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Rosatom state nuclear corporation

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Akkuyu Nuclear Power Plant – the first NPP plant configured on BOO principles

Turkey MENA Nuclear Industry Congress 2013

Akkuyu NPP Power Generation JSC

Istanbul
June 18-19, 2013

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

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Akkuyu site, Turkey

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

Why BOO? Pros and Cons

Why BOO?

- Potential profit from power sales – high dynamics of GDP and power consumption in Turkey
- Forecast for growth of power consumption and capacity deficit
- Electricity market liberalization and electricity price growth in Turkey
- Turkish power market investment attractiveness
- Availability of grid infrastructure and possibility to export power to Europe and the Middle East
- Government support of the project in Turkey and Russia

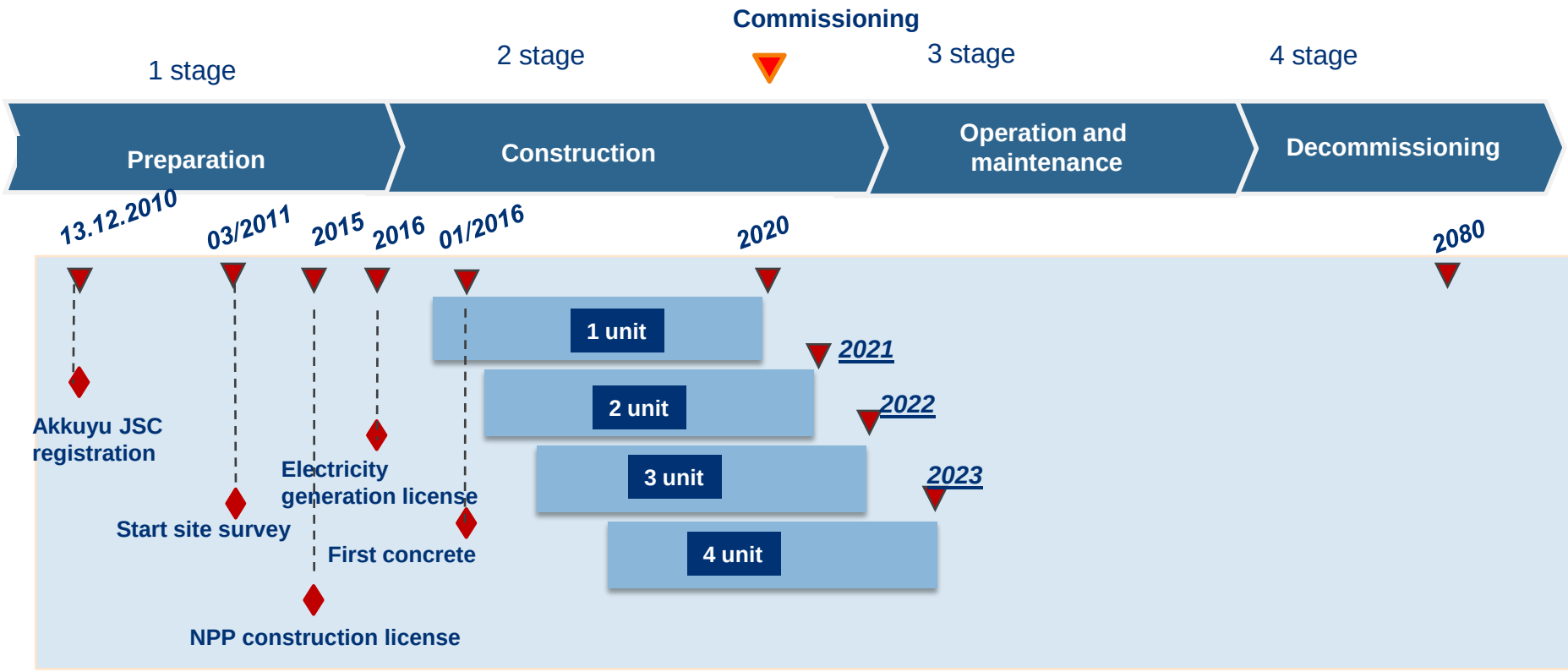
Pros

- Profit from electricity sales after pay back period
- Fixed price PPA (weighted average 12.35 cent/kwh) and fixed quantity - (70% of Units 1 and 2 output and 30% of Units 3 and 4 output) – revenue guarantee for the investor

Cons

- Need to forecast long-term electricity price – high probability of error due to unpredictable factors.
- The Project Company bears all the risks
- Possibility of unpredictable growth of the construction costs, economic and political force majeure
- Difficulty to find investors («long» money)

Major Milestones of the Project



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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

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Russian responsibilities	Joint responsibilities	Turkish responsibilities
NPP engineering, design field supervision	Nuclear energy regulation and legislation development	Site allocation
Construction management/ supervision	Construction and assembly works	Infrastructure development, grid connection
Design documentation	Physical protection	Site infrastructure
Nuclear island and other special equipment and materials	Emergency planning	
Fuel supply	Public outreach	
Startup and Commissioning		
Operation, maintenance and upgrade		
Wholesale of electricity		
Decommissioning and decontamination		
Spent fuel treatment		

Project organization structure

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Rosatom State Corporation
Project sponsor
General responsibility for Project implementation

Board of Directors (shareholders)
PC management

Rusatom Overseas CJSC
Investor/ developer

Akkuyu NPP JSC
Tailor-made JSC incorporated in Turkey. Carries functions of customer, license applicant, NPP owner and GR coordinator in Turkey
Owner of the NPP and electricity produced

Owner's Engineer
- Technical expertise
- Cost control
- Schedule control
- Quality control

OJSC «INTERRAO Worley Parsons»
Licensing consultant

Atomstroyexport – NIAEP
Prime contractor
- Engineering surveys
- Construction and assembly works
- Equipment and materials supply

Rosenergoatom Concern OJSC
Technical customer
- Development of pre-design, design and detailed design documentation
- Technical acceptance of equipment and services at all stages of project commissioning, NPP operation

Atomenergoproject OJSC
Principal Designer

Gidropress Design Bureau
Nuclear Island principal designer

Kurchatov institute
Scientific advisor

VNIIAES JSC
System integrator Automatic process control system principal designer

Alstom-Atomenergomash OJSC
Turbine-generator designer, including turbine building auxiliary equipment

VNIPIET OJSC
Designer of construction and assembly technologies

* Tender will be held in 2013

Project financial indicators and equity structure

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Akkuyu Equity Structure

Atomstroyexport CJSC	Interrao OJSC	Rosenergoatom OJSC	Atomenergoremont OJSC	Atomtekhenergo OJSC
3.5%	3,5%	92,8%	0.1%	0.1%

100%

Akkuyu NPP JSC

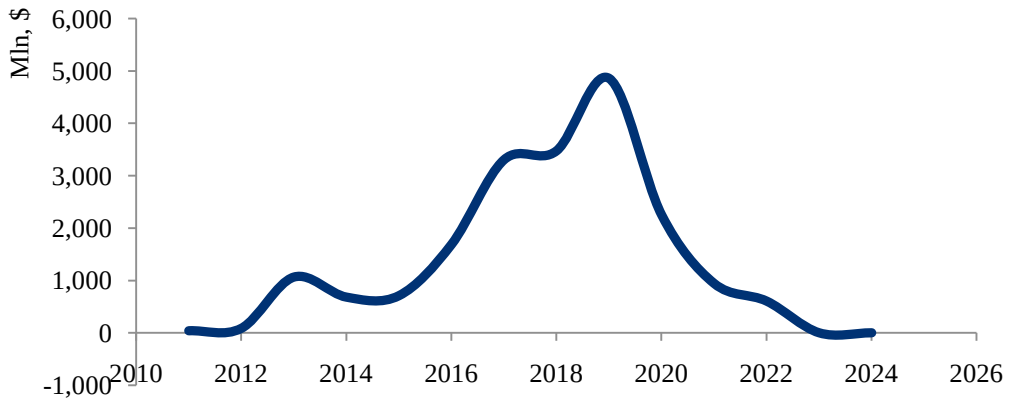
Site license holder, owner of the NPP and the power generated

49 % - Investors

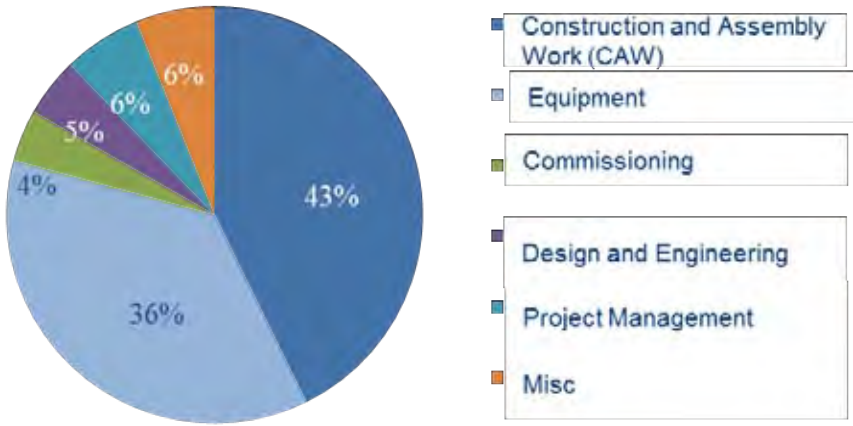
The Russian side provides Initial funding. Later, up to 49% of shares may be transferred to investors

- Project execution period: 12 years total; 5 years from first concrete to Unit 1 commissioning
- Operational lifetime: 60 years
- Generation output : 35.2 bln. kWh/year (for four units)
- IRR > 10%
- Targeted D/E Ratio – 70/30
- CAPEX: estimated <= $20 bln
- Payback period : 18 years
- Interest coverage ratio: 4,6

Akkuyu CAPEX



Akkuyu CAPEX structure, %



Current status and plans for 2013

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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.
- 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
- The Information Centers have been opened in Büyükeceli and Mersin

Plan for 2013

- Launch of the site preparation works. Start of site infrastructure construction.
- Issuance to Project Company of the EIA Report Approval
- Negotiations and completion of a Power Purchase Agreement
- 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

Social Effect of NPP Construction

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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.

Equipment and services estimated cost breakdown

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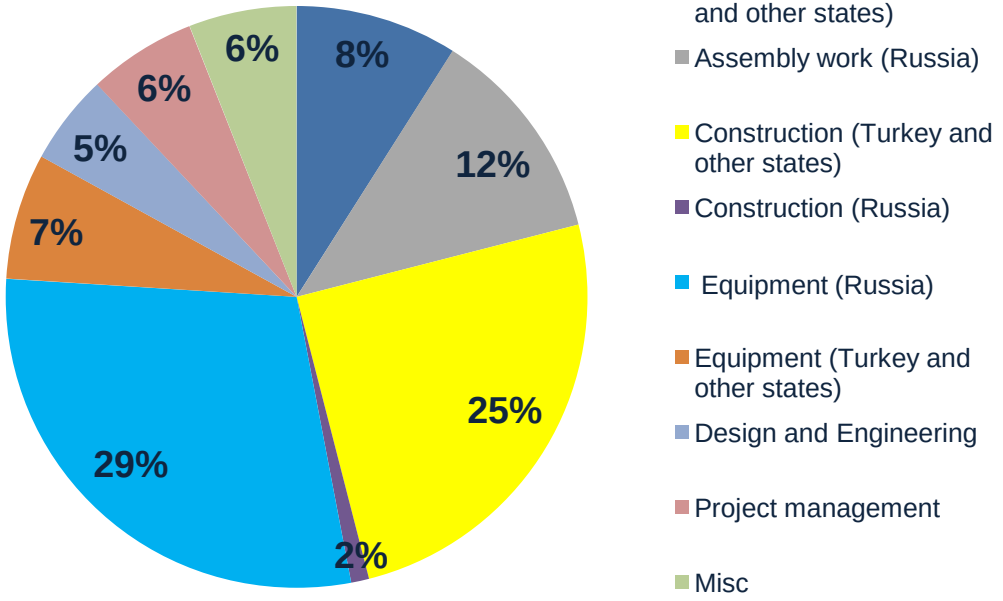
Opportunities for localization during Akkuyu NPP construction (share of the total cost)

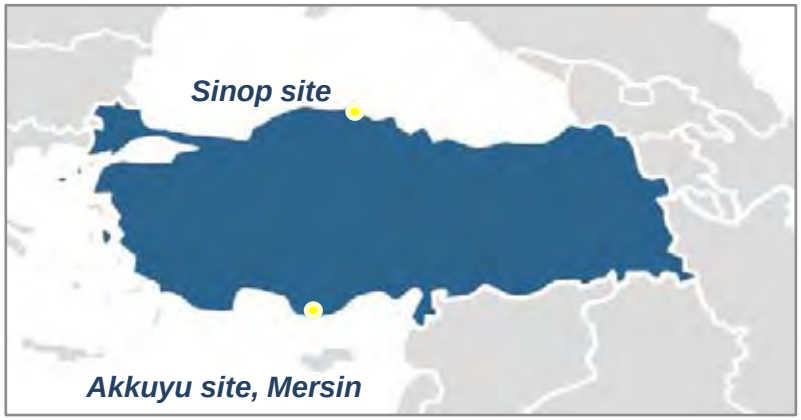
	$ bln
Construction (Turkey and other states)	**4,8**
Construction (Russia)	0,3
Equipment (Russia)	**5,6**
Equipment (Turkey and other states)	**1,4**
Assembly Work (Turkey and other states)	**1,6**
Assembly work (Russia)	2,3
Design and Engineering	0,9
Project management	1,2
Misc	1,2



Changing environment…

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

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Challenges	Solutions
• 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.	• Established effective system of consultations and government bodies and relevant agencies
• Challenges in understanding of local regulations and their interpretation. Need to work with local government bodies, local consultants from the very beginning	• Working groups on the key issues of project implementation and NPP operation, including regulatory issues and establishing nuclear infrastructure system
• Lack of understanding of ”nuclear” by the government agencies and companies and relevant concerns restrains the project implementation.	• Assistance in development of regulatory basis and regulatory agency expertise
• Some Turkish and technical market regulations are not applicable to an NPP.	
• Limited personnel with relevant competencies and knowledge	• Students’ education; training for officials, regulatory bodies’ personnel
• 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	• Public outreach; work with public opinion

How AES-2006 Safety is Ensured?

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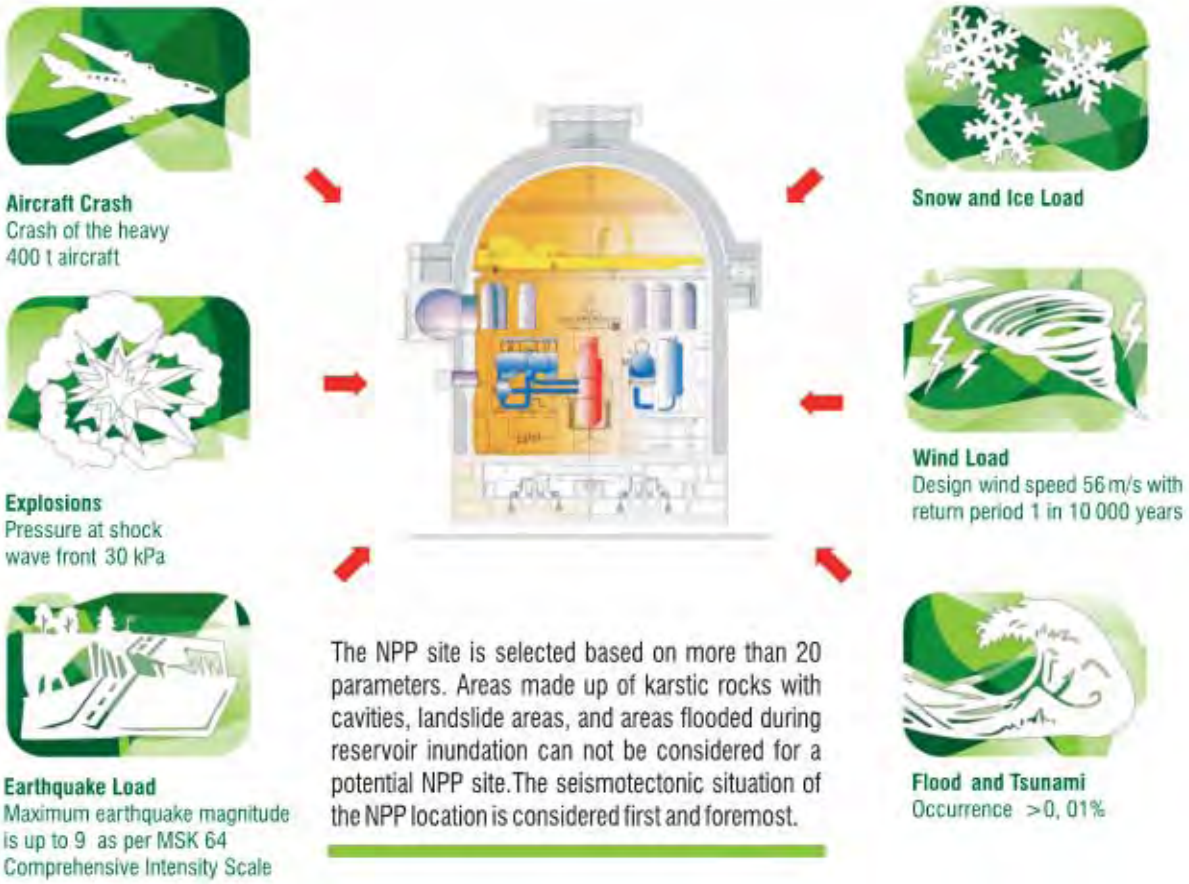
- Defense-in-depth
- Self-defense of the reactor
- Safety barriers
- Multiple duplication of the safety channels
- Active and passive safety systems
- Safety concept, including not only accidents prevention but beyond design basis accidents consequences prevention, ensuring localization of the radioactive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



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Investment highlights

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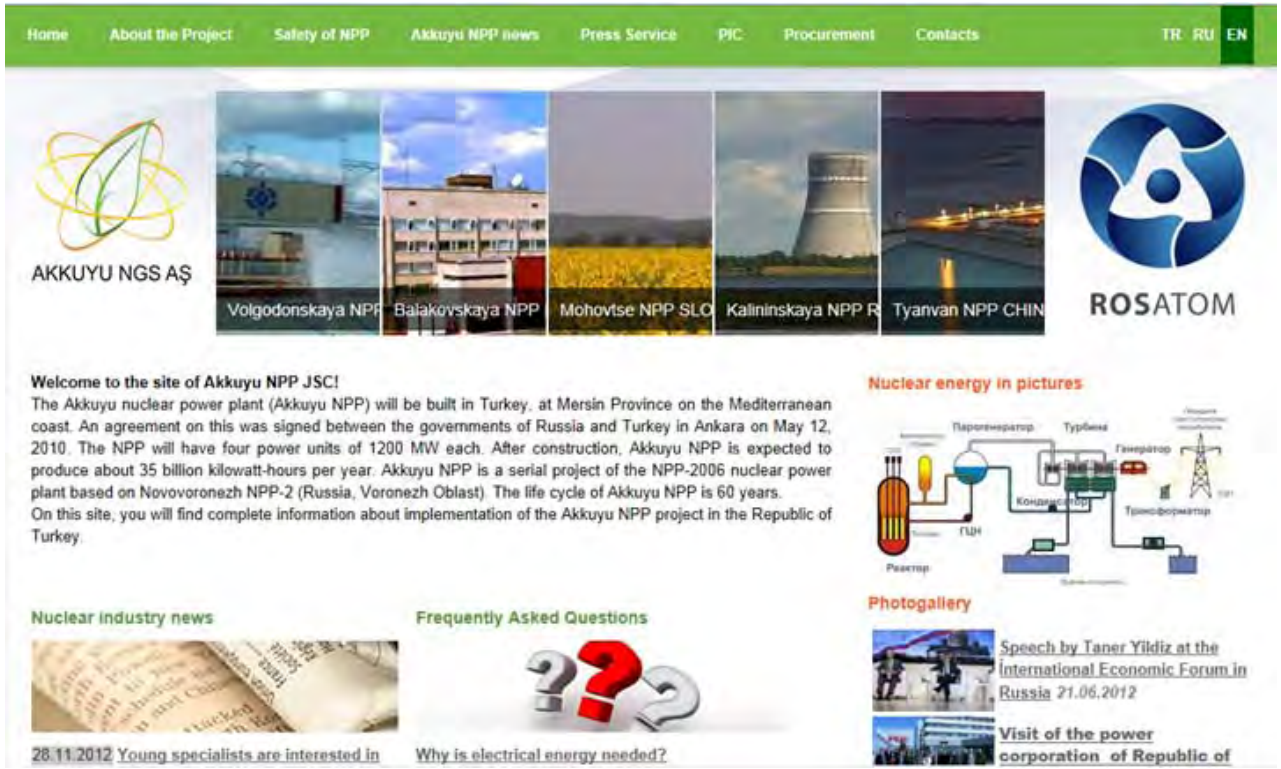
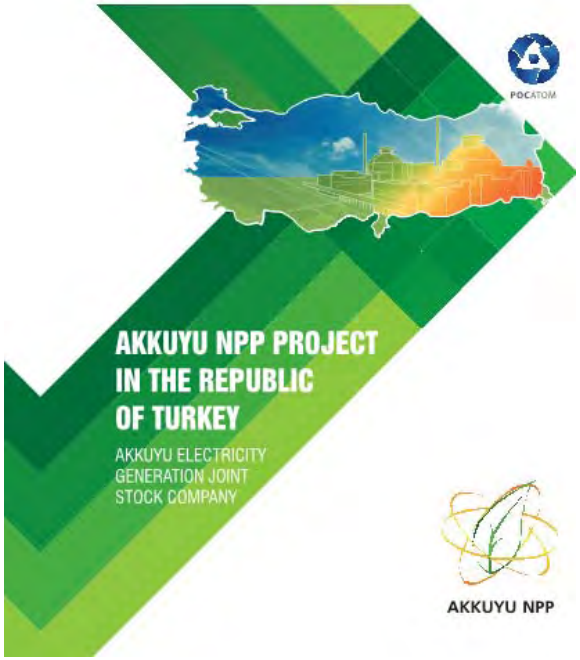
Attractive geographical location	• Turkey is at the cross-roads of Europe, Russia and the Middle East, the bridge between the oil and gas hungry Europe and oil and gas rich Russia and the Middle East • Turkey is one of the fastest growing economies with strong growth potential
Strong political support of the Project by the Governments of Turkey and the RF	• The project is supported by the governments of Turkey and the RF • It is based on the Intergovernmental Agreement (IGA) between the Turkey and the RF • Strong political priority for the project in Russia.
Substantial and growing demand for energy in Turkey	• Annual electricity demand in Turkey – 6% annual growth in 2000-2010, 8% annual growth is expected until 2023 • Electricity shortage is expected already in 2014, rolling blackouts currently occur in Turkey.
Interconnections with the EU and neighboring states (Middle East, Caucasus)	• Turkey joined ENTSO-E European synchronized zone • Opportunity to export electricity to neighboring states in Europe and the Middle East
Proven, safe, reliable and environment –friendly reactor technology	• Generation 3+ NPP meeting advanced safety requirements. Passive and active safety systems • Experience of the reference NPP operation in Russia, India, China • NPP design complies with the Russian norms, is in the process of obtaining all the required licenses and permissions in Turkey. The reactor refers to the evolutionary family VVER that meets all standards of the IAEA, the certificate EUR, will pass various international licensing procedures (Czech Republic, Great Britain), etc.
Attractive value creation potential	• Payback period : 18 years, IRR > 8% • 15 years fixed term PPA (power purchase agreement) with fixed price and assured return of investments • Favorable investment climate in Turkey. Electricity market liberalization and growing electricity prices
Diversified sources of funding	• Partners are invited to take part in Akkuyu NPP construction as equity investors (up to 49%), equipment suppliers (with credit agencies support), off-takers and providers of debt financing
Proven nuclear expertise and established legal framework	• Russia is one of the world leaders in the nuclear industry: 10 NPPs in operation/ 24 units in Russia with total capacity of 18.6 GW/ 19 more units are in order backlog overseas. Well-developed legal framework and reference NPP experience

Project information

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



Brochure about the project in Russian, Turkish and English



Public information Center

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Thank you for attention!

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