

# THE ART OF THE GLOBAL DEAL:

## *BASIC FINANCING CHALLENGES, CONSIDERATIONS, and STRUCTURES for NPPs*

Nuclear Infrastructure Council  
Special Summit on Global Nuclear Energy Markets

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# OVERVIEW OF PRESENTATION

## Presentation Outline:

- **Challenges & Considerations**
- **Financing Structures**
- **Concluding Thoughts**

# CHALLENGES AND CONSIDERATIONS

# NUCLEAR FINANCING: TYPES OF RISK

- **Key Risks in an NPP**
  - Completion
  - Political
  - Country
  - Regulatory / Licensing
  - Technology
  - Labor & Materials
  - Electricity Market
  - Operational
  - Environmental
  - Nuclear Incident
  - Reputational

# **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 dangers 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)**

# NUCLEAR FINANCING CONCERNS

- Long development / construction periods
- High capital costs
- Regulatory uncertainty
- Reputational risk
- Human resources
- First-of-a-kind risk
- Safety culture
- Operational success
- Supply chain
- Sustainability of government commitment
- Fuel cycle concerns
- Environmental responsibility
- Commitment to international regimes and standards

# CAN THE PROJECT BE FINANCED?

- **Solid economic rationale for the project**
  - Dedicated electricity source / baseload principles
  - Long-term PPA
  - Balance sheet financing (perhaps)
  - Sovereign guarantee (perhaps)
  - Quantifiable cost model
  - Verifiable delivery model
  - Delivery team with proven track record
- **The project must have a believable financial model**
- ***If you can't finance the project, you don't have a project !***
- ***Simply put: Where is the money in the deal?***
  - *Where is the money behind the deal?*
  - *How does money come from the deal?*
  - *Are there other considerations that override the first two factors?*
  - *If other considerations matter, how can the risk allocation be reconfigured in such a manner that still supports external financing?*
- ***Likely sources:***
  - *ECA financing*
  - *Government-to-Government financing*
  - *Host government support (guarantees, PPAs, financing; both program and project support)*
  - *Vendor equity*
  - *And, maybe, balance sheet deals (in regulated markets)*

# FINANCING STRUCTURES

# NUCLEAR FINANCING MODELS

1. Project Finance
2. Traditional Models
3. Government-to-Government Financing
4. Loan Guarantees
5. Export Credit Agency Financing
6. Vendor Financing
7. Investor Financing
8. Host Government-Backed Power Purchase Agreement
9. Phased Financing / Refinancing

# EXISTING AND POTENTIAL MODELS FOR NUCLEAR FINANCINGS

| <i>model</i>     | <i>Traditional Sovereign Model</i>   | <i>On-balance sheet Model</i>  | <i>Full Recourse "PF" Model</i>  | <i>Limited Recourse PF Model</i>   |
|------------------|--|--|--|--|
| <i>example</i>   | China, India, FSU  | U.S., Korea, Canada, France  | TVO (OLK3)   | None to date   |
| <i>type</i>      | Government guaranteed loans, sometimes with ECA cover  | Corporate, sometimes with ECA cover  | Project financing with full sponsor recourse, potentially with ECA cover   | Project financing with limited recourse  |
| <i>features</i>  | Available State budget, loans from multilaterals, nuclear exporting countries, vendors and commercial banks  | Strong balance sheet and / or full cost recovery especially if regulated utility   | Turnkey EPC contract or completion guarantee Strong balance sheet (sponsors) Diversified cashflow stream   | Actively supportive regulatory framework and/or host government agreement for nuclear risks Turnkey EPC contract or completion guarantee Strong structure re. risk transfer  |
| <i>ownership</i> | State owned utility  | Private or state owned utility   | Project Company  | Project Company  |
|                  | <p><i>Traditional Sovereign Model</i></p> <p>Most probably the easiest, cheapest and most simple way to quickly raise large amounts of funds for a nuclear project of this type.</p> <p>Such structure can be used for the first units of a nuclear fleet before some elements of the other structures are gradually inserted.</p> | <p><i>On-balance sheet Model</i></p> <p>Requires very strong balance sheets, with implicit or explicit state guarantees.</p> <p>Given increasing demand on the balance sheet of probably utility majors, this method cannot be an option everywhere.</p> | <p><i>Full Recourse PF Model</i></p> <p>Structured on a corporate basis with some elements more typical of a project financing, including:</p> <ul style="list-style-type: none"> <li>▪Mandatory prepayment from insurance claims, LDs, government compensation</li> <li>▪Independent Insurance and Technical reports</li> </ul> | <p><i>Limited Recourse PF Model</i></p> <p>Strong focus on contractual structure as means of distributing risk among project participants including shareholders, banks, ECAs, EPC contractors, government, power offtaker and fuel provider.</p> <p>Extremely challenging in current and foreseeable market conditions.</p> |

# PROJECT FINANCE – NUCLEAR

- **No history of project finance for nuclear power – Why?**
  - Remember, “project finance” is a term of art
    - Limited / Non-Recourse structure
    - Debt / Equity structure
    - Financing Entities look to revenue stream of the asset
    - Repayment is a function of achievement of Commercial Operation
    - Financing Entities can “take” the asset

# FINANCING A NUCLEAR POWER PROJECT

- **No history of project finance for nuclear power – Why?**
  - Classic nuclear risks
    - Regulatory risk
    - Political risk (a “moment of insanity”; the joys of democracy)
    - Schedule issues
    - Budget issues
  - Project Finance remedies don’t readily suit a nuclear asset
    - Financing Entities can’t “take” the asset
    - Need for a “licensed operator”
    - Strategic asset within many countries
    - Inability to replace the NSSS vendor during construction

# TRADITIONAL MODELS

- **Sovereign Model**
- **Utility Balance Sheet Model**

# TRADITIONAL MODELS / SOVEREIGN

- **Sovereign Model**
  - Nuclear development is part of a national plan
    - People's Republic of China
    - France
    - India
    - South Korea
  - Funding comes from sovereign sources
  - Ownership is by a government-owned utility
    - EDF
    - NPCIL
    - CGN / CNNC

# TRADITIONAL MODELS / SOVEREIGN (CONT.)

- **Strengths of sovereign model**
  - Government commitment
  - Government balance sheet
    - Possibility of sovereign guarantee
- **Limitations of sovereign model**
  - Sovereign credit rating
    - Query: Will attitudes on sovereign guarantees change, given Eurozone considerations ?
  - Budget capacity
    - Availability of funds
    - Opportunity cost
  - National pride
  - Country risk
  - Heavy government involvement

# TRADITIONAL MODELS / SOVEREIGN (CONT.)

- **National Pride / Country Risk**
  - Need to attract industry to the project
  - Need to compete with other nuclear projects
  - Capacity constraints in the industry

*Query: Are you making it easier or harder to do business in your country?*

# FOCUS AREAS FOR A PROJECT DEVELOPER AND/OR PROJECT PARTICIPANT

- Country capability
- 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)

# TRADITIONAL MODELS / UTILITY BALANCE SHEET

- **Utility Balance Sheet Model**
  - National (or regional) utility is the developer / owner / operator
  - Financing is obtained based on the strength of the utility's balance sheet
    - Regulated power market
    - Ability to pass along development costs to the rate base (during construction and operation)
    - Possible need for a sovereign guarantee
      - Function of utility's size
      - Function of nuclear liability regime
    - ECA financing and commercial financing are both possible
  - But note market capitalization limitations

# TRADITIONAL MODELS / UTILITY BALANCE SHEET (CONT.)

- **Utility Balance Sheet Model**
  - Size matters
  - Even if the balance sheet can handle one nuclear power plant ...
    - When does the balance sheet capacity run out?
    - What impact does such a burden place on its credit rating?
  - If a utility's credit rating goes down, it is more expensive for the utility to borrow money on a going-forward basis

# GOVERNMENT-TO-GOVERNMENT FINANCING

| Features  | Rationale   |
|---|---|
| Procured at government-to-government level                    | Based on relationships between countries  |
| Availability of financing is specific to certain countries    | Exporting country also benefits from the transaction                                    |
| Technology choice limited and based on bilateral relationship | Facilitates exporting country's technology by linking financing to technology selection |

## Examples of Government-to-Government Financing

- Implemented by Russia in a number of countries, including: India, Vietnam, Bangladesh, Belarus, Nigeria, etc.
- Implemented by China in Pakistan

# GOVERNMENT-TO-GOVERNMENT MODEL

- **The nuclear procurement is done at a government-to-government level**
- **Financing can be through an intergovernmental loan**
- **Currently being used by Russia in a number of locations (India, Vietnam, Bangladesh, Belarus, Nigeria, etc.) and by China in Pakistan**
- **Pros: Makes financing easier**
- **Cons: Limits technology choice**
- **Cons: Lack of competitive pressure**
- **Key Consideration: Strength of bilateral relationship**
- **Realization: Government is a key factor in a nuclear development program**
- **Remember: sovereign responsibility still remains for host government**

# THRESHOLD QUESTIONS

- **Is the host country comfortable with the technology being offered by the foreign country?**
  - Recognize that this is a “tied aid” structure
- **How will the host country ensure that it is getting a good price for the Project?**
  - Recognize that this is a “sole source” scenario and not a competitive procurement

# MOTIVATIONS

- **For the Host Country:**

- Foreign experience ... a partnership of sorts
- Foreign source of funding
- Deals in other sectors

- **For the Exporting Country**

- A market for its nuclear power plant
- Bilateral relationships
- Long term linkages
- Deals in other sectors
- More focused aid with tangible results

# CHALLENGES

- **Sovereign responsibility still remains**
  - Regulatory Authority; Licensing
  - Site Selection
  - National Law
  - International Commitments
  - Security & Safeguards
  - “Knowledgeable Customer” Capability
  - Spent Fuel / Nuclear Waste & Decommissioning

# QUESTIONS

- **What does the foreign government want in return?**
- **What else accompanies the guarantee?**
- **How strong is the bilateral relationship?**

# LOAN GUARANTEES

| Features               | Rationale  |
|------------------------|--|
| Obligation of funds    | Only serves as contingency and does not require allocation of actual funds |
| Cheaper interest rates | Guaranteed loan has lower risk   |

## Examples of Loan Guarantees

- US Loan Guarantee Program
- UK Loan Guarantee Program

# LOAN GUARANTEES - APPROACHES

- **Background:**
  - The Government guarantees the debt portion of a financing structure
- **Distinguish this from:**
  - Guarantee of an offtaker under a PPA
  - Guarantee of a price for electricity

# LOAN GUARANTEES – ADVANTAGES & CONSIDERATIONS

- **For the Guarantor, it is only a contingent obligation**
  - There is no actual money being committed by the Guarantor
- **For the Borrower, it can provide cheaper interest rates**
  - A guaranteed loan has lower risk, therefore lower cost
- **For the bank market, it can create liquidity where it might not otherwise be present**
- **Traditionally, a Guarantor charges a fee for the guarantee**
  - The fee can be based on the credit rating of the Borrower
  - The fee can be based on the quality of the Project
- **A government guarantee might place limits on how much of the debt and / or project cost it will guarantee**

# LOAN GUARANTEES – LIMITATIONS & CONSIDERATIONS

- **Credit of Guarantor**
  - If Guarantor is not above investment grade, the government guarantee does not provide the necessary support
- **Perhaps local law and local courts for enforceability**
  - Viewed negatively by international participants
  - Enforceability is a key aspect of the guarantee; therefore, if the guarantee is viewed to be difficult to enforce, such aspect reduces the value of the guarantee
- **Perhaps legal limits on guarantee capacity**
  - Query: How are guarantees “scored” under budgetary rules?
- **State Aid rules (European Union)**
  - Hinkley Point currently under review by the EU re. “contract for difference” and loan guarantee structures

# EXPORT CREDIT AGENCIES – THE KEY SOURCE FOR FINANCING INTERNATIONAL NUCLEAR POWER PLANT DEVELOPMENT

- **Overview of Export Credit Agencies (“ECAs”)**
  - Sovereign entities
  - Designed to promote exports of a country
  - ECA financing is tied to amount of national content
  - Depending on the ECA, ECAs can provide:
    - Actual loans
    - Guarantees for lenders
    - Insurance for lenders
    - Equity loans
  - ECA financing is viewed as cheaper than pure commercial debt
  - ECA financing is governed by OECD lending guidelines (for most ECAs)
  - ECA financing is viewed as a “good thing” for a project
  - ECA financing is political (both positive and negative)
  - 18 year repayment period following commercial operation

# EXPORT CREDIT AGENCIES – THE OECD RULES

- **Governed by the “OECD Arrangement on Officially Supported Export Credits”**
  - Designed to create a level playing field, so that competition is based on the underlying goods and services, not the terms and conditions of the financing
  - For financing nuclear power plants, the key tools for project-level financing include:
    - Direct Loans
    - Guarantees of Commercial Bank Loans
    - Investment Insurance
  - But note, too, that all ECAs are not subject to the OECD rules
    - Russian and Chinese ECAs have more flexibility

# ECAs – SOME THINGS TO NOTE

- **While Export Credit Agencies do provide guarantees ...**
  - They charge a fee for taking on the Borrower's risk of default
  - The fees are based on the risk of the Borrower
  - ECAs will diligence the project for technical and reputational considerations
  - They will not cover the full cost of the Project; therefore, other debt and / or equity will need to be sourced

# EXPORT CREDIT AGENCIES AS THE KEY SOURCE FOR FINANCING INTERNATIONAL NUCLEAR POWER PLANT DEVELOPMENT

- **Leadership role**
  - Financial conservatism of commercial banks vis-à-vis nuclear power
    - But, commercial banks will follow ECAs
  - Export promotion mission
  - Perhaps, the “only game in town” for NPPs, but for straight government-to-government loans
- **“Halo Effect”**
  - Creates a sovereign , bilateral quality to the deal
  - Rigor of project diligence is a confidence-building measure for the project and the marketplace
    - Addresses “Reputational Risk” considerations
  - Note the “third country” function of a multiple ECAs in the deal

# ECA FINANCING REQUIREMENTS & LIMITATIONS: THE *US-EXIM EXAMPLE*

## United States Export-Import Bank Project Finance Requirements and Restrictions:

- **Export Support:** Ex-Im Bank will finance either 85 percent of the net Contract Price, or 100 percent of its U.S. Content.
- **Capital Costs:** Ex-Im Bank will limit its support of Project Finance transactions (as it does for all project related transactions) to only those items deemed to be "capital cost" in nature. Only those capital cost items, such as equipment and services covered under an EPC Contract, legal, financial and engineering services associated with the undertaking of the project, and items such as training and insurance during construction will be considered eligible for Ex-Im Bank support.
- **Local Costs:** Ex-Im Bank will generally support eligible local costs to an amount of up to 30 percent of the U.S. Contract Price associated with the project. This support is in addition to the normal support of 85 percent of the U.S. Contract Price.

# ... BUT NOT EVERYONE BUYS A TICKET TO THE DANCE

- **Nuclear Power lacks broad-based support at an institutional level, as key institutions do not currently finance nuclear power projects:**
  - OPIC
  - World Bank
    - International Finance Corporation
    - Multilateral Investment Guarantee Agency
  - Regional Development Banks

# VENDOR FINANCING

- **Vendor finance can refer to a variety of financing options**
  - **vendor arranged credit** -- vendor facilitates financing from sources such as relationship banks and export credit agencies
  - **vendor provided credit** -- often short-term, such as construction loans
  - **vendor equity** -- gives vendors, e.g. nuclear reactor/NSSS suppliers, a share in future net income generated by the nuclear power project. From a risk perspective, vendor equity is a riskier proposition than lending or selling

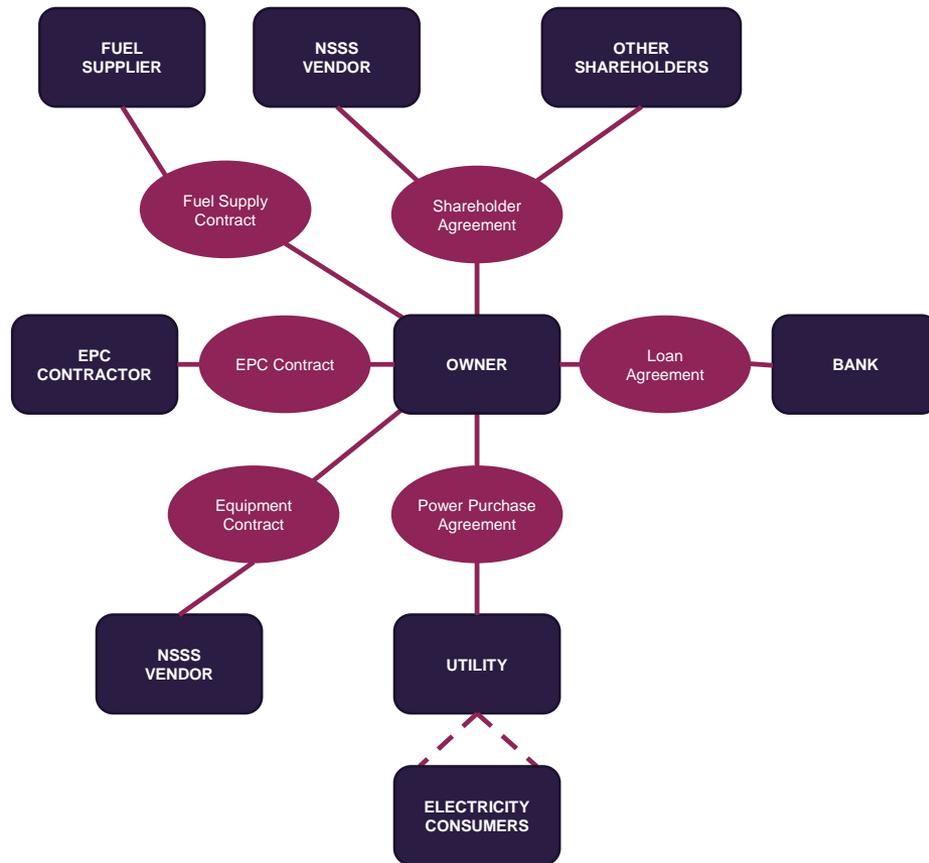


| Features                                   | Rationale  |
|--|--|
| Relatively small part of overall financing | Limited vendor balance sheet capacity  |
| Not cheap                                  | Vendor weighted average cost of capital typically exceeds that of the export credit agency |
| Limited recourse to vendor balance sheet   | Vendors unwilling to “bet the farm”  |
| Credit enhancement by host government      | Vendor risk aversion   |
| Exit strategy                              | Vendor unwilling to tie up capital long-term   |

# VENDOR FINANCING: VENDOR EQUITY

- **Vendor Equity**

- Trend over the last 5-6 years
- Source of equity (along with ECA-provided debt)
- An opportunity to move profitability from EPC Contract to equity return on investment
- Integrate foreign knowledge (and personnel) into long-term project operating plan and operating organization
- Rationale:
  - Provides foreign source of equity
  - Reduces burden on host owner
  - Facilitates export of technology; it is often not a traditional “equity play”
  - Provides further human resources development of “country of origin” utilities (as well as source of expertise in cases like the UAE and Turkey)
  - Creates alignment of interests
  - Possibly, a long term commitment



# VENDOR FINANCING: VENDOR EQUITY

- **Examples of Vendor Equity Financing**
  - Lithuania: Hitachi
  - UAE: KEPCO
  - Turkey (Akkuyu): Rosatom / BOO structure
  - Turkey (Sinop): MHI
  - UK (Hinkley Point C): Chinese investment
  - UK (Horizon): Hitachi
  - UK (NuGen): Toshiba/Westinghouse

# VENDOR / FOREIGN EQUITY: CONCERNS / LIMITATIONS

- **Perhaps, limited replicability for (most) vendors**
- **Does this limit competitive options?**
- **Contractor can't overrun the Equity**
  - Contractor / vendor is now on both sides of the deal
  - Results in a need for conflict-of-interest management; puts stress on project governance structures
  - How will disputes be handled, especially if the project has significant problems?

# INVESTOR FINANCING

| Features                               | Rationale        |
|--|------------------|
| Multiple investors finance the project | Diversifies risk |

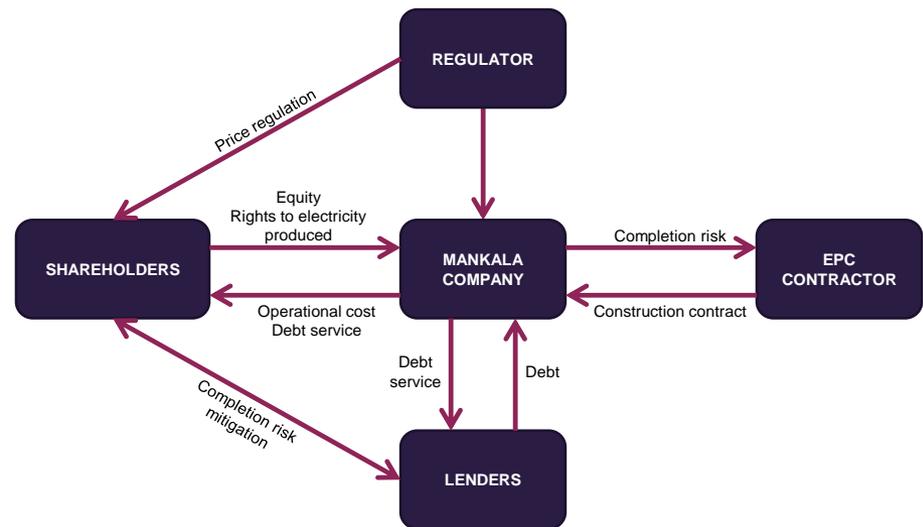
## Examples of Investor Financing

- The Olkiluoto-3 Project in Finland was financed with 75% debt financing and 25% equity. The French and Swedish governments provided the export credit guarantee.
- The Hanhikivi nuclear power plant in Finland
- The multi-utility (undivided interest) model in the USA

# INVESTOR FINANCING: FINLAND'S "MANKALA" MODEL

## Finland's "Mankala" model

- A new approach to equity
  - Composition of heavy end users
  - Assurance of supply at cost
  - ROI is not based on the NPP itself
- Fact dependent
  - Need heavy end users
- Structure
  - Multiple heavy end users invest through a joint venture, which serves as the Owner
  - Each equity investor contributes a proportion of the costs of building and operating the plant in return for electricity supplies that the shareholder will use (or resell)



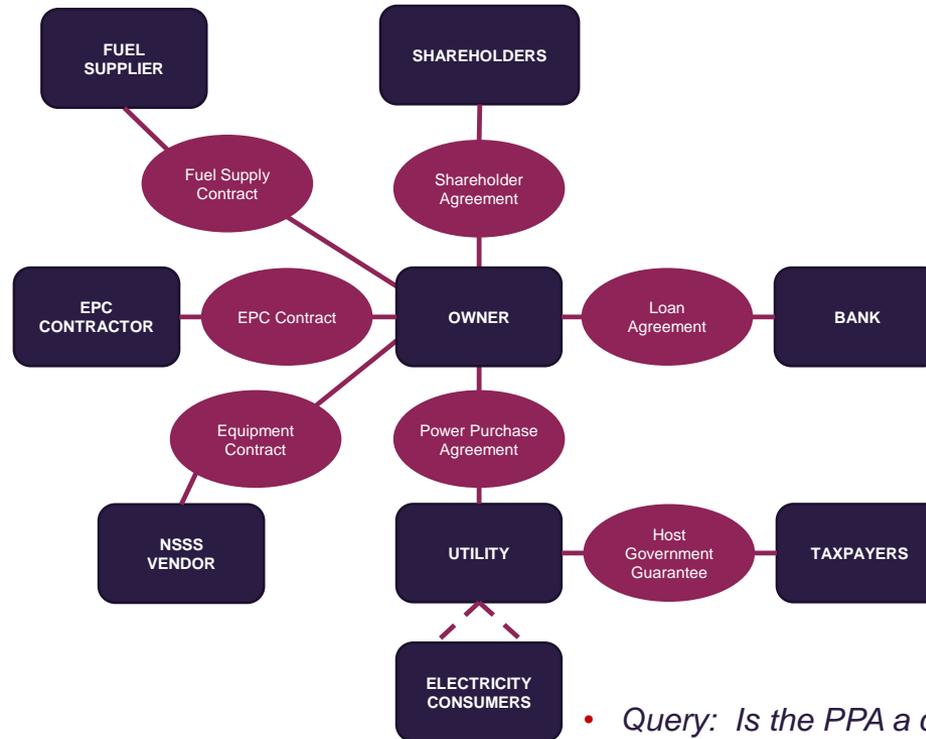
# HOST GOVERNMENT-BACKED PPAs

| Features  | Rationale   |
|---|---|
| <b>Guaranteed price, not guaranteed return</b>        | Maintains pressure to minimize costs                |
| <b>Take-or-pay, but subject to plant availability</b> | Maintains pressure to maximize availability         |
| <b>Model based “strike price”</b>                     | Minimizes cost of inducement to build               |
| <b>Contingent price adjustment mechanism</b>          | Impossible to hard-wire future tariff escalation    |
| <b>Host government-backed counterparty</b>            | Guarantee is only as good as the guarantor’s credit |

## Examples of Host Government-Backed PPAs

- EDF has requested that the Contract for Differences (CfD) framework contemplated in the Hinkley Point C project in the United Kingdom be guaranteed by the UK government.

# HOST GOVERNMENT-BACKED PPAs

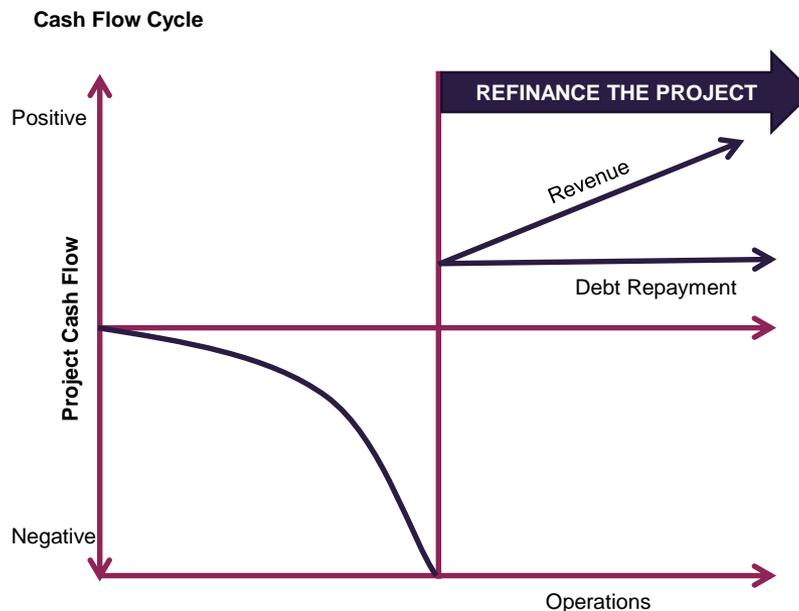


## Host government

- Assumes market risk
- Supports an above-market price to incentivize debt and equity financing
- Creates a credit-worthy offtaker to facilitate financing
- Ensures that power is sold, as it is available (via capacity and utilization payments)

- Query: Is the PPA a complete pass-through of project costs?
- Query: Does the developer suffer for delays?
- Query: Does the tenor of the PPA go beyond the term of the initial debt?

# PHASED FINANCING



## Features

Re-visitation of financing terms

## Rationale

Lower risk premium after project development and construction are complete

### Examples of Phased Refinancing

- No specific examples because these are often confidential deals

# PHASED FINANCING

- **Concept:**
  - Utilization of different financing techniques to suit different stages of the project's lifecycle
- **Options:**
  - Refinance during Construction or Operation
- **Reasoning:**
  - During development and construction, nuclear financing is most challenged
    - Equity sources are limited
    - Debt sources are limited
    - Project is not generating revenue !
  - Financing issues don't stop at Commercial Operation
    - Construction / Completion Risk is over; nuclear becomes an attractive investment
    - Asset is very inexpensive to run, relative to other forms of baseload generation
    - Asset has a very long operating life (60 plus years for Gen III / Gen III+ designs)
- **Result:**
  - Refinancing becomes a very real option, as do Leasing structures
- **Therefore:**
  - Financing must take a "lifecycle" approach (e.g., new sources of equity (pension funds and insurance companies) and new sources of debt (project bonds) after completion of first fuel reload)

# PHASED FINANCING - OPTIONS

- **During Construction:**

- Export Credit Agency debt
- Sovereign debt
- Limited commercial bank debt
- Utility and /or Sovereign equity
- Vendor equity
- Equity Bridge Loans

- **During Operation:**

- Capital Markets / “passive” equity
- Long term investors, such as pension funds and insurance companies
- Offtakers (?)
- Leasing structures

➤ By considering a lifecycle / holistic approach, the Owner can lower the cost of capital over the life of the project

# CONCLUDING THOUGHTS

# KEY FACTORS AND CONSIDERATIONS

1. Credit behind the deal
  2. Solid revenue stream
  3. Sustained host government support
  4. Reputational Risk analysis
  5. Believable execution plan
  6. Adequate nuclear liability coverage
1. Lenders need to know that they have recourse to a balance sheet, if the deal collapses
  - 2a. Investment will not occur unless there is a suitable return on equity
  - 2b. Given asset life, investors must have confidence that returns will survive over time and attract future financiers
  - 3a. Historically, NPPs have fallen victim to changing political and populist sentiments
  - 3b. NPPs require infrastructure, financial, legal, and regulatory support from the host government
  4. Lenders have nuclear-specific lending requirements that must be satisfied
  - 5a. Lenders will scrutinize the “deliverability” of the project
  - 5b. Investors will be concerned with the “achievability” of the commercial operation date
  - 6a. Lenders will not want to assume any nuclear liability exposure
  - 6b. Passive equity investors will want to insulate themselves from nuclear liability risk
  - 6c. Both lenders and investors understand that gap risk exists

# KEYS TO SUCCESS

- 1. Commitment to International Regimes**
- 2. Commitment to International Standards**
- 3. Transparency & IAEA Review**
- 4. Sustainability Planning**
- 5. Public Engagement**
- 6. Certified Design / Reference Plant in Operation**
- 7. Proven Execution Team and Model**
- 8. Integrated Package (EPC, Operations, Fuel)**
- 9. Financing (both debt & equity)**
- 10. Regulatory Assistance**
- 11. Human Resources Development**
- 12. Strength of Bilateral Relationship (and deals in other sectors)**
- 13. The “Third Flag” (a third country in the deal)**
- 14. Sustained Host Government Commitment**
- 15. Viable economics (e.g., PPA from credit-worthy entity)**

# THANK YOU!



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# PAUL MURPHY

Paul Murphy's practice focuses on multiple aspects of the nuclear industry – from legal and policy matters, including international regulatory and treaty frameworks and issues regarding nuclear liability, to strategies for creating viable nuclear power programs and the identification and mitigation of associated risks – representing developers/owners, investors, and contractors on nuclear projects internationally. Mr. Murphy is recognized as an expert in the development and financing of nuclear power programs by the International Atomic Energy Agency (IAEA), the OECD's Nuclear Energy Agency (NEA) and the US government. Mr. Murphy currently serves on the IAEA's Technical Cooperation Program team, which assists member states in developing civilian nuclear power programs. Mr. Murphy has served as a designated expert, chairman, and author at several special meetings and for multiple working groups of the IAEA, primarily involving the development, financing, and structuring of nuclear power projects. He continues to work with the IAEA in a number of key areas, including a current revision of the IAEA's *Handbook on Nuclear Law* and as lead author for the IAEA's, *"Alternative Contracting and Ownership Practices for Nuclear Power Plants"*.

Mr. Murphy has served as a three-time appointee to the US Secretary of Commerce's Civilian Nuclear Trade Advisory Committee, and he has served as chair of its Finance subcommittee. In addition, Mr. Murphy served as the US Government's sole representative on an NEA working group on *"Financing of Nuclear Power Plants"*, acting as chairman for the working group. Mr. Murphy also chaired the IAEA working group that issued, *"Issues to Improve the Prospects of Financing Nuclear Power Projects."* Mr. Murphy has also worked with the Nuclear Energy Institute, the US State Department, the US Mission to the OECD, and the Export-Import Bank of the United States on revisions to the OECD's Guidelines for the financing of nuclear power projects by Export Credit Agencies.

For the last seven years, Mr. Murphy served as a faculty member for the *"Training Course on Nuclear Power Infrastructure Programs and Related Projects in Emerging Nuclear States"*, held on behalf of the US State Department and the IAEA at the Argonne National Laboratory and attended by representatives of over 20 foreign governments. Mr. Murphy was the lead instructor for the segments on financing and the bidding / evaluation process for nuclear power projects.

In addition to his work in the nuclear sector, Mr. Murphy's representations have included extensive work in the engineering and construction industry, where he has been heavily involved in the nuclear and fossil power sectors, both domestically and internationally. His project experience, both domestic and international, includes nuclear (new build, steam generator replacement, nuclear operating plant services), coal (both new build and environmental retrofit), LNG and gas-fired power projects, ranging from EPC contracting structures to technical support agreements and including major equipment purchase agreements and subcontracting. Recent projects have included work in solar power projects (CSP), IGCC and coal liquefaction plants, and pipelines.

Mr. Murphy is a graduate of Princeton University's Woodrow Wilson School for Public and International Affairs and a graduate of Harvard Law School. Mr. Murphy is also a member of the International Nuclear Law Association.

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# GLOBAL REACH



Office location



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