

e-Markets for PNW Transmission



Automated Power Exchange

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Transmission Debates to Avoid

- Flow-based vs. contract path: flow-based wins.
- Nodal vs. Zonal: what is the necessary commercial and operational detail to manage flows? (Cutplane or Flowgate scheduling & trading)
- Forward bid-based markets vs. bid-based dispatch: when, where, and how to use both?
- Physical vs. financial transmission rights: physical rights must have financial attributes.

Realities of the PNW in the WSCC

- PNW energy and transmission prices will often be determined in California markets.
- PNW energy production often impacts prices in California markets.
- There are likely to be multiple RTOs in the WSCC and a coordinating body among the RTOs
- Hydro operational decisions and uncertain natural inflows dominate the PNW markets.

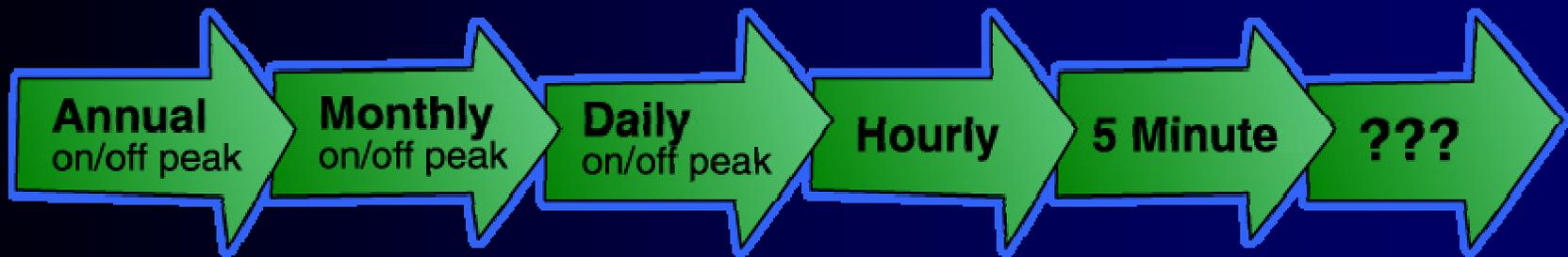
RTO Design without a Label

- *Forward*, bilateral and exchange interconnection-wide markets for energy, transmission and ancillary services seamlessly transitioning to a set of sub regional *dispatch* procedures near delivery.
- *Forward* markets allow coordination over the entire WSCC and among reservoir, generation, transmission and buyer decisions.
- *Dispatch* procedures allow coordination of frequent, closely coupled decisions with short decision lead times.

Simplify the Commercial Products and Trade them Separately

- Energy Flows
- Transmission Rights
- Ancillary Services Capacity
until real-time markets become fully
developed.

Forward Bid/Ask Markets for Electricity Provide Price Certainty; Dispatch Provides Operator Control



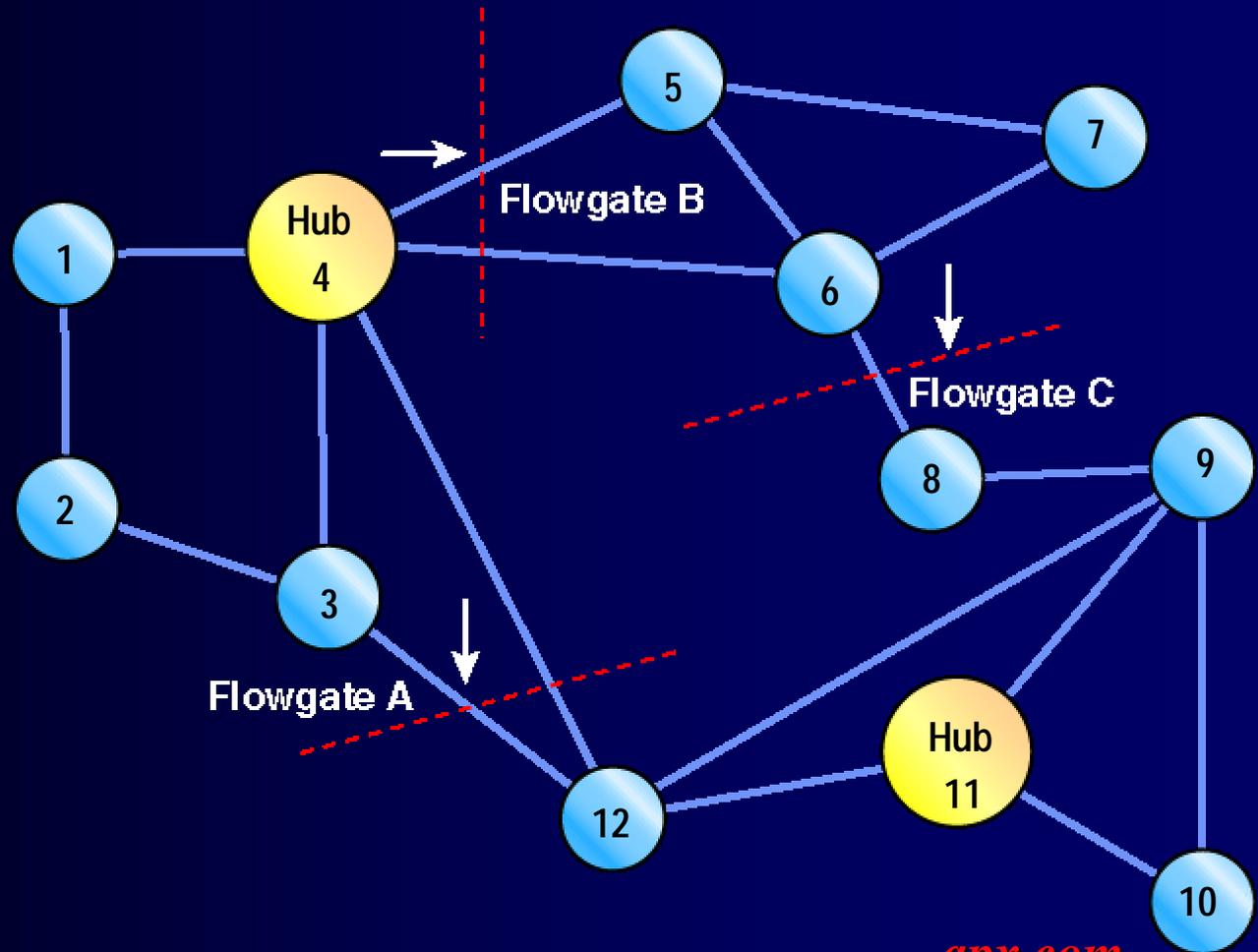
Transmission Rights Alternatives

- Zonal Interface
- Node-to-Node
- Zone-to-Zone
- Flowgate / Cutplane (supporting of node to node or zone to zone).

A New Commercial Model for Transmission: Flowgate Markets

Bus to Hub 11 Flow Factors

Bus	Flowgate		
	A	B	C
1	0.70	0.30	0.30
2	0.80	0.20	0.20
3	0.90	0.10	0.10
4	0.60	0.40	0.40
5	0.60	-0.60	0.40
6	0.50	-0.50	0.50
7	0.55	-0.55	0.45
8	0.20	-0.20	-0.20
9	0.05	-0.05	-0.05
10	-0.01	0.01	0.01
11	0.00	0.00	0.00
12	-0.05	0.05	0.05



Transmission Forward Markets

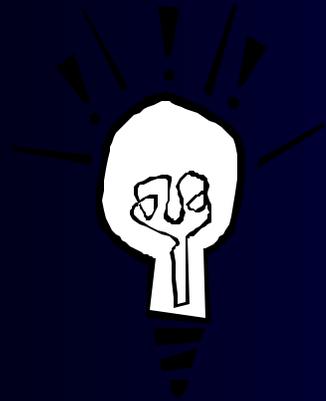
- Unidirectional Rights
- Options separated from Obligations
- Required for energy schedules
- Agents purchase transmission rights for incomplete schedules
- Should RTO do energy trades to create and consume unscheduled rights. (last resort)
- Use or lose, when.
- Market maker obligation for large holders.

Benefits of Forward Flowgate Markets

- Enables liquid energy and transmission markets
- Transmission curtailments only needed in emergencies
- Market is simple--only the commercially significant flowgates need to be traded
- No need to distinguish firm and non-firm energy and transmission
- Generators and customers get price incentives to self-manage transmission so that congestion seldom needs to be managed by the RTO

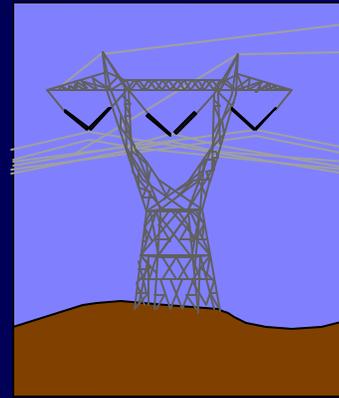
Market Vision

Energy Market



Easily find best energy deal,
taking into account the
transmission costs

Transmission Market



Easily track and trade
flowgate rights
needed to deliver
the energy

RTO Coordination and Seams



- Flows in one RTO or among RTOs can impact flows in several RTOs in an interconnection.
- Scheduling timelines, transmission and energy product definitions, nomenclature, transmission pricing may differ among RTOs causing seams between RTOs

Continuous Scheduling

- Balanced and electronically confirmed transactions managed by market participants and qualified scheduling entities.
- RTOs continuously access net injections by facility (no need for transaction schedules)
- RTOs can compute flowgate loadings from net injections
- Eliminates seams timing problems



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