



Water-Energy Cost Effectiveness Project Update



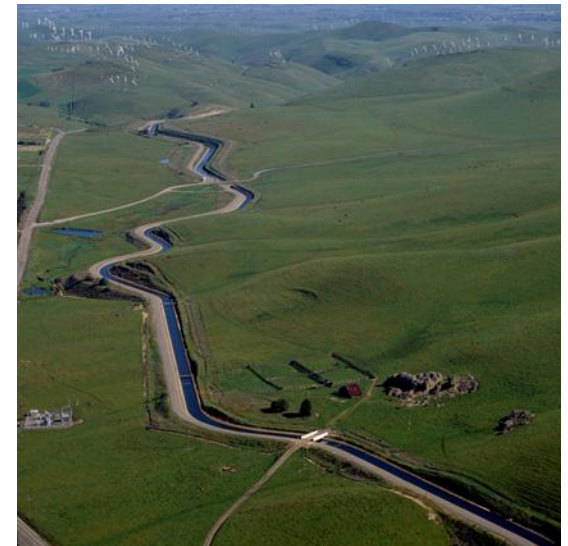
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Past and Current CPUC Proceedings on Water-Energy

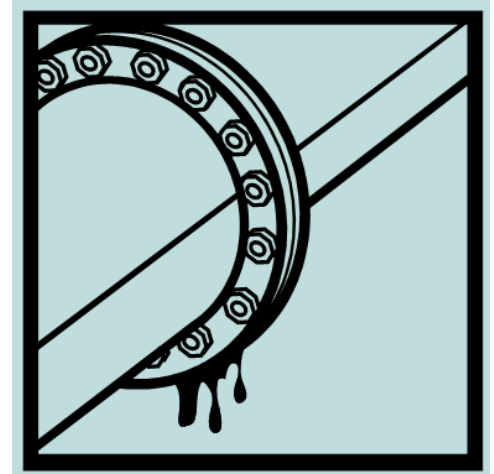
- 2007: Decision 07-12-050 authorized comprehensive Water-Energy Studies and directed IOUs to run pilot projects
- Energy Efficiency Proceeding R.09-11-014. May 2012 Guidance Decision:
 - Directed IOUs to expand water-energy efficiency programs
 - Directed staff to develop cost effectiveness framework
- New Water-Energy Proceeding opened December 2013: R.13-12-011





Past CPUC Efforts on Water-Energy

- Three comprehensive studies on the “Water Energy Relationship” (2009-2012)
- Water-Energy Pilot Projects (2007-2011)
 - Leak/loss detection and pressure management
 - Landscape irrigation efficiency
 - High efficiency toilets
 - Ozone laundry
 - More
- All materials can be downloaded via:
<http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/Water-Energy+Nexus+Programs.htm>





Water-Energy Efficiency Cost Effectiveness



- Commission Guidance (May 2012)
 - Develop a method for analyzing cost effectiveness of programs/measures that simultaneously save energy & water
 - Need to quantify embedded energy in water to calculate potential energy savings
 - Need to develop method for valuing avoided costs associated with water savings



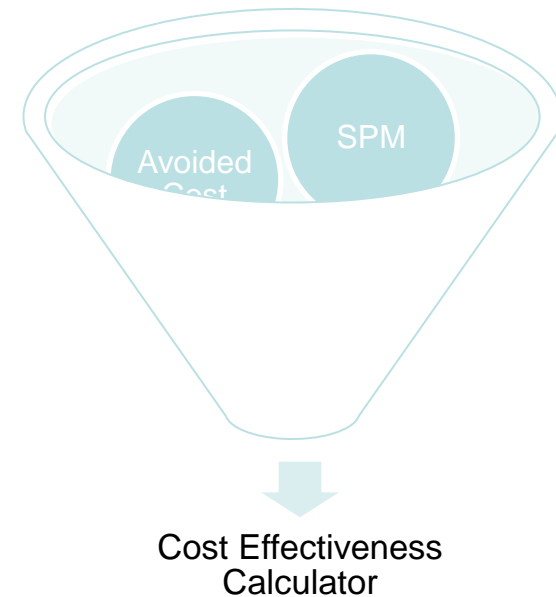


Cost Effectiveness is a Threshold and an *Estimate*

Process to evaluate and compare costs and benefits

Estimates the *Avoided Costs* of a given program, measure or project

- Avoided costs can be analyzed from different perspectives
- If programs are not proven cost effective to energy IOU ratepayers, than ratepayer funds cannot be used
- Tools:
 - Standard Practice Manual
 - Demand Side Avoided Cost Calculator
 - E3 Cost Effectiveness Calculator





The Standard Practice Manual (SPM)

- Developed to measure the cost-effectiveness of Energy Efficiency programs
- Four tests to measure cost-effectiveness from four different perspectives:
 - **Society**: The Total Resource Cost (TRC) test
“Society” defined as Utility + Participant
 - **Administrator**: The Program Administrator (PAC) test
 - **Ratepayers**: The Ratepayer Impact Measure (RIM) test
 - **Participant**: The Participant Test

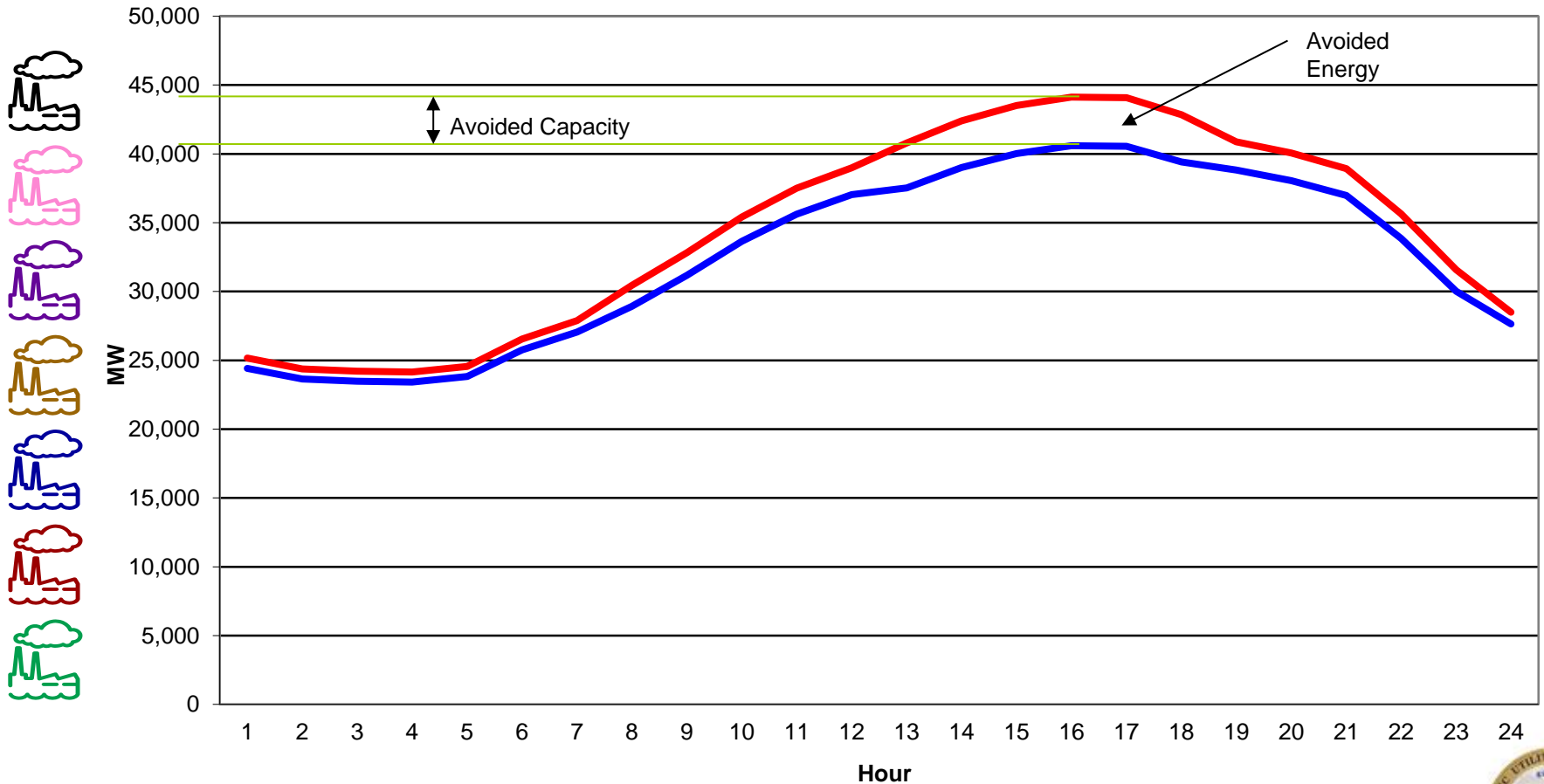
The SPM also describes the “Societal Cost Test,” a variant of the TRC that includes externalities and uses a social discount rate.





What is an Avoided Cost?

Energy Efficiency Impact on Electricity Demand



7 — Original Load (hottest day of the year) — Reduced Load due to Energy Efficiency





Goal of CPUC Cost Effectiveness Project

Develop a joint framework to analyze cost effectiveness of existing & potential Water-Energy Programs

- Primarily, this is a project to understand potential benefits to *energy* ratepayers
- Cost effectiveness requires proving that there are electric/gas ratepayer benefits from saving water
- Therefore, CPUC must ***estimate embedded energy values for water***





QUESTIONS we are trying to answer

- Is the program cost effective from energy ratepayer perspective?
 - What are the energy avoided costs from water saving programs?
- Is the program cost effective from water ratepayer perspective?
 - What are the avoided costs to the water provider from water saving programs?
- Is the program cost effective from the combined perspective?
 - If each utility contributes \$, does it = the benefit received?
- Is the program cost effective from societal perspective?
 - Benefits beyond ratepayers?





What is Embedded Energy in Water?

The amount of energy (in kWh or therms) needed to supply, move, and treat water (in million gallons (MG) or acre/ft.) delivered to a user, and to pump & treat the water post-use (if necessary)





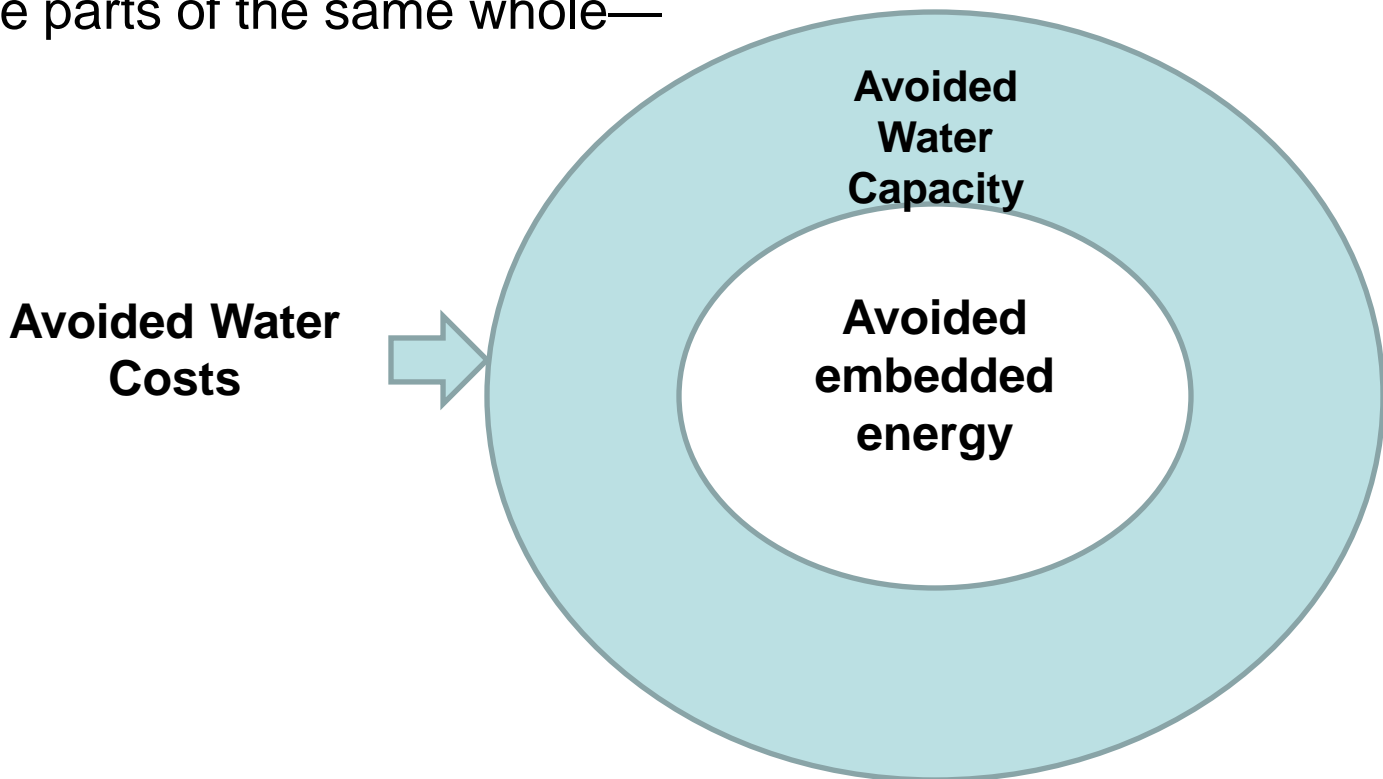
	TRC\				PAC			RIM		Participant	
	Energy	Water	Combined	Societal	Energy	Water	Combined	Energy	Water	End-User	Water Agency
Administrative costs to energy utility	COST		COST	COST	COST		COST	COST			
Administrative costs to water agency		COST	COST	COST		COST	COST		COST		COST
Avoided costs of supplying electricity	BENEFIT		BENEFIT	BENEFIT	BENEFIT		BENEFIT	BENEFIT			
Avoided costs of water capacity		BENEFIT	BENEFIT	BENEFIT		BENEFIT	BENEFIT		BENEFIT		BENEFIT
Avoided embedded utility energy in water	BENEFIT	BENEFIT	BENEFIT	BENEFIT	BENEFIT	BENEFIT	BENEFIT	BENEFIT	BENEFIT		BENEFIT
Avoided embedded additional energy in water		BENEFIT	BENEFIT	BENEFIT		BENEFIT	BENEFIT		BENEFIT		BENEFIT
Energy and Water Bill Reductions										BENEFIT	BENEFIT
Capital (measure) costs to participant	COST	COST	COST	COST						COST	COST
Capital (measure) costs to energy utility	COST		COST	COST	COST		COST	COST			
Capital (measure) costs to water utility		COST	COST	COST	COST		COST		COST		
Incentives paid by energy utility					COST		COST	COST		BENEFIT	BENEFIT
Incentives paid by water utility						COST	COST		COST	BENEFIT	
Increased supply costs	COST	COST	COST	COST	COST	COST	COST	COST	COST		
Revenue loss from reduced energy sales								COST			
Revenue loss from reduced water sales									COST		
Tax Credits	BENEFIT	BENEFIT	BENEFIT	?						BENEFIT	BENEFIT





Avoided water cost/ Avoided embedded energy

They are parts of the same whole—



....But we need to separate them to evaluate them



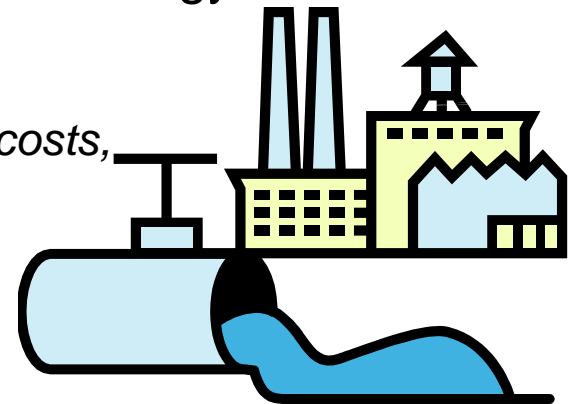


Task: Define Avoided Costs

Avoided Water Costs =

Avoided water capacity costs + Avoided embedded energy costs

Avoided water capacity costs are analogous to avoided energy capacity costs (commodity costs, capital costs, operation & maintenance costs for supply, transmission, distribution)



Avoided water capacity costs are **capital & operating** expenditures which include:

- Avoided incremental purchase price of next (marginal) water supply
- Avoided costs of new/expanded water conveyance, treatment and distribution (building new plants, etc.)
- Avoided cost of operation & maintenance of treatment & distribution system (reduced system wear & tear, reduced chemical use, etc)





Next Steps for Water-Energy Cost Effectiveness at CPUC

- 1) Stakeholder Process (Ongoing)
 - Project Coordination Group discussion-paper with input on cost effectiveness framework model and feasibility
 - PCG members include IOUs, water agencies, water policy experts
- 2) Develop Cost Effectiveness Calculations (2014)
 - Navigant/GEI consulting team chosen to conduct analysis/assist Staff
 - Expected completion Fall 2014
- 3) Staff Proposes cost effectiveness framework to Commission for consideration and potential adoption (Fall-2014)
- 4) Commission considers new programs based on this analysis (2014-2015)
- 5) Framework must include plan for periodic updates of embedded energy calculations (Future)





“Beyond Cost Effectiveness” Energy Efficiency Savings must be Measured & Verified

- Requirement: demonstrate real savings at the end of a program: for water efficiency this will mean embedded energy savings
- Without energy intensity of supplier, wholesaler and retailer, water savings by customers cannot be translated into energy savings





Questions?

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