

Water Deep Dive: A '*Smarter Water*' Approach

BRUCE REZNIK

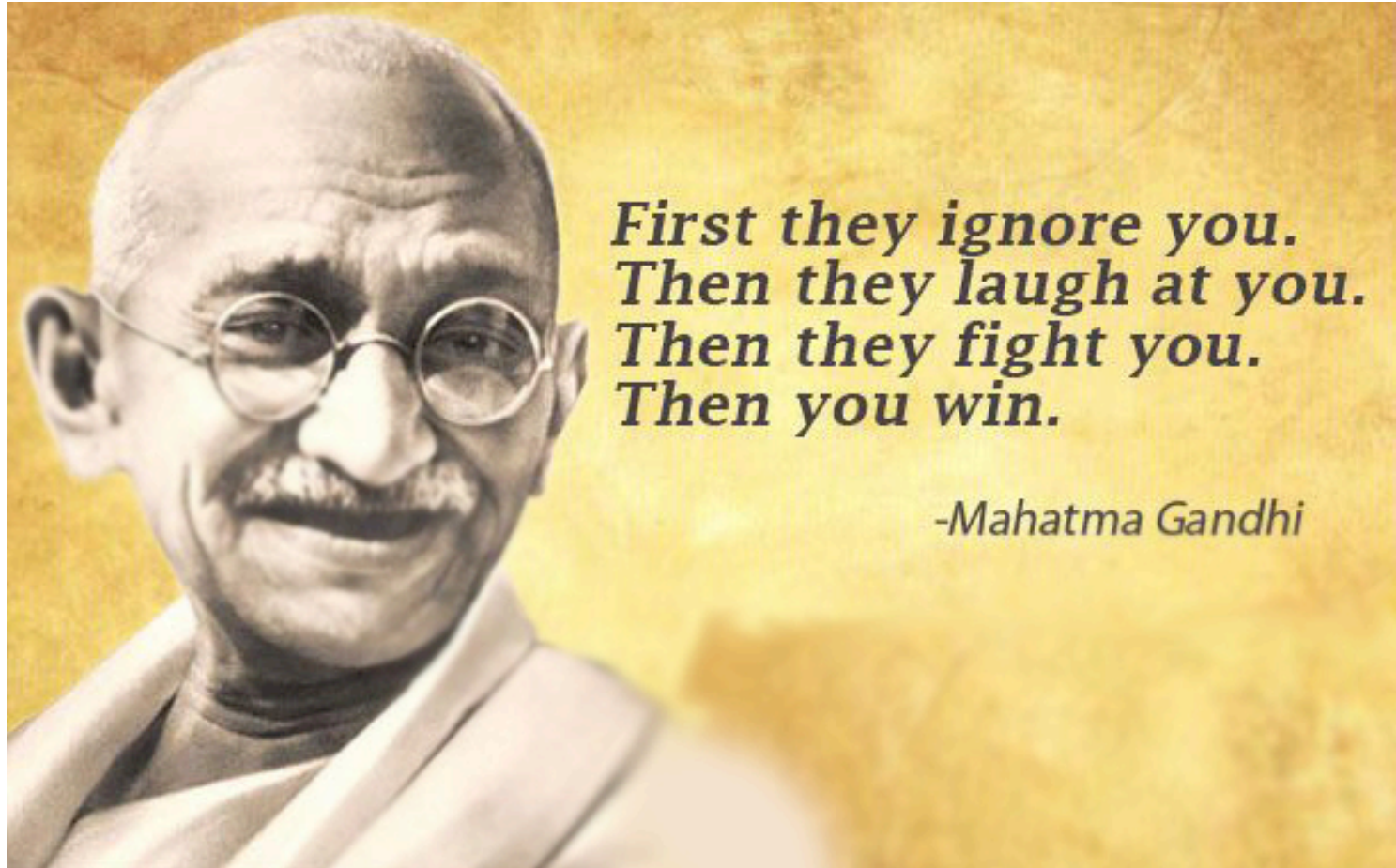
POLICY FOR THE PEOPLE

GREEN AMBASSADORS INSTITUTE

NOVEMBER 21, 2017



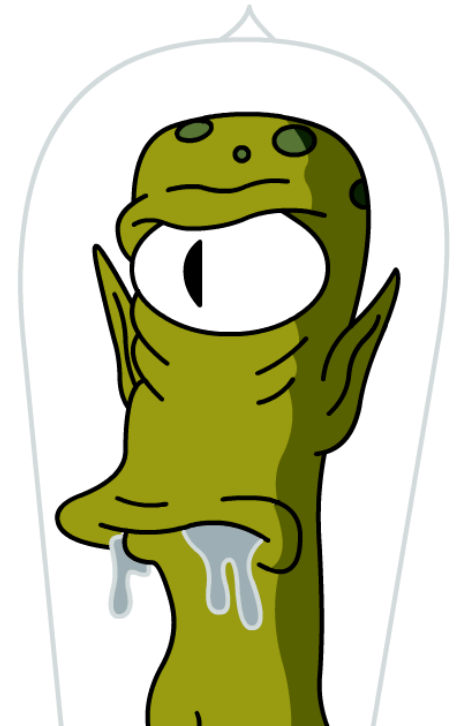
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WATERKEEPER®



***First they ignore you.
Then they laugh at you.
Then they fight you.
Then you win.***

-Mahatma Gandhi

LA's Current Water Supplies



And what that means...

WATER

19.2%

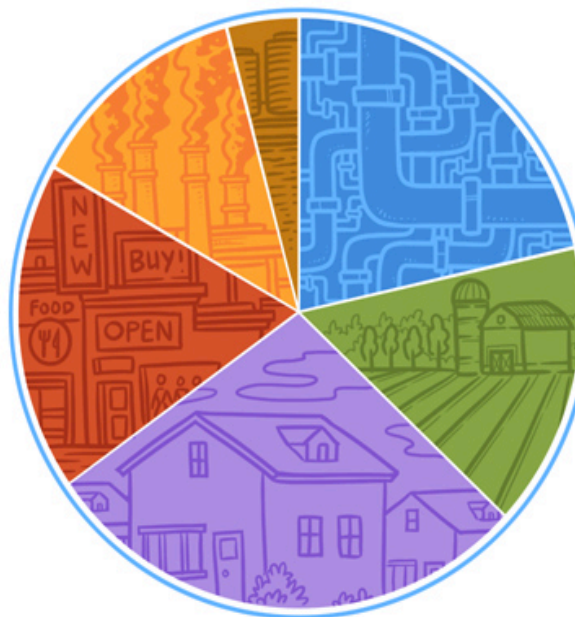
of all electricity consumption

30%

of non-utility related natural gas consumption

WATER-RELATED ENERGY USE

Nineteen percent of California's electricity goes to water-related uses



- 22%** **Moving Water**
Water pumping, extraction, transfer and distribution
- 10,300 GWh
- 15%** **Farm Use**
Irrigation, crops, livestock
- 7,400 GWh
- 28%** **Household/Residential**
Heating water, washing clothes and dishes. Essentially everything "after the meter."
- 13,500 GWh
- 18%** **Commercial**
Cooking, heating and cooling
- 8,700 GWh
- 13%** **Industrial**
Manufacturing sectors, construction, mining, airport usage
- 6,000 GWh
- 4%** **Wastewater Treatment**
- 2,000 GWh

How We Should Set Water Policy

- ▶ Set a **vision** (and **criteria** to achieve vision)
- ▶ Evaluate, select, prioritize **strategies**
- ▶ Establish **objectives** (best practice)
- ▶ Execute **strategies** (resources)
- ▶ **Evaluate** performance
- ▶ **Adaptive management**



Vision/Criteria for Water

- ▶ To ensure the LA region's long-term water security in an environmentally and economically sustainable way
 - ▶ **Safe/quality to meets needs**
 - ▶ **Reliable/flexible**
 - ▶ **Cost (for most critical needs; price reliability)**
 - ▶ **Environmentally protective/beneficial**
 - ▶ **Energy efficient**
 - ▶ Job creating (variety)
 - ▶ Other multi-benefits
 - ▶ Municipally owned/controlled
 - ▶ Prioritizes most critical uses

Energy intensity of water options

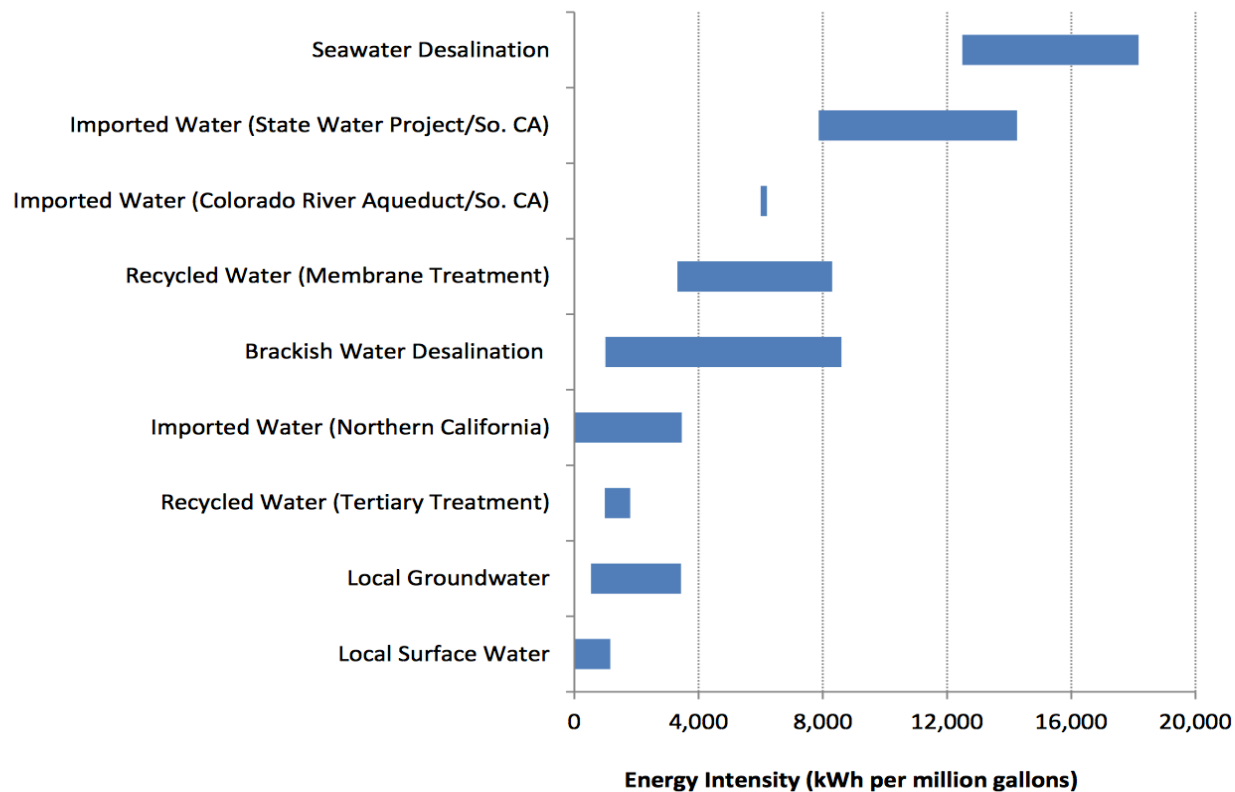


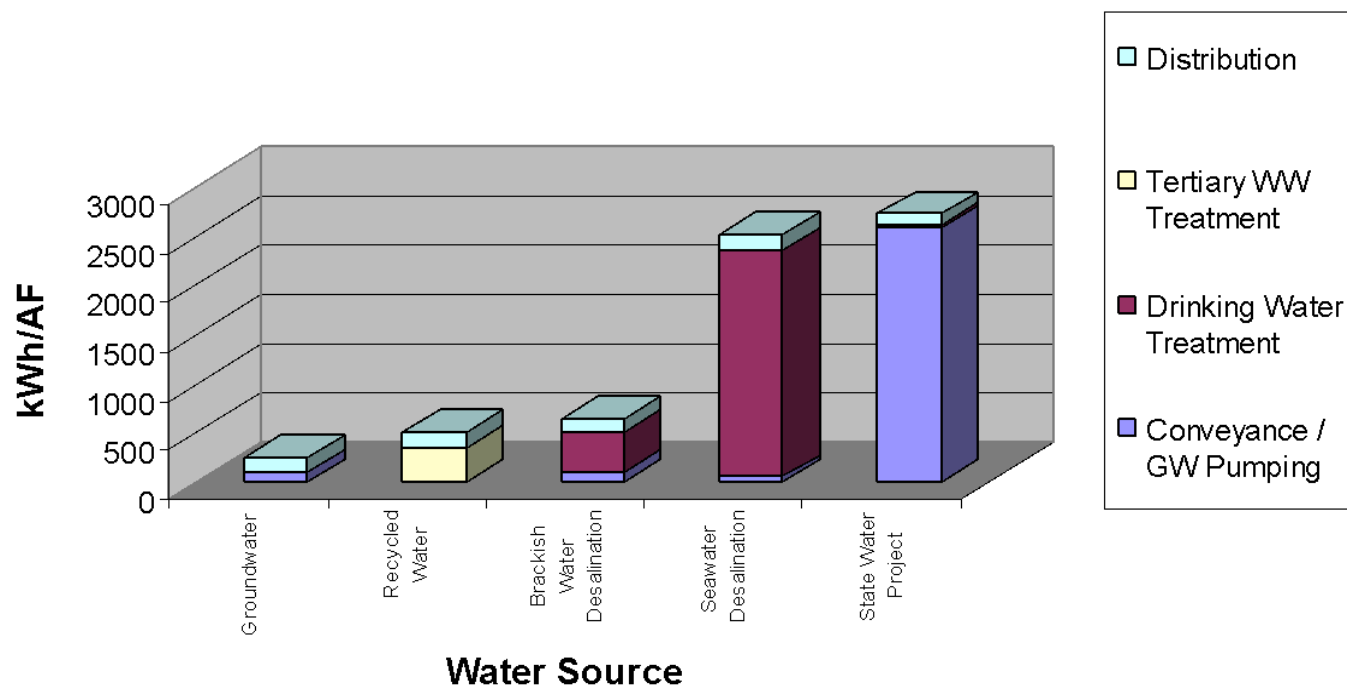
Figure 2. Comparison of the Energy Intensity of California Water Supplies

Notes: Estimates for local and imported water sources shown here do not include treatment, while those for desalination and recycled water include treatment. Typical treatment requires less than 500 kWh per million gallons. The upper range of imported water for Northern California is based on the energy requirements of the State Water Project along the South Bay Aqueduct. Energy requirements for recycled water refer to the energy required to bring the wastewater that would have been discharged to recycled water standards. Estimates for brackish water desalination are based on a salinity range of 600 - 7,000 mg/L.

Sources: Veerapaneni et al. 2011; GWI 2010; Cooley et al. 2012; GEI Consultants/Navigant Consulting, Inc. 2010

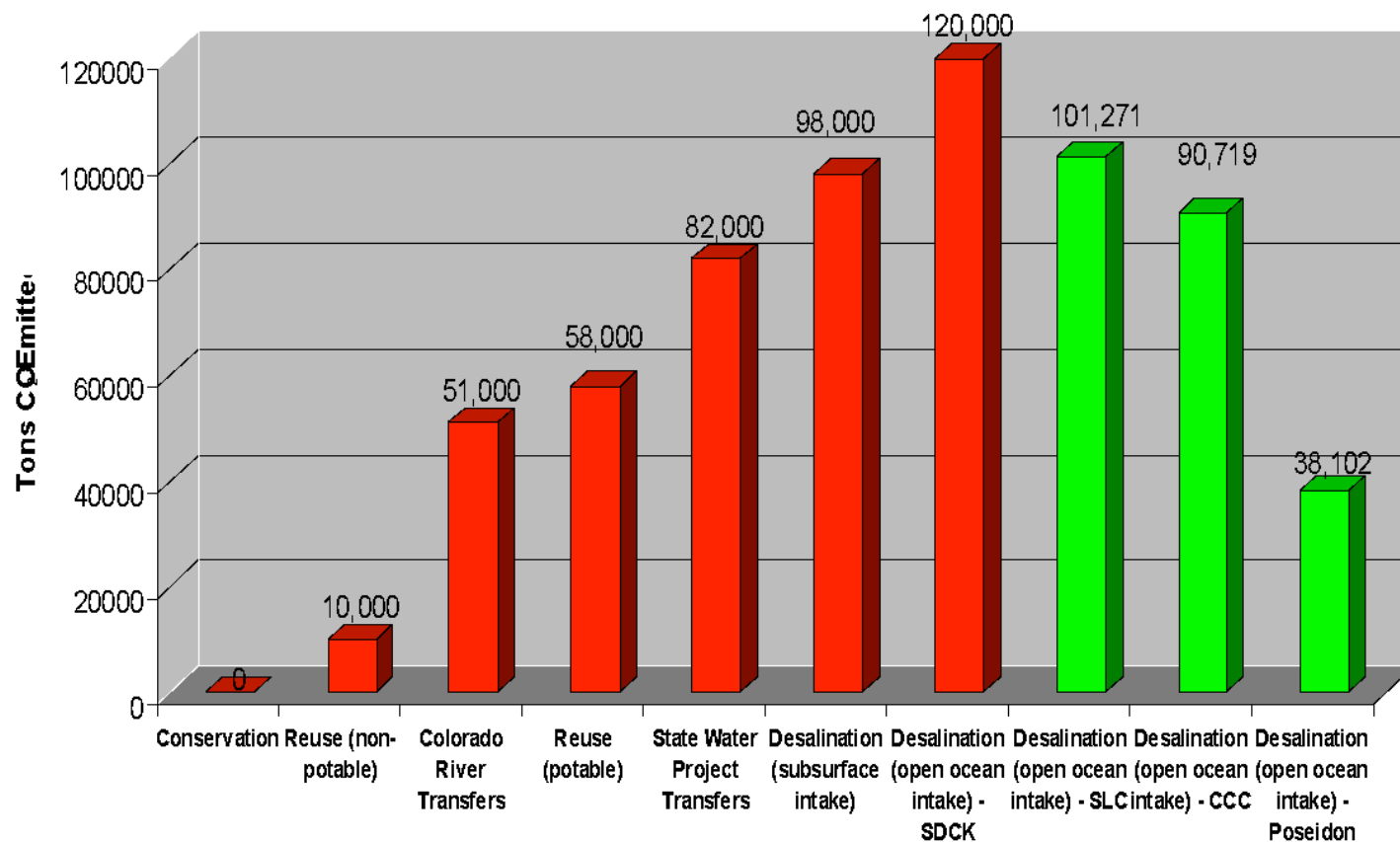
Oxnard Water Source vs. Energy

Energy Breakdown



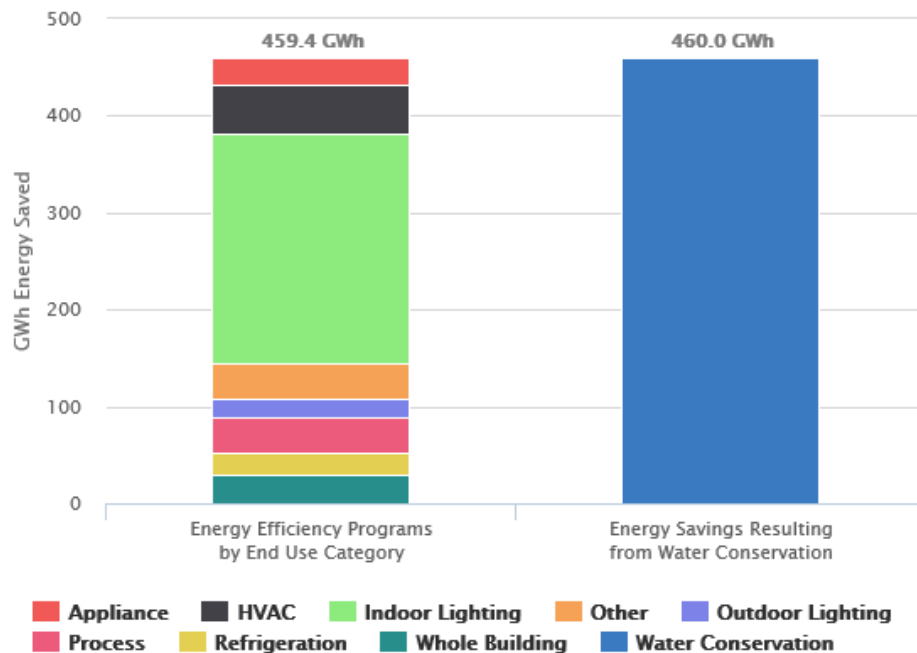
Carbon Footprint of Carlsbad Plant

Tons CO₂ Emitted Annually to Produce 56,000 Acre Feet of Water

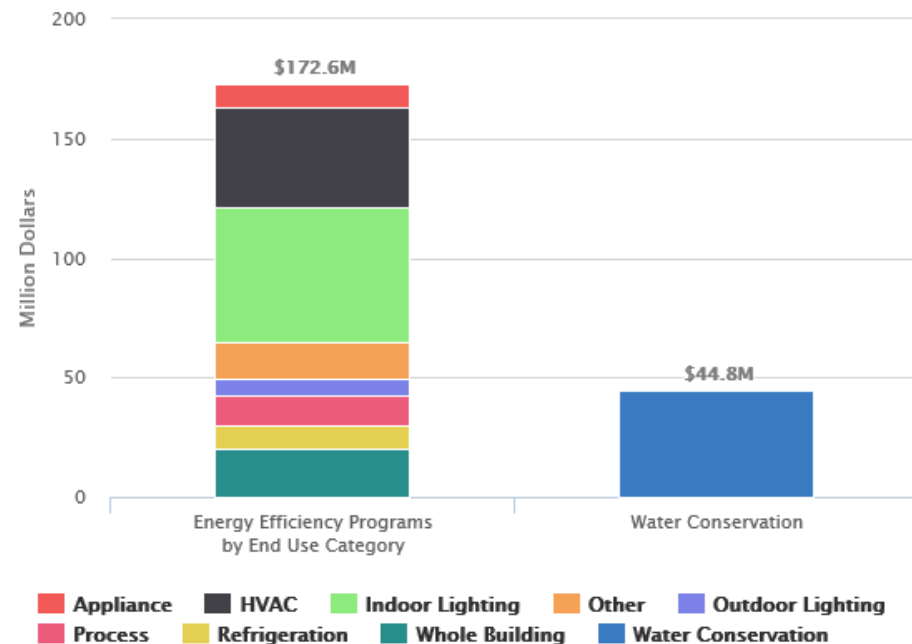


Conservation & Climate

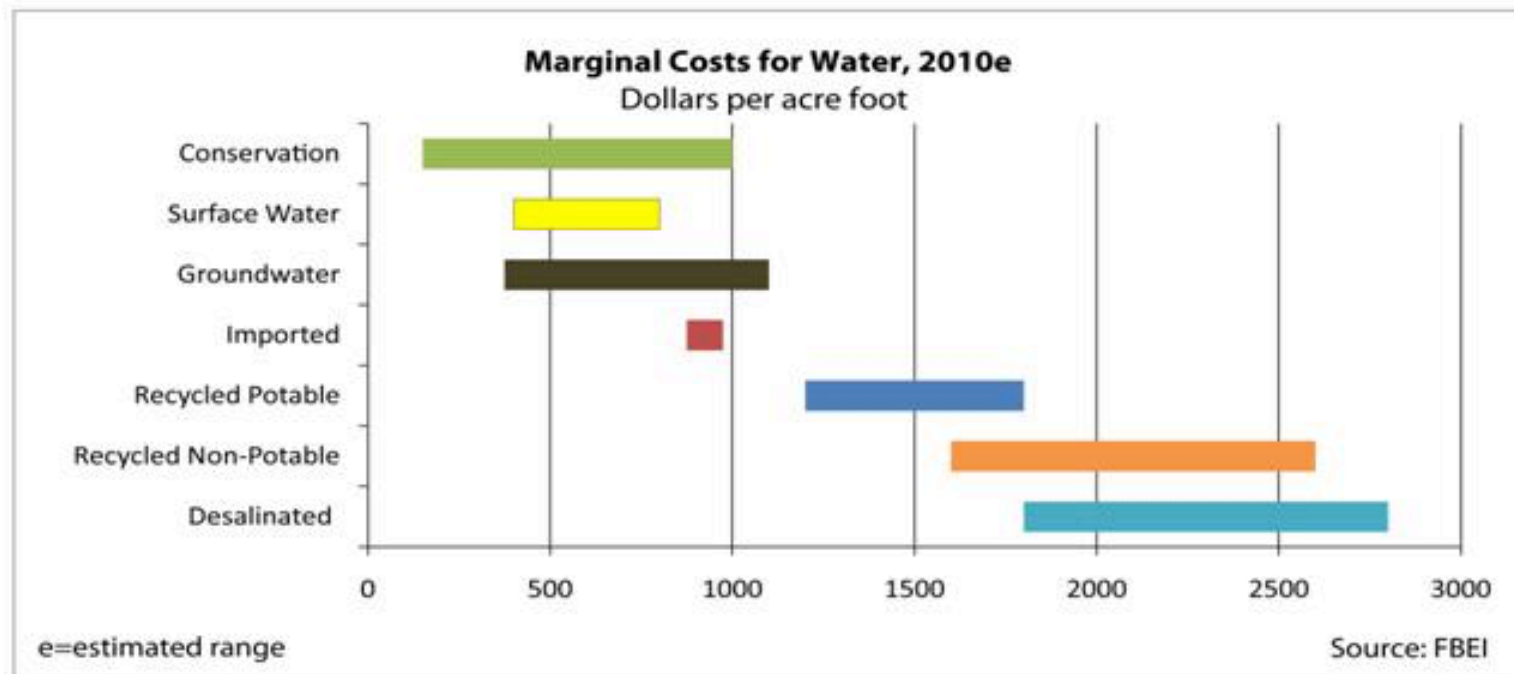
Electricity Savings from Statewide Water Conservation vs. Total First-Year Electricity Savings from Energy IOU Efficiency Programs (Jul – Sep 2015)



Cost of Statewide Water Conservation vs. Expenditures on Energy IOU Efficiency Programs (Jul – Sep 2015)

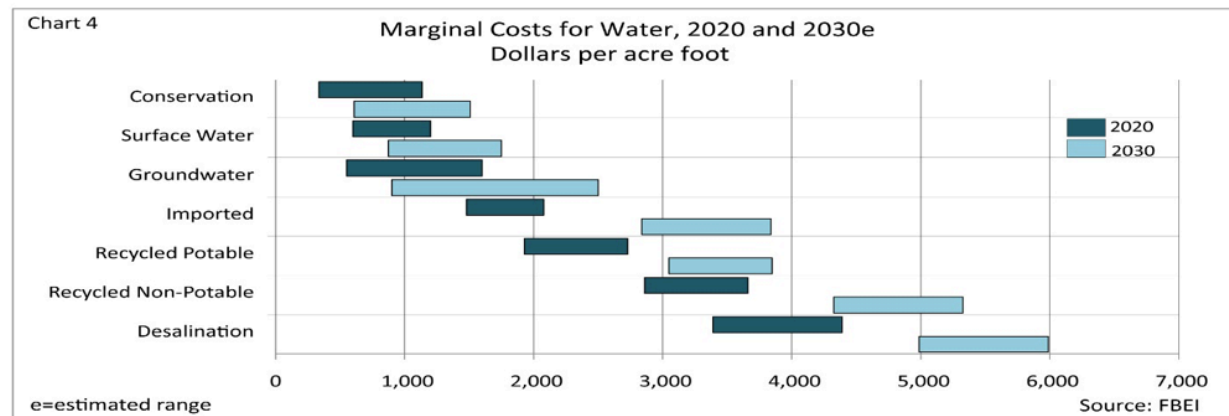


Current Costs of WS Options*



* From Equinox Center/FBEI Assessing SD's Water Option Report,
July 2010

Future Costs of WS Options



* From Equinox Center/FBEL Assessing SD's Water Option Report, July 2010

"When the well is dry, we learn the worth of water."
-Benjamin Franklin

A Smarter Water Approach

- ▶ **REDUCE** water waste (conservation & efficiency)
 - ▶ **REUSE** stormwater (stormwater capture/reuse)
 - ▶ **RECYCLE** wastewater (IPR & DPR)
 - ▶ **RESTORE** groundwater (remediation/brackish desal)
-
- ▶ Large-scale purple pipe
 - ▶ Ocean desalination
 - ▶ Water transfers, dams & diversions



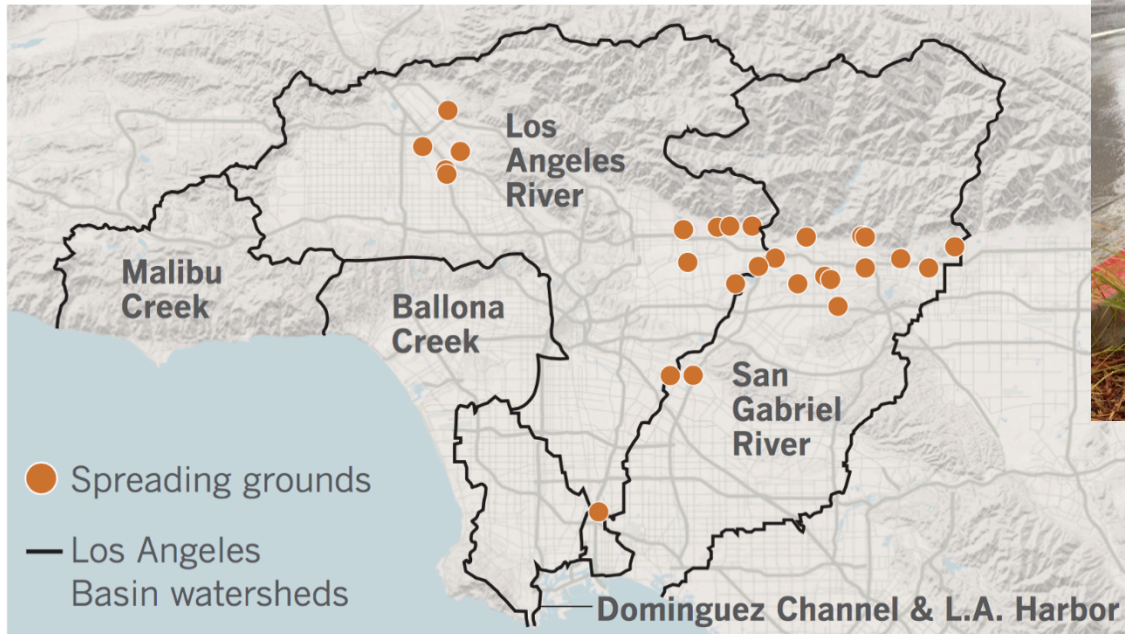
And don't forget...

RESTORE

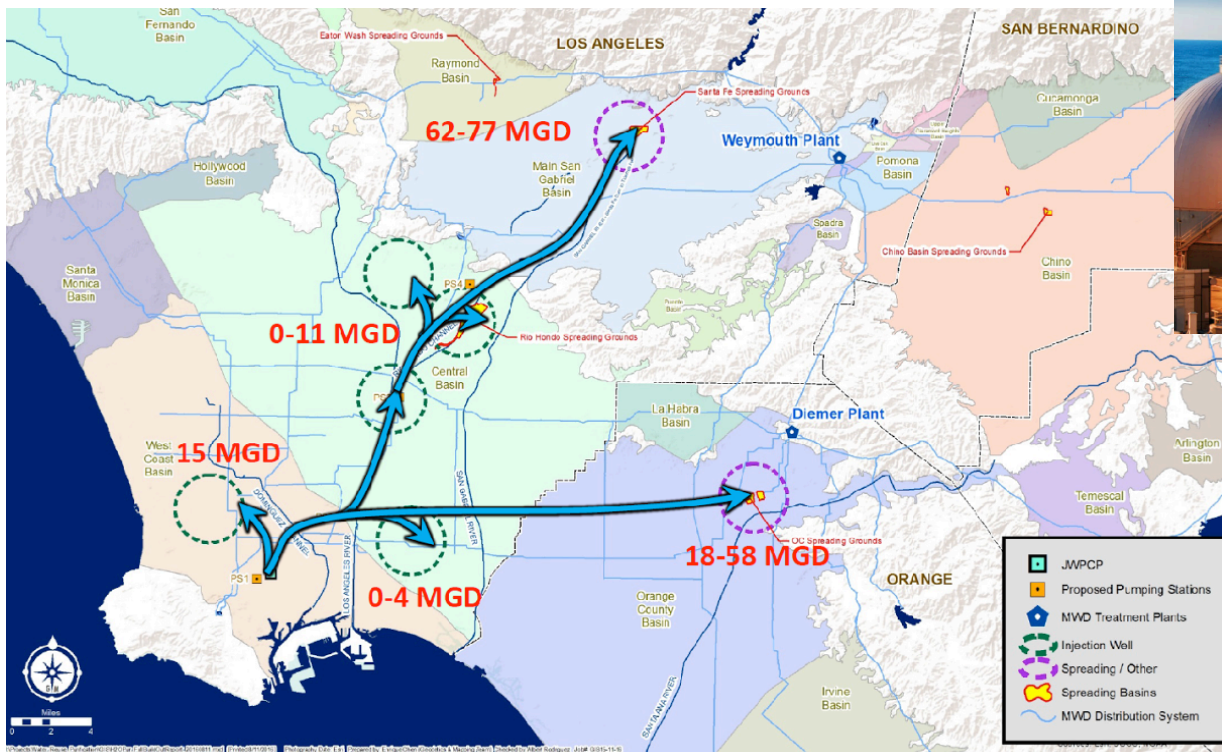
Reduce: Conservation a Way of Life?



Reuse: The Multi-Benefits of Stormwater

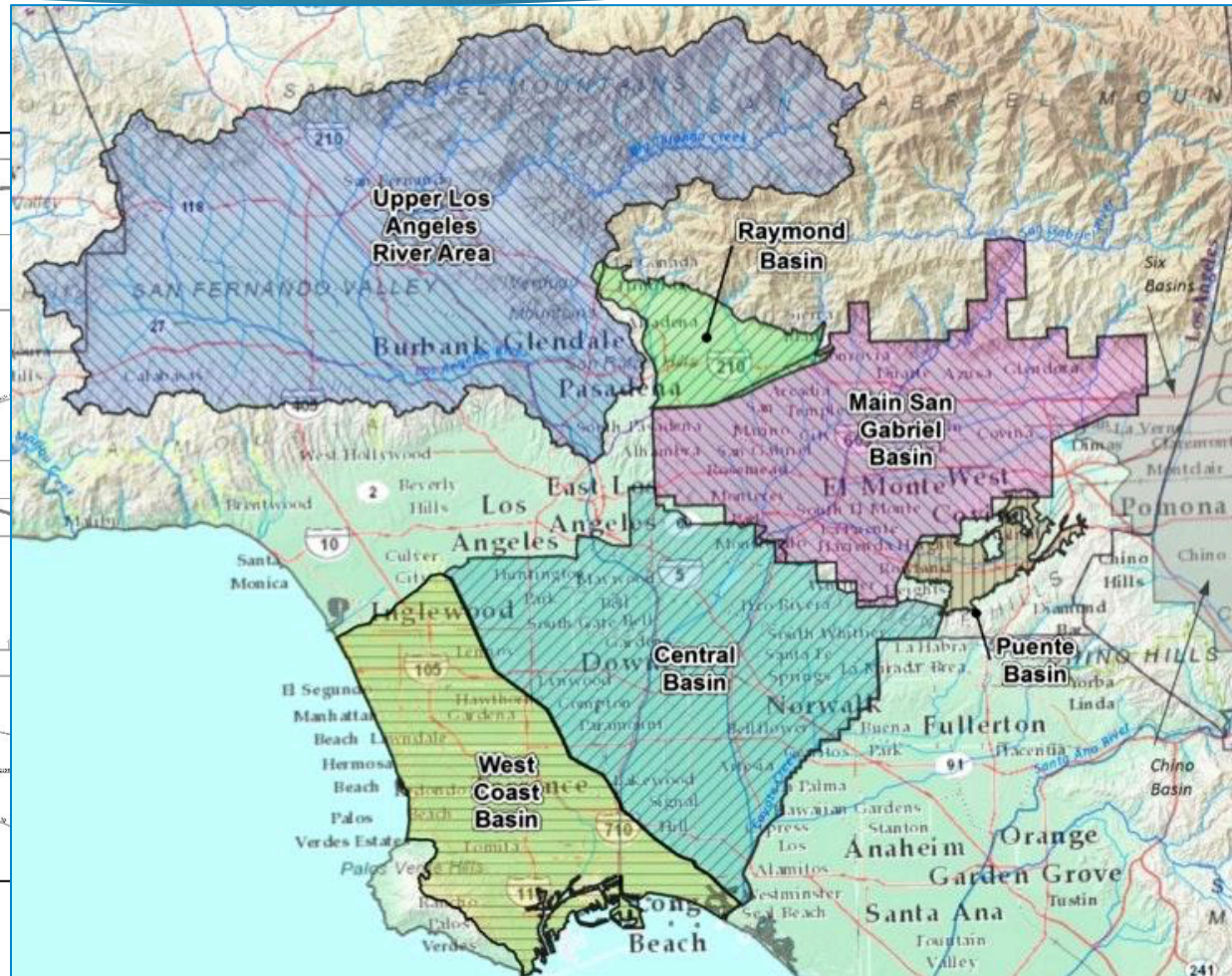
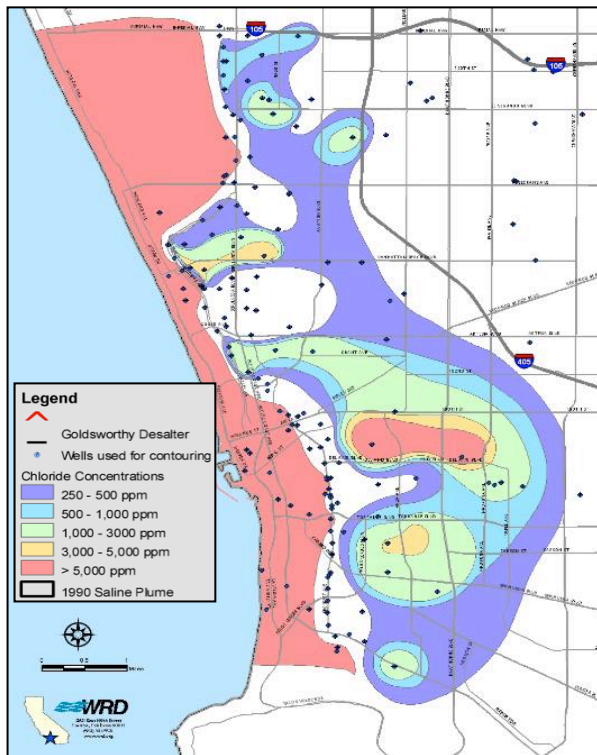


Recycle: The Potential of Wastewater

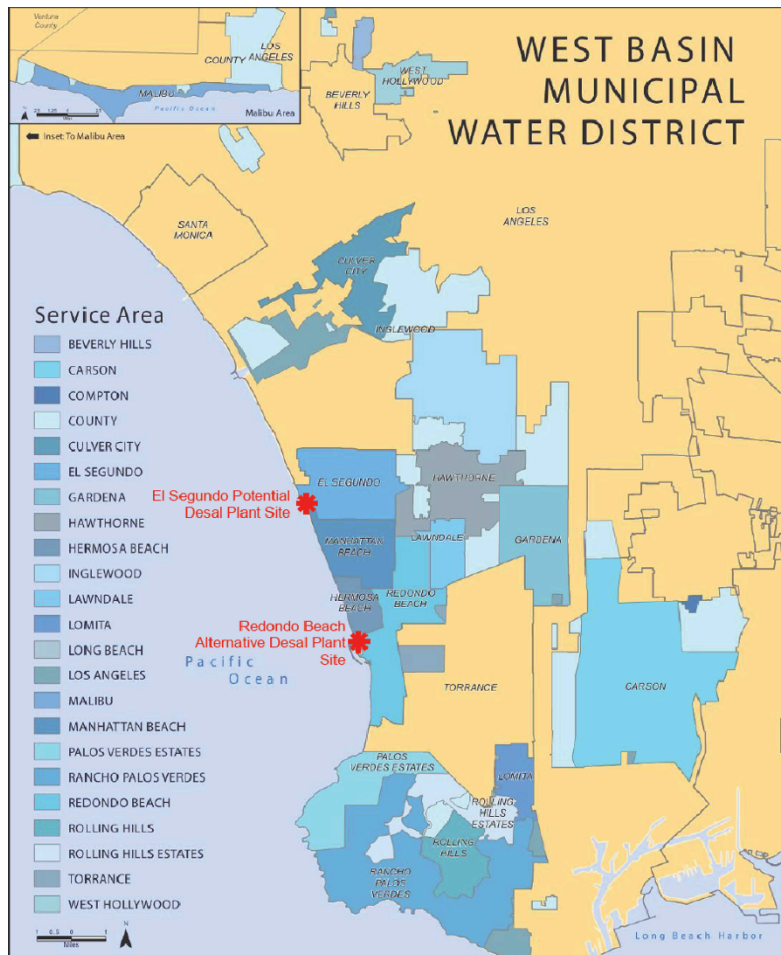


We could be recycling an additional ~250-300 MGD of wastewater

Restore: Cleaning Up our Groundwater

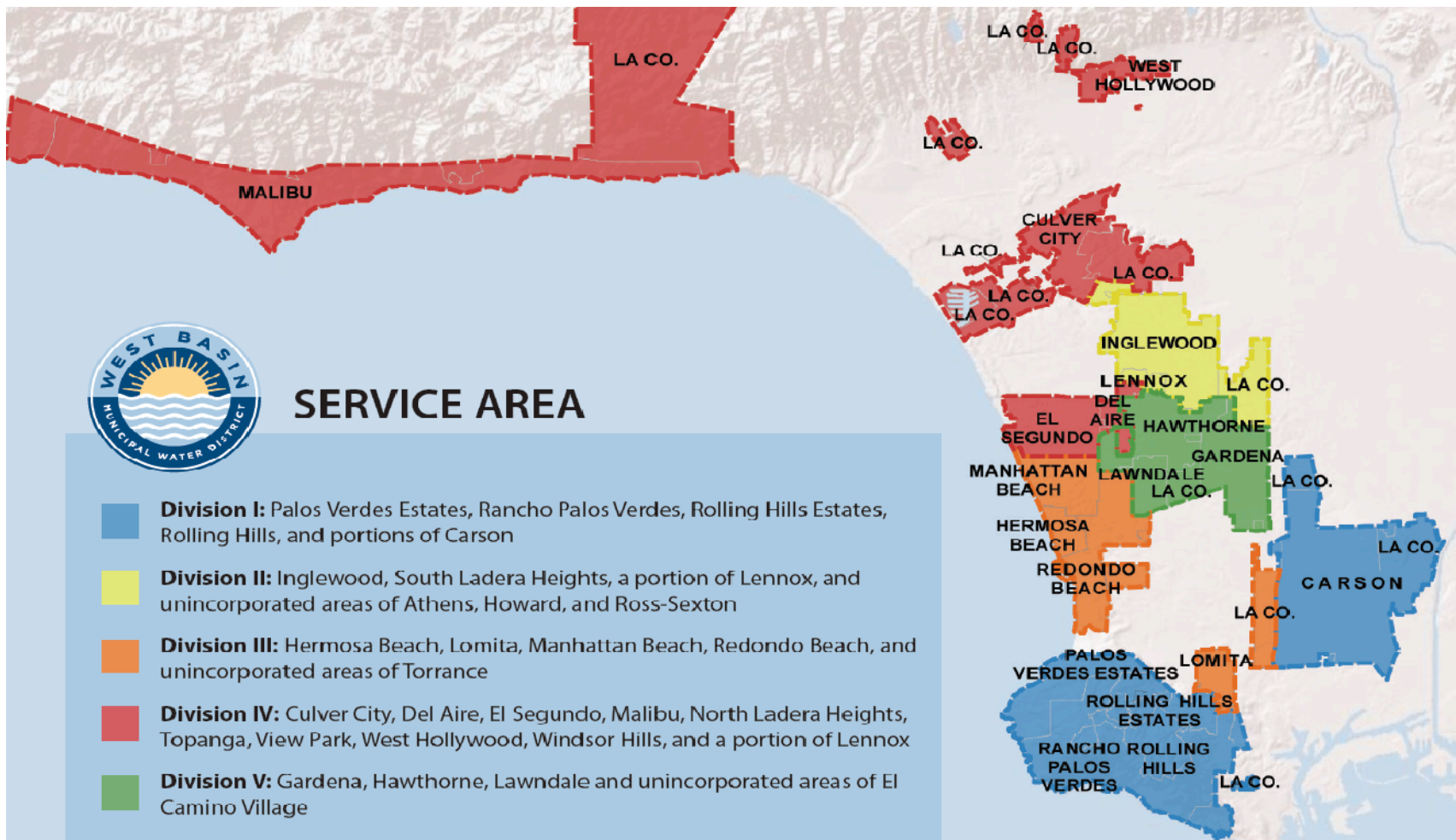


West Basin Ocean Desal (proposed)



<http://www.westbasindesal.org/master-plan.html>

About West Basin



What is Desal?

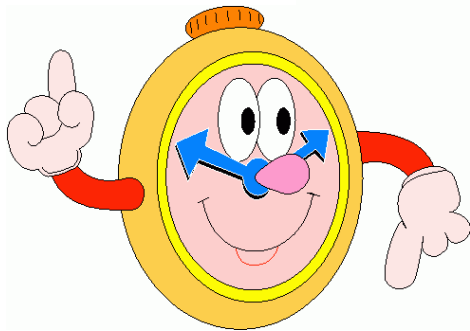
- Desalination uses reverse osmosis (filtering process) that removes 99.9% of salts and minerals from water
- Brackish v. Ocean Desal
 - Seawater contains $>35,000$ mg/l TDS
 - Brackish water contains $1,000$ - $10,000$ mg/l TDS
- \uparrow TDS = \uparrow pressure = \uparrow energy = \uparrow costs



Concerns with Ocean Desal

- ▶ Environmental (Ocean impacts; Continued OTC)
- ▶ Cost
- ▶ Energy/Climate
- ▶ Lost Opportunities

'All of the Above' in a World of Limited Resources



The High Cost of 'All of the Above'

TOO BIG

Builder's desal disclosure

\$310 maximum increases to water bills in Victoria in 2013 because of desalination plant cost

\$1.8m amount Victorians will pay each day to have access to desalination plant water

\$1b amount of damages claimed by Suez Environment because of rain delays and industrial action

\$24b nominal cost of desalination plant over 28 years

\$3.5b construction cost of Wonthaggi desalination plant

34% increases in Victorian water bills

19% drop in water use by Victorians in 2010-11

150GL per year – Wonthaggi plant

SOURCES: sydneydesal.com.au, desalination.edu.au, environment.gov.au, Australian Bureau of Statistics, Essential Services Commission, Suez Environment.



The Carlsbad Example – The Aftermath

- ▶ \$1B
- ▶ Dumping water
- ▶ Decreasing conservation mandates
- ▶ Higher than expected carbon footprint (CCC)
- ▶ 4 clean water violations (SDRWQCB)
- ▶ Rising costs (own intake)
- ▶ Threatening Pure Water

Los Angeles Times

FRIDAY DEC. 4, 2015 MOST POPULAR LOCAL ENTERTAINMENT SPORTS SAN BERNARDINO CLIMATE CHANGE OPINION PLACE AN AD 57°

LOCAL / L.A. Now

While other parts of California are bone dry, San Diego faces the opposite problem: too much water

The desalination plant in Carlsbad in September. (Lenny Ignizio / Associated Press)

By **Morgan Cook**

NOVEMBER 25, 2015, 1:00 AM | REPORTING FROM SAN DIEGO

The \$1-billion desalination plant coming online next month in Carlsbad will fit right in with years of careful planning and investment in water supply in San Diego County.

It will also worsen a peculiar San Diego problem amid a multiyear drought: an oversupply

QUESTIONS ABOUT FRACKING AND WATER?

GET ANSWERS

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"Not all alternative water source options are equal. While the California Water Plan recommends an 'all of the above' strategy for improving the diversity of California's water portfolio, the scientific consensus is that some options are more reliable, cheaper and less energy-intensive than others...Desalination should be used as an option of last resort."

**- California State Assembly Select Committee
on Water Consumption and Alternative Sources**

Thank You!

*We look forward to working with YOU on a
smarter water approach for LA*

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