RE-00000C-09-0427 ORIGINAL

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OPOWER thanks the Arizona Corporation Commission ("ACC") for the opportunity to submit these comments in response to the Commission's statewide energy efficiency goals. In Docket Number RE-00000C-09-0427, the ACC shows a firm commitment to driving significant energy reductions in the state by: 1) establishing aggressive efficiency goals for its utilities, and 2) defining DSM measures broadly, ensuring that utilities may use innovative and proven programs to meet their energy savings targets.

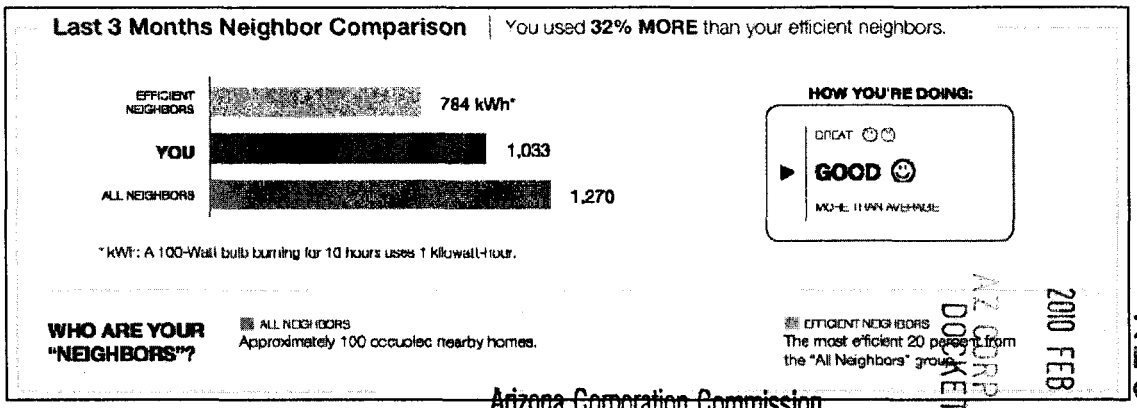
OPOWER, formerly known as Positive Energy, an energy efficiency company using behavioral science and data analytics to drive reductions in residential energy consumption, submits these comments to support ACC's energy efficiency targets and to affirm its understanding that utilities in the state may use behavior-based programming in order to meet their annual savings goals.

I. Behavior-based programming is an innovative way to drive energy savings.

Behavior is the single largest untapped efficiency resource. The reason is straightforward – behavior impacts almost every facet of energy use in the home or business.[1] A customer's efficient furnace only delivers energy savings if the thermostat is set correctly. The value of an energy star washing machine is reduced if the consumer views the "Energy Star" label as a license to use the hot cycle. Often, the only way for renters to realize meaningful energy savings is to adjust their behavior. Behavior-based programs, like OPOWER's, address this problem by motivating customers to take actions that result in measurable, large-scale energy savings.

OPOWER's approach to energy efficiency is organized around two concepts – motivating behavior change, and providing relevant, targeted information to the motivated consumer. Relying on utility supplied data, our program translates individual usage patterns into meaningful insights coupled with targeted action steps.

OPOWER's Home Energy Reports, provide recipients with a context for understanding their energy use. OPOWER does this by dynamically creating a 100-home comparison group for each house that only compares home of similar square footage. Home comparison groups are defined by a number of customizable variables, including proximity (e.g., within 0.25 miles) and census and climate data. Years of behavioral science research have demonstrated that peer based comparisons is a highly motivating way to present information. A sample neighbor comparison module is shown below.



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[1] McKinsey and Company. *Unlocking Energy Efficiency in the US Economy*. Page 22

Second, customers receive individually targeted savings tips based on their energy usage patterns, housing characteristics, and demographics. Instead of presenting customers with a thick booklet of ideas on how to save energy, OPOWER presents customers with only several of the most relevant and immediately actionable suggestions on how to save. For example, OPOWER would not suggest that a renter insulate his apartment, but might recommend smart thermostats to owner-occupied homes with high heating bills.

Critical to OPOWER's strategy is an "opt out" program design with an emphasis on mailed reporting. Mailed reports enable OPOWER to engage the majority of targeted customers and enable the delivery of large-scale energy savings. This is particularly important in Arizona, where nearly one third of the population does not use the Internet.[2] By using mail, behavior-based messaging reaches all demographic groups, including low income and elderly populations. This means that OPOWER is able to engage 85% of our program participants - far more than other efficiency measures.[3]

This high participation rate means that small savings on a per household basis add up to significant savings in aggregate. (For more information on the scope for achievable in Arizona, see Section V.) Moreover, behavior-based messaging increases participation in other utility programs. By motivating customers to act and enabling them with information, OPOWER has demonstrated a 15% impact on utility sponsored efficiency programs.

Most important, behavior-based efficiency is scalable and cost-effective. In deployments to date, OPOWER's behavior-based efficiency has come at a cost of $0.03/kWh to $0.05/kWh. Because the savings come from information and behavior, rather than hardware, there are no obstacles to quickly deploying behavior-based savings on a large scale.

II. Behavior-based programs are proven to generate measureable and verifiable results.

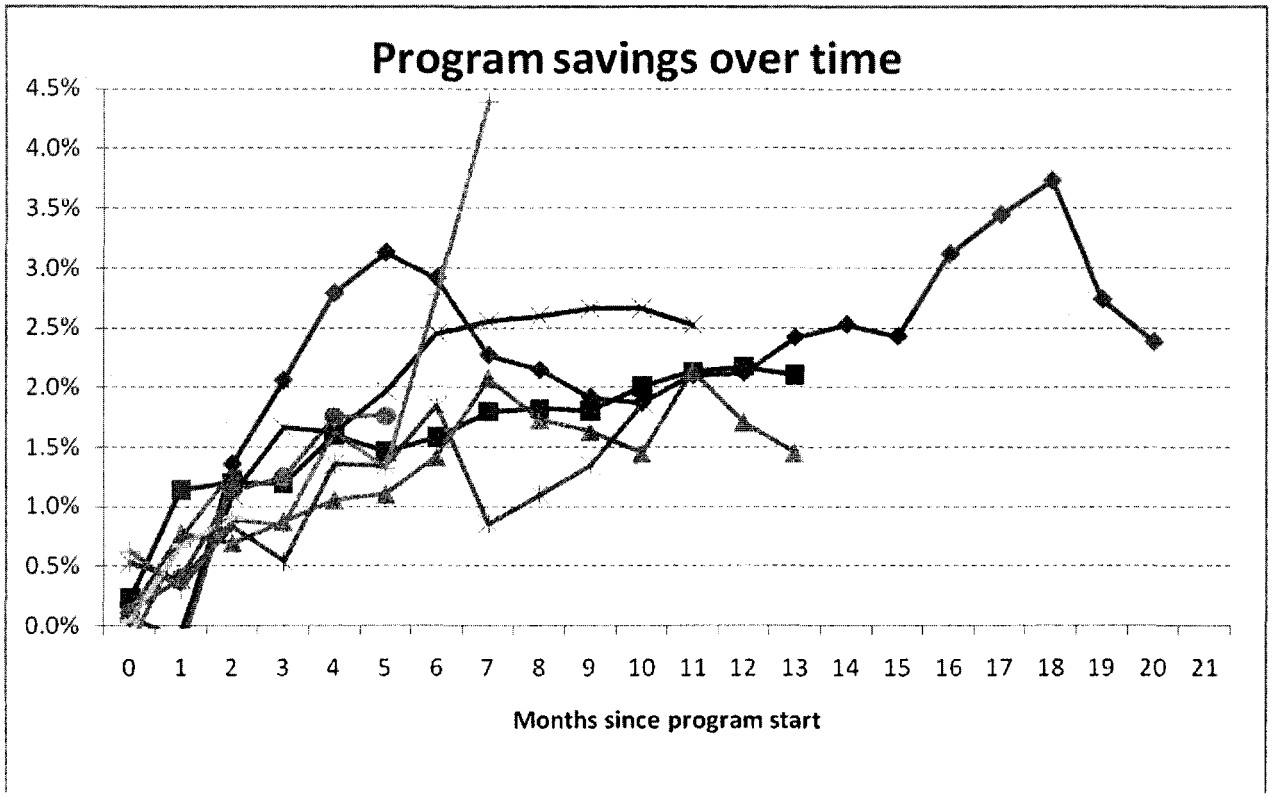
OPOWER's behavior-based messaging platform has been consistently effective in each deployment to date. Every utility with at least six months of results has achieved energy savings between 1.5% and 3.5%. These results have been consistent across electric and gas utilities, as well as in winter-peaking, summer-peaking, and mild climates. Furthermore, programs deliver savings when customers –and utilities– need them most.

Figure 1 shows the consistency of savings that OPOWER utility partners achieve through Home Energy Reporting:

[2] National Telecommunications and Information Administration. *Household Internet Usage Statistics*. 2007. <http://www.ntia.doc.gov/reports/2008/Table_HouseholdInternet2007.pdf>

[3] Summit Blue. *Impact Evaluation of OPOWER SMUD Study*. September 2009. <http://www.opower.com/LinkClick.aspx?fileticket=naU7NN5-430%3d&tabid=72>

Figure 1: OPOWER's results



Rather than impacting only select groups, behavior-based results are consistent across income, age, and have an above-average impact for seniors and low-income citizens. Furthermore, in each of these deployments, energy savings have consistently increased over time.

- With Sacramento Municipal Utility District (SMUD), a large municipal utility in California, the savings in the second year of the program have been greater than the savings in the first year. After 20 months, these savings are not only continuing, but are increasing – in the second year of the program, SMUD customers were saving 22% more energy than the year before.[4]

- Electricity savings in Puget Sound Energy, a large IOU in Washington, have increased for each of the past seven months, and are now more than 2% with nearly a year of results. Gas savings have remained greater than 1%, for the 12 months in which the program has been in effect.[5]

- Connexus Energy, a large electric distribution cooperative in Minnesota, has been deploying OPOWER's program less than a year, and savings are surpassing 2%.[6]

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[4] Summit Blue Consulting. *Impact Evaluation of OPOWER SMUD Study*, September 2009. <http://www.opower.com/LinkClick.aspx?fileticket=naU7NN5-430%3d&tabid=72>

[5] Ayres, Ian. *Evidence from Two Large Field Experiments that Peer Comparison Feedback Can Reduce Residential Energy Usage.* 2009. <http://www.opower.com/LinkClick.aspx?fileticket=HAzjluOXrr8%3d&tabid=72>

[6] Alcott, Hunt. *Social Norms and Energy Conservation.* August 2009.

III. Behavior-based energy savings can be accurately measured through experimental design

In each deployment, OPOWER uses a simple test and control methodology to measure the impact of behavioral messaging. OPOWER's test and control methodology is explicitly endorsed in the California Evaluators Protocols and the guidelines for the National Action Plan for Energy Efficiency, which was jointly produced by the US Department of Energy and the Environmental Protection Agency. By using test and control groups, OPOWER is able to isolate and cleanly evaluate the impact of behavioral messaging.

For example, consider SMUD's behavior-based program. Together with OPOWER, SMUD launched its behavior-based program to 35,000 homes, while maintaining a 50,000 home control group. The two groups were randomly selected and had no statistically significant difference in their energy consumption prior to deployment. Since deployment, the impact has been clear – over twenty months, behavior-based messaging has decreased consumption by 2.5% in the test group. Because the groups are, in the aggregate, identical—save for the fact that one group receives OPOWER's reports while the other does not—the difference in energy savings may safely be attributed to behavioral messaging.

a. The use of experimental design prevents double-counting by allowing for energy savings sources to be isolated and properly allocated.

What remains to be accounted for is attribution of program savings when behavioral messaging not only drives conservation but accelerates the purchase of installed measures that are incentivized by separate energy efficiency programs, like, for example, a new refrigerator. This is commonly called "double counting" and fortunately can be handled in a relatively straightforward manner.

There are two ways to establish other program participation across the population participating in the behavioral program. The correct method depends on whether or not the program is individually tracked.

Individually tracked programs: Individually tracked programs are programs for which the utility can track specific customer participation. This scenario covers the vast majority of programs implemented in the residential sector and range from air conditioner rebates to home energy surveys. To avoid "double-counting" utilities simply must continue to track the participation in these programs on an individual household basis, and the difference in frequency of participation can be compared from the treatment to the control group. Then the utility may choose to either (a) subtract the deemed savings from the additional installed measures in the treatment group, or (b) add the costs of the additional installed measures to the cost of the behavior change program and count the savings.

Non-Individually tracked programs: In the case of "upstream" subsidies the method to assess "double-counting" is to perform surveys that measure the increase in the installation of the subsidized measures in both the treatment and control groups. The survey should be done in a statistically rigorous fashion, and through a standardized, accepted methodology, such as the California Protocols. Once these rates of use are established, the energy savings stemming from

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<http://www.opower.com/LinkClick.aspx?fileticket=otzFSiC6BJU%3d&tabid=72>

the increase in installed measures in the treatment group can then be accounted for in the same fashion increases from individually tracked programs are handled.

It is important to note that it is likely that most of the savings resulting from behavior-based programming do not overlap with other efficiency measures. In surveys of homes that have received behavior-based messaging, the most reported energy saving actions are turning off lights, adjusting thermostats and unplugging appliances.

Thus, while it is necessary to take steps to avoid double-counting of results, the actual scope of savings overlap between behavior-based programs and other efficiency measures is likely to be small. In an analysis performed after 18 months of the SMUD program, OPOWER estimated that less than 2% of the reported energy savings are overlapped with savings reported by other efficiency programs at SMUD.

Finally, while there is strong evidence that behavior-based program results persist, behavior-based programs only require a single-year measure life, thereby reducing any risk associated with uncertain future performance. No assumptions are made regarding the full "lifetime" savings of behavior-based program beyond the actual measurements. Likewise, any costs associated with the program (including measurement and verification) are attributed to the program in the year they are incurred. There is no amortization of program costs beyond the program length, nor are any future efficiency savings considered part of the behavioral intervention. As a result, this measurement strategy can be considered as a series of single years of actual measurement, being summed for as long as the program is being run and results are being measured. This is conservative in that there are no assumed or deemed savings, rather only the savings that are actually measured.

IV. Behavior-based programs are a part of energy efficiency portfolios across the country.

The strong, verified results from these large-scale pilots have been central to the support of regulatory authorities in several states for utility filings that include large behavior-based savings. So far, decision makers in Massachusetts, Minnesota, Oregon and New Jersey have either included or supported utilities in including behavior-based programs as part of a broad energy efficiency portfolio. Below are two case studies of regulatory agencies and authorized bodies which are moving forward with OPOWER's program.

- Massachusetts – The Massachusetts Department of Energy Resources ("DOER") is allowing IOUs in Massachusetts to count savings generated by OPOWER's program towards their state-mandated energy savings targets.

Savings claimed for OPOWER's program by National Grid (MA)

	Total kWh saved	Number of Households	Total Annual kWh saved per HH
2010	26,000,000	100,000	260 kWh
2011	52,000,000	200,000	260 kWh
2012	74,520,000	300,000	248 kWh

Note: The first two years of the program, OPOWER will be targeting high energy users. As the program grows, so too will the number of "average" users in the program.

In a filing approving these goals, the DOER noted that "one successful organization upon whose work the Program Administrators [utilities] would like to build is Positive Energy [now OPOWER], a corporation that is committed to persuading consumers to save energy through a combination of technology, analytic direct marketing, and behavioral science."[7]

Overall, behavior-based programs will account for 24% of Massachusetts' residential electricity savings and 20% of the state's residential natural gas savings over the next three years. The DOER estimates that utilities will save 147,000 MWh of electricity and 5.5 million therms by using behavior-based methods during this time period.

- Minnesota – Minnesota's OES has approved two of the state's largest utilities, Centerpoint Energy and Minnesota Energy Resources Corporation (MERC) to count savings generated by OPOWER's programs to their state-mandated energy efficiency targets.

Savings claimed for OPOWER's program by Centerpoint Energy (MN)

	Total Mcf Saved	Number of Households	Total Annual Mcf saved per Household
2010	85,250	50,000	1.71 Mcf
2011	127,875	75,000	1.71 Mcf
2012	139,035	100,000	1.71 Mcf

After reviewing filings including OPOWER's program, OES was effusive in its praise of behavior-based programming:

> *OES Staff are pleased to see that CPE [Centerpoint Energy] will be starting the Residential Home Energy Reports project in 2010. Recent evaluations of programs across the country and in Minnesota suggest that home energy reports are a cost-effective way to educate customers and encourage energy saving behavior. CPE plans to include 225,000 residential customers, approximately 30 percent of the Company's residential customers, in this program by the third year of its triennial plan. This project is also expected to be one of the largest drivers of new energy savings in the Company's Residential Segment. CPE's program provider, Positive Energy [now OPOWER], reports that customers receiving a home energy report typically reduce their energy use by 1.5 to 3 percent. Based on this information, the Company estimates that households receiving home energy reports will reduce their energy use by 1.55 percent or 1.71 MCF annually. OES Staff believe that this is a reasonable assumption at this time. In future filings, the energy savings claimed by the Company should reflect the actual energy savings associated with the project based on measurement and verification by Positive Energy [now OPOWER].*[8]

[7] Massachusetts Joint Statewide Three-Year Electric Efficiency Plan: 2010-2012. Page 238

[8] Minnesota Office of Energy Security. *Proposed Decision.* October 2009. Page 23. Behavior-based programming was approved in the Final Decision dated November 23, 2009.

V. Programs with rigorous methodology and verifiable results are critical to achieving large scale energy efficiency in Arizona

Energy consumption in Arizona is increasing rapidly. Electricity use is increasing at a rate of 4.1% each year, almost twice the national average, and Arizona Public Service projects that peak customer electric demand will grow by 56% between now and 2015. If unaddressed, this increased demand will strain existing infrastructure, decrease the reliability of energy supply, create higher bills for customers, and ultimately spur requests for new power plants.

To blunt the impact of this growth, the Arizona Corporation Commission has wisely set aggressive efficiency targets in order to reduce the state's energy consumption. OPOWER believes these goals are both needed and achievable — if Arizona encourages innovation in energy efficiency.

OPOWER believes that the Commission has done exactly that by defining DSM Measures broadly. The proposed rules, published on Page 93 of the January 15, 2010 edition of the Arizona Administrative Register, define a DSM Measure as any "material, device, technology, educational program, pricing option, practice, or facility alteration designed to result in reduced peak demand, increased energy efficiency, or shifting of electricity consumption to off-peak periods and includes CHP used to displace space heating, water heating, or another load."

It is OPOWER's understanding that behavior-based programs, which have been proven to generate significant and reliable savings, fall under this definition and that Arizona utilities would be able to count these savings towards their annual energy efficiency goals.

VI. Conclusion

OPOWER supports the ambitious energy efficiency standards proposed by the Arizona Corporation Commission, and believes that behavior-based energy programs are an innovative and proven source of savings for Arizona utilities.