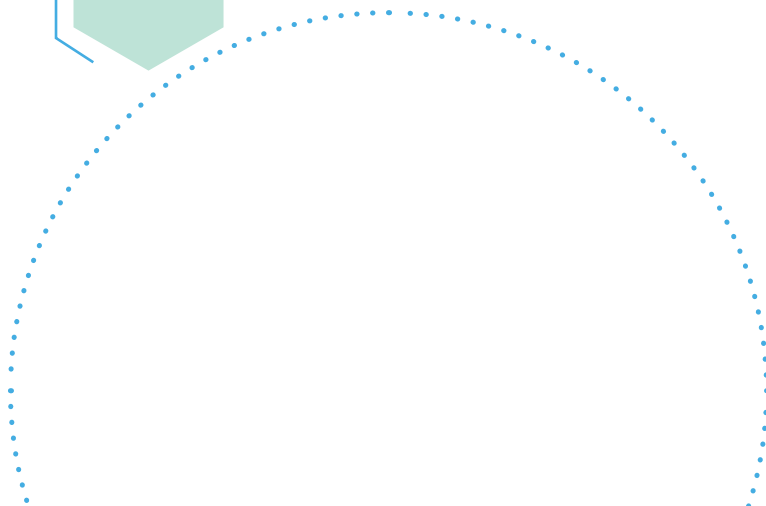
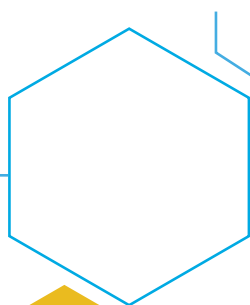


KOZLODUY NPP PLC

ANNUAL REPORT 2011





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Dear Readers,

Our review of the past year 2011 confirms beyond doubt that it has been among the most successful years in the records of Kozloduy NPP. Thanks to the achieved goals for sustainable and reliable electricity generation, the excellent performance achievements provided for the company's good financial results. With the generation of 16 314 271 MWh electricity our nuclear power plant has strengthened its plant position as a leader in the electricity production of the country.

The principle of continuing development and modernization of the nuclear installations is followed at Kozloduy NPP, and consistent efforts are made to improve the working processes. Our goal is to operate the power units in compliance with the best international practices. This was also proven during the Follow-up Peer Review of World Association of Nuclear Operators (WANO), which was held last year.

It is worth noting that 2011 was a difficult year with a worldwide importance for nuclear power. The Fukushima events focused the public attention on the safe operation of nuclear installations. The managers, employees, and workers of Kozloduy NPP driven by their responsibility to both present and future generation strictly fulfilled the national and international requirements to stress test performance. These were conducted as a result of the guidelines of the European Commission for a target reassessment of safety margins of all the EU nuclear power plants. Thus, Kozloduy NPP's high level of robustness and adequate margins for extreme external events, as well as the adequate organization and technical provisions for severe accident management have been confirmed.

What underlies all these achievements are the efforts, good organisation, and professionalism of the plant staff whose everyday work adds to Kozloduy NPP being a significant factor of a stable economic development of Bulgaria and the region with an undoubted contribution to solving ecological problems.

VALENTIN NIKOLOV
EXECUTIVE DIRECTOR





PRODUCTION

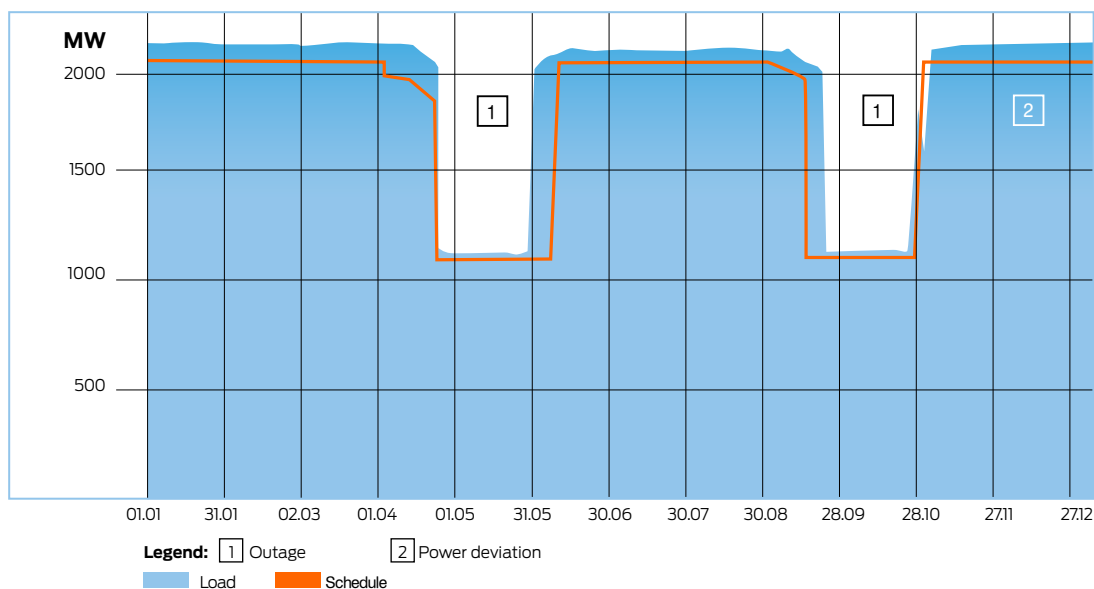


MODE OF OPERATION OF GENERATING FACILITIES

In 2011 the two 1000 MW Units 5 and 6 were operated in accordance with the load schedule agreed with the Electricity System Operator EAD and updated on-the-fly in compliance with the procedures, envisaged in the Grid Code.

No deviations from the operational parameters have occurred with any significant impact on the production process and no shutdowns have been undertaken except for the scheduled annual outages.

KOZLODUY NPP LOAD SCHEDULE FOR 2011

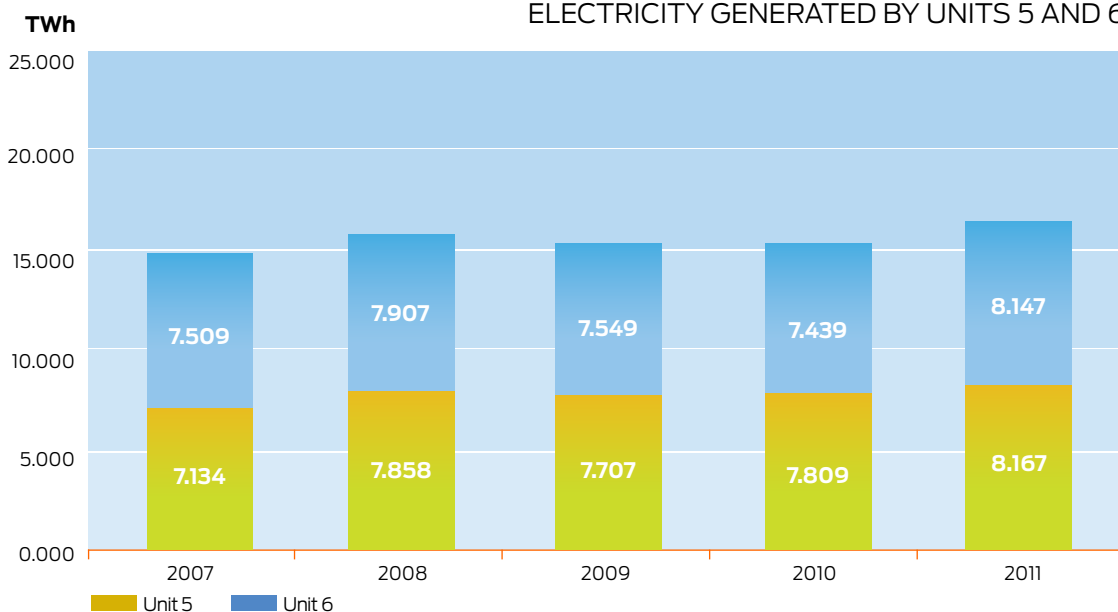


ELECTRICITY GENERATION (GROSS)

In the twelve months of 2011 Kozloduy NPP generated 16 314 271 MWh electric power. This is the greatest amount of electricity produced in the entire history of operation of the 1000 MW Units 5 and 6. This Kozloduy NPP result ranks among the world leading achievements of power plants operating this type of nuclear reactors. The 2011 production plan totalling 15 267 560 MWh was fulfilled as early as 11th December. On 20th

December, the previous Units 5 and 6 production record from 2008 of 15 765 105 MWh was achieved. These excellent Kozloduy NPP results achieved in the past year are owing to the high quality performance of KNPP staff and the Company's Management policy, based on the principle that electricity production is increased without compromising safety.

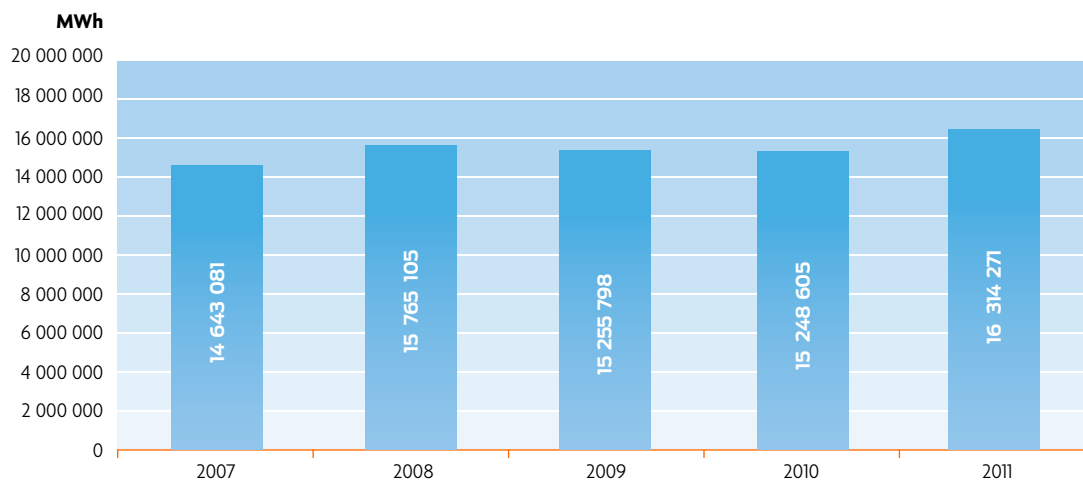
ELECTRICITY GENERATED BY UNITS 5 AND 6



In 2011, the 1000 MW Units 5 and 6 of Kozloduy NPP PLC ensured 32.6% of the national electricity production. From commissioning the first power unit in July, 1974 till the end of 2011, Kozloduy NPP

generated the total of 508 860 309 MWh electricity complying with all safety requirements for operation of nuclear facilities and without impact on the environment.

ELECTRICITY GENERATED (GROSS)

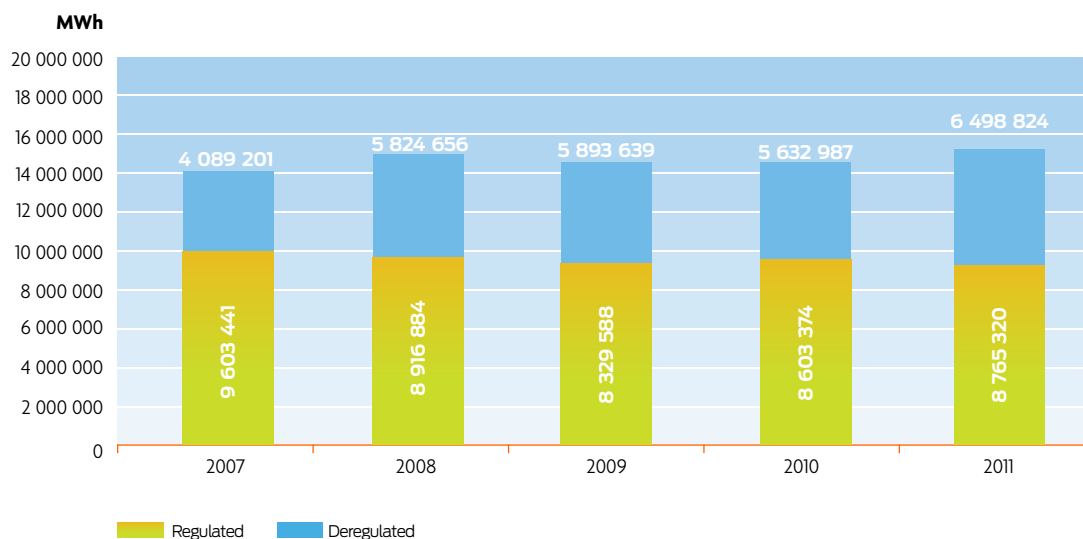


ELECTRICITY SOLD (NET)

The net active power supplied by Kozloduy NPP to the national grid amounts to 15 264 144 MWh, including 8 765 320 MWh for the regulated market, or 57.4% of the total net production. The remaining part of the net production, amounting to 42.6%

was sold on the deregulated market. On the basis of bilateral contracts with big industrial consumers and traders in the country and the region, 6 498 824 MWh were supplied.

ELECTRICITY SOLD BY KOZLODUY NPP ON THE REGULATED AND ON THE DEREGULATED MARKET IN THE COUNTRY

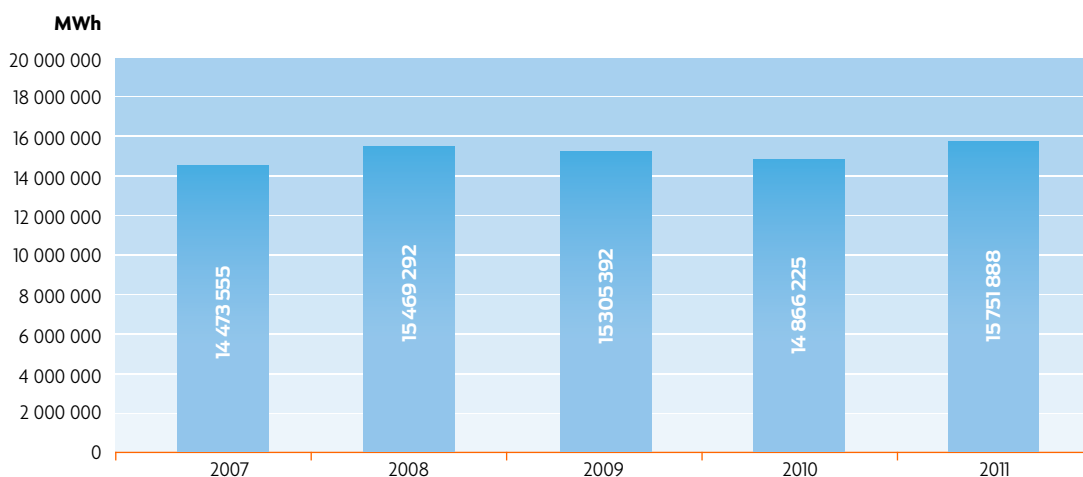


AVAILABILITY

Along with the net active electricity for satisfying the demand in the country as well as for the control and security of the electrical power system,

the availability of Kozloduy NPP generating facilities amounts to 15 751 888 MWh throughout the year.

AVAILABILITY



SPECIFIC INDICATORS, RELATING TO KOZLODUY NPP OPERATION

LOAD FACTOR – LF

The indicator is of maximum values owing to the plant operation in the optimum operational modes and without deviations to impact electricity production. LF value higher than 90% is considered to be an excellent achievement for power units of this type.

Indicator		2011
LF - Unit 5	%	93.23
LF - Unit 6	%	93.00
LF - KNPP	%	93.12

UNIT CAPABILITY FACTOR – UCF

The indicator is of maximum values owing to the plant operation in the optimum operational modes without deviations having impact on the availability of the facilities as well as minimum downtime for plant outages.

Indicator		2011
UCF - Unit 5	%	89.76
UCF - Unit 6	%	90.44
UCF - KNPP	%	90.10

UNIT CAPABILITY LOSS FACTOR – UCLF

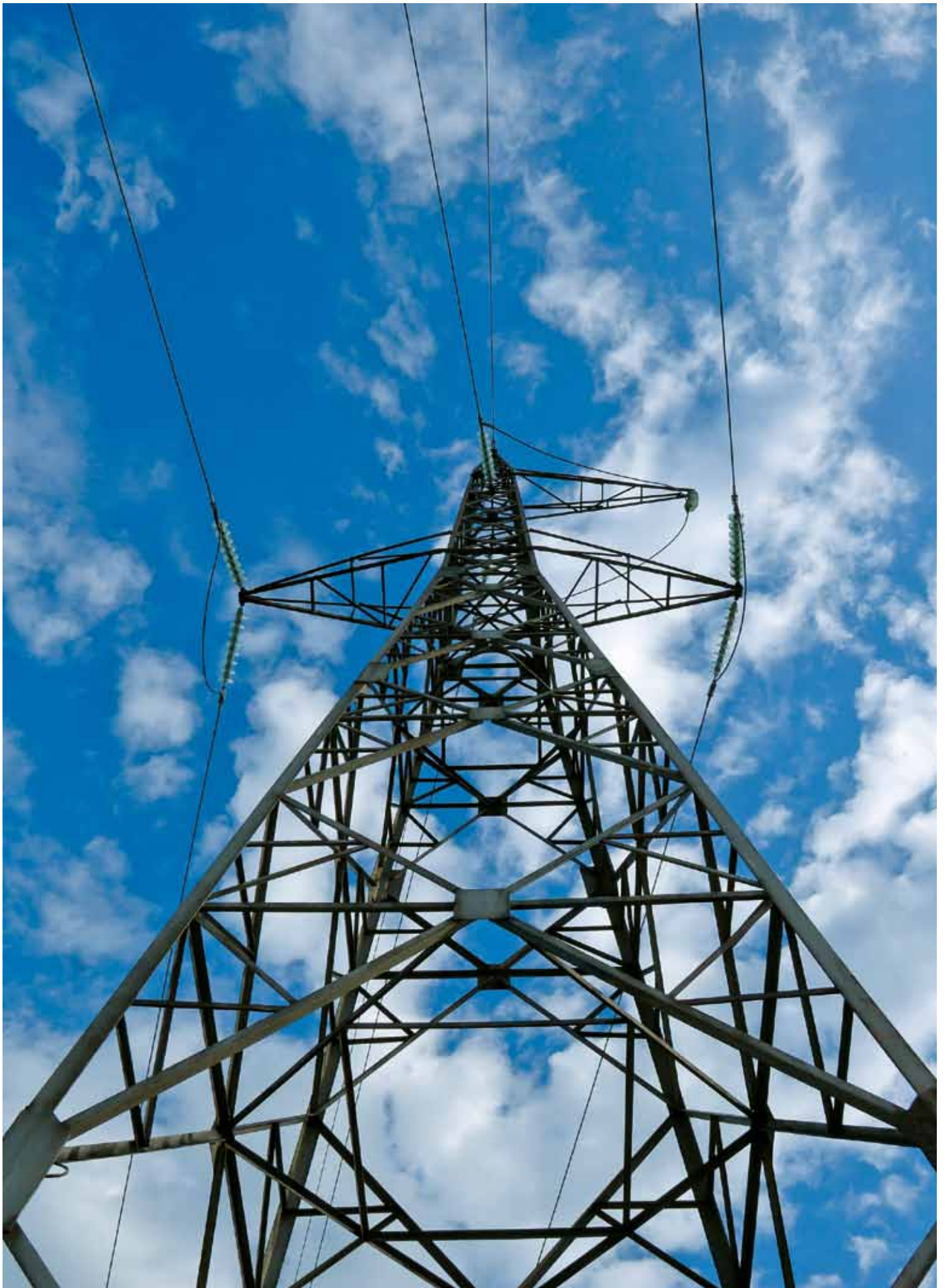
The indicator is of excellent values for the period due to the high reliability of plant operation. There have been no deviations with significant impact on the production process.

Indicator		2011
UCLF - Unit 5	%	0
UCLF - Unit 6	%	0.15
UCLF - KNPP	%	0.08

GRID RELATED LOSS FACTOR – GRLF

The grid related loss for the Plant in maintaining the power balance of the country is at the minimum for the period of Kozloduy NPP operation.

Indicator		2011
GRLF - Unit 5	%	0
GRLF - Unit 6	%	0.15
GRLF - KNPP	%	0.08



MAINTENANCE PROGRAMME

The planned outages including refuelling of Units 5 and 6 reactors have been performed within the framework of the minimum downtime for the generating facilities for their entire period of operation – 37 and 33 calendar days respectively (considered from tripping the turbine generator till its connection to the grid), owing to the good organization and coordination during implementation of the necessary scope of activities related to the maintenance and modernization of equipment.

A series of projects were implemented within the planned outages (replacement of high pressure heaters of Unit 5 turbine regenerative system with a chamber type one, installation of reactor vessel temperature controls with extended range, etc.). Successfully were implemented the activities as planned to ensure operability and reliability of equipment as well as to ensure safety of nuclear facilities in compliance with standards and requirements of granted licences.

HEAT GENERATION

Along with electric power production Kozloduy NPP secures heat generation to supply the buildings on site as well as the consumers in the town of Kozloduy, 58% of the heat generated in Units 5 and 6 boiler facilities is spent on plant

site house needs.

The heat generated sold in 2011 to the end consumers (households, industrial, etc.) totalled 83 444 MWh.





SAFETY

LICENSING REGIME

Being an organization that operates nuclear facilities, the Kozloduy NPP PLC is a subject of state supervision by the Bulgarian Nuclear Regulatory Agency (BNRA), Ministry of the Environment and Waters, Ministry of Health, Ministry of Regional Development and Improvement, State Agency for Metrological and Technical Supervision and State Agency of National Security.

In 2011, Units 3, 4, 5 and 6, and Spent Fuel Storage Facility of Kozloduy NPP were operated in compliance with the conditions of the operating licences issued by the BNRA. On 20th May 2011, the operating licence of Unit 3 was renewed by the BNRA granting a licence of E Series No.03723 for the unit operation in operation mode, which is E condition (spent nuclear fuel stored in at the reactor pool), valid for a period of three years.

In October, the specialized training licence for Kozloduy NPP plc was renewed and the licence of SO Series, No.03803 having validity of 5 years was issued.

The licence for the usage of ionizing radiation sources for supervisory functions – check of confined volumes by means of X-ray machine was renewed and in March the licence of I-6072 Series, No.03672 having a validity period of 10 years was issued.

The licence for the usage of ionizing radiation source for industrial usage in fire detectors at Electricity Production – 1 excluding the fire detectors from the fire alarm system at Units 1 and 2 was modified according to the order of the BNRA chairman.

In December 2011 Kozloduy NPP PLC notified the BNRA chairman about the planned activities related to the uprate of the reaction installations at Unit 5 and 6 to 3 120 MW. The prepared documents justifying safe operation of the units at power uprate, the programmes for performance of the activities on the separate units and the plan for

performance of the permission regime according to the the Safe Use of Nuclear Energy Act (SUNEA) were submitted.

The same year the activities related to the licensing of the constructed Dry Spent Nuclear Fuel Storage Facility (DSNFSF) continued. In July 2011 the procedure for issuing the permit for commissioning of the facility was initiated. After the check of the preparedness and performance of the requirements set by the BNRA, the permit No.O-3571/24.11.2011 for commissioning of the DSNFSF having validity of 3 years was issued.

In March 2011 the permit No.K-3535/16.03.2011 for design of the facility for treatment and conditioning of solid RAW with a high reduction factor, which is being constructed under Project 5b of the Decommissioning Projects was issued. In November the procedure for approval of the technical design of the facility was initiated.

In connection with the changes made to the Safe Use of Nuclear Energy Act and Law for technical requirements to the products related to the control of facilities with increased hazard, Kozloduy NPP PLC was granted a licence No.678/17.05.2011 for providing the technical supervision of facilities with increased hazard from the In-plant Technical Supervisions Section and three certificates for performance of the activities related to maintenance, repair and reconstruction of the facilities with increased hazard by the State Agency for Metrology and Technical Supervision.

During this year 40 permits were issued in order to implement the changes leading to modifications in structures, systems and components (implementation of technical solutions) and the internal rules applied to the licences.



SAFETY CULTURE

In 2011, a large international project Safety Culture Enhancement (KNPPI) within the Cooperation programmes between Norway and Bulgaria – Safe Nuclear Energy was finalized in Kozloduy NPP. The aim of the project was to provide expert support and guidance on enhancing the plant safety culture. As a result from the project implementation, the company has developed three safety culture manuals.

The plant specialists joined the working groups of the International Atomic Energy Agency (IAEA) to prepare documents for the Safety Report Series in the area of safety culture.

Safety culture self-assessment according to the new IAEA methodology was performed at Kozloduy NPP. The data collected through questionnaire, interview, survey, document review and discussions

in focus groups covered more than 15% of the plant personnel from all structural units and management levels.

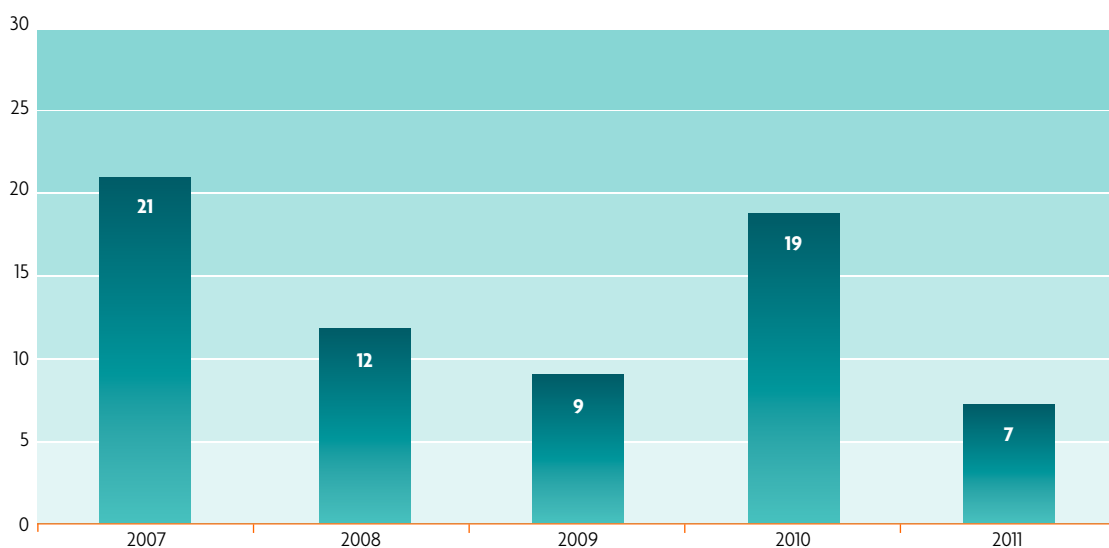
The analysis of the self-assessment data containing good practice and areas of improvement was made. At the meeting of Safety and Quality Committee held in December, the Kozloduy NPP management accepted the results and outlined the further steps for development and improvement of the plant safety culture. A long-term programme with measures whose implementation would contribute to the company safety culture enhancement was developed.

NUCLEAR SAFETY

In 2011, seven operating events (six in total for Units 5 and 6, and one for Unit 4) reported to the BNRA were recorded. All events were classified

level 0 according to the INES scale. The same year there were no unplanned reactor scrams at Units 5 and 6.

EVENTS ACCORDING TO THE INES SCALE REPORTED TO THE BULGARIAN NUCLEAR REGULATORY AGENCY



RADIATION PROTECTION

The policy of Kozloduy NPP in terms of radiation protection management is a consistent application of the ALARA (As Low As Reasonably Achievable) Principle in order to sustain the lowest reasonably achievable dose exposure. This policy is a basis for a precisely performed dosimetry and radiation control, application of good practices when repairing the systems and facilities, in-depth planning and preparation of the activities before planned annual outages.

In 2011, the annual limit of the individual effective dose of 50 mSv, as well as the limit of 100 mSv for a five consecutive year period established by the Regulation on Basic Radiation Protection Standards

of 2004 was not exceeded.

The maximum individual effective dose was 13.7% of the annual limit. The average individual dose exposure for the personnel was 0.20 mSv. In 2011, the average collective dose for the two operating units (WWER -1000 reactors) was 0.27 manSv/unit being twice lower than the average value for this indicator, which is 0.54 manSv/unit for PWR type reactors based on the WANO 2010 Performance Indicators Report.



SPENT NUCLEAR FUEL AND RADIOACTIVE WASTE MANAGEMENT

According to the agreement with the IAEA signed in 1972, Bulgaria is obliged to apply the safeguards system to the fissile nuclear material in compliance with the requirements of the Treaty on Non-proliferation of Nuclear Weapons (TNP NW). In 2000, Bulgaria ratified the Additional Protocol signed on 24th September 1998 in Vienna to the Agreement between the Republic of Bulgaria and the IAEA for the implementation of safeguards in connection with the performance of the TNP NW. Thus, all plant facilities are under the continuous supervision of the Agency inspectors.

The Treaty establishing the European Atomic Energy Community (EURATOM) and the European legislation in the safeguards area (Regulation No.302 of 2005 of the European Commission for the implementation of the EURATOM safeguards) have become effective to Bulgaria since 1st January 2007 in compliance with the Treaty for Accession to the European Union.

The Tripartite Agreement on the application of safeguards in connection with the TNP NW between Bulgaria, EURATOM and the IAEA has become effective since 1st May 2009.

According to the requirements of the BNRA regulation on the conditions and procedures for collecting and providing information to keep registry for the activities, which are subject to the NPT NW safeguards, and Regulation No.302 of 2005 of the European Commission for the implementation of the EURATOM safeguards, Inventory Change Reports (ICR), Physical Inventory Lists (PIL) and Material Balance Reports (MBR) totalled 45 were sent by Kozloduy NPP to the BNRA and EURATOM. The supervisory activity of the IAEA and EURATOM is performed through periodic inspection reviews organized through the Bulgarian Nuclear Regulatory Agency.

Thirteen inspections were conducted by the IAEA,

EURATOM and BNRA inspectors to review the compliance with the Non-Proliferation Treaty safeguards.

The IAEA and BNRA inspectors conducted a review on 15th June 2011 in compliance with the Additional Protocol to the Agreement between the Republic of Bulgaria, EURATOM and IAEA for the implementation of the safeguards in connection with the NPT NW of the buildings at Kozloduy NPP site.

The spent nuclear fuel (SNF) at Kozloduy NPP is stored in compliance with all safety requirements. After being for a certain time in at-the-reactor pools, the fuel is moved to the pool type spent fuel storage facility which is common for all units. Part of the spent fuel from Kozloduy NPP is returned for processing and a long term storage to Russia. In 2011, 390 fuels assemblies from Units 3 and 4, and 24 fuel assemblies from Unit 6 were transported to the Wet Spent Fuel Storage Facility, as well as 480 spent fuel assemblies were transported from the Wet Spent Fuel Facility to Russia.

The radioactive waste generated from the operation of the nuclear power plant, as well as the intermediate RAW is handed over for treatment to the Specialized Enterprise Radioactive Waste of Kozloduy. In 2011, 680 m³ solid RAW were generated, the entire amount was handed over for treatment to the Specialized Enterprise Radioactive Waste of Kozloduy. Apart from the amounts generated in the same year, 300 m³ waste stored in the plant storage facilities were also handed over. The generated amounts of liquid RAW were 270 m³, and those handed over were 470 m³.

The review performed by the BNRA on the implementation of the RAW management activities confirmed the right approach of the nuclear power plant to this process.

PHYSICAL PROTECTION

In order to provide the adequate and effective physical protection of Kozloduy NPP, all planned technical and organizational measures were implemented in 2011. Over 500 functional tests of the alarm security systems and facilities were carried out.

The on-line communication system of Units 5 and 6 was replaced. The construction of a new

communication unit at Electricity Production - 2 was initiated. The implementation of biometric monitoring of the plant access is underway.

In order to increase the level of physical protection, joint analyses with authorized governmental institutions to update on the design threat and specifics of the transport of spent nuclear fuel on the Danube River were performed.

EMERGENCY PLANNING AND PREPAREDNESS

In compliance with the Emergency Plan of Kozloduy NPP, the required personnel protective equipment for both the personnel and seconded personnel from other external organizations at the site and in the precautionary action zone is provided.

Two common emergency drills were conducted in order to maintain and increase the emergency preparedness. Kozloduy NPP took part in the Bulgarian and Romanian Nautilus 2011 Exercise organized by the Bulgarian Nuclear Regulatory Agency and the Romanian National Commission on Nuclear Activities Control (CNCAN). The exercise was performed with the support of the International Atomic Energy Agency and the Norwegian Radiation Protection Authority (NRPA). Teams from the Antiterrorism Squad of Bulgarian Ministry of Interior (MI), Border Police Main Directorate and Fire Safety and Protection of Population Main Directorate (FSPP MD), as well as Romanian Ministry of Interior and other ministries and governmental institutions in Bulgaria were involved in the organization and

performance. The specialists from the Security Division, Safety Division and Electricity Production – 2 at Kozloduy NPP took part in the emergency exercise. The scenario for the exercise considered a terrorist attack while transporting spent nuclear fuel. The communication and coordination between the plant emergency teams and national structures of different ministries and institutions, as well as provision of international support were checked during the exercise. General Emergency Exercise with the scenario "Accident Involving 0.26 g Earthquake" was carried out on 24th November 2011 with the participation of the on-call emergency personnel, trainees at the full-scope simulator for WWER-1000, nuclear operators, Occupational Medical Centre and Kozloduy NPP Fire Fighting Service. During the exercise the mobile diesel generator (DG) was transported and connected to the SG Complementary Emergency Feedwater System (6TX40D01).



In November a separate drill was conducted, which involved notification of the on-call emergency personnel after normal working hours, who play roles in the Emergency Control Centre, transportation and connection of the mobile Diesel Generator to the SG Complementary Emergency Feedwater System (5TX40D01). Four separate drills with the BNRA Emergency Centre and four drills with the environmental monitoring mobile laboratory with on-line data transmission to the Emergency Control Centre through the GPRS system were conducted. An exercise with the scenario "Accident Resulting from Earthquake and Flooding of the Site and

Station Blackout of Kozloduy NPP" was also carried out on site. The decision for selection of scenario was taken after the Fukushima accident.

The analysis of the training and drill results in 2011 verified the preparedness of the emergency teams to act in different emergency situations, as well as the good coordination and communication between the plant and the national structures involved in the emergency planning and preparedness.

FIRE SAFETY

In 2011, there were no fires at the site of Kozloduy NPP. The contemporary level of fire safety is provided through a set of organizational and technical measures ensuring the protection of facilities and minimization of the potential occurrence of fire at the plant site. Having implemented the measures from the modernization programmes over the past years, the fire alarm and fire extinguishing systems were improved,

which resulted in the increasing their efficiency. As a result, the fire risk has been significantly reduced. The plant high safety level was also verified by the structures of the Fire Safety and Population Protection Directorate to the Ministry of Interior while performing reviews.

RADIOECOLOGICAL MONITORING

The Radioecological Monitoring performed by Kozloduy NPP encompasses all the basic environmental components (air, water, soil, vegetation, milk, fish, agricultural crops, etc.) within a 100-km area surrounding the plant on Bulgarian territory. The scope, content, and controlled parameters are stipulated in a long-term programme for radioecological monitoring during plant normal operation, which has been agreed by the Bulgarian Regulatory and Supervisory Bodies – the BNRA, National Centre of Radiobiology and Radiation Protection (NCRRP) at the Ministry of Health (MH), and Executive Environment Agency (EEA) at the Ministry of Environment and Water (MEW). The Programme fully complies with the National and European regulatory requirements in the field including Article 35 of the EURATOM Treaty, Recommendations of EC 2000/473/EURATOM and 2004/2/EURATOM.

The Monitored Zone includes the plant site, 2 km Precautionary Action Zone (PAZ), 30 km Urgent Protective Action Planning Zone (UPAPZ), and control points within a 100-km area surrounding the plant. Figure 1 Radiation Monitoring Points within a 100 km zone of Kozloduy NPP.

The monitoring scope for 2011 exceeded 4 000 radioactivity analyses of more than 2 250 samples from different environmental objects. This is above the respective scope in a number of analogous laboratories of the EU Member States and other countries around the world. The quality of the analyses and measurements conducted is guaranteed annually by taking part in prestigious international interlaboratory comparisons involving

reference samples organised by the IAEA – Vienna, the Federal Office for Radiation Protection BfS (PTB) – Germany, the World Health Organisation (WHO) – Paris, and the National Physical Laboratory (NPL) – Great Britain. The reports demonstrate good laboratory practice proven over the years with guaranteed accuracy and reliability of analysis results. Until now, more than six years the Radioecological Monitoring Department has been participating in the World Network of the Analytical Laboratories for the Measurement of Environmental Radioactivity (ALMERA) – IAEA annually taking part, along with 124 laboratories from 78 countries, in laboratory competence tests and complying with all the requirements.

The results obtained regarding the radiation indicators of the analysed samples from the plant environment throughout 2011 are within the region specific background levels. No impact on the nuclear power plant operation has been detected. The human induced activity levels detected are much below the permissible limits for the relevant indicators and objects. The radiation situation is completely favourable. Facilities from the industrial site of the Kozloduy NPP are also subject to a comprehensive radioecological monitoring – ground water, aerosols, atmospheric depositions, soils, bottom sediments, etc. A comprehensive annual report on the radioecological monitoring including an analysis of all the results throughout the year is submitted to the BNRA, NCRRP-MH, and EEA-MEW. The results of the internal radiation monitoring are verified with the independent radioecological studies under programmes of the MEW and NCRRP-MH.



The gamma background levels at the measurement points of the Plant industrial site and the measurement points within the 100 km zone for 2011 are fully comparable with and do not differ from the natural gamma background specific for the region.

The atmospheric air-induced activity throughout the year is of values close to the background ones (at average $2.8 \mu\text{Bq}/\text{m}^3$ for ^{137}Cs) and much below the permissible limits according to the Basic Standards for Radiation Protection of 2004.

The data are comparable to the ones from previous years and are within the natural limits for this specific radiation parameter.

The total beta activity in the open water basins – the Danube, Ogosta River, Tsibritsa River, and Shishmanov Val Dam is between 0.012 and 0.15 Bq/l, which is 20% of the limit (0.75 Bq/l).

This is a confirmation of the lack of impact of the Kozloduy NPP operation on the radiation situation concerning the natural water basins in the region.

The tritium concentration in the open water samples is close to the minimum detectable activity of 8.0 Bq/l.

The total beta activity measured in the regional drinking water sources varies between 0.024 and 0.088 Bq/l. Those values are much lower than the permissible limits for drinking water defined in the Regulation No.9/16.03.2001. The tritium

concentration is below the minimum detectable activity of 5.5 Bq/l.

The activity of ^{137}Cs measured in the surface soil layer is between 1.55 and 45.4, averaging at 13.2 Bq/kg (dry weight), and of ^{90}Sr – from 0.22 to 3.97 Bq/kg. Those are values specific for the soils in the region. The values measured for ^{137}Cs are lower compared to other country regions. The vegetation analysed shows normal induced activity – ^{137}Cs - max. 2.55 Bq/kg and ^{90}Sr – max. 1.15 Bq/kg (dry weight).

Pursuant to Article 15 of the Regulation for the conditions and procedure for establishing special statute zones adjacent to nuclear facilities and facilities with ionizing radiation sources, the construction and commissioning of an automated information system for radiation monitoring of settlements within the 30 km Urgent Protective Action Planning Zone was completed in November 2011 at Kozloduy NPP.

GASEOUS AIRBORNE AND LIQUID RADIOACTIVE DISCHARGES

One of the most important tasks of the radiation monitoring is to avoid the harmful impact of the ionizing radiation on the population and the environment. Therefore, ensuring a reliable monitoring of the radioactive discharges to the environment and maintaining their impact as low as reasonably achievable is among the main objectives of the Kozloduy NPP operation.

The statutory limit for annual individual dose exposure of the population resulting from liquid and gaseous discharges totalled 250 μSv . A reference level of 50 μSv for liquid discharges and 50 μSv for gaseous discharges has been introduced to Kozloduy NPP in order to optimize the radiation protection. The annual limits and reference levels for the discharge activity, which should not be exceeded, are based on those reference levels. Those limits are approved by the BNRA and agreed with the Ministry of Health, Ministry of the Environment and Water.

Following the successful implementation of a number of projects for optimization of the monitoring of liquid and gaseous discharges to the environment, on-line sampling and reliable measurements of radionuclide contents and activity of waste waters and air is performed Kozloduy NPP. In compliance with good international practices the nuclear power plant developed successfully methods for measurement of all difficult to measure radionuclides (alpha-, beta- and low energy gamma emitters) which the discharges contain, and installed the radioactive noble gas isotopic measurement equipment. Thus, Kozloduy NPP

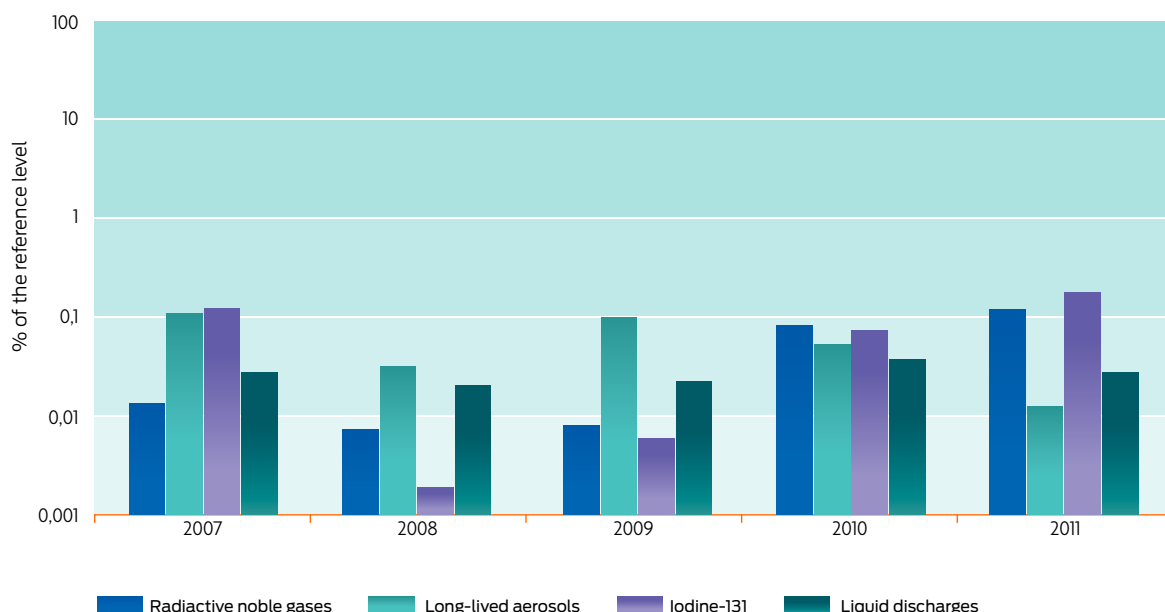
meets the requirement of the Directive 96/29/EURATOM – dose rate of the population is assessed as real as possible. Since the admission of Bulgaria to the European Union the information for the annual discharges are also reported to the European Commission.

In 2011 the content of the radioactive material in the gaseous discharges to the atmosphere is also kept at significantly lower level than the set limit. The discharges of the radioactive noble gases and Iodine-131 are approximately 0.2%, and the aerosol discharges are about 0.02% of the corresponding annual discharge limits set for Kozloduy NPP site. For a second year Kozloduy NPP determines the content of ^{14}C and tritium (^3H) in gaseous discharges from the operating Units 5 and 6. The discharges of ^{14}C are 3.6%, and discharges of tritium are 0.3% of the corresponding annual limits.

In 2011, the content of radioactive material in liquid discharges continues to be significantly lower than the reference levels. The total activity (without tritium) of the waste waters discharged to the Danube River is about 0.03% of the permissible annual limit. The activity of tritium in the liquid discharges is about 13% of the annual limit.

The content of radiologically important alpha and beta emitters in liquid and gaseous discharges similar to the previous years is negligibly low.

ACTIVITY OF GASEOUS AND LIQUID DISCHARGES (WITHOUT TRITIUM)
IN 2011 EXPRESSED IN % OF THE CONTROL LEVELS



MONITORING OF PUBLIC DOSE EXPOSURE

For calculating the additional public dose exposure verified and validated modelling codes for evaluation are used. They are based on the CREAM methodology adopted by the European Union (EU) and have been adapted to the geographic and hydrologic specifics of the Kozloduy NPP area. For 2011 the total value of the maximum individual effective dose for the population within the monitored zone due to liquid and gas and aerosol discharges in the atmosphere, taking into account the contribution of ^{14}C and ^3H is $7\text{ }\mu\text{Sv/a}$ which is negligibly low compared to the annual limit for the public ($1000\text{ }\mu\text{Sv}$) according to the Basic Standards for Radiation Protection of 2004. The collective dose for the population within the Kozloduy NPP

30 km Urgent Protective Action Planning Zone is 0.039 manSv .

The low level radioactive discharges from Kozloduy NPP determine dose exposure values of negligible radiation risk for the population within the Plant area. The average additional dose exposure for the population within the 30 km Urgent Protective Action Planning Zone is about 500 times lower than the one originating from the natural background ($2400\text{ }\mu\text{Sv}$). During the past 5 years the values of the maximum individual effective dose for the public vary within the range of $4\text{ } \div\text{ } 7\text{ }\mu\text{Sv/a}$, which is below the level for Release from Regulatory Control of $10\text{ }\mu\text{Sv/a}$ according to the Basic Standards for Radiation Protection-2004.

ENVIRONMENTAL PROTECTION – NON-RADIOLOGICAL ASPECTS

The objective of management of environmental non-radiation aspects at Kozloduy NPP is to sustain the compliance with the regulatory requirements and performance of the conditions of the permits issued to the company by the MEW, the Executive Agency of the Environment, Danube Region Waters Directorate of Pleven, and Regional Inspectorate of the Environment and Water (RIEW) of Vratsa.

In 2011, the Danube Region Waters Directorate issued a permit for discharge of the waste waters from the Ledenika Plant Recreation Centre, near the town of Vratsa and changes were made in the permit for discharge of waste waters from Kozloduy to the Main Discharge Channel.

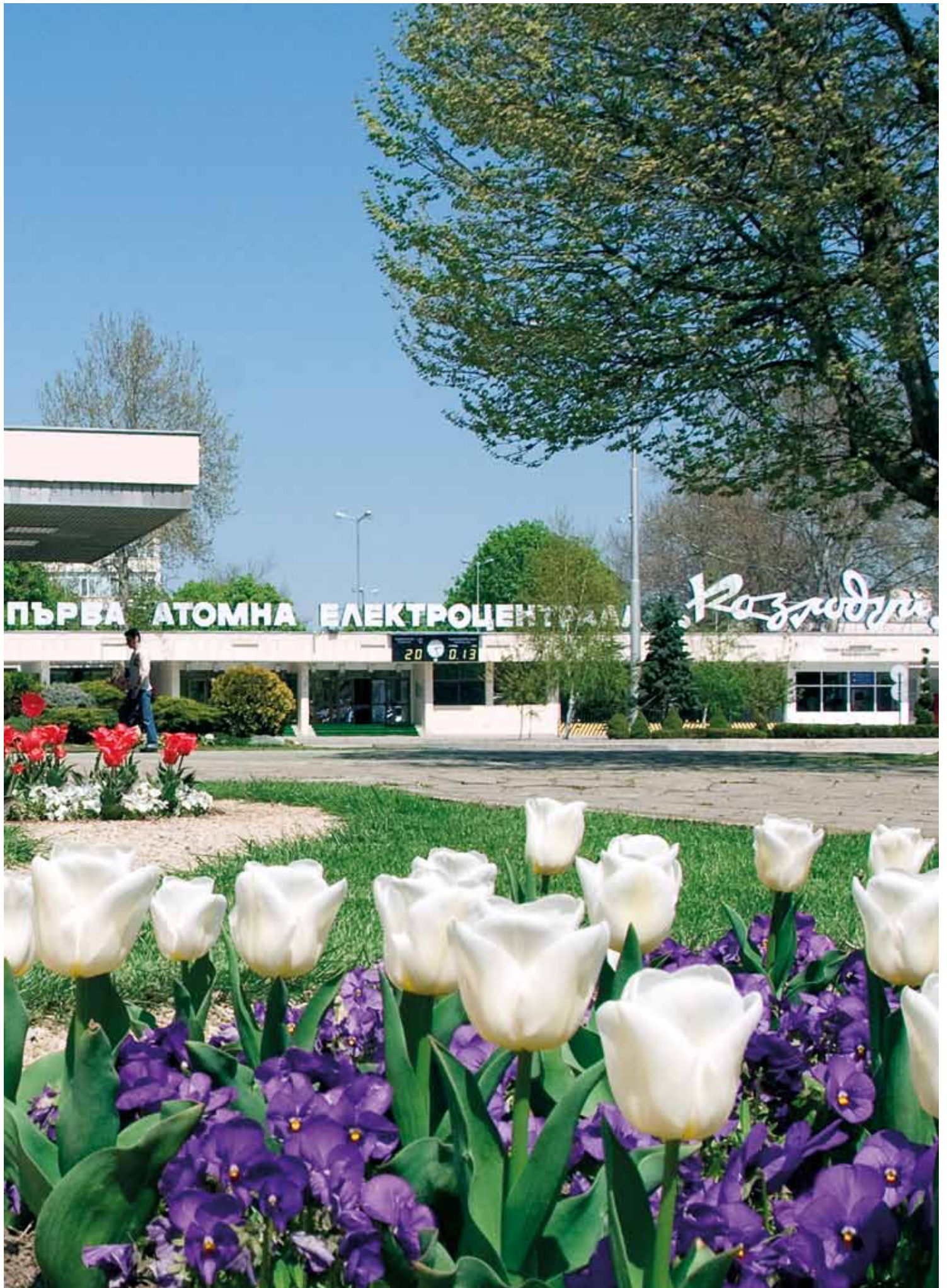
At the beginning of the year, the Regional Inspectorate of the Environment and Water (RIEW) of Vratsa changed the permit to handle waste at the plant and extended its validity by the end of 2015. After the transmission of the shutdown Units 1 and 2 to the State Enterprise RAW and replacement of the Operator for some of the diesel generators for emergency supply of safety systems at the end of 2010, a procedure to change the permit for greenhouse gas emissions was initiated in 2011. Following the conditions in the permits for discharge of waste waters from Kozloduy NPP, measuring devices to measure the amount of the discharged waters through the Hot Channel 2, as well as discharged waste waters to the Main Discharge Channel were installed.

In 2011, the implementation of the programmes for plant non-radiological monitoring including the control of 20 indicators for quality of waste waters and 30 for underground waters continued. About 3 000 analyses were carried out during the year. The results show that there is no trend toward increasing the values of the controlled indicators, no limits significantly exceeding the permissible are registered and the values are similar to those from previous years. The annual report on the results from the plant environmental non-radiological

monitoring within Kozloduy NPP region has been submitted to the Environmental Executive Agency and Regional Inspectorate of Environment and Waters – Vratsa.

The adherence to the requirements for the company environmental protection is controlled through regular internal walk downs and inspections. The MEW, RIEPW of Vratsa and Danube Region Waters Directorate conducted 12 ecological inspections as no deviations were found. The conclusions of the supervisory authorities confirmed that the company takes prompt and adequate measures to prevent and solve the ecological problems.

With the record amount of electricity generation, Kozloduy NPP saved the harmful impact of over 21 million tons of carbon dioxide (CO_2) equivalent, 990 thousand tons of sulphur dioxide (SO_2), 63 thousand tons of nitrogen oxides (NO_x) and 42 thousand tons of ashes, containing natural radioactivity in 2011.





KOZLODUY NPP STRESS TEST RESULTS

The conduct of stress tests is a result of the requirement of the European Commission (EC) to perform reassessment of all European nuclear power plants after the accident in the Fukushima NPP on 11th March 2011. On 28th October 2011 Kozloduy NPP submitted to the Bulgarian Nuclear Regulatory Agency (BNRA) the final report on conduct of stress tests, which completed the first stage of the target reassessment of the safety margins of the Bulgarian NPP – the Operator's self-assessment of nuclear installations. The review of the self-assessments of the corresponding national regulators was conducted during the second stage. The national report of the Republic of Bulgaria was submitted by the BNRA to the European Commission (EC) on 30th December. The last stage includes the review of the national reports by international experts and a follow-up peer review of the nuclear installations on the territory of each member state.

For performance of stress tests at Kozloduy NPP, all guidelines and requirements of the West European Nuclear Regulatory Authorities (WENRA), European Commission and BNRA, as well as the recommendations of the World Association of Nuclear Operators (WANO) – SOER 2011-2 (Significant Operating Experience Report) were considered. The areas of safety and risk assessments, as well as the scope, content, and temporary frames of the stress tests performed in

the Bulgarian NPP comply with those proposed by WENRA and adopted by ENSREG.

Kozloduy NPP conducted the assessment of the plant response to a number of external hazards from July to October 2011. The preventive measures which selection followed the in-depth defence concept were verified: initiating events, further loss of safety functions, severe accident management. The considered initiating events are earthquakes, external flooding, and extreme meteorological conditions leading to loss of power supply and/or loss of ultimate heat sink.



NATURAL DISASTERS - IMPACT ASSESSMENT

EARTHQUAKE

In 1992 the reassessment of the seismic characteristics of the Kozloduy NPP site was made and new seismic design bases exceeding two times those in the initial design were defined. These higher design bases were verified by an independent review by the International Atomic Energy Agency (IAEA) in 1995 and 2000.

When implementing the large-scope Modernization Programme at Units 5 and 6 (2002 – 2008), a part

of the over 220 measures were aimed at upgrading and seismic qualification of structures, systems and components. Stress tests have justified that safety margins of the nuclear facilities at Kozloduy site exceed by 55 to 80% the current design basis.

EXTERNAL FLOODING

The site of Kozloduy NPP is located on the second Danube flood-free river terrace, which is 35 m above the sea level. The maximum water level in the plant area based on the most conservative scenario with a combination of rupture of the hydraulic engineering facility Iron Gate 1 and Iron Gate 2 (Serbia and Romania), the maximum local precipitation, and

strong storm surge does not lead to flooding of the site. The conclusion from the stress tests is that the location of the plant site ensures the performance of safety functions of all nuclear facilities in case of flooding.

EXTREME METEOROLOGICAL CONDITIONS

The current design bases of nuclear facilities operated by Kozloduy NPP were assessed in terms of extreme high and low temperatures, extreme precipitations and lightning, extreme snow precipitation and ice pack, extreme atmospheric moisture, extreme winds and tornado, extreme low levels of the Danube River. When performing the

stress tests it was justified that the design basis and technical condition of the structures, systems and components ensure sufficient robustness of nuclear facilities to extreme meteorological conditions, as well as anticipated climatic changes.



LOSS OF POWER SUPPLY

The original design of Kozloduy NPP provides three independent connections to the national electrical power system (EPS). 400 kV electric power distribution system – 8 transmission lines

(two connected to the electrical power system of Romania); 220 kV electric power distribution system – with 3 transmission lines; 110 kV electric power distribution system – with 4 transmission



lines (two are transit transmission lines). Besides, an emergency plan for priority restoration of the station blackout is developed.

Three different channels for restoration of power supply from other electrical energy systems were established. The time for restoration does not exceed 4 hours.

The design measures also provide emergency power supply sources. There are three emergency diesel generators for both Units 3 and 4 – one per each safety system (SS) with an additional emergency diesel generator station per unit, with connection to the diesel generators of Units 1 and 2. Back-up power supply of Units 5 and 6 is ensured by three diesel generators per unit (1 DG per safety system), an additional unit diesel generator, and a mobile diesel generator on site. The Wet Spent Fuel Storage

Facility (WSFSF) has the following capacities for emergency power supply: an autonomous emergency diesel generator, alternative emergency power supply from the diesel generators of Units 3 and 4, and on-site mobile diesel generator. The Wet Spent Fuel Storage Facility is equipped with the autonomous emergency diesel generator. The conclusion from the stress tests in terms of loss of power supply risk is that the high level of redundancy with both external and emergency, and alternative sources of power supply located on site, Kozloduy NPP ensures the performance of safety functions of nuclear facilities in all modes and provides a long term cooling down of nuclear fuel.



LOSS OF ULTIMATE HEAT SINK

The main ultimate heat sink for Kozloduy NPP is the Danube River. The emergency cooling systems of the units involve separate heat removal systems, which are not affected by the condition of the Danube River and hydraulic engineering facilities, ensuring dissipation from the core to the atmosphere through so called spray pools.

The following measures to avoid loss of ultimate heat sink are provided in the original design: a big amount of water reserve in the cold channel, fire pumps sucking from the bottom of the cold channel, the existing alternative diagram for water supply from Shishmanov Val Dam. Besides, Units 5 and 6 have an alternative water source – dry pit pump stations designed to feed underground water to the spray pools and equipped with a diesel generator station. The units are also provided with water tanks, boric acid and demineralized water tanks, as well as emergency cooling system and SG feedwater

system. Boric acid and demineralized water tanks, as well as an option for direct cooling with diesel fire pumps provides for cooling of the fuel in the at-the-reactor pools at Units 3&4. The spray pools of Units 3 and 4 are capable of emergency cooling of the pools in the Wet Spent Nuclear Fuel Storage Facility, which is equipped with emergency diesel fire pumps.

The available water reserves in the hydraulic engineering facilities of Kozloduy NPP ensure cooling down of both power units and Wet Spent Fuel Storage Facility, as well as maintaining them in a cooled down safe condition. It is also possible to use an alternative heat sink, which ensures high level of robustness of nuclear facilities in case of loss of ultimate heat sink.

SEVERE ACCIDENT MANAGEMENT

The following technical measures for severe accident management are established at Units 5 and 6: safety parameter display system, accident and post-accident critical parameter monitoring system, in-core temperature monitoring system, containment filter ventilation system, as well as passive hydrogen recombiners. Apart from the technical measures to mitigate and manage accidents, Kozloduy NPP has developed symptom-oriented emergency procedures and severe accident management guidelines in order to ensure proper actions of the involved personnel. There is an Emergency Response Centre (ERC) equipped with on-line connection for monitoring the parameters of Units 5 and 6, and which is connected to the national and regional institutions,

authorities and organizations. The Emergency Response Centre has an independent filter ventilation system, emergency power supply from its own diesel generator station, as well as radiological consequence assessment software.

In terms of emergency planning and preparedness, Kozloduy NPP has developed an on-site emergency plan. According to the plan, there are on-call emergency teams and drills are conducted to check and improve the preparedness of the plant personnel to respond adequately to emergency.

MEASURES TO IMPROVE THE ROBUSTNESS OF THE NUCLEAR FACILITIES

Based on the conclusions from the performed tests, the Kozloduy NPP management outlines a set of measures to improve the robustness of the nuclear facilities on site. These measures include:

- development of an emergency procedure for actions in case of rupture of the walls of the hydraulic engineering facility Iron Gate 1 and Iron Gate 2.
- supply of another two mobile diesel generators;
- provide possibility to charge one of the safety system batteries from a mobile diesel generator;
- installation of additional hydrogen passive

recombiners in the containment;

- installation of measuring channel for monitoring and evaluation of water vapour and oxygen within the containment;
- implementation of measures to prevent containment early bypass in case of severe accident;
- analysis of the possibility for installation of autonomous cooling system in the Wet Spent Fuel Storage Facility.

CONCLUSIONS

The stress tests conducted at Kozloduy NPP have demonstrated the following:

- The nuclear power plant has a high level of robustness and sufficient margins to withstand extreme external impacts. The considered initiating events do not compromise the performance of safety functions of nuclear facilities.
- The Bulgarian NPP has adequate organizational and technical measures for severe accident management.



DEVELOPMENT AND MODERNIZATIONS



INVESTMENT PROGRAMME

The implementation of Kozloduy NPP 2011 investment programme aimed at attaining the company prime objectives – ensuring nuclear facilities safe operation, operability and reliability of Unit 5 and 6 structures, systems and components, undertaking the power uprate project, and preparing units' lifetime extension.

The expenses under the 2011 Investment Programme financed by company own resources amounted to BGN 98 966 thousand. The investment resources are allocated as follows: Construction and Installation – BGN 21 033 thousand, Equipment and Facilities – BGN 63 944 thousand, Research and Development – BGN 13 897 thousand, and other expenses – BGN 92 thousand.

Around 80% of the total expenses for acquiring long-term assets by own resources are aimed at implementing long-term projects and financing measures to ensure reliable, safe, and effective operation of Units 5 and 6. The remaining part of the investment expenses are for implementation of activities in the Balance of Plant scope – Switchyard, Bank Pump Station, Spent Nuclear Fuel Storage Facility (SNFSF), Hydro-Engineering Facilities and Heat Station as well as the Auxiliary facilities at the plant site.

The following large-scale activities were performed

in 2011 to improve facilities operation and prepare the implementation of Units 5 and 6 lifetime extension project:

- The second stage of high pressure heaters replacement with new chamber-type ones was completed within the Unit 5 outage. The benefits of the replacement are additional electricity generation resulting from the increased effectiveness of feedwater heating, improved secondary water-chemistry, optimized heat exchange characteristics of the steam generator, and reduction of maintenance expenses and duration.
- Replacement of 6 kV breakers type BЭ-6 in 5,6BA, BB, BC, BD sections is implemented.
- In-core monitoring detectors for Unit 6 have been delivered and a procedure for supply of 36 reactor thermal control cables for Units 5 and 6 have been initiated.
- In pursuance of the preparatory activities on Units 5 and 6 lifetime extension, a procedure for a comprehensive study of the actual status and lifetime assessment of units' equipment and facilities has been initiated. The study main objective is to justify the terms and measures required to ensure SSC lifetime up to the expiry of their existing licences in 2017 for Unit 5 and 2019 for Unit 6 as well as Units' operation from 15 to 20 years beyond their design lifetime.



- The supply of a spare enclosure of main steam line isolation valves (MSIV) was completed and the implementation of the contract on supply of advanced cylinders for MSIV is in progress.
- Supplies of important spare parts with long operational lifetime have been implemented. It aims at reducing the risk of continuous downtime resulting from emergency maintenance or exceeding outage duration. 52 control rod drive housings CRD-3, 65 advanced control rod housings CRD-3, secondary drive 400 kV for main power transformer type TC 630000/400-76U1, and spare parts for main circulation pumps type MCP 195-M have been supplied.

An important part of the allocated expenses in 2011 is for measures aiming at Kozloduy NPP Safety maintenance and continuous improvement pursuant to the requirements of the Act on the Safe Use of Nuclear Energy and licences granted. Their implementation ensures the required nuclear safety level, radiation protection, and environmental protection throughout the operation of the power units, Spent Nuclear Fuel Storage Facility (SNFSF), and radioactive materials management at Kozloduy NPP. Throughout the year the following important activities have been completed or are in progress:

- Supply of pneumatic cylinders for localization pneumatic valves at Units 5 and 6.
- Design, manufacturing, and installation of service plugs of a high temperature resistant material for preventing the early by-pass of the containment in case of severe accidents. The implementation resulted in prevention of radioactive releases in case of severe accident and it is a requirement pursuant to Units 5 and 6 operating licences.
- Measures related to power uprate of the reactor facility with WWER-1000/B320 and justification of the safe operation at the uprated power levels. Project major objective is justification of the safe operation and verification of the reactor installation and relevant systems stable behaviour in conditions of uprated power levels. The developments are approved in stages.
- Installation of a thermal control in the lower part of the reactor pressure vessel – during 2011 outages one and three channels were installed on Units 5 and 6 respectively. The project implementation will result in better assessment of the reactor pressure vessel status in emergency situations and adequate decision-making for accident management. Throughout the year the measures planned for spent fuel storage facility (SFSF) modernization and safety

enhancement, facilities modernization under the Switchyard Reliability Enhancement Programme, upgrade of the Full-Scope Simulator (FSS) for WWER-1000 reactors regarding its functionality and application extension in compliance with the requirement for FSS concordance with the referent unit, etc. were implemented where the more significant expenses were as follows:

- Reconstruction of the high voltage electrical network at Kozloduy NPP – 220 kV Switchyard, fields 7 and 9, transformer site at 1AT and Danube transmission line of 110 kV Switchyard. The facility was approved by the State Acceptance Committee on 5th October 2011 and a certificate of occupancy was issued.
- Reconstruction of Switchyard buildings – Protection Cell facility was approved by the Governmental Acceptance Committee on 5th October 2011 and a certificate of occupancy was issued.
- Upgrade of the nuclear steam supply system model on the FSS-1000 – a supply contract for upgrade of the nuclear supply system model on the full-scope simulator and a mock-up of the plant

control room was implemented.

Throughout 2011 the gradual implementation of measures under the Kozloduy NPP Energy Efficiency (EE) Programme compliant with the existing obligations of the company pursuant to the Energy Efficiency Act (EEA), applicable regulations, and EE Action Plan of the Republic of Bulgaria, continued to achieve a stable trend in improving the energy consumption indicators. Energy saving measures were implemented throughout 2011 in SFSF, administrative buildings of Management, Investment and Dry Spent Fuel Storage Facility (DSFSF), Pump Room 2 and 3 at the Bank Pump Station, Switchyard, Radioecological Monitoring, etc.; the yard water supply network at Electricity Production – 1 was replaced with an excavation-free technology; new pump houses at the plant site were supplied and installed. The measures implemented will result in energy efficiency enhancement and issue of an energy certificate of the buildings.

Throughout 2011 the applied long-term assets financed with own resources amounted to BGN 60 736 thousand and 4 facilities were approved by Governmental Acceptance Committees.

DECOMMISSIONING

The preparatory works on decommissioning of the shutdown 440 MW Units of Kozloduy NPP, including strategic planning, preparation of licence documentation, and management of projects facilitating and supporting the relevant activities, continued in 2011.

The preparatory works were being conducted under the following programme documents:

- Updated Decommissioning Strategy for Kozloduy NPP Units 1-4, KPMU/DCS/001;
- Complex Programme for Radioactive Waste Management at Kozloduy NPP PLC, ID: ДОД.ЕД.ПМ.387/03;
- Programme for Decommissioning Preparatory Works for Kozloduy NPP Units 3 and 4, П.ИЕ-01БГ/М1;
- Kozloduy Project Management Unit Procurement Plan (Deliverable D20 – Procurement plan, KPMU/COM/007, rev.20).

The Decommissioning Concept was revised in the beginning of 2011. On 5th January 2011, following a Council of Ministers Decree, the updated Strategy for Spent Nuclear Fuel and Radioactive Waste Management until 2030 was adopted. In the long term, “brown field” was identified as final state of the industrial site on which 440 MW Units 1-4 of Kozloduy NPP were being decommissioned. It will be achieved performing the following activities:

dismantling of equipment meant for no further use, release from regulatory control of buildings and facilities which will remain operable, treatment and removal of all the RAW from the site and adapting the site to the needs of the nuclear energy or other business activities.

In compliance with the regulatory framework the preparation of the documents required for issuing licences for decommissioning of Units 3 and 4 continued.

In January 2011 the following documents were sent to the State Enterprise RAW for review and approval:

- Safety Analysis Report for Decommissioning of Units 1 and 2 – Phase 1, Revision 3;
- Technical Report "Evaluation of the radioactive contamination source and dose exposure during the dismantling operations in the Reactor Building of Units 1 and 2".

The Safety Analysis Report for Decommissioning of Kozloduy NPP Units 3 and 4 – Phase 1, Revision 1 was adopted by Kozloduy NPP on 29th December 2011.

Concerning the preparation of the Environmental Impact Assessment Report for decommissioning of Kozloduy NPP Units 1-4 in May, with the assistance of the Ministry of Environment and Water (MEW),



input data for preparing an assessment of the cross-border impact were received from Romania and submitted to the Contractor – Energiewerke Nord GmbH (Germany). A Stakeholders Engagement Plan (SEP) is under development in compliance with the Regulations of the European Bank for Reconstruction and Development (EBRD). On 2nd December 2011 the Compatibility Assessment Report, Revision 3 (Annex to the Environmental Impact Assessment Report) was received and circulated.

On 12th May 2011, the Prime Minister of the Republic of Bulgaria, Boyko Borisov, officially opened the Dry Spent Nuclear Fuel Storage Facility constructed at Kozloduy NPP. The project is financed by the Kozloduy International Decommissioning Support Fund (KIDSF) and the funds are administered by the European Bank for Reconstruction and Development (EBRD). KIDSF finances several dozen projects aimed at establishing conditions for safe and integral implementation of the Units decommissioning activities. The Fund is established under the Agreement between the European Commission and Bulgarian Government as of 29th November 1999 and Framework Agreement between the Republic of Bulgaria and EBRD as of 15th June 2001.

From its establishment until the end of 2011 six agreements on funding totalling € 342.442 million were signed. 63 supply contracts under the respective projects were signed until 31st December 2011, 49 of which have been completed. The contracts under the signed agreements on funding totalled € 279 748 066. By 31st December 2011 the funds disbursed amounted to € 183 745 638.

INTERNATIONAL COOPERATION

The active cooperation and interaction of Kozloduy NPP with a number of international organizations make a significant contribution to the continuous enhancement of safety, reliability and efficiency while operating the nuclear facilities.

The World Association of Nuclear Operators (WANO) Follow-up Peer Review was conducted within the period 7th to 11th February 2011 on the Units 5 and 6 of Kozloduy NPP. The main objective was to assess the level of implementation of recommendations and progress achieved at Electricity Production – 2 for the period following the Peer Review in June 2009. The experts reviewed the personnel work as well as the status of the working places, technological rooms, equipment, and buildings. They performed interviews, reviewed the documentation, and evaluated the operation and maintenance in all their aspects.

At the end of the Peer Review, the WANO team presented their conclusions to Kozloduy NPP management underlining the progress achieved while performing the activities and the good housekeeping at the facilities and systems of Units 5 and 6. The positive results of the WANO Follow-up Peer Review are another evidence that Kozloduy NPP is operated in compliance with the best international criteria and standards.

Striving for the best possible organization of the forthcoming OSART Mission at Units 5 and 6 in 2012, Kozloduy NPP management requested a WANO Moscow Centre Technical Support Mission "Preparatory OSART Mission". It was held within the period 15th to 17th March 2011. The issues discussed were related to the OSART methodology, recent trends in mission implementation, required organization for preparation, etc. The results were included in a report to be added to the Programme for OSART Mission Preparation. The Programme was prepared at the end of 2010 including the required activities for plant successful preparation. Teams were established for each reviewed area and a database was developed to follow programme implementation. A personnel training programme was also developed. A procedure was initiated for participation of Kozloduy NPP work team members from the areas to be reviewed in the forthcoming OSART Missions to be conducted by IAEA in other nuclear power plants.

The preparatory meeting for the forthcoming OSART Mission was held in the period 29th November to 1st December 2011. The team leader and its deputy took part in this meeting. The meeting enabled Kozloduy NPP management and the plant counterparts to discuss issues concerning the details of the OSART Programme, scope of the mission, preparation of

the advanced information package, logistic support required, etc.

The OSART Mission is a peer review to be conducted by a team of international experts in the following areas: Management, Organization and Administration; Training and Qualification; Operations; Maintenance; Engineering Support; Operating experience; Radiation Protection; Chemistry; Emergency Planning and Preparedness. Safety Culture is an important aspect to be assessed by the experts in all areas during the OSART Mission. The Mission shall provide an objective assessment of Kozloduy NPP operational safety regarding international standards; possible recommendation and suggestions shall be submitted to bring plant status into compliance with the best international practices; a possibility for discussing the practices with the experts with an expertise in the same areas. The Mission shall give the member states information on the good practices found during the mission at Kozloduy NPP.

The impartial assessment is ensured by the application of the IAEA Safety Standards, which are used as criteria when deciding whether to make or not recommendations or suggestions, as well as providing it by qualified experts having a considerable international expertise.

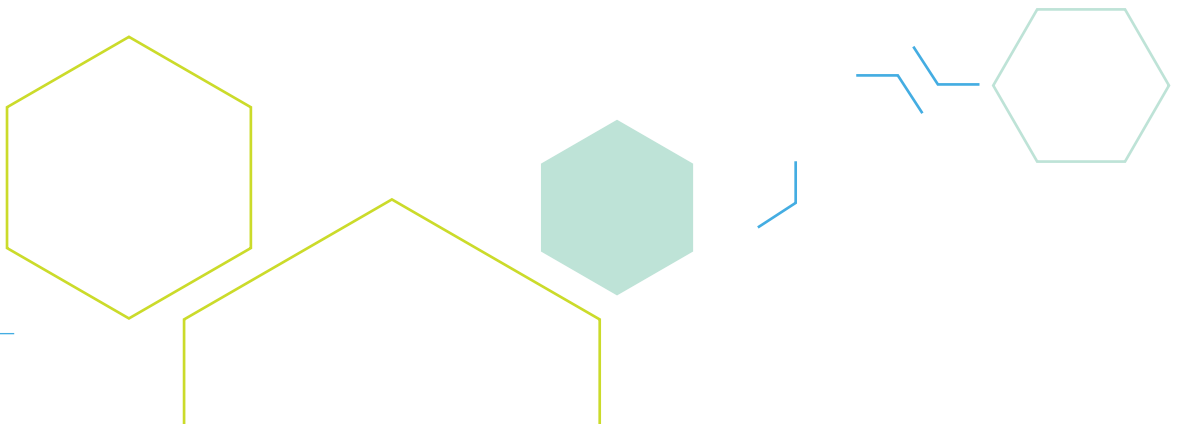
In 2011, the nuclear power plant continues its cooperation with international and national governmental and non-governmental organizations – World Nuclear Association, FORATOM, BULATOM, etc.

Kozloduy NPP renewed its membership in the ENISS (European Nuclear Installations Safety Standards) Initiative within the FORATOM organization. The initiative tasks are related to the establishment of a general position of the nuclear industry on safety reference levels proposed by WENRA (Western European Nuclear Regulators Association). The activities included in ENISS Action Plan for 2011 are focused on actual key issues among which is the adequate response to the events in the Fukushima NPP, Japan.

Throughout the year the participation of the Company representatives in international and national conferences, workshops and meetings continues. Kozloduy NPP specialists took part in missions and reviews in Tarapur NPP, India, Koeberg NPP, South Africa, Ulchin NPP, South Korea, Balakovo NPP and Smolensk NPP, Russia, etc.



FINANCIAL PERFORMANCE



Owing to the optimal units' operation modes, the excellent performance indicators, financial discipline and personnel professionalism, Kozloduy NPP plc ensured its financial and economic stability in 2011. The company's profit after the tax expenses amount to BGN 114 192 thousand. (BGN 60 437 thousand for 2010).

The financial performance of Kozloduy NPP depends on the profit from the sales of active energy and available capacities by minimizing the costs and ensuring the plant safety level. The revenues of the plant amount to BGN 884 545 thousand marking an increase by 9.4% compared to 2010 depending on the following main factors:

- increased income at the deregulated electricity market by 20.7%;
- increase of the net active electricity supplied to the national grid by 7.2%;
- reduction of the regulated prices since 1st July 2011

of the active electricity from BGN 15.75 per MWh to BGN 15.30 per MWh and from BGN 28.06 per MWh to BGN 27.00 per MWh for an available capacity. The structure components of the revenues maintain their relative weight. Electricity and thermal power sales account for 95%, which is the largest share of revenues earned in 2011, followed by 4% of external financing, 1% of sales of other services, materials and long-term tangible assets.

Kozloduy NPP operative expenses for 2011 amount to BGN 753 560 thousand. The largest share in the structure of the expenditure is for nuclear fuel management, operation and maintenance, personnel costs, depreciations and payments to the Radioactive Waste Fund (RAW) and Nuclear Facilities Decommissioning Fund (NFDF).

The expenses for RAW Fund and NFDF,

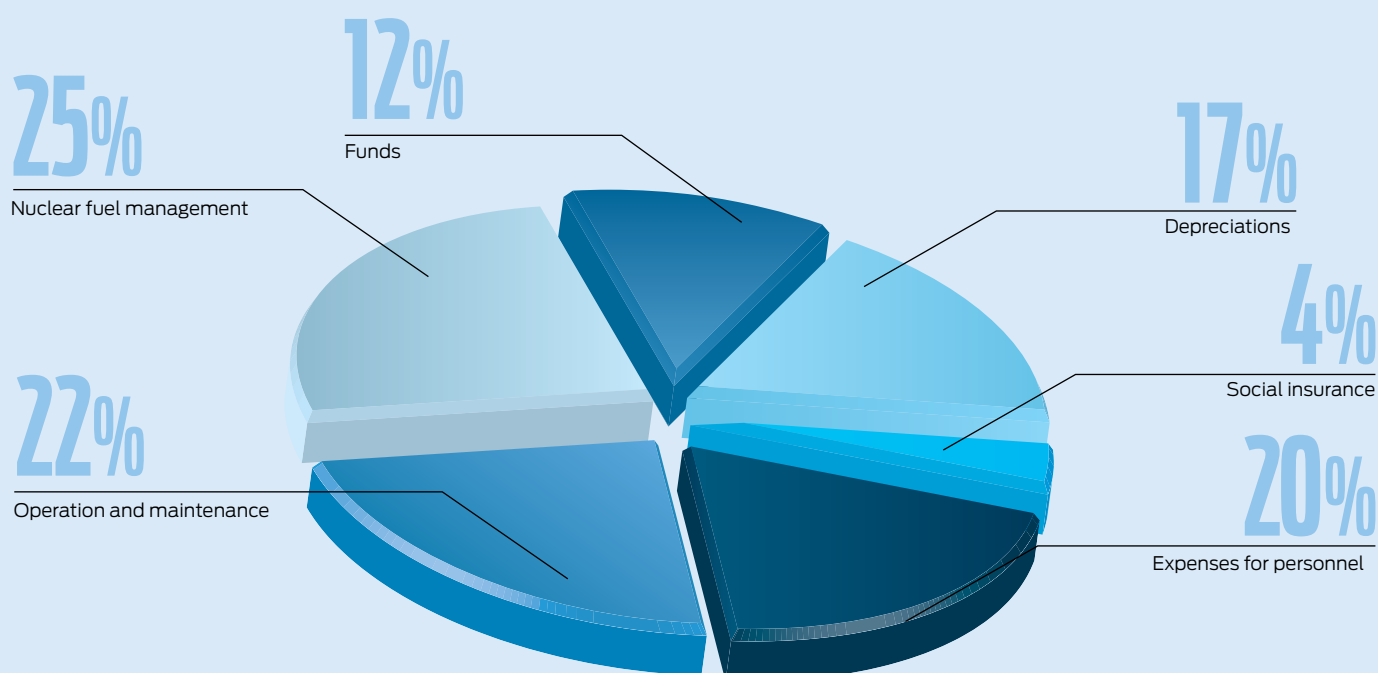
depreciations and social insurances are statutory specified limiting the possibility for their reduction. Total of BGN 41 000 000 were paid to the social funds for 2011. All taxes and fees due to the State Budget totalled to BGN 180 000 000, and the overheads to the RAW Fund and Nuclear Facilities Decommissioning Fund amount to BGN 88 000 000.

Kozloduy NPP fulfilled its commitments regarding spent nuclear fuel management. Two shipments of spent nuclear fuel from WWER-440 to Russia for technological storage and reprocessing were implemented in 2011 in compliance with the updated SNF and RAW Management Strategy 2030, adopted by a Council of Minister's Decision dated 5th January 2011.

The due dividend for 2010 for the sole proprietor of the share capital amounts to BGN 43 514 thousand and it is fully paid as of 31st December 2011.

All payments to the personnel according to the labour and social legislation were made strictly following the statutory requirements. The financial stability achieved in 2011 ensures the Company normal business activity ending the fiscal year without any overdue liabilities.

STRUCTURE OF KOZLODUY NPP PLC EXPENDITURE FOR 2011



STATEMENT OF FINANCIAL POSITION
OF KOZLODUY NPP PLC, AS OF 31ST DECEMBER 2011

	2011	2010
ASSETS	BGN thousand	BGN thousand
NON-CURRENT ASSETS		
Tangible property	1 112 833	1 174 642
Expenses for acquiring long-term tangible assets	271 085	241 625
Intangible assets	5 564	6 461
Investments in subsidiaries	1 161	1 161
Loans granted to connected persons	20 000	17 504
Claims from connected persons	8 438	-
Investments available for sale	232	232
Total of non-current assets	1 419 313	1 441 625
CURRENT ASSETS		
Nuclear fuel	222 459	231 725
Inventories	50 290	52 085
Trade and other receivables	50 955	37 781
Loans granted to connected persons	51	38
Receivables from connected persons	157 153	202 452
Payments for tax to the income	2 345	-
Expenses for future periods	554	377
Cash and short-term deposits	183 609	72 822
Total of current assets	667 416	597 280
TOTAL ASSETS	2 086 729	2 038 905

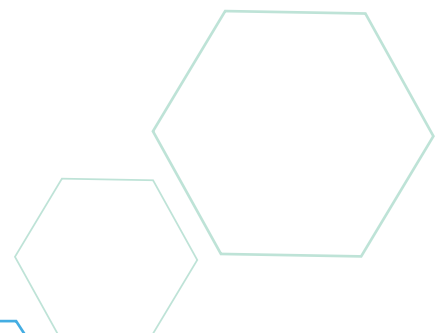
EQUITY AND LIABILITIES		
EQUITY		
Share capital	101 716	101 716
Legal reserves	20 376	14 332
Other reserves	976 842	976 842
Non-allocated profit	207 299	143 022
Total of equity	1 306 233	1 235 912
NON-CURRENT LIABILITIES		
Interest incurring loan	319 289	352 538
Deferred sums under construction contracts	7 912	3 734
Financing	182 166	176 114
Income for future periods	-	835
Payments to personnel at retirement	19 330	19 541
Deferred tax liabilities	37 287	37 723
Total of non-current liabilities	565 984	590 485
CURRENT LIABILITIES		
Trade and other payables	90 375	73 116
Payments to connected persons	1 650	10 014
Interest incurring loan	37 788	39 600
Financing	9 398	5 103
Deferred sums under construction contracts	2 414	5 933
Income for future periods	-	104
Provisions for spent nuclear fuel payments	72 221	71 554
Payments to personnel at retirement	666	1 670
Payments for tax to the income	-	5 414
Total of current liabilities	214 512	212 508
Total of liabilities	780 496	802 993
Total of liabilities and equity	2 086 729	2 038 905

STATEMENT OF COMPREHENSIVE INCOME
OF KOZLODUY NPP PLC FOR 2011

	2011	2010
	BGN thousand	BGN thousand
Electricity sales income	834 876	743 310
Income from thermal power sales	2 308	2 138
Income from sales	837 184	745 448
Income from financing	33 303	43 597
Income from services, goods and other sales	14 058	19 518
Cost for materials and consumables	(163 870)	(164 082)
Cost for personnel	(182 613)	(192 317)
Depreciation costs	(128 899)	(138 034)
Cost on hired services	(132 569)	(108 866)
Other costs	(142 067)	(153 270)
Changes in work in progress	(3 626)	24 453
Acquisition of machinery, facilities and equipment under business activity	84	838
Operating profit	130 985	77 285
Financial costs	(10 769)	(15 827)
Financial income	6 712	5 480
Profit before tax	126 928	66 938
Payments for tax to the income	(12 736)	(6 501)
Profit per year	114 192	60 437
Other comprehensive income, net income from tax	-	-
Other comprehensive income per year, net income from tax	114 192	60 437



TRAINING



An obligatory condition for safe and effective operation of a nuclear power plant is the highly qualified, competent, and motivated personnel. The improvement of the qualification, training and retraining of the workers and employees is ensured through the established and adopted system for training and qualification at the Training Centre (TC) ensuring all required modern environment for specialized training. The Centre has a full-scope simulator (FSS) for WWER-1000 Reactors and multifunctional simulator (MFS) for WWER-440 Reactors. The responsibilities for performance of the licence issued to Kozloduy NPP plc by the BNRA for arrangement of specialized training on operations in nuclear facilities and conducting of specialized training and issuing licences for operation of ionizing radiation sources are assigned to the Personnel and Training Centre Division.

All the workers and employees at Kozloduy NPP, as well as employees of contractors working on-site are due to a compulsory specialized training in order to acquire, maintain, and improve their knowledge and skills related to the operation and maintenance of the nuclear facilities. Every year the control room operators and reactor physicists undergo a simulator based training provided by licensed instructors.

Since the beginning of 2011, 129 individual programmes for initial training, 290 individual programmes for continuous training, and more than 120 time schedules for different personnel have been developed. Based on the activities planned, different training methods were applied. In 2011, the Training Centre organized 1 071 training courses covering the following areas: process systems and equipment, process modes, human factors, safety and emergency planning, quality management, decommissioning and many others. These courses covered 77 007 man-hours of training. Over 28 266 man-hours of training covering short one - and two-lesson topic classes were conducted. Simulator training of 13 484 man-hours were conducted, 9 641 of them were conducted on the full scope simulator and 3 843 on the multifunctional

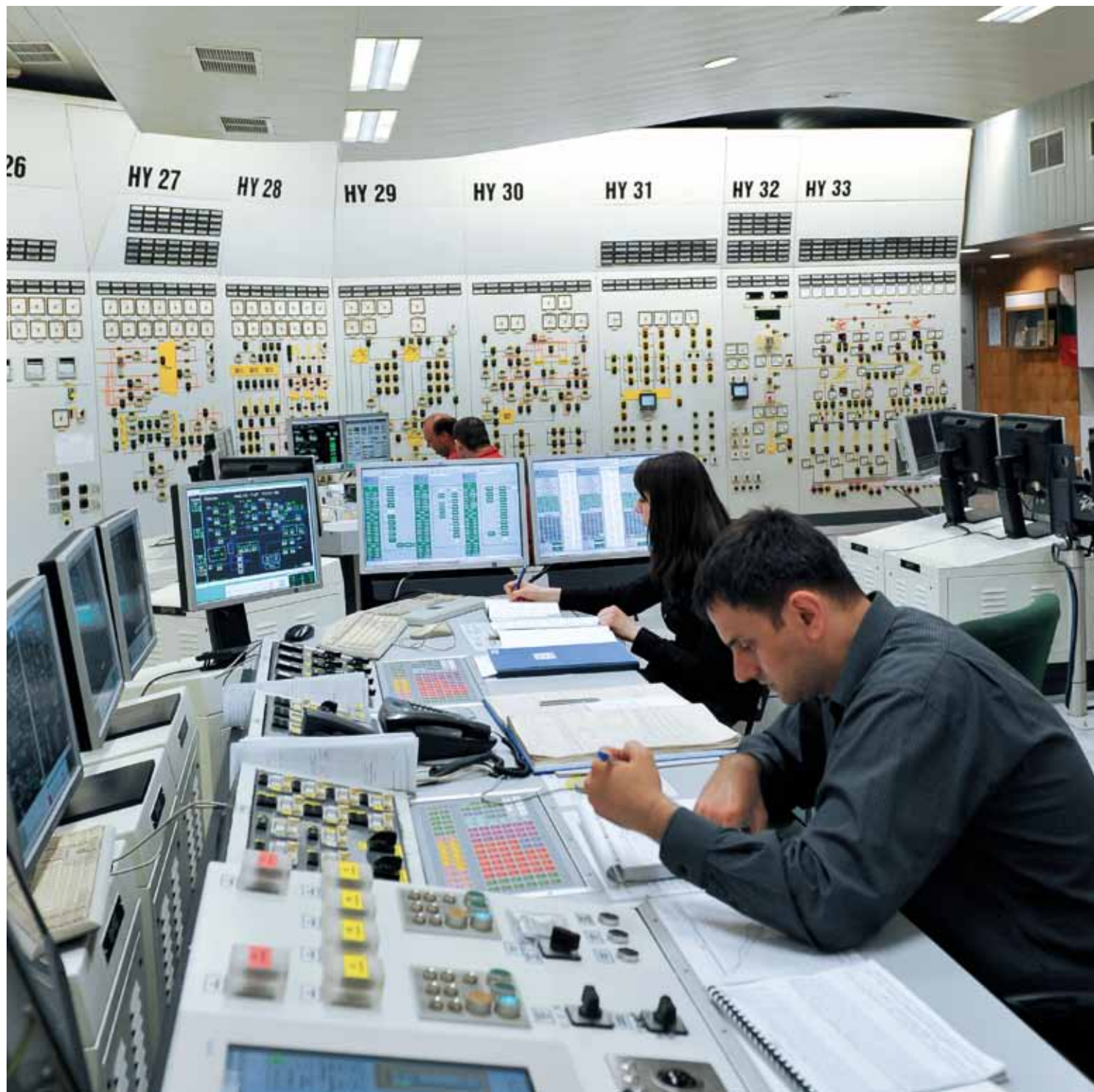
simulator. Apart from training purpose, the simulators were also used for engineering analysis and validation of the operational documentation and design changes. As a result of the long experience and a large scope of information, the Training Centre is a source of nuclear knowledge which is also applicable to the subject of activity of the nuclear power plant. Upon request of external companies and engineering organizations, 400 individuals were trained on 25 courses, and above 4 500 individuals underwent an introductory training for access to the Kozloduy NPP. Following the company's policy on cooperation with the secondary and higher educational institutions in the country, group and individual internship of 350 students was carried out.

The participation of the nuclear power plant in different scientific and application projects together with international organizations and recognized companies in the nuclear field is significant.

The IAEA project on Risk Analysis of Nuclear Knowledge Loss was completed last year. The work on the full-scope simulator modernization through upgrading the thermohydraulic model of reactor core is continuing. The implementation of the project on modernization of the simulator safety control systems commenced.

Kozloduy NPP through the Training Centre justified and supported the idea for the construction of a Regional Centre for WWER Technology Competence as a part of the EURATOM programme. A significant scope of preparatory work was carried out; an international consortium was established as well as preparation of the required documents. The proposal for the project having the reference title CORONA was adopted by the European Commission, the contract was signed and its implementation is underway. An invitation by TECNATOM for participation in the ISCU technical support project was provided by the Ukrainian NPP in the field of safety culture.





HUMAN RESOURCES MANAGEMENT

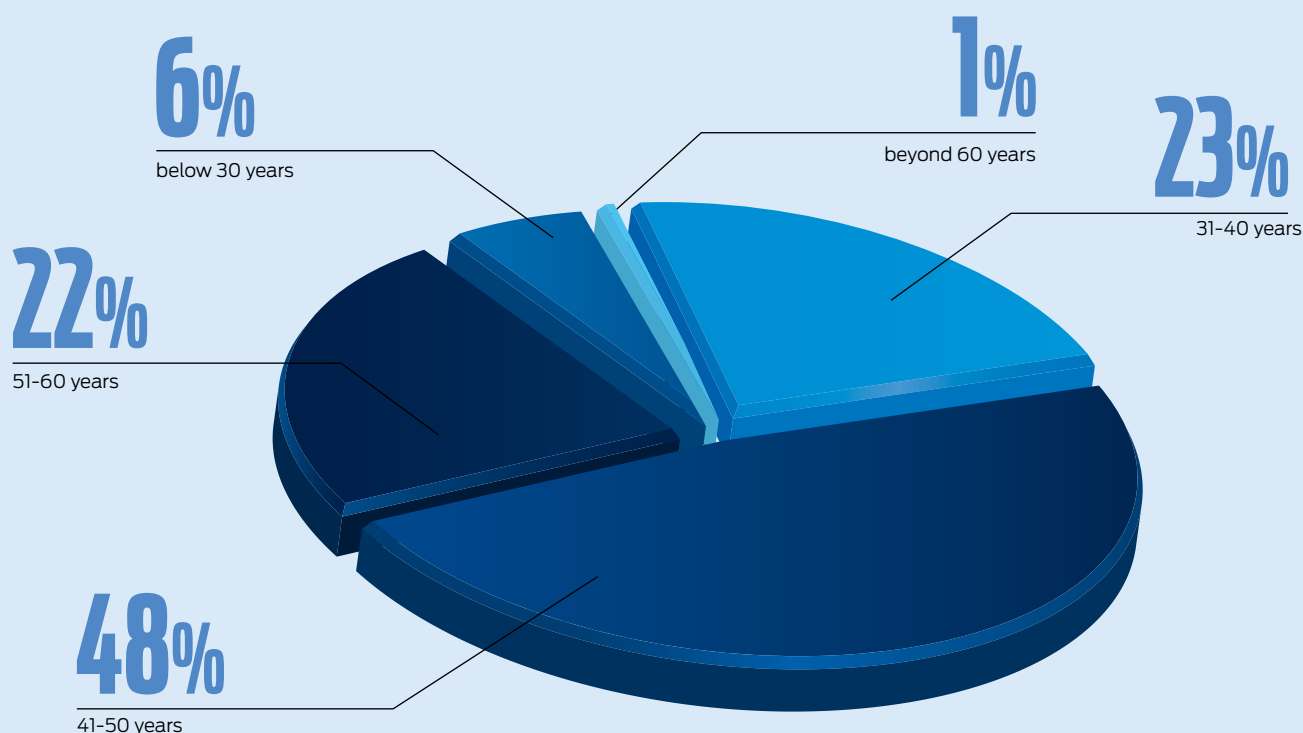
PERSONNEL PROFILE

At the end of the year the number of Kozloduy NPP employees was 4 132. The newly-employed people in 2011 are 158, about half of them are young people – below the age of 30. The people who left the plant over the course of 2011, are mostly workers and employees who have taken the advantage of the possibility for early retirement (1st and 2nd category of labour) 7% of those who left in 2011, left the plant at their own will.

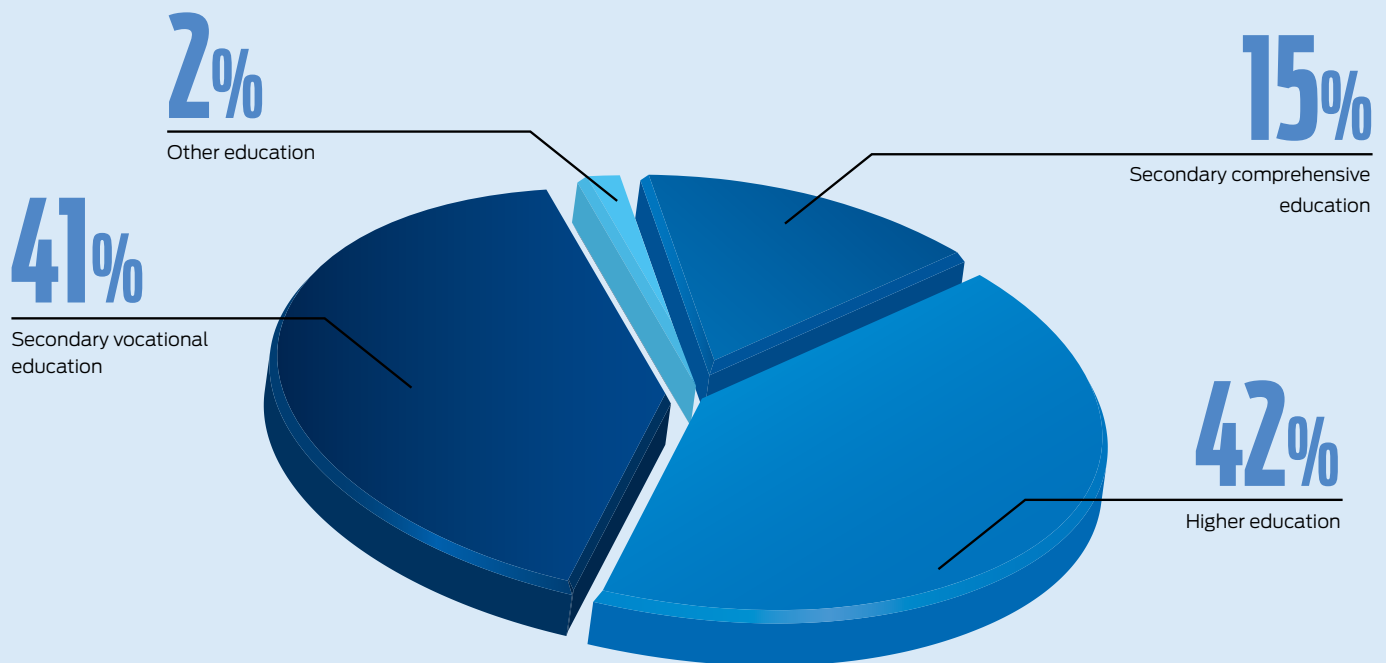
In 2011, Kozloduy NPP arranged and performed 114 recruitment and selection procedures for 153 positions in order to fill in job laying vacant at the end of 2010. The interest to the work places in the Company is traditionally high – more than 4 800 applicants in the course of the last year submitted documents to participate in the selection process. The average age of the plant employees is 44 years, and the average working experience is 18 years. Kozloduy NPP personnel is qualified and highly-educated. As of 31st December 2011, about 42% of the workers and employees have higher education, and 41% vocational secondary school education. In assertion of the policy for stimulating the development through training and qualification enhancement, the plant signed in September agreements for cooperation with leading universities in the country – Sofia University St. Kliment Ohridsky, the Technical University of Sofia, Ruse University Angel Kantchev and The Technical University of

Varna to exchange experience in the field of higher education, scientific studies and professional achievements. By these agreements a possibility is provided for part-time studies in Master's Degree and for enhancing the qualification in specialities, directly related to nuclear engineering, upon request and demand on behalf of the Plant. Kozloduy NPP itself provides for the possibility for improving students' practical training by conducting study tours, specialized apprenticeship, conditions for studies and data acquisition for the development of students' thesis related to NPP activities. In December Kozloduy NPP signed a contract with the Institute of Nuclear Researches and Nuclear Energy at the Bulgarian Academy of Sciences for organizing and conducting six Doctor's Degree studies of Company employees majoring in Nuclear Reactors.

PERSONNEL AGE STRUCTURE



PERSONNEL EDUCATIONAL STRUCTURE



A motivation study was conducted at the end of 2011 and a staff motivation profile was made. The trend from the previous years of maintaining the high level of the Company staff motivation was kept. Some of the most significant factors are: safe labour conditions and health care; responsibilities and obligations, resources for work and provided

training; line manager control in terms of complying with the safety regulations, internal communications, available individual programmes for development, improving working conditions, the quality of Personal Protective Equipment. Corrective measures and events are planned for the factors with lower level of motivation.

WORKING CONDITIONS

In order to ensure and maintain health and safe working conditions protection from and prevention of occupational hazards, risk management programmes, harmonized with the international requirements and IAEA recommendations, are developed and implemented in Kozloduy NPP. For the purpose of avoiding and restricting the harmful factors, measurement of the working environment parameters is performed in line with the normative requirements.

The efficiency of the measures applied in the nuclear plant is confirmed by the low value of the industrial injuries coefficient. The value of the indicator for 2011 in Kozloduy NPP - 0.23, is much lower than the one for this branch of the industry (2.20) and for the country (0.96).

The stable trend of decreasing the industrial

injuries related directly to work activity is preserved over the course of the year.

The good results from the efforts of the nuclear plant to create health and safe working conditions were recognized on 28th April 2011. Kozloduy NPP thereby was awarded the Prometeya prize which is conferred by the Confederation of the Independent trade Unions in Bulgaria for its contribution to humanization of the working environment for improvement of the occupational health and safety. The rationale behind the award is that the Company Collective Labour Agreement consists of terms referring to labour and insurance relations which are considerably more favourable compared with the regulatory ones and the plant Occupational Medical Centre has no analogue in the country.

WITH CARE FOR YOUNG PEOPLE

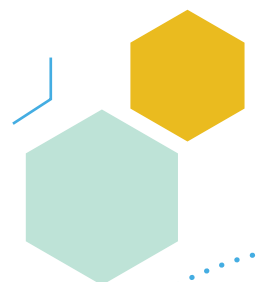
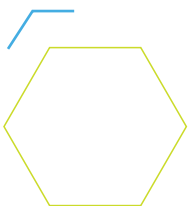
In 2011 for a seventh year in a row a programme of summer paid training was conducted, the participants in which were students from different universities in the country and abroad on important specialities for the Company – nuclear technique, nuclear engineering, engineering physics, chemistry, heating engineering, power industry and electrical equipment, electronics, automation, civil engineering and architecture, law, economics. Within 20 working days the trainees worked in different structural units of the Company according to the application forms submitted earlier. At the end of their training period all the student presented in front of their managers the results of their work and shared the lessons learnt. Kozloduy NPP provides for the opportunity for conducting unpaid group and individual internships. In order to encourage the young people interest to their professional realization and development in Kozloduy NPP at the forum "prospects for professional and career development" in front of students from the Technical University, the University for National and World Economy and the Sofia University St. Kliment Ohridsky, the opportunities for development in the nuclear power

plant were presented. In September Kozloduy NPP took part in the Employment exchange, organized by the Job Centre – Kozloduy. The plant was included in a project of the National Employment Agency – "New Beginning – from education to employment" under the Operational programme Human Resources Development, which provides the opportunity to hire unemployed young people by the age of 29 to practice and gain practical experience. The nuclear power plant participated with its own booth in the Exhibition "Career Days", Organized by the Technical University of Sofia. In the course of the exhibition hundreds of young people got information about plant activity, were acquainted with the provisions to apply for the training programmes and with the staff selection procedure.





PUBLIC RELATIONS



INTERNAL COMMUNICATIONS

The effective internal communications are of significant importance to the success of every organization. The efforts of Kozloduy NPP plc management aim at establishing and sustaining a united team of highly motivated staff. Therefore, a large part of the communication activities in the nuclear plant are oriented to the plant personnel. This sort of communication includes advice on the plant activities and management team decisions, research of motivation level and outlining the measures for its improvement, establishment of conditions to ensure feedback with employees and transfer of their opinions to the corresponding managers.

Information about the produced electricity, environmental factors, and status of the units, management announcements, news and other current information is published daily on the local Intranet page of the plant, which is designed to keep the personnel well informed. A number of web topics are also maintained. The Opinion Poll is one of them. This is a forum where opinions are expressed, management is asked questions on different topics and proposals are made by the personnel on how to solve specific issues. The weekly survey Question of the Week is also carried out. The issues are related to social services, awareness and different topics vital to personnel. The participants may also express their opinion or make a proposal in a written form and send it to the provided email address. They are given to the corresponding manager to reply or undertake

further actions and measures. A kind of feedback is the boxes where the personnel can post their opinion, as well as the notice boards.

Another way to disseminate information among those who work on-site is the Kozloduy NPP News broadcast twice a day every working day. The radioemission is broadcast through the newly built radionetwork to different buildings and areas of the plant site.

In 2011 for a fifth consecutive year opinion research on the motivation of the Kozloduy NPP plc staff according to the Methodology provided by the UK Department of Trade and Industry under the NSP/04-B29 project was carried out.

A survey in connection with the project on Safety Culture Enhancement (KNPP1) within the cooperation programme between Norway and Bulgaria for safe nuclear energy was carried out last year.

EXTERNAL COMMUNICATIONS

For more than 10 years Kozloduy NPP PLC has been striving to satisfy the interest the media and the public show to the high technology production of the company develops and following a policy of transparency and openness when presenting its activity. For that purpose, the practice of organizing public visits, sending press releases and inviting journalists when celebrating significant events, production and other plant achievements also continued in 2011. The topics which mostly attracted the journalist's attention last year were the opening of the Dry Spent Fuel Storage Facility (DSFSF) on 12th May, the submittal of Kozloduy NPP Stress Test Performance Report on 12th November, and setting a record in the electricity generation at Units 5 and 6 on 20th December 2008.

Another good practice continued in 2011 – Kozloduy NPP offers possibilities to those who wish to become familiar with the company's activities to do it upon preliminary request or during the Open Door Day held twice a year. For a second consecutive year, a special Open Door Day is organized, when those working at the plant and their relatives may visit the plant site. The initiative

attracted about 50% visitors more compared to the previous year. Throughout the year the nuclear power plant welcomed over 2 300 people from inside and outside the country, which was 1/3 more compared to 2010. The visitors came from France, Cyprus, Russian, Macedonia, etc. Among the guests to the Bulgarian NPP were professors from the Nuclear Power Plants Department of Moscow Energy Power Institute, delegation of Chinese National Energy Corporation, government of the Republic of Turkey and Turkish Electric Company, experts from the Greek Atomic Energy Commission, representatives of the diplomatic corps in Bulgaria, etc.

A special attention received children, schoolchildren and students who were almost the half of all the visitors during the year. Among the numerous schoolchildren and student groups, who visited the plant in 2011, those standing out, are the group of 20 pupils and their teachers, from the Radost Kindergarten in Kozloduy, who visited the plant on 28th March within the frames of The Atomic Heart of Bulgaria is in my Town Project. On 1st June which is the International Children Day the 4 grade schoolchildren from



Professor Dr. Assen Zlatarev 7th Secondary School of Montana arrived at the Information Centre in order to receive their certificates for completion of their primary education.

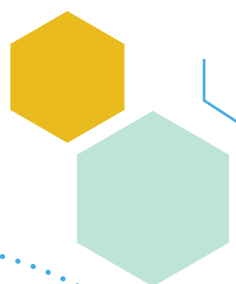
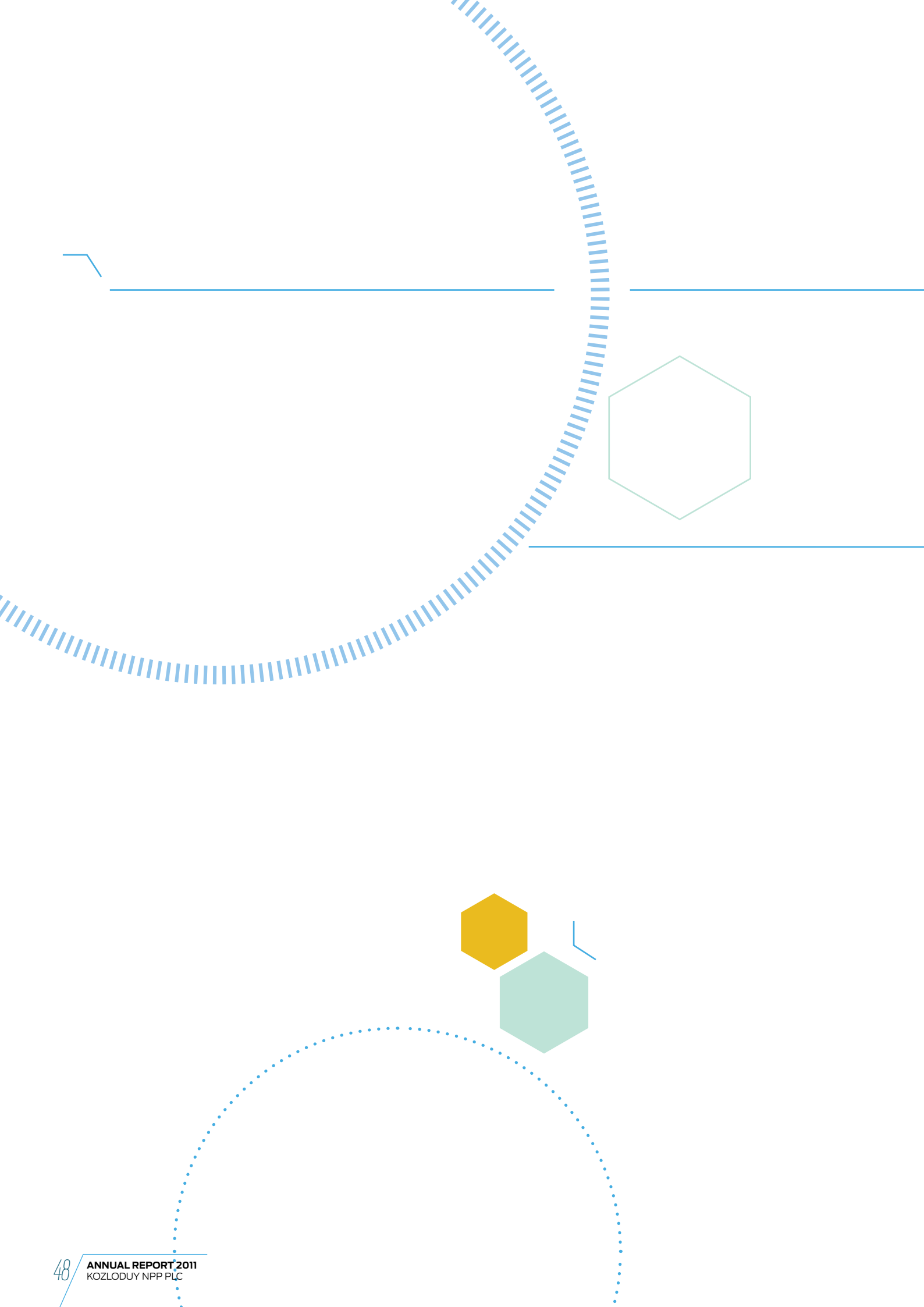
2011 was the third year in a row when Kozloduy NPP took part into the National Initiative A Manager for a Day. Twelve schoolchildren from the Secondary School St. St. Cyril and Methodius in Kozloduy were introduced to the responsibilities of the management team of the nuclear power plant in real working environment. The young people were able to see how the largest national company for electricity production was managed and learned more about the different aspect of the performed activities.

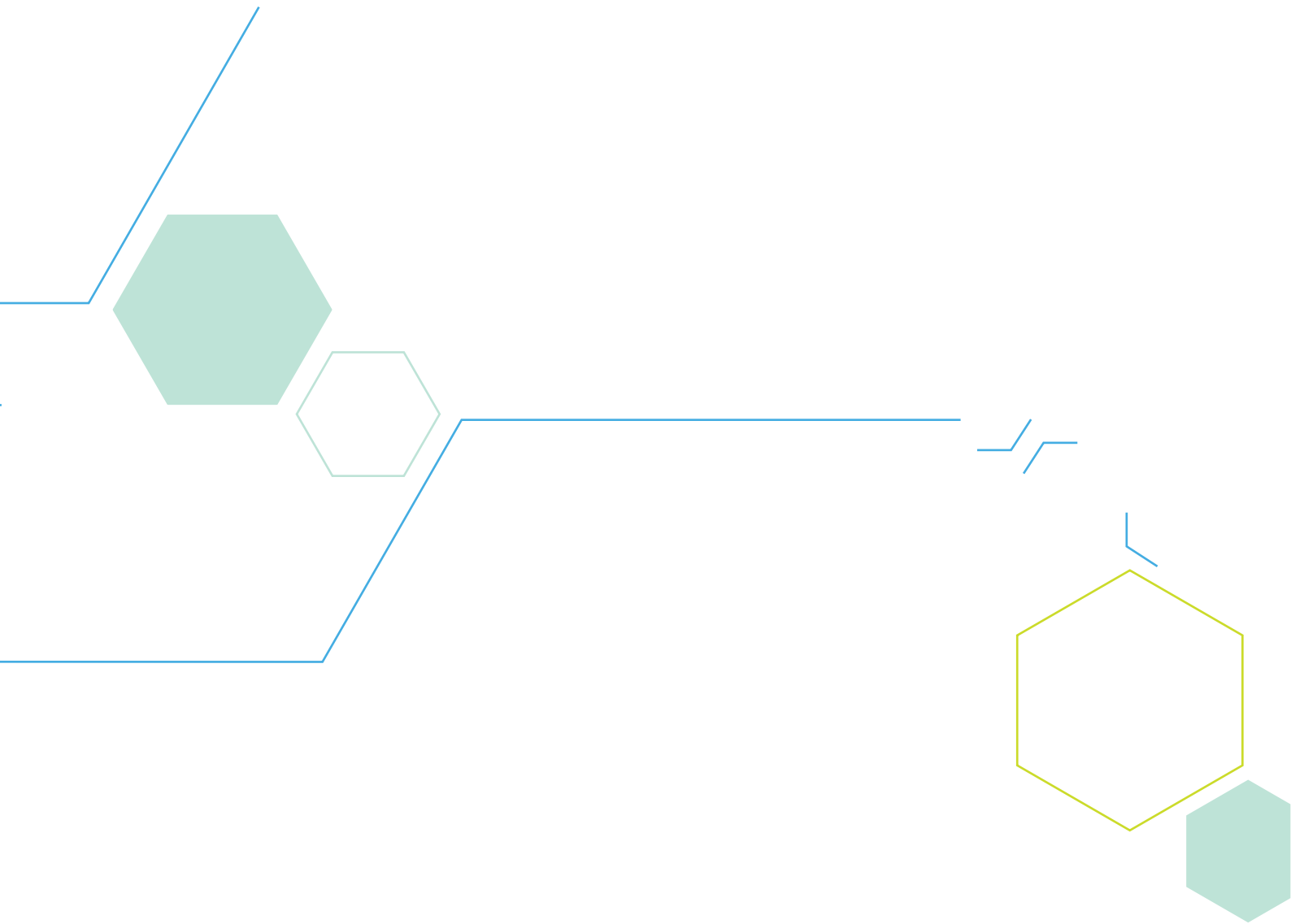
The distribution of publications and keeping the corporate web page are also among the communication channels of Kozloduy NPP. The information about the activity of the nuclear power plant is disseminated through pamphlets, reports, posters, brochures and news bulletins through the

corporate Parva Atomna journal, which has been issued without interruption for over 21 years. All issues are disseminated free to the broad public, plant staff, published on the Intranet and Internet sites of the plant.

In 2011 an increased interest in the web site of the plant www.kznpp.org was noticed. The web page of Kozloduy NPP was visited more than 290 000 times, which is 53% more compared to the previous year.







KOZLODUY NPP PLC



WWW.KZNPP.ORG

