

SMUD TESTIMONY – MICHAEL DeANGELIS

PIER SENATE COMMITTEE HEARING - 3/1/11

- Thank you for the opportunity to present today. My name is Michael DeAngelis, Manager of the Research & Development Department at SMUD. Formerly, I was the lead representative and coordinator of Public Interest RD&D Working Group Collaborative that reported to the Legislature, CPUC and CEC in the mid-1990s regarding the decline in public interest RD&D. It was the analyses and reports completed by that working group that led to the creation of the PIER program by the State Legislature in 1996.
- I'll begin by briefly answering the first three questions provided by the Committee to POU's on February 18th. What have you done to comply with PU Code Section 385? How much have you collected on an annual basis? How much have you spent for PI R&D?
 - A. SMUD has fully complied by the provisions of PUC Section 385. After this statute was enacted, SMUD set-up an internal Public Goods Account to allocate and track expenditures for the four public good areas of low income, energy efficiency, renewable energy, and R&D. Spending each year since the statute was enacted has far exceeded the minimum levels of IOU funding specified in the statute. Since the statute was enacted, SMUD has completed an annual public goods report that has an accounting of the public good expenditures. This report and accounting is made available publicly each year on the SMUD website and was also submitted annually to the CEC. In 2011, SMUD budgeted over \$100 M for the four PG areas which is about 16% of 1994 budgeted electricity sales revenue and 8% of 2011 electricity sales revenue. SMUD budgeted and spent over \$6M in PI R&D in 2010, about 0.6% of 2009 actual revenue.
- Before commenting on the remaining questions and on the LAO report on PIER, let me briefly describe the SMUD public interest R&D program.

- SMUD takes pride in being an innovation leader in the electric utility industry. SMUD's publicly elected Board of Directors has a specific adopted policy on R&D. It states "To assure SMUD's long-term competitiveness and its ability to deliver innovative products and services, SMUD shall invest in research and development projects that support its core and key values, based on an analysis of the projects' relative risks and their potential benefits to SMUD customers." So, just like many forward-thinking large businesses, SMUD's R&D program is focused on staying competitive & innovative, and also meeting the needs and benefits of SMUD ratepayers. I mention this because the LAO report (pg. 5, middle of page) stated that there was some inefficiency of having R&D programs with POU's and also having the State PIER program. Since the SMUD program is to benefit SMUD ratepayers, I see no reason or evidence in the LAO report or elsewhere to support that contention.
- SMUD staff are organized in a single Energy R&D Department and have recently completed analyses for a Strategic Plan for R&D. There are eight R&D program areas in the SMUD R&D program, including Climate Change, Smart Grid, EE, Demand Response, Electric Transportation, Renewable Energy, Distributed Generation, and Advanced Storage. There currently are more than 80 projects in the 8 program areas. SMUD R&D results also are publicly available and are presented annually in a public report to the SMUD Board in a publicly noticed meeting. We've submitted copies of the past three years of these reports to the Committee in addition to other reports related to SMUD's R&D program.
- Question 4. You asked about the outcomes of this research.
 - A. We've provided an extensive written response to this question to the Committee in writing last Friday. Since Research & Development is exploring new areas of science and technology, most research does not result in "breakthroughs" or provide new technologies that become used widespread in the marketplace. However, all good research should result in the growth of knowledge and learning. I'll cite for you some recent results that did result in products being used in real market applications today.

- **Example #1. LED Lighting in Grocery Stores.** SMUD has an R&D program to install, test and evaluate in real market applications new energy efficiency technologies that are nearing market introduction. If the technology performs well in the R&D testing, the technology will qualify for energy efficiency incentive programs also offered at SMUD to accelerate market adoption. In this example, SMUD removed fluorescent lighting and installed LED lighting in frozen food cases in a large grocery store and tested and evaluated the resulting performance. The change in lighting technologies resulted in immediate energy savings of 40%. The project went one step further to install occupancy sensors that reduced light levels to 50% during unoccupied periods, ramping back up to 100% when occupants were detected. This provided an additional 30% energy savings when compared to fluorescent. When accounting for cooling savings due to reduced heat loads in the cases, the project yielded approximately 80% savings. The results were used to develop an LED Refrigerated Case rebate program that SMUD now offer to our customers.
- **Example #2. Local Problem Wastes to Green Electricity.** From 2004 to early 2009, SMUD started a local program to convert wastes such as dairy wastes and local grease and food wastes that create local environmental problems, but can be disposed cleanly and effectively via anaerobic digestion, which also creates a renewable gas (biogas) that can be used instead of natural gas. SMUD supported the implementation and operation of two local dairy manure digester projects through its RD&D program. Two digesters were successfully installed and both dairy farmers have plans to double the capacity of their electricity generation in the near future. The projects produce environmental benefits by helping dairies better manage their manure disposal, reducing air and water contamination, and providing renewable energy to the farm and other SMUD customers. These two projects will reduce volatile organic compounds by 6 tons/year and eliminate 353 tons of methane annually --equivalent

to 7,413 tons per year of CO₂. SMUD has also received funding from USDOE in 2009 through AARA to demonstrate and deploy four biogas-related projects. The first one is the co-digestion of fats, oil and grease (FOG) and liquid food waste project at Sacramento Regional Community Sanitation District (SRCSD). SMUD funded several R&D feasibility studies for the SRCSD project and an R&D demonstration project from 2005 – 2009. This system will dramatically increase the energy generated from the digester gas from SRCSD and will displace the use of natural gas at SMUD powerplants. Due to the high efficiency of SMUD's Cosumnes Power Plant, this project can increase renewable power production by 30GWh/year (or up to 3.5 MW). Two additional projects are at local dairies (New Hope and Van Warmerdam) that will install anaerobic digestion systems. The estimated GHG (CO₂ equivalent) reduction for these two projects is about 12,000 tons/yr (around 6,000 tons/yr each). The fourth project is an above-ground, complete mix digester will be implemented in Sacramento that will deploy the co-digestion of fruits, vegetables and other organic wastes. This project will employ pipeline injection of the biogas into SMUD's pipeline with estimated electricity generation ~ roughly 16 GWh/year. These four projects also are receiving financial support from the CEC PIER program.

- Question 5. A question was asked about whether SMUD has any historical perspective on how well the annual utility R&D coordinating council meetings worked under the now repealed PU Code 9201 to 9203.
 - A. I have worked in the alternative energy R&D field for my entire career and I attended and recall the California Utility Research Council (CURC) annual meetings on R&D held in the late 80's and early 90's. The IOUs would rotate responsibility for planning and conducting the annual CURC meeting. I thought that the CURC meetings were very effective in information sharing and collaboration between the IOUs. At present, this public interest RD&D communication and coordination function has been replaced

in the past couple of years with the Western Energy Industry Leaders (WEIL) RD&D Collaborative which includes California members with RD&D programs including SMUD, LADWP, SCE, PG&E and SDG&E. This Western States R&D managers group meets quarterly and also holds meeting on specific RD&D topics. In fact, SMUD is hosting a WEIL RD&D renewable energy integration workshop focusing on solar on May 23rd and 24th.

- Question 6. The Committee also requested SMUD's response on the LAO report recommendations regarding the PIER program.
 - A. Overall, we think that the LAO report on the PIER program lacked an understanding of why the PIER program was created initially and it also lacked an understanding of the R&D process and the value and benefits that R&D can bring to California. However, we do agree with the report's recommendation that clearly supports a continued state role in public interest energy research.
 - If the LAO had understood why the PIER program was first created, we think it would have influenced their report and their recommendations. I was fully involved in this issue in the 1994-96 period and, as mentioned earlier, I acted as the lead representative and coordinator of Public Interest RD&D Working Group Collaborative that reported to the Legislature, CPUC and CEC. The background to this collaborative is that investor-owned utilities were mandated via statute in the 1980's and early 90's to conduct R&D in the public's interest on renewable energy, conservation of energy, environmental quality improvement, etc. This system of CPUC approval of IOU R&D programs in a three year general rate case was conducted throughout the 1980's and early 90's. However in 1995 and 96, faced with competitive pressures not completely unlike pressures this industry will face in the future, funding of R&D in the public interest by IOUs plummeted by \$70M to \$85M. This reduction is documented in the R&D Working Group reports. At the same time, there also were funding declines in EE and Renewable energy investments and strong concerns about the future of Low Income support. The Legislature in 1996 decided via AB 1890 to protect all four of these public interest programs. The PIER program was created primarily because of the R&D funding decline by IOUs. The Legislature decided through AB 1890 that

POUs sufficiently represent the Public's interest and required that POU's provide minimum total funding of all four public interest areas at lowest expenditure level of the three IOUs for calendar year 1994. The Legislature allowed discretion to POU's to budget each program at levels to meet the local public interests and needs. SMUD has far exceeded these minimum funding levels and, as explained earlier and provided in writing to the Committee, has a very active and productive public interest R&D program. We do not support transferring a public good charge from POU's for R&D because it is not needed and it would reduce overall Public Interest R&D funding in California by possibly reducing or eliminating the very successful SMUD R&D program. SMUD currently adds to Public Interest R&D in California particularly by the innovation, the partnerships and the added match funding we bring to PIER. For example, SMUD has R&D projects that also are PIER funded but only at 5% to 10% of total project costs - - SMUD and its R&D partners, including the Federal government, bring the other 90% - 95% of funding to the California R&D project. With that kind of funding leverage and risk sharing, why should there be a change this existing R&D structure?

- We disagree with the LAO's comments that the CEC PIER program has not demonstrated significant payoff. There are many PIER examples of significant advancements in energy efficiency, renewable energy, and other research areas that will provide significant benefits to ratepayers. The LAO did not seem to recognize in its report that every R&D project will not provide a payoff to ratepayers. The inherent nature of R&D is risky, since it is the investigation of new areas of science and technology. Some projects will go down a blind alley, other projects will result in a new innovation in the marketplace. However, all projects should advance knowledge in science and technology, which is important to improving the quality of life in our society.
- We also disagree with the LAO report that the PIER program should not address climate change. Our use of energy is the driver of this global issue and we need to do our share of advancements in science and new technologies to address this issue.

- In conclusion, we see no compelling evidence in the LAO report that a major change in the funding and governance of public interest RD&D is needed at this time. We believe that the PIER program should continue to be administered at the CEC. However, we also believe that IOUs should have CPUC-approved, ratepayer funded R&D programs - - in fact, IOUs currently do fund R&D today - - so we find some of the LAO report perplexing. The combination of Utility R&D programs with the CEC PIER program should be very effective in bringing the power of innovations to address the major challenges facing California's energy and environmental future.
- Thank you for the opportunity to comment.