

# California's Transmission Challenges for Interconnecting Renewables

**Presentation for Delegation from Nigeria**

***March 29, 2011***

Ean O'Neill

Electric Transmission System Program Specialist

Strategic Transmission Planning Office

Siting, Transmission and Environmental Protection Division

**California Energy Commission**

eoneill@energy.state.ca.us



# Transmission – Who are the Regulators?

- California Independent System Operator (CAISO) – Plans and operates the overall transmission system for a number of California's transmission owners, including all IOUs.
- Publicly owned utilities – Plan, permit, own, and operate their transmission systems.
- California Energy Commission (CEC) – Responsible for demand forecasting, overall energy planning, creation of biennial strategic transmission investment plan, and designation of transmission corridors.
- California Public Utilities Commission (CPUC) – Responsible for permitting transmission projects (including CEQA and maybe coordinate with NEPA) and regulates distribution system and procurement programs for IOUs.



# Who are the Transmission Owners?

- Investor Owned Utilities
  - Pacific Gas and Electric (PG&E)
  - Southern California Edison (SCE)
  - San Diego Gas & Electric Company (SDG&E)
- Publicly Owned Utilities
  - Imperial Irrigation District (IID)
  - Los Angeles Dept. of Water and Power (LADWP)
  - Sacramento Municipal Utility District (SMUD)
  - Turlock Irrigation District (TID)
- Federal Entity
  - Western Area Power Administration (Western)



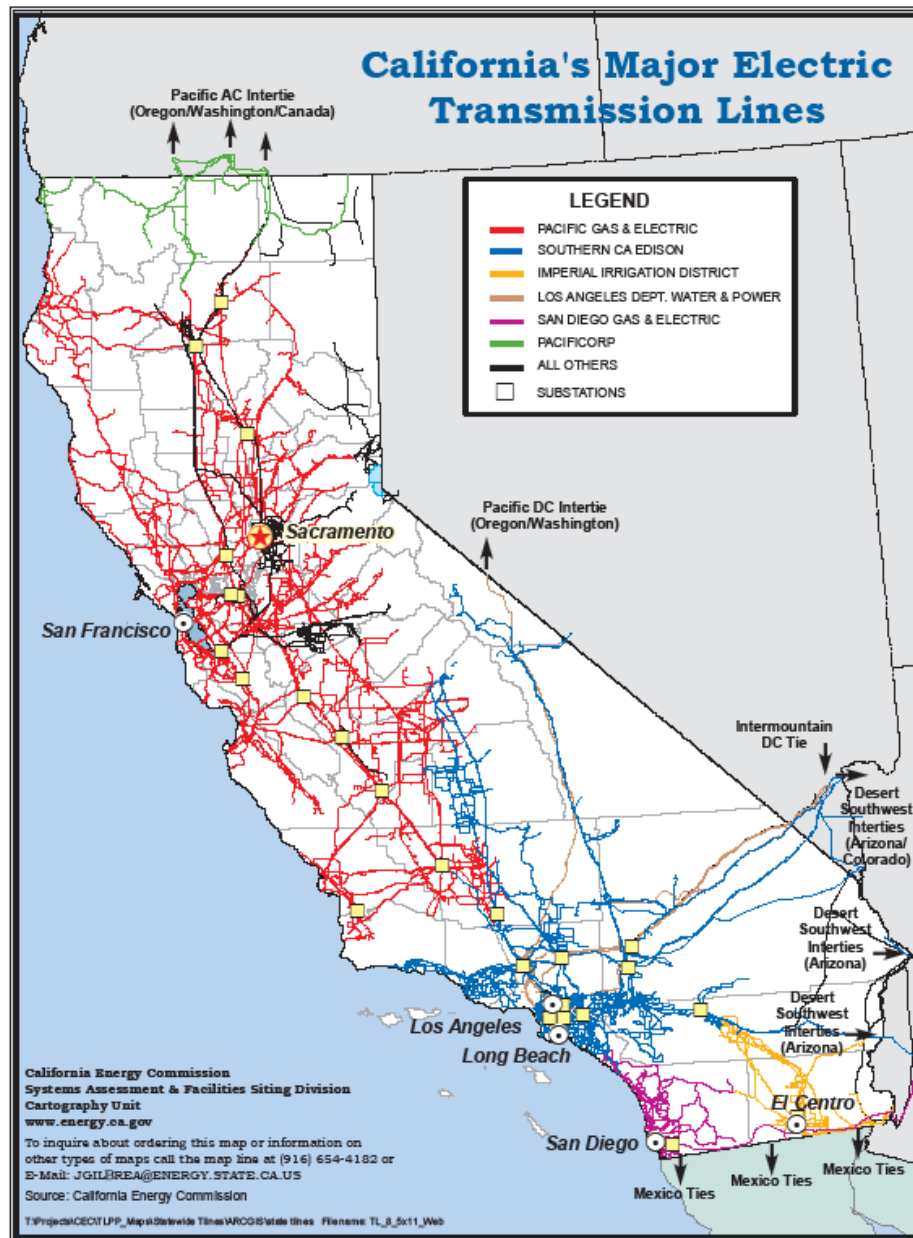
# Overview of California's Transmission System

## Transmission Line Ownership in California

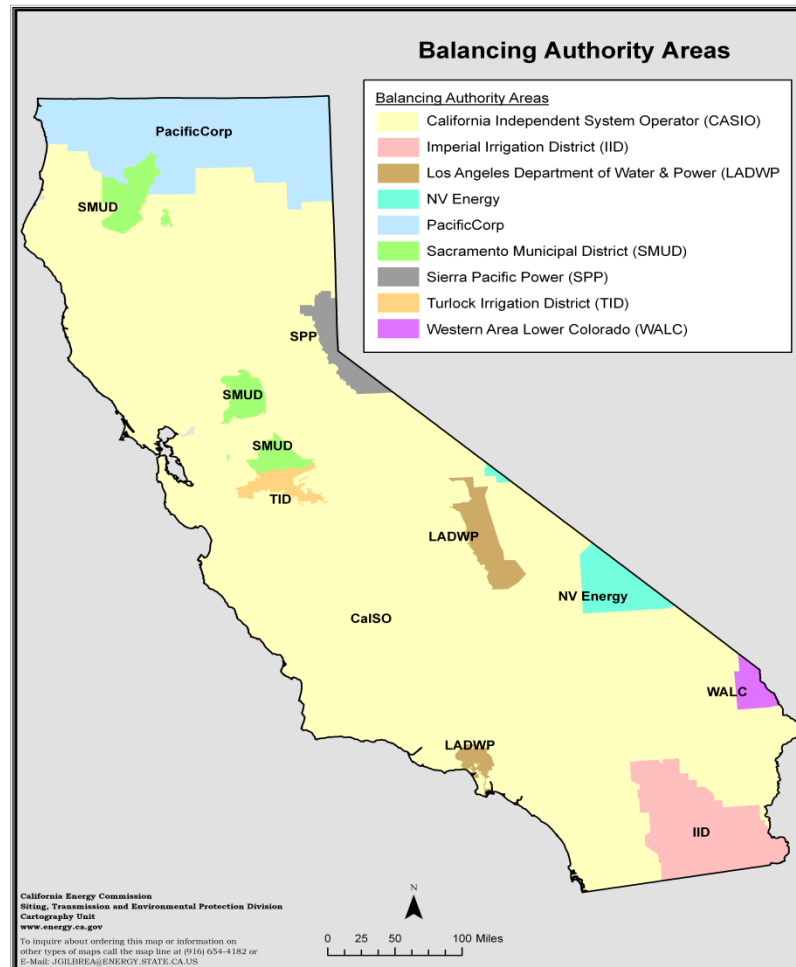
Utility	Circuit Miles	% of state total
PG&E	18,491	58.3
SCE	5,129	16.2
SDG&E	1,906	6.0
Municipal utilities	5,224	16.4
Federal (Western)	971	3.1
Total In-state Line Mileage	31,721	100

This includes all lines with voltages of 69 kilovolts (kV) and above that have a bulk transmission function (e.g., they carry electrical energy from where it is generated to the distribution system, other load centers, or a neighboring control area).





# Balancing Authority Areas in California



# Transmission Planning

- No standard set of assumptions being used by transmission planning entities, but planning entities making strides towards that goal.
- California Transmission Planning Group (CTPG)
  - Forum for conducting joint transmission planning and coordination in transmission activities to meet the needs of California.
  - Consists of transmission owners with an obligation to serve and transmission operators.
  - Develop a conceptual statewide transmission plan to meet the state's 33% RPS goal.
  - Plan to be used as starting point by balancing authorities as part of their transmission planning process.
  - Link to CTPG website: <http://www.ctpg.us/public/index.php>



# Transmission Planning (cont.)

- CAISO's Transmission Planning Process
  - CAISO's Large Generation Interconnection Procedures Process
    - Generators request interconnection to CAISO grid
    - CAISO conducts interconnection studies and identifies transmission upgrades needed for reliable interconnection to CAISO grid.
    - Upon completion, parties negotiate Large Generation Interconnection Agreements (LGIA).
  - CAISO added "policy-driven" category to its Transmission Planning Process that identifies potential transmission elements needed to achieve the state's environmental goals such as the 33% RPS goal by 2020.
- Municipal Transmission Planning Processes
  - Imperial Irrigation District (IID)
  - Los Angeles Dept. of Water and Power (LADWP)
  - Sacramento Municipal Utility District (SMUD)
  - Turlock Irrigation District (TID)





# Transmission Projects to Access Renewables



# Thermal Generation Challenges

- Thermal generation sited closer to load centers where transmission infrastructure already in place.
- Air permitting and new water regulation more of an issue.
- New generators not able to obtain air permits in the South Coast Air Quality Management District.
- AB 1318 requires Energy Agencies to prepare a report for the Governor and Legislature that evaluates the electrical system reliability needs of the South Coast Air Basin.
  - AB 1318 Draft Work Plan Link: [http://www.arb.ca.gov/energy/esr-sc/0215-workshop/ab\\_1318\\_draft\\_work\\_plan.pdf](http://www.arb.ca.gov/energy/esr-sc/0215-workshop/ab_1318_draft_work_plan.pdf)



# Thermal Generation Challenges (cont.)

- 19 existing power plants located on the California coast must comply with once-through cooling (OTC) regulation.
  - Power plants withdraw over 15 billion gallons per day from the state's coastal and estuarine waters to cool their turbines and then return the water at higher temperatures.
  - The new regulation requires power plants to replace their once through cooling systems with the "best technology possible" in the interest of protecting marine life.
- OTC compliance dates have been linked to infrastructure replacement timelines.
- Nuclear power plants were granted an extension for compliance with new regulations.
  - SCE' San Onofre plant has until 2022 to comply.
  - PG&E's Diablo Canyon plant has until 2024 to comply.
- State Water Resources Control Board website:  
[http://www.waterboards.ca.gov/water\\_issues/programs/npdes/cwa316.shtml#otc](http://www.waterboards.ca.gov/water_issues/programs/npdes/cwa316.shtml#otc).



# Renewable Generation Challenges

- Achieving state policy goals will require new transmission to connect remote renewable generation sources to the load centers.
- Given the remote location there may a “chicken and egg” problem.
  - Transmission projects may be viable only with a sufficient quantity of renewable projects.
  - The transmission owner requires firm commitments from enough renewable projects to justify the costs of the transmission.
  - The renewable generation owner requires transmission infrastructure will be available when project completed.
- Disconnect between permitting and construction time for transmission projects, and permitting and construction time for renewable generation projects.



## Renewable Generation Challenges (cont.)

- Renewable generation resources are located on geographically sensitive land.
- Broad range of groups have an interest in where new transmission lines are sited.
  - Utilities
  - Generators
  - Regulatory agencies
  - Public interest and environmental groups



# Renewable Energy Transmission Initiative

- Stakeholder-driven collaborative planning process that includes utilities, generators, regulatory agencies, and public interest and environmental groups.
- Identified and ranked Competitive Renewable Energy Zones (CREZ) in California and adjacent lands.
- Developed a transmission plan to access CREZ to meet the state's 33% RPS goal.
- Prioritize CREZ and required transmission to access renewable resources taking into consideration:
  - Development potential
  - Resource cost and value
  - Environmental issues
- RETI results provided a foundation for identifying renewable development zones for the DRECP process
- RETI used to inform CPUC RPS procurement process, CTPG statewide planning process , and the CAISO and municipals transmission planning processes.
- RETI Link: <http://www.energy.ca.gov/reti/index.html>



## Desert Renewable Energy Conservation Plan (DRECP)

- Development plan for the Mojave and Colorado deserts that will provide binding, long-term endangered species permit assurances and facilitate renewable energy project review and approval process.
- Clearly identifies and maps areas for renewable energy project development and areas intended for long-term natural resource conservation.
- Provides a forum for public participation and input from stakeholders representing the interests of the counties in the desert region, renewable energy developers, environmental organizations, electric utilities, and Native Americans.
- Provides for effective protection and conservation of desert ecosystems while allowing for the appropriate development of renewable energy projects.
- More information: <http://www.drecp.org/>



# Governor Brown Renewable Energy Plan

- California should produce 20,000 Megawatts of new renewable electricity.
  - Build 12,000 MW of localized electricity generation.
  - Build 8,000 MW of large-scale renewables and necessary transmission lines.
    - Legislature nearing passage of SBX1 2 that will codify the 33 percent renewables requirement.
    - CEC will prepare a renewable energy plan that will expedite permitting of high-priority generation and transmission projects.





# Summary

- California continues to address challenges to ensure adequate transmission is built to access renewable resources.
- Regulatory bodies and transmission planning entities are working together to develop a common set of assumptions for future transmission planning.
- CEC will prepare the Strategic Plan for Renewable Generation and Transmission Infrastructure Development by November 2011.

