

PUBLIC UTILITIES COMMISSION  
505 Van Ness Avenue  
San Francisco CA 94102-3298



**Pacific Gas & Electric Company**  
**ELC (Corp ID 39)**  
**Status of Advice Letter 5565E**  
**As of May 28, 2020**

Subject: San Joaquin Valley Disadvantaged Pilot Communities Electric Reliability Report.

Division Assigned: Energy

Date Filed: 06-17-2019

Date to Calendar: 06-21-2019

Authorizing Documents: D1812015

<b>Disposition:</b>	<b>Accepted</b>
<b>Effective Date:</b>	<b>05-28-2020</b>

Resolution Required: No

Resolution Number: None

Commission Meeting Date: None

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**PUBLIC UTILITIES COMMISSION**  
505 Van Ness Avenue  
San Francisco CA 94102-3298



To: Energy Company Filing Advice Letter

From: Energy Division PAL Coordinator

Subject: Your Advice Letter Filing

The Energy Division of the California Public Utilities Commission has processed your recent Advice Letter (AL) filing and is returning an AL status certificate for your records.

The AL status certificate indicates:

- Advice Letter Number
- Name of Filer
- CPUC Corporate ID number of Filer
- Subject of Filing
- Date Filed
- Disposition of Filing (Accepted, Rejected, Withdrawn, etc.)
- Effective Date of Filing
- Other Miscellaneous Information (e.g., Resolution, if applicable, etc.)

The Energy Division has made no changes to your copy of the Advice Letter Filing; please review your Advice Letter Filing with the information contained in the AL status certificate, and update your Advice Letter and tariff records accordingly.

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Energy Division's Tariff Unit by e-mail to  
**[edtariffunit@cpuc.ca.gov](mailto:edtariffunit@cpuc.ca.gov)**

June 17, 2019

**Advice 5565-E**

(Pacific Gas and Electric Company ID U 39 G)

Public Utilities Commission of the State of California

**Subject: San Joaquin Valley Disadvantaged Pilot Communities Electric Reliability Report**

**Purpose**

Pursuant to pages 118-119 of California Public Utilities Commission (CPUC or Commission) Decision (D.) 18-12-015, issued on December 19, 2018, Pacific Gas and Electric Company (PG&E) submits this Tier 1 Pilot Community Reliability Advice Letter (AL) providing a report analyzing root causes of the outages in PG&E's San Joaquin Valley Disadvantaged Pilot Communities and timelines for corrective action (report), as shown in Attachment A.

**Background**

In 2015, the Commission initiated a rulemaking to identify disadvantaged communities in the San Joaquin Valley, and then to evaluate the feasibility of options to improve access to affordable energy in these communities.<sup>1</sup> To assist in addressing these goals, D.18-12-015 approved pilots in eleven San Joaquin Valley Disadvantaged Communities (SJV DAC).

Pages 118-119 of D.18-12-015 directed PG&E and Southern California Edison Company (SCE) to each submit a Tier 1 Pilot Community Reliability Advice Letter within 180 days from issuance of this decision with a report analyzing root causes of the outages in the San Joaquin Valley Disadvantaged Pilot Communities in their service territory and timelines for corrective action. Prior to filing this advice letter, on May 7, 2019, SCE, in coordination with PG&E, hosted a workshop to discuss the intended format of the report, and the elements and analysis to be included in the report.

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<sup>1</sup> Order Instituting Rulemaking to Identify Disadvantaged Communities in the San Joaquin Valley and Provide Economically Feasible Options for Affordable Energy, R. 15-10-030, p. 2 (April 3, 2015).

**San Joaquin Valley Disadvantaged Pilot Communities Electric Reliability Report**

The report, as shown in Attachment A, contains clear metrics and compares the pilot communities to others in the service territory. It includes overview findings that are accessible to a non-technical audience, since one of the purposes for this report is to support community education about the severity, causes, and intended solutions to local electric reliability issues. For Allensworth, PG&E includes the causes for the failed line voltage regulator and what remediation PG&E will be investing in and under what time frame in order to ensure reliable electricity service. In considering what corrective actions are needed to ensure community reliability, PG&E and SCE consider what role In-Front-of-the-Retail Meter (IFM) storage can have and if any of these pilot communities should be considered for a Distributed Energy Resource Pilot.

**Protests**

Anyone wishing to protest this submittal may do so by letter sent via U.S. mail, facsimile or E-mail, no later than July 8, 2019, which is 21 days<sup>2</sup> after the date of this submittal. Protests must be submitted to:

CPUC Energy Division  
ED Tariff Unit  
505 Van Ness Avenue, 4<sup>th</sup> Floor  
San Francisco, California 94102

Facsimile: (415) 703-2200  
E-mail: EDTariffUnit@cpuc.ca.gov

Copies of protests also should be mailed to the attention of the Director, Energy Division, Room 4004, at the address shown above.

The protest shall also be sent to PG&E either via E-mail or U.S. mail (and by facsimile, if possible) at the address shown below on the same date it is mailed or delivered to the Commission:

Erik Jacobson  
Director, Regulatory Relations  
c/o Megan Lawson  
Pacific Gas and Electric Company  
77 Beale Street, Mail Code B13U  
P.O. Box 770000  
San Francisco, California 94177

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<sup>2</sup> The 20-day protest period concludes on a weekend; therefore, PG&E is moving this date to the following business day.

Facsimile: (415) 973-3582  
E-mail: PGETariffs@pge.com

Any person (including individuals, groups, or organizations) may protest or respond to an advice letter (General Order 96-B, Section 7.4). The protest shall contain the following information: specification of the advice letter protested; grounds for the protest; supporting factual information or legal argument; name, telephone number, postal address, and (where appropriate) e-mail address of the protestant; and statement that the protest was sent to the utility no later than the day on which the protest was submitted to the reviewing Industry Division (General Order 96-B, Section 3.11).

### **Effective Date**

Pursuant to pages 118-119 of D.18-12-015, this Advice Letter is subject to Energy Division disposition and should be classified as Tier 1, Effective Pending Disposition, pursuant to General Order (GO) 96-B. PG&E respectfully requests this Advice Letter be effective June 17, 2019, which is the date submitted.

### **Notice**

In accordance with General Order 96-B, Section IV, a copy of this advice letter is being sent electronically and via U.S. mail to parties shown on the attached list and the parties on the service list for R.15-03-010. Address changes to the General Order 96-B service list should be directed to PG&E at email address PGETariffs@pge.com. For changes to any other service list, please contact the Commission's Process Office at (415) 703-2021 or at Process\_Office@cpuc.ca.gov. Send all electronic approvals to PGETariffs@pge.com. Advice letter submittals can also be accessed electronically at: <http://www.pge.com/tariffs/>.

/S/

Erik Jacobson  
Director, Regulatory Relations

Attachments

cc: Service List R.15-03-010



# ADVICE LETTER SUMMARY

## ENERGY UTILITY



MUST BE COMPLETED BY UTILITY (Attach additional pages as needed)

Company name/CPUC Utility No.: Pacific Gas and Electric Company (ID U39 E/G/M)

Utility type:

- ELC       GAS       WATER  
 PLC       HEAT

Contact Person: Annie Ho

Phone #: (415) 973-8794

E-mail: PGETariffs@pge.com

E-mail Disposition Notice to: AMHP@pge.com

EXPLANATION OF UTILITY TYPE

ELC = Electric      GAS = Gas      WATER = Water  
 PLC = Pipeline      HEAT = Heat

(Date Submitted / Received Stamp by CPUC)

Advice Letter (AL) #: 5565-E

Tier Designation: 1

Subject of AL: San Joaquin Valley Disadvantaged Pilot Communities Electric Reliability Report

Keywords (choose from CPUC listing): Compliance,

AL Type:  Monthly  Quarterly  Annual  One-Time  Other:

If AL submitted in compliance with a Commission order, indicate relevant Decision/Resolution #: D.18-12-015

Does AL replace a withdrawn or rejected AL? If so, identify the prior AL: No

Summarize differences between the AL and the prior withdrawn or rejected AL:

Confidential treatment requested?  Yes  No

If yes, specification of confidential information:

Confidential information will be made available to appropriate parties who execute a nondisclosure agreement. Name and contact information to request nondisclosure agreement/ access to confidential information:

Resolution required?  Yes  No

Requested effective date: 6/17/19

No. of tariff sheets: N/A

Estimated system annual revenue effect (%): N/A

Estimated system average rate effect (%): N/A

When rates are affected by AL, include attachment in AL showing average rate effects on customer classes (residential, small commercial, large C/I, agricultural, lighting).

Tariff schedules affected:

Service affected and changes proposed<sup>1</sup>: N/A

Pending advice letters that revise the same tariff sheets: N/A

<sup>1</sup>Discuss in AL if more space is needed.

**Protests and all other correspondence regarding this AL are due no later than 20 days after the date of this submittal, unless otherwise authorized by the Commission, and shall be sent to:**

CPUC, Energy Division  
Attention: Tariff Unit  
505 Van Ness Avenue  
San Francisco, CA 94102  
Email: [EDTariffUnit@cpuc.ca.gov](mailto:EDTariffUnit@cpuc.ca.gov)

Name: Erik Jacobson, c/o Megan Lawson  
Title: Director, Regulatory Relations  
Utility Name: Pacific Gas and Electric Company  
Address: 77 Beale Street, Mail Code B13U  
City: San Francisco, CA 94177  
State: California Zip: 94177  
Telephone (xxx) xxx-xxxx: (415)973-2093  
Facsimile (xxx) xxx-xxxx: (415)973-3582  
Email: [PGETariffs@pge.com](mailto:PGETariffs@pge.com)

Name:  
Title:  
Utility Name:  
Address:  
City:  
State: District of Columbia Zip:  
Telephone (xxx) xxx-xxxx:  
Facsimile (xxx) xxx-xxxx:  
Email:

Advice 5565-E  
June 17, 2019

## **Attachment A**

### **San Joaquin Valley Disadvantaged Communities OIR Report**

**PACIFIC GAS AND ELECTRIC COMPANY**

**SAN JOAQUIN VALLEY DISADVANTAGED  
COMMUNITIES OIR REPORT**

**R.15-03-010**

**PG&E San Joaquin Valley Disadvantaged  
Communities Electrification Pilots Reliability  
Report**

**JUNE 17, 2019**



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## Introduction and Summary

In 2015, the California Public Utilities Commission (CPUC or Commission) initiated a rulemaking to identify disadvantaged communities in the San Joaquin Valley (SJV), and then to evaluate the feasibility of options to improve access to affordable energy in these communities. To assist in addressing these goals, D.18-12-015 approved pilots in eleven SJV Disadvantaged Communities (DACs), including electrification pilots in eight communities served in Pacific Gas and Electric Company (PG&E) electric territory. This report summarizes recent electric reliability performance in those eight communities — referred to throughout as SJV DAC Pilot Communities.

Electric reliability performance is often described in terms of how often customers experience an electric service outage (i.e., frequency) and how long those outages are (i.e., duration). This information is relevant in the context of these electrification pilots because outages may impact customer households differently once their propane or wood appliances are replaced with electric appliances. The appliances expected to be replaced in these pilots include water heaters, cooking ranges, clothes dryers and space heating and cooling equipment.

An all-electric household would instinctively experience more significant impacts from electric outages as compared to a dual-fuel household using propane or wood; however, this is not necessarily the case since most modern gas or propane appliances require electricity to ignite a flame and run motors: clothes dryers require electricity to tumble the clothes and vent the exhaust; water heaters, furnaces and electric ranges can have electric ignition instead of a pilot light, and propane furnaces and even wood stoves may require electricity to operate fan motors as well.

In the 2018 community meetings held to discuss SJV DAC Pilot proposals residents using wood or propane frequently voiced a concern about the impact of outages; however, the residents who attended the La Vina community meeting mostly already had all-electric households and stated that electric outages were not a significant problem, especially compared to burnout of electric range heating elements.

Recognizing the interest in and relevance of electric reliability, the CPUC Decision approving these electrification pilots instructs PG&E and Southern California Edison Company (SCE) to hold a workshop<sup>1</sup> and file a Tier 1 Pilot Community Reliability Advice Letter<sup>2</sup> 180 days after the issuance of the decision. The decision provides some direction on the contents of this Reliability Advice Letter:

- Include an analysis of the root causes of outages in the Pilot communities and a timeline for corrective action;
- Contain clear metrics and compare the pilot communities to others in the service territory;
- Include, for the PG&E community of Allensworth, the causes for the failed line **voltage regulator** and what remediation PG&E will be investing in and under what time frame in order to ensure reliable electricity service;
- Incorporate feedback from the workshop on the format of the report, and any other elements and analysis to be included in the report; and

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<sup>1</sup> This workshop was held on May 7, 2019.

<sup>2</sup> Decision (D.) 18-12-015, at 119.

- Explain the findings in a way that is accessible to a non-technical audience, considering that one of the purposes for this report is to support community education about the severity, causes, and intended solutions to local electric reliability issues.

In accordance with the decision language above, this report contains clear metrics—Average Interruption Frequency Index (**AIFI**),<sup>3</sup> and Customer Average Interruption Duration Index (**CAIDI**)—that compares SJV DAC Pilot Community reliability performances to the average PG&E customer. From an AIFI perspective, the average SJV DAC Pilot Community member underperformed the average PG&E customer. From a CAIDI perspective, the average SJV DAC Pilot Community member outperformed the average PG&E customer. The worst performing SJV DAC Pilot Community from an AIFI perspective was Alpaugh.

The report also includes analysis of the electric outage causes, finding that equipment failure, third-party causes and unknown causes account for roughly three-fourths of outages in the SJV DAC Pilot Communities as a whole and in Alpaugh specifically. Examples of typical outage causes on PG&E's system range from collisions with PG&E electric poles (third-party cause) to metallic balloon-caused failures.<sup>4</sup> The outage in Allensworth referenced in the decision, an animal-caused equipment failure, is described in detail as an example of PG&E's process to manage outages. The report also summarizes PG&E's programs that prioritize, plan for and implement cost-effective larger and longer-term improvements to its electric system to improve reliability.

Finally, this report also reflects feedback received during the PG&E and Southern California Edison SJV DAC Reliability Workshop, which was held on May 7, 2019 in Tulare, CA: it includes calculation of metrics with and without certain types of outages, a description of relevant programs and resources, as well as a description of opportunities in the Integrated Distributed Energy Resource (IDER) and Distribution Resources Plan (DRP) proceedings.

## Background on Electric Reliability Performance

PG&E delivers safe, reliable, and affordable power to customers through its electric system. As shown below in Figure 1, PG&E's electric system is comprised of three components: generation, transmission, and distribution. At its most basic level, electricity is generated at a power plant through various sources. Renewable generation utilizes sources such as wind or solar. Non-renewable generation utilizes sources such as nuclear, hydro-electric, and natural gas. Electricity generated at a power plant is then stepped up to a higher voltage level and transmitted through the transmission system. The transmission system is comparable to a freeway system in that higher voltage levels allows electricity to travel at a faster rate. Electricity travelling through the transmission system is then stepped down to a lower voltage level and transmitted through the **distribution system**. PG&E defines its distribution system as line voltage less than 60 kilovolts (kV). Electricity is then stepped down to its lowest voltage level and delivered to the customer. The majority of the outages which impact electric service to customers occur in the distribution system as opposed to outages of generation or transmission infrastructure.

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<sup>3</sup> Bold terms throughout are defined in Appendix A.

<sup>4</sup> For example, in 2016, balloons caused 429 outages disrupting electric service to more than 200,000 customers.

**FIGURE 1  
ELECTRIC SYSTEM**



**Power Generated at**  
13–25 kV

**Transmission Line**  
60, 115, 230 or 500 kV

**Distribution Line**  
4, 12, 17 or 21 kV  
**Home or Business**  
120–480 Volts

Electric utilities can measure electric reliability performance in many ways: duration of customer outages, frequency of customer outages, average restoration time, and these metrics can be calculated including or excluding certain types of outages such as **planned outages** or unusual events such as major storms (typically referred to as **Major Event Day (MED)**). For purposes of this report, PG&E is focusing on two reliability metrics over a 3-year period (2016-2018). The first reliability metric is AIFI, the frequency of outages that an average customer experiences in a given year. The second reliability metric is CAIDI, the time it takes to fully restore electric service to an average customer after a given outage. PG&E believes these metrics best reflect the typical customer’s experience and are common benchmark metrics used across the electric utility industry. Outage classification descriptions are detailed below in Figure 2 and Appendix A.

FIGURE 2  
OUTAGE CLASSIFICATIONS

The company classifies outages according to industry definitions, in the Institute of Electrical and Electronic Engineers (IEEE) standards.



### Momentary Outage

An outage less than 5 minutes in duration. (these are excluded in this report).



### Sustained Outage

An outage more than 5 minutes in duration.



### Planned Outage

Outages which are customer or public official-requested or where the company has provided notice to the customer (these are excluded in this report).



### Major Event Day (MED)

A set of outages which occurred during a specific time and location and which combined, exceeds historically expected outage duration for at least one day (as defined in IEEE 1366-2012)

As an example (and in accordance with D.18-12-015) Figure 3 below summarizes the results of a failed **voltage regulator** which impacted electric service to 106 customers in the Allensworth Pilot Community. On February 3, 2017, an equipment failure resulted in an outage lasting 346 minutes. The outage restoration process at the most basic level begins when PG&E becomes first aware of the outage occurrence, typically through data from sensors, smart meters, and customer calls. PG&E's Operations team then dispatches a first responder to perform an inspection of the affected circuit to identify the outage cause. In this instance, the first responder successfully identified the failed voltage regulator. This includes identifying a bird nest as the root cause for the failure as depicted in Figure 3. Operations would then dispatch an electric crew to perform the emergency equipment replacement work as reported by the first responder. In this instance, factors contributing to an elevated outage restoration time include the length of the circuit that had to be inspected to locate the fault and the muddy conditions surrounding this voltage regulator location. In addition to replacing the failed voltage regulator, crews performed bird guarding work in the form of installing insulated conductor instead of bare conductor. As a result, no new outages have been observed at this location after completion of the emergency equipment replacement work.

**FIGURE 3**  
**ALLENSWORTH PILOT COMMUNITY OUTAGE REVIEW**

### Equipment Failure outage on February 3, 2017



Failed voltage regulator impacting 106 Allensworth CDP customers. All customers fully restored in 346 minutes (~6 hours).

Locating the failed voltage regulator and muddy conditions contributed to the restoration time.

Bird nest found at location (see picture).

New voltage regulator with bird guarding installed.

No new outages observed at this location since the new installation.

In addition to PG&E's processes for managing outages as they occur, such as in the example above, PG&E employs various processes and programs with a longer view. These include proactive activities based on anticipated issues and reactive activities based on reviews of outage data across PG&E's electric system.

Minimizing the risk of catastrophic wildfires<sup>5</sup> is PG&E's primary focus when it comes to proactive reliability improvement. As reported in the Wildfire Mitigation Plan<sup>6</sup>, a key component in the Wildfire Safety Plan submittal is the System Hardening Program. Under the System Hardening Program, PG&E's distribution engineers evaluate a rebuild of overhead distribution circuits in the High Fire Threat District (HFTD) areas. While the SJV DAC Pilot Communities are not in HFTD areas, the typical system hardening work includes, as appropriate for the circuit, replacing bare wire with insulated conductor, increasing strength requirements for poles, installing new **system automation and protection** equipment, and targeted conversion of overhead equipment to underground equipment. The anticipated goal of each system hardened circuit is to minimize the risk of an asset failure that could result in a fire ignition. The anticipated reliability improvement of each system hardened circuit is to minimize outages caused by

<sup>5</sup> Important information related to wildfire safety is available here:

[https://www.pge.com/en\\_US/safety/emergency-preparedness/natural-disaster/wildfires/community-wildfire-safety.page](https://www.pge.com/en_US/safety/emergency-preparedness/natural-disaster/wildfires/community-wildfire-safety.page)

<sup>6</sup> PG&E's Wildfire Mitigation Plan submitted in Rulemaking 18-10-007 is available here:

<http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M263/K673/263673423.PDF>

vegetation, equipment failure, third party, animal, and other (unknown) causes that could result in a fire ignition.

PG&E's primary reactive reliability improvement program is the Outage Review Team (ORT) Process. The objective of the ORT process is to identify and minimize chronic reliability issues that affect a targeted pocket of customers. Under the ORT process, PG&E's distribution engineers perform a detailed review of unplanned outages on a regular basis. The detailed review involves analyzing the cause and characteristics of an unplanned outage as well as evaluating its outage history. This includes a comprehensive review of its current circuit design to cost effectively identify work that would improve the circuit's reliability performance. Typical work identified through the ORT process and incorporated into PG&E's base reliability work include, as appropriate for the circuit, installing new protection equipment, replacing overhead and underground conductors, installing new fault indicators, reframing poles to increase phase separation, installing animal/bird guards, repairing or replacing deteriorated equipment, completing pending reliability-related maintenance work, performing **infrared inspections**, and trimming trees.

As with other aspects of managing PG&E's electric system, the ORT process reflects the geographic breakdown of PG&E's service territory into four Regions and nineteen Divisions as shown below in Figure 4. A major factor for the ORT process to effectively respond to chronic reliability challenges occurring at a local level is the ORT team member assignments at the Division level. All eight SJV DAC Pilot Communities are served in Central Valley Region. The Allensworth Pilot Community is served in both Fresno and Kern Divisions. Alpaugh, Cantua Creek, Lanare, and Seville Pilot Communities are served in Fresno Division while the Fairmead, La Vina, and Le Grand Pilot Communities are served in Yosemite Division.

**FIGURE 4  
PG&E SERVICE TERRITORY BY REGION AND DIVISION**



PG&E tracks and reports all known outage events that impact one or more **distribution transformers**. Each year, PG&E prepares an annual electric reliability report (based on CPUC requirements and the nationally recognized Institute of Electrical and Electronics Engineers, Inc. Standard 1366) from both a system and division-level perspective. This annual report is submitted to the CPUC and is available to the public. In addition, PG&E annually hosts a public town hall and live webcast from a city within its service territory to discuss the details of this report. PG&E will also host meetings with communities upon their request.<sup>7</sup>

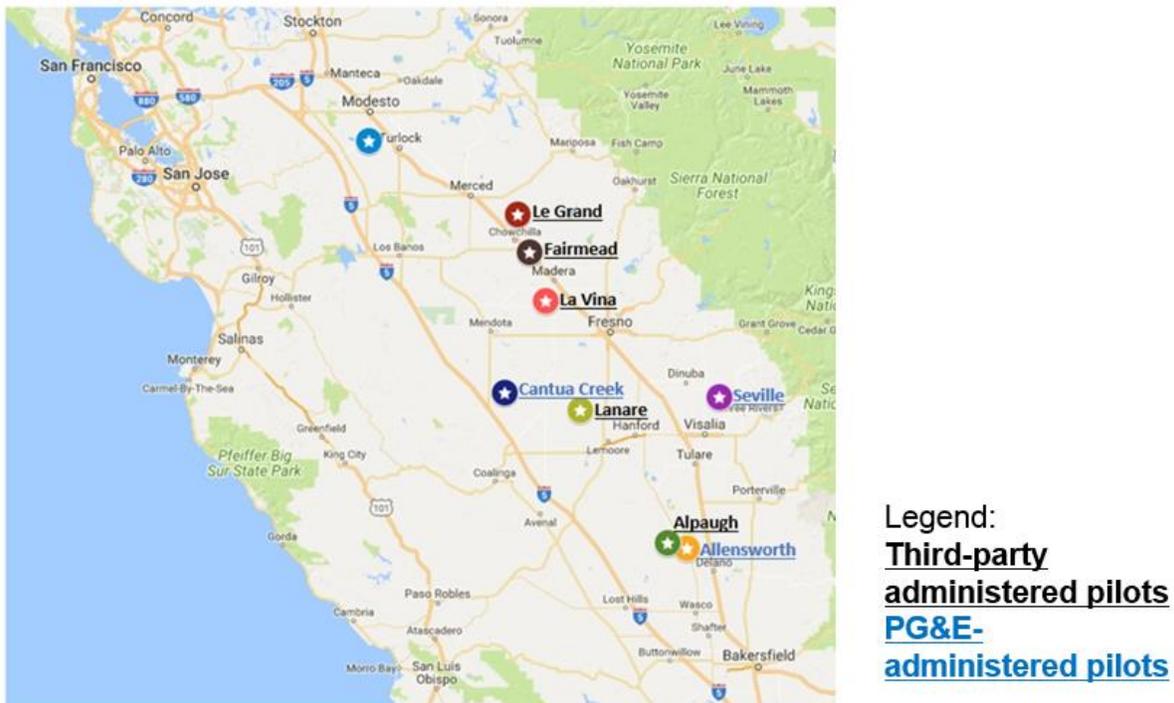
<sup>7</sup> The following link provides access to PG&E’s most recent reliability reports, contact and other related information: [https://www.pge.com/en\\_US/residential/outages/planning-and-preparedness/safety-and-preparedness/grid-reliability/electric-reliability-reports/electric-reliability-reports.page](https://www.pge.com/en_US/residential/outages/planning-and-preparedness/safety-and-preparedness/grid-reliability/electric-reliability-reports/electric-reliability-reports.page).

Finally, PG&E has two programs that will reimburse customers who experience outages. The first program is the Safety Net Program, which will pay \$25 to \$100 if a residential customer is out of power for more than 48 hours (also called a Storm Inconvenience Payment). The second program (which does not apply to serious emergencies and/or storm events) is the Service Guarantee Program under which PG&E will restore electric service within 24 hours, unless the cause is absolutely beyond its control, or PG&E will automatically credit a customer’s account \$30 for each 24 hour period a customer is without service.<sup>8</sup>

## Electric Reliability Performance in PG&E SJV DAC Electrification Pilot Communities

Per D.18-12-015, PG&E looked at the electric reliability performance in each of the eight communities in PG&E territory with an approved electrification pilot. For reference, each community location is indicated in Figure 5 below.

**FIGURE 5  
SJV DAC COMMUNITIES**



PG&E identified the electric-only residential customers (i.e., customers without PG&E gas service)<sup>9</sup> located within each pilot community and then utilized their meter numbers to quantify their respective

<sup>8</sup> Information about each program is available at the following links, respectively:

- <https://www.pge.com/mybusiness/customerservice/energystatus/outagecompensation/>.
- [https://www.pge.com/en\\_US/residential/customer-service/other-services/service-guarantees.page](https://www.pge.com/en_US/residential/customer-service/other-services/service-guarantees.page).

<sup>9</sup> These customers are expected to be propane or wood users and hence are potential electrification customers; however in Lanare and Alpaugh, some portion of these customers are likely not propane or wood users and

outage history information. PG&E was able to gather outage data from approximately 99 percent of the expected propane and wood users across the eight SJV DAC Communities. These data were used to calculate, for each pilot community, their average outage frequency, their average outage duration, and the basic cause contributing to their outages. Comparisons were also made relative to the average customer served within PG&E.

PG&E analyzed reliability performance with and without outages that occur on MEDs. These are days in which a highly unusual level of outages occur, typically due to large storm events. Including MED outages reflects the most comprehensive outage dataset by capturing all types of outages. Excluding outages on MEDs gives a better sense of reliability performance under normal conditions.

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instead receive gas service from Southern California Gas Company and hence are not potential electrification customers.

## Results including MEDs

Chart 1 below summarizes the frequency of outages the average customer experienced each year (AIFI) by each respective SJV DAC Pilot Community, overall SJV DAC Pilot Communities combined (CDP Average), and entire PG&E electric system (System). The results include MED outage data and span a 3-year period (2016-2018). The average PG&E customer experienced 1.19 outages per year while the average SJV DAC Pilot Community member experienced 1.63 outages per year, an AIFI difference of 0.44. While it is difficult to translate this fractional difference into customer experience, one way to describe this difference is that it's roughly equivalent to the average SJV DAC Pilot Community member experiencing one additional outage every two years in comparison to the average PG&E customer.

**CHART 1**  
**AIFI BY SJV DAC PILOT COMMUNITY – INCLUDES MED (2016-2018)**

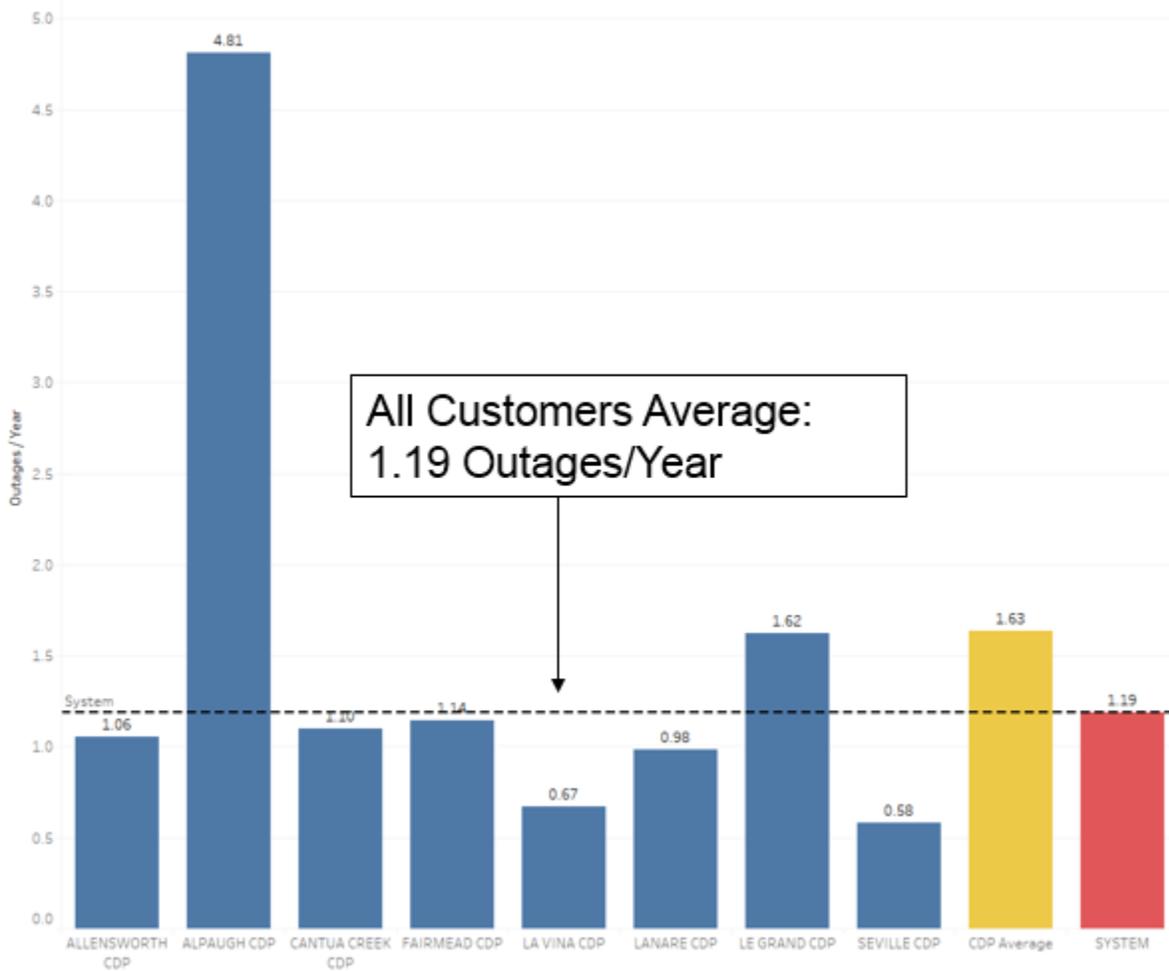
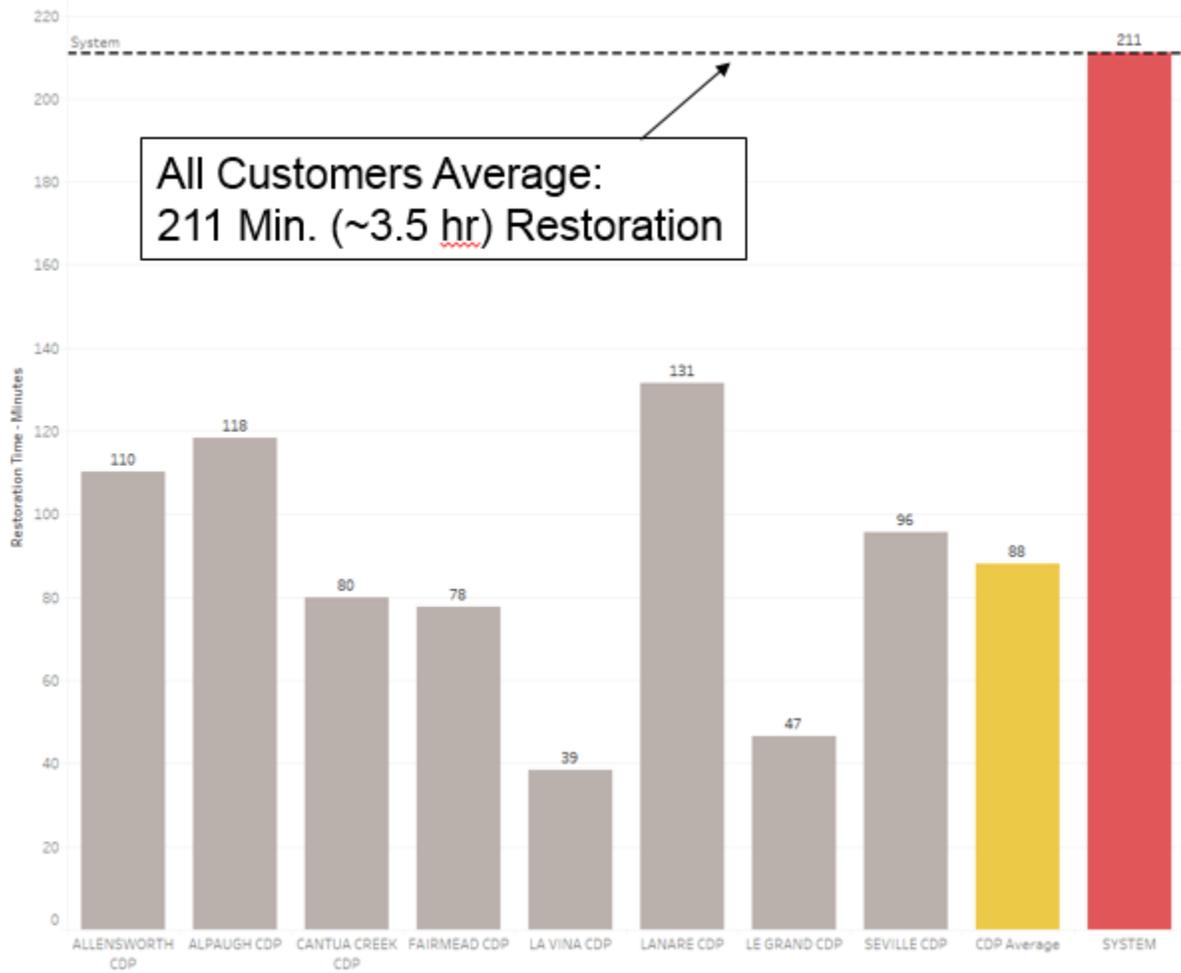


Chart 2 below summarizes the average restoration time of a sustained outage (CAIDI) by each respective SJV DAC Pilot Community, overall SJV DAC Pilot Communities combined, and entire PG&E electric system. The results include MED outage data over a 3-year period (2016-2018). The average outage restoration time for an average PG&E customer was 211 minutes while the average restoration time for an average SJV DAC Pilot Community member was 88 minutes, a CAIDI difference of 123 minutes. This is roughly equivalent to the average SJV DAC Pilot Community member having their electric service fully restored 2 hours faster than the average PG&E customer in a typical outage.

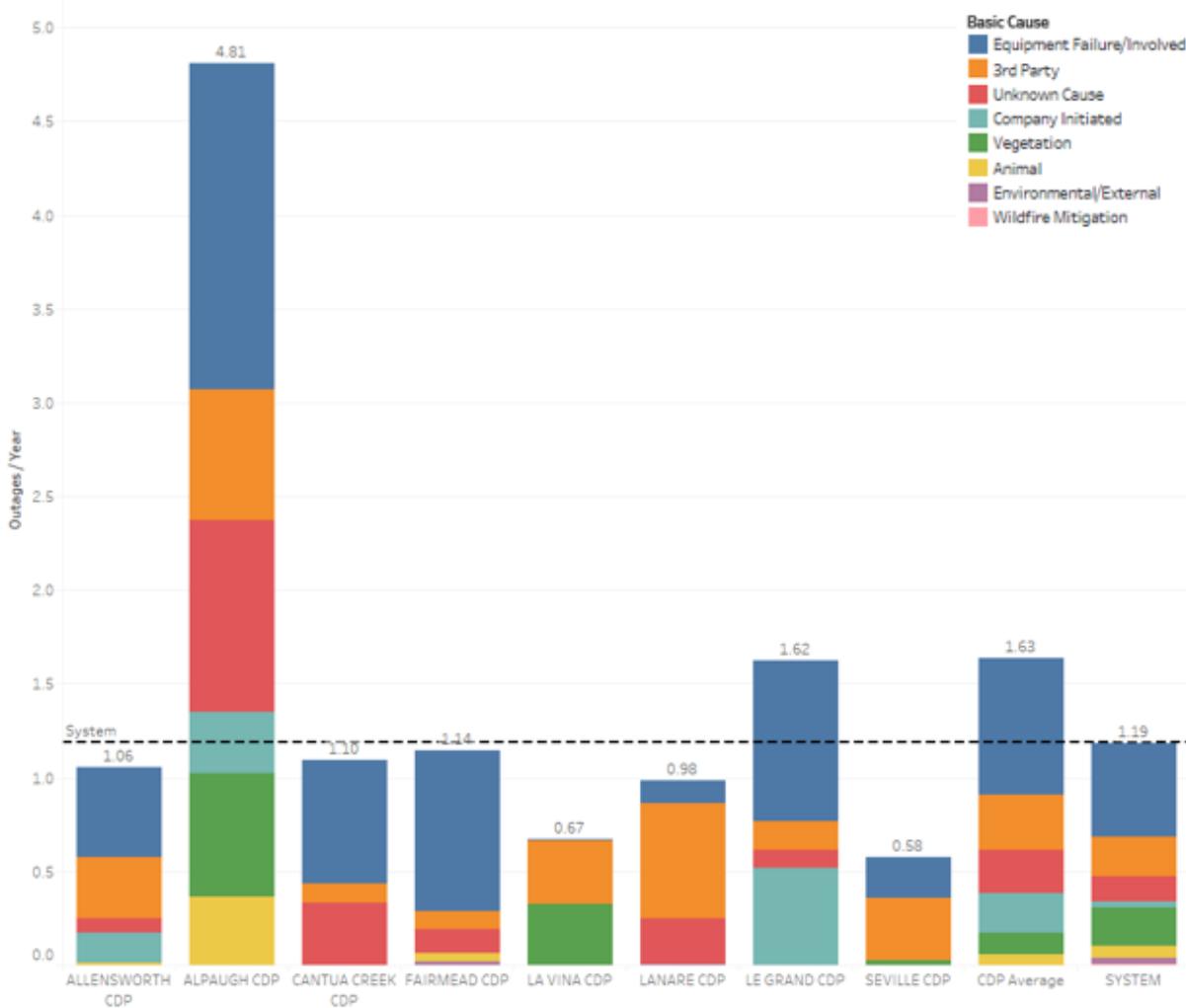
**CHART 2  
CAIDI BY SJV DAC PILOT COMMUNITY – INCLUDES MED (2016-2018)**



From an outage cause perspective, Chart 3 below profiles the basic causes for each respective SJV DAC Pilot Community, overall SJV DAC Pilot Communities combined, and entire PG&E electric system. The results include MED outage data over a 3-year period (2016-2018). Typical causes for outages are equipment failures, vegetation, animals, vehicle accidents (third-party), weather (environmental/external), and unknown. Equipment failure, third-party, and vegetation causes account for 77 percent of the outages that the average PG&E customer experienced in a given year. Equipment failure, unknown, and third-party causes account for 72 percent of the outages that the average Alpaugh Pilot Community member experienced in a given year.

**CHART 3**  
**AIFI BASIC CAUSE PROFILE BY SJV DAC PILOT COMMUNITY – INCLUDES MED (2016-2018)**

Average Annual Reliability Performance by Basic Cause (2016-2018) - Including MEDs



## Results excluding MEDs

Chart 4 below summarizes the frequency of outages the average customer experienced each year (AIFI) by each respective SJV DAC Pilot Community, overall SJV DAC Pilot Communities combined (CDP Average), and entire PG&E electric system (System). The results exclude MED outage data over a 3-year period (2016-2018). The average PG&E customer experienced 0.93 outages per year while the average SJV DAC Pilot Community member experienced 1.46 outages per year, an AIFI difference of 0.53. This is roughly equivalent to the average SJV DAC Pilot Community member experiencing one additional outage every two years in comparison to the average PG&E customer.

**CHART 4**  
**AIFI BY SJV DAC PILOT COMMUNITY – EXCLUDES MED (2016-2018)**

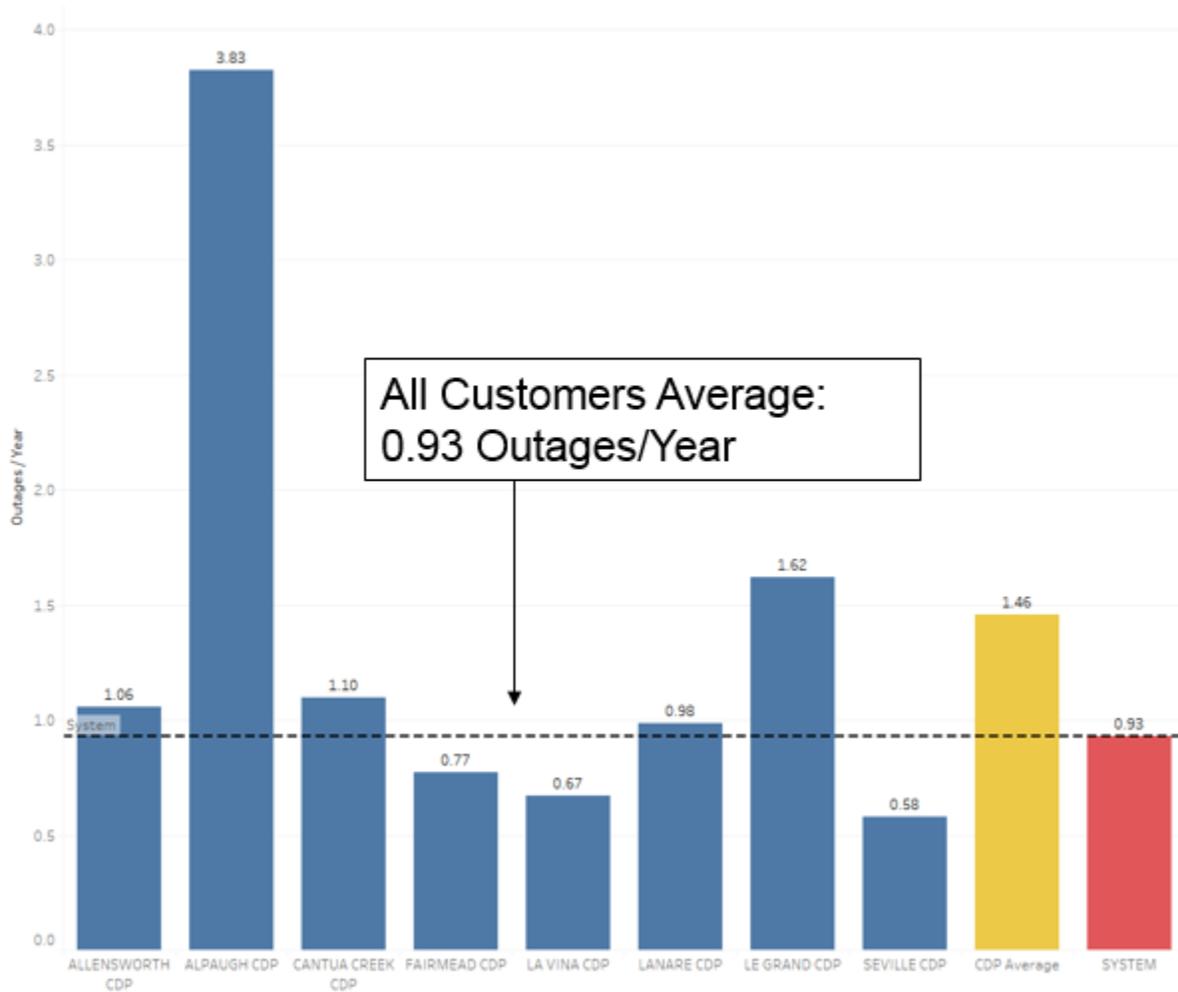
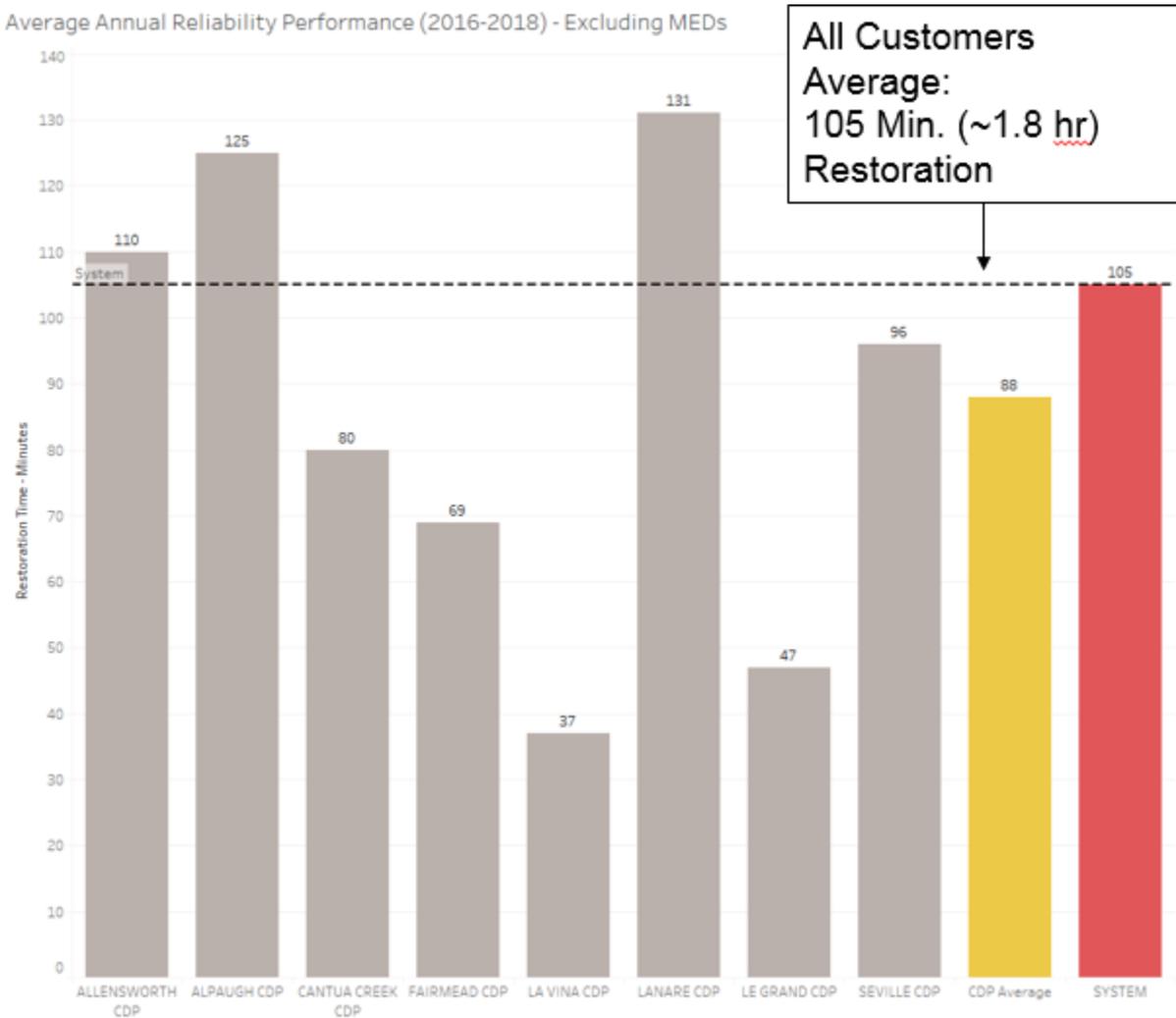


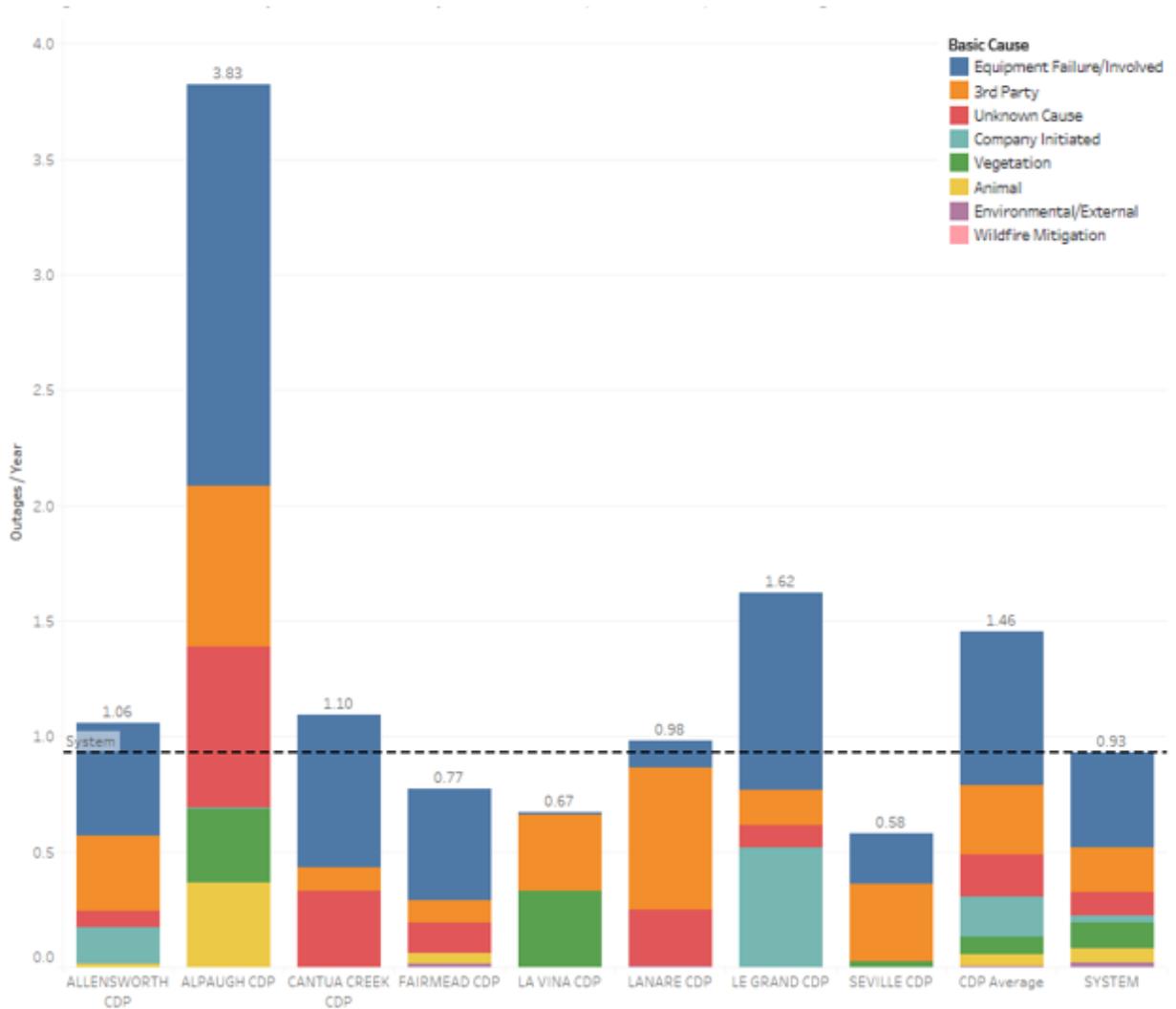
Chart 5 below summarizes the average restoration time of a sustained outage (CAIDI) by each respective SJV DAC Pilot Community, overall SJV DAC Pilot Communities combined, and entire PG&E electric system. The results exclude MED outage data over a 3-year period (2016-2018). The average outage restoration time for an average PG&E customer was 106 minutes while the average restoration time for an average SJV DAC Pilot Community member was 88 minutes, a CAIDI difference of 18 minutes. This is roughly equivalent to the average SJV DAC Pilot Community member getting their electric service fully restored a quarter hour sooner than the average PG&E customer for a typical outage that is not during a MED.

**CHART 5**  
**CAIDI BY SJV DAC PILOT COMMUNITY – EXCLUDES MED (2016-2018)**



From an outage cause perspective, Chart 6 below profiles the basic causes for each respective SJV DAC Pilot Community, overall SJV DAC Pilot Communities combined, and entire PG&E electric system. The results exclude MED outage data over a 3-year period (2016-2018). Typical causes for outages are equipment failures, vegetation, animals, vehicle accidents (third-party), weather (environmental/external), and unknown. Equipment failure, third-party, and vegetation causes account for 76 percent of the outages that the average PG&E customer experienced in a given year. Equipment failure, unknown, and third-party causes account for 82 percent of the outages that the average Alpaugh Pilot Community member experienced in a given year.

**CHART 6**  
**AIFI BASIC CAUSE PROFILE BY SJV DAC PILOT COMMUNITY – EXCLUDES MED (2016-2018)**



## Summary of Reliability Discussion at Reliability Workshop

At the May 7 SJV DAC Reliability Workshop SCE and PG&E presented on pilot status update and upcoming stages as well as reliability analysis of the pilot communities. Attendees, including community members from some non-PG&E communities, provided comments and asked for additional information related to reliability, including the following comments and responses:

- Request for further information about reliability meetings with communities:
  - PG&E response: As described above, PG&E holds an annual reliability meeting to review its annual report and also other meetings as requested.
- Request for storm data to be removed from reliability assessments to better understand potential reliability impacts: outage data by community without major events.
  - PG&E response: PG&E has presented outage data with and without MEDs in this report.
- Request for opportunities with the other projects such as IDER and DRP, and storage opportunities with timeline.
  - PG&E response: PG&E includes IDER and DRP related information as well as storage and Self-Generation Incentive Program (SGIP) information in this report.
- Customer concern identified in transitioning from wood/gas to electricity because of reliability.
  - PG&E response: These concerns are discussed throughout.
- Comment that there is a large difference in restoration time between communities.
  - PG&E response: In general, since these communities are so small, a small number of outages can have a large impact on the metrics, which results in variation. When looking at the approximately 1,200 pilot customers as a group, their reliability performance is similar to what the average PG&E customer experiences.
- Recommendation to provide a fact sheet on how measures are captured and to meet with residents to gather more information about outages in their communities.
  - PG&E response: PG&E includes above a description of how the data was collected and analyzed, and expects that discussions with community members about reliability will continue throughout the pilot.

## Impact of Distributed Energy Resources on Reliability

In California's Assembly Bill 327 (2013) Distributed Energy Resources (DER) are defined as any one of the following types of energy resource connected at the distribution system level: energy efficiency, distributed generation, demand response, energy storage and electric vehicles. DER may be connected to the distribution system in front of the meter or behind-the-meter (BTM) (i.e., on a customer's premise).

Stakeholders have explored the potential benefits or services that DER can provide to the distribution system in the IDER and DRP proceedings—the latter is focused on identifying DER opportunities to meet distribution needs while the former is focused on sourcing those DER solutions. These proceedings have found that DER are best suited to provide targeted load reduction to mitigate a forecasted capacity deficiency rather than a mitigation solution to most reliability needs.<sup>10</sup> Capacity deficiencies can be forecasted and mitigated through targeted load reduction, whereas outages are frequently caused by factors that are difficult to predict in time to deploy a DER solution.

Except in very specific situations,<sup>11</sup> PG&E, Southern California Edison and San Diego Gas and Electric have determined that DER are not able to improve reliability in the same way as a conventional distribution investment, such as devices that improve the ability to locate a fault or switches that enable a fault to be isolated so that other sections of a line can remain energized.

Consequently, in a 2017 Assigned Commissioner Ruling (ACR), the ability of DER to improve reliability was categorized as having "speculative and potentially low" value<sup>12</sup> and further working group activity on this topic did not resolve those concerns.<sup>13</sup>

Currently, the IDER and DRP proceedings are focused on DERs' ability to defer distribution capacity investments. An annual Distribution Infrastructure Deferral Framework process has been created, and it includes a Distribution Deferral Opportunity Report (DDOR) which identifies opportunities on the distribution system for targeted DER to mitigate a forecasted need based on expected load increases. Once approved, the IOUs hold a solicitation to source potential DER solutions for those opportunities.

PG&E's 2018 DDOR, which was the first cycle of this annual process, identified a number of distribution capacity deferral opportunities, summarized below.

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<sup>10</sup> More information on these findings can be found in the services section of the 2015 IDER Competitive Solicitation Framework Working Group Final Report here: <https://drpwg.org/sample-page/drpf/> and the subsequent Locational Net Benefits Analysis Working Group materials here: <https://drpwg.org/sample-page/drpf/>.

<sup>11</sup> As described in the IDER report above, back-tie capacity increases were identified as one reliability need that could be met using a DER solution.

<sup>12</sup> [https://drpwg.org/wp-content/uploads/2016/07/189819375\\_ACR\\_06.08.17.pdf](https://drpwg.org/wp-content/uploads/2016/07/189819375_ACR_06.08.17.pdf).

<sup>13</sup> Jan 2018 WG report Long Term Refinements: <https://drpwg.org/wp-content/uploads/2018/01/R-14-08-013-LNBA-WG-Final-Report.pdf>.

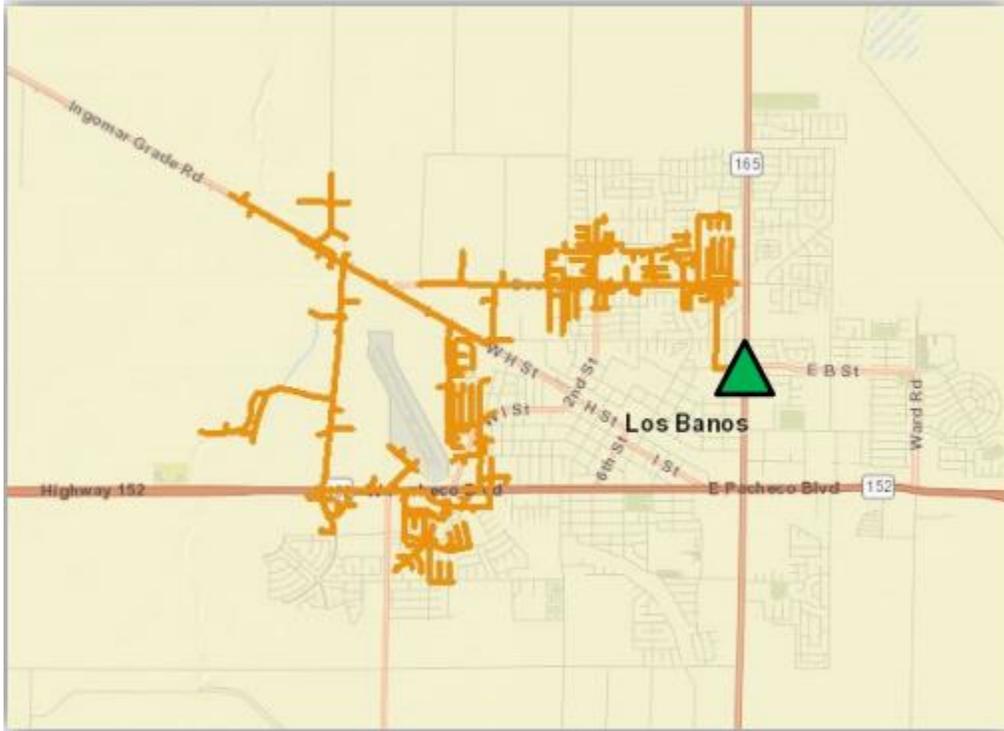
**TABLE 1  
2018 DISTRIBUTION DEFERRAL OPPORTUNITIES**

<b>FeederID</b>	<b>Asset</b>	<b>Project</b>	<b>GNA_Name</b>
<b>182131101</b>	Bank	Gonzales Bank 3	GONZALES BANK 3
<b>182131102</b>	Bank	Gonzales Bank 3	GONZALES BANK 3
<b>182131103</b>	Bank	Gonzales Bank 3	GONZALES BANK 4
<b>182131104</b>	Bank	Gonzales Bank 3	GONZALES BANK 4
<b>253161106</b>	Bank	Huron Bank 1	HURON BANK 1
<b>253161107</b>	Bank	Huron Bank 1	HURON BANK 1
<b>253161108</b>	Bank	Huron Bank 1	HURON BANK 1
<b>253161109</b>	Bank	Huron Bank 1	HURON BANK 1
<b>253161112</b>	Bank	Huron Bank 1	HURON BANK 1
<b>253161116</b>	Bank	Huron Bank 1	HURON BANK 1
<b>162771101</b>	Feeder	New Lammers Feeder	LAMMERS 1101
<b>252091102</b>	Bank	Santa Nella Bank 1 and New Feeder	CANAL 1102
<b>252091103</b>	Bank	Santa Nella Bank 1 and New Feeder	CANAL 1103
<b>252091102</b>	Bank	Santa Nella Bank 1 and New Feeder	CANAL BANK 2
<b>252091103</b>	Bank	Santa Nella Bank 1 and New Feeder	CANAL BANK 2
<b>252091105</b>	Bank	Santa Nella Bank 1 and New Feeder	CANAL BANK 2
<b>254311105</b>	Bank	Santa Nella Bank 1 and New Feeder	ORTIGA BANK 1
<b>254311106</b>	Bank	Santa Nella Bank 1 and New Feeder	ORTIGA BANK 1

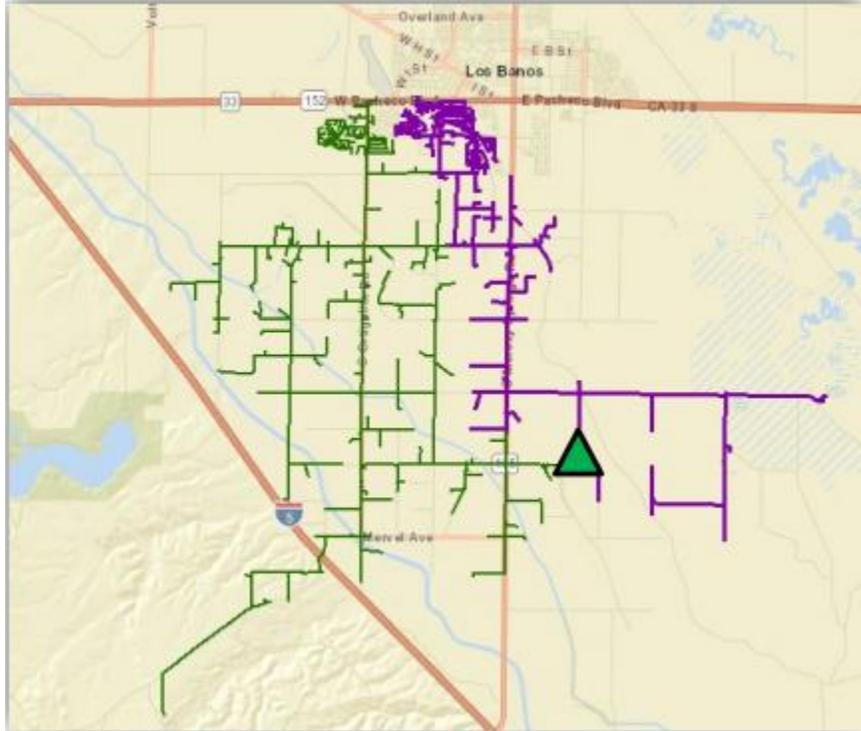
PG&E subsequently held a solicitation for DER solutions to those identified deferral opportunities and provided additional detail on the location of each need.<sup>14</sup> The closest IDER location is in the Los Banos area as pictured below.

<sup>14</sup> [https://www.pge.com/pge\\_global/common/pdfs/for-our-business-partners/energy-supply/electric-rfo/wholesale-electric-power-procurement/2019%20DIDF%20RFO/DIDF%20RFO%20Webinar\\_Final.pdf](https://www.pge.com/pge_global/common/pdfs/for-our-business-partners/energy-supply/electric-rfo/wholesale-electric-power-procurement/2019%20DIDF%20RFO/DIDF%20RFO%20Webinar_Final.pdf).

**FIGURE 6**  
**SANTA NELLA DEFERRAL OPPORTUNITY LOCATIONS**  
**CANAL FEEDER 1102 AND 1103 PLUS ORTEGA BANK 1**



**FIGURE 6**  
**SANTA NELLA DEFERRAL OPPORTUNITY LOCATIONS**  
**CANAL FEEDER 1102 AND 1103 PLUS ORTEGA BANK 1**  
**(CONTINUED)**



### Activities to Reduce the Impact of Outages for Pilot Communities

Some of the fundamental elements of the approved electrification pilots will also help customers manage the household impact of outages. These include building envelope improvements like air sealing and insulation that will help retain (or keep out) heat as well as improvements that will help with efficient use of hot water conserve and store hot water such as right-sized water heater tanks and low-flow faucet aerators and shower heads.

In addition, customer-sited energy storage has been discussed in community meetings and in an ACR.<sup>15</sup> When energy storage was presented in community meetings as an option to mitigate the impact of outages, most residents expressed interest, though there was also concern about eventual cost of repair and replacement.

Although DER are not able to provide reliability improvements at the level of the PG&E system, BTM or customer-sited DER that are able to power a customer's load during an outage, such as energy storage, can improve that individual customer's ability to manage outages. Importantly, energy storage also increases energy consumption on site due to efficiency losses, and it can only provide a limited amount or duration of backup power. Today PG&E is aware of one solar + storage project in Le Grand, and one storage project in Alpaugh.

PG&E manages several customer funded programs that incentivize customer-sited DER. The Commission highlights a few key programs for the IOUs to leverage in this Pilot:

- Self-Generation Incentive Program (SGIP)
- Disadvantage Community-Single-Family Affordable Solar Homes (DAC-SASH)
- Single-family Affordable Solar Homes (SASH)
- PG&E’s BTM Water heater Energy Storage Program
- California Solar Initiative (CSI)-Thermal Program

SGIP provides customers with monetary incentives to adopt existing, new, and emerging DER. While the program incentivizes a wide range of technologies, the most common use for SGIP funds is for residential energy storage. The ACR envisioned storage as an important part of these pilots, and proposed to carve out a \$10 million set-aside within SGIP’s budget for low-income and DAC. The set-aside would fully subsidize residential and non-residential energy storage systems with a cost cap of \$11,979, and \$26,379 respectively.

In recent comments in the SGIP proceeding, PG&E supported the \$10 million set-aside for the SJV Electrification pilots, and requested that the Commission consider recommendations filed in PG&E’s Opening Comments on the Implementation of Senate Bill (SB) 700<sup>16</sup>. PG&E recommends prioritizing both residential customers who already have solar Photovoltaic (PV) systems, and the ACR’s proposed non-residential BTM battery storage projects.

The ACR proposed non-residential BTM energy storage projects to function as a “Community Service,”<sup>17</sup> being located at a community center such as a school, or public building. PG&E supports this recommendation, and recommends prioritizing this approach in communities with lower than average service reliability. If and when an outage occurs, the community service energy storage will provide residents have a location to gather where there is still power to provide needed facilities.

Regarding to residential customers, the PG&E recognizes that the current most cost effective use of residential energy storage is to configure it to primarily charge from the onsite PV system rather than the grid via the home. The solar + storage pairing helps customers comply with SGIP’s discharge rules, not increase customers’ electric bills, and reduce greenhouse gas emissions. These approaches will not impact service reliability in the communities, but will enable communities to have limited backup power during unexpected outages.

The DAC-SASH and SASH Program provide customers with up-front financial incentives for solar installation on homes owned by low income residents. These programs allow for greater eligibility and help to overcome barriers like lack of access to capital or credit. PG&E and the Program Administrator, GRID-Alternatives, have both signed a letter of attestation<sup>18</sup> committing to market the programs in the SJV Pilot communities.

PG&E’s BTM thermal Energy Storage Program will coordinate with the SJV Electrification pilots to provide customers who receive Heat Pump Water Heaters (HPWH) with a control technology that shifts their water heating load away from the grid’s peak congestion hours. The Commission requested that a minimum of 150<sup>19</sup> HPWHs that are installed during the electrification pilots be enabled with “smart

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<sup>16</sup> R.12-11-005, PGE Opening Comments on Implementation of SB 700, at 23.

<sup>17</sup> D.18-12-015, at 41-42 and 115-118.

<sup>18</sup> PG&E Pilot Implementation Plan.

<sup>19</sup> D.18-12-015, at 121.

controls” to participate in the BTM thermal energy storage program. Given the difficulty in predicting most outages, PG&E does not expect these controls to improve customers’ ability to manage outages.

The CSI-Thermal Program offers rebates for solar water heating systems for single, multi-family residential and commercial customers. The Decision mandates PG&E to market this program to all pilot communities, particularly those in Monterey Park Tract. Systems installed under the CSI Thermal Program will still offset customer’s hot water energy usage and provide energy savings. Solar hot water systems can provide hot water during an electricity outage if they include a solar-powered pump or are designed to operate without a pump, assuming the customer is able to maintain water pressure during the outage.

These incentive programs and others will be marketed to customers in the SJV Electrification Pilots. Programs that incentivize the adoption of DERs are an important part of this proceeding, and are included in PG&E’s implementation plans. PG&E welcomes any feedback, or recommendations from parties regarding the programs and approaches described above.

Finally, in support of the electrification pilot in PG&E’s communities eight electrification PG&E plans to take several proactive steps when it comes to managing reliability:

- Provide a single point of contact for pilot communities so that calls or emails to PG&E’s dedicated pilot lines will result in direct feedback to the reliability manager responsible for each area where the pilot communities are located; and
- Ensure that all critical customers—typically schools and hospitals—in each pilot community are known to the electric operations and are able to inform their prioritization of dispatching crews to respond to outages.

## Appendix A – Definitions, Acronyms & Abbreviations

**AIDI** – Average Interruption Duration Indices

**AIFI** – Average Interruption Frequency Indices for sustained outages only

**Customer:** A metered electrical service point for which an active bill account is established at a specific location.

**CAIDI: Customer Average Interruption Duration Index** - The Customer Average Interruption Duration Index (CAIDI) represents the average time required to restore service. Also known as restoration time.

**CESO:** A term that counts the number of Customers Experiencing Sustained Outages.

**Distribution system:** That portion of an electric system that delivers electric energy from transformation points on the transmission system to the customer. PG&E defines its distribution system as line voltage less than 60 kV. The distribution system is generally considered to be anything from the distribution substation fence to the transformer prior to stepping down the voltage to the customer premise.

**Distribution Transformer:** Converts electrical energy in an electric utility system by “stepping down” the high voltage to a service delivery (low) voltage.

**Infrared Inspections:** Inspections on circuits to identify hotspots (abnormally high temperatures) for corrective action. Hotspot corrections potentially prevents equipment failure caused outage occurrences.

**Major Event:** Designates an event that exceeds reasonable design and or operational limits of the electric power system. A Major Event includes at least one Major Event Day. *See also: Major Event Day.*

**Major Event Day (MED):** A day in which the daily system, System Average Interruption Duration Index (SAIDI) exceeds a Major Event Day threshold value. For the purposes of calculating daily system SAIDI, any interruption that spans multiple calendar days is accrued to the day on which the interruption began.

**Momentary interruption:** The brief (five minutes or less) loss of power delivery to one or more customers caused by the opening and closing operation of an interrupting device.

**Planned outage:** The intentional disabling of a component’s capability to deliver power, done at a preselected time, usually for the purposes of construction, preventative maintenance, or repair.

**SAIDI: System Average Interruption Duration Index**

The System Average Interruption Duration Index (SAIDI) indicates the total duration of interruption for the average customer during a predefined period of time. It is commonly measured in minutes or hours of interruption.

**SAIFI: System Average Interruption Frequency Index**

The System Average Interruption Frequency Index (SAIFI) indicates how often the average customer experiences a sustained interruption over a predefined period of time.

**SCADA:** Supervisory Control and Data Acquisition – an online database for distribution operators to remotely gather information and control the distribution system.

**System Automation and Protection Equipment:** Equipment with the remote data and control capability that can sense and isolate a fault resulting in a power outage. This includes an immediate notification of the power outage to the Operations team.

**Sustained interruption:** Any interruption not classified as a part of a momentary event. That is, any interruption that lasts more than five minutes.

**Unplanned interruption:** The loss of electric power to one or more customers that does not result from a planned outage.

**Voltage regulator:** A device to automatically maintain a constant voltage level.

**PG&E Gas and Electric  
Advice Submittal List  
General Order 96-B, Section IV**

AT&T	Downey & Brand	Pioneer Community Energy
Albion Power Company	East Bay Community Energy	Praxair
Alcantar & Kahl LLP	Ellison Schneider & Harris LLP	Regulatory & Cogeneration Service, Inc.
	Energy Management Service	SCD Energy Solutions
Alta Power Group, LLC	Engineers and Scientists of California	
Anderson & Poole	Evaluation + Strategy for Social Innovation	SCE
	GenOn Energy, Inc.	SDG&E and SoCalGas
Atlas ReFuel	Goodin, MacBride, Squeri, Schlotz & Ritchie	
BART	Green Charge Networks	SPURR
	Green Power Institute	San Francisco Water Power and Sewer
Barkovich & Yap, Inc.	Hanna & Morton	Seattle City Light
P.C. CalCom Solar	ICF	Sempra Utilities
California Cotton Ginners & Growers Assn	International Power Technology	Southern California Edison Company
California Energy Commission	Intestate Gas Services, Inc.	Southern California Gas Company
California Public Utilities Commission	Kelly Group	Spark Energy
California State Association of Counties	Ken Bohn Consulting	Sun Light & Power
Calpine	Keyes & Fox LLP	Sunshine Design
	Leviton Manufacturing Co., Inc. Linde	Tecogen, Inc.
Cameron-Daniel, P.C.	Los Angeles County Integrated Waste Management Task Force	TerraVerde Renewable Partners
Casner, Steve	Los Angeles Dept of Water & Power	Tiger Natural Gas, Inc.
Cenergy Power	MRW & Associates	
Center for Biological Diversity	Manatt Phelps Phillips	TransCanada
City of Palo Alto	Marin Energy Authority	Troutman Sanders LLP
	McKenzie & Associates	Utility Cost Management
City of San Jose	Modesto Irrigation District	Utility Power Solutions
Clean Power Research	Morgan Stanley	Utility Specialists
Coast Economic Consulting	NLine Energy, Inc.	
Commercial Energy	NRG Solar	Verizon
County of Tehama - Department of Public Works		Water and Energy Consulting
Crossborder Energy		Wellhead Electric Company
Crown Road Energy, LLC		Western Manufactured Housing Communities Association (WMA)
Davis Wright Tremaine LLP		Yep Energy
Day Carter Murphy		
	Office of Ratepayer Advocates	
Dept of General Services	OnGrid Solar	
Don Pickett & Associates, Inc.	Pacific Gas and Electric Company	
Douglass & Liddell	Peninsula Clean Energy	