Transmission Rights, Transmission Wrongs, and Renewable Resources Conflicts Over Access, Pricing, and Jurisdiction

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Putting Nodal Pricing To Work

- Nodal signal assists operators to take actions that are synergistic with system operator needs (also reduces use of ancillary services)
- Nodal prices signal the need for new generation or demand response at the right locations
- Nodal price differences between points on the grid signal the need for transmission upgrades to relieve the congestion
- The appearance of insufficient transmission infrastructure is a symptom of a lack of pricing – generation, transmission and demand-side can all compete to relieve system “bottlenecks”
- Policymakers have clear information to support decisions – or do they?
- Should policy makers take special steps to reduce barriers to the development of renewable generation?
Watching Nodal Pricing Work
The ISO Transmission Plan

Stage 1: Develop Unified Planning Assumptions
- Transmission (LT-CRR), load interconnection requests from RW
- Trans projects from previous CAISO Transmission Plan (Baseline)
- Trans projects, data from POUs, SPGs
- Market data e.g. congestion
- Load forecasts (CEC, PTOs)
- Generation projects from phase I of LGIP
- State, Federal policies, e.g. RPS, FERC orders

ISO validates input and develops the Study Plan

Stage 2: Performing Technical Studies
ISO conducts or directs technical studies

Stage 3: Project Approval & Developing Transmission Plan
ISO evaluates & approves project alternatives

Study Plan, Planning Data

Regional (TEPPC) & Sub-Regional Planning Groups Request Window

Request Window (RW)

Trans, Gens, DR Study Requests

Trans, Gens, DR Project Alternatives

CAISO Board of Governors Meeting

CAISO Transmission Plan
(baseline for next year)

Preliminary study results
(Summary of findings & Mitigation plans)

Next planning cycle

Input to a new planning cycle

- Transmission (LT-CRR), load interconnection requests from RW
- Trans projects from previous CAISO Transmission Plan (Baseline)
- Trans projects, data from POUs, SPGs
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- Generation projects from phase I of LGIP
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ISO validates input and develops the Study Plan

ISO conducts or directs technical studies

ISO evaluates, approves projects, and develops Transmission Plan

Regional Transmission - North / Legal Services
PDibayebutra 9/24/08

California ISO

Slide 4
Accommodating Climate Change Initiatives

- 20% of Energy Supply Renewable By 2010
- 33% of Energy Supply from Renewable Resources by 2020
- CO2 Emission Level Rolled Back to 1990 Level by 2020
- Ban Once-through Cooling Technology of all Coastal Plants by 20xx
- One Million Roof-Top Photo-Voltaic
- $1 Billion/Year Investment on Energy Conservation
- $5 Billion Investment on Smart Meters
Wind generation tends to be inversely correlated to daily load curve, creating ramping impacts.
Tehachapi area wind generation varies widely from day to day and hour to hour.

The average for April 2005 is smooth, but the day-to-day variability is great, showing the importance of improved forecasting tools and telemetry to the operating floor.
Renewable Transmission Energy Initiative (RETI)

- California’s Renewable Portfolio Standard (RPS) requires that a percentage of electric energy sold at retail by California’s load serving entities (LSEs) be derived from qualified renewable energy resources. The percentage required by current law is 20% by 2010, but RETI’s goal is to identify transmission facilities likely to be required to meet a 33% RPS requirement by the year 2020.

- “RETI will assess all Competitive Renewable Energy Zones (CREZs) and neighboring areas that can provide significant electricity to California by the year 2020. RETI will also identify those CREZs that can be developed in the most cost effective and environmentally benign manner and will then use existing transmission planning processes to prepare transmission plans of service for those CREZs identified for development”
The five requirements for conditional approval of a project as a LCRIF

- ISO staff must determine that the facility is “needed”;
- The primary purpose of the facility must be to connect two or more generators located in an energy resource area, and at least one generator must be owned by an entity that is not an affiliate of the owner of another generator in the same energy resource area;
- The facility will be a high voltage facility;
- At the time of the in-service date, the facility will not be a network facility and otherwise would not be eligible for inclusion in the transmission owner’s transmission revenue requirement; and
- The facility meets the reliability requirements applicable to the ISO controlled grid as well as ISO planning standards.
Results of ISO November 2007 Integration of Renewable Resources Study

- Load Following is necessary to maintain stable operations
  - Load following Capacity requirements will increase
    - 700 - 800 MW
    - 500 - 900 MW

- Regulation is required to maintain frequency and maintain interchange schedules
  - Regulation capacity requirements can double certain hours
    - 170 - 250 MW
    - 100 - 500 MW
“To 20 Percent and Beyond”!!!

Resources Required for Renewables Integration

“Partners in Success”

- Generation Portfolio
- Storage
- Demand Response

- Quick Start Units
- Fast Ramping
- Wider Operating Range (lower P_{min})
- Regulation capability

- Shift Energy from off-peak to on-peak
- Mitigate Over Generation
- Voltage Support
- Regulation capability

- Price sensitive load
- Responsive to ISO dispatches
- Frequency Responsive
- Responsive to Wind Generation Production

Wind Generation
Solar Generation
Hydro Generation
What the Smart Grid Is

Makes use of communications, computing and power electronics to create a system that is:

- Self-healing and adaptive
- Interactive with consumers and markets
- Optimized to make best use of resources and equipment
- Predictive rather than reactive, to prevent emergencies
- Distributed across geographical and organizational boundaries
- Integrated, merging monitoring, control, protection, maintenance, EMS, DMS, marketing and IT
- More secure from attack
LCRI is a cost allocation mechanism developed to reduce barriers to the development of generation in remote locations with fuel sources that are infeasible to relocate, such as wind or solar projects.

California faces proposed feed-in tariffs of up to 20 MW of outside-the-customer-meter generation to promote wind technology:
- Fixed prices, above-market, take-or-pay?
- How many price-responsive C&I customers can offset one of these?
- How to fit within existing Renewable Portfolio Standards?

Demand response not yet credited for environmental benefits

Storage devices prompt another look at characteristics of ancillary service requirements:
- Have the A/S requirements changed?
- Do we hold the line until innovation catches up to the needs?
Preserving the Characteristics of a Workably Competitive Electricity Market

- Will price signals drive investment?
- Can an ISO remain technology and fuel neutral?
- Will Policymakers protect competition, not competitors?
- Will we foster innovation across the entire portfolio – demand, supply, delivery through competition or base the future on special programs?