

SMR MARKET OPPORTUNITIES

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AGENDA

- **FINDINGS FROM IFNEC / JORDAN (JUNE 2014)**
- **SMR PROJECT RISKS – FROM AN INVESTOR'S PERSPECTIVE**
- **GOING BACK TO BASICS**
- **DE-RISKING PROJECTS**
- **HOW COULD AN SMR DEVELOPMENT PROGRAM LOOK LIKE?**
- **BRINGING IN INVESTORS**

FINDINGS FROM IFNEC / JORDAN (JUNE 2014) – SMR FOR EXISTING NUCLEAR MARKETS

1

Understand the practical implications of SMR technology regarding safety regulations, national laws, international conventions, with the impact changes will have on financing, rating agencies, insurers etc. Leverage SMR benefits.

2

Clarify the economic regulatory approach, market structure (regulated vs unregulated) and in that context establish the optimum financing structure. Include as necessary firm contracts, loan guarantees, subsidies, tax credits, and applicable government participation.

3

Establish regulatory confidence early, including design certification with strong EPC and vendor engagement. Leverage current large fleet operating experience, while maximizing SMR benefits.

4

Develop detailed risk management strategy. Identify all risks, ownership and mitigation action plans. Risks include licensing, manufacturing, supply chain, operational, financial, political, reputational, and FOAK-related technology.

FINDINGS FROM IFNEC / JORDAN (JUNE 2014) – SMR FOR NEW NUCLEAR MARKETS

1

Select SMR technology as early as possible utilizing proven operating design and performance. Use international support for the tailoring of licensing and regulatory approaches to satisfy host country requirements.

2

Consider the feasibility of bilateral arrangements with countries that are capable of providing unsecured support.

3

Establish ownership and operating responsibilities. For ownership, clearly establish distribution of risk. For operations, secure experienced technical support, human resources and training.

4

If the project will be financed, develop comprehensive financing plan based on early interactions between host country, vendor, EPC, investors, insurers, and rating agencies. First, consider the critical role that host country support (guarantee) will play in establishing the feasibility of any financing approach. Determine level of financial support available from the market structure, EPC, vendor, exporting country, other partners.

SMR PROJECT RISKS – FROM AN INVESTOR’S PERSPECTIVE

KEY CHALLENGES

- FOAK Risk
- No Reference Plant
- Untested regulatory structure/licensing risk and cost
- Other challenges are no different than existing LWRs (reputational, completion risk, nuclear liability) but without the benefit of economies of scale

KEY BENEFITS

- Shorter construction period
- Lower cost
- Simpler and enhanced safety/passive systems
- Can be built in series
- Phased financing
- Grid suitability
- Other applications such as desalination and mining

SO WHAT DOES ALL THIS MEAN?

**Will SMRs be
easier to
finance/develop?**

NOT REALLY (at least not for now)

ABSOLUTELY

**Do they present
a unique
first-mover
opportunity?**

FIRST, GOVERNMENT FUNDING / SUPPORT IS ESSENTIAL...



Many of the benefits of nuclear energy are sovereign in nature

- Energy security
- Energy diversification
- Climate change mitigation
- Industrial development
- Promoting higher education, highly trained workforces
- Promoting research and development



- Only governments can properly value these benefits
- Experience shows that no nuclear project will go ahead without significant host government involvement
- Government involvement can take different forms, including long term PPAs/sovereign guarantees and investment

...HOWEVER



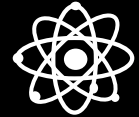
Pure reliance on government funding may lead to lack of fiscal discipline/ lack of accountability/ inefficiency



Government funding and support should be seen as a bridge to private sector support with government support decreasing over time



Attracting private sector funding requires governments/ developers to begin planning and thinking as private investors would



Analyzing nuclear projects based on project financing models will help identify and mitigate the risks just like a prudent/conservative financial institution would

GOING BACK TO BASICS

- First answer the following 5 questions:
 - Do you need a nuclear power plant?
 - Do you want a nuclear power plant?
 - Can you afford it?
 - How will you pay for it?
 - Can you manage and support it?

- Once you answer these questions then you also need to answer HOW :
 - Will you build it?
 - Will you operate it and generate the power?
 - Will you maintain it in the long term and continue generating the power?
 - Will you decommission it and clean up the site at the end of its life?

- Answering these questions will allow you to develop a plan to procure/construct/finance and operate nuclear power project

WHAT SHOULD BE (BUT NOT ALWAYS IS) THE EASY PART: DE-RISKING YOUR PROJECTS

SAFETY

Demonstrable safety culture – in absence, regulators will delay projects

DESIGN

Complete detailed design, recently constructed reference plant using proven supply chain and construction team

VENDOR MANAGEMENT

Integrated project delivery team with key personnel experience in building nuclear power projects and experienced sub-contractor networks

OWNER MANAGEMENT

Owner experience in managing large construction projects

PROJECT MANAGEMENT

Sound project management is best way to minimize risk. Vendor implemented with “hands off leadership by owner” (as stated by one of the most experienced project managers I know)

OWNER-VENDOR PARTNERSHIP AND TEAMWORK

A good contract should be your guide, not a manual for filing claims

WHAT SHOULD BE (BUT NOT ALWAYS IS) THE EASY PART: DE-RISKING YOUR PROJECTS (CONT.)

REGULATORY PROCESS AND INTERFACE

Clear and established interface mechanisms with the regulator; capacity and capability of regulator; cooperation between regulatory authorities; country of origin licensing

HOST GOVERNMENT AND EXPORT GOVERNMENT SUPPORTING STRUCTURES

Bilateral nuclear cooperation on export controls, nuclear liability, industry participation and human resource development

HUMAN RESOURCE DEVELOPMENT

Long-lead item

HOW COULD AN SMR DEVELOPMENT PROGRAM LOOK LIKE?

- 1 • Goal is to develop a demonstration project in a host country

- 2 • G-to-G deal where host and export governments support the development of the project and the regulatory system
• Governments develop jointly the regulatory and project development model
• Host and exporting governments take the licensing, completion and nuclear liability risks

- 3 • After demonstration that it can be licensed/built/operated successfully private investors come in
• Governments retain any uninsurable risks
• Governments have licensing rights for future earnings as a return on earlier investment/risk assumption

- 4 • More SMR projects built in the host country by private industry
• SMR and licensing regime exported to other markets

BRINGING IN INVESTORS

ENGAGEMENT

- Engage with investors at the early stage of project development

UNDERSTAND AND EXPLAIN RISKS

- Demystify
- Speak in plain terms
- Apply practical perspective on likelihood and potential impact

DEVELOP SOLUTIONS

- “Lessons learned”
- Explain what you will do differently to avoid past challenges and deal with new challenges
- Detailed risk identification/allocation/mitigation

SPEAKING WITH INVESTORS

Industry says...
“New Technology”

...Investor hears
FOAK risk

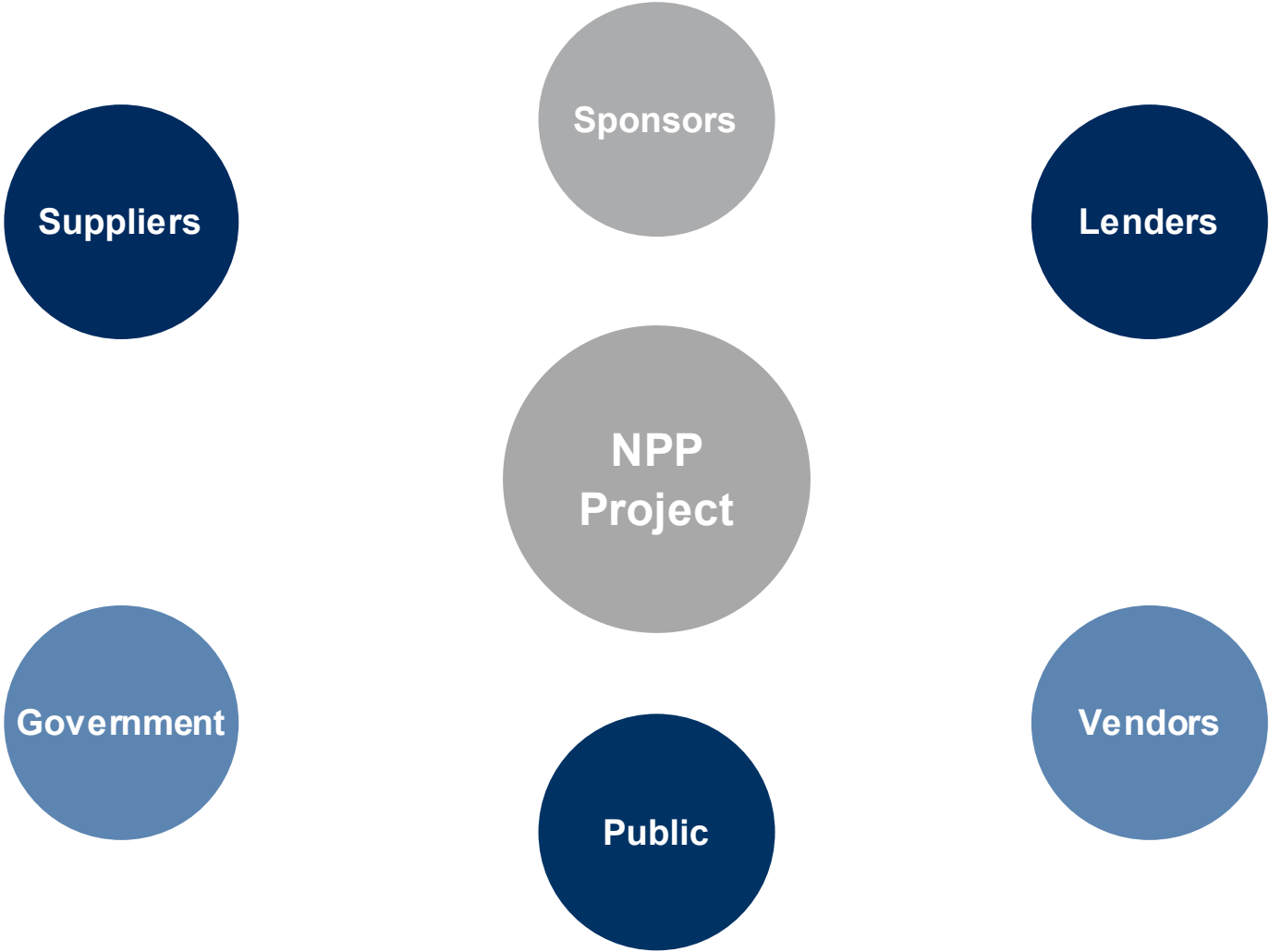
Industry says...
“Walk away safe”

...Investor asks
**Who is taking the residual
nuclear liability risk?**

Industry says...
“Consortium”

...Investor thinks
**Who is taking the completion
risk?**

VIEW OF RISK



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