



Arnold Schwarzenegger
Governor

REFINING ESTIMATES OF WATER-RELATED ENERGY USE IN CALIFORNIA

Prepared For:

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Prepared By:
Navigant Consulting, Inc.



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(MG) of water, and the number of kWh needed to treat and dispose of the same quantity of wastewater.

Inasmuch as water-energy is a new area of study, data were not readily available that directly related energy use to portions of the water-use cycle. Consequently, the team adjusted the existing data sets to prepare refined estimates.

Project Outcomes

Through detailed reviews of work papers and interviews with stakeholders, the study team identified a number of recommended adjustments to the water-energy relationship proxies for energy embedded in water for Northern and Southern California. Some of the recommended adjustments addressed a number of minor errors and inconsistencies in allocations made during the preparation of the WER. Others addressed adjustments needed to ensure consistency. In addition, the team recommends adjusting the estimates by segment of the water-use cycle for losses.

The type of water use determines whether wastewater treatment and disposal will be required. In general, outdoor water use, such as landscape irrigation, typically either flows into storm drains or recharges groundwater or natural waterways, bypassing need for wastewater treatment and disposal. Indoor water use typically discharges to sanitary sewers, consuming energy for wastewater treatment and disposal. To simplify application of the proxies, we recommend further breaking down the northern and southern proxies into indoor and outdoor use.

Table ES-1. Recommended revised water-energy proxies

	Indoor Uses		Outdoor Uses	
	Northern California	Southern California	Northern California	Southern California
	kWh/MG	kWh/MG	kWh/MG	kWh/MG
Water Supply and Conveyance	2,117	9,727	2,117	9,727
Water Treatment	111	111	111	111
Water Distribution	1,272	1,272	1,272	1,272
Wastewater Treatment	1,911	1,911	0	0
Regional Total	5,411	13,022	3,500	11,111

The bases for the recommended adjustments are provided in Section 2 and the appendices to this report.

Index No.	Author	Study Title	Date	Water-Related Energy Use Data Item	Comments
19	MWDSC	N/A	October 2006	1,400 kWh/ac-ft (4,298 kWh/MG)	Third-party data, via e-mail
20	Wolff (NRDC)	“Energy Down the Drain”	August 2004	1,700 kWh/ac-ft (5,219 kWh/MG) for Chino Desalter Facility	Pg. 12
21	Wolff (NRDC)	“Energy Down the Drain”	August 2004	405 kWh/ac-ft (1,243 kWh/MG) for Reynolds treatment plant in San Diego County	Pg. 13
Water Supply—Groundwater					
22	Anderson	“Energy Use in the ...”	1999	175 kWh/ac-ft (537 kWh/MG) for Tulare Lake	Pg. 4; Citing DWR; equals 1.45 kWh/ac-ft per foot of depth for cited depth of 120 feet
23	Anderson	“Energy Use in the ...”	1999	292 kWh/ac-ft (896 kWh/MG) for San Joaquin River and Central Coast	Pg. 4; Citing DWR; equals 1.45 kWh/ac-ft per foot of depth for cited depth of 200 feet
24	Burt (ITRC)	“California Agricultural...”	December 2003	335 kWh/ac-ft (1,028 kWh/MG) for irrigation district pumping	Calculated from statewide energy and water total estimates, Table 1 (Pg. vii) and Table 2 (Pg. xi)
25	Goldstein (EPRI)	“Water & Sustainability...”	March 2002	197 kWh/ac-ft (605 kWh/MG) average for municipal groundwater wells	Pg. 4-5
26	SCVWD	N/A	Forthcoming	650 kWh/ac-ft (1,996 kWh/MG)	Per telephone conversation