Transmission Planning at the California ISO & Overview of Generation-related Transmission

Governor’s Committee on Energy Choice
Technical Working Group on Generation, Transmission and Delivery

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Key Topics

1. Transmission under ISO operational control
2. Planning process and approvals
3. Generation Interconnection Process
4. ISO studies to support State Resource Adequacy
5. Revenue recovery through the Transmission Access Charge (TAC)
ISO is well integrated in the west, with significant transfer to and from Nevada.
Transmission facilities under ISO operational control
Transmission under ISO operational control

FERC has defined what is generally NOT considered transmission

• Radial lines connecting generation facilities
• Distribution facilities defined by FERC functional test
  – Normally in close proximity to retail customers
  – Primarily radial in character
  – Power flows into and rarely, if ever, flows out
  – Power enters and is not reconsigned or transported to some other market
  – Power is consumed in a comparatively restricted geographical area
  – Meters at the transmission/distribution interface measure flows into the local distribution system
  – Will be of reduced voltage
Planning area boundaries are defined by transmission under ISO Operational Control.

**Legend**
- BES – Bulk Electric System
- GO – Generator Owner
- DP – Distribution Provider
- GIF – Generation Interconnection Facilities
ISO transmission planning process and approvals
Transmission planning process begins each year and runs 23 months.

Phase 1
Development unified planning assumptions and study plan
- Incorporates State and Federal policy requirements and directives
- Demand forecasts, energy efficiency, demand response
- Renewable and conventional generation additions and retirements
- Input from stakeholders
- Ongoing stakeholder meetings

Phase 2
Technical Studies and Board Approval
- Reliability analysis
- Renewable delivery analysis
- Economic analysis
- Publish comprehensive transmission plan
- ISO Board approval

Phase 3
Competitive Solicitation Process
- Receive proposals to build identified reliability, policy and economic transmission projects
- Evaluate proposals to meet qualification for consideration
- Award to successful applicant

April Year X
Coordination of Conceptual Statewide Plan

March Year X+1
ISO board approval of transmission plan

Continued regional and sub-regional coordination

October Year X+1
Four Stakeholder points of input
Development of Annual Transmission Plan

- Reliability Analysis (NERC Compliance)
- Policy Driven Analysis
  - Focus on renewable generation
  - Identify policy transmission needs
- Economic Analysis
  - Congestion studies
  - Identify economic transmission needs
- Other Analysis
  (LCR, SPS, etc.)

Results
Transmission planning is coordinated with state processes:

1. CEC & CPUC: Create demand forecast & assess resource needs
2. CAISO: Creates transmission plan
3. CPUC: Creates procurement plan
4. IOUs: Final plan authorizes procurement

Results feed into next biennial cycle
ISO Management and Board Approval Process

• ISO Management approves projects with a capital cost of $50 million or less

• The Revised Draft Transmission Plan is presented to the ISO Governing Board for approval resulting in the Board Approved Plan
  – Transmission upgrades and additions with estimated capital costs $50M or more will then be deemed approved
  – Approval of other findings, including selection of non-transmission alternatives

• ISO posts the Board Approved Comprehensive Transmission Plan

• ISO makes the Plan available to neighboring transmission providers, interconnected BAAs and regional planning groups
Transmission approvals over the last 6 years – over 30 projects a year until 2014-2015:
Examples of Special studies conducted inside the transmission planning process to focus on new and emerging challenges:

- Further study of system capacities at 50% renewables
- Generator frequency response modeling to improve quality of frequency response studies
- Gas-electric coordination studies
- Potential for economically driven retirement of gas-fired generation
- Required characteristics for further reliance on demand response products
- Benefits of Large Storage in managing resource balancing and integrating renewable generation
Generation Interconnection Process
The CAISO’s generator interconnection process has evolved to address our needs:

- The CAISO relies on a “cluster study” approach to deal with potentially huge volumes of interconnection requests in a competitive market.
- The generator interconnection process is coordinated with our annual transmission planning process and the framework for policy-driven transmission.
- A “fast track” for very small projects and an “independent study track” for projects needing faster service are available, on an “energy only” basis.
Overview of Generator Interconnection Process

- Phase 1 study assesses reliability and deliverability
  - reasonable MW amounts when queue is very large
  - projects may rely on available system capacity; or
  - project posts security deposit to enter phase 2 and pay its share of delivery upgrade costs
- Phase 2 study identifies delivery upgrades only for customers willing to pay for the upgrades
  - A second financial security posting is necessary to move forward into contracts and implementation
ISO studies to support State Resource Adequacy
General Resource Adequacy Concepts

• Resource Adequacy (RA)
  – Ensure that capacity exists and is under contract in order for all load to be served by responsible Load Serving Entities (LSEs)
  – Generally, LSEs will demonstrate that they have secured adequate qualified capacity to serve their peak load including planning reserve (every month in the month ahead timeframe).
  – Generally, LSEs will demonstrate, in the year ahead timeframe that they have secured minimum 90% of the next summer’s peak load needs including planning reserve.
  – All resources participating in the ISO markets under an RA contract will have an RA must-offer-obligation to the ISO.
Transmission Planning analysis plays two roles in the California’s annual Resource Adequacy program:

• State’s resource adequacy program ensures:
  – adequate supply on a system wide basis and in local areas where transmission is constrained

• For “system” capacity:
  – ISO determines if “qualifying capacity” (determined by CPUC) should be discounted due to system limitations
  – establish qualifying import limits

• For local resource adequacy:
  – determine the needs in local load pockets, and validate that the procurement actually meets those needs
Total Resource Adequacy Procurement

115-117% Of System Peak Load

Imports

Any other resources within the CAISO control area not needed as Minimum Local Resources

Minimum Local Resources

Total RA Requirements
Recovering transmission revenue requirements
Transmission Access Charge (TAC) is the ISO’s mechanism for transmission-owning utilities to recover their costs of transmission assets.

- A transmission-owning utility that transfers operational control to the ISO becomes a “participating transmission owner” (PTO)
- The PTO continues to own, maintain and operate transmission assets turned over to ISO operational control
- Each PTO submits its transmission revenue requirements (TRR) to FERC for approval to recover through the TAC
FERC orders and precedents emphasize several basic principles for allocation of TRR.

1. Costs must be allocated in a way that is roughly commensurate with benefits
2. Calculation of benefits is not an exact science
3. The process for determining benefits and beneficiaries must be transparent
4. Broad agreement among affected parties that the cost allocation is fair
Existing TAC structure for the current ISO region was approved by FERC as part of Order 1000 compliance.

Existing TAC structure consists of:

- **Postage stamp “regional” rate** to recover TRR for all facilities rated > 200 kV under ISO operational control
  - $/MWh charge to all internal load and exports

- **PTO-specific “local” rates** to recover TRR for all facilities rated < 200 kV under ISO operational control
  - $/MWh charge to internal load in each PTO’s territory

- Currently, no differentiation of cost allocation based on project type (e.g., reliability, economic, or policy projects), in-service date or other non-voltage level factors
CAISO Draft Regional TAC Framework Proposal
Objectives for any alternative to the current TAC structure when new PTOs join

- TAC should not represent a barrier to joining the ISO
  - avoid “rate shock” for either new or existing PTOs
  - apply equally well for all new PTOs
- Align cost allocation with benefits as far as possible
- Align structure with the ISO’s transmission planning process & criteria as far as possible
- Maximize the likelihood of state commission, FERC, existing PTO, and other stakeholder acceptance
Proposed a draft framework for the cost allocation of existing high voltage facilities

- Costs will be recovered via “license plate” sub-regional TAC rates for their respective loads
- Each sub-region’s existing facilities will comprise “legacy” facilities for which subsequent new sub-regions have no cost responsibility
New facilities will have costs allocated to align with benefits (purpose)

- For a **reliability project** that is designed only to meet a reliability need within a sub-region, allocate the full project cost to that sub-region

- For a **policy-driven project** with multi-area benefits, allocate costs to loads of relevant state or local regulatory authorities
  - If connected entirely within the same sub-region where the policy driver originated, allocate full cost to that sub-region

- For a purely **economic project**, allocate cost shares to sub-regions in proportion to their economic benefits
Thank You