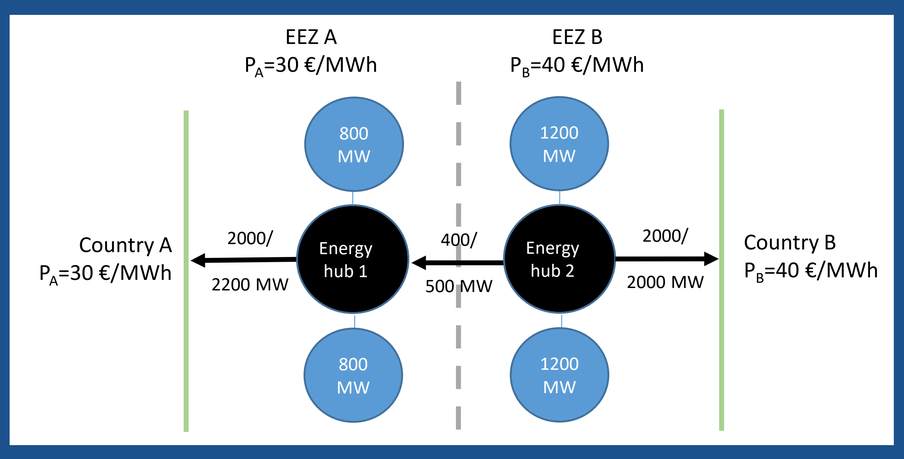
PROMOTioN
PROGRESS ON MESHED HVDC OFFSHORE TRANSMISSION NETWORKS

Hybrid Asset Regulation or Small Price Zones - New Legal or New Economic Concept?

The current market rules do not allow economically efficient connection of offshore wind energy. Two specific problems are:
- MOG assets automatically become interconnectors, but the rules on interconnectors are not adjusted to OWFs connected to them
- Bidding zones are based on EEZs as default. This does not reflect technical reality, which messes up the economic reality

PROMOTioN identified two promising solutions: hybrid asset regulation (introducing a new legal concept) and a market design based on small bidding zones (a new economic concept)

HYBRID ASSET REGULATION



Currently, assets that combine the connection of OWFs with interconnection of two (or more) countries (“hybrid assets”) are automatically qualified as interconnectors. This means that 70% of the capacity must be available to electricity trade. OWFs connected to a hybrid asset are worse off than other sources of electricity that are connected within an onshore grid. This is not a stable regulatory basis to build an offshore grid on.

The solution “hybrid asset regulation” entails introducing a new category in EU law (the Electricity Market Regulation), tailormade for hybrid assets.

This requires introducing a definition of hybrid assets in the Regulation, and adding a clause stating which rules are applicable to hybrid assets in the operative part of the Regulation.

In the example above, electricity needs to be transported from the higher to the lower priced zone. This causes two problems: the trade must be subsidized and the cross-border capacity is not used in the direction towards the higher-priced zone. An alternative could be to curtail wind generation in Energy Hub 2, but as this is physically not necessary, this would reduce the efficiency of the dispatch.

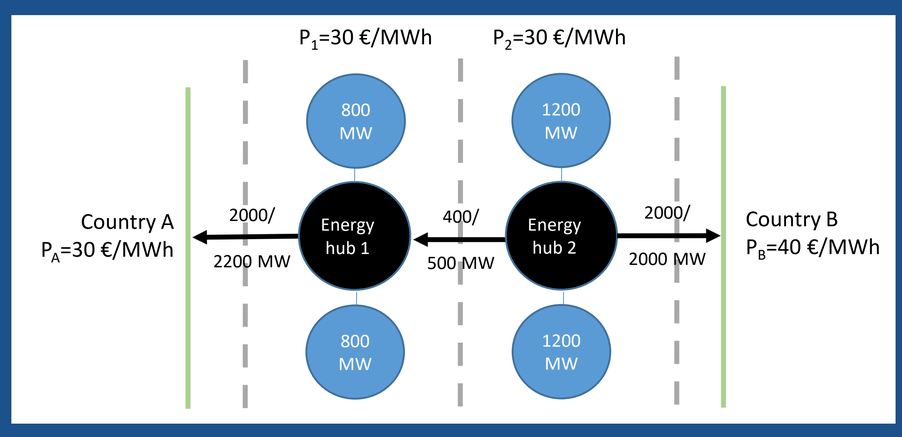
STRENGTHS

- Compatible with the current economic model
- Relatively simple change, low disturbance of the status quo (national price zones are extended into the EEZs)
- No changes needed to interconnector rules (it needs to be determined
- No changes needed to national support schemes

CHALLENGES

- The EU Electricity Regulation needs to be changed – this takes several years. It has just been revised last year so it takes some time until the next revision.
- The current market model (based on EEZs) remains unchanged, which still doesn’t guarantee efficient dispatch and may lead to underutilization of the grid. Introducing hybrid assets will not change that.
- Adding an extra category of assets reduces the uniformity of EU energy law.

SMALL BIDDING ZONES



In this market design, the meshed offshore grid is split into separate price zones. The price in each zone is equal to the marginal value of electricity in the zone.

Congested lines (in this case the line entering Country B) are always used to their maximum capacity. In a grid connecting two or more countries, the lines entering the country with the highest price will tend to be congested. There is no need for hybrid assets.

The total cost of the offshore grid is lowest when a certain degree of overplanting is allowed, but this may cause lower revenues for the park operators. A classic economic solution is to provide financial transmission rights to the park operators, but this appears to conflict with the European rule that congestion rents may not be returned to generators.

An alternative solution is to provide put options for onshore prices to the park operators at the time that the wind parks are tendered. These are exercised automatically as part of the market clearing process. E.g. if the parks connected to Energy hub 2 each had 600 MW worth of put options for Country B, they would receive a price of 40 €/MWh for this volume and 30 €/MWh for the remainder of their output.

A challenge for any meshed grid, regardless of market design, is how to organize and fund the financial support scheme, if this still proves necessary.

STRENGTHS

- Economically efficient investment and dispatch
- No need for an extra definition in the Electricity Regulation
- Wind farm developers can decide to what extent they overplant
- By adding put options, congestion rents are lowered and wind park revenues are increased: lower need for financial support

CHALLENGES

- An offshore market coupling operator needs to be established.
- Without put options, but with overplanting, offshore wind revenues may be zero during high wind conditions.
- The EU Network Code on Forward Capacity Allocation needs to be changed.
- The national support schemes and tender rules need to be changed.

PROMOTioN recommends pursuing both routes as both solutions have implementation time constraints.
A quick solution is required for infrastructure plans that are close to implementation.

Laurens de Vries
Delft University of Technology
l.j.devries@tudelft.nl

Ceciel Nieuwenhout
Rijksuniversiteit Groningen
c.t.Nieuwenhout@rug.nl

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 691714.