Pre-investment requirements for nuclear energy projects: international harmonization, licensing and investment strategies

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- Reactor Vendors
- Nuclear Engineering, Construction, Waste Management & R&D
- Operators
- Transport, Legal, Financial, Insurance & Brokerage
- Uranium Mining, Conversion, Enrichment & Fuel Fabrication
Worldwide presence

- **Americas**
  - Argentina, Brazil, Canada, USA

- **Europe**
  - Belgium, Bulgaria, Czech Republic, Finland, France, Germany, Italy, Lithuania, Luxembourg, Netherlands, Poland, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom

- **Russia and Central Asia**
  - Kazakhstan, Russia, Uzbekistan

- **Africa and Middle East**
  - Israel, Jordan, Namibia, South Africa, United Arab Emirates

- **Asia-Pacific**
  - Australia, China mainland and Taiwan, India, Japan, Singapore, South Korea
What we do

Nuclear Industry Cooperation
Joint positioning in economic, safety and environmental issues

Nuclear Energy Communication
Wider understanding among public, politicians and decision-makers

Nuclear Information Management
Trustworthy, comprehensive and easily accessible information
Rising electricity consumption worldwide

Share of nuclear energy has started to rise

Increasing nuclear construction

Based on WNA Reference Scenario

**World Nuclear Power Reactors**

**North America**
- Under construction: 5
- Projected: 7
- Total Value: $ 90 bn

**Europe (EEA)**
- Under construction: 4
- Projected: 19
- Total Value: $ 179 bn

**CIS**
- Under construction: 11
- Projected: 26
- Total Value: $ 163 bn

**Latin America**
- Under construction: 2
- Projected: 1
- Total Value: $ 14 bn

**West Asia**
- Under construction: 3
- Projected: 14
- Total Value: $ 75 bn

**South Asia**
- Under construction: 7
- Projected: 21
- Total Value: $ 94 bn

**Africa**
- Under construction: 0
- Projected: 2
- Total Value: $ 20 bn

**Southeast Asia**
- Under construction: 0
- Projected: 4
- Total Value: $ 22 bn

**East Asia**
- Under construction: 37
- Projected: 103
- Total Value: $ 590 bn

**Total**
- Under construction: 69
- Projected: 197
- Total Value: $ 1.2 trillion
IEA 2°C Scenario: Nuclear to provide the largest contribution to global electricity in 2050

Substantial nuclear growth is required to meet demand in IEA 2°C scenario

Nuclear energy is subject to stringent regulation

1. Export/import licenses – to control nuclear technology and safeguard fissile materials
2. Reactor design licence – i.e. the design is safe
3. Site licence – i.e. the site is suitable for a nuclear power plant
4. Reactor construction licence – approval of detail design & the safety analysis case prepared by the operator to demonstrate that the risks of operation will be as low as reasonably practical
5. Reactor operation is licenced and monitored
6. Periodic safety reviews – e.g. every 10 years to take account of experience and lessons-learned
7. Waste management is licensed and site is de-licensed
8. Additional licenses – e.g. environmental impact, hazardous chemicals and materials, etc.

International Atomic Energy Agency issues guidelines for member states but nuclear energy is regulated for safety, security, safeguarding of fissile materials and technology and environment impacts at the national level.
Major licensing steps for a new nuclear power plant

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<td>develop PSAR</td>
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CL: construction licence
OL: operating licence
COL: combined construction and operating licence
RHP: regulatory hold point (consent, permit, ITAAC,....)
PSAR: preliminary safety analysis report
FSAR: final safety analysis report

N.B. Typical construction period may be 40-110 months (shortest in Asia)
Pre-investment and final investment decision in building a new nuclear power plant

- Pre-licensing design?
- Pre-licensing site?
- Develop PSAR
- Develop FSAR
- Prepare appl.
- CL application
- CL
- OL application
- OL
- Order long-lead items
- Construction
- Operation
- Utility contracts with reactor vendor
- Limited work authorization
- Final investment decision by utility
- First revenue

EIA: Environmental Impact Assessment
Nuclear newcomers

Most countries that plan a nuclear energy program will sign an inter-governmental agreement with a potential supplier state to cover technical assistance and regulatory cooperation. World Nuclear Association would like to see greater regulatory cooperation and harmonization to facilitate the adoption of nuclear energy.
How the International Energy Charter can help

Title I: Objectives

• removal of technical, administrative and other barriers to trade in energy and associated equipment, technologies and energy related services;
• promotion of the harmonisation of rules, regulations and standards in the field of energy;
• achieving and maintaining a high level of nuclear safety and ensuring effective cooperation in this field;
• promotion and use of low emission technologies.
How the International Energy Charter can help

Title II: Implementation

5. Safety principles and guidelines

Consistent with relevant major multilateral agreements, the signatories will:

- cooperate to implement safety principles and guidelines, designed to achieve and/or maintain high levels of safety standards and the protection of health and the environment;

- develop such common safety principles and guidelines as are appropriate and/or concur on the mutual recognition of their safety principles and guidelines.
Harmony objectives

- Enhance standardisation
- Harmonise and update global codes and standards
- Streamline licensing processes
- Ensure efficient and effective safety regulation
- Enabling international trade
- Nuclear innovation: enable development and licensing of new technologies
Thank you:
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