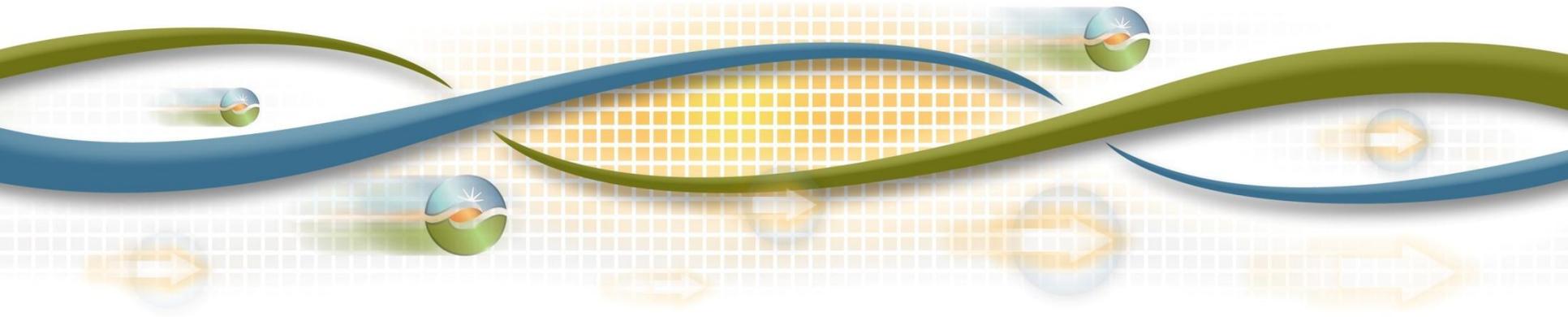


# Implementing OTC Policy on the ISO Grid

Power Association of Northern California

Dennis Peters

October 15, 2013



# Environmental goals and policies drive the evolution to the future grid.

Electric industry faces changes:

- Ambitious environmental goals
- Reliability with fewer gas-fired plants
- Cost containment

**Need to strike a balance between reliability, renewables and reasonable cost.**



# California energy and environmental policies create reliability challenges

- Greenhouse gas reductions to 1990 levels by 2020
- 33% of load served by renewable generation by 2020
- 12,000 MW of distributed generation by 2020
- Ban on use of once-through cooling in coastal & estuarine power plants
- Limits on availability of air emission credits for replacement generation

# Once-Through Cooling (OTC) Policy

- Minimize Entrainment and Impingement
- Methods of Compliance
  - Retrofit with recycled wet cooling (Cooling Towers)
  - Meet equivalent reductions in Entrainment & Impingement
  - Repower without Once Through Cooling
  - Cease operations
- Implementation
  - Staggered Compliance dates over 18 years
  - Required submittal of plans by generators
  - Review of plans by energy agencies to ensure grid reliability
  - Annual report by energy agencies on compliance date changes to maintain grid reliability
  - OTC policy includes mechanisms to adjust compliance dates in emergencies

# ISO local capacity areas and OTC plants



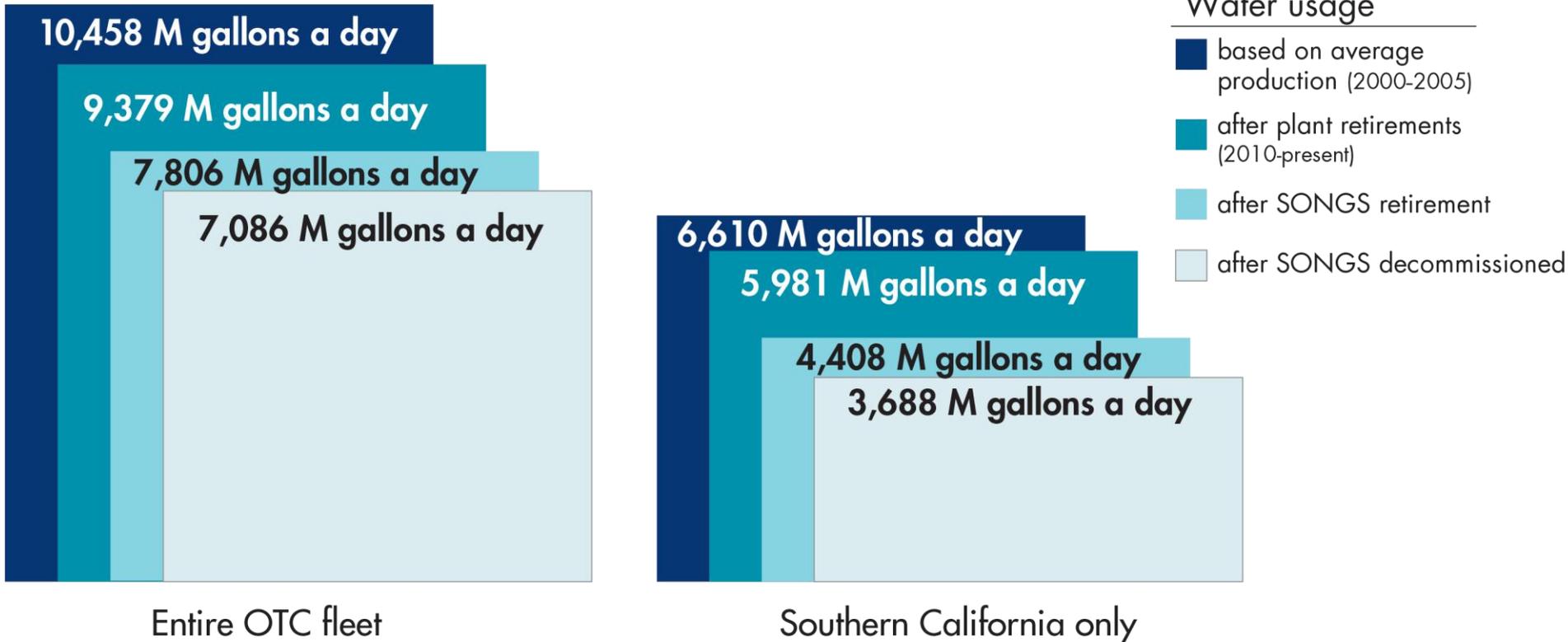
# List of OTC Generating Units in ISO BAA

| Area                                      | Generating Facility (Total Plant MW)       | Unit       | SWRCB Compliance Date | Existing Capacity (MW)  | Compliance Status  |
|---|--|------------|-----------------------|---|--|
| Humboldt Local Capacity Area              | Humboldt Bay (105 MW)                      | 1          | 12/31/2010            | Former 105 MW facility was repowered with 10 ICEs for total of 163 MW | Compliant – repowered plant  |
|   |  | 2          | 12/31/2010            |   |  |
| Greater Bay Area Local Capacity Area      | Contra Costa (674 MW)                      | 6          | 12/31/2017            | 337   | Compliant – Units retired and replaced by Marsh Landing power plant (760 MW) in April 2013 |
|   |  | 7          | 12/31/2017            | 337   |  |
|   | Pittsburg (1,311 MW**) **Unit 7 is non-OTC | 5          | 12/31/2017            | 312   | Owner proposes to utilize cooling tower of Unit 7 for Units 5 & 6 to comply.               |
|   |  | 6          | 12/31/2017            | 317   |  |
|   | Potrero (Retired)                          | 3          | 10/1/2011             | 206   | Retired  |
| Central Coast (not a Local Capacity Area) | Moss Landing (2,530 MW)                    | 1          | 12/31/2017            | 510   | Owner believes units are in compliance until 2032.   |
|   |  | 2          | 12/31/2017            | 510   |  |
|   |  | 6          | 12/31/2017            | 754   | Owner proposes to retrofit plant to comply.  |
|   |  | 7          | 12/31/2017            | 756   |  |
|   | Morro Bay (650 MW)                         | 3          | 12/31/2015            | 325   | Owner may attempt to repower with two 50 MW, one 100MW or one 164 MW                       |
|   |  | 4          | 12/31/2015            | 325   |  |
|   | Diablo Canyon (2,240 MW)                   | 1          | 12/31/2024            | 1122  | Compliance recommendation will come from Nuclear Review Committee in October 2013.         |
| 2   |  | 12/31/2024 | 1118                  |   |  |
| Big Creek-Ventura Local Capacity Area     | Mandalay (430 OTC plus 130 MW non-OTC)     | 1          | 12/31/2020            | 215   | Owner has proposed to retrofit plant to comply.  |
|   |  | 2          | 12/31/2020            | 215   |  |
|   | Ormond Beach (1,516 MW)                    | 1          | 12/31/2020            | 741   | Owner has proposed to retrofit plant to comply.  |
|   |  | 2          | 12/31/2020            | 775   |  |

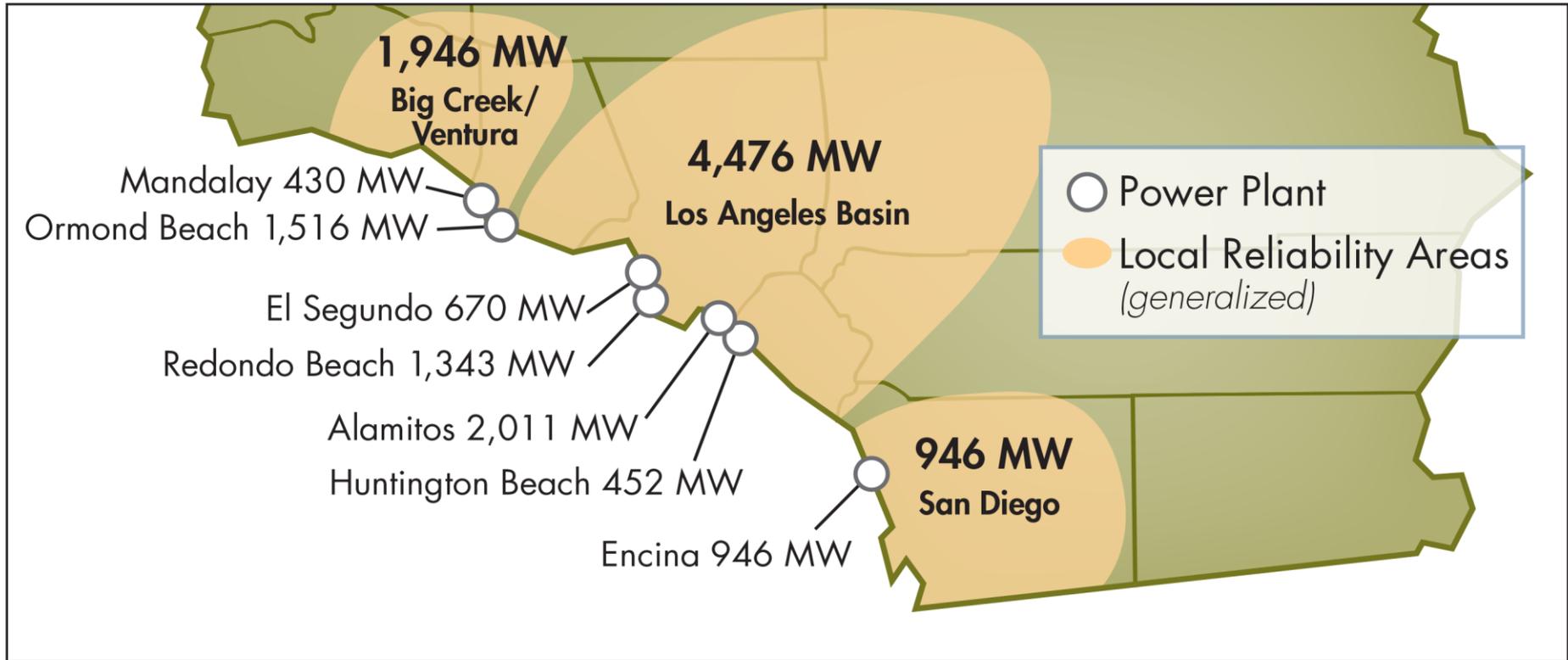
# List of OTC Generating Units in ISO BAA (cont'd)

| Area                          | Generating Facility (Total Plant MW) | Unit       | SWRCB Compliance Date | Existing Capacity (MW) | Compliance Status  |
|-------------------------------|--------------------------------------|------------|-----------------------|------------------------|--|
| LA Basin Local Capacity Area  | El Segundo (670 MW)                  | 3          | 12/31/2015            | 335                    | CEC approved with an approved PPA; Replaces Units 1-3 with 560 MW; under construction (current COD of June 2013)   |
|                               |                                      | 4          | 12/31/2015            | 335                    | Owner plans to repower.  |
|                               | Alamitos (2,011 MW)                  | 1          | 12/31/2020            | 175                    | Owner plans to repower in stages:<br>2021 – 1,056 MW<br>2023 – 528 MW<br>2026 – 528 MW<br>Have not filed yet with CEC nor is there an approved PPA   |
|                               |                                      | 2          | 12/31/2020            | 175                    |  |
|                               |                                      | 3          | 12/31/2020            | 332                    |  |
|                               |                                      | 4          | 12/31/2020            | 336                    |  |
|                               |                                      | 5          | 12/31/2020            | 498                    |  |
|                               |                                      | 6          | 12/31/2020            | 495                    |  |
|                               | Huntington Beach (452 MW)            | 1          | 12/31/2020            | 226                    | Units 3 & 4 have been converted to synchronous condensers<br>Owner plans to repower Units 1-4:<br>2018 – 470 MW<br>2021 – 469 MW<br>Application filed at CEC and under review; Does not have an approved PPA |
|                               |                                      | 2          | 12/31/2020            | 226                    |  |
|                               |                                      | 3          | 12/31/2020            | 225 (Retired)          |  |
|                               |                                      | 4          | 12/31/2020            | 227 (Retired)          |  |
|                               | Redondo Beach (1,343 MW)             | 5          | 12/31/2020            | 179                    | Owner plans to repower:<br>2021 – 528 MW<br>Application filed at CEC and data adequacy is under review; Does not have an approved PPA  |
|                               |                                      | 6          | 12/31/2020            | 175                    |  |
|                               |                                      | 7          | 12/31/2020            | 493                    |  |
|                               |                                      | 8          | 12/31/2020            | 496                    |  |
|                               | San Onofre (2,246 MW)                | 2          | 12/31/2022            | 1122                   | Retired 6/7/13   |
| 3                             |                                      | 12/31/2022 | 1124                  |                        |  |
| San Diego Local Capacity Area | Encina (946 MW)                      | 1          | 12/31/2017            | 106                    | Carlsbad is the proposed repower of Units 1-5 with 560 MW. CEC has approved the license; does not have a PPA   |
|                               |                                      | 2          | 12/31/2017            | 103                    |  |
|                               |                                      | 3          | 12/31/2017            | 109                    |  |
|                               |                                      | 4          | 12/31/2017            | 299                    |  |
|                               |                                      | 5          | 12/31/2017            | 329                    |  |
|                               | South Bay                            | 1-4        | 12/31/2011            | 692                    | Retired in 2010  |

# OTC Water Usage Reduction – System & Southern CA 2010 - 2013



# Southern California OTC generation facing compliance deadlines

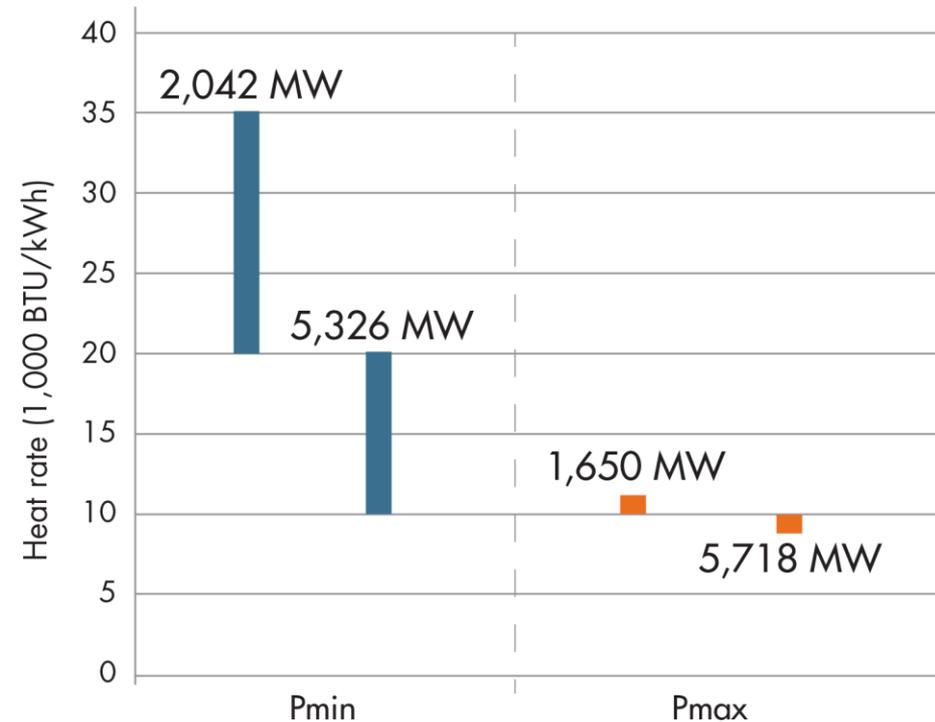


**Caveat**

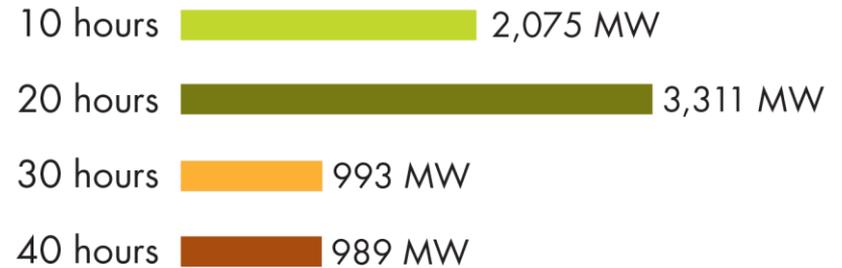
Map does not reflect 2,200 MW of OTC capacity in LADWP's balancing authority area.

# Southern CA OTC Gas-Fired Generator Characteristics

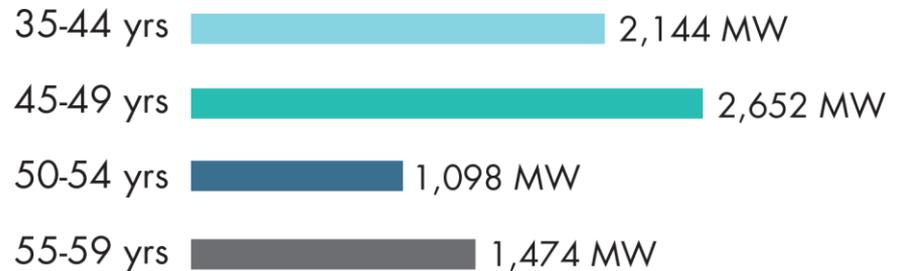
## Heat rates



## Start up times



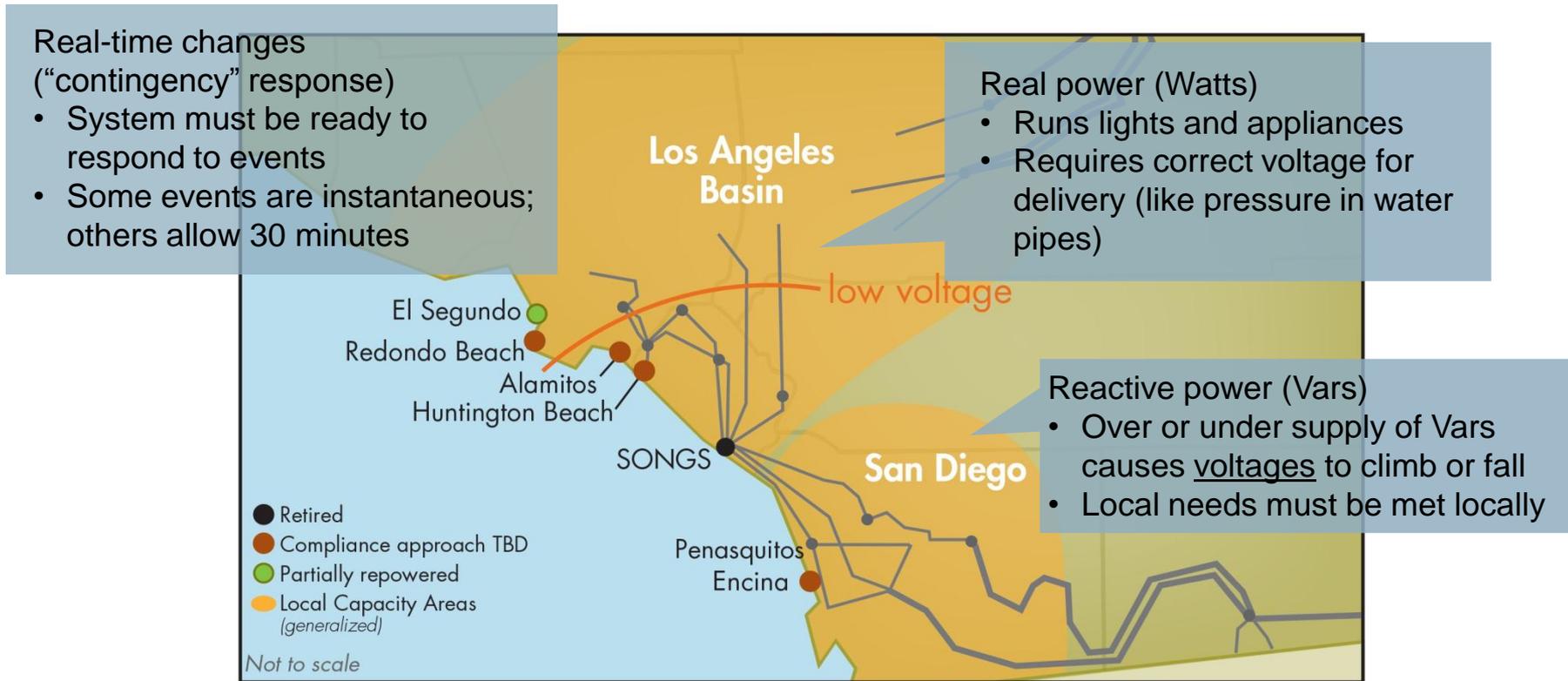
## Age



2012 Annual Capacity Factors: 1-27% (Average 9%)

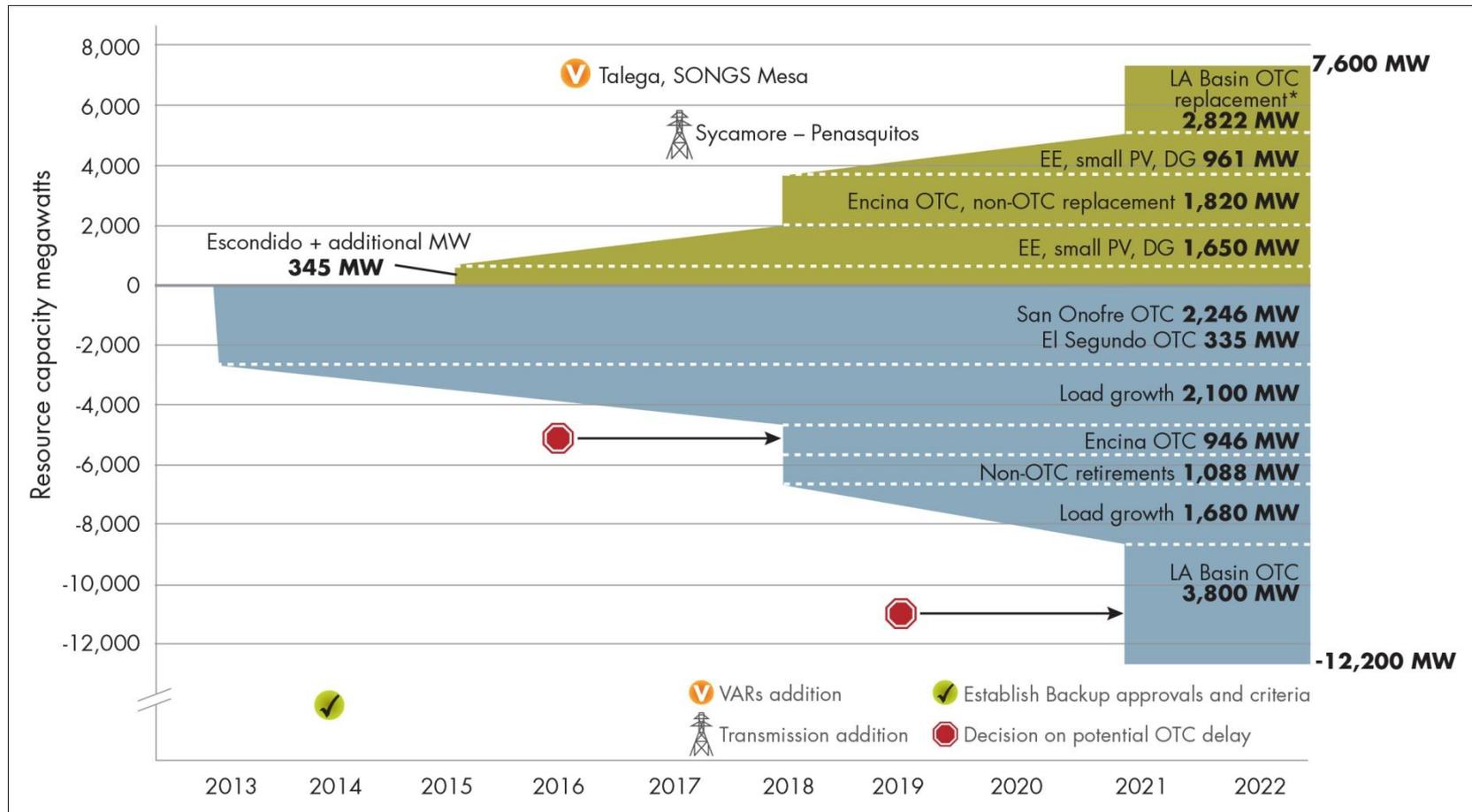
2012 Summer (June – September) Capacity Factors: 1-40% (Average 12%)

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



- 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

# Expected resource needs and potential solutions



Total load in LA Basin & San Diego:  
 2018 = 27,500 MW  
 2022 = 29,000 MW

\*1,800 MW authorized

- May include additional preferred resources
- Transmission could further reduce need

# Success requires a multi-faceted approach

- Commitment to Preferred Resources
- Timely License Decisions to Replace Once-Through Cooling Capacity
- Extend ISO reliability contract for Huntington Beach Synchronous Condensers
- Implement a multi-year auction to assist in procurement of Demand Response and Energy Efficiency
- Contingency Approach to Once-Through Cooling Compliance Dates

# OTC Policy and Grid Reliability – Short Term Emergency

- 90 days or less
  - ISO written request, if no objection by CEC or CPUC, compliance suspended for up to 90 days
- Greater than 90 days
  - ISO written request, if no objection by CEC or CPUC, compliance suspended 90 days
  - State Board must hold a hearing within the 90 days to determine whether to suspend compliance for greater than 90 days

# OTC Policy and Grid Reliability – Non-Emergency Extensions

- Statewide Advisory Committee on Cooling Water Intake Structures (SACCWIS)
  - SACCWIS reviews Implementation plans
  - SACCWIS reports to State Board on any recommended changes in compliance dates
- State Board shall consider SACCWIS recommendations
  - Direct staff to make modifications, if appropriate
  - State Board shall afford unanimous recommendations from the energy agencies significant weight

# Questions

