

September 26, 2014

**Comments From Opower, Inc., to the California Air Resources Board on the EPA's proposed Clean Power Plan**

**Executive Summary**

Opower is pleased to provide the Air Resources Board (ARB) with the following comments regarding the Environmental Protection Agency's proposal to reduce greenhouse gas pollution under Section 111(d) of the Clean Air Act (a proposal known as the "Clean Power Plan") and its implications for California.

Working with 93 utility partners to reach more than 50 million households and businesses across nine countries, Opower is a leading provider of cloud-based software to the utility industry. In California alone, Opower works with eleven utilities, including all four investor-owned utilities, to provide our products to over 6 million California households. Opower's platform uses big data analytics and behavioral science to enable utilities to achieve energy outcomes, including energy efficiency, customer engagement and demand response.

To date, Opower has delivered more than \$500 million in bill savings for residential customers and 5 terawatt-hours in energy savings. Founded in 2007 and listed on the NYSE as OPWR, Opower is headquartered in Arlington, Virginia, with offices in San Francisco, London, Singapore and Tokyo, and a global workforce of over 550 employees.

In June 2014, EPA released a proposal of the Clean Power Plan for public review and comment. The Agency is currently collecting comments from stakeholders, including states, utilities, and other businesses. This comment period is scheduled to end on December 1<sup>st</sup>. EPA will then review the comments it has received, and revise the proposal accordingly. It is scheduled to release a final version of the Clean Power Plan in June of 2015.

EPA has included demand-side energy efficiency among the permissible abatement options in the proposed Clean Power Plan. Opower believes this is a wise choice, as EE is one of the most readily available and cost-effective abatement tools. California should embrace this compliance option. Preliminary research indicates that California has significant cost-effective EE potential. However, the method EPA included in the proposed Clean Power Plan to account for emissions reductions from EE doesn't credit emissions reductions from efficiency prior to 2020, even though EPA encourages states to undertake early action.

Once the EPA has finalized the Clean Power Plan, it will be incumbent upon the ARB to develop a compliance plan (akin to a State Implementation Plan, or SIP) to meet the goals laid out by the Agency. California would be well served to include behavioral energy efficiency in its compliance plan. Our analysis suggests that behavioral energy efficiency has the potential to continue to significantly reduce energy consumption and emissions here, while saving consumers money. To prepare for this, the ARB should communicate their support for behavioral energy efficiency as a compliance tool to EPA.

We have three recommendations for the ARB:

- I. The ARB should provide comments to EPA on the Clean Power Plan by the December 1<sup>st</sup> deadline. In these comments, you should encourage the EPA to:
  - a. Give states flexibility in how they can comply, specifically including energy efficiency as an abatement measure;
  - b. Include behavioral programs that are measured and verified through the use of randomized control trials, on the list of approved abatement options;
  - c. Develop a banking mechanism in order to credit emission reductions achieved before the compliance period.
- II. The ARB should include behavioral energy efficiency in its Clean Power Plan compliance plan.
- III. The ARB should take full advantage of existing efficiency potential studies when developing your compliance plan and, if needed, should conduct your own.

### **The Clean Power Plan**

On June 2<sup>nd</sup>, the EPA released the “Clean Power Plan” proposal, aimed at reducing CO<sub>2</sub> emissions from existing power plants in the US by using Section 111(d) of the Clean Air Act.<sup>i</sup> In order to meet nationwide goals for reducing emissions, the EPA has proposed specific targets for each state<sup>ii</sup>, based upon the “best system of emissions reductions” the Agency believes is feasible in each state. States will be responsible for developing compliance plans to meet these goals. Thus, the EPA is acutely interested in state-level perspectives. The Agency has initiated a period of public comment, during which all interested parties, including states, may provide the Agency with feedback on the proposal. The comment window closes December 1<sup>st</sup>, 2014. We would encourage the ARB to provide comments to EPA on the Clean Power Plan by this deadline.

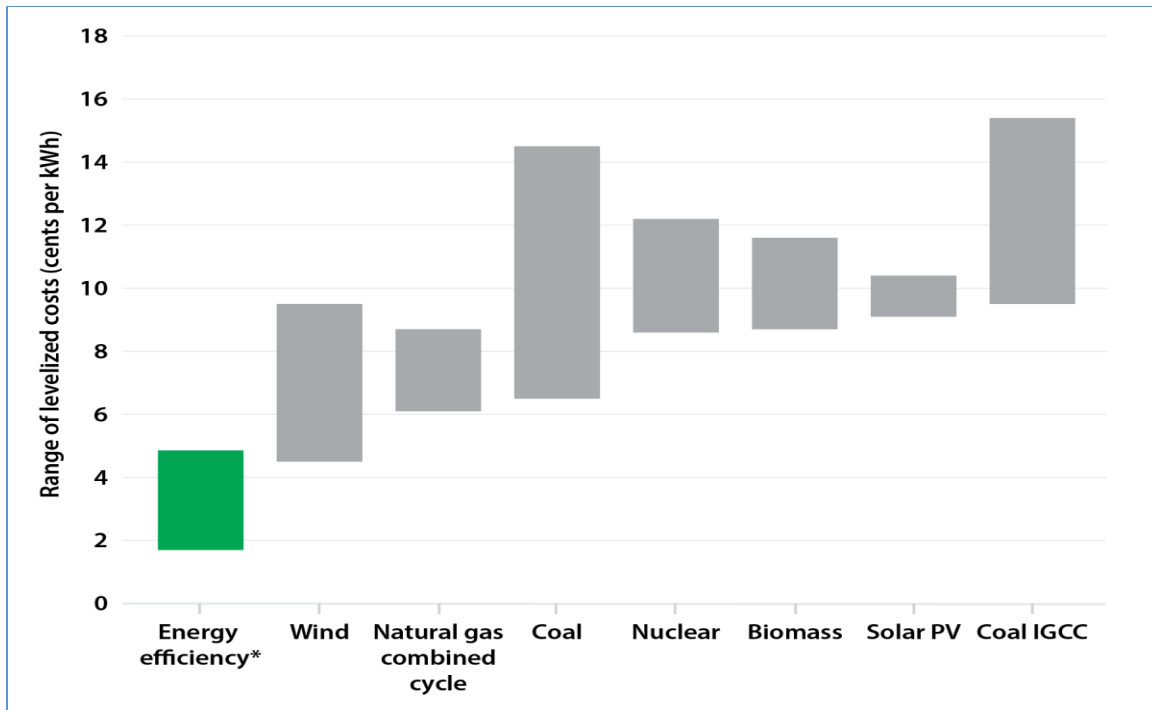
### **Energy Efficiency & the Clean Power Plan**

In crafting the Clean Power Plan, the EPA is required to utilize the “best system of emissions reductions” or BSER.<sup>iii</sup> Such systems must be “adequately demonstrated,” taking into account economic costs as well as the additional energy and environmental consequences of any approach.<sup>iv</sup> Recognizing this, the EPA has proposed that states be permitted to undertake both plant-specific actions and measures that involve the larger energy system, including demand-side energy efficiency, in order to reduce CO<sub>2</sub> emissions. Energy efficiency is an essential component of any economically feasible and environmentally effective system to reduce emissions for three reasons:

**1. Energy efficiency is capable of reducing CO<sub>2</sub> pollution** - By reducing the amount of power consumed, efficiency reduces emissions. Indeed, McKinsey & Company estimates that U.S. homes and businesses could abate approximately 710 to 870 megatons of greenhouse gases over the next twenty years through cost-effective investments.<sup>v</sup>

**2. Energy efficiency is inexpensive** - To meet demand while complying with EPA’s targets, generators will either need to transition towards lower-emission generation or reduce demand elsewhere. Energy efficiency is their most cost effective option. As Figure 1, above, demonstrates the levelized cost per of new, low-emission generation may range between \$0.05 and \$0.15 per kilowatt-hour. By contrast, the levelized cost of reducing demand through efficiency ranges, between roughly \$0.02 and \$0.05 per kilowatt-hour, one-half to one-eighth the cost.

**Figure 1. Levelized Cost of Energy Resources<sup>vi</sup>**



**3. Energy efficiency is economically beneficial** - Thanks, in part, to its cost-effectiveness, energy efficiency can be a significant economic driver. A new report by the American Council for Energy Efficient Economy finds that, by implementing four common energy efficiency policies, the United States as a whole could increase its’ GDP by \$17.2 billion and create 611,000 new jobs while reducing emissions by 26% below 2012 levels.<sup>vii</sup>

Analysis conducted by the US EPA estimates that changes to the energy system to meet emissions targets will impact utility rates. However, they also calculate that, by increasing energy efficiency, overall utility bills should fall between 8.4% and 8.7% by 2030.<sup>viii</sup> Experts from the Center for Energy, Resources and Economic Sustainability (CERES) and The University of California Berkley have found analogous economic benefits on the state level. They estimate that by 2020, if the state fully implements the efficiency policies prescribed by AB 32, Californians could save over \$4.9 billion in energy bills.<sup>ix</sup> Their analysis likewise estimates that annual efficiency gains of 1.4% could produce 181,000 additional jobs by the end of the decade.

Thus the ARB should encourage the EPA to give states flexibility in how they can comply, specifically including energy efficiency as an abatement measure.

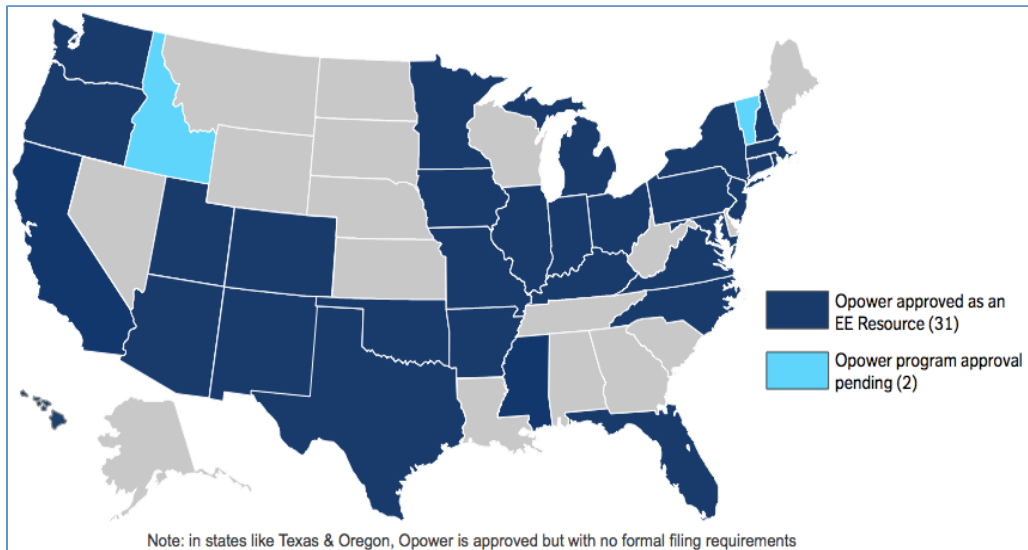
## **Behavioral energy efficiency and the Clean Power Plan**

Behavioral energy efficiency is a type of energy efficiency that takes advantage of the energy savings that result from prompted changes in consumer behavior. Energy consumers can be a significant source of efficiency. However, residents of California have limited time to think about their energy use. When they do, they have two questions: how am I using energy and what can I do to save energy and money? Opower's behavioral efficiency tools address these questions. They employ clear, actionable messages, grounded in behavioral science, that spur significant measurable reductions in energy consumption. Using multiple communications channels (e.g. web, mobile, mail) utilities use these tools to contact and motivate thousands of customers to save energy. Our tools have been shown to help people save energy regardless of age, income, or access to technology. To date, Opower's behavioral tools have helped utilities and their customers save over 5 TWh's of energy, or roughly 3.9 tons of CO<sub>2</sub>, to date. In California, Opower's behavioral energy efficiency programs have generated nearly 200 GWh of savings for our utility clients to date, but significant additional potential remains. As such, behavioral energy efficiency is an excellent compliance tool:

**1. Behavioral energy efficiency is comparatively inexpensive** - Within the realm of demand side energy-efficiency programs, behavioral energy efficiency programs are some of the most cost-effective. In a recent study, researchers at MIT and Harvard found that “an Opower-like program costs an electric utility \$0.025 per kilowatt hour saved. That compares favorably with estimates of the average cost of other energy-efficiency programs, which in two recent studies range from \$0.016 to \$0.033 and \$0.055 to \$0.064 per kWh.”<sup>x</sup>

**2. Behavioral energy efficiency's savings are well established and verifiable** - Behavioral energy efficiency has a demonstrable track record. Over 40 independent evaluations have found behavioral energy efficiency programs consistently produce savings of 1.5% to 3.5% per household.<sup>xi</sup> Moreover, Opower has extensive experience evaluating, monitoring and verifying savings from our programs. We use randomized control trials (RCT) – similar to the methodology used by the FDA to test new drugs – to measure the energy savings from our programs. These allow us to observe the impact of behavioral energy efficiency upon consumers in a statistically precise manner. The Department of Energy's State & Local Energy Efficiency Action Network (SEE Action) recommends using RCT's for behavior-based programs, as they yield “robust, unbiased program savings impact estimates”.<sup>xii</sup> These proven and precise EM&V methodologies have been used for compliance with state laws in a wide variety of states, including California at both the California Public Utilities Commission and the California Energy Commission.

**Figure 2. Map of State Approval**



**3. Behavioral energy efficiency is an established efficiency resource in California -**

As a result of this track record of savings and well establish EM&V process, Opower’s energy efficiency programs are an approved efficiency resource in 31 states, including California, and pending approval in two more as Figure 2 demonstrates.<sup>xiii</sup> Both the state legislature and the California Public Utilities Commission (CPUC), as well as the California Energy Commission have recognized behavioral energy efficiency, in the form of comparative energy usage disclosure programs. Since 2006, The California Energy Efficiency Evaluation Protocols have recognized experimental design methodologies, such as the randomized control trial, that compare energy consumption between treatment and non-treatment groups as meeting the "Enhanced" level for quantifying energy impacts. In October 2011, Governor Jerry Brown signed into law SB 488, which directed the CPUC to require utilities to report savings from comparative energy usage disclosure programs utilizing an experimental design, such as a randomized control trial. In D.10-04-029, the CPUC subsequently adopted policies to measure and count savings from comparative energy usage disclosure programs, such as Opower's Home Energy Reports.

**4. Behavioral energy efficiency has significant potential in California -**

Behavioral energy efficiency is a low-cost and readily deployable efficiency resource. It requires no additional hardware, nor must people opt into the program to participate. Instead, utilities may simply enroll their customers. As a result, behavioral energy efficiency has the potential to quickly produce substantial aggregate savings. In California, our analysis indicates that behavioral energy efficiency communications could be cost-effectively deployed to over 11.1 million households.<sup>xiv</sup> In other words, eighty-five percent of homes in the State would save more money through behavioral energy efficiency than it costs to communicate with them. Per year, the average California household could save over 179 kilowatt-hours of electricity, or about 27 dollars<sup>xv</sup> Per year, in aggregate, that saves 1,990 GWhs - enough to take Bakersfield and greater Kern County off the grid for a year<sup>xvi</sup> - puts almost \$300 million back in consumers’ pockets, and reduces more than 541 thousand tons of CO<sub>2</sub> pollution.<sup>xvii</sup>

EPA “intends to establish guidance regarding acceptable quantification, monitoring, and verification of... demand-side EE measures for an approvable [state] EM&V plan.”<sup>xviii</sup> Such guidance would, in essence, designate a pre-approved set of EM&V protocols and corresponding EE measures that states could safely include in their compliance plans. EPA is seeking comment upon what EM&V protocols and EE measures to include in such guidance.

The ARB should advocate for the inclusion of behavioral energy efficiency as a compliance option and include the following language in your comments to EPA:

*EPA should include Randomized Controlled Trials in any list of protocols provided to states as appropriate methodologies to quantify, measure and verify the savings achieved through behavioral efficiency programs.*

To substantiate this recommendation, please consider citing the independent evaluations mentioned above and listed in the endnotes. Likewise, consider encouraging EPA to consult the recommendations and protocols put forward by the SEE Action Network and DOE’s Uniform Methods Project.

### **Early Action & the Clean Power Plan**

In the proposed Clean Power Plan, the Agency has proposed that states be allowed to count the emissions reductions they achieve during the compliance period – between 2020 and 2030 – from programs and measures established prior to 2020. However, the EPA has also requested comment on a second option, that states be permitted to “recognize emission reductions that existing state requirements, programs, and measures achieved starting from a specified date prior to the initial plan performance period, as well as emission reductions achieved during the compliance plan.”<sup>xix</sup> This alternative would, in essence, allow states to begin counting emissions reductions from established programs and measures starting from a specific date before 2020, and then apply those in 2020 and thereafter.

The ARB should express their support for the second option as cited above and include the following language in their comments to EPA:

*EPA should permit states to bank the savings achieved by existing energy efficiency requirements, programs, and measures, between the date at which the Agency releases the final Clean Power Plan and the beginning of the compliance period, and apply these savings to their adjusted emissions rate during the compliance period.*

This proposal would establish a de facto banking system within the state. Savings achieved after the specified date by existing measures could be banked, then applied to the state’s adjusted emissions rate in 2020 and thereafter. Although the above approach is focused on energy efficiency (Opower’s area of expertise), it could be expanded to include low- and zero-emission generation from existing requirements, programs, and measures into the adjusted emissions rate as well.

Crediting early action allows states to smooth their compliance pathway. Currently states have a 10-year window, between 2020 and 2030, in which they must hit their emission targets. Banking savings from established measures, starting as soon as the rule is finalized, provides states with approximately five additional years to meet their targets. This should allow for more gradual adjustment and reduce transition impacts. However, rather than stretching the compliance period into the future, and allowing higher rates of emission to persist longer, this proposal encourages states to start reducing emissions earlier.

By contrast, not permitting states to bank savings achieved prior to 2020 could delay investment in EE. All energy efficiency investments have a finite life. For instance, were a household to replace their incandescent light bulbs with CFLs, those CFLs would generate energy savings every year for their 10 year lifespan. Under the EPA's current proposal, were that household to make the switch in 2017, the state could only count the savings generated in the last seven years of the CFL's life in their adjusted emissions rate. Savings from the first three years (2017-19) would be disregarded. Thus, the current proposal creates a perverse incentive for states to delay efficiency investments until 2020.

Delaying such investments would have negative economic implications. Researchers from ACEEE have observed that investments in incremental efficiency improvements contribute roughly \$90 billion per year to the US economy.<sup>xx</sup> Efficiency spending is only growing, having roughly doubled in the last decade. Industry analysts estimate that every \$1 million invested in energy efficiency creates 17 new jobs.<sup>xxi</sup> In 2013 alone, program administrators in California invested over \$1.18 billion in energy efficiency programs. If such investments postponed until 2020, the sector's growth would slow, costing California thousands of jobs. Delay could also have negative environmental consequences. It has the potential to lead to greater accumulations of CO<sub>2</sub> in the atmosphere, accelerating and accentuating climate changes. If policymakers intend to hit the same mitigation targets following such a delay, the cost to do so will be concentrated in fewer years and could be greater overall.

### **Incorporating behavioral energy efficiency into your state compliance plan**

The EPA is scheduled to propose a finalized Clean Power Plan by June of 2015. Once that is published, states will need to compose SIP-like compliance plans to meet EPA's emissions targets. Assuming the EPA maintains the flexibility contained in the proposed Clean Power Plan, California should have a range of abatement tools from which to choose. Given the low-cost, well-established EM&V process, and savings potential of behavioral energy efficiency discussed above, we encourage the ARB to include behavioral energy efficiency in their compliance plan.

### **The potential of energy efficiency**

Given efficiency's abatement potential, cost-effectiveness, and economic benefits, the California would be well served to harness this resource to the fullest extent possible. However efficiency is an intangible resource, and, consequently, it's full potential can be difficult to grasp. Thus we would encourage the ARB to take advantage of existing potential studies, developed by organizations such as the American Council for an Energy-Efficient Economy, and, when appropriate, conduct their own studies. The

findings of such studies should, in turn, be incorporated into the state's compliance planning process.

## Conclusion

The Clean Power Plan proposal presents California with an opportunity to further the state's transition towards a cleaner, more cost-effective, and diversified energy future. We encourage the ARB, to provide the EPA with input on this proposal so that the final regulations provide California with flexibility to reduce CO<sub>2</sub> emissions in a cost-effective manner. Given the economic and environmental benefits of efficiency we would likewise encourage the ARB, in its comments, to support the inclusion of efficiency as an abatement tool in the final Clean Power Plan and to encourage EPA to develop a banking mechanism such that emission reductions achieved prior to 2020 are credited. Finally, as California moves towards designing a compliance plan to meet the EPA's targets, we urge you to include behavioral energy efficiency as an abatement tool, given its low-cost, demonstrable savings, and significant potential.

Opower appreciates the opportunity to provide the ARB with comments and recommendations regarding the EPA's proposed Clean Power Plan. We stand ready to provide the ARB with any additional advice or information they may need.

Respectfully Submitted,

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<sup>i</sup> Munro, S. June 2014. "EPA's Clean Power Plan: 50 Chef's Stir the Pot." *Bloomberg New Energy Finance*.

<sup>ii</sup> Vermont does not have any large scale fossil-fired generating and thus is not subject to the plan.

<sup>iii</sup> 43 U.S.C 7411(a)(1).

<sup>iv</sup> Ibid.

<sup>v</sup> Creyts, J., Derkach, A., Nyquist, S., Ostrowski, K., & Stephenson, J. "December 2007.Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?" *U.S. Greenhouse Gas Abatement Mapping Initiative*.

<sup>vi</sup> Hayes, S. et al. April 2014. "Change is in the Air: How States Can Harness Energy Efficiency to Strengthen the Economy and Reduce Pollution." *ACEEE*.

<sup>vii</sup> Ibid.

<sup>viii</sup> EPA. June 2014. "Regulatory Impact Analysis for the Proposed Carbon Pollution Guidelines..."

<sup>ix</sup> Roland-Holst, David. October 2008. "Energy Efficiency, Innovation and Job Creation in California." *CERES & UC Berkeley*.

<sup>x</sup> Alcott, H. & Mullainathan, S., "Behavior and Energy Policy." *Science*. Vol. 327.



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<sup>xi</sup> See, for example, the following select independent evaluations:

- (i) May 2014. "Home Performance Program: Evaluation, Measurement, and Verification Report 2013" *ADM Associates, Inc.*
- (ii) April 2014. "Home Energy Report Program. 2013 Impact Evaluation. Puget Sounds Energy". *DNV-GL.*
- (iii) March 2014. "Insights from Smart Meters: The Potential for Peak Hour Savings from Behavior-Based Programs" *Lawrence Berkeley National Laboratory.*
- (iv) March 2014. "Evaluation of 2013 DSM Portfolio: Submitted to SourceGas Arkansas." *ADM Associates, Inc.*
- (v) March 2014. "Evaluation of 2013 DSM Portfolio: Submitted to Centerpoint Energy Arkansas." *ADM Associates, Inc.*
- (vi) January 2014. "Program Year 2 (2012-2013) EM&V Report for the Residential Energy Efficiency Benchmarking Program" *Navigant Consulting, Inc.*
- (vii) January 2014. "First Annual Report to the Pennsylvania Public Utility Commission for the Period June 2012 through May 2013, Program Year 4" *The Cadmus Group, Inc.*
- (viii) January 2014. "National Grid Residential Building Practices and Demonstration Program Evaluation: Final Results." *DNV KEMA.*
- (ix) January 2014. "Impact and Process Evaluation of Ameren Illinois Company's Behavioral Modification Program (PY5)". *Opinion Dynamics.*
- (x) Stewart, James and Cleff, Pete. Work in Progress. November 2013. "Are You Leaving Peak Demand Savings on the Table Estimates of Peak-Coincident Demand Savings from PPL Electric's Residential Behavior-Based Program"
- (xi) August 2013. "SDG&E Home Energy Reports Program." *DNV KEMA.*
- (xii) August 2013. "2012 IPL Residential Peer Comparison EM&V Report." *TecMarket Works.*
- (xiii) August 2013. "Review of PG&E Home Energy Reports Initiative Evaluation." *DNV KEMA.*
- (xiv) July 2013. "Evaluation of Residential Incentive Program Portfolio: May 2012 through December 2012." *ADM Associates, Inc.*
- (xv) May 2013. "Home Energy Reports Program: Program Year 2012 Evaluation Report." *Navigant Consulting;*
- (xvi) April 2013. "Evaluation of Pacific Gas and Electric Company's Home Energy Report Initiative for the 2010-2012 Program." *Freeman, Sullivan & Company.*
- (xvii) March 2013. "Puget Sound Energy's Home Energy Reports: 2012 Impact Evaluation." *KEMA;*
- (xviii) March 2013. "Evaluation of the Year 1 CL&P Pilot Customer Behavior Program." *NMR;*
- (xix) December 2012. "Program Year 1 (2011-2012) EM&V Report for the Residential Energy Efficiency Benchmarking Program." *Navigant.*
- (xx) December 2012. "Verification of Hawaii Energy 2011 Programs." *Evergreen Economics.*
- (xxi) Gunn, Randy, November 2012. "Energy Efficiency / Demand Response Plan: Plan Year 4 (6/1/2011-5/31/2012), Evaluation Report: Home Energy Reports." *Navigant Consulting.*
- (xxii) Wu, May, November 2012. "Impact & Persistence Evaluation Report: Sacramento Municipal Utility District Home Energy Report Program." *Integral Analytics, Inc with BuildingMetrics Incorporated and Sageview.*
- (xxiii) Sutter, Mary, October 2012. "Impact and Process Evaluation of 2011 (PY4) Ameren Illinois Company Behavioral Modification Program." *Opinion Dynamics Corporation with The Cadmus Group, Navigant, and Michaels Engineering.*
- (xxiv) Dougherty, Anne, July 2012. "Massachusetts Three Year Cross-Cutting Behavioral Program Evaluation Integrated Report." *Opinion Dynamics with Navigant Consulting;*
- (xxv) Gunn, Randy, May 2012. "Evaluation Report: Home Energy Reports." *Navigant Consulting;*
- (xxvi) Gunn, Randy, May 2012. "AEP Ohio EE/DR Plan Year 3. Program Year 2011 Evaluation Report - HER Program". *Navigant Consulting.*
- (xxvii) April 2012. "Puget Sound Energy's Home Energy Reports Program: Three Year Impact, Behavioral, and Process Evaluation." *KEMA Energy & Sustainability;*
- (xxviii) Allcott, Hunt, October 2011. "Social Norms and Energy Conservation." *Journal of Public Economics* Vol 95 (9-10), pp. 1082 – 1095;

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- (xxix) Todd, Annika, Steven Schiller, and Charles Goldman, October 2011. "Analysis of PSE's Pilot Energy Conservation Project: Home Energy Reports." *Lawrence Berkeley National Laboratory*;
  - (xxx) Dougherty, Anne, June 2011. "Massachusetts Cross-Cutting Behavioral Program Evaluation." *Navigant Consulting and Opinion Dynamics*;
  - (xxxi) Davis, Matt, May 2011. "Behavior and Energy Savings: Evidence from a Series of Experimental Interventions." *Environmental Defense Fund*;
  - (xxxii) Cooney, Kevin, February 2011. "Evaluation Report: OPOWER SMUD Pilot Year 2." *Navigant Consulting*;
  - (xxxiii) Gunn, Randy, December 2010. "Energy Efficiency / Demand Response Plan: Plan Year 2 (6/1/2009-5/31/2010), Evaluation Report: OPOWER Pilot." *Navigant Consulting*;
  - (xxxiv) Wilhelm, Bobbi, October 2010. "Puget Sound Energy's Home Energy Reports Program." *KEMA*;
  - (xxxv) Ivanov, Chris, July 2010. "Measurement and Verification Report of OPOWER Energy Efficiency Pilot Program." *Power System Engineering*;
  - (xxxvi) Macke, Rich, June 2010. "Measurement and Verification Report of Lake Country's OPOWER Energy Efficiency Pilot Program." *Power System Engineering*;
  - (xxxvii) Allcott, Hunt and Sendhi Mullainathan, March 2010. "Behavior and Energy Policy." *Science*. Vol. 327;
  - (xxxviii) Allcott, Hunt, February 2010. "Social Norms and Energy Conservation." *Working Paper, Massachusetts Institute of Technology's Center for Energy and Environmental Policy Research*;
  - (xxxix) Ayres, Ian, et al., September 2009. "Evidence From Two Large Field Experiments That Peer Comparison Feedback Can Reduce Residential Energy Usage." *NBER Working Paper*;
  - (xl) Klos, Mary, September 2009. "Impact Evaluation of OPOWER SMUD Pilot Study." *Summit Blue Consulting, LLC*.

<sup>xii</sup> Todd, A., et al., May 2012. "Evaluation, Measurement and Verification (EM&V) of Residential Behavior-Based Energy Efficiency Programs..." *SEE Action Network*.

<sup>xiii</sup> Opower is approved as an EE resource in Arkansas, Arizona, California, Colorado, Connecticut, Florida, Hawaii, Illinois, Indiana, Iowa, Kentucky, Ohio, Oklahoma, Oregon, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Mississippi, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Pennsylvania, Rhode Island, Texas, Utah, Virginia, and Washington. It is filed for approval in Idaho.

<sup>xiv</sup> <http://www.opower.com/beepotential/#us>

<sup>xv</sup> Calculation based upon \$0.15/kWh price of electricity

<sup>xvi</sup> Calculation based upon EIA data for California (2009): 7,000 kWh annual energy usage per household, and US Census Bureau data: ~288,000 HHs in Kern County circa 2012.

<sup>xvii</sup> Calculation based upon California's carbon intensity, drawn from Carbon Monitoring for Action, and comprised of EIA data and plant-specific emission rates.

<sup>xviii</sup> 79 Federal Register, 34920.

<sup>xix</sup> 79 Federal Register, 34919.

<sup>xx</sup> Laitner, John. February 2013. "Calculating the Nation's Annual Energy Efficiency Investments." *ACEEE*.

<sup>xxi</sup> November 2011. "Fact Sheet: How Does Energy Efficiency Create Jobs?" *ACEEE*.