

Advanced Metering Infrastructure to Enhance Water Use Efficiency and Energy Efficiency

Location:

Rancho California Water District Service Area, Temecula, CA

FINAL PROJECT REPORT



U.S. Department of Interior, Bureau of Reclamation
Agreement Number R14AP00074



Rancho California Water District

42135 Winchester Rd.
P.O. Box 9017
Temecula, CA 92589-9017

July 30, 2016

1. Recipient Information

Rancho California Water District
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2. Final Funding Information

	Project Expenditures
Non-Federal Entities	
1. Rancho California Water District	\$2,626,977.01
<i>Non-Federal Subtotal</i>	\$2,626,977.01
Other Federal Entities	\$0.00
Bureau of Reclamation	\$300,000.00
Total Project Funding	\$2,926,977.01

3. Project Summary

The Advanced Metering Infrastructure to Enhance Water Use Efficiency and Energy Efficiency Project (AMI Project) includes: 1) an upgrade of 20,165 Encoder Radio Transmitter (ERT) devices, which provide for "drive-by" collection of water consumption data, to an Advanced Metering Infrastructure (AMI) Itron 1 OOW Choice Connect Network System that will automatically collect and store hourly consumption data, and 2) deployment of a web-based application (Customer Portal) through which customers can access their accounts to view both real-time flow information and 13 months of historical usage data. The upgrade to a fully automated AMI system leads to wide-ranging efficiency improvements resulting in water savings of 1,344.91 acre-feet per year (AFY), 83,258 AFY of water better managed, 4.9 million kilowatt hours (kWh) per year in energy savings, and carbon emissions reductions on the order of 1,728.15 metric tons (MT) per year. Through remote access to historical and real-time consumption data, the District will gain information on peak demand periods, consumption trends, and system leaks, which can then be used to make efficiency improvements including improved efforts pertaining to long-range planning, water management and water conservation, leak detection and repair, on-demand customer service, simplified billing processes, and greatly reduced meter maintenance costs. Furthermore, deployment of a Customer Portal through which water users will have online access to their own real-time hourly water usage data will prompt District customers to make positive changes to their water use behaviors.

4. Final Project Description

RCWD implemented the AMI Project as part of its long-term goal of water supply reliability and efficient water management.

The AMI Project included the upgrade of 20,165 ERT devices, which provide for “drive-by” collection of current consumption data, with the AMI Itron 100W Choice Connect network System that automatically collects and stores hourly consumption data, aiding in water conservation and water use efficiency, improved water management, energy savings, and reduced carbon emissions. The Project benefits all Rancho California Water District (RCWD/District) customers.

The Project began in early 2014, ahead of the proposed October 1, 2014 start date, and has been completed within the proposed 24-month project duration. The Project was on schedule and was completed by the end of April 2016.

The following table provides a description of the Tasks and Milestones completed for the AMI Project.

Project Task	Milestones	Proposed End (Completion) Date	Actual End Date
Task 1: Assign Project Managers/Hold Kick Off Mtg.	<ul style="list-style-type: none"> Set up Project Management Team Hold Kick-Off Meeting/Finalize Scope of Work 	January 2014	Mid-Feb 2014 Mid-March 2014
Task 2: Install 3 Cell Control Antennas and 9 Network Repeaters	<ul style="list-style-type: none"> Installed infrastructure to support AMI system <i>Deliverable:</i> Agreements with City of Temecula on site locations (submitted in a progress report)	August 2014	August 2014
Task 3: Implement AMI System	<ul style="list-style-type: none"> Notify customers when work will be done on their service Transfer customer service information from old system to 100W network Remove existing ERT and install AMI 100W Choice Connect Device <i>Deliverable:</i> Customer notification (submitted in a progress report)	April 2015	May 2014 March 2014 September 2014
Task 4: Final Implementation	<ul style="list-style-type: none"> Achieve an overall 95% meter read rate throughout the service area with less than 2% failure rate for the 100W devices Make water usage data available to individual customers (Customer Portal) /MyWaterTracker 	Sept 2015	September 2014 October 2015
Task 5: Performance Monitoring and Reporting	<ul style="list-style-type: none"> Quantify water savings, water better managed, energy savings and carbon emissions savings 	April 2016	April 2016
Task 6: Grant Management and Reporting	<ul style="list-style-type: none"> Prepare and submit performance reports and SF425 Federal Financial Reports Submit periodic financial reimbursement request using the ASAP system Prepare and submit Final Project Report at end of project 	Semi-Annually beginning March 31, 2015	April 2016 Final Project Report – June 29, 2016

5. Accomplishment of Project Goals

The AMI Project has been successfully implemented. All tasks are completed including making water use data available to customers through a MyWaterTracker tool; quantification of water savings, water better managed, energy savings, and carbon emissions savings; and submission of this Final Report.

The MyWaterTracker tool was originally made available (in June 2015) far in advance of the proposed completion date, and has been improved many times since then. Many of the District's customers have provided positive comments regarding the tool, and it was featured on March 22, 2016 at the White House Water Summit as one of many innovative tools that catalyze change in how we use, conserve, protect and think about water.

The following sections show the proposed goals for water conserved, better managed, and energy savings and their actual results.

6. Amount of Water Conserved, Marketed or Better Managed

A. RCWD Total Water Supply (average annual available in AF/Y)

Average annual supply over 10-15 years is approximately 75,000 AF/Y. However, the recent drought conditions, specifically in the past three years, have limited supply. The average annual supply in the past three (3) years is approximately 63,437 AFY. Total RCWD water supply includes imported treated, groundwater, and recycled water.

B. Amount of Water Conserved, Marketed or Better Managed as a Result of the AMI Project.

The following table summarizes the proposed Project benefits and the actual Project benefits as of April 25, 2016:

AMI Project Benefits		
	Proposed	Actual
Water Better Managed	83,258 AFY	54,210 AFY
Water Savings	1,345 AFY	2,429 AFY
Energy Savings	4,900,000 kWh/year	9,799,558 kWh/year
Carbon Emissions Reductions	1,728.15 metric tons (3,809,919 pounds CO ₂ e/year)	2724.78 metric tons (6,007,129 pounds CO ₂ e/year)

C. Calculation of Amounts Stated in 6.B

1) Calculation Information/Data Relied on for Project Benefits:

To quantify water savings, water better managed, energy savings, and carbon emissions savings, the District analyzed water usage data for each of the AMI Itron 100W Choice Connect units installed as part of the Project.

Water better managed is shown as the total demand for calendar year 2015. This amount is lower than the proposed 83,258 AFY of water better managed due to a reduction in water demand during drought conditions and the District's efforts to reduce demand during water shortage conditions.

For water savings, twelve (12) months of water usage prior to the installation of each device was compared to the twelve months of usage following installation of that device. Usage was adjusted for the post-implementation period for each device to reflect differences in weather (evapotranspiration). The analysis showed that usage following device installation decreased by 12%, or 2,429 acre feet. The District recognizes that factors other than those related to the installation of the devices likely contributed to this usage reduction (i.e. drought-related factors); however, knowing the degree to which each factor contributed to the usage reduction is not possible. Therefore, this analysis did not account for the contribution of these other factors.

Energy savings were calculated based on the water supply saved, and on the assumption that all water saved is imported water. RCWD imported water comes from both the State Water Project (SWP) and the Colorado River Aqueduct (CRA). Based on average imported water supply between 2009-2013 for Eastern Municipal Water District (EMWD) and Western Municipal Water District (WMWD), approximately 80% of RCWD's imported water is delivered from the SWP and 20% from the CRA. With 2,429 AFY of water saved, this equals 1,943 AFY from the SWP and 486 AFY from the CRA.

According to the California Department of Water Resources (DWR) Bulletin B-132-14, pumping SWP water supply to Pearblossom Station, the first point "upstream" from where RCWD receives SWP water, results in energy demands of 4,549 kWh/AF. The CRA requires 1,976 kWh/AF according to CPUC Study 1. Therefore, based on the quantity of water saved through implementation of the Conversion Program and applying these energy requirements for importing water, the District's reduction of imported water will result in energy savings of 9,799,558 kWh/yr (1,943 AFY x 4,549 kWh/AF + 486 AFY x 1,976 kWh/AF = 9,799,558 kWh/yr).

Greenhouse gas (GHG) emissions reduced are estimated based on the energy reduced per year multiplied by the total output emission rate of 613.28 lb CO₂e/MWh or 0.613 lb CO₂e/kWh for California (as reported for

the CAMX sub-region in the U.S. Environmental Protection Agency Emissions & Generation Resource Integrated Database (eGRID) 9th edition Version 1.0 Year 2010 Summary Tables, Page 1.). Therefore, $9,799,558 \text{ kWh/yr} \times 0.613 \text{ lb CO}_2\text{e/kWh} = 6,007,129 \text{ lb CO}_2\text{e/yr}$.

2) Reliability of Information/Data

The data relied upon for the water savings calculation includes water usage data for each of the AMI Itron 100W Choice Connect units installed as part of the Project. All of the data used for the calculation are considered extremely accurate and reliable.

3) Supporting Data Attached

Project benefits were calculated using accurate AMI data as reported by the District's fixed network. The data report is extensive and too large to attach, although a digital copy can be made available upon request.

D. Use of Conserved Water

Water conserved as a direct result of the AMI Project was not pumped from its sources to the District. The sources include the California Bay Delta, the Colorado River, and the District's local aquifer. For each acre foot of water conserved, approximately one-third would have originated in the local aquifer, and two-thirds would have been imported. Of that import water, about two-thirds would have originated in the Colorado River watershed, and the remainder in the Bay Delta.

E. Future Tracking of Project Benefits

RCWD has no plans to track the Project benefits in the future beyond the current Project benefits identified. However, should Reclamation request that an analysis of water savings be conducted in the future, RCWD would provide the analysis.

7. Amount of Renewable Energy Added

The AMI Project includes the use of technologies that contain renewable energy components (solar panels). The solar panels are powering two (2) CCUs and five (5) of the Network Repeater antennas. Each CCU and Network Repeater, combined, require 10 watts of power per hour to operate, resulting in an estimated total annual energy savings 613.2 kWh per year. However, since the amount of energy savings is inconsequential, the energy savings calculations are not shown.

8. Project Collaboration, Stakeholder Involvement or Formation of Partnerships

The District collaborated with the City of Temecula to site and install infrastructure to support the AMI system, including CCUs and network repeater antennas. After the City provided permits for the sites and agreements were executed with the City, three (3) Cell Control antennas and nine (9) network repeaters were installed.

9. Other Pertinent Issues Regarding the AMI Project

None.

10. Feedback to Reclamation Regarding the WaterSMART Program

None.

11. Attachments – Provided upon request

Since the AMI Project is District-wide, it is not feasible to provide maps, drawings, or photos of any specific site. The Final Project Costs are shown in the next section. All items listed as follows have been previously provided and will be provided again upon Reclamation's request.

- City of Temecula Permits
- Online Customer Notification

12. Final Project Costs

Budget Item Description	Computation				Recipient Funding	Other Funding	Reclamation Funding	Total Cost
	FY1314 Rate \$/Hrs or Unit	FY1314 Quantity (Hrs or Units)	FY1415 Rate \$/Hrs or Unit	FY1415 Quantity (Hrs or Units)				
					89.750517226%		10.156822%	100%
Salaries and Wages								
Project Manager (Field Services Manager)	\$ 64.2533	22.50	\$ 67.9370	23.50	\$ 2,733.23		\$ 308.99	\$ 3,042.22
Operations Manager			\$ 71.4042	31.00	\$ 1,988.71		\$ 224.82	\$ 2,213.53
Senior Conservation/Water Use Efficiency Analyst							\$ -	\$ -
AMI Specialist	\$ 37.1808	154.00	\$ 37.1809	456.50	\$ 20,393.43		\$ 2,305.49	\$ 22,698.92
Meter Service Worker	\$ 22.8546	92.00	\$ 22.9134	92.50	\$ 3,793.28		\$ 428.83	\$ 4,222.11
Senior Water Resources Planner			\$ 60.6200	2.00	\$ 108.93		\$ 12.31	\$ 121.24
Salaries and Wages Subtotal			260.06		\$ 29,017.58	\$ -	\$ 3,280.44	\$ 32,298.02
Fringe Benefits	72.91%		77.71%					
Project Manager (Field Services Manager)	\$ 1,054.06		\$ 1,240.66		\$ 2,061.65		\$ 233.07	\$ 2,294.72
Operations Manager			\$ 1,720.13		\$ 1,545.42		\$ 174.71	\$ 1,720.13
Senior Conservation/Water Use Efficiency Analyst			\$ -		\$ -		\$ -	\$ -
AMI Specialist	\$ 4,174.71		\$ 13,189.78		\$ 15,600.81		\$ 1,763.68	\$ 17,364.49
Meter Service Worker	\$ 1,533.02		\$ 1,647.06		\$ 2,857.09		\$ 322.99	\$ 3,180.08
Senior Water Resources Planner			\$ 94.22		\$ 84.65		\$ 9.57	\$ 94.22
Fringe Benefits Subtotal	\$ 6,761.79		\$ 17,891.84		\$ 22,149.62	\$ -	\$ 2,504.02	\$ 24,653.64
Travel								
N/A								
Equipment								
Cell Control Unit Antennas (Itron)	\$ 11,688.40				\$ 10,501.23		\$ 1,187.17	\$ 11,688.40
Network Repeater Antennas (Itron)	\$ 28,674.00				\$ 25,761.63		\$ 2,912.37	\$ 28,674.00
Misc. Supplies (Hank's Hardware)	\$ 299.29		\$ 53.89		\$ 317.31		\$ 35.87	\$ 353.18
Customer Portal Software (Itron)	\$ (15,000.00)				\$ (15,000.00)		\$ -	\$ (15,000.00)
Equipment Subtotal	\$ 25,661.69	-	\$ 53.89	-	\$ 21,580.17	\$ -	\$ 4,135.41	\$ 25,715.58
Supplies/Materials								
100W ERT (Itron)	\$ 1,021,755.67		\$ 451,011.68		\$ 1,323,180.99		\$ 149,586.36	\$ 1,472,767.35
100W Through the Lid Antennas Kit (Itron)	\$ 633,898.79		\$ (7,776.00)		\$ 562,528.61		\$ 63,594.18	\$ 626,122.79
AMI Ready Meter Registers (Badgers Meters)	\$ 262,750.18				\$ 236,063.11		\$ 26,687.07	\$ 262,750.18
Supplies/Materials Subtotal	\$ 1,918,404.64	-	\$ 443,235.68	-	\$ 2,121,772.71	\$ -	\$ 239,867.61	\$ 2,361,640.32
Contractual/Construction								
100W ERT Installation (Itron)	\$ 70,711.35		\$ 275,943.10		\$ 311,445.37		\$ 35,209.08	\$ 346,654.45
Project Management			\$ 30,006.81		\$ 26,959.07		\$ 3,047.74	\$ 30,006.81
Cell Control Unit and Network Repeater Antennas Install (Itron)	\$ 1,999.29		\$ 2,009.82		\$ 3,601.91		\$ 407.20	\$ 4,009.11
Contractual/Construction Subtotal	\$ 72,710.64	-	\$ 307,959.73	-	\$ 342,006.35	\$ -	\$ 38,664.02	\$ 380,670.37
Other								
Retained by BOR for Environmental Compliance			\$ 1,323.00		\$ -		\$ 1,323.00	\$ 1,323.00
Other Subtotal								
Total Direct Costs	\$ 1,997,877.07	-	\$ 770,670.31	-	\$ 2,536,526.43	\$ -	\$ 289,774.50	\$ 2,826,300.93
			<i>Basis</i>					
FY1314 Indirect Costs: 306.57% of Salaries and Wages	\$ 28,431.81				\$ 25,544.04		\$ 2,887.77	\$ 28,431.81
FY1415 Indirect Costs: 313.78% of Salaries and Wages			\$ 72,244.27		\$ 64,906.54		\$ 7,337.73	\$ 72,244.27
Total Indirect Costs	\$ 28,431.81		\$ 72,244.27		\$ 90,450.58	\$ -	\$ 10,225.50	\$ 100,676.08
Total Project Costs					\$ 2,626,977.01	\$ -	\$ 300,000.00	\$ 2,926,977.01