

Financing the Akkuyu NPP in Turkey

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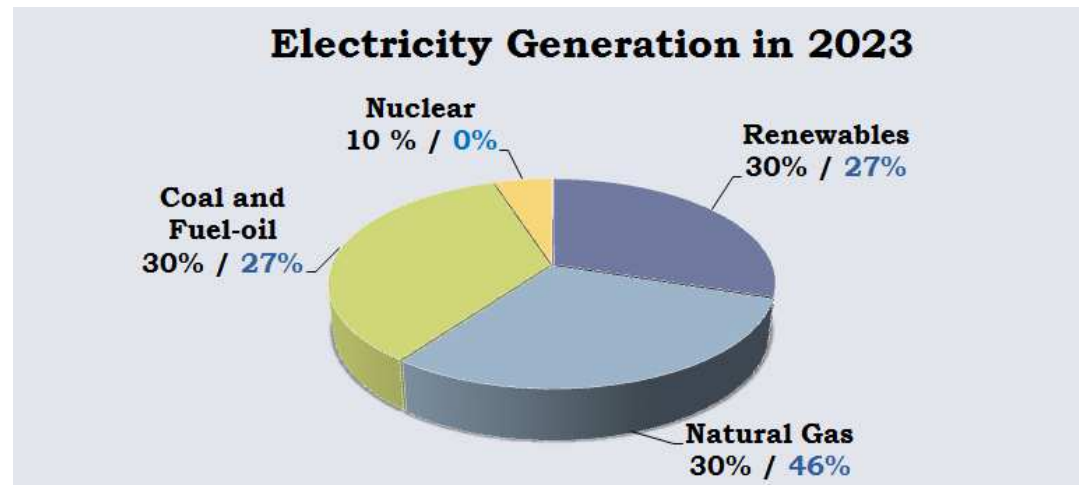
OECD/NEA, Nuclear Development Division

- ***Growing economy***
 - Demography (76 million, expected to increase by 1.1%/year in the near future)
 - Economy (growth rate of 5.1%/year in the last 12 years)

- ***Need for energy***
 - Total Primary Energy supply 105 Mtoe (+38% from 2000)
 - Relies heavily on energy imports (70% of total)
 - Electricity demand is at 241 TWh in 2012 with an expected increase of 6.5-7.5%/year
 - Electricity generation mix is based on gas (46%), hydro and coal (25% each)

- ➔ ***Clear political vision and strategy in terms of energy***
 - Defined objectives in terms of electricity generation mix
 - Unbundling and liberalisation of electricity sector and progressive opening of the electricity market

- Development of Renewable energy and nuclear
- Introduction of nuclear energy -> Target of 10% (2023) and 15% for 2030



Nuclear energy targets for 2023

- 8 Units to be operated and 4 units to be under construction
 - Akkuyu NPP (4800 MW)
 - Sinop NPP (about 4500 MW)
 - Third site (not officially declared)

- BOO model
- Contractor: ROSATOM
- Agreement signed 12 May 2010
- Estimated cost: 20-25 Billion USD
- Reactor Type: VVER-1200
- Number of units: 4 (4800 MW total capacity)
- Construction period: 2015-2022
- Operation time: 60 years



- PP partnership
 - 49% Turkish side: EUAS and, eventually, another company or IPO
 - 51% Consortium: Mitsubishi, Areva, GDF Suez and Itochu
- Inter-governmental agreement signed 3 May 2013
- Estimated cost: 22 Billion USD
- Reactor Type: ATMEA-1
- Number of units: 4 (4480 MW total capacity)



- Allocation of the NPP site
- Grid connection of the plant
- Facilitating the issuance of necessary licenses and permits
- Electricity power purchase according to the PPA

- No Sovereign Guarantees are provided

- Provide the capital
- Engineering design
- Obtaining all permits and licenses
- Construction, management and supervision
- Commissioning of the NPP
- Supply of equipment and material including nuclear fuel
- Operation and maintenance
- Waste management and decommissioning of the NPP
- Technology transfer and exchange of information
- Training of the Turkish staff of the NPP

- Russia is responsible for creating the Project Company and providing financing
 - The PC may sell up to 49% of the shares to the public (upon consent from Turkey)

- Structure of financing is preliminary envisaged as 20% equity – 80% debt
 - Equity financing (4 billion USD) is provided by Russian Federation
 - Rosenergoatom or other shareholder's bank credits
 - Funds of outside investors
 - Interest rate on credits are assumed to be 7-8%
 - Subsidy of credit rate from the Russian Government?
 - Export Credit for equipment/services provided by European suppliers
 - If OECD rules apply, this could represent up to 85% of the value (1.6 billion USD)

* (source MENR)

- Signed between TETAS and the Project Company
- Duration of the PPA: 15 years
- 70% of the electricity produced by Units 1 & 2 and 30% by Units 3 & 4
 - The Project Company will sell the remaining electricity to the market
 - One year before starting commercial operation, the PC has to indicate the amount of electricity to be produced in the first 15 years by each unit
 - The contractual arrangements and responsibilities in case of late/early commissioning will be reflected in the PPA price, but details are not public
- Electricity price at 123.5 USD/MWh (VAT excluded) in nominal term
 - Possibility to modify the price trajectory of electricity price (up to 153.3 USD/MWh) to ensure the payback of the project
- No Escalation costs
- Contribution to decommissioning and waste management funds (1.5 USD/MWh) during the length of the PPA
- Transfer of 20% of net profits of the PC to the Turkish Government after the expiry of the PPA

- *Present Value of the electricity price defined in the PPA*
 - Defined in nominal terms and valid for a period 2020-2035
 - Depends on the assumed discount rate (2%-6%) and on assumed price trajectory
 - Average wholesale electricity price for 2010 was 93.8 USD/MWh
 - The PPA has the same value of the 2010 electricity wholesale price for 1.9% discount
 - The value of “price trajectory” is about 2%-5%

	<i>Value (In USD 2011 per MWh) of the purchase price agreement at different discount rates</i>								
	2.0%	2.5%	3.0%	3.5%	4.0%	4.5%	5.0%	5.5%	6.0%
<i>Constant price trajectory</i>	92.10	85.76	79.92	74.53	69.56	64.98	60.73	56.81	53.18
<i>Maximal value</i>	93.74	87.66	82.04	76.83	72.00	67.53	63.37	59.52	55.93

- *Construction risk*
 - The PPA is not adjusted to reflect potential cost overruns
 - Construction risk is borne exclusively by the project company (state-owned)
- *Construction delays*
 - Cost will be borne by the party responsible for the delay
 - The PC has the obligation to provide the agreed amount of electricity at the fixed price

- *Electricity market risk*
 - The PPA is applied to 50% of the electricity produced by the NPP for the first 15 years, while the remaining will be sold on the wholesale market
 - The PC will be exposed to market and currency exchange rate risk
 - TETAS will be exposed to market risk and exchange risk during the PPA
 - Demand for electricity is rapidly growing in Turkey
 - Wholesale prices are strongly correlated with coal and gas prices (expressed in USD)
- *Design risk*
 - The NPP is designed to withstand earthquakes of magnitude 9, but studies are on-going
 - The PC will face the risk of safety-related design upgrades
- *Waste management and decommissioning risk*
 - The PC bears most of those risks
 - Turkish State is responsible if funds for decommissioning are insufficient (up to 25%)
- *Political risk*

- Strong political support from Governments of Turkey and Russian Federation
 - Clear strategy and objectives in term of energy infrastructure
 - Nuclear is a strategic sector for Russian Federation
- Growing electricity demand in Turkey
- Guarantee of a stream of revenues via the PPA in USD
- Structure of the Turkish electricity market limits exchange rate and country risks
- Russian contractor fully takes the construction risk
 - Proven reactor design, several units constructed recently by Russian industry
 - Integrated supply chain from design and engineering to spent fuel management
- Financial support/guarantees from the Russian government

Thank you for your attention