Financing transmission – a third way?

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In 2010, EC estimated €140bn of investment in electricity transmission required in this decade.

Significant investment challenge…	• EC estimate over €200bn of investment required in transmission projects of 'European importance' to 2020 • €140bn of this is for high voltage electricity transmission
…and is motivated by 3 key reasons	• Main driver is need to connect new **renewables** • But more cross-border interconnection will bring greater **market integration** more generally… • …. and increased **security of supply**

EC have appeared keen, at times, to get "private sector" investment in the sector

"**…**about 200 bn € are needed for energy transmission networks alone. However, only about 50% of the required investments for transmission networks will be taken up by the market by 2020. This leaves a gap of about 100 bn €. Our efforts also need to focus on further developing the internal energy market, which is essential to **boosting private sector investment in energy infrastructure, which in turn will help to reduce the financial gap in the coming years."**
(EU COM(2010) 677/4 – Energy infrastructure priorities for 2020 and beyond)

But EC only appears to want private sector finance of transmission on a non-merchant basis

Recent merchant projects had received significant negative signals from EC

BritNed

- Exemption approved…
- ….but with capped returns at 1% above IRR

NORGER connecting renewables

- EC (& Norway) resisted exemption
- Shareholders withdrew request

And administrative hurdles for merchant investment are enormous

- Significant interaction necessary with national regulators
- Then need to apply for exemption to meet a large number of relatively ambiguous criteria in relation to:
  - competition,
  - ownership
  - sales of capacity,
  - technical

Current market view is mixed

NORTHCONNECT CONNECTING RENEWABLES

"The lack of short-term clarity on the regulatory regime around interconnectors meant that continuing the project was not in SSE's strategic interest" – SSE – March 2013

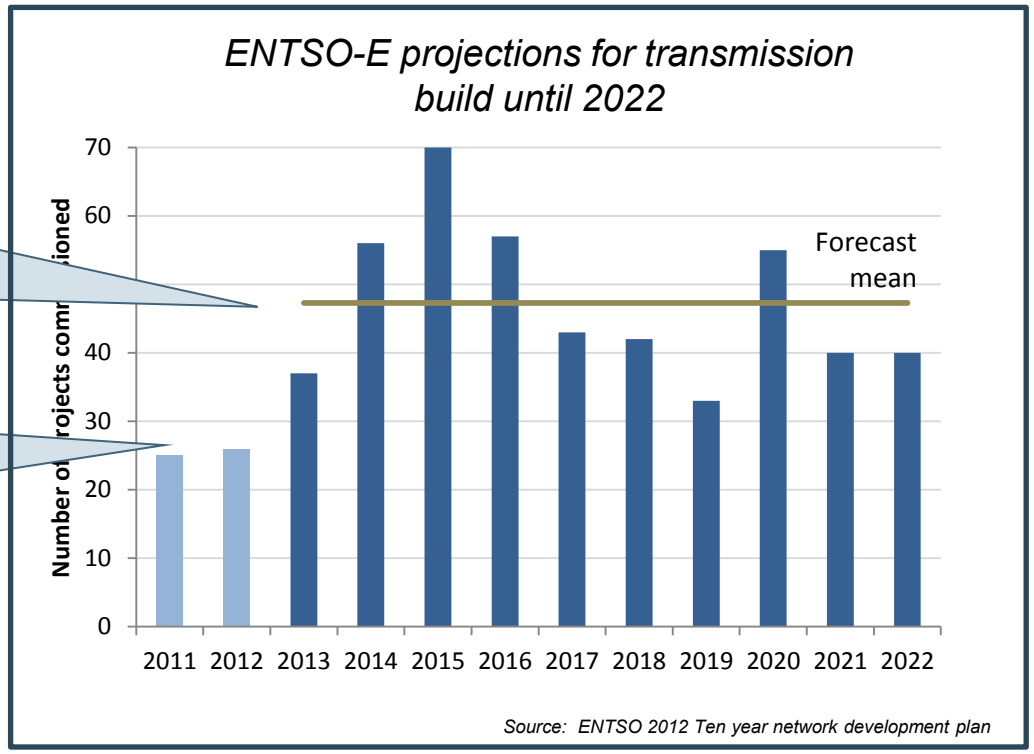
ElecLink

"We expect a benign regulatory environment to allow us to make an acceptable return on capital put at risk" Star Capital

Nonetheless, the investment challenge seems as great as ever….

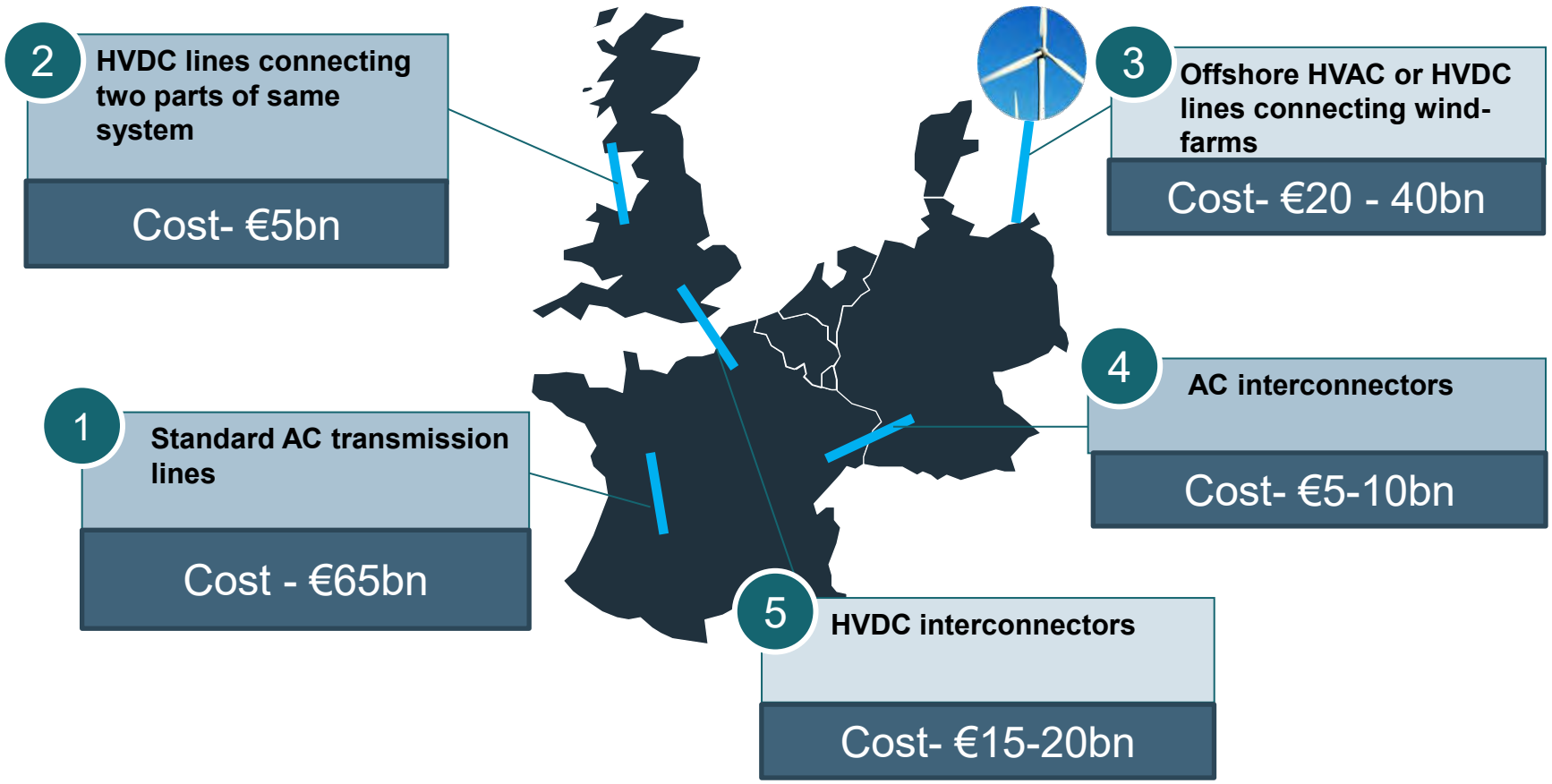
ENTSO-E forecast c500 transmission projects to 2022 at €104bn…..

…but, in last two years, built at only half that rate



….and, combined with economic problems, it seems sensible to reopen the question of ways to finance transmission

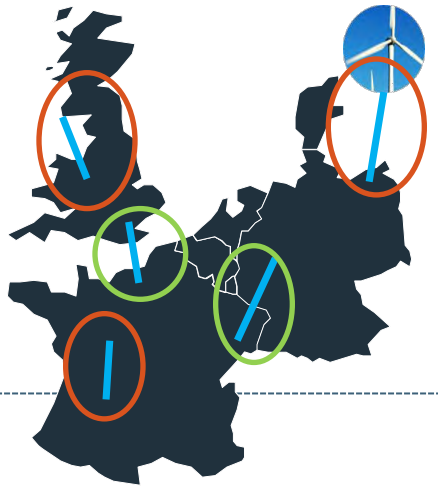
Taking a step back, there are essentially five types of transmission investment on the table…



In terms of how best to finance transmission, economic criteria are relevant

Are electricity prices different at each end of transmission line?

1	**Standard AC transmission line**	€65bn
2	**HVDC line within system**	€5bn
3	**Offshore line connecting wind-farms**	€20-40bn
4	**AC interconnector**	€5 - 10bn
5	**DC interconnector**	€15 – 20bn

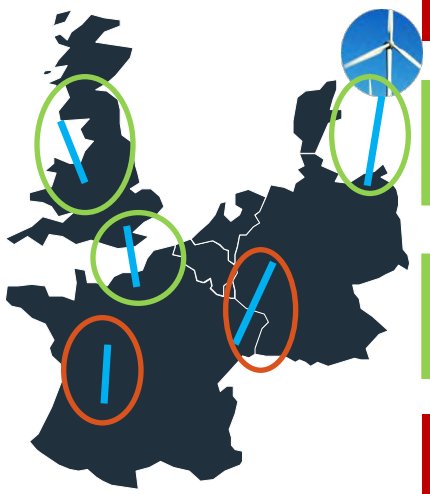


No → Will need regulated revenue recovered though grid fees

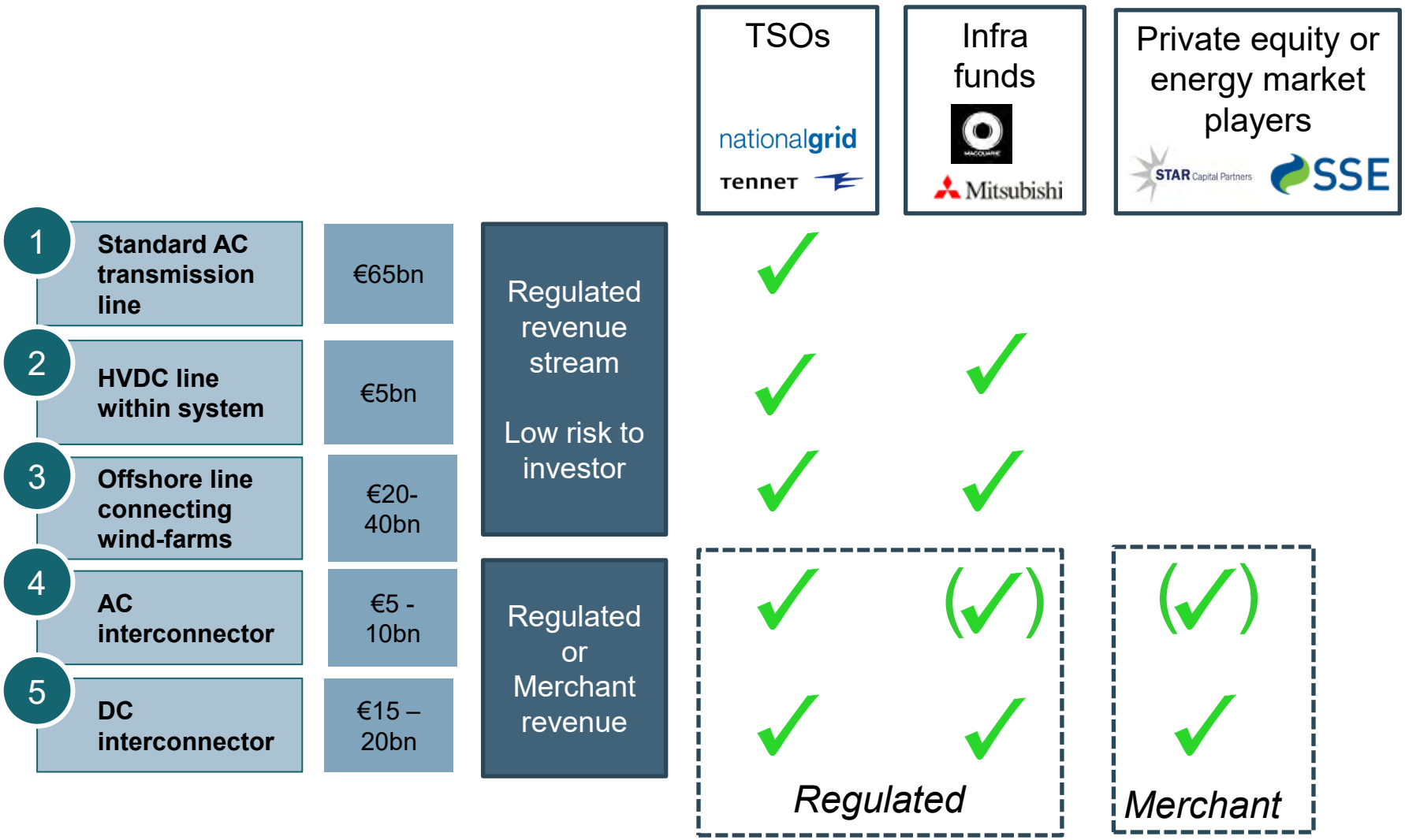
Yes → Scope for merchant financed by capacity sales

…although technical criteria are equally relevant

			Are assets easily identifiable and MW quantities definable?	Financed, owned and operated by:
1	Standard AC transmission line	€65bn	No	TSO build, due to loop flow issues
2	HVDC line within system	€5bn	Yes	3rd party owner and operators
3	Offshore line connecting wind-farms	€20-40bn	Yes, but	Third parties, but may be some central co-ordination
4	AC interconnector	€5 - 10bn	Usually, not	Mainly, TSO build due to loop flow issues
5	DC interconnector	€15 – 20bn	Yes	3rd party owner and operators



Taken together, means each type of investment has different potential sources of financing…



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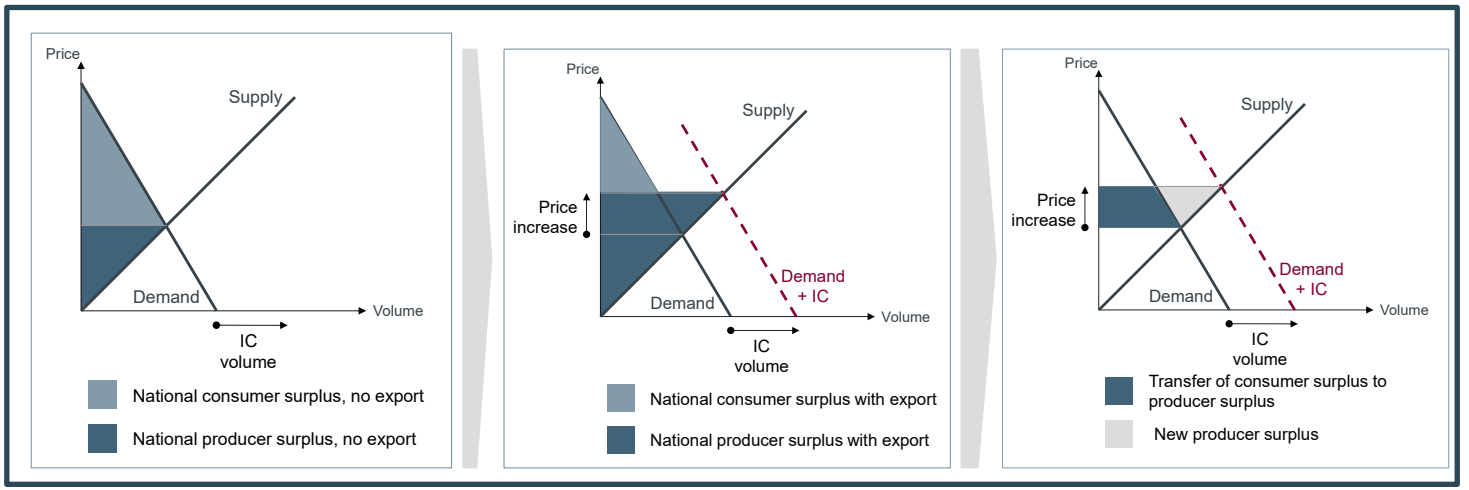
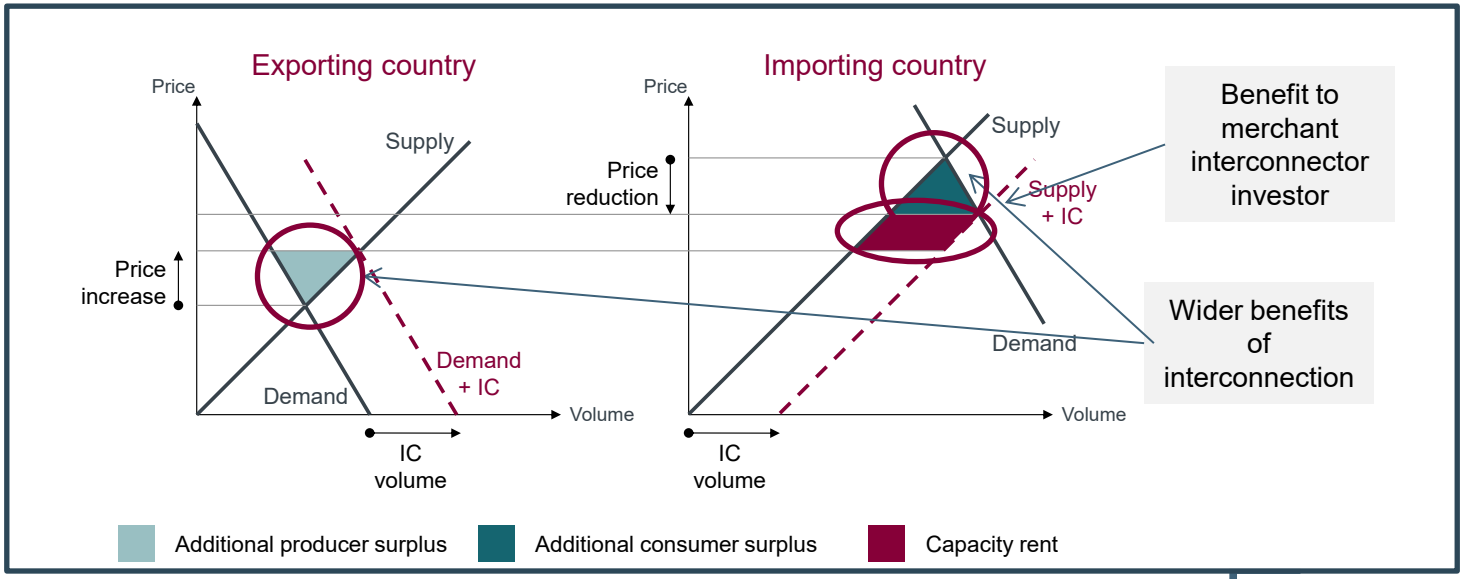
EC concerns on merchant investment supported by academics' concerns over treatment of externalities

Impact of inter-connector on exporting country



As welfare benefits spread beyond merchant investor, might get under-provision of transmission



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…and a number of other concerns about specific features of energy markets and transmission

Locational market power	• May cause over or under investment in transmission depending on whether in export or import zone
Technical features of AC transmission	• Variable (and discretionary) rating of transmission capacity plus loop flow issues make it difficult to define rights (as already noted).. • …will lead to under-investment
General conclusions on merchant transmission	*"relying primarily on market based 'merchant transmission investment, is likely to lead to inefficient investment in transmission capacity" Joskow (2008)* Although worth echoing the view of Stephen Littlechild: *"Choosing between merchant and regulated transmission is a matter of choosing between two imperfect alternatives" Littlechild (2011)*

Most academics identify underinvestment as key risk with relying on merchant investment …

… EC position of (c)overt prevention of merchant transmission seems at odds with overall policy of increasing transmission investment

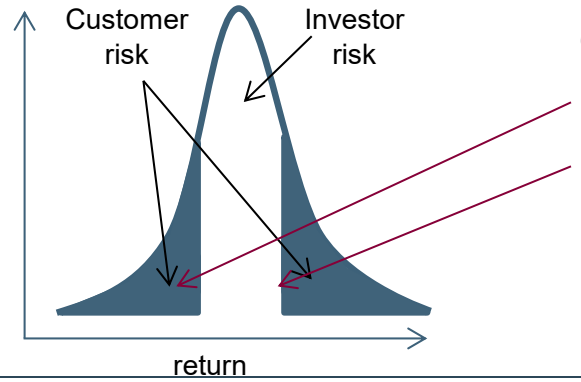
But potential investors in merchant transmission are increasingly wary

Revenue risks	• Revenues highly volatile • Even if NPV positive over life of project need to finance through revenue troughs • Revenue profile often dependent on aspects of government policy elsewhere (e.g. carbon tax) [And probably not the last time today that this will be mentioned!]
Counterparty risk	• Can pass on revenue risk by selling long term capacity (if regulatory authorities allow this)… • …but still have counter party risk
Regulatory risk	• Biggest risk is of "competing" transmission projects financed on a regulated basis… • …narrows spreads for merchant investor

So welcome to the third way for transmission finance…

Semi regulation
-
Cap and floor regime for NEMO

- Ofgem are consulting on cap and floor regime for interconnectors
- Cap limits extent to which interconnector developer can earn upside revenue…
- …but is compensated by limiting downside risk too
- Customers (via transmission charges) therefore bear extremes of up and downside risk of project



Ofgem currently consulting on parameters:

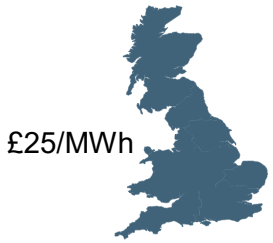
- Floor set at cost of debt
- Cap set at cost of equity of generator (Drax)
- 5 year reviews with 20 or 25 year life of project
- Availability incentives

Risk sharing approach mooted elsewhere – e.g. gas storage

Suspect more complex than envisaged and queries over proposed details (for example not sure have considered equality of risk sharing)….
... but represents pragmatic compromise between range of competing interests

Other developments may combine well with semi regulation, to increase sources of finance to sector…

Market splitting will be considered by 2014 in a range of jurisdictions.



- Currently a single price for electricity in Britain in any half hour
- …and all generators are guaranteed access to the grid.
- If, in practice, generator cannot access grid because of insufficient transmission, then receives compensation…
- …in GB cost customers £320m in 2011/12 (up from c £84m in 2005/6) and is generally agreed that will rise more in coming years

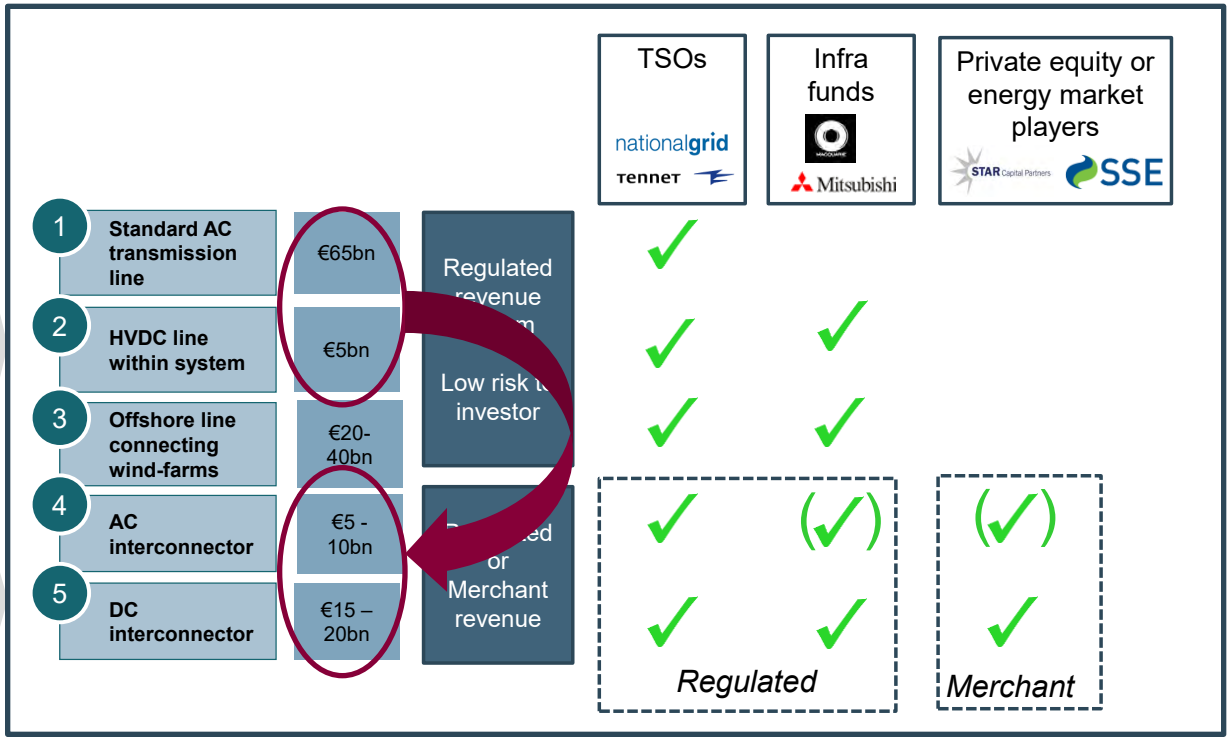
- Market splitting would have effect of creating different prices in zones in each market..
- …for example in Scotland and in England
- Has main benefit of reducing costs of congestion
- But possibly could also reward new transmission investment..
- …especially on a semi-regulated basis

…likely to relevant in a range of jurisdictions E.g. GB, Germany, Italy, and Spain.

Combining semi regulation with market splitting provides opportunities for more sources of finance

Provides opportunity to increase possible range of investors..

…to include those with higher risk return appetite.



Regulators would need to work hard in three areas to make this work

- Ensuring **loop flow** issues allowed well defined capacity…
- …so would not be suitable for all types of investment
- **Regulatory certainty** – e.g. boundary changes and details of rules of semi-regulation
- Finally – significant **legal battles** to overcome

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