CALIFORNIA ENERGY COMMISSION

Energy Research and Development Division

FINAL PROJECT REPORT

Reinventing Residential Demand Response

Appendices A-D

Gavin Newsom, Governor

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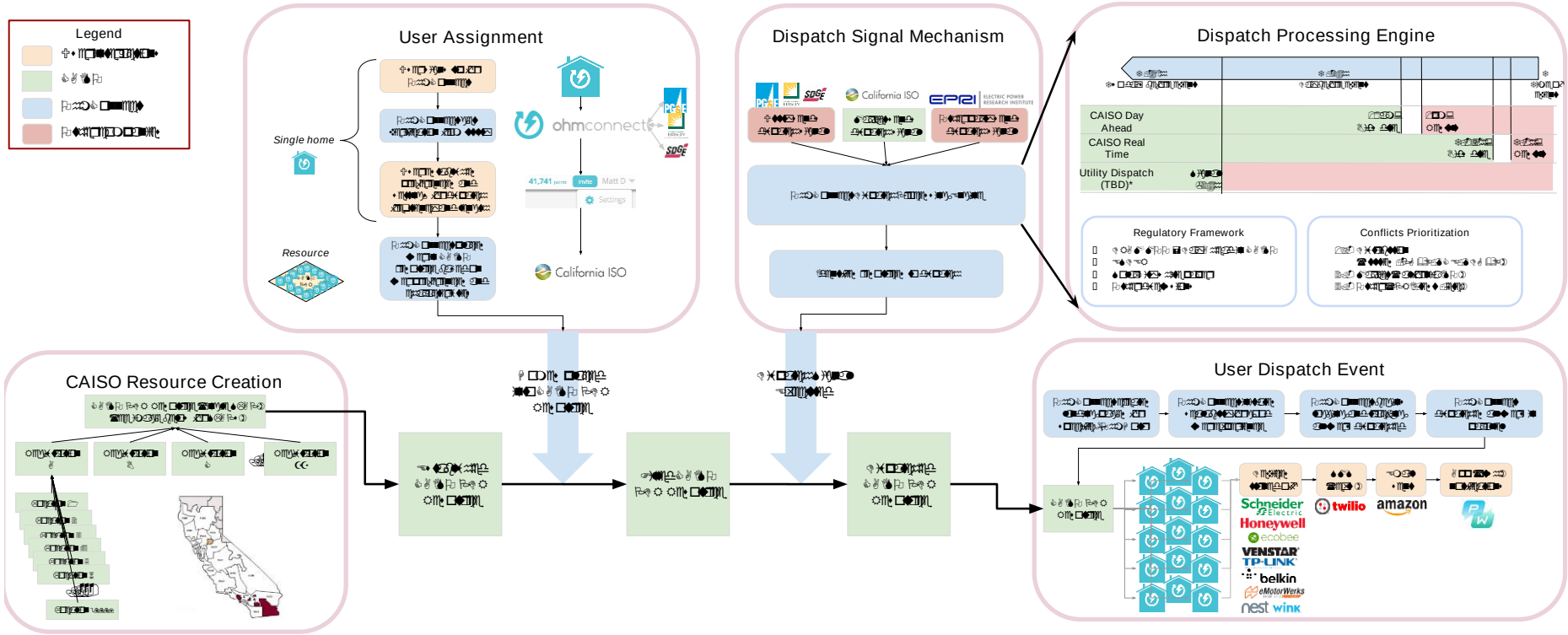


APPENDIX B:
Net Promoter Score & OhmConnect User Feedback

Net Promoter Score

The Net Promoter Score measures how likely a user is to recommend the OhmConnect product to others, and it gauges how satisfied a user generally is with OhmConnect.[1] NPS ranges from -100 to 100, and the higher the NPS, the more positive a user's experience is with the product. Furthermore, NPS can serve as an indicator of user loyalty and consequently be correlated with revenue growth.[2]

Net Promoter Score is a common metric for customer-facing products and provides a quantitative value of a company's customer relationships. Consequently, NPS helps companies quickly understand when they need to make changes to increase customer satisfaction. To provide a comparison of NPS across the energy industry, Tesla has an NPS of 96,[3] at its peak in 2014 Sunrun's was 64,[4] Engie's is 47,[5] and Pacific Gas and Electric is -6.[6] Generally, any score above a 0 is a "good" score and anything above 50 is "excellent."[7] Negative scores (i.e., scores below 0) indicate that users are unhappy and thus not likely to refer the product to others.

To calculate NPS, OhmConnect surveys its users and asks them to rank how likely they are to refer OhmConnect on a scale from 1 (not at all likely) to 10 (extremely likely) (Figure B-1). Those who give a score of 6 or less are considered "Detractors," or those who will likely speak negatively about OhmConnect. Those who give a score of 7 or 8 are considered "Passives" - these users are indifferent to their OhmConnect experience (i.e., they are unlikely to say neither positive nor negative things about the product). Finally, those who give a score of 9 or

[1] https://www.medallia.com/net-promoter-score/

[2] Call Centers for Dummies, By Real Bergevin, Afshan Kinder, Winston Siegel, Bruce Simpson, p.345

[3] http://indexnps.com/company/tesla

[4] https://cleantechnica.com/2014/10/22/sunrun-near-top-list-comes-customer-loyalty-satisfaction-according-recent-survey/

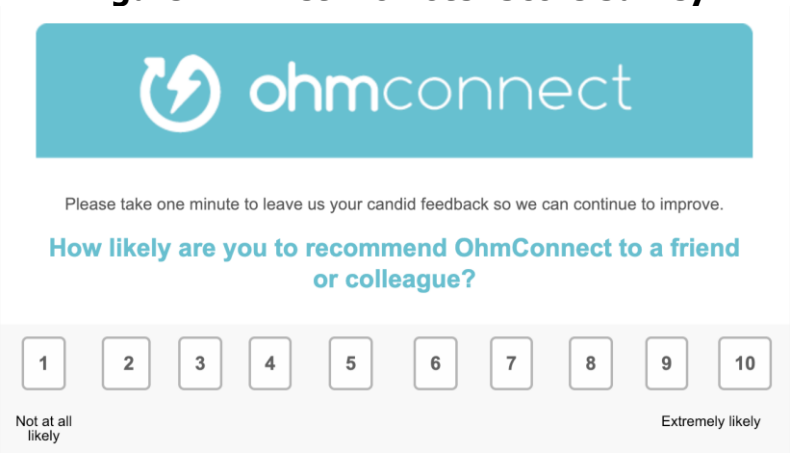
[5] https://npsbenchmarks.com/companies/engie-resources-nps

[6] https://npsbenchmarks.com/companies/pacific-gas-and-electric-corp

[7] https://customergauge.com/what-is-a-good-net-promoter-score?__hstc=166525089.d0d9e66de9bc95ecf82964546c9d1fcc.1546547732681.1546547732681.1546547732681.1&__hssc=166525089.1.1546547732682&__hsfp=1017633297

10 are considered "Promoters" and will likely refer the product to friends, family, and colleagues.[8]

Figure B-1: Net Promoter Score Survey



OhmConnect releases its Net Promoter Score survey to users via email. This survey provides OhmConnect with data on overall user satisfaction.

Source: OhmConnect

To calculate NPS, OhmConnect counts all Promoters as 1, Detractors as -1, and Passives as 0. The NPS is the difference between the average of all Promoters and the average of all Detractors multiplied by 100.[9] For example, if all survey respondents rank OhmConnect at 9 or 10, the NPS would be 100. However, if all respondents scored 6 or below, NPS would be -100. NPS is adjusted daily as new survey responses are recorded.

Because OhmConnect users only receive payments for #OhmHours after they provide us with access to their smart meter data (meaning they have a minimum status level of Silver), we calculate NPS based on responses for Silver+ users.[10] This ensure NPS is only accounted for responses from users who fully participate in the OhmConnect experience.

Qualitative Feedback

OhmConnect solicits qualitative feedback from users when they respond to the NPS survey, which is sent via email. When users select a quantitative value for how likely they are to recommend OhmConnect, they are redirected to a page that encourages them to provide more information (Figure B-2).

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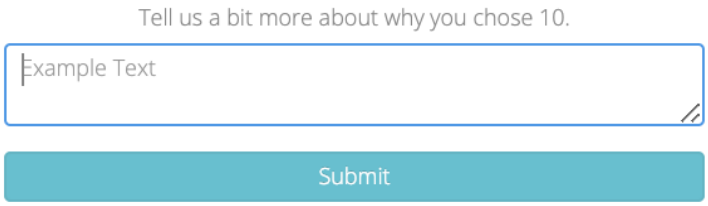
[8] https://www.medallia.com/net-promoter-score/

[9] https://www.medallia.com/net-promoter-score/

[10] OhmConnect Status Levels add a bonus to users' #OhmHour financial earnings. Status Levels, which go from Carbon through Bronze, Silver, Gold, and Platinum, are awarded based on a user's average energy reductions during #OhmHours. Users reach a minimum level of Silver when they connect their smart meter data to OhmConnect. This data access enables OhmConnect to quantify user reductions during #OhmHours and pay users accordingly. To reach Gold, users need to achieve 15% or greater energy savings during the previous 10 (or more) #OhmHours. Gold users receive a 1.5 multiplier on their #OhmHour points. To reach Platinum, users need to achieve 40% or greater reductions, and Platinum users receive a multiplier of two. The multipliers Gold and Platinum users receive greatly impact how much a user can earn through OhmConnect.

Figure B-2: NPS Qualitative Feedback



OhmConnect solicits qualitative feedback from its users after they respond to the NPS survey.

Source: OhmConnect

As an open-ended prompt, users respond with a range of feedback. For example, a Silver Promoter user who scored OhmConnect at a 10 stated: "It's so easy to get below the forecast for basically free money. Thanks." However, a Gold user who scored OhmConnect at an 8 (making them a Passive user) pointed out: "Some times are just too inconvenient to have A/C off with a small child." The Detractors who score 6 and below often comment on how #OhmHour baselines are hard to beat, that they occur at inconvenient times, or they do not lead to enough money earned.

To sort through qualitative survey responses, OhmConnect tags NPS feedback and uses the comments to inform product changes and improve the user experience. NPS comments vary across current issues, general positive and negative feedback, and confusion with the OhmConnect product (i.e., with streak or status levels). As a result, NPS tagging groups responses into the following categories[11]:

- Bugs
- Cash out
- Community
- Confusion
- Devices
- Enrollment
- Forecast
- Hot weather
- Low baseline
- Mobile app
- Negative points
- #OhmHour issues
- Points or tokens
- Customer service
- User interface
- Privacy
- Product suggestions
- Smart home
- Solar
- Streaks
- Utility Issues

OhmConnect NPS Summer 2018

From June 1, 2018 through August 31, 2018, OhmConnect's average NPS was 34. While average NPS remained between 30 and 40 over all three months, the monthly score varied across status levels (Table B-1). As noted above, this report considers NPS for Silver+ users only, meaning users that have a status level of either Silver, Gold, and Platinum.

[11] This is not inclusive of all NPS tags but merely provides an example of existing tags.

Table B-1: Summer 2018 Monthly NPS across Silver, Gold, and Platinum Users

Month	Silver	Gold	Platinum	Average NPS
June	12	29	57	33
July	15	23	30	34
August	15	30	65	36

Net Promoter Score across Silver, Gold, and Platinum status levels in June, July, and August 2018.

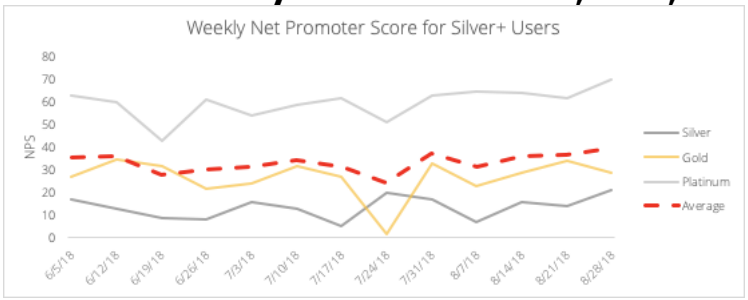
Source: OhmConnect

Each month, Net Promoter Score increased with increasing Status Level, with Silver users submitting the lowest NPS and Platinum the highest. This difference is most likely due to the amount of #OhmHour points users received during the month. Considering Gold and Platinum users receive multipliers on their base #OhmHour earnings (1.5x and 2x, respectively), they earn substantially more by participating in OhmConnect than Silver users do. Because of this, Gold and Platinum users are more likely to recommend the program than Silver users are.

Interestingly, NPS was the highest across all three Status Levels in August. Again, this is likely due to how much users were earning from #OhmHours during that month. August marked the end of OhmConnect's MEGA campaign,[12] and users were greatly reducing to meet their MEGA goals and ensure they were entered into the $100,000 drawing. These high reductions yielded high financial earnings in turn, which likely led to higher user satisfaction.

Over the course of Summer 2018, weekly NPS for Silver+ users did not greatly vary within Status Levels (Figure B-3). There is, however, a notable dip in Silver and Gold NPS the week of July 24. OhmConnect experienced barriers throughout the summer in receiving user smart meter data. Without this information, OhmConnect could not quantify how much energy users reduced during #OhmHours, thus preventing users from receiving payments for those demand response events. We hypothesize that this drop in NPS for Gold and Platinum users is due to a gap in meter data for a large group of those users, resulting in their not receiving #OhmHour payments.

Figure B-3: Summer 2018 Weekly NPS across Silver, Gold, and Platinum Users



Weekly Net Promoter Score from June 1, 2018 to August 31, 2018 for Silver+ users.

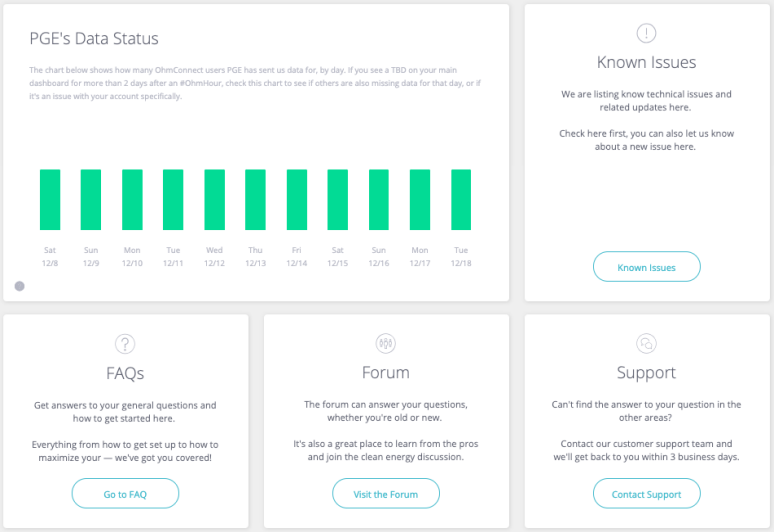
Source: OhmConnect

[12] For more information on the MEGA campaign, visit https://www.ohmconnect.com/mega-summer.

Additional User Feedback Interactions

Net Promoter Score prompts are only a portion of OhmConnect's interactions with its users. OhmConnect's Customer Support Team regularly engages with users through the Help page on the platform, which directs users to Frequently Asked Questions (FAQs), the Forum, and a direct line to the Support team (Figure B-4).

Figure B-4: Help Page



OhmConnect Help Page, with connections to FAQs, the Forum, and Support Team.

Source: OhmConnect

Additionally, the Help page highlights known issues (including potential data gaps) so users can see if their issues are common across all those interacting with the OhmConnect platform. This can also mitigate for smart meter data problems (like those experienced over the summer) and improve customer satisfaction, especially when gaps occur.

Next Steps

OhmConnect leverages NPS and other qualitative comments to improve upon its product and increase overall customer satisfaction. For example, after users commented on how confusing some aspects of the product were, OhmConnect revamped its dashboard to make it more simple and easier to follow. The new dashboard includes question marks at the bottom of each widget that clearly explain each aspect of the OhmConnect experience.

OhmConnect's NPS of 34 is promising for its continued growth as it indicates users' strong likelihood to refer the product of others. OhmConnect will continue to track NPS over time to ensure users remain satisfied, and OhmConnect will be aware if scores drop and note any related changes that need to be made to the product.

APPENDIX C:
Green Button Connect & Residential Customer Utility Data

Based on the utility rulings of Rule 24/32, third parties are allowed to access customer data as long as they have customer consent for Direct Participation in Demand Response. PG&E's Rule 24 was established in Advice Letter 4742-E, SCE's Rule 24 was established in Advice Letter 3313-E-B , and SDG&E's Rule 32 was established in Advice Letter 2578-E-A . These rules grew out of Decisions 12-11-025 and 13-12-029, becoming effective as of early 2014.

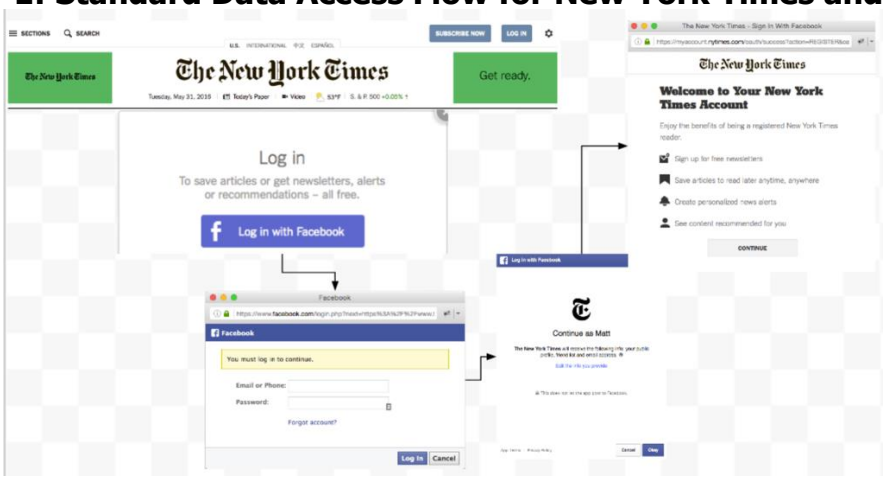
The implementation of how third parties access customer data has had a number of revisions, but leaves a lot to be desired in comparison to standards across other industries. Modern technologies such as OAuth are overlooked in lieu of outdated processes such as manual evaluation of customer signatures. This document includes both a discussion on the choices made for data transfer for Green Button Connect and outlines the technical steps to access Green Button Data via the California utilities Rule 24/32.

Industry Standard: OAuth

Requesting access for data is a common requirement across most applications and systems. This occurs in nearly all applications and data security is a paramount concern for many companies. Energy companies are not the first companies to tackle this problem, and it would behoove the energy industry to review best practices in customer facing applications. For example, take the following flow by the New York Times in Figure C-1:

1. A user sees the New York Times site and is prompted to "Log in with Facebook"
2. User logs into Facebook
3. User authorizes New York Times to access data such as your Facebook profile
4. User is returned to the New York Times site with authorized access

Figure C-1: Standard Data Access Flow for New York Times and Facebook

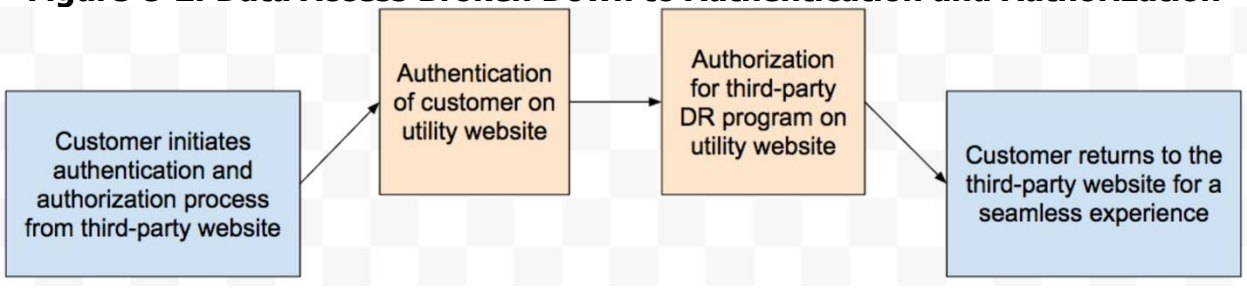


Example of using Facebook credentials for a New York Times OAuth login.

Source: OhmConnect

In this process, two distinct actions are occurring, as shown in the Figure C-2 diagram: authentication and authorization in the well-known form of "OAuth." Most commonly, this is seen in a two-step process. Authentication occurs when the user logs into Facebook with Facebook user account credentials. Authorization occurs when Facebook prompts the user to allow New York Times to see their Facebook profile.

Figure C-2: Data Access Broken Down to Authentication and Authorization



Data authentication and authorization OAuth process.

Source: OhmConnect

The utilities have currently implemented a non-electronic form that provides both authentication and authorization on a single 4-page CISR-DRP form (see picture in Figure C-6 below). While this form can provide a host of options for the user, it also creates confusion and angst from users who do not want to spend their time reading utility legalese. Even the form's name – "Customer Information Service Request for Demand Response Provider" – is daunting to the average user. Overall, this experience is frightening and shows signs of a scam (how often do you have to sign a legal document for an application?). As a point of comparison, the utility demand-response programs do not require any utility legal documents to be signed.

The CISR-DRP form is not an OAuth solution, though one is being debated in the utilities in proceeding A.14-06-001 in the "Click Through Working Group". While OAuth solutions have been rolled out in mere weeks by startups with limited resources, the proposed solution is being discussed in the terms of years and for millions of dollars of ratepayer funds. In many cases, these startups with successful implementations of OAuth have fewer employees than the number of utility lawyers that are discussing this OAuth solution.

Competing Utility Program Requirements

The utilities already have existing demand response programs. Many of these programs have been around for decades. Because the utility acts as both the supplier of the demand response program and via rate-base, the monetary payment for this program, the utility is able to leverage a number of in-house functions to streamline their process. However, this also creates an asymmetry of what a user must do to access a third party program vs what a user must do to access a utility program. For any residential utility demand-response program, users do not have to fill out any bulky form or electronically sign anything; in fact, many of the programs require just a simple checkbox for a user to check to enroll. Once they are enrolled, they are prevented from enrolling in other third-party programs.

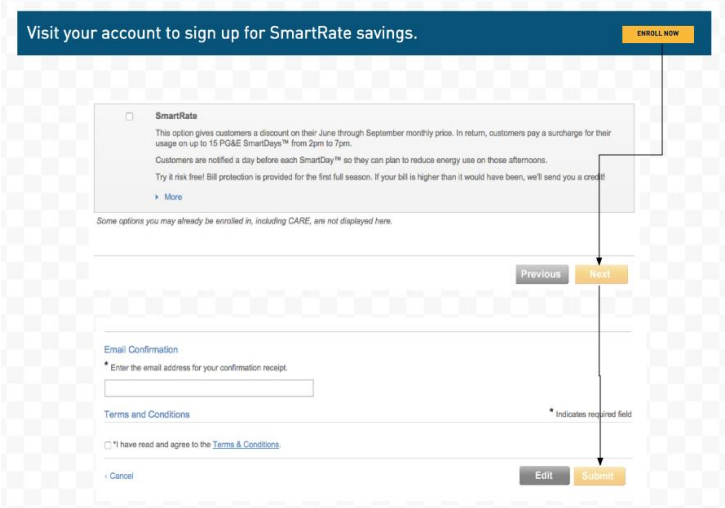
An example of the utility program pathway to enroll in SmartRate is depicted in Figure C-3. The flow is fairly simple:

- Click on an "Enroll Now" button

- Click on a checkbox that shows you have read three lines about what smart rate is
- Enter your email for confirmation and click on the "I have read and agree to the Terms & Conditions" checkbox

In comparison, current third-party programs have a much more complex process and requires a four-page CISR-DRP form to fill out. For SCE, an alternative to the four-page CISR-DRP form requires a 19-step process. This asymmetry creates a large competitive advantage for utility programs. To create a fair and level playing field, the utilities must enable third-parties the ability to have a simple registration process as shown above.

Figure C-3: Enrollment for Competitive Utility Program



Example of PG&E's SmartRate data authentication and authorization.

Source: OhmConnect

Other Concerns

Recognizing Friction

Both the CISR-DRP forms and SCE's lengthy requirements for the utility has created an extreme amount of user fatigue, which has inspired a white paper from EnergyHub who cites a 97% dropoff of user enrollment due to the numerous steps required. This white paper is attached to this documentation, titled Optimizing_the_DR_program_enrollment_process.pdf. This white paper highlights how the drop off is nearly two times worse in California than in similar programs in Texas. The requirement of having a service number that most consumers are not familiar with is highlighted as driving an 84% drop-off in customer enrollment.

Speed

A main driving force of allowing third parties to access customer meter data is the many opportunities that come by allowing innovative new startups and companies to leverage meter data. As a result, the majority of companies itching to access this data are nimble, move fast, and are not bogged down by bureaucratic processes. What is happening, however, is that the conservative and slow-moving nature of large bureaucratic organizations like investor owned utilities slow the data transfer to the point where innovation is reduced. One suggestion is to enable a third-party data manager, such as Silver Springs Networks to be able to filter and funnel data to various different third parties. An independent party will likely have deep expertise in data management beyond the capabilities of utilities. Meter companies like Silver

Springs Networks already have access to the data and are providing the data to the utilities; simply diverting that data upstream would enable faster data processing time for all parties.

Rejections

We have seen rejection of CISR-DRP or other forms for a variety of reasons, including the following:

- Forms have been rejected for having someone named "William XXX" signed as "Bill XXX". Because "Bill" was a nickname for "William", it was unaccepted
- Forms have been rejected for having the incorrect spelling of the name "Mabel", which was incorrect stored in SCE's records as "Mable". Even after customer verification indicated that "Mabel" was the right spelling, the form was rejected by the SCE's systems
- Forms have been rejected for having incorrect wording of names. For example, "Tiffany Wendy XXX" was rejected because in her utility account, her first name was "Wendy" and last name was "Tiffany"

While we understand the IOUs concerns about ensuring customer privacy, rejections such as the ones listed above create schisms in user's trust with third parties. Third parties have been called "scam"s because of issues that the utility has with enabling data transfer for menial issues such as incorrect preferences on names.

Technical Implementation

The technical implementation of green button data is unique for each utility; utility requirements have been bastardized from the core components for Green Button Data's North American Energy Standards Board (NAESB) Energy Service Provider Interface (ESPI) . As a problem generally with standardized software, enough grey area exists in the standards that each utility has interpreted those standards to fit their own needs. In this document, we have distilled the various pathways for PG&E, SCE and SDG&E into four steps:

- Request access for data from a user with data forms or online processes
- Setup a portal for each of the utilities to communicate
- Data transfer (parsing data structures) established by each of the utilities
- Status handling which informs the status of each user in the process

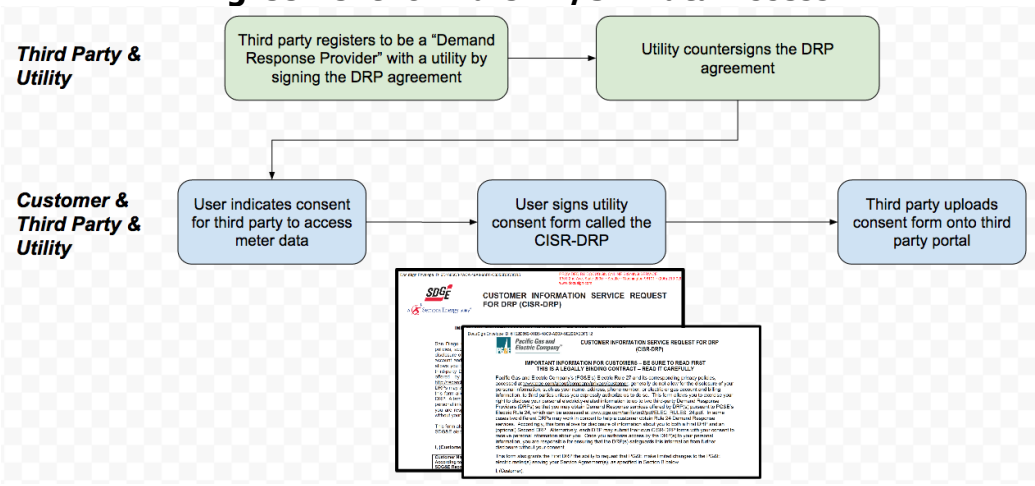
This document is intended to be a cheat sheet for companies integrating with Green Button Data for PG&E, SCE, and SDG&E. However, for any company going down the road of building out an interface with Green Button Data, we recommend that you read through documentation provided by each utility:

- PG&E probably has the most thorough documentation which has specific pages for registration, data access, software development kits, and additional helpful links
- SCE has some basic data access information only and provides helpful support via their Green Button data experts
- SDG&E has very little information but follows the same principles as the other utilities

Request Access

The requirements for requesting access involve two forms (the DRP agreement shown in Figure E-5 and the CISR-DRP form shown in Figure C-6) along with handshakes between the utilities and the third party. This process is outlined in Figure C-4. Currently, the only functionality to access Share My Data implemented by the utilities is for Demand Response Providers (DRPs). As a result, to begin integration as a third party, the company must fill out a DRP agreement and have that form signed by the utility. Each user (whether it is a large commercial or industrial facility or a single residential homeowner) that the company wants to enroll in the Demand Response Program must fill out a complex CISR-DRP form and electronically sign it.

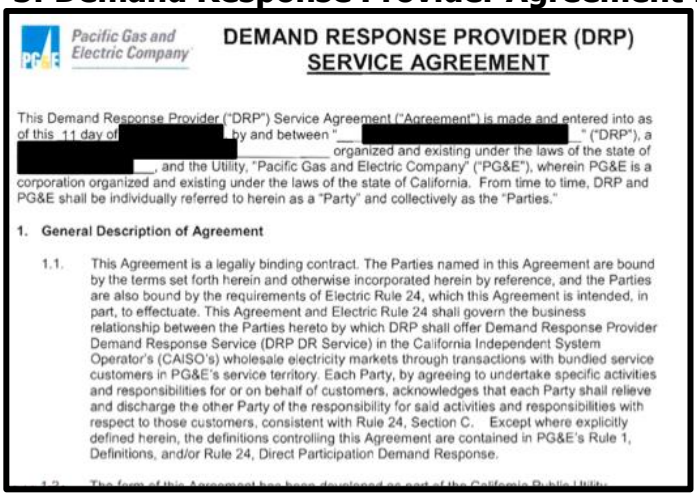
Figure C-4: PG&E and SDG&E Paper CISR Processing Requirements Including DRP Agreement for Rule 24/32 Data Access



Source: OhmConnect

SCE provides a separate "automated process" that does not involve a CISR-DRP form to be signed. However, that process is arduous and confusing for the user, requiring a user to identify and click on over 15 links and make several decisions that the user is unfamiliar with, such as identifying the service account that they would like to provide to the third-party. In addition, a typed signature is required. Overall, the "automated process" is a 19-step process, which while arguably less intrusive to a user than signing an electronic form, creates a high failure rate of users trying to complete the form. This process is walked through in the separate document "SCE Green Button Connect My Data Presentation.ppsx", with certain areas that a customer needs to click on highlighted. Note that the customer would have to, on their own, identify each place to click that is highlighted in the presentation, which requires significant amount of user education.

Figure C-5: Demand Response Provider Agreement Example



Pacific Gas and Electric Company

DEMAND RESPONSE PROVIDER (DRP)
SERVICE AGREEMENT

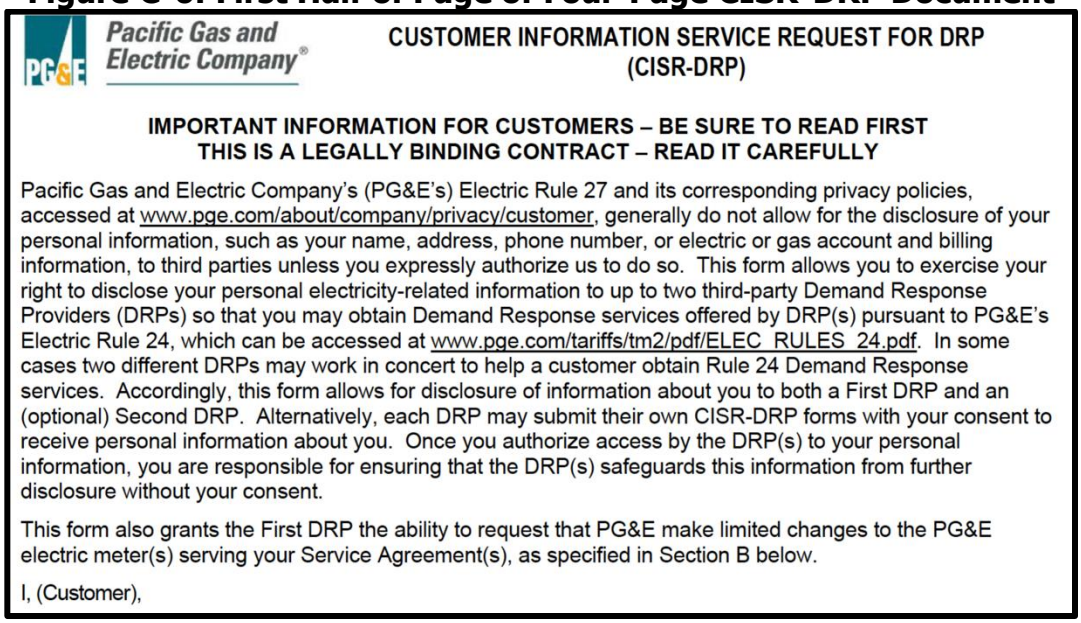
This Demand Response Provider ("DRP") Service Agreement ("Agreement") is made and entered into as of this 11 day of [redacted] by and between "[redacted]" ("DRP"), a [redacted] organized and existing under the laws of the state of [redacted], and the Utility, "Pacific Gas and Electric Company" ("PG&E"), wherein PG&E is a corporation organized and existing under the laws of the state of California. From time to time, DRP and PG&E shall be individually referred to herein as a "Party" and collectively as the "Parties."

1. General Description of Agreement

1.1. This Agreement is a legally binding contract. The Parties named in this Agreement are bound by the terms set forth herein and otherwise incorporated herein by reference, and the Parties are also bound by the requirements of Electric Rule 24, which this Agreement is intended, in part, to effectuate. This Agreement and Electric Rule 24 shall govern the business relationship between the Parties hereto by which DRP shall offer Demand Response Provider Demand Response Service (DRP DR Service) in the California Independent System Operator's (CAISO's) wholesale electricity markets through transactions with bundled service customers in PG&E's service territory. Each Party, by agreeing to undertake specific activities and responsibilities for or on behalf of customers, acknowledges that each Party shall relieve and discharge the other Party of the responsibility for said activities and responsibilities with respect to those customers, consistent with Rule 24, Section C. Except where explicitly defined herein, the definitions controlling this Agreement are contained in PG&E's Rule 1, Definitions, and/or Rule 24, Direct Participation Demand Response.

Source: Pacific Gas and Electric

Figure C-6: First Half of Page of Four-Page CISR-DRP Document



Pacific Gas and Electric Company®

CUSTOMER INFORMATION SERVICE REQUEST FOR DRP
(CISR-DRP)

IMPORTANT INFORMATION FOR CUSTOMERS – BE SURE TO READ FIRST
THIS IS A LEGALLY BINDING CONTRACT – READ IT CAREFULLY

Pacific Gas and Electric Company's (PG&E's) Electric Rule 27 and its corresponding privacy policies, accessed at www.pge.com/about/company/privacy/customer, generally do not allow for the disclosure of your personal information, such as your name, address, phone number, or electric or gas account and billing information, to third parties unless you expressly authorize us to do so. This form allows you to exercise your right to disclose your personal electricity-related information to up to two third-party Demand Response Providers (DRPs) so that you may obtain Demand Response services offered by DRP(s) pursuant to PG&E's Electric Rule 24, which can be accessed at www.pge.com/tariffs/tm2/pdf/ELEC_RULES_24.pdf. In some cases two different DRPs may work in concert to help a customer obtain Rule 24 Demand Response services. Accordingly, this form allows for disclosure of information about you to both a First DRP and an (optional) Second DRP. Alternatively, each DRP may submit their own CISR-DRP forms with your consent to receive personal information about you. Once you authorize access by the DRP(s) to your personal information, you are responsible for ensuring that the DRP(s) safeguards this information from further disclosure without your consent.

This form also grants the First DRP the ability to request that PG&E make limited changes to the PG&E electric meter(s) serving your Service Agreement(s), as specified in Section B below.

I, (Customer),

Source: Pacific Gas and Electric

Portal Setup

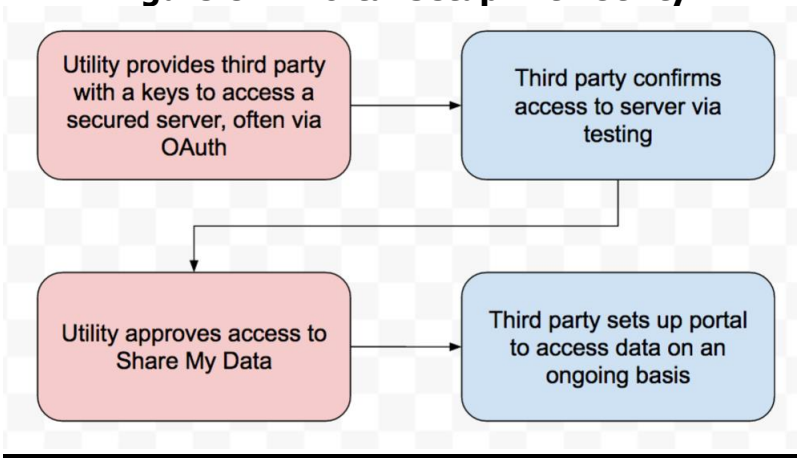
Once a user has been submitted to the utilities' systems, the utility will provide data to the third party in a "push" format. The utility will actively push data regarding the user to the third party in a standardized format. Broadly speaking (across the utilities), the requirements to access data[13] involve 1) receiving a set of keys to a secured server or secured access[14], 2)

[13] This overview is provided here for PG&E: https://www.pge.com/en_US/residential/save-energy-money/analyze-your-usage/your-usage/view-and-share-your-data-with-smartmeter/reading-the-smartmeter/share-your-data/third-party-companies/get-started.page

[14] PG&E has been used as an example here: https://sharemydata.pge.com/#register/new/step1

testing that access, 3) receiving confirmation from the utility, and finally 4) setting up a permanent portal to access data. These steps are shown in Figure C-7 below.

Figure C-7: Portal Setup with Utility

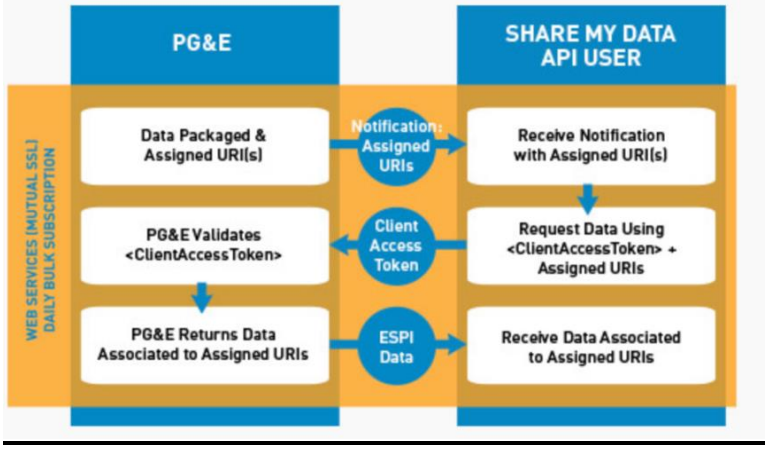


Source: OhmConnect

Each of these steps is unique for each utility. We will walk through PG&E as an example. To start access data for PG&E, the third party needs to register for access to the API. PG&E requires the third party to complete three tests: 1) API Connectivity, 2) OAuth Test, and 3) Application Resource Test. Once that has been completed, the utility will require a permanent portal to access data via a set of URLs on the third-party website that will accept notifications from PG&E that data is available. Via that permanent portal, the data access is based on the following four-step process depicted in Figure C-8:

1. PG&E sends notification that data is ready through a notification request
    a. In that notification, PG&E provides specific URIs
2. Third party will request data using that specific URI and a client access token
3. PG&E will validate that access token and return the data
4. Third party will receive data

Figure C-8: PG&E Specific Data Access Once Set Up with Permanent Portal



Source: Pacific Gas and Electric (Share My Data page on PG&E's website: https://www.pge.com/sites/en_US/residential/save-energy-money/analyze-your-usage/your-usage/view-and-share-your-data-with-smartmeter/reading-the-smartmeter/share-your-data/third-party-companies/data-access.page

Data Transfer

The data that is provided in the Share My Data APIs follow current ESPI standards. Across the utilities, this section is the most stable in that PG&E, SCE, and SDG&E have similar data structures. In practice, the data is in XML format such as the one redacted below in Figures C-9 and C-10. The general format of the XML is to establish a set of data that will be shown in the file. In the cases of some utilities, such as SDG&E, the file name differentiates whether or not the data is going to be "Daily" or current data, "Historical" data, or "Corrective" data. Within the file, the XML format identifies what user the data reflects and what data type will be conveyed within the file (Figure C-9). Once that information has been conveyed, the majority of the file is a standard data feed, such as in Figure C-10.

A few notes for the data feed (Figure C-10) are that they use timestamps reflective of Epoch time, duration of time in the seconds, and often consumption in Wh. For most residential meters in California, at this time, the lowest common denominator for meters is hourly readings (hence the 3600 second duration between readings).

Figure C-9: XML Header to Identify User and Type of Data Being Sent

Source: OhmConnect

Figure C-10: XML Data Format for Hourly Consumption Data

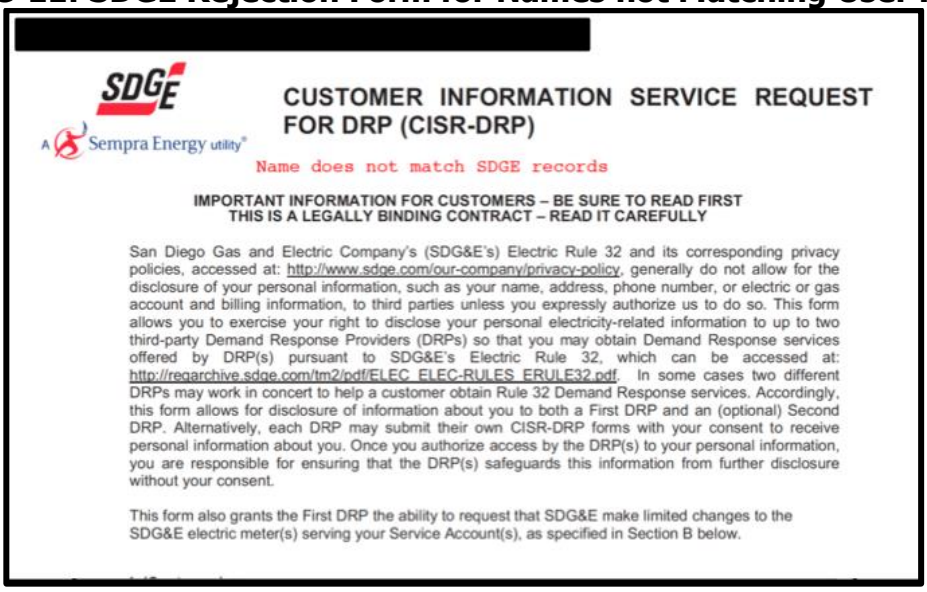
Source: OhmConnect

Status Handling

Status is an important part of the Green Button process that was overlooked in the original NAESB ESPI standards. When a user is submitted to green button data via the *Request Access* section above (either via a CISR-DRP form or SCE's 19 step "automated" flow), the user's status is unknown. Once the utility receives a user submitted, the utility has an internal "status", of which we have seen the following statuses: *Accepted*, *Rejected*, *Unknown*.

Given that this process is new for each of the utilities, we have witnessed a variety of status handling developed by each of the utilities. Because the error handling is not adequately addressed by NAESB ESPI standards, each utilities created its own process that is full of holes. These processes range from manual error checks by humans (Figure C-11) to automated updates.

Figure C-11: SDGE Rejection Form for Names not Matching User Records



SDGE
A Sempra Energy utility

CUSTOMER INFORMATION SERVICE REQUEST FOR DRP (CISR-DRP)

Name does not match SDGE records

IMPORTANT INFORMATION FOR CUSTOMERS – BE SURE TO READ FIRST
THIS IS A LEGALLY BINDING CONTRACT – READ IT CAREFULLY

San Diego Gas and Electric Company's (SDG&E's) Electric Rule 32 and its corresponding privacy policies, accessed at: http://www.sdge.com/our-company/privacy-policy, generally do not allow for the disclosure of your personal information, such as your name, address, phone number, or electric or gas account and billing information, to third parties unless you expressly authorize us to do so. This form allows you to exercise your right to disclose your personal electricity-related information to up to two third-party Demand Response Providers (DRPs) so that you may obtain Demand Response services offered by DRP(s) pursuant to SDG&E's Electric Rule 32, which can be accessed at: http://regarchive.sdge.com/tm2/pdf/ELEC_ELEC-RULES_ERULE32.pdf. In some cases two different DRPs may work in concert to help a customer obtain Rule 32 Demand Response services. Accordingly, this form allows for disclosure of information about you to both a First DRP and an (optional) Second DRP. Alternatively, each DRP may submit their own CISR-DRP forms with your consent to receive personal information about you. Once you authorize access by the DRP(s) to your personal information, you are responsible for ensuring that the DRP(s) safeguards this information from further disclosure without your consent.

This form also grants the First DRP the ability to request that SDG&E make limited changes to the SDG&E electric meter(s) serving your Service Account(s), as specified in Section B below.

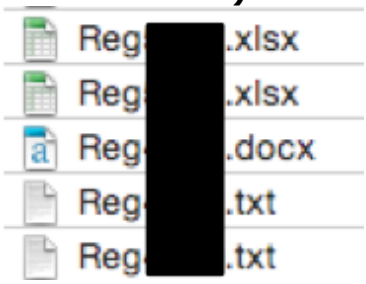
Source: SDG&E

Below, we will walk through the status handling of each of the three main IOUs in California and the ideal standard of what the utilities are recommended to strive for:

- PG&E provides data via the same SFTP directory for both acceptance and rejection. Overall, PG&E is the closest to what we would consider the gold standard of status handling
    - Acceptance – users are implicitly accepted when they are included in a csv file titled XXX_RULE_24_EXTRACT…csv; the csv file includes a set of fields including the CURRENT_SA_ID, CUSTOMER_NAME, etc
    - Rejection – PG&E does not have a good standardized convention for rejections and have created a number of different files from xlsx, docx, or txt files to try to communicate the rejection on users (Figure C-12)
- SCE does not have any type of status process and implicitly accepts users that are submitted by providing data via the standard Share My Data format
- SDG&E has a manual rejection process that has no standardization and has continued to change even over the past few months

- Acceptance – users are implicitly accepted when they send over users in the csv files titled *sdge_rule_24_1_....csv*; the csv file includes a set of fields including the SDG&E Account Number, Customer Name, etc
- Rejection – users are rejected in a variety of fashions. We have received hundreds of filenames (manually entered and have no standardized processes) that indicate rejections, mainly via the .xlsx format. We simultaneously have received a number of .pdfs that are manually written on such as in Figure C-11.

Figure C-12: PG&E Example of Rejected Registration Files (No Standardized Format)



Source: PG&E

In addition to the "Acceptance" and "Rejection", we also have hundreds of users in each utility that we have submitted CISR-DRP forms for, but do not have data back from the utilities on. In early months of CISR-DRP processing, we were seeing thousands of users that were not responded to within the requested 10-day time period. These "Unknown" status for users are a major problem; currently, there is no pathway other than resubmitting forms to better understand what that status is.

Our recommendation is that the utilities adopt a standardized Status processing format with acceptances and rejections in the same csv file. That file would contain a new column that indicates the status of "Acceptance", "Rejection" or "Other". Those files would have an automated push process (instead of currently being manually downloaded for each file) that works directly with APIs created for that purpose. The file format should be standardized across utilities and for rejected users, a standard error code could be used. Similar formats to the Acceptance files for PG&E and SDG&E could be used.

Conclusion

Third party access to customer meter data has been a huge step forward in the right direction. However, implementation details, including the architecture of how users are authenticated and authorized, have not properly accounted for the technological advances of industries outside of the energy industry. Many of the problems that we are facing as an industry in terms of Requesting Access, Portal Setup, Data Transfer and Status Handling have been dealt by other industries. We should leverage other industries, take best practices, and eventually move the management of data transfer to experts in the field, such as by metering companies like Silver Springs Network.

APPENDIX D:
Data Shared for *Empowering Consumers*

OhmConnect utilized the following data for this project:

- User: user_id, group_id, point_balance, credit_balance, donated_points, lifetime_points, current_ohm_service_id, service_zip, signup_date, utility_acronym, utility_rate_plan
- Group (for the user's group): group_id, kind, percent_group_earn, point_balance, lifetime_points
- Device: device_id, user_id, device_name, device_type, active_flag, create_time (when the device was created), state of device - (on/off), temperature, thermostat mode, cool threshold, heat threshold
- #OhmHour Dispatch: ohm_hour_id, start_dttm, end_dttm, create_dttm (when the ohm hour was created), ohmhour_type
- #OhmHour Performance: ohm_hour_id, node_id (pnode), user_id, points, baseline_kwh, actual_kwh, avg_price, last_updated, participating, cached_grant_variant, cached_grant_phase, cached_grant_price
- #OhmHour Messaging: to_user_id, from_user_id, ohm_hour_id, dttm, channel, campaign_name, campaign_name_detail
- Usage and Baseline: 15-minute interval data for the user in grant
- Census Geocode: County, blkintplat, tgeoid, trctintplon, city, user_id, zip, cgeoid, state, blkcentlat, terror, matchscore, blkcentlon, berror, result0, tract, bgeoid, trctcentlon, blkintplon, trctintplat, trctcentlat, blkgrp, block
    - The census geocode data was generated using user addresses and ensured only non-PII data was shared with University of California, Berkeley for data analysis purposes.