Project Finance Structures for Nuclear Power Plants

Jason Crowell - Peace | Crowell LLP
Jacques Lavoie - Emirates Nuclear Energy Corporation
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- The single largest debt financing of a power project in history
- One of the largest joint venture transactions underpinning a contemporary new nuclear program
- K-Exim’s largest single loan exposure to date
- A power purchase agreement securing a nominal revenue stream of nearly $300 billion over its term, making it one of the single largest commercial contracts in history
- Structured and re-structured multiple times prior to closing, including adapting many “Project Finance” like structures and concepts in early iterations
- Major Challenge: How to structure requisite governmental support in a manner palatable to all governmental stakeholders
Market Size - Under Construction and Projected

New reactors & investment by 2030

World Nuclear Power Reactors

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

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

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

Africa
Under construction: 0
Projected: 2
Total Value: $ 75 bn

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

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

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

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

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

Total
Under construction: 69
Projected: 197
$1,196 bn
Nuclear Power Plants Are Among the Most Complex Infrastructure Projects to Develop

Complicated Stakeholder Interfaces

- Technology Exporters & Other Project Participants
- Shareholders & Prospective Equity Investors
- Host & Exporting Country Governments & Governmental Authorities
- Special Interest Non-Governmental Organizations
- Local & Global Communities & Citizens
Nuclear Power is a Uniquely Government Undertaking

- Some form of Governmental financial support will be required because few project sponsors have the balance sheet capacity to independently raise capital required for a new nuclear power project
  - Subsidies
  - Completion guarantees
  - Equity
  - Nuclear liability protection
- The manner in which government support is provided will be challenged if viewed as an unfair subsidy or structured as a “bail-out”
  - E.g., State Aid rules in the EU
Can Project Finance Principles be Adapted & Applied to Finance a Nuclear Power Plant?

1. Introduction
2. The Challenges of Project Finance for Nuclear Power
3. A Potential Project Finance Solution
Key Areas Where Traditional Project Finance Approaches Require Re-Examination in the Context of Nuclear Power Projects

1. SQEPs & Executive Managers
2. Construction Period Risks
3. Nuclear Third Party Liability
4. Negotiating a Proper “Nuclearized” Project Finance Loan Agreement
5. Effectiveness of Traditional Project Finance Remedies
Lenders Must Consider Extending Credit to a Business Enterprise Rather Than a Physical Asset

- A 2- to 4-unit nuclear power station will employ thousands of highly skilled employees, many of whom are operators which are individually licensed to perform safety-related functions.

- Those employees are managed by a team of executives dedicated specifically to safe and efficient operation of the nuclear plant, and who are approved to do so by the applicable nuclear regulator.
Construction Period Risks Demand Additional Credit Enhancements

Sources & uses analysis overlooks

- **New Nuclear Regulator**
  The cost and complexity of establishing a new Nuclear Regulator is often overlooked

- **Government Institutions**
  Other government institutions and offices must be brought up to speed on international matters like interaction with the International Atomic Energy Agency

- **Host Country Residents**
  Host country residents must be brought to a level of competency to run and operate a plant

- **Other Support Infrastructure**
  Emergency preparedness facilities must be developed and local emergency responders and hospitals must be trained

- Nuclear power plants are notoriously late and over-budget
- First of a kind risks
Total Cost & Tariff Considerations

What costs will be included in the project budget/tariff?

- True “Project Costs”
- Costs of setting up a nuclear regulator
- Capacity building and training local nationals
- Consider lender expectations

How much variability in the final tariff will the host government permit?

- Lenders and any equity investors are likely to require significant contingencies
- Host government/offtaker may consider an adjustable tariff and reduce or eliminate the contingencies

Contractual “rate-making”

- With a flexible tariff, it is possible to develop an audit/prudency review as a basis for tariff adjustment
- Well crafted adjustment mechanisms can eliminate the need for contingencies and floors on the tariff and price for power

Early engagement with host government stakeholders

Early engagement with host government stakeholders to set expectations for tariff methodology and ensure proper intra-government alignment as to the manner in which potential overruns will be funded and their impact on the tariff
Nuclear Third Party Liability (NTPL)

- Lender concern focuses on extra-territorial non-convention claims - i.e., claims for nuclear damage brought by claimants domiciled or suffering harm in a “non-convention state”

- Changes in legislation and treaty framework (such as adoption of CSC, revised Paris/Brussels Conventions, the Vienna Convention, and the Joint Protocol) could mitigate some lender concerns, but lender NTPL risk cannot be fully addressed under current international frameworks absent some form of indemnity or other similar financial security

Nuclear development is an international business

Nuclear Liability Laws & Treaties

- Vienna Convention on Civil Liability
- Paris Convention on Nuclear Third Party Liability
- Joint Protocol
- Convention on Supplementary Compensation
Negotiating a Proper “Nuclearized” Project Finance Loan Agreement

- The two most significant “nuclear issues” for lenders
  - Potential NTPL in case of a nuclear incident
  - Reputational considerations associated with lending to a nuclear project

- Spectrum of appetite for “nuclear issues”
  - Some lenders will not provide financing for a nuclear project at all
  - All lenders will require NTPL concerns to be addressed
    - Indemnities or guarantees for all nuclear damage, “extraterritorial” nuclear damage from claims in “non-convention” states, and/or litigation cost protection
    - Structural solutions ranging from split-entity structure to credit constructs that obviate the need to look to project performance for repayment of the debt
Structural Considerations
Dual-Entity & Concession-Like Arrangement

Host government retains ultimate legal ownership of land, buildings and equipment constituting the Project.

**Host Sponsor**
- Local company/corporation owned by the host government or by the utility
- **Owns legal title to the land and physical assets comprising the Project**
- Grants a concession/development rights to the JV ProjectCo

**ProjectCo**
- Borrower under loan facilities
- Holds the commercial and economic entitlements of the Project, including the PPA
- Loan covenants and lender rights largely ring-fenced to ProjectCo’s “commercial” and “economic” rights
- Structurally isolated from “nuclear liability” by separation from the Licensed Operator and operating activities

**Licensed Operator**
- Licensed operator and fully staffed
- Nuclear liability channeled to Licensed Operator under relevant conventions
- Named insured under nuclear liability policies
- Has the ability to operate additional nuclear units in the future, subject to regulatory requirements
Challenges with the Regulator

- Nuclear Regulation varies from country to country
  - More certainty on the licensing process
  - Less flexible for new designs that depart from the traditional light water reactors
  - Operator need not be the owner

- In the United States, for example, the regulatory regime is very prescribed

- In the UK, the regulatory regime is less prescriptive and more “Goal Oriented”
  - More flexible but less prescriptive
  - Licensee must prove design is safe
  - Operator is typically the owner

- Some Countries, such as the UAE, have a mix of both the US and UK systems
Selecting Lenders

- Lender concerns over nuclear liability and reputational considerations associated with nuclear power projects will undoubtedly drive transaction structure and the scope of viable options.

| Some lenders have more tolerance for “nuclear” transaction attributes than others |
|---|---|---|
| Export Credit Agencies (ECAs) | Commercial Banks | Prospective Lenders Considering the Issues for the First Time |

*There is no uniform or universal approach*

- It is important to ensure that host government stakeholders are aligned with lender expectations on the level of credit support and/or nuclear liability protection.
Due Diligence/Pre-requisites to Closing

- Offtake arrangements
- Nuclear Regulator
- Nuclear liability
- Environmental
- Compelling “story” for operation & maintenance and fuel supply
- Explanation and plan for resolution of anything still in development
- Quality assurance and oversight of construction activities
Joint Venture Considerations vis-à-vis Financing

Financial Guarantees to Lenders
- Completion guarantees
- Debt service reserve undertakings

Nuclear-specific Default Triggers
- Host country compliance with international nuclear treaties, including compliance issues that may not be directly related to the specific project being financed
- “CFSI”
- Credit-related defaults of the host government or technology exporter (e.g., solvency, x-defaul ts MAEs, etc.)
- Defaults by the technology exporter under the EPC contract

Credit Support From Sponsor & Technology Exporter
- Measuring proportionate liabilities at any point in time
- Are all claims under the credit support documents treated the same? Does the technology exporter bear loan repayment risk in case of defaults within the control of the host government and/or does the host government bear repayment risk in case of defaults in the control of the technology exporter?
- The creditworthiness and balance sheet of the respective parties can impact the amount of risk that lenders will allow a minority shareholder to bear under credit supports
Other Considerations

Regulatory infrastructure and people

- Rights of all parties under project agreements and financing documents are likely to be subject to regulatory compliance
- Lender due diligence
  - Management team
  - Succession planning
  - Scope of regulations at the time of financing
  - Regulatory risk/delays due to capacity of the regulator
- Independence from the developer
- Construction License(s)

Informational Requirements

- Is the specific plant-type proven and operational elsewhere?
- Periodic reporting and inspections
- Early reporting of any matters that may give rise to “reputational” issues given the propensity for nuclear incidents or issues potentially affecting safety or security to command media attention
A Potential Project Finance Solution

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Effectiveness of Traditional Project Finance Remedies

“Step-in” remedies allow lenders to step into the shoes of the project owner to remedy project-level failures.

Controversial for two key reasons:

1. Skeptical view toward the notion that substitute plant operators would be available.

Even assuming “step-in remedies are viable:

1. Changes in operational management or control would be time consuming and costly.
2. Lenders potentially assume an inappropriate level of nuclear liability risk.
Alternatives to “Step-In” Rights During Plant Operations

- Pre-arrange “step-in” remedies under contractual option agreements
- Experienced plant operators that are in the business of selling their management models and making management teams available to support operations
- An arrangement could be crafted that benefits all parties:

- Lenders: Benefit from having assurances of effective “step-in” remedies under contract from a vetted and designated operational support contractor
- Host Country Sponsor or Developer: Benefits from selling the option for an appropriate fee or other consideration, and would be anchored into the project as a support contractor
- Operational Support Contractor: Intimately involved in the negotiation and development of the terms upon which “step-in” rights could be exercised

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Limited Liability Partnership
Debt Service Reserves

Nuclear power stations will require longer debt reserves

- Prolonged outages if there is a shutdown for regulatory review and corrective action
- Replacing an executive team and deploying a new management model will generally require approval by the nuclear regulator

Reserves may come in the form of guarantees, cash reserves or other credit support mechanisms
Conclusion

The ENEC and KEPCO joint venture and financing transactions are landmark transactions that establish a new baseline for the types of structures that can be considered when procuring and financing new nuclear plants.

We believe that a group of enterprising project sponsors can borrow on these lessons to successfully secure loan commitments by further adapting project finance structures to optimize the funding arrangements for the construction, development, operation and maintenance of a new nuclear power plant, potentially in cases where the inaccessibility of other financing sources would otherwise make pursuit of the project itself futile.
Questions & Answers

Jason Crowell
3625 5th Avenue
San Diego, CA 92103
o: +1.619.550.3062
m: +1.619.920.7129
jason@peacecrowell.com

Jacques Lavoie
General Counsel & Secretary
Legal Department
P.O. Box.112010, Abu Dhabi
United Arab Emirates
dir. +971 (2) 815 0136
fax. +971 (2) 6595 666
mob. +971 (50) 803 1537
email. Jacques.Lavoie@enec.gov.ae
www.enec.gov.ae