Beyond Standard Market Design:

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Questions Posed:

- What degree of connection, expansion and operations “Socialization” is acceptable?
- How are existing transmission rights to be treated?
- What alternative forms of financial transmission rights will succeed?
- How can model acceptance delay be compressed?
- How will the existing seams be addressed?
- How are revisions to occur to correct problems uncovered in implementation?
“System expansion, whither goest thou?”

- **The Classic Model—Vertical Integration**
  - Combined generation, transmission, distribution and customer service decisions made by the firm
  - Components not individually priced for evaluation

- **The New Model—Competitive Generation with Independent Transmission Operation**
  - Load Serving Entity (LSE) plans for obligations and acquires an energy supply portfolio
  - Generators make competing supply offers
  - Transmission cost is an external cost component paid by either buyer or seller
The “Classic” Expansion Process

- Load growth forecast
- Resource options identified, e.g.,
  - Build local generation
  - Build mine mouth generation and transmission
  - Build transmission and make a wholesale purchase
- Resource selected based on “least cost”
  - Equivalent alternatives compared
    - Energy cost—land, generator plant investment, labor, fuel, fuel transportation, cooling water, regulations for clean air and water
    - Transmission cost—right of way, incremental lines and substations, losses
- “Used and Useful” investment oversight
A New Expansion Process

- Load growth forecast by LSE
- LSE responsible for its resource portfolio
  - Separately priced components for energy and transmission
  - “Least cost” supply options:
    - Demand side and distributed resource options
    - Hub or source purchases (buyer pays transmission cost)
    - Delivered energy purchases (seller pays transmission cost)
  - Both supply risk and price risk considered
- Regulatory oversight of portfolio adequacy?
The question: How much cost is for the “common good” and how much benefits to specific parties?

Transmission expansion driven by generation siting should affect the price of energy from that source
- Interconnection as an “impact fee” paid up front
- Congestion cost from SMD prices delivery cost
- Congestion relief subscription projects requires long-term rights provisions beyond SMD

Some expansion costs that are difficult to target and may require common funding
- Generalize load growth in a region
- “Best use” of transmission corridors
A Decision Making Process

- An RTO planning regime needs an open decision-making process and dispute resolution procedures
  - Process elements:
    - Open planning process to inform participants and anticipate need
    - Known design standards and cost responsibility guidelines
    - RTO Board role to decide “split the baby” cases
    - Dispute resolution with appeal to FERC
  - A general rule cannot foresee fact-specific problems
- Regional variation needed
  - Geography and topology matter for both technical design practice and identification of causal relationships
Nature of Transmission Rights

- Existing transmission rights
  - Defined by injection-withdrawal rights from specific points in the network
    - Point-Point – from PORs to PODs include individual buses and trading hubs (COB & Mid-C)
    - Network – from network resources to load buses
  - Service was shaped and had optionality
    - Network followed load
    - Alternative, mutually exclusive PORs and PODs
    - Recognition of diversity provided additional services

- New financial rights
  - Source-Sink pairs
  - Fixed strips of rights
Problems Encountered in Converting Existing Rights

- The easy part -- mapping locational characteristics
  - From POD, POR, network resources, area loads
  - To injections and withdrawals at nodes, hubs, load zones.
- The hard part – matching optionality characteristics
  - Over commitment occurs if existing rights are converted to full strips of financial rights
    - Occurs because seasonal and load diversity is ignored
    - Use of pro rata reductions to resolve over commitment causes a cost shift due to altered protection for unchanged usage
  - Yet the physical system is able to accommodate the use of existing rights without substantial congestion cost
    - An approach needed which takes advantage of diversity
The RTO West proposal pools existing rights as Cataloged Transmission Rights (CTRs)

- Catalogue prepared codifying existing rights
  - Obligations: (1) injection and withdrawal points, (2) limits on simultaneous usage (3) timing restrictions
  - Assets: Provided by PTOs to honor issued rights such as remedial action schemes, redispatch calls, etc.
- Obligations versus assets tested to see if system capacity plus provided assets is adequate to honor the aggregate of existing commitments

RTO West proposal releases additional system capacity as Financial Transmission Options

- CTRs compress exiting rights to maximize FTO release
- Provision made for those with CTRs to release to auction by early exercise of optionality
Model Acceptance and Implementation

- A fable: The contest of the sun and the wind
  - The challenge: Who could get a man to remove his coat the blowing wind or the warming sun?
  - The moral: Force triggers resistance while desirable features carry the day

- Stage Implementation
  - Fundamental features:
    - Nodal pricing of congestion, imbalance, losses
    - Build experience with pricing and settlements
    - Allow reasonable adaptation for conversion of existing rights
    - Avoid fights over fixed cost recovery, there are no winners here
  - Expand energy market as understanding grows
    - Resolution of generation adequacy standards – (1) nature of requirement, (2) required level and (3) enforcement process
    - Add pool purchases as market understanding grows and fear of run-away prices declines
The Remaining Seams

- Getting to a “single market”
  - Doesn’t require single operator
    - Span of control considerations for reliability
    - Diminishing return with increasing scale
  - The key issues – (1) operational timing of markets and schedules, (2) loop flow and transmission rights, (3) fixed cost charges at boundaries

- A possible approach to phased implementation
  - Establish common scheduling practice
  - Start-up each RTOs systems using physical rights at interface
  - Synchronize day-ahead and real-time pricing
  - Institute common transmission rights auctions