

A renewing Pohjolan Voima focuses on the future



Joint resources bring well-being to all

The year 2012 of Pohjolan Voima was about renewal and a large number of changes. In accordance with the strategy, we continued to develop the corporate structure, improve the efficiency of business and support functions, improve the production plants, and conduct our massive investments in carbon-free production. In this way, we can better tackle the challenges brought about by the continuously uncertain financial situation and changes in the operating environment.

The share of carbon-free electricity production exceeded 80%

Since the turn of the millennium, Pohjolan Voima has invested a total of 4 million euros in carbon-free production capacity. About 1.5 million euros of this has been directed at renewable energy sources. The share of our carbon-free production exceeded 80% in 2012.

The renovation scheme for hydropower continued through the replacement of the Pahkajoki power plant's secondary machinery in Iijoki. This improved the unit's utilisation rate and increased the production volume. The challenge for hydropower continues to be that the large volume of water during the flood season has to be routed past the units because there are no reserve basins. In Iijoki, about 20% of the water was routed past the power plants in 2012.

The thermal power bioenergy scheme continued in 2012 and the fifteenth power plant using Pohjolan Voima's bioenergy was completed in Hämeenkyrö. Vaskiluodon Voima (a partnership company of ours) in Vaasa continued the construction of the world's first power plant-size bio carburettor where a significant part of the coal used as the fuel is replaced with wood chips.

The production of the Olkiluoto nuclear power plant reached the second-best result in its history. The construction of the third reactor progressed and the design and tendering phase of the fourth reactor continued. As planned, Posiva submitted an application for a construction permit for the final disposal of nuclear fuel.

Investments enabled by the cost-price operating model

Pohjolan Voima produces and supplies electricity and heat for its shareholders at cost price. In this way, we secure the success of our customers, and our operations indirectly create jobs and well-being for society as a whole. In 2012, the share of Pohjolan Voima in the electricity produced in Finland was about 20%.

The European Commission gave notice in November 2012 that the complaint concerning the legality of the cost-price operating model (Mankala) has been processed and it did not cause any further action. This was an expected outcome because the model is part of the established legal practice in Finland. Without the model, Finland would not be so self-sufficient in electricity production because the model enables major energy investments by merging the resources of several operators.

Investments require a stable operating environment

Our far-reaching investments need to be supported by a stable, predictable operating environment. The planned windfall tax for stricter taxation on carbon-free energy production would be a short-sighted and harmful political decision. If realised, it would increase the political risk of energy investments and the funding costs to companies.

After updating the energy and climate strategy spanning to 2020, the Finnish Government will prepare the strategy spanning to 2050. The starting point for the national climate and energy strategy, to be updated in 2012, should be the fundamental elements of energy policy: securing the availability and competitive prices of energy, keeping the environmental impact as low as possible, and increasing self-sufficiency in energy production.

Finnish energy production should be enough to cover the needs during peak consumption and disruptions. Relying on imports is a major price and competitiveness risk. Finland needs more production capacity just to replace the plants which will be shut down in the next few years. Energy policy should encourage companies to implement ongoing and planned investments.

Increasing the share of wind power increases the need for balancing power. Hydropower is the best and most cost-efficient production form of balancing power. In addition, it is the only renewable form of electricity generation that can be increased without financial support from the Government. The Government should have the courage to discuss hydropower in the energy and climate strategy work spanning to 2050.

The goal of energy policy should be to ensure that production capacity is not forced to be shut down prematurely. This also applies to coal plants, which have a significant role as balancing power, and peat which is required to support bio energy now and in the future.

A renewing Pohjolan Voima focuses on the future

The renewal of Pohjolan Voima will continue according to the changes in the operating environment. Our task is to effectively produce cost-price energy for our shareholders. In 2012, we did well in this task, creating possibilities for future success in the process. I wish to warmly thank our employees, shareholders and partners.

Lauri Virkkunen

CEO, Pohjolan Voima Oy

Our electricity generation made up 20 % of the Finnish production



Production year

Pohjolan Voima produces electricity and heat for its shareholders on an at-cost basis. In 2012, Pohjolan Voima produced 14.00 TWh* of electricity and 6.7 TWh of heat. Pohjolan Voima produced 20.6% of all Finnish electricity output in 2012.

At the end of 2012, Pohjolan Voima's electricity production capacity totalled 3,514 MW. The operational heat production capacity was 2,070 MW.

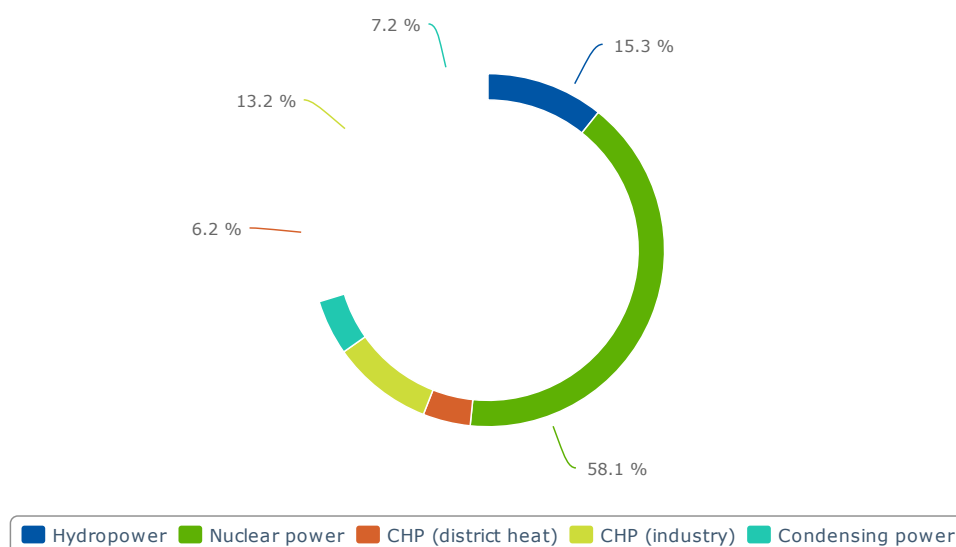
Pohjolan Voima's hydropower production achieved nearly record figures. The above-average water levels of 2012 reduced the need for condensing power capacity compared to the previous year. District heating and process steam production volumes saw a slight increase from the previous year, reaching 6.7 TWh. The electricity output of combined heat and power plants remained slightly below that of the previous year. Nuclear power production, however, reached the second-best result in its history.

In 2012, total electricity consumption in Finland was 85.2 TWh. Industrial consumption decreased by 4%, but increased consumption in other sectors resulted in a 1.1% increase in total consumption. Finnish electricity production totalled 67.7 TWh, while net imports into Finland amounted to 17.4 TWh.

**Under Production year, the volumes of electricity and heat supply are reported in accordance with Pohjolan Voima's shares in power plants, for which reason they differ from the Group figures given in the Financial Statements.*

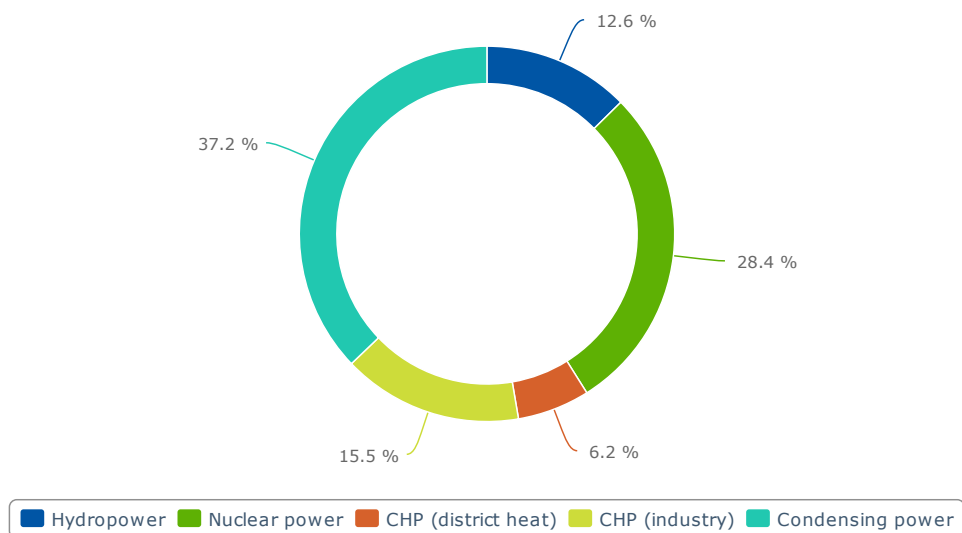
Electricity production 2012, 14.0 TWh

The share of Pohjolan Voima's electricity generation of the total electricity generation in Finland was approximately 20% in 2012.

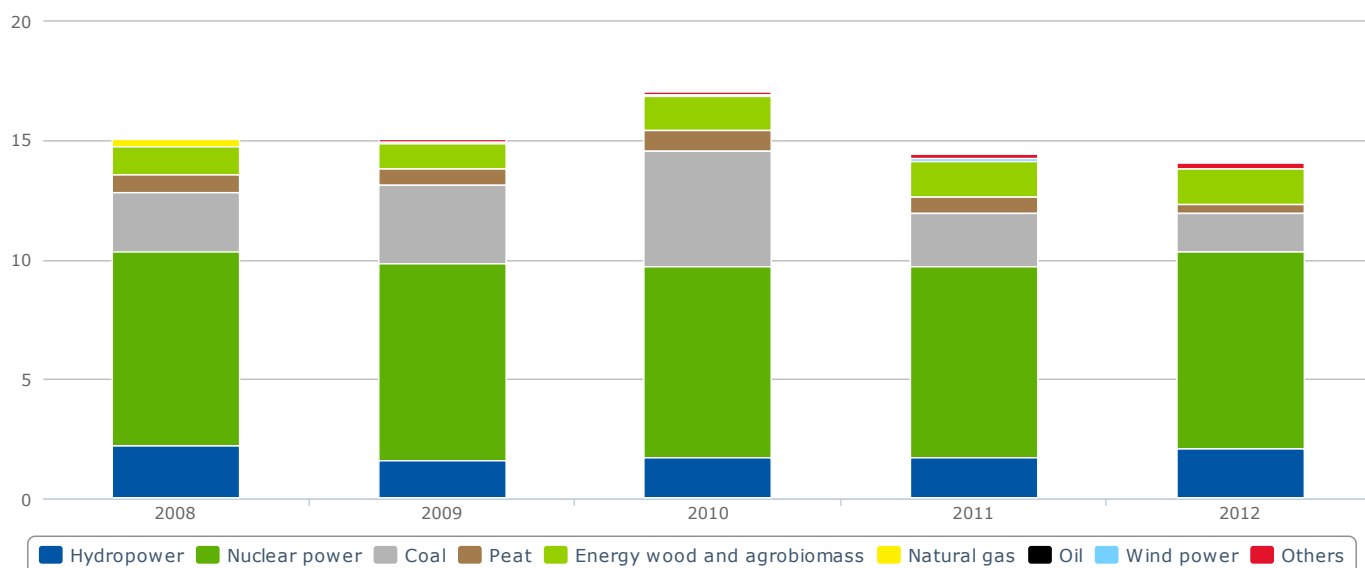


Electricity production capacity on 31 Dec 2012, total 3514 MW

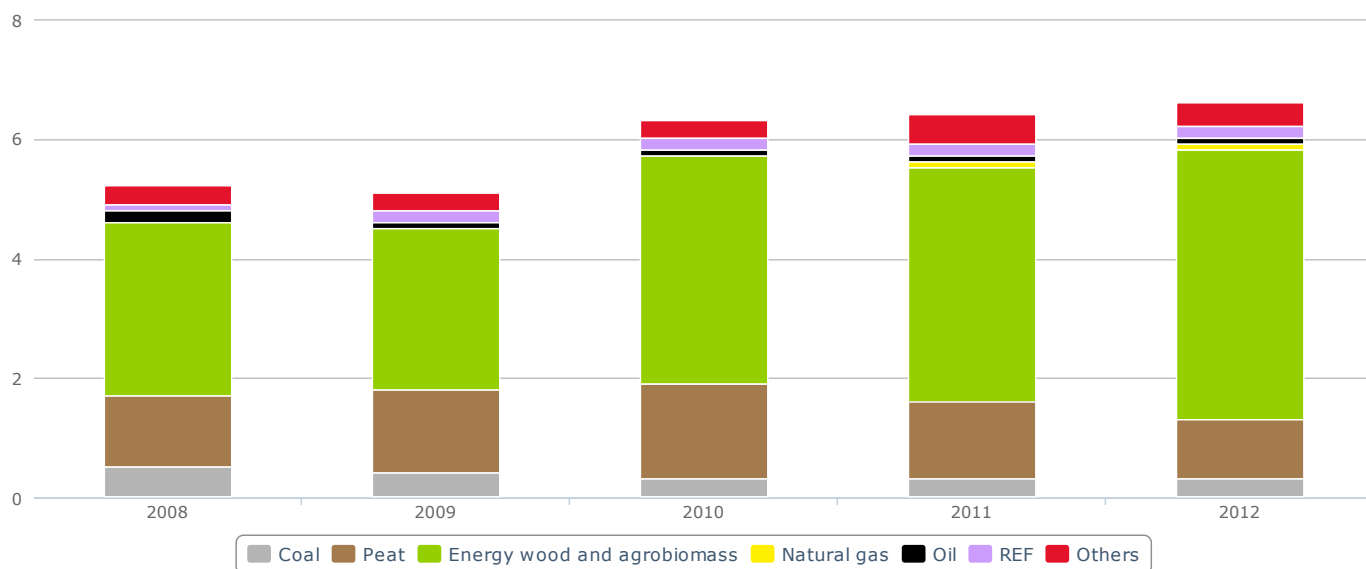
The share of Pohjolan Voima's electricity production capacity of the total electricity generation capacity in Finland was approximately 20% in 2012.



Electricity production by energy source 2008 - 2012, TWh



Heat production by energy source 2008 - 2012, TWh



Excellent year for hydropower production

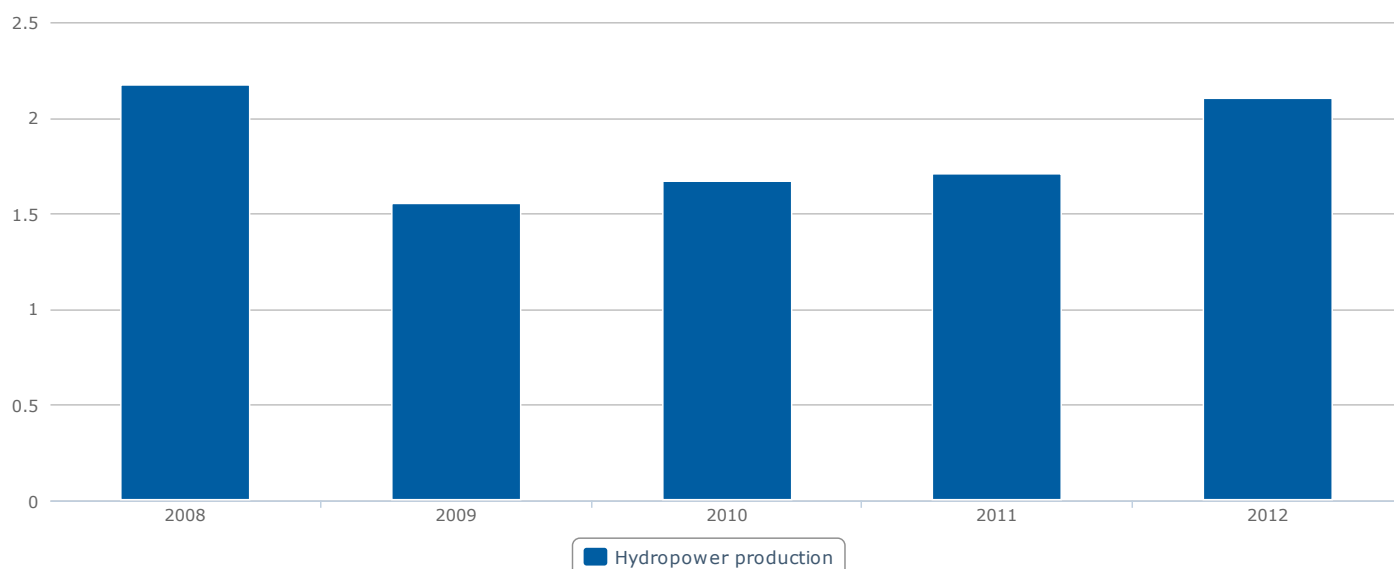
Pohjolan Voima has a total of 12 hydropower plants located on the Iijoki, Kemijoki, Kokemäenjoki and Tengeliönjoki rivers. The combined electricity generation capacity of the plants is 509 MW, of which Pohjolan Voima's share is 444 MW. This is equal to 14% of the Finnish hydropower capacity.

Exceptional hydrological conditions prevailed in Finland in 2012. Rainfall was above average, and floods occurred in many parts of the country. Some hydropower plants had to open flood gates to let excess water through. Pohjolan Voima's Iijoki power plants also had to resort to the use of flood gates. The improved water levels contributed to the increase in hydropower volumes, and Pohjolan Voima's hydropower production reached nearly record levels at 2.1 TWh in 2012.

► [Read more about hydropower and the environment in 2012](#)

► [Read more about investments in hydropower](#)

Hydropower electricity production 2008 - 2012, TWh



Thermal power production in 2012

The total electricity generation capacity of Pohjolan Voima's thermal power plants is 3,514 MW. In addition to electricity, combined heat and power plants produce district heat and process steam for local industry and communities.

The total electrical output of Pohjolan Voima's thermal power plants was 3.7 TWh. The output was 21% lower than in the previous year. Combined heat and power production plants generated 2.7 TWh of electricity. The total volume of electricity produced in condensing power plants decreased to 1.0 TWh in 2012. The reduction in the production output of condensing power resulted from the good water levels in the Nordic Countries and industry's decreased demand for electricity.

Heat output slightly increased from the previous year, being 6.7 TWh in 2012.

Less coal used

The mild winter and the lower industrial consumption reduced the use of coal as a fuel. In 2012, the volume of coal used was 25% lower than in the previous year. The use of biofuels for the generation of heat and electricity continued to grow steadily and was 0.5 TWh higher than in the previous year, while the use of refuse-derived fuels (REF) remained at the previous year's level. Peat consumption was down 38% from the previous year. Peat is used as an auxiliary fuel in several bioenergy plants. The rainy summer resulted in exceptionally low peat reserves. In 2012, the thermal power plants consumed 4.2 TWh of coal, 7.9 TWh of biofuels, 2.0 TWh of peat, 0.4 TWh of refuse-derived fuels, 0.2 TWh of natural gas and 0.2 TWh of oil in 2011.

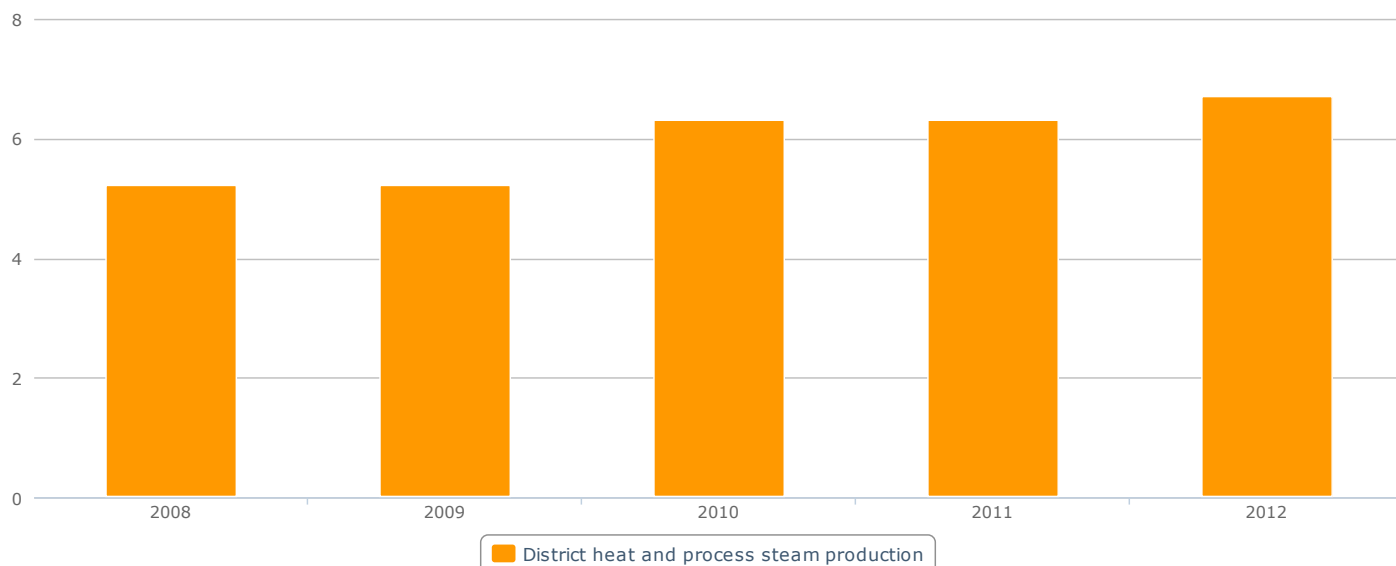
Reserve power plants

Pohjolan Voima's oil-fired condensing power plants in Kristiinankaupunki and Vaasa are included in the peaking power plant system based on the Power Reserve Act. The plants are kept at 12-hour starting readiness during the winter season from December to February. The combined electricity generation capacity of the two plants is 370 MW.

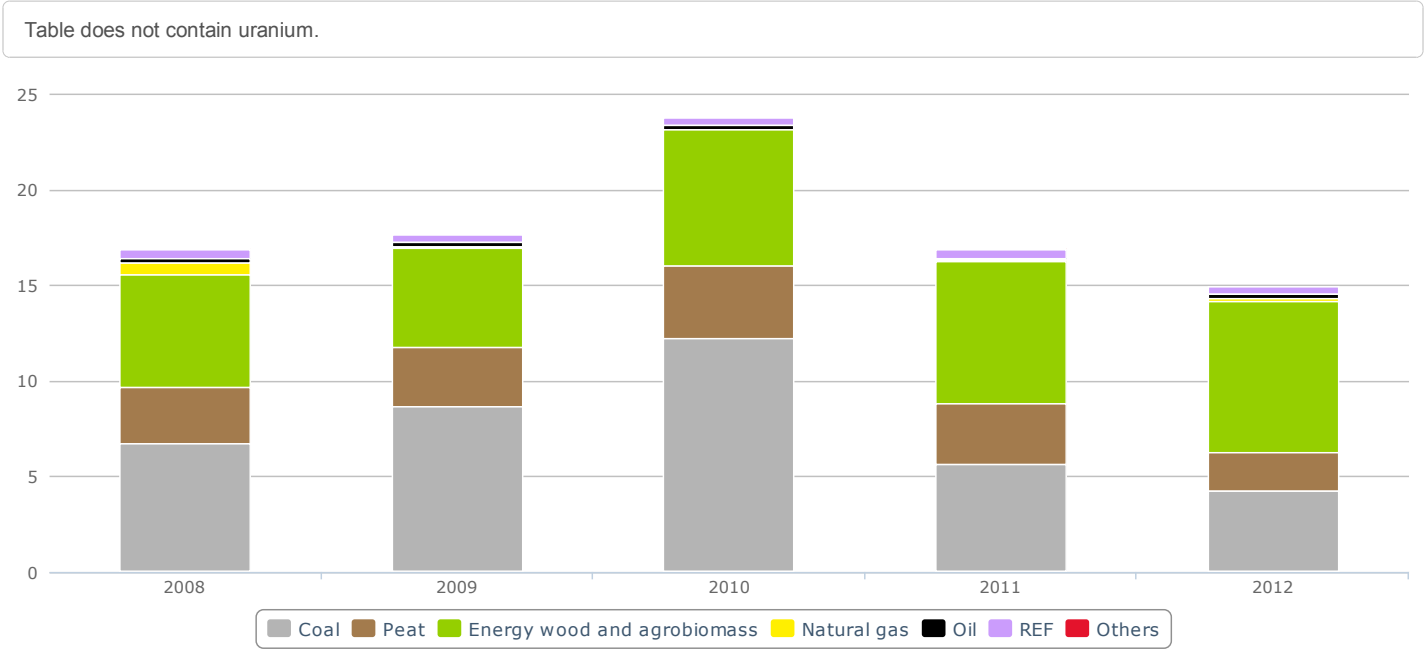
► [Read more about thermal power and the environment in 2012](#)

► [Read more about investments in bioenergy](#)

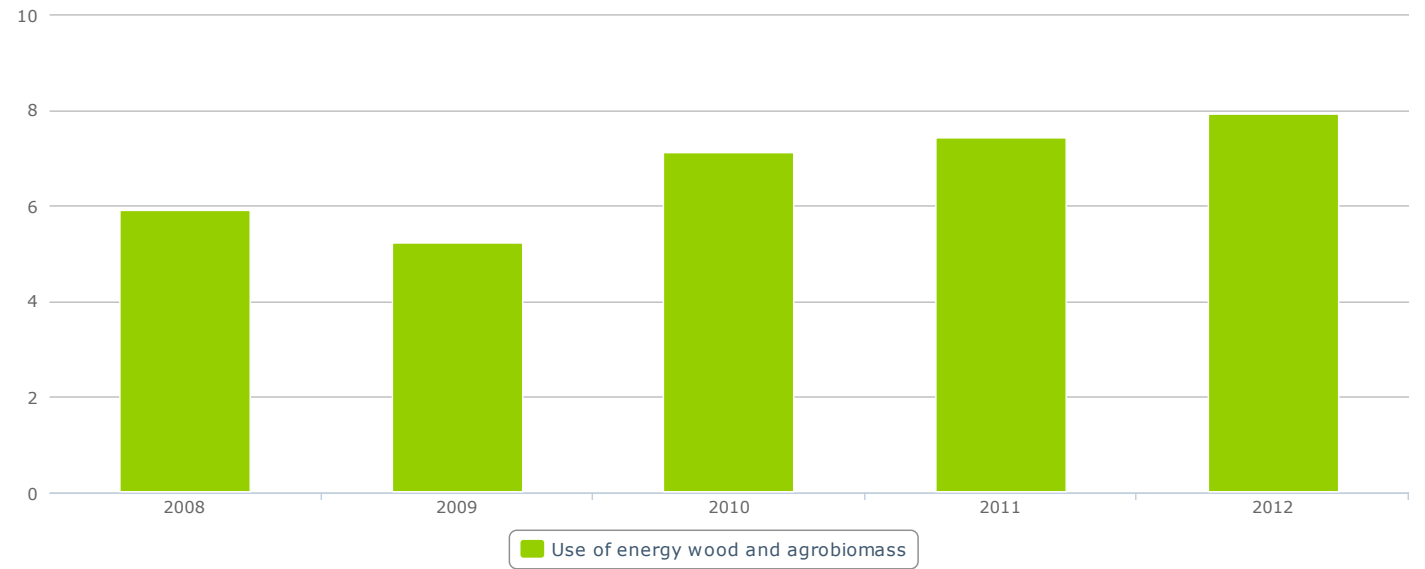
District heat and process steam production 2008 - 2012, TWh



Fuels in electricity and heat production 2008 - 2012, TWh



Use of energy wood and agrobiomass 2008 - 2012, TWh



Record production at Olkiluoto 2

Teollisuuden Voima Oyj (TVO), a joint venture partially owned by Pohjolan Voima, has a nuclear power plant located in Olkiluoto, Eurajoki. The combined output of the nuclear power plant's two plant units is 1,760 MW. Pohjolan Voima has a 58.5% stake in TVO.

In 2012, the Olkiluoto nuclear power plant generated 14.4 TWh of electricity. Pohjolan Voima's share of the production amounted to 8.2 TWh. The capacity factor of the plant units was above average, at 93.7%. The capacity factor of the Olkiluoto 1 plant unit was 90.4 per cent, while Olkiluoto 2 reached 96.9%. The production output of Olkiluoto 1 was affected by a generator failure that occurred in the spring and resulted in the annual outage beginning earlier than planned. Olkiluoto 2 achieved the best production output in its history, 7.48 TWh. The record output was a result of uninterrupted operation, short annual outage and improvements implemented in the extensive outage of 2011.

[Read more at www.tvo.fi](http://www.tvo.fi).



We join
resources and
excellent
competences

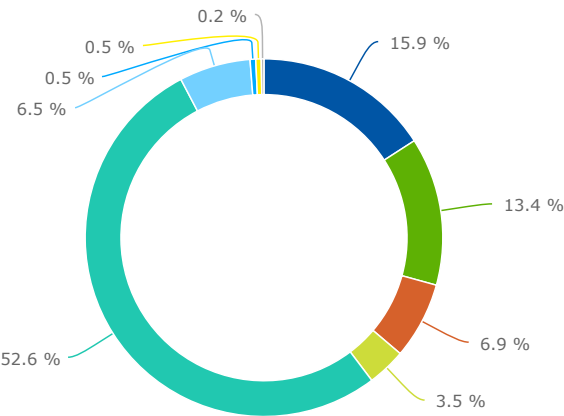
Personnel

Pohjolan Voima has solid expertise and competence in the energy field.

The personnel are committed to their work and the company. Pohjolan Voima offers good opportunities for competence development.

Number of personnel by Group companies on 31 Dec 2012

Personnel in permanent employment, total 403



- Pohjolan Voima Oy 64
- PVO-Vesivoima Oy 54
- PVO-Pool Oy 28
- Powest Oy 14
- Proma-Palvelut Oy 212
- Laanilan Voima Oy 26
- Kymin Voima Oy 2
- Kaukaan Voima Oy 2
- PVO-Alueverkot Oy

Active participation in the changes

2012 was a year of major changes for Pohjolan Voima. The development of business and support operations based on the strategy of the Group and of individual companies had an impact on the personnel. The personnel already prepared for the changes in 2011.

The new support operation model

Pohjolan Voima's business support functions adopted a new organisation, administrative and steering model on 1 October 2012. The new operational model aims to guarantee improved support for business operations, better quality of services and higher cost-efficiency.

Support functions were centralised, resulting in a transfer of most of Powest Oy's financial administration staff into the service of the parent company on 1 January 2013, and the outsourcing of the payroll administration and some financial administration duties. As of 1 January 2013, Powest has no personnel.

Maintenance services from Proma-Palvelut to production companies

The reorganisation of Proma-Palvelut Oy aims at more efficient operations, lower costs and improved competitiveness of the power plants. The services previously provided by Proma-Palvelut were handed over to PVO-Lämpövoima Oy and Vaskiluodon Voima Oy by a transfer of a business. The personnel within the scope of the transfer moved to PVO-Lämpövoima (73 employees) or Vaskiluodon Voima (91 employees) with continuing employment contracts. Some of the power plant personnel went over to service producers in connection with the outsourcing of coal processing, cleaning and field maintenance services. The number of personnel was also reduced by pension arrangements and termination of employment contracts. As of 30 June 2013, Proma-Palvelut has no personnel.

Maintenance partnership model for PVO-Vesivoima

PVO-Vesivoima Oy is developing the efficiency of its own operations in order to increase its customers' competitive advantage. PVO-Vesivoima made a decision on a maintenance partnership model with approximately 25 employees going over to the service provider with continuing employment contracts. An adequate number of personnel remain in Vesivoima's organisation to manage maintenance operations together with the new partner. In addition to the outsourcing, the number of personnel has been reduced with pension arrangements. After the personnel cuts, approximately 15 employees are estimated to remain with the company. The new operational model will be adopted in autumn 2013.

Changes discussed in cooperation procedures

Three cooperation negotiations were conducted in 2012, related to the impact of Pohjolan Voima's reorganisation on the personnel. The negotiations aimed at a solution that would require as few personnel reductions as possible, and allow the use of soft measures with the support of the employer.

Critical competencies were assessed when developing new operating methods and processes. Key tasks and positions were defined during the reorganisation, and development plans prepared.

The Group meeting, a joint forum for Group representatives, convened twice during the year.

The average number of training days per staff member was two.

Occupational well-being measures focused on change management

Pohjolan Voima's occupational well-being plan is based on Group strategy, legislation and the personnel's needs and wishes. The plan covers the perspectives of management, competence, working community and health.

Change management for improved well-being

In 2012, occupational well-being measures focused on supporting the personnel during the changes. The personnel were provided with information on the changes and on the way it may be experienced, as well as tools to deal with the new situation.

Occupational safety at a good level

The companies within the Group adopted a unified model for preparing occupational safety programmes. Two accidents leading to absences occurred in 2012. According to a personnel survey, the employees believe that the employer manages occupational safety well.

Key personnel figures 2012

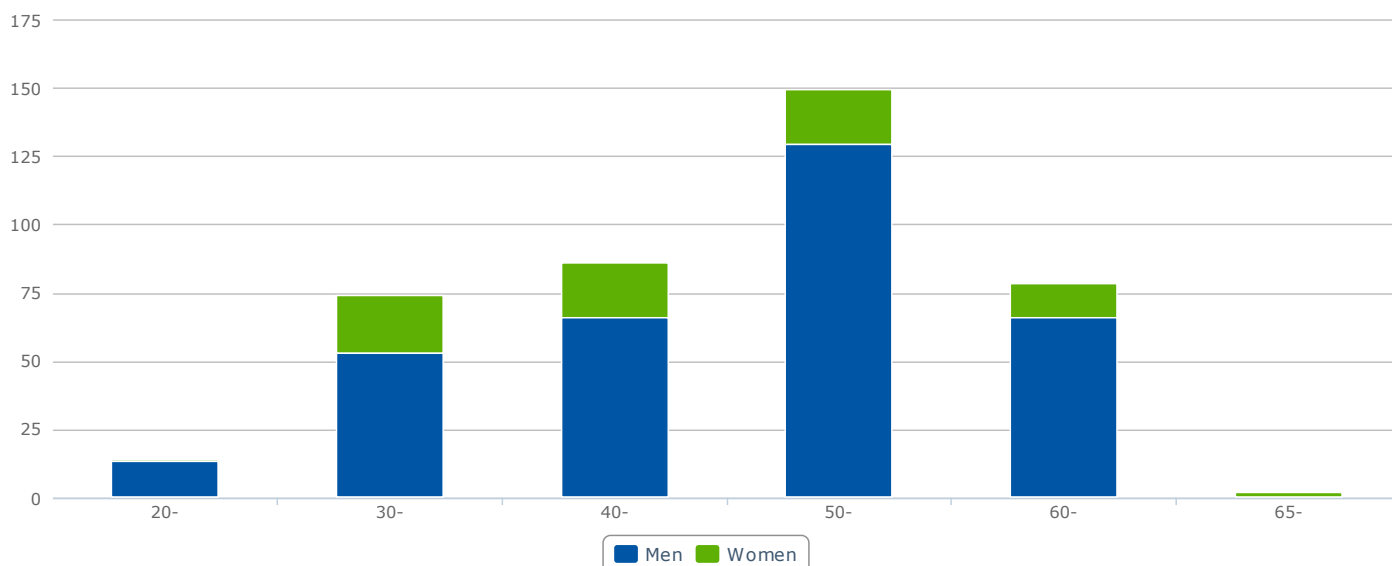
At the end of 2012, the number of personnel in the company was 418. Of these, 15 people, or 3.6%, had fixed-term contracts. The number of personnel reduced by nearly 10% compared to the previous year. Of the permanent staff, 18.9% were women in 2012, while the share of women in 2011 was 20.1%.

The prevailing working time arrangement is full-time work. The proportion of the entire personnel who are part-time workers was 7.9%. Part-time work is usually chosen by the employees on their own initiative, and it is often related to parental leave or partial retirement. The total number of summer employees on fixed-term contracts in 2012 was 33 (79 in 2011).

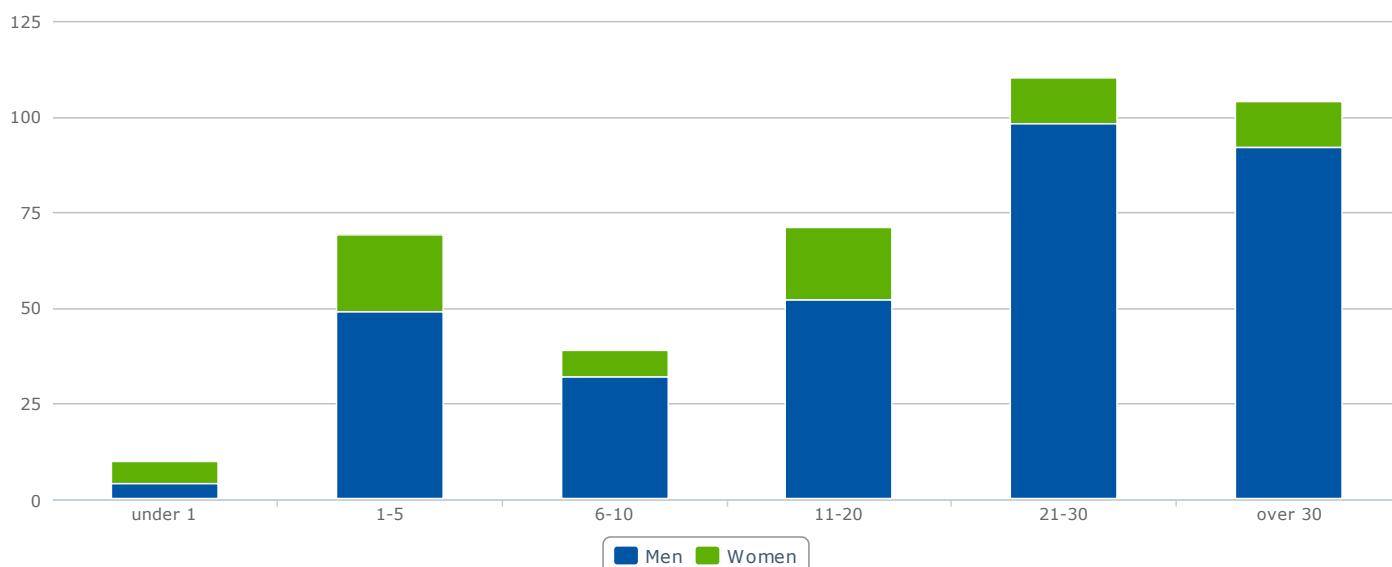
The average age of personnel in permanent employment increased slightly and was 49.3 years (49.1 years in 2011). The share of those over 50 in permanent employment was 229 people, or 56.8%.

A total of 19 employees were granted old-age pensions. The number of permanent employment contracts terminated for other reasons was 35. The number of new permanent contracts was 10. Personnel turnover in 2012 was 7.9%, while the figure in 2011 was 5.7%.

Age distribution of personnel on 31 Dec 2012, in permanent employment



Years of employment on 31 Dec 2012, in permanent employment



The share of carbon-free generation was over 80%



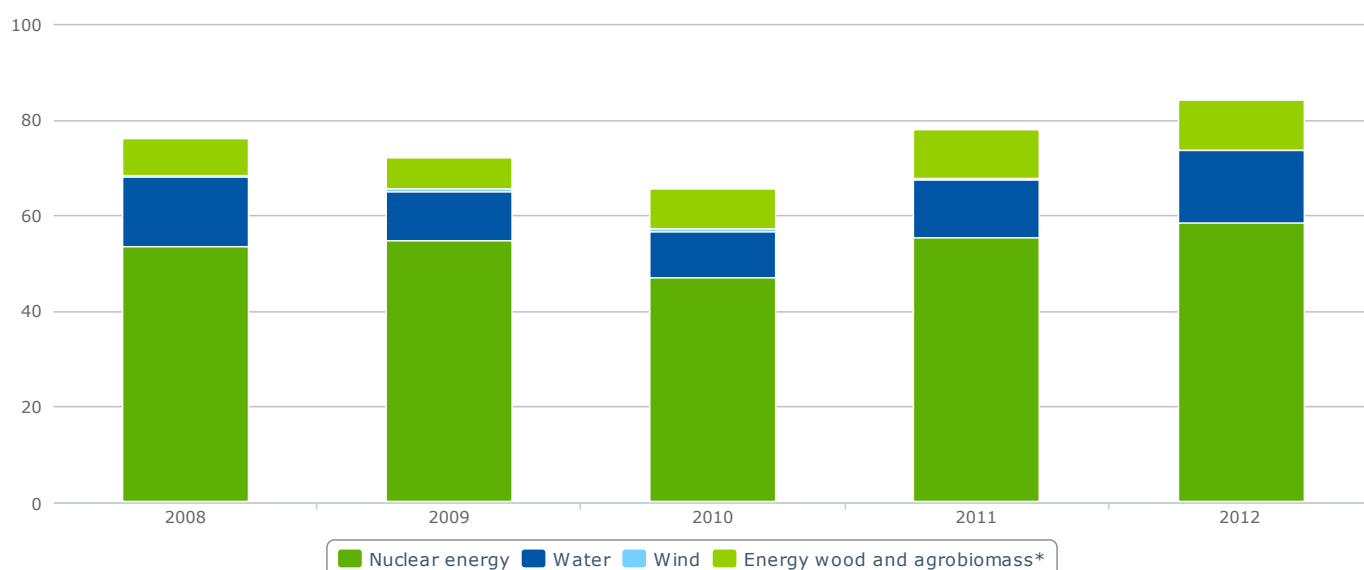
Environment

A basic requirement for persistent and long-term energy production is maintaining a safe, healthy and diverse environment.

Certified environmental management systems according to the ISO 14001 standard are in use in the majority of Pohjolan Voima's production companies, which helps to ensure the achievement of environmental objectives and the continuous improvement of operations.

Carbon-free energy sources in electricity production 2008 - 2012, %

*Energy wood and agrobiomass are carbondioxide-emission neutral

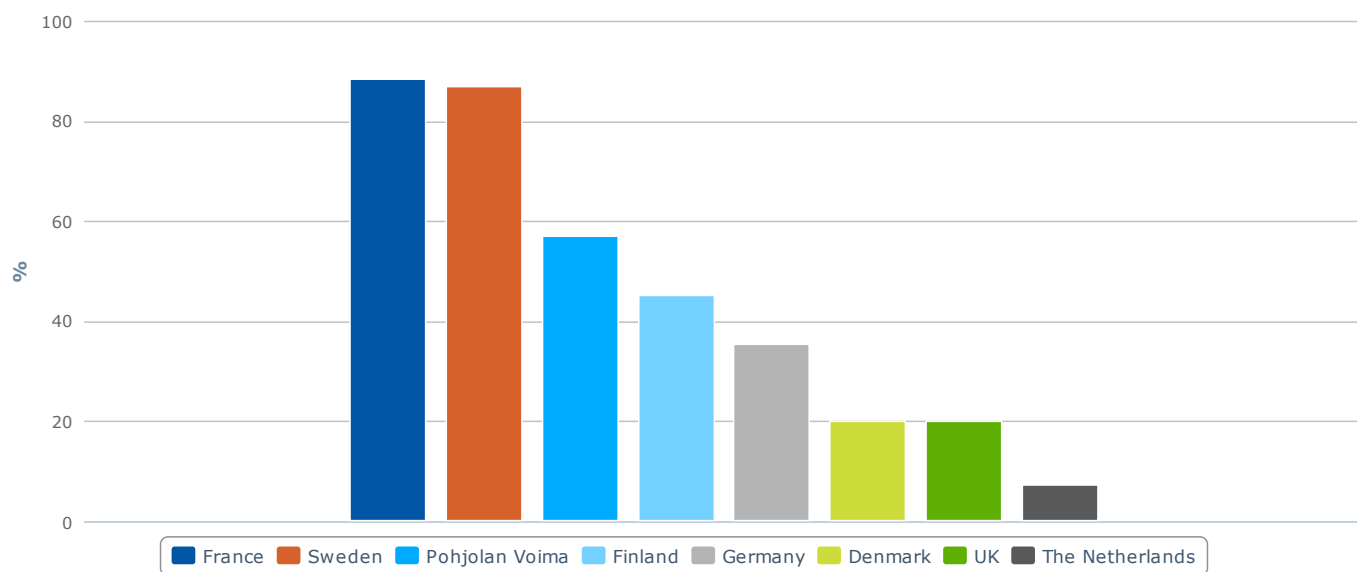


In 2012, the share of carbon-free energy sources in Pohjolan Voima's electricity production continued to increase and amounted to 84 per cent. Electricity production forms in Pohjolan Voima's portfolio that are considered to be carbon-free are hydropower, nuclear power and the electricity generated with carbon-neutral wood fuel and field biomass in thermal power plants.

The share of electricity produced by hydropower and nuclear power particularly increased compared to the previous year. There was a slight increase in the share of wood and field biomass-based electricity as well. The decreased use of fossil fuels also helps increase the share of carbon-free energy sources.

Share of emission-free electricity production of total electricity production in 2010

Emission free electricity production: hydropower, wind power, nuclear power
Source: Eurelectric, Power Statistics and Trends 2012



Hydropower and the environment

Successful fish stock management

Hydropower production has regional and local impacts on waterways and fish stocks. In order to fulfill its obligation to sustain the fish stocks of the Kemijoki and Iijoki waterways and the sea area, PVO-Vesivoima Oy stocked around 2.9 million fry in 2012. Together with Kemijoki Oy, 4.9 million fry were stocked in the Kemijoki sea and river area; of these, PVO-Vesivoima Oy's share was 17 per cent, or 0.8 million fry. On the Iijoki River, transporting of river lampreys past dams and power stations was very successful: the actual number of transported river lampreys – 72,765 – clearly exceeded the obligation of 60,000. On the Kemijoki River, the shared obligation of PVO-Vesivoima and Kemijoki Oy is 100,000 transported specimens. In 2012, double the required number of river lampreys, a total of 204,420, were transported. However, the accumulated annual obligation still shows a deficit equal to the number transported in 2012 due to the poor river lamprey catch of previous years.

New fishways established

Together with the municipalities of the Iijoki river region and other key stakeholders, PVO-Vesivoima Oy is participating in a project focusing on the Iijoki river fishways, co-ordinated by the Centre for Economic Development, Transport and the Environment for Northern Ostrobothnia. The project was launched in summer 2011, and it will cover the period from 2011 to 2013. The target of the project is to create detailed plans for fishways at the power plants in the lower reaches of the Iijoki river and to apply for construction permits for the fishways. Applying for permits requires the establishment of a joint municipal administration body. The Kosto dam fishway included in the project was completed in November 2012. The fishway will have no impact on the control of the waters in the Kostonjärvi lake.

The second Isohaara fishway, built into the timber rafting tunnel of the old Isohaara power plant, was completed in 2012, a year later than planned. The construction project was administered by the Centre for Economic Development, Transport and the Environment for Lapland.

Renovation programme to reduce the risk of oil spills

The new technology adopted within the hydropower renovation programme has resulted in considerable environmental improvements compared to earlier technology. The risk of oil spills has been significantly reduced as lubrication oil has been replaced with water in the hub bearings of new turbines.

Periodic inspections required by the Act on Dam Safety were carried out in 2012 at the Jumisko, Kierikki, Kosto, Irni, Taljajärvi and Maunujärvi dams.

Thermal power and the environment

Emissions into the air caused by thermal power production continued to decrease

Pohjolan Voima's thermal power plants use peat, coal, wood fuel, field biomass and refuse-derived fuels as primary fuels and some natural gas and oil as auxiliary fuels. The most significant environmental impact of thermal power production concerns the atmosphere.

The power plants' emissions into the air vary according to the fuel and the production volumes of electricity and thermal power. In 2012, the consumption of coal and peat decreased, causing the carbon dioxide emissions from thermal power production to continue on a downward trend and to reach 2.4 million tonnes. The nominal carbon dioxide emissions of electricity production reached a record low at 122 grams of CO₂/kWh.

Other emissions into the air also decreased compared to previous years: sulphur dioxide emissions were 2.1 thousand tonnes, nitrogen oxide emissions 4.4 thousand tonnes and particle emissions 0.2 thousand tonnes.

The Industrial Emissions (IE) Directive, which entered into force in January 2011, poses a major challenge to the future of thermal power production. In Finland, the directive will be enforced through the upgrade of the Environmental Protection Act and some related decrees. The Directive establishes extremely rigorous requirements on power plants' emissions into the air. These requirements will not, however, apply to existing power plants until in 2016 at the earliest. To most of Pohjolan Voima's power plants, the biggest challenges lie in cutting nitrogen oxide (NO_x) emissions. Pohjolan Voima is currently investigating potential technological means of reducing emission levels.

Utilisation of by-products

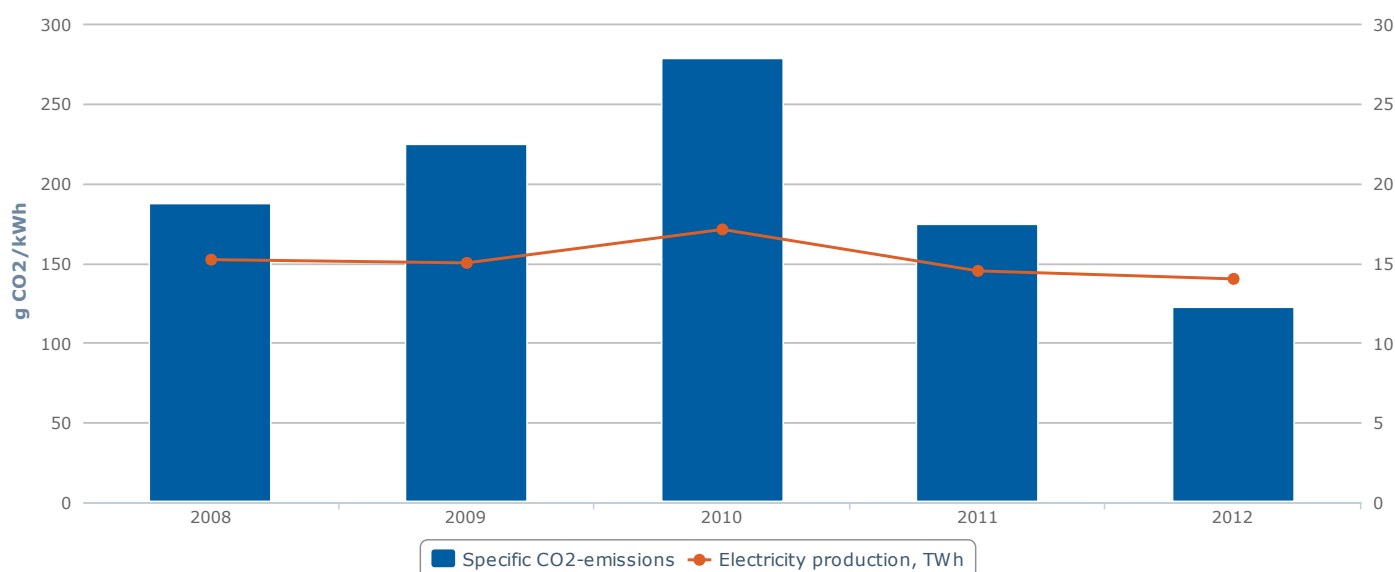
A total of 224,000 tonnes of fly ash, bottom ash and gypsum were produced, fly ash and gypsum as by-products from flue gas cleaning in the context of the power plants' combustion process. Of this volume, 64 per cent was reutilised in earth construction, the construction industry or as forest fertiliser. The utilisation rate remained nearly the same as in the previous year, with ash stored at future utilisation targets. The aim is to reuse a maximum share of the by-products of thermal power production as raw material that could replace non-renewable natural resources, such as rock and stone.

Oil spill in Oulu

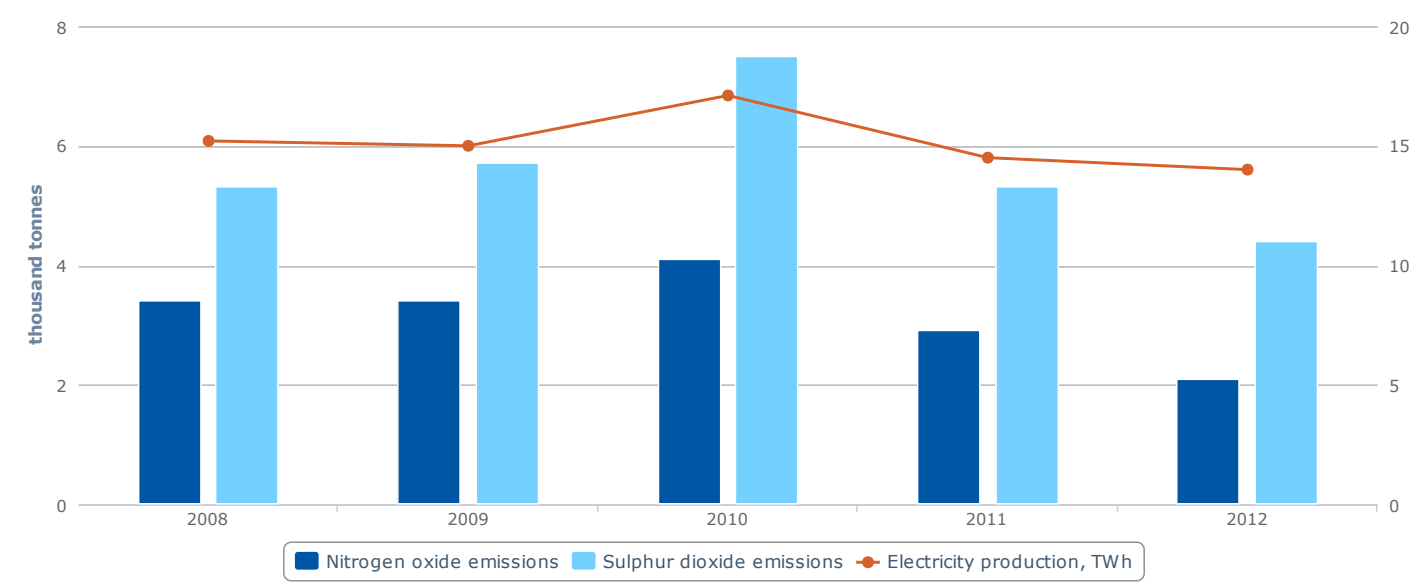
An oil spill occurred at the Laanilan Voima power plant in Oulu in May. Heavy fuel oil leaked in the boiler room due to the failure of a flange seal in the oil return loop. Despite prevention measures, a small amount of oil reached the Oulujoki river. To prevent similar accidents in the future, a new oil sump has been constructed to replace the old one.

► Read more on thermal power production in 2012

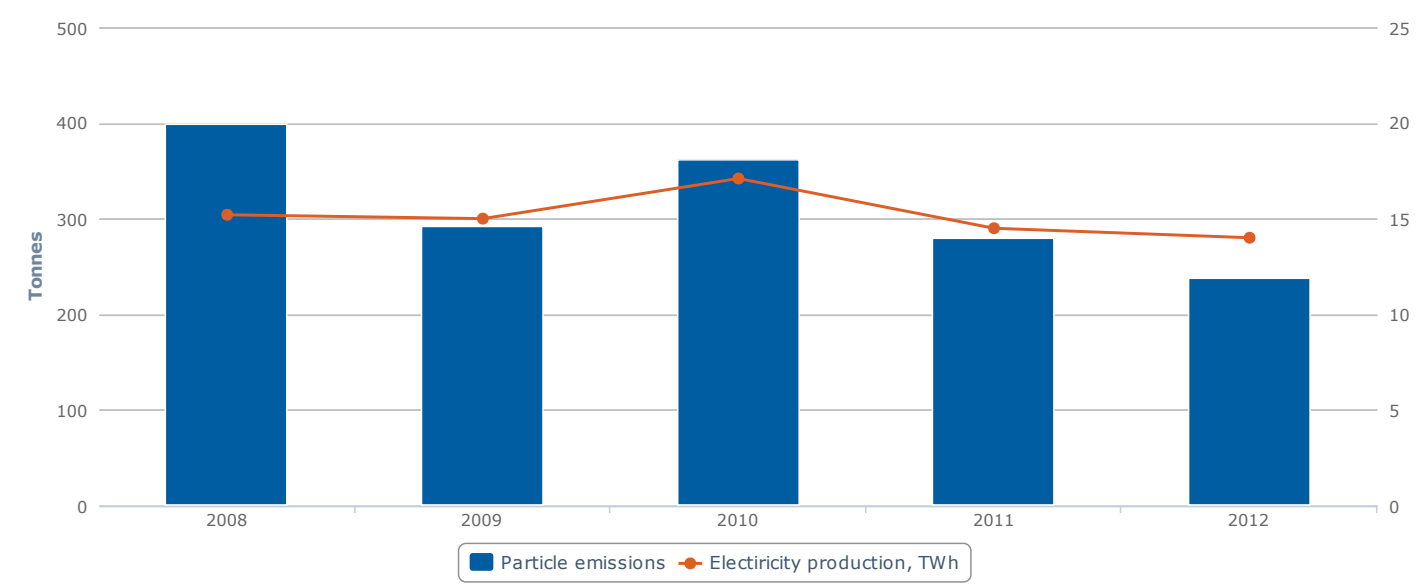
Carbon dioxide emissions from electricity production 2008 - 2012, g CO₂/kWh



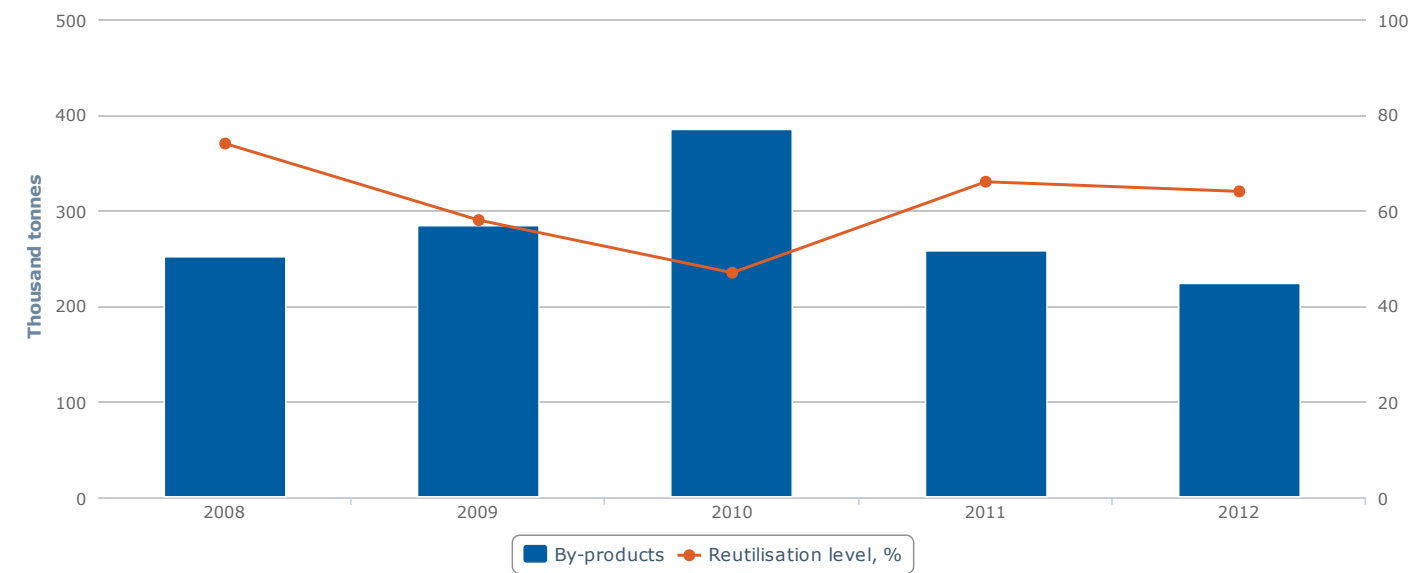
Acidifying emissions from electricity and heat production 2008 - 2012



Particle emissions from electricity and heat production 2008 - 2012



Usage of by-products and reutilisation in 2008 - 2012




Nuclear power and the environment

Nuclear power production complies with environmental permits

The operations of the nuclear power plant units owned by TVO, a joint venture partially owned by Pohjolan Voima, complied with the company's environmental policy, environmental permits and environmental management system. The company's EMAS-registered environmental management system, which also covers the construction phase of Olkiluoto 3, meets the requirements of the international ISO 14001 standard.

The greatest environmental impact of the Olkiluoto nuclear power plant results from the heat released into the sea via cooling waters; any other environmental effects are negligible. As was the case in previous years, radioactive emissions into the air and water were minimal and considerably below the authorised limits. No significant environmental deviations took place during the year.

[Read more at www.tvo.fi](http://www.tvo.fi)



Innovative solutions
for the challenges
of the future

Investments

In little over a decade, Pohjolan Voima has invested approximately four billion euro in carbon-free production capacity. Renewable hydropower and bioenergy account for approximately 1.5 billion euro of the total. In the next few years, the share of carbon-free production will increase from the current 80 per cent to 90 per cent.

Pohjolan Voima's investments prove that it assumes responsibility of Finland's continued competitiveness and the production of employment and well-being for all Finns.

Investments in hydropower

Pohjolan Voima has made decisive investments in the renovation of its hydropower plants. The renovations improve the power plants' output of renewable, emission-free energy. The increased efficiency of the power plants makes them well suited for use as load following power plants that help cope with fluctuations in the consumption and production of electricity.

Hydropower renovation programme proceeds to Pahkakoski

In 2012 the hydropower renovation programme, active since 2005, proceeded to its last planned target at the Pahkakoski power plant located on the Iijoki river. The renovation of Pahkakoski 1 was completed in spring 2012. Work on Pahkakoski 2 began in autumn 2012 and will be completed before the spring flood of 2013.

Pohjolan Voima's sizable Iijoki hydropower renovation programme began with the Kierikki power plant in 2005. The programme then proceeded to the Haapakoski, Maalismaa and Pahkakoski hydropower plants. The machinery of all the Iijoki hydropower plants, with the exception of Raasakka, has been renewed and renovated within the programme. The renovation has included new turbines, new generator stators, renovation of generator rotors, and the renewal of electrical and automation systems.

With the renovation, the Iijoki hydropower plants will have a 20 MW power increase.

Natura assessments for the Kollaja plan updated

In 2012, Pohjolan Voima updated its report on the impact of the Kollaja project on Natura values. The update will respond to the requirement for additional environmental impact clarifications concerning the Natura assessments, raised by the coordinating authority in January 2012. The aim of the additional clarifications is to ensure that the Kollaja project will not affect the Natura values in its area of impact.

Hydropower is a renewable, emission-free and competitive energy source. It is well suited for the fast balancing out of the discrepancy between the production volumes and consumption of energy. The Kollaja project would mean a significant addition to the load-following production capacity, the demand for which is increasing as a result of the increasing wind power capacity, among other things.

Investments in bioenergy

In the 2000s, Pohjolan Voima and its shareholders invested an approximate total of four billion euro in carbon-free production capacity. The bioenergy programme has constituted a major investment target. The Hämeenkyrö bioenergy plant completed in 2012 was the fifteenth power plant built within Pohjolan Voima's bioenergy programme. In addition to new plants, Pohjolan Voima also invests in projects that aim to replace some of the fuel of existing coal-fired power plants with bioenergy, reducing the carbon dioxide emissions from the plants.

These bioenergy projects are excellent examples of the top results that can be achieved when the resources of various operators are combined.

Hämeenkyrö bioenergy plant inaugurated

Pohjolan Voima's fifteenth bioenergy plant was inaugurated in Hämeenkyrö in October 2012. The bioenergy plant will increase the utilisation of domestic fuels in the region while cutting carbon dioxide emissions.

The new plant, located at Metsä Board's Kyro mill site, uses biofuels to produce electricity and heat for local needs. The plant produces an output of 12 MW of electricity and 55 MW of heat for Metsä Board's Kyro board and paper mill and for the local electric utility, Leppäkosken Sähkö.

The fuels used at the Hämeenkyrö bioenergy plant include wood chips and other wood-based fuels. These are complemented by peat. The use of domestic renewable fuels to replace natural gas reduces annual carbon dioxide emissions by about 100,000 tonnes.

The Hämeenkyrö bioenergy power plant project included a new boiler unit based on fluidised bed technology, as well as the associated fuel reception and handling systems and plant automation. The new boiler plant replaced the mill's previous natural gas power plant.

The Hämeenkyrö bioenergy plant project was a joint effort of Pohjolan Voima, Metsä Group's Metsä Board and Leppäkosken Sähkö. Practical implementation was carried out by Hämeenkyrön Voima, a subsidiary of Pohjolan Voima.

World's largest biogasification plant in operation in Vaasa

The world's first large-scale biomass gasification plant reached start-up at the Vaskiluoto coal-fired power plant in Vaasa. The plant will be used to replace coal with domestic bioenergy. The project also means significant reductions in the power plant's carbon dioxide emissions.

The biogasification plant has a gasifier that turns biofuels, mostly wood chips, into biogas that can be combusted in the existing coal-fired boiler. The biogasification plant allows 25–40 per cent of the coal used at the power plant to be replaced with renewable biofuels. The power plant's carbon dioxide emissions will decrease by about 230,000 tonnes a year. The project also bears considerable importance for the regional economy. It creates up to 400 jobs, particularly in the fuel production sector.

Biomass gasification is new technology developed in Finland, and has never before been constructed on such a large scale anywhere in the world. The fuel capacity of the Vaskiluoto biogasification plant is 140 MW.

Construction work at Vaskiluodon Voima's biogasification plant began in autumn 2011. Vaskiluodon Voima is jointly owned by Pohjolan Voima and EPV Energia. Biogasification operations began in November 2012.

Research into biocoal as a promising addition to coal

Pohjolan Voima's subsidiary PVO-Lämpövoima is involved in a research project on the potential of biocoal, or torrefied biomass, in partially replacing coal in coal-fired power plants on an industrial scale.

Biocoal is a renewable carbon-neutral fuel produced from wood chips through torrefaction. Biocoal can be burned in coal-fired power plants together with coal. The use of biocoal would reduce the plant's carbon dioxide emissions. The benefits of biocoal include good storage and transportation properties and its relatively high energy density.

The joint biocoal research project has received partial funding from Tekes, the Finnish Funding Agency for Technology and Innovation. The research project will be completed in autumn 2013.

Investments in nuclear power

Olkiluoto 3

The civil construction works at the Olkiluoto 3 (OL3) nuclear power plant unit have been, for the most part, completed. The major components of the reactor plant, such as the pressure vessel, the pressurizer and four steam generators, have been installed, and the welding of the primary circuit pipelines has been completed. Planning of the reactor plant automation, welding of pipes, electrification and pressure testing continue. Commissioning of the electricity distribution system of the reactor plant has begun. In the turbine plant, commissioning testing of the process systems continued. The OL3 training simulator is currently in test use at Olkiluoto. The construction of TVO's office building is complete.

The number of personnel at the construction site at the end of the year was around 3,000. Occupational safety at the site remained at a good level.

Originally commercial electricity production was scheduled to start at the end of April 2009, but the completion of the plant has been delayed. The installation works and plant automation system engineering of the OL3 plant unit have not progressed according to the schedules of the plant supplier, who is constructing the plant unit as a fixed-price turnkey project. TVO has informed that the company is preparing for the possibility that the start of the regular electricity production of the OL3 nuclear power plant unit may be postponed until year 2016. The plant supplier is responsible for the schedule.

[Read more about the OL3 project](#)

Olkiluoto 4

On 1 July 2010, the Finnish Parliament approved the Government's favourable decision, made on 6 May 2010, on TVO's application for a decision-in-principle concerning the building of a fourth nuclear power plant unit (OL4) in Olkiluoto.

TVO continued the preparations for the OL4 nuclear power plant project. Engineering with potential plant suppliers to clarify the licensability and constructability of plant alternatives continued, together with the procurement process with the objective of making a selection between the alternatives.

At the bidding and planning phase, preconditions will be created for TVO to be able to submit a construction license application to the Government. The construction of the power plant unit may commence after the reception of a positive licensing decision. The electrical output of the new unit will be in the range of 1,450 MW to 1,750 MW.

[Read more about the OL4 nuclear power plant project](#)

Improvements implemented in the annual outage of OL1

The entire generator was replaced in the annual outage of OL1 as planned. Other major work on OL1 included the modification of the low pressure turbine's discharge side, modernisation of the condensate purification system I&C, leak-tightness testing of the containment and the replacement of an auxiliary transformer.

The work carried out between 2010 and 2012 further improved the safety of the Olkiluoto nuclear power plant. The higher efficiency of the turbine islands increased the net electrical output of both OL1 and OL2 by approximately 20 MW.

Construction permit application for a disposal facility for spent nuclear fuel

According to the Finnish Nuclear Energy Act, TVO has responsibility for the measures related to nuclear waste management, and for the costs of these measures. The disposal of spent nuclear fuel produced by TVO is managed by Posiva Oy.

On 28 December 2012, Posiva submitted an application for a construction license for a final repository for spent nuclear fuel to the Ministry of Employment and the Economy.

[Read more at www.posiva.fi](http://www.posiva.fi)