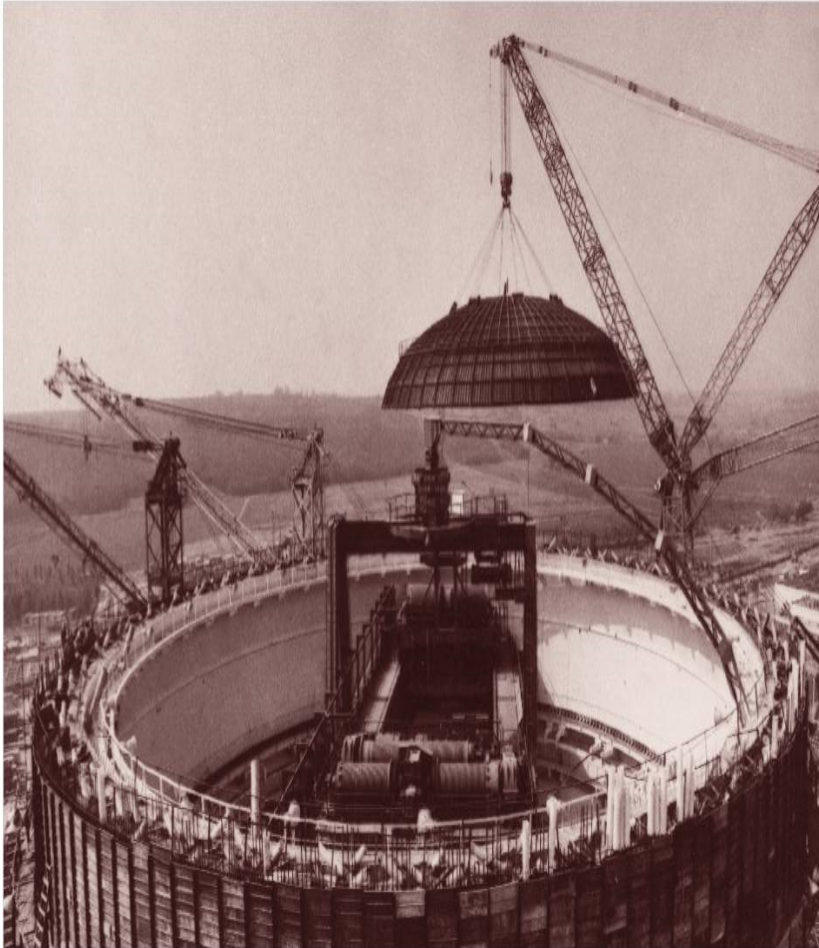




## Kozloduy NPP EAD

2018  
ATOME X PO



- **Beginning - 1974r.**
- **The first Nuclear Power Plant in Bulgaria and Southeast Europe with operating experience more than 40 years.**
- **The largest electricity generating utility in the country**
- **After the shutdown of the four 440-MWt Units, through Council of Ministers Decrees, since the beginning of 2007, two 1000-MWt Units have remained in operation.**



# GENERATING CAPACITIES

## UNITS 5 & 6

2018  
ATOME X PO



# 5

- Type: WWER-1000
- Commissioning date: 1987
- Licence valid to: 06.11.2027



# 6

- Type: WWER-1000
- Commissioning date: 1991
- Licence valid to: 02.10.2019

**34%** - share of the national electricity generation

**330 387 884 MWh** - generated by both units from 1987 to 2018



# PLANT LIFE EXTENSION PRIORITY PROJECT

2018  
ATOME X PO

- **Strategic project, part of the Energy Strategy of the Republic of Bulgaria**
- **Project implementation – the main priority of Kozloduy NPP EAD**
- **Bulgarian Nuclear Regulatory Agency – determines the requirements for plant life extension**



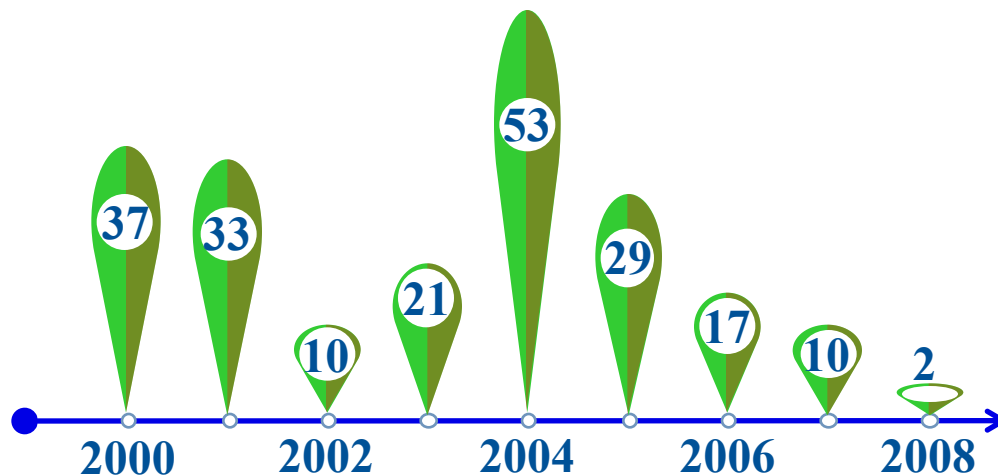




# PLANT LIFE EXTENSION BACKGROUND

2018  
ATOME X PO

- Continuous design improvement in view of safety and reliability enhancement
- Large-scale Modernization programme for Units 5 and 6 containing 212 measures

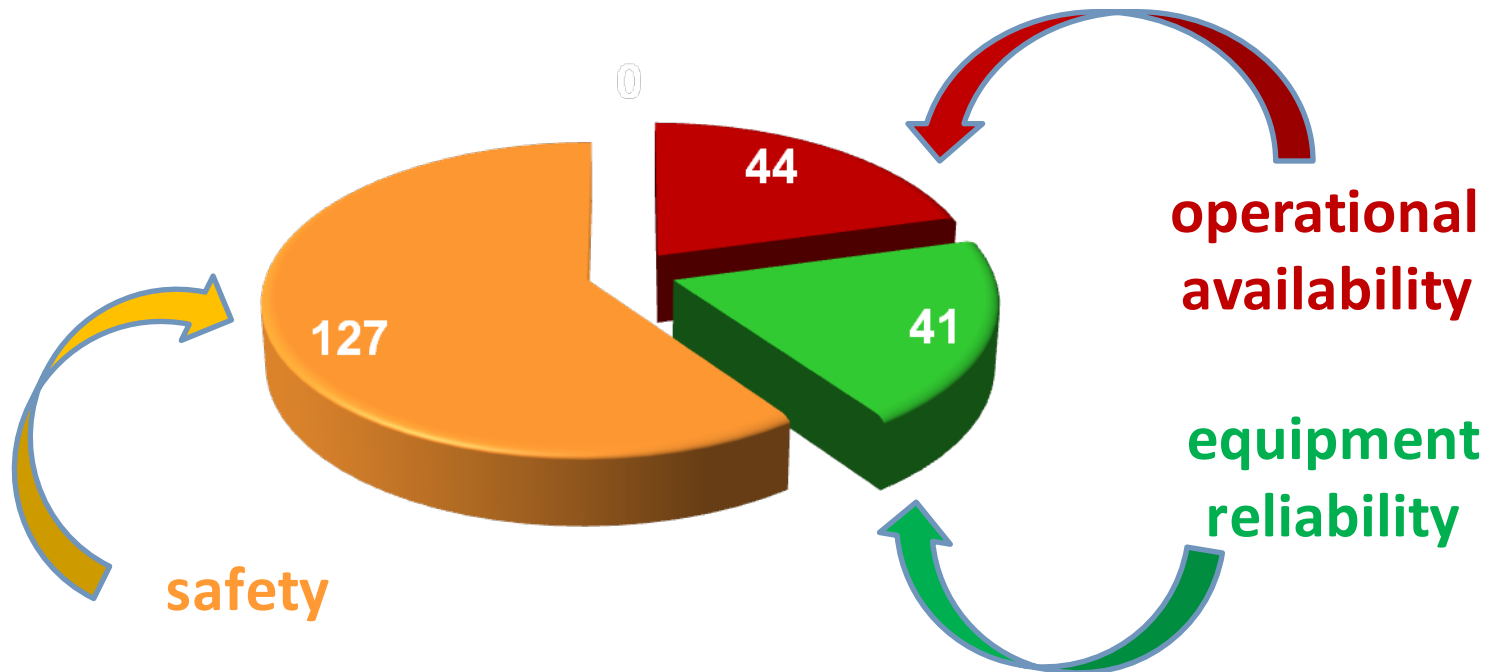




# MODERNISATION PROGRAMME OBJECTIVES and STRUCTURE

2018  
ATOME X PO

- Safety level – compliant with the latest internationally adopted requirements
- Conditions for lifetime extension of the units
- Operating reliability enhancement





# PLANT LIFE EXTENSION IMPLEMENTATION

2018  
ATOME X PO

**Stage 1** – Comprehensive assessment and residual lifetime evaluation of the Units 5&6 equipment and facilities implemented in the period 2012÷2014r.

**Recommendations have been given and specific measures have been planned as a result of the assessment. The required measures to be implemented are included in the programmes for Units 5&6 preparation for lifetime extension.**

**Stage 2** – Implementation of the Preparatory Programme for lifetime extension of Units 5&6

- Regarding Unit 5, this stage was completed in the period 2014÷2016
- Regarding Unit 6 the stage will be completed in 2018.







# PLANT LIFE EXTENSION IMPLEMENTATION

2018  
ATOME X PO

## Stage 1 Units 5&6

- Consortium: OJSC Concern Rosenergoatom and Electricite de France (EDF)

## Stage 2 Unit 5

- Consortium: CJSC Rusatom Servis, OJSC Concern Rosenergoatom and Electricite de France (EDF)

## Stage 2 Unit 6

- Consortium: JSC Rusatom Servis and JSC Risk Engineering





# PLANT LIFE EXTENSION STRATEGY

2018  
ATOME X PO



- A separate organizational structure was established for Stage 2 implementation.
- All the activities are controlled by the Safety and Quality Committee.
- Significant technical modifications and reconstructions of the systems, structures and components are implemented during the outage.
- The engineering activities are performed while the units are under operation.

The arrangement and implementation of the activities correspond with the internationally accepted standards, applied to PLEX projects performance.





# PLANT LIFE EXTENSION ACTIVITIES

2018  
ATOME X PO

Stage 2 covers the following SSCs per areas:

- thermal and mechanical equipment
- electrical and instrumentation and control equipment
- civil structures

The main activities are related to:

- replacement of equipment that has reached the end of its lifetime
- inspection of SSCs
- performing analyses, calculations and quantitative assessments of the residual lifetime



... in view of transition to operating  
power uprate of **104%**



## PLANT LIFE EXTENSION UNIT 5 - results

2018  
ATOME X PO

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**On the basis of the results obtained and recommendations given during the LTO, follow-up technical and organizational measures have been planned for the next licensing period;**

- the operability have been confirmed and possibility of extending the operating life of Kozloduy NPP Unit 5 to the year 2047 have been justified;**
- type, scope and periodicity of SSCs inspection have been specified;**
- additional reinforcement of the pipelines to be earthquake resistant;**
- replacement of devices and valves, that reach the end of their life;**



# PREPARATION AND RENEWAL OF THE UNIT 5 OPERATING LICENCE

2018  
ATOMENERGOPROEKT

**25.10.2016**

Documents justifying the possibility of extending the operating life of Unit 5 to 60 years were submitted at Kozloduy NPP.



**26.10.2016** - Submitted application to the BNRA for Unit 5 licence renewal for another 10-year period

**03.11.2017** - Kozloduy NPP obtained a licence for operation of Unit 5 for a 10-year period



## PLANT LIFE EXTENSION OF UNIT 6

2018  
ATOME X PO

**Preliminary results confirm the possibility of extending Unit 6 lifetime to 30 years beyond its design life.**

- **Completion of the Programme for preparation for plant life extension with justification of the possibility for another 30 years of operation**
- **Preparing full package of documents and submitting them to BNRA by 02 October 2018**







# INCREASING THE OPERATING POWER OF UNITS 5 & 6 TO 104%

2018  
ATOME X PO

**Stage 1**

- Preparation of project documentation

**Stage 2**

- Changes in the licensing regimes and conditions

**Stage 3**

- Modifications of SSCs

**Stage 4**

- Modernisation of the turbine and generator

**Stage 5**

- Developing test programmes

**Stage 6**

- Implementation of Comprehensive tests

**Stage 7**

- Operation at increased power



## INCREASING THE OPERATING POWER OF UNITS 5 & 6 TO 104%

2018  
ATOME X PO

**27.03.2018** – The Bulgarian Nuclear Regulatory Agency accepts the stated by Kozloduy NPP assessment of the success criteria implementation and IS NOT OPPOSED TO TRANSITION OF UNIT 6 TO LONG-TERM OPERATION AT 104%N<sub>nom</sub>.

**UNIT 6 IS UNDER OPERATION AT INCREASED POWER OF 104%N<sub>nom</sub>**

**THE OPERATION OF UNIT 5 AT INCREASED POWER OF 104%N<sub>nom</sub> WILL START IN 2020 after the implementation of turbine modernisation.**





THANK YOU FOR YOUR ATTENTION!



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