions to invest in five biofuel-fired power plants (p. 12). The plants will increase the Company's consumption of domestic fuels manifold.

Pohjolan Voima's subsidiary, Teollisuuden Voima, submitted an application for a decision in principle concerning the construction of a nuclear power plant (p. 7). Pohjolan Voima has an extensive technology programme (p. 14), which includes research and development projects concerning, e.g., wind power, biofuels and waste fuels, and power plant technology. Pohjolan Voima makes provision for the introduction of wind power and other new forms of production by establishing a production company, PVO-Innopower Oy, to concentrate on these issues.

Pohjolan Voima's subsidiary that is responsible for the Group's thermal power production signed the energy conservation agreement in 1997. The environmental management systems, aimed at continuous improvement, were certified in 1999. Increasing the efficiency of power plants is a crucial element in implementing the energy conservation agreement and the environmental management systems. Jointly with industry and other energy producers, Pohjolan Voima is studying the opportunities of extending the energy conservation programme so as to include all projects that help mitigate climate change.

Pohjolan Voima is actively involved in the work towards laying down the rules of the Kyoto Mechanisms. The emissions trading simulation of European industry, for example, enables us to acquire information and experience of the suitability of market mechanisms for the optimization of emissions reductions. Furthermore, the trading of certificates for renewable energy sources is being studied Europe-wide, and verification and trading systems are being developed. Pohjolan Voima is also planning joint implementation projects.

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TARGETS DEFINED BY THE ENVIRONMENTAL MANAGEMENT SYSTEMS

12 targets defined by the organizations in 1999, e.g.:

- Keeping the efficiency at more than 39% (Vaskiluoto)
- Increasing the proportion of renewable fuels to 10% by 2003 (SEVO)
- Investigating the opportunities for burning sorted waste by 2001 (SEVO)
- Continuous increase in the overall efficiency (Kristiina)
- Analysis of and decrease in plant service energy (Tahkoluoto)
- Prevention of gas leaks (Nokia)

Situation in 2000:

> Achieved

> Achieved

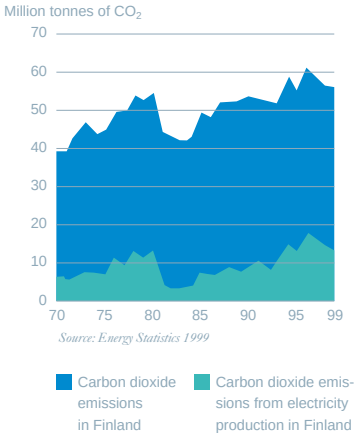
> Investigation performed

> A study to be performed in 2001

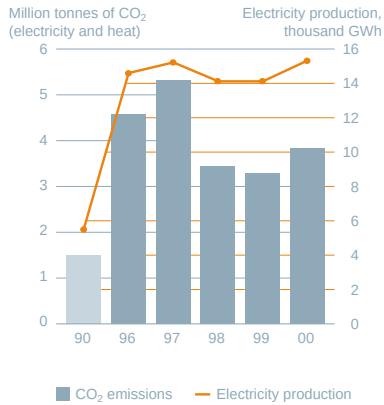
> Studies are underway

> Achieved

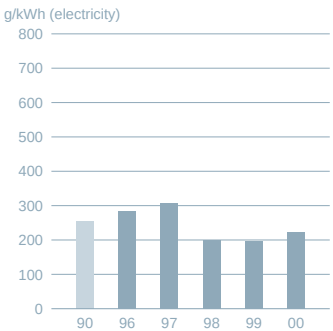
CARBON DIOXIDE EMISSIONS IN FINLAND



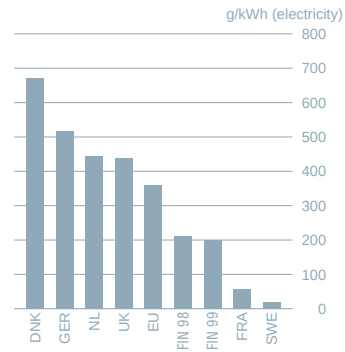
PVO'S CARBON DIOXIDE EMISSIONS



PVO'S SPECIFIC EMISSIONS OF CARBON DIOXIDE



SPECIFIC EMISSIONS OF CARBON DIOXIDE IN 1998



Source: Eurelectric, Eurprog 2000

SINKS

Any process or function that removes greenhouse gases from the atmosphere. Sinks include, for example, forests and other soil vegetation, and surface layers of seas. They bind carbon dioxide in photosynthesis, and carbon dioxide is released from them through combustion and decomposition. It remains unclear in which way the Kyoto Protocol will take account of the effects caused by changes in forest and land use on the emission balances of the countries involved.

RECENT STUDIES RELATED TO CLIMATE CHANGE PARTLY FINANCED BY PVO

- Indicators of CO_2 emissions and energy efficiency – Comparison of Finland with other countries. Technical Research Centre of Finland (VTT). 1997.
- Impact of EU burden-sharing under the Kyoto Protocol. Robert Reinstein. 1998.
- Assessment of the effects of the Climate Convention target on the overall economy in Finland. Research Institute of the Finnish Economy (ETLA). 1998. (in Finnish)
- International companies and the Kyoto Mechanisms. Pöyry. 2000.
- Emissions trading simulations GETS 1 and GETS 2. EURELECTRIC. 1999 and 2000.
- Analysis of the non-CO_2 greenhouse gas emissions from energy production. Fortum Power and Heat Oy. (to be published)

GREENHOUSE EFFECT

The earth's atmosphere functions like the roof of a greenhouse. It lets through most of the short-wave radiation emitted by the sun but efficiently prevents the long-wave thermal radiation emitted by the earth's surface and the lower atmospheric layers from being reflected back into space. This phenomenon is caused by the greenhouse gases such as water vapour and carbon dioxide found naturally in the atmosphere. The natural greenhouse effect is essential for life on earth. However, human activity has increased the amount of greenhouse gases in the atmosphere, thus intensifying the natural greenhouse effect. This consequently raises the average temperature of the earth. Climate change is a global phenomenon, and the effects of emissions do not depend on the location of their sources.

The most significant greenhouse gas resulting from human activity is carbon dioxide. Methane is also an important greenhouse gas, since the effect on global warming of one tonne of methane is equivalent to about 21 tonnes of carbon dioxide. Methane sources related to human activity include, e.g., rice plantations, cattle-farming, dumps, and the production and distribution of natural gas. In addition to carbon dioxide and methane, the Kyoto Protocol covers the emissions of nitrous oxide and three other compounds (HFC, PFC and SF6).

THE KYOTO MECHANISMS

Emissions Trading (ET) allows an Annex-B country (industrialized countries and countries in economic transition) with an excess of emission units to sell its credits to another Annex-B country.

Joint Implementation (JI) refers to a procedure in which two or more countries included in Annex B implement a specific project aimed at emission reduction units (ERUs) in the area of a country included in Annex B. The emissions reduction achieved as a result of the project or a part of it can be divided between the parties involved in the project in the way agreed on.

Clean Development Mechanism (CDM) allows governments of Annex-B countries to implement emission reduction projects in developing countries in order to meet their emission objectives. Annex-B countries receive credit for these projects in the form of certified emission reductions (CERs).

PREVENTION OF ACIDIFICATION

The acidification of soil results from acidifying emissions, such as sulfur dioxide, nitrogen oxides and ammonia, which are released into the atmosphere. Acidification is assessed on the basis of what is called the critical load. The critical load means the capacity specific to each ecosystem to continuously absorb acidifying impurities without being damaged. In Finland, the critical load was exceeded in about 6% of the country's area as recently as 1995. In most of the area where the critical load was exceeded, the target level can be reached by merely reducing the sulfur deposition.

International and domestic reduction measures for sulfur emissions have been efficient. Emissions of nitrogen oxides have also taken a downturn, and the emissions will continue to fall, mainly thanks to the increasing number of catalytic converters fitted to cars. In terms of acidifying deposition, the emissions from outside Finnish borders are significant. Some 10% of the sulfur deposition and 15% of the nitrogen deposition originate from Finland.

PREPARATION OF DIRECTIVES CENTRED AT THE EU LEVEL

The EU is discussing two important proposals for a directive aimed at reducing acidification: the Directive on National Emission Ceilings and the Large Combustion Plants Directive. Council of the European Union took a common position on the directives, but they must still be approved by the European Parliament.

Preparation of the Directive on National Emission Ceilings has been based on a calculation model that is used to find out in which way the environmental targets set can be achieved as economically as possible. The results of the modelling showed that Finland was the only country where the measures taken, those on which decisions had been made, and those planned were sufficient. The directive is thus not likely to require any extra measures in Finland.

The purpose of the Large Combustion Plants Directive is to cut emissions from energy production. The directive sets emission limit values for both new and old plants. Even now, Pohjolan Voima's plants fulfil fairly well the requirements that, according to the Commission's proposals, would concern all old European plants after 2008.

SULFUR DIOXIDE EMISSIONS HAVE BEEN DECREASING FOR A LONG TIME

In 2000, Pohjolan Voima's sulfur dioxide emissions totalled 4 300 tonnes. This was some 10% less than in the previous year. The emissions were about half the emissions allowed by the environmental permits. The specific emissions from electricity production are now about 250 mg/kWh, while they were fivefold in 1990. Pohjolan Voima's emissions account for about 5% of the total emissions in Finland.

The investments in desulfurization plants, in particular, have reduced Pohjolan Voima's sulfur dioxide emissions. Desulfurization plants were constructed at the Tahkoluoto, Kristiina and Vaskiluoto power plants in 1993. In addition, the fluidized bed technology employed at the Seinäjoki, Veitsiluoto and Oulu power plants, and the use of wood as fuel reduced sulfur emis-

Desulfurization plants help reduce the sulfur emissions from power plants substantially.

Lichens are sensitive to changes in the quality of air.

sions. The low-sulfur coal used at the Mussalo plant and natural gas used at the Mussalo and Nokia plants also contributed to cutting sulfur emissions. The total emissions depend on the operating time of power plants, variations in coal quality and the degrees of utilization of desulfurization plants.

REDUCTION IN NITROGEN OXIDE EMISSIONS SLOWED DOWN

Pohjolan Voima's nitrogen oxide emissions totalled 6 700 tonnes. The emissions increased by a fifth over the previous year, and represented about 85% of the emissions allowed by the environmental permits. The specific emissions from electricity production have dropped from the 1990 level, 1 200 mg/kWh, to a level of 400 mg/kWh. The total emissions accounted for about 2.5% of the total emissions in Finland.

The emissions of nitrogen oxides are cut by the Low-NOx burners installed in 1994 in the boilers of all of Pohjolan Voima's coal-fired power plants, Tahkoluoto, Kristiina, Vaskiluoto and Mussalo. The combustion technology employed at other plants also helps cut nitrogen oxide emissions.

EMISSIONS AND THEIR EFFECTS ARE BEING MONITORED

The operation of environmental protection equipment and emissions from power plants are monitored in accordance with monitoring programmes validated by the authorities. Significant emissions into the air are being continuously and automatically measured, and reported to the authorities.

The spreading of acidifying emissions can be calculated with the aid of dispersion models. In recent years, Pohjolan Voima has ordered new dispersion calculations concerning the towns of Vaasa, Kotka, Pori and Kristiinankaupunki and, during the preparation of new projects, similar calculations concerning the towns of Pietarsaari, Kokkola and Kuusankoski.

In most power plant locations, Pohjolan Voima cooperates with other sources of emissions and with the municipalities concerned in monitoring air quality. Location-specific monitoring results are published in the annual reports. The sulfur dioxide and nitrogen oxide contents of ambient air have been given annual guideline values, which are based on vegetation. The contents measured in Finland are far below the guideline values. Pohjolan Voima's power plants account at most for 1% of the contents measured in agricultural and forestry areas.

The effects of emissions on nature and vegetation can be assessed by means of bio-indicator studies. The most recently completed research reports concerned the towns of Kotka and Pori. The results show that in both areas the situation has clearly improved. Owing to transboundary emissions, however, acid deposition in both areas continues to exceed the critical load and the target value set by the Government for sulfur deposition. Pohjolan Voima's power plants account at most for a few per cent of the deposition.

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TARGETS DEFINED BY THE ENVIRONMENTAL MANAGEMENT SYSTEMS

12 targets defined by the organizations in 1999, e.g.:

- Increasing the availability of the desulfurization plant (Kristiina)
- Increasing the collecting efficiency of the desulfurization plant (Kristiina)
- Optimizing the burner controls and monitoring their operation (Kristiina)
- Keeping the sulfur dioxide emissions below 140 mg/MJ (Tahkoluoto)
- Keeping the emissions at the permitted level and establishing the target level (Nokia)
- Investigating the opportunities for reducing the NOx emission level by 2001 (Mussalo)

Situation in 2000:

> The result is insufficient

> Low-sulfur coal, low emission level

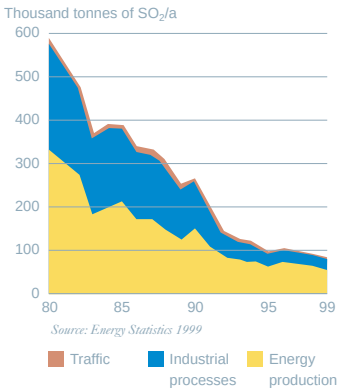
> Partly achieved

> Achieved

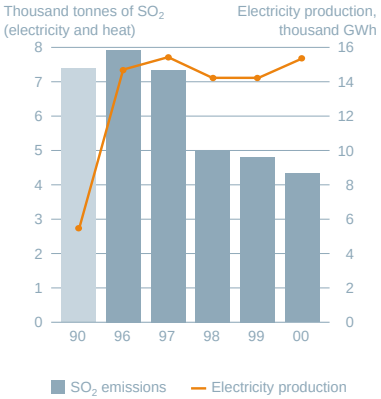
> Achieved, studies being continued

> Short time of operation, could not be done

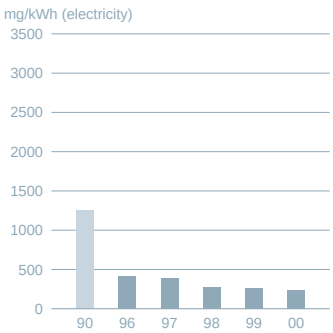
SULFUR EMISSIONS IN FINLAND



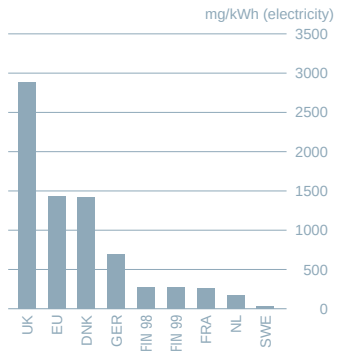
PVO'S SULFUR DIOXIDE EMISSIONS



PVO'S SPECIFIC EMISSIONS OF SULFUR DIOXIDE



SPECIFIC EMISSIONS OF SULFUR DIOXIDE IN 1998

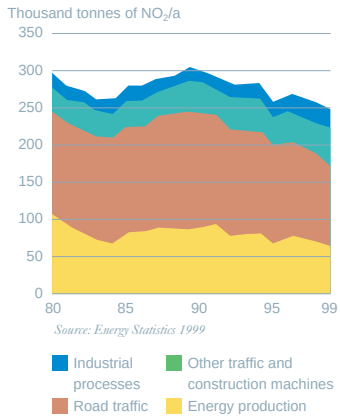


Source: Eurelectric, Eurprog 2000

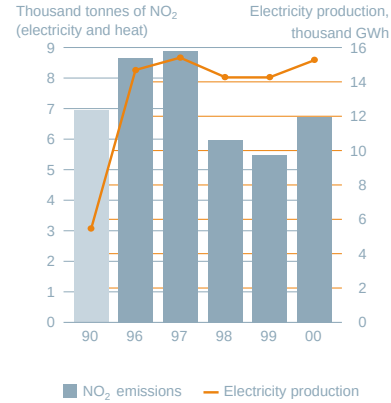
INFORMATION ON THE QUALITY OF AIR IN THE POWER PLANT LOCATIONS

- Kristiina: Annual air quality joint monitoring report; Bio-indicator study of the Suupohja area published in 2000. (in Finnish)
- Tahkoluoto: Annual air quality joint monitoring report; Bio-indicator study of the Pori-Harjavalta area and the Northern Satakunta area conducted in 1996-97. (in Finnish)
- Vaskiluoto: Annual air quality joint monitoring report; Bio-indicator study conducted in Vaasa, Mustasaari, Maalahti and Korsnäs in 1995-96. (in Finnish)
- Seinäjoki: Annual air quality joint monitoring report; Bio-indicator study of the Seinäjoki region conducted in 1995-96; Condition survey of pine trees published in 2000; Study of the heavy metals occurring in moss, to be published in 2001. (in Finnish)
- Mussalo: Annual air quality joint monitoring report; Bio-indicator monitoring of the quality of air in Kotka implemented in 1997. (in Finnish)

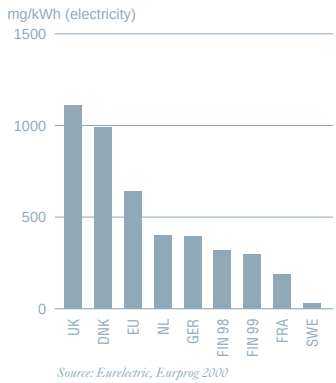
NITROGEN OXIDE EMISSIONS IN FINLAND



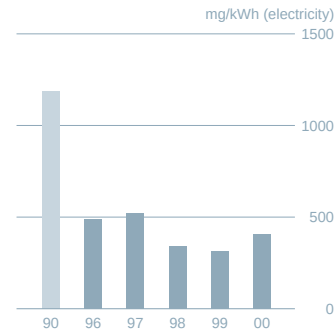
PVO'S NITROGEN OXIDE EMISSIONS



SPECIFIC EMISSIONS OF NITROGEN OXIDES IN 1998



PVO'S SPECIFIC EMISSIONS OF NITROGEN OXIDES



Oil containment booms have been installed in the cooling-water discharge channels of thermal power plants to prevent oil from spreading to the watercourse in the event of an accident.

EMISSIONS INTO WATERCOURSES AND THEIR EFFECTS

In 2000, the power plants in the Pohjolan Voima Group consumed a total of 680 million cubic metres of cooling-water. The cooling-water to be discharged into a watercourse warms some 10 °C in the condenser when it is circulated through the power plant. A total of 16 000 TJ of heat was released into the sea and 2 700 TJ of heat into inland watercourses.

In terms of the impurities passed into watercourses, the Company's own peat production is a larger emission source than the actual power plant operations.

THE GREATEST EFFECTS ON WATERCOURSES RESULT FROM HEAT RELEASES

The discharge of cooling-waters into watercourses weakens the ice, hampers movement on the ice and makes it dangerous. The ice conditions are therefore continuously monitored, and the public is alerted about thin ice.

The change in water temperature near the place of discharge of cooling-waters may also have an effect on the fish stock and fishing. The monitoring results of fish stocks show that the power plants have had no general effects on the fish stocks or catches. Compensations were paid for a fyke net area near the place of discharge at Tahkoluoto owing to the disappearance of the salmonoid. At the new power plant of Oy Alholmens Kraft Ab, the effects on fish stocks will be assessed in a separate inspection to be conducted by the environmental permit authorities.

Water analyses, studies of groundlings and analyses of the aquatic flora have revealed no changes arising from cooling-waters.

ASH BASINS CAUSE A GREATER HEAVY-METAL BURDEN THAN POWER PLANTS

The burden caused by wastewaters from the power plants is small. The burden caused by heavy metals from desulfurization plants has proved to be far smaller than anticipated, and the burden has been considerably below the limits set by permits.

Heavy metals dissolved from ash basins in seawater are probably more significant than the actual emissions from the power plants. Studies conducted at the Kristiina and Mussalo plants show that selenium, arsenic, molybdenum, vanadium and zinc burden the sea area. Their calculated dissolution in seawater is a couple of kilograms a year. On the other hand, the infiltration into seawater of cadmium and mercury, which are more harmful to aquatic organisms, is extremely small. The disposal of ash in basins separated from the sea has finished at Kristiina and will be finished at Mussalo in 2001.

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ENVIRONMENTAL MANAGEMENT SYSTEMS HAVE REDUCED THE RISK OF OIL DAMAGE

Water flows discharged from power plants are usually collected in the cooling-water channel, where the flow rate is relatively high. It is therefore possible that, in the event of an oil leak, some oil escapes with the cooling-water into the watercourse. Particular attention has been focused on the prevention of oil and chemical damage as part of the building of environmental management systems.

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INCREASING PEAT PRODUCTION ALSO INCREASES EMISSIONS INTO WATERCOURSES

Vaskiluodon Voima, of which Pohjolan Voima owns 50%, owns some 1 550 hectares of peat production areas. Nearly all of the peat is supplied to the Seinäjoki power plant. Owing to heavy rainfall, the production in 2000 was only about half the production in the previous year. The most recent emission data available are from 1999, at which time the average burden was small: 0.25 kg/ha of phosphor, 6.9 kg/ha of nitrogen, and 36.2 kg/ha of solids.

Oy Alholmens Kraft Ab will be engaged in peat production in the neighbourhood of Pietarsaari. The Company has already acquired areas for this purpose, and an environmental impact assessment procedure is underway in a production area of about 900 hectares.

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PREVENTION OF HEALTH EFFECTS

When dealing with the health effects of power plants, there has been a lively debate about the emissions of fine particles. Studies have shown a statistical correlation between the high fine-particle contents of ambient air and various health effects. Power plant operations account for an extremely small proportion of the particle contents in urban air. Responsible operations include, however, being aware of the particle emissions and reducing them, as far as possible. Other factors discussed that may have harmful health effects include heavy-metal emissions, sulfur dioxide and nitrogen oxide emissions, and electric and magnetic fields.

EMISSIONS INTO THE AIR ARE KNOWN

In 2000, Pohjolan Voima's particle emissions amounted to 372 tonnes. The amount grew by some 20% on the previous year. This was due to the increased operation of thermal power plants. However, the emissions continue to be less than a fifth of the highest permissible emissions, according to the environmental permits. The specific particle emission from electricity generation was 16 mg/kWh. Compared with 1990, the specific emissions have been reduced to a seventh thanks to, for example, more efficient electrostatic precipitators. The desulfurization plants have also contributed to cutting particle emissions.

Pohjolan Voima's sulfur dioxide and nitrogen oxide emissions and the measures taken with a view to cutting the emissions are discussed above, on pages 24 and 25.

Fuels and other substances used at power plants contain small amounts of heavy metals. A number of studies have been conducted at Pohjolan Voima's plants concerning the material flows of heavy metals, most recently at the Kristiina and Seinäjoki plants in 1998. Measurements show that ash absorbs nearly all of the metals. The emissions of heavy metals into the air and water are therefore extremely small.

ENERGY PRODUCTION ACCOUNTS FOR A SMALL PROPORTION OF IMPURITIES IN THE AIR

Emissions from power plants contribute to the impurity contents of air. The health effects of emissions can be assessed by comparing the contents present in the air with the guideline values and limit values set for the quality of air. Dispersion calculations show that the sulfur dioxide contents caused by Pohjolan Voima's separate power plants represent no more than 1 to 15% of the guideline values. Compared with the guideline values, the nitrogen oxide and particle contents are lower than the sulfur dioxide contents.

When considering the quality of air in the power plant locations as a whole, the measured sulfur dioxide contents of ambient air were far below the guideline values. The particle and nitrogen oxide contents are occasionally high. High particle contents occur particularly in spring owing to the grit on streets. On the whole, traffic plays an important role with regard to the quality of air.

ELECTRIC AND MAGNETIC FIELDS BEING ARGUED

Power lines induce electric and magnetic fields in their environment. Considerable research has been done into their potential biological effects, but the studies have provided no evidence of genetic mutations or carcinogenic effects.

Pohjolan Voima has been involved in the research carried out on this subject by the Finnish Energy Industries Federation FINERGY. Pohjolan Voima owns some 250 km of regional grids, most of which are in sparsely populated areas.

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INFORMATION ON THE EFFECTS OF POWER PLANTS ON WATERCOURSES

- Kristiina: Annual monitoring report on the power plant's effects on watercourses. (in Finnish)
- Tahkoluoto: Annual reports on the power plant's cooling-water and wastewater monitoring, and on monitoring of the fish stock management; Annual joint monitoring report on the sea area off the Kokemäenjoki River and the town of Pori; Report on the vegetation in the sea area off the power plant in 1993 and 1995; Analysis results of the bottom deposits in the sea area in 1999. (in Finnish)
- Vaskiluoto: Annual summary report on the power plant's wastewater monitoring; Annual joint monitoring report on the sea area off the town of Vaasa. (in Finnish)
- Seinäjoki: Annual monitoring report on the power plant's effects on watercourses and fish stock. (in Finnish)
- Mussalo: Annual monitoring report on the power plant's effects on watercourses. (in Finnish)

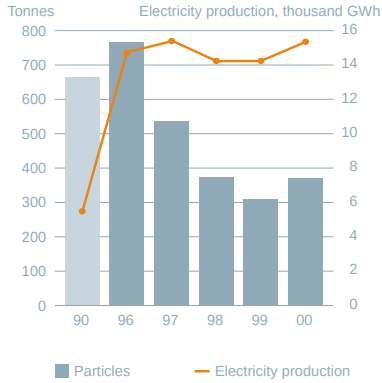
TARGETS DEFINED BY THE ENVIRONMENTAL MANAGEMENT SYSTEMS

15 targets defined by the organizations in 1999, e.g.:	**Situation in 2000:**
• Ensuring the control of oil leaks (hydropower)	> Achieved
• Drawing up a plan for the prevention of oil damage by the spring of 2000 (Vaskiluoto)	> A plan has been made
• Improving the treatment of wastewaters from the desulfurization plant (Kristiina)	> Partly achieved
• Separating the solids from flushing water of the condensate-precoat filter (Tahkoluoto)	> A plan has been made, budgeted
• Cutting the emissions of phosphor, nitrogen and solids (peat production)	> Measures taken, the rainy summer ruined achievement of the targets
• Eliminating fire and oil damage (peat production)	> Achieved

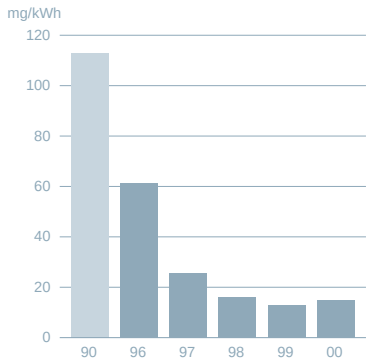
MIXING OF COOLING-WATER

The mixing of warm cooling-water is affected by a great many factors, such as seawater temperature, salinity and stratification, winds, sea currents, and freshwaters discharged into the area. Temperature measurements and model calculations show that in the sea area the cooling-water typically spreads from the place of discharge in a wedge-like form, and settles in a layer that corresponds to its density. In summer, the water drifts to the surface and spreads more widely than in deeper layers. In winter, the warm water sinks to deeper layers or to the seabed, where it drifts as a 1 to 3 metre-thick layer and gradually mixes with the surrounding mass of water. The affected area has been estimated at about 1 km^2 at most.

PVO'S PARTICLE EMISSIONS



PVO'S SPECIFIC EMISSIONS OF PARTICLES



TARGETS DEFINED BY THE ENVIRONMENTAL MANAGEMENT SYSTEMS

13 targets defined by the organizations in 1999, e.g.:	**Situation in 2000:**
• Seeking the optimum point of particulate emissions (Seinäjoki)	> Partly achieved, studies being continued
• Improving preventive maintenance of the electrostatic precipitator (Kristiina)	> Collecting efficiency has improved
• Acquiring dust-free coal (Kristiina)	> Not achieved
• Improving operation and control of the dust prevention system (Kristiina)	> Control has been improved
• Investigating the opportunity for reducing the dusting of fly ash (Tahkoluoto)	> Budgeted for 2001
• Conducting a noise survey (Vaskiluoto)	> Achieved

BY-PRODUCTS AND WASTE

Usable by-products - gypsum, fly ash and bottom ash - are produced in furnaces and air pollution control equipment at thermal power plants. Under normal conditions, the desulfurization gypsum is extremely clean, and all of the gypsum is used in the manufacture of plasterboard. Fly ash can be used in the manufacture of cement and, if the quality is good enough, also in the manufacture of concrete and as an asphalt filler. As regards their technical properties, both ash-types are very suitable for earth-work purposes, where they replace the use of natural materials.

INCOMBUSTIBLE CARBON POSES A PROBLEM

The incombustible carbon left in ash hampers the use of fly ash as a raw material for the concrete and asphalt industry. The low-NOx combustion technology, which is employed in the combustion of coal to cut nitrogen oxide emissions, greatly contributes to this effect. Methods for improving the quality of coal ash were sought. The separation techniques of incombustible carbon available on the market and their availability were investigated. Plant-specific arrangements and systems based on co-operation between the different plants were also sought. It has been decided to take this aspect into account in the acquisition of coal. Furthermore, the objective is to launch extensive joint studies to establish the importance of incombustible carbon left in fly ash used as an asphalt filler for the manufacture and properties of asphalt. The studies aim to determine whether it is possible to revise the asphalt norms in this respect. The use of ash in the asphalt industry was also promoted by a study that provided insight into the effects of the use of fly ash on the working conditions, occupational health and the environment. The study revealed no significant differences in comparison with the limestone powder commonly used as a filler.

Almost all of the heavy metals contained in coal are bound to fly ash in the combustion process. In terms of the environment, the most significant heavy metals are molybdenum, chromium, arsenic and selenium. The behaviour of metals in the different uses of ash and their migration into the environment must therefore be known. The strict environmental criteria established by state research institutes in their own studies have critically hampered the use of ash for earth works. According to these criteria, the utilization of ash is not possible at all. The problems concern molybdenum in particular.

THE ENVIRONMENTAL BURDEN OF STRUCTURES MADE OF ASH IS KNOWN

In 1999, the Finnish Energy Industries Federation FINERGY published a manual for the use of ash for earth works, which is based on the studies launched by Pohjolan Voima and other major power companies, to enhance the use of coal ash for earth works. The manual concerned the design, dimensioning and construction of structures made of ash. In 2000, the manual was supplemented by an extensive section dealing with the environmental permit. It was based on modelling work commissioned by FINERGY, which helped assess the molybdenum burden caused by a structure made of ash on the soil and groundwater under the structure. The results of the modelling work were developed into a simple nomogram tool. In accordance with the Environmental Protection Act, an essential precondition for the granting of a permit is that a project will not cause harmful health effects or other significant pollution of the environment. On the basis of the nomogram, it can be assessed that molybdenum complies with this condition.

For several years now, the objective of the Ministry of the Environment and the ash producers has been to effect a Government decree that would release the use of ash for earth works that fulfils specified conditions from the licence obligation. Until further notice, significant uses of by-products continue to be subject to licence. Indeed, the Ministry of the Environment began the preparation of a decree that would alleviate the licence obligation of industrial by-products. The large amount of ash, good technical properties with respect to earth works, extensive experience in utilization, proper instructions for use, and knowledge of the environmental properties speak in favour of including power plant ash in the decree. The use of ash for earth works instead of natural materials is in line with the principles of the Waste Act.

The suitability of fly ash from coal for covering material of a dump was investigated at the Suvilahti dump in the town of Vaasa. It was found that ash was denser the less it contained water. Water permeability calculations, together with water balance calculations, proved that sufficient density could easily be achieved with a

correctly designed structure. The calculations also showed that the ash cover does not cause any important additional burden on the environment.

Peat and coal ash were used as a filler in a joint research project aimed at finding improvement methods suitable for the surfacing of gravel roads that would increase the safe load and prevent frost heave.

Pohjolan Voima arranged an ash day for its power plant organizations, providing information from various aspects of the obstacles and opportunities to utilize by-products. During the day, a review was also given of the utilization of ash in the UK, where the use of ash has become a profitable business. Great differences were detected between the two countries with respect to legislation and the official requirement level. Pohjolan Voima aims to continue increasing the use of by-products and improve its economy.

THE DEGREE OF ASH UTILIZATION ROSE

The power plants in the Pohjolan Voima Group produced a total of some 285 000 tonnes of fly ash, bottom ash and desulfurization gypsum. Of this amount, 224 000 tonnes, or 78%, were utilized. At the end of the year, there were 26 600 tonnes of fly ash and bottom ash in an interim store waiting for utilization. Almost 35 000 tonnes of by-products were taken to dumps.

The ash was used for road construction, dump structures, and in the manufacture of cement and concrete. The desulfurization gypsum was used in the manufacture of plasterboard. Exceptionally, 4 200 tonnes of desulfurization gypsum were finally stored in disposal areas, because the quality of gypsum did not meet the requirements of the plasterboard industry. At the Kristiina plant, defective quality resulted from the exceptionally low-sulfur coal and at the Tahkoluoto plant from the quality of the coal, and the pulverization and combustion processes.

Despite the efforts to use the by-products, provision must also be made for storage in disposal areas.
An application for a permit concerning a new disposal area was prepared at the Kristiina and Seinäjoki plants. As soon as the Alholma power plant is started up, it will also need a disposal area.

Some 63.5 tonnes of hazardous waste were sent for reprocessing. A total of 430 tonnes of scrap metal and other waste that could be used accumulated at the plants. 1 300 tonnes of the filter cake produced in the desulfurization process were treated by recycling it for the process, and consequently the substances contained in it resulted in fly ash. A total of 1 170 tonnes of waste were taken to dumps.

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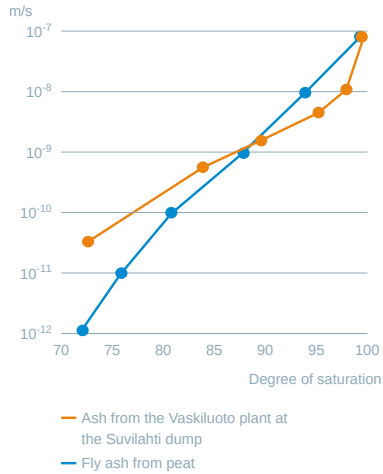
The ash produced as a by-product at thermal power plants is very suitable for earth works.

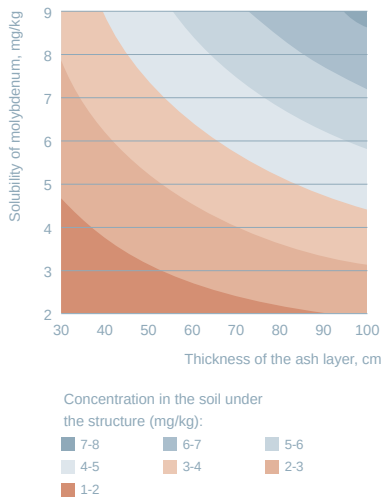
The water permeability value (known as the K value), which describes the density of a structure made of ash, is usually determined in the waterlogged state. The K value crucially depends on the degree of saturation. When used as the covering material of a dump, for example, a structure made of ash is only seldom saturated by water, and so sufficient density is easily achieved

WATER PERMEABILITY OF ASH



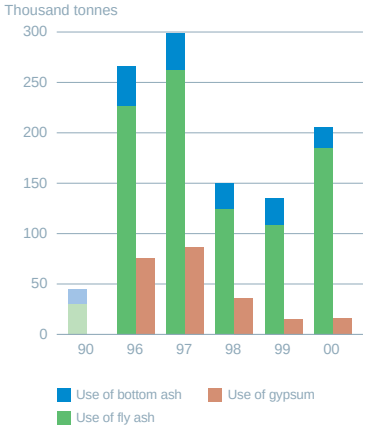
Nomograms given in FINERGY's manual for the use of ash for earth works can be used to determine the molybdenum content of the subsoil and groundwater under a structure made of ash on the basis of structural data, the solubility value of molybdenum and the properties of the subsoil under the structure. The model nomogram holds true for a gravel road under which there is a 0.5-metre clay layer. The nomogram shows the maximum molybdenum content of the clay layer during a hundred years

MOLYBDENUM BURDEN CAUSED BY A STRUCTURE MADE OF ASH

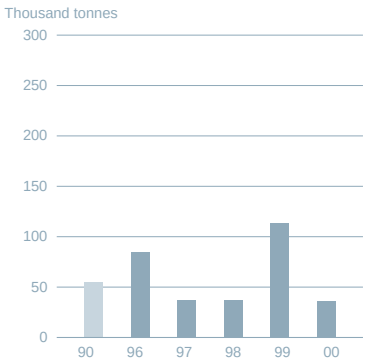


Low-NO_x combustion technology Technology specifically designed for reducing the formation of nitrogen oxides, which requires Low-NO_x burners devised for this purpose

USE OF BY-PRODUCTS



DISPOSAL OF BY-PRODUCTS



TARGETS DEFINED BY THE ENVIRONMENTAL MANAGEMENT SYSTEMS

15 targets defined in 1999 by the organizations, e.g.:	**Situation in 2000:**
• Repairing the waste collection points by 2001 (Vaskiluoto)	> Currently being finished
• Maintaining the 100% utilization of ash (Seinäjoki)	> Achieved
• Participating in R&D projects concerning the utilization of by-products and waste (Kristiina)	> Achieved
• Revising the waste instructions (Kristiina)	> Achieved
• Upgrading the management of hazardous waste (Nokia)	> Achieved
• Acquiring the ash-moistening equipment in 2001 (Mussalo)	> Budgeted for 2001

RECENT STUDIES PARTLY FINANCED BY PVO: BY-PRODUCTS

- By-products from coal and peat-fired power plants and their utilization. Milja Walsh. 1997. (in Finnish)
- Manual for the use of ash for earth works in road, street and field structures. FINERGY. 2000. (in Finnish)
- Fly ash filler in SMA (Stone Mastic Asphalt) surfacing. Finnish National Road Administration. 23/2000.
- Improvement of the quality of fly ash. Powertechnics. 2000.
- Closing of the Savilahti dump. Water balance calculation of the alternative fly ash structures. Effect of the fly ash structure on the growth in element contents of seepage waters. Envitop. 2000.
- Assessment of the migration of substances dissolved from ash. Paavo Ristola Consulting Engineers. 2000.

Fishing can be done in various ways on the Iijoki River. In addition to traditional fishing methods, fishing opportunities are also offered to tourists.

HYDROPOWER PRODUCTION

In 2000, the flow rates of rivers were considerably higher than average. On the Kemijoki and Iijoki Rivers, the beginning of the year was normal, but during the spring flood, early summer and late autumn there was plenty of water. On the Kokemäenjoki River, water was abundant in the beginning and at the end of the year. The electricity production was 21% higher than in the previous year, and only 3% lower than in the record year of 1998.

THE VOLUNTARILY AGREED INSTRUCTIONS FUNCTIONED WELL

Except for two slight deviations, the regulation and power plant operation in the water systems fulfilled the permit conditions. The upper limit of Lake Kynsijärvi, located in the headwaters of the Iijoki water system, was exceeded by five centimetres at the most, owing to the damming of the bridge downstream of the lake. In the Kokemäenjoki water system, the upper limit of Lake Pyhäjärvi was exceeded by six centimetres at the most, owing to heavy rainfall and strong wind. The regulation measures could have no effect on either of the incidents. Exceeding the limits caused no damage.

The lakes at the upper course of the Iijoki River were regulated in accordance with what are called the ecological regulation instructions. The instructions were revised on the basis of a study aimed at improving the regulation completed in 2000. The variation in the water level of the upper reservoir of the Isohaara power plant remained within the limit of 0.6 metres that was agreed on voluntarily throughout the period of recreational use. In the spring, the water level of Lake Polojärvi, located in Taivalkoski and Kuusamo, was lowered 0.8 metres below the level voluntarily agreed on, owing to the threat of flood.

The measures complying with the programmes based on the Dam Safety Act were taken. The supervising authority carried out a periodic inspection at Isohaara.

ENVIRONMENTAL MANAGEMENT WORK CONTINUED

The restoration and management of water systems continued in accordance with the currently in-force environmental management policy adopted in the 1980s. Two landscaping weirs, including the landscaping work, were completed in the drained riverbeds in the lower reaches of the Iijoki River. Up to now, 22 landscaping weirs have been completed in accordance with the programme launched in 1991. In addition, five landscaping weirs have been constructed in the regulated lakes located in the upper reaches of the Iijoki River in the 1990s. The programme for the next few years, which includes four more landscaping weirs, is being carried out jointly with the North Ostrobothnia Regional Environment Centre and the municipality of Yli-Ii. The work is completely voluntary, and the EU has granted financing for it.

Various measures relating to the clearing of shores, the building of boat harbours, drainage arrangements and landscaping were implemented in about 200 locations. Most of these measures concerned the protection of shores against erosion. Protective structures were built for a total of 18 kilometres of shores, and 19 000 cubic metres of material was used for them. The long restoration stage of environmental management will still continue until 2000, and will be followed by the maintenance stage.

The Company was also involved in the design and implementation of the environmental management programme for the Iijoki River co-ordinated by the North Ostrobothnia Regional Environment Centre. The programme rests on financing from the EU. The Company's expertise was employed in carrying out the repair work of regulation damage at Lake Pintamojärvi regulated by Koillis-Pohjan Sähkö Oy in Taivalkoski.

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PVO-VESIVOIMA OY: COMPENSATION FOR THE DAMAGE AND HARM CAUSED BY THE USE OF HYDROPOWER UP TO 2000

• Clearing and landscaping of shores *	963 km
• Protection against erosion of shores	1535 areas of real estate, 158 km
• Deepening and shaping of shores	19 locations
• Boat-moving ramps	95 pcs, 268 boat places
• Boat harbours *	for 381 areas of real estate (some of them common)
• Drainage ditches *	113 km
• Tap water *	for 443 households
• Roads *	789 areas of real estate, 89 private roads
• Landscaping weirs *	38 pcs
• Beaches	34 pcs
• Cleaning of fishing grounds	470 pcs
• Migration barriers for fish *	5 pcs
• Fish stocking (required by the authorities)	3,8 million individuals/year

*Some of them joint projects (PVO-Vesivoima Oy/ municipalities/authorities/local fishery associations)

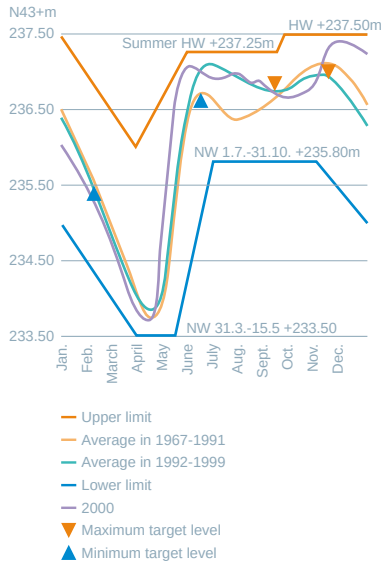
TARGETS DEFINED BY THE ENVIRONMENTAL MANAGEMENT SYSTEMS

20 targets defined in 1999 by the organizations, e.g.:	**Situation in 2000:**
• Continuing the development of maintenance	> Target for 2000 achieved
• Continuing voluntary environmental management as joint projects	> Achieved
• Continuing the fish stock management	> Voimalohi Oy's EMS system still to be completed
• Increasing the consideration of the multipurpose use of watercourses	> Regulation has been adapted
• Promoting cleanliness at the Company's own sites	> Achieved
• Developing meters for environmental performance	> Under development

RECENT STUDIES PARTLY FINANCED BY PVO: ENVIRONMENTAL EFFECTS OF HYDROPOWER

- Studies into the development of the regulation of lakes at the upper course of the Iijoki River in 1998-99. Finnish Environment Institute. 2000. (in Finnish)
- Biodiversity and restoration of harnessed watercourses in 2000-2001. Technical Research Centre of Finland (VTT). (in Finnish)
- Research programme for the development of fish stock management in harnessed watercourses in 1999-2005. Finnish Game and Fisheries Research Institute. (to be completed; in Finnish)
- Bases for the classification of regulated watercourses. Finnish Environment Institute. (to be completed; in Finnish)

WATER LEVEL OF LAKE IRNIJÄRVI IN 1967-2000



The "ecological regulation instructions" for Lakes Irnijärvi and Kostonjärvi, drawn up in 1991, were revised.

The liming of a natural food pond creates preconditions for the beginning of growth of newly-hatched fry.

PROMOTION OF FISH MANAGEMENT

Voimalohi Oy, jointly owned by PVO-Vesivoima Oy, which is Pohjolan Voima's hydropower company, and Kemijoki Oy stocked a total of 3.5 million fry in the Kemijoki and Iijoki water systems and in the sea area. PVO-Vesivoima Oy covered the cost of the stocking. The age of the stocked salmon and sea trout fry was at least two years, while the whitefish, grayling and pikeperch fry were of the age of one summer. In addition, about 25 tonnes of rainbow trout of catchable size and large-sized trout were stocked in the river areas. Some 127 000 lamprey were transferred over dams. Voimalohi Oy reared about 80% of the salmonoid and about 70% of the one-summer-old fish to be stocked in the fish farms and the natural food ponds located in the areas of the Kemijoki and Iijoki Rivers.

A GOOD YEAR FOR FISH FARMING

Voimalohi Oy was capable of implementing the fish stocking according to plan. With regard to fish farming, the past summer was good, and in terms of both quantity and quality the production was more successful than anticipated. Indeed, the stocking balances showed a surplus. Only the exceptionally high targets set for the farming of grayling were not achieved, but within the scope of Pohjolan Voima's fish stock management obligations, the proportion of grayling is relatively small.

Voimalohi Oy began the drawing up of new stocking plans for the following three-year period jointly with its shareholders. The revised monitoring programmes submitted to the relevant authority in 1999 are still awaiting official approval. Voimalohi Oy published a monitoring report concerning the Suolijärvi Lakes.

IMPROVEMENT OF THE QUALITY OF STOCKED FISH CONTINUED

In 1997-1999, the quality working-group set up by the Ministry of Agriculture and Forestry, in which Voimalohi Oy's contribution was important, studied the quality criteria for the most important species of fry. On this basis, Voimalohi Oy is involved in the condition examination of one-summer-old whitefish jointly with the Finnish Game and Fisheries Research Institute (RKTL) and other potential whitefish farmers. In 2000, the physiological condition of whitefish was studied in the Company's and RKTL's fish farms. The study that determined genetic differences of the whitefish stocks was completed at the University of Helsinki in early 2001. Voimalohi Oy is also involved in a co-operation project to investigate the effects of fish diseases on the stocked fish and nature.

NEGOTIATED SOLUTIONS FOUND TO PROPOSED CHANGES

The lifespan of many fish species is long and consequently fish stock management must also be long range. For this purpose, Voimalohi Oy published the principles of fish stock management up to 2010. They are available to local fishery associations and fishing areas for preparation of their own plans. The demands made at the mouth of the Iijoki River resulted in an agreement on the basis of which, for example, a hatchery was built for the production of newly-hatched whitefish fry. The municipality of Ii and numerous fishing industry associations jointly established a co-operative for the building and use of the hatchery. PVO-Vesivoima Oy and Voimalohi Oy supported the project by handing over equipment needed at the hatchery for the co-operative's use. In future, PVO-Vesivoima Oy will buy an agreed amount of whitefish fry from the co-operative.

The development of the stocking of sea trout is being continued by gathering tagging results up to 2003. The project is part of the development project of sea trout stocking in the northern part of the Gulf of Bothnia launched in the early 1990s. The parties involved in the project are RKTL, University of Helsinki, Employment and Economic Development Centres for Kainuu and Lapland, fishing areas, Fortum Service Oy, Kemijoki Oy, PVO-Vesivoima Oy and Voimalohi Oy.

The holders of fishing rights for the waters of Lake Kostonjärvi in Taivalkoski and the fishing area of the Iijoki water system made a proposal for changing the whitefish stocking obligation concerning Lake Kostonjärvi to a fish management fee.

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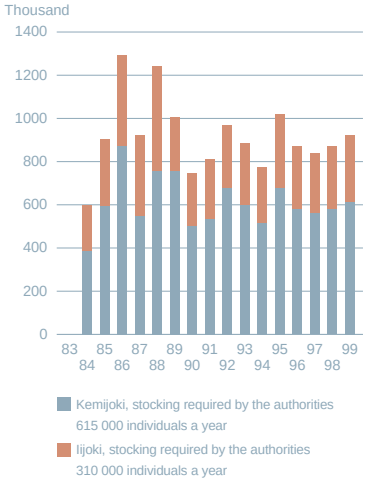
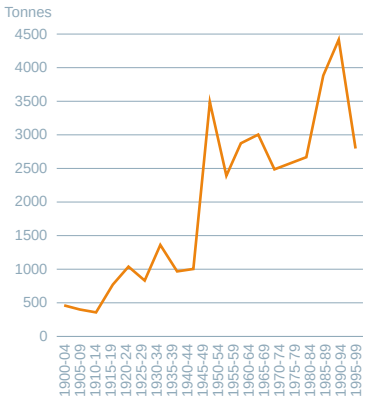
STOCKING OF SALMON IN THE SEA AREA



The stocking of salmon in the sea area based on the permits of the power plants on the Kemijoki and Iijoki Rivers. Pohjolan Voima is responsible for 100% of the stocking in the Iijoki River and for 17% in the Kemijoki River.

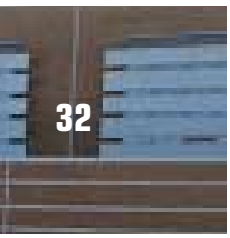
SALMON CATCHES IN THE BALTIC SEA



Salmon catches in the Baltic Sea from 1900 onwards. Salmon stocking required by the authorities in the Kemijoki and Iijoki Rivers began in 1984.

VOIMALOHI OY'S PUBLICATIONS (IN FINNISH)

- Electricity and fish / Fish management of the Kemijoki and Iijoki Rivers from 1979.
- Monitoring results of the management of fish stocks required by the authorities on the Iijoki River in 1983-1993.
- Monitoring results of the management of fish stocks required by the authorities on the Kemijoki River in 1983-1993.
- Monitoring results of the management of fish stocks required by the authorities in the estuary of the Iijoki River in 1983-1995.
- Monitoring results of the management of fish stocks required by the authorities in the estuary of the Kemijoki River in 1983-1995.
- Monitoring results of the management of fish stocks required by the authorities at lakes Kostonjärvi, Kynsijärvi, Tervajärvi and Unilampi in 1981-1996.
- Monitoring results of the management of fish stocks required by the authorities in the area of Lakes Iijärvi and Imijärvi in 1981-1996.
- Fishing and catches of fish at the mouth of the Kemijoki River in 1996 and 1997.
- Monitoring results of the management of fish stocks required by the authorities at the Suolijärvi Lakes in Posio in 1979-1998.



ENVIRONMENT AND ECONOMY

The task of environmental accounting is to combine information related to the environment with the Company's economic information. The Company's financial environmental accounting is based on the idea of the Company's social accountability. In an ideal situation, the accounting would also include the external costs incurred by the Company's operations, which are thought to be the Company's responsibility in accordance with the polluter-pays principle. The concept of external costs has gradually become common in the preparation of the EU's strategies and directives.

In 1998, FINERGY performed a comparative study of the different external cost methods. The study showed that the different methods gave results that greatly differed. The determination methods of external costs do not thus provide so far any groundwork whatever for the inclusion of external costs in internal costs in accordance with the polluter-pays principle.

THE NEED FOR COST INFORMATION IS INCREASING

In recent years, there have been increasing demands to provide information on environmental costs. Statistics Finland annually asks companies for fairly detailed information. The European Commission published in 1997 a paper on the articles of the fourth and seventh directives on financial statements, and in 1999 a separate recommendation for the recording, accounting and publishing of environmental issues in companies' financial statements and annual reports. For these reasons, there have been growing needs concerning the identification of the concepts and definition of their contents, as well as the reliability of the information provided.

In Pohjolan Voima's hydropower production, the amount of environmental costs has always been significant. They have in fact been controlled systematically for a very long time. Furthermore, the appropriateness of any operation incurring costs was analyzed as early as in the late 1980s. In 1997, Pohjolan Voima decided to begin developing environmental accounting concerning thermal power production as well. This task has proved to be far more difficult than anticipated. It is not yet possible to publish cost information covering the entire production, and neither has it been possible to integrate environmental cost information with operations control.

A SYSTEM FOR PROVIDING INFORMATION SYSTEMATICALLY

In 2000, a development project was carried out at Pohjolan Voima with a view to providing economic information on environmental issues systematically. Its results were implemented in the systems of two thermal power plants. The project defined the concept and exact contents of environmental cost from the Company's own standpoint, taking account of the definitions given by Statistics Finland, Eurostat and the European Commission. Calculating identifiers corresponding to the definition were incorporated into the financial management data system. With respect to cost control, however, the data provided by the accounting system is insufficient; in addition, separate calculations are needed to determine, for instance, the value of electricity consumed by the environmental protection equipment.

The project laid down the general outlines for the future use of cost information. With regard to the Com-

pany's performance level, it would seem useful to divide the costs into the parts of preventive and reactive operations. The former, in turn, would be divided into the part concerning the ensuring of regulatory compliance and into the part relating to improvement of the environmental protection level. The project also specified the need for separate calculations from the viewpoint that the information would build capacity for considering future operations on the basis of historical data.

Pohjolan Voima considers cost-awareness important. It is vital to provide political decision-makers, authorities and other interest groups with objective and reliable information on the condition of the environment and on the achievements and opportunities of environmental protection, so that mistaken views do not impair the scope of the Company's operations. Within the Company, cost-awareness focuses the personnel's attention on environmental issues and helps identify causal relations.

ENVIRONMENTAL COST DATA MUST BE SPECIFIED IN THERMAL POWER PRODUCTION

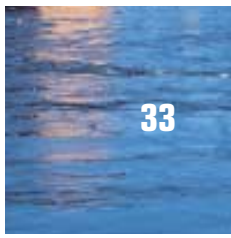
The largest environmental investments in Pohjolan Voima's history were made in 1993-1995. They included, e.g., three desulfurization plants and the Low-NOx burners of all thermal power plants. The amount of these investments totalled some EUR 91 million. In 2000, environmental investments in the existing plants were small. In the next few years, provision must be made for the construction of an ash disposal area in Kristiinankaupunki and Seinäjoki. Pohjolan Voima will cover about EUR 2 million of the costs in the first few years. After this, the disposal areas can be extended in stages as needed.

Environmental cost data were collected systematically by the new system at the Tahkoluoto and Kristiina power plants during the latter part of the year. On this basis, the environmental costs of the model plants were about EUR 1.25-1.65 per megawatt-hour produced. Desulfurization represented more than half of this. Salaries made up a third of the costs. Furthermore, environmental cost data were collected at the Mussalo power plant. No coverable environmental damage was caused at these plants or other thermal power plants, either. Environmental income came only from the sale of by-products, and the amount of income was small in comparison with the costs.

USE OF HYDROPOWER - ENVIRONMENTAL COSTS AND COMPENSATION FOR PROTECTION

The environmental costs of hydropower production were EUR 1.4 per megawatt-hour generated. Most of the costs resulted from the fish stock management obligations. The costs incurred by environmental management work were also significant. Pohjolan Voima has long been carrying out various voluntary restoration measures jointly with Regional Environment Centres and municipalities (p. 30). The co-operation parties have been financing voluntary environmental management work since 1992 amounting to EUR 3.3 million. In 2000, this work accounted for EUR 12 000 of the costs of co-operation projects.

The Supreme Court ordered the State, owing to enactment of the Rapids Protection Act, to pay damages amounting to FIM 18.5 million to Pohjolan Voima's hydropower company, in addition to the amounts paid previously. The damages consist of investments that have become useless, and research and design costs. As a separate matter, the action filed by the Company against the Finnish government was still pending. The action claims compensation for lost income from electricity sales as the Company has been unable to construct additional hydropower.



POHJOLAN VOIMA'S FINANCIAL POSITION IS GOOD

Pohjolan Voima supplies the electricity and heat it generates to its shareholders at cost price. A decrease in the turnover concurrently with an increase in the volume of production means a drop in the unit price of the end product. This is contrary to normal economic principles but proves the profitability of operations from the shareholder's viewpoint.

In 2000, Group turnover totalled EUR 508 million, which was more than 6% lower than in the previous year. The amount of energy supplied to the shareholders, including all of Teollisuuden Voima, increased by 8%.

Group liquidity remained good. Net interest-bearing liabilities went down by EUR 68.5 million and totalled EUR 705.4 million at the end of the year. There were no liabilities in foreign currencies. Because of a general rise in interest rates, however, interest expenses fell by only EUR 1.8 million, compared with the previous year.

At the end of the year, the Group had an equity-to-assets ratio of 50.7%.

The Company's good financial position has been recognized in the financial market as well. Japan Credit Rating Agency (JCR) performed its annual credit rating and gave Pohjolan Voima's long-term foreign currency loans a Double A rating, the second highest on a scale of ten.

No such obligations have been imposed on the Group owing to which it would have been necessary to set aside reserves in the accounting.

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ENVIRONMENTAL COSTS AT POHJOLAN VOIMA

Environmental costs are caused by direct functions whose primary target is to prevent, reduce or eliminate pollution and other deterioration of the environment. In addition, the compensations paid for environmental damage, municipal sewage and waste management fees, and environment-based premiums are included in environmental costs.

In accordance with the foregoing, costs incurred by a measure that benefits the environment are not considered to be environmental costs, if the principal purpose of the measure is something other than environmental protection.

EXTERNAL COSTS

Environmental costs caused to society by production for which the operator is not responsible according to legislation and which are therefore not included in the price of the product.

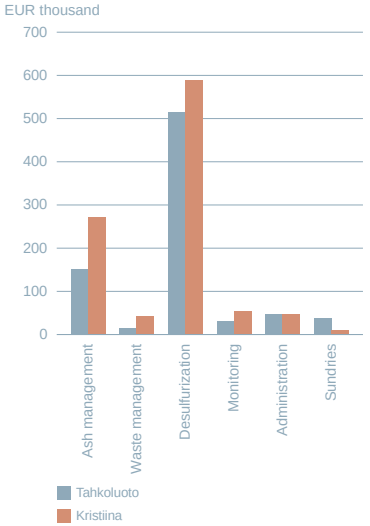
The results of the external cost studies calculated with different methods vary greatly. In FINERGY's comparative study of the different methods, the order of magnitude of the external costs of, e.g., coal electricity varied between 0.2 and 15 p/kWh, depending on the method. The differences result from the diverging values and weights given to the different environmental effects and risks. The study states in fact that the importance of the different environmental effects is basically a question of values. It is not possible to make an estimate of the external costs that, from the point of view of decision-making, would be reliable and independent of subjective assumptions, while also reasonably describe the environmental effects of different energy technologies and be based on the use of generally accepted scientific methods.

Source: External environmental costs of the alternative electricity production forms as a tool for decision-making. FINERGY 1998.

FURTHER INFORMATION

- A paper on certain articles of the fourth and seventh directives on financial statements. The European Commission. 1998.
- A recommendation for the recording, accounting and publishing of environmental issues in companies' financial statements and annual reports. The European Commission. 1999.
- Comparison of the valuation methods of environmental effects. FINERGY. 2000.
- Systematic provision and utilization of economic information on environmental issues. Master's thesis in accounting. Kirsi Mikkola. 2000.

ENVIRONMENTAL COSTS AT POHJOLAN VOIMA



The environmental costs of the Kristiina power plant in 2000 totalled EUR 1.0 million. Desulfurization represented 58% of the costs. Salaries made up 32% of the costs. Energy accounted for 13.5%.

At Tahkoluoto, the corresponding costs totalled EUR 0.8 million. Desulfurization made up as much as 64%. Salaries accounted for 37% of the costs. Energy represented 9%.

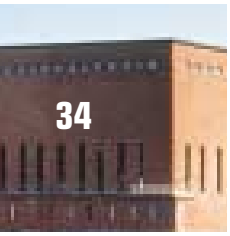
The environmental costs of the Mussalo power plant totalled some EUR 91 000, excluding salaries and energy costs.

The environmental costs of hydropower production in 2000 totalled EUR 2.8 million. Fish stock management obligations accounted for 52% of the costs, while the rest consisted of environmental management, water management obligations, dam safety control, and studies.

Low-NO_x burner Combustion technology specifically designed for reducing the formation of nitrogen oxides.

Equity-to-assets ratio

$$\frac{\text{shareholders' equity + deferred tax liabilities}}{\text{total assets - advances received}} \times 100$$



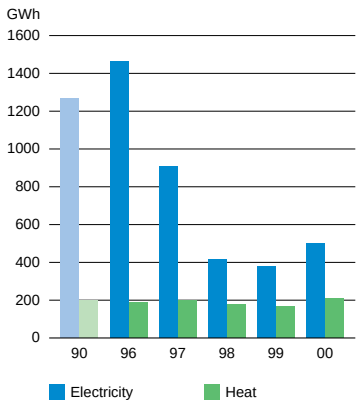
PLANT-SPECIFIC DATA

PLANT	FUEL	LOCATION	ELECTRICAL OUTPUT MW	ENVIRONMENTAL PROTECTION TECHNOLOGY	FURTHER INFORMATION
Hydropower:			(PVO's share)		jorma.autio@pvo.fi
Isohaara	water	Kemijoki	106		
Jumisko	water	Kemijoki	26		
Raasakka	water	Iijoki	58		
Maalismaa	water	Iijoki	33		
Kierikki	water	Iijoki	32		
Pahkakoski	water	Iijoki	38		
Haapakoski	water	Iijoki	28		
Melo	water	Kokemäenjoki	74		
Harjavalta	water	Kokemäenjoki	15		
Portimokoski and others	water	Tengeliönjoki	7		
Output, total	**MW**		**417**		
Electricity, total	**GWh**		**1996**		
Nuclear power:					reijo.sundell@tvo.fi
Olkiluoto	nuclear	Eurajoki	954		
Output, total	**MW**		**954**		
Electricity, total	**GWh**		**8003**		
Thermal power:					
Kristiina 2	coal	Kristiinankaupunki	247	desulfurization, low-NO_x	jari.gronvall@pvo.fi
Tahkoluoto	coal	Pori	221	desulfurization, low-NO_x	jari.gronvall@pvo.fi
Vaskiluoto	coal	Vaasa	115	desulfurization, low-NO_x	mauri.blomberg@pvo.fi
SEVO	peat, wood	Seinäjoki	63	fluidized bed combustion, fuel	mauri.blomberg@pvo.fi
Meri-Pori	coal	Pori	145	desulfurization, catalysts	arja.valli@fortum.fi
Kristiina 1	oil	Kristiinankaupunki	223		
Vaskiluoto 3	oil	Vaasa	160		
Mussalo 2	natural gas	Kotka	175	low-NO_x	heikki.tuominen@pvo.fi
Mussalo, combined cycle	natural gas	Kotka	63	low-NO_x	
Mussalo 1	coal, natural gas	Kotka	75	low-NO_x, fuel	
Nokia	natural gas	Nokia	100	low-NO_x, fuel	heikki.tuominen@pvo.fi
Veitsiluoto	wood , peat	Kemi	145	fluidized bed combustion, fuel	hannu.nurmesniemi@storaenso.com
Oulu	wood , peat	Oulu	146	fluidized bed combustion, fuel	marjaana.luttinen@storaenso.com
Kemijärvi	wood	Kemijärvi	28		antero.raassina@storaenso.com
Output, total	**MW**		**1906**		
Electricity, total	**GWh**		**5117**		
Heat, total	**GWh (entire production of the plants)**		**5522**		

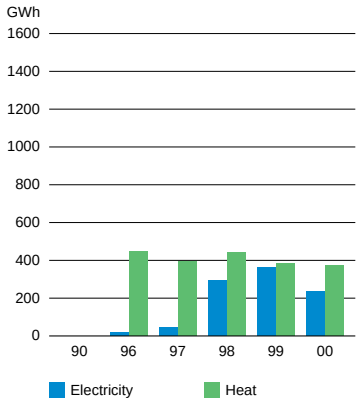
PLANT-SPECIFIC DATA

PRODUCTION

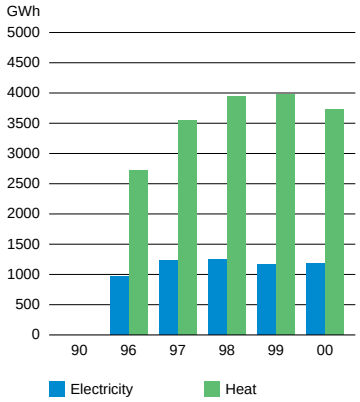
MUSSALO



NOKIA

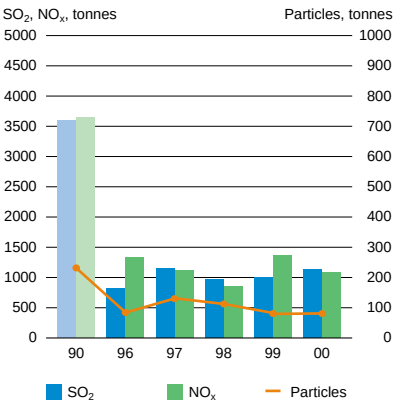


PROCESS POWER

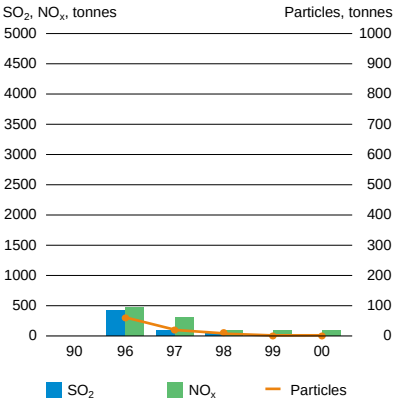


TOTAL EMISSIONS

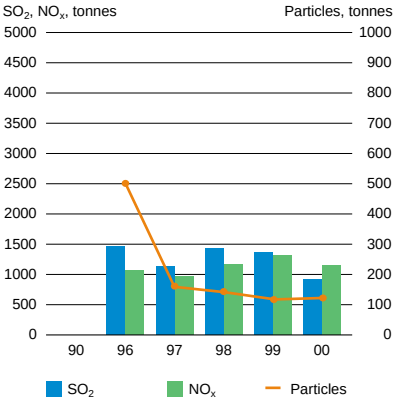
EMISSIONS FROM THE MUSSALO POWER PLANT



EMISSIONS FROM THE NOKIA POWER PLANT

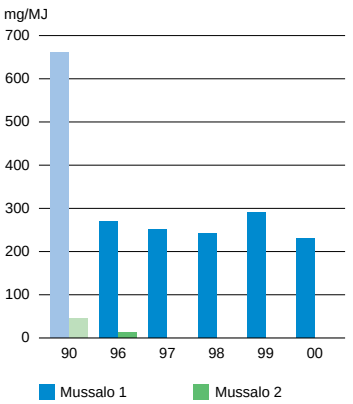


EMISSIONS FROM THE PROCESS POWER PLANTS

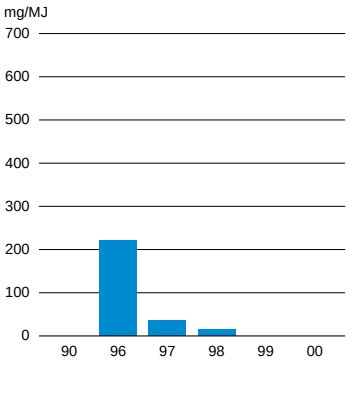


SULPHUR EMISSIONS

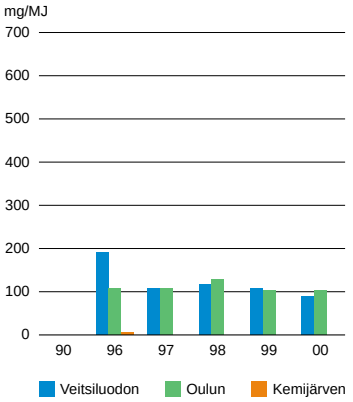
MUSSALO 1 AND 2 SPECIFIC EMISSIONS OF SULPHUR DIOXIDE



NOKIA SPECIFIC EMISSIONS OF SULPHUR DIOXIDE

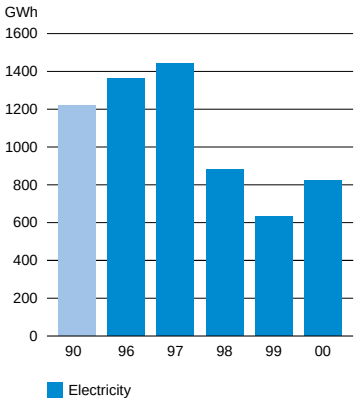


PROCESS POWER SPECIFIC EMISSIONS OF SULPHUR DIOXIDE

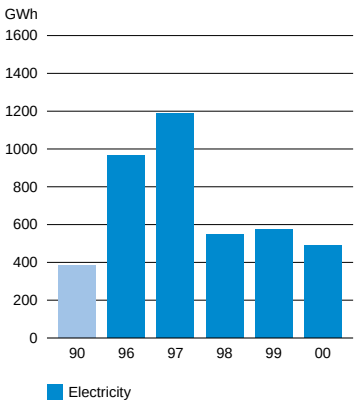


PRODUCTION

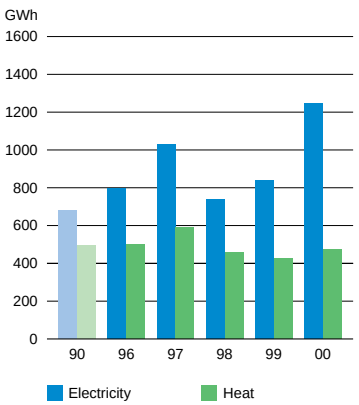
KRISTIINA



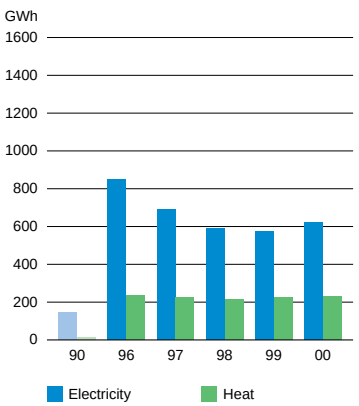
TAHKOLUOTO



VASKILUOTO

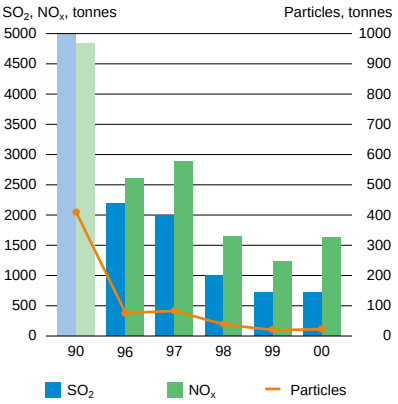


SEINÄJOKI

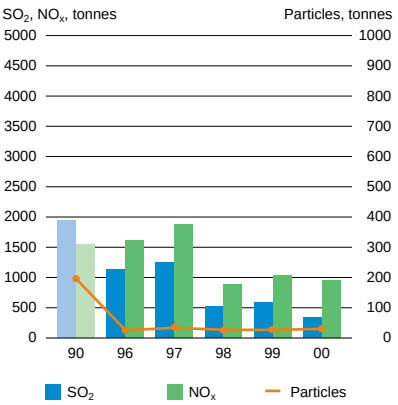


TOTAL EMISSIONS

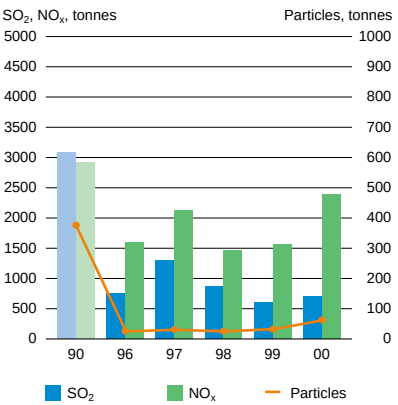
EMISSIONS FROM THE KRISTIINA POWER PLANT



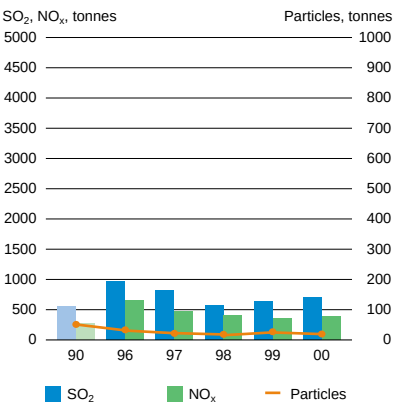
EMISSIONS FROM THE TAHKOLUOTO POWER PLANT



EMISSIONS FROM THE VASKILUOTO POWER PLANT

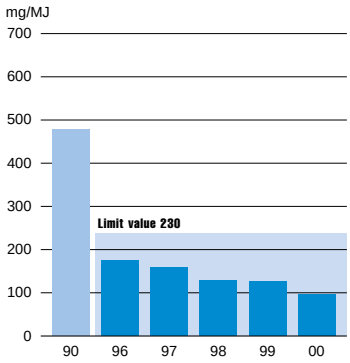


EMISSIONS FROM THE SEINÄJOKI POWER PLANT

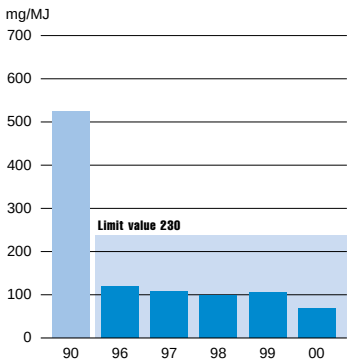


SULPHUR EMISSIONS

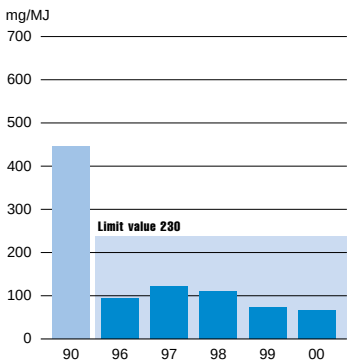
KRISTIINA SPECIFIC EMISSIONS OF SULPHUR DIOXIDE



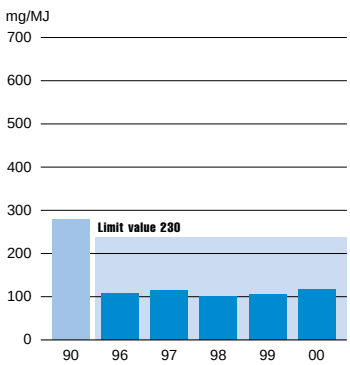
TAHKOLUOTO SPECIFIC EMISSIONS OF SULPHUR DIOXIDE



VASKILUOTO SPECIFIC EMISSIONS OF SULPHUR DIOXIDE

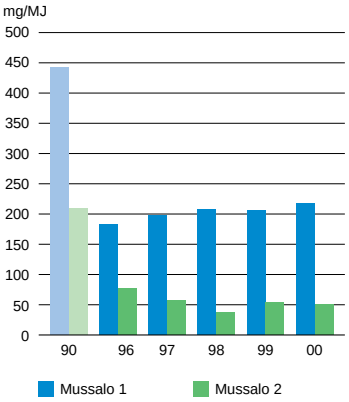


SEINÄJOKI SPECIFIC EMISSIONS OF SULPHUR DIOXIDE

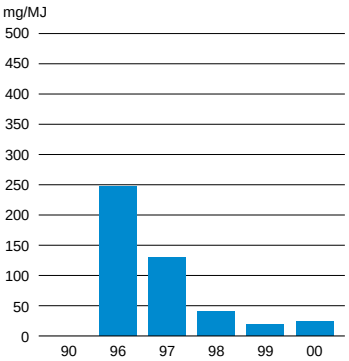


EMISSIONS OF NITROGEN OXIDES

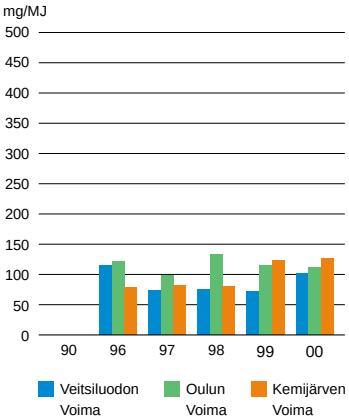
MUSSALO 1 AND 2 SPECIFIC EMISSIONS OF NITROGEN OXIDES



NOKIA SPECIFIC EMISSIONS OF NITROGEN OXIDES

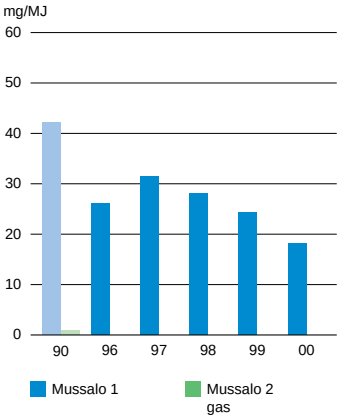


PROCESS POWER SPECIFIC EMISSIONS OF NITROGEN OXIDES

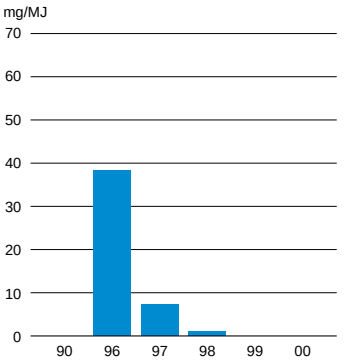


PARTICLE EMISSIONS

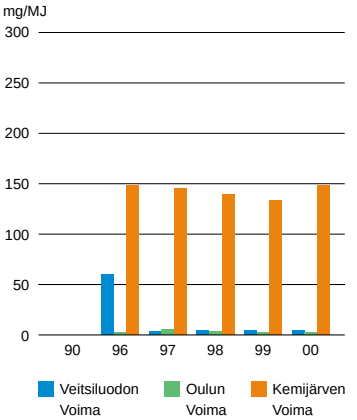
MUSSALO 1 AND 2 SPECIFIC EMISSIONS OF PARTICLES



NOKIA SPECIFIC EMISSIONS OF PARTICLES

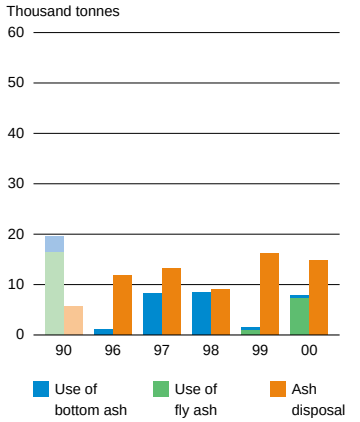


PROCESS POWER SPECIFIC EMISSIONS OF PARTICLES

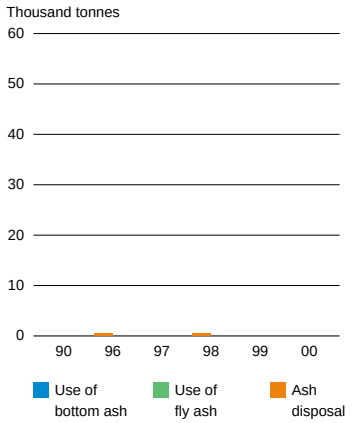


ACCUMULATION AND USE OF BY-PRODUCTS

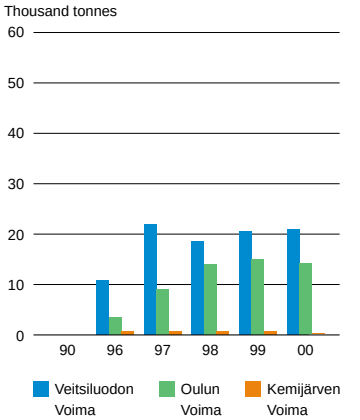
MUSSALO 1 USE AND DISPOSAL OF ASH



NOKIA USE AND DISPOSAL OF ASH

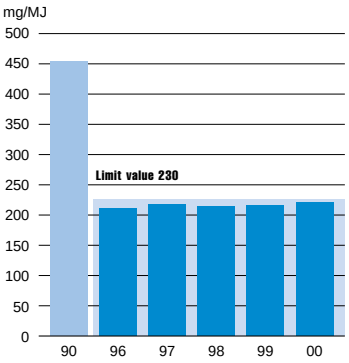


PROCESS POWER ACCUMULATION OF ASH

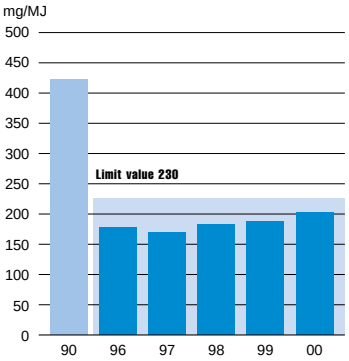


EMISSIONS OF NITROGEN OXIDES

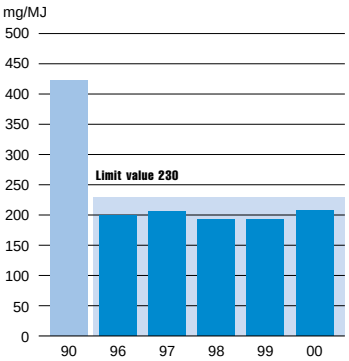
KRISTIINA SPECIFIC EMISSIONS OF NITROGEN OXIDES



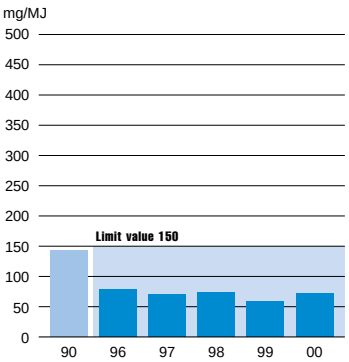
TAHKOLUOTO SPECIFIC EMISSIONS OF NITROGEN OXIDES



VASKILUOTO SPECIFIC EMISSIONS OF NITROGEN OXIDES

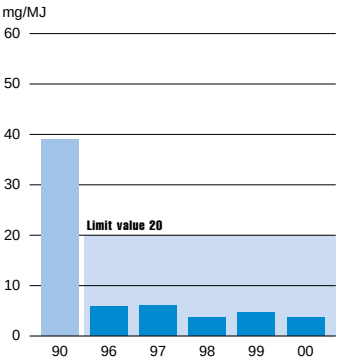


SEINÄJOKI SPECIFIC EMISSIONS OF NITROGEN OXIDES

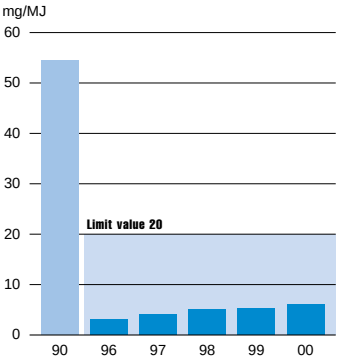


PARTICLE EMISSIONS

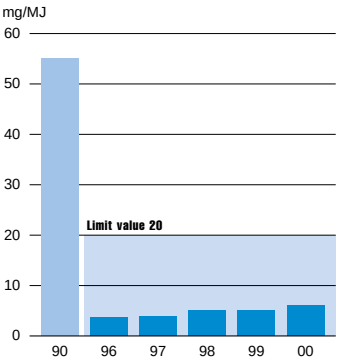
KRISTIINA SPECIFIC EMISSIONS OF PARTICLES



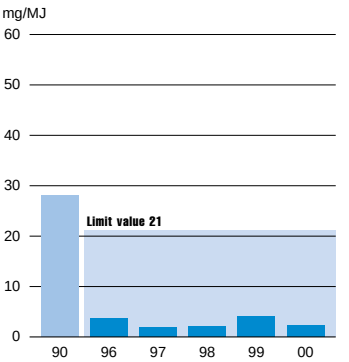
TAHKOLUOTO SPECIFIC EMISSIONS OF PARTICLES



VASKILUOTO SPECIFIC EMISSIONS OF PARTICLES

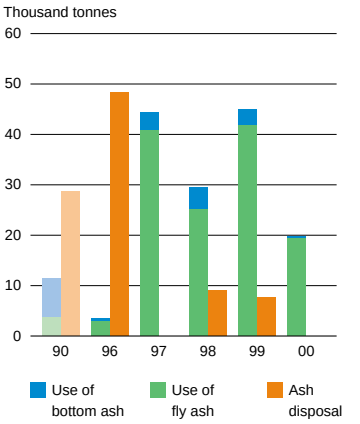


SEINÄJOKI SPECIFIC EMISSIONS OF PARTICLES

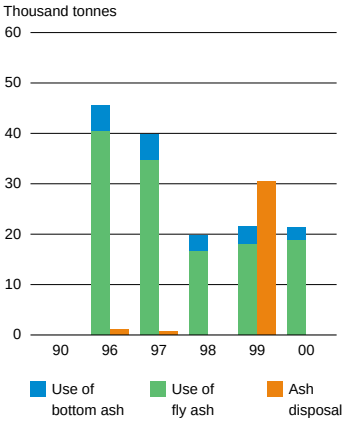


ACCUMULATION AND USE OF BY-PRODUCTS

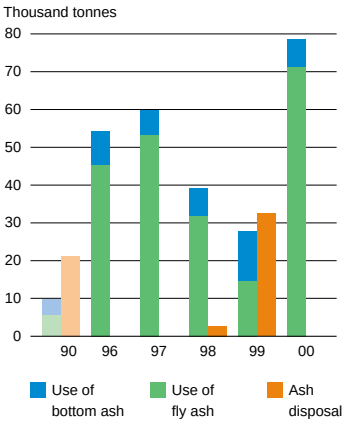
KRISTIINA USE AND DISPOSAL OF ASH



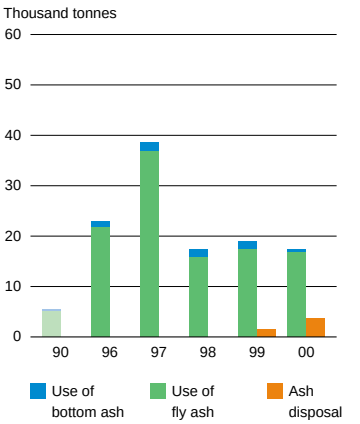
TAHKOLUOTO USE AND DISPOSAL OF ASH



VASKILUOTO USE AND DISPOSAL OF ASH



SEINÄJOKI USE AND DISPOSAL OF ASH



ADDRESSES

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The addresses of all of the Group's power plants and offices are kept up to date on Pohjolan Voima's Internet home pages (www.pohjolanvoima.fi). Information on the addresses is also available by phone from +358 9 693 061, by fax from +358 9 693 06407, and by e-mail from the address ritva.keski-nirva@pvo.fi

GRAPHIC DESIGN AND LAYOUT
Oulugrafi Design
PRINTERS
Käpylä Print, 5 / 2001
PAPER
Terreus and Galerie Art Silk
PHOTOGRAPHS
Juha Sarkkinen: p. 6
Seppo J.J. Särkkä: p. 9
Jouni Klinga: pp. 12, 21 (water photo in the composite photo), 25, 27, 30 and 31
Photo courtesy of Leila Mead/IISD: p. 22
Other photographs from Pohjolan Voima's photo archives

In the report "Society and the environment 2000", Pohjolan Voima describes its position, line of action and future outlook as a player in the energy sector in Finland. The report covers the Company's social aspect more extensively than the environmental reports published previously. The principal viewpoints include the Company's economic importance, co-operation with the interest groups and environmental aspects.

www.pohjolanvoima.fi