



The construction of nuclear power plant unit Olkiluoto 4 at Olkiluoto

General Description

Introduction

This publication describes the project of Teollisuuden Voima Oyj (TVO) to construct the nuclear power plant (NPP) unit Olkiluoto 4 (OL4). TVO has submitted an application to the Council of State, concerning a supplement to the Council of State's decision-in-principle. This supplement deals with the timing of the Olkiluoto 4 project. TVO has requested the Council of State to set a new time limit for the application of the construction licence. TVO has also requested for a decision confirming that the construction of the NPP unit Olkiluoto 4 is still in accordance with the overall good of society.

TVO is the owner and the operator of the Olkiluoto NPP, which is situated in the municipality of Eurajoki. The combined production of the plant's two units, Olkiluoto 1 (OL1) and Olkiluoto 2 (OL2), currently accounts for circa one-sixth of all electric power required in Finland. Additionally, NPP unit Olkiluoto 3 (OL3) is under construction at Olkiluoto. The planned new plant unit, with an electric power on the order of 1,000–1,800 MW, would be sited at Olkiluoto in Eurajoki and it would be based on light water reactor technology. The power production of the NPP unit is estimated to start in the latter half of 2020's and it has an operational design life of 60 years.

Furthermore, the scope of the project includes the nuclear facilities associated with the operation of the new NPP unit at the same site, required for the storage of fresh nuclear fuel, interim storage of spent nuclear fuel, as well as the processing, storage and disposal of low- and intermediate-level operating waste. The interim storage of spent nuclear fuel and the disposal of low- and intermediate-level operating waste would be implemented through expansions to existing capacity.

Posiva Oy manages the measures required for the final disposal of spent fuel of TVO and Fortum Power and Heat Oy. The Council of State made in the year 2010 a decision-in-principle concerning the final disposal of the spent fuel from OL4, which was ratified by the Parliament on July 1, 2010. Posiva Oy has applied separately for a supplement to the decision-in-principle.

During years 2007 - 2009, the environmental impacts of the planned NPP unit have been assessed in a statutory

environmental impact assessment (EIA) procedure and in a Natura assessment.

TVO has applied for a new submittal deadline for the construction licence application in the supplement to the decision-in-principle. Related to this, the Ministry of Employment and the Economy (TEM) will obtain statements from the appropriate ministries and authorities, such as the Radiation and Nuclear Safety Authority, the municipality of Eurajoki and the neighbouring municipalities.

The Ministry of Employment and the Economy provides citizens and organisations with an opportunity to express their opinions on the project in writing directly to the ministry. The ministry will also arrange a public hearing in Eurajoki. At the hearing, opinions may be expressed orally and in writing. A summary of the opinions and statements presented to the Ministry of Employment and the Economy will be prepared and taken into account in the preparation of the decision. The information in this publication is based on TVO's application for a supplement to the decision-in-principle and investigations made for that purpose. The publication has been prepared in accordance with instructions from the Ministry of Employment and the Economy, and the ministry has inspected it.

The general description is distributed to all households in the town of Rauma and the municipalities of Eura, Eurajoki, Luvia and Nakkila.

The general description is available from:

Teollisuuden Voima Oyj
Communications
Olkiluoto
FI-27160 EURAJOKI

Tel. 02 8381 5201
E-mail: viestinta@tvo.fi

The general description and other documents related to the processing of the aforementioned application can be viewed on the Web site of the Ministry of Employment and the Economy, at <http://www.tem.fi/>.

Helsinki, June 2014



TVO
Olkiluoto
27160 Eurajoki

Statement (translation)

09.06.2014

TEM/1011/08.04.01/2014

Overall description of TVO nuclear power plant unit

Teollisuuden Voima Oyj (TVO) has delivered on 21 May 2014 a draft of an overall description of the project to construct a nuclear power plant unit (Olkiluoto 4) and its environmental impacts and safety for the inspection of the Ministry of Employment and the Economy referred to in Section 13 of the Nuclear Energy Act (990/1987). The overall description is related to TVO's application dated 20 May 2014 to supplement the Government's Decision-in-Principle M 2/2010 vp made in 2010.

TVO has submitted an application concerning a supplement of Decision-in-Principle of 2010 to set a new deadline for the application of a construction license of Olkiluoto 4 nuclear power plant unit. The current deadline expires on 30 June 2015. According to TVO's notice, it is not able to make necessary decisions related to application of a construction license of Olkiluoto 4 nuclear power plant unit because of delays in construction of Olkiluoto 3. TVO notes furthermore that the content of the Olkiluoto 4 project has not changed of that in the Decision-in-Principle of 2010.

The Ministry of Employment and the Economy has inspected the draft of an overall description. Amendments have been made to the description on the basis of the remarks the Ministry has made and it has been delivered in a more detailed form to the Ministry. The Ministry states that the instructions provided by the Ministry have been adhered to in a sufficient accuracy, and that the report corresponds with the application and its content is appropriate.

The Ministry of Employment and the Economy does not object to the publication of the report in the presented form. The Ministry is of the view that the plan proposed by the company concerning the distribution of the report and making it publicly available is in accordance with section 28 of the Nuclear Energy Decree (161/1988).

Jan Vapaavuori
Minister of Economic Affairs

Pia Nordberg
Chief Counsellor

Why a new deadline for construction licence application?

The decision-in-principle issued by the Council of State and ratified by the Parliament in 2010 stated that the construction of the NPP unit OL4 is in accordance with the overall good of society.

The completion of the NPP unit OL3 has been delayed. In this situation, it is not possible to make the substantial decisions needed for the application of the construction licence for the NPP unit OL4 within the present period of validity stated in the decision-in-principle concerning the construction of the NPP unit OL4.

TVO believes that the construction of a NPP unit is a socially significant investment, worth billions of euros, to Finland. Decisions for such an investment need to be timed to take place at a time most suitable with regard to the production capacity and other factors affecting the operational environment.

According to the Nuclear Energy Act, a project to construct a nuclear power plant must be submitted to the Council of State as early as possible. In its decision-in-principle, the Council of State decides whether the project is in accordance with the overall good of society. The validity of the decision-in-principle requires approval by the Parliament. The handling of an application for a supplement to a decision-in-principle follows the same procedure.

TVO is of the opinion that the OL4 project, aiming to construct additional nuclear power to Olkiluoto as part of the required new base-load capacity free of carbon dioxide emissions, is still in line with the overall good of society. As a form of electricity production, nuclear power is in harmony with the Finnish climate and energy policy goals. The production of nuclear electricity does not cause carbon dioxide emissions, nuclear power helps to decrease dependence on import of electricity, nuclear power is competitive and well-suited for base-load production to serve the Finnish consumption.

The impacts caused by the construction of the Olkiluoto 4 unit on people, nature and the built environment have been evaluated according to the procedure for the environmental impact assessment. The Ministry of Employment and the Economy has, in the year 2008, issued a statement on the EIA report. TVO has requested The Ministry of Employment and the Economy to issue an opinion on the application of the EIA procedure in context of the application for a supplement to the decision-in-principle. TVO will take any remarks presented in the EIA statement into consideration when implementing the Olkiluoto 4 project. The requirements concerning safety and the environment will be specified in more detail during the construction licence and environmental permit procedures following the decision-in-principle.



Justification for the project

Olkiluoto 4 is now a more important investment than before

In recent years, the Finnish economic growth has stalled and the competitiveness of the industry has declined. In this present situation, TVO believes that Olkiluoto 4 is an even more important investment for the wide ownership of TVO and for the whole of Finland.

Industrial investments and domestic production are needed to secure the economic growth, employment and welfare society. The importance of reasonably priced energy is more and more underlined.

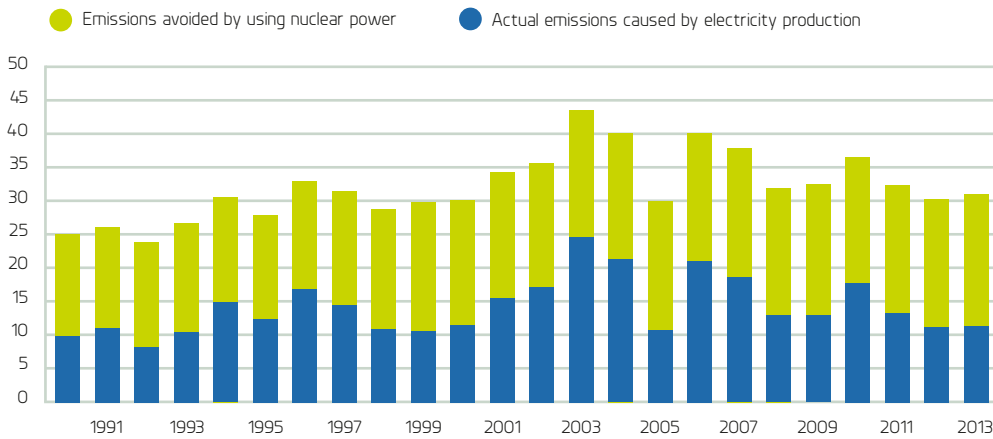
TVO is owned directly or indirectly by ten industrial companies, 50 energy companies and 135 Finnish municipalities.

The production of nuclear power does not cause carbon dioxide emissions

The prevention of the climate change is one of the most significant challenges for mankind. European Commission released in January 2014 a proposal for the European Union to commit to reducing greenhouse gas emissions by 40 % by the year 2030. A variety of actions is needed for the reduction of emissions. The focus is on increasing energy-efficiency, use of renewable energy sources and use of nuclear power. Construction of additional nuclear power is an efficient and cost-effective way to limit carbon dioxide emissions in Finland.

CARBON DIOXIDE EMISSIONS AVOIDED BY USE OF NUCLEAR POWER

MILLION TONNES / YEAR



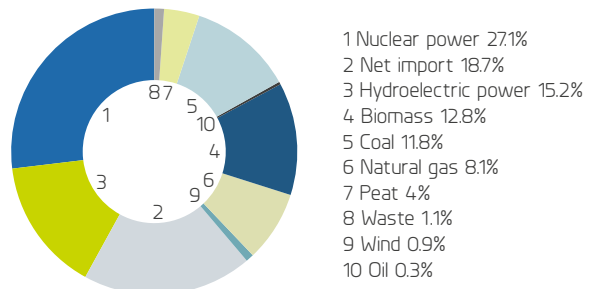
Source: Finnish Energy Industry, TVO 2014

Nuclear power helps in reducing dependence on imported electricity

In 2013, imports covered approximately one-fifth of the electricity demand in Finland. The amount of imported electricity corresponds, on average, to the annual production of 1½ nuclear power plant units. Our dependence on imports is at its highest during the coldest parts of the winter season. Construction of new nuclear power will significantly reduce Finland's dependence on electricity imports.

ELECTRICITY SUPPLY BY SOURCE 2013

TOTAL 83.9 TWH



Source: Finnish Energy Industry

More emissions-free production capacity is needed

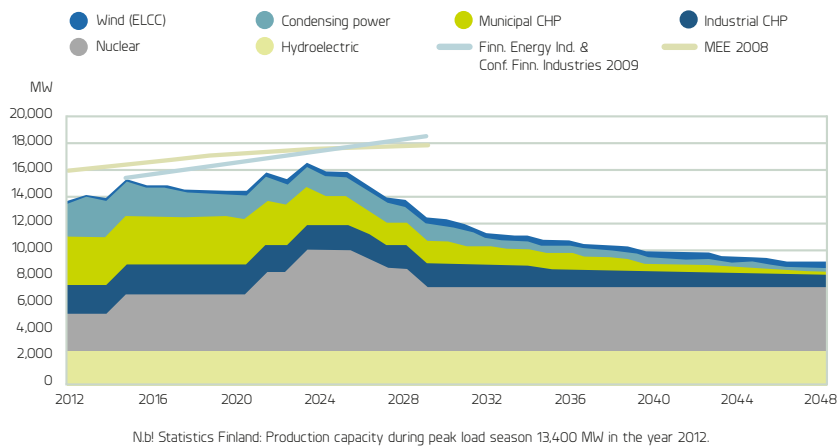
During the last few years, the industrial electricity consumption has decreased due to weak economical situation and the structural change of the industry. In year 2013, the industry consumed about 40 TWh of electricity, which comprises circa 47 % of the Finnish electricity consumption. When the economy gets back on a growth path, the electricity consumption is estimated to increase again.

Non-industrial power consumption has increased circa 2% per year in the 2000s. Despite the advances in energy efficiency, it has been estimated that the consumption of electricity by services and households will continue to grow.

According to the report "Sähkötuotantoskenaariot vuoteen 2030" by Finnish Energy Industries, Finland will need about 8,000 MW of new electricity production capacity during the next 20 years. Most of that demand is needed to substitute old capacity that is due to decommissioning.

INCREASING ENERGY CONSUMPTION AND AGING OF POWERPLANTS REQUIRE INVESTMENT IN ELECTRICITY PRODUCTION

FINNISH ELECTRICITY PRODUCTION AND PEAK LOAD (SYRI ET AL 2012)



Nuclear electricity is competitive; production is stable and predictable

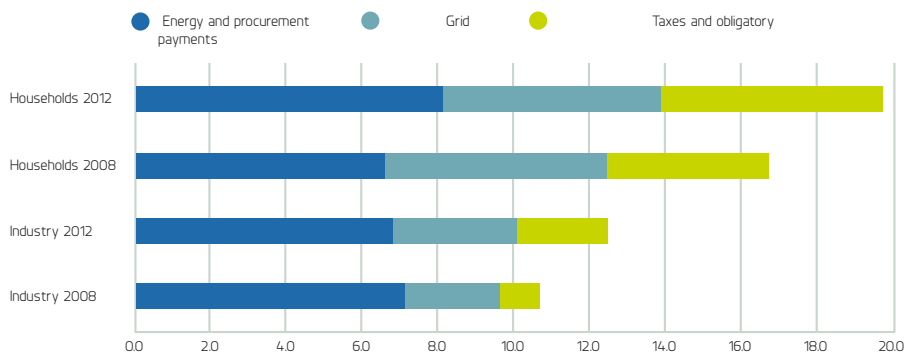
The price of nuclear electricity is stable and predictable. Most of the production cost consists of fixed costs while the share of the fuel of the total cost is small. The price of the fuel and the currency fluctuations have only a minor impact

on production costs. The emissions trade system of the European Union does not cause additional costs to nuclear power.

The production of nuclear electricity is reliable and stable. Therefore, it is well suited as base load power to safeguard the year-round electricity supply of the industry and the society as a whole.

EUROPEAN CITIZENS ARE CONCERNED OF THE INCREASE IN THE PRICE OF ENERGY

ELECTRICITY PRICE 2008–2012, EU AVERAGE, C/KWH



Source: European Commission 2014

Nuclear power and renewable energy go hand in hand

According to the Ministry of Employment and the Economy, Finland is on the energy and climate strategy's track to fulfil the 2020 goals for the utilisation of renewable energy. The measures to promote the use of renewable energy have been realised as planned.

Nonetheless, the increase in the renewable energy production alone is not sufficient to cover the gap between the electricity consumption and the production capacity. Shift into low-carbon future requires additional investments in both renewable and nuclear energy.

Economic impacts

Increased employment

The employment effect of construction a NPP unit is substantial. The extension of the power plant will increase employment in the area. This has been evident during the construction of OL3. The effects on the economy and commercial life in the region's municipalities will be positive. The project requires construction labour and construction site services, as well as special expertise and speciality manufacturing both in Finland and abroad.

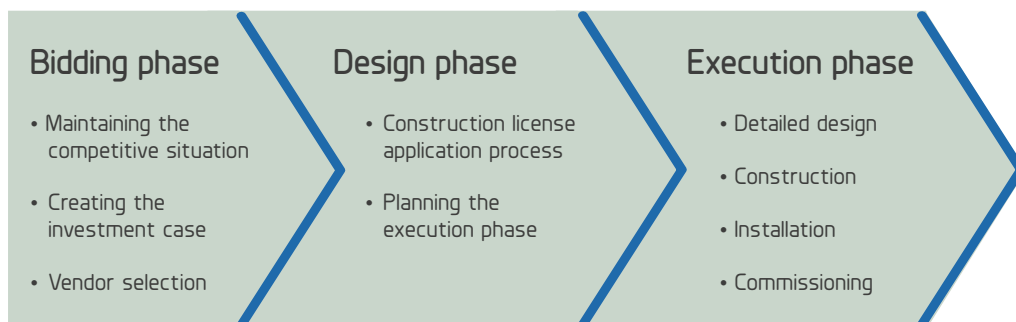
At their peak, the construction works employ circa 3,500 persons. The direct and indirect employment effect of the construction phase is almost 30,000 person years. During operations phase, the direct employment effect in Olkiluoto is estimated to be 300 persons a year, and indirect effect several hundred persons per year. The number of operating

personnel is about 200. In addition to new permanent jobs, the plant unit will provide work for approximately 700 to 1,200 people during annual maintenance outages. As the employment at the NPP increases, more services will be required in the area. The increased demand for services will boost the economy of the municipality and nearby regions and indirectly create new jobs.

Increased tax income for the region

The construction of a new NPP unit will affect the development of tax income in the municipality through personal taxes, real-estate taxes and other tax income. During the operations phase, municipal taxes levied on wages and salaries in the region will increase approximately two million euros per year as the number of personnel at the Olkiluoto NPP increases.

PHASES OF OL4 PROJECT



Project to build a new nuclear power plant unit

Olkiluoto as a plant site

The land use of the site of the new plant unit is in harmony with other land use on Olkiluoto Island and relies on the existing Olkiluoto infrastructure. The new unit may utilise supporting functions, premises and structures built for the existing plant units. The area of some 750 hectares owned by TVO in Olkiluoto provides good conditions for siting of nuclear power plant units. The continuous, undivided area allows its flexible use and makes it possible to ensure and further develop areal security and environmental safety.

The licensing procedure and the construction of the new plant unit do not require changes in the valid land use plan.

The current plan creates the preconditions for long-term safe operation of NPP units at Olkiluoto.

The site of a NPP unit must have a sufficient supply of cooling water and service water, good traffic connections, a sufficiently large area and suitable geological and topographical conditions. These prerequisites are fulfilled well at the Olkiluoto site.

The fuel management and the nuclear waste management for the new unit will be arranged in accordance with the same principles as the fuel and nuclear waste management for the units currently in operation and the Olkiluoto 3 unit under construction.



- | | | |
|----------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------|
| 1. Olkiluoto 1 | 4. Olkiluoto 4 | 7. Underground research facility for the geologic disposal of spent nuclear fuel (ONKALO) |
| 2. Olkiluoto 2 | 5. Final repository for low and medium level waste (VLJ) | 8. Power lines |
| 3. Olkiluoto 3 | 6. Interim storage for spent nuclear fuel (KPA) | 9. Emergency power plant (Gas turbine) |

Several plant alternatives

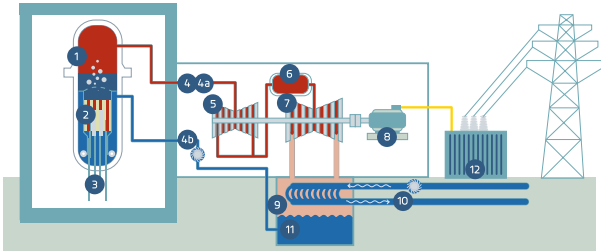
The planned new NPP unit will operate on the principle of a light-water reactor plant. Heat generated by uranium fuel is used to produce high-pressure steam. The steam is conducted to turbines that drive an electric generator. With regard to this basic principle, a nuclear power plant is similar to e.g. a coal-fired power plant.

TVO has studied the feasibility of NPP alternatives in Finland. They represent the latest developments in light-water reactor technology with regard to safety and economy-related properties. According to the studies, there are several NPP alternatives on the market that are suitable for construction in Finland.

Plant alternatives studied by TVO

Boiling Water Reactor (BWR)

The operating principle of a boiling water reactor plant



- | | | |
|--------------------------|-------------------------------|----------------------|
| 1. Reactor | 4b. Feed water to the reactor | 9. Condenser |
| 2. Core | 5. High-pressure turbine | 10. Seawater circuit |
| 3. Control rods | 6. Reheater | 11. Condensate |
| 4. Primary circuit | 7. Low-pressure turbines | 12. Transformer |
| 4a. Steam to the turbine | 8. Generator | |

In the reactor pressure vessel of a boiling water reactor (BWR), water is recirculated through fuel elements, causing the water to heat up and boil. Saturated steam is directed through an in-vessel steam separator and steam dryer to a high pressure turbine, to a reheater and to low-pressure turbines. The turbines are coupled via their axes to a generator that produces electricity.

TVO has conducted feasibility studies for two boiling water reactors.

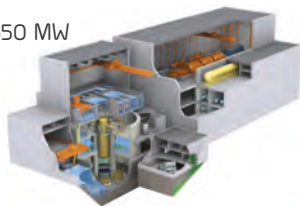
ABWR Toshiba

Net Power Output: approx. 1 650 MW
 Plant Supplier: Toshiba
 Country: Japan



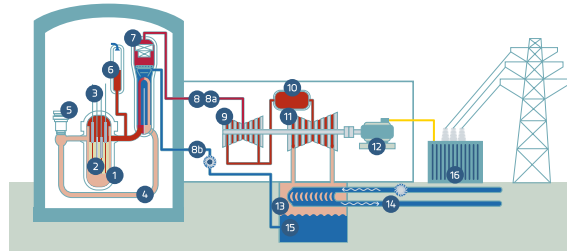
ESBWR GE Hitachi

Net Power Output: approx. 1 650 MW
 Plant Supplier: GE Hitachi
 Country: USA



Pressurised Water Reactor (PWR)

The operating principle of a pressurised water reactor plant



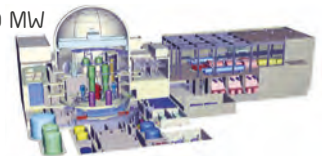
- | | | |
|----------------------------------------|----------------------------------------|---------------------------|
| 1. Reactor | 7. Steam generator | 11. Low-pressure turbines |
| 2. Core | 8. Secondary circuit | 12. Generator |
| 3. Control rods | 8a. Steam to the turbine | 13. Condenser |
| 4. Primary circuit (water circulation) | 8b. Feed water to the steam generators | 14. Seawater circuit |
| 5. Reactor coolant pump | 9. High-pressure turbine | 15. Condensate |
| 6. Pressuriser | 10. Reheater | 16. Transformer |

In a pressurised water reactor (PWR), fuel is heating water recirculating in the primary circuit. The primary circuit is maintained at such a high pressure that the water will not boil. The hot pressurised water is allowed to boil in the secondary side of the primary circuit heat exchangers, also called steam generators. Saturated steam is directed from the steam generators to a high pressure turbine, to a reheater and to low-pressure turbines. The turbines are coupled via their axes to a generator that produces electricity.

TVO has conducted feasibility studies for three pressurised water reactors.

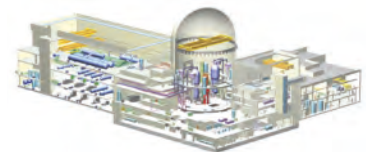
APWR Mitsubishi

Net Power Output: approx. 1 650 MW
 Plant Supplier: Mitsubishi
 Country: Japan



APR KHNP 1400

Net Power Output: approx. 1 450 MW
 Plant Supplier: KHNP
 Country: South-Korea



EPR Areva

Net Power Output: approx. 1 650 MW
 Plant Supplier: AREVA
 Country: France



Impact on the environment

During years 2007 and 2008, TVO carried out a statutory environmental impact assessment procedure where the environmental impacts of the planned NPP unit were assessed. The Ministry of Employment and the Economy issued a statement about the EIA report in 2008.

In TVO's view, it is not necessary to renew the EIA procedure in context of the application for a supplement to the decision-in-principle. TVO has requested the Ministry of Employment and the Economy to issue an opinion on the matter.

During years 2008 and 2009, TVO carried out a Natura assessment pursuant to Section 65 of the Nature Conservation Act regarding the combined impact of cooling waters from four NPP units on the Rauma archipelago Natura 2000 area (FI02000073).

Studies and environmental monitoring, which have lasted for more than 35 years, have demonstrated that the environmental impacts caused by the current NPP units at Olkiluoto, OL1 and OL2, have been only minor and local. The impacts of the new plant unit will mainly be limited to the local heating of the sea water and changes in local sea currents, both caused by the cooling water circulation.

Landscape

The new unit will add a fourth power plant building to the existing complex of power plant area buildings. The addition will not change the landscape characteristics of the plant area. The building volume of the new plant unit will be of the order of 1,000,000 m³ and the building will have a maximum height of approximately 60 metres. The vent stack will reach a height of approximately 100 metres. In addition, a number of lower auxiliary buildings will be constructed in the vicinity of the new unit.

The construction of the new unit will cause some rearrangements of traffic routes.

The capacity increase of power lines between the power plant and the national grid will result in the construction of parallel power line areas or widening of the existing power line routes.

Cooling water

The new unit's cooling water requirement will be 40–60 m³ per second, depending on the size of the plant unit. The cooling water will be returned to the sea 11 to 13 °C warmer. The discharge flow will be directed to the Kaalonperä bay in the direction of the existing discharge flow. The discharge of cooling water does not involve any release of nutrients.

The combined impact of the cooling waters of four plant units will cause an increase in seawater temperature and a larger-than-before area of weak ice on the sea. Model calculations show that an increase of maximum 1 °C in water temperature due to the combined impact of four plant units can be observed in surface waters at an approximate distance of 10 kilometres in southerly wind conditions in the summer. The size of the warmed-up area depends on wind direction and velocity.

The impact of cooling water from the OL1-OL4 units is projected to cover an area approximately 2.5 times larger than what is the present situation with two plant units in operation – that is, to a distance of approximately 75 to 12.5 kilometres from the discharge point. The unfrozen area or area of weak ice off Olkiluoto will increase to slightly more than 10 km², or approximately 1.5 times the size with three plant units (OL1, OL2, and OL3) in operation. The combined impact of the increasing thermal load will show as a longer





growth period and increased total production of phytoplankton and aquatic vegetation. The most substantial impact of the new plant unit's cooling water with regard to fishing takes place in the winter season, when the increased area of unfrozen water and weak ice limits jigging and net fishing from the ice.

It is estimated that the cooling water of the new NPP unit does not cause any substantial or extensive adverse effects on the fish populations of the area and there will be no impact on the suitability of fish for human consumption. The increased amount of warm water will benefit the species favouring warm water, such as pike-perch, perch and roach. For fish favouring cold water, the increase of warm water will be detrimental, and the cooling water can be estimated to decrease the number burbot in the discharge area.

Radioactive emissions

Since there will be only minor radioactive emissions from the fourth NPP unit during operation, they are not foreseen to have any adverse effects on human health or the natural environment. According to safety assessments prepared, the processing and final disposal of radioactive waste does not cause any adverse impact on the environment or people.

The radiation dose caused by emissions from the operation of the four plant units of the Olkiluoto nuclear power plant to a member of the most exposed group of the population, as a result of their place of abode and living habits, will not exceed 0.001 millisieverts (mSv) per year. The limit for radiation exposure arising from the operation of a nuclear power plant has been set at 0.1 mSv in Finland. It can be noted for comparison that the average radiation dose received by each Finn from other radiation sources is approximately 3.2 mSv annually.



Impacts during construction

A busy construction site

At its peak, the construction work will involve more than 3,500 people. The construction stage represents a total of almost 30,000 direct and indirect person years.

The construction site operations will mostly be focused on the location of the new unit at Olkiluoto. The initial stage of construction at the plant site will involve quarrying, grading and earthmoving work that causes local noise and dust impacts. Subsequent work will mostly involve construction and installation.

Construction in the water area

Work associated with cooling-water structures and a potential dock and ship lane will change the depth relations and the quality of the seabed. Required dredging of the seabed, filling of the sea area (such as the embankment at Kuusisenmaa Island) and construction on shores will cause cloudiness of seawater in the vicinity of the construction site during work.

The cooling water system structures do not have any impact on the water level. The water construction work will not affect fishing either, because the significant fishing sites are rather far away from the work sites.

Traffic

During the construction stage, the volume of traffic, and the proportion of heavy traffic in particular, on the road Olkiluodentie will increase as it did during the construction phase of OL3. Transport during construction will increase traffic to the power plant area by approximately 100 vehicles per day. The road transportation to the power plant includes that of building materials, equipment and components. The amount of goods deliveries and maintenance-related transport will also increase during the construction phase. The largest plant components will arrive at the plant site by ship.

Commuting during the construction of the power plant unit will increase the road traffic to the plant area. During construction, some of the labour force will live at Eurajoki and in nearby municipalities, some will stay in the accommodation village on Olkiluodentie.

Living conditions and comfort

The employment situation will improve during the construction and contribute to better living conditions in the nearby region through new jobs, increased tax income and a boost in economic activity. The temporary labour force brought by a large construction project will increase sales and demand for local services.



Nuclear waste management

The operation of a NPP produces nuclear waste. In proportion to the amount of energy produced, the amount of waste and the associated space requirements are small. The principle of nuclear waste management is to isolate the waste from the living environment. The final disposal will be designed in a way that does not call for supervision to ensure long-term safety.

Preparation for costs

In accordance with the Nuclear Energy Act, the operator of a nuclear facility is responsible for all stages of nuclear waste management. These include all measures to manage radioactive waste, including the waste arising from the decommissioning of the plant.

The funds required for nuclear waste management related to the new plant unit will be collected in the form of a nuclear waste management fee included in the price of electricity, as is the case with the existing NPP units. The funds to be collected will cover costs arising from the management of spent fuel and power plant waste, as well as the decommissioning of the plant unit and the management of waste arising from this. The money is deposited in the Finnish State Nuclear Waste Management Fund, from which it will be returned to the operator of the facility as the different stages of waste processing are implemented.

Spent nuclear fuel

After removal from the reactor, spent nuclear fuel is stored in water pools at the power plant for 3–10 years. Water cools down the fuel and protects against radiation. Storage continues in an interim storage facility for spent fuel, located at the plant site. The fuel is kept in water pools at the interim storage facility. The existing interim storage facility can be expanded if required, or a new facility can be built for the needs of the new plant unit. The new plant unit will produce 25–40 tonnes of spent fuel per year, depending on the unit size.

Interim storage will last at least 20 years, in which time the radioactivity and heat production of the fuel will be substantially reduced. After 20 years in interim storage the remaining activity of the nuclear fuel is on the order of a few thousandths of the initial value when removed from the reactor. After interim storage, spent nuclear fuel will be permanently isolated from living nature through disposal deep in the bedrock. For this purpose, the fuel will be encapsula-

ted in tight thick-walled iron-copper containers that will be placed in the bedrock at a depth of about 400 metres. The final disposal facility is located at Olkiluoto.

Posiva Oy is currently constructing a rock characterisation facility (ONKALO) at Olkiluoto for the purpose of conducting research that will confirm the suitability of the location for final disposal. In December 2012, Posiva submitted a construction license application to the Council of State concerning the construction of encapsulation and final repository facilities for spent fuel and other nuclear waste at Olkiluoto.

Spent fuel will be transported within the Olkiluoto plant area from the reactor buildings to the interim storage facility and from the interim storage further to the final disposal facility in strong steel containers. All spent fuel transports will take place within the closed plant area; spent fuel does not need to be transported on public roads. Spent fuel from the new plant unit will be placed in the same final disposal facility with spent fuel from the existing plant units and OL3 under construction.

Operating waste

Operating waste refers to low- and medium-level waste arising from the operation of a nuclear power plant, such as ion exchange masses from cleaning process waters, radioactive wastewater and diverse dry waste from maintenance operations. The new plant unit will produce 100–150 m³ of operating waste per year. The waste is processed and packaged at the plant units and disposed of in a disposal facility located at Olkiluoto. The existing facilities can be extended to correspond to the needs of the new plant unit.

Decommissioning of the plant unit

The planned service life of the new plant unit is 60 years. After the operation has ceased, the decommissioning of the plant unit can begin immediately, or it can be postponed. For example, after about 20 years, the radioactivity contained in the plant unit's systems has substantially decreased. Most of the waste arising from the decommissioning is free of radioactivity. It consists of conventional construction and metal waste that can be utilised through recycling or placed in a landfill. Decommissioning waste containing radioactivity will be permanently disposed of in the bedrock similarly to radioactive waste arising from the operation of the plant.

Ensuring safety

Experience as a foundation for safety

Strict safety regulations have been enacted for nuclear power plants in Finland, and the licence-holder is always responsible for nuclear safety. TVO has decades of experience with the operation of a nuclear power plant. During this time, the company has also developed high-level safety expertise. The Olkiluoto 3 project has made it possible to recruit new professionals, and the project has further increased the extensive nuclear power competence of the company's experts. The accumulated experience will be utilised in the design, construction and operation of the new plant unit.

Regulatory control

The Nuclear Energy Act and the government decrees issued by virtue of it form the foundation of the safe use of nuclear power and its supervision. The authority responsible for the safety supervision of nuclear power is the Radiation and Nuclear Safety Authority, the safety regulations of which specify detailed requirements for the design, construction and operation of a nuclear power plant.

It is the task of the Radiation and Nuclear Safety Authority to supervise that the use of nuclear power in Finland complies with the applicable safety requirements. This supervision covers the entire life cycle of a NPP, from design and

construction, through the entire service life of the plant, to the decommissioning and the final disposal of nuclear waste.

Advanced safety technology

The modern safety arrangements of the new plant unit provide preparedness for even the most severe situations that could ultimately lead to reactor nuclear fuel damage and meltdown. Provisions for such situations at the Olkiluoto units 1 and 2 have been managed by technical improvements made during the operating phase.

The NPP unit will be designed in accordance with the Finnish safety regulations. The containment building around the nuclear reactor is constructed to withstand even the impacts of reactor core meltdown. The purpose of the containment is to prevent radioactive substances released from the reactor in potential accident situations from entering the environment. No health hazard to nearby residents is allowed, even in the most severe situation. Releases from accidents are not allowed to cause any long-term restrictions on the use of land or water areas.

The new nuclear power plant unit will be designed to endure weather conditions, such as seawater level fluctuations, storms and temperature increase, that are expected to be very rare or improbable, and the possibility of an earthquake will be taken into account in the design of components and structures important to safety.

The safety systems of the plant unit are physically separated from each other and located in well-protected spaces. This protects the safety functions so that no external or internal event can render all of them inoperable. The design of the new plant unit will also take into account a large airliner collision and actions to damage the plant illegally.

Rescue service

In accordance with the Rescue Act, authorities have prepared plans for accident preparedness. The new power plant unit will be added to plans drafted for the existing plant units. The authorities' plans include monitoring the state of the environment in an accident situation and communication to the public about potential actions to minimise the impact of an accident.





Additional information on the application to supplement the decision-in-principle and the presentation of opinions

On June 18, 2014, The Ministry of Employment and the Economy will make a public announcement concerning the project to build a new nuclear power plant unit, Olkiluoto 4. The announcement includes information such as:

A copy of the application for a supplement to the decision-in-principle and its attachments shall be available for viewing from June 18, 2014, to August 15, 2014, during office hours at the following municipal offices:

- Eurajoki municipal office, Kalliotie 5, Eurajoki
- Eura municipal office, Sorkkistentie, Eura
- Luvia municipal office, Kirkkotie 17, Luvia
- Nakkila municipal office, Porintie 11, Nakkila
- Rauma environmental authority, Kanalinranta 3, Rauma

The application to supplement the decision-in-principle and its attachments as well as other documents related to its processing are also available on the Web pages of the Ministry of Employment and the Economy, at <http://www.tem.fi/>.

Opinions on the project can be presented in writing by submitting them to the registry office of the Ministry of Emp-

loyment and the Economy (address: Ministry of Employment and the Economy, P.O. Box 32, FI-00023 VALTIONEUVOSTO; visiting address: Aleksanterinkatu 4, Helsinki) or by e-mail to kuuleminen@tem.fi by August 15, 2014, at the latest. When expressing opinions and issuing statements, kindly refer to the diary number of the matter: TEM/1011/08.04.01/2014.

The public hearing required pursuant to Section 13 of the Nuclear Energy Act will be held on August 14, 2014, starting at 18:00, at the Eurajoki municipal office (address: Kalliotie 5, Eurajoki). The hearing is open to the public.

More information on the project and the application to supplement the decision-in-principle is available from Teollisuuden Voima Oyj, telephone +358 2 83 811, address: Olkiluoto, FI-27160 EURAJOKI.

More information about the processing of the application in the Ministry of Employment and the Economy is available from Ministerial Adviser Pia Nordberg at the telephone number +358 50 444 9763 and Senior Engineer Jorma Aurela, at the telephone number +358 50 592 2109.

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