Financing of nuclear power plants

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Investments in nuclear power

- This presentation presents a “private sector” view on investment in nuclear power projects
- If the public sector (governments) wishes to invest in nuclear power as part of its socio-economic development priorities, finance per is not a real obstacle
- It becomes an issue in the presence of other equally important development needs and private sector participation is sought

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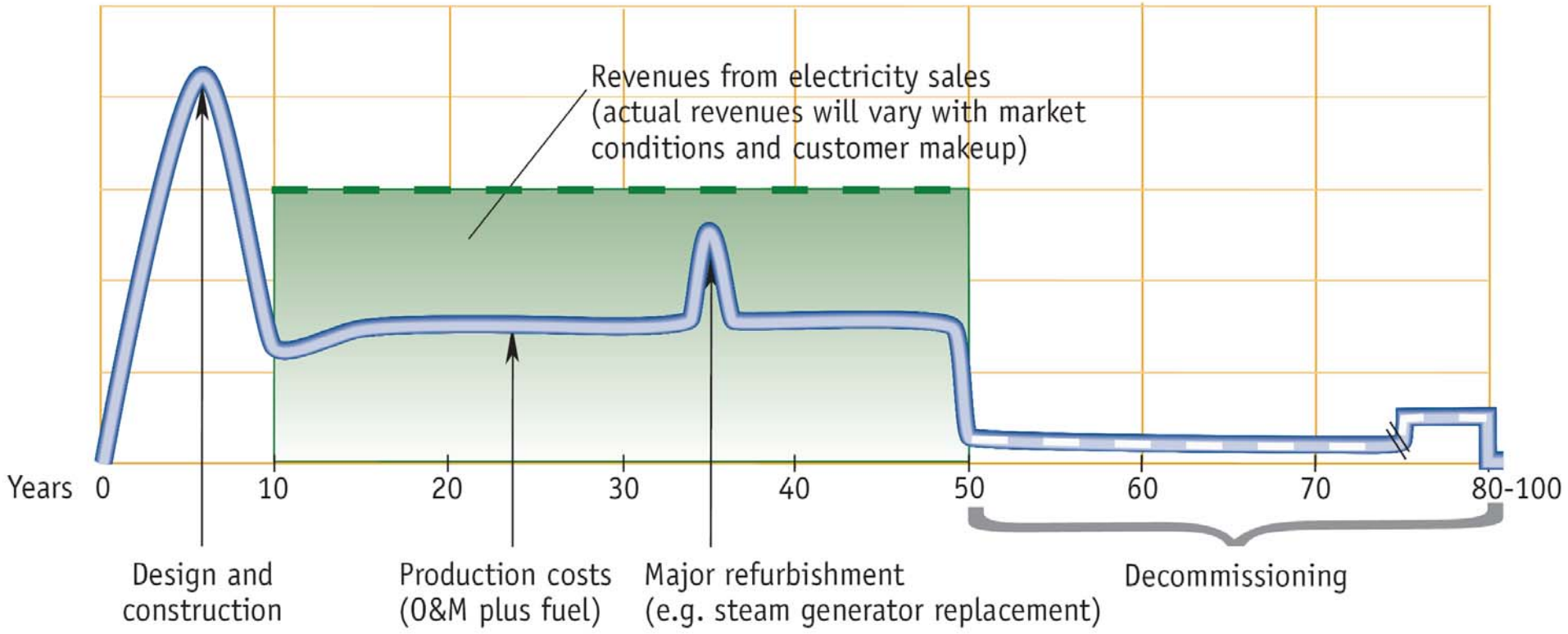
Ideally, nuclear power is viewed as "just another way to generate electricity"

- **High upfront capital requirements**
- **Large financial exposure**
- **Long life cycle (construction periods, IDC, amortization)**
- **Very long institutional commitment & responsibility**
- **Regulatory & policy uncertainty**
- **Public & political opinion often polarized**

Illustrative life cycle cash flow for a nuclear power plant



Innovative finance

- **“Innovative” means**:
  - Essentially the repackaging the existing methods and allocating risk to entities that can manage it best
- **Nothing can substitute for “revenues must cover costs”**
- **Finance of nuclear power could benefit from**
  - International **GHG reduction schemes** that recognize the GHG mitigation merits of NP
  - An **international nuclear fund** modeled after the Global Environment Facility (GEF)
  - Assistance (in cash & kind) from int’l development banks

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NPP financing is not a function of global capital availability

- In 2006, some $4.2 trillion were raised in the global capital markets of which 5%, or $230 billion, was invested in the energy sector
- Hence NP financing is not related to capital availability per se
- But rather are subject to the political, economic, commercial & operational factors mentioned earlier and
- Other investment opportunities offer “better” returns

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Nuclear premium: no consensus

Other issues of investing in NP projects

- Lack of recent investment experience in many countries
- Government involvement
- Governance
- Credit ratings for the country in general
- Socio-political stability
- Adequate grid and market size
- Adequate infrastructure

Other challenges of investing in NP projects

- Political tenures are too short
- Size of capital outlay is not unique, however the size of comparative markets (oil and gas) is larger and more flexible
- Market liberalization is not a show stopper when offset by a corresponding larger size of Utilities/Operators size (M&A)
- But requires a longer-term perspective than just short-term share holder value maximization

Finance options

Equity:

- Balance sheet
- Project finance

Debt and other financial support:

- Domestic & international capital markets (bonds, loans, etc)
- Government grants
- Soft loans, grants from int'l aid organizations & DBs
- Funds provided under ECA insurance schemes and institutions like the Overseas Private Investment Corporation (OPIC) or Multilateral Investment Guarantee Agency (MIGA)

Equity

Potential equity contributors:

- Utility companies
- Equipment (vendors) and service suppliers
- Large local and regional consumers (if eligible)
- Energy-intensive industries
- Distribution companies (if eligible)
- Electricity traders (if eligible)
- Local municipalities
- Neighboring countries
- Venture capital firms
- International investors

Balance sheet finance

Advantages:

- Full control
- No government guarantees needed
- No dealings with lenders

Disadvantages:

- Significant contractual / swap framework and collateral packages
- High costs

Project finance

Advantages:

- Attractive as no recourse or only limited recourse on sponsors' assets
- Economic risks are ring-fenced via Special Purpose Vehicles (SPVs), no debt guarantee by sponsors; the SPV bears all liabilities.

Constraints:

- Participation usually based on the project's off-take contracts (PPAs, exports) to support cash flow – requires significant contractual framework for risk allocation
- Nuclear residual risks externalized
- If weak SPV, significant security package additionally required

Appropriate only for standard or well-known projects - no practical experience with NPPs

Debt finance

- Creditworthiness of the borrower is key
- Credible government support
  - Loan guarantee
  - Securitization of government assets
  - Pledging an asset like oil reserves
  - Bartering
  - Accumulated funds used during construction (AFUDC)
  - Depreciation
  - Long-term power purchasing agreements

Vendor and supplier credits

Advantages:

- Generally good lending terms and rates
- Often extendable through Export Credit Agencies (ECAs) or commercial banks
- Can be integrated into suppliers' offers (package)

Disadvantages:

- Requires some form of sovereign guarantee
- Tied to technology / country of origin (e.g. export finance)

***Note:** BOO & BOOT: Not a financing but a ownership schemes. Vendors are unlikely to get involved*

Concluding remarks

- NP finance is not an insurmountable obstacle if
  - Revenues cover costs and
  - Returns are commensurable with risk
- Government support for NPP projects justifiable based on
  - Energy supply security
  - Environmental protection
  - Benefit of technology spin-offs

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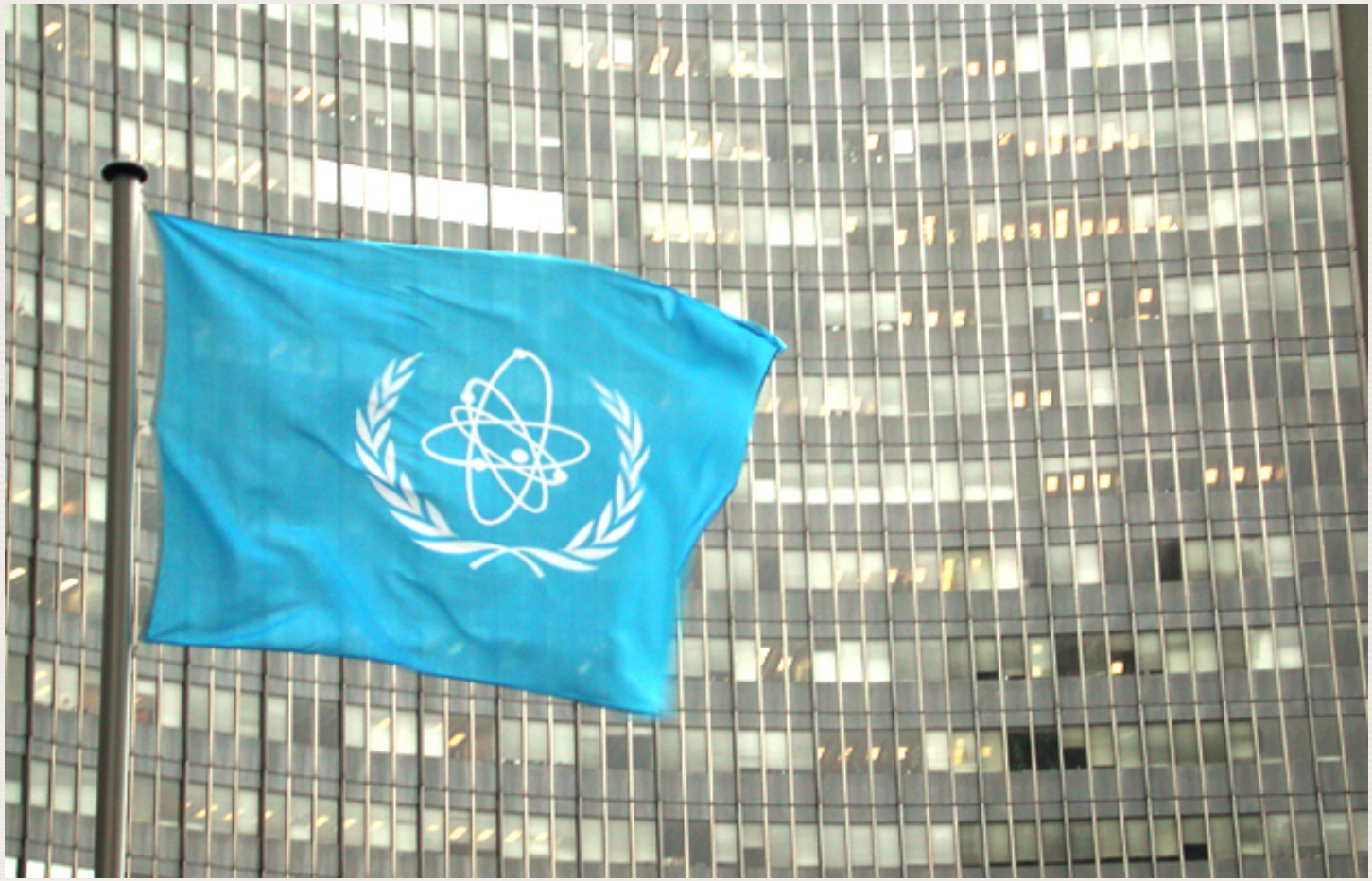

…atoms for peace.