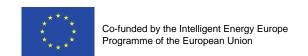


Most Promising Market Design Options

Network Representation

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Design options and specific assessment criteria for network representation in markets

Design options assessed:

- ✓ Nodal Pricing (short term marginal cost of supply in each node)
- ✓ Zonal Pricing (zones efficiently defined)
- ✓ Hybrid Zonal Pricing (zones defined within each control area)
- ✓ Single Node Dispatch (networkless dispatch)
- ✓ Average Zonal Pricing (Load: Average of nodal prices per zone; Flexible Load and Generation: pay as bid)

Specific assessment criteria

- ✓ Efficiency (Marginal cost reflectivity, Market modeling imperfection costs, Liquidity)
- ✓ Robustness
- ✓ Implementability (Level of coordination required, Computational feasibility, Compatibility with existing regulation, Simplicity, Implementation costs, Experience with its regulation, Possible extension to other time frames)
- ✓ Fairness (Price discrimination, Transparency)





Most promising design options for Network Representation for each criterion

Weakest Design Options

In-between

Design Options

Strongest Design Options

Efficiency Criterion

✓ Single Node Dispatch

✓ Zonal Pricing✓ Average Zonal Pricing

✓ Nodal Pricing

√ Hybrid Zonal Pricing

Robustness Criterion

√ Single Node Dispatch

✓ Zonal Pricing

✓ Average Zonal Pricing

✓ Nodal Pricing✓ Hybrid Zonal Pricing

Implementability
Criterion

✓ Nodal Pricing

✓ Average Zonal Pricing

✓ Single Node Dispatch

✓ Hybrid Zonal Pricing

✓ Zonal Pricing

Fairness Criterion

✓ Nodal Pricing

✓ Average Zonal Pricing

✓ Zonal Pricing

✓ Hybrid Zonal Pricing

✓ Single Node Dispatch







Most promising design options for Network Representation

Assessment Criteria

Design Options

High Grades

√ Hybrid Zonal Pricing

Average Grades

✓ Zonal Pricing

✓ Nodal Pricing

Low Grades √ Single Node Dispatch

✓ Average Zonal Pricing





Most promising design options for Network Representation: arguments

Design Options

Weak points (-)

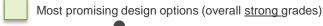
Strong points (+)

- ✓ Hybrid Zonal Pricing
 - ✓ Zonal Pricing

- Low compatibility with existing regulation (price discrimination)
- Not fair (price discrimination)
- Zonal Pricing: MC Reflectivity in meshed grids, Market Modeling Imperfection Costs in Meshed Grids

- · High Liquidity
- · Easy to compute dispatch
- Possible extension to other time frames
- Hybrid Zonal Pricing: High Local Marginal Cost Reflectivity, Large Robustness
- Zonal Pricing: Large experience with its utilization

- ✓ Nodal Pricing
- ✓ Average Zonal Pricing
- ✓ Single Node Dispatch
- Single Node Dispatch: MC Reflectivity, Market Modeling Imperfection Costs, Robustness, Compatibility with Regulation, Extension to several time frames
- Nodal pricing, Average Zonal Pricing: Liquidity, Level of coordination required, Lack of compatibility with regulation, complexity, Implementation costs, lack of Fairness and experience (Av. Zonal)
- Nodal Pricing and Average Zonal Pricing: Modeling Imperfection Costs
- Nodal Pricing: MC Reflectivity, Robustness
- Single Node Dispatch: Liquidity,
 Simplicity, Computational Feasibility,
 Level of Coordination Required,
 Experience with its Utilization,
 Transparency, and No Price
 Discrimination















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Thank you very much for your attention



