



Once-Through Cooling Phaseout

California is addressing environmental quality concerns by phasing out the use of once-through cooling (OTC) technology at coastal power plants that use marine water for cooling. The California Independent System Operator (California ISO), California Energy Commission (Energy Commission), and California Public Utilities Commission (CPUC) worked closely with the State Water Resources Control Board (SWRCB) to develop a policy to achieve water quality goals while ensuring electricity grid reliability. (See the sidebar for more details.)

When enacted in 2010, the OTC phaseout regulation affected 19 California power plants. Of those, 16 power plants totaling about 18,000 megawatts (MW) were in the California ISO balancing authority area, and 3 (about 2,600 MW) were in the Los Angeles Department of Water & Power (LADWP) balancing area. The use of OTC has been phased out from 10 power plants representing 10,400 MW. The retirement of OTC power plants with 6,300 MW of capacity is expected by 2020, and the remaining 3,800 MW are expected to retire by 2029. See **Figure 1**.

Coordinating Energy and Environmental Policy

The policy recognizes that some of these power plants are critical for system and local energy reliability. Some may also provide operational services (such as flexible capacity requirements, ramping to follow net load, and regulation) needed to integrate renewable resources. Owners that plan to repower their plants face additional regulatory challenges due to the lack of air credits required for new facilities or major changes to existing facilities in one or more of the air basins. To assure effective communication among the state’s energy and environmental agencies concerning the role of these plants in ensuring reliability, the OTC policy created a permanent advisory body – the Statewide Advisory Committee on Cooling Water Intake Structures (SACCWIS)¹ – that is scheduled to report annually to the SWRCB. A principal function of SACCWIS is to provide

Development of California’s Once-Through Cooling Policy

The Clean Water Act requires the U.S. Environmental Protection Agency to ensure that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impacts. While states have enforced this requirement on a case-by-case basis since 1972, California developed a clearer, more prescriptive rule.

In March 2008, the State Water Resources Control Board (SWRCB) first described a California regulatory approach when it published a scoping document titled *Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling* to implement Section 316(b) of the Clean Water Act, 33 U.S.C. § 1326(b).

On May 4, 2010, the SWRCB approved an OTC policy that included many grid reliability recommendations made by California ISO, as well as a joint implementation proposal developed by the Energy Commission, CPUC, and California ISO. The policy came into effect as a regulation on October 1, 2010.

In 2014, the United States Environmental Protection Agency issued its own OTC regulations, but these do not appear to exceed the regulations already enacted by the SWRCB.

¹ SACCWIS includes seven organizations: California ISO, Energy Commission, CPUC, California Coastal Commission, State Lands Commission, California Air Resources Board, and SWRCB.



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recommendations to the SWRCB if the member agencies believe a delay in compliance is needed to assure reliability. Recognizing the unique circumstances of the two nuclear power plants in California that were using OTC technologies (now only one), the OTC policy also established a second advisory body – the Review Committee for Nuclear Fueled Power Plants (RCNFPP) – to refine the cost estimates for the nuclear power plants to satisfy the policy.

Figure 1: Map of Once-Through Cooling Facilities



Source: California Energy Commission staff



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OTC Phaseout Status Tracks

The OTC policy determined that closed-cycle evaporative cooling was the best available technology and established this as a benchmark for two compliance tracks.

Track 1: Reduce the intake flow rate at each power-generating unit to a level that can be attained with a closed-cycle evaporative cooling system.² A minimum of 93 percent reduction is required compared to the design intake flow rate.

Track 2: If compliance with Track 1 is not feasible, reduce the impingement mortality and entrainment³ for the plant as a whole to 90 percent of Track 1 reductions, using operational or structural controls, or both.

Alternatively, a plant can comply by shutting down.

Recent Power Production Patterns of OTC Facilities

Over decades, the OTC plants have changed power production patterns from baseload units to load-following or peaking units, but the reality is more nuanced. **Tables 1 and 2** provide annual capacity factors for the natural gas-fired OTC plants still in service in the California ISO and LADWP balancing authority areas, respectively, for 2014 to 2018. Unit-specific and cumulative (total amount for all units added together) capacity and capacity factors are provided.

² A closed-cycle evaporative cooling system refers to a cooling system that transfers waste heat to the surrounding air through the evaporation of water, thus enabling the reuse of a smaller amount of water several times to achieve the desired cooling effect. The only discharge of wastewater is from periodic blowdown to limit the buildup of materials in excess of desirable limits by best engineering practice.

³ Most power plants that obtain cooling water from surface water sources use some method of primary screening to prevent large objects from being drawn through the cooling system, where they may clog or damage sensitive equipment. These screens typically have mesh panels with slot sizes ranging from 3/8 inch to 1 inch and are rotated periodically or removed to clean any debris, including aquatic organisms. *Impingement* occurs when organisms are trapped against the screen as a result of the force of the intake water and are unable to escape. *Entrainment* is the action of drawing smaller objects through the entire cooling water system, including the pumps and condenser tubes, and discharging them along with the cooling water and other plant wastes.



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Table 1: Annual Capacity Factors for Natural Gas OTC Units in the California ISO Balancing Authority Area, 2014 to 2018

Units	SWRCB Compliance Date	Unit Capacity	ANNUAL CAPACITY FACTORS				
			2014	2015	2016	2017	2018
Alamitos Unit 1	12/31/2020	175	1.4%	3.0%	2.0%	2.7%	2.1%
Alamitos Unit 2	12/31/2020	175	5.4%	6.1%	3.4%	4.2%	5.7%
Alamitos Unit 3	12/31/2020	326	16.6%	10.8%	10.4%	6.7%	10.1%
Alamitos Unit 4	12/31/2020	324	18.7%	7.0%	9.9%	8.8%	9.6%
Alamitos Unit 5	12/31/2020	485	1.7%	3.4%	1.9%	3.1%	2.9%
Alamitos Unit 6	12/31/2020	485	4.5%	6.2%	2.7%	4.2%	3.6%
Alamitos Units 1-6	12/31/2020	1,970	7.9%	6.1%	5.0%	5.0%	5.7%
Encina Unit 1	12/31/2018	107	2.0%	4.0%	1.2%	Retired 4/18/17	
Encina Unit 2	12/31/2018	104	2.6%	5.1%	1.4%	2.7%	2.4%
Encina Unit 3	12/31/2018	110	4.7%	5.3%	1.6%	3.6%	2.7%
Encina Unit 4	12/31/2018	300	6.3%	8.2%	3.2%	7.4%	4.0%
Encina Unit 5	12/31/2018	330	9.9%	10.4%	5.6%	7.4%	5.0%
Encina Units 1-5	12/31/2018	951	6.5%	7.8%	3.4%	5.6%	3.5%
Huntington Beach Unit 1	12/31/2020	215	22.3%	19.0%	13.3%	12.7%	9.8%
Huntington Beach Unit 2	12/31/2020	215	26.2%	19.4%	12.4%	9.0%	7.0%
Huntington Beach Units 1-2	12/31/2020	430	24.2%	19.2%	12.9%	10.9%	8.4%
Moss Landing Unit 1	12/31/2020	540	39.2%	35.5%	24.6%	24.7%	44.6%
Moss Landing Unit 2	12/31/2020	540	47.0%	37.0%	26.1%	24.8%	43.5%
Moss Landing Units 1, 2	12/31/2020	2,484	43.1%	36.2%	25.3%	24.8%	44.1%
Ormond Beach Unit 1	12/31/2020	806	0.8%	2.5%	0.7%	1.6%	1.3%
Ormond Beach Unit 2	12/31/2020	806	2.4%	3.2%	0.8%	1.7%	1.3%
Ormond Beach Units 1-2	12/31/2020	1,612	1.6%	2.9%	0.7	1.7%	1.3%
Redondo Beach Unit 5	12/31/2020	179	2.3%	3.5%	1.4%	2.5%	2.0%
Redondo Beach Unit 6	12/31/2020	175	2.1%	4.2%	3.1%	4.2%	1.7%
Redondo Beach Unit 7	12/31/2020	505	0.9%	4.5%	4.0%	5.4%	2.2%
Redondo Beach Unit 8	12/31/2020	496	3.3%	3.9%	1.7%	4.0%	2.8%
Redondo Beach Units 5-8	12/31/2020	1,355	2.1%	4.1%	2.7%	4.3%	2.2%

Source: California Energy Commission staff



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Table 2: Annual Capacity Factors for Natural Gas OTC Units in the LADWP Balancing Authority Area, 2014 to 2018

Units	SWRCB Compliance Date	Unit Capacity	ANNUAL CAPACITY FACTORS				
			2014	2015	2016	2017	2018
Harbor 5	12/31/2029	75	3.3%	2.4%	2.9%	2.0%	1.0%
Haynes Unit 1	12/31/2029	230	12.7%	6.5%	12.8%	3.4%	1.6%
Haynes Unit 2	12/31/2029	230	13.1%	8.0%	12.7%	5.3%	1.1%
Haynes Unit 8	12/31/2029	264	34.2%	38.0%	39.0%	39.6%	45.4%
Haynes Units 1, 2, 8	12/31/2029	724	20.7%	18.5%	22.3%	17.2%	16.1%
Scattergood Unit 1	12/31/2024	163	22.2%	7.6%	21.5%	4.8%	4.5%
Scattergood Unit 2	12/31/2024	163	5.8%	18.9%	4.0%	1.9%	2.4%
Scattergood Units 1, 2	12/31/2024	326	14.0%	13.3%	12.7%	3.3%	3.4%

Source: California Energy Commission staff

Although the annual capacity factors shown in **Tables 1 and 2** suggest relatively little use for most of these OTC facilities across the year, many of them operate at full capacity at some point in many months of these years. For example, Ormond Beach Unit 1 and Unit 2 ran at full capacity only on peak days during the summer months July through August 2018. This reflects the usage of these plants as part of a complex system that the two balancing authorities manage to best serve the requirements of the overall grid within each area.

Status of OTC Facility Compliance

The original regulatory compliance dates range from 2010 to 2024. In July 2011, LADWP obtained the SWRCB’s consent to delay compliance for Scattergood Units 1 and 2 until 2024 and Harbor Unit 5 and Haynes Units 1, 2, and 8 until 2029. In return, LADWP agreed to exceed the ocean water best available control technology embodied in the OTC policy by eliminating the use of ocean water for its repowered plants.

Several generating companies contested the SWRCB OTC policy in court, but a settlement was reached between the SWRCB and the current owners of the power plants in fall 2014. In this settlement, the Moss Landing compliance dates were pushed back to December 31, 2020 (Moss Landing Units 5 and 6 were retired in 2016), and the SWRCB agreed to several specific implementation constraints for the Pittsburg, Mandalay, and Ormond Beach facilities. (The Pittsburg and Mandalay power plants have since retired.)

Below is a review of the compliance dates for each power plant, as reflected in the adopted policy or formally approved amendments, as well as information about compliance proposals from generator owners. Within the policy itself, generator owners have options for compliance and can



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petition the SWRCB for changes in compliance dates. Also provided below is information about the recommendations SACCWIS made to the SWRCB for compliance date changes needed to assure electric system reliability.

Facility Owner Plans

The owners of each power plant were required to submit an implementation plan by April 1, 2011. In these plans, the owners indicated whether they proposed to follow Track 1 or Track 2, or shut down the plant. SWRCB staff, with assistance from the technical staff of the SACCWIS agencies, submitted letters seeking clarifications of the original implementation plans and, in some cases, sought further clarification as new issues surfaced. In initial implementation plans, no facility owner proposed Track 1, and many proposed Track 2 if power purchase agreements justifying the investment in retrofit costs could be secured. As a rule, most of the owners of fossil-fueled generating facilities, except for Dynegy – Moss Landing, have abandoned plans to pursue Track 2 and have announced retirement plans.

For the nuclear power plants in California with OTC technologies, one is retired, and the second is scheduled to be retired. In January 2012, the San Onofre Nuclear Generating Station (San Onofre) was shut down for steam generator tube leaks, which the owners later determined to be too costly to repair. Southern California Edison announced the permanent retirement of San Onofre in June 2013. In August 2016, PG&E submitted a joint proposal⁴ to the CPUC to retire the Diablo Canyon Power Plant when its nuclear regulatory license expires. PG&E joined with labor, leading environmental organizations, and a community-based nuclear safety advocacy group⁵ to develop the proposal to phase out nuclear power in California in 2024 and 2025. The Diablo Canyon Nuclear Regulatory Commission (NRC) license expires November 2, 2024, and August 26, 2025, for Units 1 and 2, respectively, while the OTC compliance date is December 31, 2024, for both units. In Decision 18-01-022, the CPUC approved the retirement of Diablo Canyon nuclear power plant at the end of its federal NRC operating licenses.⁶ PG&E's implementation plan would require an extension of the OTC compliance date for Unit 2. Per the joint proposal, PG&E will ask the SWRCB for an amendment to the OTC policy to conform the compliance date

4 See <http://www.pge.com/includes/docs/pdfs/safety/dcpp/diablo-canyon-retirement-joint-proposal-application.pdf>.

5 The joint parties include PG&E, the Natural Resources Defense Council, Friends of the Earth, Environment California, International Brotherhood of Electrical Workers (IBEW) Local 1245, Coalition of California Utility Employees, and the Alliance for Nuclear Responsibility.

6 CPUC Decision 18-01-022 available at <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M205/K423/205423920.PDF>. Senate Bill 1090 (Monning, Chapter 561, Statutes of 2018) was passed to modify the terms of CPUC Decision 18-01-022, which approved funding for the community impact mitigation settlement and for the employee retention program that PG&E proposed in an application to the CPUC. The bill requires the CPUC to ensure that integrated resource plans avoid any increase in emissions of greenhouse gases because of Diablo Canyon's retirement. CPUC Decision 18-11-024 implements Senate Bill 1090 and modifies CPUC Decision 18-01-022. CPUC Decision 18-11-024 is available at <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M246/K081/246081285.PDF>.



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to the date of actual expiration of the Unit 2 NRC operating license. Although PG&E has not yet made this request to the SWRCB, there is sufficient time to do so.

The information shown in **Table 3** is from the original April 2011 filings of owner implementation plans, any subsequent revisions, and other statements of intent to retire facilities, if applicable. This table shows each power plant and unit, the existing net qualifying capacity (NQC),⁷ the mandated compliance date, and the owner-proposed method and date of compliance. The power plants are listed in order of SWRCB compliance date.

Table 3: OTC Implementation Schedules – Adopted and Owner-Proposed

Facility & Units	NQC	SWRCB Compliance Date	Owner Proposed Compliance Method/Date
Humboldt Bay 1, 2	135	Dec. 31, 2010	Retired Sept. 30, 2010
Potrero 3	206	Oct. 1, 2011	Retired Feb. 28, 2011
South Bay	296	Dec. 31, 2011	Retired Dec. 31, 2010
Haynes 5,6	535	Dec. 31, 2013	Repowered as air cooled June 1, 2013
El Segundo 3	335	Dec. 31, 2015	Repowered as air cooled July 27, 2013
El Segundo 4	335	Dec. 31, 2015	Retired Dec. 31, 2015
Morro Bay 3, 4	650	Dec. 31, 2015	Retired Feb. 5, 2014
Scattergood 3	450	Dec. 31, 2015	Repowered as air cooled.in 2015.
Encina 1	106	Dec. 31, 2017	Retired March 1, 2017
Contra Costa 6, 7	674	Dec. 31, 2017	Retired April 30, 2013 ⁸
Pittsburg 5,6,7	1,307	Dec. 31, 2017	Retired Dec. 31, 2016 ⁹
Encina 2, 3, 4, 5	840	Dec. 31, 2018	Retired Dec. 11, 2018
Moss Landing 1, 2	1,020	Dec. 31, 2020	Settlement defers compliance to Dec. 31, 2020 ¹⁰
Moss Landing 6, 7	1,510	Dec. 31, 2020	Retired Dec. 31, 2016
Huntington Beach 1, 2	452	Dec. 31, 2020	Plans to retire HB 1 on Dec. 31, 2019 and HB 2 on Dec. 31, 2020 ¹¹
Huntington Beach 3, 4	452	Dec. 31, 2020	Retired Nov. 1, 2012
Redondo Beach 7	493	Dec. 31, 2020	Plans to retire on Oct. 1, 2019, to allow Huntington Beach to be repowered ¹²
Redondo Beach 5, 6, 8	850	Dec. 31, 2020	Plans to retire by Dec. 31, 2020
Alamitos 1, 2, 6	848	Dec. 31, 2020	Plans to retire on Dec. 31, 2019 ¹³ to allow Alamitos to be repowered.
Alamitos 3, 4, 5	1,163	Dec. 31, 2020	Plans to retire on Dec. 31, 2020
Mandalay 1, 2	430	Dec. 31, 2020	Retired February 5, 2018

⁷ *Net qualifying capacity* is the concept used to describe the capacity from each resource that can be used by a load-serving entity to satisfy its overall obligation. Most technologies have a single value, such as dependable capacity, used year-round. Some technologies (wind and solar without backup) have monthly NQC values reflecting the variability in performance using historical data.

⁸ Although NRG retired Contra Costa 6-7, the Marsh Landing facility was constructed beside it.

⁹ Unit 7 (682 MW) cannot operate independently of Units 5 and 6.

¹⁰ Dynegy/SWRCB Settlement Agreement, http://www.swrcb.ca.gov/water_issues/programs/ocean/cwa316/docs/energy_comp/settlement_dynegy_2014.pdf.

¹¹ AES Huntington Beach, letter to SWRCB, November 8, 2018.

¹² AES Redondo Beach, letter to SWRCB, November 8, 2018.

¹³ AES Alamitos, letter to SWRCB, November 8, 2018.



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Ormond Beach 1, 2	1,516	Dec. 31, 2020	Plans to retire by Dec. 31, 2020
San Onofre 2, 3	2,246	Dec. 31, 2022	Retired June 7, 2013 ¹⁴
Scattergood 1, 2	367	Dec. 31, 2024	Plans to repower by Dec. 31, 2024 ¹⁵
Diablo Canyon 1, 2	2,240	Dec. 31, 2024	Plans to retire Unit 1 on Nov. 2, 2024 and Unit 2 on Aug. 26, 2025 ¹⁶
Haynes 1, 2	444	Dec. 31, 2029	Plans to repower by Dec. 31, 2025 ¹⁷
Harbor 5	229	Dec. 31, 2029	Plans to repower by Dec. 31, 2029 ¹⁸
Haynes 8	575	Dec. 31, 2029	Plans to repower by Dec. 31, 2028

Source: California Energy Commission staff

SACCWIS Analysis From 2013 to Date

In early September 2013, the CPUC, Energy Commission, California ISO staff, and other SACCWIS member agencies put forward a preliminary reliability plan, and the Energy Commission conducted a workshop as part of the *2013 Integrated Energy Policy Report* to review it.¹⁹ The plan includes the opportunity for the energy agencies to request deferral of compliance dates for specific units if the primary mechanisms for assuring reliability (increased use of preferred resources, transmission system upgrades, and flexible gas-fired resource additions) fail to develop on schedule or at the level anticipated. In March 2014, the CPUC adopted a decision authorizing a combination of preferred resource development (energy efficiency, demand response,²⁰ fuel cells, renewable distributed generation [power generation at the point of

14 Although both San Onofre units ceased generation by January 31, 2012, they draw limited amounts of ocean water to cool nuclear fuel rods and other “hot” equipment. According to an SCE report to the SWRCB dated November 27, 2013, the combination of Units 2 and 3 is now drawing water at about 4 percent of normal power flow rates. The report says that San Onofre will continue to draw ocean water throughout the decommissioning, but not above Track 1 compliance levels.

http://www.waterboards.ca.gov/water_issues/programs/ocean/cwa316/powerplants/san_onofre/docs/sce_112713.pdf. San Onofre has reduced water intake below 93 percent of normal power flow rates, and therefore, complies with Track 1 of the OTC policy.

15 LADWP is revising its repowering plans in light of Los Angeles Mayor Eric Garcetti’s statement that LADWP will not repower its OTC plants at Scattergood, Harbor, and Haynes and will phase out natural gas operations by 2029 and move toward 100 percent clean energy. <https://www.lamayor.org/mayor-garcetti-ladwp-will-phase-out-natural-gas-operations-three-power-plants>.

16 CPUC Decision 18-01-022 approving the retirement of the Diablo Canyon nuclear power plant, <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M205/K423/205423920.PDF>.

17 LADWP informed the Energy Commission in comments on the *2017 Integrated Energy Policy Report* of revisions to its OTC compliance dates based on an ongoing OTC study. See http://docketpublic.energy.ca.gov/PublicDocuments/17-IEPR-01/TN221735_20171113T143301_Ramon_D_Gamez_Comments_LADWP's_Comments_to_DRAFT_2017_IEPR_and.pdf.

18 The original OTC policy didn’t specify which Harbor or Haynes units were under the policy. The amendment for LADWP specified that the policy applies only to Harbor Unit 5 and Haynes Unit 8. Harbor 5 and Haynes 8 are combined-cycle units. Although only the heat recovery steam generator uses OTC technology, it is unclear whether LADWP will repower just that portion or replace the combustion turbines.

19 http://www.energy.ca.gov/2013_energypolicy/documents/#09092013.

20 Demand response programs are designed to shift end-use customers’ consumption patterns by altering the timing, level of instantaneous demand, or total electricity consumption.



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consumption], combined heat and power, and so forth)²¹ and gas-fired procurement by the affected utilities.²² Subsequently, San Diego Gas & Electric and Southern California Edison have submitted specific power purchase agreements to the CPUC for review and approval under the procurement authority provided to them.²³ The CPUC has approved most of the power purchase agreements.²⁴ These power purchase agreements allow the retirement of steam-boiler units using OTC technology with new air-cooled, gas turbine technologies at several OTC facilities.²⁵ At most, OTC power plants, the new generating capacity being built is less than the OTC capacity being retired. Preferred resources (energy efficiency, distributed generation, demand response, and storage) are being developed to serve some of the capacity needs once provided by legacy OTC units. Appropriate amounts of replacement capacity must be in place before the associated OTC plant can be retired. In adopting the *2013-2014 Transmission Plan*,²⁶ the California ISO board approved several additional transmission system upgrades to reduce local capacity requirements.²⁷ Two of the projects have come on-line, and the last project is under construction. If any of the resources or transmission system upgrades fail to develop on schedule or at the level anticipated, a compliance date extension may be necessary.

The energy agencies are using the SACCWIS process to communicate the need for compliance date changes to the SWRCB. In August 2016, the Energy Commission published the staff report *Mitigation Options for Contingencies Threatening Southern California Electric Reliability*,²⁸ which included the OTC deferral process as a mitigation option. The SWRCB approved extending the compliance date for Encina Units 2-5 until December 31, 2018, due to the delay of its replacement project, Carlsbad Energy Center. Encina was retired December 11, 2018.

The Energy Commission approved the Alamitos application for certification and Huntington Beach petition to amend certifications on April 12, 2017, and the projects are under construction and on track to be on-line in 2020 to allow the existing OTC generating units to retire.

21 Fuel cells and combined heat and power plants can be environmentally desirable resources under some but not all circumstances. These technologies are preferred in situations where fuel source and efficiency characteristics of the power plant have a lower environmental impact than conventional power plants.

22 <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M089/K008/89008104.PDF>.

23 CPUC D.14-03-004.

24 CPUC D.15-05-051, CPUC D.15-11-041, and CPUC D.16-05-050. In D.15-11-041, the CPUC approved all of Southern California Edison's power purchase agreements in Greater Los Angeles Area except for 70 MW of demand response. These six demand response contracts were denied based on not meeting the definition of preferred resources and excessive costs.

25 Power purchase agreements have been approved to replace capacity at Alamitos, Huntington Beach, Encina, and Mandalay OTC facilities.

26 http://www.caiso.com/Documents/Board-Approved2013-2014TransmissionPlan_July162014.pdf.

27 <http://www.caiso.com/Documents/DecisionTransmissionPlan-Presentation-Mar2014.pdf>.

28 http://docketpublic.energy.ca.gov/PublicDocuments/16-IEPR-06/TN212836_20160818T131005_Staff_Report_Mitigation_Options_for_Contingencies_Threatening_S.pdf.



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The Puente application for certification (the proposed replacement project for Mandalay) was withdrawn on December 7, 2018. As an alternative to the Puente project, the California ISO's *2017-2018 Transmission Plan*²⁹ recommended approval of a transmission project in conjunction with preferred resources to meet the reliability needs in the Moorpark and Santa Clara subareas and allow Mandalay and Ormond Beach to retire. Mandalay was retired on February 6, 2018. The California ISO's *2019 Local Capacity Technical Analysis*³⁰ showed that Ormond Beach was required to meet reliability needs. The CPUC directed SCE to contract with Ormond Beach until a transmission project is in service on December 31, 2020. The CPUC approved a contract for January 1, 2019, to November 30, 2019, on September 26, 2018, and approved the contract extension through December 31, 2020, on March 28, 2019. Ormond Beach operators intend to retire the power plant by the associated compliance date with no further operations.

The Mesa Loop-in substation project in the Western Los Angeles Basin local capacity area is delayed and is being monitored closely to ensure grid reliability in the Western Los Angeles Basin area. In its Securities and Exchange Commission 10Q filing and Federal Regulatory Commission Form 730, SCE forecasts an in-service delay from June 1, 2021, to March 2022. The California ISO is conducting a 2021 local capacity technical analysis to determine if the Alamitos or Redondo Beach OTC compliance date needs to be extended beyond December 31, 2020, to ensure reliability. The study is expected to be complete by summer 2019.

In the draft *2019 Report of the Statewide Advisory Committee on Cooling Water Intake Structures*,³¹ SACCWIS does not recommend any change to the compliance schedule in the OTC Policy for the generating facilities.

Implication of Owner Compliance Plans and Actual Operations on Power Plant Water Use

Figure 2 shows expected progress toward the goal of the OTC policy – reduction in the inflow of ocean and estuarine water for power plant cooling – assuming plants fully use cooling water inflows as designed.³² The two upper lines show the design flow rates of the OTC fleet included within the OTC policy adopted in May 2010. The uppermost (blue) line shows the reduction in design water flow based on the OTC policy compliance schedule as adopted (and amended) by the SWRCB. The green line shows the aggregate, or combined, water flow using design flow rates for the actual and expected retirement dates based on OTC owner implementation plans or other plans known to the SACCWIS agencies. The short red line is an estimate of actual flows for the OTC fleet. The red line is far below the two upper lines because virtually all fossil fuel OTC plants are operating with annual capacity factors far below power plant permit expectations (the source of the design condition flow rates). **Table 1 and Table 2** show that most fossil fuel OTC

²⁹ http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf.

³⁰ <http://www.caiso.com/Documents/Final2019LocalCapacityTechnicalReport.pdf>.

³¹ https://www.waterboards.ca.gov/water_issues/programs/ocean/cwa316/saccwis/docs/dft_2019_rpt_saccwis.pdf.

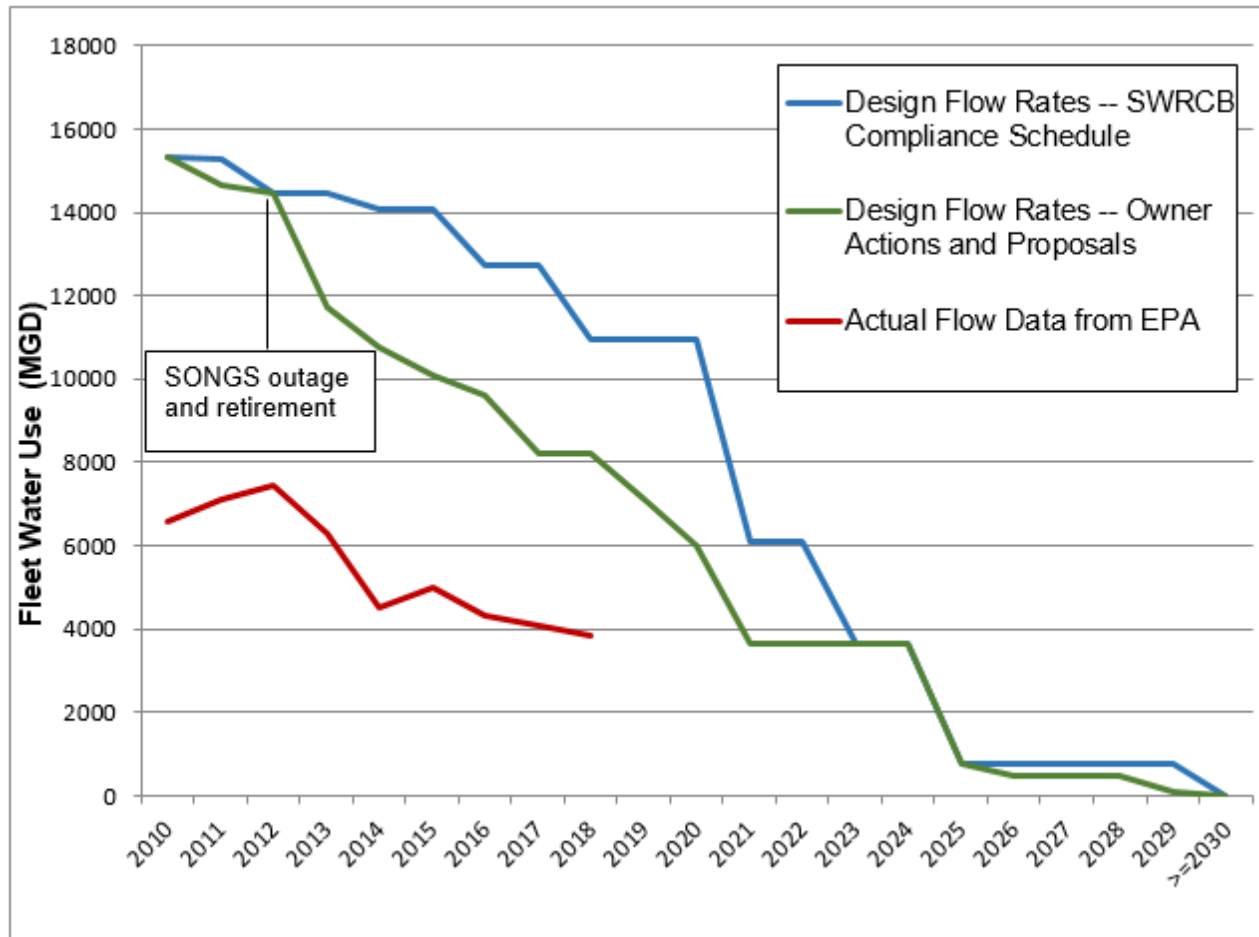
³² Although most plants use less water in an actual operating year than expected under design conditions, data about actual water use are incomplete, and some available data appear to be inaccurate.



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plants are operating at extremely low annual capacity factors. In addition, San Onofre and some OTC facilities have retired well before the respective OTC compliance dates, thus creating accelerated environmental benefits compared to the OTC policy. All the owners' latest implementation schedules show compliance with the OTC policy.

Figure 2: Historical and Projected Water Use by the Combined OTC Fleet



Source: California Energy Commission staff

Additional References:

http://www.swrcb.ca.gov/water_issues/programs/ocean/cwa316/docs/policy100110.pdf.

http://www.waterboards.ca.gov/water_issues/programs/ocean/cwa316/powerplants/.

http://www.energy.ca.gov/2013_energy/policy/documents/2013-09-09_workshop/2013-08-30_prelim_plan.pdf.

<http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M089/K008/89008104.PDF>.



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http://docketpublic.energy.ca.gov/PublicDocuments/16-IEPR-06/TN212836_20160818T131005_Staff_Report_Mitigation_Options_for_Contingencies_Threatening_S.pdf.

https://www.waterboards.ca.gov/water_issues/programs/ocean/cwa316/saccwis/docs/dft_2019_report_saccwis.pdf.

<http://www.caiso.com/Documents/Board-Approved2013-2014TransmissionPlan.pdf>.

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Next Update:

As needed