



ROSATOM

Rosatom state nuclear corporation

World's first nuclear power plant project implemented on BOO

**April 1, 2014
Paris, France**



Akkuyu NPP Power Generation JSC

Akkuyu Nuclear Power Plant is the First Rosatom BOO Construction Project Outside Russia



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Akkuyu Project Features

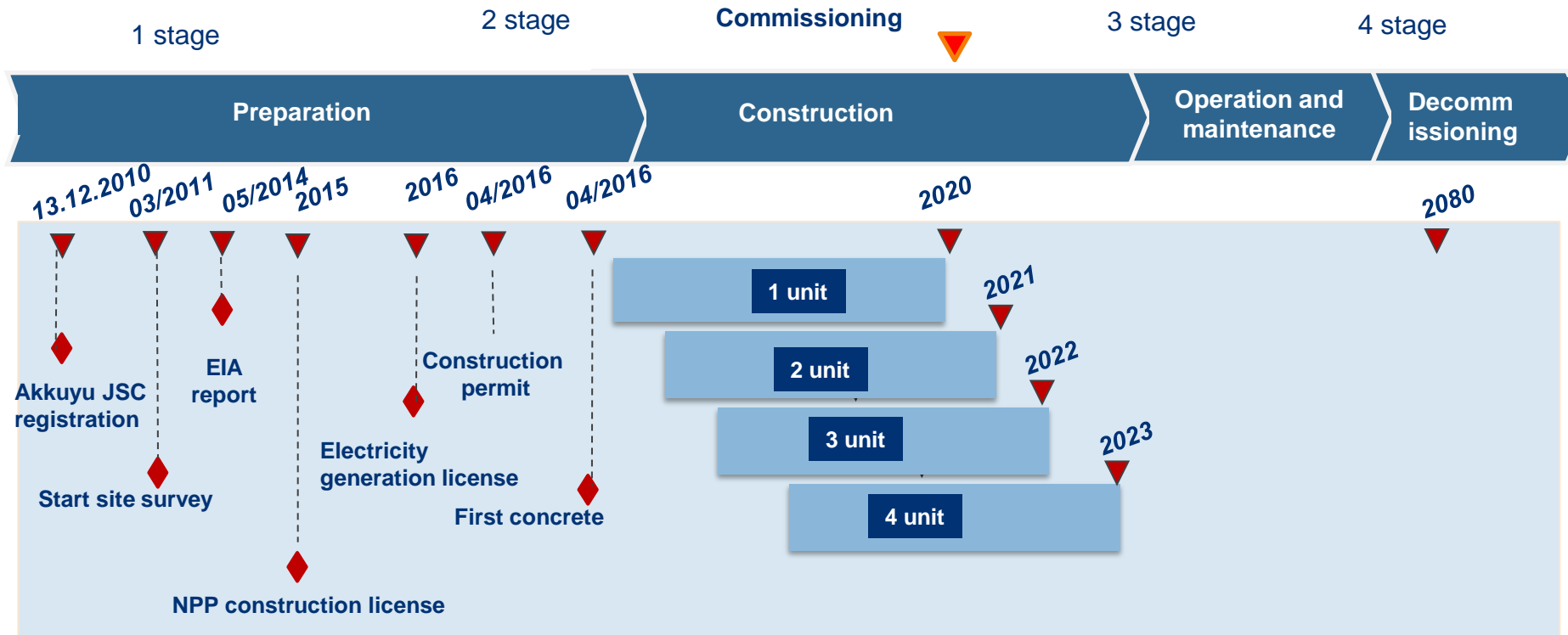
- First Nuclear Power Plant in Turkey
- First Rosatom BOO (build-own-operate) project. Under the IGA, Rosatom is responsible for engineering, construction, operation and maintenance of the plant.
- Legal basis: Intergovernmental Agreement, May 12, 2010
- Project design: AES-2006 (VVER-1200)
- Total capacity: 4,800 MW. (4 x 1200 MW)
- Implementation period: 2011-2023
- Total cost ~ \$ 20 bln
- Power Purchase Agreement for 15 years, fixed price terms
- Support of the Russian and Turkish Governments
- Maximization of Turkish personnel involvement in construction and operation of the plant.
- Job creation potential – up to 10 000 for the construction only



Akkuyu site, Turkey



Major Milestones of the Project



Akkuyu Chronology



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- 1955** An Agreement on peaceful use of the atom signed with the U.S.
- 1956** Atomic Energy Committee begins its work
- 1965** Studies on the construction of the NPP begin
- 1972** The Department of Atomic Energy created
- 1974-1975** Study on the first NPP site location conducted

- 1976** License for the Akkuyu site on the Mediterranean coast issued

- 1981** Cooperation Agreement with the IAEA signed
- 1977-2009** Tender for building 4 NPP units in Turkey held
- May 2010** Signing the Intergovernmental Agreement between the RF and the TR

- July 2010** The Law ratifying the IGA enters into force in Turkey
- December 2010** “Akkuyu” NPP Power Generation JSC (AKKUYU NGS ELEKTRIK URETIM ANONIM SIRKETI) is registered in Turkey

- March 2011** Preliminary engineering survey; start of the front-end engineering design, licensing and Environmental Impact Assessment process, generation license application



Project Cooperation Between Russia and Turkey Covers a Wide Range of NPP Related Construction, Operation and Infrastructure Issues



Russian responsibilities

NPP engineering, design field supervision

Construction management/supervision

Design documentation

Nuclear island and other special equipment and materials

Fuel supply

Startup and Commissioning

Operation, maintenance and upgrade

Wholesale of electricity

Decommissioning and decontamination

Spent fuel treatment

Joint responsibilities

Nuclear energy regulation and legislation development

Construction and assembly works

Physical protection

Emergency planning

Public outreach

Turkish responsibilities

Site allocation

Infrastructure development, grid connection

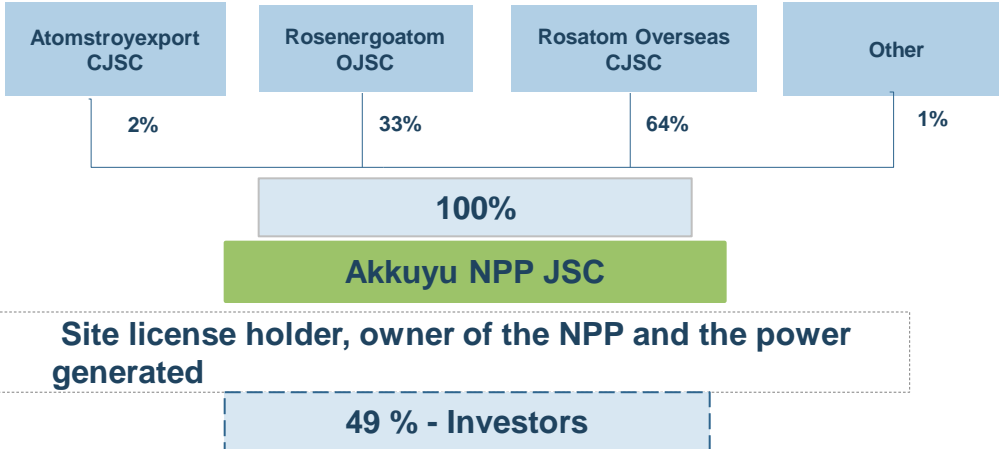
Site infrastructure

Project financial indicators and equity structure



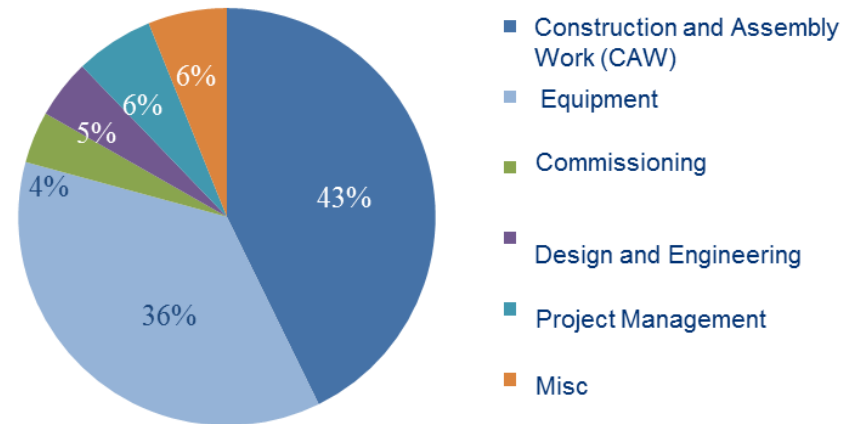
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Akkuyu Equity Structure

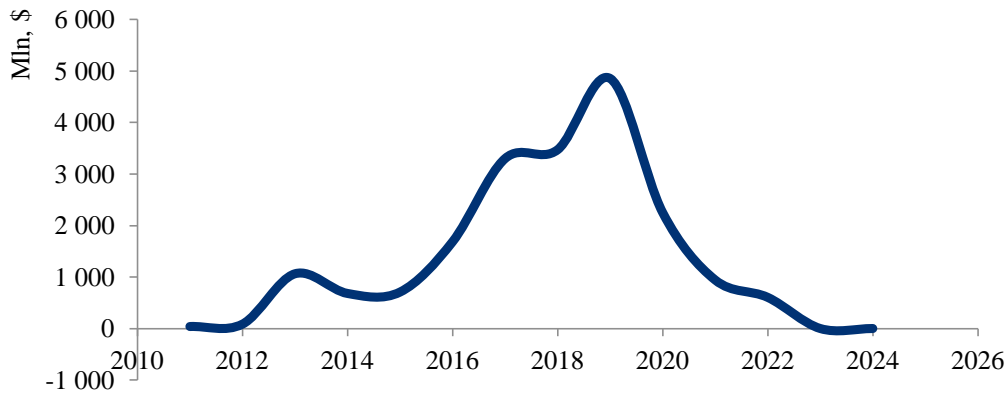


The Russian side provides Initial funding. Later, up to 49% of shares may be transferred to investors

Akkuyu CAPEX structure, %



Akkuyu CAPEX





Current status and plans for 2013-2014

Current Status

- The Project Company has received the NPP construction site with effective site license and renewed licensing conditions
- Engineering surveys have been completed in order to get an independent assessment of the Akkuyu NPP site seismicity.
- Updated “Basic Site Selection Report” has been prepared and submitted to TAEK.
- EIA Public Hearings have been held. The EIA Application Dossier and the EIA Report have been filed and sent to the Ministry of Environment and City Planning
- Pre-construction work has been started. Groundwork has been started
- Power Generation License application has been prepared and filed.
- Consolidated report on “Reference NPP Selection Justification” has been developed and submitted to TAEK. Novovoronezh-2 NPP is approved as reference NPP.
- NPP Construction Preparatory Plan has been developed.
- Negotiations with TETAS on Power Purchase Agreement (PPA) are in progress
- Negotiations with TEIAS on power distribution scheme are in progress
- The Information Centers have been opened in Büyükeceli and Mersin

Plan for 2014

- Launch of the site preparation works. Start of site infrastructure construction.
- Issuance to Project Company of the EIA Report Approval
- Completion of the engineering design development
- Completion of Akkuyu site seismic hazard assessment consolidated report
- Approval of power distribution scheme and NPP grid connection to Turkey energy system.
- Development of Information Center in Istanbul
- “Site Parameters Report” development and submission to TAEK
- Completion of designing of the four of the five priority civil construction facilities of the preliminary construction period
- Updated “Basic Site Selection Report” to be approved by TAEK
- Work with TAEK in the WGs for organization of Project licensing and permissive activities on Turkey territory
- Organization and conducting of the engineering surveys for “working documents” stage
- Sign EPC contract



Jobs creation and infrastructure development

Infrastructure development of the nearby cities will lead to construction of new roads, hospitals, schools, sport facilities and will result in establishing of about 15,000 new positions for infrastructure facilities, including medicine, trade, transport.

The Turkish Party will be involved in construction and assembly work, as well as supplies of non-specialized equipment and NPP operation.

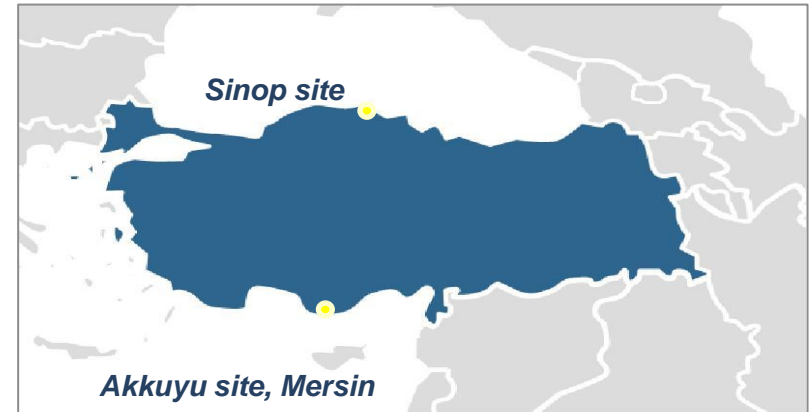
It is feasible that up to 95% of construction and up to 40% of installation work will be performed by the Turkish companies; 20% of equipment and materials will be provided by the Turkish companies.



In addition to construction personnel (in the “peak years” more than 10 000 people will work on the construction site only), more than 2000 operational personnel will work at the NPP and around 1200 will be involved during the planned outages.

ATMEA AREVA-MITSUBISHI project selected for second NPP construction at Sinop

- Akkuyu Project Company hopes to work jointly with AREVA-MHI consortium to develop nuclear industry in Turkey
 - Regulatory framework development
 - Personnel education and training
 - Infrastructure development
 - Interface with IAEA
 - Public opinion development



New Electricity Market Law approved in March 2013

- Changes in the licensing procedure
 - Preliminary license for the period up to 36 months
 - Permanent generation license after issuing construction license
 - An applicant is required to obtain and submit all relevant permits, consents, approval and documents within a period of preliminary license
 - An applicant is prohibited to change shareholder structure during the period of holding a preliminary license.

Lessons learned

Challenges

- No experience of the Turkish Party in regulating and licensing NPP. No local nuclear infrastructure. No system of radioactive waste treatment/management; radiation control; emergency planning and emergency response, decommissioning etc.
- Challenges in understanding of local regulations and their interpretation. Need to work with local government bodies, local consultants from the very beginning
- Lack of understanding of "nuclear" by the government agencies and companies and relevant concerns restrains the project implementation.
- Some Turkish and technical market regulations are not applicable to an NPP.
- Limited personnel with relevant competencies and knowledge
- Possibility of changes in regulations without consent of the NPP owner. Regulation changes could impact the owner's costs
- Public fears of nuclear. Need to work with public opinion

Solutions

- Established effective system of consultations and government bodies and relevant agencies
- Working groups on the key issues of project implementation and NPP operation, including regulatory issues and establishing nuclear infrastructure system
- Assistance in development of regulatory basis and regulatory agency expertise
- Students' education; training for officials, regulatory bodies' personnel
- Public outreach; work with public opinion



How AES-2006 Safety is Ensured?

- Defense-in-depth
- Self-defense of the reactor
- Safety barriers
- Multiple duplication of the safety channels
- Active and passive safety systems
- Safety concept, including not only accidents prevention but beyond design basis accidents consequences prevention, ensuring localization of the radioactive instances within the containment vessel
- Safety culture for all the lifecycle stages: from selecting the site up to decommissioning



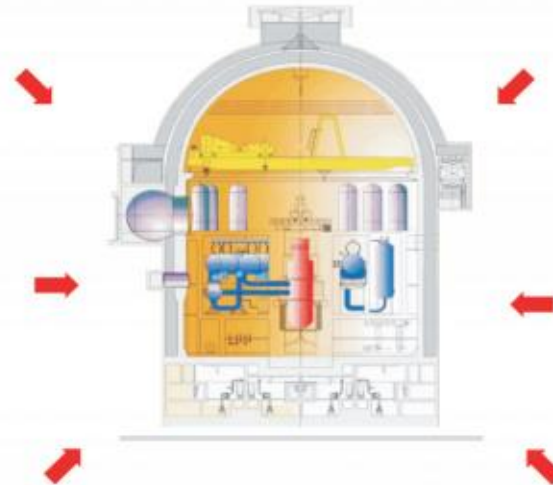
Aircraft Crash
Crash of the heavy 400 t aircraft



Explosions
Pressure at shock wave front 30 kPa



Earthquake Load
Maximum earthquake magnitude is up to 9 as per MSK 64 Comprehensive Intensity Scale



Snow and Ice Load



Wind Load
Design wind speed 56 m/s with return period 1 in 10 000 years



Flood and Tsunami
Occurrence >0, 01%

The NPP site is selected based on more than 20 parameters. Areas made up of karstic rocks with cavities, landslide areas, and areas flooded during reservoir inundation can not be considered for a potential NPP site. The seismotectonic situation of the NPP location is considered first and foremost.



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Project information



AKKUYU NGS AŞ

Webiste in Turkish, Russian and English
www.akkunpp.com



AKKUYU NGS AŞ



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Welcome to the site of Akkuyu NPP JSC!

The Akkuyu nuclear power plant (Akkuyu NPP) will be built in Turkey, at Mersin Province on the Mediterranean coast. An agreement on this was signed between the governments of Russia and Turkey in Ankara on May 12, 2010. The NPP will have four power units of 1200 MW each. After construction, Akkuyu NPP is expected to produce about 35 billion kilowatt-hours per year. Akkuyu NPP is a serial project of the NPP-2006 nuclear power plant based on Novovoronezh NPP-2 (Russia, Voronezh Oblast). The life cycle of Akkuyu NPP is 60 years. On this site, you will find complete information about implementation of the Akkuyu NPP project in the Republic of Turkey.

Nuclear industry news



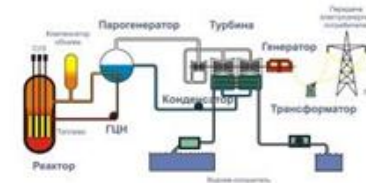
28.11.2012 Young specialists are interested in

Frequently Asked Questions



Why is electrical energy needed?

Nuclear energy in pictures



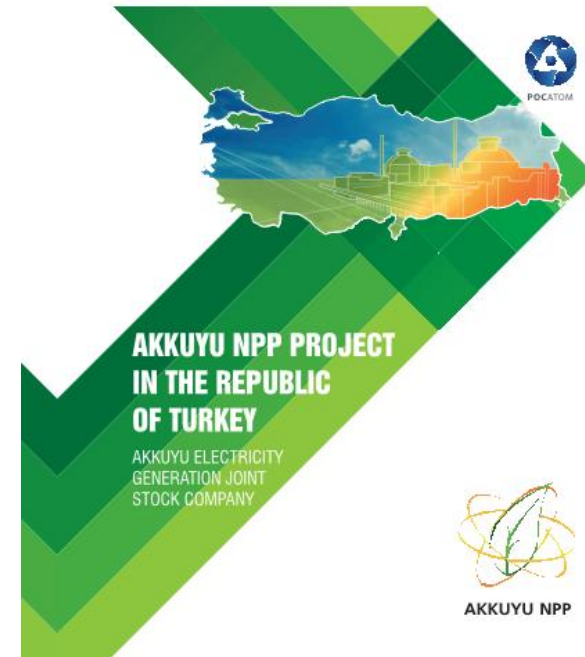
Photogallery



Speech by Taner Yildiz at the International Economic Forum in Russia 21.06.2012

Visit of the power corporation of Republic of

Brochure about the project in Russian, Turkish and English



AKKUYU NPP PROJECT
IN THE REPUBLIC
OF TURKEY

AKKUYU ELECTRICITY
GENERATION JOINT
STOCK COMPANY



AKKUYU NPP

Public information Center





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Thank you for attention!

www.akkunpp.com

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