

**Quality and Productivity Commission**  
**32<sup>nd</sup> Annual Productivity and Quality Awards Program**  
*“Innovating for Impact”*

**2018 APPLICATION**

Title of Project (Limited to 50 characters, including spaces, using Arial 12 point font):

**NAME OF PROJECT:**

**HYDRO TURBINE AT M-7W PRESSURE REDUCTION STATION**

**DATE OF IMPLEMENTATION/ADOPTION:** **JUNE 19, 2017**

(Must have been **fully** implemented for a **minimum of** at least one year - on or before July 1, 2017)

**PROJECT STATUS:**  Ongoing  One-time only

**HAS YOUR DEPARTMENT PREVIOUSLY SUBMITTED THIS PROJECT?**  Yes  No

**EXECUTIVE SUMMARY:** Describe the project in 15 lines or less using Arial 12 point font. State clearly and concisely what difference the project has made.

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In an effort to utilize renewable energy, the County of Los Angeles Department of Public Works (DPW), Waterworks Districts (LACWD), in a partnership with the Internal Services Department (ISD), successfully installed a small Hydro Energy Recovery Pressure Reducing Turbine (PRT), which converts excess water pressure energy to electricity, at a potable water pressure reduction facility located in Palmdale, California. DPW supplies water throughout the Antelope Valley. Water supplies are managed by pumping groundwater and purchasing imported surface water. Water collected from the two sources is stored in tanks and then redistributed to the neighboring communities. The newly installed PRT produces up to 248 kilowatts (kW), from flow rate of 8 cubic feet per second and a pressure differential of 330 feet-head. This renewable energy is being used to operate groundwater well pumps and booster pumps. From June 19, 2017 to May 1, 2018, the PRT's total electricity production has exceeded 1,200,000 kilowatt hours (kWh), resulting in \$120,000 in electrical cost savings and a reduction of 893 metric tons of greenhouse gas emission, equivalent to emission by 191 cars driven for one year.

**BENEFITS TO THE COUNTY**

(1) ACTUAL/ESTIMATED ANNUAL COST AVOIDANCE	(2) ACTUAL/ESTIMATED ANNUAL COST SAVINGS	(3) ACTUAL/ESTIMATED ANNUAL REVENUE	(1) + (2) + (3) = TOTAL ANNUAL ACTUAL/ESTIMATED BENEFIT	SERVICE ENHANCEMENT PROJECT
<b>\$ 0</b>	<b>\$140,000</b>	<b>\$ 0</b>	<b>\$ 140,000</b>	<input type="checkbox"/>

**ANNUAL = 12 MONTHS ONLY**

**SUBMITTING DEPARTMENT NAME AND COMPLETE ADDRESS**  
 County of Los Angeles Department of Public Works/Waterworks District  
 900 S Fremont Ave Alhambra, CA 91803

**TELEPHONE NUMBER**

**PROGRAM MANAGER'S NAME**  
 Ramy Mattar

**TELEPHONE NUMBER**  
 626-300-3354

**EMAIL**  
 rmattar@dpw.lacounty.gov

**PRODUCTIVITY MANAGER'S NAME AND SIGNATURE**  
(PLEASE CALL (213) 893-0322 IF YOU DO NOT KNOW YOUR PRODUCTIVITY MANAGER'S NAME)  
 Leslie Schenk

**DATE**

**TELEPHONE NUMBER**  
 626-458-5946

Original Signature on File

**EMAIL**  
 lschenk@dpw.lacounty.gov

**DEPARTMENT HEAD'S NAME AND SIGNATURE**  
 Mark Pestrella

**DATE**

**TELEPHONE NUMBER**  
 626-458-4001

Original Signature on File

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**1<sup>st</sup> FACT SHEET – LIMITED UP TO 3 PAGES ONLY:** Describe the **challenge(s), solution(s), and benefit(s)** of the project **to the County**. What quality and/or productivity-related outcome(s) has the project achieved? Provide measures of success **and specify assessment time frame**. Use Arial 12 point font.

**Challenge:**

The County of Los Angeles Department of Public Works (DPW), Waterworks Districts (LACWD) provides customers of five water systems in the Antelope Valley, Kagel Canyon, Val Verde, Acton, and Malibu with potable water from local groundwater and purchased imported water. DPW serves approximately 240,000 people through 67,000 connections. DPW also operates and maintains 115 water storage reservoirs (over 80 million gallons), 54 groundwater wells, 137 booster pumps and pressure regulating stations, and 1,374 miles of water mains.

For Antelope Valley, DPW manages water supply by pumping groundwater and purchasing imported surface water from the Antelope Valley East Kern Water Agency (AVEK), a state water project contractor. The water supply is collected, stored in tanks, and then redistributed using booster pumps to the neighboring communities. Overall, high energy consumption is currently required for DPW operations to deliver water.

Annually, approximately \$4,000,000 is spent on energy costs to operate their system. Energy rates continue to increase, so DPW’s energy costs will also increase if operations continue without innovation or improvements.

**Solution:**

Reducing energy costs by utilizing renewable energy can help meet the DPW’s mission to provide reliable, high-quality water in a safe, cost-effective, sustainable and environmentally responsible manner.

To utilize renewable energy, the DPW, in a partnership with ISD, AVEK and Southern California Edison (SCE) successfully installed a small Hydro Energy Recovery Pressure Reducing Turbine (PRT), at a potable water pressure reduction station known as M-7W located in Palmdale, California.

Prior to the PRT installation, M-7W had pressure reducing valves to decrease high water pressure from the AVEK turnout to meet the system’s needed pressure by wasting the energy in water into heat. Replacing a valve with the PRT captures the wasted energy into green hydro electric energy.

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The electricity produced from the PRT is used to power M-7W on-site operations such as four groundwater well pumps and three booster pumps, while excess hydro energy not used on-site is transferred to electricity grid-tied to SCE. Energy costs are reduced by utilizing a hydro energy to power M-7W facility’s operations rather than solely relying on power purchased from SCE’s grid. This helps DPW to keep low water rates for their customers with sustainable energy, hydro power.

The project cost is \$1.5 million. Fifty percent of the cost was funded by the County of Los Angeles Quality and Productivity Commission. In addition, over \$200,000 of SCE’s incentives were secured. The high efficiency PRT is an inline turbine made by Soar Hydro that is site specific for maximum efficiency, yet shares a number of common parts to reduce the initial capital cost and ensure low maintenance costs.

**Benefits:**

The PRT reduces pressure for the water distribution system’s needs while generating renewable hydro electric energy. The hydro electric energy is used for on-site operations while excess energy is transferred into the grid. The PRT was estimated to save \$140,000 in costs annually. This reduces energy costs and helps keeps low water rates.

In addition, DPW now incorporates sustainable practices at the existing M-7W pressure reduction station by using green hydro electric energy rather than solely using grid energy which is primarily generated for fossil fuels.

From its start of operations on June 19, 2017 to May 1, 2018, the PRT total electricity production has exceeded 1,200,000 kWh, resulting in \$120,000 in electrical cost savings that helps keep low water rates and a reduction of 893 metric tons of greenhouse gas emission, equivalent to emission by 191 cars driven for one year.

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**Linkage to the County Strategic Plan – 1 page only.** Which County Strategic Plan goal(s) does this project address? Explain how. Use Arial 12 point font.

The Hydro Turbine project addresses the following goals:

**Goal 2: Foster Vibrant and Resilient Communities**

This project practices Strategy II.3.2 to foster a cleaner, a more efficient, and more resilient energy system by integrating renewable hydro electric energy into operations. Facility operations on site can be partially or fully powered directly from the green hydro electric energy generated by the turbine. This project also practices Strategy II.3.3 to address the serious threat of global climate change by reducing greenhouse gas emissions as energy generated from available natural resources (water) is used rather than energy used solely from the grid, which is primarily generated by fossil fuels.

**Goal 3: Realize Tomorrow’s Government Today**

This project practices Strategy III.2.3 to implement technology initiative that increases efficiency and Strategy III.3.2 to maximize existing County assets by installing a small Hydro Energy Recovery Pressure Reducing Turbine (PRT) at a County facility to reduce pressure for the water distribution system’s needs while generating renewable hydro electric energy to reduce energy costs that help keep water rates low for customers.

At the M-7W facility, purchased water is delivered through a turnout connection, stored in tanks, and pumped to the distribution system. Pressure reduction from a flow rate of 8 cubic feet per second and a pressure differential of 330 feet-head is needed to prevent damage to equipment and meet system operations’ needs. Prior to the PRT installation, this reduction was completed by a pressure reducing valve which wasted the energy in water to heat.

The PRT performs the same pressure reduction while generating hydro electric energy. The hydro electric energy is used to power operations on-site which reduces grid energy consumption, while excess generated energy is transferred to the grid and charged as credit to be applied to energy bills under SCE’s Net Energy Metering program. Overall, the PRT maximizes M-7W’s operations and efficiency by harnessing hydro electric energy and reducing energy costs.

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**COST AVOIDANCE, COST SAVINGS, AND REVENUE GENERATED (ESTIMATED BENEFITS TO THE COUNTY):** If you are claiming cost benefits, include a calculation on this page. Please indicate whether these benefits apply in total or on a per unit basis, e.g., per capita, per transaction, per case, etc. You must include an explanation of the County cost savings, cost avoidance or new revenue that matches the numbers in the box. Remember to keep your supporting documentation. Use Arial 12 point font

**Cost Avoidance:** Costs that are eliminated or not incurred as a result of program outcomes. Please indicate whether these are costs to the County or to other entities.

**Cost Savings:** A reduction or lessening of expenditures as a result of program outcomes. Please indicate whether these were expenditures by the County or by other entities.

**Revenue:** Increases in existing revenue streams or new revenue sources to the County as a result of program outcomes.

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<b>\$ 0</b>	<b>\$ 140,000</b>	<b>\$ 0</b>	<b>\$ 140,000</b>	<input type="checkbox"/>

**ANNUAL= 12 MONTHS ONLY**

The estimated annual cost savings is due to lower electric bills for the county facility’s operations at M-7W as hydro electric energy is being used rather than energy solely used from the grid. This energy cost reduction helps to keep water rates low.

From previous electric bills, the County paid an estimated \$0.104 per kilowatt hour (kWh) consumed, while the hydro turbine is estimated to annually produce 1,345,536 kWh. Nearly all hydro electric energy produced is used directly for facility operations.

Cost Saving Calculations:  $\$0.104/\text{kWh} \times 1,345,536 \text{ kWh/year} \approx \$140,000$

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**FOR COLLABORATING DEPARTMENTS ONLY**

*(For single department submissions, do not include this page)*

<b>DEPARTMENT NO. 2 NAME AND COMPLETE ADDRESS</b> <b>INTERNAL SERVICE DEPARTMENT (ISD)</b>	
<b>PRODUCTIVITY MANAGER’S NAME AND SIGNATURE</b> DIANE QUARKER EMAIL: <u>          DQUARKER@ISD.LACOUNTY.GOV          </u> _____ Original Signature on File	<b>DEPARTMENT HEAD’S NAME AND SIGNATURE</b> Original Signature on File  EMAIL: _____
<b>DEPARTMENT NO. 3 NAME AND COMPLETE ADDRESS</b>	
<b>PRODUCTIVITY MANAGER’S NAME AND SIGNATURE</b>   EMAIL: _____	<b>DEPARTMENT HEAD’S NAME AND SIGNATURE</b>   EMAIL: _____
<b>DEPARTMENT NO. 4 NAME AND COMPLETE ADDRESS</b>	
<b>PRODUCTIVITY MANAGER’S NAME AND SIGNATURE</b>   EMAIL: _____	<b>DEPARTMENT HEAD’S NAME AND SIGNATURE</b>   EMAIL: _____
<b>DEPARTMENT NO. 5 NAME AND COMPLETE ADDRESS</b>	
<b>PRODUCTIVITY MANAGER’S NAME AND SIGNATURE</b>   EMAIL: _____	<b>DEPARTMENT HEAD’S NAME AND SIGNATURE</b>   EMAIL: _____
<b>DEPARTMENT NO. 6 NAME AND COMPLETE ADDRESS</b>	
<b>PRODUCTIVITY MANAGER’S NAME AND SIGNATURE</b>   EMAIL: _____	<b>DEPARTMENT HEAD’S NAME AND SIGNATURE</b>   EMAIL: _____
<b>DEPARTMENT NO. 7 NAME AND COMPLETE ADDRESS</b>	
<b>PRODUCTIVITY MANAGER’S NAME AND SIGNATURE</b>   EMAIL: _____	<b>DEPARTMENT HEAD’S NAME AND SIGNATURE</b>   EMAIL: _____