

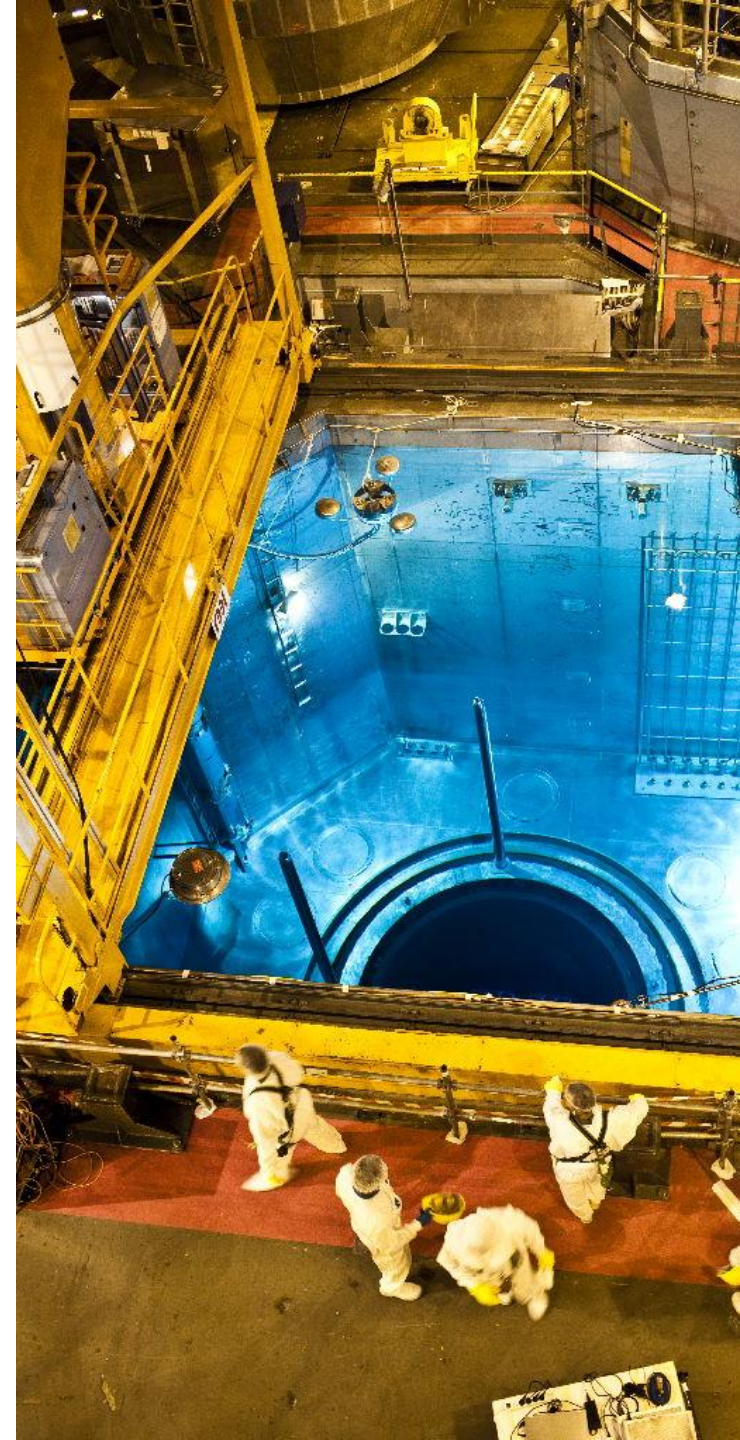
Financing of Nuclear New Build (NNB)

EDF feedback experience

Seminário : Perspectivas da Energia Nuclear
no Brasil

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Financing of Nuclear New Build. EDF Feedback experience

SUMMARY

How nuclear is different from conventional power projects

Competitive financing costs versus risk management

Structuring the NPP Financing Plan

Conclusion

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How nuclear is different from conventional power projects

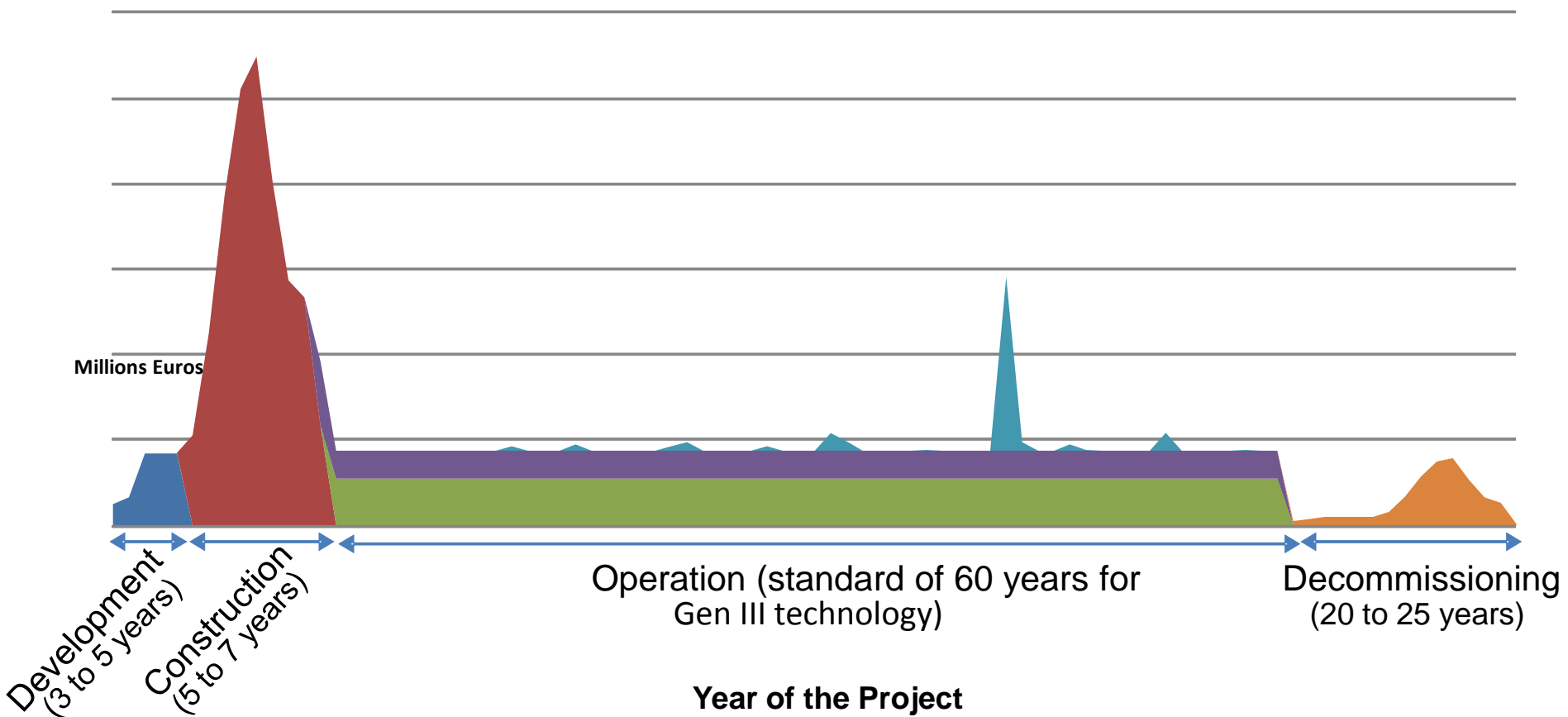
TIMELINE AND COSTS

WHY COST OF CAPITAL IS KEY FOR NPP COMPETITIVENESS?

NON FINANCIAL NUCLEAR CHARACTERISTICS AT STAKE

Standard cash out expenditure curve of a nuclear plant

- Development
- Construction
- O&M
- Fuel
- Large Scale Maintenance
- Decommissioning



The cost curve of a NPP Project can be divided in 4 periods, each having specific stakes

1. Development Phase:

Stake: Significant industrial preliminary tasks (engineering studies, site characterization...) have to be undertaken to better secure the project schedule and budget but at cost and at risks by investors.

Development costs financed through Equity

⇒ **Need for strong and experienced project sponsors**

2. Construction Phase:

Stake: Construction period runs for a several years period of time with an amount too large to be born equity only. Lenders do not take the construction risk.

Construction costs mostly Financed through Debt

⇒ **Need for very long repayment term on debt**

The cost curve of a NPP Project can be divided in 4 periods, each having specific stakes

3. Operation Phase:

Stake: The pay back period is quite long (usually over 20 years) and measures the exposure of project to the operation and market risks.

O/M costs financed by Electricity Sale Revenues

⇒ **Need for revenue stream visibility and credit worthiness of offtaker**

4. Decommissioning:

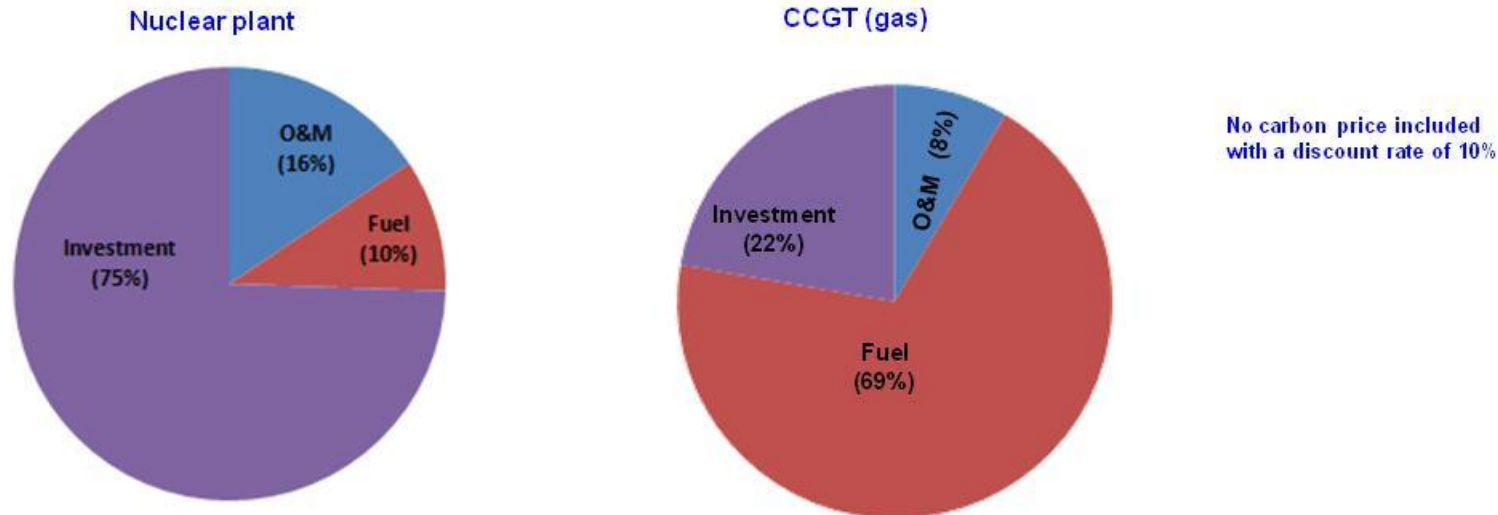
Stake: Allocation of responsibilities and financing scheme for decommissioning activities must be clearly defined before hand in the legal framework.

Decommissioning costs financed through provisions

⇒ **Need for clear legal and regulatory framework**

Drivers of Nuclear Power Generation Costs compared to other Technologies

Source : IEA – 2010 Edition



- Investment represents more than 70% of total generation costs
 - the Weighted Average Cost of Capital (WACC) of the project determines the competitiveness of the NPP

Other nuclear characteristics at stake

- Safety and Security.
- Public acceptance and Politicization of process.
- Technology: Increased First Of A Kind risks.
- Strict Regulatory oversight:
 - ✓ Stronger restriction on transfers of ownership,
 - ✓ Independent, stable Safety Regulator
 - ✓ Predictability of licensing and permitting process particularly once construction has started
 - ✓ Clear liability rules (Nuclear third party responsibility regime, waste and decommissioning, etc).
- Lender's clear understanding of a NNB project ("education" issue).

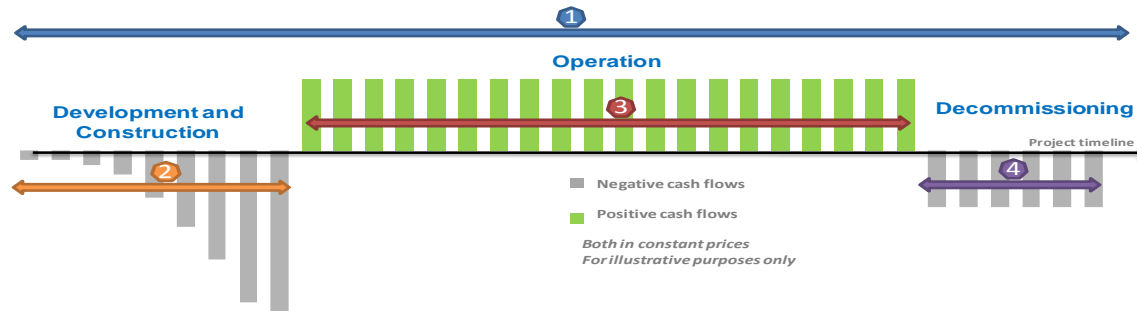
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Competitive financing costs versus risk management

FROM RISK IDENTIFICATION TO RISK MANAGEMENT: EDF
EXPERIENCE

ENSURING SUSTAINABLE PROJECT BANKABILITY

Lenders and investors need confidence on NPP's ability to generate sufficient and predictable cash flow



Examples of risks identified

1. Political and regulatory risks

- Lack of public acceptance
- Lack of political support
- Unclear / non-predictable legal and regulatory framework, licensing and permitting processes

2. Construction risks

- Insufficient industrial capabilities
- First of a kind Technology Risks

3. Operation risks

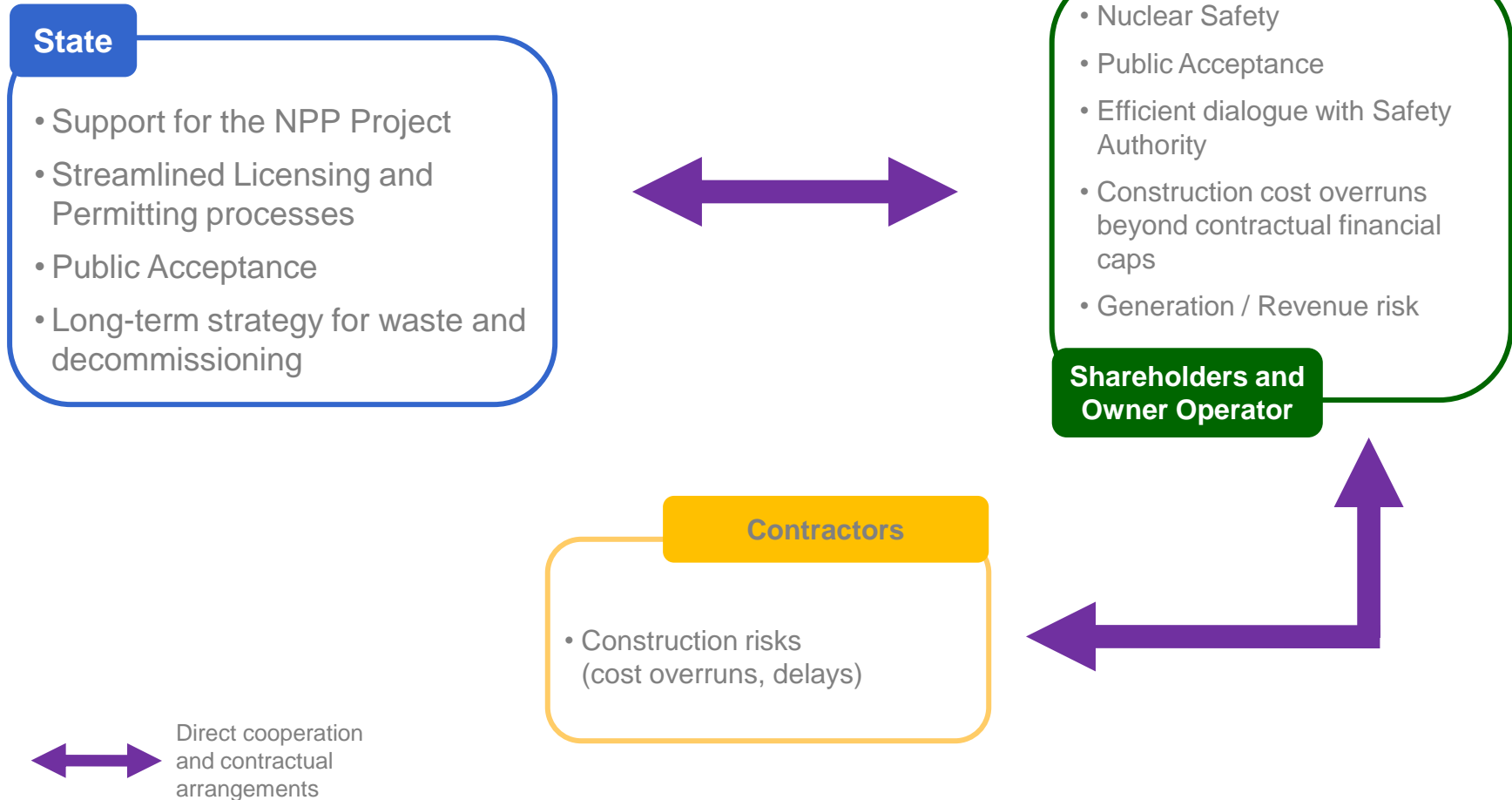
- Nuclear operation safety
- Electricity Market Risk
- Difficult dialogue between the Owner-Operator and the Nuclear Safety Authority
- Natural disasters risk

4. Decommissioning & Waste Management risks

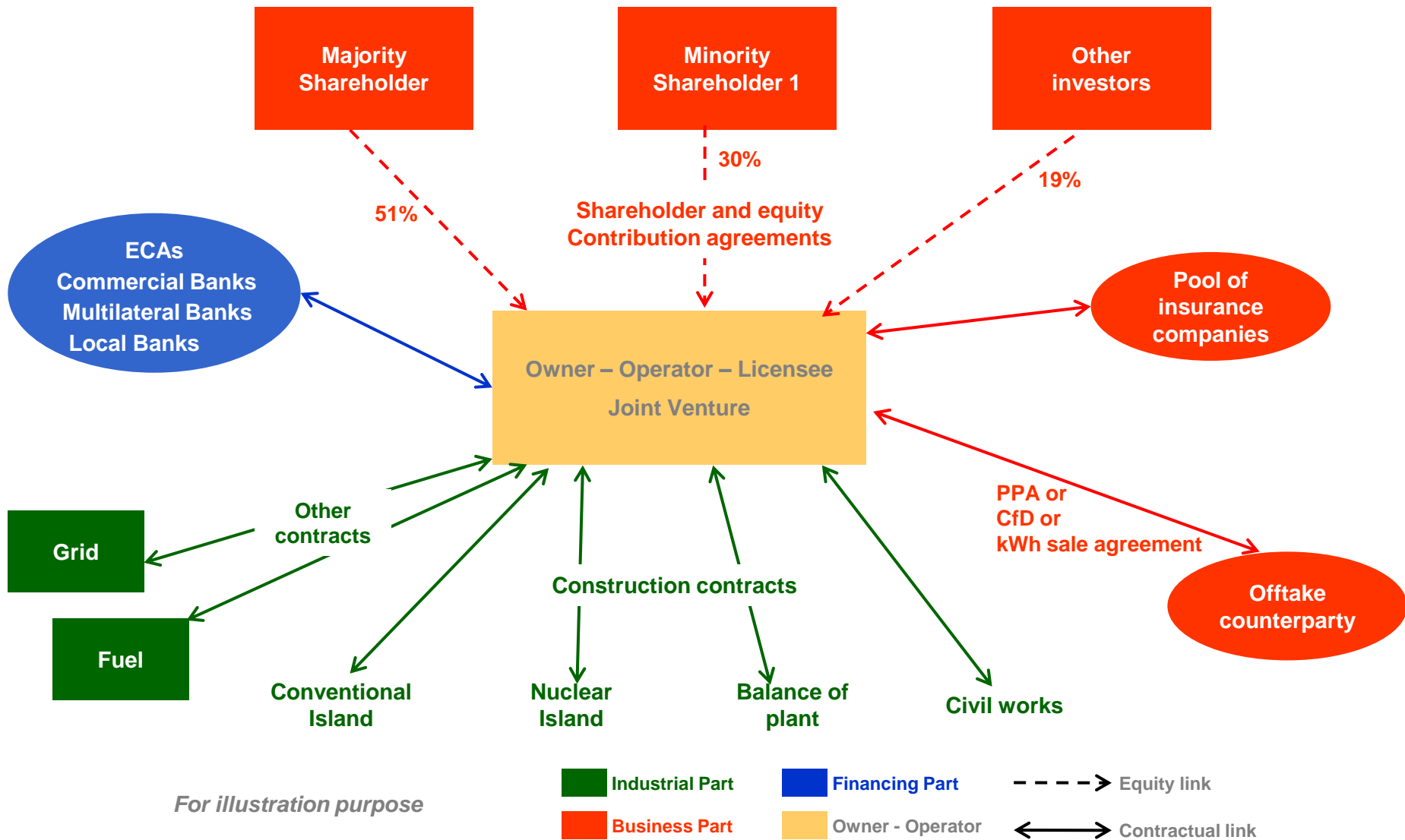
- Poorly defined decommissioning strategy
- Unbalanced financial and technical responsibilities between stakeholders
- Costs undervaluation

Building a risk matrix of the project is key

A risk must be allocated to the party which can manage it



Risk Allocation must be integrated in an appropriate contractual scheme: example



For illustration purpose

Based on EDF experience, International Banks have six main prerequisites for NPP project bankability (1/2)

1. Adherence to Safeguards and Security international standards.
2. Early discussions between Owner-Operator and the banks & investors on:
 - Project risk matrix
 - Proposed overall contractual scheme with associated risk allocation.
3. First Of A Kind technology may clearly not be accepted by most lenders.
4. Stakeholders' reputation
 - Financial strength and nuclear project management & operational experience of the Owner/Operator,
 - Experienced construction contractor(s) with in-house design capabilities
5. Solid Integration of Environmental and Social impacts into the project

Based on EDF experience, International Banks have six main prerequisites for NPP project bankability (2/2)

6. Strong support from the state:

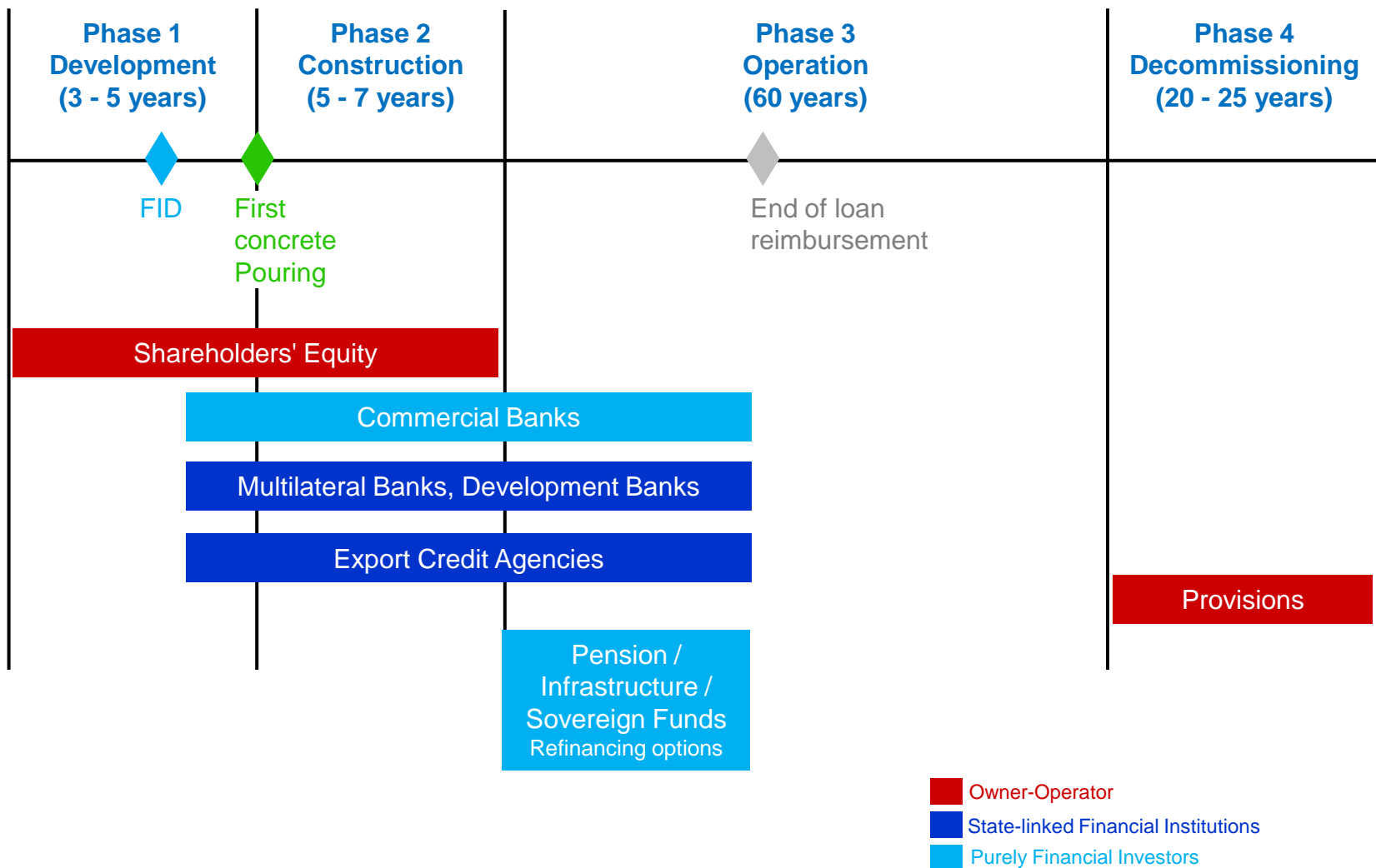
- Even in an open market environment (e.g. UK), new nuclear projects can arise given they get the necessary visibility including state support which can take different forms:
 - **Visibility on Political Commitment** (broad political consensus from major political parties....),
 - **Visibility on Legal and Regulatory framework** (strong independent nuclear regulator , clear and straight forward licensing and permitting process, clear waste and decommissioning policy and financing....)
 - **Visibility on potential Public financing** (possibility of loans from Public State Banks, etc...)
 - **Visibility on Revenues** (possibility of diverse schemes such as PPA, Contract for Difference, etc).

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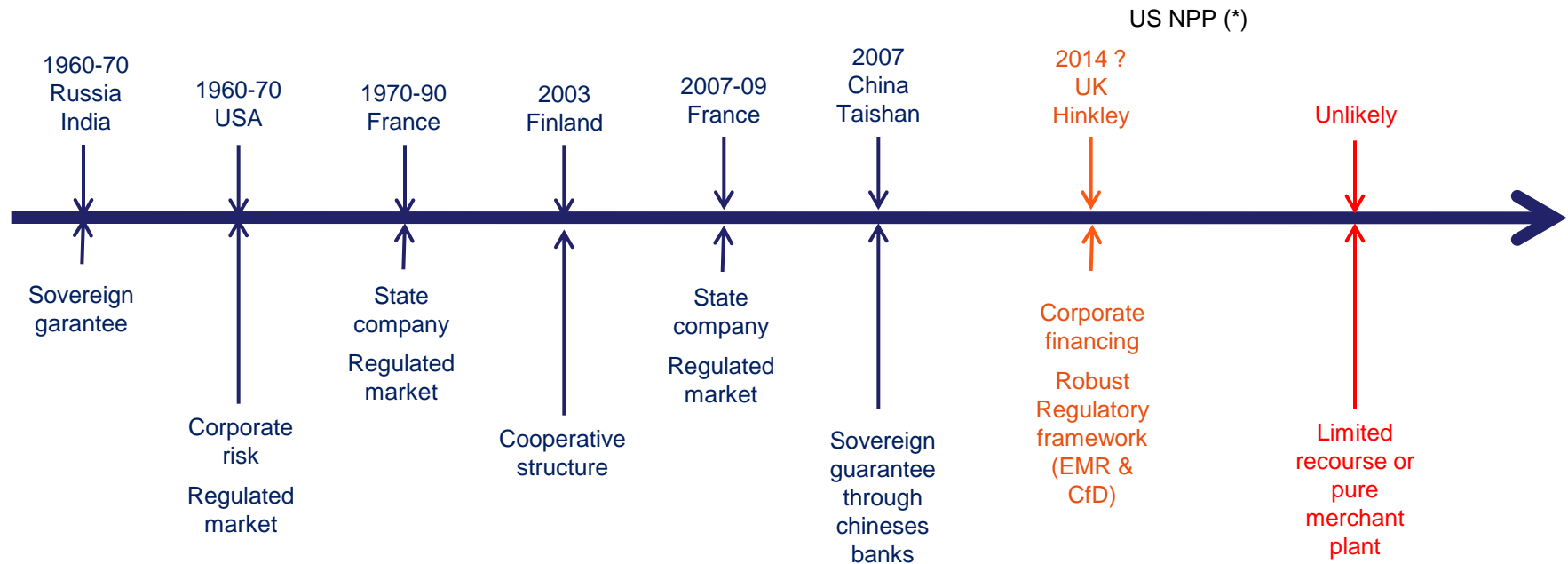
Structuring the NPP Financing Plan

SOURCES AND POSSIBLE FINANCING MIX

FINANCING SCHEMES



Review of different models for NPPs financing



Following the NPP financing models evolution...

"Traditional Sovereign" model, Public Corporate model, "Public / Private" Partnership model...

(*) under the scope of the Energy Policy Act of 2005 with investment protection against delay, loan guarantees (up to 80% of project cost), Production tax credit covered by the US Government (i.e. a quasi sovereign risk), etc.

Key Priorities to Ensure the Economic Competitiveness and the Successful Financing of a NPP Project

1. **Solid risk allocation and contractual arrangements** among the NPP project stakeholders is of the utmost importance for getting project bankability together with competitive cost of capital from both lenders and investors
2. **Strong political support from the State** in term of political consensus on nuclear by main parties, public acceptance
3. **Highly qualifies Owner-Operator and first class generation III technology provider** will provide comfort to lenders and investors towards a NPP project
4. **Securing the cash flow of the project company through visibility on future revenues** from electricity sale. The **role of the government is essential to get project bankability** through government equity, guarantees or other schemes such as PPAs and/or market price support mechanisms to secure future revenues
5. Getting a **robust legal and regulatory framework** with a straightforward licensing and permitting process to be sure that project will develop smoothly during construction
6. Solid integration of **social and environmental impacts** into all project levels



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