

2023



ANNUAL  
**REPORT**



Dear readers,

I am proud to present to you the results of Kozloduy NPP's activities in 2023, which confirm that the nuclear power plant is convincingly defending its well-deserved position as a leading energy producer in Bulgaria and a safe power generating facility.

With their optimal operation, Units 5 and 6 produced over 16 million megawatt hours (MWh) of electricity, whereby Kozloduy NPP's share in the national energy mix represents nearly 41% in 2023. It should be emphasised that this was achieved in strict compliance with all the high-level safety requirements that were rigorously followed thus ensuring the stable and reliable operation of the nuclear facilities.

Our efforts over the last year were beyond doubt focused on the projects for new build at the Kozloduy site and diversification of nuclear materials and services. Thanks to coordinated expert work and active institutional support, significant progress has been made on both projects. This is a prerequisite for their successful implementation which will allow the nuclear power plant to continue to provide carbon-free energy for Bulgarian citizens and businesses and to maintain its role as a major factor for the country's energy security and economic stability.

The heart of all Kozloduy NPP's accomplishments is its team of well-trained, highly motivated and dedicated specialists. Building on the experience gained over the years and best practices, my colleagues and I look forward with confidence to 2024, the year of our corporate golden jubilee, when the Bulgarian nuclear power plant celebrates its 50th anniversary, and to the next stage in the development of the Bulgarian nuclear energy.

**Valentin Nikolov**  
Chief Executive Officer



Our Professionalism  
and Dedication Are  
Key to Achieving  
High Goals





# Generating Clean Energy

## Electricity Generation

In 2023, the nuclear power units of Kozloduy NPP operated in optimal mode with no events affecting safety or the environment. The NPP generated 16,163,276 MWh of electricity during the year which accounted for nearly 41% of the national annual electricity generation.

The electricity generated by Unit 5 during the previous year is 8,280,916 MWh. The total amount generated by the Unit since its start-up in 1987 is 219,743,290 MWh.

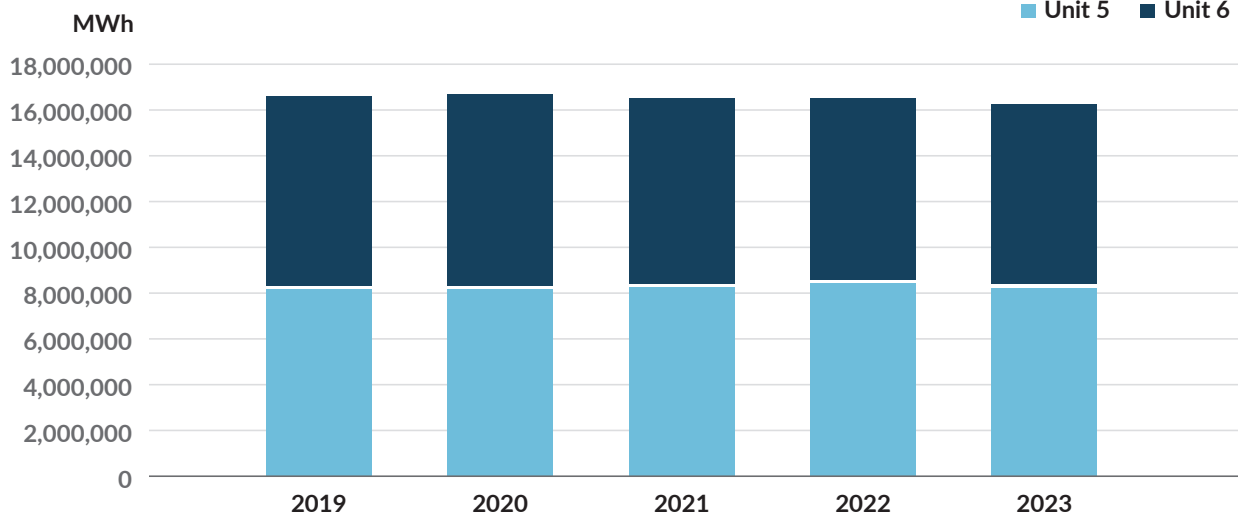
In 2023, Unit 6 generated 7,882,360 MWh of electricity, and the total amount it has generated since its start-up in 1991 until the end of the previous year is 209,063,116 MWh.

The gross amount of electricity generated by Kozloduy NPP since the first nuclear power unit was connected to the grid in July 1974 until the end of 2023 is a total of 699,802,363 MWh.



KOZLODUY NPP SHARE IN BULGARIA'S ELECTRICITY MIX IN 2023 WAS APPROXIMATELY 41%.

## Electricity generated (gross)



## Electricity Sold, by Market Segments

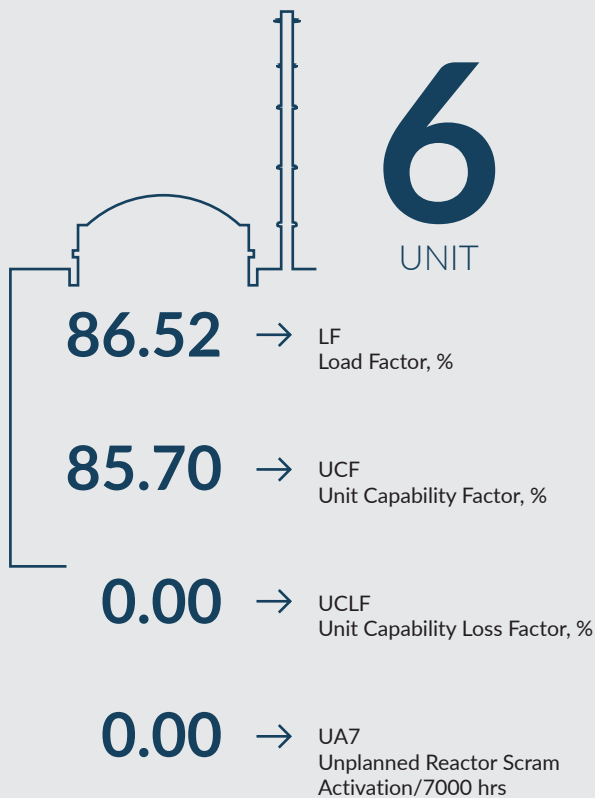
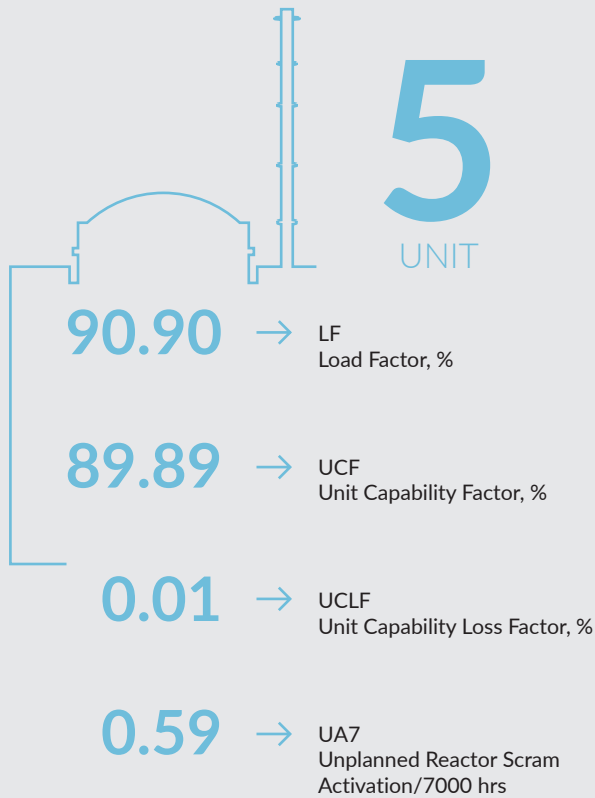
In 2023 the net active electricity supplied to the national grid by Kozloduy NPP amounted to 15,342,941 MWh, sold in compliance with the current Bulgarian regulations.

In accordance with the monthly quotas determined by the Energy and Water Regulatory Commission, 26.56% of the net generated electricity was allocated to the Public Supplier (NEK EAD) at regulated prices. In compliance with the mandatory provisions of the Energy Act, the remaining portion of the electricity

generated was traded on the organised exchange market administered by the Independent Bulgarian Energy Exchange EAD (IBEX).

In parallel with its main business activity – electricity generation, Kozloduy NPP is engaged also in heat generation to cater for the households of the facilities on-site and to supply heat to the town of Kozloduy. The heat energy supplied during the previous year by the Plant to the end consumers is 73,889 MWh.





## Performance Indicators

The World Association of Nuclear Operators (WANO) and the International Atomic Energy Agency (IAEA) have defined a number of specific performance indicators which are used to compare the reliability, safety and efficiency of the generation from nuclear units, as well as to monitor the state of nuclear energy and the impact that general trends in the energy sector have on it.

According to the WANO and IAEA criteria and standards, LF and UCF values are an indicator for achieved level of reliability and safety of nuclear power plants operation, and imply a high efficiency of the electricity generation process. The performance indicator values achieved by Kozloduy NPP in 2023 confirm the pronounced and persistent trend for a safe, reliable and efficient operation of the Bulgarian nuclear power plant, thus maintaining its leading position among the well-performing nuclear plants equipped with pressurised water reactors worldwide.



KOZLODUY NPP  
PERFORMANCE INDICATORS  
FOR 2023 CONFIRM ITS SAFE  
AND RELIABLE OPERATION.





## Maintenance Programme

The annual Maintenance Programme of Kozloduy NPP comprises preventive maintenance and repair, servicing, performance tests and checks, specialised inspections and diagnostic non-destructive testing of structures, systems and components of the safety systems, systems important to safety, and systems important to the production process.

The main priority is the maintenance and repair of the equipment, with the aim of ensuring its full operability in the long term. The necessary activities are planned and performed in accordance with the approved scopes and schedules, in compliance with the licensing obligations of the Plant, the requirements of the technical specifications for safe operation and the manufacturers' requirements.

The main scope of the annual Maintenance Programme is completed while the units are shut down for scheduled outage and refuelling. As a result of the effective organisation and coordination of activities, all the works, repairs and modernisations planned for 2023 were implemented with the required high quality within an optimal timeframe: Unit 5 outage lasted 36 days and Unit 6 outage was 38 days.

In parallel with the necessary maintenance and repair activities within the scheduled annual outage, the planned measures identified in the lifetime extension, safety enhancement and equipment lifetime management programmes are being implemented.

The Maintenance Programme of Kozloduy NPP is self-financed.





# Top Priority for Safety

## Licensing Regime

Kozloduy NPP EAD operates two nuclear power units – Units 5 and 6 with WWER-1000 reactors, as well as two spent nuclear fuel storage facilities - one for dry storage and one for underwater storage.

The operation of the nuclear facilities is subject to regulatory control on behalf of the Nuclear Regulatory Agency (NRA) at the Council of Ministers of the Republic of Bulgaria. Specialised oversight is also exercised by the following state 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.



KOZLODUY NPP EAD OPERATES FOUR NUCLEAR FACILITIES – TWO NUCLEAR POWER UNITS AND TWO SPENT FUEL STORAGE FACILITIES.



The nuclear facilities are operated according to the provisions of the operating licences issued by the NRA. The Company maintains licences to use ionising radiation sources for commercial purposes, for transport of radioactive substances and for specialised training. In June 2023, an application for renewal of the spent fuel storage facility (SFSF) operating licence

was submitted to the NRA, accompanied by a set of documents containing the results of the SFSF periodic safety review and justifying its safe operation during the next licensing period – a PSR summary report, comprehensive justification and a draft integrated programme with measures to improve the safety of the SFSF.

## Safety Culture

Kozloduy NPP applies a systematic long-term approach to building and developing a high-level safety culture by maintaining a set of measures aimed at fostering a responsible personal attitude, expanding the staff's conviction in the priority importance of safety when operating nuclear facilities and building values related to motivation and strive for continuous enhancement of safety culture. The organisation and implementation of the planned activities are coordinated by the Safety Culture Council, an advisory body to the Safety and Quality Director.

In 2023, a self-assessment of the safety culture was conducted based on a WANO methodology, involving nearly one-third of the Company's staff. As a result, strengths and areas for improvement were identified and measures have been established to improve safety

culture. In the past year a new model of Kozloduy NPP safety culture was introduced, in line with international and national requirements and best practices. The model is reflected in the relevant controlled documents, a draft self-assessment questionnaire has been prepared and staff familiarisation with it through training is foreseen for 2024.

The 'Human Performance Review' bulletin – published monthly on the intranet – enables the Company to track trends. A separate 'Safety Culture' page is also maintained on the intranet with up-to-date information, analyses and documents. Regular observations of maintenance and operational activities focusing on safety culture and human performance are carried out and the results are summarised and communicated to the relevant departments.



## Nuclear Safety

The operation of the nuclear facilities is in compliance with their licences, technical specifications requirements and relevant operating procedures. In 2023, there were no violations of the safe operation limits and conditions. The 3 operating events registered were classified Level '0', which is below the IAEA INES scale (non-safety related events), and were reported to the NRA. Based on the causes identified by the analyses, corrective actions were defined in order to prevent recurrence.

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



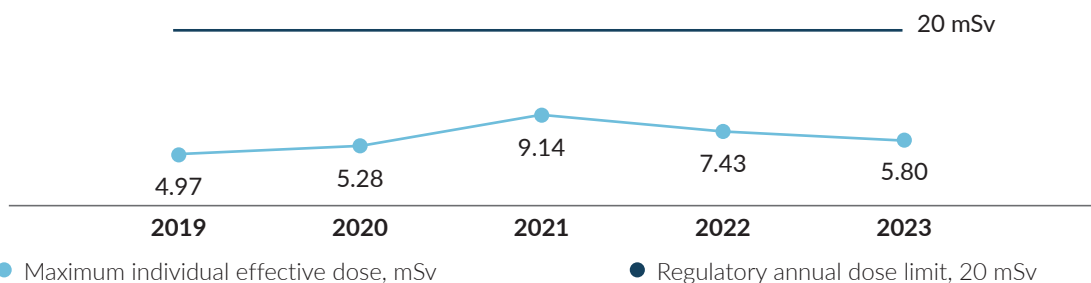
## Radiation Protection

Radiation protection measures at Kozloduy NPP are continuously optimised in accordance with the ALARA (As Low As Reasonably Achievable) principle. The high level of safety for the workers and the public is achieved based on reliable and effective radiation monitoring, training, enhancing staff motivation, precise planning, preparation and analysis of activities, use of internal and international best practices.

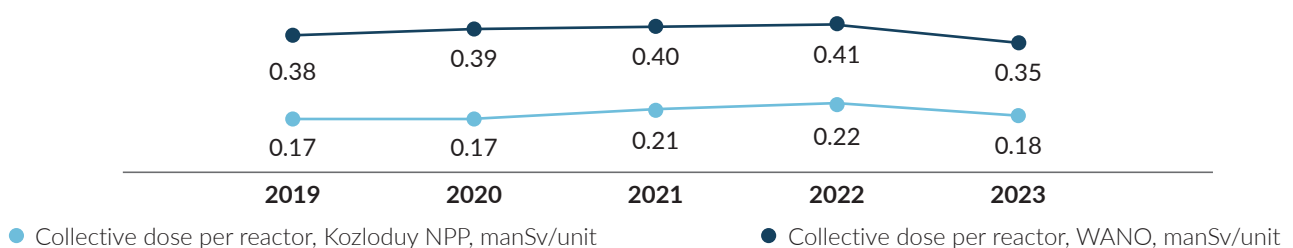
The maximal individual effective dose incurred in 2023 was 5.80 mSv – 30% of the annual regulatory

limit. The personnel collective dose from the operation of Units 5 and 6 was 0.36 manSv, or 0.18 manSv on average per reactor. Comparison with data from WANO annual reports shows that the reported values at the Plant are consistently lower than the annual averaged collective doses from the operation of similar reactors around the world.

Maximum individual effective dose in the controlled area of Kozloduy NPP, mSv



Collective dose per reactor at Kozloduy NPP compared to the WANO indicator, manSv/unit



## Radiation Monitoring of Discharges into the Environment

Continuous improvement of operational practices and adoption of the highest standards in nuclear industry are the main prerequisites for the high quality of radiological monitoring at Kozloduy NPP.

In 2023, the radioactive noble gases, aerosols and iodine-131 detected in the gaseous discharges from the Plant were approximately 0.04%, 0.01% and 0.09% of the reference levels. Radioactive substances in the effluents were within 0.08% of the reference

levels. Tritium content of the discharges was also within the specified limits.

The reference levels of the discharges at Kozloduy NPP are significantly lower than the statutory limits. Independent external control is performed by the NRA, MEW and the National Centre of Radiobiology and Radiation Protection (NCRRP). Monitoring data is also reported annually to the European Commission.

## Radioactive Waste Management

The generated in 2023 RAW from the operation of Kozloduy NPP did not exceed the previously forecasted quantities. The methods and technologies applied in their management are aimed at keeping their generation to a reasonably achievable minimum

in terms of their activity and volume. During the year, about 80 t solid and 160 m<sup>3</sup> liquid RAW were generated and transferred to the State Enterprise Radioactive Waste (SE RAW) for processing.

## Spent Nuclear Fuel Management

Spent nuclear fuel (SNF) at the Plant is managed in accordance with the updated Strategy for SNF and RAW Management until 2030 and stored with strict adherence to all relevant safety conditions. After being kept in the Spent Fuel Pools (SFPs) at the reactors, the SNF is transferred to the Wet Spent Fuel Storage Facility (WSFSF), which is common for both units. During the refuelling outages in 2023, six transfers of SNF from the SFP of Unit 5 and four transfers of SNF from the SFP of Unit 6 were made to the WSFSF. SNF from the WWER-440 reactors loaded in CONSTOR 440/84 casks is stored in the Dry Spent Fuel Storage Facility (DSFSF).

Seven inspections were carried out at the Plant during the year by the NRA, IAEA and EC to ensure compliance with the safeguards of the Nuclear Non-Proliferation Treaty.





## Emergency Planning and Preparedness

An important aspect of ensuring safety at the Plant is maintaining high-level emergency preparedness of the team in accordance with national and international requirements.

In 2023, more than 35% of all Kozloduy NPP employees, as well as employees of the SE RAW, Kozloduy NPP Regional Police Department, Kozloduy NPP On-Site Fire Safety and Civil Protection Service and other organisations received training in emergency planning and preparedness.

Exercises and drills are regularly organised to test and improve the knowledge of the staff regarding the established procedures. In 2023, two joint exercises were held with the participation of various institutions, including General Directorate 'Gendarmerie, Special Operations and Counterterrorism' and the Institute of Psychology of the Ministry of Interior.

During the year, the Off-Site Emergency Response Centre in the town of Kozloduy was commissioned. A series of lectures were delivered in schools in the Kozloduy and Miziya municipalities, presenting to 424 students and 28 teachers the high level of safety in the operation of Kozloduy NPP as well as with the emergency response procedures. On 4 May 2023, student teams from 6 schools from Kozloduy, Miziya,



Belene and Montana participated in an emergency preparedness competition under the motto 'Nuclear Energy - a Secure Future'.



IN 2023, THE OFF-SITE EMERGENCY RESPONSE CENTRE IN THE TOWN OF KOZLODUY WAS COMMISSIONED.

## Nuclear Security

In accordance with the current global requirements, Kozloduy NPP ensures a high level of nuclear security. Targeted efforts are also being made to develop a nuclear security culture and a programme of specific measures and initiatives has been developed based on the findings of the 2022 self-assessment on this topic.

Last year, the 'Nuclear Security' intranet section was created where important national and international documents stipulating nuclear security activities are published. Theoretical training on physical protection topics was provided for about two thirds of the Plant's employees. Information materials on the Company's security were prepared and distributed.

In respect of the International Nuclear Security, in July 2023, the Plant hosted a partnership meeting with a delegation of the US Department of Energy which was attended by representatives of the Kozloduy NPP Regional Police Department, Vratsa Regional Directorate of the Ministry of Interior, and General Directorate 'Gendarmerie, Special Operations and Counterterrorism'. During the business visit, good practices were exchanged and future cooperation was planned.

## Cybersecurity

As a strategic site of national importance, Kozloduy NPP maintains the required high level of information security – confidentiality, accessibility and sustainability of information resources. In accordance with the national legislation requirements, the Company has internal rules and procedures in place to ensure continuous improvement of network and

information security. A set of measures ensures the protection of all information and communication assets from internal, external, malicious and accidental threats. Training materials have been developed on cybersecurity topics, which are used in the ongoing training to maintain staff knowledge in this area.

## Fire Safety

To ensure fire safety at Kozloduy NPP, a number of technical and organisational measures are implemented to minimise the risks of fires and ignitions and protect the nuclear facilities as much as possible.

Fire safety is ensured in accordance with national and international requirements, and for that purpose assessment and construction supervision are carried out during the implementation of projects, terms of reference and modifications at the Company, as well as in connection with contractors' works.

Compliance with fire safety standards is systematically monitored. During the year, the planned inspections were carried out and the necessary corrective actions implemented. No violations were found during the regular inspection of Vratsa Regional Directorate of Fire Safety and Civil Protection. As a result of the good performance in this area, no fires occurred on the industrial site in 2023.

The scheduled continuing training was conducted for the operating staff and employees directly involved with the fire safety control.



## Radiological Environmental Monitoring

The radiological parameters of the basic environmental components (air, water, soil, vegetation) are subject to continuous monitoring involving detailed and systematic testing. In accordance with national legislation and Article 35 of the Euratom Treaty, Recommendation 2000/473/Euratom and IAEA documents, approved and validated methods for measurement and analysis are applied in the plant

laboratory accredited according to BDS EN ISO/IEC 17025. Along with the monitoring of Kozloduy NPP agreed by the MEW and MH and approved by the NRA, independent external monitoring is also carried out under the programmes of the ExEA at the MEW, and of the NCRRP at the MH. The results are verified at national level with regulatory control.

The monitored area includes the industrial site, 2-km Precautionary Action Zone (PAZ), the Bulgarian part of the 30-km Urgent Protective Action Planning Zone (UPZ), and monitoring points within the 100-km radius surrounding Kozloduy NPP in the Bulgarian territory. In 2023, 10 new monitoring points have been established on Site 2 which is designated for the construction of a new nuclear power unit.

Data from the automated monitoring system are transmitted in real time to Kozloduy NPP and subsequently transferred to the ExEA and the NRA. They are also visualised on digital displays in 13 populated areas around the Plant. The gamma background levels measured throughout 2023 at the monitoring points across the site and within the 100-km zone did not exceed the natural gamma background levels specific for the region.

Sampling is carried out at 36 monitoring points in the 30-kilometre zone and at remote monitoring points in Lom, Pleven and Berkovitsa. Water from the Danube and inland water bodies at a total of 7 sites, drinking water sources and food produced in the area (milk, fish, agricultural produce) are subject to continuous monitoring. The results of more than 1,350 gamma-background measurements and more than 4,400 analyses of more than 2,300 samples from various sites carried out during the year are within the background limits, in accordance with the relevant regulations. No impact of the Plant on the radiological

status of water, soil and staple foods produced in the region was detected. The measured values comply with the health standards. Radiological environmental indicators are stable, within normal background limits.



KOZLODUY NPP USES A WELL-DEVELOPED SAMPLING NETWORK, VALIDATED ANALYSIS METHODS AND PRECISE MEASUREMENT EQUIPMENT FOR RADIATION MONITORING.

## Evaluation of Public Dose Exposure

The low levels of emissions into the environment during the Plant operation cause negligible public dose exposure in the surrounding area. For 2023, the maximum effective annual dose per member of the public in the 30-km zone was conservatively estimated at 4.2  $\mu\text{Sv/a}$ . The value, which is hundreds of times below the natural background exposure level nationwide (2.33 mSv/a), is fully comparable with past years' and about 35 times below the regulatory dose constraint.

The evaluation employs verified and validated modelling programmes adapted to the geographical and hydrological characteristics of the Kozloduy NPP area, which are based on the EU adopted CREAM methodology and the IAEA MODARIA platform. The results are independently verified by the NCRRP. Comparison with EC data demonstrates that the values are commensurate with the ones reported by other nuclear power plants with WWER reactors in the EU and across the world.



## Occupational Health and Safety

Creating healthy and safe working conditions is a priority for the Company. As a responsible employer, Kozloduy NPP ensures high-quality organisation of work activities and applies effective protection and risk assessment measures. All occupational risk prevention measures are included in health and safety programmes prepared for the relevant organisational units. The requirements for each workplace are met and the necessary collective and personal protective equipment is provided. Laboratory measurements of working environment parameters and assessment of their compliance with the regulations are performed regularly.

Concerning health protection measures, priority is given to prevention and promoting of safety improvements at work. Only well-trained and instructed persons with the required competence and qualification are allowed to carry out work duties.

As a result of the set of measures implemented in 2023, the industrial accident rate for the Plant is 0.13 – significantly below the industry average of 1.21 and national average of 0.63.

## Environmental Protection

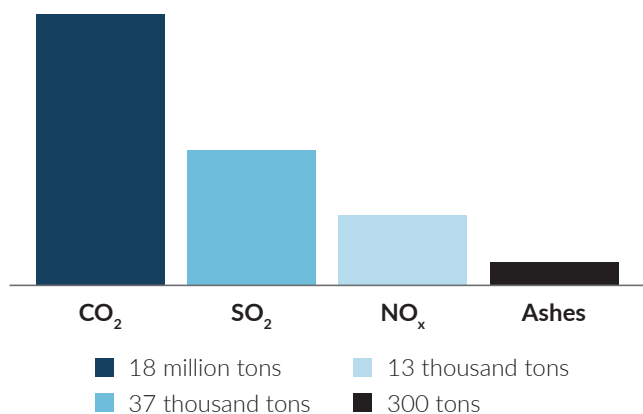
All environmental measures planned for 2023 have been successfully implemented. The permits granted to the Plant under the applicable national legislation are up to date. The permit for discharge of waste waters from the Ledenika Health and Recreation Complex had its validity term extended to 2029. During the year, the updated Safety Report of Kozloduy NPP EAD was approved by decision of the ExEA.

In 2023, 7 inspections were carried out by Vratsa Regional Inspectorate for Environment and Water, Danube Region Basin Directorate, Black Sea Region Basin Directorate, Kozloduy Municipality, Vratsa Regional Directorate of Fire Safety and Civil Protection detecting no violations and issuing no prescriptions.

The system for separate collection of packaging waste has been optimised – suppliers are required to supply only biodegradable and compostable disposable bags, containers, cups, utensils, etc.; the schedule for collection of paper and cardboard has been expanded to include new sites; and a requirement for separate collection of waste from on-site catering activities has been introduced. Around 1,180 tons of non-radioactive waste have been transferred to licensed contractors for further safe treatment.

The wastewater, surface water and groundwater samples scheduled for the year have been collected and analysed. Approximately 1,850 tests have been performed by the accredited laboratories of Kozloduy NPP and Vratsa Regional Lab at the ExEA. The results fully comply with the individual emission constraints set for the Plant.

Emissions of greenhouse and other harmful gases saved in 2023 by Kozloduy NPP compared to conventional thermal power plants (tons)





# Responsible Management and Business Integrity

## Management System

The integrated application of the requirements on safety, occupational health and safety, environment, security, quality and business, considering the interaction between technical, human and organisational factors to ensure the utmost priority of safety requirements in the implementation of activities at Kozloduy NPP EAD, is ensured by the Management System. It has been developed in accordance with the IAEA Safety Standard GSR Part 2 Leadership and Management for Safety, taking into account national statutory and regulatory requirements, the principles and requirements of applicable IAEA and WANO safety standards and guidelines, the requirements of BDS EN ISO 9001:2015 Quality Management Systems. Requirements, BDS EN ISO 14001:2015 Environmental Management Systems, BDS EN

ISO 45001:2018 Occupational Health and Safety Management Systems, and other standards applicable at the Company.

The Plant's management system is based on a process approach, ensuring the identification and management of processes and their interaction so as to ensure the achievement of the intended results, in accordance with the stated objectives, policies and strategic direction of the Company. It comprises 29 processes divided in three groups: management processes, core processes and support processes.

The Company's management system is implemented, evaluated and improved in order to ensure safety enhancement of nuclear facilities, to encourage and support a high level of safety culture of the personnel.



THE KOZLODUY NPP MANAGEMENT SYSTEM HAS BEEN DEVELOPED IN ACCORDANCE WITH APPLICABLE NATIONAL AND INTERNATIONAL REQUIREMENTS.

## Prevention of Corruption and Other Misconduct

The conditions and procedures upon receiving, registering and verifying reports on corruption and/or conflict of interest are regulated in an administrative procedure in force at the nuclear power plant. The document is based on the principle of confidentiality of information and protection of the anonymity of persons reporting corruption, irregularities, fraud, abuse, etc. The aim is to strengthen public and civil control and increase public confidence, while reinforcing values such as honesty, integrity and morality among the Company's employees.

Reports or complaints can be submitted by email and hotline, posted on the Company's intranet and website, through alert boxes placed at the entrances of buildings on site, and by means of an electronic form available on the Kozloduy NPP corporate website. Alerts received are dealt with in accordance with the established procedure and the results of the checks carried out are reported to the Chief Executive Officer of the Plant. None of the alerts verified in 2023 were classified as corruption.

## Internal Audit

The internal audit activity at the nuclear power plant, aimed at providing an objective assessment of the processes, systems and other audited entities, is carried out in accordance with the provisions of national legislation and international standards in this area.

The annual audit plan developed at Kozloduy NPP for 2023 has been fully implemented. A well-established quality assurance programme is implemented to improve activities. The programme

is subject to periodic comprehensive review and is updated as necessary. The IT audit module is kept up to date, ensuring its efficient operation. The audit engagements planned for the year to provide assurance have been completed and a joint audit by the internal audit departments of the nuclear power plant and Bulgarian Energy Holding EAD has been implemented. Feedback has also been collected from the audited entities.





# Financial Performance

In the past year Kozloduy NPP EAD continued to maintain financial stability, high liquidity, low total indebtedness and own capital sources for investment in new fixed assets. Good financial performance was achieved in a dynamic market environment.

The Company's operating and investing activities in 2023 were fully financed with its own funds. All activities to ensure the safe operation of the nuclear facilities, as well as to implement the Maintenance and Investment Programmes, were financially secured. All commitments to the budget, personnel and commercial partners of the Company have been fully met and the nuclear power plant ended the year with no arrears. BGN 1,684 million, or 66% of the revenue generated, were paid into the state and municipal budgets. Of these, BGN 709 million are earmarked contributions to the ESS Fund, BGN 407 million - current contributions

to the ESS, NFD and RAW Funds, BGN 504 million - taxes and fees, BGN 64 million - contributions to social and health insurance funds.

Pursuant to Order No. 2/26.04.2023 of the Council of Ministers, BGN 364.7 million dividend was paid representing 50% of the Company's reported profit for 2022.

In accordance with the requirements of the applicable accounting legislation and the Updated Strategy for the Management of RAW and SNF until 2030, provisions in the amount of BGN 49 million representing the value of the outstanding shipments of SNF from WWER-1000 for technological storage and reprocessing have been set aside in a special deposit account of Kozloduy NPP EAD as at 31 December 2023.



## KOZLODUY NPP EAD INCREASED THE CAPITAL OF ITS SUBSIDIARY KOZLODUY NPP – NEW BUILDS PLC BY BGN 1,500,000,000 TO BACK THE CONSTRUCTION OF NEW NUCLEAR UNITS.

As at 31 December 2023, there are no overdue receivables of principal and interest on loans granted to related parties. On 28 March 2023, the loan granted to Bulgarian Energy Holding EAD in the amount of BGN 350 million in accordance with the decision of the Ministry of Energy was finally repaid.

The year ended with a net profit of BGN 537 million and cash in the amount of BGN 913 million.

Revenues from the Company's operations amounted to BGN 2,545 million. Of these, BGN 2,526 million are from the sale of electricity, which is 58% less than the record amount of BGN 6,052 million achieved in 2022.

As a result of the increased price for the Public Supplier NEK EAD as of 1 July 2023, revenues from sales on the regulated market amounted to BGN 252 million, a 10% increase compared to 2022.

Revenues from sales at non-regulated prices are BGN 2,272 million, 61% below the amounts reported for the previous year. The decrease is due to the significant drop in the exchange prices in 2023 and the change in the market sales structure. As a risk management measure against the high price volatility in spot electricity markets in 2023, the Company has shifted a portion of the electricity sales on the Bilateral Contracts segment of the exchange market. During the reporting period, the share of electricity volumes sold on the Day Ahead and Bilateral Contracts segments was 53.6% and 45.5%, respectively, with the average exchange price of both segments around BGN 202/MWh. In 2022, 99.6% of exchange transaction revenues were made on the Day Ahead segment at an average exchange price of BGN 497/MWh.

Operating expenses totalled BGN 1,946 million and differ significantly from the amount reported in 2022, namely BGN 5,261 million. Significant decrease of 78% compared to the previous year was reported in the expenditure on earmarked contributions to the

ESS Fund and in the expenditure related to statutory contributions to the ESS, NFD and RAW Funds.

To compensate non-household consumers for the high cost of electricity, the State continued the mechanism for raising earmarked contributions to the ESS Fund in 2023, despite the sharp decrease in electricity prices during the year. The earmarked contributions to the Fund are reported at BGN 576 million against BGN 3,379 million for 2022. For the first six months of 2023, the cost of earmarked contributions was BGN 293 million, formed by the positive difference between market revenues and the revenue ceiling of BGN 180/MWh for Kozloduy NPP set by the Council of Ministers. For the second half of the year, BGN 283 million were reported against a reduced NPP revenue ceiling of BGN 150/MWh.

Expenditure on contributions to government funds in 2023 was as follows: for the RAW Fund (3% of revenues) – BGN 76 million vs. BGN 181 million for 2022; for the NFD Fund (7.5% of revenues) – BGN 189 million vs. BGN 453 million for 2022; for the ESS Fund (5% of revenues) – BGN 126 million vs. BGN 302 million for 2022.

The significant decrease in contributions to the funds compared to the previous year is the result of lower revenues from electricity sales.

At the end of the year, by a decision of the Board of Directors of Bulgarian Energy Holding EAD, the capital of Kozloduy NPP EAD was increased by a cash contribution in the amount of BGN 1,500 million to increase the capital of the plant's subsidiary Kozloduy NPP – New Builds PLC by the same amount. The capital increase is for investment purposes and is in compliance with the decision of the National Assembly of 18 December 2023 to take action on the construction of Units 7 and 8 at Kozloduy NPP Site 2 with AP1000 technology, and the decision of the Minister of Energy of 21 December 2023.

## Key Indicators Presenting the Results Achieved by Kozloduy NPP EAD in 2023

Indicators (BGN '000)		Statements 31.12.2023	Statements 31.12.2022	Change 2023/2022 (%)
c.1	c.2	c.3	c.4	c.5=(c.3/c.4)-1
1	Total operating income	2,545,128	6,072,178	-58%
2	Total operating expense	(1,945,764)	(5,260,764)	-63%
3	EBITDA <sup>1)</sup>	808,057	1,020,271	-21%
4	EBIT <sup>2)</sup>	599,364	811,413	-26%
5	EBT <sup>3)</sup>	596,655	810,304	-26%
6	EBIT margin	24%	13%	84%
7	EBITDA margin	32%	17%	88%
8	Total assets	5,552,368	4,041,616	37%
9	LTA <sup>4)</sup>	2,272,828	2,375,852	-4%
10	Working capital <sup>5)</sup>	1,272,463	1,058,293	20%
11	Cash and cash equivalents	912,588	738,743	24%
12	Equity	4,830,758	3,158,761	53%
13	Return on equity <sup>6)</sup>	12%	26%	-54%
14	Return on assets <sup>7)</sup>	11%	20%	-45%

<sup>1)</sup> EBITDA – earnings before interest, taxes, depreciation and amortisation from continuing operations

<sup>2)</sup> EBIT – earnings before interest and taxes from continuing activities

<sup>3)</sup> EBT – earnings before taxes from continuing activities

<sup>4)</sup> LTA – long-term tangible assets + expenses on LTA acquisition

<sup>5)</sup> Working capital – current assets minus current liabilities

<sup>6)</sup> Return on equity – EBT/Equity

<sup>7)</sup> Return on assets – EBT/Total assets



## Separate Statement of Financial Position

	31 December 2023	31 December 2022
Assets	BGN '000	BGN '000
<b>Non-current assets</b>		
Property, plant and equipment	2,272,828	2,375,852
Intangible assets	24,327	21,601
Investments in subsidiaries	1,522,916	22,916
Loans granted to related parties	26,598	28,464
Advance payments	40,907	
Financial instruments at fair value through other comprehensive income (OCI)	505	482
<b>Non-current assets</b>	<b>3,888,081</b>	<b>2,449,315</b>
<b>Current assets</b>		
Nuclear fuel	469,247	419,062
Inventory	143,258	122,149
Trade and other receivables	11,063	3,958
Advance payments	61,403	2,561
Loans granted to related parties	12,127	188,351
Receivables from related parties	49,938	98,673
Income tax receivables	4,663	18,804
Cash and cash equivalents	912,588	738,743
<b>Current assets</b>	<b>1,664,287</b>	<b>1,592,301</b>
<b>Total assets</b>	<b>5,552,368</b>	<b>4,041,616</b>

## Separate Statement of Financial Position

(continued)

	31 December 2023	31 December 2022
	BGN '000	BGN '000
<b>Equity and liabilities</b>		
<b>Equity</b>		
Share capital	1,744,585	244,585
Legal reserves	24,458	24,458
Revaluation reserve of non-financial assets	2,148,678	2,153,877
Remeasurement of defined benefit liabilities	(71,881)	(71,537)
Revaluation reserve of financial assets at fair value	246	225
Other reserves	11,405	11,405
Retained earnings	973,267	795,748
<b>Total equity</b>	<b>4,830,758</b>	<b>3,158,761</b>
<b>Liabilities</b>		
<b>Non-current liabilities</b>		
Retentions on contracts	324	134
Financing	83,115	90,390
Pension and other employee obligations	101,898	98,267
Long-term trade and other payables	125	-
Deferred tax liabilities	144,324	160,056
<b>Non-current liabilities</b>	<b>329,786</b>	<b>348,847</b>
<b>Current liabilities</b>		
Trade and other payables	229,784	432,098
Liabilities under contracts with customers	20,083	46
Payables to related parties	5,251	4,498
Financing	7,619	7,619
Retentions on contracts	5,047	6,842
Pension and other employee obligations	42,940	33,978
Provision for spent nuclear fuel and others	81,100	48,927
<b>Current liabilities</b>	<b>391,824</b>	<b>534,008</b>
<b>Total liabilities</b>	<b>721,610</b>	<b>882,855</b>
<b>Total equity and liabilities</b>	<b>5,552,368</b>	<b>4,041,616</b>

## Separate Statement of Profit or Loss and Other Comprehensive Income for the Year Ended 31 December

	2023	2022
	BGN '000	BGN '000
Revenue from sale of electricity	2,526,020	6,052,284
Revenue from sales of heat energy	3,848	3,599
<b>Revenue from sale of production</b>	<b>2,529,868</b>	<b>6,055,883</b>
Income from sale of services, goods and other sales	5,302	4,263
Income from financing	7,278	7,340
Other income	2,643	4,343
Gains from sale of non-current assets	37	349
Change in the fair value of investment properties	-	-
Electricity purchased	(399)	(17,284)
Cost of materials	(147,312)	(145,230)
Hired services expenses	(215,181)	(184,487)
Employee benefits expenses	(337,903)	(311,113)
Provisions for defined benefit plans	(25,916)	(30,226)
Depreciation/amortisation and impairment of non-financial assets	(208,693)	(208,857)
Provisions costs	(32,173)	(24,100)
Reversed impairment of financial assets, net	534	2,824
Other expenses	(406,485)	(966,472)
Compensations of industrial end consumers of electricity	(576,275)	(3,379,239)
Cost of goods and other current assets sold	(1,325)	(996)
Changes in work in progress	4,673	(294)
Acquisition of machinery, plant, and equipment, self-constructed	691	4,709
<b>Operating profit</b>	<b>599,364</b>	<b>811,413</b>
Finance costs	(8,303)	(7,709)
Finance income	5,594	6,600
<b>Profit before tax</b>	<b>596,655</b>	<b>810,304</b>
Income tax expenses	(59,603)	(80,841)
<b>Profit for the year</b>	<b>537,052</b>	<b>729,463</b>



## Separate Statement of Profit or Loss and Other Comprehensive Income for the Year Ended 31 December

(continued)

	2023	2022
	BGN '000	BGN '000
<b>Other comprehensive income:</b>		
<b>Items that will not be reclassified subsequently to profit or loss:</b>		
Remeasurement of defined benefit liabilities	(344)	5,015
Revaluation of non-financial assets	-	-
Change in the fair value of financial instruments at fair value through other comprehensive income		
– profit/(losses) for the current period	23	(67)
Income tax relating to items that will not be reclassified into profit or loss	(2)	7
<b>Other comprehensive income for the year, net of tax</b>	<b>(323)</b>	<b>4,955</b>
<b>Total comprehensive income for the year</b>	<b>536,729</b>	<b>734,418</b>

## Separate Cash Flow Statement for the Year Ended 31 December

	2023	2022
	BGN '000	BGN '000
<b>Operating activities</b>		
Cash receipts from customers	3,018,483	7,207,440
Cash paid to suppliers	(451,899)	(354,929)
Advance payments for supply of fresh nuclear fuel	(95,090)	-
Payments to the ESS Fund under a programme of the Council of Ministers to compensate non-household end customers of electricity	(708,997)	(3,181,011)
Cash paid to employees and social security institutions	(359,262)	(310,960)
Paid licences, taxes and other payments to the NRA	(5,463)	(5,861)
Payments to the RAW Fund, NFD Fund and ESS Fund in accordance with Kozloduy NPP's statutory obligations	(407,215)	(949,890)
Cash flows related to other taxes and payments to the governmental budget and local budgets	(393,056)	(1,177,482)
Cash flows related to insurance policies	(14,293)	(13,892)
Income tax payments, net	(61,195)	(139,287)

## Separate Cash Flow Statement for the Year Ended 31 December

(continued)

	2023	2022
	BGN '000	BGN '000
Litigation payments	-	(25,000)
Other payments for operating activity, net	(12,987)	(8,191)
<b>Net cash flows from operating activities</b>	<b>509,026</b>	<b>1,040,937</b>
<b>Investing activity</b>		
Acquisition/increase of investments in subsidiaries	(1,500,000)	(750)
Acquisition of property, plant, and equipment	(153,217)	(119,712)
Received and reimbursed financing, net	-	(6,303)
Proceeds from disposals of property, plant, and equipment	48	5,523
Loans granted	(10,000)	(387,865)
Loan repayments received	188,308	176,957
Dividends received	3,252	2,602
Interest received	1,131	4,317
<b>Net cash flows from investing activity</b>	<b>(1,470,478)</b>	<b>(325,231)</b>
<b>Financing activity</b>		
Proceeds related to capital increase	1,500,000	-
Interest paid	-	-
Dividends paid	(364,732)	(890,304)
Lease payments	(221)	(240)
<b>Net cash flows from financing activity</b>	<b>1,135,047</b>	<b>(890,544)</b>
<b>Net change in cash and cash equivalents</b>	<b>173,595</b>	<b>(174,838)</b>
Cash and cash equivalents at the beginning of the year before impairment	738,743	914,193
Recovered/(expected) credit losses of cash and cash equivalents	250	(612)
<b>Cash and cash equivalents at the end of the year</b>	<b>912,588</b>	<b>738,743</b>

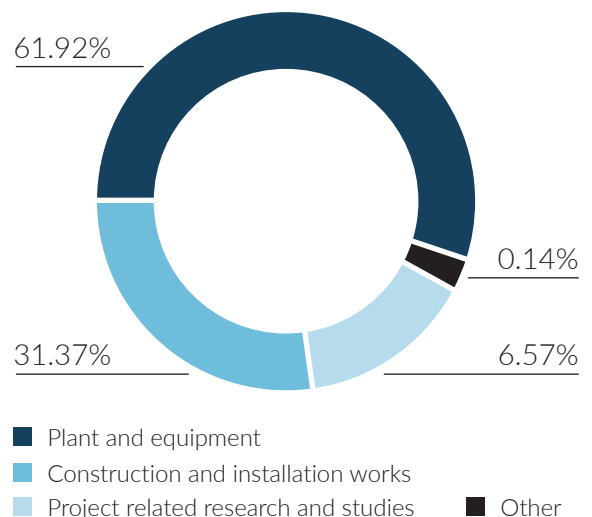


# Investing in Efficiency and High-Level Safety

Under the Plant Investment Programme, activities are being implemented to ensure the safe and reliable operation and high availability of the country's largest power generating company which is a crucial factor for the stability of the national grid.

The investments in 2023 were provided by own funding and amounted to BGN 100,593 thousand, 83% of which were invested in maintaining and improving safety. The value of the long-term assets put into operation throughout the year amounted to BGN 107,320 thousand.

Reported expenses structure as per types of activity







THE INVESTMENT ACTIVITIES AT KOZLODUY NPP ARE FINANCED EXCLUSIVELY WITH OWN FUNDS.

## Maintaining and Enhancing Safety

In 2023, BGN 28,550 thousand were spent to finance measures of the Programme for Maintaining and Enhancing Safety at Kozloduy NPP arising from internal and external operating experience, from peer reviews, or based on regulations outside the scope of the current programmes on nuclear safety, radiation protection, fire safety, emergency preparedness, physical protection and environment. The implemented activities include:

- Replacement of the excitation systems of the Units 5 and 6 turbine generators with new more reliable systems capable of self-diagnostics, visualisation, archiving and trending;
- Modernisation and reconstruction of the ion exchange backwash system filters.
- Justification of safety and required modifications to the SSCs for the transition to an alternative type of nuclear fuel;
- Supply of baskets for transport and storage of SNF from WWER-1000 reactors at the Wet Spent Fuel Storage Facility;
- Modernisation of the switchyard DC system, concerning rectifiers, batteries, DC control panels and battery room ventilation systems, in order to improve equipment reliability and ensure high level of worker's safety;
- Modernisation of eddy current testing systems, including control systems, workstations and software, eddy current flaw detectors, additional modules for eddy current and ultrasonic testing.



## Ensuring Units 5 and 6 Long-Term Operation

Measures aimed at ensuring that the safety related SSCs adequately perform their intended functions are foreseen for the LTO period.

Equipment is being replaced with modern analogues due to physical ageing, as well as in connection with technological development and scientific advancements, and modified regulatory requirements.

In 2023, the amount invested in ensuring Units 5 and 6 long-term operation was BGN 52,070 thousand.

The implemented activities include:

- Supply of pneumatic cylinders for isolation pneumatic valves on Units 5 and 6;
- Migration of Ovation Computer Information and

Control System of Units 5 and 6 to the latest generation Ovation platform, including integration of the Safety Parameter Display System, symptom-based emergency operating procedures, and partial upgrade of the Full-Scope Simulator-1000 (FSS-1000);

- Installation of a cybersecurity system to ensure adequate computer protection of the Ovation-based systems at Units 5 and 6 in accordance with current requirements and international standards;
- Completion of the modernisation of the control panels in Units 5 and 6 MCRs and at the FSS-1000;
- Replacement of the batteries installed on Units 5 and 6 as well as in the Common Purpose Building.



## Ensuring Reliable Operation at Up-rated Power Level

In 2023, a total of BGN 2,670 thousand was invested in activities ensuring the operation of Units 5 and 6 at up-rated thermal power, namely:

- All the upgrades on the automated neutron flux monitoring systems of Units 5 and 6 aimed at enhancing safety and ensuring reliable operation as well as increasing accuracy and reliability of core condition monitoring;
- Replacement of the Unit 5 In-core Monitoring System (ICMS) Upper Layer Hardware & Software and delivery of a new suite of applications. Installation and commissioning will be carried out in 2024, according to the outage schedule.

## Current Maintenance of the Units, Auxiliary Facilities and Infrastructure

In 2023, BGN 17,303 thousand was recognised for activities completed within the Investment Programme concerning the maintenance of major and auxiliary equipment, as well as ensuring normal operation of the balance of plant related to production activity. Investments were made in:

- Modernisation of equipment not covered by the measures within the major investment projects;
- Maintenance and repair of balance of plant and construction and installation works in the Switchyard, Bank Pump Station, Spent Fuel Storage Facility, Training Centre, etc.;
- Measures to maintain and enhance security and physical protection;
- Phased implementation of measures to enhance the efficiency and quality of the heat supply in the town of Kozloduy;
- Enhancing the security and capacity of the Kozloduy NPP information system.





# Reliability and Development

## New Builds

In order to ensure safe, reliable and low-emission baseload generating facilities in the long term, Bulgaria has taken action to build new nuclear units on the Kozloduy NPP site.

Following a decision of the Council of Ministers, the process of preparation for the construction and commissioning of a new nuclear power unit at Kozloduy started in 2012. The company Kozloduy NPP - New Builds PLC was established as a subsidiary of the nuclear power plant, with the strategic objective of organising and managing a feasibility study, design, construction and commissioning of nuclear power facilities of the latest generation, in compliance with

the standards for nuclear safety, protection of the population and the environment, in accordance with applicable national and international legislation and under the terms of the permits and licences issued.

The feasibility study has been prepared and an environmental impact assessment procedure has been carried out, including in a transboundary context, which has been identified as good practice by the United Nations Economic Commission for Europe.

In accordance with the conditions of the decision of the Ministry of Environment and Water, a radioecological monitoring programme has been put



in place at the site of the new facilities approved by an order of the Nuclear Regulatory Agency. A preliminary safety analysis has been prepared and a detailed spatial plan has been developed.

The active work at institutional and expert level over the past year upholds the strong commitment to the implementation of the new nuclear build project.

On 12 January 2023, the National Assembly instructed the Council of Ministers to conduct negotiations with the US Government to conclude an Intergovernmental Agreement for the construction of new nuclear build at Kozloduy NPP with AP1000 technology (Kozloduy NPP Unit 7).

On 29 March 2023, an agreement was signed between Kozloduy NPP - New Builds PLC and Westinghouse Energy Systems LLC, Bulgarian Branch

for front-end engineering and design activities. The results will be used in the upcoming design and construction works related to the future nuclear facility.

On 2 August 2023, the Council of Ministers adopted a decision declaring the new nuclear power plant at the site approved by the Nuclear Regulatory Agency a site of national importance and a national site.

On 19 October 2023, Memoranda of Understanding were signed between Westinghouse and five key Bulgarian companies to support the upcoming activities.

At the end of the year, Kozloduy NPP EAD increased the capital of its subsidiary Kozloduy NPP - New Builds PLC by BGN 1,500,000,000 to back the construction of new nuclear units.

## Diversification

Ensuring a reliable supply of fresh nuclear fuel required for the operation of the nuclear power plant is of key importance for Kozloduy NPP. The nuclear fuel cycle diversification programme developed by the plant aims to ensure the reliable and safe operation of the units by securing alternative supplies. The implementation of specific measures and actions is coordinated with the EURATOM Supply Agency.

In pursuance of Kozloduy NPP Programme for Diversification of the Fresh Nuclear Fuel Supplies, safety analyses have been developed for the licensing and implementation of an alternative type of nuclear fuel on Unit 5 under a contract concluded by Kozloduy NPP with Westinghouse Electric Sweden AB. According to national regulations, the analyses are necessary to prove the safe operation and to license the new fuel.

In accordance with the planned timetable, the technical reports with the analyses prepared by Westinghouse were reviewed by the nuclear power plant experts and submitted for review and assessment to the Nuclear Regulatory Agency. The amendments, based on the estimates, to the Company's internal

documents regulating the safe operation of the nuclear units were also submitted to the regulator for approval. The detailed and thorough safety assessment developed included neutron-physical, thermo-mechanical, thermo-hydraulic and radiological analyses, together with a feasibility study to demonstrate the viability of the joint operation of the two fuel types during the phased transition to RWFA type assemblies manufactured by Westinghouse.

A contract with the French company Framatome was concluded in March 2023 to provide alternative supplies of fresh nuclear fuel for Unit 6.

In order to diversify the supply of nuclear equipment, services and spare parts, after extensive market research, agreements were reached with world leading companies ensuring the reliable operation of Units 5 and 6 and the security of the Bulgarian power system.

The progress in ensuring diversified supplies of nuclear fuel and technology was highly appreciated in late 2023 by the Bulgarian Energy and Mining Forum. The organisation awarded Kozloduy NPP a special prize for its successful diversification programme.



# In Partnership with the Global Nuclear Community

Continuous performance improvement by ensuring an ever-higher level of safety and reliability of nuclear facilities is a top priority in the development of modern nuclear power. This priority is realised through openness, knowledge sharing and the application of global best practices in partnership with a number of international organisations.

Kozloduy NPP is an active participant in the activities of the IAEA, WANO, OECD NEA, etc., which enables the Company's employees to engage in various forms

of information and experience exchange such as workshops, reviews, support missions and seminars. In cooperation with the global nuclear community, leading experts from the Bulgarian nuclear power plant are involved in the process of developing documents and standards which define the general framework for the development of the industry on a global scale.



# IAEA

In 2023, experts from the Bulgarian nuclear power plant participated in a number of events organised by the IAEA: OSART missions to Tihange NPP, Belgium, and Bohunice NPP, Slovakia, an IAEA expert mission to assess the knowledge management programme to support human resource development and competency and knowledge management at the Armenian NPP, as well as many training courses, technical and advisory meetings, briefings and forums held in-person and online. Representatives of Kozloduy NPP participated in the Review Meeting of the Contracting Parties to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, as well as in the Bulgarian delegation to the 67th Regular Annual Session of the IAEA General Conference.

In view of the importance of the IAEA OSART missions, during the year the Company also started the implementation of a programme to prepare for the upcoming OSART mission to the Plant in late 2024. The document stipulates the organisation, deadlines, responsibilities, reporting and follow-up of



THE IAEA SALTO FOLLOW-UP MISSION FOUND THAT ALL NECESSARY ACTIVITIES TO ENSURE THE SAFE LONG-TERM OPERATION OF UNITS 5 AND 6 HAVE BEEN COMPLETED.

the implementation of the measures identified upon a detailed self-assessment of the review areas.

From 20 to 31 March 2023, an IAEA Technical Safety Review mission was conducted at Kozloduy NPP to independently assess the Units 5 and 6 Level 1 PSA. Its objective was to verify that the scope, modelling



and data used in the PSA meet the requirements of current IAEA safety standards and internationally recognised good practices in this area.

The Bulgarian nuclear power plant also hosted a SALTO follow-up mission from 13 to 15 June, which assessed the progress in the implementation of the recommendations and suggestions from the 2021 SALTO mission. In the closing session, the IAEA Team Leader, Gabor Petofi, noted that Kozloduy NPP has completed all the necessary activities to ensure the

safe long-term operation of Units 5 and 6.

The activities of the sixth phase of the IAEA IGALL project continued in 2023, with the third meeting of the Electrical and I&C Components Working Group taking place at Kozloduy NPP from 30 May to 2 June. In the framework of IGALL, IAEA Member States are exchanging scientific and operational experience in the field of equipment ageing management, and international groups of experts are developing a database with synthesised information on the topic.

## OECD NEA

In 2023, the participation of experts from Kozloduy NPP in the working groups of the Nuclear Energy Agency, part of the Organisation for Economic Co-operation and Development, continued.

The Republic of Bulgaria became the 34th member state of the NEA in early 2021. The Agency's main

objective is to support partnership and exchange of best practices among its member states in order to achieve excellence in nuclear safety, technology, science, environment and law.

## WANO

Two WANO peer reviews were conducted at the nuclear power plant in 2023. The Corporate Peer Review of Bulgarian Energy Holding EAD and Kozloduy NPP EAD continued from 16 to 26 October with the aim of assessing their interaction with a view to continuously improving the safety and reliability of the nuclear power plant. In preparation for the review, a previsit by a WANO team was conducted from 3 to 7 April to coordinate the schedule for the mission and scope of the information package provided to WANO prior to the mission.

A WANO follow-up peer review was held from 13 to 17 November to assess the progress in implementing the corrective actions taken in the areas identified during the Design-Informed Peer Review (DIPR) of late 2021. According to the WANO experts' final report, Kozloduy NPP has successfully completed the DIPR cycle.

Under the auspices of WANO, other events took place at the Bulgarian power plant, including support missions on Performance Improvement (19-23 June) and Training Effectiveness Assessment and Indicators for Return on Investments in Training (2-5 October), benchmarking for Optimal Outage Duration Planning (5 September), training workshop on Operational Decision-Making (9-13 January), workshop on Human Error Prevention Tools (3-5 October) and workshop on Operator Fundamentals (5-7 December).



TWO WANO PEER REVIEWS WERE SUCCESSFULLY CONDUCTED AT KOZLODUY NPP IN 2023.



During the past year, Company's nuclear experts participated as reviewers in international teams in four peer reviews at Kudankulam NPP (India), Tianwan NPP (China), Loviisa NPP (Finland), and Hanbit NPP (South Korea), as well as in the support mission on Ageing Management at the UK's Heysham 2 NPP. Through a number of international workshops, seminars and training courses, held both in-person and online, experiences were exchanged on issues such as the impact of climate change on nuclear

power plant operations, maintenance organisation and practices, staff work, human performance and organisational effectiveness, performance indicators – monitoring and trends, fire protection and fire safety, etc. Plant representatives participated in the WANO Moscow Centre General Meeting and Governing Board Meeting held in Yerevan, Armenia, as well as in the meeting of the WANO Moscow Centre site representatives at the member NPPs held in the Russian capital.







## The Most Valuable Asset - Trained and Motivated Professionals

A key factor for achieving the main goal of the Company – safe, efficient and environmentally friendly generation of energy under long-term operation conditions and with guaranteed quality and security of supplies in compliance with national and international standards, is the availability of licensed, competent and motivated specialists. The Company team includes both experts with many years of experience and unquestionable competences, as well as many young people who develop professionally in the work process and

successfully master the vast array of specific knowledge and skills accumulated at the plant.

The long-term programmes developed to provide the necessary personnel in the Company ensure quality professional recruitment, a successful continuity between generations, effective management of the risk of loss of nuclear knowledge and the development of an organisational culture based on the values of continuously enhancing safety culture and maintaining high motivation of employees.

## Personnel Profile

An important condition for ensuring safety is that activities are carried out by people with the appropriate level of qualification. For years, nearly 60% of the personnel have higher education degree and about a quarter have secondary vocational education. The proportion is similar for the employees recruited in 2023, with 58% of them having higher education degree and 26% having secondary vocational education. Trends are also continuing, with around a third of new recruits aged under 30, and over 70%

directly involved in activities related to the electricity generation process.

Kozloduy NPP, being a responsible employer, provides equal career development opportunities based on professional qualities and personal performance. The level of employee motivation is also the subject of continuous attention and is examined annually by considering the impact of 24 work environment factors.

## Training and Qualification

The 50-year tradition of nuclear facilities management is associated with the accumulation of a wide range of professional knowledge and core competencies, as well as the formation of a number of good practices and valuable operating experience. This significant resource has been the subject of consistent efforts for identification, preservation and transfer within the nuclear power plant team to ensure that the achieved high level of operational safety will be maintained in the future.

The training process at Kozloduy NPP is aimed at maintaining licensed, competent and motivated personnel, establishing and maintaining a high level of safety culture, effective use and management of personal and corporate knowledge, stimulating the acquisition of the necessary knowledge and skills, developing a positive attitude towards work. Training is based on a systematic approach underpinned by the tasks to be performed and the relevant competences. The scope, topics, forms and sequence of the training



are defined in training time schedules and initial and continuing training programmes.

Kozloduy NPP holds a licence issued by the NRA for performing specialised training for activities at nuclear facilities and with sources of ionising radiation. The plant Training Centre is equipped with the facilities required for theoretical, practical and simulator training. The ESTRA e-learning platform is also being continuously upgraded. Specialised on-the-job training is conducted in various forms.

In 2023, a total of 4,002 training courses were carried out at the Training Centre, 1,612 on-the-job trainings were conducted as well as 142 hands-on trainings in laboratories, workshops, mock-ups, etc. Training was delivered to 3,207 employees of the Plant and 8,954 individuals from 139 other organisations. The number of issued individual licences for working at nuclear facilities was 16, and of the individual licences for working with source of ionising radiation – 16. A total of 286 individual training programmes for initial training to take a position were developed, of which 98 for retraining of reassigned employees. The individual training programmes for continuing training developed were 245, and the additional training programmes – 4.

In order to ensure the effectiveness of the practical training conducted at the Training Centre, the training aids (mock-ups) are maintained in conformity with the equipment that is in service at Kozloduy NPP. In 2023, the implementation of the activities on the

construction project for new premises for practical training of operations and maintenance staff, as well as for upgrading of the existing ones, continued. The purpose of the project is to ensure full compatibility of the facilities with those used at the Plant, and to extend the scope of practical training of the personnel.

The Full-Scope Simulator (FSS-1000) is used for specialised initial and continuing training of operations personnel performing functions for nuclear safety assurance and control. The high-tech facility is maintained in compliance with the current state of Unit 6 which is the reference unit, with 24 configuration changes implemented over the year. In 2023, the FSS-1000 hosted the initial training for 14 people, continuing and specialised training of all Units 5 and 6 Main Control Room operator crews as well as general emergency drills.

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IN 2023, TRAINING WAS PROVIDED TO 3,207 PLANT SPECIALISTS AND 8,954 SPECIALISTS FROM OTHER ORGANISATIONS.





## Support for Careers in the Nuclear Sector

The prospects for the nuclear power industry in Bulgaria, in the light of the long-term operation of Units 5 and 6 and the construction of new power units at the Kozloduy site, raise the important issue of the need to direct young people towards choosing education and a professional career in the nuclear sector. To this end, Kozloduy NPP pursues an active and consistent policy, part of which are the successful youth-focused programmes. Experience shows that they contribute to increasing interest in engineering and technical subjects, encourage learning and support early career choices.

The dual training for students from vocational high schools in Kozloduy and Miziya is among the initiatives aimed at raising future nuclear power engineers with the required high level of training while still at the secondary education stage. In 2023, thirty-three 11th-grade students from the 'Igor Kurchatov' Vocational School of Nuclear Energy in Kozloduy switched to a new stage in their dual training. Alongside their school classes, they are now learning work competencies in real jobs at the Plant under the guidance of experienced mentors. In the 2023/2024 school year, the young people are scheduled to work two days a week and four weeks in July, and as for the next school year - three days a week and two weeks in May. In two years, the preparation of the other dual students from 'Igor Kurchatov' Vocational School of Nuclear Energy and 'Vasil Levski' Vocational School in Miziya will be conducted in the same way. The partnership with the specialised schools also includes support for the training process, within the framework of which the infrastructure in the schools is improved and some of the required skills are acquired at the nuclear power plant during the specially organised practical classes.

Young people take a keen interest in the support they receive for their studies in subjects applicable at the Plant by joining the scholarship and internship programmes for school and university students. Last year, due to their participation in the Summer Internship Programme, 36 future Bachelor and Master students increased their practical skills, and the unpaid form of the programme welcomed another 12 motivated young people to Kozloduy NPP.

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193 PEOPLE PARTICIPATED IN THE KOZLODUY NPP YOUTH-FOCUSED PROGRAMMES IN 2023.



Information on all these opportunities is available on the Company's website and is regularly presented as part of the Plant's participation in career forums organised by universities and other institutions.

In addition to the individual stages of secondary and higher education, Kozloduy NPP also partners with educational institutions in various joint projects to develop and upgrade the competences of its employees. In view of the dynamic development of the technological and economic parameters of the modern business environment, many of the employees of the NPP, in their pursuit of career development, use the increasingly flexible opportunities for acquiring higher or new qualifications offered by leading Bulgarian technical universities.



# Commitment and Transparency in Work

With a strong commitment to high corporate social responsibility, Kozloduy NPP consistently applies business practices to protect human rights and labour law norms, to counteract corruption and other wrongdoing, to contribute to the development of the region and to environmental protection. In accordance

with the principles of the UN Global Compact, the Company operates in a responsible, transparent and ethical manner, incorporating the UN Sustainable Development Goals aimed at achieving lasting benefits for people and society into its organisational culture and daily operations.

## Positive and Supportive Working Environment

By prioritising the care of its employees, Kozloduy NPP provides modern workplaces and working conditions that ensure health and safety. The Company provides its employees with the opportunity to participate in various cultural and sports activities in their free time away from professional commitments.

A leading goal for Kozloduy NPP is to attract young and educated specialists to the team and fully adapt

them to the organisational environment, and to maintain a high level of motivation and competence of the employees. The staff recruitment and development process at the plant is as transparent as possible and is based on objective criteria.

Teamwork, prioritising safety, personal responsibility, striving for development and continuous learning are among the shared corporate values underlying the numerous successes achieved in the 50-year history



of Kozloduy NPP. Internal communication campaigns and initiatives, the most significant of which is Power Engineer Day, contribute to their promotion among employees. Every year, the celebration is an occasion to honour the best professionals in various categories,

as well as to present the Safety First Award for collective contribution, to the team with the greatest achievements in terms of safety culture and workplace leadership.

## Contribution to the Well-Being of the Region and Society

Kozloduy NPP has a long tradition of caring for the sustainable development of Kozloduy Municipality and the region. A good and fruitful partnership has been established with the local authorities, aimed at supporting culture, education, health, sports, youth and social activities, improving the infrastructure and public areas. The nuclear power plant maintains the Power Engineers Cultural Centre and the Sports and Health Complex in the town of Kozloduy, which offers modern conditions for active sports and recovery.

Kozloduy NPP, declared a national youth site as early as April 1971, has always paid special attention to the youngest. Dedicated efforts to ensure good conditions for the children and young people of the region are

reflected in the consistent support for the educational establishments and the children's ward of the Sveti Ivan Rilski Hospital in the town Kozloduy. Support is also provided to events developing the abilities and interests of adolescents - competitions in various sports, cultural and festive activities.

Along with the bolstering young people's advancement, the Company also upholds its former employees, encouraging them to maintain their active lifestyle. The Kozloduy NPP Pensioners' Club, which celebrated its 20th anniversary in 2023, has assisted with the provision of well-maintained facilities and the organisation of a variety of events.

## Together for a Better Future

Kozloduy NPP confidently shares and follows in its activities the values laid down in the ten principles of the UN Global Compact. The company has been one of the active members of the UN Global Compact Network Bulgaria since its accession in 2012.

A number of important causes and initiatives for the whole society receive the corporate support of the plant and the Company's employees engage with them. These include the Bulgarian Christmas initiative, campaigns to support social institutions and people in need. Thanks to the commitment of Kozloduy NPP and its employees, vulnerable members of society receive better living conditions on weekdays and an occasion for joyful emotions during the holidays.



## For Cleaner Environment

In 2023, the nuclear power plant once again participated in environmental campaigns such as Earth Hour, Forest Week, World Environment Day, International Danube Day, European Mobility Week, etc. with various initiatives. Employees of the Company readily joined the actions supporting the efforts for a cleaner environment.

Two of the plant's environmental business practices

were distinguished in 'The Greenest Companies in Bulgaria' competition of b2b Media. Kozloduy NPP ranked first as a paperless office for its new document management information system introduced in 2022, and was awarded third prize for green investment for the Company's green transport model, including the use of passenger and freight electric vehicles and the construction of charging infrastructure.

## Open and Transparent Communication

An important priority for Kozloduy NPP is the provision of objective information on safety, production, social activities and other aspects of its operations, as well as maintaining a constructive dialogue with stakeholders, including company staff, state and local authorities, a number of national and international partner organisations, the public and the media. Information on the Company's activities is available on the intranet platform, on the Plant's website and on the official Kozloduy NPP profile maintained on one of the popular social networks.

Printed materials and publications are also produced – brochures, posters, the corporate magazine *Parva Atomna*, etc., which are disseminated to readers from different social groups.

Traditionally, the opportunity to visit the nuclear power plant has enjoyed strong interest, with 1,715 people gaining personal impressions of Kozloduy NPP operations in 2023. Some 730 of them visited the Company on 24 June 2023, during the traditional Doors Open Day.





## List of Abbreviations Used

<b>BPS</b>	Bank Pumping Station
<b>DSFSF</b>	Spent nuclear Fuel Storage Facility
<b>EC</b>	European Commission
<b>ESS</b>	Electricity System Security
<b>EU</b>	European Union
<b>EWRC</b>	Energy and Water Regulatory Commission
<b>ExEA</b>	Executive Environment Agency
<b>FSS-1000</b>	Full-scope Simulator for WWER-1000 reactors units
<b>GSOCT GD</b>	Gendarmerie, Special Operations and Counterterrorism General Directorate
<b>I&amp;C</b>	Instrumentation & Control Systems
<b>IAEA</b>	International Atomic Energy Agency
<b>IBEX EAD</b>	Independent Bulgarian Energy Exchange EAD
<b>IGALL</b>	International Generic Ageing Lessons Learned
<b>INES</b>	International Nuclear and Radiological Event Scale
<b>IRS</b>	Ionising Radiation Sources
<b>MCR</b>	Main Control Room
<b>MEW</b>	Ministry of Environment and Water
<b>MH</b>	Ministry of Health
<b>Mol</b>	Ministry of Interior
<b>MRDPW</b>	Ministry of Regional Development and Public Works
<b>NC</b>	Nuclear Security
<b>NCRRP</b>	National Centre of Radiobiology and Radiation Protection
<b>NEA</b>	Nuclear Energy Agency
<b>NEK EAD</b>	Natsionalna Elektricheska Kompania EAD
<b>NFD</b>	Nuclear Facilities Decommissioning
<b>NRA</b>	Nuclear Regulatory Agency
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>On-site FSCP - Kozloduy NPP</b>	On-site Fire Safety and Civil Protection Service at Kozloduy NPP
<b>On-site RPO</b>	On-site Regional Police Office at Kozloduy NPP
<b>OSART</b>	Operational Safety Review Team Mission
<b>PSA</b>	Probabilistic Safety Analysis
<b>PSR</b>	Periodic Safety Review
<b>RAW</b>	Radioactive Waste
<b>RD FSCP</b>	Regional Directorate of Fire Safety and Civil Protection
<b>RDMol</b>	Regional Directorate of Ministry of Interiors
<b>RIEW</b>	Regional Inspectorate for Environment and Water
<b>SALTO</b>	Safety Aspects of Long Term Operation
<b>SAMTS</b>	State Agency for Metrological and Technical Surveillance
<b>SC</b>	Safety Culture
<b>SE RAW</b>	State Enterprise Radioactive Waste
<b>SFP</b>	Spent Fuel Pool
<b>SFSF</b>	Spent Fuel Storage Facility
<b>SNF</b>	Spent Nuclear Fuel
<b>SSC</b>	Structures, Systems and Components
<b>TC</b>	Training Centre
<b>WANO</b>	World Association of Nuclear Operators
<b>WWER</b>	Water-Water Energy Reactor



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