What Are Vendors Looking for in NPP Finance?

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Context:

nuclear economics under pressure, for new builds projects

► Traditional financing model for NNB projects impacted by financial crisis and its sequels (including Basel 3 requirements for banks): lenders are becoming more risk-adverse and require higher spreads

► Frequent questions from investors or analysts about the cost competitiveness and predictability of NNBs, given post-Fukushima safety requirements
Key questions debated by Nuclear Utilities and AREVA

► How to finance nuclear new builds in an optimal way, in a post-Lehman and post-Fukushima world?

► Regulatory regime: a case for re-regulation?

► What funding package for nuclear new builds (investor profiles, debt instruments, role of ECAs)?

► How to optimize investment process for nuclear new builds, in order to minimize risk taking for investors?
New ideas / prerequisites emerge on nuclear projects’ financing

1/ Project de-risking as THE priority:
   - ‘NOAK’ as a must (avoiding prototypes by all means)
   - Introduce cross-licensing between EU countries (aerospace industry benchmark)
   - Robust engineering phase prior to first concrete as a key de-risking factor

2/ New funding sources to be tapped:
   - Towards more sharing of NNB projects between utilities?
   - Attract ‘long’ investor base (sovereign or pension funds)?
   - Issue ‘Nuclear bonds’ with appropriate State / EU backing?

3/ Electricity Market Reform necessary not only in the U.K.: all low carbon energies, not only renewables, are capital intensive and need long term visibility on power prices (through PPAs of CfD)

4/ Competition should not be biased by financing issue
‘NOAK’ as a must

1) What is at stake?

- E.g. EPR design had to be submitted to 4 Safety Authorities: Finland, France, China and the U.K,
  - License granted in each case however with variations of criteria, requests and final designs
  - Learning effect clearly observed from the first to the third EPR project, resulting in shorter procurement and construction time and lower costs

- From basic design to detailed design: a robust engineering phase prior to first concrete is a key de-risking factor and is mainly carried by FOAK

- The social value of first movers: how to share the experience gained on FOAKS: e.g. experience sharing in “owners groups”

- Supply chain efficiency through sustained activity: avoid long sleeping periods, maintain a stream of projects, achieve series effect when possible
‘NOAK’ as a must

2) On-going international initiatives

- Towards international harmonization of nuclear safety standards for reactor designs:
  - Dialogue between the nuclear industry and nuclear regulators, initiated in World Nuclear Association (WNA) CORDEL group: design approval as part of the overall regulatory process

- MDEP program within NEA pools the resources of nuclear regulatory authorities
  - exploring opportunities and potential for harmonisation of regulatory requirements and practices.

- Towards cross-licensing between EU countries
  - ENEF (2013) report by Legal subWG: « The existence of a separate generic approval of a design and/or a site, prior to a licensing procedure for a particular nuclear power plant, greatly enhances the efficiency and predictability of a national licensing regime. ”

  - ERDA process launched by the Commission together with ENEF: a European Reactor Design Acceptance (ERDA) would be issued by a national authority or a group of national authorities and accepted by consensus in several or all EU Member States where new nuclear power plant projects are forthcoming.
New funding sources to be tapped

- Attract ‘long’ investor base (sovereign or pension funds)?

- Issue ‘Nuclear bonds’ with appropriate State / EU backing?
ENEF (*): Financing Subgroup recommends not only making best-use of existing EU financing tools, but also to set up new temporary financing tools which will have a signalling and catalytic effect for private investments in nuclear new build projects.

- Role of the EIB for nuclear financing: Currently risk-adverse commercial banks are looking for support from international institutions.
- Euratom loans: ENEF calls for An ambitious financial envelope and the modernization of the facility towards a revolving facility.

(*) The European Nuclear Energy Forum (ENEF) has been created by the EC as a multi-stakeholder process elaborating and discussing on the European nuclear energy policy.
New temporary financing tools

- **Loan Guarantee**
  - **Main objective:** to facilitate commercial banks to provide loans and to reduce financing costs by improving the borrower’s credit rating

- **Direct loan during construction with repayment flexibility**
  - **Main objective:** to channel public financing to the construction phase, during which financing is more challenging

- **Standby Credit Lines**
  - **Main objective:** to allow financing of cost overruns – by nature unpredictable and unquantifiable – caused by additional requirements from safety authorities during licensing and construction
The Need of Electricity Market Reform

- All the value components of a nuclear new build are not fully rewarded by the market
  - Security of supply in the LT
  - Carbon free
  - Predictable cost evolution
  - Flexibility and reliability: dispatchable
  - Gen3+ extra safety level compared with operating Gen2

- Prospects of capacity market, renewables market integration and ETS market for CO2 still unclear in Europe
Competition biased by financing?

- Export Financing conditions of OECD countries partners, are driven by the “the ARRANGEMENT ON OFFICIALLY SUPPORTED EXPORT CREDITS” (the OECD consensus)

- Non OECD countries partners, such as Russia or China, may act out of the OECD framework and as a consequence may offer more attractive conditions

- Even within the OECD partners national organization of Export Finance support introduces financing competition
  - EU: ECA such as Euler Hermes or COFACE are acting as insurance companies and the cost of the credit is based on the commercial banks funding cost which induces an additional spread over the CIRR.
  - USA: US Exim Bank is acting as a direct lender and applies CIRR without additional spread (funding being based on US T Bonds)
  - Japan and South Korea in addition to the traditional financing support offered through the OECD consensus have set up untied financing instruments which open access to better financing conditions and possibilities of equity investment in NPP new built.
Competition biased by financing?

- Involvement of the EU is a must to support its own industry especially for capital intensive infrastructure Export projects.
  - Long term European Investment fund or,
  - Project bond issuance initiatives

- It is necessary to maintain a fair playing field between competitors
THANK YOU FOR YOUR ATTENTION
Back up Slides
EPR™ reactor lessons learned process achievements

Evolution between OL3 and Taishan

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<th>Process</th>
<th>Comparison</th>
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<tr>
<td>Engineering</td>
<td>- 60 %</td>
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<tr>
<td>Construction</td>
<td>- 50 %</td>
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<td>Procurement</td>
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- Number of engineering hours on the Nuclear Steam Supply System scope
- Duration of construction (from 1st concrete to dome installation)
- Average procurement time (reliability of procurement planning)
Potential EU / EIB role to ease the financing of NPP in the short term

Rationale

- Significant investments are needed for new nuclear power plants in the EU.
- In the long-term, regulation can address many of the issues impacting nuclear financing.
- Meanwhile, introducing temporary financing instruments can help overcome some temporary hurdles, i.a. lack of track-record and ongoing licensing of GEN III+
- Currently risk-adverse commercial banks are looking for support from international institutions.
- Since 1970’s, 7 billion euros worth of loans (Euratom and EIB) have been granted for the construction of nuclear plants.

Potential instruments (Euratom, BEI)

- Direct loans granted during construction - designed to be refinanced during operation - to provide leverage for other financing sources.
- Direct loans to cover the extra safety cost of Gen 3+ reactors.
- Loan guarantees from EU institutions, granted on market terms, with appropriate recourse on relevant stakeholders: sponsors, suppliers, national governments...
- Standby credit lines available to mitigate construction risks resulting from regulatory delays.

Implementation for new Gen III+ plants, with specified deadline and for a limited number of projects (see US DOE incentives)
In the long-term, regulatory initiatives could reduce risks impacting nuclear financing

**Issues faced**

**Market failures:**
- Inefficient market for CO₂ allowances, in particular after 2020
- Information asymmetry: Limited track record for GEN III+
- No internalization of customer preference for stable electricity price
- No factoring-in of safety premium for new generation of reactors

**Regulatory framework:**
- Political support varying over time
- Non harmonized licensing and no standardized design. Licensing of Gen III+ still under way

**Possible regulatory initiatives:**
- Commitment to efficient ETS from 2020 onwards
- Introduction of a carbon price floor or equivalent measure
- Long-term contracts or co-investment models between nuclear energy suppliers and users
- Introduction of binding safety standards (PINC: construction of Gen III + only)
- EU strategic guidance (2011-2020; 2050)
- Standardization effort and harmonization of the licensing procedures