



Milbank

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Perspectives on NPP Financing

**U.S. Nuclear Regulatory Commission: Briefing on
Foreign Ownership, Control, and Domination**

Paul Murphy

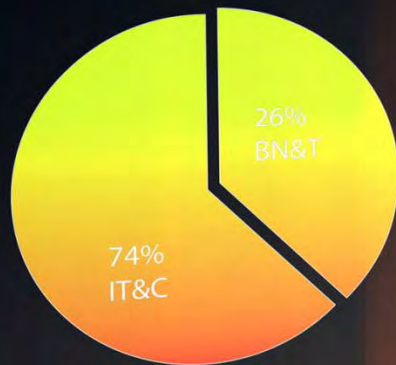
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Five Key Points

1. Financing is the biggest challenge for NPP development
2. Financiers need clarity
3. Vendor equity has become a key trend in NPP development
4. Nuclear power has a key role to play in climate change
5. Current market conditions do not favor NPP development in the US



Distribution of market share among the major industry players: IT & C and BN & T was 74% and 26% percent respectively. A further change in the economic situation in the market will be characterized by a more equal distribution of market share major players



Market Conditions: *Challenges and Trends*



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
- The Foreign Ownership Rules implicate two of these critical issues:
 1. The challenges associated with financing nuclear power plants
 2. Regulatory oversight

Difficulties and Considerations

- **Current rules lack certainty**

- “All or nothing” is easy
- Presumption: “foreign” = “bad”
- Current rules are subjective and qualitative
- Current rules are very fact-dependent
- Current rules don’t reflect the current state of the global nuclear industry or electricity markets

❖ ***Yet, it is understandable why there is uncertainty on this subject***

❖ ***Moreover, all investors are not created equal***

- **Query:**

- Will a financier be willing to navigate this process?
- Does this uncertainty limit our options?
- Do we have a need for external financing?
- Given current market conditions, would a modification of the rules matter?
- But, should we focus on current market conditions to drive rule-making?

Trending in the Nuclear Sector

- “Newcomer” countries

- Lack of a track record
- Human resource challenges

- ECA Financing

- Key source of financing
- Driven by national content of exporter country
- Confidence-building measure

- 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.)
- Pros: Makes financing easier
- Cons: Limits technology choice
- Key Consideration: Strength of bilateral relationship
- Realization: Government is a key factor in a nuclear development program

- Vendor Equity

- Not a “Western” model
- Foreign Investment / Ownership
- Source of equity
- Source of alignment (?)
- How much capacity is there (?)

- Localization

- En vogue, esp. with larger programs
- Part of a national development strategy
- Note the tradeoffs with ECA financing
- What is feasible?

- Technology Transfer

- En vogue, esp. with larger programs
- Part of a national development strategy
- Intellectual property, competition, and export control issues
- Note: Distinguish “technology” transfer from “knowledge” transfer

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***
- *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)*

What are the prevailing trends and considerations in nuclear financing ?

- Current:
 - Bringing both debt and **equity** to the deal
 - Government-to-Government relationships / importance of bilateral relationship
 - The importance of sustained government support
 - Export Credit Agency financing
 - Reputational Risk analysis
- Emerging:
 - Climate change
 - Grid stability / capacity markets

Current Examples of Foreign Ownership: *Would these projects be happening in the ABSENCE of foreign equity?*

- UAE (yes)
 - Barakah: KEPCO
- Turkey (no)
 - Akkuyu: BOO structure with 5 Russian companies
 - Sinop: Itochu, GDF Suez, MHI
- United Kingdom (no)
 - Hinkley Point: EDF, AREVA, CGN, CNNC, possibly others
 - NuGen: GDF Suez, Toshiba
 - Horizon: Hitachi
- Finland (no)
 - Hanhikivi: Rosatom
- Lithuania (no; project status already uncertain)
 - Visaginas: Hitachi, Latvian utility, Estonian utility
- Czech Republic (probably no)
 - Temelin: foreign equity expected

Phased Financing

- Phased Financing involves utilization of different financing techniques to suit different stages of the Project's lifecycle
- 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)
- ***Current rules limit financing options because they limit market participants during both development and operation***

Climate Change & Nuclear Power

- A stable grid cannot be based solely on intermittent generation
- From a emissions perspective, baseload “clean” power options are limited to hydro and nuclear, with hydro options limited in many countries
- Other countries have recognized that climate goals can only be met with nuclear power as part of the solution (e.g., UK, China)
 - Contrast this with the failure of Germany’s *Energiewende* strategy
- Environmentalists, biologists, and international organizations have recognized the critical role that nuclear power must play in climate change efforts
 - *Pandora’s Promise*
 - “Open Letter” in *Conservation Biology* from 65 noted biologists
 - “Open Letter” from James Hansen, Ken Caldeira, Kerry Emanuel, and Tom Wigley
 - International Energy Agency’s *World Energy Outlook*
 - UN’s Intergovernmental Panel on Climate Change
- With recent closures of NPPs in the US (Vermont Yankee, Crystal River 3, San Onofre), nuclear’s share of electricity generation is in decline, making climate goals more elusive
 - ***Without significant contributions from the nuclear sector, basic math tells us that climate change goals are not achievable***

An abstract graphic featuring a central sphere filled with a dense, glowing blue and white pattern, possibly representing a molecular structure or a complex network. This central sphere is surrounded by several smaller, translucent blue spheres and is connected by thin, white, curved lines that radiate outwards, creating a sense of dynamic movement and interconnectedness. The background is a deep blue with subtle, diagonal, wavy lines.

Concluding Thoughts

Nuclear Power Development in the United States: Would changing rules on foreign ownership help?

- Q1: Why aren't more NPPs being built in the US and why are existing NPPs being shut down?
- A1: Limited demand growth, cheap natural gas, deregulated markets, subsidized and favored renewable projects.
- Q2: Do ownership rules relate to these factors.
- A2: No.
- Q3: So why do these rules matter?
- A3: Because they limit (via constraint and confusion) our financing options, when NPP financing is the greatest challenge to NPP development.
- Q4: But why should we care?
- A4: In order to (a) make any meaningful attempt to address climate change, (b) have a stable and reliable grid, (c) have a diverse energy mix, nuclear power has to be part of the equation.

Looking Ahead

- Can things be done differently?
 - 810 list: A precedent for having different approval structures for different countries
 - Should all foreign owners/operators be viewed in the same light? Should experience matter?
 - Commitment re. “local” operators
 - Reserve accounts in US banks, escrowed funds, etc.
 - Advance funding requirements to create financial certainty
 - Should reciprocity be a guiding principle?
- Approach
 - Identify the concern and then create a structure to address that concern
 - Distinguish among national security, plant safety, and operational issues
- Finally, given the long operating life of an NPP (approx. 60 years for Gen III designs), NPPs become an attractive long-term investment once they are in operation
 - History of the US fleet supports this view
 - Consideration of investors post-completion is part of a reasoned, lifecycle approach to the financing of NPPs

Thank you for your time and attention

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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 a new report to be released in the next few months, entitled, *"Alternative Contracting and Ownership Practices for Nuclear Power Plants"*.

Mr. Murphy currently serves 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 recently 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.

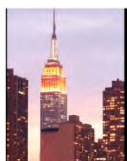
For the last six years, Mr. Murphy served as a faculty member for the *"Training Course on Nuclear Power Infrastructure Programs and Related Projects in Emerging Nuclear States"*, held on behalf of the US State Department and the IAEA at the Argonne National Laboratory and attended by representatives 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), 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.

Prior to joining Milbank, he served as Senior Counsel for Bechtel Power Corporation, supporting both the Nuclear and Fossil business lines as a transactional attorney involved in bid evaluations, business development, proposal submittals, contract negotiations, procurement, and project execution.

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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