

## **2.0 PURPOSE OF ACTION & NEED FOR POWER**

### **2.1 Purpose of Action**

The Action's fundamental purpose is to maintain the existing UARP's capacity while adding additional pumped-storage capacity. The additional capacity provided by the proposed Iowa Hill Development will help meet the anticipated growth in electric demand, provide grid management and ancillary services, and manage the increasing use of non-dispatchable generation resources, such as wind power. SMUD uses the UARP for cost-effective electric generation purposes, but more importantly, SMUD relies on the UARP to provide control area management services or ancillary services and dependable capacity. As a control area operator, SMUD must comply with the requirements of the Western Energy Coordinating Council (WECC) and must balance at all times the second-to-second changes in the demand and supply of electrical energy. The UARP and proposed Iowa Hill Development will provide SMUD with the critical resources necessary to continue providing these valuable services to our customer-owners throughout the term of our new license, as well as reliable, cost-effective electric service, particularly during summer peak periods.

### **2.2 SMUD's Control Area Responsibilities**

Responsibility for maintaining safe, reliable, and dependable operation of the electric grid in California is divided among various "control areas." A control area operator assumes responsibility for operational and system reliability for electric customers within a specific electrical and geographic area. In 2002, SMUD became independent of the California Independent System Operator (CISO) and formed its own control area to provide more reliable, cost-effective electric service to its customer-owners. By doing so, SMUD assumed responsibility to meet WECC and North American Electric Reliability Council (NERC) criteria for reliable system operations. SMUD's control area represents one of four such areas that lie entirely within California.

In 2005, the Western Area Power Administration's Sierra Nevada Region (WASN) transferred most of its loads, resources, and transmission facilities from the CISO control area into SMUD's control area. SMUD anticipates that later in 2005, the California-Oregon Transmission Project (COTP) will become part of the SMUD control area as well. At that time, SMUD will become directly interconnected to the Bonneville Power Administration (BPA) control area and assume a direct reliability role in operation of the California-Oregon Intertie (COI), one of the most important transmission paths in the Western Interconnection. The UARP is, and will continue to be, a critical resource available to SMUD to meet its control area reliability obligations and serve as a primary source of economic power generation.

The instantaneous power produced by hydroelectric facilities is essential to balancing services: once the operator opens the gates, water flows through the turbines and immediately generates power. In contrast, thermal power plants, fired with natural gas, biomass, or geothermal fluids, can only increase the amount of generation in accordance with a specific curve that allows the equipment to gradually warm up without damage. A small combustion turbine may take up to half an hour to come up to full power depending on size and configuration, while a larger

combined-cycle machine can take many hours (depending upon how long the equipment has been shut down).

In addition, balancing the load within a control area requires power generation sources to be placed at specific locations to maintain system reliability. For SMUD's system, the specific locations of the current hydro generating facilities play an important part of this crucial role.

Maintaining the UARP's current capacity and adding the new pumped-storage capacity provided by the Iowa Hill Development (a 58% increase in total capacity of the UARP) are particularly critical to meet the projected increased demand for electricity in the Sacramento region. The population of the greater Sacramento region has been growing at an annual rate of approximately two percent, and is expected to continue growing at this rate throughout the next decade and beyond.

The Proposed Action is also critical to ensure the reliability of regional electric supply. SMUD is located in the WECC's Northern California area. The WECC annually forecasts electric supply and demand for the nation and each area within the WECC. In 2004, the WECC forecasted annual growth rates on the Northern California area for electricity demand of approximately one percent each year through 2014<sup>6</sup>. During this same period, reserve capacity in the WECC is expected to fall with critical shortages during the summer months occurring between 2006 and 2010 depending on assumptions regarding energy supply and growth. If SMUD is unable to respond to increased demand, it would further contribute to the already declining reserve margins in the region. In addition, reductions in hydroelectric generation would also reduce generation diversity and increase dependence on natural gas-fired generation, which is the dominant fuel for new power generation in California, and throughout the west. This is a concern to planners because of the potential for interruptions in natural gas supplies and fluctuations in natural gas prices.

### **2.3 Need for Power in SMUD's Service Area**

SMUD generates, transmits, and distributes electric power to a 900-square-mile service area that includes Sacramento County and small portions of Placer and Yolo counties. General information concerning SMUD and its customer-owners as of March 2005 includes:

- Service area population: 1.5 million
- Service area: 900 square miles
- Total number of customers: 567,176 (503,790 residential, 63,386 commercial)
- Full-time employees: 2,149
- Transmission bulk substations: 10
- Transmission lines: 500 circuit miles
- Distribution lines: 9,885 circuit miles
- Peak demand: 2,809 megawatts (July 22, 2003)

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<sup>6</sup> WECC Power Supply Assessment November 24, 2004.

SMUD has augmented the UARP with other generation assets to create an environmentally-preferred energy portfolio that includes hydro, natural gas-fired generation (thermal), solar, and wind resources. Together, these SMUD-owned generation assets are expected to meet 76 percent of SMUD's electricity demand by 2007. This will be comprised of 48 percent from thermal plants, 16 percent from hydroelectric, and 12 percent from renewables. Another 22 percent of the demand is expected to be met by long-term fixed energy contracts and the remaining two percent will be met by purchases on the wholesale short-term and spot energy markets.

The lynchpin of SMUD's energy portfolio, however, is the UARP. No other energy source provides comparable reliability, flexibility, and economic benefits. Without the UARP, SMUD could not provide the current level of service our customer-owners require. The proposed Iowa Hill Development will assure that SMUD can continue to provide cost-effective service to our customer-owners well into the future and supplement many of the other benefits the existing UARP provides.

The existing UARP produces an average of approximately 1,835,000 megawatt-hours (MWh) of power annually. The Iowa Hill Development is not expected to significantly change the UARP's average annual energy production, but by using off-peak energy to pump water to the storage basin and then releasing water through the powerhouse during peak periods, SMUD will significantly increase the generated energy's value and water use efficiency.

Maintaining and expanding the UARP is also of significant importance to air quality in the Sacramento region and the foothill communities in Placer and El Dorado counties. Hydroelectric facilities do not result in any atmospheric emission of criteria pollutants or other hazardous material that can affect air quality. Thus, the continued operation of the existing UARP facilities under the Proposed Action will, on average, result in the annual generation of 1,794,000 MWh of clean energy. This same energy, if generated from fossil fuel facilities, would produce 278,070 metric tons of carbon emissions.<sup>7</sup> The Iowa Hill Development component of the Proposed Action has the potential to further benefit air quality by facilitating future development of intermittent renewable resource power generation. The operational flexibility of pumped-storage will aid system control operators in the management of energy produced by these intermittent resources to the point where the Iowa Hill Development would theoretically allow for a higher level of renewable generation than would exist without it. This increased development renewable opportunity would, in turn, allow diminished reliance on existing and/or future fossil units.

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<sup>7</sup> 278,070 metric tons of carbon emissions equals 1,794,000 MWh/yr x 155 kg of carbon/MWh x 0.001 metric tons/kg. The value of 155 kg of carbon/MWh for a regional carbon intensity factor of a California gas-fired facility was derived from the Oak Ridge Competitive Electricity Dispatch computer model.