

Attracting financing in infrastructure – market design for an efficient risk allocation

CONFERENCE ON SUSTAINABLE FINANCE FOR INVESTING IN A LOW-CARBON EUROPEAN ELECTRICITY SECTOR

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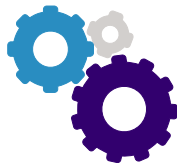
22 September 2019, Paris

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Real Estate

Retail & Consumer

Telecom, Media & Technology

FCN

Publicly traded – NYSE

\$1.76 BLN

Market Capitalization

1982

Year founded

80

Different disciplines

4,400+

Employees worldwide

700+

Industry specialists

440+

Senior Managing Directors

79

Offices in 79 cities around the globe

2 Nobel Laureates

47/100

47 of all Global 100 corporations are clients

10/10

Advisor to the world's top 10 bank holding companies

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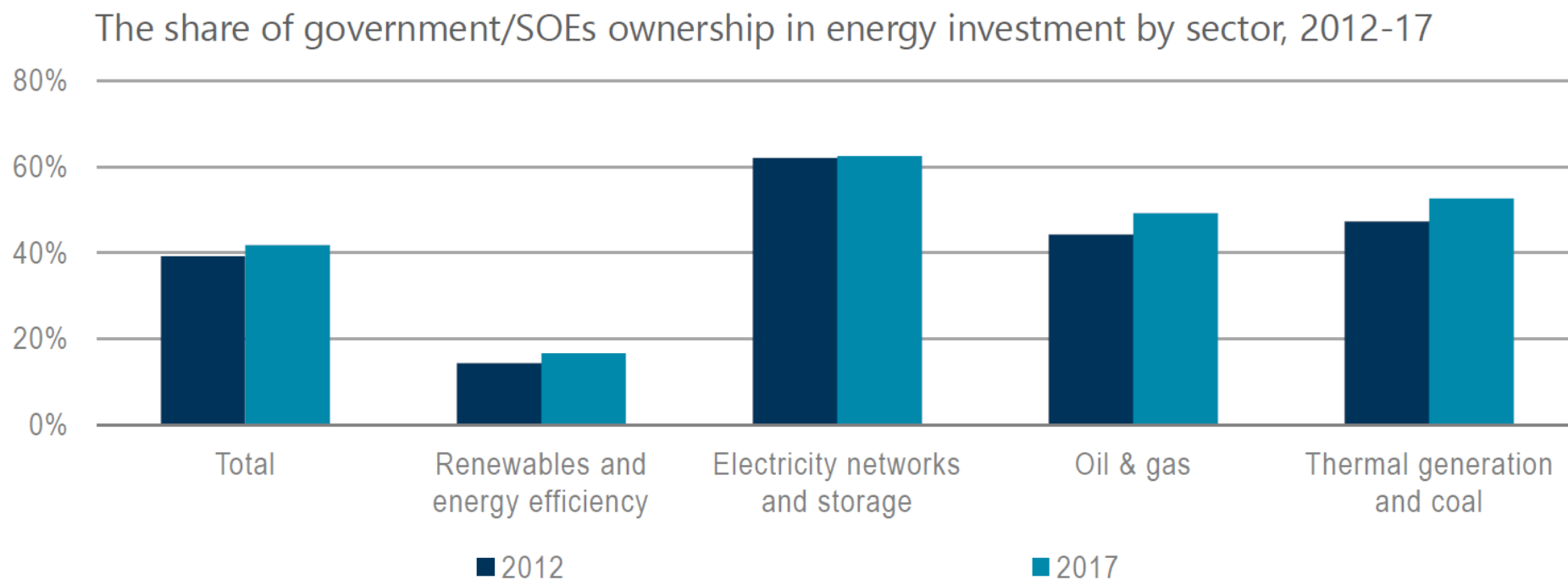


Agenda

- A trend in energy investment toward greater state involvement
- Which market design / regulatory framework to support an efficient risk allocation in the power sector?
- The interlinkages between market design / regulatory framework and the cost of capital for power sector investments
- Conclusions

A trend in energy investment toward greater state involvement

The share of state – backed energy investment is on the rise

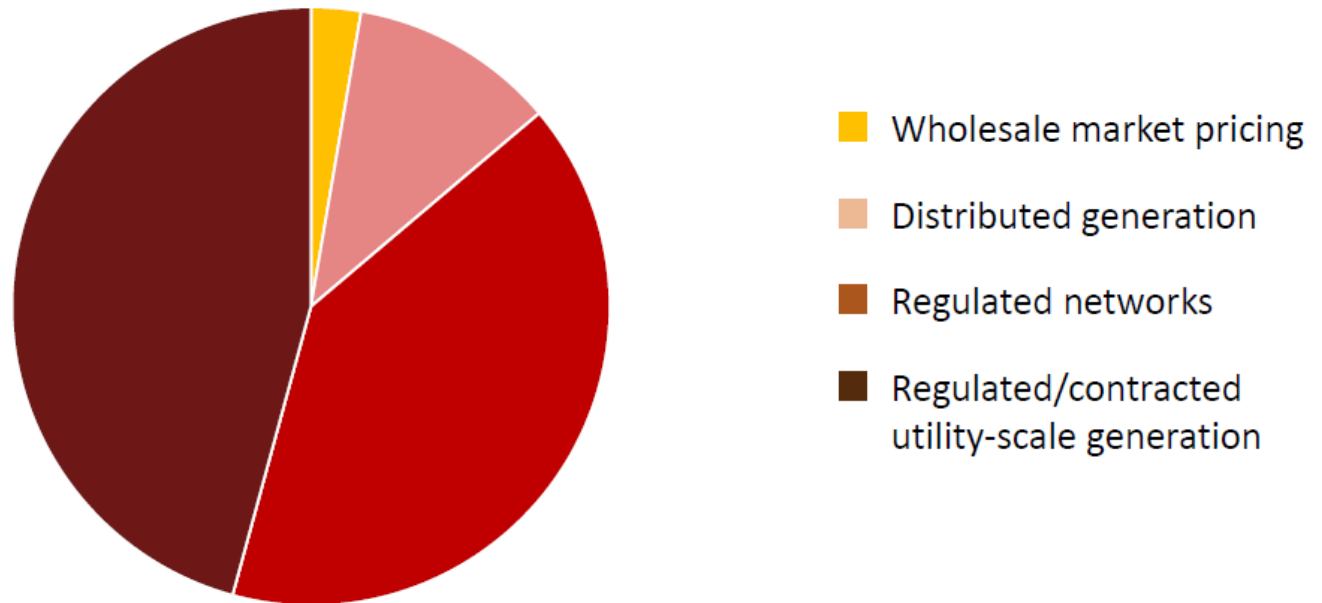


Source: IEA World Investment Outlook 2018

Government policies in the form of regulation or state backed contracts play a growing role in the power sector

Global power sector investment by main remuneration model

Total power sector investment in 2017:
USD 750 billion



Over 95% of power sector investments rely on regulation or contracts beyond short-term wholesale markets for their main remuneration, as regulators pursue adequacy and environmental aims.

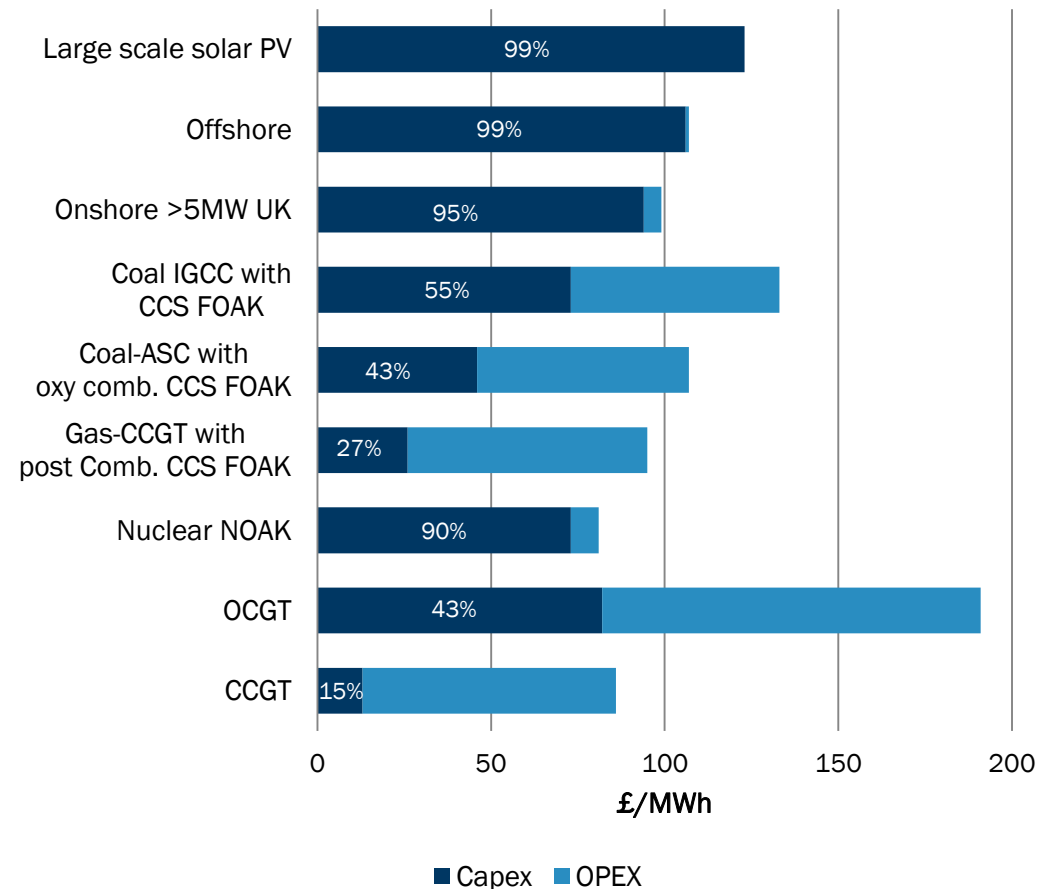
© OECD/IEA 2018

Source: IEA World Investment Outlook 2018

A changing cost structure: capital intensive technologies dominate in the power sector

- The industry cost base is moving from 'OPEX' to 'CAPEX': should pricing follow?
 - The ongoing reforms contribute to aligning costs and revenues:
 - RES support schemes moving away from production based subsidies (e.g. Spanish reform)
 - Capacity mechanisms for thermal plants
- ⇒ Spot power market prices remain key for operational/dispatch incentives
- ⇒ Investment decisions increasingly based on some form of long term contract / regulation

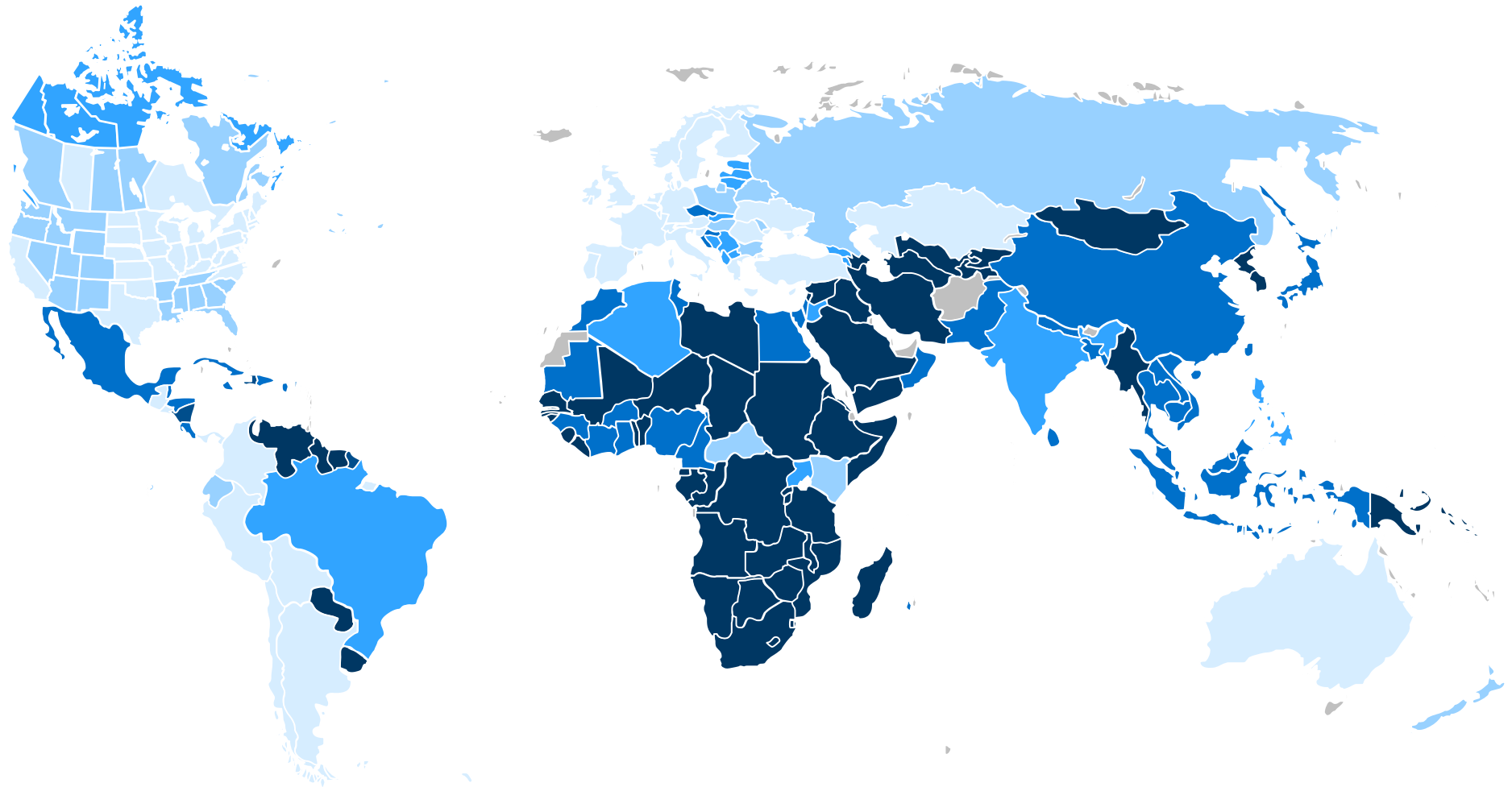
Levelised cost estimates for projects starting in 2019, 10% discount rate



Source: Electricity Generation Costs 2013
Department of Energy & Climate Change (UK)

Which market design / regulatory framework to support an efficient risk allocation?

Global mapping of electricity industry regulatory arrangements



Vertically integrated monopolist

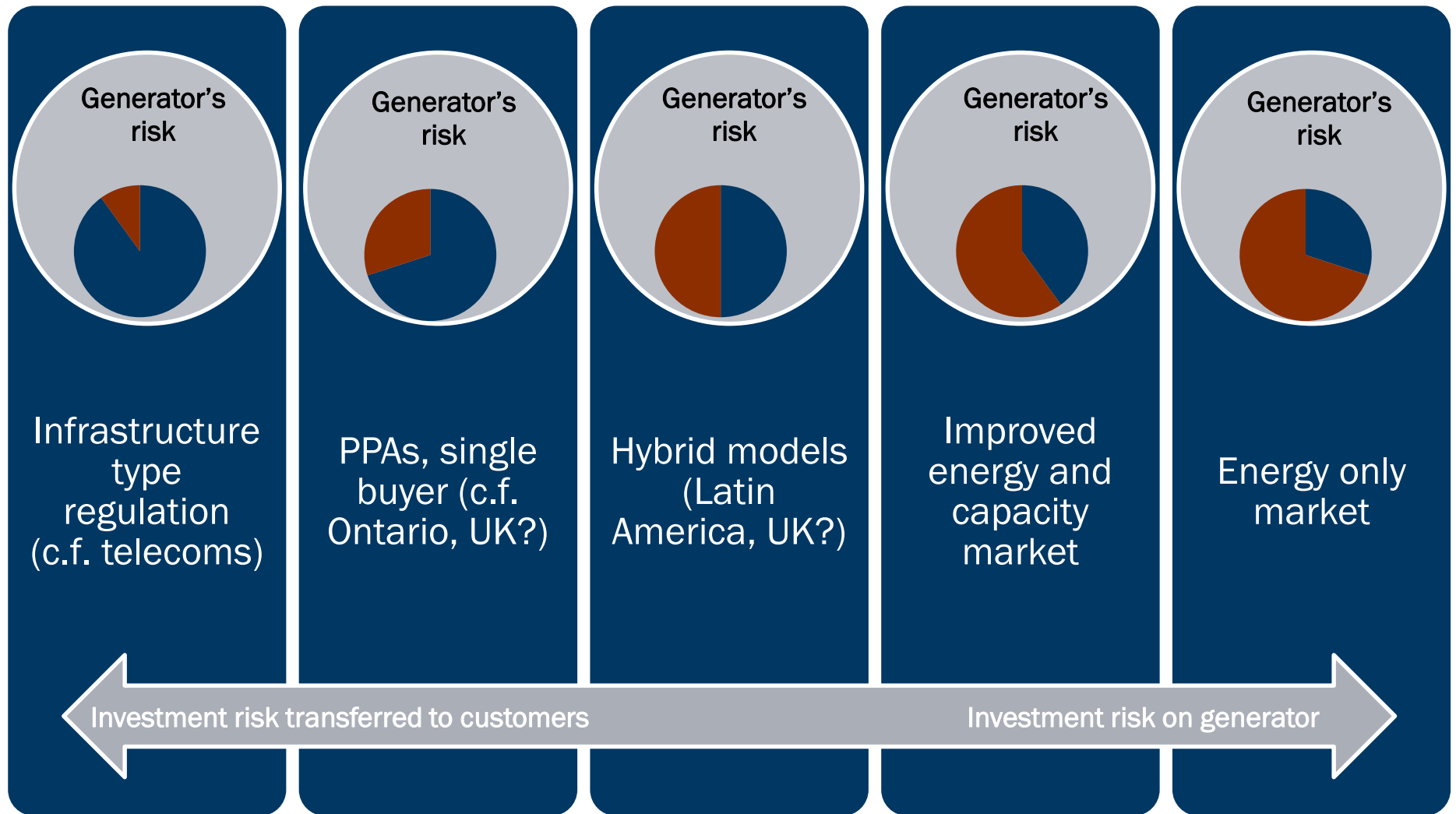
Vertically integrated monopolist + IPPs

Single Buyer as a national genco, disco or disco, or a combined notional genco-transco or transco-disco + IPPs

Many discos and gencos, including IPPs, transco as a Single Buyer with Third-Party access

Power market of gencos, discos and large users, transco and ISO

From regulation to 'pure markets', a range of approaches to allocate risks





Potential role of the public sector in managing risks associated with power generation

Economic theory suggests that risks should be allocated to those parties best able to manage them – Implications for power investments

Planning and licensing risk

=> Ensure predictable and credible energy policy, streamline planning and licensing procedures

Construction risk

=> To be managed by investor / passed on to EPC contractor

Operation risk

=> To be managed by plant operator

Market risk: 'Missing market' for long term electricity price risk hedging

- ⇒ Natural counterparty is supplier with 'sticky' customers, vertical integration and diversification of mix are usual hedging strategies
- ⇒ Design power market that does not rely purely on scarcity pricing and price volatility to stimulate investment
- ⇒ Consider additional risk transfer / hedging mechanisms to reduce hurdle rates and costs to consumers

Policy and regulatory risks: Assess impact of interventions to support specific technologies

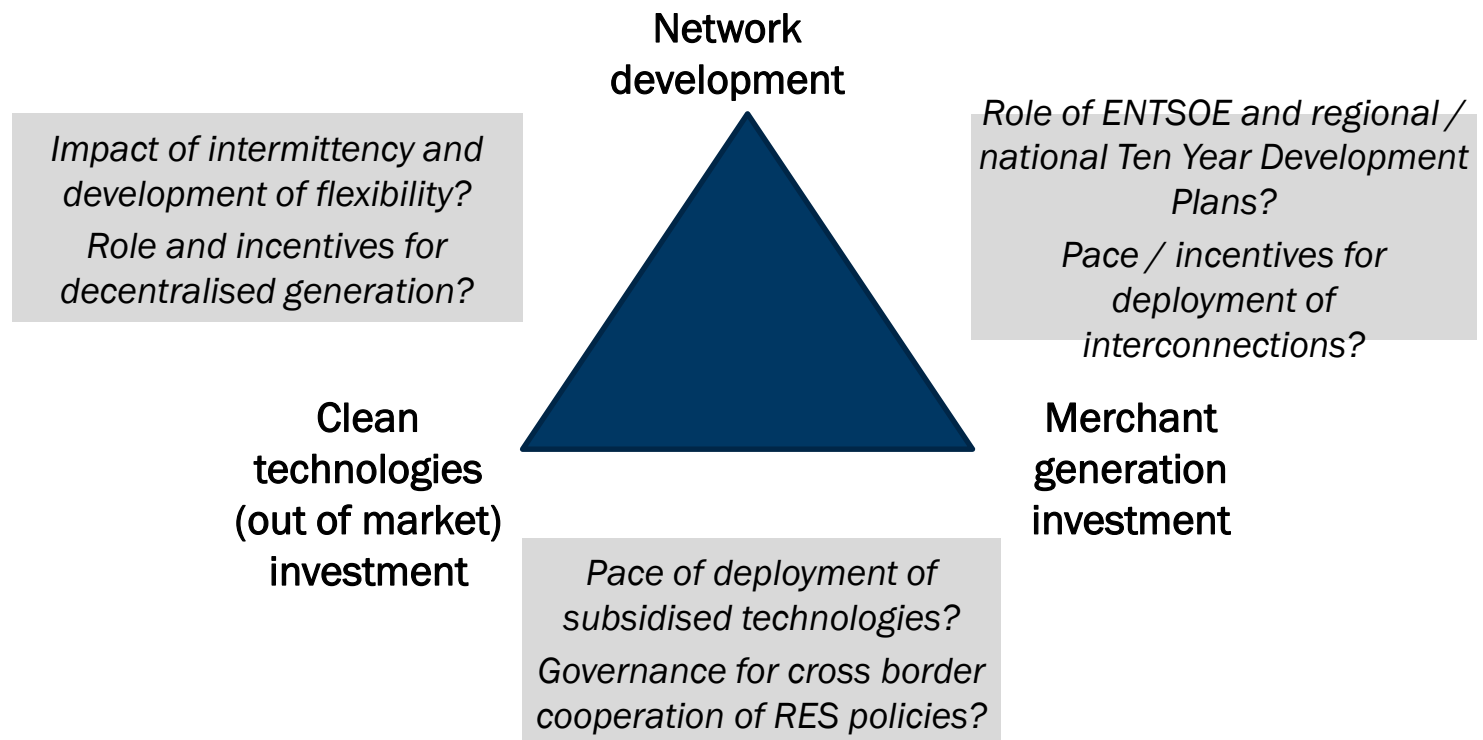
Unpredictable merit order changes leading to fall in plant revenues because of policy intervention

- ⇒ Ensure that deployment of clean technologies is predictable and at a pace compatible with amortization of other plants
- ⇒ Give visibility on CO2 policies
- ⇒ Develop coordination mechanisms to ensure that transition does not create stranded costs

Which coordination mechanisms for investment to decarbonize the power sector?

Improved governance mechanisms are needed to coordinate investments :

- Across network and generation
- Across 'subsidised' generation and merchant generation



Lessons from international case studies: many power markets are hybrids combining state intervention and competition

Investment planning (years ahead)

Operations planning (days /hours ahead)

Competition “for” the market

- Tendering of long term capacity contracts
- Can be technology neutral or specific
- Puts competitive pressure where it matters: CAPEX
- Can be used to stimulate new entrants and development of competitive market
- Ensures coordinated system development

Competition “in” the market

- Well integrated and liquid forward, day ahead and intraday markets
- Optimizes short term dispatch and minimizes costs for consumers
- Level playing field with balancing obligation
- No distortions as subsidies not based on production

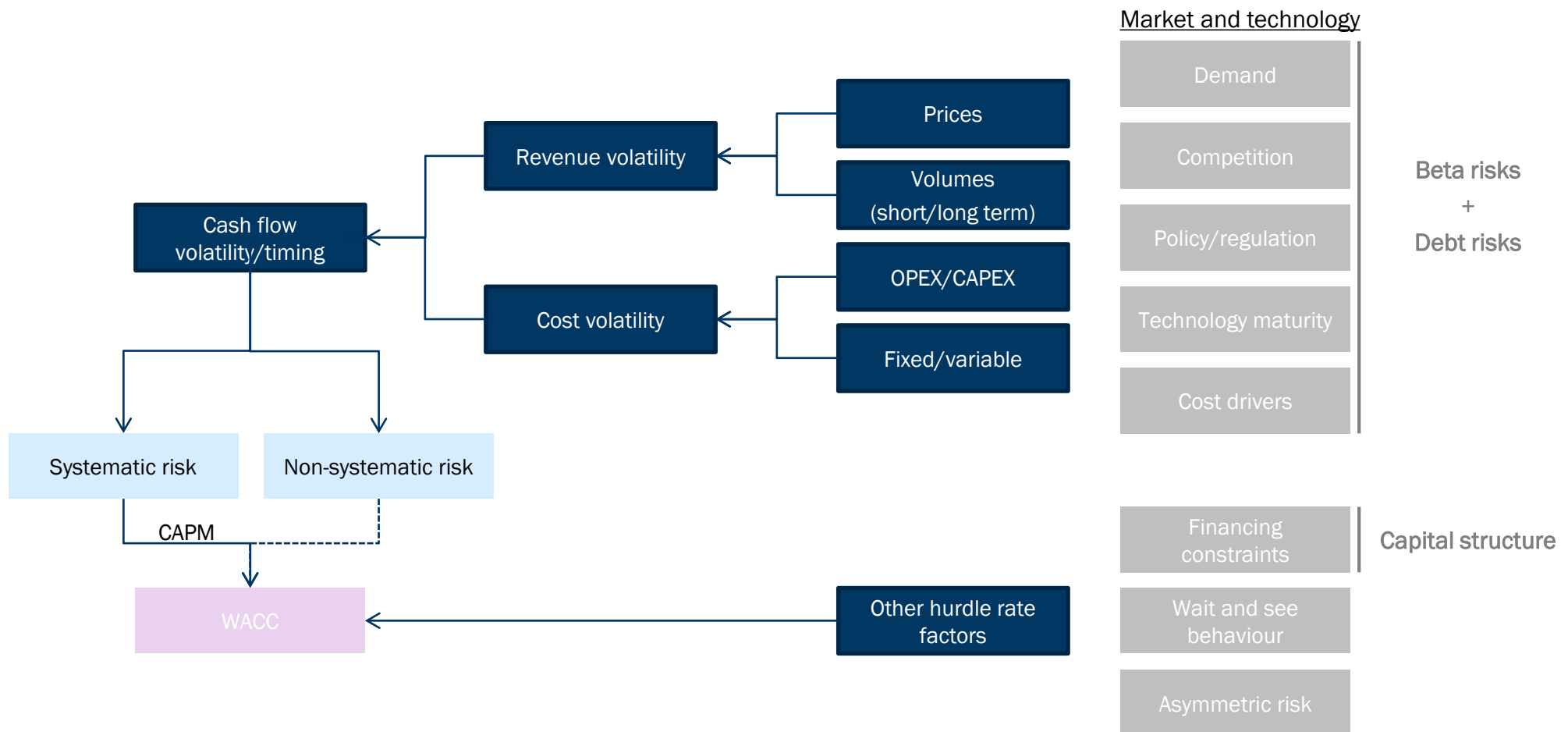
Alternatives to implement two step competition based on long term contracts :

1. Mandate an independent organization to define the type of contracts and to procure them through a centralized auction (e.g. capacity auction, CFDs, etc.), or
2. Implement a decentralized process with contracting obligations on suppliers (e.g. capacity obligation, renewables obligation, etc.)



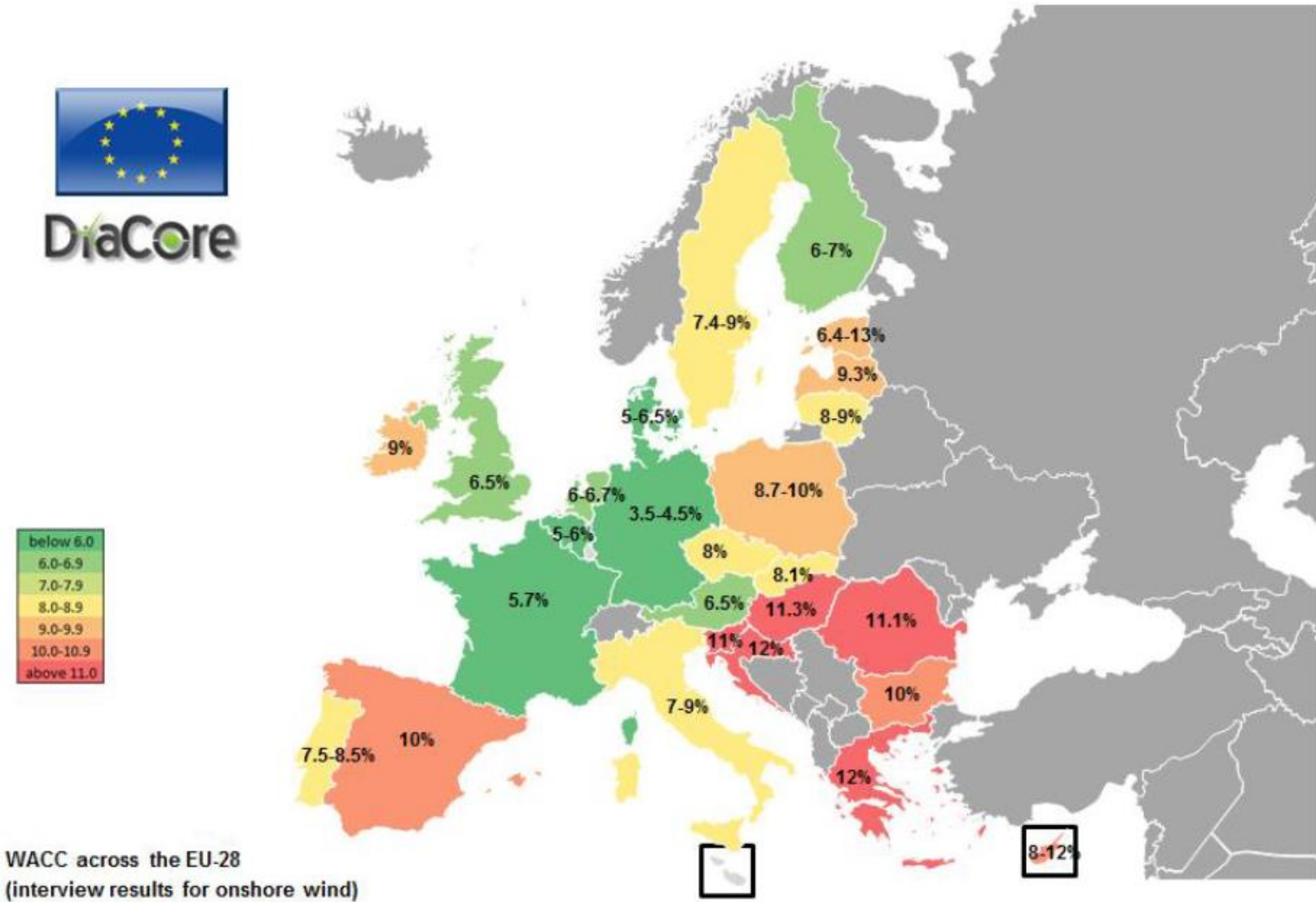
The interlinkages between market design / regulation and the cost of capital

Drivers of the cost of capital – technology, grid connection, public acceptance, regulation, and policy risks



The perception of market risk and technology risk affects the cost of debt and equity for different technologies, and in doing so affects the cost of capital.

Cost of capital for Wind projects in Europe (WACC)

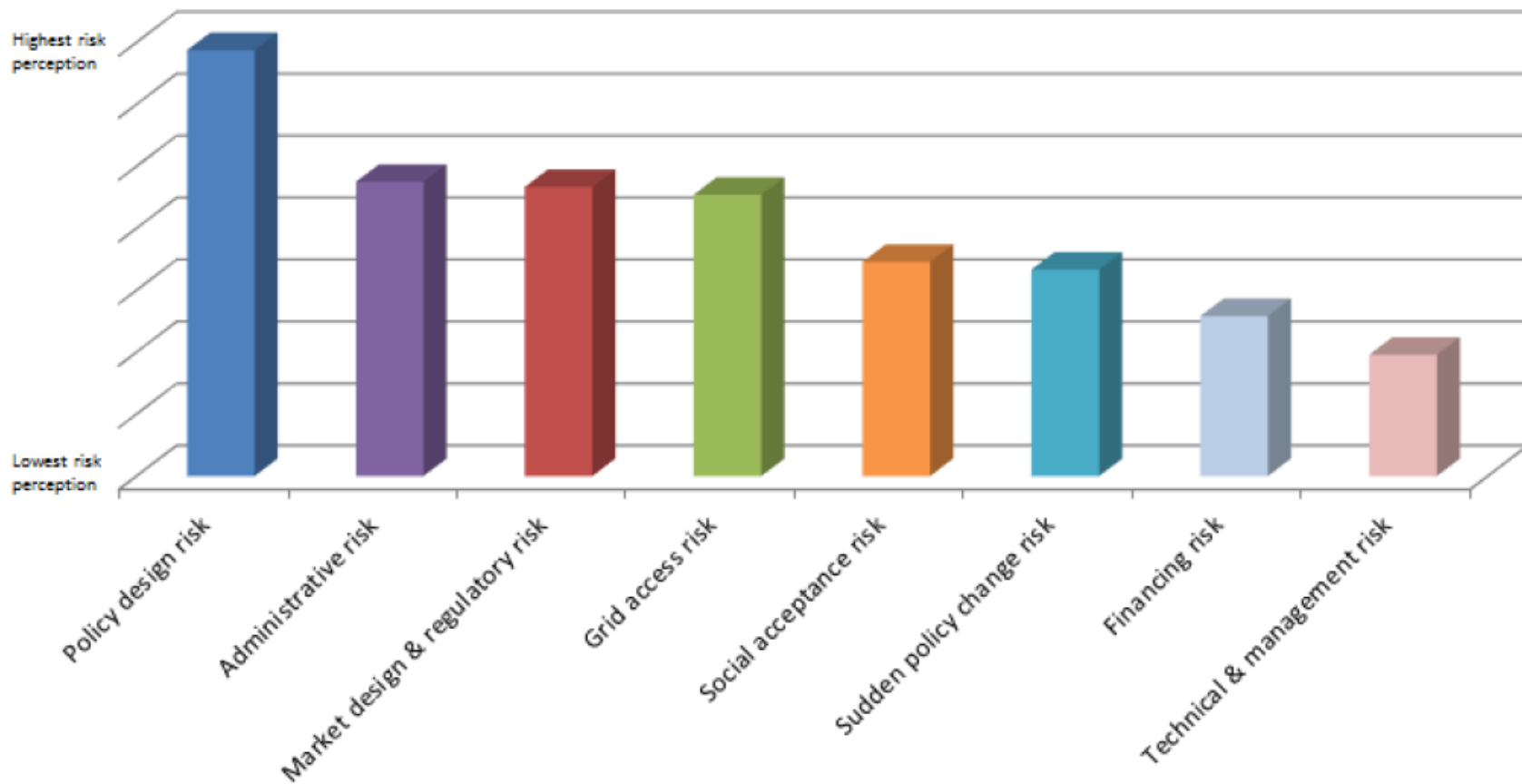


Source: DiaCore The impact of risks in renewable energy investments and the role of smart policies

Key sources of risk for wind investors in Europe

Which risk category do you consider most important? Average Ranking of Risks across 24 EU MS

Following countries are missing due to lack of data: HR, IE, LU, MT



Source: DiaCore The impact of risks in renewable energy investments and the role of smart policies

Case study 1: Impact of CfDs Compared to RO regime for RES on the WACC

- In case study 1, long term contracts in the form of contracts for difference (CfDs) provide a reference price guarantee.
- The net impact of the CfDs introduction on the post-tax EU-WACC is defined as an average over studies focusing on the UK experience, i.e. switch from RO regime to CfDs subsidies.
- A literature review is used to determine a reduction in the WACC for the different technologies:

WACC reduction CfD/RO	DECC (IA)	DECC (White paper)	CEPA	NERA	Redpoint
CCGT + CCS	NA	-0,1%	NA	NA	-0,5% to -0,1%
Coal + CCS	NA	-0,4%	NA	NA	-0,7% to -0,4%
PV	-0,9%	NA	NA	NA	NA
Onshore wind	-0,5%	-0,3% to 0%	-0,4% to 0%	-1,7% to -0,9%	-0,3%
Offshore wind	-1,1%	-0,8% to -0,5%	-0,8% to -0,6%	-0,9% to 0%	-0,5 to -0,6%
Biomass	0%	-0,5%	NA	-1,2% to -0,4%	-0,7%
Nuclear	-0,8%	-1,5%	NA	NA	-0,2%

Source: DEEC (2011, 2012), CEPA (2011), Ecofys (2014), NERA (2013), RedPoint (2010)

The reduction in WACC associated with a CfD compared to a RO (market risk) ranges from -0.3% to -0.9% depending on the technology.

Case study 2: Impact of Infrastructure regulation on the WACC

- The reduction on the WACC is calculated as the difference between the current EU-WACC under the RO regime and the WACC of regulated power infrastructure operators, with adjustment for the gearing ratio.
 - Based on Exane financial data for European infrastructure companies in the EU power sector, data, the EU-post tax WACC reduction is estimated at **-3,7%** (before adjustment to gearing ratio).
 - Based on a benchmark of different studies, we assess the change in the gearing ratio of investments as a consequence of moving from current regime (with RO) to the regulated regime.

Gearing ratio	CEPA		NERA		Redpoint		Ecofys
	RO	CfD	RO	CfD	RO	CfD	RO
CCGT + CCS	NA	NA	NA	NA	75%	85%	60%
Coal + CCS	NA	NA	NA	NA	75%	95%	60%
PV	NA	NA	70% - 80%	75% - 80%	NA	NA	75%
Onshore Wind	70%-75%	75%-80%	70% - 80%	75% - 80%	90%	90%	75%
Offshore wind	60%	62,5%	65%	70%	75%-80%	90%-95%	75%
Biomass	NA	NA	NA	NA	75%	95%	75%
Nuclear	NA	NA	NA	NA	75%	95%	60%

Source: DEEC (2011, 2012), CEPA (2011), Ecofys (2014), NERA (2013), RedPoint (2010)

The reduction in WACC associated with infrastructure type regulation is > 3%

Toward a Regulated Asset Base model for new nuclear in the UK?

6/12/2019

New Sizewell power station could add £6 to energy bills -

New Sizewell power station could add £6 to energy bills

By Dominic O'Connell
Today business presenter

11 June 2019 202



Energy bills could go up by a few pounds a year to pay for a new nuclear power station at Sizewell in Suffolk.

“EDF Energy is also keen to reduce the financing costs by adopting the new financing model, which is already used in regulated monopolies including airports and water companies.

Users pay up front - it has been suggested the Sizewell surcharge could be about £6 on the average annual energy bill - and the developers borrow against that guaranteed stream of income.

Analysts say the financing cost could be reduced from about 9% at Hinkley Point to 4-5% - meaning a much lower cost of power. Industry sources say the final price could be around £60 per megawatt-hour.

Critics of the plan say it shifts risk onto consumers, and point out that the taxpayer will have to pick up the bill if the construction costs turns out to be much greater than predicted.”

EDF

<https://www.bbc.com/news/business-48593581>

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The interlinkages between regulation and the cost of capital

Conclusion: need for a market design supporting efficient risk allocation and financing

- **Ongoing trend toward greater state involvement to support financing in capital intensive energy technologies – particularly in the power sector:**
 - Hybrid power markets with some form of public sector involvement of long term contracts backing observed in many jurisdictions
- **Key lessons from the different mechanisms for public intervention across hybrid markets:**
 - Public interventions can either hamper the functioning of the market or supplement it in a constructive way to address market failures / missing markets
 - If well designed, state backing and long term contracts can reduce cost of financing... but careful design is needed
 - Beware of unintended consequences / system gold plating...
 - Key issues are the design of regulatory interventions and their interface with the market
- **An efficient allocation of risks is essential to underpin the investment framework for the decarbonisation of the power sector:**
 - => Coordination of transmission, merchant generation and policy driven clean technologies
 - ⇒ Risk sharing mechanisms such as long term contracts should play a role (e.g. PPAs)
- ⇒ **The debate on market design has not paid enough attention on the interface with the financing costs and investment constraints**

Conclusion: Global macro economic and policy context should trigger a debate in Europe about infrastructure financing

“At present there is a global and structural need for infrastructure investment of nearly 7 trillion dollars per year, taking into account the energy transition in addition to traditional investment requirements. Paradoxically, the investment gap is growing at a time when governments can obtain long-term financing at very low, even negative, rates.”

Laurence Boone, OECD Chief Economist ([weblink](#))

- Growing recognition among economists that **monetary policy is reaching its limits in stimulating economic growth... and that investment in infrastructure can be an efficient way to support the economy at times of low / negative interest rates**
 - Global trade experiencing a structural shift, with disputes over trade agreements, suggesting that way forward will rely on a commitment between like-minded countries to push ahead with policies supporting investment in infrastructure...which would in turn support economic growth
- ⇒ **New European Commission and revision of State Aid guidelines for energy sector investments represent an opportunity to revisit the role of states and private sector to scale up investments and deliver on Europe's climate ambitions**



Thank you for your attention

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