



Kozloduy NPP EAD

Annual report

2020



TOGETHER ON THE ROAD TO SUCCESS

We glance back on the years behind and see how each of them differs – with the lessons learned, the experience gained, and the goals successfully achieved. The summing-up shows that although the year 2020 was marked by Covid-19, Kozloduy NPP stood out even more distinctly as the leading producer and reliable supplier of electricity in the country, a responsible corporate citizen and an active participant in processes important for the community as a whole. Last year we all faced a new and serious challenge – working in the conditions of a global pandemic that affected all the spheres of people's lives worldwide.

In spite of all the restrictions we have triumphed over the difficulties and proved once again that nuclear power workers demonstrate a praiseworthy role model. Our joint efforts, strong responsibility, discipline and dedication prevented the extraordinary situation from affecting negatively our performance, the plant safety or the production process.

We retained and ensured the stable and reliable plant operation, generated a record amount of electricity that provided nearly 41% of the energy mix in Bulgaria, and successfully accomplished the maintenance programme. There were no trips on any of the operating units, the scheduled annual outage on Unit 6 was implemented within a record short timescale, and excellent performance indicator values were recorded for the nuclear units operation.

Our concern for the people manifested in our continual involvement in all that was happening around us; in those hard times we extended a helping hand to the local community and the Bulgarian medics.

For all this I would like to express my profound respect and sincere gratitude to my colleagues, to the whole team of Kozloduy NPP. This exceptional team, with its professional commitment and devotion to the common goals, is the strongest guarantee for the prosperity of Bulgaria's nuclear energy.

Nasko Mihov

Chief Executive Officer



ENERGY FOR RELIABILITY, STABILITY, AND SECURITY

OPERATIONAL STATES

In 2020, Kozloduy NPP nuclear power units worked in compliance with the planned load schedule and with optimal loads of the generating capacities. For the reporting period, no events affecting safety or the environment occurred and there were no unplanned events with an impact on production.

The arrangements and strict application of the measures established for restricting Covid-19 spread ensured reliable operation of the nuclear power units and performance of the maintenance activities to their planned extent.

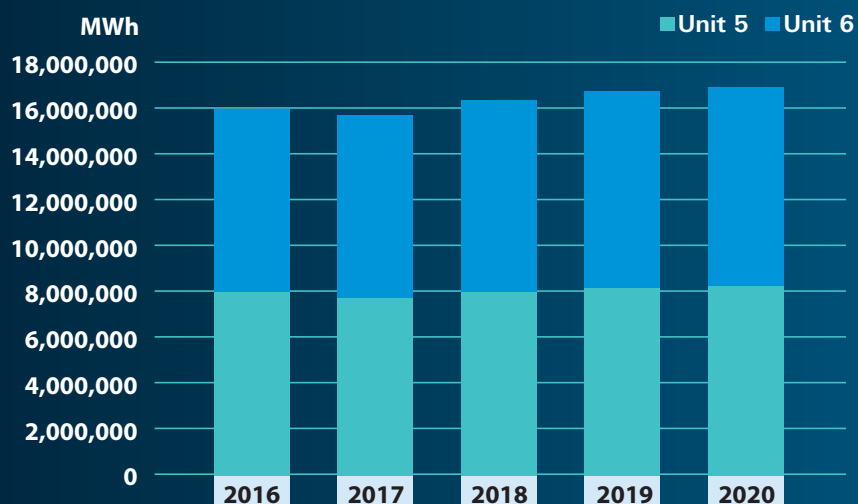
GENERATION

In 2020, the highest production achievement of Units 5 and 6 from the previous year was improved and a new electricity production record was set for the whole operational history of Units 5 and 6. Kozloduy NPP nuclear power units generated 16,625,765 MWh of electricity which provided 40.8% of the national electricity generation for the year.

Since the commissioning of Unit 5 in 1987 and Unit 6 in 1991 until the end of 2020, the two units have produced 194,709,385 MWh and 184,984,833 MWh of electricity, respectively.

Since 1974, when Unit 1 was commissioned, until the end of 2020, Kozloduy NPP has generated 650,690,175 MWh of electricity in total with the share of Units 5 and 6 being nearly 60%.

ELECTRICITY GENERATED (GROSS)



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KOZLODUY NPP PROVIDED 40.8% OF THE NATIONAL ELECTRICITY GENERATION FOR THE YEAR.

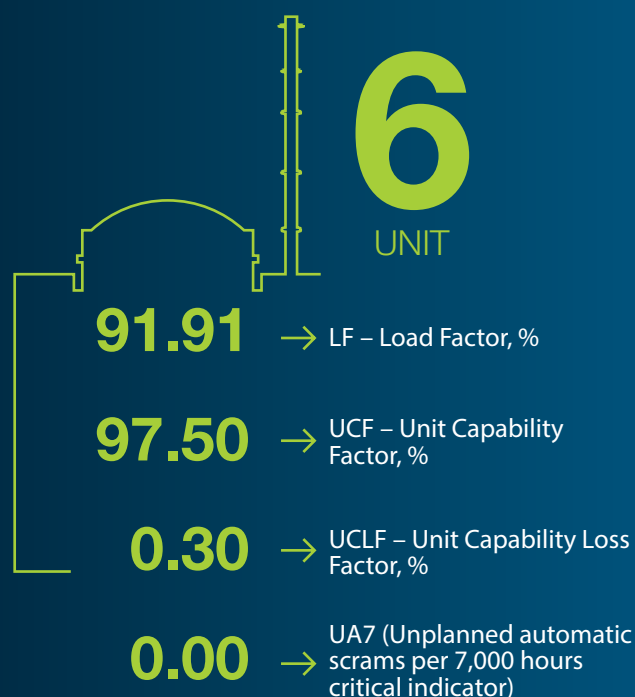
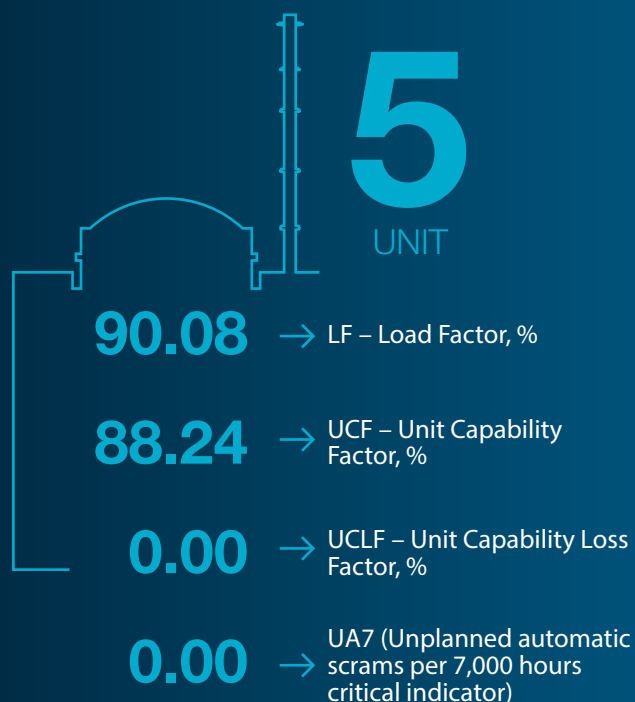


ELECTRICITY SOLD BY KOZLODUY NPP PER SEGMENTS

The net active electricity supplied to the national grid by Kozloduy NPP amounted to 15,787,268 MWh, sold in compliance with the current regulations.

In pursuance of the monthly quotas set by the Energy and Water Regulatory Commission, 18.7% of the net generated electricity was sold to the Public Supplier at regulated prices. The remaining portion was successfully traded on the organised exchange market administered by the Independent Bulgarian Energy Exchange EAD.

Heating energy to the amount of 76,765 MWh was delivered for heating of on-site facilities, and for heat supply to end consumers (domestic or other) in the town of Kozloduy.



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KOZLODUY NPP ACHIEVED EXCELLENT PERFORMANCE INDICATOR VALUES IN 2020 AS WELL.

PERFORMANCE INDICATORS

The World Association of Nuclear Operators (WANO) and the International Atomic Energy Agency use a system of specific performance indicators for the power units' normal operation to monitor and analyse the trends in nuclear energy.

For 2020, Kozloduy NPP Load Factor (LF) was 91% (Unit 5 – 90.08%, Unit 6 – 91.91%). In recent years, this Kozloduy NPP indicator has shown a lasting trend of keeping values of about 90% and above. The high comprehensive safety and reliability rating throughout the year was also based on the indicators Unit Capability Factor (UCF), Unit Capability Loss Factor (UCLF) and Unplanned automatic scrams per 7,000 hours critical indicator (UA7).

According to the WANO criteria, UCF values exceeding 85% and UCLF up to 3% demonstrate very good reliability and safety levels of the nuclear power plants, as well as a high level of operation process optimisation. The absence of Units 5 and 6 unplanned trips due to technological problems and the record short Unit 6 outage were causal of those extremely favourable indicator levels.

The excellent performance indicators achieved by Kozloduy NPP in 2020 formed a lasting trend towards high reliability and safety levels, thus rating the plant among the best nuclear power plants in the world.

Throughout the year, there was not a single unplanned reactor scram actuation at Kozloduy NPP.





MAINTENANCE PROGRAMME

The annual maintenance programme of Kozloduy NPP comprises a large number of preventive maintenance and repair activities, performance tests and inspections, specialised inspections and diagnostic non-destructive testing of structures, systems and components of the safety systems, safety important systems, and systems important to the production process.

All the activities were carried out in compliance with the licensing obligations, technical specifications for safe operation, and manufacturer requirements in order to ensure operability of the nuclear installations and balance of plant in the long term.

The main part of the annual maintenance programme was completed when the units were shutdown for outage and refuelling. The activities were optimised and team coordination enabled timely completion of the maintenance, repairs and modernisations planned for 2020. The outage of Unit 5 lasted 42 days, while the outage of Unit 6 was performed in the record-short time of 32 days for a second consecutive year.

Along with the required maintenance activities, the scheduled activities in the programmes for long-term operation, safety enhancement, ageing management, as well as the activities enhancing the equipment resistance against extreme external impacts, were implemented during the outage.

All maintenance and modernisation activities were performed to an extremely high quality standard and funded with own funds of the plant.

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ALL MAINTENANCE
AND
MODERNISATION
ACTIVITIES WERE
PERFORMED TO AN
EXTREMELY HIGH
QUALITY STANDARD.



SAFETY – OUR TOP PRIORITY

LICENSING REGIME

Kozloduy NPP EAD operates two nuclear power units – Units 5 and 6 with WWER-1000 reactors, and two spent nuclear fuel storage facilities (SNFSF) – wet storage facility (WSFSF) and dry storage facility (DSFSF).

The operation of nuclear facilities is subject to regulatory control on behalf of the Bulgarian Nuclear Regulatory Agency (NRA) at the Council of Ministers of the Republic of Bulgaria. Specialised oversight is exercised by a range of governmental bodies – Ministry of Environment and Water (MEW), Ministry of Health (MH), Ministry of Regional Development and Public Works (MRDPW), State Agency for Metrology and Technical Surveillance (SAMTS), etc.

The nuclear installations are operated according to the provisions of the operating licences issued by the NRA. The Company maintains licences for use ionising radiation sources (IRS), licences for transport of radioactive substances (RAW) and licences to conduct specialised training.

SAFETY CULTURE

Kozloduy NPP has adopted a systematic long-term approach to establishing and developing a strong safety culture (SC) as a mandatory requirement for safety enhancement. This includes periodic SC assessment and enhancement activities, involvement of all employees and fostering an attitude of personal responsible behaviour. Special emphasis is placed on building of values associated with the motivation to continuously improve SC.

The organisation and implementation of the planned activities is coordinated by the Safety Culture Committee – an advisory body to the Safety and Quality Director.

All the activities for safety culture maintenance, assessment and enhancement included in the annual work plan for 2020 were completed as scheduled. A self-assessment was performed according to the WANO document ‘Traits of a Healthy Nuclear Safety Culture’. For the first time since SC self-assessments were introduced at Kozloduy NPP, the questionnaire was published on the plant Intranet site and workers not included in the representative sample, but willing to express their opinion had the opportunity to do so.

In September 2020, safety culture was also a subject of review during the nuclear risk insurance inspection at Kozloduy NPP EAD.



IAEA GSG-3.5

NUCLEAR SAFETY

The operation of Kozloduy NPP nuclear power units is performed in full compliance with the conditions of the licences, requirements of the technical specifications and operating procedures.

In 2020, there were no violations of the operational limits and conditions for safe operation. Three operating events were registered and reported to the NRA. All of them were rated level 0 as per the INES scale (events without safety significance). Based on the causes identified during the analyses, corrective actions were initiated to prevent recurrence.

There were no reactor scrams at Units 5 or 6 during the reporting year.

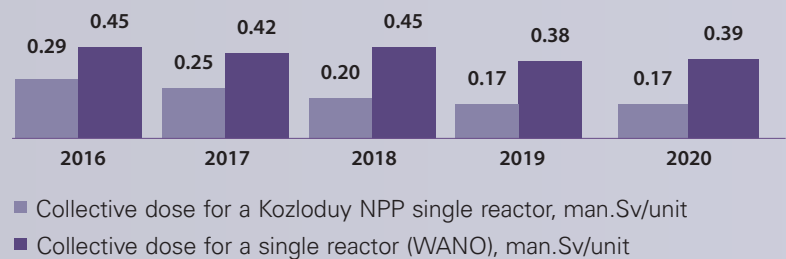


RADIATION PROTECTION

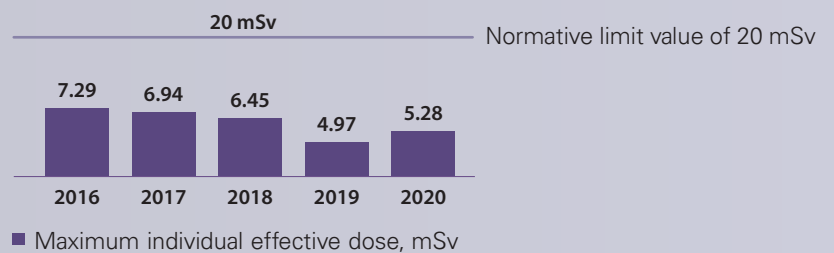
The annual individual and collective dose exposure values for 2020 confirm the efficiency of the radiation protection measures and rank Kozloduy NPP among the well performing in this area nuclear power plants.

The maximum individual dose was 5.28 mSv which constitutes 26.4% of the normative annual occupational exposure limit. The total collective dose received during the operation of the two WVER-1000 reactors was 0.34 man.Sv, or 0.17 man.Sv, on average, per each reactor. Over the recent years, the trend for this value in Kozloduy NPP has been stable and lower than the data published in the World Association of Nuclear Operators annual reports.

COLLECTIVE DOSE FOR A SINGLE KOZLODUY NPP REACTOR COMPARED TO THE WANO INDICATOR, manSv/unit

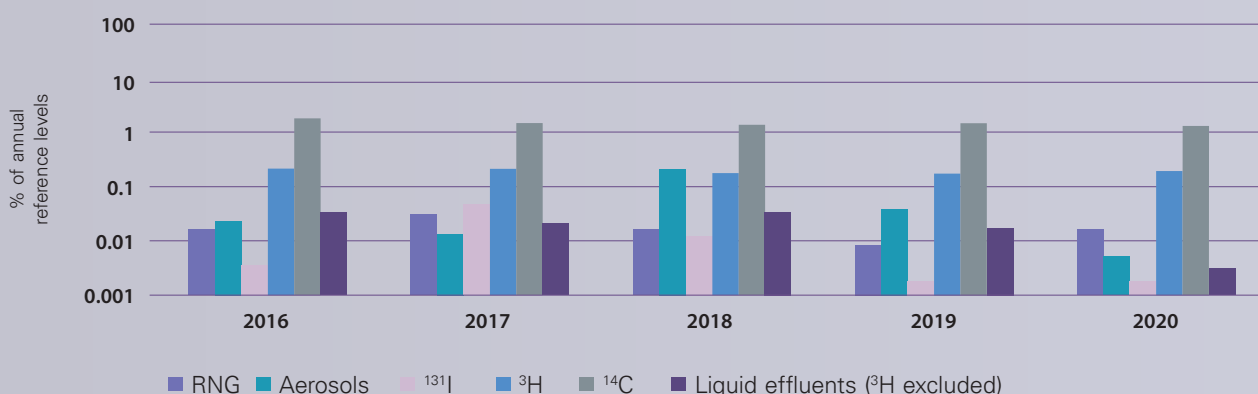


MAXIMUM INDIVIDUAL EFFECTIVE DOSE IN THE KOZLODUY NPP CONTROLLED AREA, mSv



TO ENSURE CONTINUOUS ENHANCEMENT OF RADIATION PROTECTION EFFECTIVENESS, KOZLODUY NPP SYSTEMATICALLY IMPLEMENTS THE ALARA PRINCIPLE (AS LOW AS REASONABLY ACHIEVABLE).

TOTAL ACTIVITY OF AIRBORNE (RNG, AEROSOLS, ^{131}I , ^3H , ^{14}C) AND LIQUID EFFLUENT DISCHARGES, IN % OF THE REFERENCE ANNUAL LIMITS FOR THE PLANT



RADIATION MONITORING OF DISCHARGES TO THE ENVIRONMENT

The continuous improvement of operational practices and adoption of the highest standards in nuclear industry ensure high quality radiological monitoring at Kozloduy NPP.

In 2020, the amounts of the discharged radioactive noble gases (RNG), aerosols and iodine-131 were approximately 0.02%, 0.01% and 0.001% below the reference levels. The radioactive substances in the plant waste waters were within 0.005% of the reference levels. The limits set for tritium content in the discharges to the environment were not exceeded.

The plant stipulated annual limit values of the discharge activity were significantly lower than the normatively defined limits. An independent external control on behalf of the NRA, MEW and the National Centre of Radiobiology and Radiation Protection (NCRRP) is performed. Data from the monitoring of liquid and gaseous radioactive discharges to the environment are annually reported to the European Commission (EC).



RADIOACTIVE WASTE MANAGEMENT

The approach to radioactive waste management (RAW) adopted at Kozloduy NPP is aimed at transferring the currently generated RAW for further processing and phased retrieval of historical RAW from repositories according to the approved annual schedule. In 2020, some 100 tonnes of solid and 224 m³ of liquid radioactive waste was generated and transferred to the State Enterprise 'Radioactive Waste' (SE RAW) for subsequent processing.

SPENT NUCLEAR FUEL MANAGEMENT

Kozloduy NPP spent nuclear fuel (SNF) is managed according to the National Strategy for SNF and RAW Management, and stored in compliance with all safety requirements. After being kept for a specified time period in the spent fuel pools (SFP), the SF assemblies are transferred to the wet spent fuel storage facility which is common for all the power units. Spent nuclear fuel from Units 1, 2, 3, and 4 loaded in Constor 440/84 casks is stored in the Dry Spent Fuel Storage Facility (DSFSF).

During the 2020 outage on Unit 5, three shipments of spent fuel assemblies were performed from Unit 5 spent fuel pool to the WSFSF. No spent fuel assemblies were moved from Unit 6 spent fuel pool to the WSFSF. Two casks loaded with WWER-440 spent fuel assemblies were transported from the WSFSF to the DSFSF. Spent nuclear fuel from Units 5 and 6 was transported to Russia for technological storage and processing.

In 2020, ten inspections of SNF were performed on behalf of the NRA, IAEA and EC.

EMERGENCY PLANNING AND PREPAREDNESS

Maintaining and improving emergency preparedness pursuant to the requirements of the national legislation, the European and global standards is an important element in ensuring plant safety.

In 2020, the Covid-19 pandemic placed a strong focus on the preparedness for response in case of extraordinary events. Kozloduy NPP was among the first WANO – Moscow Centre nuclear plants that had developed and implemented an emergency action plan in the event of a pandemic. Based on decisions of the task force set up for the purpose, a large scope of measures aimed at ensuring safe operation of the facilities and health protection for workers were implemented. All recommendations of the Bulgarian health authorities were strictly followed.

Six hundred eighty-two employees of Kozloduy NPP and SE RAW were trained in emergency planning and preparedness related topics. Ten exercises and drills were performed, four of them together with the NRA and two with SE RAW.

In 2020, a new action plan was prepared for accidents related to the transport of SNF from Kozloduy NPP.

As part of the international cooperation, Kozloduy NPP participated in on-line meeting of the members of the Emergency Preparedness group at the European Atomic Forum (FORATOM), and held two working meetings with representatives of the WANO – Moscow Centre Regional Crisis Centre (WANO – MC RCC). Kozloduy NPP took part in six international exercises included in the WANO – MC RCC plan-schedule.

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MAINTAINING
AND IMPROVING
EMERGENCY
PREPAREDNESS IS
AN IMPORTANT
ELEMENT IN
ENSURING PLANT
SAFETY.

PHYSICAL PROTECTION

No violations of the Kozloduy NPP physical protection system were committed in 2020. In order to maintain the high level of protection needed, efficiency analyses were performed throughout the year and used as a basis for planning enhancement measures.

Kozloduy NPP updated its plan for counteracting terrorism and protection against terrorist activity. The work to prevent unauthorised actions with and encroachments on the nuclear material, nuclear facilities and radioactive substances was optimised, and the plans of the plant, Kozloduy NPP Regional Police Department, and Vratsa Regional Directorate of Interior were synchronised.

The security systems modernisation and update continue, as well as the improvement of the physical protection measures in the protected area around the nuclear power plant.

Throughout the year, the efficiency of the Kozloduy NPP Physical Protection System was inspected by the NRA and the Ministry of Interior. The inspections concluded that the protection level fully complies with the national and international requirements.

CYBER-SECURITY

Being a strategic site of national importance widely using advanced technologies, Kozloduy NPP is building and developing a modern cyber-security system.

The measures implemented for maintaining network and information security are consistent with the legislative requirements, applicable international standards, recommendations of the software and hardware manufacturers and vendors, as well as with the best global practices in the field.

The Internet communication system and all other important systems were upgraded to enhance cyber-security, which provides a high information protection level.

Apart from the activities carried out at the plant for efficient protection against cyber attacks, the Company's team also receives training. Last year, 720 Kozloduy NPP employees were trained in order to enhance their competencies for protection against phishing attacks in compliance with EU Directive 2016/1148 concerning measures for a high common level of security of network and information systems across the Union, the Cyber-security Act of the Republic of Bulgaria and the Ordinance on the minimum requirements for network and information security.

In 2020, the information security system did not register any event that could have been classified as a cyberattack.





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MODERN
SYSTEMS ENSURE
THE FIRE SAFETY
OF THE NUCLEAR
POWER PLANT.

FIRE SAFETY

Kozloduy NPP maintains a high level of fire safety in accordance with the Bulgarian legislation, and the IAEA and EU standards. A set of technical and organisational measures provides efficient fire protection of the production process and the workers.

In 2020, a scheduled training was performed for the operational staff and the designated officers directly involved in the fire safety control in the respective Kozloduy NPP structural units.

In order to enhance reliability, the fire detection systems for gaseous fire suppression were replaced in the Unit 5 safety systems premises. A project is in progress for construction of new seismically qualified garages and a building for the On-site Fire Safety and Public Protection Service at Kozloduy NPP.

Throughout the year, no fires or ignitions occurred on the production facilities.

RADIOECOLOGICAL MONITORING

Kozloduy NPP radioecological monitoring covers major components which are important for the public health and environment. The activities are in full compliance with the requirements of Article 35 of the Euratom Treaty, and Recommendation 2000/473/Euratom. The implementation of validated and practically recognised methods ensures high sensitivity and accuracy of the results. Monitoring data are verified by independent studies of the national control and supervisory bodies – the National Centre of Radiobiology and Radiation Protection (NCRRP) and the Executive Agency for the Environment (EAE).

The monitoring area covers the Kozloduy NPP site and the Bulgarian part of the 30-km monitored zone within a 100-km radius from the nuclear power plant. The automated radiological monitoring system measures continuously the gamma background radiation levels in 14 local populated areas. Broad public access is provided to the measured data which are displayed on information boards in public places and transmitted on-line to the central station at Kozloduy NPP, and thence – to the EAE and the NRA.

Over 1,250 measurements of the gamma background radiation and more than 4,100 analyses of over 2,400 samples of different environmental constituents were conducted throughout 2020. The results were fully comparable with those from previous years and did not deviate from the natural gamma background levels specific for the region.

The atmospheric air human-induced activity was of values close to the background ones and is much below the permissible limits. No radiological effects due to the operation of Kozloduy NPP were detected on water of the Danube, or drinking water sources in the region. The beta activity of water from natural water bodies, and the radiation status of drinking water met the health sanitary norms. No impact of the nuclear power plant was established on the radio-ecological status of soils in the area and the staple foods produced in the region, such as milk, agricultural crops, etc. The human-induced activity of fish in the Danube River, upstream and downstream of Kozloduy NPP site, was also examined. The results obtained from upper and lower reaches of the river were similar, much below the limits. The environmental radiation parameters are within normal background levels.





EU AND IAEA
METHODOLOGY
IS USED FOR
EVALUATION
OF THE
PUBLIC DOSE
EXPOSURE.

PUBLIC DOSE EXPOSURE EVALUATION

In recent years, the values of the maximum annual individual effective dose to the public have varied within the range of 4 – 7 $\mu\text{Sv/a}$ – hundreds of times below the natural background exposure level in the country (2.33 mSv/a), and about 30 times below the normative dose limit.

The maximum annual individual effective dose to the public in the supervised area was conservatively calculated at 4.2 $\mu\text{Sv/a}$ for 2020, using microclimate data.

The assessment employed verified and validated modelling programmes based on the CREAM methodology approved by the European Union, and the MODARIA platform of the International Atomic Energy Agency, both of which were adapted to the respective geographical and hydrological specifics of the Kozloduy NPP surrounding area.

The results are subject to independent control by the National Centre of Radiobiology and Radiation Protection. The comparison with data published periodically by the European Commission for the nuclear power plants of the EU member-states shows compliance with the reported results from other nuclear power plants with pressurized water reactors (WWER and PWR) in the EU and the world.

HEALTH AND SAFETY AT WORK

Maintaining health and safety at work is a major responsibility of Kozloduy NPP senior management. The plant has adopted a modern approach aimed at implementing highly effective health and safety measures, enhancing the safety culture of workers and building an awareness-based behaviour of compliance with the safety requirements. The requirements of the legislative regulations of the Republic of Bulgaria on occupational health and safety are strictly adhered to, and the best international practices in this field are applied.

The long-term industrial safety enhancement and risk evaluation programmes have been harmonised with the recommendations of the International Atomic Energy Agency and relevant international practices. The programmes cover the protection and prevention of occupational risks arising from work processes, work equipment and the working environment in all aspects of the nuclear power plant activities – operation, maintenance, repairs, etc.

Risk assessment at workplaces and laboratory measurements of working environment parameters are conducted systematically. Only individuals with the required education, qualification or licence are admitted to work. Workers periodically undergo training on safety at work, and receive the necessary briefings – pre-job, on-the-job, periodic, daily and extraordinary ones.

As a result, Kozloduy NPP has established a stable downtrend for the lost-time rate due to industrial incidents. In 2020, the industrial injury factor was 0.19, nearly five times lower than the average industry levels (0.96), and some three times lower than the average for the country (0.63).



ENVIRONMENTAL PROTECTION

As a producer of clean energy, Kozloduy NPP is strongly committed to protecting the environment. All the permits issued to the Company in accordance with the regulatory framework are maintained up to date.

In 2020, the permit for greenhouse gas emissions was renewed as a result of equipment replacement. The validity periods of the permits for groundwater usage and for waste water discharge into the Danube were extended to 2026 and 2027, respectively.

More than 1,600 tests of 350 samples from waste, surface and ground waters collected from the area surrounding the nuclear power plant have been conducted within the self-performed, non-radiation monitoring. The analyses have been made by Kozloduy NPP accredited laboratories and by the Vratsa Regional laboratory at the EAE. The results fully comply with the individual emission limits specified for the plant.

The nuclear power plant uses its own landfill for non-radioactive household and industrial waste operated in compliance with the regulatory requirements and good practices. The remediation of its first stage was successfully completed in 2020. The separate waste collection and utilisation of the generated non-radioactive waste contribute to the slower filling of the second landfill stage. Its free capacity was approximately 81% as at the end of the last year.

The Vratsa Regional Inspectorate for Environment and Water conducted three inspections, but found no deviations and issued no prescriptions.

**GREENHOUSE AND OTHER
HARMFUL GAS EMISSIONS SAVED
IN 2020 BY KOZLODUY NPP
COMPARED TO CONVENTIONAL
THERMAL POWER PLANTS
(IN THOUSAND TONS)**

CO₂
19,637

SO₂
64

NO_x
14

Ash
0.2





LONG-TERM OPERATION

Kozloduy NPP Units 5 and 6 long-term operation was justified by the successful implementation of the large-scale project ‘Units 5 and 6 Lifetime Extension’ from 2012 to 2019. The results and the conclusions from the performed analyses confirmed the possibility for Unit 5 and 6 safe operation until 2047 and 2051, respectively. In pursuance of the Safe Use of Nuclear Energy Act requirements, the Nuclear Regulatory Agency renewed the licences for operation of both units for further 10-year periods – on 3 November 2017 for Unit 5, and on 27 September 2019 for Unit 6. Ten years is the maximum term as regulated by the national legislation after the expiry of which the plant will apply for licences for the next 10-year period.

Pursuant to the licence conditions, Kozloduy NPP has developed a plan to manage the activities related to the reliable and safe long-term operation of Units 5 and 6.

IMPLEMENTATION OF THE PLANNED ACTIVITIES

Throughout 2020, all the activities scheduled for the year were completed, and the planned technical measures regarding the structures, systems and components (SSCs) were carried out.

Nineteen of the measures scheduled for the current licence term were completed for the two units. By the end of the licence period two measures on Unit 5 and five measures on Unit 6 are to be implemented.

From the other group of measures planned to be completed during the long-term operation of the units until 2047 and 2051, respectively, as at the end of last year, 29 measures were implemented on Unit 5 and 30 were in the process of implementation;

thirty measures were implemented on Unit 6, and 17 were underway.

The scheduled measures were completed regarding the revision of the qualification terms of components for which safety is justified, replacement of equipment with exhausted operating life as well as modernisations of obsolete facilities. The necessary tests, inspections and investigations were carried out of the technical condition of the control and protection systems equipment and instrumentation, the neutron flux monitoring systems and the control rods individual and group control systems.

Valves from systems important to safety have been replaced. The diesel generators 6 kV switchgears that provide reliable electric power supply to the safety systems have been replaced with modern systems up to the highest standards. The diesel generators synchronous generators excitation systems have been upgraded which gives higher reliability in performing the design safety functions. The control systems of the AlgoRex fire detection systems have been upgraded and replaced with new generation control units.

AGEING MANAGEMENT

Ensuring the high level of safety and reliability of Kozloduy NPP in the period of long-term operation necessitates a special focus on ageing management (AM). The aim is to guarantee the performance of the required safety functions by the designated structures, systems and components taking in account the changes occurring after a certain time and a certain number of work cycles. This includes both the physical ageing effects and the SSCs obsolescence compared against current knowledge, standards, regulations, and technologies.

In order to effectively manage ageing, Kozloduy NPP implements a systematic approach based on in-depth understanding of degradation mechanisms and the related ageing effects.

Component-specific programmes for ageing management have been developed to co-ordinate the activities on a specific component or a commodity group. Data collection, documentation of the activities' results and the records management relating to ageing management is of particular importance for the analysis and evaluation of the programmes' efficiency. The results are reviewed during the implementation of the said programmes and corrective measures are identified and performed, if improvement is needed.

A proactive obsolescence management approach is applied and all necessary documents for this purpose have been developed – rules, procedures and methodology that ensure the activities' co-ordination and control. The proactive approach guarantees the security of maintenance and supplies, helps sustain optimum warehouse inventories, allows timely identification of potential difficulties in case of market changes, and provides sufficient time horizon for the implementation of the decisions needed.

In order to minimise and control the degradation resulting from ageing, preventive and corrective measures are implemented such as operation strictly within the design limits, sustaining optimum water chemistry, preventive periodic inspections, preventive maintenance, repairs to restore the lifetime characteristics according to the design specifications, etc.

Kozloduy NPP has introduced coordinated performance of the activities included in the basic processes and component-specific ageing management programmes – related to information exchange, implementation of measures for prevention, identification, control, monitoring and mitigation of the ageing effects, as well as taking corrective actions. All this guarantees that the design safety functions of the structures, systems and components will continue to be performed throughout the whole lifetime of Kozloduy NPP.



THE ACTIVITIES
RELATED TO THE
RELIABLE AND
SAFE LONG-TERM
OPERATION ARE
IMPLEMENTED
ACCORDING TO
SCHEDULE.



FINANCIAL PERFORMANCE

Upholding Kozloduy NPP financial stability is of key significance for ensuring safe, efficient and environmentally friendly energy generation.

The data reported for 2020 show that the set business goals of the Company were achieved despite the fluctuations in the electricity market inflicted by the Covid-19 pandemic and the change in the sales structure. The record amount of electricity generated over the year, the good rate of collectability of sales revenues, and the effective cost management contributed crucially to this result.

Kozloduy NPP ended the year with a net profit of BGN 276 million and cash and cash equivalents to the amount of BGN 485 million.

The total revenues reached BGN 1,272 million, only 4% less than the record of BGN 1,328 million in 2019. The revenues from electricity sales were BGN 56 million less than the previous year, which is due mainly to the significant price drop on the 'Day Ahead' market where the greater portion of the generated electricity was sold. The revenues from sales to the regulated market amounted to BGN 160 million. This exceeded by 21.8% the data reported for 2019, which is a result of the increased electricity production quota for the Public Supplier NEK EAD. The revenues from sales at non-regulated prices were BGN 1,094 million which is 7.2% less than the figure reported for 2019 despite the better performance indicators. This is due to the change in the market sales structure (prevailing share of exchange transactions on the 'Day Ahead' market) and the significant price drop.

The Company's operating costs in 2020 amounted to BGN 966 million, the difference compared to 2019 is negligible.

In comparison with the previous year, a significant increase was accounted only in the costs related to price for access to the grid – from BGN 17 million to BGN 35 million. It results from the regulatory obligation, in force as of the middle of 2019.

The expenses for contribution payments to the 'Nuclear Facilities Decommissioning Fund' (NFDF), 'Radioactive Waste Fund' (RAWF) and 'Electricity System Security Fund' (ESSF) were reduced with by 4% due to the reduced electricity sales revenue.

Throughout the year, the Company maintained a large amount of net monetary exposures, which provided for timely payment of all current payables to the personnel, budget, commercial partners, and other commitments. The Company funded all the operating and investment activities entirely with its own financial resources.

The measures ensuring the safe and event-free operation of the nuclear facilities, including the activities related to Spent Nuclear Fuel (SNF) and Radioactive Waste (RAW) Management, are financially ensured with high priority. In pursuance of the 2030 SNF and RAW management Strategy, a shipment of SNF from WWER-1000 reactors for processing and storage in Russia was performed in December 2020.

Regular payments went toward the loan of the year 2000, under the Modernisation Programme of Units 5 and 6, in accordance with the terms of the Loan Agreement with Euratom. In 2020, repayment instalments of principal and interest were paid to the amount of BGN 23 million, with tranches six and eight being fully repaid. The Euratom loan will be fully repaid in 2021.

The nuclear power plant closed the year 2020 without any overdue payments. All due payments for securing the next fuel campaigns of Units 5 and 6, the obligatory insurance premiums, and contribution payments to NFDF, RAWF, and ESSF, were made in time. The payment commitments to the personnel and the social security institutions were also fulfilled, as well as the obligations under commercial contracts for the implementation of the maintenance and investment programmes. In 2020, BGN 491 million went to the state and the municipal budgets. The payments to NFDF and RAWF amounted to BGN 129 million, BGN 62 million were payments to ESSF, BGN 245 million were paid for taxes and fees, and another BGN 55 million – for social security and health insurance payments.

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ALL THE KOZLODUY NPP ACTIVITIES
ARE FULLY SELF-FINANCED.

The tables below present key indicators of the results of the Company's activity and evaluation of the condition and performance of Kozloduy NPP in 2020 in comparison with the preceding year.

Indicators (BGN '000)		Statements 31.12.2020	Statements 31.12.2019	Change 2020/2019 (%)
c.1	c.2	c.3	c.4	c.5=(c.3/c.4)-1
1	Total operating income	1,272,241	1,327,799	-4%
2	Total operating costs	-966,447	-968,782	0%
3	EBITDA ¹⁾	484,353	527,994	-8%
4	EBIT ²⁾	305,794	359,017	-15%
5	EBT ³⁾	306,377	360,906	-15%
6	EBIT margin	24%	27%	-11%
7	EBITDA margin	38%	40%	-5%
8	Total assets	3,481,607	3,387,144	3%
9	LTA ⁴⁾	2,328,304	2,408,171	-3%
10	Working capital ⁵⁾	766,612	597,097	28%
11	Cash and cash equivalents	485,106	395,583	23%
12	Equity	2,795,595	2,681,323	4%
13	Return on equity ⁶⁾	10.96%	13.45%	-19%
14	Return on assets ⁷⁾	8.80%	10.66%	-17%

¹⁾ EBITDA – earnings before interest, taxes, depreciation (and amortization) from continuing operations

²⁾ EBIT – earnings before interest and tax, from continuing activities

³⁾ EBT – earnings before tax, from continuing activities

⁴⁾ Long-term Tangible Assets – Non-current Tangible Assets + expenses on LTA acquisition

⁵⁾ Working capital – current assets minus current liabilities

⁶⁾ Return on equity – EBT/Equity

⁷⁾ Return on assets – EBT/Total assets

SEPARATE STATEMENT OF FINANCIAL POSITION

	31 December 2020	31 December 2019
Assets	BGN '000	BGN '000
Non-current assets		
Property, plant, and equipment	2,328,304	2,408,171
Intangible assets	6,768	8,672
Investment properties	4,115	4,120
Investments in subsidiaries	22,161	15,161
Loans granted to related parties	5,989	8,289
Long-term trade and other receivables	1,145	3,818
Equity instruments at fair value through other comprehensive income (OCI)	510	457
Non-current assets	2,368,992	2,448,688
Current assets		
Nuclear Fuel	433,399	303,607
Inventory	56,928	54,303
Trade and other receivables	43,840	70,624
Loans granted to related parties	2,398	2,374
Receivables from related parties	32,868	53,924
Income tax payments	1,834	764
Cash and cash equivalents	485,106	395,583
	1,056,373	881,179
Assets included in disposal groups classified as non-current assets, kept for distribution to owners	56,242	57,277
Current assets	1,112,615	938,456
Total assets	3,481,607	3,387,144

SEPARATE STATEMENT OF FINANCIAL POSITION

(continued)

	31 December 2020	31 December 2019
Equity and liabilities	BGN '000	BGN '000
Equity		
Share capital	244,585	244,585
Legal reserves	24,458	24,458
Revaluation reserve of non-financial assets	1,399,254	1,400,140
Revaluation reserve of defined benefit plans	(69,450)	(70,375)
Revaluation reserve of financial assets at fair value	250	203
Other reserves	676,667	676,667
Retained earnings	519,831	405,645
Total equity	2,795,595	2,681,323
Liabilities		
Non-current liabilities		
Borrowings	0	10,879
Retentions on construction contracts	326	978
Financing	103,158	106,966
Pension and other employee obligations	89,115	84,707
Long-term trade and other payables	6,118	13,181
Deferred tax liabilities	141,292	147,751
Non-current liabilities	340,009	364,462
Current liabilities		
Trade and other payables	167,989	143,749
Payables to related parties	4,807	5,424
Borrowings	11,170	22,833
Financing	4,206	4,340
Retentions on construction contracts	3,626	3,210
Pensions and other employee obligations	28,606	34,272
Provision for spent nuclear fuel, and other	79,720	81,652
	300,124	295,480
Liabilities included in disposal groups classified as non-current assets, held for distribution to owners	45,879	45,879
Current liabilities	346,003	341,359
Total liabilities	686,012	705,821
Total equity and liabilities	3,481,607	3,387,144

SEPARATE STATEMENT OF PROFIT OR LOSS AND OTHER COMPREHENSIVE INCOME FOR THE YEAR ENDED 31 DECEMBER

	2020	2019
	BGN '000	BGN '000
Revenue from sale of electricity	1,255,807	1,312,117
Revenue from sale of heat energy	2,161	1,933
Revenue from sale of production	1,257,968	1,314,050
Income from financing	3,942	4,081
Other revenues and incomes	9,916	9,645
Gains from sale of non-current assets	415	3
Change in the fair value of investment properties	-5	20
Cost of materials	(131,783)	(134,162)
Hired services costs	(157,358)	(134,489)
Employee benefits costs	(240,446)	(234,521)
Provisions for post-employment benefit plans	(17,346)	(40,862)
Depreciation and amortisation costs, and revaluation of PPE	(178,559)	(168,977)
Provisions costs	(37,924)	(39,881)
Impairment costs/reversed impairment on financial assets (net)	1,693	477
Other expenses	(205,417)	(210,138)
Cost of sold goods and other current assets	(368)	(670)
Changes in work in progress	834	(9,409)
Acquisition of self-constructed machinery, plant, and equipment	232	3,850
Operating profit	305,794	359,017
Financial costs	(1,587)	(2,117)
Financial income	2,170	4,006
Profit before tax	306,377	360,906
Income tax expenses	(30,567)	(36,014)
Profit for the year from continuing operations	275,810	324,892
Profit for the year	275,810	324,892

SEPARATE STATEMENT OF PROFIT OR LOSS AND OTHER COMPREHENSIVE INCOME FOR THE YEAR ENDED 31 DECEMBER

(continued)

	2020	2019
	BGN '000	BGN '000
Other comprehensive income:		
Items that will not be reclassified subsequently to profit or loss:		
Revaluation of the liabilities under defined benefit plans	1,028	(27,419)
Change in the fair value of financial instruments at fair value through other comprehensive income		
– losses for the current period	(19)	(9)
Income tax relating to items not reclassified	(101)	2,743
Other comprehensive income for the year, net of tax	908	(24,685)
Total comprehensive income for the year	276,718	300,207

SEPARATE CASH FLOW STATEMENT FOR THE YEAR, ENDED 31 DECEMBER

	2020	2019
	BGN '000	BGN '000
Operating activities		
Cash receipts from customers	1,542,877	1,558,261
Cash paid to suppliers	(469,081)	(339,827)
Cash paid to employees and social security institutions	(247,986)	(242,092)
Cash paid for fees, commissions, and other	(20)	(27)
Payments to the RAW, NFD, and ESS Funds	(190,867)	(202,330)
(Paid to)/Receipts from income taxes	(38,198)	(54,598)
Cash flows related to other tax and payments to the state budget	(179,419)	(185,840)
Cash flows related to insurance	(13,925)	(15,478)
Other cash flows from operating activities	(12,425)	(5,608)
Net cash flows from continuing operations	390,956	512,461
Net cash flows from operating activities	390,956	512,461
Investing activity		
Acquisition of long-term investments	(7,000)	
Acquisition of property, plant, and equipment	(112,810)	(94,865)
Proceeds from disposals of property, plant, and equipment	1,383	4
Loan repayments received	2,250	2,200
Interest received	254	308
Dividends received	969	869
Net cash flows from investing activity	(114,954)	(91,484)
Financing activity		
Repayments of borrowings	(22,247)	(33,005)
Leasing payments	(232)	(116)
Interest paid	(912)	(1,385)
Dividends paid	(162,446)	(230,056)
Net cash flows from financing activity	(185,837)	(264,562)
Net change in cash and cash equivalents	90,165	156,415
Cash and cash equivalents, beginning of year	395,583	239,725
Effect from expected credit losses under IFRS 9	(642)	(557)
Cash and cash equivalents at the end of the year	485,106	395,583



WE INVEST IN SUSTAINABLE DEVELOPMENT

The total amount of the funds invested under the Investment Programme in 2020 was BGN 85,817 thousand, provided by Kozloduy NPP own funds. The long-term assets commissioned throughout the past year had a value of BGN 55,278 thousand.

Over 74% of the total reported investment costs were used to fund the implementation of measures related to Units 5 and 6 operational safety, reliability and efficiency, and for improving the operation of the facilities and equipment to secure the long-term operation of the nuclear power units. Along with this, the required investment activities were also carried out to ensure the normal operation of the common plant facilities supporting the production activity.

The main priority in the Company's Investment Programme is the implementation of actions ensuing from the Safe Use of Nuclear Energy Act provisions, the current licences for operation of Units 5 and 6, and the measures foreseen in the integrated programmes for continuous enhancement of the safety level at Kozloduy NPP. Their implementation will provide for the long-term operation of the nuclear power units over the next 30 years and will guarantee the safe and reliable operation of Kozloduy NPP, in compliance with the requirements of the relevant legislation in force.

MEASURES TO MAINTAIN AND ENHANCE SAFETY

Under the Investment Programme, 45 measures of the 'Programme for Maintaining and Enhancing Safety at Kozloduy NPP' were funded in 2020. The Programme covers actions resulting from tests carried out, or in completion of the surveillance programme, of corrective actions in connection with internal or external operating experience, or any inspections performed. The implementation of these actions is systematically monitored.

The total amount of the funds invested in 2020 in costs for measures related to licensing conditions, regulatory requirements and activities targeted at safety enhancement, is BGN 17,545 thousand.

All actions to maintain and enhance safety in the nuclear power plant are implemented in compliance with the respective provisions of the Safe Use of Nuclear Energy Act and in observance of the provisions of the licences and permits issued by the authorised oversight and regulatory bodies.

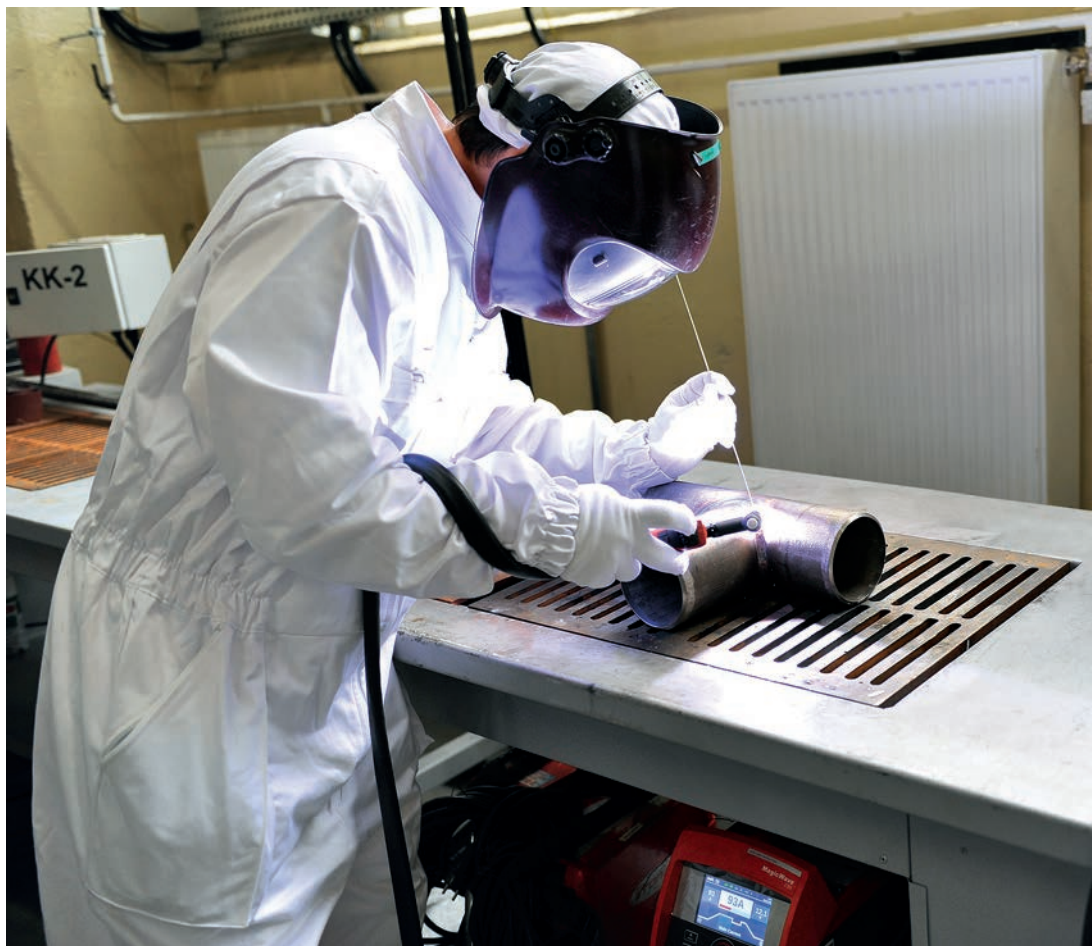
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OVER 74% OF THE REPORTED INVESTMENT COSTS WERE DESIGNATED TO ENSURE THE SAFETY AND EFFICIENCY OF UNITS 5 AND 6 AND TO IMPROVE THE FACILITIES' PERFORMANCE.



ACTIVITIES ENSURING LONG-TERM OPERATION

After the successful completion of the Plant Life Extension project for the two units and the renewal of their operational licences, a Plan for Managing the Activities during Units 5 and 6 Long-term Operation was adopted at Kozloduy NPP. The document foresees the implementation of technical measures on structures, systems, and components, as well as measures resulting from the expiry of the operating life of major equipment and systems. In 2020, the amounts invested in ensuring Units 5 and 6 long-term operation were BGN 41,544 thousand.



ACTIVITIES FOR ROUTINE MAINTENANCE OF THE POWER UNITS AND INFRASTRUCTURE

For the maintenance of major and auxiliary equipment, as well as for ensuring the normal operation of the facilities supporting the production activity, BGN 26,234 thousand were invested in 2020 under the Investment Programme. A considerable portion of the reported expenses was dedicated to supplies of long lead spare parts, which reduces the risk of extended downtimes when a need of unscheduled maintenance and repair works arises. The following were secured: spare parts for steam generators feedwater control valves, gear boxes for isolation valves and regulators, spare parts for turbogenerators 9,10GQ type TBB-1000-4Y3 and exciters 9,10GE type БВД-4600-1500-AY3, for low pressure cylinders of turbines K-1000-60/1500-2 at Units 5 and 6, etc.

The planned investment activities related to the upgrade and replacement of equipment, measures to enhance physical security, maintenance of rest and recreation and other plant facilities were carried out over the year.

LONG-TERM ASSETS LAUNCHED IN OPERATION IN 2020

The total value of the long-term assets launched in operation in 2020 amounts to BGN 55,278 thousand. Some of these assets are:

- Reconstruction of hydraulic snubbers test laboratory;
- Upgrade of 0.4 kV and 6 kV electric motors test bench;
- Construction of specialised working premises for the needs of Primary Equipment Department – Stage 1;
- Construction of a hot laundry and specialised radiation control equipment;
- Development of technology, design, fabrication and commissioning of customised equipment for recovery of sealing surfaces on Units 5 and 6 heat exchangers.

In 2020, the number of acceptance commission meetings was 24 at in-plant level and 2 – at government level. The result of these was signing of Protocol 16 and issuance of utilisation permits on behalf of the Directorate for National Construction Supervision.

A leading principle in the implementation of Kozloduy NPP Investment Programme is to ensure that all activities are performed with efficient use of the available sources of funding, with the high quality required and without violating the operation and maintenance schedules of the main production capacities of the nuclear power plant.





IN PARTNERSHIP WITH THE GLOBAL NUCLEAR COMMUNITY

The regular exchange of information and operating experience is a standard practice of the global nuclear community contributing to the continuous enhancement of safety and reliability of the nuclear power plants around the world. Being an active member of this professional community, Kozloduy NPP employs a large number of practices for international cooperation. In 2020, due to the number of limitations imposed as a result of the Covid-19 pandemic, new communication methods were introduced and events were held online. This way of organising events has become a positive experience in respect of the collaboration between the experts from the Bulgarian nuclear power plant and their colleagues worldwide.

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ACTIVE INTERNATIONAL COOPERATION LIES
AT THE BASIS OF MODERN NUCLEAR ENERGY
DEVELOPMENT.

COOPERATION WITH WANO

During the first quarter of 2020, Kozloduy NPP experts took part in events organised by the WANO Moscow Centre (WANO-MC), such as pre-commissioning peer reviews at Mochovce NPP (Slovakia) and Tianwan NPP (China), a training workshop at South Ukraine NPP on Leadership in Nuclear, annual meeting of turbine department managers from Russian and other NPPs, etc.

For the rest of the year, the WANO-MC initiatives were conducted online. Video conferencing was employed for the following initiatives: a member support mission on Organisational Efficiency Indicators; the second international forum of the WANO-MC youth movement – WANO Young Generation; webinars on ‘Reactivity control during commissioning of WWER reactors’ and ‘SOER 2015-02’ Risk Management Workshop’; work meetings focused on plant configuration management, thermal power uprate of existing WWER units, cooperation in the field of communications and the progress in respect of the new initiative of WANO-MC, ‘Action for Excellence’.

In 2020, Kozloduy NPP hosted three benchmarking member support missions held via video conferencing with representatives of JSC Atomenergoremont, Russia. Together with their Russian colleagues, specialists from the plant Maintenance Division discussed the following topics: ‘Reactor operation. Optimisation of maintenance duration’ and ‘Modular replacement methods applied in NPP maintenance’. The issues discussed at those meetings were related primarily to the procedure for planning of maintenance activities on major reactor equipment: timeframes, responsible persons, level of detail of the schedules, preparation of schedules for performing specific maintenance activities on



pieces of equipment, planning and organisation of maintenance activities at Kozloduy NPP applying the modular replacement method.

‘Ecological management. Ecological safety in handling wastes of safety classes 1-4’ was the topic of the third benchmarking event involving experts from the Quality Division and the Engineering Support Division together with the Russian participants. The topics addressed were related mainly to the ISO 14001-2016 standard, ‘Ecological management systems’, management system audits, planning with due consideration given to risk, resources for ensuring leadership, etc.

In 2020, the plant continued its active organisational and preparatory work towards the forthcoming, in late 2021, Design-Informed Peer Review (DIPR) of WANO-MC.



SHARING OF
EXPERIENCE AND
GOOD PRACTICES
CONTINUED IN 2020 VIA
ONLINE PLATFORMS
AND VIDEO
CONFERENCING
EVENTS.



COOPERATION WITH THE IAEA

The participation of Kozloduy NPP specialists in workshops, meetings and other events under the auspices of the International Atomic Energy Agency (IAEA) was also adapted to the epidemic situation.

The following were among the topics dealt with during the workshops and meetings attended by representatives of the plant: ‘Safety aspects of using smart digital devices in nuclear installations’; ‘Use of periodic safety reviews in support of long-term operation safety assessment’; ‘Enhancement of methods, approaches, and tools for the development and application of probabilistic safety assessments’; ‘Develop guidance on a methodology for defining key performance indicators for knowledge management in nuclear organisations’.

Ageing management of WWERs, civil structures, and mechanical components were addressed under the IAEA programme International Generic Ageing Lessons Learned (IGALL) Phase 5 at WWER Ageing Management and LTO Experience Exchange Group Meetings. A meeting of the First International Generic Ageing Lessons Learned Project Steering Committee, Phase 5, was held late in 2020 and one Kozloduy NPP representative took part in it.

Plant representatives joined the Third International Conference on Nuclear Security: Sustaining and Strengthening Efforts (ICONS 2020);

17th Coordination Meeting (virtual event) of the IAEA's Network of Analytical Laboratories for the Measurement of Environmental Radioactivity (ALMERA); Virtual CS – Consultants' Meeting to Draft a Publication on Mentoring and Coaching for Nuclear Knowledge Management; workshops on the following topics: 'Development of Severe Accident Management Guidelines Using the IAEA's Severe Accident Management Guideline Development Toolkit', 'In-service inspection using the current technologies for non destructive testing', 'Regional workshop on surveillance test/in-service inspection through advanced non-destructive inspection technology', as well as in training courses on 'Assessment of behavioural competencies for safe, secure and effective performance in nuclear organisations' and 'Control of nuclear material in use, movement, and storage'.

The SALTO (Safety Aspects of Long Term Operation) peer review of the International Atomic Energy Agency scheduled for 2020 was postponed for mid 2021.

COOPERATION WITH THE OECD NEA

In 2020, the preparatory activities continued for Bulgaria's accession to the Nuclear Energy Agency at the Organisation for Economic Cooperation and Development. At the beginning of the year, Kozloduy NPP was visited by Nobuhiro Muroya, Deputy Director General for Management and Planning at the Agency. During the visit, the good level of operation of the nuclear facilities in the Bulgarian power plant was noted and emphasis was given to the strategic importance of the partnership which will contribute to the development of the Bulgarian nuclear sector, and allow for exchange of good practices and application of the highest industry standards.





OUR TEAM OF PROFESSIONALS – THE BACKBONE OF SUCCESS

Highly qualified, motivated and dedicated to the overall objectives, Kozloduy NPP team of professionals integrate the experience of the long-time specialists with the energy of the younger generations. The established traditions and the accepted values are at the heart of the human resources management policy developed in compliance with the Bulgarian Energy Holding Human Resources Management Policy and the IAEA Safety Standards' requirements. The major activities are aimed at attracting and providing for the required personnel through professional recruitment, maintaining training process in compliance with the national and international standards, risk management of nuclear knowledge loss and ensuring effective succession planning, developing organisational culture based on the Company's values for the workers' safety culture continuous improvement.

GOOD EDUCATION – GOOD RESULTS

The stringent safety requirements to nuclear facilities operation determine also high requirements to the education and training of the nuclear power plant employees. The predominant number of Kozloduy NPP employees hold a higher education degree, and that number marks an increase compared to the previous year, while about one third of the total workforce have completed vocational training.

Throughout 2020, the existing trend for the prevailing part of the newly employed (64%) to hold higher education degree has continued. There is a growing interest among young people in professional realisation at Kozloduy NPP – some 33% of the newly employed are young people below 30 years of age, compared to 27% in 2019.

TRAINING AND QUALIFICATION

Sustaining a training process which ensures provision of competent personnel for the long-term operation period is a prime objective of the human resources management policy of Kozloduy NPP.

The nuclear plant holds a licence issued by the NRA for performing specialised training for activities at nuclear facilities, and activities with sources of ionising radiation.

Training is performed at the Training Centre where the necessary modern material and technical facilities for theoretical, practical (hands-on) and simulator training are provided. The ESTRA on-line training platform is also used. Specialised on-the-job training in various settings is conducted as well.

Programmes are developed for initial or continuing training. Individual programmes are developed for the licensed personnel. The rest of the personnel are trained in accordance with approved curriculum schedules. A total of 1,350 training courses at the Training Centre and 1,345 on-the-job trainings were organised and performed throughout 2020. A total of 3,135 Kozloduy NPP employees and 2,950 workers from 162 subcontractors and external organisations have taken training.

The personnel of Kozloduy NPP received a total of 184,345 man-hours of specialised training, 77,815 of which were via the ESTRA on-line training platform. All of this averages 59 hours of training per person (initial, continuing and extraordinary training).

A total of 550 individual training programmes were developed. The programmes for initial training for a job position were 328, and the other 222 programmes were for continuing training.

Thirty-one individual licences for work at nuclear facilities, and three individual licences for work with sources of ionising radiation were issued. The Training Centre has a full-scope simulator (FSS-1000) for WWER-1000 reactor units for specialised initial and continuing training of shift operating personnel performing functions related to nuclear safety ensurance and control. The simulator is upgraded to comply with the reference Unit 6 at Kozloduy NPP. In 2020, thirty-seven modifications were introduced to the FSS configuration in conformity with the engineering solutions identified to reflect the design changes to Unit 6. The FSS-1000 facility was used for conducting continuing training for 33 main control room crews, training of FSS-1000 trainers, and a general emergency response exercise. Successful training was delivered to 20 WWER-1000 operator trainers, and 2 trainers on operation of conventional plant. Two new scenarios were developed as a result of a training needs analysis (TNA), and 12 other were updated.

EDUCATIONAL STRUCTURE OF PLANT PERSONNEL

higher
education

59%

secondary
vocational
education

28%

secondary general
education

12%

other
education

1%



A TOTAL OF 1,350 TRAINING COURSES AT THE TRAINING CENTRE AND 1,345 ON-THE-JOB TRAININGS WERE PERFORMED THROUGHOUT 2020.



TAKING CARE OF THE YOUNG PEOPLE

In the context of long-term operation of Units 5 and 6, the issue of ensuring generational succession is particularly important. This makes it necessary to undertake consistent action to support young people in the process of professional orientation and arousing their interest in engineering education and nuclear energy.

A lot of applicants are attracted by the Kozloduy NPP Scholarship Programme which in 2020 was implemented in two campaigns for selection of students. The scholarship holders which study higher education subjects considered priority ones for the plant engage to be employed by Kozloduy NPP after graduating.

In 2020, a new scholarship programme started for early career guidance of pupils studying the subjects 'Nuclear Energy' and 'Automated Systems' in the nuclear energy vocational secondary schools in the towns of Kozloduy and Belene. The scholarship programme covered 36 pupils.

A significant progress was achieved in implementation of training through work (a dual educational form) at the vocational school in the town of Kozloduy. According to the plan, the registered 39 pupils in the subjects 'Nuclear Energy' and 'Thermal Power Engineering – heating, air conditioning, ventilation and refrigeration equipment' shall start their training through work in Kozloduy NPP in 2023. A trial apprenticeship was conducted in the nuclear power plant within the 'Support for Dual Educational System' project.

Twenty-two university students participated in the 'Paid Summer Internship' programme and nine other students underwent unpaid internship in the plant. All of them positively assessed the programme and in the questionnaire on the internship most of them declared that they would like to link their future career with Kozloduy NPP.

Kozloduy NPP regularly participates in career forums and profession choice events organised by technical universities where opportunities for work at the plant and further professional and career development are presented to the young. Active support is provided for school students' thematic initiatives, which promotes interest in technical sciences and assists students' performance. Such an example is the on-line meeting with pupils and teachers from 'Igor Kurchatov' vocational school in the town of Kozloduy and 'Marie Skłodowska-Curie' vocational school in the town of Belene, on the occasion of the European Vocational Skills Week.

The plant continued to develop the partnerships with academic circles nation-wide – the Bulgarian Academy of Science, Technical Universities in Sofia, Gabrovo, Ruse and their branches, as well as St. Kliment Ohridski Sofia University.

KNOWLEDGE MANAGEMENT

The approach to knowledge management in the Company is based on the understanding that knowledge is an exceptionally valuable corporate asset capable of generating added value. Specific measures are focused on preservation of the accumulated knowledge and the continuous enrichment with new knowledge in a number of specific areas of strategic and technological significance. The knowledge loss risk and the importance of workers' expertise and competences are regularly assessed and procedures are developed to ensure the storage and use of this precious resource.

Among the measures for storage and transfer of operating experience and specific professional knowledge are analysis and determination of the needs of employees with competencies relevant to the period of long-term operation; establishment of a pool of specialists trained as per individual curricula; training of replacement staff for key positions. The specially developed 'Tacit Knowledge Monitoring' information system is particularly useful in the knowledge management process and is regularly updated based on the feedback and the results from the training process.

An inter-departmental knowledge management expert group with participants from different institutions supports the sustainable management of the risk of critical knowledge loss in the industry, its retention and transfer to the next generation of nuclear specialists.





Being a socially responsible company, Kozloduy NPP makes consistent efforts focused on human resources development, provision of health and safety at work, taking care of the region, the implementation of anti-corruption practices and environmental protection. Thus, the Global Compact principles and the UN Sustainable Development Goals are strongly integrated in the strategy, culture and day-to-day activity of the nuclear power plant.

RESPONSIBLE EMPLOYER

Kozloduy NPP provides for excellent working conditions and supportive work environment. The social policy of the Company is aimed at maintaining the employees' loyalty and motivation, attracting and professional adaptation of young and highly educated specialists, equal opportunities for career growth based on performance results, support for the retired. Women at Kozloduy NPP account for more than one third of the staff and are represented at various positions including responsible operator and management levels. The sense of belonging to the professional community and the affiliation to the values of the Company is supported also by the annual 'Best performer in...' award, conferred on the occasion of the professional holiday – Power Engineer Day. The winners in the different categories are selected on-line in the internal information network of the Company.

The nuclear power plant provides for a number of leisure activities – more than 30 sports are practiced. For over 35 years, the House of Culture presents opportunities for contacts with visual and performing arts.

RESPONSIBLE MEMBER OF THE PUBLIC

With the awareness of a responsible corporate member of the public, the nuclear power plant strongly supports socially significant causes and regularly takes part in initiatives important to the society.

Committed to dealing with the Covid-19 pandemic, in 2020 Kozloduy NPP provided financial support for a number of hospitals in the country and the region. Funds for purchasing of medical equipment for diagnosis and treatment were donated to the Military Medical Academy, Aleksandrovska University Hospital EAD, Pirogov Hospital and St. Sofia Hospital, all of them in the capital of Sofia. In addition to the financial support for St. Ivan Rilski Hospital in the town of Kozloduy, the Company provided the disinfectants and the personal protective equipment necessary for the work of the medics. Plant employees also contributed to the efforts for dealing with the pandemic on the territory of the municipality with personal donations for the Department of Internal Medicine of the town hospital.

Kozloduy NPP and the Military Medical Academy organised two successful initiatives for blood donation on the site of the power plant. Dozens of Company employees had the possibility to state their personal commitment and engagement to the people in need and donate blood.

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KOZLODUY
NPP ACTIVELY
SUPPORTS SOCIALLY
SIGNIFICANT CAUSES.

COMMON EFFORTS TOWARD POSITIVE CHANGES

Kozloduy NPP has been a member of the Bulgarian Network of the UN Global Compact (UNGC Bulgarian Network) since 2012.

The plant shares the values of the ten Global Compact universal principles and the activities which apply the principles in practice are presented in a Communication on Progress prepared and issued annually by the Company. Kozloduy NPP representatives regularly take part in initiatives and events organised by the UNGC Bulgarian Network. Throughout 2020, experts from the plant participated in a series of webinars on the topic of ‘The Power of Internal Communications’ together with representatives of companies in different areas in order to share good practices in that sphere.

WITH CARE FOR THE REGION

In partnership with the local authorities the nuclear power plant actively supports the development of the town of Kozloduy and the nearby towns and villages. The co-operation with the municipal government produces visible and useful to all results in areas such as education, culture, sports, health care, social and youth-focused activities. A number of joint activities are aimed at public works, infrastructure upgrade, and care for open spaces around schools, public and residential buildings, parks and recreational areas.

FOR CLEAN ENVIRONMENT

The Company and its employees participate regularly in various national and international initiatives aimed at protecting the biodiversity of nature and keeping the environment clean – ‘Let’s Clean Kozloduy Municipality Together’, the World Environment Day, the World Tree Planting Day, the International Danube Day, the European Mobility Week, etc.

The photo competition among plant personnel on the topic ‘Kozloduy NPP and Nature – Co-Existence’ was dedicated to the World Environment Day 2020 the motto of which was ‘Time for Nature’ with focus on biodiversity. The photos of the amateur photographers reflect the biodiversity retained in the area surrounding the nuclear power plant. Photos from the competition were compiled in a mobile exposition which opened officially in the plant on 5 June and was afterwards moved in front of the House of Culture in the town of Kozloduy. The album ‘Kozloduy NPP – a Glance at Nature’ was compiled with materials from the competition and can be found in the ‘Library’ section of the corporate web site version in Bulgarian.

The first place in the category ‘Green Educational Initiative’ of the ‘The Greenest Companies in Bulgaria’ organised by b2b Media brought another recognition of the consistent efforts the plant makes to protect nature, and of the numerous initiatives aimed at enhancing the personal commitment of the Company team to the ecology.



TRANSPARENCY AND DIALOGUE

In its public communications, the nuclear power plant follows the principles of open, precise and timely provision of information on every aspect of its activity. To this end all communication channels are used – the traditional press and printed editions as well as publications in on-line format. A series of videos in an educational web site presenting aspects of nuclear energy and some important professions in the nuclear power plant in a simple and amusing way provoked keen interest among the youngest.

The second edition of a national essay contest among the students in Bulgarian vocational secondary schools was held in an attempt to enhance the awareness of the role of nuclear energy. The topic was ‘Nuclear Energy – in Symbiosis with Electric Mobility’. The contest was organised by Kozloduy NPP, the Electric Vehicles Industrial Cluster (EVIC), Kozloduy NPP – New Build EAD, the Bulgarian Nuclear Society and the Kozloduy Municipality. Students from 9th to 12th grades from all over the country took part in the contest and presented their views on the interaction between two of the modern low emission technological sectors.

In 2020, the corporate internet web site was fully updated and the number of followers of the official profile of the Company in one of the social networks has been steadily increasing.





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