

Section 8

Projects Warranting Additional Detailed Feasibility Evaluation

A grant was recently awarded to EID et al. (2009) by the California Energy Commission (CEC) to evaluate reoperation of selected water systems. The reoperation evaluation will seek to maximize water system (e.g., El Dorado Main and Georgetown Ditch) hydro generation during peak energy value periods, improve system energy efficiencies, and shift water system energy loads to off-peak periods. A key aspect of this grant will be to assess the feasibility of reoperation by incorporating intermittent energy storage systems, primarily water storage tanks, which would allow turbine-generator efficiency optimization and peaking re-regulation of flows to maximize hydroelectric revenues. Basically, the water systems would be re-operated to uncouple customer demand from daily operations.

The four projects shown in Table ES-4 (Diamond Springs Main PRS 1, El Dorado Main 2 PRS 3, Oak Ridge Tanks to Bass Lake Tanks Pumped Storage, and Buffalo Hill Siphon) do not appear economically viable based solely on analyses of existing water system operations. The reoperation evaluation through the grant application may demonstrate that these and other system options would be economically viable with system flow re-regulation (made possible with increased storage at key locations), energy efficiency cost savings, and load management to take advantage of energy prices at different times of the day.

An example of potential energy generation benefits from reoperation is presented in Section 7.6.1. The intermittent storage systems would also boost overall water system reliability. Indeed, EID and GDPUD may have other facility improvement and operation considerations that could make these hydro options attractive for reasons other than economics.

Additional hydro options, other than the four projects identified for reoperation, warrant detailed feasibility studies to better assess their merits. The most promising are identified in Table ES-5. Included are hydro options within the South Tahoe Public Utility District (STPUD) and Heavenly Ski Resort water systems. Studies by Heavenly Ski Resort and STPUD's update to its 2001 evaluation of the "C-Line" treated wastewater pipeline are expected to identify some viable options.

Consultant Team discussions with EID staff regarding the El Dorado Powerhouse Low-High Flow Optimization option identified the need for a broader powerhouse operations optimization study. The potential high flow generation at this location is operationally possible with the turbine generators, but is currently constrained by the transformers interconnecting the powerhouse with PG&E's grid. However, when water is available during high flow conditions, EID cannot generate at the maximum capacity of the powerhouse. The incremental 1 MW of additional capacity that could be generated during high flows or during peak energy demand periods would qualify for the FIT rates and TOD multipliers, which are more than twice the energy values that EID now receives for generation sold on the spot market. With recent and projected changes in

canal flows, an optimization study is needed that assesses the tradeoffs and cost-benefits of equipment modifications that would allow generation both below the current minimum of 3 MW and above the current maximum of 21 MW.

Of the projects listed in Table ES-5, the greatest potential for hydroelectric generation would be from the Alder Reservoir hydro options. Previous studies of Alder Reservoir focused on either a very large alternative to support then-proposed South Fork American River (SOFAR) Project, or a smaller, stand-alone alternative that was limited to storing Alder Creek flows. This study identified Alder Reservoir concept alternatives that include water projects shared and jointly studied with other County purveyors or downstream purveyors (e.g., members of the American River Basin Regional Water Authority) that may be seeking drought, conjunctive use, or other water rights.

A new Alder Reservoir and seasonal pumped storage concept identified by this study consists of a medium-sized (50,000 to 100,000 acre-foot) reservoir that would support an approximately 15 MW Alder powerhouse, augment water supplies for the 21 MW El Dorado Hydroelectric Project, store existing and supplemental County purveyor water rights, and possibly augment flows for instream and other downstream beneficial uses. Water would come from two sources: 1) Alder Creek flows that include existing EID hydroelectric water rights and 2) existing and possibly supplemental water rights diverted from the South Fork American River during high flow runoff periods when instream resources would not be adversely affected by increased diversions. More specifically, increased diversions in the El Dorado Canal between the Kyburz diversion and Alder Siphon would be used to convey high runoff period flows to a pump station, at the Alder Siphon, that would lift water to the Alder Reservoir. This winter/spring runoff from the South Fork American River, together with Alder Creek basin water, would be released for hydroelectric generation at a new Alder Powerhouse and the existing El Dorado Powerhouse during peak generation revenue periods in the summer and fall. Besides providing new storage and power generation facilities, this option capitalizes on excess capacity in the existing canal and increases power generation at an existing powerhouse by prolonging power generation into late summer and fall, which is currently not possible due to release restrictions.

Of all previous reservoir concepts considered, the newly identified Alder Reservoir seasonal pumped storage hydroelectric option offers substantial promise for an energy revenue-supported, long-term water supply project for El Dorado County purveyors. Based on preliminary estimates, a 50,000 acre-foot Alder Reservoir and 15 MW Powerhouse would yield a net increase of about 50,000,000 kWh (50,000 MWh) and roughly \$5 million/year in net energy revenues for Alder and El Dorado Powerhouse generation combined. Additional storage would allow electric generation for both hydro projects (Project 184 and Alder) during the highest demand/price periods as water released from Alder could flow to Forebay reservoir and the El Dorado Powerhouse to help meet seasonal, daily peak, and 'on-call' demands for electricity.

Discussions of other hydro options recommended for additional detailed study are presented in the Executive Summary (Caples Dam), Section 6.1 (El Dorado Powerhouse Low-High Flow Optimization), and Section 9.6 (Stumpy Meadows). These additional studies should be carried out and completed prior to the expiration of the current renewable energy program incentives.