



POSEIDON WATER

Diversification in a Water-Constrained World
AMWA Executive Management Conference

October 22, 2014

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CONFIDENTIAL

These are the topics that I'll try to address today

- ❖ **Seawater Desalination Process and Use**
- ❖ **Benefits and Challenges including Climate Change**
- ❖ **Water Supply Diversity Strategies and Public Private Partnerships**
- ❖ **Carlsbad Desalination Project**

DESALINATION PROCESS AND USE

“Designer water” In areas of growing water demand and limited sources of new water supply, desalination may play a role

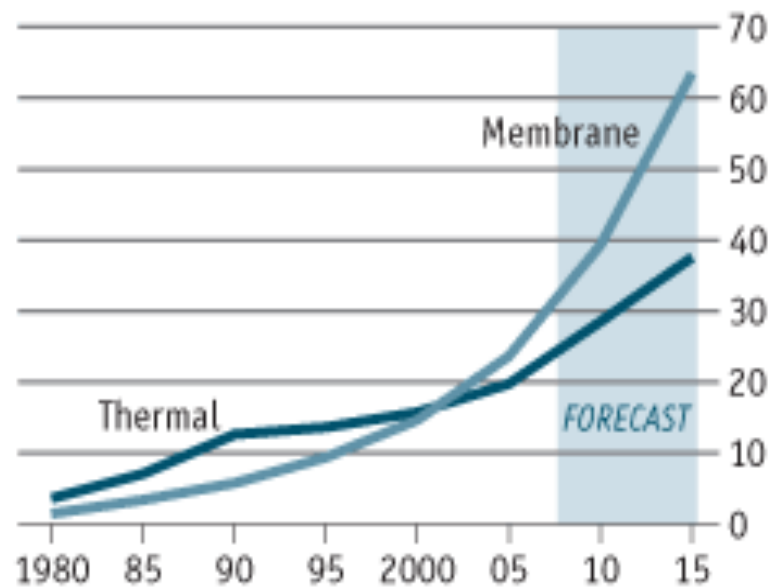


Even if you don't have experience with seawater reverse osmosis (SWRO) desalination, you probably have worked on other membrane technology projects

Membrane technology will be increasingly employed in ocean water, groundwater, and recycled wastewater treatment facilities as membrane efficiencies continue to improve.

Membrane gain

Worldwide installed desalination capacity
Millions of cubic metres per day



Source: Global Water Intelligence

America's Authority in Membrane Treatment



Improving America's Waters Through Membrane Treatment and Desalting

Focus will be on SWRO desalination

The process

From saltwater to tap water

A look at how desalination plants convert saltwater to drinkable fresh water.



Capacity of municipal desalination facilities increased 10 X from 1990 to 2010

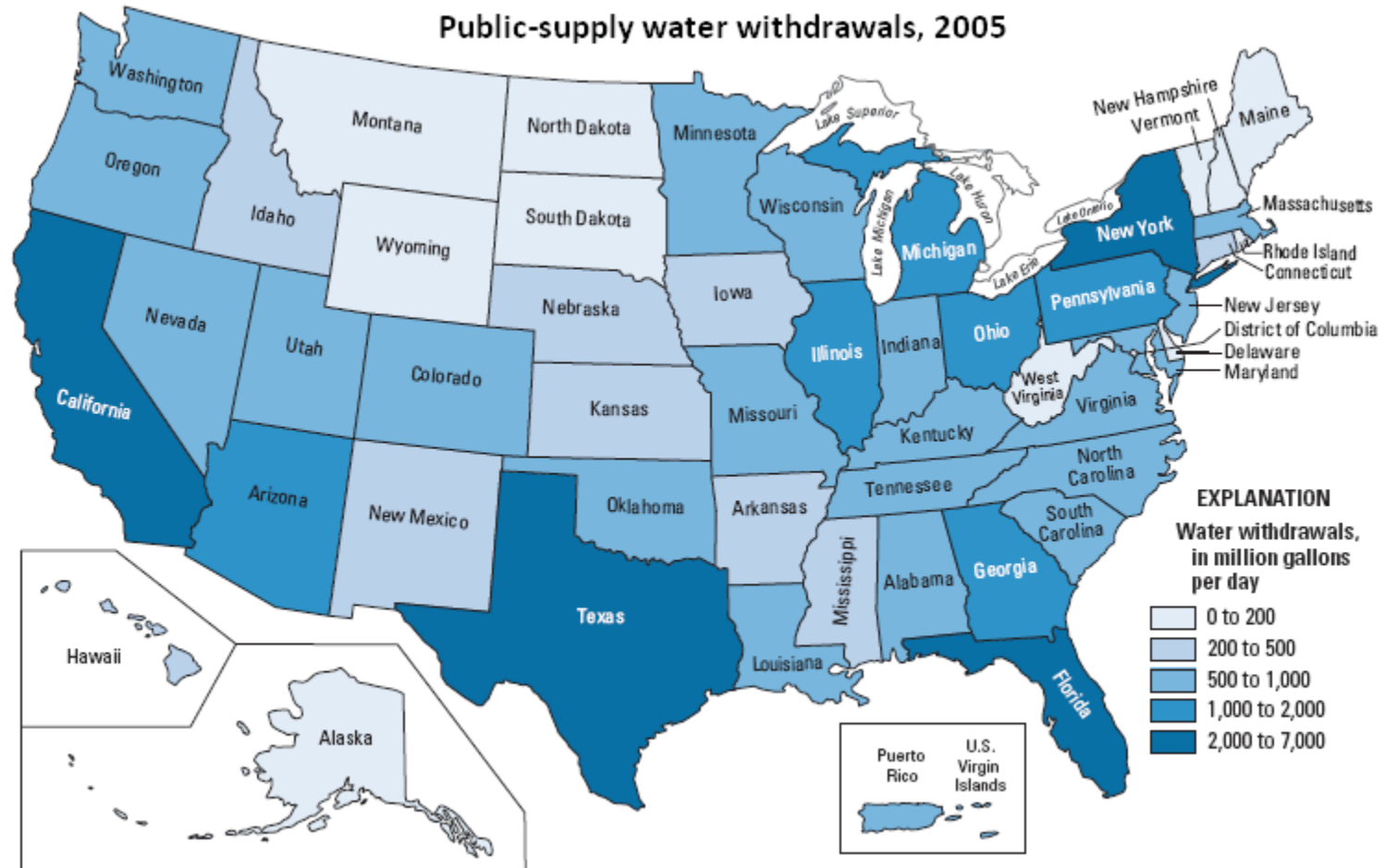
- ❖ Municipal use of desalination for saline water and wastewater treatment in the United States expanded from 1990 to 2010:

	1990	2010	% Change
Facilities	98	324	231%
Capacity	100 MGD	1,100 MGD	1,000%

- ❖ By 2010, 32 states had municipal desalination facilities.
- ❖ Florida, California, and Texas account for 68% of the municipal desalination facilities.



Coastal states with growing demands are the focus for desalination and here are that states with the highest withdrawals in 2005



Particularly with the current drought, California is counting on desal as part of the future water supply portfolio



- ❖ CA State Water Plan – 400,000 AF/Year of seawater desalination developed by 2030
- ❖ Gov. Brown’s State Water Strategy identifies desalination as one of the pillars to increase regional water self-reliance
- ❖ MWDSC – planning on 150,000 AF/Year of desalination by 2020 in Southern California (just increased incentive for local investment (including desal) to \$340 per acre-foot).

BENEFITS AND CHALLENGES INCLUDING CLIMATE CHANGE

The benefits of desal focus on reliability as part of a diversified portfolio of water supply sources

- ❖ Reliable, drought-proof, clean and safe source of water
- ❖ Diversifies water supply to reduce dependence upon rainfall and snowpack
- ❖ Limited incremental land needs that reuse existing industrial sites
- ❖ Competitive with other locally available water supply options



Desal, particularly in California, seems to have some clear challenges that create develop risks

- ❖ Energy use and indirect greenhouse gas emissions
- ❖ Marine impacts (brine discharge, intakes)
- ❖ Permitting
- ❖ Cost/financing
- ❖ Public perception- broad public support and dedicated opponents



Tell your local water agency
NO DEAL with Poseidon

Home About the cost Environment Better Choices Latest News Who We Are



\$5 Billion Dollars
To Be Added to Local Water Bills to Fund
New Private Beachfront Water Factory

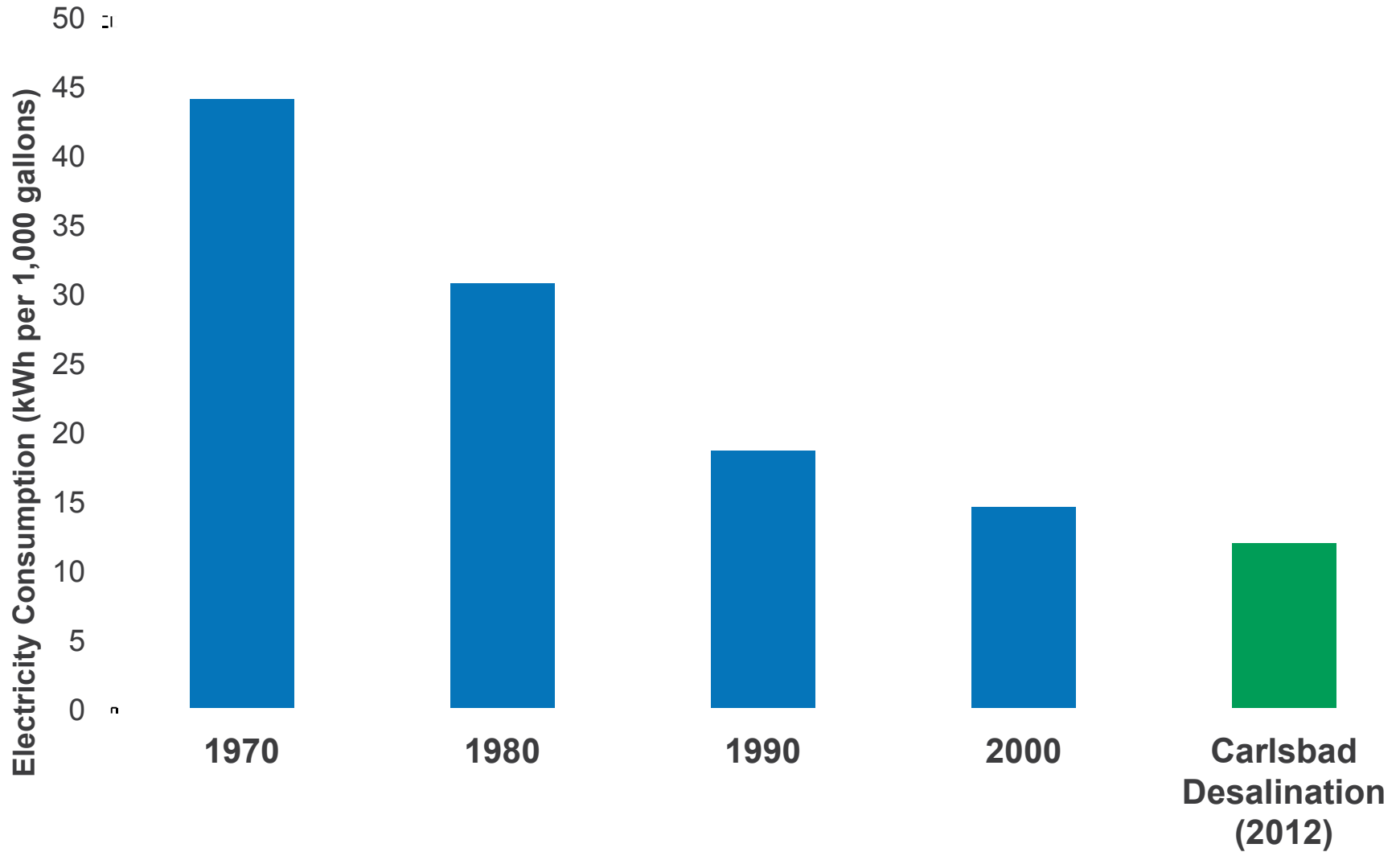
Lobbyists and public relations specialists from Poseidon Resources are working behind the scenes at local water agencies around Orange County, trying to secure long-term "Take or Pay" contracts similar to the ones they recently signed with the San Diego County Water Authority.

These deals could total \$8,500 for the average retail water customer over the next 30 years* for very expensive water that we just don't need.

Thanks for stopping by. You're probably here because a volunteer gave you one of our informational

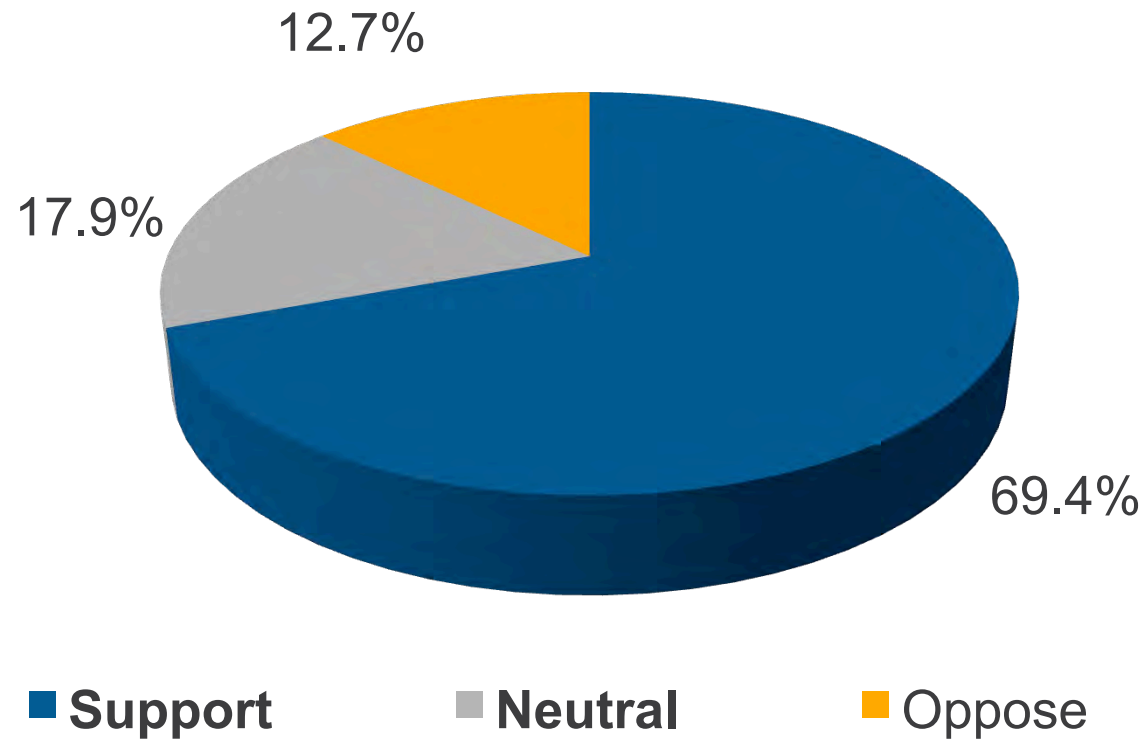
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Overall desalination energy efficiency is Improving



Poseidon has found broad public support in San Diego and Orange Counties

In general, do you support or oppose The Huntington Beach Desalination Facility?



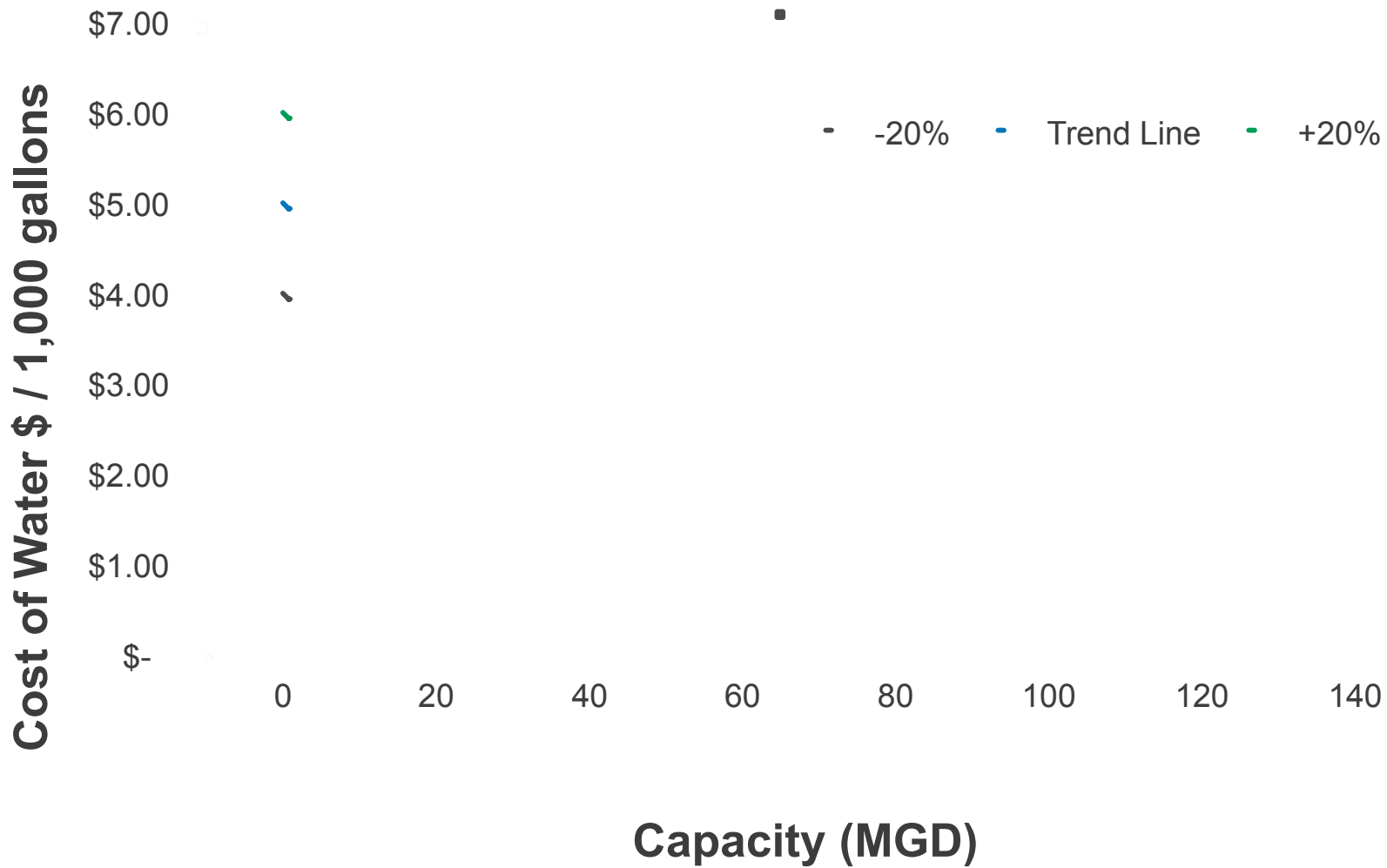
2014 Orange County Survey – 70% Support Project

Poseidon is a private sector company involved in water supply development



When you are a private company sometimes the opposition gets personal, but they haven't gone this far in depicting Poseidon's private sector status – it just seems that way

In working on the cost issue, there are scale economies for desalination plants that need to be considered



Desalination can be a climate change adaptation strategy as part of a Water Portfolio Management approach according to NACWA and AMWA

CONFRONTING CLIMATE CHANGE:

An Early Analysis of Water and Wastewater Adaptation Costs



- ❖ Climate change affects water more than any other resource.
- ❖ Adaptation portfolios feature many components ranging from conservation to new water storage and conveyance, desalination, and water reuse.

This is not the role of desalination as part of an Adaptation Portfolio



“To combat the rising sea levels we construct thousands of desalination plants to suck up the water.”

STRATEGIES

One strategy is to leverage PPP to help create resiliency

Strategy-Leverage partnerships with the private investment sector to broaden the incorporation of technologies that create more resilient water and wastewater systems.

- ❖ New assets can be designed, built, financed, operated and owned by the private entity that sells the services provided by the plant back to the public authority.
- ❖ This enables public agency to acquire expanded capacity without taking on additional debt burdens.
- ❖ The private entity takes on the risks associated with permitting, building and operating the facility.

The San Diego County Water Authority (SDCWA) saw desalination as a resource strategy

- New, local water supply
- Reduces need for imported water
- Drought-proof supply
- Improved water quality

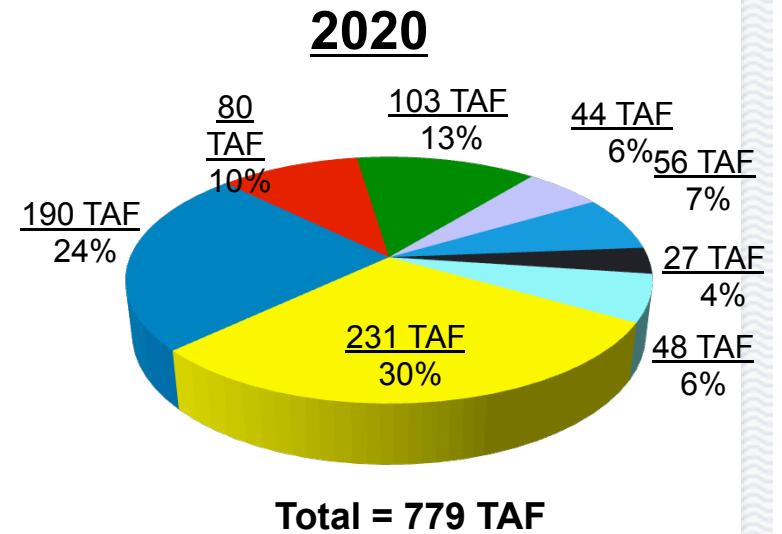
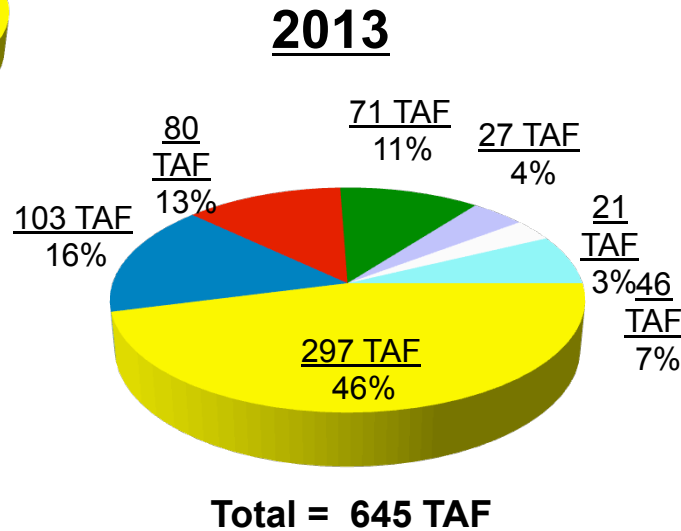
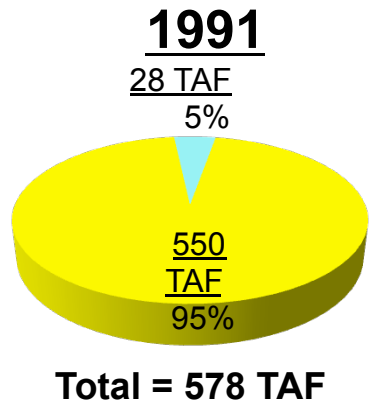
More expensive than existing imported supplies

but, cost on par with other new, local water supplies

Enhances regional supply reliability and local control



San Diego County's Water Supply Reliability through Supply Diversification is increasing



- Metropolitan Water District
- Recycled Water
- Imperial Irrigation District Transfer
- Seawater Desalination
- All American & Coachella Canal Lining
- Groundwater
- Conservation (existing and additional)
- Local Surface Water

SDCWA also focused on ratepayer protection in negotiating a Water Purchase Agreement with Poseidon

- Risk Transfer to Poseidon/Contractor team
 - Permitting
 - Design liability
 - Cost overruns
 - Operation (e.g., if the plant never operates, the Water Authority does not pay)
 - Water Authority can reject water if it does not meet water quality requirements per the WPA
- Price certainty throughout WPA term
 - Cost increases are specified
 - Electricity consumption guaranteed by Poseidon
 - Electricity price is a Water Authority risk
- Buy-out provisions after 10 years of operation
- Transfer to public ownership at the end of the 30 year agreement

CARLSBAD DESALINATION PROJECT

CNN Cities of Tomorrow

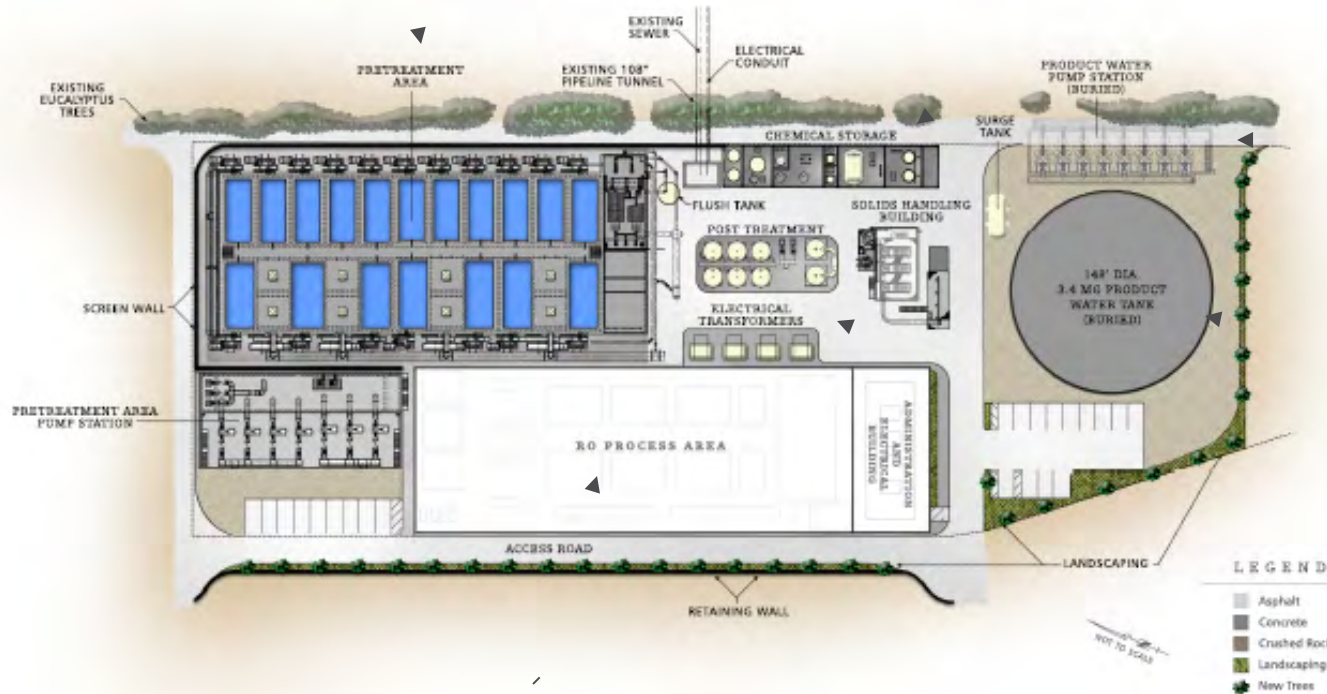


Carlsbad Plant Layout

Plant Schematic

Step 1 The pretreatment system removes the organic compounds in the seawater via gravity filtration.

Step 2 Any chlorine remaining in the filter can damage the RO membranes. To protect the RO system, filter effluent will be dechlorinated using sodium bisulfate prior to treatment.



Step 3 The RO treatment system will separate the pretreated and conditioned intake seawater in two streams: desalinated water, and concentrated seawater.

Step 6 The product water pump station pressurizes the water for delivery to SDCWA.

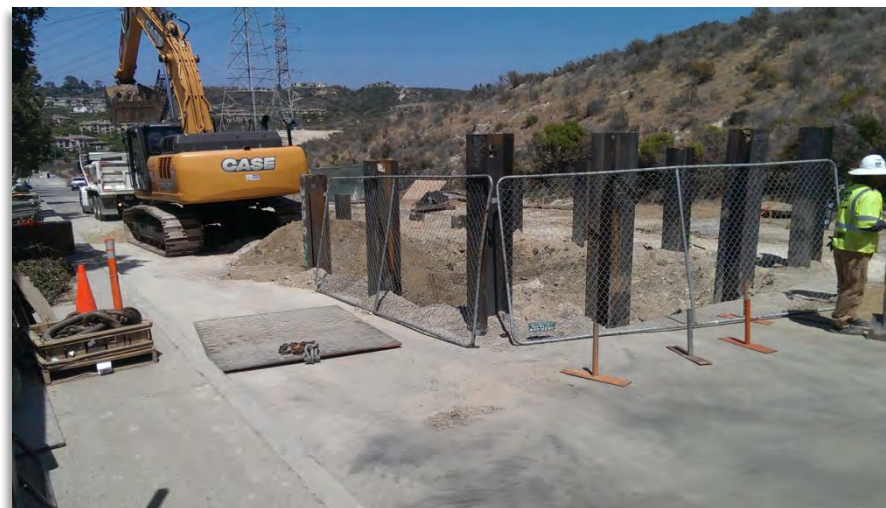
Step 5 The finished water (product water) is held in a 3.4 MG storage tank prior to delivery to SDCWA.

Step 4 Desalinated water requires chemical conditioning prior to delivery to increase hardness and reduce corrosion potential. Chlorine is also added to meet the California Department of Public Health quality standards for potable water disinfection and to control biological growth in the transmission pipeline.

Carlsbad Desalination Project Construction Flyover



Pipeline Construction: On Budget and Schedule

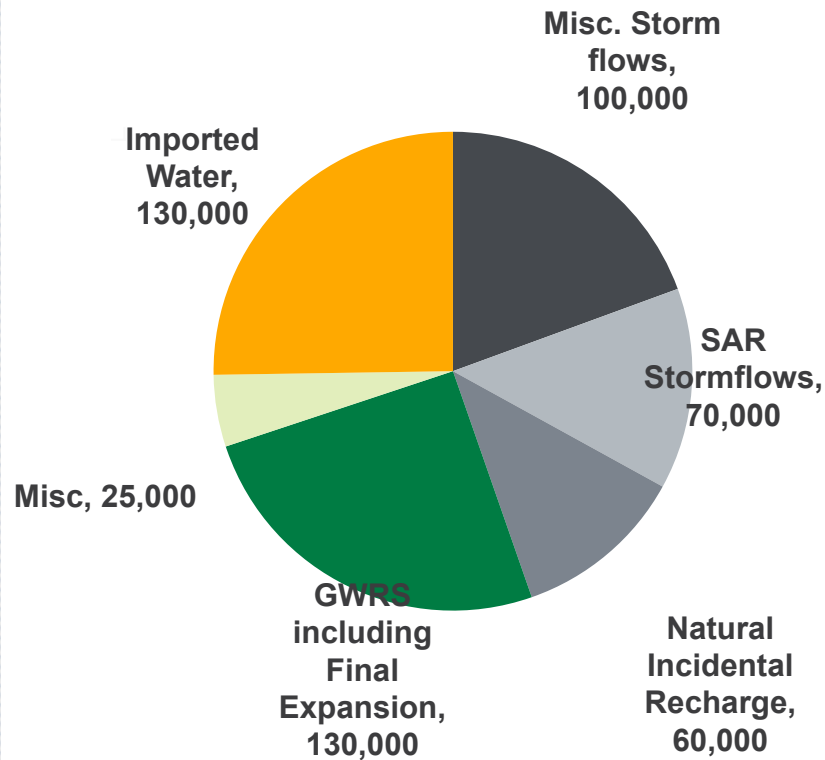


Questions?

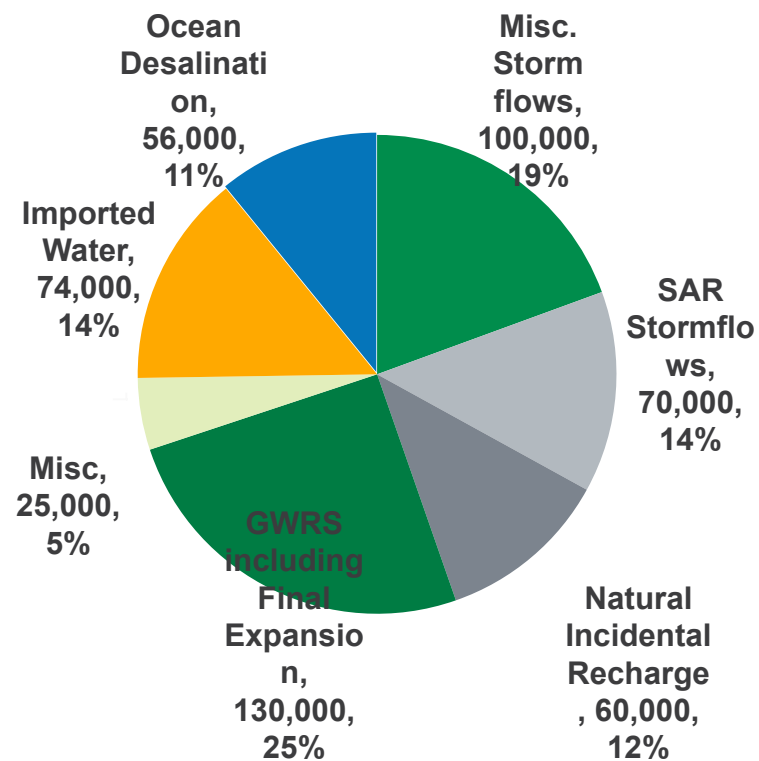
HUNTINGTON BEACH DESALINATION PROJECT

Huntington Beach Desal Project Could Reduce Future 2035 OCWD Water Supply Sources Use of Imported Water

515,000 af/year
Without desal



With desal



Proposed Huntington Beach Desalination Project

Current



Proposed Project



- Proposed 54 MGD seawater desalination facility co-located with AES Power
- Project is currently in late-stage development and awaiting final permit from California Coastal Commission
- Orange County Water District (OCWD) is evaluating the purchase of the project's entire 56,000 AF / year capacity.

OCWD is Pursuing Diligent Review of Poseidon's Huntington Beach Proposal

- District adopted a 2014 Long-term Facilities Plan Update and included the Huntington Beach project in the planning document.
 - The Plan identifies an anticipated 20% increase in water demand within the OCWD territory by 2035, that's over 90,000 AF / year
 - The District's interest in the project is to reduce the county's demand on imported water and ensure another local, drought-proof supply that would allow for flexible management of the groundwater basin.
- Now evaluating a financial analysis of Poseidon's proposal, with a draft report developed by a financial advisor