

PAPER 322

3.2 Market experiences

Market Price Signals and Regulated Frameworks for Coordination of Transmission Investment

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(WG C5-18)

France, Sweden, United States,
Great Britain, Germany, Australia



INVESTMENT COORDINATION: WHY?

- **USA:** The US power sector will require USD 2.1 trillion of new investments between 2014 and 2035:
 - 579 GW of new generating capacity,
 - 260 000 km of new transmission lines*(IEA World Energy Investment Outlook 2014)*
- **Europe:**
 - RES development is the major driver for grid development until 2030,
 - Interconnection capacity boost: about 100 spots on the European grid where bottlenecks exist or may develop in the future if reinforcement solutions are not implemented,
 - Total investment costs for the portfolio of projects of pan-European significance amount to approximately €150 billion, of which €50 billion relates to subsea cables.*(ENTSO-E TYNDP 2014)*

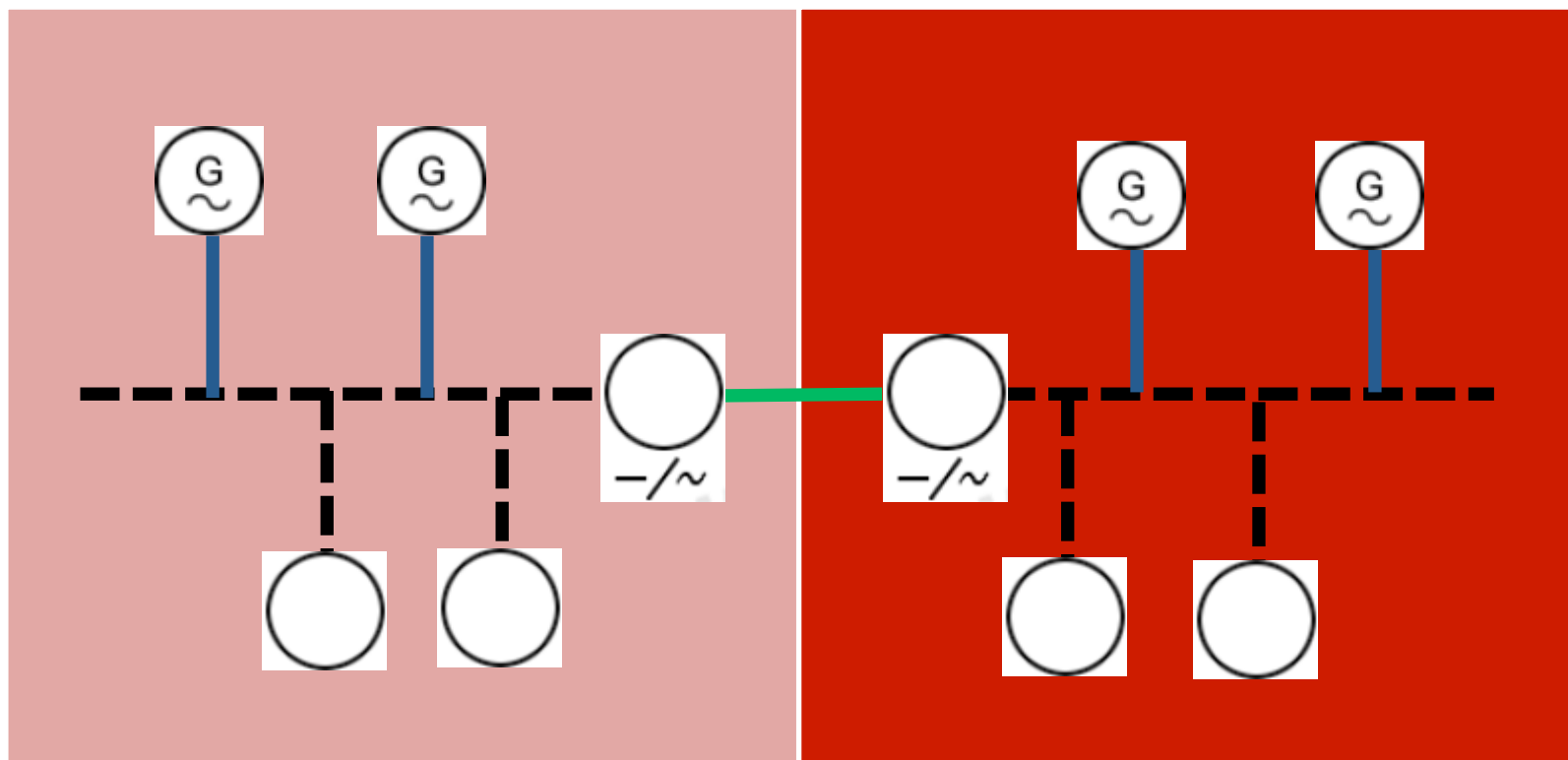


INVESTMENT COORDINATION: WHAT IS IT?

How could market and regulated frameworks favour:

Vertical Coordination: |

Horizontal Coordination: —



N.B. Coordination with distribution is not part of this survey

INVESTMENT: WHO IS INVOLVED?

Many different organisations potentially involved:

- ISO
- TSO
- ITO
- RTO
- Merchant developpers
- Network of TSOs
- ...
- VIU
- Generator
- Customer
- NRA
- Supranational regulatory agency
- Central planner
- Government
- Parliament



WHO IS RESPONSIBLE FOR PLANING TRANSMISSION INVESTMENTS?

| Planning entity | Countries |
|--------------------------------------|--|
| Central planner | Brazil, Colombia, Australia NEM (in one state) |
| Government / Minister | China |
| ISO/RTO | PJM (binding regional grid plan) |
| VIU | Japan (strategy: Agency for Natural Resources, recommendation: Energy Electric Power System Council of Japan) |
| TSO | Great Britain, Poland France, Germany, Switzerland (NRA approval) Belgium, Portugal (governmental approval) Australia (asset owner except in one state) |
| Regional planning non-binding | Australia NEM (central planner, non binding except in one state) Europe (ENTSO-E Ten Year Network Development Plan) |



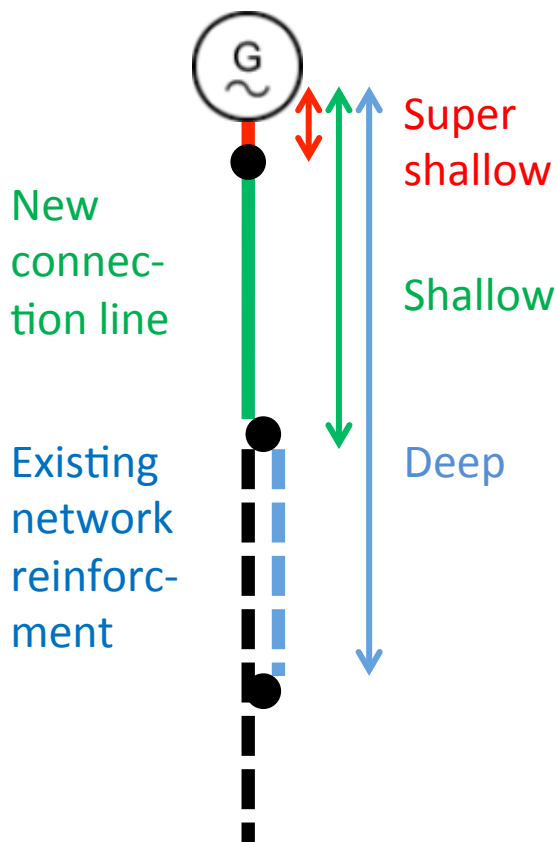
WHO IS IN CHARGE OF INVESTING IN TRANSMISSION?

| Investing in T | Countries |
|--|---|
| Call for tenders then regulated | Brazil, Colombia, PJM, Great Britain Australia (state planner in one state) |
| Merchant | PJM. Europe: for some interconnectors partially exempted from regulation. Japan (introduced for remote wind). South Africa (introduced for cross border) |
| Open season | Argentina May be implemented for a France-GB interconnector project (ElecLink) |
| VIU | Japan, South Africa, PJM |
| Regulated made by incumbent TSO | Australia (with one exception where state planner tenders to asset owners), Belgium, China, France, Great Britain, Germany, Poland, Portugal, Switzerland |

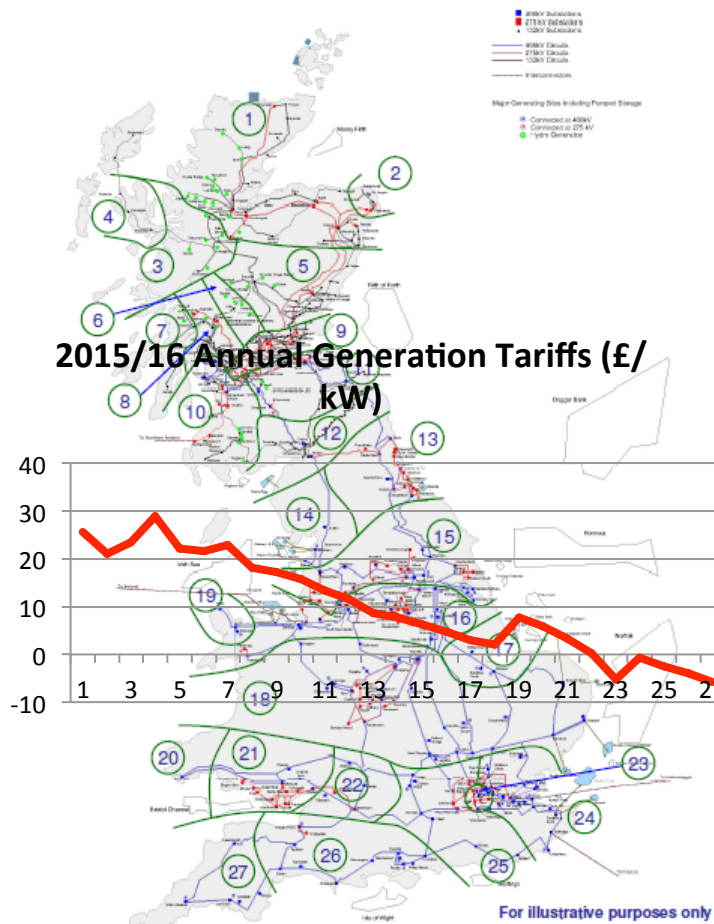


VERTICAL COORDINATION WITH GENERATION: CONNECTION AND TARIFF

First connection Cost allocation:



Zonal tariff (example GB):



Nodal tariff/ Prices:



SOME WAYS TO IMPROVE COORDINATION BETWEEN NETWORKS AND GENERATORS

Less cost reflective

| Network use signal | 0 G-charge | Uniform | Zonal | Nodal |
|--------------------|---|-------------------------------|------------------------------------|-------------------------------|
| First connection | | | | |
| Super shallow | China (conventional) Germany (offshore) | | Great Britain | |
| Shallow | Australia, China (RES), Colombia, Germany, Poland, Switzerland | Belgium France Portugal | Argentina Japan South Africa | |
| Deep | | | | Brazil PJM AUS (losses) |

More cost reflective

Additional coordination signals can be provided by:

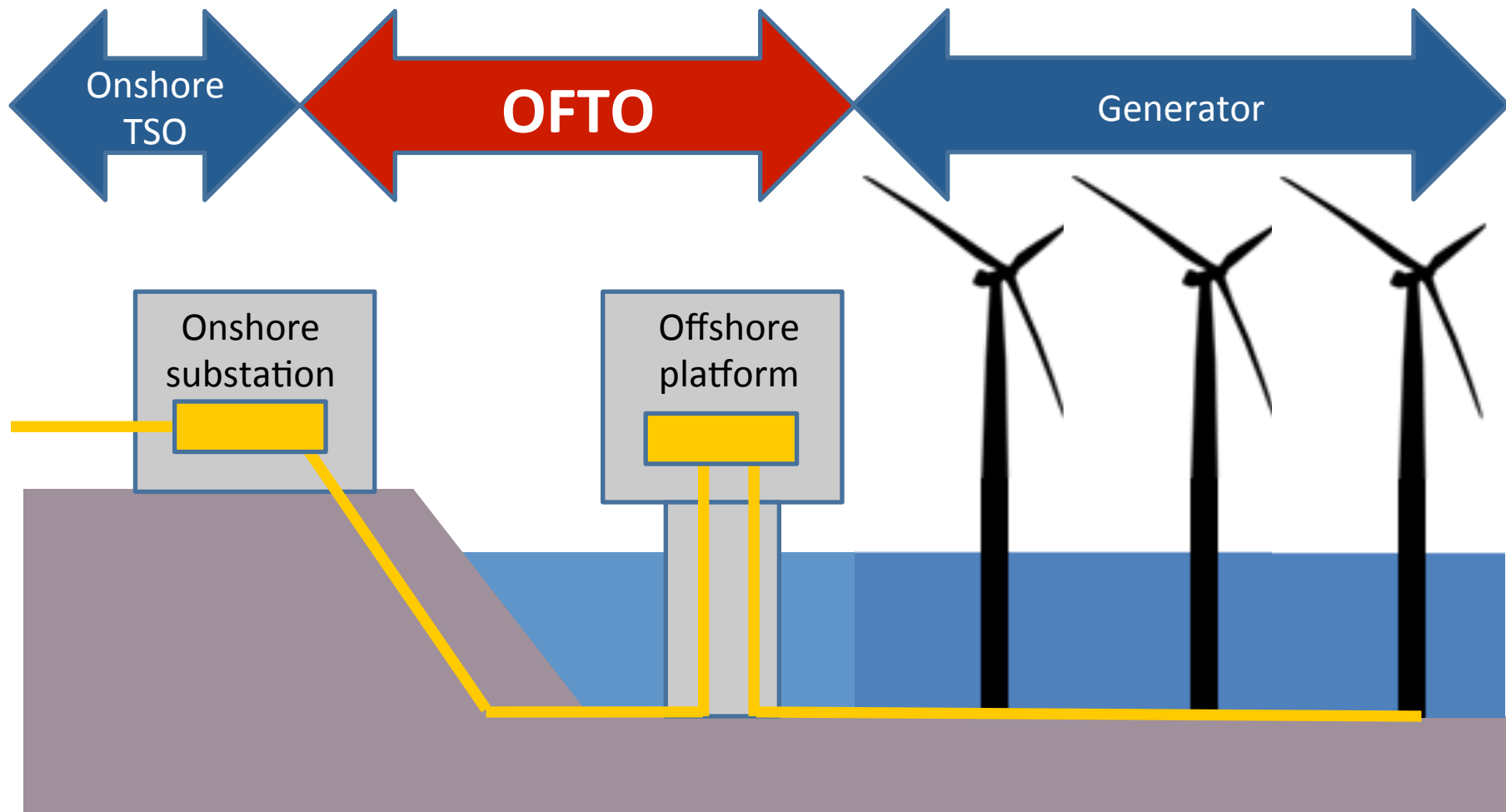
- Market (zonal) price (example: Australia)
- Constraint payments etc.



VERTICAL COORDINATION: TWO EXAMPLES

- Great Britain «OFTO »: OFFshore Transmission Owner
- Germany offshore regime

GREAT BRITAIN: OFTO REGIME



In "late OFTO" model, during the development stage the generator is responsible for design development, construction and commissioning of the offshore network

GERMANY: HVDC OFFSHORE REGIME



VERTICAL COORDINATION / TWO EUROPEAN EXAMPLES: SHORT COMPARISON

| | GB : OFTO | G : HVDC Offshore |
|-------------------------------------|--|---|
| Ownership | Private investors | Incumbent TSO (majority stake) with equity partners |
| Legal regime | New fully unbundled TSOs | New fully unbundled TSOs |
| Type of financing | Project finance | Project finance |
| Building lines | Generator (« late » OFTO) | TSO |
| Operating lines | National Grid as GB TSO | Outsourced to incumbent TSO |
| Maintaining lines | OFTO | TSO |
| New entrants on TSO business | Financial institutions (banks & pension funds) | Equity partners |
| Coordination ? | Spur connection (uncoordinated) | Integrated approach (coordinated) |



HORIZONTAL COORDINATION: TWO EXAMPLES

- Europe: European Infrastructure Package
- USA: Order 1000

VERTICAL COORDINATION / TWO EXAMPLES: SHORT COMPARISON

| | Europe: Regulation 347/2013 | USA: Order 1000 (2011) |
|--|--|---|
| Background | European Union's energy and climate objectives. Focuses on "Projects of Common Interest" | Transmission required to link RES to load across states borders |
| Accelerated permit granting | < 3 ½ year | - |
| Transmission planning | European TYNDP (Reg 714/2009): European and 6 regional investment plans | Local utilities must include themselves in regional and interregional planning processes |
| Cost-Benefit Analysis (CCA) | Methodology to be developed by ENTSO-E (proposed in Oct 2014) | - |
| Cross border cost allocation (CBCA) | Costs borne by TSOs of Member States to which the project provides a net > 0 impact | Cost allocated to those that benefit from the facility in a manner commensurate with benefits |
| Incentives and financial support | <ul style="list-style-type: none"> - Incentives for risky projects - Financial support for some projects | - |
| Common mandatory process? | Yes | No |



EUROPEAN INFRASTRUCTURE REGULATION: IMPLEMENTATION TO DATE

- October 2013: list of 132 electricity PCIs (and 107 in gas) adopted
- CBCA:
 - NRAs must agree on cost allocation of sufficiently mature projects within 6 months
 - If not → ACER decision:
 - Compensation: only if at least one hosting country has a negative benefit
 - Contribution: only countries with a significant positive benefit (significant threshold: 10% of the sum of >0 net benefits)
 - Based on CBA:
 - Socio Economic Welfare
 - Variation in losses
 - Security of supply
 - Relieving national constraints
 - ...

EUROPEAN INFRASTRUCTURE REGULATION: CBCA DECISIONS TO DATE

- 14 CBCA decisions (including 4 in electricity)
- Including 4 compensations... in gas

| | Electricity | Gas |
|------------------------------------|--|--|
| NRAs decision: no compensation | 3 | 6 |
| NRA decision: compensation | 0 | 3 |
| ACER decision: no compensation | LitPol No net loser → no compensation to LT | 0 |
| ACER decision: compensation | 0 | GasPol PL compensated by LT, LV, EE |

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**THANK YOU FOR
YOUR ATTENTION**

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