California ISO
Shaping a Renewed Future

Integrated Energy Policy Report Workshop

Southern California Reliability

California Energy Commission
DOCKETED
14-IEP-1E
TN 73665
AUG 18 2014

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Date

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The ISO annual transmission planning process results in approval of necessary projects each March.

January 2014 | April 2014 | March 2015

Previous transmission plan approved projects

State and federal policy

CEC - Demand forecasts (w/ AAEE and DR)

CPUC - Resource portfolios, additions and retirements

Other issues or concerns

Assumptions

Stakeholders

Sequential technical studies

- Reliability analysis
- Renewable delivery analysis
- Economic analysis

Publish comprehensive transmission plan with recommended projects

ISO Board approves transmission plan

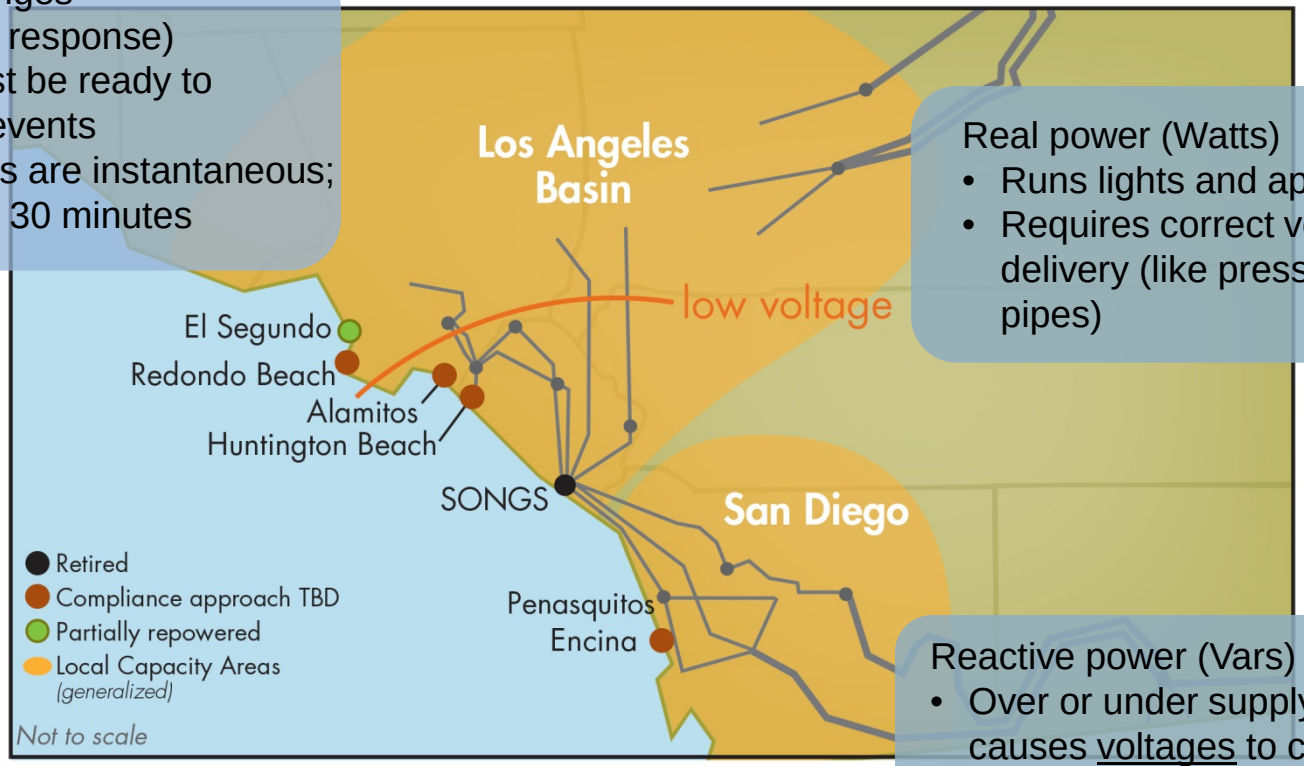
Iterative process repeats annually

Key transmission planning inputs:

- Previously approved transmission and generation
- CEC Demand Forecast
  - CEC Integrated Energy Policy Report
  - Energy efficiency level and Demand Response assumptions coordinated with CPUC
- 33% RPS Generation Portfolios
  - Basis for identifying policy-driven transmission
  - Collaboratively developed with the CPUC and CPUC
  - Include references to out of state resources
- Power grid topology and resource output modeling

San Onofre closure caused reliability problems in Southern California because Los Angeles and San Diego are load pockets with limited options

Real-time changes
("contingency" response)
- System must be ready to respond to events
- Some events are instantaneous; others allow 30 minutes



Real power (Watts)
- Runs lights and appliances
- Requires correct voltage for delivery (like pressure in water pipes)

Reactive power (Vars)
- Over or under supply of Vars causes voltages to climb or fall
- Local needs must be met locally

- All three characteristics are needed – not all resources can provide.
- Compliance with once-through cooling schedule compounds the issues.
- San Onofre provided: 2,246 MW in the LA Basin
  1,100 MVars supporting voltages between Los Angeles & San Diego

Initial transmission to mitigate the issues

- Completed the Sunrise Power Link into San Diego
- Returned Huntington Beach units 3 & 4 from retirement in 2012 and in 2013 converted these units to synchronous condensers
- Reconfigured Barre-Ellis transmission in South Orange County
- Increased generation in the LA Basin Area
- Installed voltage support capacitors in South Orange County
- Flex Alerts fully funded (through 2014 only)
- Fully utilized available demand response as needed
- Ensured that existing generation was well-maintained and available

Transmission infrastructure changes to come…

- Additional voltage support
  - 2015: SDG&E Talega synchronous condensers (450 MVAR)
  - 2016: SDG&E San Luis Rey synchronous condensers (450 MVAR)
  - 2017: SDG&E synchronous condensers near SONGS (450 MVAR)
  - 2017: Miguel Voltage Support
  - 2017: Suncrest Dynamic Reactive support

- Additional transmission lines and grid upgrades
  - 2017: Sycamore-Penasquitos 230 kV line (relieve overloads in SDG&E area resulting from increased loads and absence of SONGS)
  - 2017: Imperial Valley Phase-Shifting Transformer
  - 2020: Mesa 500 kV Loop In

Immediately after SONGS retirement:

Initial grid upgrades to mitigate immediate issues.

ISO approved grid upgrades in progress through 2020.