

**2015-2016 PG&E
AUTOMATED DEMAND
RESPONSE PROGRAM
MANUAL**

OVERVIEW AND POLICIES

**PREPARED FOR:
FRED YOO
SENIOR PROGRAM MANAGER
PG&E DEMAND RESPONSE**

**PREPARED BY:
ADR PROGRAM TEAM
ENERGY SOLUTIONS AND ASWB ENGINEERING**

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***Pacific Gas and
Electric Company***[®]

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1 Introduction

This manual provides a single comprehensive resource to effectively implement the Pacific Gas and Electric Company (PG&E) Automated Demand Response (ADR) Program. The document contains the Program policies and procedures, and requirements associated with the management of all aspects of the Program to deliver planned load reductions during demand response (DR) events. The primary audience for this document is interested PG&E Customers and DR Program Managers. Other stakeholders include DR service providers, equipment manufacturers and vendors, PG&E Energy Solutions and Sales representatives (ES&S reps), and internal project staff.

PG&E offers a portfolio of electric DR programs for its Customers. These programs provide financial incentives and other benefits to participating Customers for reducing their energy usage during times of peak demand. Participation in PG&E's DR Programs can make a difference in California's energy and economic well-being.

Starting in 2014, California's investor-owned utilities (IOUs), including PG&E, transitioned to locational-specific notification for all existing and new Participants for DR events.¹ As such, all new ADR customers receiving incentives starting in 2014 must be locationally dispatchable. Customers are also encouraged to participate in energy efficiency programs to permanently lower consumption, and DR programs provide additional incentives for Customers to voluntarily curtail electrical load during peak periods when electrical demand is highest. Customers may choose from among different options designed to fit their needs.

2 Program Overview

PG&E's ADR Program provides incentives and technical assistance for medium to large non-residential Customers to install and/or program equipment at the Customer's facilities. The objective of this program is to enable the execution of a sequence of steps at the facilities to curtail electrical load after receiving a communications signal from the utility via the OpenADR communications protocol. PG&E aims to maximize the reliability and consistency of available kW capacity in DR programs. As such, PG&E wants the kW for projects receiving ADR incentives to be as realistically achievable as possible, and such that customers will participate consistently in as many DR events as possible.

In fully automated DR, the facility equipment receives a signal from the utility directly, and executes load shed strategies without Participant intervention. The technology solution consists of an open, interoperable industry standard control and communications technologies designed to work with both common energy management control systems and individual end-use devices. The technologies include a communications infrastructure via a computer server that sends DR signals to PG&E's Participant sites where load reductions are automatically implemented through building

¹ Rather than calling a DR event for the entire service territory, PG&E will send a DR event signal to a subset of DR customers within a specific geographical area or areas within its territory.

control systems. The technology and communications infrastructure used in ADR originated from an initial conceptual design developed in 2002 at Lawrence Berkeley National Laboratory (LBNL). ADR is a fully automated DR system using Client/Server architecture and is intended to replace labor-intensive manual and semi-ADR.

The ADR architecture consists of two major elements built on an open-interface standards model called OpenADR. First, the Demand Response Automation Server (DRAS) provides signals that notify electricity Participants of DR events. Second, a virtual end node (VEN) or client for each Participant's site continually communicates with the DRAS and is linked to existing pre-programmed DR strategies independent of control network protocols such as BACnet or Modbus. Legacy ADR control systems used a VEN called a Client and Logic with Integrated Relay (CLIR) but these devices are no longer manufactured.

2.1 Resource Goals

The program goal for 2015-2016 is 30 megawatts (MW) of peak load reduction. Incentives have also been set aside for ADR projects that will also pursue at least one energy efficiency measure.

2.2 Eligibility Requirements

2.2.1. CUSTOMER ELIGIBILITY

The ADR Program is open to all Non-Residential Customers who:

- Receive electric services from PG&E.
- Have a PG&E interval meter installed at the site. A site is defined as a single free-standing building or structure; an individual utility interval meter; or a service account number where the retrofit or installation takes place
- Have an existing Utility service account with at least 12 months of billing and usage history. 24 months of billing and usage history is needed for customers with intermittent loads, such as pumping or agricultural irrigation.
- Either already enrolled in one of four qualifying DR programs (see section 2.4) or eligible to enroll.
- Is not a small or medium business installing a lone, single-zone communicating thermostat as part of PG&E's Smart Thermostat Trial.

Direct access (DA) customers who purchase electricity from an electricity generator other than PG&E are eligible provided the customer enrolls in a DR program that also accepts DA customers (Capacity Bidding Program, Demand Bidding Program, and Aggregator Managed Portfolio Program).

2.2.2. ADR PROJECT ELIGIBILITY

ADR project eligibility applies to equipment that can be controlled through a central Energy Management System, Building Automation System or other local control system that can receive an event signal from the DRAS. The system requires no human intervention to initiate the pre-programmed load reduction sequence during a DR event.

In order for the project to be eligible for the ADR Program incentives it must meet the following criteria:

1. Project is new, ADR-enabling equipment that provides incremental kilowatt (kW) and kilowatt hour (kWh) reductions relative to existing (baseline) equipment.
2. New equipment/systems must not already be installed. Installation cannot begin until the ADR Program Team has the opportunity to inspect and approve the project.

A Customer may choose to include multiple project sites in a single project application, provided that the requirements listed below apply.

1. The same Customer must own and/or occupy the Customer project sites.
2. Each site must have a unique service agreement identification (SAID).
3. Project Sites for which the Customer is applying for incentives must all be in PG&E's service territory.
4. The sites can have entirely different measures, operating hours, energy use profiles, and DR strategies.

Starting in 2014, California's investor-owned utilities (IOUs), including PG&E, transitioned to location-specific notification for all existing and new Participants for DR events. Customers enrolling multiple facilities at multiple sites must have a VEN and the ability to monitor DR event participation at each facility or site individually, based on the SAID.

Projects must be installed by October 31, 2016 in order to receive Program incentives.

When combining sites and measures into a single application, the Customer should be aware that such projects will not be reviewed, approved, or receive payment until paperwork on all of the individual sites and measures is complete. If the project is being implemented in phases, the Customer should consider submitting individual applications. Under special circumstances, the ADR Program, at its sole discretion, may waive certain project eligibility conditions.

2.2.3. INTEGRATED DEMAND SIDE MANAGEMENT (IDSMS) ADR PROJECT ELIGIBILITY

DR projects that integrate energy efficiency (EE) measures are called integrated demand-side management (IDSMS) projects. Incentives have also been set aside for ADR projects that will specifically pursue at least one energy efficiency measure.

To be considered an IDSMS project eligible for ADR Program incentives, the energy efficiency measure(s) must be installed at the same site(s) as the DR measure(s), defined by the service agreement identification (SAID) number(s). For single applications combining multiple sites and measures, sites without EE measures will be considered ADR-only projects. A multi-site application can qualify as an IDSMS project if the EE measure at the installed location impacts all the sites in the application. For example, a customer may implement a multi-air conditioner

compressors cycling strategy for buildings in a business park and install high efficiency exterior lighting for a parking lot or lots shared by those same buildings.

There is no minimum kWh energy savings requirement for the EE measure. Customers may claim both EE savings and DR load shed for the same measure or technology. The EE measure may be directly connected to the DR measure or it may be on another portion of the facility. If the EE measure is on the same technology as the DR project then the EE rebate will be applied first and the ADR incentive will be applied on the remaining project cost. For example, a customer installing a lighting control system will see EE savings and DR load shed from the same control system. The EE rebate will be applied first and then the ADR incentive up to 100% of the project cost.

The IDSM projects must follow the “loading order” adopted by California from the *2003 Energy Action Plan*² and the Energy Commission’s *2003 Integrated Energy Policy Report*³. The EE measure must be installed before the DR measure or strategy is applied to the site. The efficiency measures must also be implemented in the same timeframe as the ADR project.

2.2.4. ADR PROJECT DR EVENT SIGNALING ELIGIBILITY

PG&E DRAS SIGNALING

Customers must have an OpenADR 2.0A or B certified VEN on site that pulls the automated DR event signal directly from the PG&E DRAS. In the situation where an aggregator is working with a customer, the aggregator does not have the option to pull the event curtailment signal from the DRAS and then have the customer pull the event curtailment signal directly from the aggregator. The aggregator is responsible for the nominated load for each Service Agreement and assumes the risk and penalty of the customer not shedding load. Projects utilizing a cloud based ADR solution will need to adhere the eligibility policies laid out in 2.2.5.

LOCATIONAL DISPATCH

Customers with projects involving multiple accounts/service agreement IDs (SAIDs) or multiple sites must have the ability to trigger the DR load measure at each account individually. The details of which account will be triggered will be determined from the signal that is pulled by the VEN from the PG&E DRAS. This can be accomplished by having a separate VEN for each account/site or by using the OpenADR 2.0A or B VEN that can parse out the DR event signal to specific accounts/sites. During post installation inspections, the ADR Team will test that the PG&E DRAS can successfully call a subset of the account/sites to execute DR strategies.

² State of California. (2003). *Energy Action Plan*. California Power Authority, California Energy Commission, California Public Utilities Commission. Retrieved from http://www.energy.ca.gov/energy_action_plan/2003-05-08_ACTION_PLAN.PDF

³ California Energy Commission (2003). *Integrated Energy Policy Report*. California Energy Commission. Retrieved from <http://www.energy.ca.gov/reports/100-03-019F.PDF>

2.2.5. CLOUD-BASED PROJECTS ELIGIBILITY: STRANDED ASSETS

Cloud-based ADR projects allow a remote server or EMS to act as a central hub for receiving DR event signal from the utility DRAS and then execute DR strategies for one or more facilities across a campus or a region (city, country). Cloud-based ADR projects are being increasingly adopted by ADR technology vendors, service providers, and aggregators because of their attractive cost efficiencies of scale of a central server over localized server and controls at individual facility sites. On the other hand, cloud-based solutions create stranded asset risks for PG&E in the event a customer is no longer connected to the cloud or if the relationship with the cloud vendor is terminated.

To manage the stranded asset risk, vendors and aggregators using cloud-based equipment must meet the following requirements:

1. The communication regarding DR event initiation and termination between the PG&E DRAS and the cloud as well as between the cloud and the customer must follow the OpenADR 2.0A or 2.0B protocol.
2. Provide the customer and PG&E with written instructions detailing how the local VEN can be reconfigured to pull a signal directly from the PG&E DRAS and execute DR strategies at the customer site in the event that the cloud based service is terminated.
 - a. Any additional hardware and programming services must be provided to the customer during project installation. These additional hardware and programming services are eligible for ADR incentives.
 - b. The additional hardware will be of similar construction. For example, if the main VEN is built for the outdoor environment, the additional hardware will be built for the outdoor environment.
 - c. All future revisions to the hardware / software retain the standalone capability.
3. The local VEN on site includes the proper security certificate for connection to the PG&E DRAS end-point and must be able to connect to 2.0A or 2.0B (connecting to the 1.0 endpoint is not allowed).

STRANDED ASSET TESTING

Additionally, stranded asset testing is required to ensure the local VEN can communicate with the DRAS without the third party cloud. Stranded asset testing is typically completed following completion of project installation and commissioning and before the Load Shed Test to verify direct DRAS communication capability. Testing includes the ADR Team initiating an event notification signal via the DRAS and having the onsite VEN solution shed load without having the signal go through the cloud. PG&E will conduct this test once per VEN but may request another demonstration at any time if there are concerns that the demonstration is no longer valid (e.g. dramatic hardware or software update occurs).

* Vendors that cannot pass the cloud-based project eligibility or stranded asset testing are allowed to connect to the PG&E DRAS but will not be eligible for a PG&E ADR Incentive.

STRANDED ASSET OPTION FOR OUTSOURCED ADR SYSTEMS

Similar to a cloud solution, the ADR system can be outsourced, but still owned by the customer and is so integrated into the customer's energy management and control system that severing from the vendor would render the management and control system inoperable. This results in a very low risk of the ADR-enabled system becoming a stranded asset for PG&E. As with all projects the control system will need to demonstrate locational dispatch capabilities described in Section 2.2.4.

2.2.6. TECHNOLOGY ELIGIBILITY

- 1) Technology must be OpenADR 2.0A or 2.0B certified and connect to the PG&E DRAS OpenADR 2.0A or 2.0B endpoint.
- 2) Technology must have previously demonstrated DR capability.
- 3) Technology must either:
 - A) have been evaluated in an independent assessment; or
 - B) be currently installed and available for evaluation by program staff at a site in PG&E territory or other location easily accessed by the program staff, and where both pre- and post-project conditions are documented or currently verifiable.
- 4) Technology must be under Manufacturer warranty for a minimum of three years.
- 5) Software and programming costs required for local hardware controls or local facility energy management systems (EMS) for enabling local ADR strategies at the facility site (see cloud-based projects) are eligible to receive an incentive.
- 6) Technology must set the market context field to the wildcard character (*).
- 7) Technology must be programmed to poll the PG&E DRAS on a one-minute interval.
 - A) Customers may choose to poll the DRAS at intervals greater than 1 minute but not less than 25 minutes if necessary for their business requirements. In these cases, the customer assumes all risk of missed event notifications, changes, cancellations, and any other missed information payloads transmitted between PG&E's DRAS and the customer's resources. Customer also assumes the lost revenue risk for incorrect load shed due to missed notifications.
- 8) Additional metering equipment used to relay data from the PG&E meter into the ADR control system to manage the ADR shed in **real-time** during an event are eligible to receive an incentive.
 - A) Costs covered by ADR incentives include equipment and labor used to relay metering signals from the utility meter into the ADR control system. Power monitoring equipment that collect data for post-event performance analysis or sub-metering are not eligible for an incentive.

2.2.7. ADVANCED TECHNOLOGY INCENTIVE ELIGIBILITY

Technologies are evaluated for ADVANCED incentives at \$350 per kW for HVAC & Refrigeration or \$400 per kW for Lighting by the ADR Program Team and PG&E Program Management. None of the six criteria listed below are firm requirements, but the criteria are used to classify projects as ADVANCED or standard ADR projects. ADVANCED projects must also meet all the eligibility requirements listed above for ADR technologies.

- 1) Inclusion in an evaluation by the California Emerging Technologies Coordination Council (CA ETCC) that includes DR capability.
- 2) Inclusion in other recent advanced technology evaluation.
- 3) Advanced communication technology:
 - A) Wireless communication (e.g. Daintree, Zigbee technologies),
 - B) Technologies that extend real-time, two-way communication within facilities (e.g. Wireless Pneumatic Thermostat systems).
- 4) Granularity of control:
 - A) Integration of DR control at level of room or fixture in lighting projects (e.g. Lutron Quantum, etc.),
 - B) Integration of DR control beyond central plant, at zone or thermostat level, in HVAC projects (e.g. Cypress WPT, Vigilent, etc.).
- 5) Granularity of data reporting and sensing.
- 6) Market adoption stage: technologies in early stages of adoption are preferred.

ADVANCED TECHNOLOGY EVALUATION PROCESS

- 1) ADR Team communicates with technology sponsor, either the manufacturer, integrator, Customer, or trade professional partner to gather information.
- 2) ADR Team considers evaluations from the following sources:
 - A) CA ETCC
 - B) Federal laboratories and agencies
 - C) PIER / CEC
 - D) EPRI
 - E) LBNL
 - F) Other utilities
- 3) ADR Team evaluates installation sites, if appropriate.
- 4) ADR Team along with PG&E program management qualifies the technology as Standard ADR or ADVANCED ADR

2.2.8. INELIGIBLE PROJECTS

Non-utility supply, such as on site electric generation, does not qualify as an ADR project. Thermal energy storage systems are not eligible for ADR incentives. These projects are considered permanent load shifting, for which PG&E offers incentives under a separate program.

The ADR program will not pay incentives for manual DR measures, manual improvements/changes, or Customer behavior changes to existing equipment. DR measures programmed to opt out of DR event participation as a default setting, are ineligible. Cameras are not eligible for ADR incentive. Software license & maintenance fees are not eligible for ADR incentives. As mentioned above in 2.2.6 (8), power monitoring equipment that collect data for post-event performance analysis or sub-metering are not eligible for an incentive. Also, the ADR program cannot pay for any metering charges owed to PG&E, including new meter equipment, KYZ pulses, isolation relays and any on-going tariff charges.

2.3 Incentives

The intent of the incentive structure is twofold:

- Motivate performance during the DR season by reserving a portion of the incentive for payment for up to 12 months following installation, and
- Motivate enrollment by providing all program incentives to participants to invest in ADR-enabled equipment⁴.

The following table summarizes the incentive structure for the 2015-2016 Program:

Table 1. Automated Demand Response Program Incentives

Technology Category	Incentive Rate (\$ per kW)
Standard Automated Demand Response	\$200
Advanced Technology HVAC/R	\$350
Advanced Technology Lighting	\$400

Participants will be awarded incentives on a 60/40 basis in two installments.

In the first installment, Participants receive 60 percent of the total program incentive after successful on-site verification of equipment installation and testing of the committed ADR strategies.

⁴ In the 2009-2011 program cycle, a portion of program incentives were allocated to technical coordinators.

The second incentive installment of an amount up to the remaining 40 percent is paid upon verification of DR event performance in a full DR season of participation. This performance period may be shorter than 12 months in certain cases:

- When an ADR project is verified outside of DR season, or
- Verified at the beginning of DR season before any events have been called in the qualifying DR program, the performance period shall end at the close of that first DR season.

The second incentive payment amount is prorated based on the percentage of the verified kW curtailment the Participant actually achieves during the DR season.

A minimum performance of 60 percent of the verified kW curtailment, averaged across all events called during the DR season, must be achieved to be eligible for any second incentive payment. The second incentive amount to be paid is the total ADR incentive times the difference between the customer's actual percentage performance and the 60 percent benchmark. The second incentive is never less than zero, nor ever greater than either the project cost or the approved incentive for the project, even if the customer's actual performance exceeds 100% of verified kW.

Average kW performance during the performance period is calculated based on DR events in that period for which the customer was called by PG&E or their aggregator, regardless of opting out. For the purposes of the average performance period kW, DR event opt-outs are considered as zero kW performance. Participants are expected to actively participate in DR events as ADR Program incentives supports investments in DR-enabling technology.

SAMPLE PROJECT INCENTIVE CALCULATION

For illustrative purposes, we've created sample incentive calculations for a sample project (Table 2). This customer committed to shedding 500 kW in load, equivalent to \$100,000 in incentives at a \$200/kW rate, and incurred project costs in excess of the eligible incentive.

First incentive payment: Upon completion and verification of the 500 kW, the customer would receive 60%, or \$60,000 in incentive money.

Second incentive payment: Following the performance period (one full DR season), the customer's DR participation will be evaluated for the 40%, or \$40,000, remaining in incentives. The customer needs a minimum performance of 300 kW (i.e., 60% of the committed 500 kW load curtailment) in order to be eligible for any of the remaining for 40%. If the customer curtailed 481 kW on average across DR events called during the DR season, the difference between the customer's average performance (481 kW) and the kW Benchmark (300 kW) is multiplied by the project incentive rate (\$200/kW) to determine the second payment amount. The customer under this scenario would thus receive \$36,200 in incentives, slightly lower than the \$40,000 they would have received if they had averaged at least 500 kW over the performance period.

Table 2. Second Incentive Payment Calculation for a Sample ADR Project

<u>Project Commitment & Performance</u>		Notes
Committed & Verified Project Curtailment	500 kW	
kW Curtailment Minimum for 40% Performance Incentive	300 kW	= 60% x Program Committed & Verified Curtailment
Average Performance over Season	481 kW	Each event is given equal weight
<u>Project Financials</u>		Notes
Project Cost	\$125,000	
Total Eligible Incentive	\$100,000	Incentives in this case are less than the total project cost. The 60/40 incentive amounts are always based on the maximum incentive amount, whether capped at the project cost or limited by the verified kW curtailment amount.
60% incentive paid upon project installation & verification	\$60,000	
40% incentive maximum for DR performance period	\$40,000	
Actual 40% incentive based on Customer's Performance	\$36,200	= (Avg kW Performance - kW Curtailment Minimum for 40% Incentive) * \$200/ kW
Total Incentive Earned	\$96,200	\$60,000 + \$36,200 = 96.2% of total eligible incentive, based on average kW curtailment at 96.2% of verified kW (481 ÷ 500)

2.3.2. RESERVATION PERIOD

Following project approval, funds are reserved for six months pending demonstration of active Participant progress towards meeting remaining project milestones.

2.3.3. PROJECT AND CUSTOMER INCENTIVE CAPS

The program incentive is capped at 100 percent of the ADR project cost. In order to promote diversity in the number and types of projects enrolled in the Program, no Customer can receive more than \$2,000,000 of incentive dollars, based on Customer account ID. Multiple service account IDs can qualify under a single Customer account ID within the Customer cap. No single service account can receive more than \$2,000,000 of program incentives.

2.3.4. INCENTIVE CAPS BY DR PROGRAM

Incentive caps by DR program are as follows:

Table 3. Incentive Cap by DR Program

DR Program	Program cap (dollars)
DBP	\$1,083,000
CBP	\$819,000
PDP	\$2,635,000
AMP	\$1,637,000

Additional incentives have been set aside for ADR projects that will specifically pursue at least one energy efficiency measure, as integrated demand-side management (IDSMS) projects. The incentive budget for IDSMS projects is \$1,000,000.

2.3.5. INCENTIVE CAPS BY TECHNOLOGY

PG&E and the implementation team reserves the right to create incentive caps by technology as needed to meet program diversity goals, including allowing exceptions to the cap.

2.3.6. ADDITIONAL ELIGIBLE PROGRAM INCENTIVES

The following section describes additional PG&E and Federal incentives that Customers can apply for in addition to ADR Program incentives, with the total amount from all eligible incentive sources subject to the project caps identified above. However, Customers cannot receive rebates from other utility administrators for the same equipment.

PG&E EFFICIENCY PROGRAMS AND INCENTIVES

ADR projects are eligible to receive energy efficiency incentives. Implementing at least one energy efficiency measure for ADR participants is highly recommended, though not required (see section 2.2.2 for additional information on IDSMS projects integrating efficiency with ADR measures). PG&E offers both prescriptive (deemed) and customized EE rebates for hundreds of measures for lighting, HVAC, motors, and other technologies. For more information on energy efficiency rebates from PG&E go to <http://www.pge.com/mybusiness/energysavingsrebates/rebatesincentives/>.

FEDERAL INCENTIVE PROGRAMS

Customers may work with DR technology and service providers to apply for Federal ARRA-funded incentives in addition to ADR Program incentives. Sum of all incentives received shall not exceed 100% of project cost.

2.4 Participation in PG&E Demand Response Programs

ADR Program Participants are required to be already enrolled, or to newly enroll in one of the following PG&E DR program: Peak Day Pricing, Capacity Bidding Program, Demand Bidding Program, and Aggregator Managed Portfolio.

2.4.1. DR PROGRAM ENROLLMENT

Below is a brief description of the current DR program for which ADR Participants are eligible to enroll in:

1. **Peak Day Pricing (PDP)** - Peak Day Pricing (PDP) benefits Customers by reducing or shifting their energy usage away from the noon to six p.m. peak period during 9-15 PDP events per year. In exchange for participation, a customer's rates are discounted at all other times from May 1st - October 31st. DR events are called between May 1 and October 31 each year.

2. **Capacity Bidding Program (CBP)** - The Capacity Bidding Program (CBP) is a voluntary DR program that offers Customers monthly capacity reservation and energy payments when participants commit to and deliver load reductions on request. Customers enroll in CBP with an Aggregator, a third party demand response services provider. CBP provides flexibility for Customers to choose various options, such as day-ahead or day-of notification, within the program. The program has the penalties for load reduction non-compliance. DR events are called between May 1 and October 31 each year.

3. **Demand Bidding Program (DBP)** - The Demand Bidding Program pays Customers an incentive to reduce electric load when notified of a demand response event by PG&E. This is a relatively low-risk demand response program that allows Customers to submit load reduction "bids" for a DBP event, based on kW. DBP events are called on a day-ahead basis. For any event, Customers may elect to submit or not submit a bid. Customers who submit a bid can still choose to forgo reducing electric load on event day, without penalty. DR events can be called year round and can be called between 6 am and 10 pm.

4. **Aggregator Managed Portfolio (AMP)** – AMP is designed for third-party providers to deliver turn-key DR services directly to PG&E Customers. Customers enrolled by these providers are then aggregated as a portfolio to deliver demand reduction on an as requested basis by PG&E. Aggregators agree to provide a capacity reduction to PG&E via contracts. DR events are called between May 1 and October 31 each year.

The DR program that a Participant selects is considered 'committed' when the application package is approved and project incentives reserved (per section 2.6.5). The ADR Participant must complete DR program enrollment following ADR technology inspection and testing (per section 2.6.7). Participants may move between their committed DR program and another eligible DR program following participation in one full DR season, which may be up to 12 months from first incentive payment. Participants who switch out of their committed program before the first full DR season will be considered non-performing and forfeit their second incentive payment.

2.4.2. PARTICIPATION IN DEMAND RESPONSE EVENTS

Participants are expected to remain enrolled and participate for a total of 36 months following inspection and testing of ADR technology. Participants who de-enroll from the DR Program within 36 months will forfeit their incentive, including any incentive already paid to Participant. The calculated amount of the incentive refund is prorated based on remaining months of enrollment. Aggregators are responsible for ensuring that their ADR customers are informed and understand the 36 month minimum enrollment requirement, by notifying their ADR customers in writing when their ADR project is approved.

ADR Participants are expected to participate in all DR events that are called by PG&E for the respective DR program the customer is enrolled in (see section 2.3).

Aggregators are expected to nominate their Auto-DR customers for each DR event. All ADR participants are highly encouraged to participate in all DR events, and the customers enrolled in AMP and CBP should check with their aggregators to ensure their loads are nominated every month so they can participate in each AMP or CBP events. The second incentive payment (of up to 40%) of total eligible incentives is calculated based on actual DR participation over all events.

2.5 Program Organization

The ADR program is implemented by PG&E through third-party consultants. PG&E manages the contract and any change orders, works with the implementers and monitors their activities and progress against goals, and oversees program integration. PG&E also processes incentive requests, communicates with Customers about the ADR program, and reports on the program to the California Public Utilities Commission (CPUC).

Energy Solutions and ASWB Engineering were selected by PG&E to implement PG&E's ADR Program. Energy Solutions and ASWB Engineering are responsible for detailed program design; program marketing and promotion; identifying and recruiting participants; training technical and other program staff; providing technical and programmatic support to participants to secure program incentives; facilitating and monitoring the completion of ADR projects; conducting ongoing participant support to maximize DR event performance.

2.5.1. ADDITIONAL IMPLEMENTATION CONTRACTORS

PG&E has hired additional third-party contractors to provide operational management, implementation, and technical support. They include members of the Demand Response Research Center (DRRC) at Lawrence Berkeley National Laboratory (LBNL), who provide overall technical guidance and verify facility DR load shed calculations for the purposes of calculating participant incentive payments.

Honeywell/Akuacom provides the communications infrastructure for automated Participants. Honeywell/Akuacom hosts the DRAS software. It resolves technical issues relating to DRAS connectivity and operations at Participant sites, and interfaces through Itron and APX with PG&E systems for scheduling of DR events. Honeywell/Akuacom also maintains compliance with OpenADR Standards for the DRAS.

2.5.2. PROGRAM STAKEHOLDERS

The ADR Program is implemented through the coordinated efforts of stakeholders internal to PG&E and external parties, who interact on a regular basis with the Implementation Contractors. The most important internal stakeholders include the following:

- **Customer** - An eligible non-residential ratepayer who is applying for incentives through the Statewide Customized Offering.
- **Participant** – A Customer who has gone through the screening, audit, and enrollment process, whose project has been approved for program incentives.

- **DR Program Managers (PM)** – An entity that manages and coordinates program services, budget and other resources, including monitoring and reporting of performance goals. The PM is also responsible for developing program procedures and policies, managing contractors, and monitoring quality assurance.
- **Energy Solutions and Sales** – PG&E account managers who manage Customer and Participant relationships and promote DR programs. DR Program Managers are responsible for training ES&S reps and providing the marketing materials and tools needed to recruit Customers to enroll in the appropriate DR program.
- **Project Office** – PG&E department responsible for processing incentive payments to ADR participants.
- **DR Operations Team** – Team who calls events based on triggers such as forecasted weather, customer demand, and scheduled or available generation supply. The Operations Team establishes priorities for load reduction and determines which DR programs will be called to meet event load reduction targets.

The external stakeholders include, but are not limited to:

- **CPUC** – The CPUC monitors overall utility performance related to DR programs including budget performance and the effectiveness of programs in meeting load reduction targets.
- **Other California Utilities** – The ADR Program Managers attend statewide teleconferences and participate in other forums with the other California electric utilities to discuss DR program issues and learn about best practices to continuously improve program performance and Participant satisfaction.
- **California Independent System Operator (CAISO)** – The CAISO is responsible for managing the utility transmission system and issuing alerts during emergency conditions when load reductions are required.

2.6 ADR Implementation Process

The ADR Program delivers its services and incentives to Program Participants in a phased process designed to enhance the cost effectiveness of realized savings. The implementation process has three phases: Initial Setup, Verify Equipment Installation and Signal, and Performance. Within the three phases are a total of 11 milestones. The transfer of a specific deliverable between the Implementation Team and the Participant concludes each milestone. Participant Leads track milestone progress within each phase to ensure that projects move forward expeditiously. ADR Program staff requires that Participants complete certain milestones within a pre-determined time period in order to maintain their right to claim an incentive.

The ADR Team fosters the engagement of the PG&E ES&S representatives throughout the entire program process. Participant leads keep ES&S reps apprised of Participant progress throughout the process, and notify the representative if issues arise. The program process flow is described in the following section. A diagram of the program process flow is provided in the Appendix, section 6.3.

2.6.1. SCREENING AND ENROLLMENT

In the Screening and Enrollment milestone, the ADR Team collects information about the Customer and Customer facilities to help identify eligible Customers and projects. The ADR Team works closely with PG&E ES&S reps and the Interact tool, as well as speaking with Customers directly, to determine eligibility and interest.

Screening information gathered to determine eligibility includes, but is not limited to, the following:

- Valid electric SAID
- Prior participation in DR programs or new DR program enrollment eligibility
- Peak demand
- Facility size
- Interval meter data to assess availability of kW load for DR
- Customer willingness to curtail loads

The screening step is conducted in collaboration with trade allies where applicable, and PG&E ES&S reps, whose engagement is essential in obtaining Customer screening information. Potentially eligible Customers are contacted by the ADR Team through the ES&S reps whenever possible, and an initial call or meeting is scheduled to inform the Customer about the ADR program benefits and gather additional screening information as needed. Interval data is collected at this step to verify Customer's SAID and presence of electric. Electric data and other Customer information are collected by the ADR Team once Customer grants permission via the Customer Information Authorization Form.

If an in person meeting is scheduled, the Customer's ES&S rep is invited to attend. The purpose of the first meeting is to explain the ADR program to the Customer, clarify expectations, and determine if there is sufficient interest, load, energy management capability, and possible shed to justify moving forward in the program process. Customers are also given information on the DR programs that they are eligible for, in order to lay the ground work for DR program enrollment by the Installation and Commissioning milestone.

For these meetings, it is helpful if the Customer contact includes his/her facilities manager and other key decision makers in the meeting. Depending on the complexity of the Customer, the ADR Team member could also invite an existing Trade Ally, or a technical representative from LBNL to participate. First meetings are usually one to two hours in length. If the Customer is interested in ADR, has sufficient load, and appears to meet the technical eligibility requirements, the customer moves on to the next ADR milestone.

Deliverable: Customer Information Authorization Form and Program Enrollment Form (Customer to ADR Team)

2.6.2. FACILITY AUDIT

Activities performed by ADR Program staff during this phase will vary depending on the measure, and may involve a site visit by at least one member of the ADR Team staff for data collection. Energy efficiency project recommendations are included at the discretion of the Participant and ADR Team staff.

Customer Audit Reports generated by Trade Allies or Vendors may require a site visit by an ADR Team staff member on a case-by-case basis. **LBNL conducts final review of all audits.** All other requirements are the same as above.

Below is a guide for Vendors and Trade Allies preparing the Customer Audit Report, which consists of the following sections:

1. Cover Page identifying the Customer, title of the audit, and date completed.
2. Table of Contents listing page numbers for all sections and important subsections.
3. Introduction identifying the purpose of the Audit, Customer business and operations, and the overall extent of the Audit.
4. Executive Summary that includes brief descriptions of the DR systems analyzed, written detail of the proposed DR measure, a table of all applicable DR measures, and the PG&E DR program the customer is considering for enrollment.
5. Description of Scope of Work and eligible ADR measures to be installed.
6. Inventory of Customer equipment identifying major systems in use by the Customer.
7. List of the proposed DR Measures with a written description of the equipment along with the measure.
8. Calculations shall be provided for each measure and shall include detailed equations as well as existing nameplate and electrical data.
9. Table of Results showing all identified load reduction measures.
10. List of any potential energy efficiency measures. IDSM project must also provide a copy of the energy efficiency audit including estimated energy savings and costs.
11. Itemized budget for each measure.
12. Conclusions reviewing the effects of participating in DR.

Customer must also provide OpenADR 2.0 (A or B) certification documentation for ADR technology solution which can include directions to the OpenADR Alliance website that lists certified equipment.

Deliverable: Audit Report (ADR Team to Customer), Open ADR 2.0 certification documentation

2.6.3. AUDIT REPORT REVIEW AND EVALUATION

Following receipt of audit report or project proposal, the ADR Team staff conducts an engineering review of the submitted report. The objective of the review and evaluation is to verify the proposed DR strategies employed and validate the assumptions and accuracy of the engineering calculations in estimating the kW reduction from the proposed DR strategies in the audit report.

The ADR Team staff may submit questions to the Customer or the Vendor for further clarification or request additional information related to the audit report for follow up.

As mentioned in the beginning of Section 2, PG&E aims to maximize the reliability and consistency of kW enabled by ADR technologies. As such, PG&E wants the kW committed for projects receiving ADR incentives to be as realistically achievable as possible, and such that customers will participate consistently in as many DR events as possible. The ADR Team staff uses an analysis methodology that has been vetted with LBNL, often with buy-in from PG&E as well as SCE, particularly for common DR strategies. Using a consistent methodology ensures that similar projects within the portfolio are treated similarly, and thus fairly.

The adjusted kW follows from the audit report evaluation, and may be higher or lower than the initial kW proposed in the audit report. Findings of the technical review, along with the recommended kW reduction and associated ADR incentive, are then submitted to LBNL for final review. If a kW adjustment is made to the audit report, Participant Leads will notify the Customer and Vendor to discuss the findings and basis of the adjustments.

Deliverable: Audit report review and evaluation findings (ADR Team to Customer)

2.6.4. CUSTOMER DECISION

During the Decision milestone, the Participant Lead notifies the Customer of the audit report evaluation findings, including the original or the adjusted kW reduction, and amount of eligible incentives. The Customer decides which, if any, ADR measures he or she wishes to install. ADR Program staff provides support during the decision phase by providing any additional technical information required and/or providing information about similar installations at other facilities. Customer responds to Participant Lead in writing with the decision to implement one or more ADR projects.

Deliverable: Written notification of decision to pursue ADR measures (Customer to ADR Team)

2.6.5. INCENTIVE RESERVATION

In the Incentive Reservation milestone, PG&E reviews the application information and reserves the incentive funding. The incentive reservation is based on the approved kW from the review and evaluation of the Customer's audit report. The ADR Team may conduct a pre-inspection, which may be additional to prior audits and site visits conducted by the Customer's Vendor. ADR Team prepares and reviews for accuracy the forms listed below and then provides the following package to PG&E:

- Signed ADR Program Application
- Copy of written confirmation from customer to move forward
- ADR Summary Approved Measures List
- Audit Report
- Signed Energy Efficiency Program Application (deemed or customized) and submitted to PG&E, with estimated energy calculations (for IDSM projects), if available at time of ADR submission

PG&E reviews the reservation package and upon approval, processes the ADR application. PG&E enters the project information into MDSS. PG&E then assigns an application number, logs the project approval date, and emails the Incentive Reservation Confirmation email directly to the relevant ADR Program staff. At this point the incentive funding is reserved. Once the application is processed and the incentive is reserved, the Customer becomes a Program Participant. ADR Program staff notifies the customer and ES&S reprof of the incentive reservation via email and attaches the ADR Program Agreement. The Program Agreement outlines terms and conditions for participation in ADR. The Participant is then authorized to begin installation of their project.

If the incentive is not reserved due to Customer ineligibility, PG&E logs the rejected application date in MDSS and sends a Project Rejection email to the relevant ADR Program staff. The ADR program staff notifies the Customer in writing.

Note: Significant changes to the project scope after PG&E approves the ADR application may require a cancellation of the existing application and resubmission of the projects as a new application (see also Section 4.2.2). Customers also have the option of submitting a new application for the change only.

Deliverable: Email notification of incentive reservation and ADR Agreement (ADR Team to Participant)

2.6.6. PROJECT INSTALLATION AND COMMISSIONING

In this milestone, the Participant notifies the ADR Team of the date construction started and was completed. Prior to installation, the ADR Team is available to support the Participant's procurement process by providing specifications for use in solicitations and/or reviewing bids submitted to the Participant. The ADR Team may also facilitate the use of one or more bulk procurement methods to accelerate implementation timelines while containing costs and ensuring quality installations. During installation, the ADR Team is also available for technical support as site specific issues arise.

The Participant notifies the ADR Team in writing (email is acceptable) when the new equipment is installed, operational and commissioned. The Participant must also submit detailed invoices outlining labor and equipment. The ADR Team works with the Participant and relevant vendors to collect the required invoices. The vendor or Participant also reviews and completes the Installation Form, which describes the technical details of the installation including description of the VEN and location, DR load shed execution sequence, and bid mapping for DBP if applicable.

The invoices that the Participant submits must be of a sufficient level of detail or granularity to allow the ADR Team to verify the major equipment components installed during site inspection. The larger and more complex the project, the more detailed the invoicing documentation needs to be. Costs above \$5,000 must include itemized details. Please see Appendix 6.2 for additional invoice guidelines.

Deliverable: Installation Form (Participant to ADR Team); Invoices (Participant to ADR Team); written notification of project completion (Participant to ADR Team)

2.6.7. PROJECT INSPECTION

Once commissioning is complete, installed equipment is operational, and project invoices have been provided, an ADR Team member schedules an inspection and simulated DR event test with the Participant and facility site manager at a date convenient for the Participant. The entire inspection typically takes two to three hours. The timing of inspections—the time of day, day of the week, and season of the year—is set by the ADR Team so that the test event corresponds to an actual DR event as closely as possible. Test events are scheduled according to the following rules:

- Test event dates and times should be scheduled about 2 weeks in advance to allow preparation, and all invoices need to be delivered to the ADR Program staff at least 3 business days in advance of the test.
- Test events are scheduled for hours that are within the same time window as the enrolled DR program.
 - The only exception is for Agricultural Pump tests, which may be scheduled at other times of day.
- Test events for weather-dependent DR strategies are scheduled in the noon – 4 pm window so that indoor temperatures can be evaluated independently of any end-of-workday changes in occupancy or process load.
- Hot weather is best for testing weather-dependent loads, however this is not always possible and the ADR Program prioritizes timely testing and payment to PG&E customers. Test results from days with cooler weather are adjusted to compensate for the effects on load shed. At a minimum, a project with a space cooling DR strategy must be tested on a day where, under normal HVAC parameters, the cooling equipment is on and cooling is called for by the zones. The ADR Program will coordinate with the vendor and customer in advance of a scheduled test day where insufficient outdoor temperature is forecast.
- Test events for space cooling DR strategies are a minimum of two hours.
- Friday afternoon tests are not permitted for office buildings and other facilities where loads vary by day of the week.

Prior to the inspection, the ADR Team member goes over the expectations for the test with the Participant. During the project inspection, the following are verified:

1. All automation controls are located and verified for proper installation and connection to the related equipment. Photos are taken as applicable.
2. Pre-test site conditions are verified as applicable to the proposed measures (observations of foot-candles, temperatures, motor frequencies, etc. may be recorded as part of this verification).
3. For IDSM projects, the energy efficiency measure installation is also visually verified. Photos are taken as applicable.
4. The ADR Team member records the time the test initiates. Typical test duration is two hours as this is the minimum timeframe for participation in any DR program.

- If the test does not initiate, the ADR staff member works with the Participant to work out the source of the issue. A second test may be necessary.
 - It may, or may not be necessary for the ADR Team member to remain at the site for the duration of the test. Each test case is unique.
5. A second set of observations may be made during the test to verify site conditions resulting from the sequence of operations (the same observations as pre-test conditions apply). Photos are taken as applicable.
 6. The ADR staff member also takes note of any potential comfort or safety issues that might arise during the test (i.e. areas that are too dark, or too hot due to curtailed equipment).
 7. Once the second set of observations have been made, and there are no other potential issues due to the test, the Project Inspection may conclude. The ADR staff may or may not be present during the entire duration of the testing period. The observations made during the test are compared to interval data recorded during the test period to establish the site's verified load reduction.

The kW load reduction measured during the test event must be within 25% of the approved kW load shed calculated during the Audit Review and Evaluation Milestone. If the measured load reduction is outside of that window, the ADR Team will investigate into the cause of the discrepancy. If necessary, a second test may be scheduled. Otherwise, approved kW and reserved incentive may be adjusted appropriately.

Deliverables: Verification Report (ADR Team to PG&E); Incentive Recipient Certification of Contractor License and Permits Form (Participant to ADR Team).

2.6.8. FIRST INCENTIVE PAYMENT

The ADR Team works with PG&E to confirm the Participant is enrolled in an ADR eligible DR Program. Following confirmation of enrollment, the ADR Team provides the Installation and Verification Submittal Package to PG&E. PG&E authorizes and issues the first incentive payment following approval of the paperwork. The incentive check is mailed directly from PG&E to the Participant. The first payment amount is 60 percent of the calculated kW for the DR project, multiplied by the technology incentive category (STANDARD ADR, ADVANCED HVAC, or ADVANCED Lighting).

For IDSM projects, the first ADR incentive payment is contingent upon completed installation of the EE measure. For deemed efficiency projects, installation is verified during ADR site inspection and testing. For customized efficiency projects, installed measure(s) must be inspected and approved by the assigned PG&E EE project verification engineer.

Deliverable: First incentive payment (PG&E to Participant)

2.6.9. ONGOING PERFORMANCE MONITORING

During the subsequent DR season, the ADR Team operates the program, tracks DR event participation and performance based on kW load drop relative to an applicable DR program baseline, and maintains regular communication with the Participant to provide DR event performance feedback and help resolve any difficulties.

2.6.10. PROJECT EVALUATION

At the end of the first full DR season (usually May 1 – October 31) following project completion, the ADR Team conducts an evaluation of the Participant’s DR event performance to determine the amount of the second incentive payment. The ADR Team calculates the average kW reduction achieved, averaged across every hour of DR events called, for all events called in the season. The calculated performance for the second payment also includes any DR events for which Participants decided to opt out during the season.

The project completion milestone is set at the Installation and Verification approval date. Project evaluation is completed no more than 12 months following project completion.

Deliverable: Performance Evaluation Report (ADR Team to Participant)

2.6.11. SECOND INCENTIVE PAYMENT

The ADR Team provides PG&E with the Performance Evaluation Report for processing. PG&E authorizes and issues the second incentive payment following approval, and the incentive check is mailed directly to the incentive recipient. The second payment varies from 0 to 40 percent of the calculated kW for the DR project based on the Performance Evaluation Report, multiplied by the technology incentive category (STANDARD ADR, ADVANCED HVAC, or ADVANCED Lighting).

As noted in Section 2.3, Participants must reduce a minimum of 60 percent of the total calculated kW in the Audit report in order to be eligible for the second incentive payment. Participants are furthermore required to participate in one full DR season in order to be eligible for the second incentive payment. Thus, for Participants who complete installation, commissioning, and pass the load shed test before the first event of the DR season is called, they can receive their second payment the same year. If the Participant misses the first event, then it will be 12 months from date of passing the load shed test.

Deliverable: Second incentive payment (PG&E to Participant)

2.7 Program Forms and Documentation

Table 4 summarizes the program forms and documentation required for milestones in the program process described in section 2.6 above. Projects are not approved unless Customers provide all required forms and documents. Incentives are paid only when program documentation is complete and deemed satisfactory by PG&E.

Table 4. ADR Program Forms and Documentation

Project Milestone	Milestone Documentation
Screening and Enrollment	Application, Customer Data Authorization Form
Facility Audit	Audit Report and OpenADR 2.0 technology certification
Customer Decision	Written notification of decision
Incentive Reservation	Written notification of approval, ADR Agreement
Project Installation and Commissioning	Equipment and labor invoices; Written notification of project installation completion, Installation Form

Project Inspection	Verification Report, Incentive Recipient Certification of Contractor License and Permits Form
First Incentive Payment	Incentive check
Ongoing Performance Monitoring	Performance Reports
Project Evaluation	Performance Evaluation Report
Second Incentive Payment	Incentive check

In addition to ADR program forms, ADR Participants must enroll in a PG&E DR Program and participate in DR events for a minimum of three years. The ADR Team and PG&E ES&S reps will assist Participants with DR Program enrollment. Energy Efficiency projects are highly encouraged for ADR Participants. Participants are responsible for obtaining the PG&E efficiency incentives. The ADR Team provides limited assistance completing efficiency program documentation.

2.8 How to Apply

Interested Customers can call their ES&S representative, or ADR Participant Lead to begin the project screening process. Once eligibility has been confirmed, ADR Program staff assists the Customer with the completion of their application, as well as all program forms and requirements, and is available to answer specific program questions. The application process requires careful attention to detail. Incomplete or incorrect applications will be returned, so it is highly recommended that Customers follow the program instructions carefully.

PG&E Energy Solutions and Sales Representative:

1-800-468-4743

ADR Program Contacts:

Christine Riker
 Senior Project Manager
 Energy Solutions
 (510) 550-8513
pge-adr@energy-solution.com

Application forms and program contacts are also available on the PG&E ADR program website: www.pge-adr.com. Please check the website regularly for the latest updates to program policies, and remaining program incentives information.

3 Customer Services Management

3.1 Participant Leads

Each Participant is assigned a specific Participant Lead. Most Participant Leads are trained on providing technical audit and support to the Participant throughout the program process. The

Leads guide Participants through all aspects of enrollment and the delivery of all program services, from project identification to implementation and final incentive payment.

As the Participant's primary point of contact, Participant Leads facilitate timely information exchange and collaboration between Participants and their DR services providers with PG&E ES&S Reps, DR Program Managers, and installation contractors. They provide decision support to prospective participants to enroll in the program. Participant Leads track specific actions within each phase to ensure that projects move forward expeditiously. The ADR Program requires that Participants complete specific milestones within a pre-determined time period in order to maintain their right to claim a rebate. Additional roles and responsibilities of Participant Leads include:

- Scoping and analyzing projects;
- Coordinating with vendors responsible for project implementation;
- Supporting Participants through successful project installation, testing, verification, and incentives.

3.2 Responsibilities of Participating Customers

In order to facilitate timely implementation, participating Customers are expected to review and comply with all program rules, and submit a signed Program Application as a condition of receiving program services. By participating in the ADR Program, Customers are expected to provide the ADR Team with access to facilities and data, and demonstrate reasonable progress towards meeting program milestones.

3.3 Issues Resolution Procedure

The issue resolution procedure involves a series of escalation steps dependent on how long the issue has taken to be resolved.

1. Customer contacts their Customer Lead and explains the issue. Customer Lead responds within 24 hours.
2. Customer Lead documents issue including type, user, program, and details in the Project Tracking Tool. The Project Tracking Tool is always available to PG&E for review.
3. Customer Lead works with customer to resolve issue.
4. If issue is not resolved in 2 business days then the ADR Program Lead will be notified of the issue and will work with the Customer Lead to resolve the issue in a timely manner.
5. If issue is not resolved in 5 business days then the PG&E ADR PM will be notified of the issue and will work with the ADR Program Lead to resolve the issue in a timely manner.

4 Technical Services

Technical support for this program includes DR strategies identification and project scoping, site assessment, and technical and economic feasibility analyses. Implementation assistance provided to Participants includes support in obtaining PG&E approvals, development of bid specifications, reviewing contractor proposals, helping manage the selected installation contractors, attending post-installation project inspections, and site verification testing for quality control and savings verification. The Participant and ADR Team staff troubleshoot technical problems revealed following event days as they arise as part of DR program operations.

4.1 Audit Procedures

4.1.1. ADR REVIEW OF AUDITS

The ADR Team reviews audits performed by Vendor for acceptability of curtailment strategies, calculation of curtailment kW in accordance with ADR Program standards, and consistency with program policies. The ADR Program Audit Review document summarizing the ADR Team's findings is always provided to the Customer, and to the Vendor where applicable.

4.1.2. CUSTOMER AUDIT REPORTS

Vendors typically develop Customer Audit Reports for delivery to the Customer and the ADR Program. The recommended practice is for Vendors to share an electronic draft Audit Report with the ADR Team prior to presenting the project and ADR incentive applied for to the customer to confirm the kW calculation. For customers who are not working with a Vendor, the ADR Team may either perform the kW calculations and provide them in its Audit Review format, or perform a full investigation of ADR measures on-site and produce an Audit Report.

P R E S E N T A T I O N

The Customer Audit Report shall be presented in a professional format, including an accurate inventory defining all Customer equipment along with detailed descriptions of such equipment. This inventory shall list which pieces of equipment are applicable to DR and energy efficiency measures, and include photographs of equipment and nameplate data when available. Detailed calculations, including equations and results shall be presented in a comprehensive format to allow for a step by step validation of all DR measures evaluated. Calculations must be submitted for identified energy efficiency measures associated with IDSMS projects. Accurate and detailed descriptions of such energy efficiency measures shall be included with sufficient information to convey the specifics of each measure. Detailed calculations, including equations and results shall be presented in a comprehensive format to allow for a step by step validation of all energy efficiency measures evaluated for IDSMS projects.

P H O T O G R A P H S

When permitted by the Customer, photographs of major mechanical and electrical equipment, as well as equipment proposed for inclusion as DR measures shall be included in the Customer Audit Report. Legible photographs of nameplate data are also preferred. Descriptions of the contents of each photograph are required.

INVENTORY

Customer Audit Reports shall include an inventory of all major electrical and mechanical equipment and their respective loads and efficiencies, clearly identifying which equipment is a candidate for DR, which piece of equipment is a future candidate for energy efficiency measures, and which equipment has no potential for neither DR nor energy efficiency. The equipment schedule must indicate the load factors and sizes of each piece of equipment.

4.1.3. CUSTOMER AUDIT REPORT FORMAT

The Customer Audit Report shall be submitted in the format described below. Alternate formats are permissible, provided that all required information is included, and that, in the sole opinion of the utility, the report presents all information in a professional, presentation quality format suitable for delivery and discussion with the Customer by ADR Program staff. Any key energy efficiency opportunities, recommendations, and conclusions should also be included.

Cover Page: The Customer Audit Report shall begin with a cover page identifying the Customer, title of the audit, date completed, and the utility program to which the audit pertains. In addition, the cover page shall identify the contractor performing the Audit.

Table of Contents: A Table of Contents shall be included.

Introduction & Acknowledgements: A separate introduction shall be provided, identifying the purpose of the Audit, brief project history, description of Customer business and operations, and the overall extent of the Audit, as conducted. A brief description of the Audit process shall be included along with a brief description of the analyses performed and how the results have been obtained. Specific acknowledgements to Customer personnel who assisted the contractor in completing the audit shall be included in this section.

Executive Summary: The Executive Summary of the Customer Audit Report shall include brief descriptions of the DR systems analyzed, a written detail of the proposed DR measure, a table of all applicable DR measures, and the PG&E DR program the customer is considering for enrollment. A summary table listing the identified energy efficiency measures, where applicable, shall be included. A table of DR measures shall include equipment type, any Customer identification specific to that equipment, nameplate size, existing electrical demand, and the proposed demand reduction as a result of a DR event. This summary shall also include incentives available to the Customer for each measure identified. For each identified DR measure, the effects on Customer operation shall be documented and characterized in a clear manner, such that the Customer is aware of the ramifications on their operation for each proposed measure. This should be summarized at the account level, as well as at the measure level.

Inventory: As a separate section, an inventory of Customer equipment shall be as defined above. An inventory of external and internal electrical meters should be included. If the electric load is split among multiple PG&E electric accounts, the inventory should explain which equipment is served by which accounts by using the Service Agreement IDs (SAID).

Demand Response Measures: For each DR measure recommended, a written description of the equipment along with the measure shall be included in this section. Any modifications to existing control systems, new control points, equipment operation, or other methods of controlling and reducing demand during an event shall be characterized. Where modeling is used, any adjustments to actual energy consumption made in the model will be included. Requirements for energy simulations involving third-party software, and statements of assumptions and input model load profile to within 10% will also be included.

- **Calculations:** Calculations shall be provided for each measure, and shall include detailed equations, existing nameplate and electrical data, proposed nameplate and electrical data, and a summary table of the DR results. Calculations are required to follow a clear step by step approach indicating precisely how results were arrived at, and the methodology used. Facility schedule, shift work, and operational characteristics shall be considered on a daily and annual schedule as required for an accurate analysis. Calculations shall address incremental demand reduction for each measure.
- **Customer Specific Summer Baseline:** The Vendor should state the typical demand baseline, called the Customer Specific Summer Baseline (CSSB). The CSSB is defined as the average maximum demand during the DR period for summer business days, excluding weekends, holidays and other DR event days, and is the starting point for ADR Program calculations. Vendors must clearly state what demand they are using as a baseline and their source.
- **Table of Results:** A Table of Results, in tabular form at the end of this section, shall include all identified load reduction measures, identifying the equipment, proposed measure, existing kW load, proposed kW load, total kW reduction and the ADR Program incentive available.
- **Scope of Work:** A scope of work shall be provided along with an itemized budget, broken down for each measure.

Energy Efficiency Measures: From the inventory obtained during the Audit, this section shall identify the top potential energy efficiency measures, which will be required by the program for IDSM projects. For equipment that has the potential to save Customer energy on an ongoing basis, descriptions of the equipment, along with the proposed energy efficiency measures are to be outlined.

Conclusions: The final section of the Customer Audit Report shall include any conclusions drawn from the audit. Effects of participating in the utility DR program are to be outlined. The Financial benefits of preferred or recommended programs shall also be provided for the Customer. For energy efficiency measures, recommendations shall be reiterated, and conclusions regarding all energy efficiency measures provided.

Report Appendices: The Customer Audit Report shall include Appendices that clarify and support the Vendor's report findings and recommendations. This includes drawings or sketches, photographs, and other data that support the final recommendations.

4.2 Project Installation Services

The primary responsibility of the Participant Lead is to support Participants during installation to ensure timely completion of the installation milestone. Participant Leads provide limited support services during installation, including RFP and contractor bid review, and responses to program and technology related questions. The ADR Team will under no circumstances supervise, manage, direct, or otherwise control any construction or installation work, in connection with a project that receives a rebate from the ADR Program. The ADR Team will not purchase any equipment, material, or supplies intended for permanent incorporation into buildings or job sites as a part of a project that receives a financial rebate from the ADR Program.

4.2.1. WAIT FOR APPROVAL

As a general rule, actual project implementation should not begin until after the project application has been approved. However, sometimes based on special circumstances PG&E, at their discretion, may allow installation to begin immediately after any pre-installation inspection has been performed or waived. PG&E's pre-approval does not mean the application has been approved and will receive funding, but rather that proceeding with installation will not impair the chances for the application's approval. The Customer is to request this notification in writing from PG&E. "Installation" includes, but is not limited to, decommissioning and removal of existing equipment, demolition, facility alterations to prepare for new equipment, and installation of new equipment.

4.2.2. CHANGE IN PROJECT SCOPE

If the scope of the project changes substantially from what was identified in the project application review, the project must submit a new application. Substantial changes include significant modifications to the proposed equipment type, size, quantity, configuration, or the expansion of project to include additional retrofits. The revised project scope and supporting calculations are subject to an additional review and may require a new agreement prior to the removal of existing equipment/systems or the installation of the replacement equipment/systems. Exceptions may be granted as deemed reasonable by PG&E.

4.2.3. INSTALLATION DEADLINE

All projects must demonstrate reasonable progress towards completion of project installation. As described earlier, following project approval, funds are reserved for six months pending demonstration of active Participant progress towards meeting remaining project milestones. If PG&E determines a project is not making reasonable progress towards the project milestone of installation completion, the ADR Agreement is subject to cancellation. Extensions may be requested and granted at PG&E's discretion.

4.3 System Testing and Verification

A description of site inspection and equipment testing activities are described in Section 2.6.7. In addition to the project inspection, the following considerations are involved in the kW reduction verification process.

CONFIRMING LOAD SHED CALCULATIONS FROM SYSTEM TEST:

The following information is provided as guidance for understanding the process of determining the load reduction. Each situation is unique, and not all testing requires one or more of these methods. ADR Program staff examine all reasonable options when evaluating test results. Only utility revenue meter data can be used to confirm kW reductions resulting from a test event.

Calculation of load shed following site verification testing depends critically on the accuracy of the Customer baseline. The baseline is the hourly load that the Customer would have in the absence of a DR event, calculated from the previous 10 business days without any DR activity. The actual load during the DR event is subtracted from the calculated baseline for each hour, and the Program incentive is based on the average kW performance across each hour of every event called throughout the DR season. Each PG&E DR program has defined a baseline calculation methodology. During testing, the baseline can vary widely depending on conditions at the time of the testing as compared to typical summer daytime activity. The ADR Team accounts for this variability and make adjustments to baseline as appropriate to account for these seasonal variations.

The ADR Team defines a baseline calculation methodology for the purpose of determining the ADR Program incentives. The hourly CSSB (defined as the hourly summer average kW for summer weekdays, non-holidays, non-event days) can be used in conjunction with the 10-in-10 to help determine the Customer's weather dependent demand reduction for a test event. The 10-in-10 is determined using a 10-day rolling average energy usage profile of the immediate past 10 similar days prior to the test event. The 10-in-10 is calculated on an hourly basis from Noon to 6:00 PM using the average of the same hour for the past 10 similar days. The 10-in-10 includes Monday through Friday, excluding holidays, and additionally excludes days when the Customer was paid to reduce load on an interruptible or other curtailment program or when Customers were subject to rotating outages. The 10-in-10 may vary for each hour and for each event.

- Recorded Test Energy (RTE): The Recorded Test Energy (RTE) equals the actual recorded kWh/hour of the Customer's demand during a test event.
- Calculated Reduced Energy (CRE): The Calculated Reduced Energy (CRE) can be calculated as follows. CRE = (applicable baseline – RTE) adjustments can be made for seasonal load variations.
- Incentive Payment (IP): The Incentive Payment (IP) is based on the maximum CRE calculated during the test event, multiplied by the applicable incentive level per kWh/hour.
 - $IP = CRE * \text{applicable incentive level}$

The load shed test scheduling varies depending upon the timing of the installation of specific measures, availability of Customer processes and personnel, seasonal schedules, and the opportunity for the ADR Team to schedule the test at the Customer site. As such, the schedule of a test may occur during mild conditions or during the summer time. If a test is conducted during mild conditions when HVAC loads are low, the initial tests results are adjusted to account for reduced DR potential resulting from cooler weather. This adjustment can also be used for assessing variable, non-weather related, loads that are not accurately represented using the (applicable baseline – RTE) method. This determination is made on a case-by-case basis.

All loads are examined for their consistency to ensure that there has not been significant reduction in the available capacity (diminished load). In cases where diminished load is detected, the applicable baseline is adjusted to account for the diminished load.

The kW load reduction measured during the test event must be within 25% of the approved kW load shed calculated during the Audit Review and Evaluation Milestone. If the measured load reduction is outside of that window, the ADR Team will investigate into the cause of the discrepancy. If necessary, a second test may be scheduled. Otherwise, approved kW and reserved incentive may be adjusted appropriately.

The ADR Team may change the methodology if it fails to represent the actual loads. If the project fails the inspection and testing, PG&E may decline the application. PG&E may also assess a re-inspection fee if multiple site inspections are conducted.

5 ADR Program Operations

5.1 DRAS Connectivity Monitoring

As the primary communication contact for Participants, the ADR Team supports and coordinates with Honeywell/Akuacom in conducting continuous site testing to check for DRAS connectivity. The ADR Program team monitors DRAS connectivity to ensure that the DRAS server is functioning, that all Participants remain connected to the DRAS, and that event performance issues due to DRAS connectivity issues are promptly addressed.

5.1.1. CUSTOMER CONNECTIVITY AND NON-INVASIVE TESTING

The DRAS provides functionality to alert program participants of any loss of connectivity between the DRAS and a Participant's VEN. The ADR Team is included in the set of contacts receiving these notifications, and works directly with Participants to determine and correct the source of the connectivity issue. Sites that frequently lose connectivity are flagged for follow-up by phone, and technical staff is dispatched to troubleshoot issues which cannot be addressed remotely. Some sites may appear to have intermittent connectivity due to internal network configurations, and may actually be sufficiently connected despite the appearance of frequent brief outages. The ADR Team continuously monitors sites that appear intermittent, and adjusts the notification threshold in cases where connectivity is sufficient. Annual test events may also be issued to all existing sites and then to poll the DRAS to find any sites not responding to the pending event signal. To ensure the test is non-invasive to Participants, the event is cancelled before actually entering the "active" status.

5.1.2. EVENT-BASED TESTING

When the first event is issued in the new program cycle, the ADR Team follows up with any newly non-performing sites to troubleshoot and correct site configuration. In the case that no demand events occur in a given year, the ADR Team schedules a predefined set of three testing days and requires each site to sign up for a testing day of their choice. On each of these testing days, a two hour test event is issued by the DRAS, and performance statistics are gathered from InterAct and analyzed to determine event performance for all participants. The ADR Team addresses issues at non-performing sites either remotely or onsite, as appropriate to ensure future connectivity and performance.

5.2 Event Execution and Performance Validation

PG&E initiates events by notifying DR Program Participants through the DRAS. The ADR Team is available to assist if needed to ensure event notifications are received and that Participants are ready to respond. Following each DR event, the ADR Team conducts an assessment of participant performance.

The ADR Team sends a Participant Performance Report out to the Participants following each event after the event data has been processed and the event performance is calculated for all applicable Participants. The report documents each Participant's incentive status, including but not limited to number of events called, Participant's individual and average participation, and estimated final incentive calculations.

After the Participant has gone through a full DR season, the ADR Team develops a Final Performance Report for PG&E. Upon approval of the final report, PG&E sends the final Participant incentive payment (up to 40% of the total, adjusted for performance) to the Customer directly in the mail. Final Participant Incentives are paid one year following the initial 60% incentive date or after the completion of an entire summer DR season of event calls.

Table 5. Program Overview and Polices Revision Log: Reflects all policy and procedural changes that occur during respective program period

Revision	Date	Revision Notes
Original Release	2/19/2015	<p>First issue of 2015-2016 ADR Manual. Major changes from 2012-2014 ADR Manual:</p> <ul style="list-style-type: none"> Semi-ADR Projects are not eligible for an ADR incentive Added 2.2.4 - ADR Project DR Event Signaling Eligibility Section 2.2.5 Clarified content with regards to Cloud-based project eligibility Removed incentive budget caps per technology 2.4.2 Clarified that aggregators are expected to nominate ADR customers for each event and customers must enroll and participate in DR events for 36 months

6 Appendices

6.1 DR Strategies

The DRRC is a part of the California Energy Commission's Public Interest Energy Research (PIER) program and has been developing ADR as part of its PIER and utility-funded research efforts since the early 1990s. The DRRC has tested both the technologies and load shedding strategies they have developed as part of pilot programs in the PG&E service territory. The use of this technology is integrated with various existing utility DR programs, such as the peak day pricing program.

The DR control strategies adopted by the majority of commercial participants primarily affected HVAC and lighting loads. Industrial Customers typically adjust their process loads to accommodate the DR events. The types of control strategies that were adopted included the following:

- Global temperature adjustment: Existing energy management control systems (EMCS) were adjusted to receive the DR event signal from the DRAS. Once that signal was received, the EMCS would raise the setpoint temperature established by a Customer (usually in the range of two to eight degrees) for a period of time.
- HVAC equipment cycling: For buildings with multiple packaged HVAC systems, select units were configured to receive the DR event signal from the DRAS. Once that signal was received, compressor units were shut off for a subset of the building's systems during an acceptable period of time. Additional signals were then sent to restart those units and shut off other units.
- Other HVAC adjustments: Other HVAC shed strategies included decrease in duct pressures, auxiliary fan shutoff, pre-cooling, valve limits and boiler lockouts.
- Light shutoff or dimming: Various lighting circuits were wired to receive the DR event signal from the DRAS. When signaled, these loads would be tripped or dimmed for the entire duration of the DR event. Typically these were for lighting applications in common areas with sufficient natural light or for task applications that could accommodate full shutoff given the proximity of other lighting in the area.
- Other lighting and miscellaneous adjustments: Other shed strategies that were employed included bi-level lighting switches and motor/pump shutoff.
- Process adjustments: Given the varying nature of industrial processes, the strategy for each Customer was tailored to their particular process. The most common ADR strategy employed was modifying ancillary processes where there is sufficient storage capability such that the Customer can accommodate complete equipment shutdowns during DR events and catch up production later in the day or the following day.

6.2 Invoice Requirements: Checklist

The invoice at a minimum should include the following:

- Label clearly stating the document is an invoice
- Date of submittal
- Vendor contact name, job title, contact information and address
- Project Address (245 Market Street, San Francisco, CA 94105)
- Reference to PO number, with contract number below (IF AVAILABLE)
- Invoice #
- Page # of #
- Contract Summary - Contract value (Not to Exceed amount,) invoiced charges to date, plus contract or P.O. balance
- Labor cost detail - Itemized invoice consistent with the scope of contract and payment terms
- In-house labor - Include hourly or per unit rate (whichever applicable) consistent with the contract plus corresponding quantities and current charges, with dates and description of work performed
- Non In-house labor - Hours for each classification of work (management, programming, etc)
- Parts and Materials - Itemized invoice consistent with the scope of contract and payment terms
- Sub-Contractor invoices (if applicable)

Parts and Labor not covered by PGE:

- Leasing equipment
- PG&E metering charges: new meter, new meter equipment, KYX pulses, isolation relay and any on-going tariff charges
- Power monitoring equipment that collects data for performance analysis post-event or sub-metering
- Service contracts
- Recurring costs (ex. DSL lines)

6.3 Program Process Flow Diagram

PG&E ADR Application Process Flow

