



De-risking Nuclear Power Projects

Session 7: Financing Issues

*IAEA Nuclear Economics Workshop Series:
Workshop on the Economics of the Current Generation of Nuclear Power
Plants*

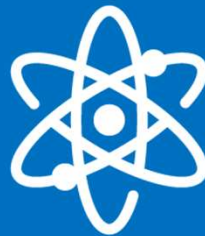
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- Risks in NPP Development
- Importance of a Project Risk Register
- Economics & Financing
- Concluding Thoughts

Risks in NPP Development



Project Risk in the Context of Financing

One of the principles of Project Finance is ...

The risk should be borne by the party in the best position to manage the risk.

Consider: Is this statement fully applicable to a nuclear power project?

But in a financing / project development context, important to consider incremental costs to the project:

What is the “risk premium” associated with the assumption of risk by supplier, contractor, or offtaker?

Who bears the risk if the key project participants got it wrong?

For lenders, the key question is: “Have all the risks been addressed and allocated among the key project participants?”

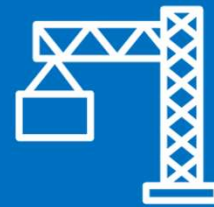
COST AND COMPLETION RISK: WHY HAVE PROJECTS STUMBLLED?

1. Regulatory changes
2. Estimating errors (both generally and due to overall length of construction period)
3. Lack of / Lost execution experience
4. NSSS knowledge vs. project delivery experience
5. Supply chain failures
6. Inexperienced subcontractors (and the challenges of localization)
7. Lack of in-country experience
8. Site specific changes (vs. reference plant)
9. First-of-a-kind issues
10. Changes in public / government support
11. Political / country risk factors
12. Lack of an “informed customer” (note the importance of a competent Owner’s Engineer)
13. Labor availability (esp. specialty crafts)
14. Commodity price fluctuations
15. Lack of a project management “A Team” (either due to inexperience or capacity challenges)
16. Geopolitical events / force majeure

Country Risk: Focus Areas for a Project Developer and/or Project Participant

- Country stability (both economic and political)
- Sovereign credit rating
- Exchange rate fluctuations
- Tax policy
- Licensing and regulatory requirements
- Consistency (vs. unpredictability) in the legal and regulatory regime
- Geopolitical dynamics, to include specific bilateral linkages between host country and country of origin
- Rule of law
- Ethical behavior (e.g., country rating on levels of corruption)
- Contractual terms and conditions
- Local market capacity (to include host nation plans to develop / expand such capacity)
- Local content requirements
- Technology/knowledge transfer requirements
- Availability of skilled labor
- Prior experience with nuclear technology and power generation
- Commitment to multiple NPPs (as opposed to a “one-off” project)

The Importance of a Project Risk Register



What are the Elements of a Project Risk Register?

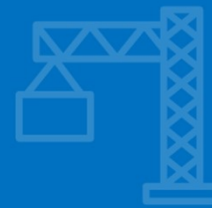
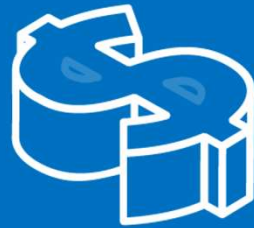
- List of potential risks
- Assessment of likelihood of the risk
- Assessment of impact of the risk
- Allocation of the risk (and potential price impact)
- Mitigation of the risk
- Management of the risk

Query: Should some risks be shared? If so, why?

Why is the Project Risk Register a Useful Planning Tool?

- ✓ “Double Check” effect
 - ✓ Means of alignment / common understanding among key stakeholders
 - ✓ Isolation of where real problems exist
 - ✓ Influences on: Project Structuring; Project Documentation; Financing; Economics; Government Support; Insurance Program
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- ❖ Note that the risk register should be influenced / informed by a robust “lessons learned” analysis
 - including both positive and negative lessons
 - drawing from both nuclear and non-nuclear projects
 - incorporating international “best practices”

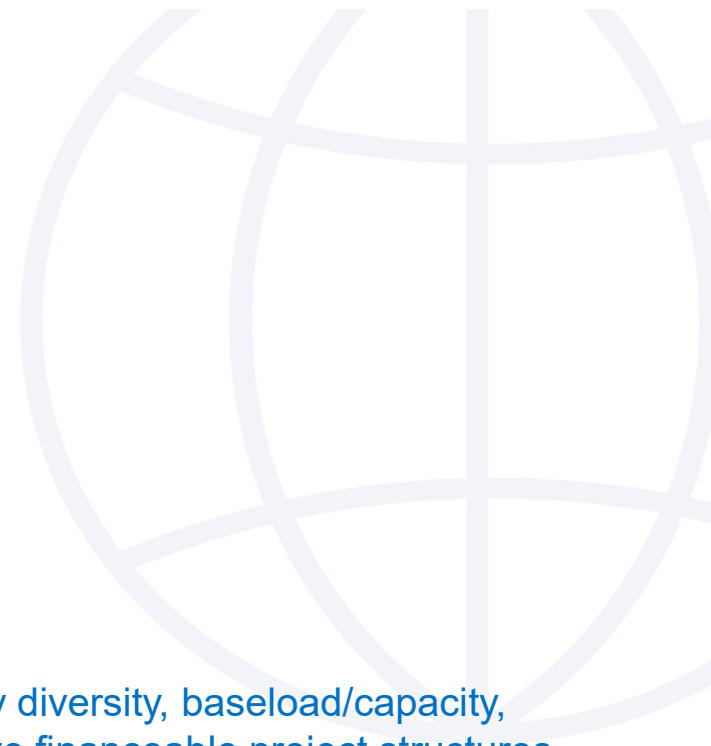
Economics & Financing



Creating Certainty

The Project's economic viability will drive financing

- Economic certainty is needed to support financing structures
 - Challenges of market deregulation
 - Preferences & Subsidies for renewables
- Certainty is created by long-term, creditworthy structure
 - Regulated structure or Regulated Asset Base model
 - Power Purchase Agreement
 - Contract for Difference
- Need to consider intangibles of nuclear power (energy security, energy diversity, baseload/capacity, decarbonization/net zero) to justify economic supports needed to create financeable project structures
- Need to recognize that electricity constitutes “critical infrastructure”
 - Such an approach can drive policy decisions that create the necessary project fundamentals for a financeable project



Reducing Financing Costs

Remember, that risks change over time

- Development and Construction Period: high risk; limited sources of capital
- Operating Period: low risk; new sources of capital
- ❖ *But risk is only “low” if the revenue stream is stable*

Lowering the cost of capital

- Need to build a phased financing plan to reduce the overall cost of capital
 - investors unwilling to take long development & construction risk
 - need to mobilize capital particularly after COD, which requires economic certainty
- Government sources can provide lower cost financing, which created project savings
- De-risking can mobilize capital, which can then take out government support that is needed during development & construction

Key: build a financing plan that considers different stages of risk and sources of capital



CONCLUDING THOUGHTS



De-risking NPPs to create economic viability & financeability

- **Risk** and **Price** move together
- Risk analysis should influence project development and structuring
- Risk analysis should be done early in the project planning cycle, and the project risk register should be updated as the project progresses through various phases
- Risk analysis should draw from international “lessons learned” and “best practices”
- Remember: ***Prior Planning Prevents Poor Performance***
- Note: ***Risks change over time***
- Governments (and government-owned entities) should have longer-term and broader interests, which can facilitate risk management techniques during the high-risk portions of the project’s lifecycle
- De-risking the project can enhance financeability



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