

COLORADO RIVER AQUEDUCT

OVERVIEW

Metropolitan was established to obtain an allotment of Colorado River water, and its first mission was to construct and operate the Colorado River Aqueduct (CRA). The CRA consists of 5 pumping plants, 450 miles of high voltage power lines, 1 electric substation, 4 regulating reservoirs, and 242 miles of aqueducts, siphons, canals, conduits and pipelines terminating at Lake Mathews in Riverside County. Metropolitan first delivered CRA water in 1941 to its member agencies.

Metropolitan owns, operates, and manages the Colorado River Aqueduct. Metropolitan is responsible for operating, maintaining, rehabilitating, and repairing the CRA, and is responsible for obtaining and scheduling energy resources adequate to power pumps at the CRA's five pumping stations.

Under its contracts with the federal government, Metropolitan has a fourth priority to 550,000 acre-feet per year of Colorado River water, less certain use by higher priority holders and Indian tribes. Metropolitan also holds a fifth priority for an additional 662,000 acre-feet per year that exceeds California's 4.4 million acre-foot per year basic apportionment, 38,000 acre-feet under the sixth priority during the term of the Colorado River Water Delivery Agreement, and another 180,000 acre-feet per year when surplus flows are available. Metropolitan can obtain water under the fourth, fifth, and sixth priorities from:

- Water unused by the California holders of priorities 1 through 3;
- Water saved by extraordinary conservation programs, crop rotation, and water supply program; or,
- When the U.S. Secretary of the Interior makes available:
 - o Surplus water, Intentionally Created Surplus water, and/or
 - o Water apportioned to, but unused by, Arizona and Nevada.

CRA Cost Summary¹, \$ millions

	2014/15 Actual	2015/16 Budget	2016/17 Proposed	Change from 2015/16	2017/18 Proposed	Change from 2016/17
CRA Power	\$39.6	\$36.5	\$46.6	\$10.1	\$54.4	\$7.8
CRA Dues ²	\$0.6	\$0.6	\$0.7	\$0.1	\$0.7	\$0
Acre-feet delivered	1,185,493	876,000	857,100	(18,900)	881,850	24,750

¹ Does not include Departmental costs reflected elsewhere in this Budget

²Six Agency and Colorado River Authority of California

Budgeted CRA Power costs represent expenditures for the Hoover and Parker contracts and market power purchases to support budgeted CRA water deliveries.

CRA COSTS FOR TRANSPORTATION AND SUPPLY

Metropolitan incurs capital and operations and maintenance expenditures to support the CRA activities. The direct costs of the CRA activities include labor, materials and supplies, outside services to provide repair and maintenance, and professional services. The CRA activities benefit from Water Systems Operations support services and management supervision, as well as Administrative and General activities of Metropolitan. Metropolitan finances past, current and future capital improvements on the CRA, and capitalizes those improvements as assets. The costs of Metropolitan’s capital financing activities are apportioned to service functions, such as the CRA.

The costs of the CRA supply portfolio developed by Metropolitan are paid by Metropolitan. The CRA supply portfolio is supported by Water Resource Management labor, materials and supplies. The CRA supply portfolio activities benefit from Water Resource Management support services and management supervision, as well as Administrative and General activities of Metropolitan. Metropolitan finances past, current and future capital improvements associated with the CRA supply portfolio capital assets and has capitalized these investments as Participation Rights.

Accordingly, the CRA costs for transportation and supply are reflected in the Departmental and General District Requirements budgets

CRA COST FOR POWER

Metropolitan currently has four basic sources of power available to meet CRA energy requirements: Hoover Power, Parker Power, Benefit Energy from Southern California Edison (SCE), and wholesale purchases from entities in the Western United States. Each source is obtained at different unit prices

Cost of CRA Power Sources, \$ per Megawatt-hour (MWh)

	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Hoover ¹	\$16.81	\$17.26	\$18.60	\$29.74	\$15.84
Parker ¹	\$20.13	\$17.27	\$9.33	\$12.41	\$13.55
SP15, off-peak ²	\$23.73	\$23.44	\$33.15	\$40.24	\$33.15
SP15, on-peak ³	\$37.53	\$33.45	\$45.38	\$50.90	\$40.68

¹Information from Annual Reports for years 2011, 2012, 2013, 2014, and 2015

²SP15, off-peak price, described below, is used to determine the market value of Benefit Energy. Benefit Energy is available to Metropolitan for use only during off-peak hours. Thus, to the extent Benefit Energy is not available to meet Metropolitan’s off-peak energy needs, Metropolitan must purchase off-peak power.

³SP15, on-peak, described below, is used to determine the market value of Metropolitan’s sales of excess energy, if any. SP15 on-peak is also used to determine the pumping costs associated with pumping non-Metropolitan water through the CRA system, unless otherwise provided by contract.

Under a contract between the United States, Department of Energy, Western Area Power Administration, and Metropolitan, Metropolitan currently has a right to approximately 247 megawatts (MW) of capacity at the Hoover Power Plant, which is about 12 percent of the total generating capacity. Metropolitan has an annual firm energy entitlement of 1,291 megawatt-hours (MWh) (904 MWh in summer and 387 MWh in winter), which is about 28 percent of the total Boulder Canyon Project (Hoover) firm energy allocations. This contract expires in 2017; a follow-on contract is in the process of negotiations. Hoover Power Plant generation is cost-

based. Metropolitan acquired the benefits of the low-cost, federally funded hydroelectric plant in order to cost-effectively deliver Metropolitan's Colorado River water to its member agencies.

Under a contract among the United States, Department of the Interior, Bureau of Reclamation (Reclamation) and Metropolitan, Metropolitan funded the total cost of construction of Parker Dam and incidental facilities, and 50 percent of the construction cost of the Parker Powerplant. By providing the funding contribution, Metropolitan is entitled in perpetuity to 50 percent of the capacity and energy of the four Parker generating units, which is approximately 60 MW of capacity. Parker power is also cost-based. Like Hoover power, Metropolitan acquired the benefits of the low-cost, federally funded hydroelectric plant in order to cost-effectively deliver Metropolitan's Colorado River water to its member agencies.

Metropolitan has a Service and Interchange Agreement (Agreement) with SCE that provides services and benefits to both parties. The Agreement expires in 2017. Under the Agreement, SCE can dispatch Metropolitan's Hoover Dam and Parker Dam power entitlements and utilize excess transmission capacity on Metropolitan's CRA transmission system. SCE in return must meet Metropolitan's CRA energy and reliability requirements on a continuous basis. SCE must also provide Benefit Energy, the amount of which is determined annually, at no cost to Metropolitan for the benefits SCE receives.

Benefit Energy is the energy SCE provides to Metropolitan in consideration of the benefits SCE receives under the Service and Interchange Agreement. There is no charge for this energy. The amount of Benefit Energy available annually depends on the amount of water diverted through the CRA, and thereby the amount of energy used. Because SCE is obligated to meet the energy and reliability requirements of the CRA, SCE benefits if the CRA is not operating at full capacity. The relationship between the amount of Benefit Energy provided and pumping load is inverse: the more Metropolitan pumps, the less Benefit Energy SCE provides. Therefore, under a high diversion scenario, Metropolitan receives slightly less Benefit Energy to meet pumping loads than would be realized under a lower diversion scenario. The minimum amount of Benefit Energy provided annually by SCE is 200,000 MWh. The contract sets maximum and minimum amounts of Benefit Energy that can be allocated monthly. Benefit Energy can only be used to meet off-peak energy requirements. A follow-on contract to the Service and Interchange Agreement is in the process of negotiations.

Metropolitan's current basic resource mix is very cost effective but is not sufficient to pump Metropolitan's Colorado River water supplies in all years. For that reason, Metropolitan is required to purchase supplemental power to transport Colorado River water supplies in some years. As a result, Metropolitan requires that any party seeking to transport non-Metropolitan water through its Colorado River Aqueduct to purchase, or arrange for Metropolitan to purchase, the power supplies required to pump that water. The amount of power required to pump an acre-foot of water through the CRA is 2,000 kilowatt-hours. The additional pumping would also reduce the amount of Benefit Energy available to Metropolitan under the Service and Interchange Agreement with SCE. To compensate for this loss of Benefit Energy to Metropolitan, an additional 317 kilowatt-hours per acre-foot of water pumped must be provided to Metropolitan. Finally, any Colorado River water that is pumped through Metropolitan's CRA is diverted above Parker Dam and cannot generate energy for Metropolitan's use at the Parker Powerplant. To compensate for this loss, an additional 32 kilowatt-hours per acre-foot are required to make Metropolitan whole for undertaking to pump non-Metropolitan water through the CRA that would otherwise have flowed through the Parker Powerplant. In total, 2,349 kilowatt-hours (or 2.349 megawatt-hours) of energy must be provided to Metropolitan to convey each acre-foot of non-Metropolitan water supplies through the CRA.

Supplemental power can be purchased and transmitted to Metropolitan to pump non-Metropolitan water through the CRA. The market rate for electric energy prices is regularly tracked and published for various regions in California. Metropolitan uses the Platt's Market Report index and the California Independent System Operator (CAISO) Open Access Same-time Information System (OASIS) Day-Ahead Locational Marginal Price as reflective of the supplemental power costs for electric energy used for its pumping plants

on the CRA. The regional index applicable to energy sold for use on the CRA is designated as “South-of-Path 15”, or SP15.

Any party seeking to pump non-Metropolitan water through the CRA would have to purchase, or arrange for Metropolitan to purchase on its behalf, supplemental power. The market cost for purchases of power for the CRA is reflected in the SP15 index published by Platt’s Market Report or the CAISO OASIS Day-Ahead Locational Marginal Price. Because Metropolitan utilizes the pumping capacity on the CRA for its own water supplies during off-peak hours to minimize its costs, the pumping of non-Metropolitan water would occur during on-peak hours and the on-peak price index published in Platt’s Market Report or the CAISO OASIS Day-Ahead Locational Marginal Price is indicative of the price that would be paid to pump non-Metropolitan water.

Metropolitan from time to time sells excess energy into the wholesale market and realizes revenues, which offset the total cost of energy as reflected in the System Power Rate. If Metropolitan were to deliver additional water through the CRA, these sales become a lost opportunity. The on-peak price index published in Platt’s Market Report or the CAISO OASIS Day-Ahead Locational Marginal Price is indicative of the price that Metropolitan could realize by selling excess energy.

South-of-Path 15 On-Peak Energy Prices, \$/MWh

	CY 2011	CY 2012	CY 2013	CY 2014	CY 2015
January	\$ 37.13	\$ 28.73	\$ 46.15	\$ 49.53	\$ 35.70
February	\$ 38.13	\$ 29.05	\$ 46.45	\$ 71.85	\$ 31.88
March	\$ 32.72	\$ 24.85	\$ 51.39	\$ 52.06	\$ 30.73
April	\$ 36.01	\$ 29.33	\$ 56.34	\$ 51.19	\$ 29.03
May	\$ 34.91	\$ 31.36	\$ 51.49	\$ 51.85	\$ 28.11
June	\$ 36.98	\$ 31.43	\$ 47.77	\$ 50.90	\$ 37.01
July	\$ 41.20	\$ 36.46	\$ 51.74	\$ 53.18	\$ 39.27
August	\$ 42.25	\$ 44.32	\$ 45.44	\$ 50.47	\$ 39.02
September	\$ 41.53	\$ 41.99	\$ 48.91	\$ 51.49	\$ 38.00
October	\$ 34.78	\$ 42.81	\$ 42.82	\$ 49.06	\$ 35.55
November	\$ 34.49	\$ 39.84	\$ 44.13	\$ 49.28	\$ 30.22
December	\$ 32.59	\$ 38.77	\$ 52.14	\$ 41.80	\$ 29.83

MWh = megawatt-hour, or 1,000 kilowatt-hours

As key contracts expire in 2017, namely Hoover and the SCE Service and Interchange Agreement, Metropolitan’s resource mix and costs will likely change. Metropolitan has an obligation to acquire and surrender emissions allowances for the generation that is imported into California. As these factors continue to develop, Metropolitan may face increased exposure to both on- and off-peak wholesale energy prices.

BUDGET HIGHLIGHTS

The budget for the CRA power is increasing due to expiration of the SCE Service and Interchange Agreement and the loss of Benefit Energy. Benefit Energy is replaced by market purchases, which increases the operating costs.