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## Current Trends in “Counting What Counts” and Integrated Water-Energy Sustainability Programs

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# Today's Objectives



- Originally part of series of presentations and briefings on “Counting What Counts”
  - energy agency support for water industry and larger public goals (energy, GHG)



- Origin of “19% of CA’s energy used for water” statistic and subsequent programs
  - Often quoted (Chu, Sutley)

- New federal approach in “Greening the Federal House” under EO13514: *“Federal Leadership in Environmental, Energy and Economics Performance”*

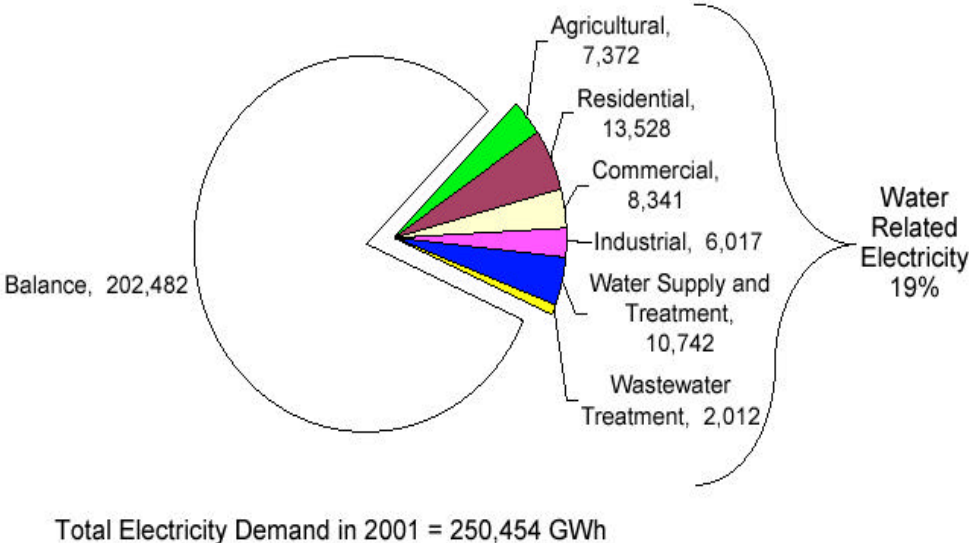
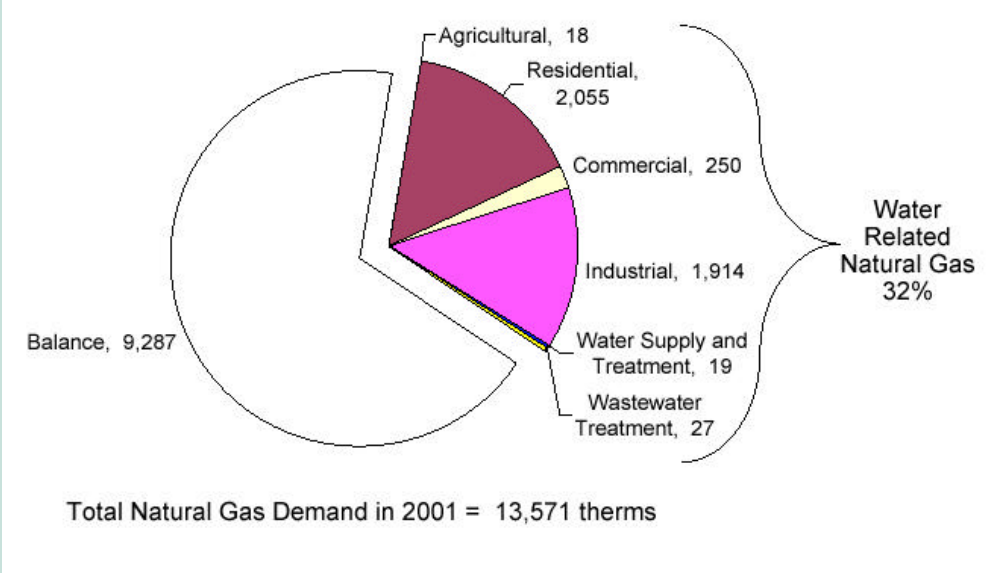
- “Zero Environmental Footprint”
- Increased need for baseline audits and programs
- Market, incentives, credibility, game-changer



# CA Energy Commission 2005 Study

## STEP ONE: MEASURE (BASELINE + CHANGES)

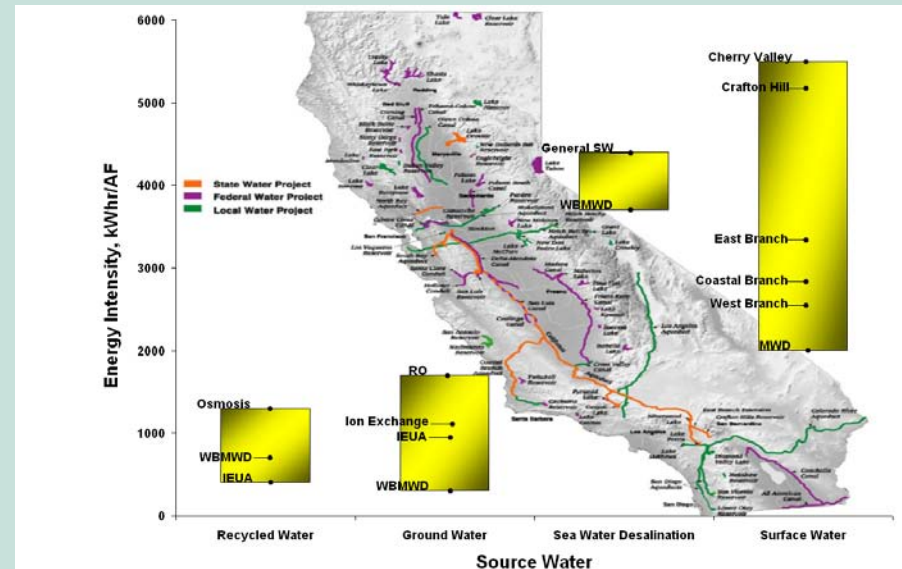
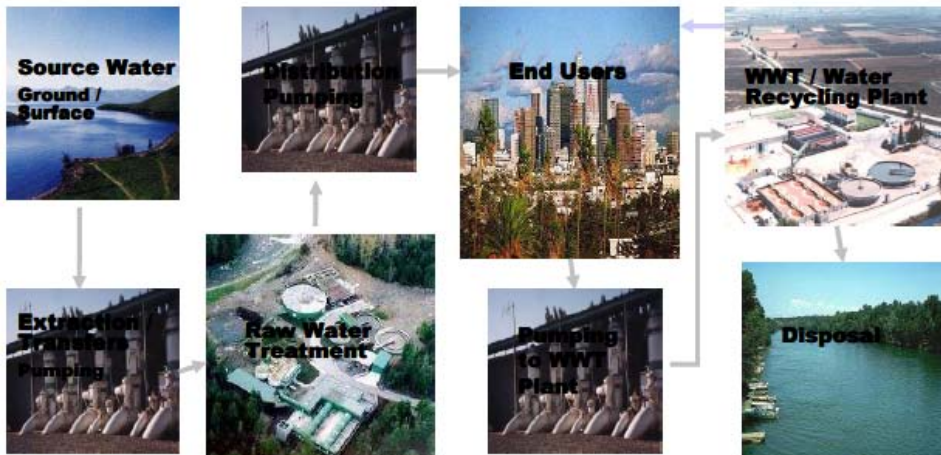
- CA: 19% electricity and 33% natural gas used for water
- Also determined GHG Emissions associated with water



# CEC Energy for Water Audit Approach

- CA considered entire cycle: extract, conveyance, treat, distribute, END USE (MUN/IRR/IND), collect, treat, dispose of water
- Allows comparisons of projects, technologies (e.g. desal/reuse locally vs pumping/importing water)
- National estimate from DOE EIA is 3%, projected to double to 6% due to increased treatment (predicting 1.5% increase in energy for treatment)
  - only pumping and treatment
  - Beginning to review this approach

## • Typical Urban Water Cycle Energy Intensity can Vary Significantly: 2,000 – 20,000 kWh/MG





# CA Concerns: Energy/Water Security and GHG

## 1) ENERGY SECURITY

California Relies Heavily on **Imported Energy** from **Out-of-State**, & **Out-of-Country**:

Electricity: 27%  
Oil: 62%  
Gas: 87%

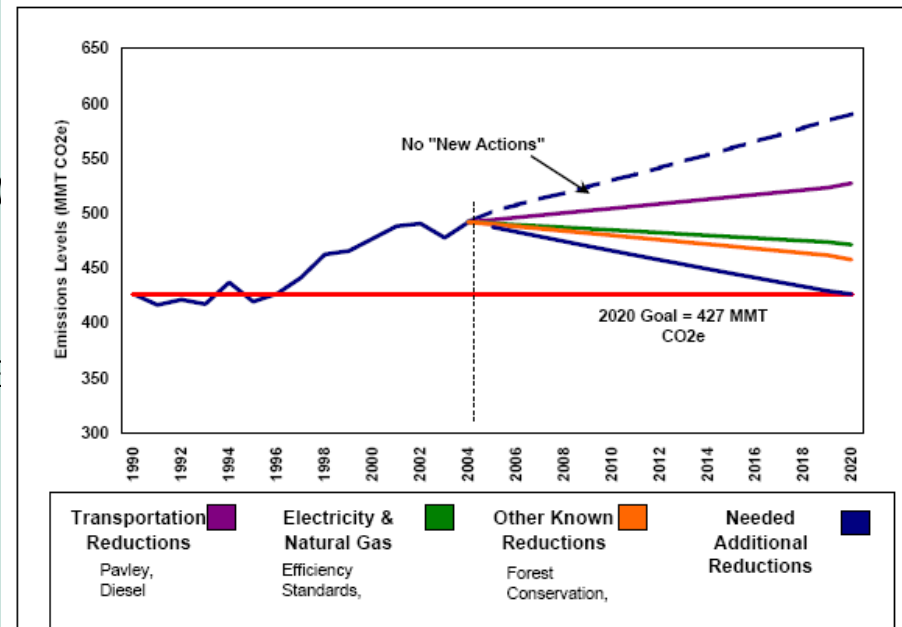
### Two Major Threats

- Disruption in Oil Imports / Supply Cuts
- Growing Energy Demand, & Flat or Declining Conventional Energy Sources
- Water-Related Energy Use Growing Faster Than Other Uses

## 2) GHG EMISSIONS

AB32 – CA’s GHG Emission Reduction Bill (2006)  
1990 levels by no later than 2020.

TOOK AN INTEGRATED APPROACH TO CLIMATE  
ENERGY FOR WATER





## CA Programs: CEC Technical Assistance for Water

Site Baseline Audits Technical Assistance and Demonstration Project Grants for Water System Energy Efficiency Improvements:

- Reducing Process Energy Usage
- Replacing / Retrofitting Aging Equipment with More Efficient Technologies
- Repairing / Replacing Leaking & Damaged Pipes & Equipment
- Improving Electrical Load Management through Scheduling or Control modifications
- Adding System Flexibility with Storage
- Incentive for Water Utilities: Cost Savings



# CA Solutions: Renewables/On-site Energy

## CA Water Agencies RE Feed-in-Tariff (Adopted on Dec. 17, 2009)

PG&E		Price Paid'			
	Super Peak	Shoulder	Night		
Jun-Sep	\$ 0.2133	\$ 0.1086	\$ 0.0667		
Oct-Feb	\$ 0.1023	\$ 0.0904	\$ 0.0739		
Mar-May	\$ 0.1109	\$ 0.0819	\$ 0.0621		
PG&E Tariff E-P * 2010 MPR (20 yr) =		\$ 0.09674			
SCE		Price Paid'			
	On-Peak	Mid-Peak	Off-Peak	Super Off-Peak	
Summer (June-Sept)	\$ 0.3028	\$ 0.1306	\$ 0.0726		NA
Winter (Oct-May)	NA	\$ 0.0967	\$ 0.0803	\$	0.0590
* 2010 MPR (20 yr) =		\$ 0.09674			
SCE tariff WATER - <a href="http://www.sce.com/NR/sc3/tm2/pdf/ce296.pdf">http://www.sce.com/NR/sc3/tm2/pdf/ce296.pdf</a>					
SDG&E		Price Paid'			
	On-Peak	Semi-Peak	Off-Peak		
Summer	\$ 0.1588	\$ 0.1006	\$ 0.0855		
Winter	\$ 0.1153	\$ 0.1044	\$ 0.0767		
* 2010 MPR (20 yr) =		\$ 0.09674			
SDG&E Tariff WATER <a href="http://www.sdge.com/tm2/pdf/ELEC_ELEC-SCHEDS_WATER.pdf">http://www.sdge.com/tm2/pdf/ELEC_ELEC-SCHEDS_WATER.pdf</a>					

## Renewables

### Photovoltaic Solar

- First PV System Installed @ WWTP in the U.S./World
- Sewerage Commission of Oroville Region (N. CA)
- Solar Bee – Solar Powered Water Recirc. System
- CPUC's CA Solar Initiative – Started in 2006 to Provide \$3 Billion by 2016; Incentive Levels Reduce Annually

### Biogas / Anaerobic Digester Gas

### Wind – 950 KW by Palmdale Water District for Pumping

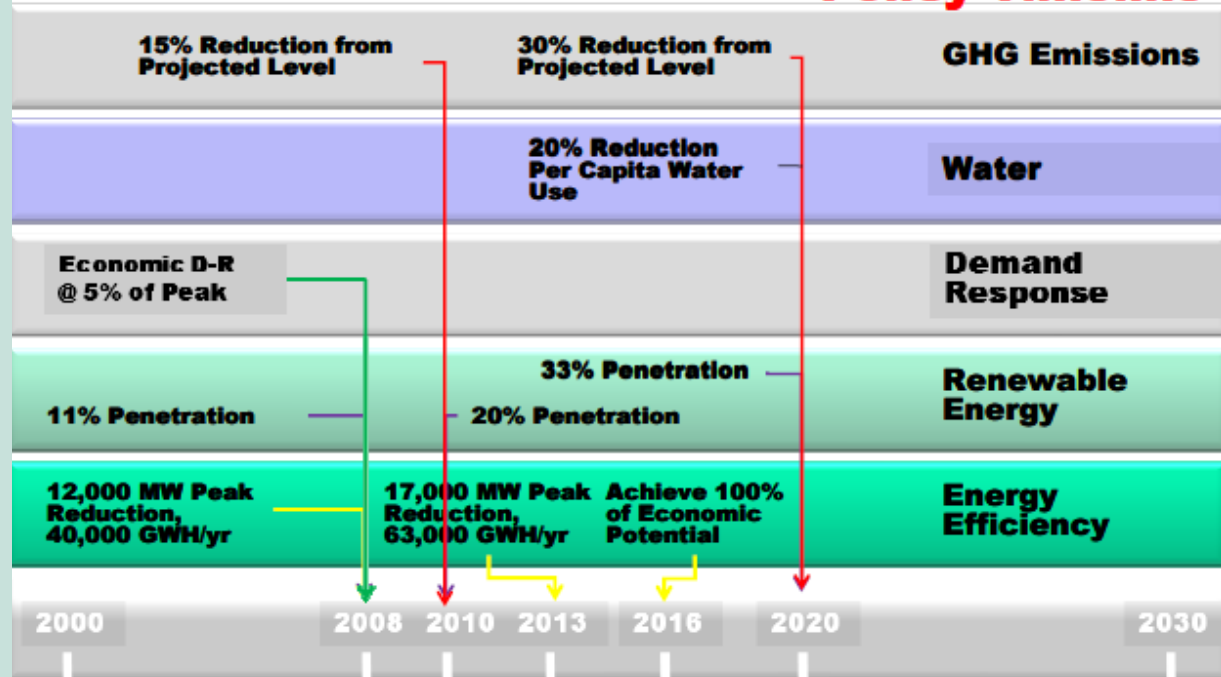


# CA “Three Birds” Approach (W/E/GHG)

- Ways to Reduce GHG Emissions from Water Sector :
  - Reducing the Amount of Water Used,
  - Energy Efficiency in the Water Cycle
  - Water Recycling, and
  - Using Cleaner / Renewable Energy Sources.

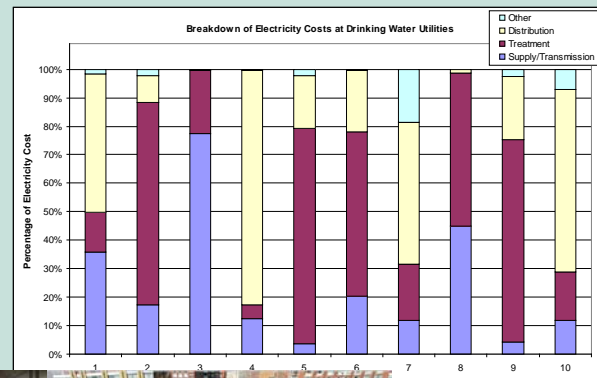
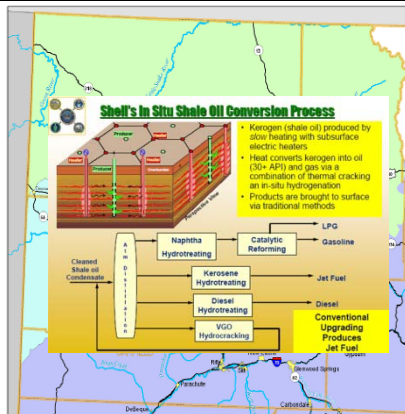
- Most Cost Effective
- Permanent Savings
- Killing Three Birds with One Stone
- Anticipated Reductions from Water Sector towards AB32 Target = 4.8 MMTCO<sub>2e</sub> Annually

## • California Responds to CC Impacts – Policy Timeline



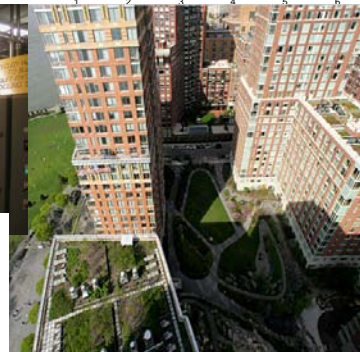


# Other Integrated W-E Program Approaches

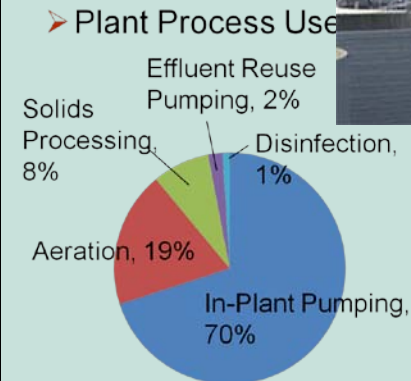


## AWWA Survey of DW Energy Demands

## Western CO Basin Roundtable Energy Studies



## Green Buildings & Microwatersheds



## WWTP Energy Use & Generation (ARPA-E?)

## USDA Rural Economic Development For Food, Ecosystems, Energy





## Plus this Week's Presentations!

- Excellent studies underway (e.g. WRF) to look at energy for wastewater and water supply → moving towards integration and sustainability?
- Remaining questions
  - Much better understanding of what to count, how to count, how to keep track.
  - What are the goals? What are the benchmarks? What reporting structures to move towards improvement from baseline
  - Where are the incentives? Who pays? What is driving these activities?



## New Twist: EO13514 – What is it?

- “Greening the Federal House”
- Signed October 5, 2009 by President Obama
- Federal Leadership in Environmental, Energy and Economic Performance (Executive Order 13514)
- Tasks Federal Agencies to develop, implement and annually update a plan that prioritizes sustainability actions based on a positive return on investment for the American taxpayer and to meet energy, water, and waste reduction targets.
- First SSPPs for 50+ agencies released 9/9/10
- Available at [www.greengov.gov](http://www.greengov.gov)
- GreenGov Symposium October 5-7, 2010 in DC (next week)



## EO13514 Water Efficiency Targets

- Note: Efficiency, not just conservation
- EO 13514 builds upon EO 13423 (potable water use intensity reduction 2% annual through FY2015 based on FY2007 baseline) as well as EISA 2007 (facility evaluations of 25% of covered facilities annually to identify water efficiency measures)
- EO 13514 requires
  - 2% annual potable water use intensity through FY20 (FY07 baseline)
  - 2% annual volumetric water use reduction for industrial, landscaping, and agricultural use (ILA) through FY2020 (FY10 baseline)
  - Improvement EPA stormwater management guidelines
  - Implement water reuse strategies (compl. w/state laws)
  - Use WaterSmart



# Zero Environmental Footprint

- Federal government as a whole “is a **fulcrum** that can leverage its “massive buying power to impact the government’s environmental footprint.”
  - Buying power, creating markets
  - Demonstration projects, establishing credibility
  - Behavioral changes
  - Contracting mechanisms (Schedules, RFPs)
  
- GSA moonshot goal is “eliminating the impact of the federal government on our natural environment.”
  - **“ZERO ENVIRONMENTAL FOOTPRINT**
  - **SHIFT FROM ZERO ENERGY FOOTPRINT**
  - **Energy, water, transportation, materials ...**



# Federal Integrated W-E/Sustainability Approach

- CEQ/White House leadership
  - guidance, fed employee input, GreenGov Symposium
- DOE FEMP
  - DOE getting into the water business???
  - PNNL Sunday workshop at GovEnergy last month (specialty buildings have interesting challenges)
  - To meet aggressive energy AND overall sustainability goals, must review water systems
  - For economic efficiency, must take approaches that meet water AND energy AND GHG targets
- DOD – the great social experiment, ahead of the game
- All 50+ other agencies
  - Example – during lunch, briefing with Mike Gabaldon on how Interior and USBR
  - 5000+ buildings (note: many landed agencies on GW)



## SSPP Goals (Chapters in Report)

- GHG Reductions (Scope 1, 2, 3, Comprehensive Inventory)
- High-Performance Sustainable Design
- REGIONAL AND LOCAL PLANNING
  - how will communities, local utilities support federal goals
- Water Use Efficiency and Management
- Pollution Prevention and Waste Elimination
- Sustainable Acquisition
- Electronic Stewardship and Data Centers
- Department Innovation



- **SAVING WATER IS:**
  - **NOT JUST ABOUT ENERGY SECURITY**
  - **NOT JUST ABOUT SAVING MONEY**
  - **NOT JUST ABOUT REDUCING GHG EMISSIONS/CLIMATE CHANGE**
  - **NOT JUST ABOUT REDUCING WATER QUALITY IMPACTS**
  
- ***Federal government taking leadership on operating more sustainably***
  
- ***Feds to consider water supply and use at federal facilities as part of energy savings and GHG reduction -- Aggressive targets***
  
- ***Impacting communities around fed facilities (w/ww/power utilities)***
  
- ***Critical to continue progress towards identifying energy use from water/wastewater systems and end use as BASELINE for future programs towards greater efficiency – and determine what to count***
  
- ***One component: understanding water and energy use of products we use at home and work → WaterSense and EnergySTAR***