



Recycling Conserves Both Water and Energy

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We Live in a Green World



*Water may not be as **green** as you think*



Supply, Conveyance, Treatment of Water can be Energy Intensive

Water Use Cycle	Range of Energy Intensity [kWh/MG]	
	Low	High
Water Supply and Conveyance	0	14,000
Water Treatment	100	16,000
Wastewater Collection, Treatment and Discharge	1,100	5,000
Recycled Water Treatment and Distribution	400	1,200

California Energy Commission

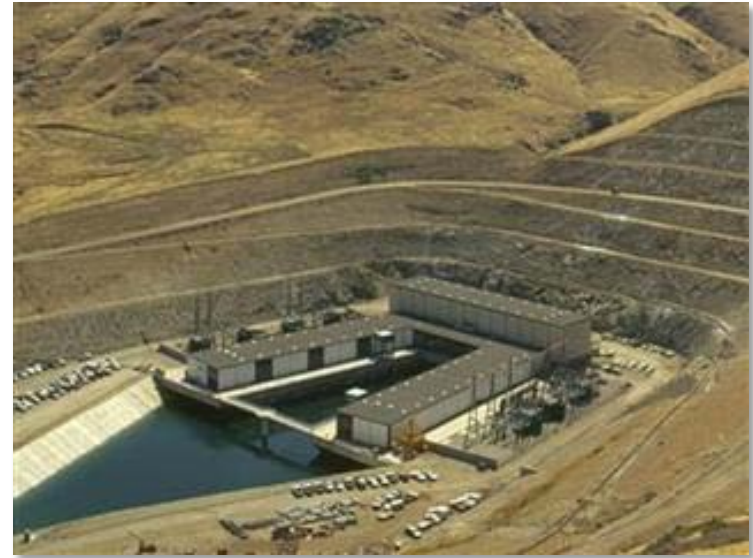


Moving Water Around is a Big Deal!

2900 MGD

1900' lift

Power: 1.1 million Hp (835 mW)



*Edmonston Pumping Plant,
CA state water project*

*State water project is the largest electricity
user in the state of CA (5 billion kWh/yr)*



Arid Locations Pay Dearly (Energy) for Their Water

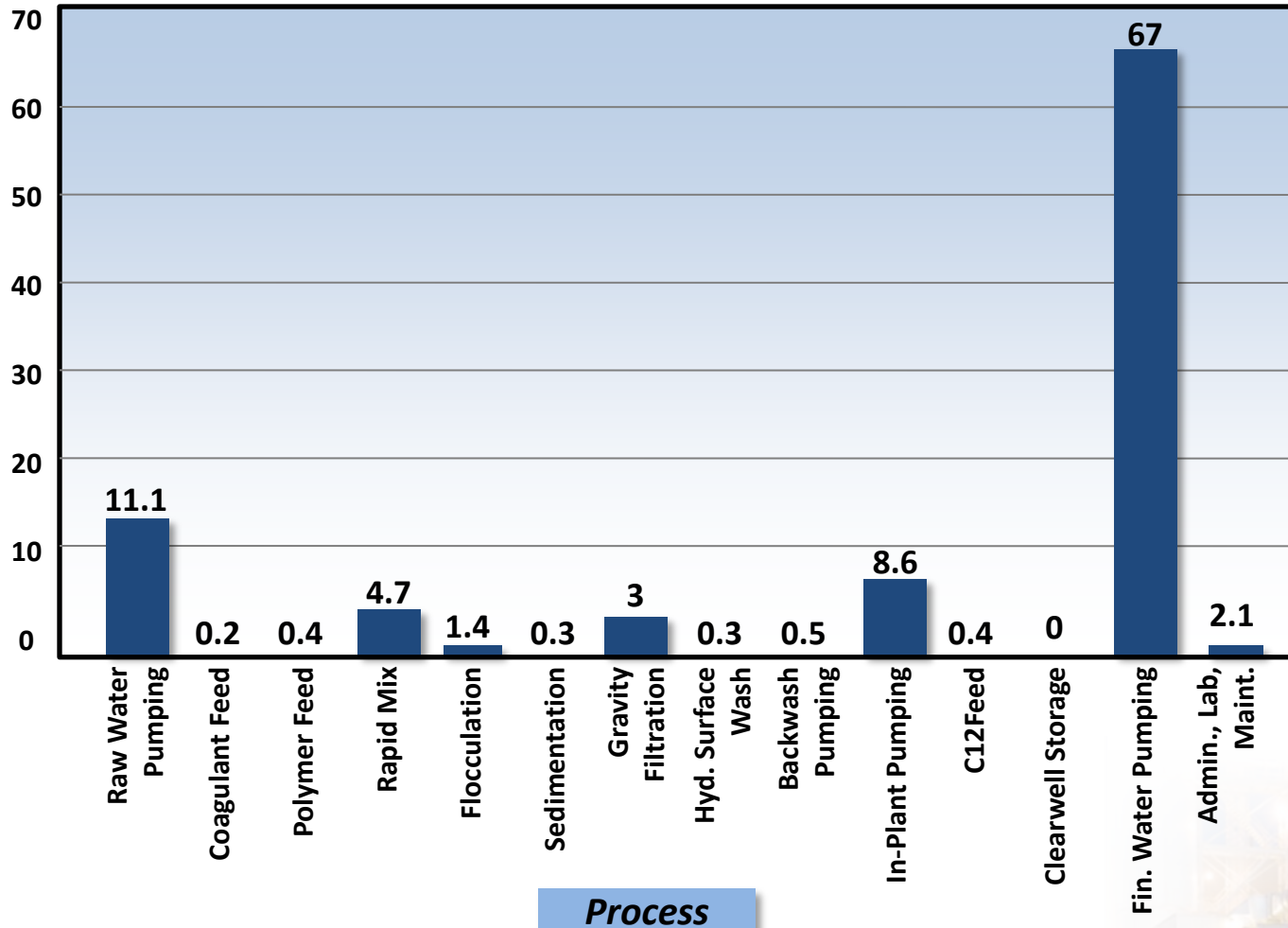
	Northern California	Southern California
	kWh/MG	kWh/MG
Water Supply and Conveyance	150	8,900
Water Treatment	100	100
Water Distribution	1,200	1,200
Wastewater Treatment	2,500	2,500
Total	3,950	12,700
	<i>Water Rich</i>	<i>Water Poor</i>

Source - California Energy Commission



Where is the Energy in the Conventional Water Treatment Process?

Percent of Total Plant Energy



Source - CEC and EPRI

Sample relative distribution of energy at a 10-MGD surface water treatment plant.

Recycled Water Not Only Saves Energy but Big Money



**3,150 TPD waste to energy facility
(75MW)**

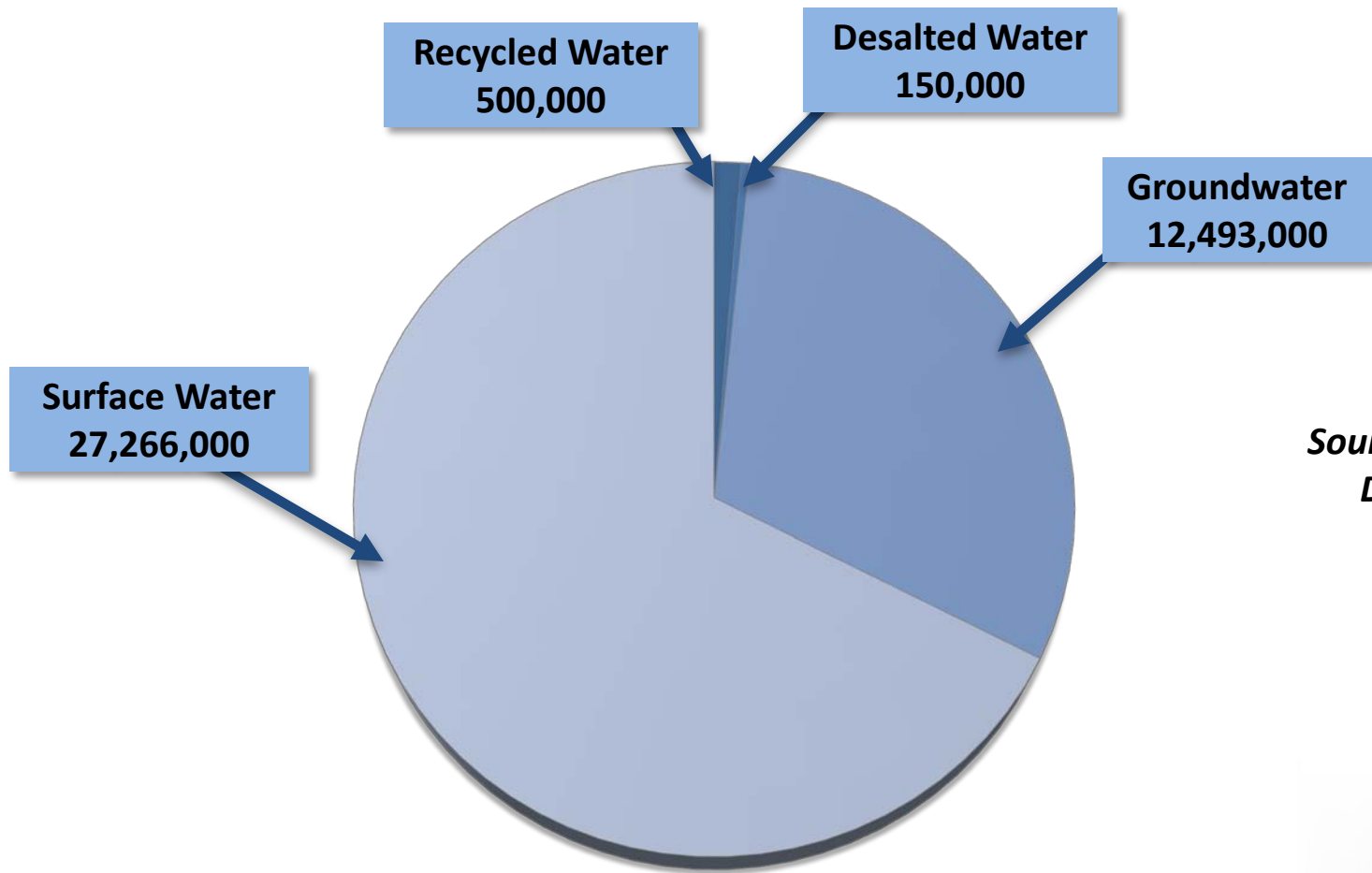
**60,000 to 150,000 GPD Boiler make
up water**

**Conversion to recycled water saves
\$192,000/yr vs. potable water**

***The Pinellas County
Resource Recovery Facility***



But What About Ground Water?



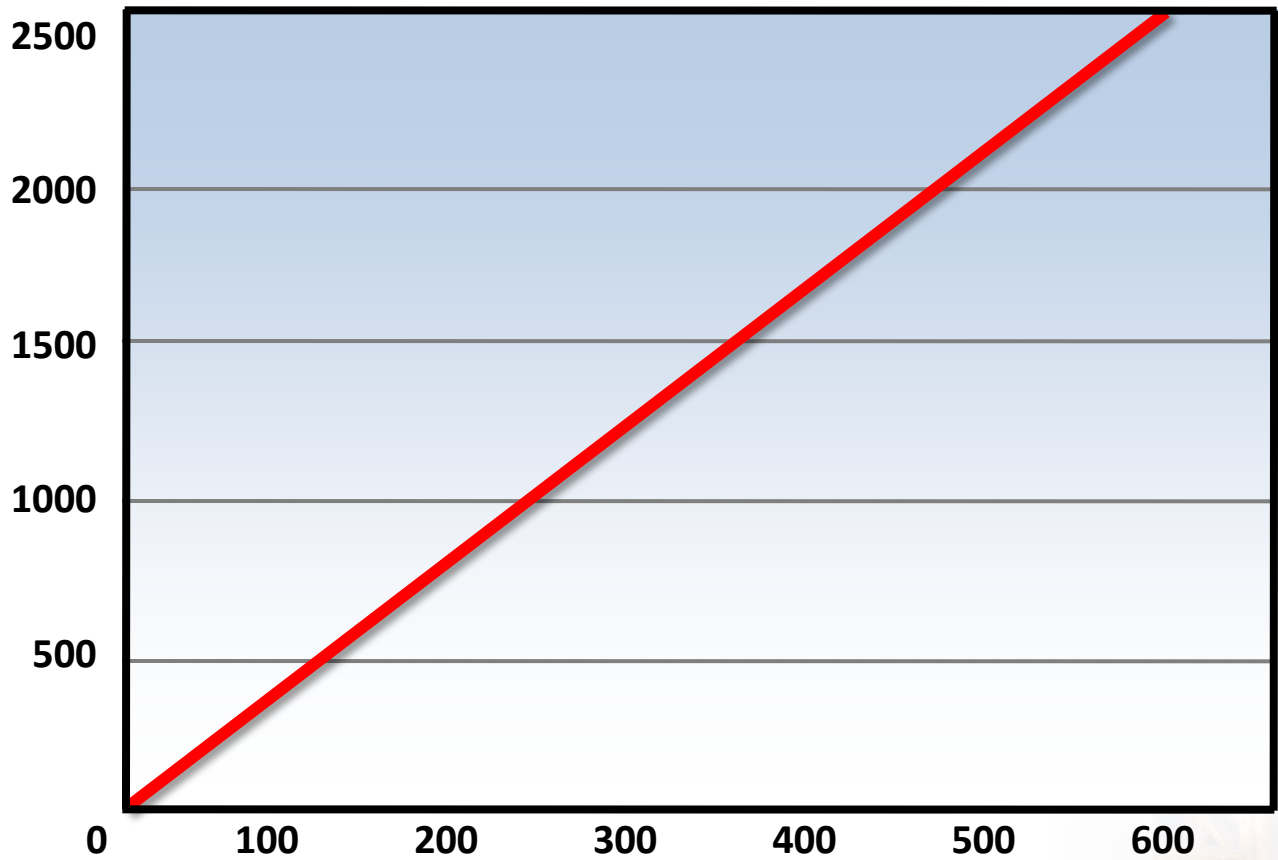
Source NRDC – “Energy Down the Drain”

Primary sources of water in California, Ac-Ft/yr



Ground Water Can be Energy Intensive

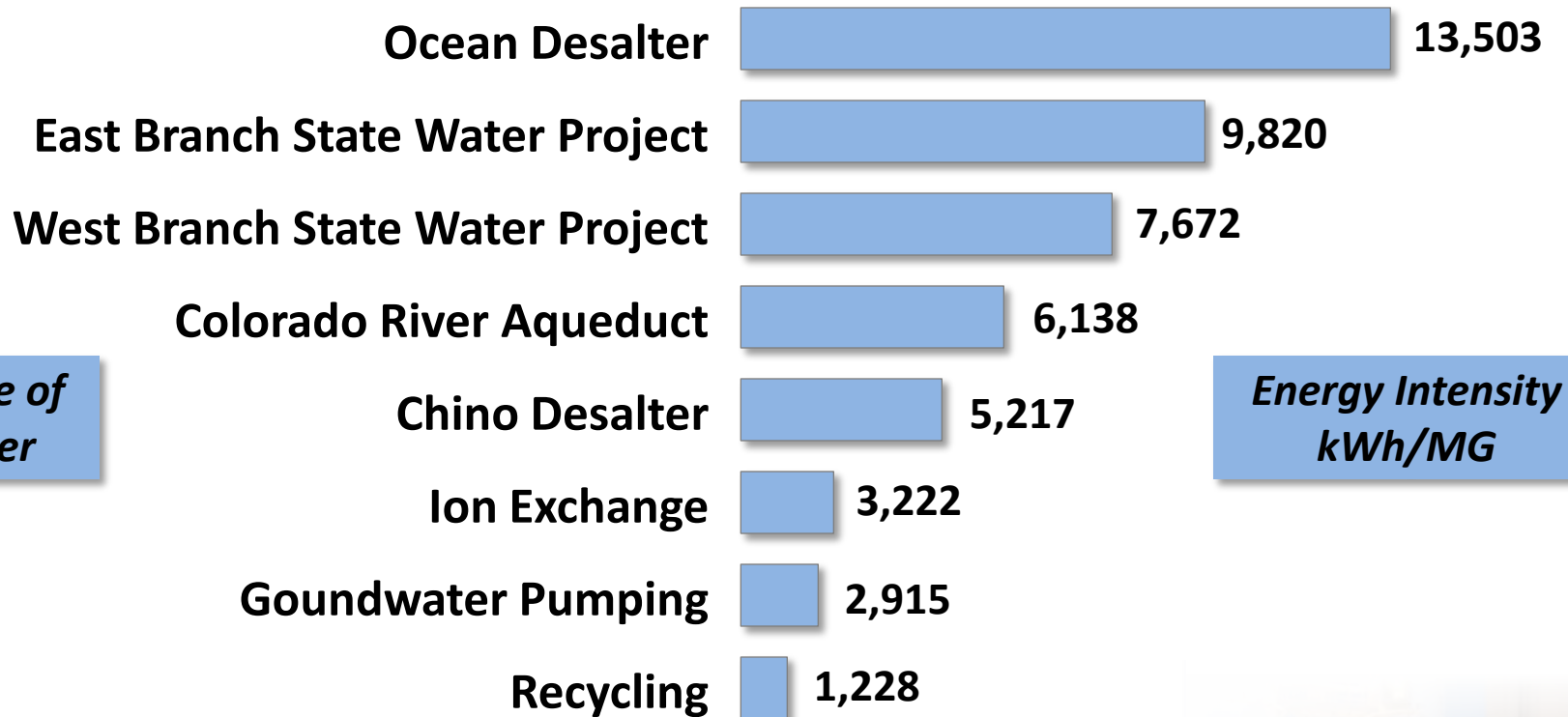
**Energy Intensity
kWh/MG**



Depth to Ground Water, FT



Energy Intensity of Water Supplier in Southern California



Source - Dr. Robert Wilkinson, Environmental Studies Program, University of California, Santa Barbara, and Martha Davis



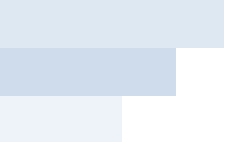
If Water Conveyance Energy Intensity Scares you, Take Look at the End Energy Use

Residential Water Use Category	Estimated Percent of Total Use in 2010	Estimated Energy Intensity (kWh/MG)
Toilets and leaks	14%	0
Dishwashers	1%	98,000
Clothes washers	8%	36,000
Showers, faucets, and bathtubs (1)	12%	24,120
Landscape irrigation	23%	0

**Water End Use Energy Intensity
San Diego County, CA**

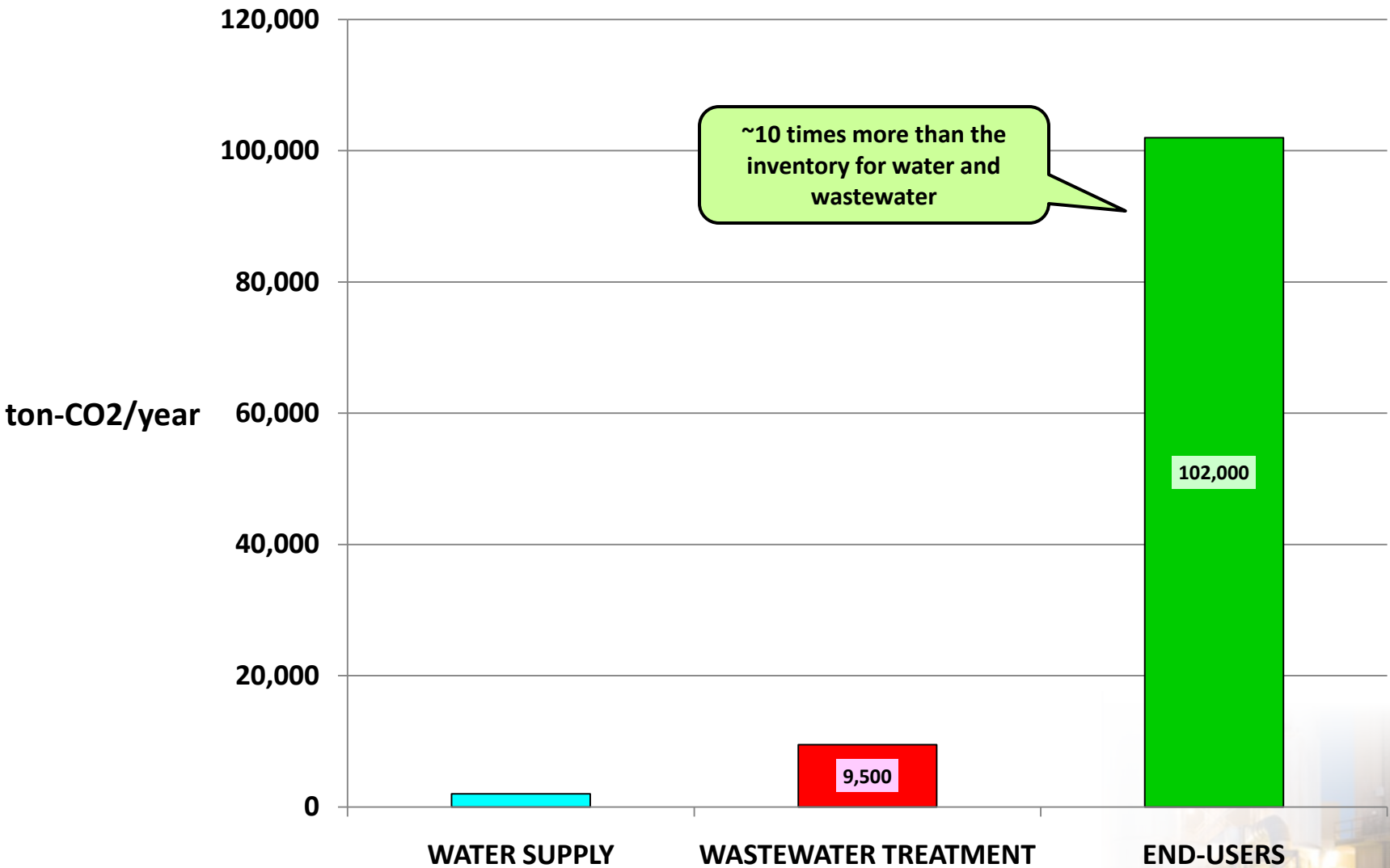
Source - NRDC





***CUSTOMERS HAVE THE
LARGEST ENERGY/GHG
IMPACT IN THE URBAN
WATER CYCLE***

2005 GHG Emissions from Santa Rosa, CA Urban Water Cycle



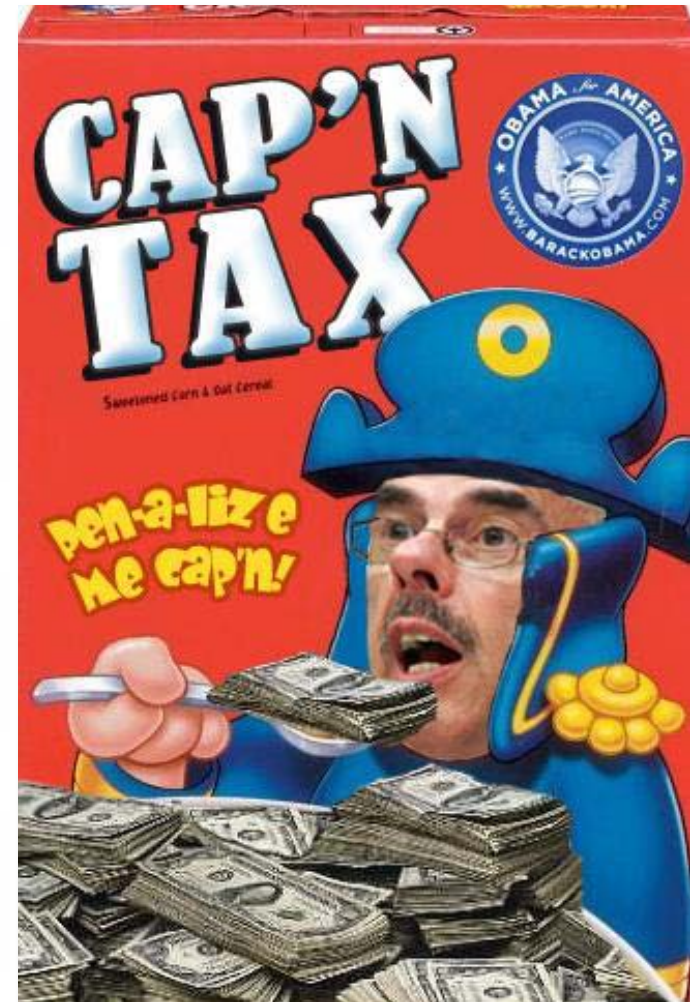
A Few Notes on Energy Costs

Electricity cost is not going down
(currently 9.9¢/kWh) nationwide avg.

Coal is a 4 letter word. Coal produced
electricity cost will go up big-time

Non renewable Energy – GHG

GHG legislation looms (Waxman-
Markey, AB 32-CA, 21 States)



Should Reclamation be Part of Your Carbon Action Plan?



Napa Reclamation System

Reclamation energy is trivial – take advantage of this windfall in your carbon action plans

Reclamation Energy Summary

Within 5-10 years most WWTPs will produce unrestricted use reclaimed water quality

Energy for their WWTPs is a sunk cost

Energy intensity for reclaimed water is almost zero!

Almost every other water supply source has a higher energy intensity

WWTP discharge standards: cheaper to reuse than discharge



Discussion

