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Financing Structures for a Nuclear Power Plant Project

P. Warren
IAEA, Vienna, Austria

Strada Costiera, 11 - 34151 - Trieste - Italy • Tel. +39 0402240111 • Fax. +39 040224163 • sci_info@ictp.it • www.ictp.it
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Financing Structures for a Nuclear Power Plant Project

ICTP/IAEA Nuclear Energy Management School 2013

Paul Warren

Planning & Economic Studies Section

IAEA

International Atomic Energy Agency

Plan of presentation

Presentation outline:

1. Key dimensions of financing structures
2. Risk premia
3. Risk allocation and financing cost
4. Takeaways

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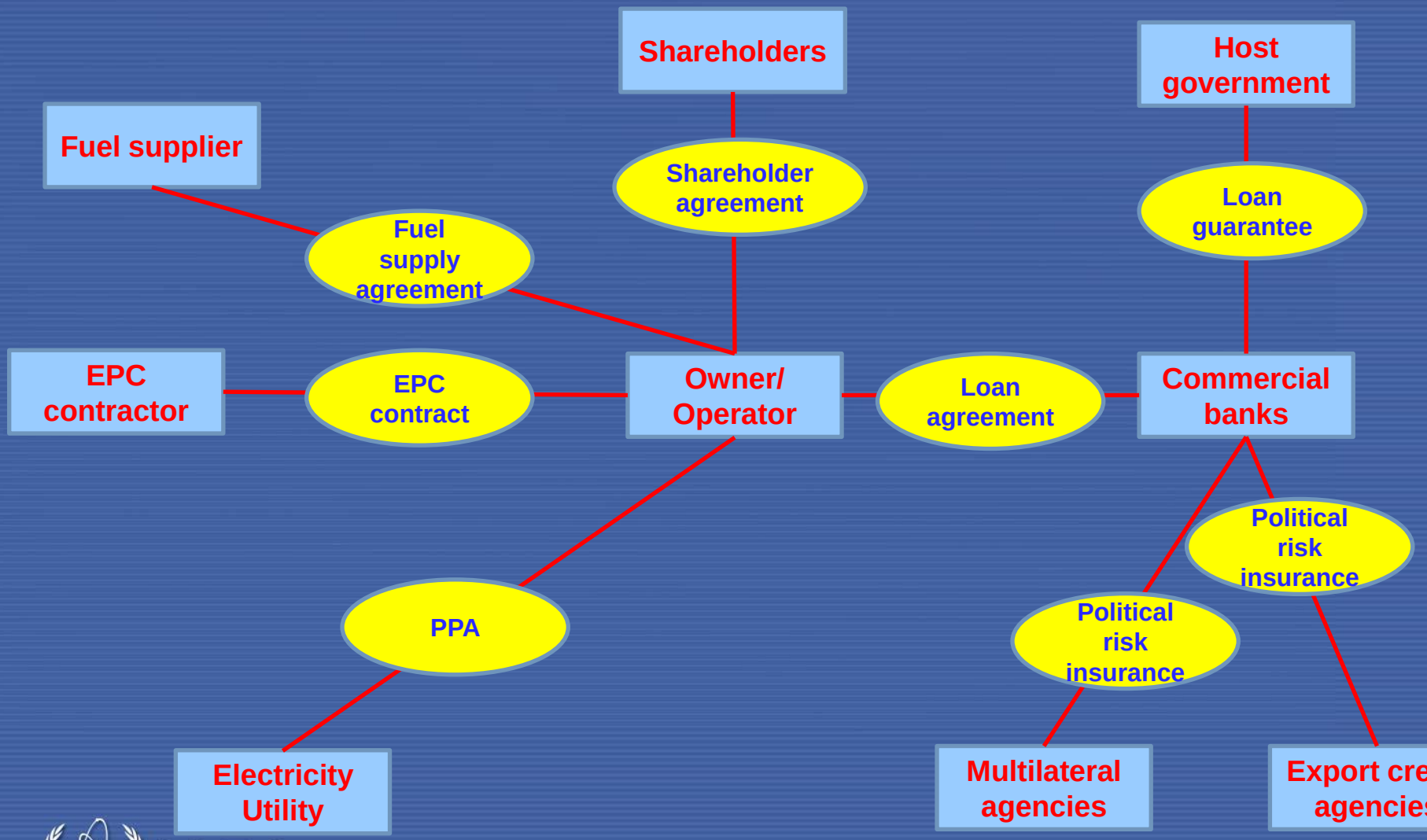
Financing structure



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How can financing structures differ?

- How can financing structures differ between projects?
- Structures can differ along five key dimensions:

1. Debt versus equity
2. Ownership
3. Contracting
4. PPAs
5. Recourse

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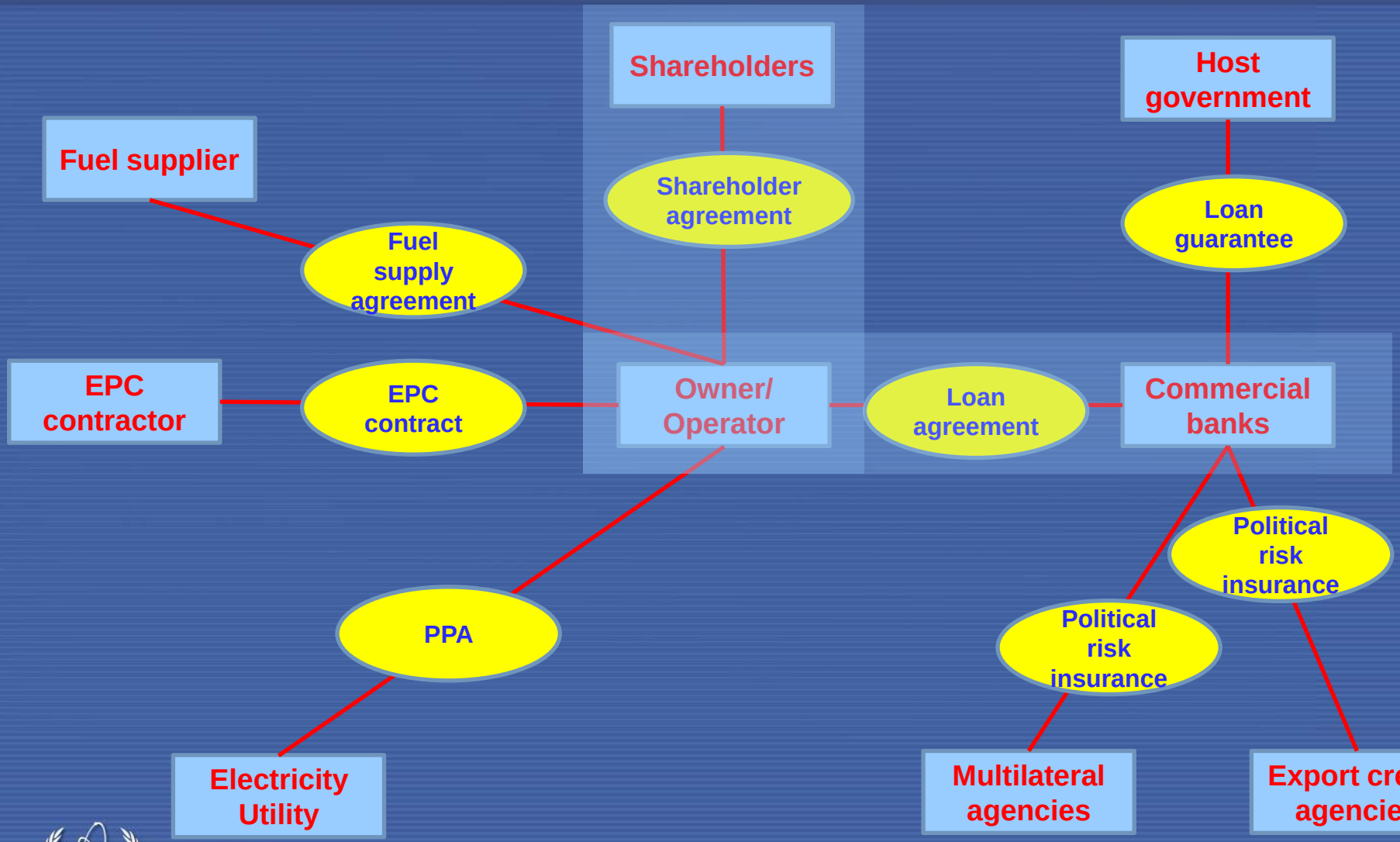
1. Debt versus equity



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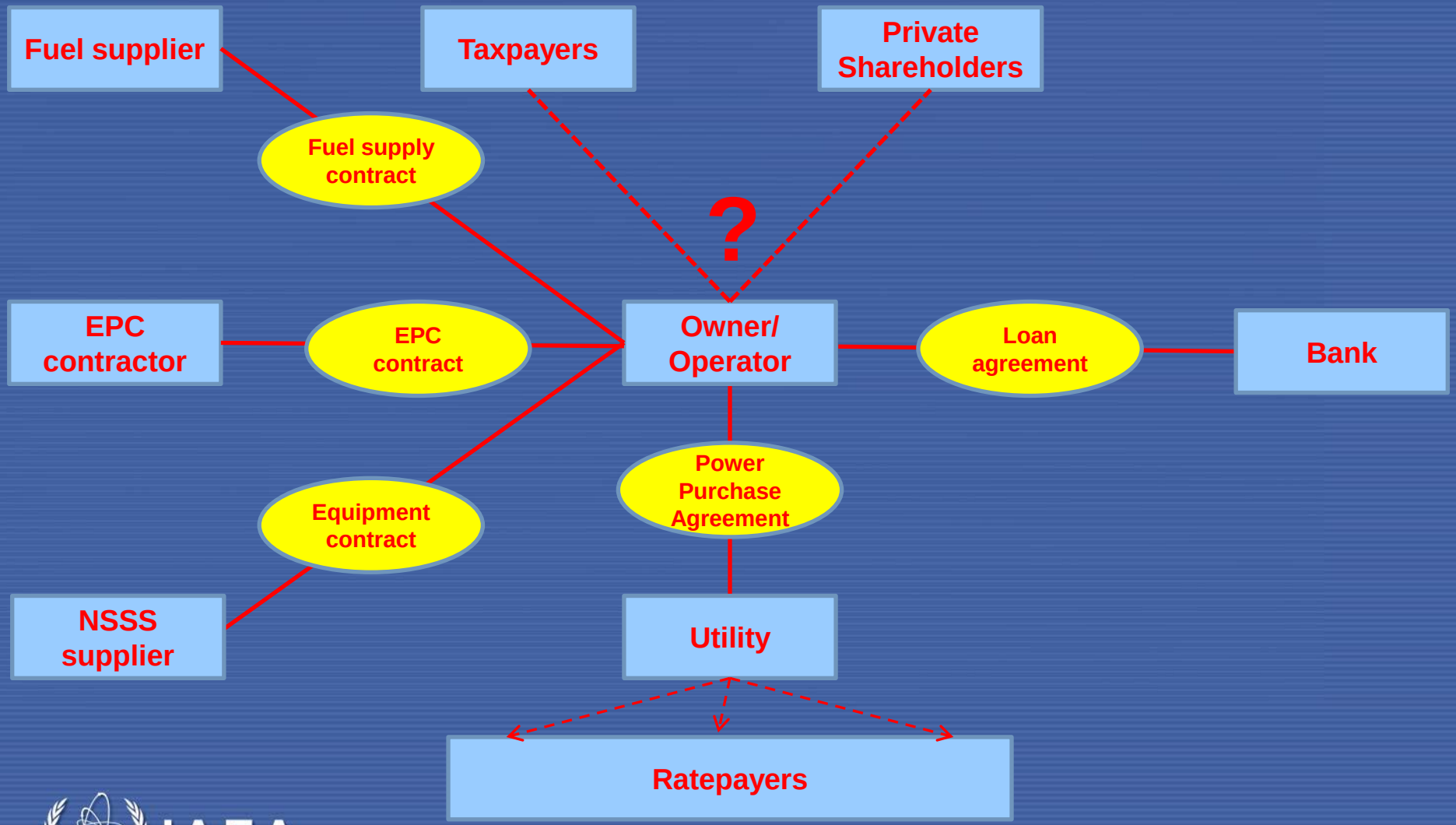
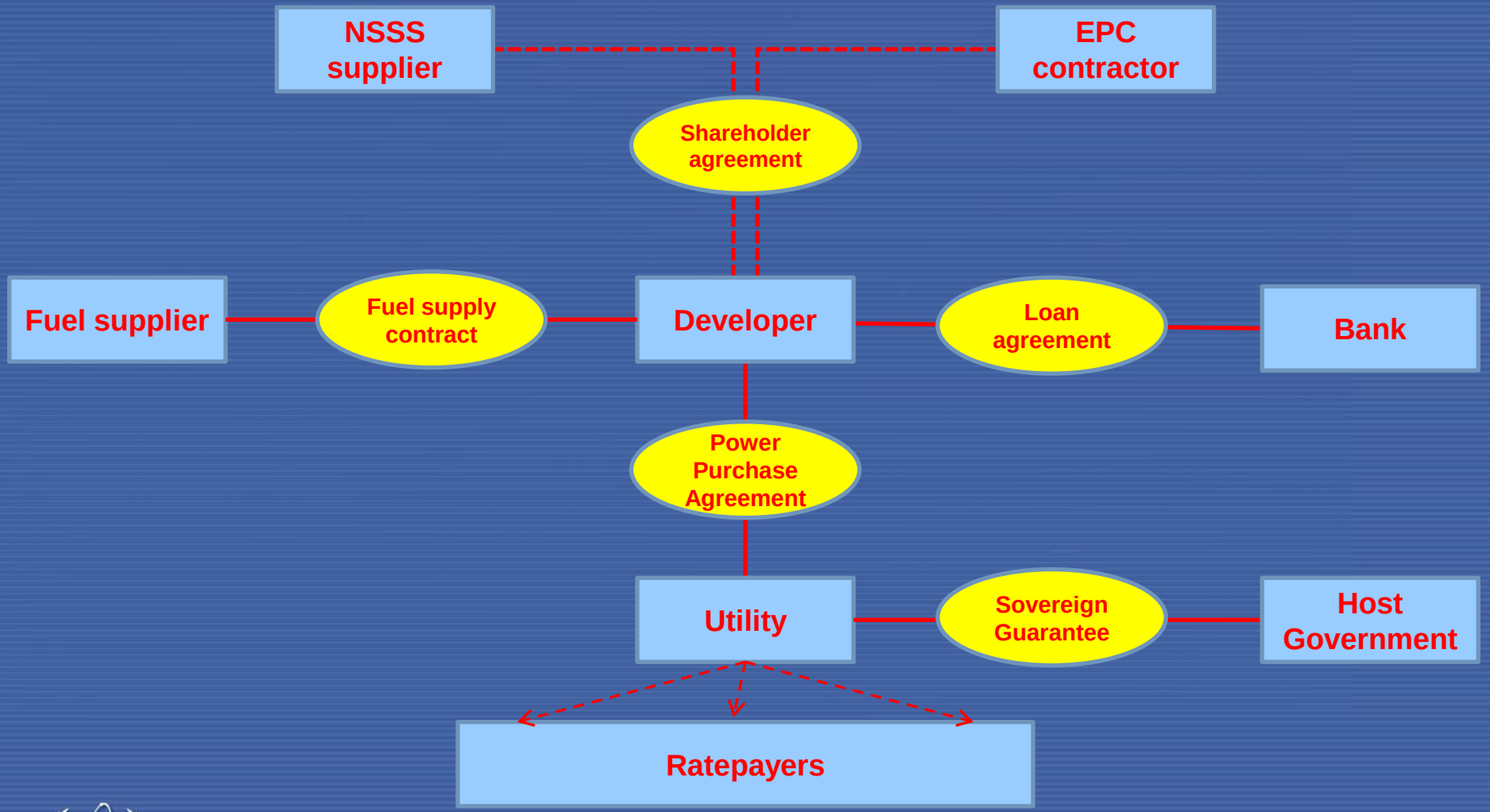
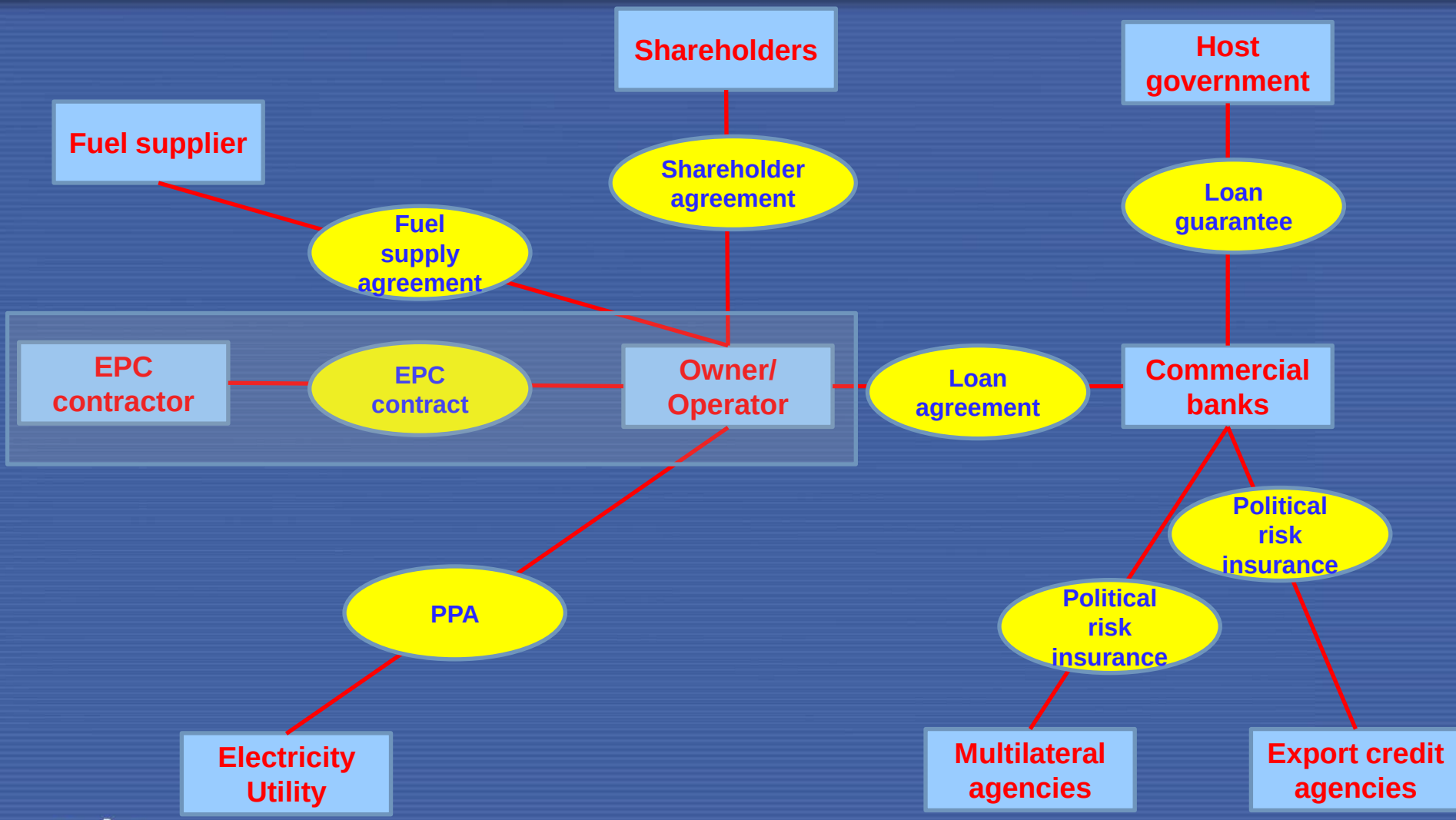
2. Ownership: a more *traditional* model



2. Ownership: a more *recent* model



3. Contracting



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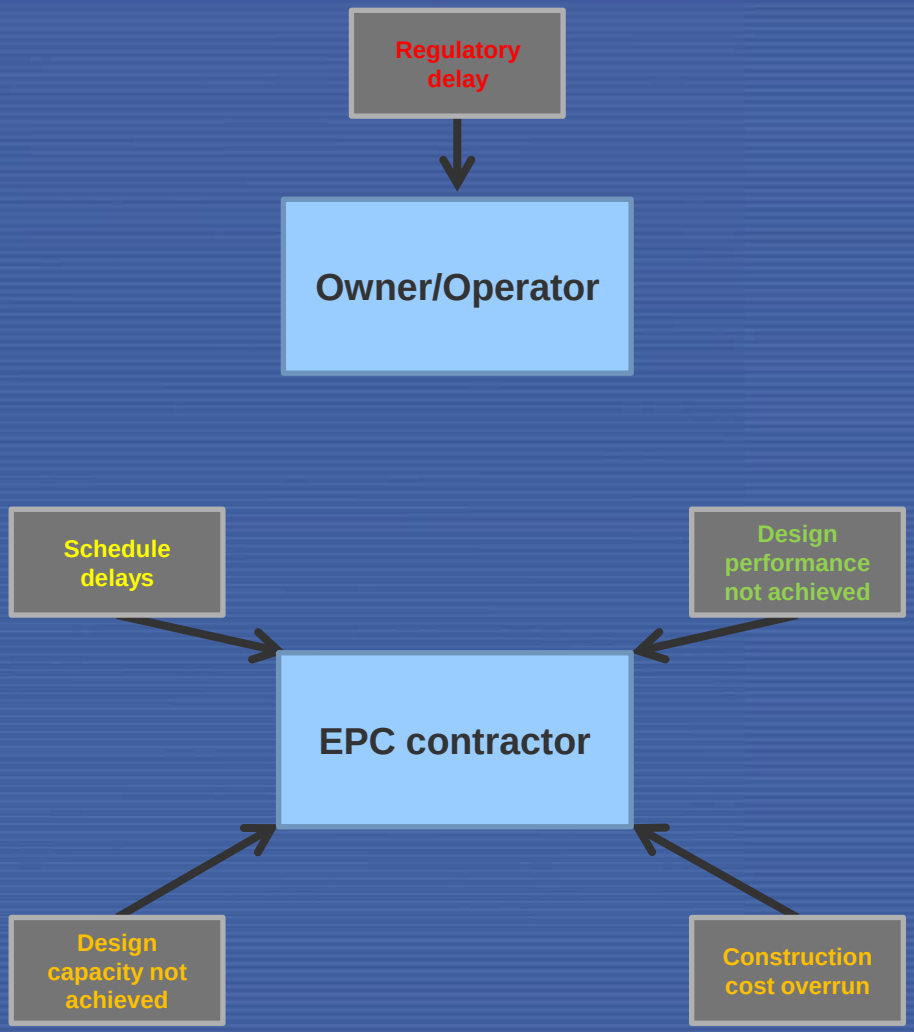
3. Contracting: contract language and risk

"The contractor undertakes to construct a power plant with a (net) capacity of 900MWe for the sum of 4 billion USD.

The contractor will pay for replacement power for each day in excess of 10 in any year in which unplanned outages exceed 10 days.

The contractor will also pay for replacement power for every day on which the plant is not synchronized to the grid after January 1, 2018, except for delays caused by unreasonable regulatory performance."



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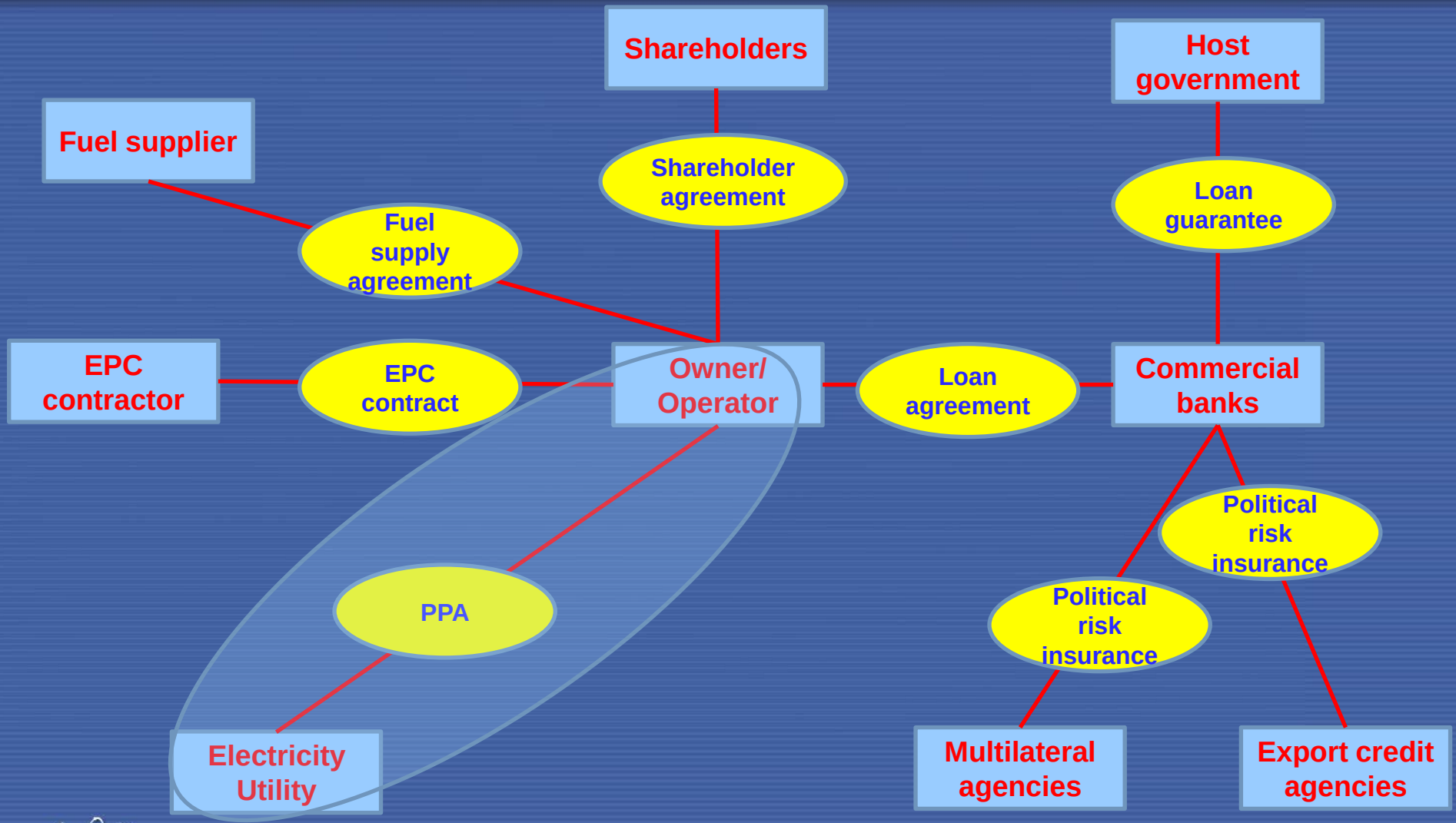
4. Power Purchase Agreements (PPAs)



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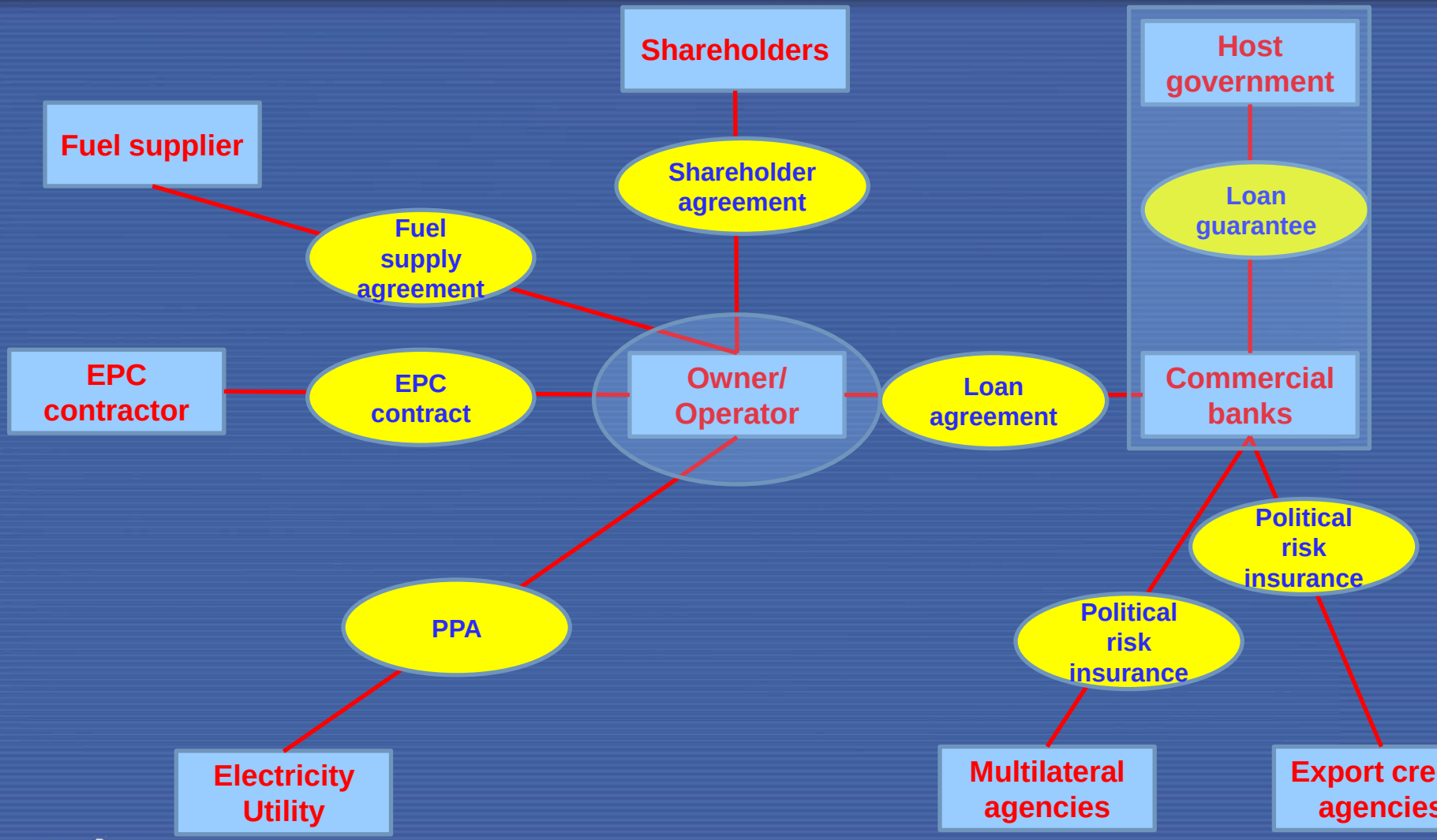
5. Recourse



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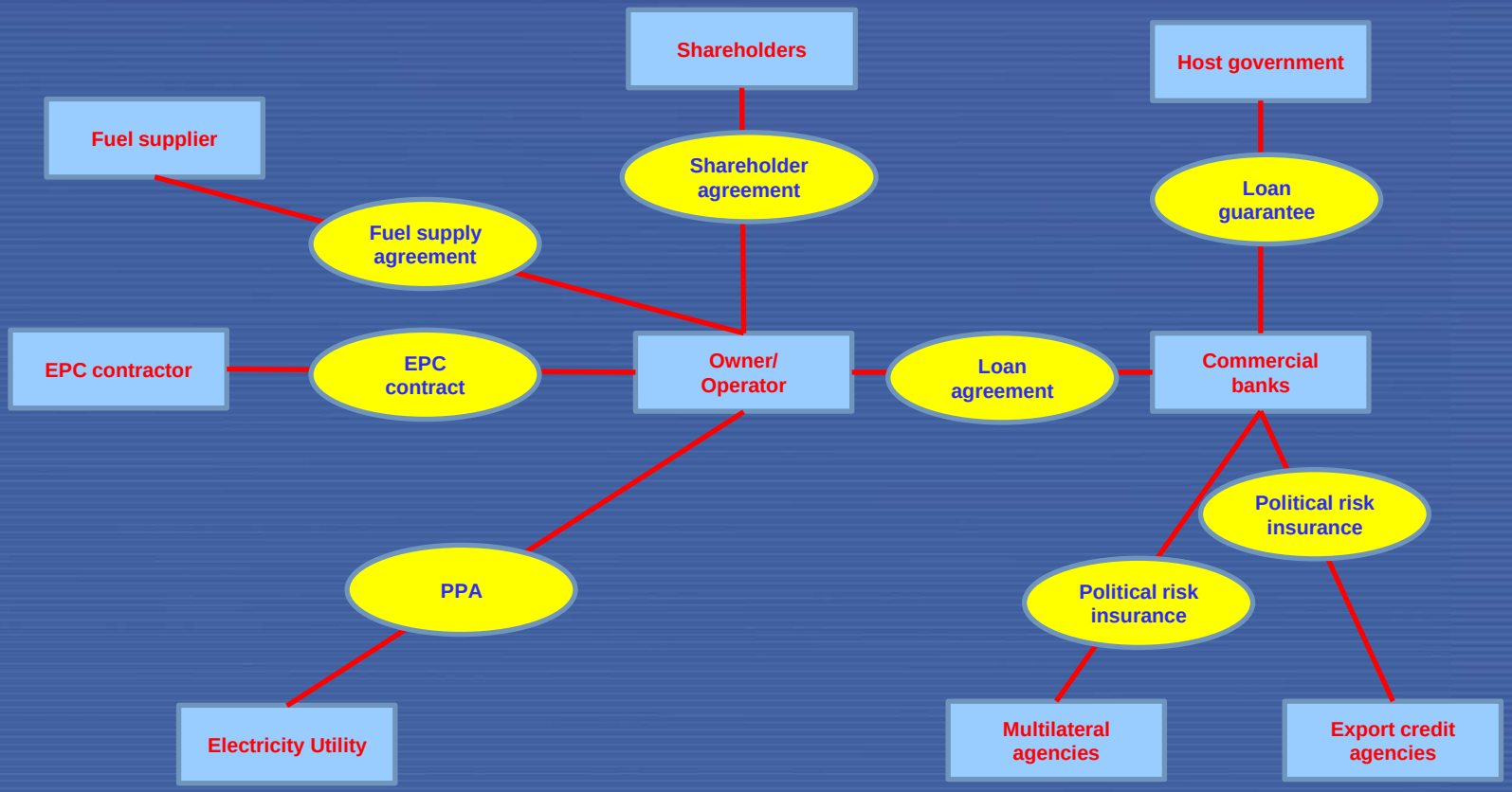
Shifting risk away ⟶ risk premia



- As you put together your project as an Owner/Operator you can offload risk – *but there'll be a cost of doing so: a risk premium*

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Risk premium example

- Consider the development of a 15-year agreement between an NPP owner/operator (e.g. a utility) and a nuclear fuel supplier
  - Price of U_3O_8 (as well as the prices of SWU, zirconium etc.) is subject to escalation risk
  - If the NPP owner were to insist on a price for fuel which was fixed throughout the contact, fuel supplier would demand a *risk premium*
  - Risk premium would be reflected in the fuel price

Risk premium example

- Suppose the U_3O_8 price for the duration of the contract was projected to average $100/kg
  - Consistent with fuel price of p^* per fuel assembly
  - If the fuel supplier took the risk it would insist on a price of p' where $p' > p^*$
  - $p' - p^*$ is the risk premium

Intuitions on risk premia

NB!

- Premium paid by OO to shift risk to the other side of a contract ('counterparty') will depend on:
  1. *Size* of the risk
     - Volatility
     - Monetary value

  2. Counterparty's *financial capacity* relative to the size of the risk
     - A small party, with limited financial capacity *might* be willing to bear a large volatile risk, *but*….
     - …it will demand a large risk premium for doing so
  3. Counterparty's risk *appetite*
  4. Couinterparty's ability to *control* the risk

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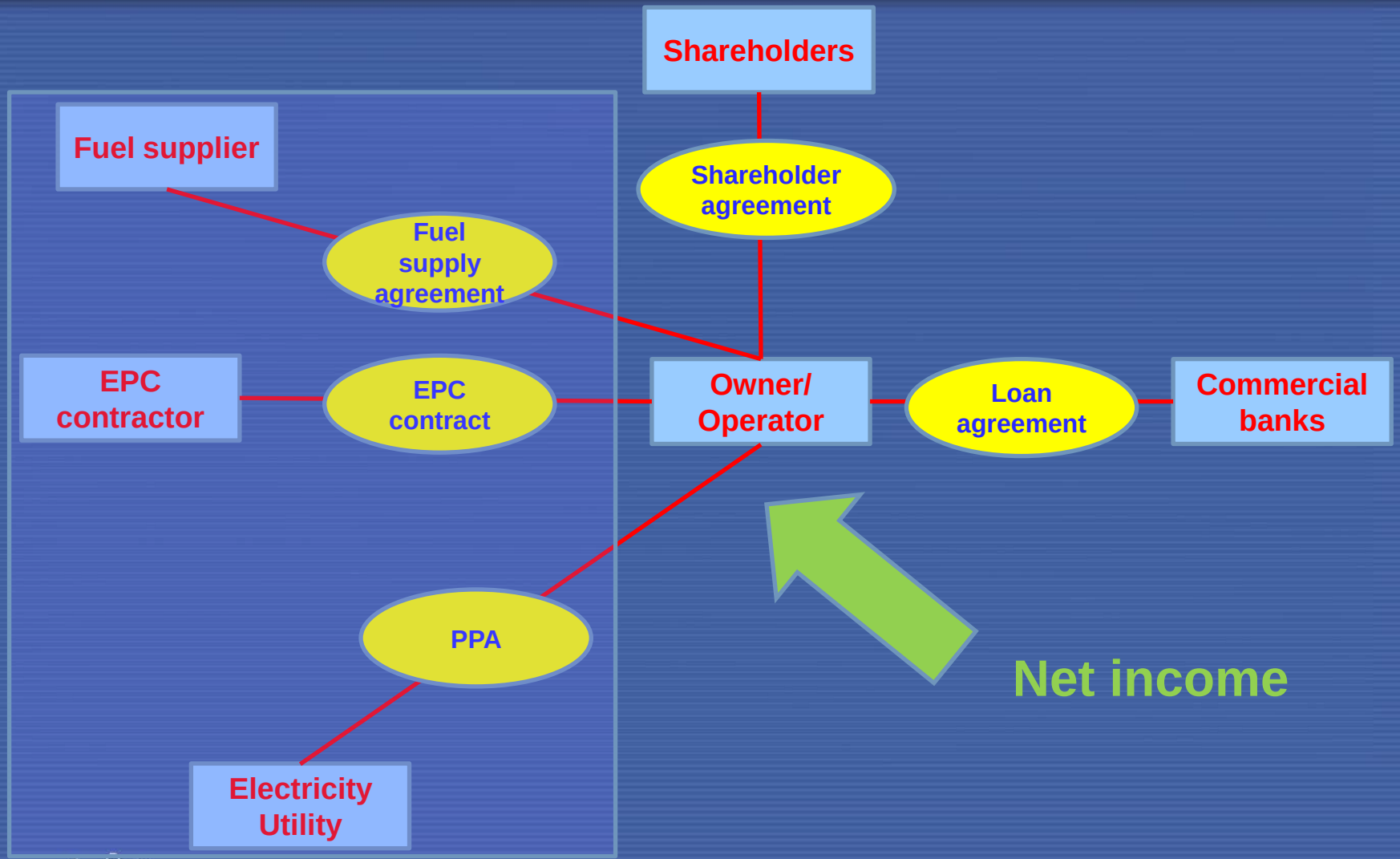
Contracting ⟶ net income



Risk allocation and financing cost

- Potential financers will be concerned about the risk ("default risk") that the owner of the project will be unable to pay dividends, or to repay some part (or any) of the principal or interest on the loan
  - Default risk associated with volatility of net income
- Default risk associated with a project will be a concern for equity investors and lenders
  - ***This makes it a concern for the project owner as well: the higher the default risk that financers perceive in a project, the more they will charge to finance!***

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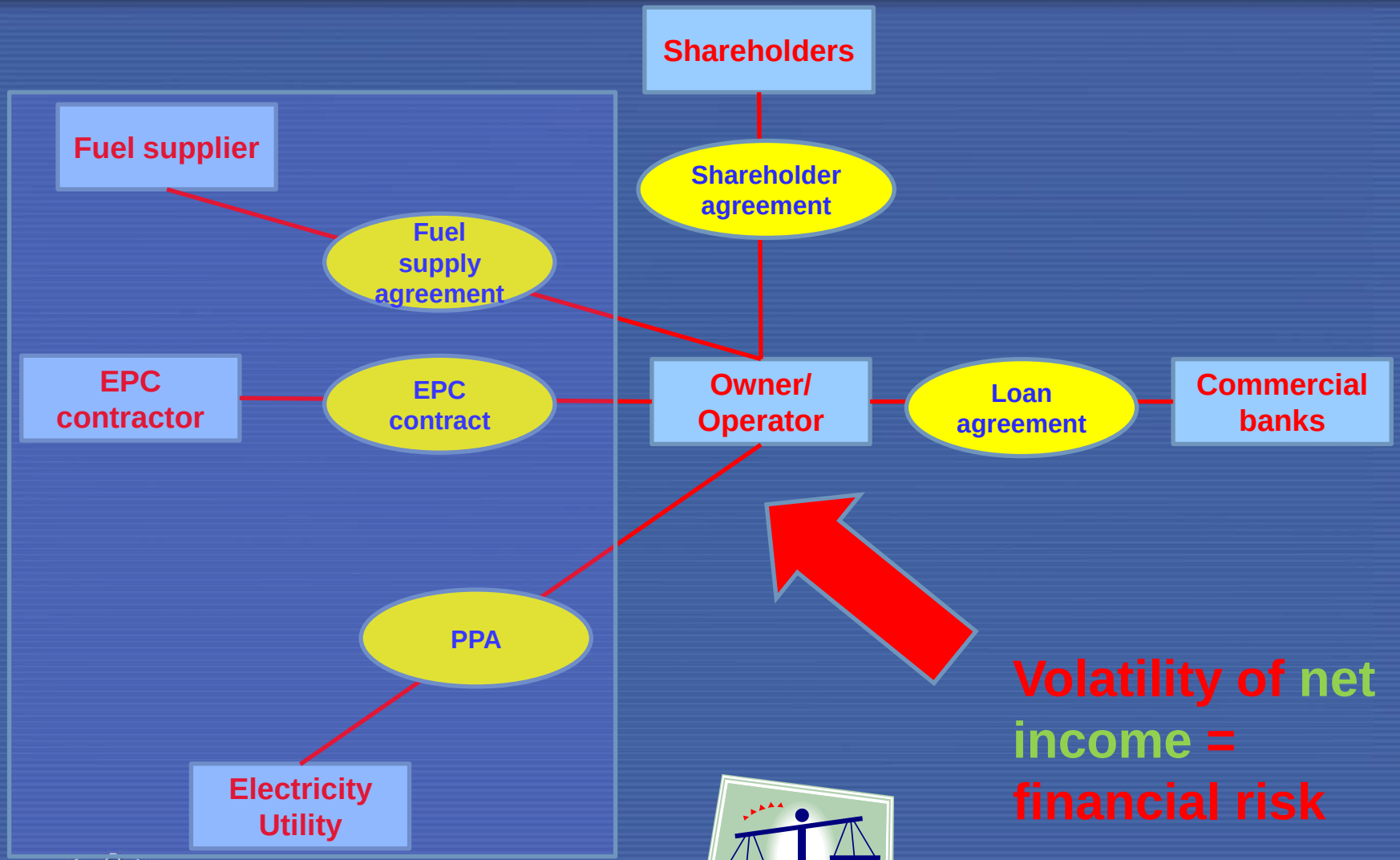
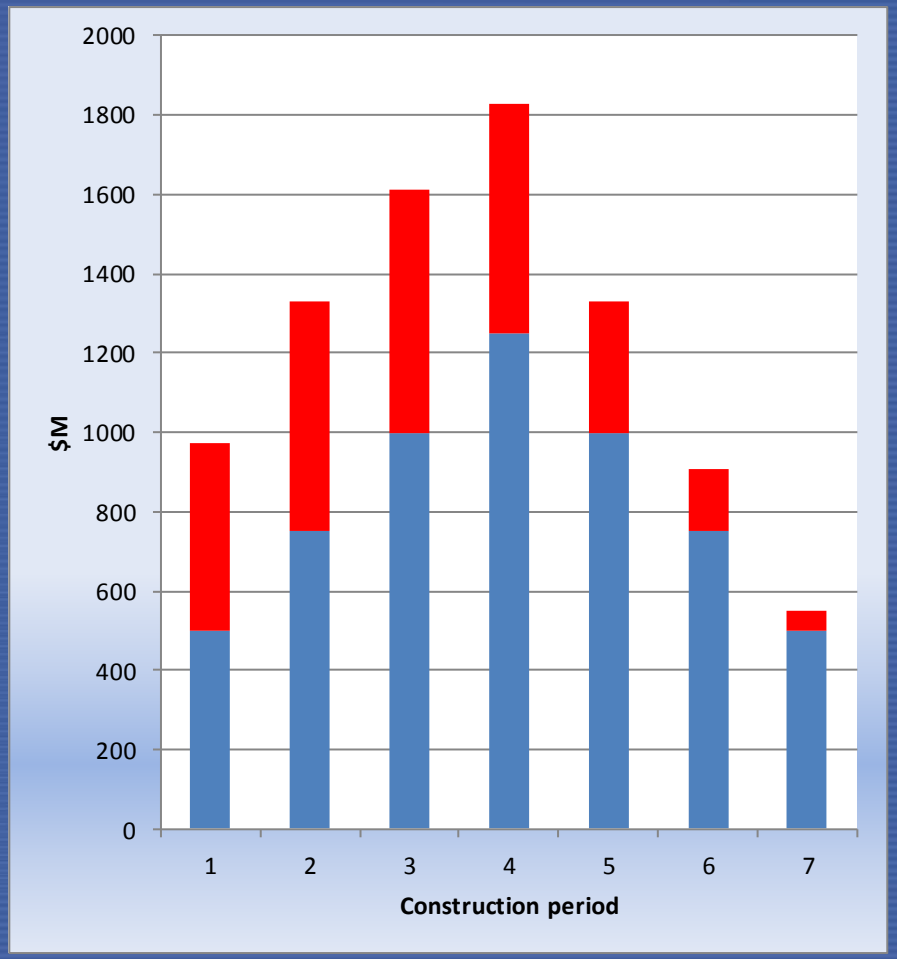
All risk is financial risk!



Volatility of net income = financial risk

Interest During Construction (IDC)

- Given the size of the capital investments needed, and length of time over which construction can stretch financing crucial!
- With an interest rate of 10% p.a. and a seven year construction period, a total OC of $5750M gives rise to IDC of $2780M
  - Reducing the interest rate by 1% reduces IDC by $326M
  - Reducing the construction period by one year – even by adding all Y7 spending to Y1 – reduces IDC by $390M



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Takeaways

1. The way an NPP project is structured financially is all about *allocating risk*
2. As you put together your project as you can offload risk – *but there'll be a cost of doing so: a risk premium*
3. For financing purposes, *all* risk should be regarded as financial risk

Financing TECDOC CMs

- Document is currently being prepared
- Authors (5) are investment banking professionals
  - Extensive financing experience in energy and nuclear ‘space’
- Framework, contents and topics set out by IAEA
  - Document will constitute a “textbook” (a comprehensive set supporting material) for future Expert Missions on financing
- Two Consultancy Meetings (CMs) will be held in Vienna in November
  - Purpose is to get feedback from potential users (i.e. Member States)
- *Contact:* P.Warren@iaea.org

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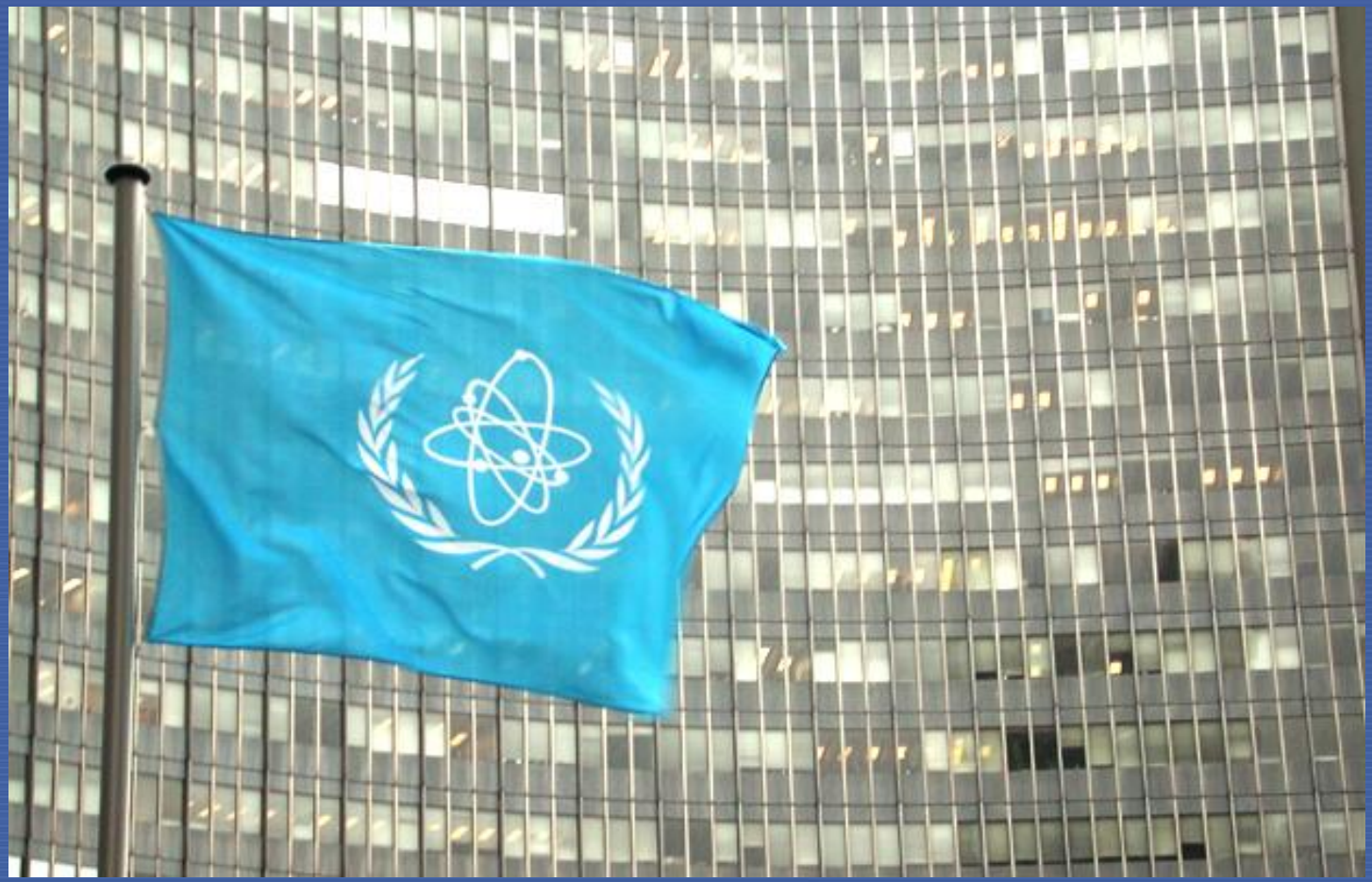
Thank you!



…atoms for peace

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