



ANNUAL REPORT

2017



KRŠKO
NUCLEAR
POWER PLANT





CONTENTS

KRŠKO NUCLEAR POWER PLANT

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ADDRESS BY THE MANAGEMENT BOARD



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Dear business partners, owners and colleagues,

During the 2017 business year, to which this report refers, we achieved the aims set and accomplished our mission in all four fundamental areas; we ensured safe operations in accordance with standards which safeguard individual and collective safety of all employees and the wider public. The production price of the electricity generated was competitive in comparison with other sources and in line with the business plan, ensuring the owners profitability in the demanding conditions in the electricity market. We generated 5967 GWh hours of electricity, thus contributing a significant share of low-carbon power production which is in the light of climatic treaties increasingly vital, thus making a significant contribution to a clean environment. This positive aspect speaks for itself as to how wise it is for nuclear energy to remain one of the key segments in the blend of future energy supply.

The second phase of the Safety Upgrade Program was in progress intensively which includes two major projects: the construction of a new emergency control room and the upgrading of the operational support centre for which building works are currently in progress.

The third phase of the Safety Upgrade Program has also been started. This phase includes the construction of a fortified building with additional water sources and systems for residual heat outlet in the event of existing systems failure and the implementation of the spent fuel dry storage unit. For both project designs were being prepared.

A major part of the Safety Upgrade Program was also simulator upgrading as the simulator is an indispensable part of operating personnel training and supports the exercise part of training. This was the first major upgrading and extension after a period of seventeen years when the simulator was constructed as a complete copy of the main control room. The upgrading is a significant contribution to the high competence standard of operators and further safe and reliable plant operation.

The low- and intermediate level radioactive waste handling building was completed up to 90%. The moving of the measuring equipment and the waste treatment equipment from the temporary store will leave additional room for intermediate level waste to bridge the time until the permanent waste disposal facility is available.

In August we reached a milestone on the Sava River. Our thanks go to all who worked in difficult conditions in order to complete the upgrading in the third coolant circuit systems under the changed river water regime. It is appreciated that the equipment was upgraded and that the safe and reliable plant operation was secured with simultaneous Brežice Hydro Power Plant in operation.

Year 2017 will also be remembered for the intensive three-week assessment of operational safety and working processes carried out by the International Atomic Energy Agency requested by the Government of the Republic of Slovenia. Experts from different countries compared our operational practices with the Agency's recommendations. They established that this plant is an organisation constantly improving in the field of nuclear safety and operational reliability. Our targets concerning the safety and operational performance as well as method of work are high. At the same time we are well aware that in the nuclear industry there is no room for self-satisfaction. Our work and all projects are constantly directed into improvements leading to the achievement of our ultimate goal - safety.



Krško Nuclear Power Plant, with its reliable operation, without effects on the environment, year by year essentially contributes to the stability of the Slovenian and Croatian electricity system. The fact that the power generated by the nuclear facility is reliable, competitive and low-carbon energy has increasingly high value. The awareness of nuclear energy advantages is especially topical in the context of endeavours to reduce the green-house gases.

The knowledge and experience gained in the period of more than thirty years in the plant and supporting organisations coupled with good infrastructure maintained represent good foundations to build a long-term concept of nuclear energy use and improve the stability of the electric power supply.

Our achievements are not minute. We can look at them with pride and content. Only co-operation and good relationships bring success, development, progression, and future. Thank you all who contribute to these. Thank you for your efforts, hard work, knowledge and support in all decisions we have taken and will take.

Stane Rožman,
President of the
Management Board

Hrvoje Perharić,
Member of the
Management Board





SUMMARY REPORT AND CHALLENGES FOR 2018




SUMMARY REPORT AND CHALLENGES FOR 2018

In 2017, NPP had an output of 5967 GWh which is higher than 5945 GWh planned. As there was no outage the production was higher than the usual annual production with an outage. Through our stable operations we contributed to the stability of the Slovenian and Croatian power systems.

We are intensively implementing the Safety Upgrade Program (SUP); phase 2 is being implemented and preparations for phase 3 are underway which should be complete by the end of 2021. Phase 1 was completed during the outage in 2013. An important NPP's achievement is an agreement for constructing a spent fuel dry storage in March as dry storage is an important safety upgrade.

There were a number of international review missions in 2017.


The review mission of WANO Corporate Peer Review Follow-up in April concluded there was an improvement in resolving recommendations given at the last expert review in 2014. The mission concluded that NPP successfully implemented the action plan of improvements in organisation and administration, human performance, work management and operating experience.

The mission OSART (Operational Safety Assessment Review Team), composed of experts from the International Atomic Energy Agency (IAEA), took place in May. Its objective was to assess the adequacy of our implementation of the IAEA standards and to find any areas for improvement. This was the fourth such mission in NPP, taking place upon the invitation of the Slovenian Nuclear Safety Administration (URSJV). After a three-week long review, recommendations and proposals for improvements were given and good practice emphasised.

NPP conducted a special safety review on ageing between April and October which was requested by the URSJV in accordance with the requirements of the ENSREG-WENRA association. It issued a report on the program of ageing for which it had obtained an expert opinion of the authorised organisation on the ageing monitoring compliance with Slovenian laws and regulations of the American Nuclear Regulatory Commission (NRC). The report will be a component part of the Republic of Slovenia's report and a subject of subsequent international reviews and comparisons.



There were
several
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in 2017.

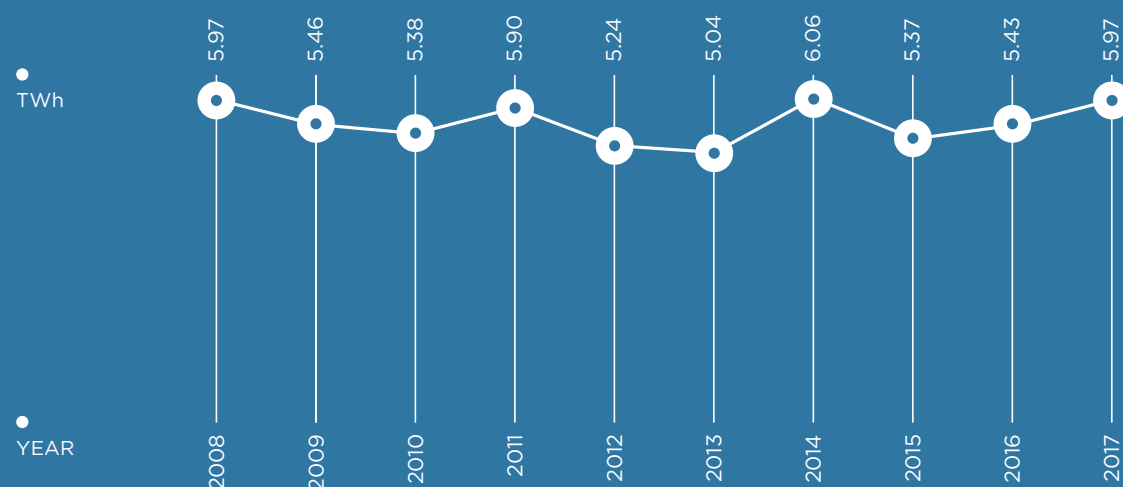


NPP had a very successful 2017. Its two shareholders had more electricity than planned. Together with reliability and the predictability of operation, which are important for the power system, economy and household, we were cost effective in accordance with the economic plan. We applied high standards of nuclear energy, regulatory restrictions and environmental obligations. Our plans for 2018 are based on good achievements.



DIAGRAM OF OUTPUT BY YEARS

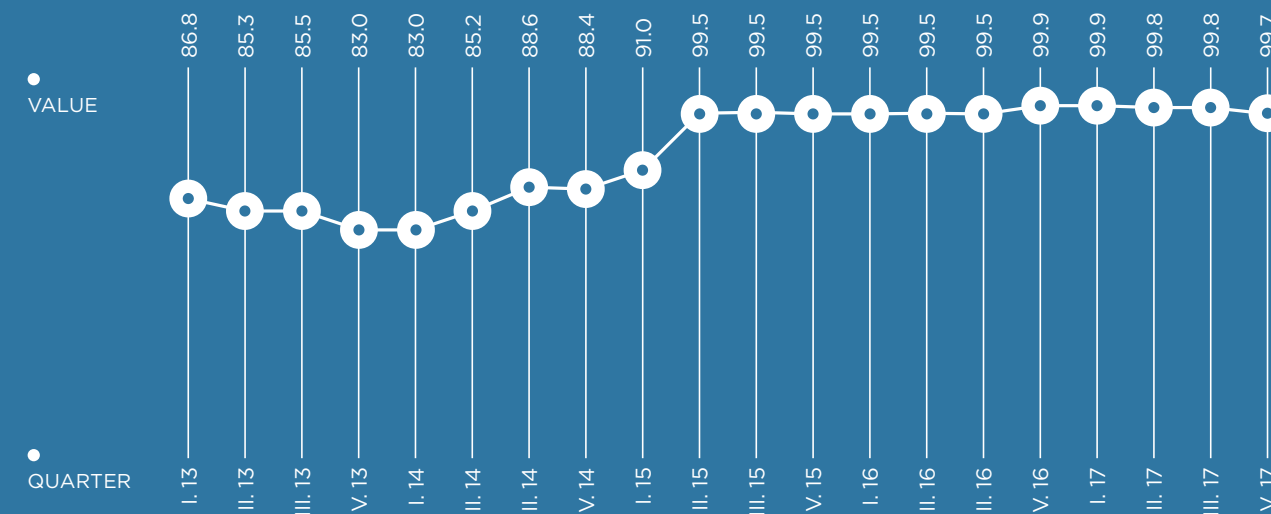
Total: 169.56 TWh
(output since the start of commercial operation)
NEK target for 2017: 5.95 TWh



NPP had stable operation, with two short shutdowns. In February, the plant tripped due to closing of the main feedwater control valve, while in April the plant was shutdown intentionally to rectify disturbances in the functioning of the moisture separator reheater relief valve. All environmental restrictions were met.



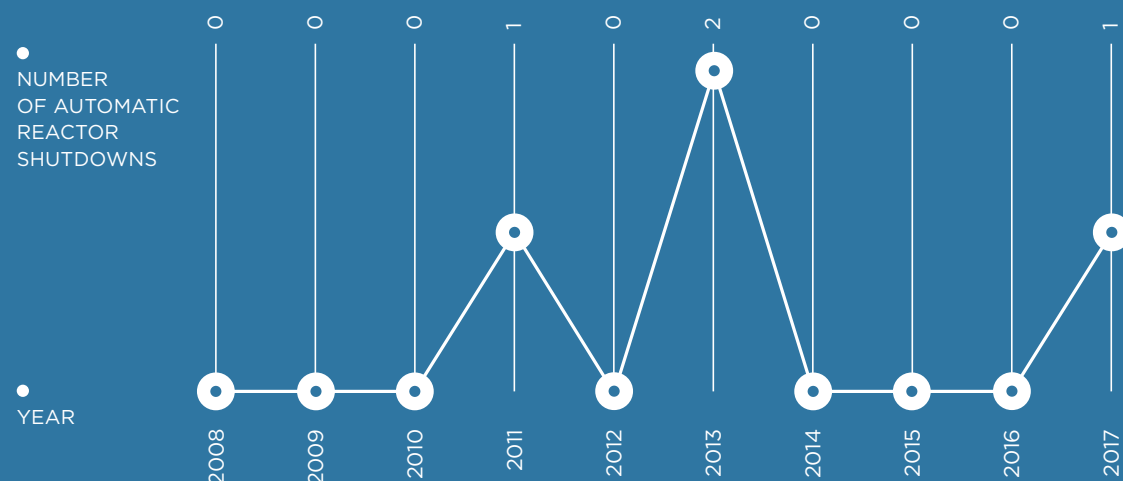
PERFORMANCE INDICATOR INDEX



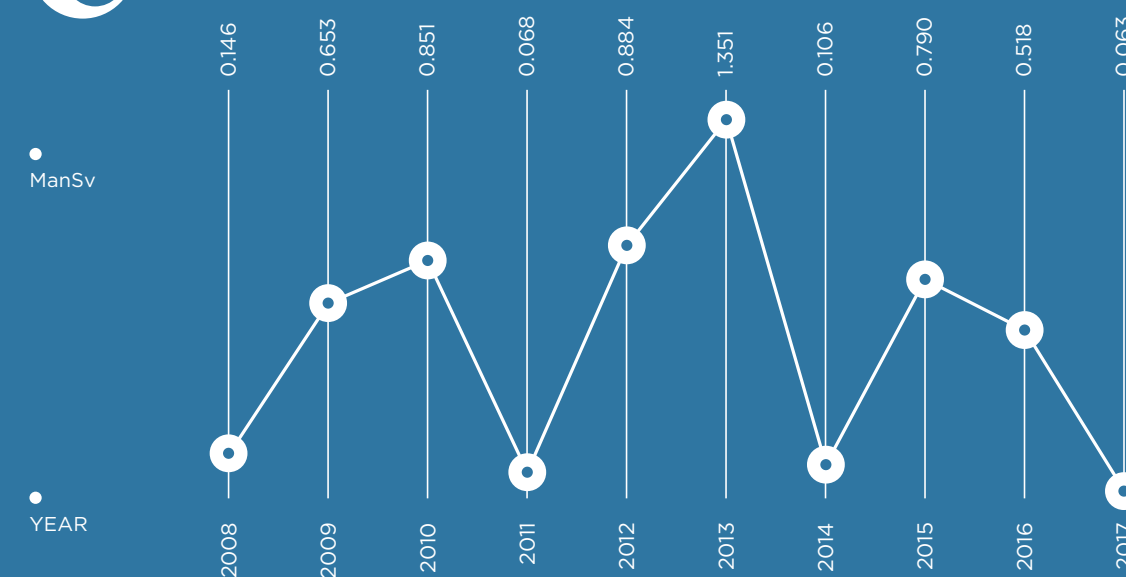
The operational efficiency is supported by the high value of the performance indicator index (above 99) which was instituted by WANO to facilitate the efficiency monitoring and data comparison between plants. It is calculated by weighted values of individual indicators, with the scale 0 to 100.



UNPLANNED AUTOMATIC SHUTDOWNS



TOTAL COLLECTIVE RADIATION EXPOSURE



● CHALLENGES FOR 2018

A decade and a half has passed since the Intergovernmental Agreement was concluded between the Government of the Republic of Slovenia and the Government of the Republic of Croatia on regulating the status and other legal issues related to investments in the Krško Nuclear Power Plant, its utilisation and decommissioning, and since the Articles of Association entered into effect. The Intergovernmental Agreement, together with laws and nuclear industry standards and the standards of effective company management, is the external framework of NPP's operation and business. It provides stable sources for its operation and technological upgrading while the results allow positive effects on the electric energy market for the benefit of both shareholders.



**High operating
standards
require extensive
investment and
maintenance
work.**

The Business Plan for 2018 and the Long Term Investment Plan into Technological Upgrade, which are two framework documents reflecting our responsibility to the owners, plan output at 5.4 million GWh of electricity, successful performance of all outage activities and investments, including the implementation of projects under the Safety Upgrade Program. The scope and complexity of works before us require from each employee, not only a high level of professionalism, but also enthusiasm, quality and effectiveness in order to smoothly perform all management, key and working processes and to achieve the set objectives.

The plant's outage is an extremely work intensive period with a 18-month fuel cycle operation because it is necessary to replace fuel, perform preventative reviews, maintenance inspections, and systems and equipment upgrading within a very short period of time. High operating standards require extensive investment and other maintenance work. Most upgradings are only possible during an outage due to operating restrictions. For these processes to be completed per high quality standards and on time, while continuing to provide nuclear safety, we need to be well prepared, organised and concentrated on work, maintaining at the same time good cooperation between NPP's workers and contractual partners. Only consistent and high quality performance of planned work provides the basis for good operating results in subsequent fuel cycles.

In NPP, we use the strategy of continuous technological upgrading. Deliberate investments are confirmed by achieving good operating results and high nuclear energy standards as acknowledged by the international missions. With new systems and equipment the scope of maintenance grows as well. In spite of demanding electricity market conditions, financial sources remain unchanged, rather they have been in decrease just like human resources; therefore, maintaining good results is an ever-lasting challenge. The scope and complexity of work will be particularly extensive due to intensive performance of tasks on the projects for the phases 2 and 3 of the Safety Upgrading Program that is to be completed by 2021, which will ensure that NPP will be comparable to new plants in terms of safety criteria. During the second phase of the Program, additional pressure relief valves on the pressurizer will be installed and alternative cooling of the spent fuel pit provided, while the project on the emergency control room will be completed during the next outage. At the same time, projects for the third phase of the Program are being prepared.

Successful operation, dedication to advancement and good internationally comparable plant performance indicators show that NPP has been fulfilling its share of responsibility for long-term use of nuclear energy and that we importantly contribute to energy independency as well as to the realisation of international environmental commitments.



RESPONSIBLE ATTITUDE TOWARDS THE ENVIRONMENT



RESPONSIBLE ATTITUDE TOWARDS THE ENVIRONMENT



The effects
on the
environment
are so low
that they
are practically
unmeasurable.



Environmental protection is included in all work processes of the plant. The measurement results demonstrate that all effects on the environment are far from administrative limits. Authorised organisations prepare a special annual report on radiation surveillance in the surroundings of the plant. The adequacy of our environmental management was confirmed by an additional review as to the compliance with the requirements of the new environmental standard.

The objective of radiation monitoring is to monitor the plant's operations and assess the effects on the environment and the population. This ensures that prescribed limits are respected.

NNP carries out radioactive measurements of the wastewater releases into the Sava River and emissions from the ventilation system into the air. Independently, external authorised organisations measure samples in the surroundings, in particular in the area around NNP, within a distance of 12 kilometres. In addition, there are 13 automatic radiation measuring stations located in the vicinity of the plant which can detect changes in the natural radiation due to precipitations as well as potential changes due to the nuclear facility. The Sava River is monitored downstream for 30 kilometres from the plant by independent authorised organisations.

The effects of the NPP on the population are so low that they are practically immeasurable. However, they can be calculated by models for the most exposed group of the population and the annual dose can be compared to the dose received from natural and other radiation sources. The assessment of a dose received by an individual in a critical reference group (an adult receiving the highest doses and whose food originates exclusively from locally grown food and fish) shows that the annual dose of such an individual is approximately 1 microsievert or less than 0.1 percent of the dose on average received by a person from natural sources of radiation (approximately 2,500 microsieverts). The annual dose for NNP is limited to 50 microsieverts per individual (at a distance of 500 meters from the reactor or more) from air and water media. The measurement results taken are analysed in detail in a special report for 2017, prepared for NNP by the Jožef Stefan Institute together with the Institute for Occupational Safety, MEIS and the Ruđer Bošković Institute; it is published on the NPP's website.

• LIQUID RADIOACTIVE DISCHARGES

Wastewater may contain fission and activation products. The activity of fission and activation products (excluding tritium H-3, carbon C-14 and alpha particle emitters) amounted to 0.0072 percent of the additional annual limit of activity for liquid discharges. The activity of discharged tritium was approximately 19.2 percent of the prescribed annual limit. Tritium is a hydrogen isotope found in water; in spite of being more active than other contaminants, it is less important due to its rapid secretion from a body in the event of its intake.

The plant observed administrative and technical regulations which require the concentration of radioactivity in the discharge channel wastewater not to exceed the prescribed limits.



DATA ON
LIQUID RADIOACTIVE
DISCHARGES IN 2017

RADIOACTIVE SUBSTANCES	ANNUAL LIMIT	PERCENTAGE OF THE LIMIT
FISSION AND ACTIVATION PRODUCTS	100 GBq	0.0072
TRITIUM (H-3)	45 TBq	19.2

• RADIOACTIVE
RELEASES
INTO THE AIR

The annual limit dose of 50 microsievert for releases into the air and water are checked monthly. The dose calculated for the air at a 500-metre distance from the reactor is calculated as the dose that could have been received by an individual at such distance in one year from external and internal radiation. The least favourable monthly average air rarefaction values and releases near the ground are presumed in the calculation of particular wind directions. The result for 2017 was 1.01 microsieverts (2.01 percent of the annual limit). More detailed data is given in the table below.



DATA ON
RADIOACTIVE
RELEASES INTO
THE AIR IN 2017

RADIOACTIVE SUBSTANCES	TOTAL ANNUAL LIMIT	DOSE	PERCENTAGE OF THE LIMIT
FISSION AND ACTIVATION GASES (TOTAL)		4.62E-02 µSv	
IODINES (I-131 AND OTHERS)		1.29E-04 µSv	
DUST PARTICLES (COBALT, CAESIUM, ETC.)	50 µSv	2.49E-07 µSv	2.01
TRITIUM (H-3)		6.78E-01 µSv	
CARBON (C-14)		2.81E-01 µSv	

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RESPONSIBLE
ATTITUDE
TOWARDS THE
ENVIRONMENT

1

Technical regulations were taken into account to the effect that radioactive concentrations in the air, e.g. the dose rate within a 500-metre distance from the reactor, did not exceed the prescribed value.

• MEASUREMENTS OF
RADIOACTIVE RELEASE
AND ENVIRONMENTAL SAMPLES

The NPP laboratory for radioactive protection regularly checks air and environmental samples by an accredited method, thus having fulfilled conditions set by the standard SIST EN ISO/IEC 17025 since 2007; this is checked by a Slovenian accreditation body. The accredited measurements of radioactivity of periodically inspected samples of liquid releases are carried out by the NPP laboratory for radio-chemistry.

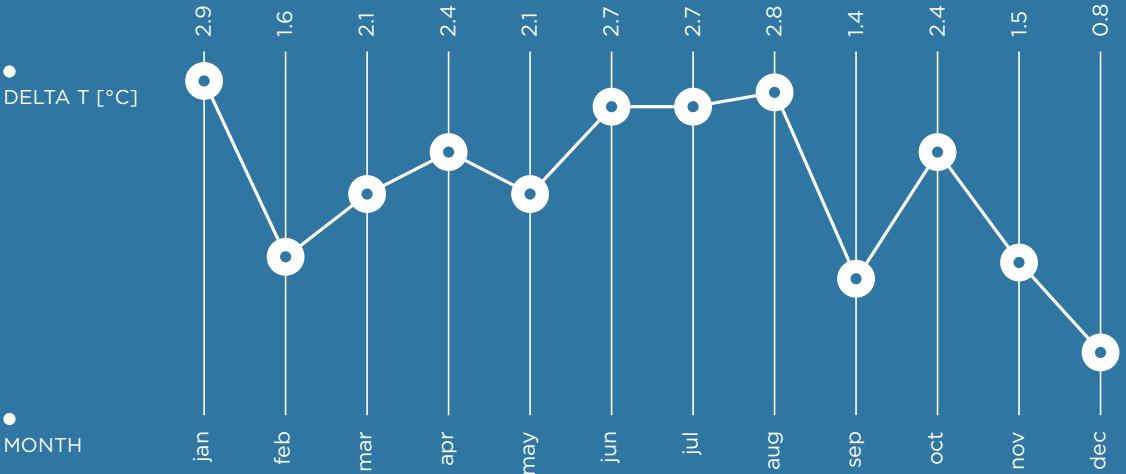
• MEASUREMENTS OF
THE SAVA RIVER AND
GROUNDWATER PARAMETERS

In accordance with the Environmental Permit (EP) on water emissions and the Water Permit, we measured the Sava River temperature and its flow rate, and monitored the river level and the underground flow rates, and took monthly measurements of biological and chemical oxygen consumption.

At the end of August, unfavourable weather conditions caused the Sava River temperature to reach the maximum permitted temperature increase level of 3°C several times. We had a similar situation at the start of the year.



AVERAGE INCREASE
OF WATER TEMPERATURE
IN THE SAVA RIVER IN 2017





Groundwater is regularly inspected by the power plant and authorised organisations; the ground water level and temperature in three boreholes and at two locations on the Sava River are constantly measured and, on a weekly basis, in ten boreholes in the Krško-Brežice fields. The level of groundwater in the boreholes observed in the vicinity of the watercourse increased by about 2 meters when compared to the past year due to the Brežice hydro power plant reservoir.

• DATA ON RADIOACTIVE WASTE AND SPENT NUCLEAR FUEL

In 2017, 148 packages of low- and intermediate-level radioactive waste was stored (NSRAO), with the total volume of 32.1 m³. Of these, 87 packages were compressible combustible waste, 59 packages were non-compressible combustible waste and 2 packages were super-compacted waste. There were a total of 3888 packages in the NSRAO interim storage. Of these, 87 new packages of compressed combustible waste and one package of compressed combustible waste from the previous period were moved to the decontamination building where a shipment for incineration by an external contractor in 2018 was prepared. The total volume of the inventory stored in the Krško plant's NSRAO storage on 31 December 2017 was 3800 packages, with a total volume of 2284.12 m³ and the total activity of 16.5 TBq.

The spent fuel pit contains 1208 spent fuel elements from 28 fuel cycles. The overall mass of spent fuel material is 470 tons.

In 2017, 32.1 m³
of LILW were
stored.



• ENVIRONMENTAL MANAGEMENT AND MUNICIPAL WASTE

Since the end of 2008, the standard ISO 14001 environmental management standard has been operating in NPP. Since the certificate was granted, the system has been checked regularly on an annual basis by an external certification organisation. The fourth audit was conducted; this time, according to the ISO 14001:2015 standard. It was established that NPP adequately respects the environmental management system requirements.

A special waste water treatment plant is used for communal waste water. Measurements of pH, temperature, non-soluble substances, chemical and biological use of oxygen at the outlet are taken by an external organisation, which is in line with the EP requirements. Monitoring results show adequate operation of the treatment plant since all values were in accordance with regulations.



2 HIGH LEVEL OF NUCLEAR SAFETY



2 HIGH LEVEL OF NUCLEAR SAFETY

We are committed to ongoing progress, professional work and personal growth.

Nuclear safety always has a priority at NPP. A high level of nuclear safety of our plant is achieved by independent verifications and critical self-assessment of the results, on-going improvement of human performance and the safety culture, equipment and processes upgrading, learning from own operating experience and international practices, and by comparing with the best facilities in the world.

NPP has paid special consideration to ensuring and verifying the implementation of legal regulations and standards related to nuclear technology as well as other modern technologies in the project designs (equipment modernisation), operational and maintenance activities, purchasing and other activities which all contribute to safe plant operations and the safety of the wider population. We are committed to ongoing progress, professional work and personal growth. Our mission is achieved through independent verification, continual improvements of human actions and safety culture, own critical self-assessment of the results achieved, permanent benchmarking with the best comparable facilities in the world, operating experience at home and abroad, and continual assessment of safety and stability of plant's operations.

Due to its specific nature, NPP had its attitude towards environment implanted in its very initial project (extensive research prior to site selection, strict respect of standards during construction). During the start-up and later operations, independent supervision of the effects on the environment was established (radioactive substance release into water and air, measuring of radioactivity in the environment, management of spent nuclear fuel, radioactive and hazardous waste). The Protection and Rescue Plan of NPP (NZIR NPP) has been prepared, defining organisation, measures and means to be followed in case of emergency events having potential radioactive effects on the environment. The attitude towards the environment is part of the business policy within which we give priority to safe and stable operation. The environment treatment practice in NPP is in accordance with the standard ISO 14001, internationally the most widely recognised standard concerning environmental issues.

One of the vital elements to be considered in maintenance and nuclear safety improvements lies in operating experience. After the events in Japan in 2011, we started to prepare and implement certain long-term actions already in that year; on the basis of experiences following industrial and administrative requirements and as instructed by the administrative authority, the Safety Upgrade Program (SUP) was developed for NPP, leading to a comprehensive upgrading of the plant which is to take place within the next four years.

The Program includes a list of projects for upgrading certain safety systems, electrical safety supply systems, radioactive release surveillance, flood safety and spent nuclear fuel storage. Individual projects have been finished, some are still on-going. Currently, phase 2 of a number of projects is on-going. Among the most important projects is the construction of a new emergency control room. Phase 3 (to be completed by 2021) includes the construction of extra reinforced bunkered building BB 2 and a spent fuel dry storage.



In March and October, NPP carried out non-scheduled regular annual theoretical and practical exercises in the unlikely event of extreme events. The exercises were attended by the staff of the main control room and the simulator, the technical support centre, operational support centre and emergency operations facility, the Krško professional fire-fighter unit, the Slovenian Nuclear Safety Administration, the Emergency Notification Centre of the Republic of Slovenia, and the Regional Emergency Notification Centre. The Slovenian Army participated at the start of the second exercise.

During exercises, we tested the mobilisation of staff, the procedure of informing competent authorities of the event, the performance of prescribed operational measures and interventions, fire fighting, measures for providing plant's physical safety and communication without basic information tools since the Process Information System (PIS) was not functioning. We also checked the functioning of operational groups during various tasks such as the provision of anti-flood protection with water barriers.

At NPP we achieved the objective and the goals of the exercise. The exercise showed adequate readiness of the plant's staff for managing an emergency event aspects that were tested; it also revealed areas which could be improved.

Laws and international standards require that plants carry out periodic safety reviews every ten years and report the results to a relevant administrative authority. A periodic safety review, as a supplementary tool to a regular safety review, comprehensively checks the level of plant's nuclear safety and confirms that the plant is able to operate safely in the next 10-year period. NPP carried out the second periodic safety review which was confirmed by URSJV at the end of May 2014 together with the implementation plan. All modifications and improvements related to legislations must be completed within five years of the report endorsement date which is by end of May 2019. We are pleased to report a visible advancement in the execution of the plan of modifications and upgrading of the plant, since more than 85 percent of all actions were completed by the end of 2017.

This is one of the key reviews through which we ensure a long-term operation of NPP.

In April, experts from WANO carried out a peer review follow-up in NPP, checking the implementation of the Action Plan 2014. NPP successfully accomplished the management improvement plan.

In May, the review of plant by OSART commenced, ending in June, after three very intensive weeks of evaluating operational safety and work processes. The objective of the OSART mission was to evaluate and compare the operational practices at NPP against the best international practices, to assess whether IAEA standards had been suitably implemented and to identify potential areas for improvement. The bases for assessment were the IAEA safety standards and long-term experience of experts from various countries. This was the fourth such mission by IAEA, following an invitation by the Government of the RS.

**Periodic
safety reviews
comprehensively
check the level
of the plant's
nuclear safety.**



By conducting this review, the URSJV obtained an objective assessment of the plant's status in terms of its adherence to the IAEA standards.

The experts of the OSART mission evaluated thirteen operating areas: organisation and administration for attaining safety, staff training and qualification, operations, maintenance, performance improvement, operating experience application, radiation protection, chemical processes, emergency preparedness and response, severe accident management, human performance, work management, plant life extension and the use of probabilistic safety analysis.

The OSART members indisputably established that NPP is an organisation that is committed to continuous improvements in providing nuclear safety and reliable operations. They made a number of recommendations for improvements and emphasised our good practices as a model at an international level.

In September, we made an action plan integrating the OSART's recommendations. There were 87 recommended actions, all with their own holders and deadlines. The holders and analysis sponsors are also caretakers and motivators, ensuring that actions are taken in time and report at review meetings.

The full-scope simulator, installed in NPP in 2000, represents a full-scale replica of the main control room of the plant with all control systems and displays, which was updated between 2016 in and 2017, after 17 years of use. As part of the upgrading, a project for the emergency control room is underway to replace the shutdown panels.





The simulator now works virtually, which means that its operation is no longer linked to specific software that could be out of date. Virtualisation which was for the first time implemented to such a wide extent allows the simulator to work on any modern computer.

The simulator is the most important part of the operating staff training system; it also supports the performance of exercises within the Protection and Rescue Plan. During the last seventeen years, these exercises amounted to a few hundred hours, expert training of operators to around 12,000 hours, while 67 new operators completed their initial training who trained for more than 5,000 hours for different scenarios.

The stimulator upgrade project is an important contribution to staff training who directly take part in the provision of plant's safe and stable operation as well as timely and successful intervention in emergency events.

Our developmental tasks and work priorities are part of the document entitled Commitments and Goals. They are based on the expectations of the management board and established policy as well as our priority areas. In 2017, our focus was on improvements in four areas: human excellence, management expectation and coaching, the implementation of the Corrective Action Program and effective work processes.



In November, a review mission by IAEA was completed which thoroughly examined the readiness system for any nuclear or radiological accident. During the closing meeting, international experts emphasised excellent cooperation between all participating organisations. The review included all parties involved in the protection and rescue system. Members of the mission praised accident readiness plans which define tasks and responsibilities. The report, drawn up on the basis of a two-week review, is the basis for preparing an action plan for improving the readiness of the whole system.

In accordance with instructions of the Western European Nuclear Regulators Association (WENRA), all European plants must have an assessment made on managing the ageing of equipment. In November, a special safety review was conducted in NPP. The review did not show discrepancies on safety important systems, structures or components; to the contrary, it confirmed that NPP has good ageing programs that manage these processes well. The review was focused on checking electricity cables, underground pipelines, a reactor vessel and the containment.

NPP issued a report on the program of ageing called Topical Peer Review - AMP for which it had obtained an expert opinion of the authorised organisation for monitoring the compliance of ageing with Slovenian laws and regulations of the American Nuclear Regulatory Commission (NRC). The report will be a component part of the Republic of Slovenia's report and a subject of a subsequent international review and comparison.

In November, NPP's external certification organisation conducted a follow-up audit of the Environmental Management System in accordance with the newly issued ISO 14001:2015 standard as well as of the Occupational Health and Safety Management System in accordance with BS OHSAS 18001.



The management
system
synchronises
all management
requirements.

• PROCESS AUDITING

NPP operations represent specific risks due to enormous stored power, residual heat and radioactive material in the reactor core; for this reason NPP has in place a management system which synchronises all management requirements. Through planned and systematic measures we achieve and continually improve safety, at the same time ensuring that requirements concerning health, environment, security, quality and economic aspects are not addressed separately from safety requirements, which prevents them having potential negative effects on safety. Therefore nuclear safety in all areas of the plant's operation is our first priority, placed before production targets, operational availability and cost limits. By encouraging and respecting the principle of safety culture at all levels, each NPP's employee, within their individual expertise, responsibility and competence take part in providing nuclear



safety, the safety of employees, population and environment. Our principles are manifested in the efficiency of inter-dependant processes within NPP and support the overall facility's operations.

Compliance of NPP's programs and efficiency of processes are assessed by periodic internal assessments. We assess the efficiency of activities which have a direct impact on the structures, systems and components by assessing their effects on safe and reliable plant operation. The audits are regularly planned for each or every other year in the fields laid down in the Quality Assurance Program. They are carried out by qualified staff without direct responsibilities for the area being assessed. Every audit and results of such audit is supported by a report prepared in writing, which is sent to individuals responsible for the relevant process, including harmonised proposed corrective measures and deadlines for their completion. NPP's management is informed of the audit conclusions at the management review. The auditors must follow-up the implementation and effectiveness of the corrective measures.

In 2017, the QA engineers, together with other organisational units in NPP, conducted ten internal audits in the following areas:

- organisation and administration: assessing compliance of the environmental management system with the SIST EN ISO 14001 standard and the occupational health and safety management system with the BS OHSAS 18001 standard;
- organisation and administration: checking organisational effectiveness (carried out by the team self-assessment of the examples of management team behaviour);
- radiological protection, including checking compliance of the accredited laboratories with the ISO 17025 standard;
- chemical processes, including radioactive waste, checking compliance of accredited laboratories with the ISO 17025 standard;
- fire protection;
- production;
- monitoring design changes in the Engineering;
- corrective actions program and operating experience;
- instrumentation, mechanical and predictive maintenance;
- security.

The efficiency
of work processes
is checked by
internal audits.



Conclusions of internal audits confirmed that the plant's systems function in accordance with the requirements set by applicable standards and that they meet policies and objectives set. Discrepancies found are recorded in a corrective actions program with identified responsible individuals and deadlines set for implementing the corrective measures. The corrective measures, determined on the basis of discrepancies detected in a previous assessment, had been successfully completed.

• OBSERVATION AND COACHING

Coaching through observations is one of priority areas which we will try to consistently apply in 2018. Through perseverance we will surely more effectively achieve concrete improvements and goals.

Management and other workers conduct observations and analysis of work processes in the technological facility to uncover discrepancies and take appropriate corrective measures. The fundamental objective of observations is not to criticize an individual, but rather to detect deviations in work processes and their rectification, finding methods for their improvements and to underline the desired standards and good working practices.

In 2017, more than 899 observations were carried out, many more than the previous year. The focus was on observing an individual's behaviour at work, with emphasis on the desired behaviour, followed by an immediate correction of the behaviour which was not in line with expectations. All disciplines and work groups underwent the observation procedure in different organisational units.



3 TECHNOLOGICAL MODERNISATION AND SAFETY UPGRADE PROGRAM



3 TECHNOLOGICAL MODERNISATION AND SAFETY UPGRADE PROGRAM

16 technological upgrades were carried out or started on-line.

In 2017, investment in technological upgrading included 16 technological upgrades which were carried out or started on-line. In accordance with the SUP, works related to the emergency control room construction that can be carried out during plant's operation were carried out as planned. Projects were prepared and international public procurements carried out for other safety upgrading projects and for major technological modernisation projects planned for the 2018 outage and later period.

Among the most important projects under individual sections, which were completed or started in 2017, are:

- **ENSURING SAFETY AND OPERATIONAL RELIABILITY**

Among the most important upgrades are projects which maintain the plant in compliance with environmental legislation requirements, projects which enable stable operations, and upgrades which ensure safe and reliable operation of NPP with simultaneous operation of the Brežice hydro power plant.

REPLACING CORROSION INHIBITOR

By stopping using the corrosion inhibitor based on chromates in the pipe systems, the environmental statutory requirements were met. As a substitute for environmentally unsuitable chromate, a new inhibitor based on molybdate was selected, which is environmentally acceptable and carries less restriction on operating and maintenance staff during its handling.

In 2017 we continued with modernisation and technological upgrading in NPP to directly increase nuclear safety and plant operational reliability. Upgrading is aimed at system and structure adjustment to ensure safety and plant's operational reliability at simultaneous operation of Brežice hydro power plant. The phase 2 includes modernisation according to the Safety Upgrade Program.

WASTE MANIPULATION BUILDING

Within the NPP's area, a waste manipulation building (WMB) was built in 2017.

The area is intended for:

- managing and handling radioactive waste (RAW) in accordance with the Radioactive Waste Management Program; the new spatial facility will allow for measuring equipment and the super-compactor to be moved from the handling area of the RAW temporary storage, leaving free room for storing RAW packages;
- preparing RAW for transport for incineration or melting;
- resolving the issue of hot workshops by providing room for an additional workshop for snubber testing;
- a new reservoir, intended for handling primary wastewater.

The construction of the facility is in its completion phase.

The project ensures an uninterrupted operation of the plant.



• SAFETY UPGRADE PROGRAM 2013–2021

The Safety Upgrade Program (SUP) is important for long-term plan's operation and has been supplemented on the basis of experience following the nuclear accident in Japan.

It was confirmed by URSJV. It comprises the construction of additional safety systems to provide reactor core and spent fuel cooling and represents an even higher level of resistance of the plant in case of extraordinary natural and other unlikely events such as extreme earthquake, flood, and aircraft crash. Additional safety systems enable the integrity of the containment and minimum releases to the environment also in the event of the worst accidents similar to that in Japan in 2011.

The Program consists of three phases and comprises projects of upgrading certain safety systems, safety power supply, radioactive release surveillance, flood safety and spent nuclear fuel store.

During the 2013 outage, the first phase of the safety upgrade was finished which included the installation of the passive containment filtered pressure relief ventilation system and the installation of passive autocatalytic hydrogen recombiners in the containment.

After 2013, intensive work of the phases 2 and 3 was on-going which include the following projects:

- upgrading anti-flood protection of NPP buildings (completed);
- upgrading the operational support centre;
- constructing an emergency control room and a technical support centre;
- installing additional pressure relief valves in the reactor coolant system;
- installing additional sprays for cooling the spent fuel pool and a connection for a mobile heat exchanger;
- installing an additional pump and a heat exchanger for alternative long-term cooling and residual heat removal; and
- spent fuel dry storage;
- construction of a bunkered safety building (project BB 2) with accompanying systems for alternative reactor cooling through water injection into the primary system and the containment, and for adding reactor cooling water by steam generators.

The Safety
Upgrade Program
is important
for long-term
plant's operation.



SAFETY UPGRADE PROGRAM PROJECTS IN 2017

Works related to the construction of the emergency control room continued while other projects were in the project documentation preparation phase or in the equipment procurement phase.

After selecting the contractor following the public procurement procedure, the upgrading of the operational support centre began. A contractor was selected based on an international public tender for an important segment of safety upgrade phase 3, i.e. the bunkered safety building 2 (BB 2) project.

A contractor for the whole spent fuel dry storage project was also selected on an international public procurement basis and first works have already started. Such storage systems operate passively and no equipment is needed nor systems or an energy source.

CONSTRUCTING THE EMERGENCY CONTROL ROOM

Constructing the emergency control room is a modification which is the core of phase 2 of the Safety Upgrade Program, and consists of three phases:

- Phase 1 – works during the 2016 outage: Preparatory work related to the installation of certain instruments in the reactor building was carried out and two transfer panels were installed.
- Phase 2 – preparatory work during operating cycle 29: During this phase, which took place in 2017, the full cable infrastructure was completed, including the laying of cables. All control panels in the emergency control room were installed. The remaining instruments will have to be installed before the 2018 outage.
- Phase 3 – completing the project and declaring the emergency control room operational: During the last phase (during 2018 and 2019 outages) all required rewiring for safety components monitoring from the emergency control room will be carried out.

The main purpose of building the emergency control room is to set up an alternative monitoring location which will allow for safe shutdown and cooling of the plant in case of main control room evacuation and to monitor the status in the containment in case of a serious accident which includes core damage.

Emergency
control
room –
alternative
monitoring
location.



The new emergency control room will provide:

- an alternative location for shutdown and cooling of the plant in case the main control room is not functioning which will bring NPP in line with comparable nuclear plants in central Europe where similar 'bunker-style' emergency control rooms were built in the 90's, while the newer plants have this solution included in the primary project.
- The emergency control room will also have additional instrumentation installed, which will be independent of the main control room, for monitoring the plant including in case of a serious accident. Qualified nuclear instrumentation will be installed as well as the water level measuring system in the spent fuel pit. Radiation monitors will be installed in some old and new locations in the technical support centre. The main and the emergency control rooms will be fitted with the new system components control panel for the extended project conditions, at the same time providing the monitoring of isolation valves of the containment filtered pressure relief ventilation system.
- The adjustment of the simulator with all the functions of the emergency control room was carried out. NPP's operators have already been trained on the full scope simulator for work in the emergency control room.
- New procedures were prepared for operators to use for training for alternative safe plant shutdown or the main control room evacuation.



● TECHNOLOGICAL MODERNISATION DUE TO CONSTRUCTING THE BREŽICE HYDROPOWER PLANT

MODIFICATIONS OF THE CIRCULATING COOLING WATER SYSTEM

Because of the construction of the Brežice hydropower plant (HE Brežice) and the increased water level of the Sava River, works were completed in 2017 that relate to extensive modifications in the intake structure of the circulating cooling water system. The bulk of modifications, completed before raising the water accumulation level in the new HE Brežice dam, included finishing works on the installation and start-up of a new pump of the water de-icing system in the intake structure, works on the water supply pump for an additional line of backwash nozzles of travelling screens and corrective measures for rectifying discrepancies on robust cleaning equipment which were detected during the start-up tests; their elimination ensured a full-scale functionality of the equipment in all the modes of operation.

RECONSTRUCTION OF EQUIPMENT FOR NPP DAM

The modification included the reconstruction of the hydro-mechanical equipment and the equipment for dam floodgates regulation due to higher Sava River water level following the construction of the HE Brežice water reservoir.

The reconstruction included extensive building works on the dam and immediately following the dam waterfalls downstream, works on the depot of new outage floodgates, new rail tracks were installed and a crane fitted for handling the new floodgates, the mechanical equipment for handling segment floodgates was replaced as well as extensive electrical and regulation equipment of the management system.

The modification ensures safe management and control of the floodgates, including circumstances when the Sava River water regime is changed, resulting in greater reliability of the plant operations.



ADJUSTING THE PLANT SECURITY SYSTEM

Due to the higher Sava River water level which has been raised by about 3 m and slow water current, resulting from the construction of HE Brežice, it was necessary to also adjust the plant security system to the new conditions.

ADJUSTING STORM AND FAECAL SEWAGE SYSTEMS

Following the rise of the Sava River water level, it was necessary to adjust and upgrade also the main storm water pumping station and the NPP treatment plant, which included the construction of the main storm water pumping building, the effluent into the Sava River was adjusted and mechanical equipment installed, including pumps, and non-return and isolation valves. The controls of the treatment plant were also upgraded.



MAJOR MAINTENANCE ACTIVITIES AND INSPECTION OF PRESSURE BOUNDARIES



Appropriate inspection, maintenance and upgrading ensure the operational readiness of equipment. Maintenance falls into the categories of preventive maintenance carried out at specific intervals defined in programs, predictive maintenance which is used for establishing the status of equipment (diagnostics), and corrective maintenance aimed at re-establishing the state of equipment to ensure its designed functionality.



MAJOR MAINTENANCE ACTIVITIES AND INSPECTION OF PRESSURE BOUNDARIES

We maintained the equipment which could be maintained on-line.

During corrective activities on vital equipment which are included in the preventative maintenance program, we conduct a detailed root cause analysis and revise the program accordingly.

The most vital maintenance activities were carried out on the equipment which enable on-line maintenance - mostly in accordance with the preventive maintenance plans and the programs related to the management of ageing equipment and components.

Mechanical maintenance took place on the basis of preventative maintenance programs. The most important works include overhaul of various pumps, compressors, vents and other components. There were no significant corrective works.

Maintenance of electrical equipment also took place in accordance with the programs and plans on preventative maintenance. Standard preventative activities included: preventative review of electrical equipment and surveillance tests of various batteries and relay protection. Overhauls and revision of various high- and low-voltage engines, circuit breakers and measuring transformers were also carried out.

The instrumentation maintenance staff carried out regular surveillance testing of the automatic reactor protection and the radiological control instrumentation. Since there was no outage during this business year, calibration and preventative maintenance activities were carried out during plant's operation.

Predictive maintenance included identifying the condition of the equipment by using various techniques not being part of the primary maintenance, e.g. thermographic inspection, vibration control of major rotating components, inspection of lubricant quality and inspection of rotors during the operation of powerful electrical engines.

There was no regular outage in 2017 and for this reason a limited amount of work was performed by non-destructive methods according to the integrity inspection program of components which represent the primary system boundary. There were no discrepancies. In accordance with the secondary systems component inspection program for erosion and corrosion effects, there were no instances detected which would necessitate more important corrective measures.

Other maintenance work was carried out during plant operation in accordance with the program; however, there was no major corrective work done which would essentially affect the plant's safety and/or availability.



In 2017, the NPP's total output was 6 285 272.3 MWh of gross electricity, representing 5 967 826.6 MWh of net electricity. This annual output was higher than planned. The availability factor was 99.4 percent while the capability factor was 99.2 percent.



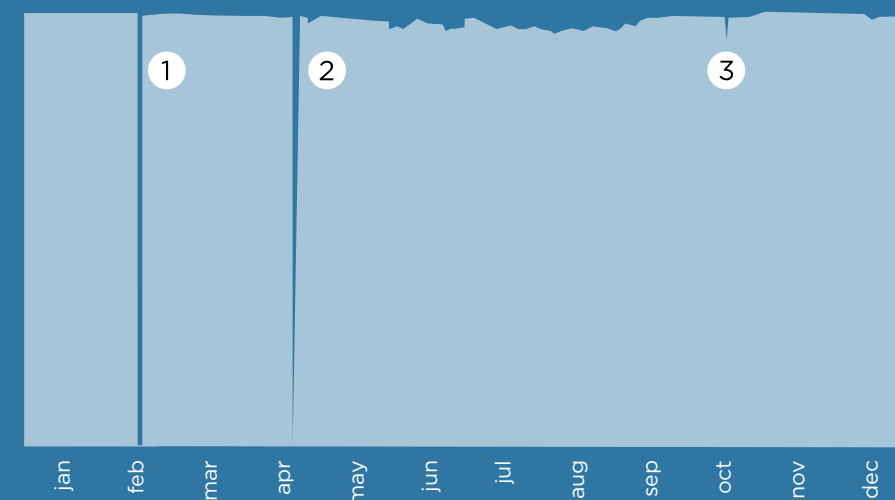
OUTPUT DIAGRAM FOR 2017

Gross energy produced: 6 285 272.3 MWh
Net energy produced: 5 967 826.6 MWh
Availability factor: 99.4%
Capability factor: 99.2%

- 1 Reactor scram due to closing of the main feedwater control valve
- 2 Opening of the moisture separator reheater relief valve
- 3 Turbine valves test

700 MW
● POWER (MW)

● MONTH



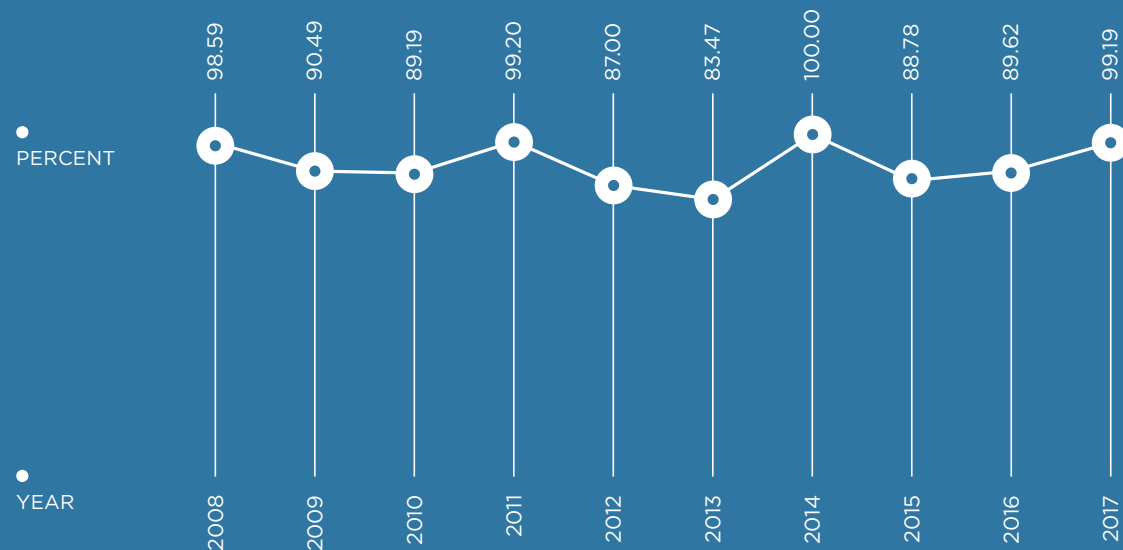
Performance indicators used to follow up the achievement of targets, efficiency and improvements in a certain area of the plant operations facilitate setting new goals after relevant improvements have been made, the adjustment of priorities and the provision of assets to ensure successful operation of the plant. In addition, these indicators allow comparison with other power plants.

• OPERATIONS

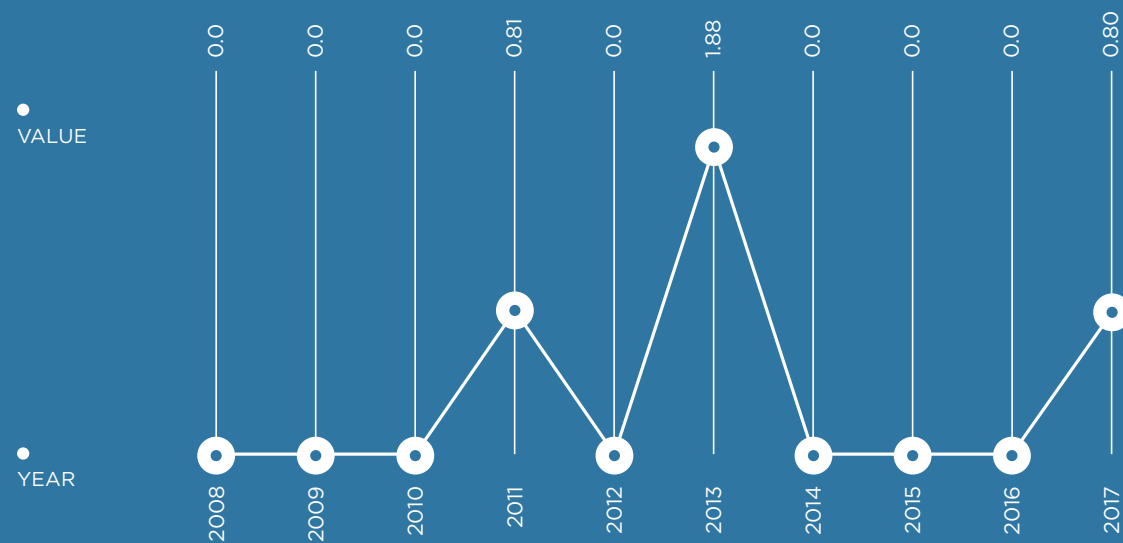


UNIT CAPABILITY FACTOR

NEK target for 2017: $\geq 97\%$



UNPLANNED AUTOMATIC SCRAMS, NORMALISED AT 7000 HOURS CRITICAL



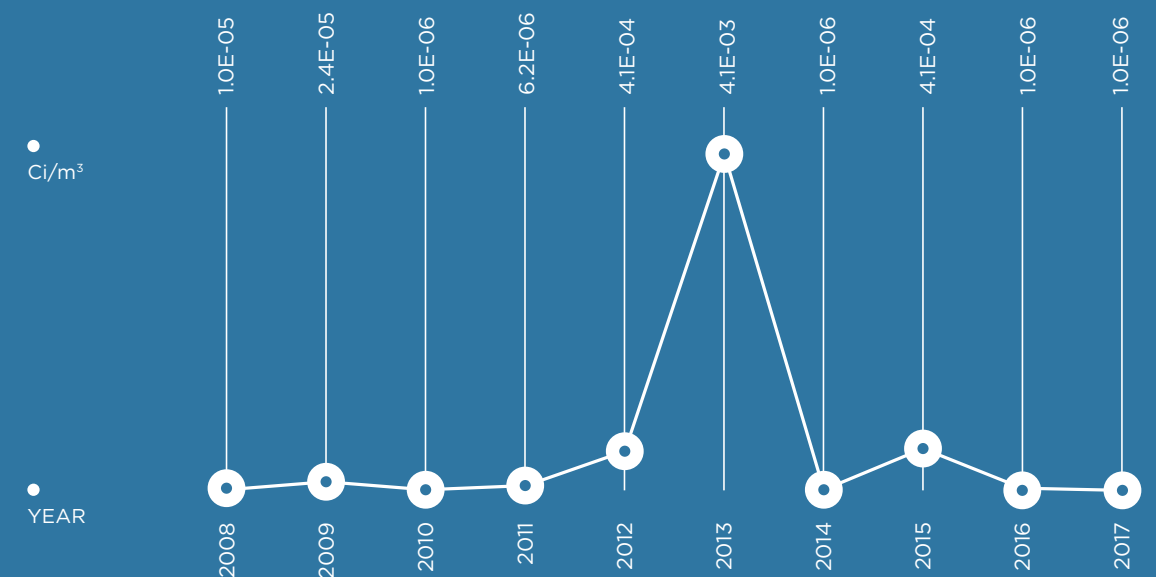
• NUCLEAR FUEL AND SECONDARY CHEMISTRY

In 2017 (during the fuel cycle 29), the specific activity of the primary coolant and its contamination was far below the limits prescribed by law and for a third less than in the previous cycle 28. Until the end of 2017, there were no damages to the nuclear fuel or deterioration of its integrity in the fuel cycle 29. The nuclear fuel reliability indicator of this period met the targets set by NPP and INPO (Institute for Nuclear Power Operations), which proves the reactor core operational reliability without nuclear fuel leakage.



NUCLEAR FUEL RELIABILITY INDICATOR

NEK target for 2017: $\leq 2.0E-04$



Chemical and radiochemical parameters were kept in accordance with the technical and chemical specifications. The ingress of aggressive chemical contaminants into the primary coolant was comparable to previous years and remained at a low level. This applies also to the radiation source inventory, resulting from corrosion products in the reactor coolant.

Ingress of chemical components into the secondary coolant was occasionally detected, in particular during transient events, but it remained moderate. There were no effects of degradation mechanisms on installed material. Release of iron particles and iron oxides due to erosion and corrosion in the secondary cycle was comparable to values of the previous year. WANO indicator of the secondary chemistry cycle, which includes the concentration of aggressive contaminants and the release of iron in its evaluation, reached the value of 1.019 in 2017. The target indicator value of ≤ 1.02 was thus achieved.

The chemistry of water media in the closed cooling cycles was adequately maintained. The corrosion inhibitor was successfully replaced in the component cooling system; thus, the toxic chromate was removed from the system under controlled conditions.

The monitoring of key chemical parameters was effective as well as the cleaning systems which contributed to the effective chemistry program.



There were no active corrosive mechanisms detected in the water cooling systems media. By using the chemistry of water media systems, NPP ensures long-term plant system availability and importantly contributes to both nuclear fuel and reactor coolant integrity as well as to keeping the dose figures within limits.

• SERVICE AND EQUIPMENT PURCHASING

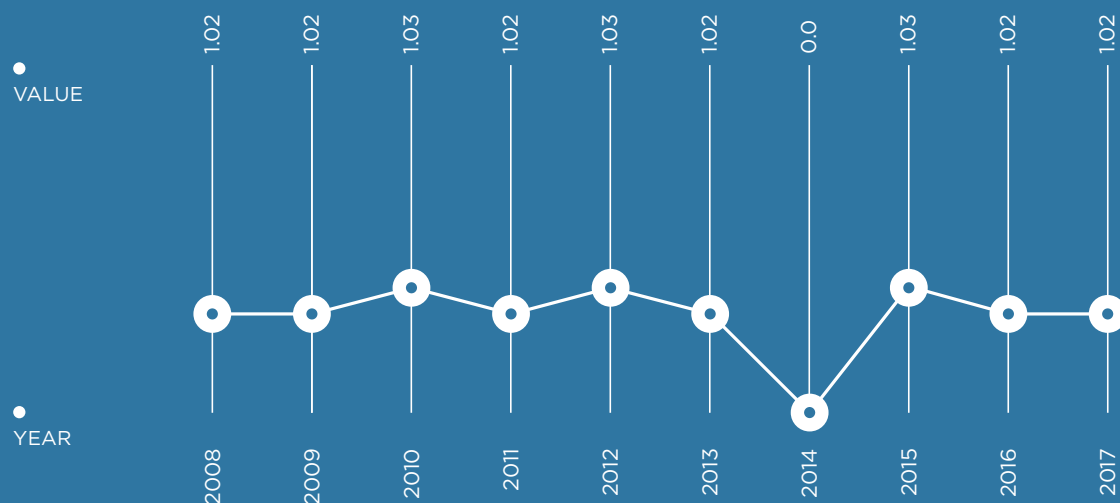
During 2017, a year without an outage, activities for purchasing services and materials for the 2018 outage began including activities to support the SUP program. Applying the relevant laws, internal NPP procedures and authorised resources, all other purchasing activities took place.

We intensively coordinated and optimised continuous provision of services from the local market and negotiated outage contracts of which most were concluded. Through good coordination, timely and proper communication we set the foundations for good cooperation.

With regard to the external market, we continued with the practice of visiting most important American suppliers to ensure their understanding of our regulations, in particular in the field of public procurement. We obtained the fuel in time and issued orders for the SUP which is partially also the result of successful intersectoral cooperation.



SECONDARY CHEMISTRY PERFORMANCE INDICATOR





NPP has joined numerous international professional organisations, which enables our employees to remain up-to-date with and to co-create the best practices, and exchange and transfer experience to their work environment. An active role and international inspection significantly contribute to the improvement of work processes and the achievement of good safety and operational results.

Good results
of our plant are
becoming a model
practice for other
nuclear facility
operators.

• OUR PARTICIPATION IN 2017

The President of NPP's Management Board is a member of the Management Board of WANO Paris Centre which comprises representatives of all countries who are members of this Centre. Two NPP's employees are temporarily working in WANO. One of NPP's employees is in the London Centre as a senior adviser of the operating experience team. The second NPP's employee is in the Paris Centre and is performing work as a peer reviewer in WANO nuclear plant expert missions.

In the period from 11 to 13 April, WANO Corporate Peer Review Follow-Up took place in NPP, to assess improvements in work processes as recommended after the previous peer review that took place at the plant in 2014. It was concluded that NPP has successfully implemented the action plan of improvements in management.

NPP has been active in WANO and INPO for years. Our experts have taken part in 48 of their missions worldwide. In 2017 two of our representatives took an active part in international WANO peer reviews of plants operations, in the *DOEL* facility in Belgium and *Sellafield* in the United Kingdom.

Through the technical assistance mission our plant has received over 34 such missions in the past years, with topics which cover various areas of the plant's activities. There was no such mission in NPP in 2017. Four of our experts took part in the technical assistance missions in other nuclear plants (*Ringhals* and *Oskarshamn* in Sweden, *Angra* in Brazil and *Dukovany* in the Czech Republic).

The NPP's representatives take part in professional training organised by various expert organisations. Good results of our plant are becoming a model practice for other nuclear facility operators and a source of good practices in various fields of work. There were 32 benchmarking visits in NPP. In 2017, NPP's experts took part in four such visits to plants abroad, e.g. the American plant *Ginna*, *Sizewell B* in the United Kingdom and two visits to the Spanish plant *Asco*.

NPP sent to WANO eight recommendations on operating experience of our plant.



Between 15 May and 1 June an OSART review took place at the plant which was conducted by IAEA. The objective of this review was to assess the adequacy of our implementation of the IAEA standards and to find any areas for improvement. This was the forth such mission in NPP, taking place upon the request of URSJV. As part of the mission, recommendations and proposals for improvements were given and good practice identified.

Together with NUPIC, representatives of NPP took part in seven audits of safety equipment suppliers in the USA and Europe.

NPP takes an active part in some of the important areas of the EPRI activities, including:

- equipment maintenance in nuclear facilities (NMAC - Nuclear Maintenance Applications Centre);
- equipment upgrading, equipment purchasing and equipment qualification (PSE - Plant Support Engineering);
- non-destructive testing and research (NDE - Non-Destructive Examination);
- exchange of experience in applying accident analysis programs (MAAP - Modular Accident Analysis Program User Group);
- exchange of experience concerning erosion/corrosion issues (CHUG - Checworks Users Group).

Our plant has participated in PWROG annual conferences, organised separately for nuclear facilities from Europe.

We actively participated in conferences of nuclear societies of Slovenia and Croatia.



• MEMBERSHIP IN INTERNATIONAL ORGANISATIONS

At NPP we are aware of the importance to participate in international organisations and in the international monitoring of our operation. Only this way we can attain international comparable operation and safety results. For this purpose, NPP is a member of many organisations listed below:

WANO

All nuclear power plants in the world are members of World Association of Nuclear Operators (WANO). NPP has been a member of this organisation since its establishment in 1989. Its aim is to promote the highest standards of operational safety, availability and excellence of nuclear power plants. WANO runs programs for sharing operating experience, reviews plants' operations, assists member plants in their operational improvement programs, encourages communication, and promotes benchmarking and copying best practices.

IAEA

The International Atomic Energy Agency (IAEA) is an independent intergovernmental organisation which operates within the United Nations Organisation. Its primary objective is to help members in planning and using nuclear technology for various peaceful purposes. This includes production of electricity and transfer of technology and knowledge in this area. IAEA develops safety standards that support the realisation of high level of safety in using nuclear energy and on protecting the public against ionising radiation. The organisation operates on the basis of various programs such as nuclear safeguards, nuclear technology application, nuclear energy, nuclear safety and technical cooperation. It organises OSART (Operational Safety Review Team) missions which involve visiting power plants in order to inspect and assess their operational safety.



EPRI

EPRI (Electrical Power Research Institute) is a non-profit and independent organisation for research in the area of electricity production and environment protection. It was established in 1973 in support of the development of the electrical industry. The Institute currently covers all aspects of production, transmission and use of electricity.

NRC

NRC (Nuclear Regulatory Commission) is an USA independent nuclear regulatory commission to ensure safety and protection of people from radioactive nuclear material, reactors and nuclear waste reprocessing plants. Through URSJV and IJS, NPP has become a member in several programs which gives access to information and literature in various areas.

PWROG

PWROG (Pressurized Water Reactor Owners Group) is an association of all the pressurized water reactor (PWR) operators of the company Westinghouse. The organisation offers various programs related to improved equipment, optimisation of technical specifications, reduced number of unplanned shutdowns, increased power of the plant, simplification of the plant systems, the manufacture and use of nuclear fuel, analyses by contemporary programs and analytical methods, etc.



ENISS

As a member of ENISS group (European Nuclear Industry Safety Standards), NPP took part in the preparation of the EU nuclear industry position in drafting amendments to legislation in this industry. The work group acts within FORATOM, an EU nuclear industry organisation.

NUPIC

NUPIC (Nuclear Procurement Issues Committee) is a committee of American and other nuclear facilities for joint evaluation of safety class equipment suppliers. The aim of this organisation is to improve the process of locating the suppliers of high standards of quality.

PROFESSIONALISM AND ENTHUSIASM OF STAFF AS THE BASIS OF SUCCESS

PROFESSIONALISM AND ENTHUSIASM OF STAFF AS THE BASIS OF SUCCESS

The fundamental values which are part of our work processes and relationships include safety culture, excellence in relationships and integral personal development. At the same time, these values are the reference line of our actions and the basis of our vision and mission.

• COMPREHENSIVE DEVELOPMENT OF STAFF

In NPP we provide preconditions for long-term safe and stable operation through planned staff processes, timely staff recruitment and systematic development of all employees. We are aware of the fact that work can be accomplished safely, efficiently and at a high quality level and all work areas improved only by professional, well qualified and competent individuals. The established professional training programs are intended to acquire and reinforce professional knowledge and skills which ensure successful completion of all work tasks at a high professional level and in accordance with international standards. Reinforcement of knowledge and transfer of skills from highly experienced staff onto younger generations are provided through in-service training and mentorship. At the same time we take steps to bring up and develop the next generation for key positions in the plant. In human resources special attention has been paid to monitoring staff enthusiasm and implementation of new managerial processes, such as annual development discussions.

Staff with expertise and skill, while possessing suitable values, are of strategic significance and one of the key factors of nuclear safety, long-term stability, competitiveness and success.

In 2017, we provided a stable and suitable staff structure in all work processes of the plant. The process of staff generation replacement is slowly coming to an end since timely recruitment of new staff resulted in successful replacement of staff that have retired in the past years. The annual staff turnover was 1.5 percent.

At the end of the year, the plant had 608 employees of which 41.8 percent had high professional and university education. The employee structure included 9 doctors of science and 15 masters of science. The share of female staff was 14.8 percent. At the end of the year there were ten students receiving our scholarship for the Bologna second degree university study program.

Our values are
safety culture,
excellence in
relationships
and integral
personal growth.

Through systematic staff training and the staff knowledge management system we ensure a high level of professionalism and enthusiasm. Comprehensive staff development is one of our fundamental values; the latter are the basis of our overall activities and tools for achieving our vision and mission.



DISTRIBUTION OF EMPLOYEES ACCORDING TO THE LEVEL OF EDUCATION

1	UP TO LEVEL 4	4.1%
2	LEVEL 5	38.2%
3	LEVEL 6	20.4%
4	LEVEL 7	33.4%
5	LEVEL 8	3.9%



• TRAINING OF OPERATING STAFF

In NPP we organise initial licensed staff training and provide an on-going licensed staff training and professional training of equipment operators.

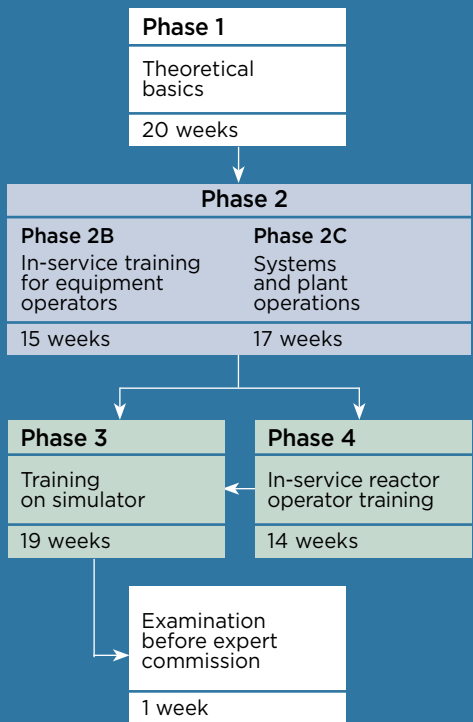
Initial licensed staff training for reactor operators was conducted in accordance with national legislation requirements and practices in the nuclear industry. The 85-week training course is structured in four phases of different forms of training, aimed at preparing the candidates for independent work in the main control room. In December, four candidates successfully completed phase 3 training - Simulator Training and phase 4 training - Reactor Operator Training. All four candidates also successfully passed the exam before an expert examination commission appointed by URSJV for a reactor operator licence.

In November 2016 four candidates started phase 1 training - Theoretical basics which they continued in 2017 by in-service training for equipment operators, phase 2 B and phase 2 C - Systems and Plant's Operation. This group of candidates will be continuing training in 2018, to obtain their first licence as a reactor operator.

On-going professional training of licensed staff was conducted in accordance with the approved outline program and NPP internal procedures. The training was conducted through lectures and simulator scenarios, during four weekly segments, attended by all operations crews and other licensed personnel.



THE INITIAL LICENSED STAFF TRAINING



Final exams before an expert commission appointed by URSJV were successfully passed by all 31 candidates: four candidates were awarded their first senior reactor operator licence, one candidate was awarded the first shift engineer license, nine candidates successfully renewed their senior reactor operator licence, 12 their licence for a reactor operator and five their license for a shift engineer.

The on-going professional training for equipment operators was conducted in parallel with the training for licensed staff, in four weekly training segments. The program focused on technical expertise and hands-on training by using operating procedures in the technological building or with the full-scope simulator. Other training was aimed at refreshing and upgrading existing knowledge and skills which equipment operators need in their day-to-day work.

A group of 19 production staff attended a four-day hands-on training, which included handling of refuelling equipment. Training was aimed at preparing the participants for safe and quality performance of this important refuelling activity.

The operational staff underwent training on the full-scope simulator prior to infrequently performed tests and evolutions in the facility.



● STAFF TRAINING FOR MAINTENANCE AND OTHER SUPPORT FUNCTIONS

The professional training of technical personnel included courses whose aim was for candidates to acquire the required general and specialist knowledge needed for performing maintenance, engineering and other supporting functions.

Courses aimed at acquiring legally required knowledge and refresher courses for general and professional knowledge were conducted for maintenance and other support functions.

Within the framework of initial training for technical staff, a course in the fundamentals of nuclear power plant technology is usually carried out; this year it did not take place as no new staff had been recruited.



Training of maintenance personnel continued with programs of specialist and legally required training. The training required was prepared on the basis of matrices of required qualifications. Some courses were conducted in the Maintenance Personnel Training Centre and in NPP technological units, and partly in cooperation with external institutions. The training was conducted by engaging, in addition to our own training staff, mentors of practical training from individual maintenance departments.

Under an on-going training of maintenance staff in two segments, we completed a training program on the subject of general and legally required areas. The maintenance staff was updated on the new aspects of plant processes and in-house and industry operating experience.

● OTHER LEGALLY PRESCRIBED AND GENERAL TRAINING

Legally required training includes: occupational health and safety, fire protection, hazardous substances, etc. General training includes: general employee training program, supervisor training program, etc.

We continued with the implementation of established programs of initial and refresher courses related to occupational health and safety, fire protection, hazardous substances, protection and rescue plan (NZIR), movement within the power generating facilities, etc.

Radiation protection initial and refresher training was conducted according to legal requirements.

Extensive NZIR drills were carried out, supported by the full-scope simulator.

In addition, other courses were carried out for other departments within the power plant. They were intended to update the staff on new legislation, and introduce innovations in the area of production processes. Courses on computer literacy and language courses were also conducted.



COMPANY ORGANISATION



COMPANY ORGANISATION



**NEK generates
and supplies
electric power
exclusively
to its owners
alone.**



Legislation, the Intergovernmental Agreement, nuclear industry standards and the standards of effective company management represent a framework of NPP's business. The plant's strategic documents - Code of Safety and Business Ethics, Five-Year Development Plan, and Management System - provide replies to answers who we are, what we believe in, and how and what we want to achieve and lead us to the accomplishment of our mission and vision.

In accordance with the intergovernmental agreement concluded between the Government of the Republic of Slovenia and the Government of the Republic of Croatia on regulating the status and other legal issues related to investments in the Krško Nuclear Power Plant, its utilisation and decommissioning, and the Articles of Association, both having entered into force on 11 March 2003, NPP is organised as a limited liability company. The bodies of the company, having parity membership, are the General Assembly, the Supervisory Board and the Management Board.

The nominal capital of NPP is divided into two equal business shares owned by the members *GEN* energija, d. o. o., Krško and Hrvatska elektroprivreda d. d., Zagreb. NPP generates for and supplies electricity exclusively to the members; it is their right and obligation to take 50 percent of the total available capacity and net electric power.

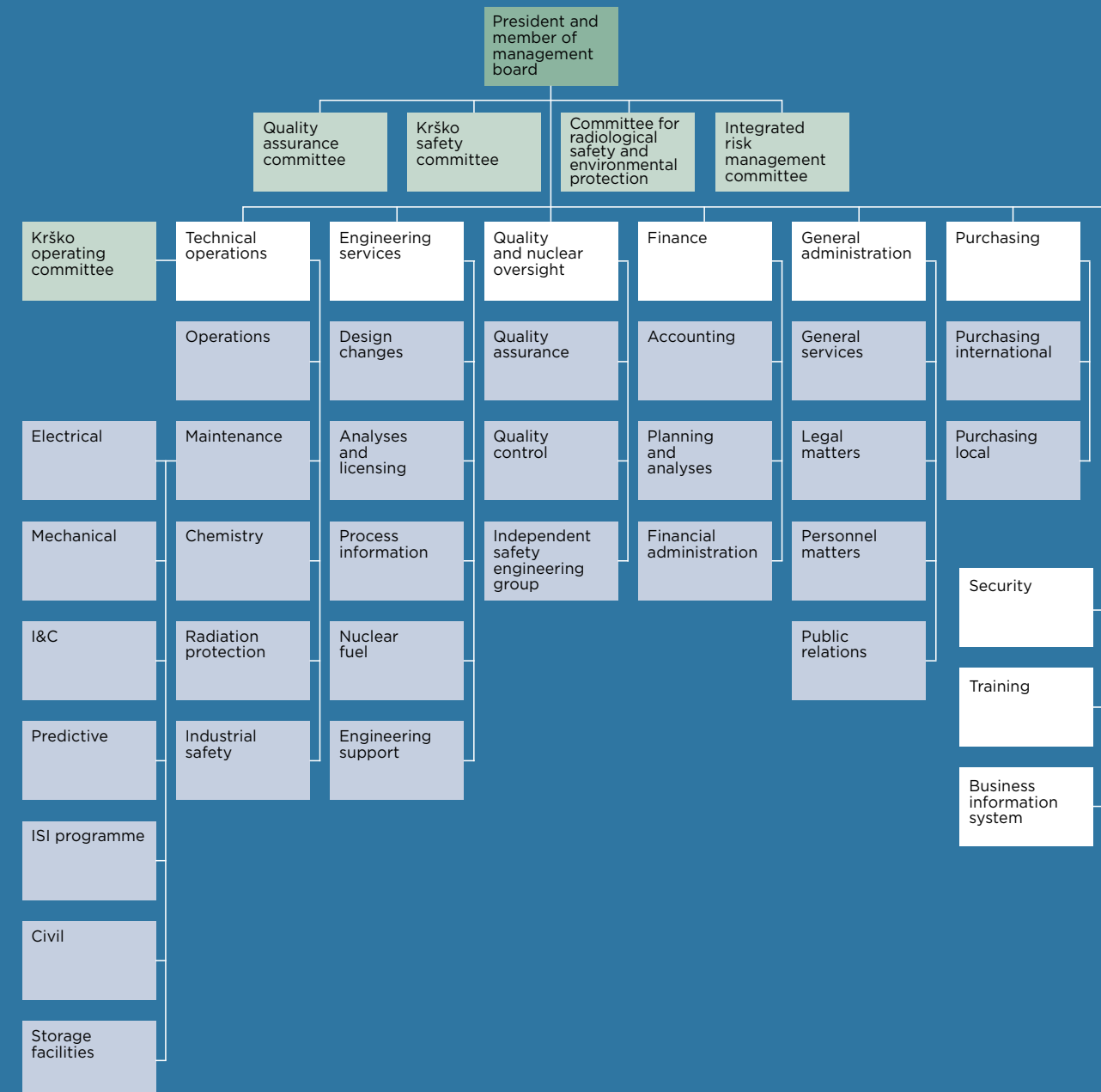


Our internal organisation of the company is designed to cover all functions which are in accordance with nuclear industry standards and regulations necessary for professional work processes. Due to the company's specific position, its internal organisation covers operational, engineering and corporate functions, including independent nuclear oversight. The Management System, one of the key documents, outlines in a systematic manner the fundamental organisational features and defines responsibilities of management, key and support processes.

The advantage of staff configuration with competent and responsible employees, whose merits lie in their high enthusiasm and motivation, is the advantage of our organisation. Knowledge and professionalism are highly valued; therefore, staff personal development is among our top priorities.



ORGANISATION CHART



SUMMARY OF THE 2017 FINANCIAL STATEMENTS

SUMMARY OF THE 2017 FINANCIAL STATEMENTS

In accordance with the Companies Act (ZGD-1) and the Articles of Association of NPP, a summary of the NPP Report for 2017 is given below. The summary includes the main characteristics of business operations in 2017 and consolidated fundamental financial statements. The full versions of basic financial statements are presented in the NPP Annual Report for 2017 prepared in accordance with the Agreement concluded between the Government of the Republic of Slovenia and the Government of the Republic of Croatia on regulating the status and other legal issues related to investments in Krško Nuclear Power Plant, its utilisation and decommissioning (Intergovernmental Agreement), NPP's Articles of Association, the Companies Act (ZGD-1) and Slovenian Accounting Standards (SRS).

The Annual Report of NPP for 2017 was submitted to the organisation authorised to process and publish the data the first working day after it had been accepted at NPP's General Meeting, and is published on NPP's website.

2017 was successful for NPP; the plant's economy and nuclear safety were at a high level, while all environmental requirements were strictly respected. All key targets we had set were met. We had high annual output - 5967 GWh electricity, which is 22 GWh more than planned. This generated EUR 159 million turnover and EUR 159 million of expenditure.

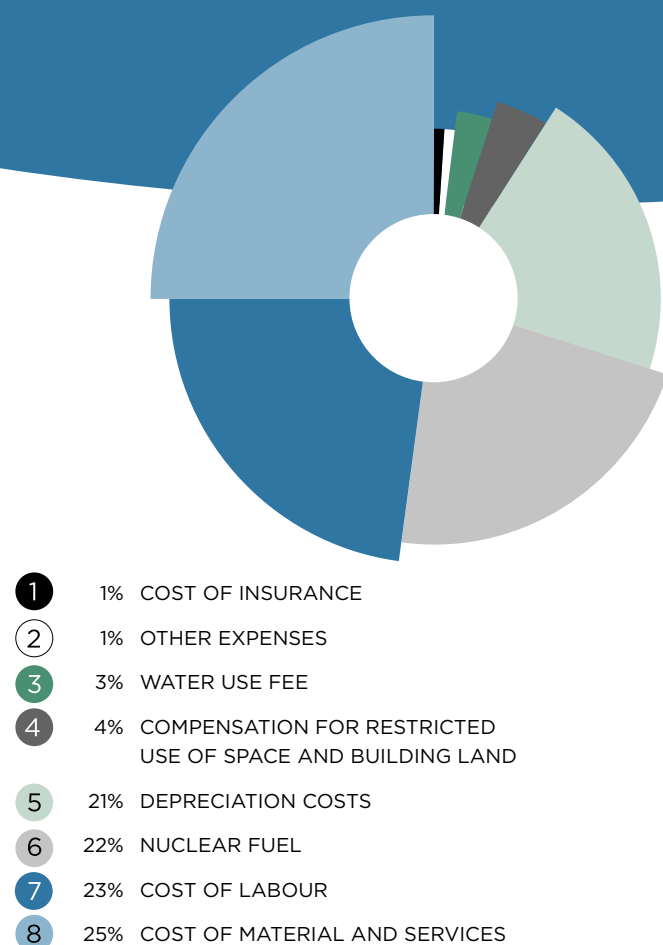
The expenditure structure is shown in the graph below.

**We achieved
the key targets
and supplied
5967 GWh
of electric
power.**

In 2017 NPP continued to strictly respect the Intergovernmental Agreement, Slovenian Accounting Standards and other legal regulations; we achieved good operational and business results. The economy of operations is backed up by financial results, while the positive auditor's report confirms that they reflect a fair picture of the financial position of the company, its financial results and cash flows.



EXPENDITURE STRUCTURE FOR 2017



The largest share (91% in the structure of expenditure) represents cost of materials and services and cost of labour, nuclear fuel and depreciation.

The financial position of NPP is satisfactory. Long-term resources cover all long-term assets and also all inventories.

Business results are demonstrated in the consolidated fundamental financial statements. These should be interpreted together with notes detailed in the NPP's 2017 Annual Report which is published on the website of the Agency of the Republic of Slovenia for Public Legal Records and Related Services (www.ajpes.si).

AUDITOR'S REPORT ON FINANCIAL STATEMENTS TO BE PUBLISHED FOR PUBLIC USE

Deloitte.

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REPORT OF THE INDEPENDENT AUDITOR ON THE SUMMARY FINANCIAL STATEMENTS of Nuklearna elektrarna Krško, d.o.o., intended for public notice

Opinion

The summary financial statements, which comprise the summary balance sheet as at December 31, 2017, the summary income statement, summary statement of changes in equity and summary cash flow statement for the year then ended are derived from the audited financial statements of Nuklearna elektrarna Krško, d.o.o. for the year ended December 31, 2017.

In our opinion, the accompanying summary financial statements are consistent in all material respects, with the audited financial statements, in accordance with ZGD and the materiality criterion and the nature of the summary financial statements purpose.

Summary Financial Statements

The summary financial statements do not contain all the disclosures required by a Treaty between the Government of the Republic of Slovenia and the Government of the Republic of Croatia on the Regulation of the Status and Other Legal Relations Regarding Investment, Exploitation and Decommissioning of the Krško Nuclear Plant (hereinafter 'the Intergovernmental Treaty'), a NEK, d.o.o. Contract of Members (hereinafter 'the Contract of members'), and Slovenian Accounting Standards in those parts that are not governed by the Intergovernmental Treaty or the Contract of Members. Reading the summary financial statements and the auditor's report thereon, therefore, is not a substitute for reading the audited financial statements and the auditor's report thereon.

The Audited Financial Statements and Our Report Thereon

We expressed an unmodified audit opinion on the audited financial statements in our report dated March 27, 2018.

Management's Responsibility for the Summary Financial Statements

Management is responsible for the preparation of the summary financial statements in accordance with and the materiality criterion and the nature of the summary financial statements purpose.

Auditor's Responsibility

Our responsibility is to express an opinion on whether the summary financial statements are consistent, in all material respects, with the audited financial statements based on our procedures, which were conducted in accordance with International Standard on Auditing ISA 810 (Revised), *Engagements to Report on Summary Financial Statements*.

DELOITTE REVIZIJA d.o.o.

Barbara Žibret Kralj
Certified Auditor

Ljubljana, 27 March 2018

For signature please refer to the original
Slovenian version.

Deloitte.
DELOITTE REVIZIJA D.O.O.
Ljubljana, Slovenija 3

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• FINANCIAL STATEMENTS

BALANCE SHEET AS OF
31 DECEMBER 2017

		in EUR
ASSETS	31.12.2017	31.12.2016
A. Long-term assets	335,759,148	317,895,341
Tangible fixed assets	335,706,571	317,815,077
Investment property	-	-
Long-term financial investments	52,577	80,264
B. Current assets	161,003,271	159,774,506
Inventories	76,420,003	68,833,361
Short-term financial investments	67,143,151	73,031,779
Short-term operating receivables	17,405,995	17,864,433
Cash	34,122	44,933
C. Short-term deferred expenses and accrued revenue	647,309	626,583
TOTAL ASSETS	497,409,728	478,296,430
LIABILITIES		
A. CAPITAL	440,362,215	441,905,443
Called-up capital	353,544,826	353,544,826
Revenue reserves	89,294,326	88,843,448
Reserves from fair value re-evaluation	1,327,535	-933,709
Net profit or loss carried over	-3,804,472	0
Retained net profit or loss	0	450,878
B. Provisions and long-term accrued costs and deferred revenue	14,003,884	9,275,983
Provisions for jubilee benefits and severance pay	10,454,629	8,812,187
Other provisions	427,152	463,796
Long-term accrued costs and deferred revenue	3,122,103	-
C. Long-term operating liabilities	197,916	211,665
Long-term operating liabilities	197,916	211,665
Č. Short-term operating liabilities	38,212,306	26,778,891
Short-term operating liabilities	38,212,306	26,778,891
D. Long-term accrued costs and deferred revenue	4,633,407	124,448
TOTAL LIABILITIES	497,409,728	478,296,430

INCOME STATEMENT
FOR YEAR ENDING
31 DECEMBER 2017

	2017	in EUR 2016
Operating revenue	158,392,606	163,281,991
Operating expenses	158,542,053	162,569,866
OPERATING PROFIT OR LOSS FROM OPERATIONS	-149,447	712,125
Financial revenue	298,397	211,647
Financial expenses	148,950	472,894
OPERATING PROFIT OR LOSS FROM FINANCING	149,447	-261,247
NET OPERATING PROFIT OR LOSS FOR THE PERIOD	0	450,878
NET OPERATING PROFIT OR LOSS FOR THE PERIOD	0	450,878

CASH FLOW STATEMENT FOR
THE YEAR ENDING
31 DECEMBER 2017

	2017	in EUR 2016
A. Cash flows from operating activities		
Cash receipts from operating activities	177,295,834	177,202,494
Cash disbursements from operating activities	135,022,905	159,027,391
POSITIVE OR NEGATIVE CASH FLOW STATEMENT FROM OPERATING ACTIVITIES	42,272,929	18,175,103
B. CASH FLOWS FROM INVESTING ACTIVITIES		
Cash receipts from investing activities	202,262,315	303,808,726
Disbursements from investing activities	244,546,055	321,952,646
POSITIVE OR NEGATIVE CASH FLOW STATEMENT FROM OPERATING ACTIVITIES	-42,283,740	-18,143,920
C. Cash flow from financing activities		
POSITIVE OR NEGATIVE CASH FLOW STATEMENT FROM FINANCING ACTIVITIES	-	-
CLOSING BALANCE OF CASH	34,122	44,933
Cash flow statement for the period	-10,811	31,183
Opening balance of cash	44,933	13,750



**STATEMENT OF CHANGES
IN CAPITAL FOR THE YEARS
2017 AND 2016**

in EUR

	Nominal capital	Legal reserves	Statutory reserves	Other reserves from profit	Reserves from fair value re-evaluation	Net profit or loss carried over	Retained net profit or loss	TOTAL
Opening balance 01.01.2017	353,544,826	35,354,483	53,321,477	167,488	-933,709	450,878	-	441,905,443
Changes to equity - transactions with owners	-	-	-	-	-	-	-	-
Total comprehensive income of financial year	-	-	-	-	-	-	-	-
Changes within capital - allocation of part of net profit for reserves	-	-	-	450,878	-	-450,878	-	0
Changes in capital - other changes in capital	-	-	-	-	2,261,244	-3,804,472	-	-1,543,228
Closing balance 31.12.2017	353,544,826	35,354,483	53,321,477	618,366	1,327,535	-3,804,472	-	440,362,215
Opening balance 01.01.2016	353,544,826	35,354,483	53,321,477	167,488	426,992	-	-	441,961,282
Changes to equity - transactions with owners	-	-	-	-	-	-	-	-
Total comprehensive income of financial year	-	-	-	-	-	-	450,878	450,878
Changes in capital	-	-	-	-	-506,717	-	-	-506,717
Closing balance 31.12.2016	353,544,826	35,354,483	53,321,477	167,488	-933,709	-	450,878	441,905,443



LIST OF ACRONYMS

AMP	Aging Management Program
BS OHSAS	British Standard – International Occupational Health and Safety Management Standard
CHUG	Checworks Users Group
ENISS	European Nuclear Industry Safety Standards
ENSREG-WENRA	European Nuclear Safety Regulators Group-Western European Nuclear Regulators Association
EPRI	Electrical Power Research Institute
FORATOM	European Atomic Forum
HE	Hydroelectric Power Plant
IAEA	International Atomic Energy Agency
INPO	Institute for Nuclear Power Operations
I&C	Instrumentation and Control
ISI	In-Service Inspection
ISO	International Organisation for Standardization
LILW	Low- and Intermediate-Level Radioactive Waste
MAAP	Modular Accident Analysis Program User Group
NDE	Non-Destructive Examination
NEK/NPP	Krško Nuclear Power Plant
NMAC	Nuclear Maintenance Application Centre
NRC	Nuclear Regulatory Commission
NUPIC	Nuclear Procurement Issues Committee
NZIR	Protection and Rescue Plan
OL	Online
OSART	Operational Safety and Review Team
OTJE	Fundamentals of Nuclear Plant Technology
OVD	Environmental Permit
PIS	Process Information System
SUP	Safety Upgrade Program
PSE	Plant Support Engineering
PWROG	Pressurized Water Reactor Owners Group
RAW	Radioactive Waste
RS	Republic of Slovenia
URSJV	Slovenian Nuclear Safety Administration
WANO	World Association of Nuclear Operators
WMB	Waste Manipulation Building
ZGD	Companies Act