Rulemaking to modify existing consumer	)	
protection and meter rules to include Advanced	)	Docket No. U-180525
Metering Infrastructure	)	

**RESPONSE OF MISSION:DATA COALITION TO THE COMMISSION'S QUESTIONS
DATED DECEMBER 21ST, 2018**

The Mission:data Coalition (Mission:data),[1] a national non-profit coalition of technology companies delivering data-enabled energy management services, is pleased to provide this response to the Commission's questions concerning electric and gas rules pertaining to data privacy, data access and billing practices.

To reiterate from our September 21st, 2018 comments in Docket No. U-180525, Mission:data was founded six years ago to advocate for consumers' rights to access, use and share energy information collected about them by utilities. Empowering customers with secure access to their own energy usage and cost information – including the ability to easily share that information with third parties of their choice – will give consumers access to advanced tools that cost-effectively reduce energy consumption and save money. We are the primary advocate of Green Button Connect ("GBC") nationwide, a standard developed by industry and government stakeholders to facilitate permission-based customer sharing of energy usage information with third parties. Mission:data has been active in over 15 states and the District of Columbia; to date, five (5) leading states, representing over 36 million electric meters, have adopted Green Button Connect.

Mission:data applauds the Commission for thoughtfully drafting the amended electric and gas rules. The drafts incorporate numerous "lessons learned" from other jurisdictions such as California, and such improvements will improve both privacy as well as customer access to, and

---

[1]   www.missiondata.io

use of, their energy-related data. Below, Mission:data provides several important recommendations to further improve the draft electric and gas rules.

1. Recommended Revisions to WA 480-90-153, "Protection and Disclosure of private information."

Mission:data strongly supports several aspects of the draft electric and gas rules. For example, the definitions of "primary purposes" and "secondary purposes" are well-crafted and incorporate some of the best practices from states such as California, which adopted substantially similar definitions in a comprehensive data privacy docket in 2011.[2]

That said, Mission:data has several suggestions to improve the draft rules. Based on our experience working with stakeholders on data privacy rules at Commissions in 15 other states, we offer the following recommendations to the sections titled "WAC 480-90-153 Protection and disclosure of privacy information." Each comment below applies to both the electric and gas draft rules.

(A) The Commission should require "reasonable security practices and procedures" rather than a vaguely-defined NIST standard for safeguarding personally identifiable information.

1) A gas/electric utility must safeguard all personally identifiable information within the utility's possession or control from unauthorized access or disclosure ~~to the maximum extent possible~~ **with reasonable security practices and procedures**. ~~For purposes of this section, "safeguard" includes but is not necessarily limited to encrypting the information in a manner that meets or exceeds the National Institute of Standards and Technology (NIST) standard.~~

---

[2]   California Public Utilities Commission. Decision D.11-07-056, July, 2011. Available at http://docs.cpuc.ca.gov/WORD_PDF/FINAL_DECISION/140369.pdf. Attachment D contains the definitions of "primary purposes" and "secondary purposes" and is published as a separate document, available at http://docs.cpuc.ca.gov/PublishedDocs/PUBLISHED/GRAPHICS/140370.PDF.

As indicated above, Mission:data suggests replacing "to the maximum extent possible" with "reasonable security practices and procedures." This simplification is suggested both to avoid unnecessary or excessive expense and confusion, and avoid having customers' data become impossible to actually share in any practical way.

A reasonableness standard has been adopted in other jurisdictions, such as in California with Assembly Bill 1476 (Padilla, signed by Governor Brown Sept 29, 2010). The risk of requiring utilities to always act "to the maximum extent possible" to safeguard personal information is that utility spending becomes a runaway train without constraint. In a rapidly evolving technology and cybersecurity environment, "maximum extent" is virtually limitless, providing justification for astronomical utility expenditures on information technology tools, systems and consultants – even if they are unreasonable and provide no security benefit. It is already common knowledge that utilities spend much more on information technology systems than do other industries, enriching many firms in the process. Mission:data believes that a reasonableness standard provides strong protections for consumers without diminishing the actual cybersecurity protections that customers deserve.

Second, the draft's reference to a NIST standard is vague and unclear. NIST has literally dozens, if not hundreds, of different standards for everything relating to cybersecurity issues such as access control, authentication practices, encryption schemes, etc. The draft's use of the singular word "standard" indicates that the Commission has a particular standard in mind, but it is not specified. Is the Commission trying to say that personally identifiable information should be protected at the same level as "critical infrastructure" such as transmission operation centers pursuant to Executive Order 13636, which led to several NIST standards? If so, then it would be impossible for customers to exercise their rights to access and correct information about them held by the utility without submitting to biometric authentication practices in person at a utility's office location – clearly an absurd outcome. Similarly, is the Commission saying that utilities should adhere to NIST "frameworks" or "guidelines," which are malleable, or a particular hard-and-fast standard? If the Commission desires utilities to meet specific requirements, then it should specify them; if not, then Mission:data submits that the phrase "reasonable security practices and procedures" is sufficient, and the second sentence should be deleted.

(B) Draft rule #9 is critically important and should be adopted with one minor addition.

*9) If a customer discloses his or her gas consumption data to a third party that is unaffiliated with, and has no other business relationship with, the utility **other than registering to access the utility's data sharing platform**, the utility will not be responsible for the security of that data, or its use or misuse.*

Mission:data strongly supports the inclusion of the above rule with the minor clarification added in bold above. The Commission may not fully realize its significance, but this language is absolutely critical to ensuring that customers receive the benefits of investments in advanced metering infrastructure (AMI). In our experience, it is absolutely essential that utilities are not put in the position of being a "policeman" as it relates to third parties, such as energy management companies, and their handling of customer energy information. The utilities do not want a policing responsibility, nor would it be appropriate for a utility to have such responsibility. If, hypothetically, the utilities *are* required to police third party behavior – whether directly through order of the Commission, or by implication as a result of the utility's liability for third party acts – then several distressing outcomes could result. Utilities could refuse to follow customers' wishes to share their information with third parties entirely because of a risk, no matter how small, that a subsequent breach by the third party might occur and the utility would be "on the hook." Such refusal to serve customers would make the utility the *de facto* monopoly for all distributed energy resources, particularly energy efficiency and demand response, that depend upon the customer's energy information. Mission:data strongly cautions against any such determination by the Commission in this docket, even if inadvertent. Another possible outcome is that utilities could impose excessive, discriminatory and costly cybersecurity requirements on customer-designed third parties that all but eliminate the potential for third parties to serve customers in Washington. For example, utilities might require the right to physically audit third parties' internet-based servers – which itself is impossible if third parties use cloud-based systems such as Microsoft Azure or Amazon Web Services – or require adherence to multi-million-dollar cybersecurity protections. This unfortunate reality has surfaced recently in New York, where plans to "animate" distributed energy resource markets have been stalled because Consolidated Edison has imposed draconian requirements on third parties that

receive energy data at the customer's direction.[3] Relieving the utility of its liability associated with the acts of entities over which the utility does not, and should not, exert control, as draft rule #9 does, is essential to avoiding a similar unfortunate outcome in Washington.

(C) Customers' abilities to share their information held by utilities should not be limited to personally identifiable information.

11) Subject to agreements with third parties, a customer has the right to revoke, at any time, any previously granted authorization to transfer ~~personally identifiable~~ **any** *information to a third party.*

In the draft rules, personally identifiable information (PII) is defined as "information that can be used to distinguish or trace an individual's identity, either alone or when combined with other personal or identifying information that is linked or linkable to a specific individual..." But customers may wish to share information that is not PII but is important to participating in an energy efficiency or demand response offering. Several examples come to mind: (1) A customer's historic efficiency program participation information might be important to an energy efficiency contractor for qualifying the customer, but such program participation information may not be considered PII; (2) the rate a customer is on, such as whether or not the customer pays peak demand charges or what the monthly fixed charge is, could be very important to an energy efficiency or demand response provider determining the costs and benefits of its service for a particular customer, but the rate applicable to that customer does not constitute PII; and (3) information pertaining to the customer's location on the distribution grid that is necessary for customer load to be aggregated for participation in future markets such as demand response. For example, New York utilities assign an "ICAP" tag to customer locations, which is not necessarily unique to each customer, that is essential for participation in the New York

---

[3]   For example, see Mission:data's Petition for Declaratory Ruling, Case No. 18-M-0376, "In the matter of regulation and oversight of Distributed Energy Resource Providers and Products." New York Public Service Commission, dated Nov 30th, 2018. Available at http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={70A0B812-6EA8-4C62-B1A0-2B5459EFAEB7}.

Independent System Operator demand response market; California utilities mark customer locations in the California Independent System Operator's sub-Load Adjust Point and Pricing Node that are essential to participation in that market. Although similar ISOs/RTOs do not yet exist in Washington, it is conceivable that they might in the future, and this type of "grid location" information would not be considered PII but is nonetheless important to have under the control of the customer in order to participate in future demand response services.

Mission:data strongly believes that customers should be "in the driver's seat" with regard to authorizing or revoking the sharing of information with any entity. Our recommendation is that the Commission should not inadvertently limit the scope of the information held by a utility to PII because non-PII could be extremely important to the customer deriving value from advanced meters or consuming energy in more economical ways.

The same reasoning applies to rule #10, marked below:

10) The utility will retain the following information for each instance of a customer consent for disclosure of his or her ~~personally identifiable~~ *information,* **whether or not personally identifiable,** *if provided electronically:*

a) The confirmation of consent for the disclosure of ~~personally identifiable~~ **any** *information;* **and**

b) A list of the date of the consent and the affiliates, subsidiaries, or third parties to which the customer has authorized disclosure or his or her ~~personally identifiable~~ *information;* ~~and~~

~~c) A confirmation that the name, service address, and account number exactly matches the utility record for such account.~~

The notable difference in our markup between rule #10 and rule #11 above is rule #10(c), which Mission:data recommends deleting because it references an antiquated, manual, paper-based process. Utilities across the country are offering electronic, web-based authorizations such as Green Button Connect (GBC), which, as state above, has been adopted by utilities with over 36 million electric meters nationwide. Rule #10(c)'s original language leads one to believe that a human is reviewing a paper authorization form submitted by the customer and that the customer

name, service address and account number must match the utility's records. But when a web-based interface is used, the customer's online account is linked with the correct account number and so no additional check is required – and certainly not a manual verification by a person, which would add significant cost and unnecessarily lengthen the time required for an authorization to be processed.

Another reason for deleting rule #10(c) is that it would appear to mandate an online customer authentication requirement. Authentication is the process of establishing one's online identity (as opposed to authorization, which is the granting of certain rights or privileges *after* one's identity has been established). Not only does the Commission inadvertently risk micro-managing the utilities' online security practices with rule #10(c) as written, but it would be unwise to maintain the text of rule #10(c) because it appears to be inconsistent with Puget Sound Energy's and Avista's customer authentication practices today. Puget Sound Energy's website requires customer name and account number, but not address, to create an online account.[4] Similarly, Avista's website requires account number and the last four digits of the customer's phone number, but not the address, to create an online account.[5] There is a risk that rule #10(c) could be construed as dictating new authentication requirements when customers wish to share their energy information with third parties via the utility's website. Again, if the authorization were a paper form, there would be no issue with the text of rule #10(c) as written; but since the vast majority of data-sharing authorizations are expected to occur online, the draft could introduce unnecessary and costly changes to the utilities' websites that provide no security benefit to ratepayers.

To avoid complicating matters unnecessarily, Mission:data recommends striking rule #10(c) altogether. However, if the Commission still wishes to retain some requirement that the utility attest that the information transmitted to a third party is, in fact, the customer's information and not the information of some other customer, then we would suggest carefully isolating this particular issue and rephrasing rule #10(c) in the following manner: "c) a confirmation that the information transmitted to a third party is that customer's information and not that of another customer."

---

[4]   See https://www.pse.com/create-account.
[5]   See https://myavista.com/register-account.

Finally, Mission:data recommends the following changes to rule #16 to be consistent with rule #10 above, so as not to limit customer access to personally identifiable information only:

16) Customers are entitled to access their own ~~*personally identifiable*~~ *information,* **whether or not personally identifiable information,** *within a reasonable time after the utility collects and verifies the data.*

(D) New uses of aggregated, anonymized energy savings information should be made explicitly exempt from nondisclosure requirements.

In rule #15, the draft makes an important exemption for the disclosure of aggregate customer information "for legitimate business purposes." One important purpose that has recently arisen in states with AMI is energy savings numbers calculated for individual premises. With "pay for performance" (P4P) efficiency programs, site-level energy savings is calculated using smart meter data, as opposed to using estimated "deemed savings" values for particular devices or appliances. Site-level energy savings is the difference between the customer's usage and a calculated baseline. It would be impossible for a "bad actor" with access to the site-level energy savings data to derive the energy usage data. Given that P4P programs are growing rapidly in states such as California, Oregon and New York, Mission:data believes it is important to explicitly identify anonymous energy savings information as one of the exemptions for "aggregate data." Our recommended language is in bold below.

15) The utility may disclose customer information in aggregate form for legitimate business purposes, **including, but not limited to, demand side management***.*

(E) Customer data should be transmitted to third parties at no charge.

Rule #17 as written is very important for customers to receive the most value from utility investments in AMI. Customers pay for the large capital costs of AMI through rates, and customers are therefore entitled to directly receive the benefits of AMI such as energy efficiency, conservation and reduced monthly bills. Charging a fee for the provision of information either to

customers, or to customer-authorized third parties, would dramatically reduce the number of customers who would avail themselves of the opportunities presented by AMI. It would also put Washington out of step with national trends: None of the five states with Green Button Connect mandates (California, Colorado, Illinois, New York and Texas) charge fees for accessing customer information. For these reasons, Mission:data strongly urges the Commission to maintain rule #17 as written.

Customers should incur no additional charge for the provision of their retail gas consumption data in a timely, accessible manner to themselves or their third-party designee.

2. Proposed Additions to WA 480-90-153, "Protection and Disclosure of private information."

First, Mission:data proposes the following addition to the above-referenced section of the draft rules: "**Nothing in these rules shall limit a customer's right to provide his or her information to anyone.**" This sentence will ensure that the utility acts in a fair and non-discriminatory manner as it relates to customers voluntarily sharing their information with any third party of their choice. The above sentence was approved recently by Colorado's Commission in a comprehensive rulemaking concerning data access and data privacy.[6] As mentioned above, limiting the utility's liability in case of a third party's breach (provided the customer affirmatively agreed to share his or her information with the third party) is critically important to avoiding putting utilities in the role of policeman. To further assure fair treatment with any energy management or demand response company, the above sentence should be incorporated into the rules.

Second, borrowing another rule from Colorado, the Commission should add the following: "**As part of basic utility service, all utilities shall provide access to the customer's information, including energy use, billing, account, and any information necessary for energy efficiency or demand response participation, in electronic machine-readable form, without additional charge, to the customer or to any third party recipient to whom the**

---

6   Colorado Public Utilities Commission. 4 Code of Colorado Regulations 723-3, Section 3027(e).

customer has authorized disclosure. Such access shall conform to nationally recognized open standards and best practices."

The above paraphrases Colorado's Rule 3027(d) that was approved by the Commission in 2016. It is important that the rules refer to machine-readable formats conforming to nationally recognized open standards and best practices. The growing energy management and "Internet of Things" industries depend upon a technologically-consistent environment from utility to utility. Since over 36 million electric meters are now subject to a Green Button Connect mandate, Washington ratepayers can benefit from the same ecosystem of energy management services that currently serve other states, but only if standards are adhered to. If Washington utilities were to make their own idiosyncratic information technology platforms, then energy management software companies would face increased interoperability costs in Washington and consumers' options would be substantially limited.

In addition, we would add that even if the Commission directs utilities to follow evolving industry standards for secure data sharing, the Commission should discourage utilities from each developing their own implementation of those standards independently. The Commission should encourage the utilities to collaboratively develop a shared platform that reduces costs, improves user experience, and facilitates innovation in energy services. There is a national discussion beginning among energy management firms and utilities about the potential for a centralized data sharing application that all utilities could participate in. The concept is analogous to the software applications that underlie the ATM system, which revolutionized retail banking by providing a consistent interface between ATM terminals and banks. A shared, cloud-based solution for provisioning customer energy information could reduce costs for utilities and improve customer experience as well as security. Such a solution is probably ultimately required to fully enable the potential of the smart grid for data-driven innovation, both for customers and utilities.

Third, the Commission should adopt a lesson learned from California about the importance of streamlining the customer experience when sharing his or her information with third parties by adding the following rule: "**The process by which customers may authorize any third party entity to receive customer information, including but not limited to personally identifiable information, from the utility shall be no more difficult than the process by which a customer accesses his or her own information from the utility.**"

This is known as the "no more onerous" principle in California[7] which arose from the observation that utilities provided very easy-to-use website interfaces requiring a small number of steps for customers wishing to pay their bills online, but the utilities offered long, complex forms – many of which simply did not function on the web – when a customer wishes to share their information with a third party. By providing a high-quality customer experience in some cases but not others, demand response providers found data sharing rates to be considerably hindered as the state of California sought to sign up 150,000 households with third party demand response services. One company, EnergyHub, found that a simple data-sharing process resulted in 42% of customers completing the process, whereas with an onerous process, only 3% successfully shared their data with a third party.[8] Mission:data's newly published whitepaper, attached hereto, discusses several disturbing anecdotes in which utilities' poorly-designed user experiences significantly detracted from reaching the state's distributed resource goals. For these reasons, Mission:data strongly recommends incorporating the language above into the electric and gas rules.

Thank you for the opportunity to provide comment.

Dated: January 31st, 2019   Respectfully submitted,

                                                FOR THE MISSION:DATA COALITION, INC.

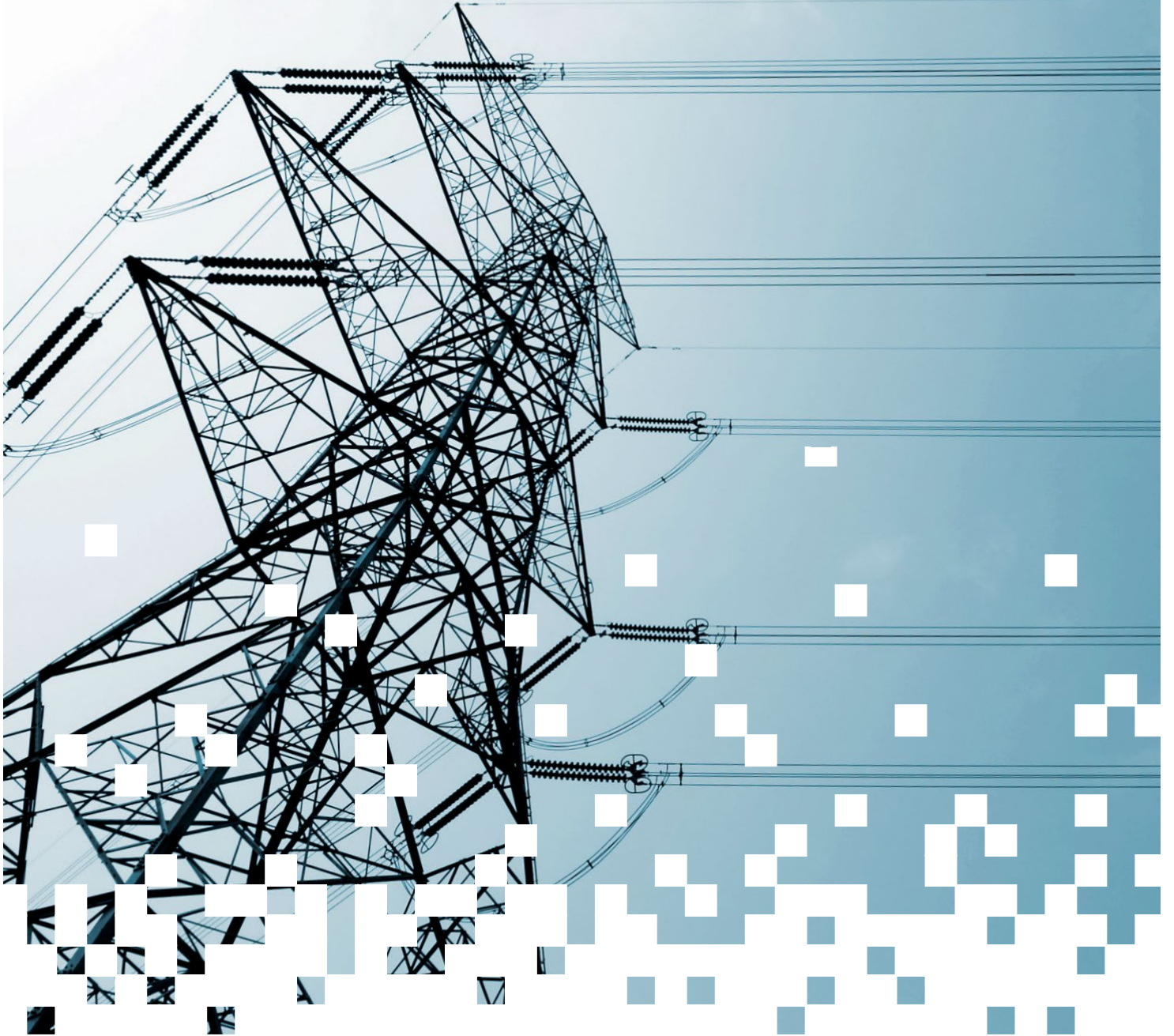   ____/s/_____
                                                Michael Murray, President
                                                Mission:data Coalition
                                                1752 NW Market St #1513
                                                Seattle, WA 98107
                                                (510) 910-2281 (phone)
                                                michael@missiondata.io

---

7   California Public Utilities Commission. Resolution E-4868, dated August 24, 2017 at p. 13 ("the credentials should be no more onerous than a similar online utility transaction.")

8   EnergyHub, 2016. "Optimizing the demand response program enrollment process," available at: http://www.energyhub.com/optimizing-demand-response-enrollment

ENERGY DATA PORTABILITY

Assessing Utility Performance and Preventing "Evil Nudges"

TABLE OF CONTENTS

MISSION:DATA
empowering energy savings

Mission:data Coalition is a national coalition of 35 energy innovative technology companies that empower consumers with access to their own energy usage data. Mission:data advocates for customer-friendly data portability policies throughout the country in order to deliver benefits to consumers and enable a vibrant market for energy management services.

EXECUTIVE SUMMARY

Electric and gas utilities have "nudged" consumers to save energy for many years. Pioneered by Opower (now Oracle), utilities have used the concept of "nudges" to induce certain consumer behaviors with peer comparisons, badges, smiley faces or other techniques. But nudging can be used to suppress certain behaviors as well, particularly those behaviors that go against the utility company's commercial or strategic interests. We define an "evil nudge" as any effort to frustrate customers' ability in online transactions to exercise their rights to use competing services, such as third party energy management services. The magnitude of an "evil nudge" is determined by the difference in elapsed time between two instances: First, where a customer takes an online action the utility wants (such as enrolling in automatic billing), and second, where a customer exercises his or her right to receive energy information services from a non-utility provider. The bigger the difference, the larger the evil nudge.

Initially begun in California, Green Button Connect My Data is now spreading nationwide, offering "data portability" to consumers who wish to take their energy usage information from utilities and transfer it to "third parties." However, the success of data portability mandates and true interoperability will be determined by the usability of the utility's website and the performance of its information technology (IT) systems. With anecdotes from energy entrepreneurs with direct experience working with utilities' Green Button Connect My Data systems, we present four common performance shortfalls: data delays, incorrect data, unplanned outages and poor conformance.

Identifying evil nudges and setting performance criteria for utilities' information technology (IT) systems are prerequisites to achieving data portability. Usability of utilities' websites should be evaluated with a panel of average consumers attempting to share their energy data with a non-utility entity. Next, regulators should hold utilities accountable for their IT systems by requiring performance metrics and public reporting. Only by testing and reporting on the start-to-finish user experience across multiple scenarios can regulators align the performance of the utility with the desired outcome: the meaningful exercise of consumer choice.

WHAT IS DATA PORTABILITY?

Data portability is the idea that consumers should have the capability to move one's data from corporations to other service providers with simplicity and interoperability. Originally used in computer science, portability initially meant the ability to move text or documents across different software platforms without any loss in content. For example, "PDF" is an acronym for "Portable Document Format," meaning PDFs can be viewed on all computer operating systems such as Windows, MacOS and Linux. A document that can only be viewed on Microsoft Windows computers is not considered "portable." Recently, data portability has been adopted by several countries as a policy goal to encourage competitive markets and to prevent formation of "data monopolies" in the information economy. For example, Europe's General Data Protection Regulation (GDPR) Article 20 establishes a "right to data portability":

> *"Controllers must make the data available in a structured, commonly used, machine-readable and interoperable format that allows the individual to transfer the data to another controller."*

In the context of utilities, data portability means the ability of consumers to transfer their energy usage data, account information and billing information to any third party service provider, such as a smartphone app, a demand response provider or a commercial building energy management system. Green Button Connect My Data is a technical standard that makes data portability a reality.

HOW DOES DATA PORTABILITY BENEFIT CONSUMERS?

Portability means consumers can access information services not offered by their utility. Many of these data-driven applications have been shown to reduce energy usage by 6%-18%.[1] For example, new services from the private sector include:

• Budgeting software to manage energy costs

• Demand response software that uses "gamification" and prizes to encourage residential load-shifting

• Tailored efficiency recommendations based on analyzing smart meter data

• Utility cost minimization services for commercial and industrial customers

But without true energy data portability across the country, consumers won't have access to these services.

BARRIERS TO DATA PORTABILITY: "EVIL" NUDGES

As popularized by Richard Thaler and Cass Sunstein, to *nudge* consumers in a certain direction is to subtly encourage them to make certain decisions over others. In "Nudge: Improving Decisions About Health, Wealth and Happiness," Thaler and Sunstein describe several examples, such as making workers' retirement contributions the default option upon hiring (rather than asking workers to opt in later). Consumers still have the right to choose, but the "choice architecture" is constructed in such a way that the default option leads to the best outcome, or choice, for the individual. Government, Thaler and Sunstein argue, can encourage healthy eating, energy conservation or other societal goals without mandates using what they termed "libertarian paternalism."

Electric and natural gas utilities "nudge" their customers all the time — for example, to encourage automatic bill payments instead of mailing checks. Anyone who has dialed an 800 number only to hear a recorded voice imploring you to "see our website for faster service" has experience with being nudged — in this case, to a lower-cost communications method for the utility.

Of course, nudging can be used to discourage as much as encourage. Investor-owned utilities have shareholders, of course, and there are customer behaviors that could cut into profits. Over time, utilities have taken actions to discourage those behaviors.

We define an "evil nudge" as any effort by utilities to impede customers' ability in online transactions to exercise their rights to use competing services. For example, increasing the number of required steps or the cognitive burden on the consumer to complete the process of sharing their data with a third party. Absent government interventions to compel utilities to behave differently, utilities will naturally impose burdens on customers who seek to do things that are not aligned with the utilities' interests.

Unfortunately, when it comes to sharing energy data with app makers, evil nudges are widespread

---

1   "Got Data? The Value of Energy Data Access to Consumers." Mission:data Coalition, January, 2016. http://www.missiondata.io/s/Got-Data-value-of-energy-data-access-to-consumers.pdf.

in utilities' websites and forms. Whether through bureaucratic incompetence, neglect or deliberate action, some utilities purport to offer data portability but, in practice, frustrate customers' desire to exercise their rights to data portability. Rather than a few breezy clicks of the mouse, the customer experience with utilities' websites can be more like a Kafkaesque labyrinth.

GREEN BUTTON CONNECT MY DATA SPREADS NATIONWIDE

WHAT IS GREEN BUTTON?

Green Button is a technical standard developed by industry for exchanging energy data to make it "portable." Green Button is formally known as the North American Energy Standards Board's (NAESB) REQ21, the Energy Services Provider Interface (ESPI). These terms are interchangeable.

As with other technical standards, the primary benefits of widespread adoption of Green Button are reduced transaction costs and the facilitation of commerce. For example, if every state had its own Wi-Fi standard (IEEE 802.11), travellers would need to buy different Wi-Fi communication cards for use in each state. Lack of consistency means that energy management firms experience higher transaction costs than if Green Button were universally deployed.
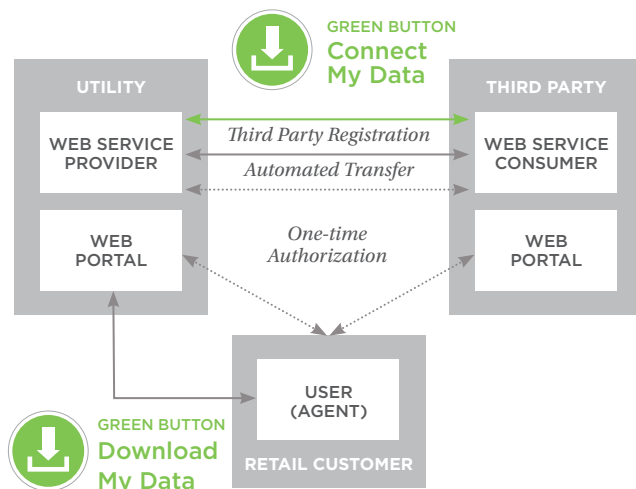

There are two flavors of Green Button. As the name suggests, Green Button DMD requires users to login to their online utility account and download a file manually. The file format is standardized using an XML (eXtensible Markup Language) and can be opened in spreadsheet programs such as Microsoft Excel or OpenOffice. Unfortunately, DMD has not been widely used by customers, primarily due to the friction introduced by the downloading-and-uploading process. Many of the best energy applications function in an ongoing capacity, making recommendations to the customer by email or text messages as usage increases. Asking customers to periodically upload a data file into a website to keep their energy app current presents a burden that nearly all attention-constrained customers will not bear.[2] As a result, most third parties do not consider DMD an adequate solution. In contrast, Green Button Connect My Data (GBC) is an automatic, ongoing transfer of usage data to a third party upon authorization by the customer. Initially, 12 to 48 months of historical usage, account and billing data are transferred from the utility to the third party. Thereafter, ongoing interval readings are transmitted.

GROWING ADOPTION

Several state policies across the U.S. support portability of energy data. In 2013, California became the first state to require its electric utilities to provide Green Button Connect My Data (GBC). After two and a half years of development and offering limited trials, GBC became widely available by Pacific Gas & Electric (PG&E), Southern California Edison (SCE) and San Diego Gas & Electric (SDG&E) in 2016. Since then, a growing number of state public utility commissions (PUCs) have ordered their utilities to support GBC.

---

2   See, e.g., "Green Button: One year Later." Edison Foundation's IEI Issue Brief, Sept 2012. http://www.edisonfoundation.net/iee/Documents/IEE_Green%20Button%20Report_Final.pdf.

GREEN BUTTON CONNECT MY DATA (GBC) ACROSS THE U.S.

GBC MANDATED
GBC UNDER CONSIDERATION
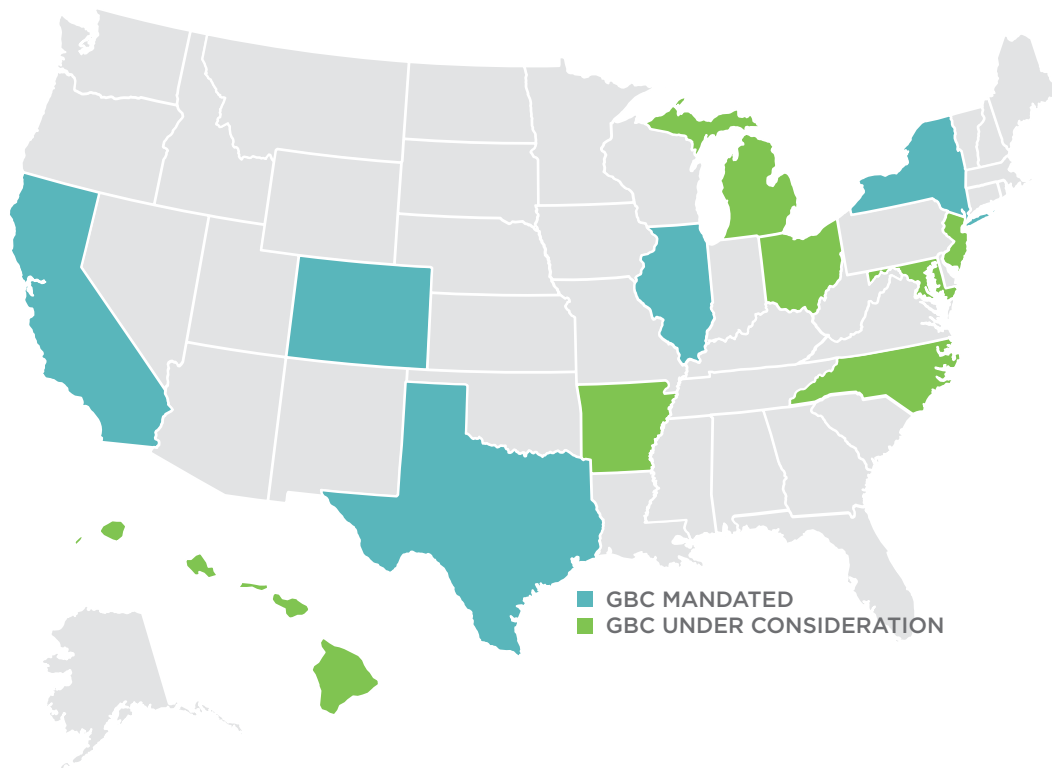
	Utility	Number of electric meters	Type	Status of GBC
CALIFORNIA	Pacific Gas & Electric	5,070,987	Mandated	Implemented as of 2016
	Southern California Edison	5,024,164	Mandated	Implemented as of 2016
	San Diego Gas & Electric	1,408,733	Mandated	Implemented as of 2013
COLORADO	Xcel Energy	1,587,603	Mandated	Planned for 2020
ILLINOIS	Commonwealth Edison	4,157,200	Mandated	Implemented as of 2017
	Ameren Illinois	1,252,000	Mandated	Implemented as of early 2018
MICHIGAN	Consumers Energy	1,818,090	Voluntary	Planned in Q3 2019
NEW JERSEY	Rockland Electric	61,109	Voluntary	Implemented in Q2 2018
NEW YORK	Consolidated Edison	3,550,000	Mandated	Implemented in Q2 2018
	Orange & Rockland	226,000	Mandated	Implemented in Q2 2018
	New York State Electric & Gas	883,563	Mandated	Planned, pending AMI approval
	Rochester Gas & Electric	372,931	Mandated	Planned, pending AMI approval
	National Grid	1,885,000	Mandated	Planned, pending AMI approval
	PSEG Long Island	1,070,000	Voluntary	Planned in 2019
TEXAS	Oncor, CenterPoint, TNMP, AEP	7,374,271	Mandated	Planned GBC upgrade by Jan 2020
	Entergy Texas	477,000	Proposed	Date not specified
	Total	**36,218,651**		
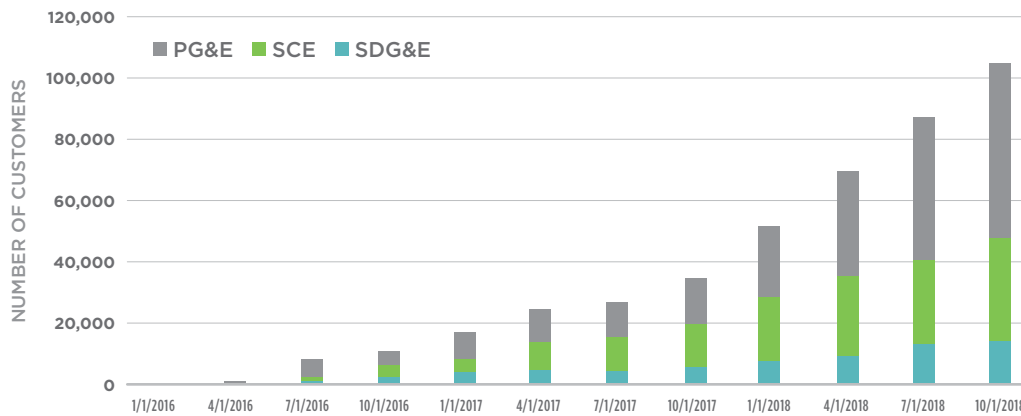
Number of California customers using Green Button Connect to share data with demand response providers, by electric utility and by quarter, 2016-2018. Source: Quarterly compliance filings, CPUC A.14-06-001 et al.

RISING UTILIZATION BY CUSTOMERS

In states with GBC, many customers are choosing to share their utility data with service providers such as rooftop solar companies or energy management firms. In California, where GBC has been operating the longest, residential demand response (DR) has been a strong driver. DR providers obtain customer permission to access their energy information, which must be transmitted to the wholesale market operator (California Independent System Operator) for verification and settlement. In the past 36 months, over 100,000 households have enrolled in these services, demonstrating that GBC is a scalable solution to meet the needs of innovative distributed energy resource (DER) providers. In addition to the chart shown above, PG&E reports that 120,000 of its customers are using GBC for purposes other than demand response as of mid-2018. PG&E has over 100 third parties registered to receive data via GBC.

USER EXPERIENCES DESIGNED TO SUPPRESS

There is no question that the internet and smartphones have made certain tasks in modern life faster and more convenient. Only a few years ago, we used telephone books. Shopping required physically going to a store. Encyclopedias on library shelves provided answers to our questions, rather than the omniscient search bar on web browsers.

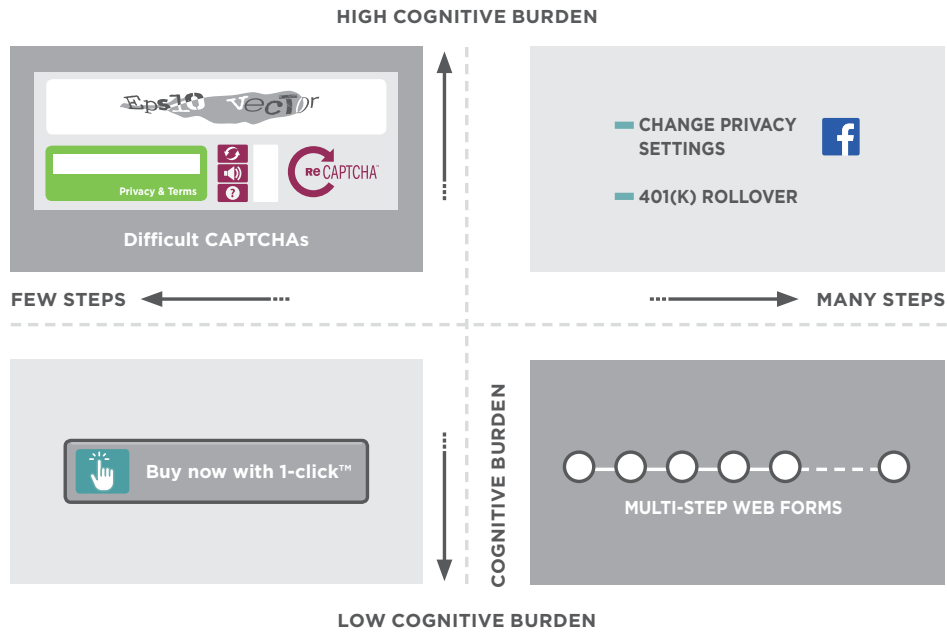We forget how quickly our expectations for modern services have changed. For example, Millennials find it infuriating when businesses don't answer questions immediately via Twitter because making telephone calls and waiting on hold is intolerable. Rolling over a 401(k) retirement account feels like a nightmarish return to pre-internet barbarism due to the paper forms that need to be signed and mailed.

Not only have our expectations for services increased dramatically as a result of the internet and smartphones, but a massive "convenience industry" now commands billions of dollars across the economy. Some highlights of this industry include:
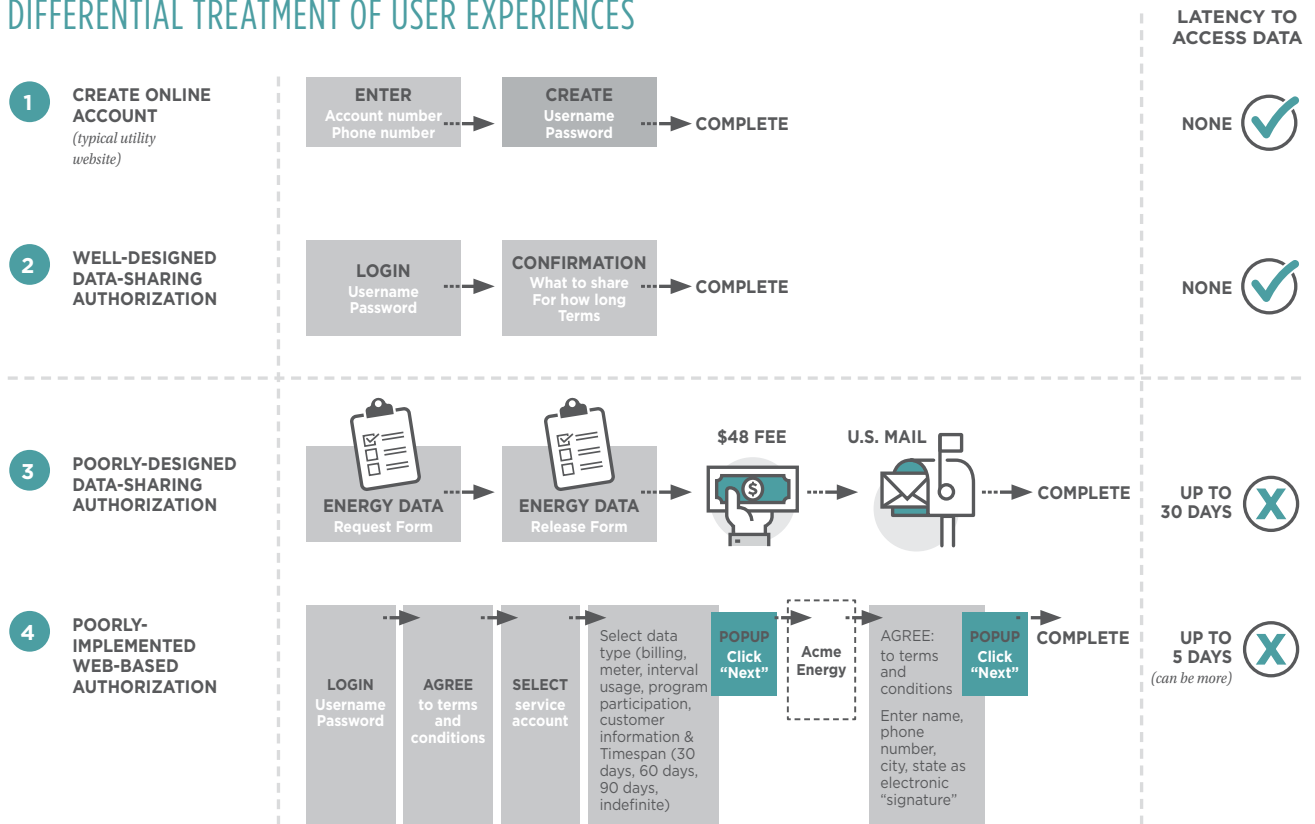
• Amazon's 1999 patent for "1-Click" ordering was among the company's most valuable, helping power the rise of the e-commerce giant to take $1 of every $2 Americans spend online. Two or three clicks resulted in fewer sales than one, so Amazon pioneered the practice of saving shipping and credit card information online to prevent the customer from re-entering such information for each purchase.

• Google's "traffic acquisition cost" was approximately $25 billion in 2018. The search giant spends this money across many players to make Google the default search engine on platforms such as the iPhone's Safari browser or Mozilla's Firefox. Only a small percentage of users bother to change the default search engine on their web browser.

• Accenture found that 95 percent of millennials say they'd switch energy providers altogether if their energy provider proves unable to provide a seamless experience.[3]

---

3   https://www.greentechmedia.com/articles/read/utilities-ignore-millennials-at-their-peril

USER EXPERIENCE TYPOLOGY

HIGH COGNITIVE BURDEN

Eps10 vector

Privacy & Terms

ReCAPTCHA

Difficult CAPTCHAs

- CHANGE PRIVACY SETTINGS
- 401(K) ROLLOVER

FEW STEPS ⬅ ⋯   ⋯ ➡ **MANY STEPS**

Buy now with 1-click™

COGNITIVE BURDEN

MULTI-STEP WEB FORMS

LOW COGNITIVE BURDEN

DIFFERENTIAL TREATMENT OF USER EXPERIENCES

LATENCY TO ACCESS DATA

1 CREATE ONLINE ACCOUNT
(typical utility website)

ENTER Account number Phone number → **CREATE** Username Password → **COMPLETE**

NONE ✓

2 WELL-DESIGNED DATA-SHARING AUTHORIZATION

LOGIN Username Password ⋯ **CONFIRMATION** What to share For how long Terms ⋯ **COMPLETE**

NONE ✓

3 POORLY-DESIGNED DATA-SHARING AUTHORIZATION

ENERGY DATA Request Form → **ENERGY DATA** Release Form → **$48 FEE** → **U.S. MAIL** → **COMPLETE**

UP TO 30 DAYS ✗

4 POORLY-IMPLEMENTED WEB-BASED AUTHORIZATION

LOGIN Username Password → **AGREE** to terms and conditions → **SELECT** service account → Select data type (billing, meter, interval usage, program participation, customer information & Timespan (30 days, 60 days, 90 days, indefinite) → **POPUP Click "Next"** → **Acme Energy** → **AGREE:** to terms and conditions Enter name, phone number, city, state as electronic "signature" → **POPUP Click "Next"** → **COMPLETE**

UP TO 5 DAYS *(can be more)* ✗

(1) Utilities want customers to interact with the utility online, reducing call-center operating expenses, as shown in the relatively small number of required steps. (2) A utility's online experience to facilitate sharing one's energy data can be similarly streamlined, though it often isn't. (3) Paper forms for data sharing require significantly more effort from customers, as shown above using Duke Energy in North Carolina as an example. (4) A complex, multi-step online experience can be equally arduous, as shown above referencing Southern California Edison's GBC implementation as of 2018. Note that GBC, as a technical standard, is silent on user experience topics, so it is possible to have a poor UX while complying with the standard.

Against this backdrop of decreasing friction in customer interactions across industries, inconvenient, multi-step user interactions have become reserved for those things firms *don't* want their users to do: return purchased items, change privacy settings to minimize personal information shared, move retirement funds from one IRA to another. Many firms, including utilities, are required to provide services they don't wish to emphasize. The relative convenience of online user interactions is therefore reflective of a firm's priorities: the simplest-to-execute actions are those that increase revenues, decrease costs or provide strategic benefit.

By quantifying the time differential between a given customer transaction and a well-designed "reference" interaction, we can assess the magnitude of the "evil nudge": How badly does a utility want to discourage the customer's given behavior relative to the behaviors that the utility desires?

Differential treatment of user experiences (UX) can be separated into two characteristics: the number of steps required and cognitive burdens. Tasks requiring greater cognitive effort lead to increased time to complete a given process. Examples include complex forms where reading and comprehension are required to avoid selecting the wrong items in a list. A multi-step process with high cognitive requirements results in high user attrition rates. In one example specific to the electricity sector, a study by demand response provider EnergyHub found that 42% of customers solicited for a demand response program ultimately enrolled when the process was simplified, as compared with 3% when the enrollment process was arduous.[4]

User experience typology is shown in the four quadrants on page 8, with the number of steps on the x-axis and cognitive burden on the y-axis. Darker shading indicates a longer, more difficult user experience.

> *"Even our buddies at the utility said they couldn't get through their own authorization process successfully to try out our app!"*
>
> - MISSION:DATA MEMBER

> *"This is very poorly thought out…This is a horrible user experience."*[5]
>
> - ENTREPRENEUR

BUGS AND GLITCHES: THE PERFORMANCE OF UTILITY IT SYSTEMS

The operation of GBC by utilities requires successful information technology systems. When outages or glitches occur — as they inevitably do — third parties (such as energy management firms) don't get the information they need, resulting in several consequences. The first and most obvious consequence is confused or dissatisfied customers. For example, one demand response company experiences a large number of complaints from customers when utilities are delayed in transmitting data. These consumers expect to be compensated for their energy reduction. Waiting days or weeks — often an unpredictable, inconsistent delay from time to time — causes customer confusion and often leads to unenrollment.

TYPES OF PERFORMANCE PROBLEMS

Data Delays are when utilities fail to transmit customer energy information to third parties in a timely manner.

Incorrect Data are data sent to a third party that do not match what the customer sees on the utility's web portal.

Unplanned Outages are when parts (or the entirety) of a utility's GBC system goes offline, outside of a scheduled maintenance window.

Poor Conformance is when the utility's implementation does not conform to the Green Button Connect My Data standard.

Second, business interruptions and uncertainty add costs to the third party. Technical support and software engineers from the third party need to be called in to troubleshoot problems and communicate with the utility. It is important to note that the resulting harms from IT system outages are asymmetric: The utility faces virtually no consequences in terms of lost revenue or dissatisfied

---

4   "Optimizing the demand response program enrollment process." EnergyHub, 2016. https://www.energyhub.com/optimizing-demand-response-enrollment.

5   Awesome Power, Public Utility Commission of Texas Project No. 42786. April 25, 2017. http://interchange.puc.texas.gov/Documents/42786_34_937368.PDF.
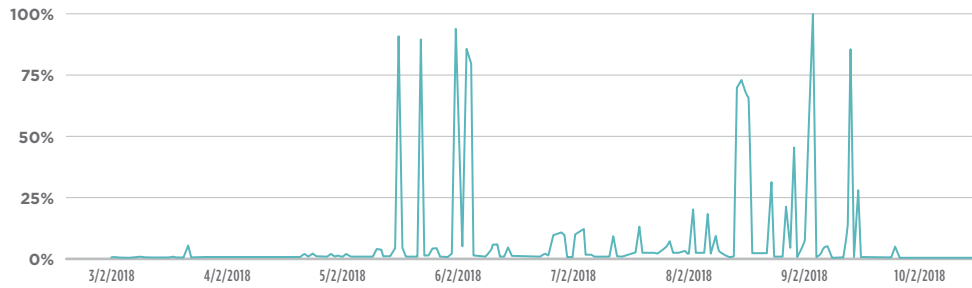
customers, but the third party suffers.

With some 17 million electric meters' data available via GBC today, many third parties have sufficient experience to assess how well these utilities' IT systems are performing. We have distinguished performance "glitches" into four general categories (see sidebar), each with their own unique set of impacts.

% USERS WAITING MORE THAN 5 DAYS AFTER AUTHORIZATION FOR DATA DELIVERY

One firm experienced multiple delays in which nearly 100% of their customers' data was delayed by 5 days or more.

DATA DELAYS

Many third parties have reported significant delays in receiving energy data. Delays can occur initially, after a customer clicks the final "submit" button to complete an authorization, or they can occur on an ongoing basis. Several app developers have reported that they were forced to entirely re-design their applications to accommodate data delays from utilities. For example, one firm built its software to inform facility managers of yesterday's energy usage data, but the firm had to re-build its user interface when it realized energy data was frequently delayed by multiple days. Delays were such a regular occurrence for one third party that it programmed its software application to tells its users upon completing the authorization: "We will notify you via email when data are received. This may take some time."

One third party monitored data delays from Southern California Edison (SCE) over several months. The graph below shows the percent of its customers in SCE's territory whose data was delayed more than five (5) days. For example, customer usage data from Sunday was sometimes delayed until Friday or later. Numerous "spikes" are noticeable, indicating that SCE's

system was frequently delayed in transmitting data from virtually all of this customer set. Far from being predictable and robotic, the SCE system is inconsistent, creating challenges for third parties who must accommodate widely varying latencies in their products.

> *"We find that data is stale and updated irregularly. It can have a 3-day to 2-week lapse."*
>
> - ENTREPRENEUR

INCORRECT DATA

Sometimes utilities transmit incorrect energy usage data to third parties. This is a particularly vexing problem because the third party often has no way to know whether the data provided are correct or not. In the case cited below, from Southern California Edison, the third party compared the data received from the utility via GBC with what the customer sees on the utility's web portal. An hour-by-hour comparison showed numerous significant
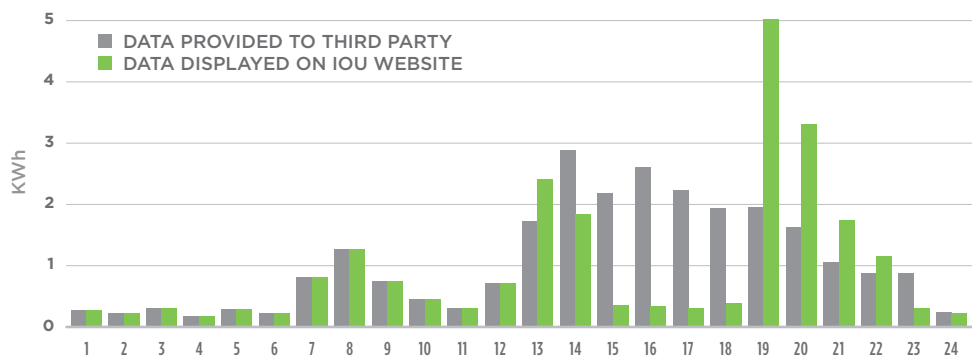
In this example from demand response provider OhmConnect, a utility in California provided OhmConnect hourly readings via GBC that were different from what was displayed on the utility's web portal. "IOU" = investor-owned utility. Source: Comments of OhmConnect, Inc. on August 8, 2018 IEPR Commissioner Workshop on Demand Response. California Energy Commission Docket No. 17-IEPR-12, dated August 22, 2017.

discrepancies, creating challenges and headaches when settling a demand response transaction at the California Independent System Operator for monetary compensation. Other issues have been reported by third parties, such as null values (no reading) mistakenly represented as zeros.

UNPLANNED OUTAGES

Unplanned system outages can occur with any IT system, but they are particularly problematic for energy management companies because delivery of energy efficiency recommendations — a core value of a third party's service — is delayed to consumers. When analyzed quickly, timeseries energy data is more valuable because it alerts consumers or building owners to ongoing energy waste and immediate savings opportunities. Managing sporadic outages is therefore a challenging task for many entrepreneurs.

> *"Now that we are hitting it [the utility's servers] nightly, we just break it — a lot. It sucks. Unstable. Gets overloaded at the drop of hat."*

- ENTREPRENEUR

From: ShareMyData <ShareMyDataMB@pge.com>

Subject: Share My Data Unplanned Outage Notification - Thursday October 25th

To: ShareMyData <ShareMyDataMB@pge.com>, sharemydata <sharemydata@pge.com>

PG&E is experiencing an unplanned network outage that is impacting Share My Data jobs. Users are unable to successfully make any API calls.

At this time, we are still assessing the issue and looking for a solution. A notification will be sent out when we have more information or the issue is resolved.

Should you have any questions or need for additional support, please feel free to contact us at sharemydata@pge.com.

Thanks,

Share My Data Team

Email notice of an unplanned outage from Pacific Gas & Electric. At least PG&E notifies third parties by email of outages (whether scheduled or unscheduled); many utilities provide no notice whatsoever.

THIRD PARTY COMMENTS ON THE PERFORMANCE OF SMART METER TEXAS

"...[T]he system for third party access is actually much worse, because frequently it just stops working entirely. Here is a list of such failures (we notified the PUC each time):

- **January 17th, 2017:** Third party agreement invites are not sending.

- **January 19th, 2017:** Third party agreement invites are not sending, resolved six hours later, but then the problem occurs again and is not fixed for three to four more hours.

- **January 24th, 2017:** Third party agreement invites are not sending. This problem continued, more or less, for two full days.

- **February 21st, 2017:** Third party agreement invites are sending, but they contain broken links that do not work. This problem continued for two full days.

- **March 1st, 2017:** SMT completely crashes for hours, and no one can log in.

- **March 14th, 2017:** SMT completely crashes again, and no one can log in.

- **March 20th, 2017:** Just like February 21st, third party agreement invites are sending with broken links (rendering them useless).

- **March 28th, 2017:** Registration of new users stops working completely.

- **March 30th, 2017:** SMT completely crashes for hours, and no one can log in.

As is apparent, SMT crashes a lot, and the third party authorization process is very buggy."

An entrepreneur reports on Smart Meter Texas (SMT)'s operations in 2017. A subsequent settlement agreement, approved by the PUC, will improve the user experience and require greater uptime beginning in 2020. Source: Awesome Power.

POOR CONFORMANCE

Adhering to the GBC standard has been an ongoing challenge in several jurisdictions. While some elements of the standard allow a degree of flexibility, many are rigid. For example, the XML format for usage data is specified in great detail; it is either followed properly, or it isn't. Last year, Mission:data discovered that one major electric and gas utility was claiming to follow the Green Button standard for usage data, but in practice it had made its own custom version. Non-conformance makes interoperability impossible, requiring entrepreneurs to write customized software for each utility.

Usage data files can be validated for conformance by uploading samples to this website, managed by the nonprofit Green Button Alliance: dmdvalidator. greenbuttonalliance.org. It's easy for many utility customers to download their own Green Button
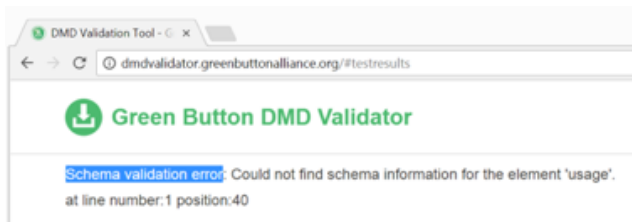
file and run a conformance test. Errors, such as a "schema validation error" as shown below, will result if the energy usage file does not conform to the standard.

> *"We have separate code for each California utility. Their implementations are totally different from one another."*
>
> - MISSION:DATA MEMBER

OTHER ISSUES

Beyond data delays, incorrect data, unplanned outages and poor conformance, there are other friction points that, if introduced by utilities, inhibit the successful operation of third party software applications. These include:

Registration and onboarding: Firms seeking to acquire customer data from a utility must register with the utility, exchange encryption keys for secure communication, and complete technical interoperability tests. Often times, utilities shortchange this process by not providing sufficient information or staff resources. In the case of San Diego Gas & Electric (SDG&E), entrepreneurs

have told us there is a long queue to register with SDG&E's GBC system. **Two firms told us they have been waiting in line for over three years** and are unable to complete onboarding due to the utility's lack of readiness.

> *"We've been waiting in SDG&E's registration queue for over three years."*
>
> - MISSION:DATA MEMBER

Technical support: Questions concerning the operation of any IT system inevitably arise, but many utilities provide poor response times to even basic questions. In many cases, email is the only way to communicate with utility staff. One entrepreneur said, "The utility's lack of responsiveness to basic questions became a running joke among our development team. If they responded to an email within *three weeks*, we pretended to be impressed."

Documentation: Documentation is important for any IT system. However, some utilities offer only marketing brochures, and while others provide detailed documentation, such documentation can be incorrect or out-of date, leading to many vexing delays and trial-and-error attempts to fix problems. Good documentation is especially important in cases where utilities do not conform closely to the GBC standard. One entrepreneur wrote, "The API has a fairly involved 'onboarding process', and the documentation is badly out of date. In fact, a lot of the API documentation simply makes claims that aren't true."[6]

SOLUTIONS

When analyzing the many instances of utilities' poor IT performance, the question of intent frequently arises. Are utilities acting nefariously to prevent competitive services from succeeding, or are they merely inept? Many are inclined to cite the adage about human behavior, "Never ascribe to malice what can more easily be explained by incompetence." However, in the face of climate change and the need for immediate action to reduce our energy usage, we would argue that intentions are irrelevant. What matters most is the actual experience ultimately had by customers who want to share their data. Once usability and performance metrics are quantified, regulators can set standards for utilities and hold them accountable. Objective measurement of utility shortcomings is more important than speculation

---

6   Awesome Power.

about utilities' intent because measurement focuses regulators' attention on necessary reforms.

USABILITY STANDARDS: LEARNING FROM THERMOSTATS

Long before Nest modernized the public's vision of thermostats as elegant, energy-saving devices, the thermostat industry experienced a crisis. In 2008, EPA's EnergyStar found that homes with programmable thermostats were using more energy than those without, leading the federal agency to terminate its thermostat labeling program. Rebates for programmable thermostats were shelved in many parts of the country, hurting sales. The culprit — as anyone who has used a clunky 1980s or 1990s thermostat can attest — was their poor user interface. Many users could not set their thermostat's clock correctly, handcuffing the device's energy-saving features. 50% of thermostats observed were set to 'override,' or manual control, defeating the purpose of programmability.

Lawrence Berkeley National Laboratory scientist Dr. Alan Meier and his colleagues developed a usability test for thermostats, measuring how long it takes the average person to complete several tasks such as "set the correct time" or "program a weekly schedule."[7] The results showed significantly longer periods than expected. The findings had a significant impact on policy, particularly in California, where usability requirements became a prerequisite for energy efficiency rebates.

---

7   Alan Meier, Cecilia Aragon, Therese Peffer, Daniel Perry and Marco Pritoni. "Usability of residential thermostats: Preliminary investigations." *Building and Environment* 46 (2011) 1891-1898.

CONCLUSION AND FUTURE WORK

The time has come for regulators to institute usability requirements on utilities' GBC websites. As more and more customer service functions are completed online, it is critical that regulators do more than simply assert the rights of consumers to share their data. Regulators must specify usability and performance minimums associated with exercising those rights. Utilities may have sole discretion over their web portals in a general sense, but regulatory scrutiny is necessary in any area with clear anti-competitive implications. Sharing one's energy usage data with a company that assists you in buying less energy is certainly such a case.

Usability requirements will also ensure that consumers receive the benefits of advanced metering infrastructure (AMI). Ratepayers have paid billions for AMI investments over the years in states across America. One study by the Edison Foundation found that 33% to 66% of the total benefits of AMI are consumer benefits (as opposed to utility benefits, such as reduced costs of meter reading).[8] The value of smart meters to consumers will remain elusive unless regulators make third party conservation software accessible — not just in theory but also in practice. Evil nudges by utilities reduce the likelihood that consumers will take control of their energy data with the help of third parties.

IT system performance is also critical to data portability. Even if a customer successfully passes through a utility's "digital gauntlet" to make his or her data portable, a non-functional IT system prevents the consumer from realizing the benefits of advanced meters. Regulators should mandate performance requirements and public display of real-time operating metrics as mechanisms for utility accountability. For example, California recently required electric utilities to report Application Programming Interface (API) response times, website latencies and start-to-finish elapsed times of customer experiences on a publicly-available website.[9] Such reporting also provides critical information to regulators in examining the prudence of IT costs.

To be maximally useful, an objective usability test must be compared with a well-designed reference case. For example, if a panel of average consumers can complete an authorization on a utility's website within 30 seconds, then other utilities' websites should be compared against that benchmark. Most likely, a composite metric will be needed to summarize the average elapsed times across multiple tests: The consumer uses a desktop computer and a mobile device to grant an authorization; the consumer does and does not have an online account established at the utility; the consumer knows or does not know his or her utility account number. Only by testing and reporting on the start-to-finish user experience across multiple scenarios can regulators align the performance of the utility with the desired outcome: the meaningful exercise of consumer choice. Mission:data is designing a user experience metric to help jump-start its development.

The Internet age presents customers with a dazzling new array of products and services, including energy management. But utility customers will be prevented from accessing such services so long as electric and gas utilities are permitted to offer data portability "in name only." Enforcing true interoperability requires state regulators to develop greater technical expertise to ensure that utilities' digital platforms are high-performing and customer-centered.

MISSION:DATA
empowering energy savings

---

8   Ahmad Faruqui et al., July 2011. The Institute for Electrical Efficiency, The Edison Foundation. *The Costs and Benefits of Smart Meters for Residential Consumers*, p. 27.

9   California Public Utilities Commission. Resolution E-4868, August, 2017, p. 54-57. http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M194/K746/194746364.PDF.