Discussion of the Presentation:
“Transmission Planning and Pricing: Lessons from Elsewhere” by
Benjamin F. Hobbs

Transmission Policies to Unlock America's Renewable Energy Resources

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Outline

› Key Points of the Ben Hobbs Presentation
› Impact of RES on Congestion
› Cost Allocation Issues
› TSO Incentives
› Electricity SupeGrid Highways
› Poland: LMP-Based Market Development
› Conclusions
Key Points

- EU jurisdictional friction between Internal Energy Market (IEM) Rules (EU-Wide) and RES implementation goals (country-by-country)
- Socialized short-term congestion management within the Bidding Zones (usually a country) and Physical Transmission Rights (PTRs) across borders
- “Path Based” Cross Border Trading vs Integrated Energy and Transmission Markets
  - Inefficient
  - Leads to unrealized gains from trade
- RES absolute scheduling priority does not make sense from economic and environmental viewpoint

Key Points

- Despite current problems major EU stakeholders refuse to move to LMP-based markets (Some EU countries are pushing for more granularity)
- Most EU markets socialize transmission investment costs except shallow or super-shallow connection costs
- Blueprint for future transmission investments
  - 10 year Development Network Plan
  - Development of the SuperGrid
- Transition to an LMP energy model is a necessity
- Management and investment in the cross-border transmission system remains a very serious issue
How Increasing Wind Penetration Can Affect Grid Congestion

Congestion becomes a pan-European problem
Planning should be coordinated between the TSOs
Frequent flow changings heavily affect operation
and require a coordinated approach

RES and Grid Infrastructure

RES connection cost allocations:
from deep to super-shallow

The Super-shallow grid integration charging policy option has been recommended for large scale offshore-wind farms and other RES projects. The LMP based model is critical for supporting RES deployment location decisions.
In different EU Member States there still exist a variety of different, non-transparent cost allocation and cost reimbursement principles for RES-E grid integration and system operation.

- TSO have no incentives for large scale RES-E grid integration, since the corresponding grid related costs are hardly eligible in the grid regulation / grid tariff determination process.
- Empirical case studies provide evidence that the “overall costs” of RES-E grid integration are below 10% of the long-run marginal costs of the RES-E generation technology itself.
- The pattern of RES-E deployment depends to a large extent on the cost allocation method.
TSO Incentives

- TSOs are not motivated to build new cross-border links when they operate in the exporting Zone or a transited Zone since local customers would see a reduction of their social welfare. (Regulators at this ‘losing side’ of the interconnector might oppose such an investment: National vs. European interests)
- In an open market, transmission and generation investments are decoupled, thus coordination is more difficult especially between two countries.
- Proposed Solution: Anticipate the transmission infrastructure construction for facilitating new generation development to minimize social costs.
  - Need EU guidelines for maximum delays in national projects.

Electricity Highway

- Objective: Establish an EU coordinator and a long-term modular development plan by 2013/2014 which should feed into the short-term TYNDP (Commissioning of first highway planned by 2020)
- ENTSO-E presented the «Electricity Highways Roadmap» at the Florence Forum in May 2011.
- North Sea Offshore Grid is considered as the «incubator» for the European Electricity Highway system.
- The key for developing the pan-European grid architecture will be the guidelines for permits and cross-border cost allocation.
Poland: Energy Market Design

Integration Models/Market Splitting

- **Model 1: Single Market Coupling (First Best Solution)**
  - One-step market clearing (Huge MIP Optimization problem)
  - Single market clearing algorithm which clears Zonal market simultaneously with Nodal (domestic) market (Nodal market is cleared for all nodes taking into account all resource and transmission constraints)

- **Model 2: Sequential Market Coupling (Second Best Solution)**
  - Two-step market clearing: EU Zonal → Polish Nodal
  - Simplified representation of Nodal market in Zonal market clearing (nodes aggregated into zones; only key resource and transmission constraints reflected)
  - Separate Nodal market clearing that includes results from Zonal market clearing (energy exchange between zones)
Conclusions

- Security of Supply and RES EU policies call for massive investments of transmission grids both within and between the EU Member States.
- ENTSO-E’s first Ten-Year Network Development Plan has been a timely initiative that has enabled the policy debate.
- Seamless integration of Electricity Highways with the 400 KN grids requires active participation of the TSOs with proper incentives.
- Implementation of LMP-based energy markets is essential for managing increasing congestion within EU Member States and across borders in the presence of large penetration of RES.