RESPONSIBILITY REPORT 2018

Content

Responsible leadership

The operation of the TVO Group is based on the defined principles and values, ethically sustainable operating practices are promoted, and unethical operating practices and situations are challenged. In TVO's vision, nuclear power-generated electricity commands a competitive price and holds a strong position in the production and investment palette of TVO's electricity consumers.

The cornerstones of responsible leadership and operating practices are the Company values, on which the Company-level policies and the Code of Conduct are based. TVO's objective is to operate in a responsible, transparent, proactive manner and to continuously improve operation. The Board of Directors approves the strategic objectives and operational guidelines of the Company, such as the Company values, Group-level policies and the Code of Conduct, for example.

TVO complies in its operation with valid laws, regulatory guidelines and principles of good governance. Operation also fulfils the requirements laid down in STUK's Regulations and Nuclear Power Plant Guides (YVL Guides). Everybody working at TVO is required to comply with legislation and regulatory guidelines and regulations, the principles of good governance and TVO's voluntary commitments.

TVO has committed to promote the following United Nation's Sustainable Development Goals in its actions:

The purpose of the targets is to generate stable and climate friendly electricity for the society and to minimize the adverse impacts in all stages of electricity production.

TVO's managerial and supervisory personnel have the task of starting discussions about TVO's policies as well as the values and responsibilities on which they are based, and of controlling that laws and regulatory provisions are complied with in the activities of each responsibility area. The Legal Function in cooperation with the Internal Audit Function and the Safety Function provide support and advice in legal questions and questions related to business ethics. Internal Audit is for its part responsible for verifying that laws and regulatory requirements are taken into account in the operation of the organisation.

TVO's subcontractors are informed about the Code of Conduct by, for example, attaching the Code of Conduct to contracts concluded with contractors and cooperation partners. TVO's personnel and the contractors operating in Olkiluoto need to complete the online training on the Code of Conduct. In 2018, 335 people had completed the training course regarding the Code of Conduct in TVO Group.

TVO's management system covers production operations at the Olkiluoto nuclear power plant, the maintenance and development of production capacity, the construction of additional production capacity, as well as related steering and resourcing operations. The system meets the requirements of international

quality management, environmental and health and safety standards, and has been certified by DNV GL Business Assurance Finland Oy Ab. The general part of the activity-based management system also acts as the licensee's quality management system approved by the Radiation and Nuclear Safety Authority (STUK). Implementation, effectiveness, and efficiency of the system are regularly monitored with internal audits and management reviews.

TVO's activity-based management system meets the requirements of the following procedures and standards, among others:

- Quality management system ISO 9001:2015, STUK YVL A.3 Management system for a nuclear facility
- Environmental management system ISO 14001:2015, EMAS Regulation 1221/2009
- Energy efficiency system (ETJ+)
- Occupational health and safety management system OHSAS 18001:2007

The most important aspects of responsibility are dealt with in the meetings of the Board and the Committees appointed by the Board from among its members; the Nuclear Safety Committee, for example, deals with matters related to the promotion of the safety culture. The Audit and Finance Committee monitors the development of the shareholder value, among other things. The work of the OL3 Committee focuses on the monitoring and promotion of the power plant project designed to ensure the supply of electricity in Finland and a positive impact on climate.

The management of and the efforts taken in relation to the most significant aspects of responsibility concern the entire organisation of TVO, including the Management Group as well as the Business Units and the service functions. The President & CEO of the Company is responsible for the responsibility objectives and policies of the Company, and they are dealt with and approved by the Management Group. The Management Group is in charge of the implementation of the strategy, strategic projects and objectives as well as the development of future business opportunities. The Management Group also assists the President & CEO in the planning and management of the strategic operation of the TVO Group. Duties of the Responsibility Team include:

- Making decisions on responsibility goals, policies, operating plan and indicators
- Considering stakeholder expectations
- Monitoring the responsibility goals, actions and indicators
- Preparing, developing and monitoring the implementation of a corporate social responsibility policy and a related Code of Conduct
- Reporting responsibility issues to the CEO and Management Team once or twice a year

The aspects of responsibility are in TVO's organisation and the Organisation Manual dealt with by specific Work Groups:

Most significant responsibility aspects	TVO organisations and Work Groups dealing with the matter
Safety	Safety Group, Fuel Group, Occupational Safety Group, ALARA Group, Safety Culture Group, Management Group of Corporate and Information Security, CAP Group, Plant Meeting, Ageing Management Group, Research and Development Group, Steering Group of Engineering and Expert Services, Outage Group, Operating Experience Group, Competence Centre for Finance
Good Work Community	Occupational Safety Group, ALARA Group, Competence Centre for HR, Competence Centre for Communication, Better Workplace Steering Committee
Shareholder Value	Risk Management Group, Steering Group of Engineering and Expert Services, Competence Centre for Finance, Competence Centre for Communication
Supply of electricity in Finland and climate impact	Environment Group, Energy Efficiency Group, ALARA Group, Environmental and Nuclear Waste Management Research Group, Research and Development Group, Chemicals Work Group, Competence Centre for Communication, Risk Management Group, Regulations Amendments Work Group

Objectives and Results of TVO's Responsibility Program

Objectives of responsibility are based on the principle of continuous improvement. The objectives enable the company to follow realization of major responsibility issues.

	Objective 2018	Actual 2018
Reputation index	-	-
Personnel survey, category	B	A
Reports suspecting violations of the Company's Code of Conduct	-	6
Sick leaves, %	< 2.2	3.1
Occupational accident frequency	< 3.2	3.6
Collective radiation dose, manmSv	1055	1101
Number of environmental incidents, pcs	0	2*

Unplanned energy unavailability factor, %	0	2.2
Number of unplanned automatic scrams, pcs	0	3

Reputation index: TVO Group stakeholder survey, average of respondent groups 0–100; under 50=Weak, 50–62=Moderate, 62–70=Good, over 70=Excellent. The survey is conducted and the results are reported in every two years. The next survey will be conducted in 2019.
Personnel survey: AAA=Excellent, AA+=Good+, AA=Good, A+=Satisfactory+, A= Satisfactory, B=Negative, C=Weak. Implemented every 18 months.
Occupational accident frequency: per million working hours. The indicator is Group-level.
Collective radiation dose: World Association of Nuclear Operators (WANO) indicator. Reference point: other WANO members' NPPs. Goal: the best quarter.
Environmental incidents: in class considerable/severe. *During the year occurred one incident and one earlier incident was cleared.
Unplanned energy unavailability factor: % of total production.

There is more information on the principles and results of TVO's ethical business operations in the non-financial information section of the 2018 report of the Board of Directors.

Social opinion leader

Dialogue with stakeholders is the basis of TVO's development. The views of the stakeholders are taken into account in all of TVO's plans and decisions that may have a significant impact on the local community or the Finnish society.

Cooperation with stakeholders, as well as reviews related to it, are carried out in accordance with the influencing strategy. TVO's most important stakeholders include the personnel, shareholders, authorities, investors, decision-makers, local community, contractors, media and the public.

Stakeholder reviews are carried out at regular intervals, and the relationship with the stakeholders is adapted to their expectations. Regular dialogue is necessary to be familiar with the stakeholders' expectations. The Company seeks to identify through regular discussions and surveys the expectations of the stakeholders and to meet them using all available means and methods. Equal interaction with all stakeholder groups is important to TVO.

Interaction and footwork

TVO communicates its operations in an open and neutral manner, without delays and based on facts. TVO aims for open and active interaction with all levels of society, including decision-makers, opinion leaders, and the general public. The objective is to increase knowledge of nuclear power and build mutual trust among stakeholders, as well as to support open and constructive interaction in the immediate region, in Finnish society, and within the international nuclear energy sector.

In 2018, interaction was expanded especially in social media, a variety of events and meetings. The goal is quick, open, people-friendly and fact-based communication that is easy to understand. TVO cooperates with political decision-makers and the government in the development and adoption of laws and guidelines pertaining to the energy sector. TVO does not support political activities.

The company participates in the public energy production discourse in which many different values are expressed. TVO also respects the views and values of those who have a negative attitude towards nuclear power and TVO’s operations.

TVO is an active participant in both the national and international nuclear power community and in various organizations and communities of the nuclear energy sector.

The most important international organisations in which TVO is a member include Foratom that represents the European atomic industry, as well as the World Association of Nuclear Operators (WANO) which focuses on the development of nuclear safety.

Acceptance of nuclear power

TVO monitors carefully the public acceptance of nuclear power by means of opinion polls and surveys conducted on a yearly basis.

According to a survey conducted by Finnish Energy in late 2018, 87 per cent of Finns are concerned about climate change and believe that the whole world should take immediate action to prevent climate change using any means possible. An increasing number of Finns are of the opinion that nuclear power is an

environmentally friendly way of producing electricity. More than half of Finns, 51 per cent, consider nuclear power an environmentally friendly way of producing electricity. Most Finns believe that the consumption of electricity will increase. The share of Finns who believe this has clearly increased since 2014. The number of people who find nuclear power worth supporting is markedly higher than in the previous survey.

The survey was carried out by IRO Research Oy based on an assignment of Finnish Energy in November 2018. The survey was implemented solely through IRO Research's web panel. The sample of 1,000 respondents was weighted in terms of gender, age, place of residence and political views in order to represent the entire population. The survey's margin of error is +3.2 percentage units. TVO is a member of Finnish Energy. The results were published on the website of Finnish Energy.

Local communities

The population and local communities in the vicinity of Olkiluoto belong to the immediate region of the nuclear power plant.

The economic, social, and environmental impact of the operations primarily concerns the municipalities and population of the immediate region. On the other hand, the entire country can be considered to be within the immediate region of TVO, as the cost price electricity of TVO benefits the whole country through the municipally owned energy companies included in TVO's shareholders.

TVO aims to be a good and active neighbor. This means open dialog and listening to its neighbors. The company organizes various events and meetings to maintain interaction with the residents of neighboring areas.

Close cooperation through several channels

TVO publishes the Uutisia Olkiluodosta (News from Olkiluoto) magazine for the people living in the immediate region, and organizes regular interaction in various forums, such as the Municipal Cooperation Committee. TVO maintains close interaction with Eurajoki in the municipality's own cooperation team. TVO also participates in the operations of Vuojoki Foundation and Vuojoki cooperation group.

The municipal cooperation committee was established in the 1970s upon the initiative of TVO. The committee is a forum for interaction and the exchange of information, providing local municipal decision-makers with first-hand information. In addition to representatives of TVO and Posiva, the committee includes representatives appointed by the municipalities and towns of Eurajoki, Rauma, Nakkila and Eura.

TVO engages in free-form interaction with the residents of the neighboring areas at open coffee and chat events. These events are always characterized by lively discussion about TVO and nuclear power. TVO is a sponsor company for Eurajoen yhteiskoulu (a junior high school). The school and TVO have arranged themed days for several age groups. Energiaa Länsi-Suomessa (Energy in Western Finland) themed weeks are arranged together with other west-coast power plants.

TVO arranges four science and technology camps per year for elementary school children with the theme Kiinnostus herää kokeilemalla (Whetting your appetite by experimenting). The Olkiluoto science and technology camps have been offered since 2003. Each camp lasts from Monday to Friday and is attended by

22 children, a total of 88 children during the summer. At the camp, the children get to learn about natural sciences and technology on their own terms.

TVO's impact on the local community and surrounding environment

The public may send feedback and questions to TVO via the TVO website or social media channels among other forums. TVO replies to all contacts made with contact details appended. In 2017, TVO received one external expression of concern. TVO's most significant measurable effect on the region is the increase in the temperature of the sea in the vicinity of the power plant. The increase in the temperature of seawater is regularly monitored and measured, together with the impact of the increased temperature on the seabed.

TVO's strongest positive impact on the immediate community is related to economic wellbeing and activity in the area, achieved through employment. The local community's attitude towards investments by the TVO Group, such as the OL3 project and the ONKALO project of Posiva, is positive. The real estate taxes paid by TVO have a significant economic impact on the municipality of Eurajoki, and the neighboring municipalities in the region also benefit from the taxes paid by TVO employees. TVO and the OL3 construction site are important sources of employment and economic prosperity in the region, both directly and indirectly. The purchases of products and services also provide employment and income to local people.

Visits

The views of stakeholder groups regarding TVO's corporate social responsibility aspects are best obtained from the continuous flow of visitors to Olkiluoto. A visit to the Visitor Center and the Olkiluoto nuclear power plant is the best and most effective way for stakeholders to learn about nuclear power.

The Visitor Center is open to all visitors with no advance booking needed. The Electricity from Uranium science exhibition at the Visitor Center provides information about the production of electricity using nuclear power and covers the entire lifecycle of the uranium fuel from responsible mining to safe final disposal.

The total number of visitors at the Visitor Centre in 2018 was 11,623. Of this number, 5,896 studied the exhibition on their own. The number of various groups of visitors was 296. Visitor groups consisted primarily of schoolchildren and students, as well as members of various associations and staff groups from different companies. Every summer, open visits referred to as "Summer Wednesdays" are organised. At best, they have attracted up to a hundred visitors to Olkiluoto during the day.

Sponsorship activities

TVO supports sports, cultural endeavors, and activities for the public good. TVO's sponsorship principles are built on the company's values, and the supported activities must be in line with the company's strategy and operating principles.

When selecting partners and sponsorships, the emphasis is on offering opportunities for recreational activities to the local people, children, and young people in particular. TVO supports activities that reach large numbers of people and are open to everyone.

TVO's most important sponsorship partners in 2018 included:

- Rauman Lukko (ice hockey, representative team and junior work)
- Pallo-Iirot (soccer, representative team, junior work and supervised exercise for children)
- Fera ry (Finnish baseball, Fera women's representative team - Lukko, junior girl teams)
- Rauma Golf
- Eurajoen Veikot
- Festivo, summer festival of chamber music in Rauma

TVO also sponsors sports, cultural endeavors, and associations in the immediate vicinity of the power plant.

In addition to sponsorship, TVO makes annual donations to organizations, communities, and student groups who work for the public good. In 2018, sponsorship recipients included the Rauma branch of the Finnish Red Cross, among others.

Decisions concerning sponsorships and donations are made by TVO's Competence Centre for HR together with the company management. In line with the sponsorship principles, TVO does not sponsor any activities that do not comply with the TVO values, ethical code, or principles of social responsibility, or any political or religious organizations or projects.

Responsible procurement operations

High-quality procurement operations ensure safe, competitive, and reliable production and long-term operation of the plant units.

TVO Group and the OL3 construction site are major employers and providers of financial wellbeing in Finland and the Satakunta region, both directly and indirectly. Purchased products and services provide work and employment in the entire country. Furthermore, TVO and Posiva pay real estate tax to the municipality of Eurajoki.

In supplier selection, particular attention is paid to the continuity of the suppliers' operations, delivery reliability, quality, environmental management, and competitiveness, while also appreciating domestic and local suppliers. Suppliers are assessed, delivery quality is monitored, and immediate corrective measures are taken when necessary.

TVO only procures products and services from evaluated and approved suppliers. TVO uses a supplier classification system for all its suppliers based on how significant their operations are for TVO's safety and potential risks contained in its production operations. The products procured must meet TVO's safety, quality, and environmental requirements. Orders can be placed with assessed suppliers only.

Audits – a quality assurance method

TVO requires that contracting parties use operating methods that comply with TVO's Code of Conduct and group-level policies. TVO's contractors generally apply a quality level in accordance with the ISO 9001 quality system, ISO 14001 environmental system, and OHSAS 18001 occupational health and safety system. Auditing is one of the quality assurance methods used. The audits may be carried out by TVO or a third party. TVO has the right to audit quality, safety, information security, and environmental systems, as well as the operations of its contractors and subcontractors to the extent it considers necessary. Contractors are obligated to ensure that the above-mentioned right is included in all contracts between the contractor and its subcontractors in the entire delivery chain. The Radiation and Nuclear Safety Authority (STUK) may participate in the audits to validate TVO's or its contractors' operations.

Procurement of uranium

TVO has high-level expertise regarding all phases of the fuel procurement process. TVO procures its fuel through a decentralized supply chain, entering into negotiations and making procurement contracts with each separate supplier at the various stages of the fuel production chain. There are several suppliers for each stage of the chain, and the procurement operations are regularly subjected to competitive bidding.

Furthermore, the composition of the fuel and the manner in which it is used are designed by TVO itself. The policy chosen by TVO clearly strengthens the company's position as Finland's leading supplier of nuclear power. Procurement operations are based on long-term contracts with leading suppliers. These companies have mining operations in many countries. If required, TVO purchases additional batches and services from the market, the developments of which are followed actively. The majority of the uranium procured by TVO comes from Kazakhstan, Canada, and Australia, and the fuel elements ordered by the company are constructed and assembled in Germany, Spain or Sweden.

TVO subjects fuel suppliers to strict evaluation

TVO employs a supplier evaluation method and only procures uranium and nuclear fuel refining services from suppliers who have passed the evaluation process. A systematic evaluation process precedes the closure of each supply contract. In addition to the requirements set for the products, the process also considers the reliability and responsibility of the supplier.

TVO's supplier evaluation also includes active monitoring and evaluations at fixed intervals. Remote monitoring in Finland and excursions to production sites both provide TVO with an opportunity to examine the suppliers' practices and, when necessary, to demand that changes are made. The purpose of supplier evaluation is to ensure that suppliers pay appropriate attention to environmental issues, the wellbeing of personnel, and quality management. Special issues concerning mines are also considered, such as the impact of operations on local people.

Research and development

The key objective of the research activities of TVO is to support the safe operation of the nuclear power plant units, as well as the acquisition and renewal of operating licences, through production of high-quality technical knowledge, and to validate data and calculations for the needs of and use by the plant units.

Modernization and modification work carried out at the plant units, as well as following and using new technology, also create research needs. In 2018, measures based on safety assessments have been carried out at the plant. These measures have also resulted in the creation of new research areas. Changes made to national regulations (YEL, VNA and YVL guides) have been taken into account in the definition of research projects. Storage, handling, and final disposal of waste comprise another important research area. The development activities related to the safe final disposal of spent fuel by Posiva Oy still remains the most significant objective of research for TVO as we approach the 2020s.

TVO is an important nuclear sector research and development organization

The total costs of TVO's research and development operations were EUR 26.2 million. The figure includes nuclear waste management research and development costs.

TVO is the biggest contributor to the financing of national public research programs on nuclear power plant safety (SAFIR2018) and nuclear waste management (KYT2018). In 2018, TVO paid a total of EUR 7.2 million in research fund-related contributions to the Finnish State Nuclear Waste Management Fund. TVO also participated in the steering and monitoring of the programs through the work of 30 experts.

Key research projects

As concerns the life cycle management and modernization projects of the OL1 and OL2 reactors, primary focus areas for research operations in 2018 included a study into RPV damage mechanisms, development of piping calculations and analyses, as well studies related to the plant structures, and R&C efforts carried out together with VTT Technical Research Centre of Finland in the field of I&C ageing.

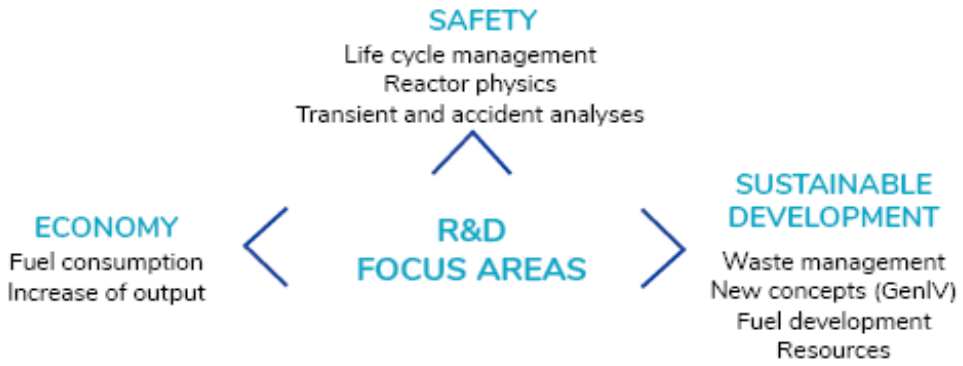
Research in I&C technology focuses on the solutions required for the modernization of OL1 and OL2 and the construction of OL3. Primary research targets include the adoption and licensing of digital I&C technology. In 2018, TVO coordinated a research project on the assessment of the long-term strength of dissimilar joints in the main steam pipes, carried out together with the Finnish Funding Agency for Innovation (Tekes) and other industrial companies. The total duration of project is three years.

The research aims at safe reactor operation, good fuel economy, and safe final disposal of spent fuel. Fuel research is TVO's most important area of international research cooperation, which requires special competence, available testing reactors, and hot cell studies. The best option to obtain all of these is international cooperation. Research further specifies and validates the safe use of the fuel and accident safety margins with a higher burnup. The behavior of fuel in storage and after final disposal is another important field of study. TVO also participates in the international OECD-NEA Studsvik Cladding Integrity Project (SCIP III) to investigate the behavior of fuel rods during various transients.

The processing and final disposal of operating waste, as well as the long-term safety of final disposal operations (VLJ repository) constitute an important research area at the nuclear power plant. A new research and monitoring program for 2018–2027 was prepared and taken into use in 2018.

TVO also actively participates in the work of more extensive international cooperation networks and research projects. TVO is a member of the European NUGENIA association and involved in the management of Euratom's Sustainable Nuclear Energy Technology Platform (SNE TP). The purpose of these organizations is to steer and carry out European research and development in the field of fission energy, focusing on existing reactors, that is, GenII and GenIII nuclear power plants. Furthermore, TVO participates in the Swedish Energiforsk reactor technology research program, the main topics of which are concrete structures, I&C, electrical components and reactor circuit components, as well as materials and vibration management.

TVO supports the development of new research infrastructure in Finland and Europe. New experimental technology is being built into the Jules Horowitz material testing reactor. It can be used for reactor material and fuel research required by modern nuclear facilities, supporting the development of new reactor types over the next few decades. According to plans, the research reactor will be started during 2021.



Safety

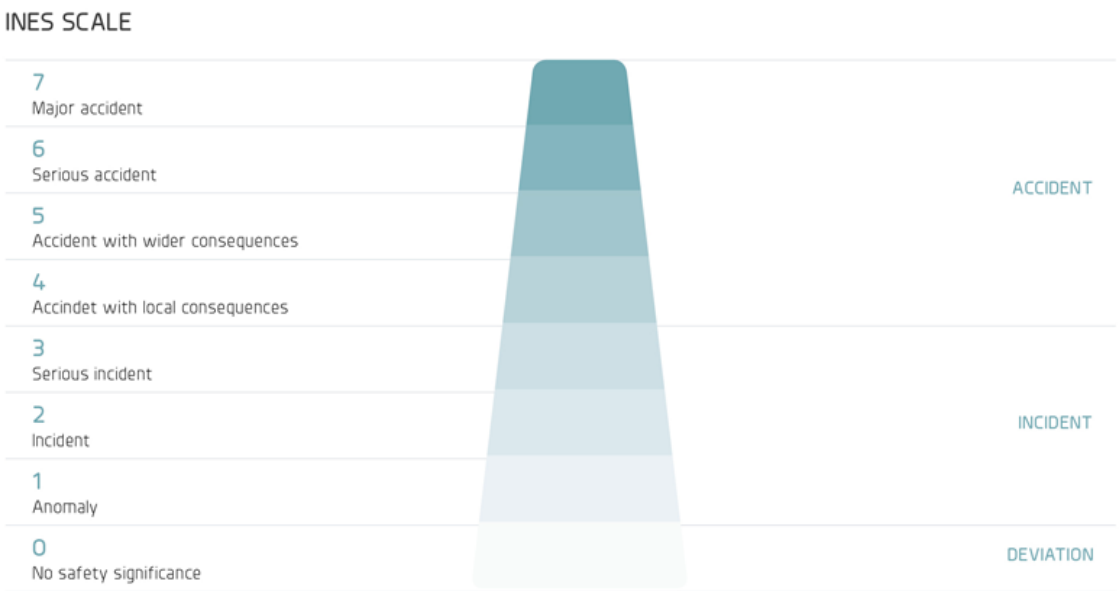
Safe use of the Olkiluoto nuclear power plant is based on competent and responsible personnel, high-quality plant technology, principle of continuous improvement and independent internal and external supervision. TVO's activity-based management system meets the requirements of the ISO 9001 standard. In order to ensure safe operation, TVO systematically estimates the level of safety and safety culture, and the entire TVO personnel is committed to observing a high-quality safety culture.

TVO regularly assesses the state of its overall safety from the viewpoints of production, nuclear safety, safety and service life management as well as management, organization and personnel. The overall level of safety is good.

The state of the safety culture is regularly assessed according to the IAEA procedure. TVO's safety culture is estimated to be at a level at which the strategic importance of safety has been recognized and preventative practices are observed. TVO aims at reaching the highest possible level of safety culture. TVO has continued to employ various measures to maintain and develop the Company's safety culture.

The Company regularly assesses the operations of its plant units with the help of internationally used safety indicators. Of the safety indicators, collective radiation dose, unplanned energy unavailability factor and unplanned automatic scrams realization are described in Table "Objectives and results of TVO's responsibility principle" (see "Responsibility").

The Olkiluoto nuclear power plant units, OL1 and OL2, operated safely throughout the year. TVO classifies events affecting nuclear safety in accordance with the international INES scale (0–7). In 2018, the Olkiluoto nuclear power plant had 9 INES classified issues, of which 8 incidents classified as level 0 (No safety significance) and 1 (Anomaly). In case of special situations and operational disruptions, the Company submits separate, incident-specific reports to the Radiation and Nuclear Safety Authority in Finland (STUK) with plan of corrective measures. TVO publishes information on every event with public interest on the company website in the News section.



INES events	2018	2017	2016	2015	2014
INES 0	8	7	2	5	2
INES 1	1	0	0	1	1

Plant modifications to further improve safety

The refueling and maintenance outages carried out at the plant units on alternating years are designed to ensure that a good level of operability and production is maintained at the Olkiluoto nuclear power plant at all times.

During the 2017 and 2018 annual outages of the OL1 and OL2 plant units, major plant modifications were carried out in preparation for the continuation of the plant units' operating license in 2018. The modifications further improved the plant units' capability of coping with events caused by exceptional natural phenomena.

The 2018 annual outages of the Olkiluoto nuclear power plant were started on April 22 with a refueling outage at OL2. In addition to refueling, the OL2 outage also included annually recurring maintenance work as well as completion of the installation of a new alternative coolant injection system. The outage lasted more than 13 days.

At OL1, the annual outage commenced on May 13 and was completed on June 23. The most important work of the outage at the plant unit included replacement of the reactor's main internal pumps and their frequency converters, renewal of turbine condensers, installation of a new alternative coolant injection system, high-pressure drain forward pumping, and replacement of the high-pressure preheaters and feedwater distributors. A containment leak-tightness test was also carried out.

Procedures of Nuclear industry were enhanced

The principles of management and working policies in nuclear power plant were developed in 2018 by defining the expectations for Nuclear professionals. The expectations were included in TVO's Operating System.

The expectations cover the features of all personnel and contractors working in Olkiluoto. They also include function specified expectations for production, lifecycle management, safety, construction site standards, maintenance and final disposal.

Function specified expectations are complied jointly with Company's policies, instructions and procedures in every day work. Implementation of expectations for Nuclear professional will be continued in 2019.

Preparation for crises and exceptional situations

Laws, decrees, and regulations provide the framework for fire response operations as well as emergency preparedness and safety arrangements. Regulatory guides define the minimum requirements for the operations. TVO carries out emergency preparedness operations in accordance with its own action plans.

Provisions for exceptional situations are included in TVO's procedures, and they are used as the basis for action, training, and practice plans that relate to emergency preparedness operations, fire safety, and security arrangements. The procedures are regularly reviewed and updated. TVO has prepared crisis communication procedures and also practices their execution during drills for exceptional situations. Corporate Communications is responsible for crisis communications.

Several exceptional situation drills were organized in 2018, including emergency preparedness drills, joint drills with the fire department, and joint drills with the security organization. Drills are organized every year, and their scope and duration vary in accordance with the objectives of the drill. The purpose of the drills is to test procedures for their coverage and practical feasibility, and to improve cooperation between various operators. The most important cooperation parties include the Radiation and Nuclear Safety Authority, the police, and the rescue services.

Good work community

The objective of TVO is to have an equal, healthy working environment that tolerates no discrimination and promotes the implementation of equality.

TVO's Code of Conduct and company-level policies determine the HR policy principles. A prerequisite for TVO's operations is that its entire personnel remains motivated, take responsible care of their duties and commit to compliance with the agreed procedures.

TVO provides its personnel with varied duties and an opportunity for professional and career development. TVO provides competitive rewards and encourages employees to work profitably, to meet their goals and to operate at a high level every day.

In 2018, TVO continued its activities to develop work community culture and promote safety culture. TVO carries out a personnel survey every 18 months or so. Results of the 2018 survey showed clear improvement in all sectors. TVO's total score (A) was higher than the target level (B). The survey was carried out by Corporate Spirit Ltd.

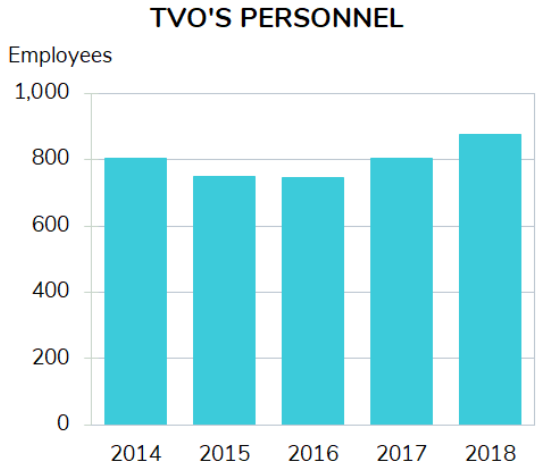
More than 130 new employees joined the Olkiluoto team

In 2018, TVO continued with its preparations for the commissioning of Olkiluoto 3 (OL3) by recruiting new talent. The recruitment campaign was clearly visible in different communication channels over the course of the year. A total of 134 new employees were hired during the year.

At the end of 2018, TVO employed 877 people. The average number of employees during the year was 870. Most of TVO's employees work at Olkiluoto, with some 20 people working in Helsinki. The average age of TVO's employees was 42.7 years in 2018.

At the end of 2018, 21.2% (22.2% in 2017) of the permanent employees were female. The Board of Directors had ten members, one of them female. The Management Team had thirteen members, four of them female. The Management Team includes three personnel representatives. A total of 55 permanent employees left the company. Nine employees left due to retirement and twelve employees from financial administration and payroll accounting became employees of Administer Oy due to a business transfer on 1 November 2018.

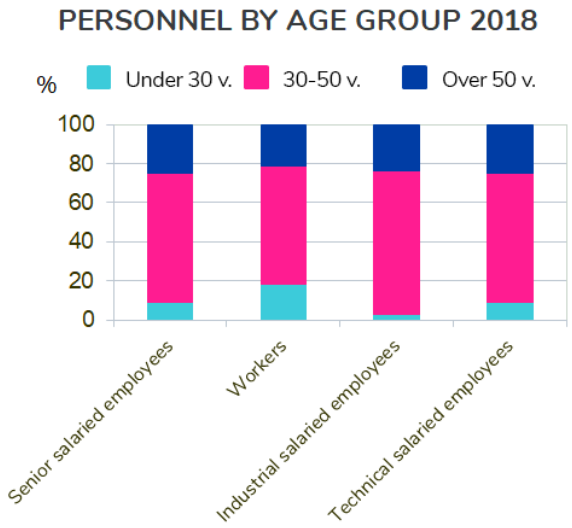
In 2018, TVO employed 105 (2017: 92) summer trainees. As in the previous year, TVO participated in the Responsible Summer Job campaign of the Children and Youth Foundation. The campaign aims to develop summer jobs and the readiness of youth between the ages of 16 and 25 to transfer to working life. For TVO, the participation meant applying the campaign's principles to the summer jobs of interns. TVO also continued its cooperation with educational institutions in the adjacent area and participated in recruitment events arranged by institutes of higher education in different parts of Finland.



Over the course of the year, 9% of TVO's permanent employees (2017: 12%) took parental leave. The competence and expertise of TVO's employees is based on systematic development of professional competence and long employment relationships.

On 31 May 2018, Anna Lehtiranta, Senior Vice President, Stakeholder Relations and Risto Siilos, Senior Vice President, Legal Affairs and Procurement, resigned from the TVO Management Team. On 1 November 2018, TVO's Board of Directors named Ulla-Maija Moisio as the Senior Vice President, Legal Affairs and a new member of the Management Team.

TVO complies with the applicable collective labor agreements for the energy sector in all its operations. The current agreements are valid until 31 January 2020. All of the employees fall under the scope of the collective agreements. TVO has freedom of association. The energy sector's agreed salary systems for technical and industrial officials and employees are based on the job requirement categories and support the implementation of an equal salary policy. As a rule, the various employment benefits apply to the entire personnel, excluding very short employment relationships.



Large projects provide employment for thousands of people in Olkiluoto

OL3 EPR is a large international project and the plant supplier's average workforce at the Olkiluoto 3 construction site was 1,895 in 2018. A high level of safety culture is required from all parties working at the construction site. The occupational health and safety of the employees working at the site remained at a good level.

Annual outages of the OL1 and OL2 plant units give work to dozens of subcontractors from Finland and abroad every year. In 2018, a total of 1,405 people participated in the work during the annual outages.

Wellbeing at work

Better Workplace project develops the Group's management and operating culture.

Goals of the Better Workplace project include boosting the operations and ensuring good operational preconditions by developing issues pertaining to the employee's own work, their immediate work community and the entire Group.

The 2018 themes of Better Workplace were the development of work community skills and wellbeing at work, introduction of lessons learned from change management and communication projects to the work of

supervisors and the personal safety and occupational health and safety sub-area of the main theme “healthy at work and on the way from work to home”.

The goals in 2018 were performing an intermediate assessment of the results of Better Workplace, monitoring the agreed development actions and integrating the project with other development projects, such as projects on safety culture and wellbeing at work. Additional goals included promoting the concrete development actions, making practical work more fluent and communicating information about these issues. Supervisor training will continue in 2019 in compliance with the above-mentioned goals.

Wellbeing at work as part of development of corporate culture

Key development actions related to the maintenance and development of wellbeing at work in 2018 involved occupational health and safety, personal safety, development of the atmosphere at work and operations arranged together with occupational healthcare services. Furthermore, for the purpose of developing the work community, lectures were held for the employees on topics such as building trust in the work community, the liability of employees, working together, managing stress and efficient meeting practices.

Close cooperation with occupational healthcare services has continued. The company uses an early intervention model and has created models for substitutive and lighter work. Occupational healthcare services focus especially on proactive management and maintenance of working capacity and risk-based working capacity analyses. An example of this is the lively small group activity targeting the factors that threaten the working capacity of special groups.

In addition to the comprehensive occupational healthcare services that are available to all the Group’s employees, supplementary insurance coverage for the employees promotes wellbeing at work. All the Group’s permanent employees have access to voluntary medical expenses insurance, additional accident insurance and travel insurance. The employees’ ability to reconcile work and leisure is supported by using flexitime and a sabbatical leave system. A new system introduced to support the reconciliation of work and leisure is a working hour bank system. The working hour bank system covers senior officials who are included in the scope of the total compensation system.

Employees of TVO Group can use Smartum sports and culture balance, through which the employer supports the employees’ voluntary working capacity maintenance. Over the course of the year, wellbeing at work and community spirit were maintained and promoted by arranging a variety of family and employee events. In addition, the employees have access to several holiday locations.

Navigation discussions as part of everyday work

Performance, workload and coping at work of the employees are monitored through navigation discussions arranged three times per year. The focus in management and supervisory work has been shifted from the monitoring of working hours towards the management of performance. This procedure allows for more flexible ways of working, such as telecommuting, for all employees whose job description allows it. In the navigation discussions, all employees can discuss their development proposals involving the operations of the company, their immediate work community, or their own work with their supervisor.

Development of competence

Competent and motivated employees create the foundation for the safe operation of a nuclear power plant.

TVO continuously offers training to maintain the competence and expertise of its employees and the external workforce. Internal training courses are arranged on topics such as plant, nuclear power and operating technology. A high level of expertise can be achieved by using training requirements tailored for the different units, job rotation, employee orientation and work guidance. An individual training plan has been prepared for each employee of TVO. The plan includes training requirements involving the unit, licenses/permits and special roles.

PERSONNEL WERE TRAINED ON AVERAGE

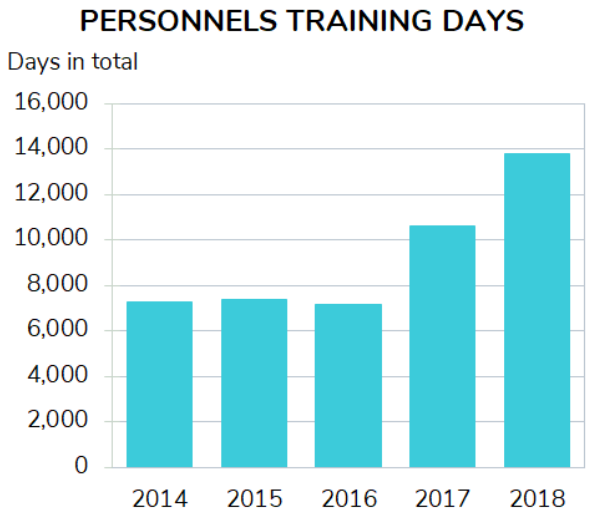
15.7 DAYS

In 2018, competence development focused especially on plant introduction training courses, introduction of a competence analysis system and modernisation of online training. The main goal of operation training at OL1 and OL2 was the implementation of high-quality training, with particular focus on plant modifications. The planned goals were reached.

The operating personnel of the nuclear power plant receive comprehensive training throughout their careers. In spring and autumn 2018, operators of OL1 and OL2 participated in operating training events and advanced simulator courses as required by their refresher training program.

Several supervisor training events focusing on a variety of themes were arranged. Furthermore, a number of people completed supervisor training and special training on supervisory operations.

Basic annual outage competence was developed with two separate training courses. The prerequisites for receiving an access permit were completion of the annual online training course and practical training (in a "mock-up tent"). The purpose of these actions was to inform the employees of the Group and all persons working on the site during the annual outages of TVO Group's expectations related to high-quality work performance and correct procedures. A total of 828 TVO Group employees, 1,930 subcontractors and 55 representatives of authorities were trained. The total number of persons attending the training was 2,758.



TVO aims to do its part in competence development, being aware of the fact that it will continue to employ new nuclear sector experts in the future. Cooperation with educational institutions and schools takes place in many different ways.

The Group prepares an extensive annual training program that takes into account unit-specific training requirements and other special training needs observed in the organisation. The annual training program was mostly implemented according to plan. In 2018, the employees received a total of 13,813 days of training, which means on average 15.7 days per TVO employee.

All employees working at the Olkiluoto nuclear power plant site must complete the general part of the introduction training and all persons working in the controlled area must complete the radiation protection part of the training. Both training courses must be repeated every three years. The figures for the general and radiation protection part of the introduction training include the attendance of TVO Group employees and subcontractors. In 2018, 3,585 people completed the introduction training, of whom 1,567 people completed an online refresher course.

The radiation protection part was completed by 1,703 people, of whom 697 completed an online refresher course. Both training parts were provided in Finnish and English.

Training for OL3 operators

In 2018, OL3 operators participated in training arranged by the plant supplier as well as a theory course and simulator training included in the basic simulator training course. The operators also attended training events in spring and fall in accordance with their refresher training program. The OL3 operators worked in shifts in the joint operating organisation of the plant supplier and TVO, performing operational and monitoring tasks and participated in the inspection and preparation of operating procedures. Licensing of the OL3 operating personnel took place in late 2018.

Competence analysis

The competence analysis project continued in 2018 with an assessment of the units' competencies and their criticality in terms of the business, carried out by employees and supervisors. The navigation discussions between the supervisors and employees are also part of the competence analysis. The competence analysis aims at surveying the competencies required by the Group. The competence analysis provides valuable information on any competence gaps, which will improve awareness of the actions needed to improve competence development.

Occupational health and safety

TVO's goals are to guarantee its employees, contractors and service providers a safe workplace and operating environment, as well as to verify that standardised operating methods are used in the Group's operating area.

The occupational health and safety operations are governed by a certified occupational health and safety system (OHS system) compliant with OHSAS 18001. It also covers TVO's share of the OL3 construction site operations. Work to renew the OHS system to make it compliant with ISO 45001 was started in 2018. The plan is also to merge the OHS systems of TVO and Posiva.

Mission of the occupational health and safety organization is: The line organization identifies and monitors their own OHS responsibilities and independently handles OHS issues. The OHS organization is an expert organization that supports, supervises, and develops occupational health and safety operations, as well as assists the line organization.

Reports on functionality of the OHS system and the required corrective measures are submitted to the management twice a year in connection with management reviews. Development of the operations is supported by annually set OHS targets.

The occupational health and safety policy is included in the group-level policy under social responsibility. The starting points for the occupational health and safety policy are zero accidents, maintenance of a good atmosphere at work and habitability, as well as zero tolerance in terms of workplace harassment or bullying.

All persons working at the Olkiluoto site must complete the occupational health and safety card training, and it is a prerequisite for receiving an access permit. According to the zero accidents goal, all accidents can be prevented by properly planning the work, by proactively identifying risks and by performing the work in a high-quality manner.

OHS cooperation across organisational borders

The occupational health and safety operations are coordinated by the OHS experts in the competence centre's fire, environment and OHS team. Furthermore, personnel groups (employees and officials) have named industrial safety delegates and deputy delegates from amongst themselves. There is an Olkiluoto OHS team consisting of OHS experts, industrial safety delegates, representatives of the different business functions and units, as well as representatives of occupational healthcare services. The comprehensive assembly of the team ensures that the team is representative of the entire personnel.

Senior management of the company reviews functionality of the OHS system twice a year. The management sets company-level OHS goals. The management OHS representative in the Management Team is the head of the Security business. Once a month, the management performs a safety walkdown of an agreed site. Observations made during the walkdowns are entered in the electronic quality management system for further actions. The development of OHS issues is also monitored by the company's Board of Directors.

The goal set for 2018 was decreasing the combined accident frequency at Olkiluoto from the previous

year's target level of 20%, which means 3.2 or fewer accidents per one million working hours. This goal applies to employees of TVO, Posiva and subcontractors working at Olkiluoto.

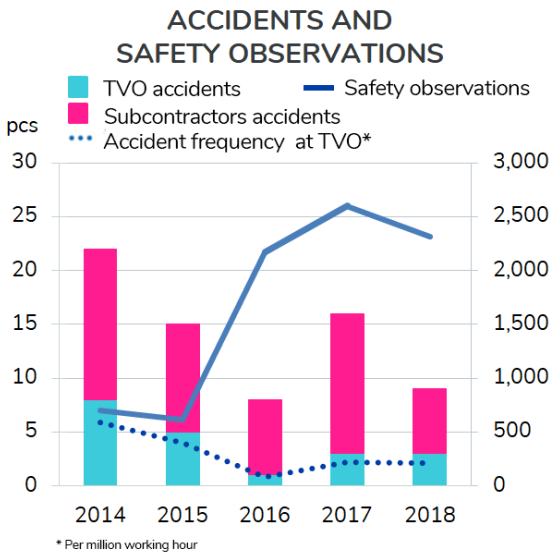
Goal	Indicator	Actual
Accident frequency at Olkiluoto (not CFS) < 3.2	Monthly cumulative accident frequency monitoring for previous 12 months	3.6

OHS goals were determined during the planning of the OHS organisation's operations. They aim to influence the goal set by the Group. The main themes in 2018 were the use of personal protective equipment at Olkiluoto, support of supervisors' safety-oriented work and development of risk assessments and risk management.

The number of accidents resulting in absence among TVO's own personnel was three during the year, the accident frequency being 2.1 accidents per one million working hours. The total number of absence days due to accidents was 81. Two commuting accidents resulting in absence took place during the year. All the accidents resulting in absences were investigated and corrective actions were specified to prevent reoccurrence of the accidents.

Employees of TVO's subcontractors in Olkiluoto had six accidents resulting in absences, the accident frequency being 4.4 (2017: 9.5) accidents per one million working hours. The total number of absence days of subcontractor employees due to accidents was 24 (2017: 216). Nine accidents resulting in absences took place at the OL3 construction site.

The combined accident frequency at Olkiluoto was 3.6. This figure includes TVO's employees, Posiva's employees and the employees of all the subcontractors who worked at Olkiluoto, excluding the OL3 construction site, the statistics of which are reported by the AREVA-Siemens consortium.



The management of the company specified goals for 2019 in connection with its strategy planning. OHS is included in the planning of the safety strategy. The company-level goal was set as decreasing the combined accident frequency at Olkiluoto to 3.2 or fewer accidents per one million working hours.

Careful investigations and instructions will prevent future accidents

Reporting all observed hazardous situations assists in the prevention of accidents. The investigation of hazardous situations and implementation of corrective actions aim to prevent the reoccurrence of the events. In addition to slipping and stumbling, the most common accident type at Olkiluoto in 2018 was a burn caused by a short circuit.

The supervisor of an employee involved in an accident initiates the accident investigation together with the occupational health and safety organisation. A report of all accident investigations is submitted to the line management. The line management is then responsible for processing the report in each of the organisations and verifying that corrective actions are implemented. The safety level of all ongoing construction sites is monitored by means of weekly TR measuring rounds.

Radiation safety

TVO and the personnel of the Company are in all radiation protection activities committed to the ALARA principle (as low as reasonably achievable). According to the principle, individual and collective radiation doses are kept as low as possible by practical measures.

The limitation of the doses and keeping radioactive emissions as low as possible are taken into account already at the design stage of structures and functions. Every employee shall consider factors that influence radiation protection in their own work. The development of radiation protection activities is based on regulatory guidelines, and also on international recommendations.

The radiation doses of everyone working in the controlled area of the nuclear power plant are monitored and measured using dosimeters. According to Section 3 of the Radiation Decree in Finland, the effective dose caused to a worker by radiation work shall not exceed an average of 20 mSv per year reckoned over a period of five years, nor 50 mSv in any one year. TVO's own goal regarding individual doses is that the annual dose shall not exceed 10 mSv per year for anybody working in Olkiluoto and the doses caused by internal contamination shall not exceed the value of 0.5 mSv. These goals have also been achieved.

New radiation protection legislation entered into force on 15 December 2018. The dose limits set in the new law are stricter than before. In 2018, the radiation doses remained below the limit values set in the new law.

Radiation exposure under dose limits

The radiation exposure of employees in Olkiluoto has been low, remaining clearly below the dose limits specified by the authorities. In 2018, the total dose of employees subject to radiation exposure was 1 101 man-mSv. A total dose of 918 man-mSv was accumulated during the power plant's annual outage.

The combined radiation dose of TVO's own personnel was 250 (2017: 210) man-mSv, and that of external personnel 851 (2017: 740) man-mSv. The highest individual annual dose incurred at the Olkiluoto nuclear power plant was 9.49 mSv. The number of employees covered by dose monitoring was 4,324 (2017: 3,350), and the doses of 1,226 (2017: 1,167) persons exceeded the recording limit. The average annual radiation dose received by a person living in Finland from environmental radiation sources is approximately 3.2 mSv.

Environmental radiation exposure under extensive monitoring

Environmental radiation safety is at the Olkiluoto nuclear power plant monitored on a regular basis with many different methods and through the cooperation of several parties. TVO has set up seven continuous radiation dose rate measurement points in the plant area and ten in the surrounding region. These automatically report their results as well as any alarms to both the Olkiluoto plant units and the Radiation and Nuclear Safety Authority (STUK). TVO has installed four air samplers and eleven dosimeters in the immediate vicinity of Olkiluoto. The sampler filters are analysed for radioactivity every 1–4 weeks. The

dosimeters are read four times a year. In addition to these, TVO carries out extensive measurements in the plant area twice a year, and uses portable measurement equipment to perform work-specific radiation monitoring when necessary.

The people living in the environment of the nuclear power plant are once a year measured in Olkiluoto in STUK's mobile full-body scanner unit. TVO reports the results of radiation safety monitoring carried out in the plant environment to environmental and radiation safety authorities.

In measurements conducted by STUK on the local residents, no radioactive nuclides originating from the plant were detected.

Social responsibility key figures

Personnel

Personnel structure	2018	2017	2016	2015	2014
Personnel, permanent, Dec 31	862	783	720	730	751
- Men	679	609	555	570	583
- Women	183	174	165	160	168
Personnel, fixed-term, Dec 31	15	23	26	18	54
- Men	10	12	14	6	28
- Women	5	11	12	12	26
Personnel, part-time, Dec. 31 1)	18	11	17	14	-
- Men	6	4	7	5	-
- Women	12	7	10	9	-
Average age of personnel 1)	42.7	43.2	43.3	42.8	43.4
- Men	43.2	43.6	43.8	43.2	43.8
- Women	40.7	41.8	41.8	41.4	42.0
Personnel place of domicil (%) 1)					
- Eurajoki	18	19	17	17	17
- Rauma	50	51	53	54	54
- Pori	15	14	14	13	12
- Other	17	16	16	16	17
New employees 1)	134	110	48	69*	33
- Men	102	92	32	48*	28
- Women	31	18	16	21*	5
Average age of new employees 1)	34.8	35.8	34.1	38.4*	30.6

- Men	35.3	36.2	34.8	36.6*	30.8
- Women	33.3	33.7	32.8	42.3*	30.0
Average service period 1)	11	12	13	13	14
Incoming turnover (%) 1)	15.5	14.0	6.7	9.5*	4.4
Ongoing turnover (%) 1)	6.4***	6.0	8.1**	12.3	5.9
Number of retirees 1)	9	8	17	28	24
Average age of retirees 1)	63.8	64.6	63.7	63.3	63.2
Summer workers	105	92	79	75	129
- Men	78	68	49	46	87
- Women	27	24	30	29	42
Board of directors by age (%)					
< 30	0	0	0	-	-
30-50	40	45	30	30	-
> 50	60	55	70	70	-
Management group by age (%)					
< 30	0	0	0	-	-
30-50	23	21	31	23	-
> 50	77	79	69	77	-

1) 1) Data only reported for permanent employees
* The figure includes 30 employees who were transferred to TVO due to a business transfer.
** The figure includes 9 employees who were transferred to TVO due to a business transfer.
*** The figure includes 12 employees who were transferred to TVO due to a business transfer.

Personnel sections by gender	**Women (%)**	**Men (%)**	**Total**
Senior salaried employees	133 (26 %)	380 (74 %)	513
Workers	0 (0 %)	165 (100 %)	165

Industrial salaried employees	28 (97 %)	1 (3 %)	29
Technical salaried employees	22 (14 %)	133 (86 %)	155

Personnel sections by age	**Total**	**< 30**	**30-50**	**> 50**
Senior salaried employees	513	48	339	126
Workers	165	30	100	35
Industrial salaried employees	29	1	21	7
Technical salaried employees	155	14	103	38

In 2018, hired permanent personnel by age	**Men**	**Women**	**Total**
< 30	36	12	48
30-50	59	18	77
> 50	8	1	9

Service period by age and gender (departed personnel 2018)*	**Men**	**Women**	**Total, on average**
< 30	2	0	2
30-50	5	12	8
> 50	26	26	26
Total, on average	14	17	15

* The figures in the table includes 12 employees who were transferred to TVO due to a business transfer.

Wellbeing at work

Occupational health care figures	**2018**	**2017**	**2016**	**2015**	**2014**
Absentee rate, illness (%)	3.1	2.1	2.4	2.6	3.4

- Men	2.9	2.0	2.5	2.5	3.4
- Women	3.6	2.5	2.2	3.2	3.1
Absentee hours, illness (h/person)	55	41	48	53	63
Persons, with 0 absentee rate 1)	238	300	246	289	233
- Men	192	243	202	235	205
- Women	46	57	44	54	28
Occupational sickness rate	0	0	0	0	0
Health percentage (%)	29	38	33.8		
Proportion of preventive occupational health care and medical care of total costs (%)	68	69.6	66.8		
Proportion of medical care of total costs (%)	25	23.1	24.8		

1) Data reported only for permanent employees

Competence development

Competence indicators	2018	2017	2016	2015	2014
Training days per person	15.7	13.2	9.4	9.3	8.5
Training days total	13,813	10,639	7,157	7,392	7,272
- Men	11,946	9,018	6,021	6,362	-
- Women	1,866	1,621	1,136	1,030	-
Training days on average					
- Senior salaried employees (11.7 days/person)	7,157	5,343	3,992	3,393	3,667
- Technical salaried employees (22.7 days / person)	4,030	3,475	2,188	1,986	2,429
- Industrial salaried employees (2.8 days / person)	121	107	67	148	164
- Workers (10.6 days / person)	2,064	1,436	751	1,719	740
- Fixed-term employees + others (12.1 days / person)	440	278	159	146	271
Induction training - general part in Finnish					
- Participants	2,034	2,119	717	1,599 1)	1,188
- Training revised by e-learning	1,113	991	973	756	344
Induction training - general part in English					
- Participants	1,551	1,950	1,847	1,977	706
- Training revised by e-learning	454	202	197	56	-
Induction training - Radiation protection part					
- Participants	1,202	1,397	647	936	671
- Training revised by e-learning	655	637	489	555	229
Induction training - Radiation protection part in English 2)					
- Participants	499				
- Training revised by e-learning	42				

- Occupational Safety Card training, participants	398	144	137	190	428

1) An error was detected in the number of persons who participated in the general part of the introduction training in Finnish. The error has been corrected.

2) Reported as of 2018.

Occupational safety

Occupational health and safety figures	2018	2017	2016	2015	2014
Accidents of TVO personnel					
Absences, more than one day	3	3	1	5	8
- Men	3	2	1	5	7
- Women	0	1	0	0	1
Absences due to occupational accidents (days)	81	13	7	16	39
- Men	81	12	7	16	33
- Women	0	1	0	0	6
Accident frequency	2.1	2.2	0.8	4	5.9
(occupational accidents per one million working hours)					
- Men	2.7	2.1	1	5.2	5.1
- Women	0	3.5	0	0	0,7
Lost day rate (per 100 employees) 1)	11.2				
Zero accidents, no absence	16	8	13	11	11
- Men	11	5	11	9	7
- Women	5	3	2	2	4
Accidents on the way home or to work	2	5	1	3	2
- Men	1	4	0	2	2
- Women	1	1	1	1	0
Safety observations	2,319	2,602	2,171	618	703
Work related deaths (incl. TVO personnel and subcontractors)	0	0	0	0	0

Accidents of TVO sub-contractors					
- absences, more than one day (LTA1)	6	13	7	10	14
Occupational accidents, OL3					
- absences more than one day (LTA1)	9	9	5	9	7

1) Reported as of 2018.

Radiation safety

	2018	2017	2016	2015	2014
Personnel maximum radiation dose (mSv) 1)	9.5	9.0	8.1	7.91	7.66
Collective radiation dose (manmSv)	1,101	950	884	752	643
Annual outage radiation dose (manmSv)	918	775	730	614	514

1) The maximum permissible annual dose is 50 mSv / year and over five consecutive years of 100 mSv for radiation workers.

Shareholder value

Nuclear power is a competitive, CO2-free electricity production method. In future, the EU's stricter binding emission reduction requirements will further improve competitiveness of clean energy when compared to the fossil options.

One of the benefits of nuclear energy is its stable and predictable price to the owners. Most of the total costs of nuclear electricity are capital costs, while fuel costs remain fairly low. The construction and production of nuclear power do not require any financial support from society.

For more than forty years, TVO has produced electricity for its industrial and municipal owners at cost price. TVO's nuclear electricity has boosted competitiveness of the industrial owners and their prerequisites for providing employment in Finland.

Nuclear power is an extremely efficient energy production method: for example, the amount of uranium fuel that fits into a matchbox is more than enough to produce electricity for one year for a family of four living in a detached house with electric heating. Electricity produced in Finland brings wellbeing and offers the preconditions needed for growth – and it will continue to do so in future as well.

In the case of nuclear power, competitiveness challenges include rising costs and increased price fluctuation due to weather-dependent production. Operators in the nuclear industry are actively developing the industry to secure future operational preconditions.

Profitable investment

TVO produced approximately 16% of all the electricity consumed in Finland.

TVO operates according to the cost price principle, and produces electricity to its shareholders at cost price. The shareholders cover all of TVO's operating costs and, in return, receive electricity pro-rata to their respective shareholding. They consume the electricity themselves or sell it on to third parties. The cost price model allows electricity companies and electricity consumers of different sizes to participate in major investments, such as those required for nuclear power, and take advantage of the benefits of large-scale production. TVO's shareholders include 132 municipalities, which means that the benefits of stable costs and predictability based on cost-price electricity are enjoyed across Finland. Due to the cost price principle, conventional financial indicators cannot be applied to TVO, as they were created for comparing profit-making companies. Indicators that are important to TVO and the shareholders include the amount of electricity produced and the load factors of the plant units.

The most important financial goals of TVO in 2018 comprised achievement of the budgeted production costs and the electricity supply volume specified in the plans. The most important indicators of economic responsibility are presented in the financial statements of 2018.

The third best production year ever for Olkiluoto 2 plant unit

TVO's Olkiluoto nuclear power plant had a good production year in 2018. The electricity production of the Olkiluoto power plant units, OL1 and OL2, during 2018 was 14,089 (13,415) GWh. The total load factor was 91.1 (87.2) %.

The plant units operated safely. OL1's net production was 6,755 (7,158) GWh and load factor 87.8 (93.1) %. OL2's net production was 7,334 (6,256) GWh and load factor 94.3 (81.3) %.

The production of the OL2 plant unit was the third best result ever in the history of the unit. The production volume and load factor of OL1 did not rise as high as in the previous years due to some major modification and repair works carried out during the annual outage. Thanks to the modifications the nominal output of OL1 was increased from 880 megawatts to 890 megawatts at the turn of the year.

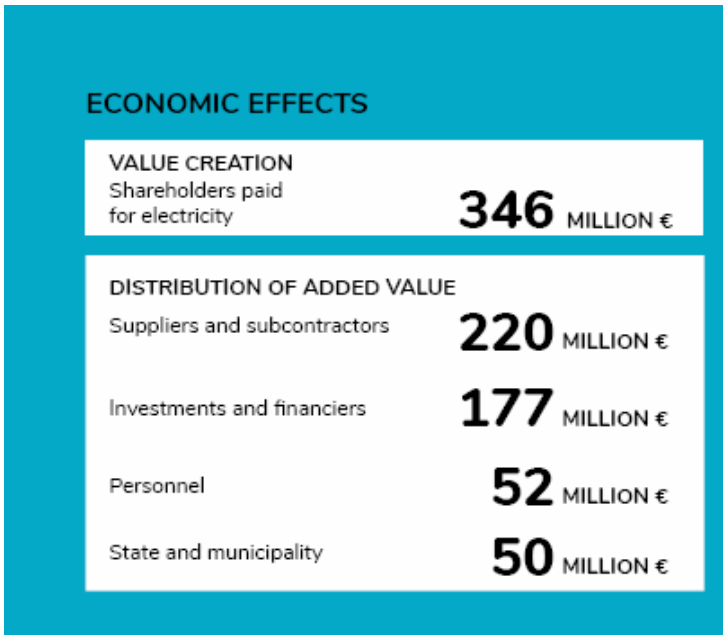
The Finnish Government approved the extension of operating licences for OL1 and OL2 plant units to be continued up till the year 2038. The Government decision was preceded by the statement of the Radiation and Nuclear Safety Authority (STUK) issued in May. According to STUK, the operation carried out by TVO is safe and in conformity with the law, and the Company has the required capabilities, procedures, expertise and resources for the safe continuation of the operation of the OL1 and OL2 plant units up till the year 2038.

In 2018, TVO's investments totalled EUR 176,7 million of which the OL3 project accounted for EUR 107.9 million.

Economic impacts

TVO uses in applicable parts in the reporting of economic responsibility the key indicators referred to in Global Reporting Initiative (GRI) Standards and reports some figures obtained from the financial statements process that are not included in the actual financial statements. We describe the economic impacts (M€) of TVO on the most important stakeholders by means of the Figure below. The numerical data presented in the Figure have been derived from TVO's profit and loss account and balance sheet. All impacts are not described in the legends.

The economic impacts (M€) of TVO are described by (Figure) below.



Producing added value

TVO produces electricity to its shareholders according to the cost price principle. In 2018, the shareholders of TVO paid EUR 346 million for the electricity. TVO supplied 14,723 GWh of electricity, or about one sixth of the electricity consumed in Finland.

This electricity travels all across Finland via TVO's shareholders, because the owners of TVO's largest shareholder, Pohjolan Voima, and thus the recipients of the electricity, consist of a large number of Finnish companies as well as 132 municipalities through the energy companies they own.

About half of the electricity produced by TVO is used in industries by the industrial companies owned by TVO's shareholders in different localities. About half is consumed in households, agriculture and the service sector.

Distribution of added value

Suppliers and sub-suppliers: The annual outages employed about 1,320 external employees, ca. 1,000 of them Finnish. The contractors came from 20 different countries, in addition to Finland.

Long-term cooperation partners have included Securitas Oy that is in charge of security services, Rauman Hovi Oy that runs the staff catering services, and RTK-Palvelu Oy that provides housekeeping and sanitation services. The total number of their employees working in Olkiluoto is more than 300. All in all, TVO employed more than 700 persons in Olkiluoto on a regular basis through contractors and consulting firms.

Investments and investors: TVO's short and long-term debt totalled EUR 4,750 million at the end of the year. A total of EUR 894 million was borrowed in new loans, and the repayment of the loans amounted to EUR 718 million.

The good condition of the Olkiluoto nuclear power plant at all times in production and functional terms is ensured through alternating refueling and maintenance outages at the plant units. In the maintenance outage of 2018, major works included replacement of the reactor's main internal pumps and their frequency converters, renewal of turbine condensers, installation of a new alternative coolant injection system, high-pressure drain forward pumping, and replacement of the high-pressure preheaters and feedwater distributors.

Investments in the OL3 project totalled EUR 108 million in 2018. Training of the operating personnel has progressed, and the first statutory decisions on operator licenses were obtained in December.

Investments in R&D totalled EUR 26 million, with the majority spent on R&D related to nuclear waste management.

Personnel: At the end of the year, the number of TVO's employees was 877. 50 percent of the employees live in Rauma, 15 in Eurajoki and 15 in Pori. TVO hired 134 new employees in 2018, and 9 persons retired.

The average number of personnel on the OL3 worksite was 1,500 at the end of the year. In addition, subcontractors involved in the project provide employment opportunities both in Finland and internationally. TVO paid the Municipality of Eurajoki EUR 16 million in real estate tax.

In 2018, TVO paid EUR 34 million in the State Nuclear Waste Management Fund where funds are collected to cover the future costs of nuclear waste management.

The figures presented have been derived from TVO's profit and loss account, and balance sheet. All impacts are not described in the legends.

Supply of electricity in Finland and climate impact

The volume of electricity production in Olkiluoto will be doubled when the operation of the OL3 plant unit starts. This means that the emission-free nuclear electricity produced in Olkiluoto will play a significant role in the economic development, electricity self-sufficiency and general well-being of the whole country.

As a producer of electricity that is benign to the environment and the climate, TVO safeguards and maintains the diversity of nature. About 21 percent of all electricity produced in Finland and about 16 percent of all electricity consumed in Finland is generated on the small island of Olkiluoto, surrounded by four nature conservation areas. The centralisation of energy production into a small area minimises the environmental impact and makes it possible to preserve other areas in their natural state. The Environmental Management System of TVO has been certified against the requirements of the ISO 14001 standard and registered to EMAS.

The effects that the operation of the Olkiluoto nuclear power plant has on land, sea and air are monitored constantly, and environmental baseline studies have been carried out in the area already before the start of electricity production, since the 1970s. Based on the monitoring results, environmental loads are minor. Energy production has had no significant impact on the nature of Olkiluoto, which in main parts is rugged and poor in species. The most significant impact resulting to the environment from the power plant is the thermal load caused by the cooling water to the sea water.

Finnish people are highly concerned about the climate change and the majority consider the fight against climate change extremely important. Nuclear power is seen to play a major role in the common fight against climate change and an increasing number of respondents believe that it is very difficult for Finland to reduce greenhouse gas emissions to the atmosphere without the construction of new nuclear power plants. Nuclear electricity contributes significantly to the reduction of greenhouse gas emissions and the achievement of the climate target. Without nuclear power, there is no credible path to a low-carbon society.

The number of people who are in favour of nuclear power due to environmental reasons is increasing. The production of nuclear power does not cause any carbon dioxide emissions; emissions remain on the same level with hydropower and wind power during the entire lifecycle of nuclear power. TVO's role in the mitigation of climate change and promotion of sustainable development is significant. Emission-free nuclear power creates the basis for green economy.

TVO cooperates with political decision-makers and the government in the development and adoption of laws and guidelines pertaining to the energy sector. TVO's contact with all the stakeholder groups is based on high ethical principles and thus reinforces confidence in the operation of both TVO and the stakeholder group, posing no threat to the reputation or objectivity of either of them.

ENVIRONMENTAL REPORT 2018

TVO as a company

TVO is a non-listed public limited liability company owned by Finnish industrial and energy companies. According to TVO's Articles of Association, the Company operates in the fields of power plant and transmission system construction and acquisition as well as generation, relay and transfer of electricity primarily to the Company's shareholders in accordance with the terms set in the Articles of Association.

TVO operates on a cost-price principle (Mankala principle). TVO's goal is not to make profit or pay dividends. The shareholders are charged incurred costs on the price of electricity and thus in principle the profit/loss for the period under review is zero, unless specific circumstances dictate otherwise. The shareholders pay variable costs based on the volumes of energy supplied and fixed costs in proportion to their ownership, regardless of whether they have made any use of their share of the output or not.

TVO is owned by six shareholders, some of which, like TVO, operate on the Mankala principle. Electricity generated by TVO serves the needs of numerous Finnish industry and energy companies, some of which are owned also by 132 Finnish municipalities. Olkiluoto nuclear power plant generates about 16 percent of all electricity consumed by Finns.

TVO's operations are founded on strong safety culture and securing the safety of production. TVO's activity-based management system covers production activities at the Olkiluoto nuclear power plant, maintaining and developing production capacity, additional construction of production capacity and functions required to control and resource these activities. The system meets the requirements of international quality management, environmental management and occupational health and occupational safety standards has been certified by DNV GL Business Assurance Finland Oy Ab. The general part of the activity-based management system also acts as the licensee's quality control system approved by the Radiation and Nuclear Safety Authority in Finland (STUK). The implementation, functionality and efficiency of the activity-based management system is regularly monitored with internal audits and management reviews.

The objectives of TVO's strategy include predictable and competitive price of electricity, solid safety brand and satisfied customers. The goal is to maintain a competitive average electricity production cost and to ensure that the operability of the plant units meets the Company's goals. Safety culture is maintained at a high level and safety is systematically upheld and developed at all stages of nuclear power lifecycle.

Environment and climate

In its group-level policy, TVO commits itself to the principles of sustainable development, and environmental responsibility is a key part of the TVO management system.

Electricity produced with nuclear power is climate friendly. TVO carries its responsibility for the environment by identifying the environmental and energy efficiency aspects of its operations and minimizing the related adverse impacts. Furthermore, TVO sets targets for its operations in compliance with the principle of continuous improvement. TVO has monitored the impact of its operations on the state of the environment since 1970's and launches immediate corrective actions when necessary. The TVO takes care of the environmental competence and expertise of its personnel and others working at the Olkiluoto nuclear power plant.

TVO believes that its overall responsibility of environment for all stages of the fuel cycle is important. TVO

ensures that nuclear fuel is used in a safe manner from raw material acquisition to final disposal. TVO monitors and supervises the environmental management of fuel suppliers. TVO requires responsibility from suppliers in ensuring and developing the living conditions in the surroundings of uranium production and processing plants while taking local people into account. Fuel is taken care of in a responsible manner all the way from uranium mines to final disposal according to the “from bedrock to bedrock” principle.

The objective of TVO is to prevent and reduce the already low emissions of radioactive substances. Potential exceptional events in the plant process are predicted and preparations are made in order to prevent potential harmful environmental impacts.

Energy and material efficiency is taken into account in all of TVO’s operations

TVO observes energy efficiency requirements and improves the energy efficiency of its operations throughout the organisation. TVO monitors its own energy consumption and improves its efficiency by taking energy aspects into account in project planning, the procurement of components and the development of operating practices and procedures. Plant unit modernisation projects improve the energy efficiency of the power plant process.

TVO improves the efficiency of the use of energy, and raw materials, and improves the reuse of waste. The goal is to increase the relative share of waste delivered to reuse and to decrease the amount of radioactive waste. TVO also strives to reduce the amount of spent fuel through optimisation of the use and properties of the fuel.

Sustainable utilization of the environment is taken into account in the development of the Olkiluoto area and expansion of operations. Surrounded by four nature conservation areas, the small island of Olkiluoto produces around one sixth of all the electricity used in Finland. Centralising energy production into a small area minimises the environmental impacts and makes it possible to preserve other areas in their natural state.

TVO requires not only from its own employees but also all the companies and partners working in the power plant area commit to the group-level policies and the TVO Code of Conduct, and that they have a responsible attitude towards environmental issues.

Environmental management

The operations are managed with a certified environmental management system that complies with the international standard ISO 14001:2015, and includes as well an integrated energy efficiency system.

The system is EMAS-registered, and the goal of the management system is increasing the level and continuous improvement of environmental protection. TVO has identified the environmental and energy aspects of its operations and determined that eight of them are major aspects. The significance of environmental and energy aspects are assessed on the basis of statutory and permit requirements as well as by observing the severity/utility of the impact, probability, and impacts to the stakeholder groups. Also TVO’s opportunity to influence the issue are affecting the assessment process.

TVO has specified for significant environmental and energy aspects targets that are confirmed by the Company Management. An environmental team of experts from various organisational units monitors the achievement of the targets on a regular basis, at intervals of about two months. Other subjects discussed in the meetings of the team include potential environmental non-conformances and observations, as well as topical regulatory matters and other environmental issues. The team acts as an expert, advisor, and information forwarding party in environmental matters. In 2018, the focal area of targets was to enhance the environmental risk management and to add environmental training and communication. The achievement of the objectives of the environmental programme is described in full under Environmental Programme.

The feasibility of the environmental management system is assessed semi-annually in conjunction with the management review. If necessary, corrective actions are specified to ensure that the goals are reached. TVO identifies all statutory and other requirements pertaining to its operations and systematically monitors the requirements for any changes. Compliance with the requirements is also assessed in conjunction with the management review. Furthermore, TVO's operations are regularly assessed both within the organization and by means of external audits.

Anticipation to improve environmental safety

An environmental accident took place at the Olkiluoto nuclear power plant in 2018 when oil leaked from a work machine into the soil. A total of 9 metric tons of contaminated soil was removed. During the year, an accident that had occurred during the construction of OL1 plant unit was also detected. Corrective measures were carried out and supervised by an external operator, and a total of 250 metric tons of contaminated soil was removed. Five cases of minor environmental damage also took place. Three of these were indoor oil leaks, and in two cases, a minor volume of oil leaked into soil.

TVO utilises a system of preventive safety observations to prevent environmental accidents, as only identified risks can be controlled. The target specified for observations related to the environment and energy efficiency for 2018 was 80 observations during the year. With 106 observations made, the target was more than achieved. The safety observations concerned, for example, waste handling, management of chemicals, energy efficiency, and malfunctions of machines. All the safety observations made are monitored and any deficiencies are eliminated immediately to avoid accidents. The environmental authorities are informed of all significant environmental non-conformances and events.

Active communication with stakeholders

Stakeholders have a key role for a company that is engaged in environmentally responsible business. The Olkiluoto Visitors' Center receives about 12,000 visitors each year. The visitors are openly told about TVO's operations, and their questions are answered. Each year, TVO introduces its operations at various trade fairs or other similar events. Furthermore, TVO arranges open coffee and chat events in the neighbouring municipalities, allowing citizens to speak with representatives of the company. In addition to these it is possible to send feedback or questions in TVO web pages. TVO did not receive any expressions of concern related to environmental issues from external sources in 2018.

The Company's system of initiatives also supports stakeholder involvement in TVO's environmental management. The total number of initiatives in 2018 was 125. Part of the initiatives were directly or indirectly related to the reduction of the environmental impacts of the operations or to the improvement of energy efficiency.

Environmental program 2019–2021

An environmental and energy efficiency programme has been prepared for the years 2019–2021 to ensure the achievement of the environmental targets specified in group-level policies and to improve the efficiency of the management of significant environmental and energy aspects. The focal areas of development in 2019 are to enhance the environmental risk management, to improve energy efficiency and to develop the management of chemicals. The efforts based on long-term goals are continued as concerns also the management of radioactive emissions and the thermal load of the cooling water.

Environmental and energy efficiency program 2019–2021

Development of the environmental and energy efficiency program

- Development of environmental risk management: Adoption of a new HSE risk assessment program and performance of assessments in accordance with the plan.
- Increasing awareness of environmental issues and energy efficiency: More attention to be paid to environmental issues and energy efficiency in projects and modifications. Renewal of environmental training.

Management of environmental load

- Zero environmental accidents: No serious or significant environmental accidents, at least 80 proactive environmental observations.
- Production of climate-friendly electricity: Production goal for 2019: 14,800 GWh.
- Management of the cooling water's heat load: Compliance with the target value specified in the environmental permit.

- Management of environmental issues at OL3: Harmonization and updating of the environmental systems of TVO and the plant supplier.
- Optimal and controlled environmental load from the use of chemicals: New pools for preventing chemical contamination, inspection and maintenance of the pools and the oil trap wells and other similar structures in accordance with the preventive maintenance program (100%).

Improvement of material and energy efficiency and sustainable land use

- Total energy saving goal for agreement period 2017–2025: 150 GWh; goal for 2019: 30 GWh.
- Development of circular economy: Reduction of waste volume and recycling of waste as material (a minimum of 35% of the overall waste volume).
- Land use planning: The concentration of energy production in a small geographic area minimizes environmental impacts and allows the preservation of other areas in their natural state.

Suppliers' environmental responsibility

- Environmental and energy efficiency in purchasing: Energy efficiency assessment questions are added to the supplier evaluation procedure.
- Development of supplier monitoring at Olkiluoto: Evaluation of our partners' management of environmental issues and energy efficiency measures.

Isolation of radioactivity originating from the power plant from the organic environment

- Ensuring the purity of the process: Adoption and implementation of the TLTA system for safety classified materials at OL3.
- Keeping radioactive discharges into air and water clearly below the limits set by the authorities: ALARA program.
- Management of nuclear safety risks: Risks are actively identified and measured for their probability and consequences by means of up-to-date Probabilistic Risk Assessment (PRA). The identified risks are mitigated applying the Safety As High As Reasonably Achievable (SAHARA) principle.

Results of the environmental program

Operation complied with the legislation, environmental permits and the environmental management system in 2018.

TVO is committed to promoting the following sustainable development goals of the UN:

The purpose of the targets is to generate stable and climate friendly electricity for the society and to minimize the adverse impacts in all stages of electricity production. In order to achieve the targets,

procedures, responsibilities, and timetables are set. To ensure continuous improvement the implementation of the targets are monitored regularly.

Realization of targets set for environmental objectives in 2016-2018

Target was achieved as planned | Target was achieved partly | Target was not achieved

Management of the thermal load of cooling water / Temperature measurements in the sea area
The cooling water temperature stayed within the limits specified in the environmental permit during the whole period. The extended voluntary monitoring of seawater temperature was continued in the sea areas near Olkiluoto, and measurements were carried out to obtain new information about the spreading of cooling water into the sea area. The analysis of the obtained results was further developed and the results will be utilised in the future in the determination of the baseline state of the environment.

Development of environmental risk management
TVO has recognized the environmental aspects and risks according to the requirements of the environmental management system. The preparedness plan to manage environmental risks was updated in 2018. Procedures and tools for assessing environmental risks were developed, and a new risk assessment tool was acquired.

Management of environmental issues on OL3
TVO has prepared an environmental plan for the OL3 plant unit that includes procedures for the management of environmental impacts. The plan was updated to the commissioning stage in 2017.

Optimised and controlled environmental load related to use of chemicals
The supply of sodium hypochlorite used for the prevention of Cordylophora caspia (freshwater hydroid) was optimised at the OL1/OL2 plant units according to the specified target. Chemical approval procedures were extended to the TVO Group level, and the environmental risks of chemical storage were mitigated by including all protective pools into the scope of regular inspections.

Development of energy efficiency system and activities
The maintenance and development of the energy efficiency system and activities were continued. Training was provided for both TVO's own personnel and cooperation partners in the determination of measures designed to produce energy savings in a techno-economically lucrative manner.

In 2018, TVO continued conducting baseline state reviews in the buildings that had not been reviewed yet. In addition, new energy consumption counters were installed and unit performance tests and energy analyses were conducted to OL1- and OL2 -plant units after the annual outage.

Acknowledgement of biodiversity
Key figures describing biodiversity have been introduced in Olkiluoto for the monitoring of changes in the state of the environment, and the factors causing such changes.

Amount of landfill waste less than 9.5% of total amount of waste
The amount of waste delivered to the landfill in Olkiluoto for final disposal was about 2% of the total

amount of waste in 2018. Waste management was developed in Olkiluoto by the renewal project of the waste sorting instructions and giving waste sorting training, for example.

Reduction of low and intermediate level waste
Training related to TVO's environmental responsibility was provided for TVO's own and external personnel in a practical training (so called mock up -training).

Reduction of environmental impact and costs resulting from work practices of employees
The environmental and energy efficiency training of the personnel and cooperation partners operating in Olkiluoto was reformed during the year. Environmental responsibility is addressed in many of the training events in the TVO Group and information about it has been communicated through many different channels to ensure that everybody working in Olkiluoto is familiar with the environmental principles and objectives of the TVO Group, and the agreed procedures and practices related to environmental issues.

The number of proactive environmental observations made by the personnel and cooperation partners wanted to be increased considerably, and the objective was achieved with 106 submitted environmental observations.

Sustainable development of land use and construction of infrastructure in Olkiluoto based on TVO Group's business needs
Surrounded by four nature conservation areas, the small island of Olkiluoto produces around one sixth of all the electricity used in Finland. The target is to operate according to strategic planning in operations by centralising energy production into a small area to minimise the environmental impact and to make it possible to preserve other areas in their natural state. A steering group for infrastructure and land use adapts infrastructure designed and implemented in the area to the natural environment paying particular attention to natural sites and nature conservation areas.

Control and monitoring of environmental management implemented by cooperation partners
The environmental issues related to the cooperation partners operating in Olkiluoto were monitored through regular environmental inspection rounds. TVO updated the contractors' guidelines related to requirements that concern environmental issues and increased the coverage of supplier assessment surveys.

Ensuring purity of process, zero foreign material non-conformances
TVO nominated FME- and HU-coordinator to be responsible for the cleanliness of the process. The foreign material exclusion (FME) team has continued to increase the awareness of the personnel and the cooperation partners of the challenges related to foreign materials and reduced the foreign material risks of the process through training and practical exercises. In addition, new and better FME-covers were introduced. Regular cleanliness and order rounds took place during the annual outage.

Maintaining radioactive emissions into atmosphere well below regulatory limits
Radioactive emissions to the air remained well below the regulatory limits of the authorities despite the fuel leak at plant units. TVO's own targets defined in the ALARA-programme were not achieved in terms of noble gases and iodine.

Maintaining radioactive emissions into water bodies well below regulatory limits

Radioactive emissions into water bodies (fission and activation products) were considerably lower than the regulatory limits of the authorities. TVO's own targets related to ALARA-program were achieved.

Management of nuclear safety risk

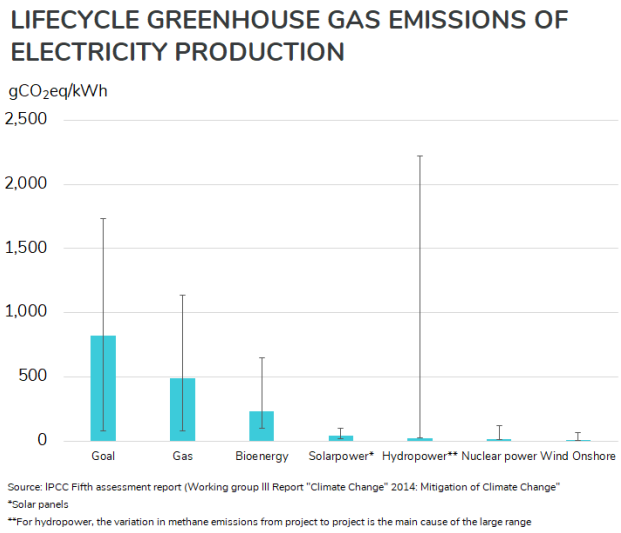
Risks are actively identified and measured for their probability and consequences by maintaining the Probabilistic Risk Assessment (PRA) up-to-date. Identified risks are mitigated according to the Safety As High As Reasonably Achievable (SAHARA) principle. Following the Fukushima accident, TVO has further developed the capabilities of the plant units against extreme natural phenomena and simultaneous losses of power supply. Plant modifications related to these capabilities have been started, and also implemented mostly, which has already been reflected in a considerable reduction of the nuclear safety risk. The rest of the improvements will be implemented in the upcoming years. The changes that occurred in the core damage risk and radioactive emissions risk assessed using the PRA procedure were due to plant modifications as well as improvements made in the PRA models of the plant units.

Climate-friendly electricity

The role of low-carbon energy, such as renewable energy and nuclear power, is crucial in the mitigation of climate change. According to the report published by Intergovernmental Panel for Climate Change (IPCC) in October 2018 nuclear energy has a pivotal role in prevention of climate change. Nuclear power remains a major part of the energy selection of Finland and the entire EU as we make our way towards a carbon-neutral society. In 2018, the share of nuclear power was about 33 percent of all electricity produced in Finland.

The Commission published a new climate strategy that reaches to the year 2050 aiming to a carbon neutral society. The strategy will direct EU’s climate and energy policy during the term of the next Commission. In the strategy, nuclear energy is considered a pivotal part of European energy system beside renewable energy sources.

Nuclear electricity is during its entire lifecycle an as environmentally friendly electricity production method in terms of greenhouse gas emissions as wind power, hydropower and solar power. The use of bioenergy does not add to the amount of carbon dioxide in the atmosphere either. Without the use of nuclear power, annual carbon dioxide emissions would be 20 tons higher in Finland at present.



Environmental impacts

Under normal conditions, the environmental impacts of nuclear energy production do not pose any harm to people or the environment. The impact of Olkiluoto nuclear power plant's operations on land, sea and air are being continuously monitored. Based on the monitoring, operations only cause minor environmental load.

The most significant environmental aspect of the Olkiluoto nuclear power plant is the production of climate friendly electricity and the most significant impact is the warming up of the sea water near the plant. The long-term target is continuous management of the thermal load of the cooling water. During the year under review, the temperature of cooling water remained within the limits required by the environmental permit. Radioactive emissions from the nuclear power plant into air and water bodies were extremely small. The commissioning tests carried out at OL3 created temporary environmental effects.

Nuclear electricity is climate-friendly, and thus TVO is a significant contributor to the mitigation of climate change and promotion of sustainable development. TVO participates in the Energy Efficiency Agreement Scheme, and complies with the associated Action Plan for Energy Production that describes the implementation of actions designed to make the use of energy more efficient and to improve the efficiency of primary energy use as well as the total efficiency of energy production.

OLKILUOTO NUCLEAR POWER PLANT'S ENVIRONMELTAL BALANCE SHEET 2018

Emissions to the air		Allowed annual emissions
Noble gases	0.91 TBq (Kr-87 ekv.)	(9,420 TBq)
iodine	0.0005 TBq (I-131)	(0.103 TBq)
Aerosols	0.0006 TBq	
Carbon-14	0.93 TBq	
Tritium	1.32 TBq	
CO_2	1,505 t	
NOx	1.8 t	
SOx	0.0 t	
Particles	0.1 t	

Uranium fuel	34.7 t
Water	
Tap and process water	372,295 m³
Cooling water	2,200 million m³
Intermediate agents	
Oils	657 m³
NaClO (15 %)	45 m³
Other chemicals	137 t
Ion exchange resins	15 t

Electricity	14.09 TWh		
Municipal waste	OL1 ja OL2	OL3	Total
- Recyclable waste	650 t	1,039 t	1,689 t
- Landfill waste	44 t	0 t	44 t
- Hazardous waste	53 t	112 t	165 t
- Contaminated soil			259 t
Radioactive waste			
- Low level waste			92 m³
- Intermediate level waste			53 m³
- Spent nuclear fuel			32.7 t

Emissions to the water		Allowed annual emissions
Thermal load to the sea	25.8 TWh	(56.9 TWh)
Fission and activation products	0.0001 TBq	(0.296 TBq)
Tritium	1.62 TBq	(18.3 TBq)
Phosphorus	11 kg	
Typpi	4,380 kg	
BOD_{7ATU}	913 kg	

Emissions to the soil

Oil n. 11 l (contaminated soil was removed)

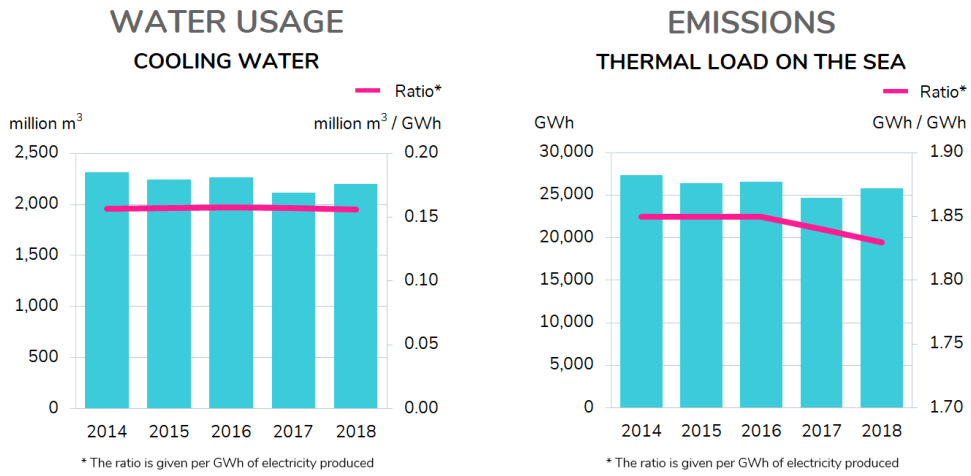
Cooling water

The warming up of seawater, caused by the cooling water's thermal load, is the most important environmental impact of the Olkiluoto nuclear power plant. The total amount of seawater used for the cooling of the OL1 and OL2 plant units is approximately 76 m^3/s.

In 2018, 2,200 million cubic meters of seawater was used for cooling, and the resulting thermal load on the sea was 25.8 TWh. Seawater temperatures are monitored as required by the environmental permit. One of the environmental permit regulations is that the seawater temperature does not exceed the target value of 30°C when measured as a weekly average at a distance of 500 meters from the cooling water discharge channel. Limit values have also been specified for the amount of cooling water (max. 4,415 million m³) and the thermal load (max. 56.9 TWh) in the environmental permit. None of the permit limits were exceeded in 2018.

As the cooling water passes through a plant unit, its temperature increases by approximately 10°C, after which it mixes with seawater. The cooling water does not come into direct contact with the power plant's circulating water. Throughout the operation of the power plant, TVO has monitored the impacts of cooling water and conducted related surveys. The cooling water accumulates in an extensive sea area in the surface layer from where part of the heat transfers into the air. Depending on the weather conditions, an increase in temperature can be observed at an approximate distance of 3–5 kilometres from the cooling water discharge location. The cooling water also causes changes in the ice conditions, as the cooling water discharge area remains unfrozen throughout the winter. The size of the unfrozen and weak ice area varies depending on the winter weather, being at a maximum of around 7 km^2. TVO issues warnings about the

unfrozen area to the local residents in newspapers and on ice warning boards. The warm cooling water extends the growth period in the unfrozen sea area and increases its overall biological production. Other biological effects caused by the cooling water are minor.



Cooling water (milj.m³)	2018	2017	2 016	2015	2014
OL1	1,058	1,134	1,114	1,164	1,140
OL2	1,142	976	1,147	1,075	1,172
Total	2,200	2,109	2,261	2,238	2,312

Thermal load on the sea (GWh)	2018	2017	2016	2015	2014
OL1	12,380	13,263	13,098	13,721	13,481
OL2	13,401	11,423	13,474	12,677	13,871
Total	25,781	24,686	26,572	26,398	27,352

Raw materials and material efficiency

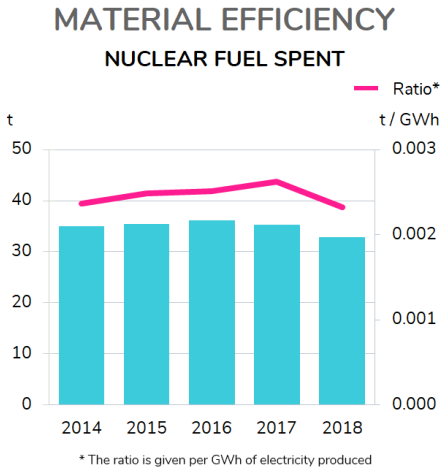
The safe use of uranium fuel is ensured at all stages of the power production chain, from the responsible procurement of uranium to the safe final disposal of spent fuel. The OL1 and OL2 plant units require an annual total of about 40 tonnes of low-enriched uranium for fuel.

TVO applies a diversified nuclear fuel procurement chain, which means that separate contracts are concluded for the different stages of procurement, usually with several suppliers for each stage. Procurement operations are based on long-term contracts with leading suppliers. Uranium is only acquired from suppliers who meet the strict requirements specified by TVO.

Material efficiency is improved in compliance with the principle of continuous improvement

TVO procures products that are durable and have a long lifespan, and to takes into account opportunities for their recycling and potential reuse at the end of their service lives. The company's procurement operations ensure safe, competitive, and reliable production and long-term operation of the plant units.

The products and services procured must meet TVO's quality, work safety and environmental requirements. The availability of products and services necessary for the company's operations is ensured through long-term contracts based on mutual trust and partnership.



Intermediate agents in production

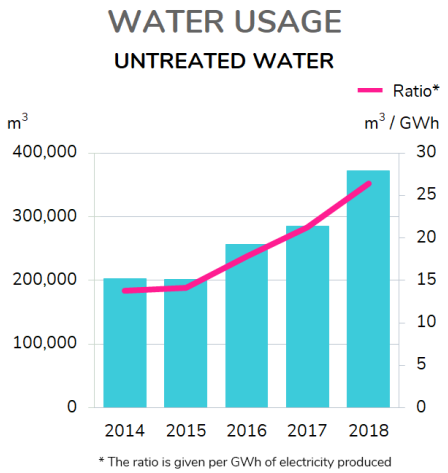
Chemicals are extensively stored and processed by TVO. The Olkiluoto nuclear power plant is a safety report establishment. The intermediate agents include the fuel of the emergency diesel generators, the reserve power boiler plant, and vehicles (oils) and sodium hypochlorite (NaClO) used for hydroid control in the seawater systems. The ion-exchange resin used to clean the circulating water as well as solvents, bitumen, and nitrogen used at the plant (other chemicals) are among the reported additives. Consumption of oil increased due to the commissioning tests of the emergency diesel engines that help ensure the safety of OL3.

Intermediate agents	2018	2017	2016	2015	2014
Oils (m^3)	657	258	255	391	277
NaClO (15%) (m^3)	45	40	41	45	46
Other chemicals (t)	137	176	235	139	191
Ion exchange resins (t)	15	17[1)]	18	15	13

1) Data has changed from the one reported last year

Recycling reduces water consumption

In addition to the seawater used as cooling water, the Olkiluoto power plant makes use of fresh water, used as tap water and circulating water. The circulating water that boils in the reactor may not contain any salts, impurities, or particles that could damage the reactor internals. Olkiluoto has all the necessary plants for water treatment: a water treatment plant, a demineralization plant, a laboratory, and a wastewater treatment plant. The tap and circulating water are treated at TVO's own water treatment plant. Ion exchange and reverse osmosis methods are used to purify the water used in the power plant process. Circulating water is continuously recycled and purified. During annual outages, the fuel pool water is stored in storage pools to wait for redeployment. In total, recycling of water reduces TVO's need for clean circulating water and the amount of circulating waste water discharged from the plant by approximately 30,000 m^3 each year. During the year under review 372,295 m^3 of fresh water was taken from the River Eurajoki. The reason for the increase in the consumption of water was the commissioning stage at the OL3 plant unit.



Raw water treatment	2018	2017	2016	2015	2014
Amount of water (m^3)[1)]	372,295	284,874	256,237	201,229	203,341
Water treatment chemicals (t)[2)]	117	83	70	43	50

1) Amount of water pumped from River Eurajoki to Korvensuo 2) Chemicals used in water processing (H_2SO_4, NaClO (10%), NaOH, sedimentation chemicals)

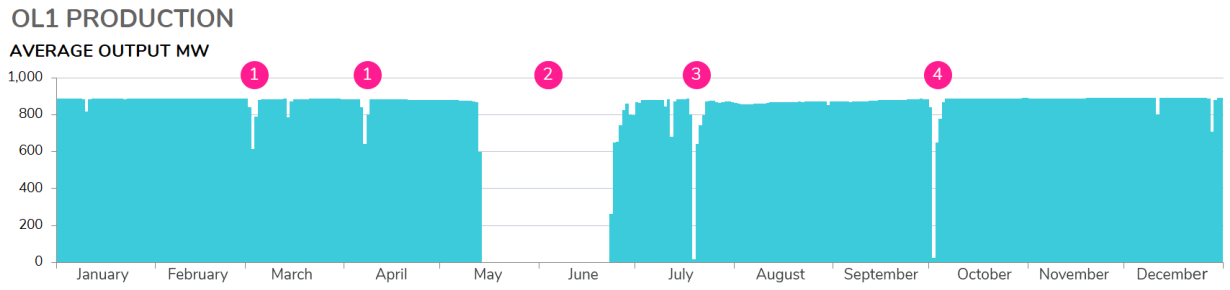
Production and energy efficiency

In 2018, the combined power output of the Olkiluoto units, OL1 and OL2, was 14,089 GWh. The combined load factor of the plant units was 91.1%. TVO produced approximately 16% of all the electricity consumed in Finland.

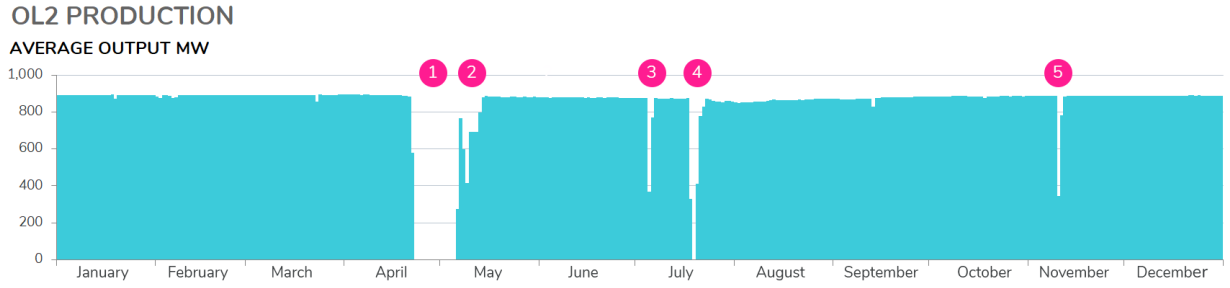
The plant units operated safely. The net output of OL1 was 6,755 GWh and the load factor was 87.8%. The net output of OL2 was 7,334 GWh and the load factor was 94.3%.

OL1	2018	2017	2016	2015	2014
Net production (GWh)	6,755	7,158	7,048	7,397	7,266
The plant units own electricity consumption (GWh)	246	264	258	270	266
Capacity factor (%)	87.8	93.1	91.4	96.2	94.5
Efficiency (net) (%)	35.3	35.1	35.0	35.0	35.0

OL2	2018	2017	2016	2015	2014
Net production (GWh)	7,334	6,256	7,301	6,864	7,497
The plant units own electricity consumption (GWh)	264	226	265	248	270
Capacity factor (%)	94.3	81.3	94.6	89.2	97.4
Efficiency (net) (%)	35.4	35.4	35.1	35.1	35.1



1. Change of control sequence
2. Annual outage
3. In house load operation due to a fire in the 400 kV switchgear
4. Reactor scram after stop of five recirculation pumps



1. Annual outage
2. Reactor scram after stop of five recirculation pumps as a result of a grid disturbance
3. Repair of a valve in the feedwater system
4. Reactor scram as a result of a fire in the 400 kV switchgear
5. Repair of a valve leak in the reheater system

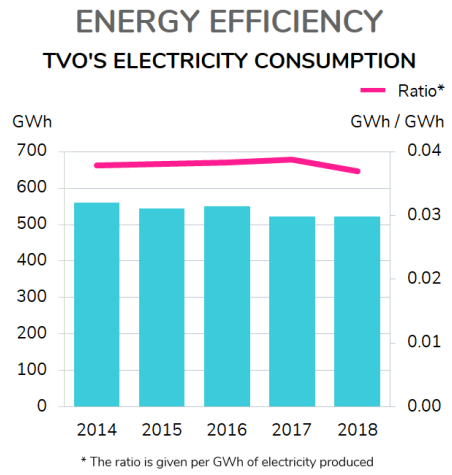
Improving energy efficiency

TVO has for several years participated in the voluntary Finnish Energy Efficiency Agreement for Industries. For the first time TVO signed the Agreementin 1998. Efforts have been focused on the continuous improvement of energy efficiency at the plant units and in the Olkiluoto area, as required by the Agreement.

TVO continued in the Energy Efficiency Agreement also for the period of 2017-2015, in which the associated Action Plan for Energy Production aims to implement actions designed to make the use of energy more efficient, and to improve the efficiency of primary energy use as well as the total efficiency of energy production. TVO's total energy savings target for the years 2017–2025 is 150 GWh which equals the average annual consumption of about 7,500 single family homes heated with electricity.

Energy efficiency measures carried out in 2018 include the renewal of the main coolant pumps and turbine condensers at OL1. In addition, the north gate building has been demolished. Inspections of Olkiluoto buildings continued in 2018. Measurements and energy analyses were also performed in both existing plant units after the annual outages.

TVO carries out activities related to energy efficiency as part of normal operations. For TVO, the highest potential for savings is related to the improvement of the efficiency of the electricity production process; this has been implemented according to long-term plans throughout the operational history of the Company through plant modernisation projects. Another area for improvement of efficiency is the reduction of own energy consumption in the Company's area in Olkiluoto. TVO's environmental management system includes energy efficiency system EES+ as an integral part; it is used to make the continuous improvement of energy efficiency more systematic throughout the organisation.



Emissions to the air

With regard to the management of radioactive substances, TVO always strives to keep any emissions well below both the emission limits set by the authorities and TVO’s own target limits, which are more stringent than the official limits.

Radioactive emissions to the air

Emissions of noble gases into the atmosphere were 0.014% and emissions of iodine 0.48% of the permitted regulatory limit.

In 2016-2018, there were fuel leaks at the Olkiluoto power plant which resulted in the release of radioactivity into the environment through the main stack. The radiation safety of the environment was not endangered as a result of these events. Radiation doses and emissions remained under the regulatory limits with a good margin.

The theoretical radiation dose caused to neighboring residents is estimated to remain clearly below the threshold value. In 2017, the value was 0.38 µSv (threshold value: 100 µSv).

Radioactive emissions to the air	2018	2017	2016	2015	2014
Noble gas TBq (Kr-87 equivalent)	0.91	3.43	9.69	0	0
% of allowed amount	0.01	0.04	0.1	0	0
Iodine TBq (I-131 ekv)	0.0005	0.0009	0.0016	0.00000008	0.00000025
% sallitusta	0.48	0.84	1.50	0	0.0002
Aerosols TBq[1)]	0.0006	0.025	0.24	0.000017	0.000007
Tritium TBq	1.32	1.07	2.65	1.04	0.69
Carbon-14 TBq	0.93	1.02	1.26	1.07	0.84

1) At the beginning of 2019, TVO observed that the aerosol sampling efficiency of the vent stack's sampling system had not been taken into account in the OL1 and OL2 emission reports during the operating history of the plant units. Therefore, the reported aerosol emissions will be revised later.

Carbon dioxide emission

TVO takes part in Finland's battle against climate change by producing emission free base load power. The Olkiluoto nuclear power plant is included in the European Union emissions trading scheme that aims at monitoring greenhouse gas emissions and achieving the CO_2 reduction goals. The power plant's actual CO_2 emissions are generated by the releases of the reserve boilers and the emergency diesel generators. The emergency diesel generators ensure the power supply of the plant in the possible but unlikely loss-of-power situation. In order to ensure safety, the emergency diesel generators are regularly tested in compliance with the technical specifications, which means that their emissions cannot be lowered. The replacement of the emergency diesel generators in OL1 and OL2 during the next few years will reduce particulate emissions to the air.

Verified CO_2 emissions of the Olkiluoto power plant	2018	2017	2016	2015	2014
CO_2 emissions total (t)	1,505	717	737	832	448
OL1/OL2 back-up heating boilers (8 MW + 12 MW)	1	22	95	496	1
OL1/OL2 emergency diesels (8 x 1,8 MW)	380	355	491	329	441
OL3 emergency diesels (4 x 6,4 MW, 2 x 2,5 MW, 1 x 1,3 MW)	1,124	340	152	7	6

Emissions to water and soil

The emissions of radioactive fission and activation products into water amounted to 0.04% and tritium emissions to 8.9% of the limit value specified by the authorities.

Radioactive emissions to water	2018	2017	2016	2015	2014
Fission and activation products TBq	0.0001	0.0003	0.0002	0.0001	0.00008
% of allowed amount	0,04	0,09	0,05	0,04	0.03
Tritium TBq	1.62	2.46	2.32	2.05	1.56
% of allowed amount	8.9	13.5	12.7	11.2	8.5

Sanitary wastewater is treated at the Olkiluoto wastewater treatment plant before it is discharged into the sea. In 2018, the total volume of sanitary water treated was 89,558 m^3. The phosphorus load discharged into the sea was 11 kg and the nitrogen load 4,380 kg. The biological oxygen demand (BOD_{7ATU}) was 913 kg. The treatment of sanitary wastewater is based on the permit regulations specified for the purification efficiency and loads discharged into water bodies, as well as regulatory requirements. Emissions from the sanitary wastewater treatment plant were a fraction of the nutrient load of River Eurajoki running to the north of Olkiluoto, totalling of nitrogen. Water quality measurements are carried out by an external operator.

* Load caused by the River Eurajoki in year 2017

Sanitary waste water treatment	2018	2017	2016	2015	2014
Amount of water (m^3)	89,558	97,207	88,606	77,093	66,389
Concentration (mg/l)[1)]					
BOD_{7ATU}	10	8	13	4.7	6.6
Phosphorus	0.12	0.12	0.24	0.10	0.11
Treatment efficiency average					
BOD_{7ATU}	96	96	94	97	96
Phosphorus	99	98	98	99	99
Load on sea area (kg)					
Phosphorus	11	12	21	7.7	7.3
Nitrogen	4,380	5,840	4,380	3,541	2,993
BOD_{7ATU}	913	767	1,132	361	438
Water treatment chemicals (t)[2)]	35	39	34	22	24

1) The permit regulation for the sanitary waste water: The maximum BOD_{7ATU} value of waste water discharged into the seas is 13 mg O_2/l and the maximum phosphorus concentration is 0,52 mg P/l. The minimum treating efficiency for the BOD_{7ATU} value and phosphorus is 95%. All values are calculated as annual averages. 2) Chemicals used for the treatment of sanitary waste water.

Emissions to the soil

An environmental accident took place at the Olkiluoto nuclear power plant in 2018 when oil leaked from a work machine into the soil. A total of 9 metric tons of contaminated soil was removed. During the year, an accident that had occurred during the construction of OL1 plant unit was also detected. Corrective measures were carried out supervised by an external operator, and a total of 250 metric tons of contaminated soil was removed. Five cases of minor environmental damage also took place. In two of these accidents, a total of 11 liters of oil ended up in the soil. All oil was recovered, and the used spill control materials were delivered to appropriate further processing.

Waste

TVO is committed to reduce the amount of waste and to promote its utilization. Radioactive waste is isolated from the organic environment until its radioactivity has decreased to a harmless level.

Radioactive waste

The waste produced at the power plant is classified as waste exempted from control, low and intermediate level operational waste, high level waste (spent fuel), and decommissioning waste according to its level of radioactivity.

Waste exempted from control contains such a small amount of radioactive substances that the waste can be reused or delivered to the Olkiluoto landfill for final disposal. Waste is produced in activities related to the operation and maintenance of the power plant. In 2018 the amount of maintenance waste exempted from control was 44 tons. About 123 tons of metal was also cleared for recycling.

The protective gear used in operating and maintaining the power plant, the equipment removed from the process, and the insulating materials are low level waste. They are tightly packaged and placed in the

repository for operational waste (VLJ repository) located at an approximate depth of 100 meters in the plant area.

The ion exchange resins used for the treatment of the process water at the power plant are classified as intermediate level waste that is incorporated in bitumen and embedded in the operating waste repository. In 2018, 53 m³ of intermediate level waste and 92 m³ of low level waste was placed in the operating waste repository. The amount of high-level spent fuel generated during the year under review was 32.7 t. It is kept in an interim storage in Olkiluoto until it can be embedded in the bedrock of Olkiluoto for final disposal. Final disposal operations will start around 2020s. Decommissioning waste is waste produced in connection with the demolition of the power plants at the end of the operating life. The final disposal of decommissioning waste will also take place in Olkiluoto.

Radioactive waste	2018	2017	2016	2015	2014
Low-level (m^3)[1)]	92	47	86	171	59
Intermediate level (m^3)[1)]	53	51	9	6	38
Operating waste cleared after monitoring (t)	44	40	96	50	46

1) Waste disposed in the VLJ repository

Amount of spent fuel in the OL1 and OL2 storage polls and interim storage, cumulative	2018	2017	2016	2015	2014
Number of assemblies (pcs)	9,122	8,922	8,720	8,518	8,304
Assemblies (t)	1,531.2	1,498.5	1,465.2	1,432.0	1,396.6

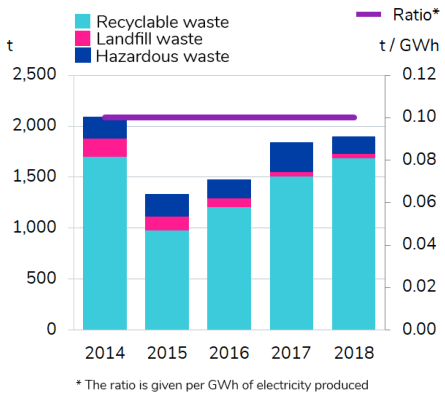
Municipal waste

TVO is committed to the reduction of the amount of waste and to the improvement of the reuse of waste. This is required of everybody working in Olkiluoto. All waste generated in Olkiluoto is sorted and processed. The sorted wastes are sent for reuse, and wastes not suitable for reuse go to the landfill. Hazardous waste is collected in the hazardous waste storage to be sent to an appropriate waste treatment plant.

Waste suitable for recycling or reuse as energy amounts to 89 percent of the total amount of waste, landfill waste for 2 percent and hazardous waste for 9 percent. The majority of hazardous waste consists of batteries and electrical waste. The total amount of waste was 1,898 tons in 2018. In addition, 259 metric tons of contaminated soil was transported to further processing.

WASTE

MUNICIPAL WASTE



OL1 and OL2 (metric tons)	2018	2017	2016	2015	2014
Mixed waste to energy[1)]	59	65	103	61	88
Landfill waste to TVO's landfill	44	41	45	54	78
Paper and cardboard	49	50	74	90	99
Energywaste	102	132	114	94	86
Biowaste	57	50	64	65	55
Wood	108	99	67	59	93
Metal	208	107	77	99	85
Cable refuse	23	8	7	11	7
Glass	5	5	5	2	3
Crushed brick and concrete	3	0	0	0	0
Screening	36	79	61	72	35
Hazardous waste	53	62	64	72	102
Sludge[2)]	1,038	933	807	555	597

1) Since 2017, mixed waste has been taken to a waste-to-energy plant where it is used to produce district heating and electricity.
2) Sludge from waste water treatment plant, (solid matter 8-10%, is not counted into the total waste amount)

OL3 (metric tons)	2018	2017	2016	2015	2014
Mixed waste to energy[1)]	173	168	118	70	93
Landfill waste to TVO's landfill	0	0	44	54	68
Paper and cardboard	26	31	43	33	27
Energywaste	128	140	138	98	110
Biowaste	43	53	35	37	36
Wood	168	214	188	183	205
Metal	43	275	138	58	328
Cable refuse	22	32	65	51	16
Crushed brick and concrete	436	0	20	10	506
Screening	0	5	2	10	12
Hazardous waste	112	221	114	146	109

1) Since 2017, mixed waste has been taken to a waste-to-energy plant where it is used to produce district heating and electricity.

Environmental research and biodiversity

Environmental research has been conducted on the Olkiluoto Island since the 1970s, years before electricity production was launched. The early baseline studies created a basis for the environmental monitoring programs aimed at facilitating environmental radiation monitoring and determination of the impact on waters.

Environmental radiation safety at the Olkiluoto nuclear power plant is continuously monitored with many different methods and through the cooperation of several parties. Around 300 samples are taken from the environment of Olkiluoto each year to be analysed in compliance with an environmental radiation monitoring program approved by the Radiation and Nuclear Safety Authority (STUK). There are also several radioactivity monitors in the immediate vicinity of the plant. They continuously measure radiation and are connected to STUK's automatic network for monitoring external radiation.

Over 100 water samples are taken from the sea surrounding Olkiluoto each year. These samples are subjected to about 1,500 different water quality analyses. Furthermore, the condition of fish stocks is monitored by, for instance, fishing for record-keeping purposes, and surveys among professional and recreational fishermen. In 2018 test fishing was carried out in Olkiluoto area in accordance with the environmental monitoring plan. The state of aquatic plants is monitored by means of transect line diving every six years, the last study was carried out in 2016.

Extensive environmental impact assessment procedures have been carried out for the OL3 and OL4 plant unit projects. The final disposal of spent nuclear fuel has been studied since the 1980s, and it has also been evaluated through environmental impact assessments.

Production of clean electricity secures and maintains biodiversity

Surrounded by four nature conservation areas, the small island of Olkiluoto produces around one-sixth of all the electricity used in Finland and after OL3 has got started, around one-third. The concentration of energy production in a small geographic area minimizes environmental impacts and makes it possible to preserve other areas in their natural state. Climate change also has a major impact on biodiversity. By producing clean and climate-friendly nuclear power-generated electricity, TVO makes a significant contribution to the mitigation of climate change and promotion of sustainable development.

Cooperation with the authorities

The operation of a nuclear power plant is subject to a licenses and permits, and it is governed by the authorities. The Radiation and Nuclear Safety Authority (STUK) supervises nuclear and radiation safety.

The competent environmental permit authority is the Southern Finland Regional State Administrative Agency, and the supervising authority is the Southwest Finland Centre for Economic Development, Transport and the Environment. Other authorities involved in the management of environmental issues include the environmental department of the municipality of Eurajoki and the Ministry of Economic Affairs and Employment, which acts as TVO's liaison authority in EIA procedures.

Radiation monitoring samples taken from the Olkiluoto environment are submitted to STUK for analysis. TVO annually prepares a report on the waste and emissions caused by its operations and submits the report to several regional and national authorities. TVO annually reports its environmental investments and environmental protection activity costs to Statistics Finland. After verification, TVO reports the annual carbon dioxide emissions of the emergency diesel generators and reserve boilers to the Energy Authority. Finnish Safety and Chemicals Agency (Tukes) acts as the supervising authority for the industrial processing and storage of hazardous chemicals. In the autumn of 2015, Tukes performed a periodic inspection.

Nine special events in 2018

The Olkiluoto nuclear power plant units, OL1 and OL2, operated safely throughout the year. TVO classifies events affecting nuclear safety in accordance with the international INES scale (0–7). In 2018, the Olkiluoto nuclear power plant had nine INES classified issues, of which eight incidents classified as level 0 (No safety significance) and 1 (Anomaly, exceptional incident with safety effects).

In case of special situations and operational disruptions, the Company submits separate, incident-specific reports to the Radiation and Nuclear Safety Authority of Finland (STUK) with plan of corrective measures. TVO publishes information on every significant event with public interest on the company website in the News section.

Events taking place at other nuclear power plants around the world are continuously monitored in TVO. Necessary changes will be implemented based on the assessments to further develop the operation.

Permits govern the activities

In addition to legislation pertaining to nuclear energy and radiation safety, the operation is also regulated by the requirements laid down in environmental laws. The permit referred to in the Environmental protection Act is required for the operation of the Olkiluoto nuclear power plant, and the permit referred to in the Water Act for the intake of cooling water. The Regional State Administrative Agency for Southern Finland issued on 16 December 2016 a decision on the adjustment of the permit regulations of the environmental permit and on the adjustment of the permit regulations of the water permit granted to the Olkiluoto nuclear power plant. The decisions became valid in July 2018.

The environmental and water permit decisions cover power plant operations and its back-up energy production systems. The permit conditions control the nuclear power plant's cooling water volume and the amount of heat contained in it, wastewater treatment efficiency, processing of waste, operations in transient and abnormal conditions, as well as monitoring and reporting. The Olkiluoto nuclear power plant landfill has its own environmental permit. The environmental permit for crushing and storage of blasted stone by TVO and Posiva was updated in 2018.

The licences referred to in the Chemicals Act have been granted for the handling and storage of hazardous chemicals.

The reserve boilers of the Olkiluoto nuclear power plant, as well as the emergency diesel generators of OL1, OL2, and OL3 (a total of 15 generators), are included within the scope of the emissions trading system. Pursuant to the Finnish Emissions Trading Act, TVO submits an annual verified emissions report and the verifier's statement to the emissions trading authority.

Compliance with environmental legislation

TVO continuously monitors statutory regulations and other requirements pertaining to its operations. People in charge of different parts of the operations are in charge of ensuring that the organizations receive enough up-to-date information about statutory regulations and their impact on TVO's operations. Compliance with the regulations and requirements is regularly assessed in internal and external audits as well as management reviews. In 2018, operations were in compliance with environmental legislation and permits.

Nuclear waste management

The types of nuclear waste generated at a nuclear power plant include waste exempt from control, low and intermediate level operating waste, and high level spent fuel.

Compared to the volume of produced energy, however, the amount of waste and its space requirements are small. The principle of nuclear waste management is to isolate the waste from organic nature until the radioactivity of the waste has decreased to an insignificant level.

Spent nuclear fuel from the nuclear power plants of Teollisuuden Voima and Fortum will be packed in copper canisters and embedded in Olkiluoto bedrock at a depth of 400-450 metres. The final disposal of spent nuclear fuel is based on the use of multiple release barriers, which ensure that the nuclear waste cannot be released into organic nature or become accessible to humans. A deficiency of a single barrier or a predictable geological or other change will not endanger the performance of the insulation. The release barriers include the physical state of the fuel, the disposal canister, the bentonite buffer, the backfilling of the tunnels and the surrounding rock.

Plenty of time has been reserved for the preparatory stage and the implementation stage of final disposal. Thorough preparations and implementation will ensure the safety of final disposal. The final disposal of spent nuclear fuel is planned to start in 2020's and will continue for almost a hundred years.

The responsibility for nuclear waste management lies with the nuclear power companies who must carry out the necessary nuclear waste management measures for their own waste at their own cost. Posiva Oy manages research into the final disposal of spent nuclear fuel, construction and operation of final disposal facilities, and eventual closing up of the facilities on behalf of its owner companies.

According to the Nuclear Energy Act, the processing, storage and final disposal of nuclear waste generated in Finland must take place in Finland and the import of nuclear waste into Finland is prohibited.

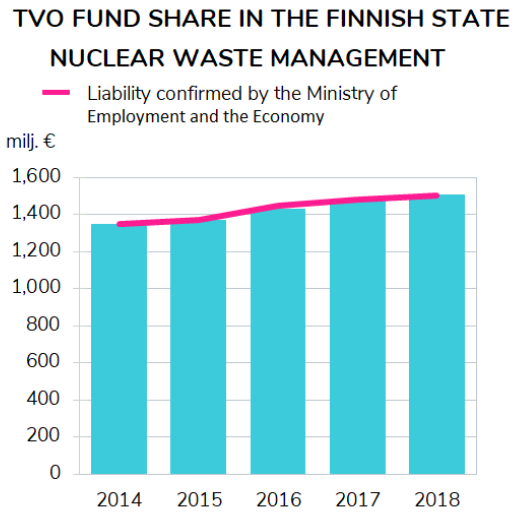
Funds for waste management collected in advance

The costs of nuclear waste management and final disposal of spent fuel are collected in the price of nuclear electricity from the shareholders of TVO into a fund for future use.

In Finland, nuclear power companies bear the costs of nuclear waste management, and the funds for that purpose are collected into the State Nuclear Waste Management Fund. Each year, the Ministry of Economic

Affairs and Employment determines the share of each nuclear power company in the State Nuclear Waste Management Fund as well as the waste management fee to be paid to the fund. The liability share of the nuclear power companies in the Fund is decreased by the investments they make in final disposal.

The annual fee payable to the Fund is determined on the basis of the difference between the amount of accumulated nuclear waste for final disposal and the measures implemented for nuclear waste management. The fee is also increased or decreased on the basis of how well the Fund succeeds in its investments: if the interest income is higher than expected, the liability share in the Fund is correspondingly reduced. The objective is to accumulate enough assets in the Fund for the final disposal of accumulated nuclear waste.



Responsibility reporting

TVO has reported its responsible management of the environment starting from 1996, and corporate social responsibility aspects since 2001.

TVO's Corporate Responsibility Report for 2018 (January 1 to December 31, 2018) was published in Finnish and English on TVO's annual report website. The Corporate Responsibility Report includes an environmental report, which provides information on the environmental impact of TVO's operations, TVO's environmental protection goals, their achievement, and key environmental indicators.

The responsibility reporting data for 2017 were published on TVO's website in February 2018. The 2019 reports will be published in spring 2020.

Limited external verification of the Corporate Responsibility Report was carried out by KPMG Oy Ab. KPMG provided limited assurance on TVO's Employment, Occupational Health and Safety and Training and Education information. The report is available under Verification in the Corporate Responsibility Report. DNV GL Business Assurance Finland Oy Ab, an independent and impartial accredited certification body, has verified the environmental report data. The statement is available under Verification report of the environmental report. The accounting, financial statements, annual report, and administration for 2018 have been audited by PricewaterhouseCoopers Oy, a firm of Authorized Public Accountants.

Material responsibility aspects

The materiality analysis is used to identify the most significant aspects that affect responsibility as concerns TVO's stakeholders and business activities. Apart from the personnel, TVO's most important stakeholders include shareholders, authorities, investors, decision-makers, local community, contractors, media and the public.

The reporting principles pertaining to content definition in the Global Reporting Initiative (GRI) Standards were used as the basis in the definition of the reporting content and in the materiality analysis. The materiality analysis is regularly updated. Social responsibility information is reported on TVO's website in accordance with the materiality analysis updated in 2016.

The updating of the materiality analysis was started by identifying aspects relevant to TVO on the basis of discussions with the Company management, the personnel and external stakeholders, as well as information obtained from opinion polls. Data were produced for the materiality analysis by the "Energy attitude" survey as well as the stakeholder survey carried out as an online survey and targeted at shareholders, decision-makers, public officials, media, opinion leaders, experts, non-governmental organisations and the personnel. In addition to these, the comments and queries made by visitors to the plant were taken into account in the preparation of the analysis. After the prioritisation of material aspects, the outcome of the analysis was the materiality analysis confirmed by the key persons of corporate social responsibility; it describes the view of the Company and its stakeholders of aspects of responsibility that are important to TVO, the impact of responsibility and the development areas of social responsibility. After prioritisation, the materiality matrix was once more subjected to an approval procedure carried out as discussions between experts in corporate social responsibility and representatives of Company management. The Senior Vice President in charge of corporate relations has approved the aspects most relevant to TVO and the content of responsibility reporting.

TVO'S MATERIALITY MATRIX FOR COMMUNICATION PURPOSES

Based on the materiality analysis, for TVO the most important aspects of responsibility include a safety culture of a high standard, a good work community, safeguarding the shareholder value, and the supply of electricity to the Finnish people as well as a positive impact on the climate.

Measurement and calculation principles

TVO's Corporate Social Responsibility Report is based on the data required by the Global Reporting Initiative (GRI) Standards for the Core option.

The reporting principles pertaining to quality in the Global Reporting Initiative (GRI) Standards have been taken into account during the reporting process.

The report covers the operations of the parent company, Teollisuuden Voima Oyj, as well as operations in the whole of Finland by regions. TVO reports accident and training data to some extent also for the personnel in the TVO Group (TVO and Posiva) as well as TVO's contractors. These data are presented in the report with an indication of which personnel they pertain to. The research into the final disposal of spent fuel implemented by Posiva Oy, a company jointly owned by Fortum Power and Heat Oy and TVO, is described in the reporting. Data on the Meri-Pori coal-fired power plant are not included in the Responsibility Report, as the exclusion of the data will not result in any continuous positive or negative material impact being omitted from reporting.

TVO has defined for reporting several Company-specific aspects to complement the material aspects included in the Global Reporting Initiative (GRI) Standards. These aspects describe social responsibility issues that are typical for TVO. The aspects that are material specifically for TVO include Number of subcontractors during the annual outage, average number of subcontractors at the OL3 construction site, occupational health and safety, preparation for crises and exceptional situations, level of safety, acceptance of nuclear power, economic service life of plant units (service life management) and decommissioning of nuclear power plants.

The majority of the data presented in the Responsibility Report are based on the data required to be reported to the authorities, which have also been published in TVO's other annual reports (link to Annual Report portal). The occupational health and safety data on the personnel are based on the Occupational Health and Safety Management System, and the other data are based on personnel data collected from the operations of the Company.

As concerns the reporting of economic responsibility, TVO uses in applicable parts the key indicators referred to in GRI Standards and presents in the Corporate Social Responsibility Report some figures obtained from the financial statements process that are not included in the actual financial statements. The amount of carbon dioxide emissions has been verified by an external GHG verification body.

The Responsibility Report 2018 is part of TVO's overall annual reporting. The other reports published in TVO's online Annual Report include:

- The Report of the Board of Directors of TVO, prepared in accordance with the IFRS standard, and the Financial Statements 2018 report on the financial development of the Company. The Report of the Board covers the requirement set out in the Finnish Accounting Act for reporting of data non-financial reporting.
- TVO Corporate Governance Statement 2018 describes the governance systems and the tasks of the administrative bodies.

The Report contains a comparison against the requirements of the GRI Standards. TVO's reporting complies with the Core option of the GRI Standards.

Significant responsibility aspect of TVO	**GRI Standard Aspect**	**Aspect Boundary**
Safety	TVO's Aspect: Preparation for crisis and state of emergency	TVO
Safety	TVO’s Aspect: Level of safety	TVO
Safety	TVO's Aspect: The acceptability of nuclear power	TVO
Safety, Shareholder value	TVO’s Aspect: Investments	TVO

Safety, Shareholder Value	TVO's Aspect: Economic life of plant units (life cycle management)	TVO
Economic Responsibility		
Shareholder value, Supply of electricity in Finland and climate impact	Direct economic value generated an ddistributed	TVO
Environmental Responsibility		
Supply of electricity in Finland and climate impact	Materials	TVO
Supply of electricity in Finland and climate impact	Energy	TVO
Supply of electricity in Finland and climate impact	Water	TVO
Supply of electricity in Finland and climate impact	Emissions	TVO
Supply of electricity in Finland and climate impact	Effluents and waste	TVO, Posiva
Social Responsibility		
Good work community	Employment	TVO
Good work community	Labor and management relations	TVO
Safety culture, Good work community	Occupational health and safety	TVO, subcontractors operating at Olkiluoto
Good work community	Training and education	TVO, subcontractors operating at Olkiluoto
Good work community	TVO's Aspect: Subcontractors working in Annual Outages of OL1 and OL2	TVO, subcontractors operating at Olkiluoto
Good work community	TVO's Aspect: Average workforce at the Olkiluoto 3 construction site	TVO, subcontractors at Olkiluoto 3

GRI Content index

TVO provides in the various Sections of the Social Responsibility Report all the information referred to in the Global Reporting Initiative (GRI) Standards.

GRI Content index is available at vuosikertomus.tvo.fi/gricontentindex2018

Assurance Report

Independent Limited Assurance Report to the Management of Teollisuuden Voima

This document is an English translation of the Finnish report

We were engaged by the Management of Teollisuuden Voima (hereafter TVO) to provide limited assurance on TVO's Employment, Occupational Health and Safety and Training and Education information (hereafter "Corporate Responsibility Information") for the year ended December 31, 2018. The corporate responsibility information has been presented in TVO's Responsibility Report 2018, in the "Corporate Responsibility" section's GRI Index. The scope of the assurance included the following GRI-disclosures:

General Disclosures

102-8: Information on employees and other workers
102-41: Collective bargaining agreements

Employment
Management Approach
103-1: Explanation of the material topic and its Boundary
103-2: The management approach and its components
103-3: Evaluation of the management approach

Employment
401-1: New employee hires and employee turnover
TVO: Subcontractors working in Annual Outages of OL1 and OL2
TVO: Average workforce at the Olkiluoto 3 construction site

Occupational Health and Safety
Management Approach
103-1: Explanation of the material topic and its Boundary
103-2: The management approach and its components
103-3: Evaluation of the management approach

Occupational Health and Safety
403-2: Types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities

Training and Education
Management Approach
103-1: Explanation of the material topic and its Boundary
103-2: The management approach and its components
103-3: Evaluation of the management approach

Training and Education
404-1: Average hours of training per year per employee

Management's responsibilities

The Management of TVO is responsible for the preparation and presentation of the Corporate Responsibility Information in accordance with the GRI Sustainability Reporting Standards, and the information and assertions contained within it; for determining TVO's objectives in respect of sustainable development performance and reporting, including the identification of stakeholders and material issues; and for establishing and maintaining appropriate performance management and internal control systems from which the reported performance information is derived.

Our responsibilities

Our responsibility is to carry out a limited assurance engagement and to express a conclusion based on the work performed. We conducted our engagement in accordance with International Standard on Assurance Engagements (ISAE) 3000 (Revised), *Assurance Engagements other than Audits or Reviews of Historical Financial Information*, issued by the International Auditing and Assurance Standards Board IAASB. That Standard requires that we plan and perform the engagement to obtain limited assurance about whether the Corporate Responsibility Information is free from material misstatement.

KPMG Oy Ab applies International Standard on Quality Control ISQC 1 and accordingly maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

We have complied with the independence and other ethical requirements of the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants IESBA, which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behavior.

Procedures performed

A limited assurance engagement on a sustainability report consists of making inquiries, primarily of persons responsible for the preparation of information presented in the Corporate Responsibility Information, and applying analytical and other evidence gathering procedures, as appropriate. These procedures included for example:

- Interviews with members of the Management to reassert our understanding of the objectives for corporate responsibility and of the connection between corporate responsibility and the business strategy and operations;
- Interviews with relevant staff responsible for providing the information in the Corporate Responsibility Information;
- An assessment of the Corporate Responsibility Information's conformity with the principles of the *GRI Sustainability Reporting Standards* for defining content and reporting quality;
- An assessment of data management processes, information systems and working methods used to gather and consolidate the presented Corporate Responsibility Information, and a review of related internal documents;
- Testing of data accuracy and completeness through samples from information systems and original numerical information.
- One site visit.

The procedures performed in a limited assurance engagement vary in nature and timing from, and are less in extent than for, a reasonable assurance engagement. Consequently the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained has a reasonable assurance engagement been performed.

Inherent limitations

Inherent limitations exist in all assurance engagements due to the selective testing of the information being examined. Therefore error may occur and not be detected. Additionally, non-financial data may be subject to more inherent limitations than financial data, given both its nature and the methods used for determining, calculating and estimating such data.

Conclusion

Based on the procedures performed and the evidence obtained, nothing has come to our attention that causes us to believe that the Corporate Responsibility Information of TVO for the year ended December 31, 2018 is not presented, in all material respects, in accordance with the reporting criteria GRI Sustainability Reporting Standards.

Helsinki, 14 March 2019

KPMG OY AB

Tomas Otterström
Partner, Advisory

EMAS-statement

TVO's environmental report is based on the requirements laid down in the EMAS Regulation and serves as a verified environmental statement of the operation of the Company.

The environmental report for 2018 provides a comprehensive presentation of the environmental impact of TVO's operation, the Company's objectives with respect to environmental protection, and their achievement, as well as the key environmental indicators. DNV GL Business Assurance Finland Oy Ab has in the capacity of an accredited, independent and objective party verified the information presented in the environmental report. The report can be found under Verification report.

TVO publishes the environmental report in Finnish and English.
The information to be reported for 2019 will be published in the spring of 2020.

REQUIREMENT	REPORT PAGE
A clear and unambiguous description of the organization registering under EMAS and a summary of its activities, products, and services, and its relationship to any parent organizations as appropriate.	Company
The environmental policy and a brief description of the environmental management system of the organization.	Corporation-level Policies Environmental management
A description of all the significant direct and indirect environmental aspects which result in significant environmental impacts of the organization and an explanation of the nature of the impacts as related to these aspects.	Environment and climate Environmental impacts
A description of the environmental objectives and targets in relation to the significant environmental aspects and impacts.	Environmental management Environmental program 2019-2021 Results of the environmental program
A summary of the data available on the performance of the organization against its environmental objectives and targets with respect to its	Environmental management Environmental program

significant environmental impacts. Reporting shall be on the core indicators and on other relevant existing environmental performance indicators.	2019-2021 Results of the environmental program Climate friendly electricity Environmental impacts Cooling water Raw materials and material efficiency Production and energy efficiency Emissions to air Emissions to water and soil Waste Environmental research and biodiversity Nuclear waste management
Other factors regarding environmental performance including performance against legal provisions with respect to their significant environmental impacts.	Environmental management Cooperation with authorities Cooling water Emissions to air Emissions to water and soil Waste management
A reference to the applicable legal requirements related to the environment.	Cooperation with authorities
The name and accreditation number of the environmental verifier and the date of validation.	Confirmation of compliance

Olkiluoto power plant has been EMAS (Eco-Management and Audit Scheme) registered with code FI-000039 (NACE code D 35.11).

Verification report of the environmental report

Confirmation of compliance

DNV GL Business Assurance Finland Oy Ab has, as an accredited certifier (FI-V-0002), reviewed the environmental management system observed at Teollisuuden Voima Oyj's Olkiluoto power plant. Based on this review, DNV GL Business Assurance Finland Oy Ab states that the environmental system with the programs and audit procedures as well the environmental statement including the indicators fulfill the requirements of Regulation (EC) No. 1221/2009 as well as Commission regulation (EC) 2017/1505.

Scope and methodology of verification

The Updated Environmental Statement 2018 (called Environmental Report 2018) was verified at the Olkiluoto location of Teollisuuden Voima at the 12th of February 2019. The verification was performed with the ISO 14001:2015 periodical audit by processing the requirements for both systems, and compliance with them.

The scope of the report and the accuracy of the information contained therein were verified by means of a written report and practical inspections. Key personnel at the plant were interviewed, and the information contained in the report was compared with information found in reviewed source material.

The Updated Environmental Statement 2018 has the same structure as the Environmental Report 2017 and continues along the same lines as previous reports, which means that the content and environmental indicators can easily be compared year by year. The statement provides a clear and accurate image of Teollisuuden Voima Oyj's operations and their impact on the environment. The environmental system is implemented by setting the goals. The implementation and effectiveness of the system is monitored by the environment team and management reviews. The Environmental Report 2018 with environmental indicators, which describe the impact of the system, meet the EMAS 1221/2009 requirements for Updated Environmental Statement.

The dedicated level of Teollisuuden Voima Oyj commitment to a high standard of safety, quality and environmental protection, and continuous improvement is shown in the Updated Environmental Report 2018.

Espoo, the 20th of February 2019
DNV GL Business Assurance Finland Oy Ab
EMAS-accredited verifier
FI-V-0002

Esa Notkonen
Lead Auditor, Verifier

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Glossary

A

Activation product: A radioactive nuclide created by neutron radiation in the reactor.

Activity: The number of spontaneous nuclear disintegrations occurring in a given quantity of radioactive material within a certain time. The unit of radioactivity, the becquerel (Bq), equals one disintegration per second.

Aerosols: A gaseous medium containing solid or liquid particles. In the case of emissions or releases from a nuclear power plant, these particles may be radioactive.

ALARA (As Low As Reasonably Achievable): An internationally used principle regulating the amount of radiation doses at nuclear power plants.

Alpha-active element: A radioactive element that emits an alpha particle upon decomposing. An alpha particle consists of two protons and two neutrons.

AVI: Regional State Administrative Agency

B

Background radiation: Radiation emanating from natural sources, such as radon from the soil, radiation from space, and radioactive materials in the human body.

Base load power: An electricity production method that is reliable and produces evenly. The production of renewable energy methods fluctuates for example along weather conditions so besides them a reliable base load power production such as nuclear power is needed.

Becquerel (Bq): The unit expressing the activity of a radioactive substance. 1 Bq is equal to one spontaneous nuclear disintegration in the substance per second.

Beta-emitting substance: Radioactive material that emits negatively charged particles (electrons).

BOD7ATU: The biological oxygen demand in wastewater.

BWR, Boiling water reactor: A light-water reactor in which water used as the coolant boils as it passes through the reactor core. The steam generated rotates the turbines.

C

Capacity factor: The figure depicting the production at a power plant; for example, for one year. The capacity factor is the energy produced in a year by a power plant as a percentage of the energy it would have produced had it been operating at full capacity for the entire year.

Carbon-14: Carbon-14 is a long-lived, naturally occurring, beta-emitting radioisotope created by cosmic rays in the Earth's atmosphere. It is also formed in a nuclear reactor when the oxygen in the coolant is

activated. Carbon-14 then enters the atmosphere bound to carbon dioxide.

Climate change: Long-term change in global or local climate. In common language climate change means the permanent changes in the climate caused by human actions and greenhouse gas emissions. These changes occur for example in temperature, precipitation, or winds.

CO2: Carbon dioxide

Consortium: A temporary merger of companies, formed for a particular business venture.

Controlled area: The area that contains or may contain radioactive materials; separated from other plant facilities. The doors to the controlled area are locked.

Control rod: A rod holding material that absorbs neutrons. It regulates the number of neutrons in the reactor core and thus the power of the reactor. A power plant reactor has a large number of control rods.

Conversion: The chemical transformation of one substance into another substance. In nuclear technology, conversion usually refers to the conversion of uranium oxide (U3O8) into uranium hexafluoride (UF6) for enrichment purposes, and the conversion of uranium hexafluoride into uranium dioxide (UO2) for the fuel manufacturing process.

D

Decibel, dB: Noise is measured by a decibel scale expressing sound intensity.

Dose rate: A dose of radiation per time unit (e.g. mSv/h) expressing the amount of radiation a person is exposed to within a certain period of time.

DNV GL: DNV GL Business Assurance Finland Oy Ab acts as an independent third party in various inspection/assessment tasks. DNV's central fields of operation include services relating to the classification of ships and the certification of management systems.

E

Ecosystem services: Ecosystem services are the benefits people obtain from nature. These include provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as recreational, and cultural benefits; and supporting services, such as nutrient cycling, that maintain the conditions for life on Earth.

EIA, Environmental Impact Assessment procedure: The Environmental Impact Assessment (EIA) procedure is a procedure related to the granting of an environmental permit. It must be performed in the planning phase of a project if the project causes, or may cause, significant environmental impacts.

ELY center: Center for Economic Development, Transport and the Environment.

EMAS: Eco-Management and Audit Scheme is an environmental management system for the EU region. TVO's environmental management system is EMAS compliant.

Emission right: EU-wide carbon dioxide emission rights trading began in 2005. For the entire EU area,

annual carbon dioxide quotas were specified for industry and energy plants emitting carbon dioxide. The target is to allocate cost-efficiently emission reduction measures to where their implementation is the most inexpensive. Plants that successfully and cost-efficiently reduce their emissions to a lower level than their quota allows may sell their spare emission rights in emissions trading. The plants for which the reduction of emissions is costly can purchase emission rights from the market.

Energy aspect: An element related to energy production and energy use that has an impact on the company's total use of energy, such as technology, organisational operations, and behaviour.

Environmental and energy efficiency principles: General objectives and policies that have been defined by top management and that set the framework for establishing the level and targets of operations and environmental protection.

Environmental performance: The measurable results of an organisation’s management of its environmental aspects.

Environmental aspect: An element of an organisation’s activities, products or services that has or can have an impact on the environment. Significant environmental aspect means an environmental aspect that has or can have a significant environmental impact.

Environmental impact: Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation’s environmental aspects.

Environmental program: Description of the environmental targets, their schedules and the planned and implemented actions as well as the means used to achieve the goals.

Environmental target: A target set by an organization in accordance with the environmental and energy efficiency principles.

Euratom: A unit of the EU Commission that supervises nuclear material.

F

Fission: The splitting of one heavy atomic nucleus into two or more intermediate-mass nuclei, releasing neutrons and a considerable amount of energy in the process.

Fission products: The medium-heavy nuclei produced in nuclear fission. They are usually radioactive.

FME = Foreign Material Exclusion

Foreign material: Materials that gets into a process or machine but doesn't belong there. Examples of foreign materials are loose parts of appliances such as bolts and nuts, tools, and rubbish. Foreign materials cause malfunction in machines and processes, such as jamming machines, clogging pipelines, and fuel leaks.

Fuel assembly: An element formed by fuel rods.

Fuel rod: A slender metal tube holding fuel pellets. The fuel inside the tube is generally uranium oxide compressed into pellets.

G

Gamma radiation: Electromagnetic radiation emitted during alpha and beta decay.

Gigawatt, GW: A unit of power. One gigawatt is one million kilowatts.

Gigawatt hour, GWh: A unit of electrical energy. One gigawatt hour equals one million kilowatt hours.

GRI (Global Reporting Initiative): Reporting guidelines for social responsibility that were approved by a meeting of the UN in Johannesburg in 2002. The reporting covers a company's financial, human, and environmental responsibility.

H

Half-life: The time it takes for the activity of a radioactive isotope to be reduced by half.

HU = Human Performance

I

IAEA: International Atomic Energy Agency.

IEA: International Energy Agency. An intergovernmental organization founded by the OECD in 1974 that promotes international co-operation in the energy sector. It serves its member countries as a scientific expert organisation and as a supporting actor for the development of the whole sector.

INES (International Nuclear Event Scale): A seven-level scale used internationally to depict the seriousness of accidents and incidents at nuclear power plants. The lower levels (1-3) depict incidents that have weakened plant safety and the upper levels (4-7) accidents that could cause emissions into the environment that require protective measures against radiation.

Iodine: From the point of view of radiation safety, the most important isotope of iodine among fission products is iodine-131, which has a half-life of eight days.

Ion exchange resins: Substances used to remove impurities from water.

ISO 9001 standard: International standard for quality management systems.

ISO 14001 standard: Environmental management standard that is widely used in various parts of the world.

Isotope: Atoms of the same element differing from each other in the number of neutrons in their nucleus.

Almost all natural elements occur as more than one isotope.

K

KAJ Store: Storage facility for intermediate-level waste.

KPA: Interim storage for spent fuel.

M

ManSievert, manSv: The unit used to indicate the collective radiation dose received by a certain number of people.

MTT: MTT Agrifood Research Finland.

Megawatt, MW: A unit of power. One megawatt equals 1,000 kilowatts, or one million watts.

MWth: Thermal power produced in a nuclear power plant.

N

Natura area: Protected areas selected on the basis of EU-wide nature conservation goals. In Natura areas, nature conservation is implemented so that the normal use of the area is limited as little as possible.

Noble gas: The name for certain gases rarely found in the atmosphere. The noble gases are helium (He), neon (Ne) argon (Ar), krypton (Kr), xenon (Xe), and radon (Rn).

Nuclide: A type of atom or nucleus with a specific number of protons and neutrons.

O

ONKALO: ONKALO is the name of the underground bedrock research facility for the final disposal facility for spent nuclear fuel.

Occupational accident: An accident that occurs at work or on the way home from work or vice versa and which causes an absence of at least one day.

P

Power delivered to the owners (GWh): Electricity produced - (internal consumption at the plant + consumption in the plant area).

PRA: Probabilistic Risk Assessment.

PWR, Pressurized water reactor: A light-water reactor with such a high reactor pressure that water used as the coolant does not boil in the reactor. The hot water is conducted from the reactor to a steam generator in which the water in the secondary circuit evaporates and the steam is led to rotate the turbine.

R

Radiation: Electromagnetic waves or particle radiation consisting of the smallest particles of matter.

Radioactive operating waste: Waste such as plastic, paper, and cloth generated during maintenance work at the power plant. The volume can be reduced by baling.

S

SAHARA (Safety As High As Reasonably Achievable): An internationally used principle emphasizing safety at a nuclear power plant.

Screenings: The organic matter which accumulates on the screening plant's fine screen and traveling basket filters in cooling
water intake. The screenings mainly consist of debris, algae, mussels, and fish carried with cooling water.

Sievert (Sv): A radiation dose unit indicating the biological effects of radiation. As it is a very large unit, millisieverts (1 mSv = 0.001 Sv) and microsieverts (1 µSv = 0.001 mSv) are more commonly used.

STUK: Finnish Radiation and Nuclear Safety Authority. STUK is the authority that regulates the Finnish nuclear energy sector.

T

TEM: The Finnish Ministry of Employment and the Economy.

Transuranium element: An element with an atomic number greater than that of uranium (92). Transuranium elements are not found in nature, but are created from uranium for example in nuclear reactors under the influence of neutron radiation.

Tritium: Tritium is a hydrogen isotope with a nucleus consisting of one proton and two neutrons. The nucleus is called tritium.

Tukes: The Finnish Safety and Chemicals Agency.

TW, terawatt: A unit of power. One terawatt equals one billion kilowatts.

TWh, terawatt-hour: A unit of energy. One terawatt-hour equals one billion kilowatt hours.

U

Uranium: An element with the chemical symbol U. Uranium comprises 0.0004% of the Earth's crust. All uranium isotopes are radioactive. Natural uranium is mostly in the form of isotope U-238, which has a half-life of 4.5 billion years. Only 0.72% of natural uranium is in the form of isotope U-235, which can be used as a nuclear fuel.

V

VLJ repository: A repository for low and intermediate-level radioactive waste.

VTT: Technical Research Centre of Finland.

W

WANO: The World Association of Nuclear Operators.

Y

YVL guide: Nuclear power plant guide.

GROUP-LEVEL POLICIES

The group-level policies have been approved in the meeting of TVO Group's Management Board on 5th of March 2018.

Safety culture

TVO Group and its entire personnel are committed to a high standard of safety culture.

Safety culture is comprised of organisational practices and individuals' attitudes. Thanks to the safety culture, all factors that affect the nuclear power plant's safety will receive attention in proportion with their significance and are given priority in decision making.

Group-level policies

TVO Group and its personnel comply in their actions with the policies defined by the Group.

Applicable laws, decrees, and official regulations as well as international agreements are strictly followed. TVO Group sets objectives for its operations, which are stricter than those set out in the applicable laws.

Issues are dealt transparently within the Group. Reporting of development needs, detected shortcomings, nonconformances and errors is encouraged.

TVO Group requires its partners and their personnel working at Olkiluoto to be committed to the high safety culture and high-quality operating methods. This means that the companies and personnel in a direct or indirect contractual relationship engage in responsible operations according to TVO Group environmental, nuclear safety and quality policy, and information security principles.

Policy on nuclear safety and quality

The nuclear safety and quality policy includes nuclear safety, radiation protection, nuclear material supervision and quality.

Nuclear safety

TVO Group is committed to maintain and develop operating conditions where efficient procedures can be implemented by taking safety, quality, and costs into account. This ensures the capacity to also produce competitive electricity in a safe and reliable manner over the long term.

TVO Group's operations shall not cause any damage to people, the environment or property.

Radiation protection

In all their radiation protection activities, TVO Group and its personnel are committed to follow the ALARA (As Low As Reasonably Achievable) principle. According to the principle, individual and collective radiation doses are kept as low as possible by practical measures.

Restricting the amount of doses and keeping the amount of radioactive emissions as low as possible are already accounted for when designing the structures and functions. All employees shall observe matters affecting radiation protection in their work.

In addition to authority guidelines, the development of radiation protection operations also takes international recommendations into account.

Nuclear safeguards

TVO Group takes good care of nuclear material and ensures that it does not get into the hands of unauthorized persons.

Quality

Work practices of a high standard are followed within TVO Group, which creates a basis for safe and economically efficient operation.

The professionals in nuclear industry who work at TVO Group are expected to show unfaltering compliance with procedures and verified execution of their own work. On the level of individual employees, this refers to a prudent approach to work, i.e., compliance with the STAR principle (Stop, Think, Act, Review) and questioning attitude against even the smallest uncertainties. The personnel shall be aware of the safety significance of their work and utilise methods developed for the management of human errors which are employed in the Group.

Risk management is implemented on a regular and consistent manner. Any risks affecting operation, and in particular safety, are identified already at the operational planning phase.

We consider our internal and external customers equally important. We perform all work tasks appropriately, according to schedule, and with high quality.

TVO Group develops co-operation with its suppliers so that the safety, availability, and environmental friendliness of the plant units remain at a high international level.

Corporate social responsibility policy

The corporate social responsibility policy covers the environment, energy efficiency, procurement, personnel, occupational health and safety, and communication.

Environment and energy efficiency

TVO Group operates in accordance with the principle of sustainable development and produces environmentally friendly nuclear electricity. The Group recognises the environmental and energy aspects of its operation and minimises the related adverse impacts at all phases of electricity production. Operational objectives are specified in compliance with the principle of continual improvement. TVO Group monitors the impact that its operations have on the state of the environment, and when necessary, launches immediate corrective actions. TVO Group ensures that the personnel and other persons working at the Olkiluoto nuclear facilities have competence and expertise in matters related to the environment and energy efficiency.

The objective of TVO Group is to prevent and further reduce the already low emissions of radioactive substances. Abnormal events in the plant process are anticipated and preparedness for the prevention of environmental damage caused by them has been established.

TVO Group acknowledges the importance of its overall responsibility for all the phases of the fuel cycle. The Group monitors and supervises the management of environmental issues implemented by the fuel suppliers. TVO Group requires the suppliers to assume responsibility for the securing and development of living conditions in the surroundings of uranium production and

processing plants, taking indigenous peoples into consideration. Fuel management extends from the uranium mines all the way to final disposal according to the “from bedrock to bedrock” principle.

TVO Group is committed to improve the efficiency of energy production. The Group monitors its own energy consumption and improves its efficiency by taking energy aspects into account in the operations. Plant unit modernisation projects are implemented to improve the energy efficiency of the power plant process. Opportunities for improvement of energy efficiency are considered in investments, modifications and procurement. The level and performance of energy efficiency are also reported on in the annual environmental report.

TVO Group minimises the amount of waste through the improvement of the use of raw materials and the reuse of waste. The goal is to increase the relative share of waste delivered for reuse and to decrease the amount of radioactive waste. TVO Group also takes efforts to reduce the amount of spent fuel through optimisation of the use and properties of fuel.

Sustainable utilisation of the environment is taken into account in the development of the Olkiluoto area and expansion of operations. The design and construction of any new nuclear power plant units aims to minimise harm and disruption to the environment.

Procurement

TVO Group employs procurement activities of a high standard to ensure safe, competitive and reliable production as well as the long service life of the plant units.

The products and services purchased by the Group are required to meet the requirements for safety, quality and the environment which the Group has specified. The availability of requisite products and services is ensured by means of long-term agreements based on mutual trust and partnership.

Factors particularly emphasised by TVO Group in the selection of suppliers include the continuity of the supplier’s operation, reliability of delivery, management of quality and environmental aspects, as well as competitiveness, with domestic and local suppliers given priority. Supplier assessments are based on the safety significance of the products and services to be ordered. The quality of deliveries is monitored and when necessary, corrective actions are taken without delay.

TVO Group conducts its relations with the supplier chain and business partners in a responsible and ethical manner. TVO Group expects its partners to uphold a high level of safety culture and responsible practices in their own operations.

Personnel

The objective of TVO Group is to ensure that the whole personnel is motivated, carry out their tasks in a responsible manner and commit to the agreed practices and procedures.

TVO Group makes sure that the human resources of the Group are competent and adequate to guarantee the achievement of the objectives specified for the Group.

TVO Group offers the employees opportunities for self-development in their work and profession and for the improvement of their competence by taking advantage, according to their own individual needs, of the training programmes provided by the Group. TVO Group offers competitive rewards and encourages employees to work profitably, to meet their goals, and to work to a high standard every day.

TVO Group provides its personnel opportunities for the maintenance of their work ability. The principles of the HR policy are implemented through good cooperation with the personnel. The objective of TVO Group is to ensure the equality and well-being of the work community where no discrimination is approved and which promotes the implementation of equality.

Health and safety

The goal of health and safety activities in TVO Group is to promote health and occupational safety by a proactive approach.

A good atmosphere is maintained in the work community within the Group, ensuring good working conditions as well as equality of treatment. We do not approve of any form of harassment or bullying in the workplace.

The goal of every employee in terms of occupational safety is to look after the safety of oneself and others. Occupational safety considerations are integrated in a proactive manner into all activities.

Communication

TVO Group increases mutual trust by supporting open and responsible interaction with all of its stakeholders in the local region, the Finnish society and the international cooperation network of the nuclear industry.

The Group promotes public knowledge about and acceptance of nuclear power by participating in social debate and communicating transparently about operations and events at the Olkiluoto nuclear facilities.

TVO Group uses internal communication to support an interactive work community culture and ensures that the personnel understand the goals and policies of the Group and are aware of the Group's financial and production situation.

TVO Group's contact with stakeholders is based on high ethical principles and thus reinforces confidence in the operation of both the Group and the stakeholders, posing no threat to the reputation or objectivity of either.

Sponsorship of culture, sports, research and non-profit activities is part of the corporate social responsibility of TVO Group. Factors considered in the selection of cooperation partners and sponsorship recipients include reputation, values and compatibility with the strategic objectives and principles of the Group. Finnish origin, a ground-breaking role, reliability, and interaction are some of the key selection criteria.

Production policy

The production policy covers the operation and maintenance of the plant, and the expansion of the production capacity.

Operation and maintenance

The objective of the operation and maintenance activities implemented by TVO Group is to ensure uninterrupted, predictable and competitive electricity production. Nuclear and operating safety are always given priority.

Plant safety and reliability are developed systematically. Modification and renovation projects are implemented at the plant in accordance with pre-approved plans to ensure an as long service life as possible for the plant.

Systematic test and inspection activities of an appropriate scope are carried out to verify the safe and reliable operation of the plant.

Plant maintenance operations are implemented in a well-planned manner, predicting potential disruption situations, and preparing for the measures the situations require.

Expansion of production capacity

TVO Group follows development in nuclear power technology and participates in international cooperation both with power plant suppliers and with nuclear power companies.

The electrical output of the existing plant units in Olkiluoto will be increased where possible by taking advantage of the latest available technology.

The best economically feasible technology that minimises environmental impacts over the entire life cycle of the plant unit is applied in the design and implementation of Olkiluoto 3.

Corporate security policy

The corporate security policy covers the safety of production and operation, personnel safety and facility security, rescue and emergency preparedness, and information security.

Safety of production and operation, personnel safety, and facility security

Procedures related to safety and security are implemented in a systematic, proactive and comprehensive manner. The procedures are designed to guarantee the safe operation of the plant, as well as the physical integrity of the personnel and others working at the plant.

Rescue and emergency preparedness

TVO Group maintains and develops preparedness for special conditions. Exercises in rescue and emergency operations are arranged systematically and regularly.

TVO Group maintains at all times its awareness of risks related to the company, the personnel and the operating environment.

Information security

Information security procedures are in TVO Group designed according to the significance and risk of each function. The objective is to secure nuclear safety, financial interests and the privacy protection of the personnel, to verify the availability of correct and reliable information, and to avoid any damage resulting from information processing.

TVO Group's information security procedures cover the availability, authenticity, and confidentiality of information and information systems, as well as management of access rights.

Group employees are granted access rights to the Group's information and information systems as required for the performance of their work tasks. Disclosure of information to third parties is only allowed when this is in the interest of the Group. Information disclosed by other parties is in TVO Group processed using at least the information security procedures used or required by the disclosing party.