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April 16, 2015

To: California Department of Water Resources

From: The Center for Water-Energy Efficiency, UC Davis

Re: 2014 Water Energy Grant Draft Funding Recommendations

This document represents an official submission to the public comment process for the California Department of Water Resources' (DWR) Water-Energy Grant Program Draft Funding Recommendations. The UC Davis Center for Water-Energy Efficiency's (CWEE) proposal, Smart Water Energy Savings (SWES), was deemed ineligible in the Technical Review Summary stating that the "actual water and energy saving activity is outside the scope of the grant" (DWR 2015). In follow-up discussion with DWR program managers, we learned that the main concern about our approach was the deployment of a "behavior-based" water conservation technology, as opposed to more traditional water conservation approaches, such as the installation of water-efficient hardware. We request reconsideration of our proposal and offer the following justification.

CWEE argues against the conclusion that "behavior based" conservation is not an eligible technology under the grant given the project eligibility guidelines outlined in the Grant Program Solicitation Package. The brief guidelines indicate proposals must "implement residential, commercial, or institutional water-efficiency programs or projects that reduce GHG emissions and also reduce water and energy use," and defines a project as "an action that may be the construction of physical facilities or implementation of non-structural actions." CWEE believes our SWES proposal to design and deploy residential water (and hot-water) behavioral messaging programs (i.e. non-structural actions) in five California cities is a valid water, energy and GHG conservation method, and therefore, within the scope of the Water-Energy Grant Program.

While the proposed behavioral messaging project differs from traditional conservation programs that tend to focus on physical solutions (e.g. faucet aerators, shower heads, turf removal), it is a proven and valid method of securing water and energy savings in the residential sector. Behavior-based technologies have been deployed and accepted in the energy sector for many years, and the savings have been validated in multiple peer-reviewed academic studies (Allcott 2011, Allcott and Mullainathan 2010). The success of the technology for energy savings has also been endorsed at the highest levels by the State of California, with the California Public Utilities Commission releasing decision 10-04-29 in 2010 that states, "[w]e agree with the utilities that it is within our energy efficiency program's best interest to create a regulatory environment that encourages behavior change and conservation."

More recently, the behavior-based approach to conservation was adapted to the water sector and proven to be effective as well (Ferraro and Price 2013). An independent study funded by the California Water Foundation concluded that the deployment of behavior-based water conservation messaging (by our partner technology provider, WaterSmart Software) delivered water savings of 4-6% (Mitchell and Chestnutt, 2013). A broader study funded by the California Urban Water Conservation Council (Hastings and Galib, 2015) presents a comprehensive and research-based review of behavior-based efficiency programs. The study includes an in-depth literature review of referenced case studies and published research articles proving the effectiveness of behavior based conservation programs. The paper concludes that "social norms messaging appears to be an effective tool for moving consumers toward conservation of resources, especially when a comparison is made between the consumer and their closest neighbors" (Hastings and Galib, 2015).

This approach is also broadly supported by thought leaders and decision-makers across the State of California and beyond. In fact, in the public comments for this solicitation (DWR 2014), the Executive Director of the California Water Foundation, Lester Snow, specifically requested that “behavioral water-efficiency programs would qualify for grant funding.” He goes on to say that:

Behavioral water efficiency is a new approach that water agencies can rapidly deploy to assist them in coping with the drought, and with an independent evaluation showing water savings of 5% from one such program, we believe these projects should be considered for funding. (DWR 2014)

Further, in a recent article by the Washington Post (Mooney, 2015), Peter Brostrom, DWR Water-Use Efficiency Section Chief, had the following to say about behavior-based water conservation: “we think that’s the biggest way that we will achieve the savings that we need during the drought.”

The depth of support for behavioral approaches would not exist if the savings were not measurable. Our experimental design for the program applies a randomized control trial (RCT) to differentiate the savings between households that receive the technology (the treatment group) and those that do not (the control group). By randomizing the selection of the households into the treatment and control groups, we minimize the influence of confounding factors beyond the deployed technology that may be contributing to household water and energy savings. Thus, we are able to carefully isolate the relationship between the implementation of the technology and the resultant household water and energy savings. This methodology has been specifically vetted and endorsed for verifying the impact of behavior-based energy conservation programs by the CPUC (Decision 10-04-29, as referenced previously), which sets a formal precedent for DWR to accept this methodology for measuring and verifying water (and energy) savings achieved in the SWES project.

Along with the stated reasons for the SWES Project to be both eligible for funding and verifiable in terms of resource savings, the project is estimated to deliver both “high” water savings and “high” energy savings to communities of majority DAC status. Based on the published evaluation criteria for the draft funding recommendations, the SWES Project would deliver the second-highest energy savings per dollar spent at 63,800 kWh/\$million (but nearly identical to the top-ranked project with \$64,000 kWh/\$M) and third-highest water savings per dollar spent at 1,400 MG/\$M. Further, because the technical lifespan of our proposed technology is three years, the calculated savings would be accrued rapidly in relation to other technologies whose total savings are spread over 10- or 20-year lifespans (such as those generally projected for faucet aerators and high-efficiency toilets).

This speed of deployment and impact is especially relevant and necessary given the context of the current “exceptional drought” in California. In the Governor’s executive order issued on April 1, 2015, among mandating the reduction of urban water use by 25%, he also requires investing in “innovative water management technologies” that result in water, energy, and greenhouse gas reductions, including “water-use monitoring software” (Brown, 2015). We consider the SWES project an opportunity for DWR to invest in a highly innovative approach that is directly in line with the Governor’s mandate and will achieve measurable and verifiable water and energy savings.

Behavior-based water and energy efficiency solutions are a relatively new conservation methodology, but we believe they represent an essential tool for achieving meaningful water and energy savings statewide. Thus, we urge DWR to reevaluate the SWES proposal’s eligibility and allow the program to be ranked in the Draft Funding Recommendations. We believe our approach will save significant (and measurable) amounts of water, energy, and GHG emissions rapidly and effectively – resulting in a smart investment for the State in the context of our historic and exceptional drought. We appreciate your reconsideration of our proposal.

Sincerely,

Frank Loge
Director, UC Davis Center for Water-Energy Efficiency

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