

# Jordan Atomic Energy Commission

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## Financing Perspective for Jordan Nuclear Power Plant

London, May 09, 2012



# Agenda

- Jordan's Nuclear Power Programme
- Financing Challenges
- Financing Options
- Delivering a Financeable Project
- Way Forward



# Jordan Country Profile



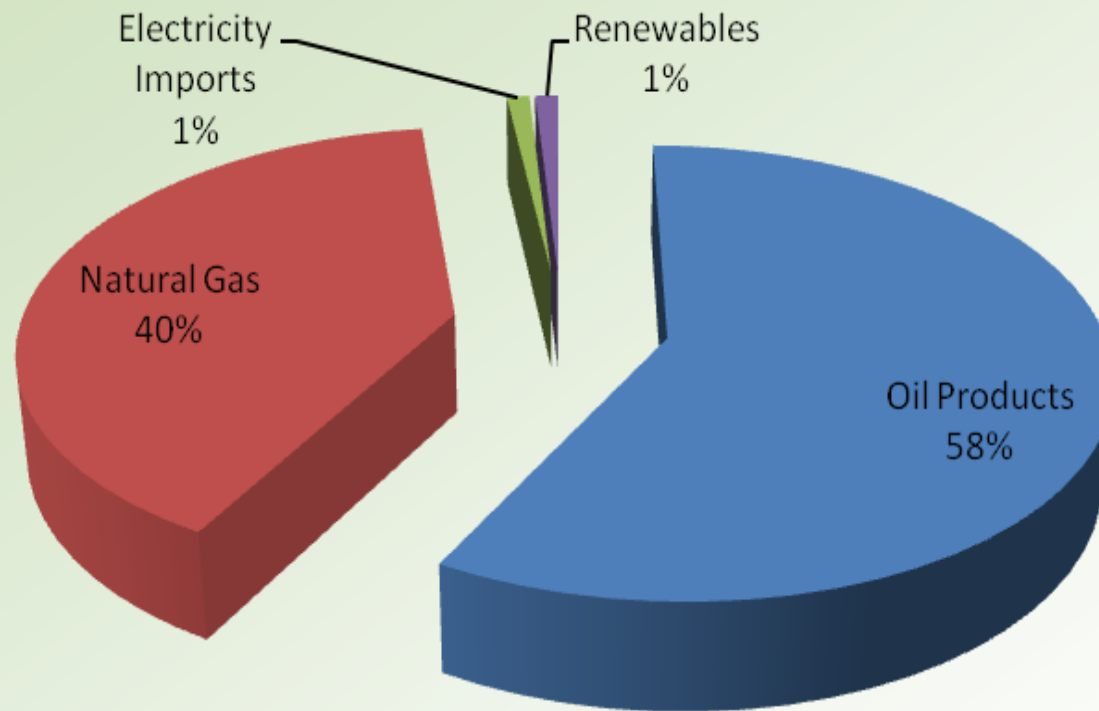
- Total Area: 89 213 sq. Km
- Sea Port: Aqaba
- Coastline: 26 Km
- Population: 5.96 million  
31% (15- 29) 38% (below 15)
- Climate: Mediterranean & Arid Desert
- GDP: \$21.5 billion
- Per Capita: \$3,554
- Annual GDP Growth: 7% (2000-2009)

# Jordan's Nuclear Power Programme – Why Nuclear Power?

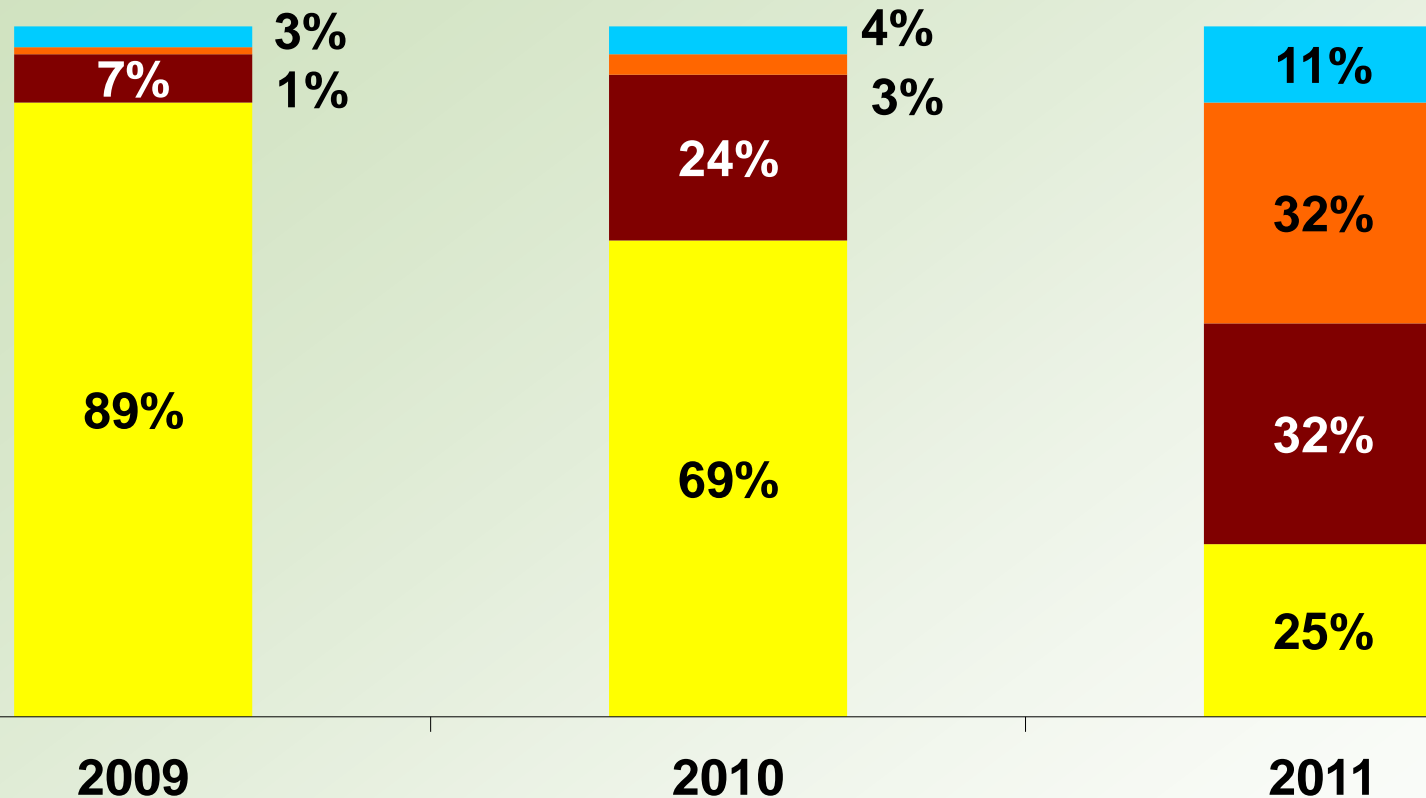
- Growing demand for energy
  - electricity
  - desalination
- Need for Baseload power
- Diversification away from hydrocarbons
  - high and volatile prices
  - greater energy independence/security of supply
- Lack of indigenous fuel options



# Energy Mix - 2009



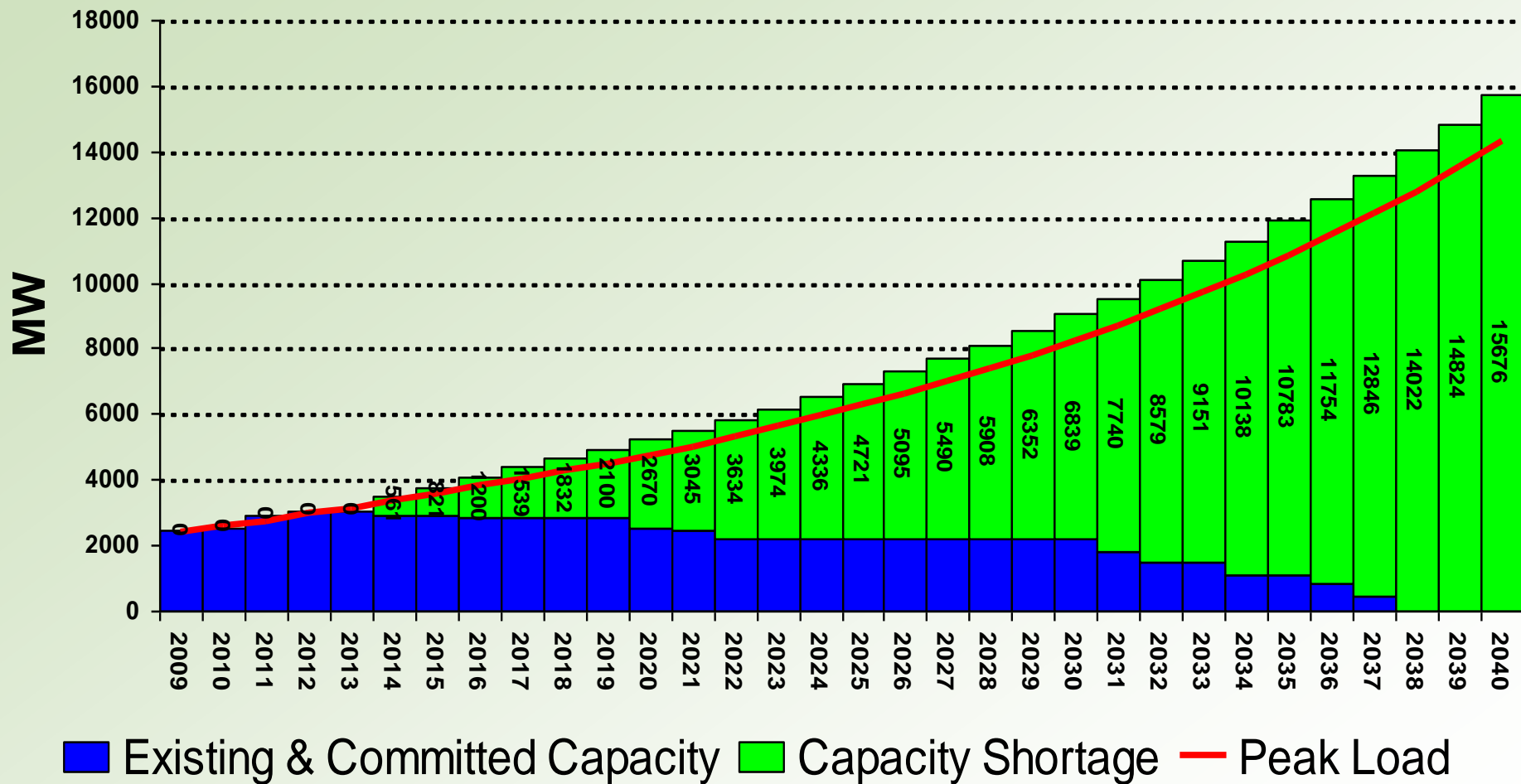
# Electricity Generated by Fuel Type



■ NG ■ HFO ■ LFO ■ Imported Electricity



# Available and Committed Capacities versus the Electricity Median Load Forecast



# Status of Implementing Nuclear Power in Jordan

- Established key bodies:
  - Nuclear Regulator – JNRC
  - Nuclear Procurement Agency - JAEC
- Building the Infrastructure
  - Sites
  - Laws and regulations
  - Education
  - International Collaboration – IAEA, Peer Groups, Collaboration Agreements
- Technology Selection
  - Detailed process using IAEA methodology and supported by experienced advisors
  - Shortlisted two technologies for final negotiations
- Identification of operator/investor partner





# Financing Challenges for Nuclear Power in General

- Capital intensity and long pay-back period
- Risk of construction delays and cost increase – potential for stranded investments
- Market risk – requires stable power offtake arrangements
- Nuclear liabilities – spent fuel, decommissioning
- Political and regulatory risks – e.g. Germany's exit from nuclear
- Accidents – Fukushima-type events affect the whole industry
- Lack of experience in financing nuclear and condition of the capital markets



# Financing Challenges for Jordan in Particular

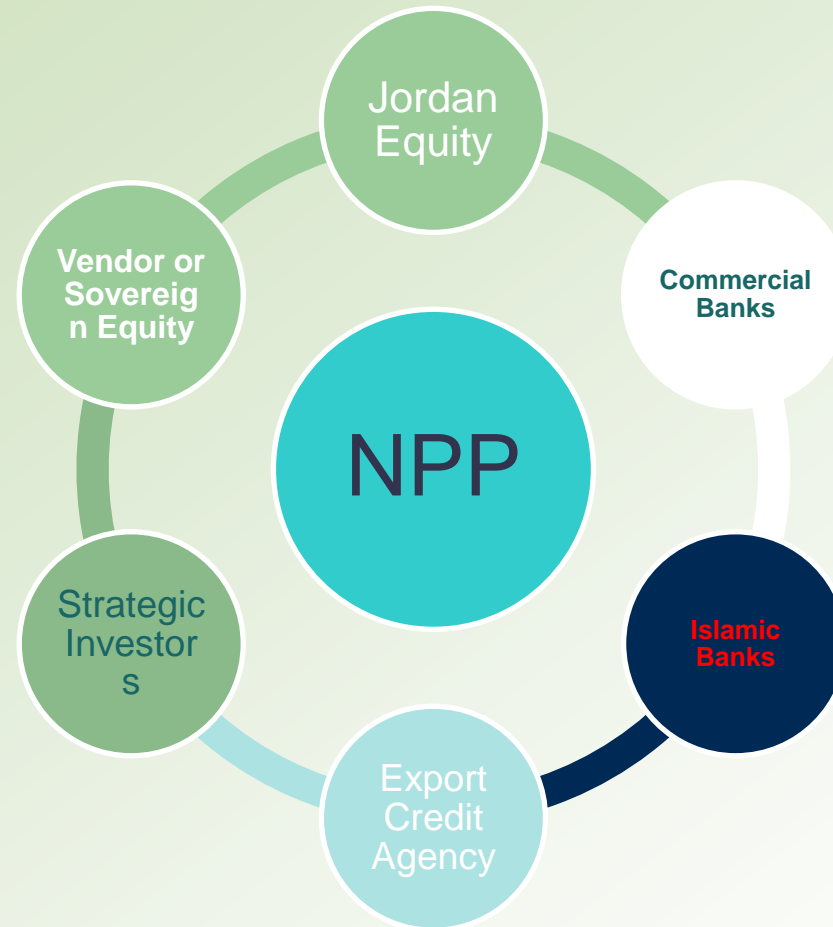
- Scale of the investment relative to Jordan's GDP
- Limited Government financing available – not like many other Arab Countries
- Jordan's credit rating and IMF restrictions are hurdles for financing and ability to provide sovereign guarantees (which are likely to be required)
- First nuclear power plant – no track record of construction or operation
- Regional issues

# Financing Options

Option	Characteristics	Applicability to Jordan
<b>Project finance</b>	Limited or non-recourse financing	Very few, if any examples, worldwide – extremely difficult for new entrant such as Jordan
<b>Private sector utility financing</b> e.g. EDF (UK), Southern Company (USA)	Large utility finances project all or largely on-balance sheet  Level of pricing certainty/support may be required or cost recovery via regulated customer base	Currently, no private sector utilities in Jordan  Intention is to establish a nuclear utility owned by Jordan and strategic partner(s)
<b>Federal/State financed</b> e.g. China, Russia	State-owned utility	Scale of financing required beyond Jordan's capability
<b>Finnish – “Exeltium model”</b> e.g. Olkiluoto	Plant built to serve consortia of large power users. (paper mills, aluminium smelter) Plant itself is not for profit	Power required for non-industrial consumers – industrial users not of sufficient scale
<b>Vendor/Sovereign financing</b> e.g. Turkey	Government of the vendor finances (all or part), builds and operates plant	Attractive to Jordan as long as Jordan participates in project



# Financing Sources for Jordan



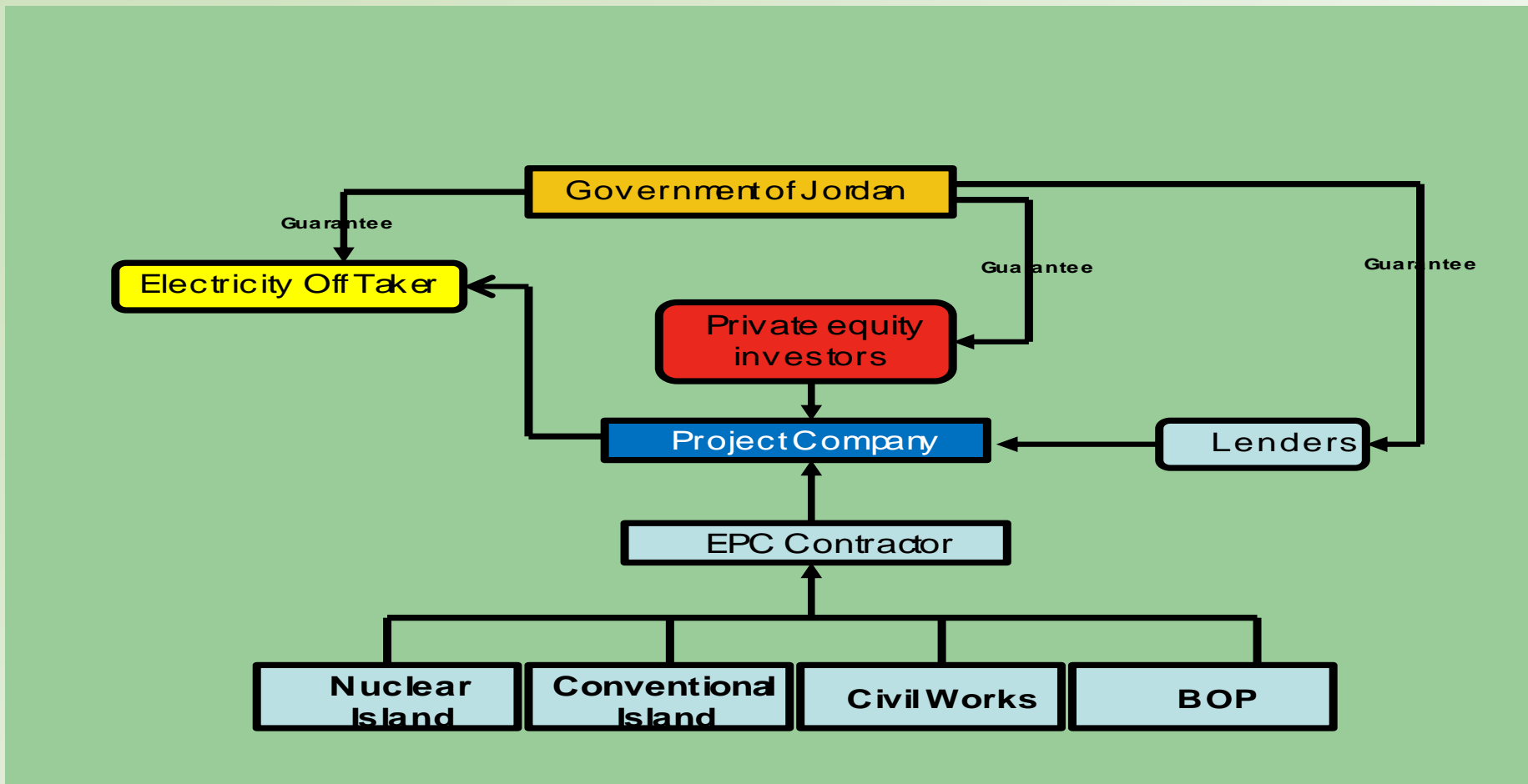
# Delivering a Financeable Project Infrastructure Development

- Following IAEA guidelines
- Modern reactor technology - evaluating Gen III+ technologies incorporating latest safety systems
- Thorough site selection and licensing process
- Developing legal and regulatory framework
- Working with the international nuclear community
- Developing nuclear capabilities in Jordan
- Identifying an experienced international nuclear strategic partner

# Delivering a Financeable Project Project Structure

- **Schedule risk** - two project phases:
  - Early Works Phase – develop project definition and reduce project risk
  - Project realization phase for which financing/investment solutions will be investigated
- **Construction risk** - EPC contract with major vendor
- **Political risk** - direct Jordanian government investment in the project
- **Fuel risk** - secure fuel supply agreement
- **Market risk** - Long term power purchase agreement
- **Operating risk** - Strong international operator
- **Nuclear risk** – international treaties, decommissioning and spent nuclear fuel policy

# Potential Project Structure



# Next Steps for Jordan NPP

