



Issues and Challenges for Merchant Nuclear

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U.S. NRC – 10 CFR 50.33(f) – Financial Qualifications for Merchant Plant COL Applicants
11 Oct 2012



The slides that follow are not a complete record of the presentation and discussion

The views expressed in in these slides and the discussion today are mine

My views may not be the same as the views of NERA's clients or my colleagues

Nuclear development hurdles



- Large size and high initial capital cost
- Long development & construction period
- High project risk, especially for FOAK units
- Significant political and public controversy
- Pervasive regulation of safety and externalities



Nuclear project cash flow

Illustrative

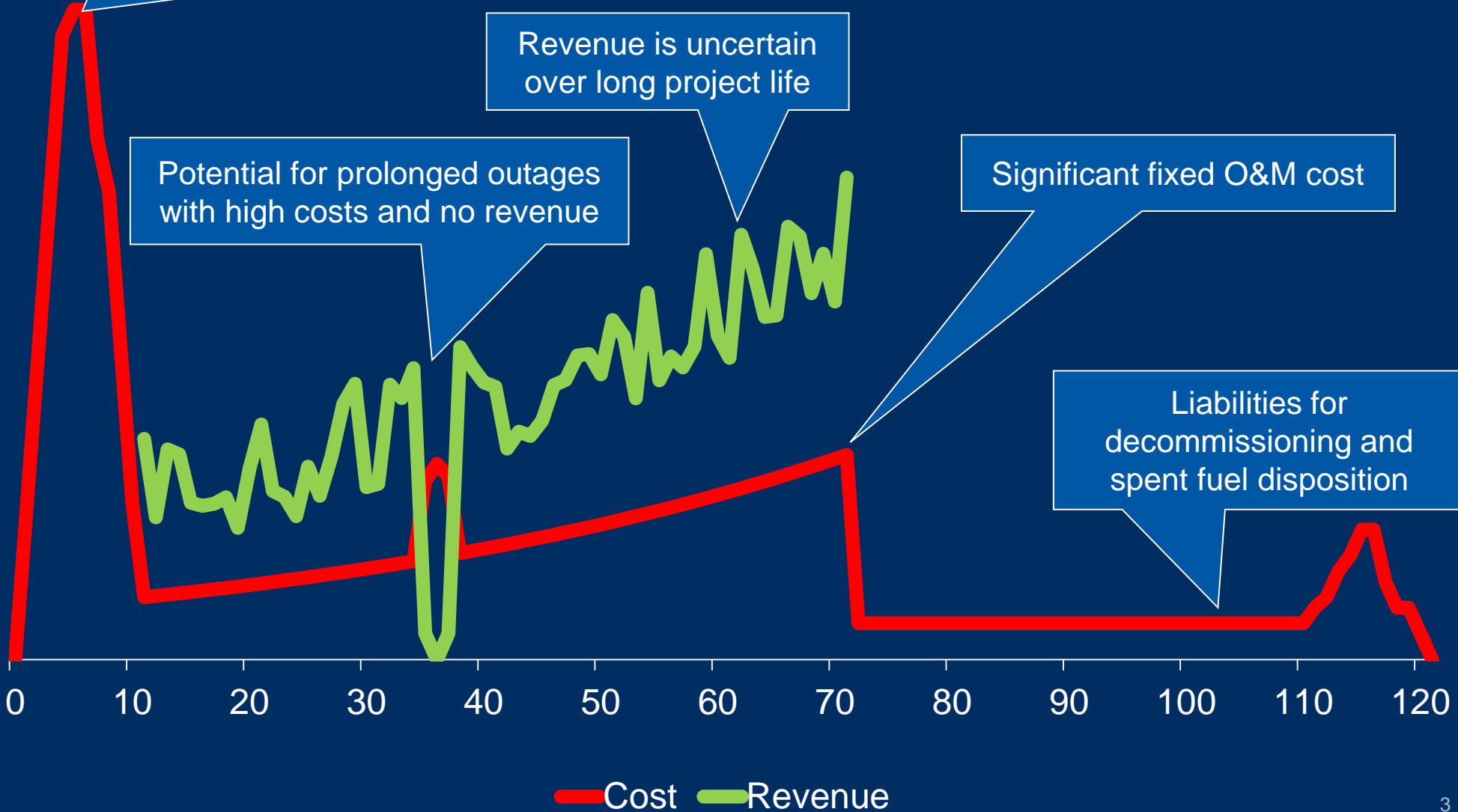
10+ year development and construction period; high and uncertain capital cost

Revenue is uncertain over long project life

Potential for prolonged outages with high costs and no revenue

Significant fixed O&M cost

Liabilities for decommissioning and spent fuel disposition



Nuclear development approaches



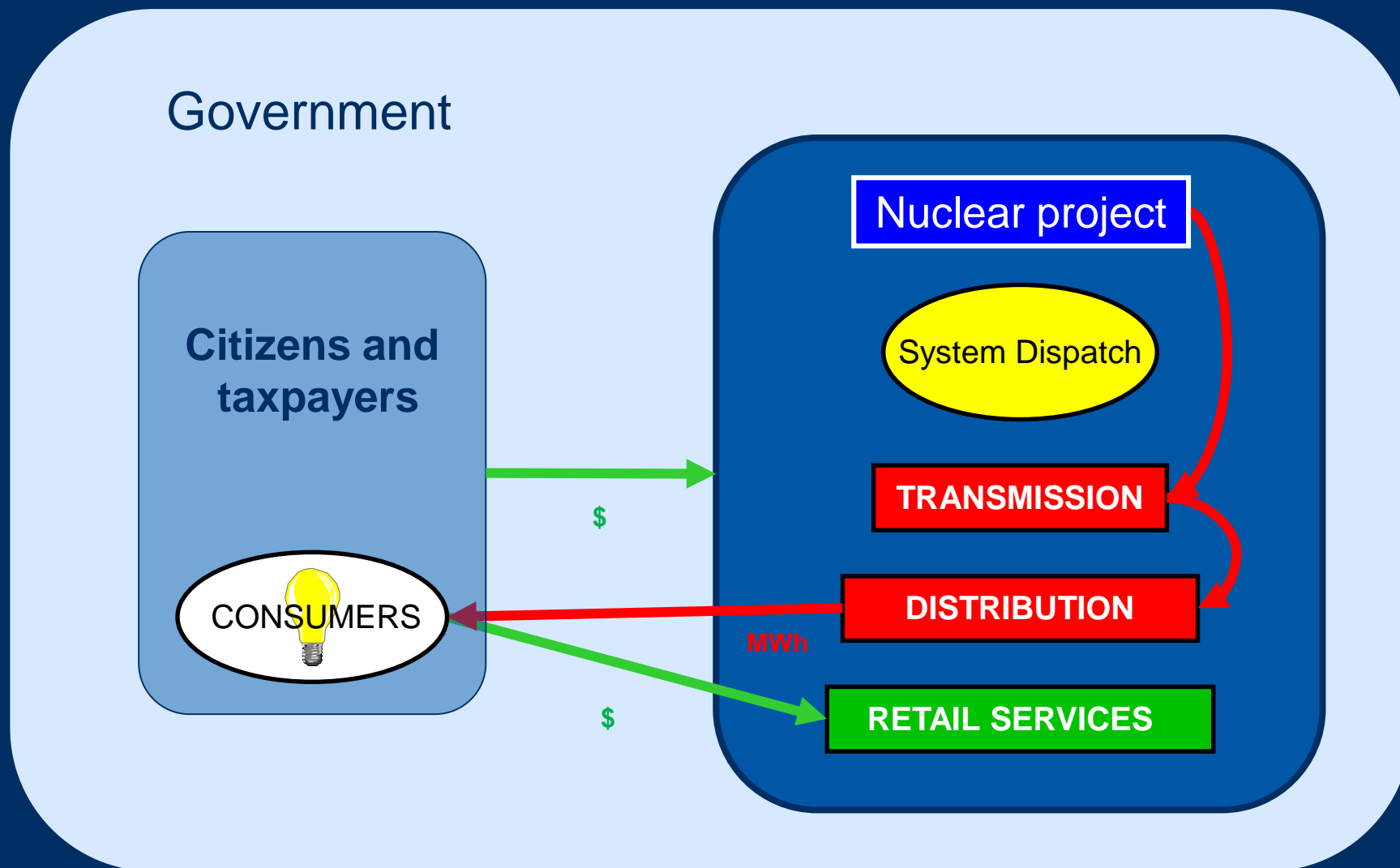
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- Government owned nuclear projects
- Regulated nuclear projects
- PPA-based IPP – long-term PPA with creditworthy counterparty
- Merchant project in reformed/restructured electricity industry with formal electricity markets

Government utility model



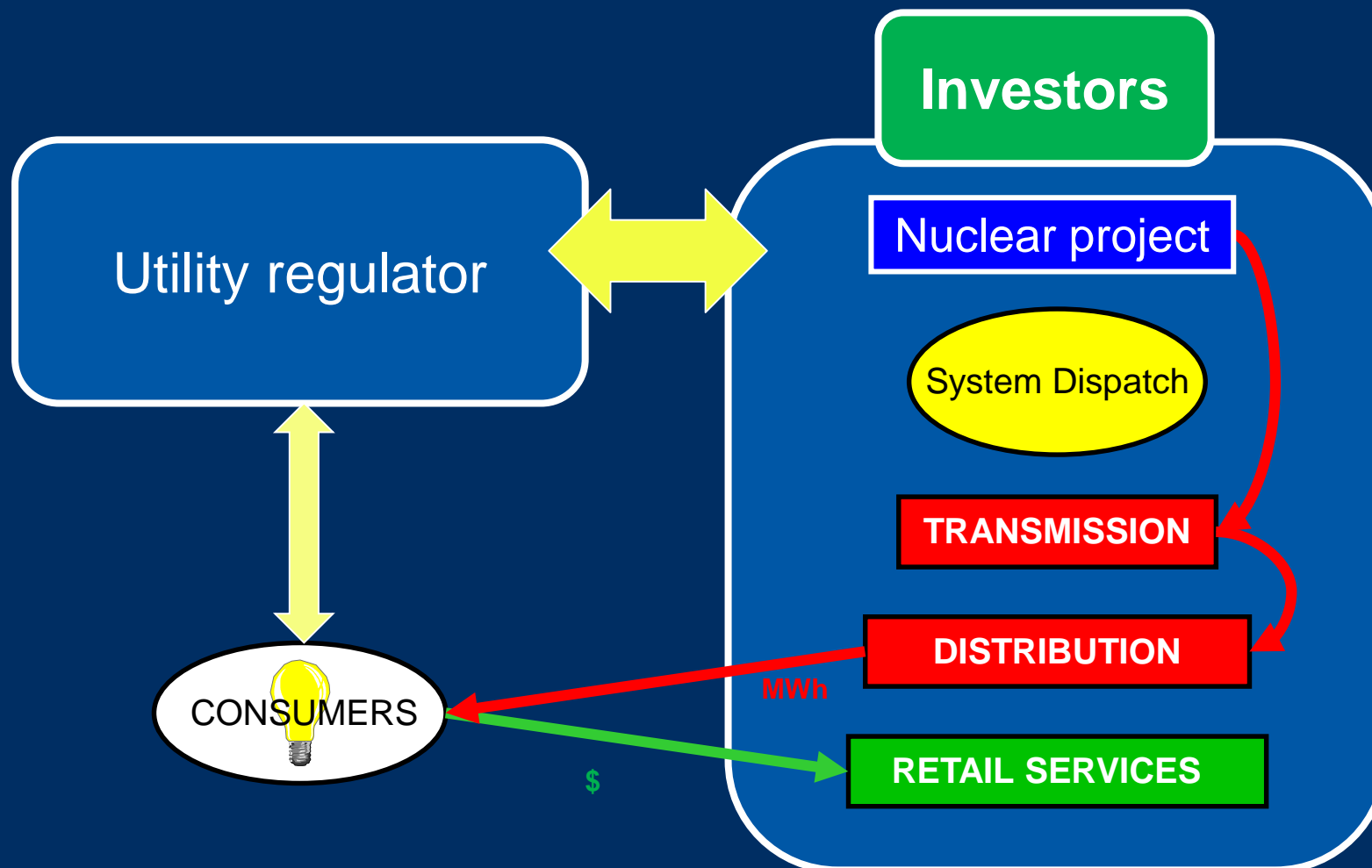
Vertically-integrated, government-owned electric utility



Regulated utility model



Vertically-integrated, regulated, investor-owned electric utility

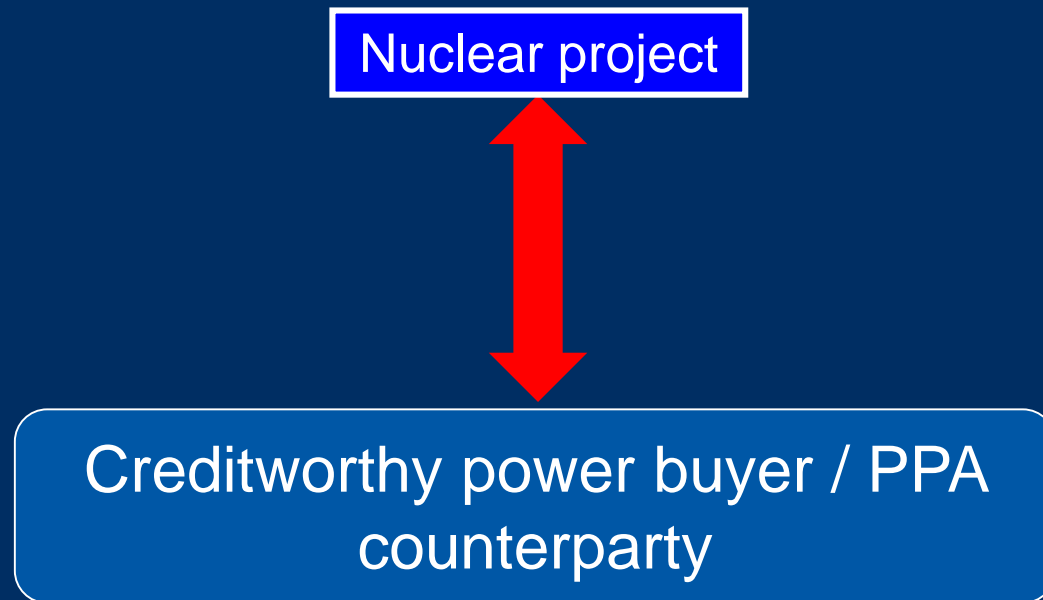


PPA-based IPP model

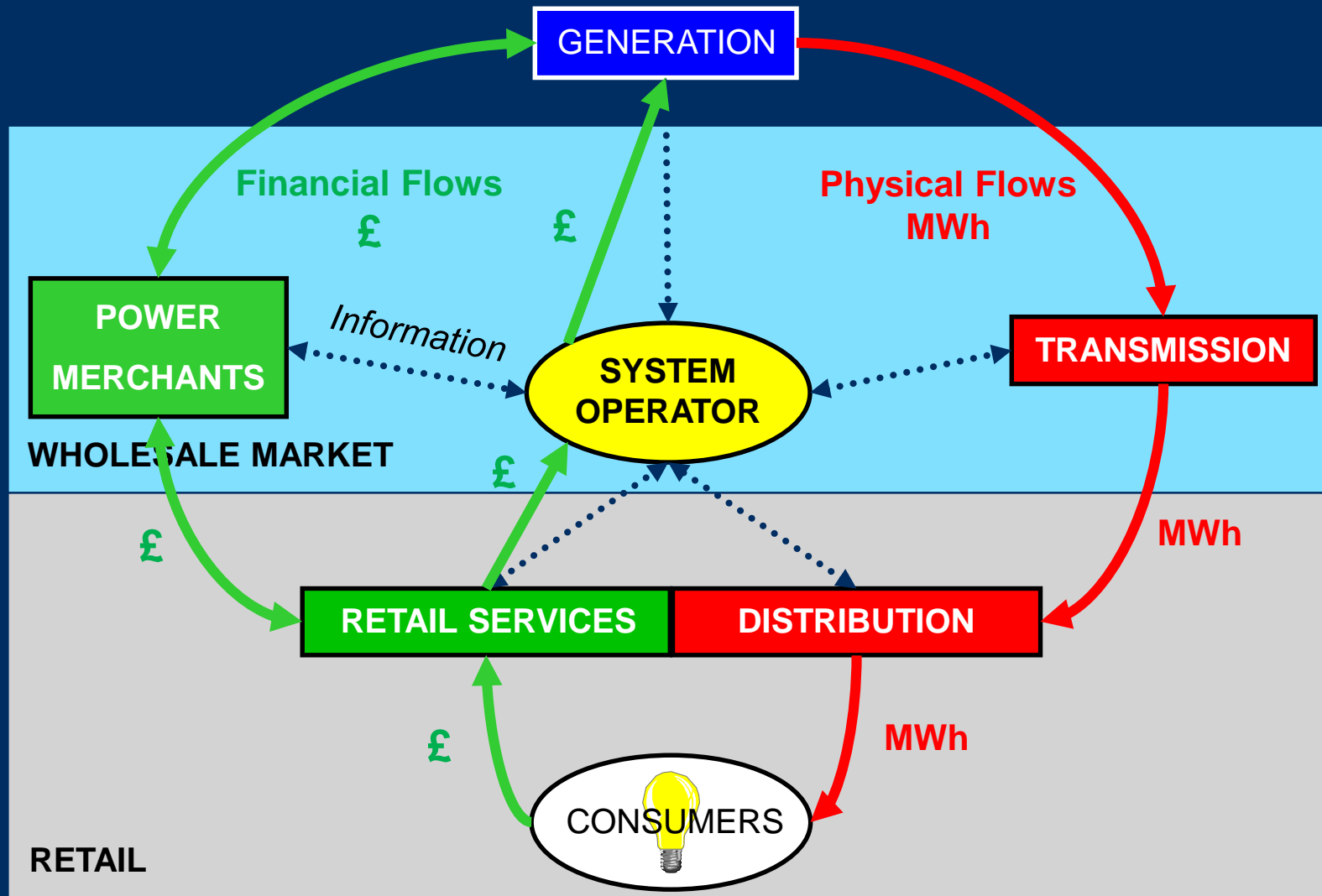


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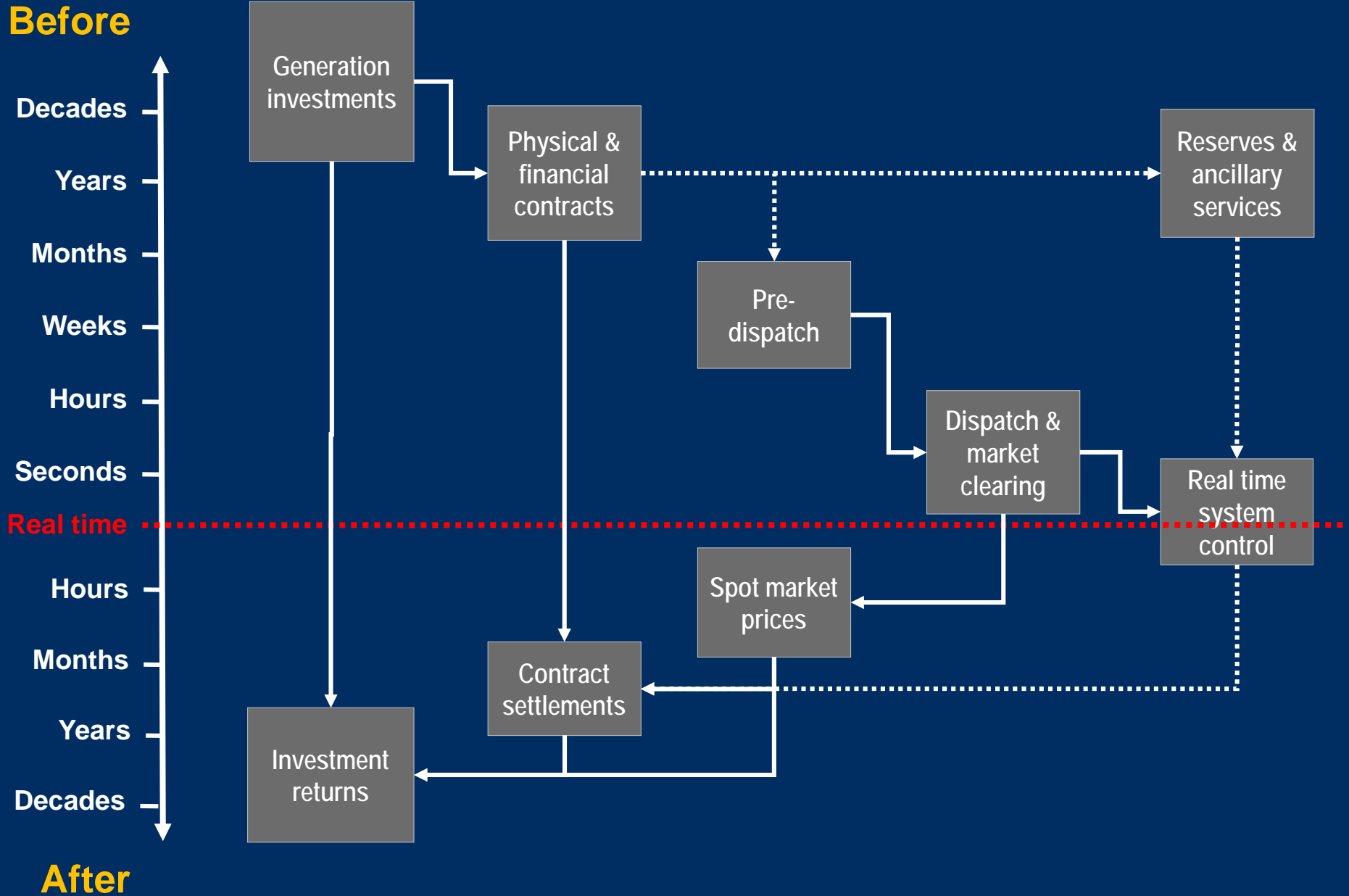
Revenue certainty from long-term contract



Merchant nuclear model



Electricity time-scales go from seconds to centuries





- This is *really hard* – none have been built
- Project *and* market risk assumed by developer
 - Project cost & completion risk - before COD
 - Project availability and market price risk - after COD
- Project finance approach strained by
 - High capital intensity and large project size
 - Long development and construction period
 - Lack of revenue certainty
 - Requirements of funding entities



- Add revenue certainty - PPAs, CfDs, carbon floor price, Production Tax Credits, etc.
- Reduce development uncertainty – streamline nuclear site & license approvals, fund design approvals, US EPA Act delay insurance, etc.
- Help with funding – Loan guarantees, etc.
- Reduce long-tail liabilities and/or make them more predictable – e.g. US DOE spent fuel fee

Merchant nuclear case studies



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- USA
 - UniStar - Calvert Cliffs 3
 - NRG - South Texas Project 3&4
- Turkey
 - Akkuyu – Rosatom BOO approach
- UK

Trend toward vendor ownership



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- Increasingly, nuclear power plant vendors bring financing to power plant sale (e.g., ECA debt, equity participation, etc.)
- Government nuclear vendors have access to capital – and see this as competitive advantage
- Extreme case is Rosatom BOO deal
- Foreign ownership of US merchant plants inconsistent with NRC ownership requirements

NB – this slide was added to EDK's 14 Sep 2012 WNA presentation



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