

SMUD News Release

Sacramento Municipal Utility District

• News Media Services

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Powerhouses increase output by up to 15 percent; improve efficiency

Recent upgrades to the Sacramento Municipal Utility District's (SMUD) Jaybird and Loon Lake hydroelectric powerhouses have led to dramatic improvements in efficiency.

Installing new computerized controllers to better regulate water flow to the turbines has increased megawatts by 15 percent for the same amount of water when running at low power levels (unit loads less than 20 megawatts).

The new equipment, called a governor control system, automatically regulates the amount of water that shoots out of six high-pressure nozzles and onto a wheel that spins the generator.

Each high-pressure nozzle or needle is nearly two feet in diameter and shoots water out at a pressure of up to 650 pounds per square inch. Those streams hit "buckets" on the edge of the turbine wheel, spinning it at about 300 rpm.

With the old equipment, the controller opened all six needles at once, boosting water flow to the turbine as demand for electricity increased. When the unit was at low load, requiring less water, the water jetting out of the needles fanned out -- similar to a garden hose set to a wide spray pattern. This caused most of the water to miss the turbine wheel, wasting much of the stream's power potential.

The new gear starts out by opening two needles and adds the others as demand for power increases. By initially moving the same volume of water through two needles instead of six, the water stream is more tightly focused and hits the turbine wheel more directly. The result: significant water savings for the same amount of power generation.

Based on current short-term power pricing forecasts, SMUD estimates that the new equipment will save the utility approximately \$130,000 per year. That's a major benefit since hydropower is much more economical than wholesale electricity -- particularly during peak demand periods on hot summer afternoons.

Each controller costs about \$300,000 with a complete payback in about six years into the 30-year estimated life of the equipment.

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