

DR17.17 SCE Flexible Load Opportunities IRWD Recycled Water System Hydraulic Modeling

PURPOSE

The purpose of this project was to develop a “proof of concept” for using a water distribution system hydraulic model to estimate how electrical use and its timing changes if water pumping is moved into periods of overgeneration. If this project is proven successful and cost-effective, hydraulic models may help water and wastewater (W-WW) utilities identify and evaluate strategies for mitigating overgeneration.



Image 1: IRWD Recycled Water System

APPROACH

This project was designed to utilize Irvine Ranch Water District’s (IRWD) existing hydraulic modeling tools to simulate shifting pumping operations to occur during periods of overgeneration. Daily overgeneration was assumed to be 9:00 am to 4:00 pm, and seasonal overgeneration was assumed to start on February 15 and end on June 15, based upon information provided by SCE. Two operational alternatives were developed and simulated within the hydraulic model:

- **Alternative 1** maximized pumping between 9:00 am to 4:00 pm
- **Alternative 2** built on the daily adjustments of Alternative 1, and also maximized pumping between February 15 and June 15 by adding seasonal recycled water storage

FINDINGS

Findings indicate that water system operations could be adjusted, both daily and seasonally, to significantly increase the total energy consumption and peak power demand during overgeneration periods. The table below presents the results for the existing conditions and two operating alternatives. Alternative 1 impact could be accomplished with daily changes to operations and minimal infrastructure investment. Alternative 2 would require substantial changes to operations on a seasonal basis, as well as significant new storage.

Table 1. Results Summary – Total Annual Energy Consumed, Daily + Seasonal Overgeneration Period

Alternative	Pump Energy Consumed, kWh		Percent of Total Energy During Daily + Seasonal Overgeneration
	Total Energy Used	Total During Daily + Seasonal Overgeneration	
Baseline (Existing Conditions)	1,478,000	92,000	6%
Alternative 1 (Daily)	1,600,000	205,000	13%
Alternative 2 (Daily and Seasonally)	1,911,000	831,000	43%

CONCLUSION

The results indicate that there is potential to mitigate overgeneration, both on a daily and seasonal basis. The mitigation impact identified and described in the report is based primarily on operational changes. Lastly, the report provides recommendations for additional evaluations to further enhance the potential for overgeneration mitigation.