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Pacific Gas and Electric Company®

June 12, 2009

Mr. Arthur Rosenfeld
Commission and Presiding Member, Efficiency Committee

Ms. Julia Levin
Commission and Associate Member, Efficiency Committee

California Energy Commission
Building and Appliances Office
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: PG&E Comments on Phase 2 of the 2008 Appliance Efficiency Regulations Proceeding for Landscape Irrigation Equipment Performance Standards and Labeling Requirements. Docket No. 09-AAER-1A.

Dear Mr. Rosenfeld and Ms. Levin:

The Pacific Gas and Electric Company (PG&E) appreciates this opportunity to provide input to the Commission as it considers adopting standards and labeling requirements for landscape irrigation controllers and moisture sensors, as directed by AB 1881, the Water Conservation in Landscaping Act of 2006.

California currently faces some of the most serious water challenges seen in the last half-century. A significant fraction – approximately one-third – of the water used by California's urban areas is used for landscape irrigation. Consequently, improving the efficiency of the landscape irrigation sector is extremely important to reducing California's water use.

As we discussed in our presentation to the Committee at the April 1st workshop, California's energy and water systems are inextricably linked. Approximately eight percent of California's total energy consumption goes towards pumping and treating water.[1] Recognizing the potential for energy-savings through greater water efficiency, the California investor owned utilities (IOUs) are currently partnering with water agencies in California to implement embedded-energy pilot programs that will document the potential for competitive embedded energy efficiency savings.

PG&E acknowledges the importance of reducing outdoor water use and the promise of "smart controllers" and other advancements in landscape irrigation equipment for achieving these reductions. The savings potential of smart controllers, which represent a relatively new generation of irrigation controllers, has been studied and documented over the last ten years.[2] However, the irrigation controller is only one component of an in-ground irrigation system; proper landscape irrigation design, equipment specification, installation, and maintenance are also essential for realizing the full potential for water savings in landscape irrigation sector. The recently published evaluation of California's weather-based smart irrigation controller programs found that while, on average, installing smart controllers saved water (14.5% per site) throughout the state of California, about 42% of sites experienced a statistically significant *increase* in water use after installing a

smart controller.[3] These findings help reemphasize that the irrigation controller is just one component of the larger irrigation system. The magnitude of actual savings realized by at any particular site will depend on prior irrigation practices – especially the level of excess irrigation that exists before a smart controller is installed, as well as other factors including the existing landscape design (e.g., appropriate head spacing and distribution uniformity) and system maintenance.

While smart controllers and related devices (e.g., rain sensors, soil moisture sensors, receivers) can provide water savings by more efficiently and effectively scheduling irrigation, many of these devices also constitute a plug-load. At the Commission's June 1st Technical Workshop, Rich Brown from the Lawrence Berkeley National Laboratory (LBNL) presented data on controller energy use and discussed the potential energy tradeoff between embedded energy savings (from conserved water) and increased standby energy consumption (from plug-load).[4] The controller testing conducted by LBNL shows that on average, a smart controller consumes about 2 watts more in standby mode than a traditional controller, without accounting for the standby power from the various rain gauge, moisture sensors, and other sensing and data handling peripheral devices that are often used with these controllers.

In many cases, we expect embedded energy saved through more efficient and effective application of water to landscapes will greatly overshadow this increase in standby energy consumption. For example, if a home in Walnut, California (Southern California) that currently uses 134,000 gallons of water each year for landscape irrigation,[5] saves 15% on its outdoor water use by installing a smart controller, the energy-saved through reduced water use (222 kWh, estimated embedded-energy savings) would be greater than the increase in site energy use (18 kWh, increased standby load). As a result, there would be a net annual energy savings of roughly 205 kWh.[6] For a comparable home in Northern California, since water requires far less energy to pump and treat before it reaches end users, the net annual energy savings would be only 52 kWh (70 kWh - 18 kWh). But in certain sites where smart controllers only provide very marginal water savings over prior practice, there is potential that the increased standby load of the controller may result in an overall net increase of energy consumption. Moreover, at sites where smart controllers actually *increases* outdoor water use compared with prior-practice, there would also be a net increase in annual energy use.

As the Commission moves forward with this proceeding to consider irrigation equipment standards and labeling requirements, PG&E recommends further study into the causes of this increase in standby power to determine whether a standard and test method that addresses standby load of controllers (or potentially just the power supply) should be established.

We appreciate your consideration.

Sincerely,

Patrick Eilert
Program Manager, Codes and Standards
Pacific Gas & Electric Company

[1] Navigant Consulting. (2006). *Refining Estimates of Water-Related Energy Use in California"*. Prepared for California Energy Commission. December 2006. CEC-500-2006-118.

[2] e.g., Mayer, P. DeOreo, W., Hayden, M. and Davis, R. (2009). *Evaluation on California Weather-Based "Smart" Irrigation Controller Programs*. Presented to the California Department of Water Resources by the Metropolitan Water District of Southern California and the East Bay Municipal Utility District. May 2009. < http://www.cuwcc.org >; and studies summarized by the Bureau of Reclamation in comprehensive literature review on this subject: Department of the Interior. (2008). *Summary of Smart Controller Saving Studies*. < http://www.usbr.gov/waterconservation/docs/WaterSavingsRpt.pdf >

[3] Mayer, P. DeOreo, W., Hayden, M. and Davis, R. (2009). *Evaluation on California Weather-Based "Smart" Irrigation Controller Programs*. Presented to the California Department of Water Resources by the Metropolitan Water District of Southern California and the East Bay Municipal Utility District. May 2009. < http://www.cuwcc.org >;

[4] Brown, R. (2009). "Energy Consumption of Irrigation Controllers." Environmental Energy Technologies Division, LBNL. July 1, 2009. < http://www.energy.ca.gov/appliances/irrigation/documents/2009-06-01_workshop/presentations/Brown_Rich_LBNL_Irrigation_Controls.pdf >

[5] Data from earlier survey of indoor and outdoor water use in 1,000 homes in 12 cities throughout the U.S. See pg 18, of Water and Energy Consulting and Demand Response Research Center. (2007). *Water Supply-Related Electricity Demand in California.* Prepared for the California Energy Commission. November 2007. CEC 500-2007-114.

[6] Calculation based on the following assumptions: the energy-embedded in outdoor water for Southern California and Nothern California is of 11.1 and 3.5 kWh per 1,000 gallons, respectively, as reported in the Navigant Consulting (2006) study referenced above; a smart controller increases in standby load by 2.1 watts. From PG&E's presentation at the April 1, 2008 Scoping Workshop, we've also assume a controller's duty cycle is 97% of time in standby and 3% of time in active mode and that the average active mode power is 8.8 watts. These assumptions were presented at the April 1st Scoping Workshop: Eilert, P, and Stevens, A. (2009) "Landscape Irrigation Equipment." Presentation made at the Efficiency Committee Workshop on behalf of the Statewide Codes and Standards Program. April 1, 2009.
< http://www.energy.ca.gov/appliances/irrigation/documents/2009-04-01_workshop/presentations/Pat_Eilert+Amanda_Stevens.pdf >