

# Annual Emissions Report

## California Department of Water Resources

### (Emissions from California operations)



Report Generated On: 05/29/2009 11:17 am PT

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 Industry Type: Government – State  
 NAIC Code: 9241-Administration of Environmental Quality Programs  
 SIC Code:

Description: The mission of the California Department of Water Resources (DWR) is "To manage the water resources of California in cooperation with other agencies for the benefit of the state's people and protect, restore, and enhance the natural and human environments."

DWR operates and maintains the State Water Project (SWP), including the California Aqueduct, and provides dam safety, flood control, and local water management assistance while it plans for the state's future water needs.

Primary Calculation Methodologies: Reports of emissions associated with DWR operations is derived using the California Climate Action Registry (CCAR) General Reporting Protocol, and the Power/Utility Reporting Protocol.

Continuous Emissions Monitoring Systems (CEMS) data from the SWP's Power Procurements for Reid Gardner Unit No. 4 was reported by the plant's operator to the United States Environmental Protection Agency (US EPA) Clean Air Markets Division (CAMD). DWR in turn downloaded CO2 emissions directly from the CAMD website.

For unspecified emissions, DWR applied the emissions factors reported to the CCAR when available for its bilateral counterparties. CCAR members' most recent filings report emissions factors for 2006, with the exception of one counterparty, whose most recently reported emissions are associated with 2005.

For unspecified emissions from purchases where this data is not available, DWR applied the applicable Western Electricity Coordinating Council (WECC) regional default emissions factors that are associated with the Emissions & Generation Resource Integrated Database (eGRID) most recent published default emissions factors (eGRID2006 Version 2.1, April 2007). DWR takes receipt of the energy it has acquired within the State of California. Consequently, the default emissions factor for DWR unspecified purchases is eGRID Subregion Name "WECC California" or Code "CAMX."

Some of the indirect emissions from purchased electricity disclosed in this report are estimated based on a California Registry-approved methodology for estimating electricity use, not calculated based on metered data.

Organizational structure disclosure: DWR is a State Department under the Resources Agency of the State of California, headquartered in Sacramento, responsible for monitoring, conserving, and developing California's water resources, providing public safety and preventing property damage related to water resources.

Legend	
<b>Blue</b>	= required
<b>Orange</b>	= optional

#### VERIFIED EMISSIONS INFORMATION

Reporting Year:	<b>2007</b>
Reporting Scope:	<b>CA</b>
Reporting Protocol:	General Reporting Protocol, Version 3.0, (April 2008)
Reporting Boundaries:	Management Control - Operational Criteria
Baseline Year (Direct Emissions):	2007
Baseline Year (Indirect Emissions):	2007

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Direct Emissions	CO2e	CO2	CH4	N2O	HFCs*	PFCs*	SF6	Unit
Mobile Combustion	<b>13,614.62</b>	13,614.62	0.00	0.00	0.00	0.00	0.00	metric ton
Stationary Combustion	<b>683.62</b>	683.62	0.00	0.00	0.00	0.00	0.00	metric ton
Process Emissions	<b>0.00</b>	0.00	0.00	0.00	0.00	0.00	0.00	-
Fugitive Emissions	<b>0.00</b>	0.00	0.00	0.00	0.00	0.00	0.00	-
<b>TOTAL DIRECT</b>	<b>14,298.24</b>	14,298.24	0.00	0.00	0.00	0.00	0.00	metric ton

\* HFCs and PFCs are classes of greenhouse gases that include many compounds. These columns may reflect the total emissions of multiple HFC and PFC compounds, each of which has a unique Global Warming Potential (GWP). Emissions of each gas are first multiplied by their respective GWP and then summed in the total CO2-equivalent column.

Indirect Emissions	CO2e	CO2	CH4	N2O	Unit
Purchased Electricity	<b>3,226,249.51</b>	3,226,249.51	0.00	0.00	metric ton
Purchased Steam	<b>0.00</b>	0.00	0.00	0.00	-
Purchased Heating and Cooling	<b>0.00</b>	0.00	0.00	0.00	-
<b>TOTAL INDIRECT</b>	<b>3,226,249.51</b>	3,226,249.51	0.00	0.00	metric ton

De Minimis Emissions	CO2e	CO2	CH4	N2O	HFCs*	PFCs*	SF6	Unit

Percentage of Total Inventory:

#### VERIFICATION INFORMATION

Verification Body: Eastern Research Group

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**Basis of Verification Opinion:**

ERG verified CDWR's inventory according to the GVP, version 3.0 (current protocol at the time of inventory development), including conducting site visits of nine CDWR locations throughout California. ERG found that all emission sources were accounted for. Although CDWR does not have a formal GHG Management Plan, personnel involved in GHG inventory development are informed and knowledgeable of the CCAR protocols. Detailed documentation at the facility-level within the CARROT report, as well as supporting spreadsheets and data, helped to demonstrate that appropriate methods were used. ERG focused verification efforts on verifying emissions generated from sources categorized under the Power Purchase Portfolio (PPP), which accounts for approximately 99.5% of CDWR's 2007 CO2 emissions. The PPP comprises electricity generated and purchased through energy marketers to operate the State Water Project (e.g., Nevada Power Company, American Electric Power, BP Energy Company, Calpine Energy Services, Shell Power, Duke Energy Trading, etc.). Actual power purchase records were cross checked against the PPP financial settlements spreadsheet which CDWR used to compile PPP emissions. No mistakes in the data, emission factors used, and resulting emissions estimates were found. The only difference between CDWR reported emissions and ERG calculated emissions appeared to be from rounding.

Also, spreadsheet calculations for CDWR's other direct and indirect sources were reviewed, and independent calculations were made for selected sources. These other direct and indirect sources, which comprise <0.5% of the total entity-level CO2 emissions, include: mobile sources (i.e., gasoline, diesel, and propane combustion in trucks, cars, and off-road mobile equipment); stationary sources (i.e., combustion of diesel and LPG in standby emergency generators [SEGs], and natural gas combustion for heating/cooling); and indirect electricity purchases, including power purchased through several named utility providers (e.g., Sacramento Municipal Utility District, Pacific Gas & Electric, Southern California Edison, etc.). ERG verified electricity and natural gas purchases from PG&E. ERG did not verify all data used and CDWR calculations for these other direct and indirect sources because of their relative insignificance, not all electricity, natural gas, and mobile/stationary fuel purchase receipts were readily available, and difficulty in determining how Voyager (for mobile fuels) and SAP (for stationary and mobile fuels) data were disaggregated to the facility level.

Overall, ERG found that CDWR had accounted for all sources and activity data, and had made all calculations according to the GRP. ERG found only minor errors, or differences, between emission results in CDWR's 2007 CARROT report as compared to ERG's calculations; no material misstatements (i.e., 5% or greater) were found.

Date Submitted:  
5/26/09 4:54 pm

**OPTIONAL INFORMATION**

*Information in this section is voluntarily provided by the participant for public information, but is not required and thus, not verified under California Registry protocols.*

Optional Emissions	CO2e	CO2	CH4	N2O	HFCs*	PFCs*	SF6	Unit
	<b>0.00</b>	0.00	0.00	0.00	0.00	0.00	0.00	-
<b>TOTAL OPTIONAL</b>	<b>0.00</b>	0.00	0.00	0.00	0.00	0.00	0.00	-

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**Emissions Efficiency metric:** 0.27 MT CO<sub>2</sub>/MWh

**Emissions Management Programs:**

The SWP's aqueducts and reservoirs were designed to provide water storage with some flexibility for the SWP to pump during hours of lower power demand and generate during hours of higher power demand. However, this flexibility is constrained by water delivery obligations and environmental and regulatory requirements.

In addition to the vital role of the SWP as California's water delivery system and the functions DWR performs in managing floods, the SWP provides benefits to the CAISO wholesale power grid, including consuming off-peak resources, and contributing clean, carbon-free hydroelectric generation during peak hours. SWP hydroelectric generation replaces energy provided by less efficient, carbon emission producing generators during peak hours.

DWR also provides grid participants with a zero-emissions energy product through a Demand Response option of dropping pump load up to 200 MW during the summer. This service effectively reduces greenhouse gas emissions by decreasing the amount of peak generation that would be necessary and likely served by inefficient, high carbon emitting resources. SWP is California's largest individual demand response provider.

DWR develops and administers a comprehensive power resources program for the strategic timing of generation and pumping schedules, purchase of power resources and transmission services, short-term sales of energy surpluses, and studies of resources for future needs.

DWR is continually evaluating its operational strategies and energy portfolio to increase its carbon free energy resources to complement SWP's ability to deliver water using environmentally sensitive and sustainable energy resources.

The State Water Project Power Purchase Portfolio MWh and Metric Tons of carbon dioxide represents gross emissions levels. However, when SWP power purchases exceed the energy required to serve the SWP's pumpload, DWR sells its surplus energy. Since SWP sales transactions are not tied to specific generation resources, the SWP emissions rate of 0.270 MT CO<sub>2</sub>/MWh represents MT CO<sub>2</sub> divided by MWh from all Generation Sources. This derived rate yields an estimated 395,291 MT CO<sub>2</sub> associated with Electricity Sales. Consequently, the net MT CO<sub>2</sub> associated with the SWP pumpload in 2007 equals 2,653,991 MT CO<sub>2</sub>

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#### **Emissions Reduction Projects:**

DWR operates California's SWP, the largest State-built multipurpose project in the United States. Each pump manufactured for the SWP meets the highest standards and the highest levels of efficiencies that are technically possible at the time the pumps are manufactured, refurbished, or replaced. DWR also invests substantial resources to conduct engineering feasibility and design studies to improve the overall water to energy conversion of all SWP equipment and facilities. DWR's improvement programs include pump and turbine replacements and refurbishments using state-of-the-art design and construction methods to bring SWP's hydroelectric units to first in class levels of energy efficiency. The A.D. Edmonston Pumping Plant and Edward Hyatt Powerplant are two SWP facilities where major energy efficiency projects have been undertaken with some still in progress.

A. D. Edmonston Pumping Plant is the largest plant in the SWP, with 14 pumps, each rated at 80,000 horsepower, pumping water from the California Aqueduct over Tehachapi Mountains into Southern California. Based upon the SWP's metered data, averaged over years 2002 through 2006, with increases in efficiencies measured against each unit's original efficiency levels, DWR's refurbishment of Edmonston Unit No. 6 reduces the SWP pumpload requirement by 4,020 MWh annually. Together with upgrades to Edmonston Units No. 1, 2, and 3, by 2011, the SWP pumpload requirement at Edmonston will be reduced by an estimated 40,000 MWh annually.

The SWP's largest generation resource is the Edward Hyatt Powerplant, an underground, hydroelectric, pumping-generating facility constructed in the bedrock below Lake Oroville. DWR developed the Hyatt Powerplant modernization program to increase unit efficiency in the generation mode and reduce power consumption in the pump mode. All six of Hyatt's units have been upgraded using state-of-the-art model design technologies, manufacturing techniques, and materials. DWR's refurbishment of Hyatt Unit Nos. 1 through 6 represents an estimated annual energy savings of 132,000 MWh annually.

DWR will continue its role as the State's third largest generator of clean hydropower. DWR is currently investigating ownership interest and contractual agreements to not only replace its resources provided by coal generation, but also to reduce its use of fossil fuels. This can be accomplished with a combination of cleaner, more efficient resources, including renewables, and improvements to the SWP system.

DWR's membership in the CCAR, as well as the ARB's reporting regulations which integrate and expand upon the CCAR's standards, will provide a consistent and transparent reporting mechanism of DWR's CO2 emissions and its progress in meeting California's GHG emissions reductions goals.

#### **Emissions Reduction Goals:**

The electric power needed to operate the SWP comes from its own and jointly developed hydroelectric facilities, long-term and short-term purchase agreements, and a 30 year agreement with Nevada Power Company (NPC). Since July 25, 1983, DWR has received up to 235 MW from Unit 4, one of four units at the Reid Gardner coal-fired generation facility located in Moapa, Nevada. In May 2007, DWR formally notified the plant's owner that DWR will not renew this agreement, which expires on July 25, 2013. DWR intends to replace this coal based energy with a combination of cleaner, more efficient resources, improvements to the SWP system and renewable energy resources.

DWR anticipates meeting the AB 32 goal of reducing its carbon emissions to 1990 levels at least six years earlier than the mandated reduction target for California in 2020.

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#### REFERENCE DOCUMENTS

Title	Author	Document Status	Publish Date
<a href="#">CDWR 2007 Electric Power Generation Report</a>	Holly B. Cronin	Public	05/20/2009 12:00:00AM