

**BEFORE THE  
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

**Pennsylvania Public Utility Commission**

:

**v.**

:

**R-2016-2537349**

:

**Metropolitan Edison Company**

:

:

**ENVIRONMENTAL DEFENSE FUND &  
CITIZENS FOR PENNSYLVANIA'S FUTURE**

**DIRECT TESTIMONY OF MICHAEL MURRAY**

**DATE: JULY 21, 2016**

1 **I. INTRODUCTION**

2 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

3 A. My name is Michael Murray. I am a Chief Technology Strategist with the Mission:data  
4 Coalition. My business address is 1020 16<sup>th</sup> Street, Suite 20, Sacramento, California  
5 95814.

6 **Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL BACKGROUND AND**  
7 **YOUR RELEVANT PROFESSIONAL EXPERIENCE.**

8 A. I received my B.A. from Bachelor of Arts with highest honors in Environmental Studies,  
9 Oberlin College, Oberlin, OH (2004), and I am a member of *Phi Beta Kappa*.

10 From 2004 to 2014, I co-founded Lucid, which offers cloud-based energy  
11 efficiency software products for commercial buildings to connect building automation  
12 systems, lighting controls, inverters and submeters into an online platform to better  
13 enable energy conservation. The company currently has approximately 60 employees and  
14 its customers include Google, Yahoo!, Starbucks, Fidelity Investments, and all eight Ivy  
15 League universities.

16 From December, 2013 through the present, I co-founded Mission:data, a non-  
17 profit coalition of 40 companies (representing nearly \$1 billion/year in energy  
18 management) to support electricity consumers' access to data from smart meters, thereby  
19 enabling data-driven energy efficiency measures and dramatically reducing transaction  
20 costs ([www.missiondata.org](http://www.missiondata.org)).

21 **Q. ON WHOSE BEHALF ARE YOU FILING THIS DIRECT TESTIMONY?**

22 A. I am filing this direct testimony on behalf of the Environmental Defense Fund (“EDF”)  
23 and Citizens for Pennsylvania’s Future (“PennFuture”), intervenors in this case.

1 **Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?**

2 A. I recommend that the Commission order Metropolitan Edison Company (“Met-Ed”) as  
3 part of its advanced metering infrastructure (“AMI”) deployment to embrace customer  
4 and authorized third party access to smart meter data for energy management services so  
5 customers can receive the significant energy savings made possible by advanced  
6 metering technology.

7 **Q. ARE YOU FAMILIAR WITH THE COMMISSION’S RECENT ORDER ON**  
8 **THIRD-PARTY ACCESS TO ENERGY USAGE INFORMATION?**

9 A. Yes. The Commission addressed this issue in Docket No. M-2009-2092655. The  
10 purpose of this docket was to develop a process for certain third parties to access  
11 customer usage data. I participated in this proceeding and filed comments on behalf of  
12 Mission:data. On June 30, 2016, the Commission issued a final order approving a  
13 process for third parties including electric generation suppliers (EGSs) and conservation  
14 service providers (CSPs) under contract to the utility to access energy usage data through  
15 the utilities’ web portals.

16 The Commission further stated:

17 The Respondents recommend that the Commission  
18 determine a process or pathway by which they could be  
19 granted, with customer authorization, access to the web  
20 portals. At this time, the Commission does not have  
21 enough information in order to implement such a request.  
22 Furthermore, we do not believe this proceeding to be the  
23 appropriate one for determining the manner in which a  
24 third party, with a customer’s consent, may utilize other  
25 avenues to access that customer’s data. As stated in our  
26 Sept. 15 Final Order, we reserve the right to revisit third  
27 party access at a future point in time.<sup>1</sup> Additionally, as  
28 noted in our Sept. 2015 Final Order, third parties currently  
29 may access customer data through customer portals and/or

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<sup>1</sup> *Id.*

1 through their own equipment, so long as they have obtained  
2 customer consent.<sup>2</sup>  
3

4 **Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS.**

5 Mission: data recommends several low-cost steps to ensure that electricity customers  
6 have access to new data-enabled technologies and services to help them save energy and  
7 money, and otherwise realize value from the state's advanced metering infrastructure  
8 deployments:

- 9 1. **To promote open markets for consumer-side services such as advanced energy**  
10 **management, the Commission should require Met-Ed to provide customers easy**  
11 **access to the best available information about their energy use (including both**  
12 **“backhaul” information through the utility website and real-time information**  
13 **directly from the home/premise area network (“HAN”) radios typically found in**  
14 **advanced meters) and the ability to easily share that data with energy management**  
15 **service providers of their choice.** This data should be provided in the best available  
16 granularity to support innovative new services (including machine-readable formats that  
17 are consistent nationwide and consistent with industry best practices) and without charge,  
18 as a component of basic utility service. Backhauled data should follow the best practices  
19 of Green Button Connect, a technical standard maintained by the North American Energy  
20 Standards Board and also referred to by its technical name, the Energy Services Provider  
21 Interface (ESPI). Met-Ed should provide binding cost estimates for implementing Green  
22 Button Connect, by doing the IT work to install this software functionality with internal  
23 staff and/or by licensing the technology from vendors. The HAN radios should be  
24 immediately enabled as meters are deployed so that customers will have real-time access

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<sup>2</sup> *Id.*

1 to their energy usage data. The HAN radios installed should allow customers to easily  
2 connect any Zigbee-compliant device on a self-service website. Testing and certification  
3 of Zigbee devices should be inexpensive and standardized state-wide.

4 Illinois is considering an Open Data Access Framework intended to provide clear  
5 rules on enabling customers to conveniently obtain access to their usage data in an  
6 electronic format, using national standards, proposed by leaders in the consumer and  
7 environmental community. Mission:energy supports this framework and urges the  
8 Commission to adopt it as a framework in Pennsylvania.

9 2. **Provide customers and authorized third parties with access to billing history and**  
10 **tariff data in an electronic format.** Access to tariff and bill data is important so that

11 services can provide information to consumers on the exact bill impacts of their energy  
12 decisions. Consumers often want to know about dollars, not kilowatt-hours. Tariffs and customer bills  
13 should be published in standardized, machine-readable forms. Giving third parties access  
14 to tariffs in a machine-readable format is important because it takes human beings out of  
15 the cost-calculation process and lets software do the work, regardless of how complex  
16 tariffs may be. Commissions should publish approved tariffs in a standardized XML  
17 format.<sup>3</sup> Separately, historical bills should also be available for download in a  
18 standardized XML format, with third party access to whomever the customer authorizes.  
19 I recommend that Met Ed develop a process, to be approved by the Commission, in  
20 which third parties could be granted, with customer authorization, access to a machine-to-  
21 machine interface.

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<sup>3</sup> The same group that developed the ESPI standard, the UCA-IUG OpenADE Task Force, has developed an extension to ESPI that uses a standardized XML schema for tariffs: <https://github.com/energyos/OpenESPI-GreenbuttonDataSDK/tree/master/GreenButtonTariff>

1       3. **Third party-led authorization processes should be allowed.** For customers with access  
2       to an online utility account, authorizing a third party to access his or her usage data  
3       should be easy and seamless. But as for the large number of consumers and businesses  
4       nationwide who do not have, or do not want, an online account, the friction associated  
5       with creating such an account is not trivial. One solution is for the Commission to require  
6       utilities to accept a third party-submitted form requesting access to usage data. That form  
7       does not have to be on paper, but can be electronic on a website or submitted  
8       automatically. With a paper form or website, the third party collects the customer account  
9       number and/or service address and submits this information (sometimes with a customer  
10      signature) to the utility as proof of the customer’s authorization. This “third party-led”  
11      process is placed in contrast with a customer-led authorization that requires the customer  
12      to interact directly with the utility, a process customers often find to be fraught with  
13      complexity.<sup>4</sup> The third party-led process exists today albeit with paper forms, sometimes  
14      called customer information service requests (“CISR”) or letters of authorization  
15      (“LOA”).

16     4. **Met-Ed should have no liability for a third party’s breach of customer privacy.**

17     Simply put, only a third party should be liable for acts committed by the third party. So  
18     long as Met-Ed has fulfilled certain obligations, it should not bear any responsibility for  
19     privacy breaches committed by third parties. The utility’s obligations include (i)  
20     receiving valid customer authorization to share energy data and (ii) sharing such data  
21     securely with the designated third party (using modern encryption such as Transport  
22     Layer Security, or TLS). Failure on the part of regulators to make explicit a utility’s

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<sup>4</sup> For more detail on third party-led authorizations, see, e.g., presentation by Michael Murray at Joint RMS/WMS Workshop II on Improving 3<sup>rd</sup> Party Access to Smart Meter Texas, October 16<sup>th</sup>, 2015.  
[http://ercot.com/content/wcm/key\\_documents\\_lists/73667/07\\_Murray\\_presentation\\_ERCOT\\_workshop\\_Oct\\_16.pptx](http://ercot.com/content/wcm/key_documents_lists/73667/07_Murray_presentation_ERCOT_workshop_Oct_16.pptx)

1 limited liability will result in utilities policing third parties to avoid potential liabilities  
2 and inevitably lead to significant delays in consumers making effective use of their data.

- 3 5. **If the Commission finds that a third party has engaged in a “pattern or practice” of**  
4 **misusing customer data in violation of state or federal law, the Commission should**  
5 **order Met-Ed to cease providing energy data to that party.** The question of  
6 commission jurisdiction over non-EGS and non-CSP third parties arises frequently in the  
7 context of privacy violations. What can a utility regulator do when a third party not  
8 subject to commission jurisdiction breaches customer privacy? The simplest answer is:  
9 order the utility to terminate data-sharing with the entity in question. Termination will not  
10 prevent future breaches of usage data already transmitted, but it will prevent ongoing data  
11 transfers from being put at risk. Termination will also effectively ban the third party from  
12 operating in the state. The customer will have remedies against the third party under state  
13 and federal law. In such cases, it is important to remember that third parties should be  
14 entitled to due process before the Commission before data access is revoked.<sup>5</sup>

## 15 II. **BACKGROUND OF THE MISSION:DATA COALITION**

### 16 Q. **WHAT IS THE MISSION:DATA COALITION?**

- 17 A. The Mission:data Coalition is national coalition of more than 35 technology companies  
18 delivering consumer-focused, data-enabled energy savings for homes and businesses. Our  
19 members – with sales in excess of \$1 billion per year – have developed innovative  
20 services leveraging smart meter and utility bill data that benefit consumers’ pocketbooks.  
21 Our companies are focused on bringing energy efficiency solutions to a national market  
22 and we encourage commissions to leverage this market-based innovation.

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<sup>5</sup> California Public Utilities Commission Decision D.13-09-025 dated September 19<sup>th</sup>, 2013.  
<http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M077/K191/77191980.PDF>

1           To realize that objective, it is vital that we empower consumers with convenient  
2 access to their own energy data in a consistent manner from state to state. Mission:data  
3 works with industry and policymakers to advance customers' ability to quickly and  
4 conveniently share their meter data with energy management companies of their choice.  
5 More information about Mission:data is available on our website at  
6 <http://www.missiondata.org/>.

7           The exciting new industry our companies represent is based on: (1) advances in  
8 computational capability and (2) the availability of personalized data that did not exist a  
9 decade ago. In energy efficiency, one fundamental problem has been the cost associated  
10 with simply evaluating how much a home or building is wasting energy and identifying  
11 the most cost-effective steps needed to reduce that waste. In the industrial and large  
12 commercial sectors, the amounts of energy consumed are large enough to justify  
13 significant investments in customer-owned submeters and IT systems to analyze energy  
14 use, even though those investments are often unnecessary in theory because the utility's  
15 advanced meters collect the same information. In the residential sector, the loads are  
16 much smaller and diverse, meaning that efficiency solutions that depend on usage data  
17 have been severely limited to date because a multi-hundred-dollar cost in metering  
18 equipment, communications systems and installation is necessary at each home.

19           The real game changer in the residential sector is been the availability of ongoing  
20 energy usage information made available by AMI. Energy use varies greatly across  
21 households. The detailed understanding of each home's energy use enabled by AMI  
22 opens the door to highly effective strategies for managing energy use and helping



1 consumers save money – particularly those on time-varying rates where the time period  
2 of the consumption has a significant impact on bills.

3 A vibrant, competitive marketplace is developing to take advantage of these  
4 opportunities. The key enabler is consumer access to their own usage data and the ability  
5 to share that data with energy management providers, also known as “third parties,” of  
6 their choice. Four states (Texas, New York, Illinois and California), representing a total  
7 market of approximately 25 million data-enabled advanced meters, are on the forefront of  
8 this development. While the results of data enablement are just beginning to come in,  
9 they are impressive. Data-driven energy savings generated by our members are saving  
10 consumers between 8% and 15% of their energy and reducing utility bills by up to \$20  
11 per month or more.

12 In many of these cases, harnessing competitive market forces has made our  
13 member companies’ energy savings much more cost-effective than traditional energy  
14 efficiency programs. In one case involving analytical software and weekly energy  
15 reports in California, the energy savings achieved was comparable to a traditional  
16 efficiency program but only 1/20th of the cost.

17 **Q. HAS MISSION:DATA HELPED DEVELOP DATA ACCESS POLICIES IN**  
18 **OTHER STATES?**

19 A. Yes. Mission:data has filed comments or otherwise provided information for data access  
20 proceedings in the following states: Arizona, California, Colorado, Illinois, Indiana,  
21 Massachusetts, Michigan, Minnesota, New York, North Carolina, Pennsylvania, Texas  
22 and Washington, D.C. Copies of our comments or other filings are available at the  
23 “Activities” tab on our website at [www.missiondata.org](http://www.missiondata.org).

1 **Q. HOW DOES MISSION:DATA’S PERSPECTIVE COMPARE WITH THE ROLE**  
2 **OF OTHER PARTIES IN DATA ACCESS PROCEEDINGS?**

3 A. Mission:data’s perspective is different from other parties in data access proceedings. The  
4 utility typically will install advanced meters but does not always take the steps needed to  
5 provide timely energy usage data to customers; utilities are, understandably, so focused  
6 on AMI rollout matters that thoughtful consideration of how consumers will use their  
7 AMI data with new technologies such as smartphone apps may receive less attention.  
8 Consumer advocates may not be familiar with best practices nationally to provide usage  
9 data to customers to enable them to save energy, nor may they know about recent  
10 technological innovations such as inexpensive cloud computing and predictive analytics  
11 that can now be applied to customer energy data. In states with retail competition, retail  
12 electric service providers usually focus on getting access to energy usage data from the  
13 utility for themselves, but not for the customer. Mission:data’s perspective is different  
14 from these other parties because we focus on getting the customer access to timely energy  
15 usage data in a user-friendly way to help customers reduce their energy usage.

16 **Q. HAS MISSION:DATA DONE ANY STUDIES OR REPORTS ON DATA ACCESS**  
17 **PRACTICES IN OTHER STATES?**

18 A. Yes. In December 2015, Mission:data release a report entitled *The EmPowered*  
19 *Consumer: How Consumer Access to Energy Data can Help Solve our Biggest Energy*  
20 *Challenge*. This is a case report highlighting the leadership of three states – Texas,  
21 Illinois and California – in ensuring that consumers reap the benefits of advanced meter  
22 deployments

1 Earlier this year, Mission:Data also collaborated with More Than Smart in  
2 preparing *Got Data? The Value of Energy Data Access to Consumers*, which is a policy  
3 manual covering model regulatory approaches and best practices to animate market-based  
4 solutions and enable consumers to reduce their utility bills.

5 **III. REAL-TIME DATA ACCESS**

6 **Q. WHAT METHODS CAN A UTILITY USE TO GIVE CUSTOMERS ACCESS TO**  
7 **THEIR ENERGY USAGE DATA FROM SMART METERS?**

8 A. There are two distinct interfaces by which utilities can provide customer energy usage  
9 data to customers for their own use:

10 (1) historic interval data (typically collected through the meter and conveyed  
11 through the utility's fixed network) made available to customers or authorized third  
12 parties typically on a next-day basis by providing an automatic file transfer. Preferably,  
13 this data is formatted and transmitted according to a national standard such as "Green  
14 Button Connect My Data," also known by its technical name, the Energy Services  
15 Provider Interface ("ESPI") or the North American Energy Standard Board's REQ21. A  
16 principal advantage of ESPI is that consumers can authorize third parties to automatically  
17 receive consumption data without having to purchase equipment.

18 (2) real-time data provided through the HAN radio contained in the advanced  
19 meter and provided directly to a device owned by the consumer, typically a gateway or  
20 other HAN device capable of receiving the signal from the meter. Real-time data access  
21 can unlock a host of new applications and services, but only if the utility enables the  
22 HAN radio on the advanced meter and makes it easy for a customer to pair their HAN  
23 device with his or her specific meter.

1 **Q. DO YOU HAVE AN OPINION AS TO WHETHER CUSTOMERS' OWN USAGE**  
2 **DATA SHOULD BE PROVIDED TO THEM AS A COMPONENT OF BASIC**  
3 **UTILITY SERVICE?**

4 A. Yes. Mission:data strongly believes that a customer's own usage and billing data should  
5 be provided to that customer as part of basic utility service, without charge. A large part  
6 of the total value proposition of AMI – perhaps 40% of its total benefits -- represents  
7 consumer value from demand-side savings. The IT improvements needed to provide  
8 customers access to their data represent a small fraction of the total cost of an AMI  
9 deployment.

10 Charging consumers or third parties for access to data when ratepayers have  
11 already shouldered the cost of AMI will deter and discourage consumers from adopting  
12 data-enabled technologies that save energy and money -- essentially reintroducing costs  
13 and frictions that AMI technology is supposed to eliminate. It would also put third  
14 parties at a distinct market disadvantage compared to utility-provided offerings. States  
15 like California, Colorado, Illinois, New York and Texas require that usage information be  
16 provided to the customer or authorized third parties without charge.

17 The decision as to the granularity of data to be provided as basic utility service is  
18 critical to market animation and enabling the development and scale of very inexpensive  
19 energy management services for consumers. Mission:data observes that Texas requires  
20 15-minute meter intervals. As more granular data becomes available (such as 5-minute  
21 or 1-minute) it should also be made available to consumers without charge. There are  
22 several important considerations in establishing a required interval. First, the interval  
23 should enable a third party to reconstruct the customer bill. Second, it should match the

1 interval required to settle demand response transactions. Finally, it should be at least as  
2 granular as the interval used for demand charges. For example, if demand charges are  
3 based on 15-minute interval usage, interval data provided through the meter should be at  
4 least as granular as 15 minutes so that consumers can access affordable products to avoid  
5 or reduce demand charges.

6 An additional consideration is that the granularity provided should support  
7 techniques such as disaggregation – the use of algorithms to determine what specific  
8 devices in the home or building are being used. Disaggregation represents a key tool in  
9 supporting more powerful energy savings. Hourly data supports only the most basic  
10 disaggregation, whereas shorter intervals enable disaggregation of more appliances and  
11 at greater detail.<sup>6</sup>

12 **Q. DO YOU HAVE AN OPINION AS TO WHETHER CUSTOMERS SHOULD**  
13 **RECEIVE REAL-TIME ACCESS TO DETAILED ENERGY USAGE DATA?**

14 A. Yes. Customers should receive this information because they can use it to significantly  
15 reduce their energy usage. Neither utilities serving regional markets nor the firms  
16 administering traditional programs are likely to have the skills or the capital necessary to  
17 create the next generation of technology-enabled services on smartphones and the  
18 internet today – particularly as technology changes so rapidly over time. Customers have  
19 extremely high expectations in 2016: they expect seamless services, push notifications on  
20 their smartphones and an effortless interaction with service providers online such as  
21 banks and fitness trackers. Bringing similar experiences to the energy market will only  
22 occur at the pace it is needed by private sector technology companies operating across a

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<sup>6</sup> See, e.g., Armel, Carrie; Gupta, Abhay; Shrimali, Gireesh and Albert, Adrian. Is disaggregation the holy grail of energy efficiency? The case of electricity. *Energy Policy* 52, p. 213-234. January, 2013.  
<http://web.stanford.edu/group/peec/cgi-bin/docs/behavior/research/disaggregation-armel.pdf>

1 national market. Companies providing innovative efficiency services can only operate in  
2 a national market if the technological and policy environment is consistent amongst the  
3 states and the utilities.

4 The exciting trend – made possible by ever cheaper computing power and  
5 individual consumption data in standard electronic formats – is the development of  
6 customer energy efficiency products and services that are specifically tailored to their  
7 own energy use patterns and development of individual strategies.

8 These tailored offerings can be more effective than conventional efficiency  
9 programs and produce greater energy savings. For example, customized energy audits  
10 that address a customer's specific energy use can be prepared without a visit to the  
11 customer's home. Audits used to cost hundreds of dollars with an on-site home visit but  
12 now can be performed for a tenth of that cost, or less. Also, comparative benchmarking  
13 can be performed to compare the energy use of the customer's appliances against normal  
14 energy use for the same appliances using statistical disaggregation and machine-learning  
15 techniques.

16 Providing highly granular real-time usage data also enables: (a) diagnosis of large  
17 energy loads in real time, by letting the customer turn off certain appliances and  
18 immediately see their impact; (b) rapid and immediate verification of load reduction,  
19 which is required for rapid demand response; and (c) disaggregation (or non-intrusive  
20 load monitoring), which is the use of algorithms to differentiate energy loads without  
21 measuring them directly and enable customers to understand how individual *devices* are  
22 consuming energy. As previously discussed, disaggregation enables a virtual "itemized  
23 bill" and the development of automated personalized recommendations and alerts, such

1 as “stove left on,” or “window AC unit left on with windows open.” Hourly interval data  
2 can enable very basic disaggregation, but the most powerful disaggregation tools require  
3 short-interval data.

4 **Q. HAVE ANY STATES APPROVED GIVING CUSTOMERS ACCESS TO**  
5 **ENERGY USAGE DATA IN THIS MANNER?**

6 A. Yes. Regarding data access on a real-time basis from the HAN, Texas was the first state  
7 to enable real-time access to data through the HAN<sup>7</sup>, and California<sup>8</sup> promulgated a HAN  
8 implementation order in 2012 directing that the investor-owned utilities be capable of  
9 supporting an unlimited number HAN deployments by January 1, 2015. Illinois is  
10 moving forward with consideration of a comprehensive set of rules by which customers  
11 can obtain access to their own usage data and share it with third parties of their choice --  
12 the Open Data Access Framework -- and a related proceeding to simplify and standardize  
13 the process under which consumers will provide informed consent to the sharing of their  
14 data with third parties. Commonwealth Edison is already enabling use of the HAN radio  
15 where it has deployed advanced meters.<sup>9</sup> These states represent three of the largest four

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<sup>7</sup> *Rulemaking Relating to Advanced Metering*, Texas Public Utility Commission Project No. 31418 (Order) (May 10, 2007), available at: <http://www.puc.texas.gov/agency/rulesnlaws/subrules/electric/25.121/31418adt.pdf>

<sup>8</sup> *Order Instituting Rulemaking to Consider Smart Grid Technologies Pursuant to Federal Legislation and on the Commission's own Motion to Actively Guide Policy in California's Development of a Smart Grid System*, California Public Utility Commission Rulemaking No. 08-12-009 (Decision 11-07-056) (July 28, 2011), available at: [http://docs.cpuc.ca.gov/PublishedDocs/WORD\\_PDF/FINAL\\_DECISION/140369.PDF](http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/140369.PDF)

<sup>9</sup> *Investigation into the Customer Authorization Required for Access by Third Parties Other Than Retail Electric Suppliers to Advanced Metering Infrastructure Interval Meter Data*, Illinois Commerce Commission Case No. 15-0073 (Proposed Order) (December 23, 2015), available at: <http://www.icc.illinois.gov/docket/files.aspx?no=15-0073&docid=237768>

1 states in energy consumption in the U.S.,<sup>10</sup> accounting for 25 million (or about 40%) of  
2 the 60 million smart meters that have been deployed in the U.S.

3 **Q. WHAT IS THE IMPACT OF GIVING CUSTOMERS TIMELY ACCESS TO**  
4 **DETAILED USAGE DATA?**

5 A. Commercial and residential buildings make up approximately 41 percent of total energy  
6 use in the U.S.<sup>11</sup> - the single largest energy-consuming sector - and experts estimate that  
7 20% of this energy usage can be cost-effectively eliminated.<sup>12</sup> In 2010, the American  
8 Council for an Energy Efficient Economy's review of 36 studies concluded that timely  
9 consumer access to granular energy data yielded household energy savings of between  
10 4% and 12% or more.<sup>13</sup> The larger savings enabled by granular, real-time data are an  
11 order of magnitude larger than the savings that many customer engagement strategies are  
12 attaining today. As new energy efficiency programs and services evolve and improve,  
13 potential savings will increase. In our survey of more recent studies that followed the  
14 ACEEE report, Mission:data found 12 studies in which the savings ranged from 8% to  
15 17%.

16 It is important to note that even though real-time, highly granular data is most  
17 powerful, backhauled data made available in intervals of between 15 minutes and 1 hour  
18 is also proving to be very useful in saving energy. All three of California's investor-

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<sup>10</sup> U.S. Energy Information Administration, State Energy Profiles, available at:  
[http://www.eia.gov/state/seds/data.cfm?incfile=/state/seds/sep\\_sum/html/rank\\_use\\_gdp.html](http://www.eia.gov/state/seds/data.cfm?incfile=/state/seds/sep_sum/html/rank_use_gdp.html)

<sup>11</sup> Energy Information Administration, U.S. Department of Energy, available at:  
<http://www.eia.gov/tools/faqs/faq.cfm?id=86&t=1>

<sup>12</sup> K. Carrie Armel, Abhay Gupta, et. al., *Is Disaggregation the Holy Grail of Energy Efficiency? The Case of Electricity*, Precourt Energy Efficiency Center, Stanford University, Technical Paper 2012-05-1, 2012, p. 3.

<sup>13</sup> Karen Ehrhardt-Martinez, Kat Donnelly, et.al. *Advanced Metering Initiatives and Residential Feedback Programs: A Meta-Review for Household Electricity-Saving Opportunities*, American Council for an Energy Efficient Economy (aceee.org), Report Number E105, June 2010, p. iii. The assumption is that actual savings across the entire population would be on the order of half this amount, but these studies do not account for ongoing improvements in new energy management technologies



1 owned utilities have now activated consumer (and authorized third-party) access to  
2 interval and real-time HAN usage data from their advanced meters.

3 Preliminary results from backhaul data are encouraging. For example, in  
4 Alameda and Santa Clara Counties in California, the use of data-access functionality now  
5 available has demonstrated significant household savings: a study in Alameda County  
6 found electricity savings of 7.4% for electricity and 13% for natural gas and another in  
7 Mountain View found 5.5% savings in electricity and 16.4% savings in gas – at a cost per  
8 household a small fraction of the cost of traditional efficiency programs.<sup>14</sup> In one  
9 recently-implemented program in Livermore using Green Button Connect, consumer  
10 utility bill savings are averaging about \$20 per residential customer per month.<sup>15</sup>  
11 Moreover, these gains are extremely cost-effective because data analysis and presentation  
12 inexpensively delivers an understanding of the individualized usage patterns of each  
13 building, enabling strategies that specifically identify the most cost-effective  
14 opportunities.

15 **Q. HOW WOULD PROVIDING REAL-TIME ENERGY USAGE DATA ALLOW**  
16 **CUSTOMERS TO RECEIVE THE FULL BENEFITS OF SMART METERS?**

17 A. Customers pay for the full cost of smart meters in their rates, but they do not receive the  
18 full benefits from smart meters unless they receive real-time energy usage data.  
19 Approximately 40% of the total net benefits of AMI can be demand-side benefits for

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<sup>14</sup> Rebecca Brown, *Bringing It All Together: Design and Evaluation Innovations in the Alameda County Residential Behavior Pilot* (Presentation to the Behavior, Energy and Climate Change Conference), December 8, 2014; City of Mountain View, Acterra and Home Energy Analytics, *Energy Upgrade Mountain View Final Report*, January 2015

<sup>15</sup> <http://www.wattzon.com/wp-content/uploads/2015/06/Partner-Story-Livermore.pdf>

1 consumers.<sup>16</sup> Customers need easy, real-time access to their energy usage data in order to  
2 get the full availability of these customized energy efficiency and demand response  
3 offerings. Furthermore, many AMI deployments across the country were predicated on  
4 the notion that customers would be “empowered” to use energy in the unique ways they  
5 wanted. It is difficult to see how customers could be empowered when an upgrade from  
6 a regular meter to a smart meter does not come with a tangible additional benefit for the  
7 user, such as the ability to use new data-driven services.

8 **IV. INTERVAL DATA DELIVERED IN ELECTRONIC**  
9 **FORMAT (“GREEN BUTTON”)**

10  
11 **Q. WHAT IS GREEN BUTTON?**

12 A. Green Button is an industry-led standard, ratified by the North American Energy  
13 Standards Board (NAESB), for downloading and sharing customer usage and cost data.  
14 Green Button comes in a manual and an automated format – Green Button Download My  
15 Data and Green Button Connect My Data, respectively. Green Button uses common  
16 Internet web services methods and XML. More than 50 utilities nationwide have  
17 implemented Green Button "Download My Data." The automated version, called "Green  
18 Button Connect," has been deployed by investor owned utilities across the state of  
19 California and in Washington, D.C. and will be deployed by investor-owned utilities in  
20 Illinois. In New York, the commission recently required Con Ed to implement Green  
21 Button Connect with 5-minute intervals for commercial customers and 15-minute  
22 intervals for residential customers.

23 **Q. PLEASE EXPLAIN THE DIFFERENCE BETWEEN GREEN BUTTON**  
24 **DOWNLOAD MY DATA AND GREEN BUTTON CONNECT MY DATA.**

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<sup>16</sup> See California Public Utilities Commission, Resolution E-4527, September 27, 2012; See also Ahmad Faruqui et. al. al. *The Costs and Benefits of Smart Meters for Residential Customers*, Institute for Electric Efficiency, July 2011

1 A. Green Button Download My Data allows customers to download their electricity usage  
2 information in an XML file. This data can be imported in third party software  
3 applications by manually uploading it. This is useful, but it requires customers to log into  
4 their utility’s website, download the Green Button XML file, and manually upload it.  
5 This is valuable for one-time uses, but is burdensome for ongoing data collection. The  
6 utility industry acknowledged that Download My Data would not be particularly useful.<sup>17</sup>  
7 *Most applications for energy efficiency require ongoing access; thus, “Download My*  
8 *Data” is considered very limited in terms of overall usefulness.*

9 The real game changer, critical to enabling the kind of ongoing monitoring and  
10 control that consumers expect with apps, is Green Button Connect. The utility hosts an  
11 automated web service through which developers of energy management software can,  
12 with customer authorization, automatically retrieve and import meter data into their  
13 software. There is no need for the customer to repeatedly log in to their online utility  
14 account and download files every day. These authorizations are valid for an agreed upon  
15 time and can be revoked at any time by the consumer.

16 **Q. WHAT FORMAT SHOULD BE USED FOR CUSTOMER USAGE DATA?**

17 A. Green Button XML is formatted according to the NAESB Energy Services Provider  
18 Interface (ESPI) schema. Any implementation of Green Button should be compliant  
19 with the NAESB standard and documented best practices, and be subjected to annual  
20 independent certification by the Green Button Alliance. Non-compliant implementations  
21 should be promptly remedied, with fines or penalties imposed for prolonged non-  
22 compliance.

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<sup>17</sup> Edison Foundation Institute for Electric Innovation. “Utility-scale Smart Meter Deployments: Building Block of the Evolving Power Grid.” IEI Report, September, 2014.

1 **Q. IS GREEN BUTTON CONNECT MY DATA TOO COSTLY TO IMPLEMENT?**

2 A. No. Commonwealth Edison (“ComEd”) and PEPCO have licensed Green Button  
3 Connect technology from Schneider Electric, rather than build it with in-house  
4 information technology teams, saving considerable expense. Neither ComEd, Ameren  
5 nor PEPCO asked for cost recovery.

6 In addition to Schneider Electric, another utility vendor, Oracle, also offers Green  
7 Button Connect functionality for sale to its utility clients. Earlier this year, Public  
8 Service Company of Colorado, an Xcel subsidiary, documented that its cost to implement  
9 Green Button Connect across the state of Colorado was only \$1.5 million to \$2.0 million,  
10 or about \$1.13 to \$1.54 per customer.<sup>18</sup> That is a one-time fee and included all aspects of  
11 Green Button Connect such as online registration and authentication of third parties.

12 **Q. WHAT RECOMMENDATIONS DOES MISSION:DATA HAVE TO ENSURE**  
13 **CUSTOMER DATA PRIVACY?**

14 A. Providing consumers access to their own individual usage information is consistent with  
15 the trend in privacy laws to give consumers more understand and control over the  
16 information collected about them. It is critical that consumers have confidence in the  
17 measures that utilities, their contractors or third parties take to protect their privacy and  
18 security.

19 Mission:data urges the Commission to adopt similar approaches to protecting  
20 privacy while simultaneously empowering customers with access to their own  
21 information as has been adopted in other states like California, Colorado, Illinois or New  
22 York. With respect to enforcement, the Commission may wish to consider the approach

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<sup>18</sup> Colorado Public Utilities Commission, docket 15A-0789E. Joint Motion for Approval of Settlement Agreement and Request for Shortened Response Time by Mission:data Coalition and Public Service Company of Colorado, dated April 25, 2016.

1 adopted by California which provides that any third party engaging in a “pattern and  
2 practice” of violating privacy rules risks loss of its ability to access utility data by virtue  
3 of the Commission’s oversight over utilities.

4 In California, an enforcement framework<sup>19</sup> establishes that utilities and third  
5 parties receiving data: (1) must provide consumers meaningful, clear, accurate, specific,  
6 and comprehensive notice regarding the collection, storage, use, and disclosure of  
7 individually identifiable energy usage information, (2) must disclose to consumers each  
8 category of covered information collected, used, stored or disclosed by the covered  
9 entity, and, the purposes for which it will be collected, stored, used, or disclosed, (3) must  
10 provide to customers upon request access to their covered information, (4) may share,  
11 with few exceptions, individually identifiable covered information only with customer  
12 consent, or under a “chain of responsibility” approach whereby parties that receive  
13 covered information may disclose such information without consent to another party only  
14 for a primary purpose (e.g. grid operations) and only if the contract requires that party to  
15 adopt restrictions no less restrictive than those adopted by the providing entity; and (5)  
16 must ensure that the covered information they collect, store, use and disclose is  
17 reasonably accurate and complete and use reasonable safeguards to protect it.

18 California’s rules do not regulate the consumer’s own decision as to with whom  
19 to share data, and the rules do not hold the utility responsible for policing the acts of  
20 entities who receive information. But the Commission holds a huge stick to ensure  
21 compliance: the Commission can order utilities to terminate data sharing with third

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<sup>19</sup> California Public Utilities Commission (CPUC) Decision 11-07-056.

1 parties who the Commission has found exhibit a “pattern and practice” of violating  
2 privacy rules.

3 V. CONCLUSION

4 **Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?**

5 A. Yes.

VERIFICATION

I hereby verify under the penalties of perjury that the foregoing representations are true to the best of my knowledge, information and belief.

Signed: ME Murray

Dated: 7/14/2016

**AFFIDAVIT**

STATE OF WASHINGTON )  
COUNTY OF King ) SS:

Michael Murray, being first duly sworn, deposes and says that he is Chief Technology Strategist and is testifying on behalf of the Environmental Defense Fund, an Intervenor in this proceeding; that as such he has executed the foregoing Verification and has authority to do so; that he has read said Verification and knows the contents thereof; and that the statements therein contained are true to the best of his knowledge, information and belief.

ME Murray  
Michael Murray

Subscribed and sworn to before me,  
This 14<sup>th</sup> day of JULY, 2016.

Kirsten Floner  
Notary Public

My Commission Expires: 12-09-2019

My County of Residence: King County

