OPOWER

May 31, 2012

Smart Metering Implementation Programme
Department of Energy and Climate Change
Room 103
55 Whitehall
London
SW1A 2EY

Re: Opower Comments on the Smart Metering Implementation Programme Consumer Engagement Strategy

Dear Sir or Madam:

Opower appreciates the opportunity to submit comments on the Smart Metering Implementation Programme's Consumer Engagement Strategy consultation. This consultation identifies consumer engagement and energy efficiency driven by behaviour change as key components of a successful smart metering deployment. In Opower's experience, behavioural energy efficiency programs are the most effective way to empower consumers to save energy, and, in turn, deliver on the promise of smart metering.

Opower is a leader in behavioural efficiency and smart grid consumer engagement. We currently work with over 70 utilities, including First Utility in the UK, to provide energy insights to more than 10 million households. As Box 3 on page 39 of this consultation notes, Opower and First Utility will be sharing results of our smart metering trial with the Government as evidence of the potential for indirect feedback. As further evidence of effective smart metering consumer engagement, Opower also engages millions households in conjunction with two of the largest smart metering deployments in the US with Pacific Gas & Electric in California and Baltimore Gas & Electric in Maryland.

Summary of response

Opower agrees with the emphasis of this report on the value of consumer engagement in the context of smart metering deployments. By providing the right incentives and adequate regulatory oversight, the Government can create a robust market for the provision of information, advice, motivational messaging, and guidance, which will in turn drive behaviour change.

We agree with the objectives of the consumer engagement strategy, and emphasize our support for the goal of, "Delivering cost-effective energy savings, by helping all consumers to use smart metering to better manage their energy consumption and expenditure." In our experience, the

data collected by smart meters enable suppliers and vendors, like Opower, to deliver timely notifications, frequent outreach, and personalised advice to customers. While smart meters themselves do not deliver energy saving services to consumers, they are an essential enabling technology for other customer engagement and behaviour change services.

We also agree that individual suppliers are uniquely qualified to effectively deliver household-specific advice and guidance based on smart meter data, as indicated by Figure 1 on page 34 of the consultation. Opower has saved over 1 billion kWh working with suppliers to deliver indirect feedback. These results demonstrate the powerful potential of supplier-service provider partnerships.

Finally, Opower agrees with the outstanding issues identified by the consultation related to evidence of effective engagement, delineation of responsibility across suppliers and other parties, the importance of measurement and verification, and the prospect for integrating other energy saving policies in conjunction with the smart metering rollout.

In the context of these outstanding issues, Opower recommends that the Government:

- **Give priority to consumer engagement strategies that deliver measurable and verifiable results:** The second objective described in paragraph 2.12 on page 15 related to cost-effective energy savings should be amended to include the language, "measurable and verifiable" to ensure that priority is given to programs with a proven ability to accurately measure results. This emphasis will align goals of the strategy more appropriately with the monitoring and verification efforts described in Section 7 of the consultation. The Government should also adopt best practices for measuring, monitoring and verifying the impact of these consumer engagement programs.

- **Use Opower independent evaluations as evidence of the potential for indirect feedback when implemented through supplier-service provider partnerships:** Opower results have been independently verified by twelve reports that evaluated programs across the United States. In addition to the results of the Opower-First Utility trial, Opower recommends the Government draw on evidence from past Opower trials in the U.S. as evidence of the potential for indirect feedback programs implemented by suppliers in partnership with energy service providers.

- **Develop an energy saving obligation or efficiency feed-in-tariff to facilitate investment in energy efficiency in conjunction with the smart metering rollout:** Energy saving obligations or energy efficiency feed-in-tariffs could complement a consumer engagement strategy by aligning utility incentives with the Government's objectives. These should be considered, for example, as part of the draft Electricity Market Reform (EMR) legislation where they are currently absent. Energy saving obligations, in particular, are proven to drive considerable investment. The more than twenty U.S. states that have implemented obligations now spend billions of dollars annually on efficiency. These policies should be considered when the Government performs its policy analysis on incentives that could potentially affect investment in behaviour change tools in conjunction with the smart metering implementation plan.

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Opower responses to select questions

1. Are these the right aims and objectives (paragraphs 2.12 – 2.13) against which to evaluate the Government's consumer engagement strategy for smart metering? Please explain your views?

Opower recommends that "measurable and verifiable" is included in the second objective as described in paragraph 2.12 so these goals accurately reflect the importance of the monitoring and verification efforts described in Section 7 of the consultation. We recommend the change be implemented as follows (additions in bold typeface and underlined):

> "Delivering **measurable, verifiable**, and cost-effective energy savings, by helping all consumers to use smart metering to better manage their energy consumption and expenditure"

It is also important that the Government develop a standard for measurement of savings that is consistent with accepted best practice. For example, the U.S. Department of Energy recently developed a consensus report that recommends best practices for the measurement of both direct and indirect feedback programs like Opower's programme with First Utility.[1] This report recommends the use of randomized controlled trials (RCTs) and the panel data method analysis for evaluation of energy savings from these types of behavioural efficiency programs.

This approach is endorsed by all parties to the document, including suppliers, evaluators, academics, consumer advocates, energy service providers, and other stakeholders. The Government should adopt this best practice as part of the framework for evaluating programs implemented as part of the consumer engagement strategy to ensure that consumers have received real, measured benefits from the smart meter programme.

2. What are your views on focusing on direct feedback, indirect feedback, advice and guidance and motivational campaigns as behaviour change tools? What other levers for behaviour change should we consider?

Opower agrees that each of these tools holds potential for helping to deliver behaviour change if implemented effectively. But Opower recommends that the Government focus on results and relative cost effectiveness when prioritizing these tools. If the focus of customer engagement is on specific measureable outcomes, then suppliers will use the technologies that most cost-effectively achieve them. Rather than prescribe specific technologies or approaches, the Government should hold all approaches accountable in terms of results delivered and the costs of delivery.

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[1] "Evaluation, Measurement, and Verification (EM&V) of Residential Behavior-Based Energy Efficiency Programs: Issues and Recommendations," May 2012, *The State and Local Energy Efficiency Action Network*, available here: http://www1.eere.energy.gov/seeaction/pdfs/emv_behaviorbased_eeprograms.pdf

In our experience, partnerships between suppliers and energy service providers have delivered energy savings cost effectively at scale. These results have been independently verified by twelve separate evaluations using methods that measure impact at over 90% statistical confidence. The Government should use a similarly robust results-focused approach to prioritizing these tools in its consumer engagement strategy.

4. Have the right evidence requirements been identified for foundation learning? What other evidence or approaches to research and trailing might we consider?

Opower recommends that the Government incorporate evidence from twelve independent evaluations of Opower indirect feedback trials into the foundation learning process.[2] These independent evaluations verify Opower's energy saving impact from deployments across geographies and demographics. For a complete list of these evaluations, please refer to **Appendix A**.

Exemplary of these evaluations, a recent article published in the *Journal of Public Economics* by Dr. Hunt Allcott of MIT evaluated nearly 22 million utility bills from Opower's 17 longest running deployments.[3] Allcott concluded that Opower's programme generated electricity and gas savings of 1.4 – 3.3% for all targeted households, with an average of 2%, across all geographies, and that these savings persist over time.

10. Do you have any views on mechanisms for monitoring progress and holding suppliers to account in delivering objectives?

As discussed in our response to the first question, Opower supports randomized controlled trials and *ex-post* measurement of energy savings using statistical billing analysis. This approach is recommended by the U.S. Department of Energy as most rigorous for evaluation of energy efficiency programs that deliver behaviour change.[4] It produces unbiased and precise

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[2] See the following: (i) Allcott, Hunt, October 2011. "Social Norms and Energy Conservation." *Journal of Public Economics* Vol 95 (9-10), pp. 1082 – 1095; (ii) Dougherty, Anne, June 2011. "Massachusetts Cross-Cutting Behavioral Programme Evaluation." *Navigant Consulting and Opinion Dynamics*; (iii) Davis, Matt, May 2011. "Behavior and Energy Savings: Evidence from a Series of Experimental Interventions." *Environmental Defense Fund*; (iv) Cooney, Kevin, February 2011. "Evaluation Report: OPOWER SMUD Pilot Year 2." *Navigant Consulting*; (v) Wilhelm, Bobbi, October 2010. "Puget Sound Energy's Home Energy Reports Programme." *KEMA*; (vi) Todd, Annika, Steven Schiller, and Charles Goldman, October 2011. "Analysis of PSE's Pilot Energy Conservation Project: Home Energy Reports." *Lawrence Berkeley National Laboratory*; (vii) Ivanov, Chris, July 2010. "Measurement and Verification Report of OPOWER Energy Efficiency Pilot Programme." *Power System Engineering*; (viii) Macke, Rich, June 2010. "Measurement and Verification Report of Lake Country's OPOWER Energy Efficiency Pilot Programme." *Power System Engineering*; (ix) Allcott, Hunt and Sendhi Mullainathan, March 2010. "Behavior and Energy Policy." *Science*. Vol. 327; (x) Allcott, Hunt, February 2010. "Social Norms and Energy Conservation." *Working Paper, Massachusetts Institute of Technology's Center for Energy and Environmental Policy Research*; (xi) Ayres, Ian, et al., September 2009. "Evidence From Two Large Field Experiments That Peer Comparison Feedback Can Reduce Residential Energy Usage." *NBER Working Paper*; (xii) Klos, Mary, September 2009. "Impact Evaluation of OPOWER SMUD Pilot Study." *Summit Blue Consulting, LLC*

[3] Allcott, Hunt, October 2011, "Social Norms and Energy Conservation," *Journal of Public Economics*, available here: http://web.mit.edu/allcott/www/Allcott%202011%20JPubEc%20-%20Social%20Norms%20and%20Energy%20Conservation.pdf

[4] "Evaluation, Measurement, and Verification (EM&V) of Residential Behavior-Based Energy Efficiency Programs: Issues and Recommendations," May 2012, *The State and Local Energy Efficiency Action Network*, available here: http://www1.eere.energy.gov/seeaction/pdfs/emv_behaviorbased_eeprograms.pdf

measurement of energy savings. This methodology is most appropriate for measuring energy savings as part of meeting the consumer engagement strategy's second objective.

13. Do you think the objectives and activities of the Central Delivery Body described here will help deliver the aims of the consumer engagement strategy (see paragraphs 4.32 – 4.33)? Please explain your views. Do you have any alternative suggestions?

Opower generally agrees that these are appropriate objectives for an effective consumer engagement strategy. However, Opower offers two recommendations regarding these objectives:

- In Opower's experience, "energy efficiency advice and guidance" is most effectively provided through partnerships between suppliers and energy service providers. The Government should recognize the value of the supplier's unique position in providing this advice by making it an objective for suppliers rather than the Central Delivery Body.

- *Ex-post* monitoring and verification of programme effectiveness—using randomized controlled trials where possible—should be the standard approach for evaluating progress against these objectives.

By deferring to suppliers to deliver household-specific energy saving advice and guidance, the Government can ensure that responsibility is appropriately designated by entity. And by implementing rigorous monitoring and verification, the Government can ensure that its strategy is focused on measurable results.

36. What are your views on whether the Government should, in due course, alter energy efficiency incentives in the light of new opportunities arising from smart metering? How might any such incentives operate?

The Government should consider implementing an energy saving obligation or energy efficiency feed-in-tariff to align utility incentives with Government objectives. These policies will complement the consumer engagement strategy by creating broader incentives for cost-effective investment in energy efficiency programs and consumer education programs that take advantage of increased availability of energy usage data from smart meters.

An energy saving obligation is a requirement that suppliers—or other obligated parties—save a certain amount of energy annually through investment efficiency programs. Twenty-six states in the U.S., and both Victoria and New South Wales in the Australia provide examples of successful energy saving obligations that encourage the most cost effective energy efficiency measures. New South Wales provides a particularly relevant example of how these policies can be implemented in competitive markets. The New South Wales Energy Saving Scheme places an obligation on retailers to deliver energy savings equal to 2.8% of total annual energy sales in

2012, 3.6% in 2013, and 4% for each year thereafter.[5] This type of target on energy savings without specification of technologies encourages suppliers in competitive markets to meet the obligation in the most cost effective way possible. The penalty for failing to meet this target is $25.52 (AUD) per MWh.

Opower also believes that suppliers should be able to earn incentives for exceeding their obligations so that their efficiency investment is not simply compliance-based. Several U.S. states, including Massachusetts, California, and Michigan, have regulatory mechanisms that allow suppliers to receive performance-based incentives for exceeding goals.

Whereas an energy saving obligation sets the target for energy savings needed and lets the market set the price, a feed-in-tariff sets the target price for efficiency and lets the market determine the quantity of savings.[6] The possibility of an energy efficiency feed-in-tariff has been discussed recently by advocacy organizations in the context of UK energy policy. The Green Alliance has argued in support of a tariff, and the Regulatory Assistance Project has produced a framework for its design.[7] Tariffs are innovative alternatives to obligations as a potential mechanism for driving increased investment in efficiency.

Conclusion

Opower asks the Government to include "measurable and verifiable" in their energy savings objective, use Opower independent evaluations as evidence, and consider adoption of either an energy saving obligation or energy efficiency feed-in-tariff. At Government's request, Opower would appreciate any opportunity to work with the Government on any of these recommendations.

Sincerely,

[5] See: http://www.ess.nsw.gov.au/participants/participants.asp

[6] See, "Energy Efficiency Feed-in-Tariffs: Key Policy and Design Considerations," April 2012, *Regulatory Assistance Project*, available here: http://www.raponline.org/event/energy-efficiency-feed-in-tariff

[7] See: "Decarbonisation on the Cheap," October 2011, *The Green Alliance*, available here: http://www.green-alliance.org.uk/uploadedFiles/Publications/reports/Decarbonisation_on_the_cheap_dble.pdf; and "Energy Efficiency Feed-in-Tariffs: Key Policy and Design Considerations," April 2012, *Regulatory Assistance Project*, available here: http://www.raponline.org/event/energy-efficiency-feed-in-tariff

Appendix A: Bibliography of Opower Independent Evaluations

A. Allcott, Hunt, October 2011.[8] "Social Norms and Energy Conservation." *Journal of Public Economics*,
Vol 95 (9-10), pp. 1082 - 1095.

- *Utility (State):* Report verifies savings achieved by 600,000 households across 17 Opower deployments in various geographic areas
- *Results*: Opower's programme is the most effective non-price efficiency intervention available at scale to date. Average savings range from 1.4 – 3.3% with an unweighted mean of 2.0%, equivalent to a short-term price increase of 11 – 20% (or long-term increase of 5%), at a cost-effectiveness of $0.013 - $0.054 per kWh with an unweighted mean of $0.033 per kWh.

B. Dougherty, Anne, June 2011. "Massachusetts Cross-Cutting Behavioral Programme Evaluation." *Navigant Consulting and Opinion Dynamics.*

- *Utility (State):* National Grid (Massachusetts)
- *Results*: 1.61% average savings, of which the majority came from actions that were taken outside other National Grid programs.

C. Davis, Matt, May 2011. "Behavior and Energy Savings: Evidence from a Series of Experimental Interventions." *Environmental Defense Fund.*

- *Utility (State):* Report verifies results from 11 different gas and electric utilities covering urban and suburban communities in 6 states in the Northeast, Midwest, and West. Specific utility names are not released for confidentiality purposes.
- *Results:* Reports have driven electricity savings ranging from 1.1-2.9% across the 11 deployments, and, if fully deployed in the US, OPOWER programs would lead to $3 billion in annual savings

D. Cooney, Kevin, February 2011. "Evaluation Report: OPOWER SMUD Pilot Year 2." *Navigant Consulting.*

- *Utility (State):* Sacramento Municipal Utility Department (CA)
- *Results:* (i) 2.89% savings in the second year, 22% increase over first year; (ii) Highest savings—3.56% savings in July/August of 2009—occurred during peak season; and (iii) only signs of impact stability over the first 30 months of the programme

[8] Note: In reverse chronological order

E. Todd, Annika, Steven Schiller, and Charles Goldman, October 2011.[9] "Analysis of PSE's Pilot Energy Conservation Project: "Home Energy Reports." *Lawrence Berkeley National Laboratory.*

- *Utility (State):* Puget Sound Energy (WA)
- *Results:* "The evaluation study design for the HER pilot programme utilized a randomized controlled experiment with an opt-out design, which is the best feasible method of inferring that a programme caused energy savings." Averaged 2.03% savings in the last 12 months for electricity, 1.40% for gas.

F. October 2010. "Puget Sound Energy's Home Energy Reports Programme." *KEMA.*

- *Utility (State):* Puget Sound Energy (Washington)
- *Results:* The savings rate of the most recent 12 months was significantly greater than for the first 12 months – improving from 1.87% to 2.28% average electric savings

G. Ivanov, Chris, July 2010. "Measurement and Verification Report of OPOWER Energy Efficiency Pilot Programme." *Power System Engineering.*

- *Utility (State):* Connexus (MN)
- *Results:* With 99% confidence, the programme demonstrated an average of 2.07% savings across three distinct approaches to measuring and verifying the results

H. Macke, Rich, June 2010. "Measurement and Verification Report of Lake Country's OPOWER Energy Efficiency Pilot Programme." *Power System Engineering.*

- *Utility (State):* Lake Country Power (MN)
- *Results:* Average of 2.77% first-year savings with 99% statistical confidence

I. Allcott, Hunt and Sendhil Mullainathan, March 2010. "Behavior and Energy Policy." *Science*, Vol. 327

- *Utility (State):* This article is a literature review
- *Results:* Using randomized, controlled trials with hundreds of thousands of utility customers across
  the United States, these [OPOWER] reports have been shown to reduce electricity consumption
  in the average household by over 2%

[9] Though produced in October 2011, this is an analysis of a KEMA independent evaluation that was released October 2010. For this reason, we have included it at this position in the annotated bibliography, which is otherwise organized in reverse chronology.

J. Allcott, Hunt, February 2010. "Social Norms and Energy Conservation." *Working Paper, Massachusetts Institute of Technology's Center for Energy and Environmental Policy Research.*

- *Utility (State):* Connexus (MN)
- *Results*: Using data from a randomized natural field experiment at 80,000 treatment and control
  households in Minnesota, it is estimated that the monthly programme reduces energy consumption
  by 2.3 – 2.4% relative to baseline

K. Ayres, Ian, et al., September 2009. "Evidence From Two Large Field Experiments That Peer Comparison Feedback Can Reduce Residential Energy Usage." *NBER Working Paper.*

- *Utility (State):* Sacramento Municipal Utility Deptartment (CA) & Puget Sound Energy (WA)
- *Results:* There is evidence of a reduction in the early years of the programme of 1.2% (natural gas) and
  2.1% (electric) participants

L. Klos, Mary, September 2009. "Impact Evaluation of OPOWER SMUD Pilot Study." *Summit Blue Consulting, LLC.*

- *Utility (State):* Sacramento Municipal Utility Department (CA)
- *Results:* Summit Blue (d/b/a Navigant) verified an average of 2.2% savings in the first year, as well as a bump to 2.8% average savings in the first four months of year two