




California ISO
Your Link to Power

Participating Load Technical Standard

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

REVISION HISTORY

REVISION NO.	DATE	DESCRIPTION
1.0	08/21/2000	Final Summer Load Standard V4
2.0	02/28/2001	Filename change, Summer 2000 references removed References for Supplemental Energy were changed Removed ModBus references Sections Revised: 1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 3.2, 4.1, 8.1, 7.4.3, Appendix 3.1 Section Added: 5
2.1	6/18/2001	Section 2.2 - Re-inserted "Timing for Non-Spinning Reserves" diagram
2.2	7/18/01	Reformat of document
6.0	8/1/2003	Update. Summary of Changes: 1. Section 1 "Introduction" - Clarified that Participating Loads may aggregate Loads, may self-provide Ancillary Services Schedules, and also provided notice that elimination of Replacement Reserve is under consideration in certain new ISO market design proposals. 2. Section 2 "Operational Requirements" - Clarified the specification of Scan Rates to ISO EMS Telemetry. 3. Section 4 "Telemetered Data Points List" - Clarified point requirements by inserting this new section. 4. Section 8 "Services and Scheduling" - Clarified that the maximum amount of Load allowed to be monitored by a DPG is 1100 MW. Of the total Load monitored by a DPG, no more than 400 MW can participate in ISO A/S markets. 5. Section 9 "Implementation" - Clarified implementation plan and Ancillary Services testing/certification requirements by adding links to additional information on the ISO Home Page. 6. "Appendix 1 - ISO Security Policy" - Deleted redundant detail, provided a link to the ISO Security Policy, and made conforming changes throughout the standard. The ISO Security Policy is now located centrally on the ISO Home Page for




 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

TABLE OF CONTENTS

Section	Title	Page
1. INTRODUCTION		1
1.1.	BACKGROUND	1
1.2.	DEFINITIONS	2
1.3.	REFERENCES.....	4
2. OPERATIONAL REQUIREMENTS.....		5
2.1.	GENERAL REQUIREMENTS	5
2.2.	SCAN RATES	5
2.2.1	Non-Spinning Reserve	5
2.2.2	Replacement Reserve	6
2.3.	VISIBILITY	7
3. ISO EMS TELEMETRY REQUIREMENTS		8
3.1.	OVERVIEW.....	8
3.2.	COMMUNICATIONS.....	9
4. TELEMETERED DATA POINTS LIST		11
4.1.	PARTICIPATING LOAD ANALOG VALUES	12
4.2.	PARTICIPATING LOAD DIGITAL VALUES	15
4.3.	SWITCHYARD VALUES	15
5. METERING INFRASTRUCTURE.....		20
5.1	OVERVIEW.....	20
5.2	METERING COMMUNICATION	21
5.3	ACCESS TO METER DATA - INDIVIDUAL LOADS OF PARTICIPATING LOADS.....	21
5.4	ACCESS TO METER DATA - AGGREGATED LOADS OF PARTICIPATING LOADS.....	21
5.4.1.	SC Metered Entity	22
5.5	COMPATIBLE METER DATA SERVER (CMDS)	22
5.5.1	CMDS Requirements	22
5.6	AGGREGATING LOAD METER DATA SERVER (ALMDS)	23
5.6.1.	ALMDS Requirements.....	23

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

6. AVAILABILITY & MAINTENANCE.....	25
6.1 ISO RELIABILITY REQUIREMENTS.....	25
6.2 MARKET AVAILABILITY REQUIREMENTS.....	25
6.3 DPG OPERATION AND MAINTENANCE.....	26
6.4 SOFTWARE CONFIGURATION AND MANAGEMENT.....	27
6.5 DATA BASE CONFIGURATION AND MANAGEMENT.....	28
6.6 DPG ROUTINE TESTING AND MAINTENANCE.....	30
7. SECURITY AND METER DATA VALIDATION	31
7.1 OVERVIEW.....	31
8. SERVICES AND SCHEDULING	32
8.1 SERVICES.....	32
8.1.1 Non-Spinning Reserve.....	32
8.1.2 Replacement Reserve.....	33
8.1.3 Supplemental Energy.....	33
8.2 SCHEDULING & BIDDING REQUIREMENTS.....	34
9. IMPLEMENTATION	37
9.1 OVERVIEW.....	37
9.2 CONTRACTUAL REQUIREMENTS – PARTICIPATING LOAD AGREEMENT (PLA).....	37
9.3 CONTRACTUAL REQUIREMENTS – METERING AGREEMENTS.....	37
9.4 CERTIFICATION OF SERVICES.....	38
9.4.1 Non-Spinning Reserve Requirements.....	38
9.4.2 Replacement Reserve Requirements.....	39
9.4.3 Supplemental Energy Requirements.....	40
9.5 IMPLEMENTATION PLAN.....	40
APPENDIX 1 - ISO SECURITY POLICY.....	42
1. SECURITY	42

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

1. INTRODUCTION

1.1. BACKGROUND

This document provides the standards required for Loads to participate as Participating Loads in the ISO Non-Spinning Reserve and Replacement Reserve Ancillary Services (A/S) markets, in the Supplemental Energy (SE) market, and in self-providing Ancillary Service Schedules.


Participation by Loads in ISO markets is implemented by means of the Participating Load Agreement (PLA) filed as part of ISO Tariff Amendment No. 17 and subsequently accepted by the Federal Energy Regulatory Commission (FERC). The objective of the Participating Load Agreement is to bind Loads participating in the ISO's SE and A/S markets and self-providing A/S to the ISO Tariff.

The ISO also filed tariff changes with the FERC in Amendment No. 17 to specify the conditions under which Loads subject to existing retail interruptible service arrangements may participate in the ISO's SE and A/S markets or self-provide A/S. Those conditions include: 1) authorization by the California Public Utilities Commission (CPUC) or other Local Regulatory Authority, and 2) mitigation of any incentives under the retail tariff to be unavailable or incapable when the ISO is relying on Demand reductions.

A variety of requirements apply to Loads that participate in the ISO's markets or self-provide A/S, including requirements related to aggregation if the maximum Demand available for curtailment for an individual Load is less than 1 MW, metering, scheduling, dispatching, and ISO EMS Telemetry, as well as contractual, certification and testing requirements.

Significant expansion of Load participation in the A/S markets or self-provision of A/S depends on the ability of Loads to aggregate and meet ISO requirements. For Aggregated Loads, particular issues arise with regard to communication requirements supporting ISO EMS Telemetry. The ISO EMS must obtain near real-time values from Participating Loads providing A/S in order for the ISO to continuously monitor the status, location and amount of reserves available to meet reliability criteria set by the Western Electricity Coordinating Council (WECC) and the North American Electric Reliability Council (NERC).

In addition, the ISO has filed with and had accepted by FERC ISO Tariff Amendments Nos. 29 and 35, which further address participation by Loads in the ISO's markets. FERC's order on Amendment No. 29 added ISO Tariff Section 2.2.16, which makes clear that Participating Loads must meet the standards for participation in the ISO's markets posted on the ISO Home Page, which includes

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date


compliance with the standards set forth herein. The ISO's compliance filing to comply with the FERC order regarding Amendment No. 29 added Section 2.5.26.6 to the ISO Tariff. ISO Tariff Section 2.5.26.6 incorporates "relaxed No-Pay" requirements applicable to settlements for Participating Loads. Amendment No. 35 extended the "relaxed No-Pay" requirements in Section 2.5.26.6 indefinitely.

Due to the nature of the requirements for Regulation and Spinning Reserve, Load participation is presently limited to the ISO's markets and self-provided Ancillary Service Schedules for Supplemental Energy, Non-Spinning Reserve, and Replacement Reserve. Elimination of Replacement Reserve is under consideration in certain new ISO market design proposals.


1.2. DEFINITIONS

Unless the context otherwise indicates, any word or expression defined in the Master Definitions Supplement, Appendix A to the ISO Tariff, and capitalized herein has the same meaning where used in this standard. In addition, the following words and expressions used in this standard with initial capitalization have the meanings set forth below:

1. Aggregated Loads: Multiple Loads represented by a Participating Load that meet ISO standards specified in this technical document, and that are approved by the ISO to schedule and bid Supplemental Energy and Ancillary Services as a single resource using some combination of individual Loads.
2. Aggregating Load Meter Data Server (ALMDS): A Meter Data acquisition and processing system which is capable of aggregating meter data for Loads for purposes of telemetry through a DPG to the ISO Energy Management System, within the parameters set forth in the ISO's standards for Participating Loads.
3. Compatible Meter Data Server (CMDS): A Meter Data acquisition system which is capable of passing Operational Data to either the ISO Energy Management System or the ALMDS, within the parameters set forth in the ISO's standards for Participating Loads. The term compatible meter data server (CMDS) is generic for a device or specific functionality of a revenue meter that establishes an interface between a revenue meter and a communications media. Fundamental to the functionality of the CMDS is that it must reliably present accurate measurement data to the host with which it communicates.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

4. Data Processing Gateway (DPG): A communication solution that transmits the required data from a Load or generating resource to the ISO with the appropriate protocol, security layer, and timing.
5. DNP 3.0: Distributed Network Protocol, Version 3.0, a data processing application that runs on master and remote devices and is used for data exchange. (See www.dnp.org for more information on this protocol.)
6. Energy Communications Network (ECN): The overall ISO digital network architecture comprised of multiple subnet, wide area, and local network segments.
7. Energy Management System (EMS) Telemetry: A process for measuring a quantity as a real time instantaneous value (amps, volts, MW, etc.) and transmitting the result via a communication system (leased line, radio, microwave, etc.) to a remote location for indication or recording.
8. KYZ output: A three-wire pulse output from a metering device to drive external control or recording equipment. Each pulse or transition represents a predetermined increment of power or other quantity.
9. ISO Certified Meter: One of a class of revenue metering devices that is capable of providing an interface for Operational Data.
10. Operational Data: Data (such as, but not limited to kV, MW, Mvar, status) collected at defined periods by ISO EMS Telemetry that is immediately available as instantaneous quantities, and not quantities averaged over time, for ISO system operator's use in determining system conditions.
11. Ramp Rate: The measured rate, expressed in MW per minute, of a Participating Load's ability to adjust its Demand.
12. Report by Exception: A data collection method that involves only retrieving data that has changed by predetermined parameters since the last scan period when the data was actually retrieved and is used to reduce the amount of data that must be retrieved during each scan.
13. Scan Rate: Predefined rate for receiving or sending data.
14. Secure Socket Layer (SSL): A security protocol that uses symmetrical and public key cryptography to secure communication over the Internet.


 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

15. Transmission Control Protocol / Internet Protocol (TCP / IP): IP is used at the network layer of the Objective Systems Integrators (OSI) stack for routing packets. TCP is used at the transport layer of the OSI stack and works with IP for packet routing.

16. X.509v3: Digital certificate public key format defined by the International Telecommunications Unit (ITU) X.509 Standard.

1.3. REFERENCES

- ISO Tariff
- Participating Load Agreement
- Meter Service Agreement for ISO Metered Entities
- Meter Service Agreement for Scheduling Coordinators
- Scheduling Coordinator Agreement
- ISO Dispatch Protocol
- ISO Metering Protocol
- ISO Metering Specification
- ISO Scheduling Protocol
- ISO Scheduling and Bids Protocol
- ISO Settlements and Billing Protocol

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

2. OPERATIONAL REQUIREMENTS

2.1. GENERAL REQUIREMENTS


Participating Loads must comply with all applicable requirements in the ISO Tariff. All Participating Loads that provide Non-Spinning Reserve or Replacement Reserve must provide ISO EMS Telemetry. Participating Loads which intend to participate only in the Supplemental Energy market are not presently required to provide any ISO EMS Telemetry. Participating Loads may employ an Aggregating Load Meter Data Server (ALMDS) to collect data from distributed Participating Load components for processing and transmission to the ISO through a Data Processing Gateway (DPG). For Participating Load components at the same site or clustered at discrete sites, it may be feasible to utilize the DPG to communicate directly to the Participating Load components. The exact implementation for providing ISO EMS Telemetry shall be at the discretion of the Participating Load provider, subject to approval by the ISO.

2.2. SCAN RATES

2.2.1 Non-Spinning Reserve

For Non-Spinning Reserve, ISO EMS Telemetry must be available on a four-second Scan Rate from the DPG to the ISO EMS. If an ALMDS is utilized, each meter behind the ALMDS must be polled no less frequently than once per minute. The ALMDS, if utilized, shall provide the aggregated Demand value to the DPG at no greater than one minute intervals. The aggregated Demand shall be updated after each individual meter is polled. This functional requirement is depicted in Figure 1.

An effective way to meet such requirement is by having a revenue meter capable of providing instantaneous Operational Data in four-second intervals if the meter is directly scanned by the DPG, or having a revenue meter capable of providing instantaneous Operational Data on a one-minute interval basis if the meter is scanned by the ALMDS. Subject to prior ISO approval, the ISO EMS Telemetry requirement can also be met using a device other than the revenue meter, in which case the revenue meter would not have to be capable of providing instantaneous data. All Load resources must have the capability to provide required data simultaneously to the ISO Control Center facilities located in Folsom and Alhambra.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

2.2.2 Replacement Reserve

ISO EMS Telemetry for Replacement Reserve must be available on a four second Scan Rate from the DPG to the ISO EMS. If an ALMDS is utilized, each meter behind the ALMDS must be polled no less frequently than once every five minutes. The ALMDS shall provide the aggregated Demand value to the DPG at no greater than one minute intervals. The aggregated Demand shall be updated after each individual meter is polled. This functional process is depicted in Figure 2.

An effective way to meet such requirement is by having a revenue meter capable of providing instantaneous Operational Data in four-second intervals if the meter is directly scanned by the DPG, or having a revenue meter capable of providing instantaneous Operational Data on a five-minute interval basis if the meter is scanned by the ALMDS. The ISO EMS Telemetry requirement can also be met using a device other than the revenue meter, in which case the revenue meter would not have to be capable of providing instantaneous data. All Load resources must have the capability to provide required data simultaneously to Folsom and Alhambra.

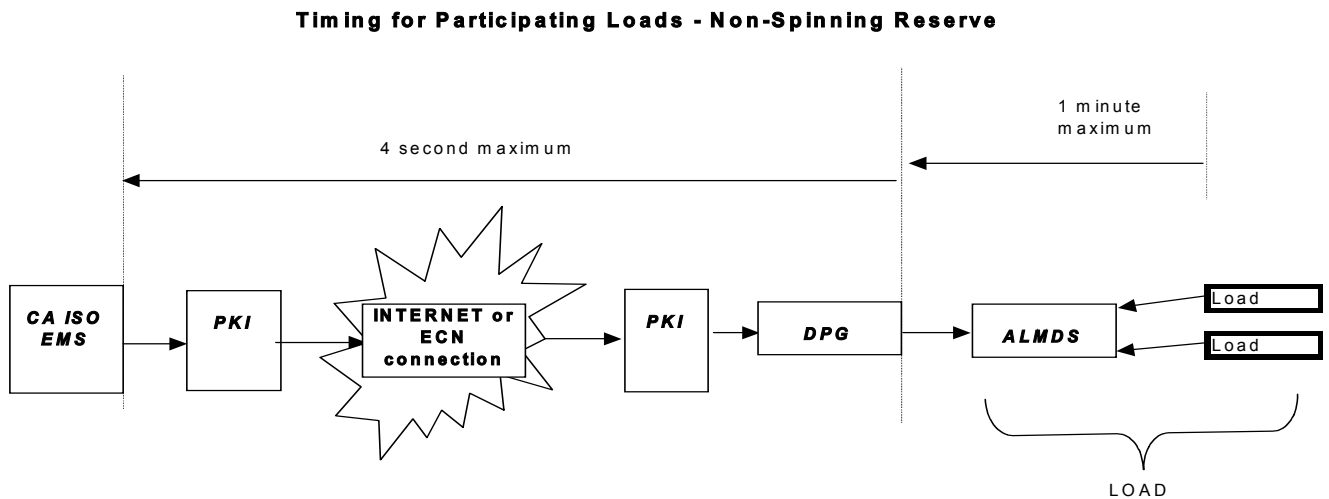



Figure 1

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	

Timing for Participating Loads - Replacement Reserve

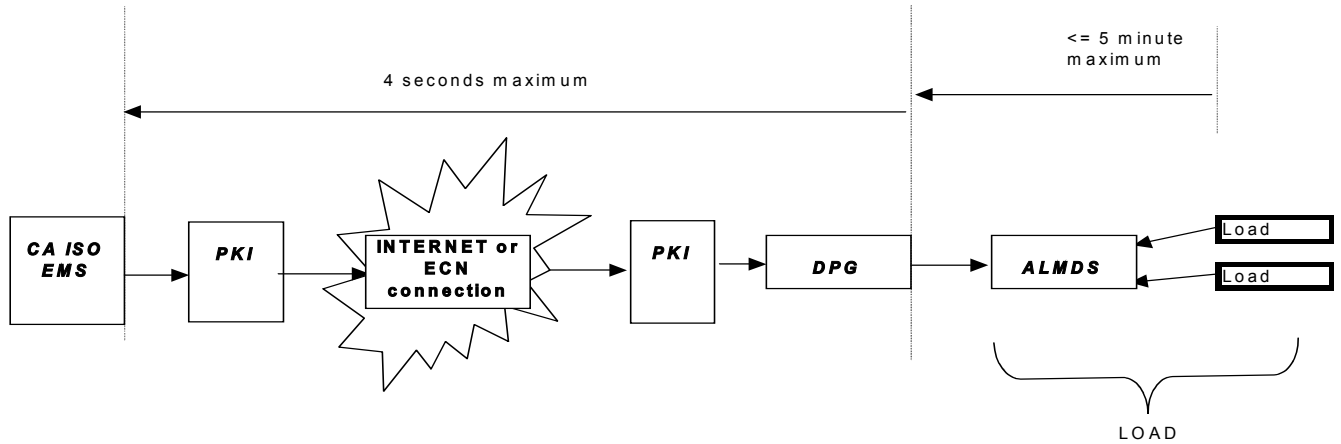


Figure 2

2.3. VISIBILITY

Participating Loads bidding Non-Spinning Reserve or Replacement Reserve must provide active ISO EMS Telemetry on a continuous basis. Non-Spinning Reserve and Replacement Reserve bids may be deemed invalid should loss of ISO EMS Telemetry occur during the time that a Load is called upon to participate in the ISO's Non-Spinning Reserve or Replacement Reserve markets. Participating Loads will not be allowed to bid into the ISO's Non-Spinning Reserve or Replacement Reserve markets during the time the ISO EMS Telemetry is out of service, even if meter data is accurate. The Scheduling Coordinator must make a Scheduling Logging for the ISO of California (SLIC) entry should loss of ISO EMS Telemetry occur.

Participating Load Operational Data will be directly communicated to the ISO Energy Management System via the public Internet or the ISO Energy Communications Network (ECN) connection through a DPG solution.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

3. ISO EMS TELEMETRY REQUIREMENTS

3.1. OVERVIEW


Figure 3 provides a high level overview of the Operational Data flows related to Participating Loads, either from Loads directly communicating with a DPG or from distributed Loads communicating through an ALMDS.

Referring to the left-hand side of Figure 3, the individual Load meters could be interfaced directly to a DPG that is extracting Operational Data and presenting it directly to the ISO Energy Management System. Such a scenario might exist where the Loads are all at a single site (e.g., pumping plant, industrial complex, etc.) and the DPG is installed at that site.

For distributed Aggregated Loads, the data can be presented from the Load to the ALMDS through any direct, dedicated (i.e., not dial-up) communication path as depicted on the right-hand side of Figure 3. After the data from each of the contributing Loads is presented to the ALMDS, the data is aggregated, stored and transmitted to the ISO EMS through a Data Processing Gateway with security (see Appendix 1). The ISO EMS Telemetry requirements for the Aggregated Load must be met, in the same manner as for individual Loads, through the entire data transfer process, from the Load to the ALMDS to the DPG to the ISO Energy Management System.

While the ISO will provide and maintain the ISO Energy Management System, the Participating Loads, the Load aggregators, and/or their Scheduling Coordinators (SCs) will be fully responsible for all other telemetering equipment, communications circuits, systems, and hardware required to provide Operational Data to the ISO Energy Management System.

In terms of performance, the SC will be responsible for assuring 1) the functionality of its entire telemetering system and 2) the integrity and accuracy of data telemetered to the ISO. To enforce this requirement, SCs must comply with ISO auditing requirements, and the ISO will have auditing rights similar to those applicable to SC metering systems.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

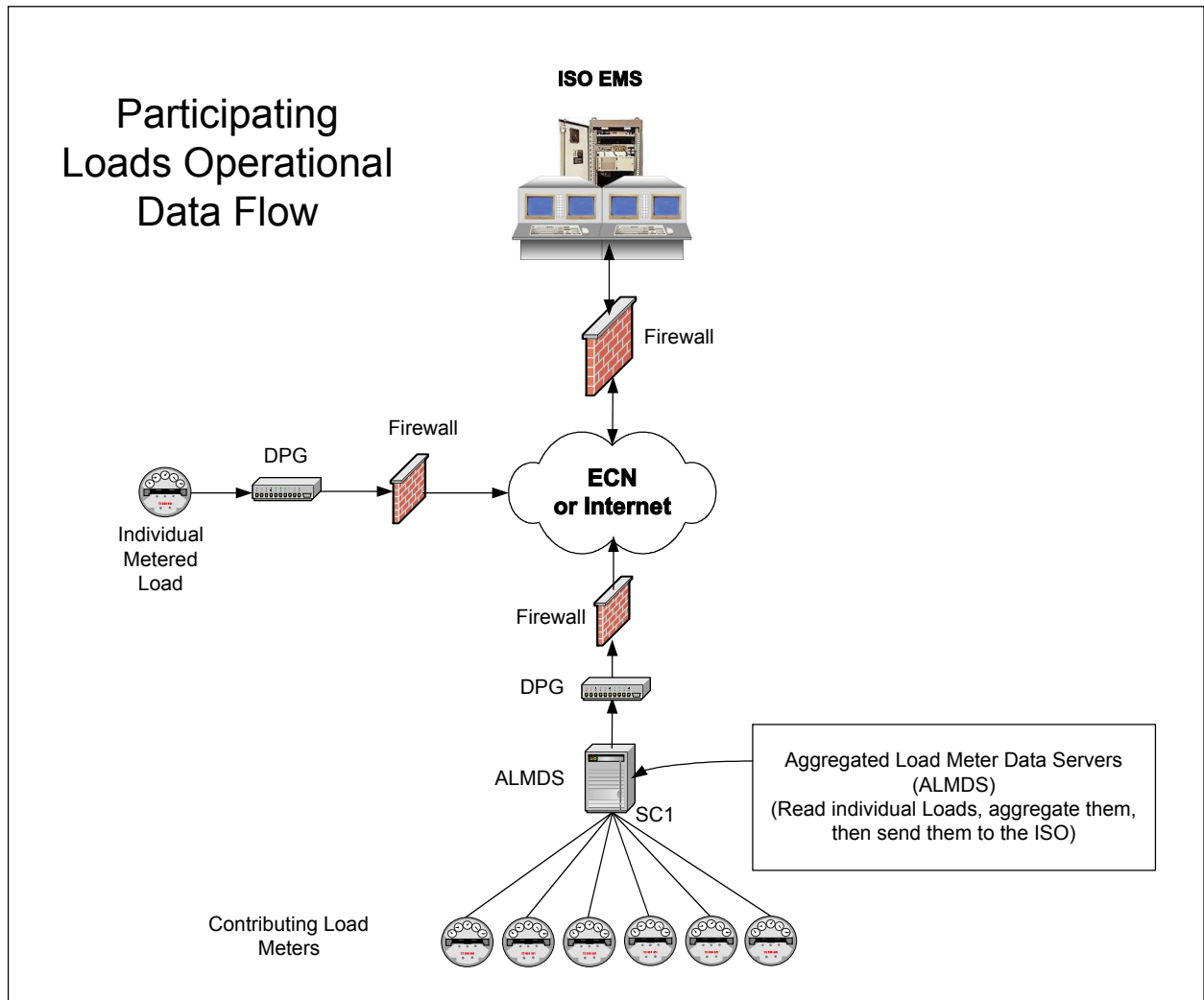



FIGURE 3.

3.2. COMMUNICATIONS


The ISO will allow communications to the ISO EMS either through the use of public communication infrastructures such as the Internet or through the ISO ECN from the Participating Load's DPG device. The ISO EMS will only accept the DNP 3 protocol.

Participating Loads' systems must comply with ISO Security Standards as

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
Participating Load Technical Standard		Print Date	2/26/2007
		Effective Date	8/1/2003

referred to in Appendix 1.

Participating Loads are responsible for dedicated remote site connectivity to the Internet via their ISP using T-1, 56k BRI, ISDN, HDSL, DSL, ADSL, Frame Relay (DSU/CSU) or other standard connections provided by Internet Service Providers.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

4. **TELEMETERED DATA POINTS LIST**


This section describes the minimum requirements for real-time¹ telemetry for Participating Loads and describes and identifies the specific points to be provided. The ISO Operations & Engineering groups have approved these requirements. They are the minimum standards that will allow the ISO to manage effectively the reliability of the electrical system. At any time, the ISO may require additional values to be telemetered to meet real-time requirements. Additional telemetered values that may be specified by the ISO are required if applicable. The ISO may allow some exemptions to these standards for Participating Loads with relatively small Loads where the ISO deems this is acceptable. Such exemptions will be handled on a case-by-case basis.

TELEMETERED DATA REQUIREMENTS

The telemetered data requirements for Participating Loads are established based on the type of service bid into the ISO's markets, the size of the Loads of the Participating Load, and the manner in which those Loads connect to the grid in the ISO Control Area. The general requirements are outlined in Section 2. The following specific requirements and data points apply to individual and Aggregated Loads participating in the ISO Non-Spinning Reserve and Replacement Reserve markets that are required to provide real time telemetry as outlined in Section 2.

- For distributed Aggregated Loads, Aggregated Loads at a single site, and individual Loads, and where the individual or Aggregated Load has a total Demand of less than 10 MW, the Participating Load is required to provide only Point of Delivery MW, Point of Delivery Mvar, Bus Voltage, and Connectivity Status data for the individual or Aggregated Loads, as applicable, to the ISO by means of ISO EMS Telemetry, as those data points are described below. The ISO may exercise its reasonable discretion with regard to Mvar and kV telemetry requirements where the data is not needed to support ISO network modeling or other ISO Controlled Grid operational requirements.
- For individual and Aggregated Loads at a single site (e.g., pumping plant, large industrial complex, etc.) and for distributed Aggregated Loads, where the individual or Aggregated Load has a Demand of 10 MW or more, the Participating Load is required to provide Point of Delivery MW, Point of Delivery Mvar, Bus Voltage, and Connectivity Status data for the individual or

¹ Timing requirements are described in Section 2.2 hereof.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

Aggregated Load and Gross MW, Gross Mvar, Bus Voltage, and Connectivity Status data for each individual Load or individual component of the aggregated Load to the ISO by means of ISO EMS Telemetry, as those data points are described below. The ISO may exercise its reasonable discretion with regard to these telemetry requirements for the individual Loads within an aggregate where the data granularity is not needed to support ISO network modeling requirements.

- For individual and Aggregated Loads at a single site (e.g., pumping plant, large industrial complex, etc.) connected to the high voltage transmission system (60 kV or above) where the Participating Load owns the associated transmission switchyard facilities, the Participating Load is required to provide the transmission switchyard line and transformer MW and Mvar data, the switchyard bus voltage, and the status of all switchyard switching devices, as those data points are described below, in addition to the data points specified above. The ISO may exercise its reasonable discretion with regard to these telemetry requirements for the individual telemetry points where the data granularity is not needed to support ISO network modeling requirements

4.1. PARTICIPATING LOAD ANALOG VALUES

- **Point of Delivery Real Power (POD MW)**

Definition:


This quantity is defined as the total Load (i.e. pump, motor, process Load, etc.) MW consumption at the point of delivery with the ISO Controlled Grid.

Purpose:

Point of Delivery MW is used to determine the ISO Control Area's non-conforming Load component and may be used as the "equivalent Load" take-out real power measurement value in the network model.

Methods of providing this value:

This value can be provided from the revenue meter if equipped to provide instantaneous measurement values, or from instrument devices at the site using accurate transducers. It must be a "real time" instantaneous value and not "averaged" over time.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

- **Point of Delivery Reactive Power (POD Mvar)**

Definition:

This quantity is defined as the total Load (i.e. pump, motor, process Load, etc.) Mvar consumption at the point of delivery with the ISO Controlled Grid.

Purpose:

Point of Delivery Mvars is used to determine the Control Area's non-conforming Load power factor and may be used as the "equivalent Load" take-out reactive power measurement in the network model.

Methods of providing this value:

This value can be provided from the revenue meter if equipped to provide instantaneous measurement values, or from instrument devices at the site using accurate transducers. It must be a "real time" instantaneous value and not "averaged" over time.

- **Gross Real Power (Gross MW)**

Definition:


This quantity is defined as the Load (i.e. pump, motor, process Load, etc.) MW consumption as measured at the terminals of the Load device.

Purpose:

Gross MW is used to identify the discrete Load device's real power consumption and is used as a measurement in the network model. This value is used in conjunction with the connectivity value to confirm connection of the Load device to the grid.

Methods of providing this value:

This value can be provided from a revenue meter connected at the terminals of the Load device if equipped to provide instantaneous measurement values, or from instrument devices at the site using accurate transducers. It must be a "real time" instantaneous value and not "averaged" over time.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

- **Gross Reactive Power (Gross Mvar)**

Definition:

This quantity is defined as the Load (i.e. pump, motor, process Load, etc.) Mvar consumption as measured at the terminals of the Load device.

Purpose:

Gross Mvar is used to identify the discrete Load device's reactive power consumption or production and to establish the Load device's power factor. It is used as a measurement in the network model.

Methods of providing this value:

This value can be provided from a revenue meter connected at the terminals of the Load device if equipped to provide instantaneous measurement values, or from instrument devices at the site using accurate transducers. It must be a "real time" instantaneous value and not "averaged" over time.

- **Bus Voltage (kV)**

Definition:


This quantity is defined as the operating voltage associated with the Participating Load. For Loads at a single site which are only required to be telemetered as an aggregate quantity, the bus voltage shall be the voltage as measured at the point of delivery with the ISO Controlled Grid. For Loads at a single site which are required to provide telemetered values for the individual Load components, the bus voltage shall be the voltage as measured at the terminals of the Load device. It must be a "real time" instantaneous value presented as a phase-to-phase voltage quantity.

Purpose:

The ISO uses bus voltage to determine each Participating Load's impact on system voltage as well as an indication of an individual Load component's connectivity. Bus voltage is critical as a measurement in the network model. This value is also useful in identifying voltage control issues, Mvar circulation problems, overall system voltage profiles, etc.

Methods of providing this value:

This value can be provided from a revenue meter connected at the appropriate point if equipped to provide instantaneous measurement values, or from instrument devices at the appropriate point using accurate transducers.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

4.2. PARTICIPATING LOAD DIGITAL VALUES

- **Connectivity Status (UCON)**

Definition:

The connectivity status represents the connection status to the grid of the Loads of the Participating Load (i.e. pump, motor, process Load, etc.).

Purpose:

The UCON value establishes the Participating Load's compliance with dispatch instructions and it provides a measurement in the network model to identify connection of the Load to the system.

Method of providing this value:

This value is calculated from the actual breaker status points of each Load of a Participating Load plus Load MWs or voltage greater than 1% (or other threshold determined by the ISO engineer). For aggregated Loads, this value is calculated from the breaker status and Load MWs for the individual Load components comprising the aggregate Load.

4.3. SWITCHYARD VALUES

The Participating Load may own some or all of the equipment and connection points associated with the interconnecting high voltage (60 kV or above) switchyard. Data from the high voltage switchyard must be communicated to the ISO through an ISO approved DPG for those switchyard devices and connection points. If the Participating Load owns other switchyard devices and existing IOU telemetry to the ISO is available for these devices (i.e. through an RTU), then this is an acceptable means of obtaining these values. However, the ISO Data Acquisition Engineer must agree with the specific methods.


- **Switchyard Line and Transformer MW and Mvar**

Definition:

The MW and Mvar flow quantities for the transmission lines and transformers in or connected to the switchyard.

Purpose:

These values allow for proper network model measurements and assessment of network topology and assist in troubleshooting data quality problems (i.e. sum of flows into and out of a bus). The MW and Mvar values are essential for modeling system restoration scenarios.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

Method of providing this value:

These values are obtained through typical transducer outputs from the line or transformer CT and PT devices or other such instrument devices connected to the line or transformer.

- **Switchyard Bus Voltage**

Definition:

This value is the high side voltage at the Participating Load’s switchyard bus.

Purpose:

The switchyard bus voltage is used as a measurement in the network model. It identifies voltage concerns and/or system-imposed limitations on reactive support. The ISO also uses it in identifying data quality issues such as “bad” PT readings.

Method of providing this value:

This value is provided from transducers or other instrument devices connected to the bus PT devices.

- **Switchyard Status**

Definition:

The breaker and/or Motor Operated Disconnect (MOD) status for each Load, line, bus, and transformer breaker in the Participating Load’s switchyard.

Purpose:


These values are used in determining network topology in the network model. They are needed for system restoration and outage information. In some arrangements, they may be the basis for forming unit connectivity.

Method of providing this value:

These values are direct measurements from switchyard devices and may be obtained through existing RTUs owned by the IOU and located in the switchyard. The breaker status for each Load of the Participating Load must be communicated to the ISO through an ISO approved DPG. If the Participating Load owns other switchyard devices and existing IOU telemetry to the ISO is available for these devices (i.e. through an RTU), then this is an acceptable means of obtaining these values. However, the ISO Data Acquisition Engineer must agree with the specific methods. The

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
Participating Load Technical Standard	Print Date	2/26/2007	
	Effective Date	8/1/2003	


Participating Load is ultimately responsible to ensure these values are provided at all times.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date


Participating Load Point Requirements

Analog	Data Point	Units	Notes
Participating Load Unit (Pump, Motor, etc)			
Per Unit/Device Basis	POD Real Power *	MW	
Per Unit/Device Basis	POD Reactive Power *	Mvar	
Per Connected Bus	Bus Voltage	kV	
	DPG Heartbeat **	CNT	
	* ISO requires telemetry values to be direct measurements unless otherwise specified by the ISO.		
	** DPG Heartbeat is an analog value that increments from 0 to 100 (one increment each second). The value is used to calculate connectivity from the DPG through to the ISO EMS and is supplied by the DPG vendor.		

Digital	Data Point	Units	Status Indication (Point Binary Logic)	
Participating Load Unit (Pump, Motor, etc)	On per Unit Basis		0	1
	Connectivity Status (UCON) ***		Off	On
RIG/DPG (Supplied by the Vendor)	RIG/DPG Status Connection. This value represents the status of separate connections to the RIG/DPG device. If a "field side" port connection is lost, all data associated with this point is flagged as bad data quality.		Normal	Alarm
	*** This value is calculated from Load breaker status plus MW or kV > 1% (or other threshold agreed to by ISO).			

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

Switchyard Values**		Units	Status Indication (Point Binary Logic)	
Load / Station or Device	On per Unit Basis		0	1
Per Line	Line Real Power	MW		
	Line Reactive Power	Mvar		
Per Connected Bus	Bus Voltage	kV		
Per Connected Transformer	Transformer Real Power	MW		
	Transformer Reactive Power	Mvar		
Breaker Status	Load Breaker Status*		Open	Closed
	Line Breaker Status		Open	Closed
	Transformer Breaker Status		Open	Closed
Other breaker status may be required (bus, transformer, bank, etc.).				
<p>* Load Breaker(s) Status is required from each Load of the Participating Load via the DPG regardless of other telemetry requirements.</p> <p>** Switchyard analog and digital points are required for that part of the switchyard that is owned by the Participating Load. With the exception of the Participating Load's Load breaker(s), these values must have visibility to the ISO either through the existing IOU connection (i.e. RTU) or through the Participating Load's field DPG. Each switchyard configuration may have different required values to be determined by the Data Acquisition Engineer and Operations Engineering at the ISO. The Participating Load is ultimately responsible to ensure these values are provided at all times.</p>				

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

5. METERING INFRASTRUCTURE


5.1 OVERVIEW

Participating Loads and their SCs must ensure that revenue Meter Data is made available to the ISO revenue Meter Data Acquisition System (MDAS) in accordance with the ISO Tariff and the ISO Metering Protocol. The specific requirements for ISO Metered Entities and details regarding the ISO Certified Meter, including the ISO's standards for the certification of a "Load-only" meter, can be found in the ISO Metering section on the ISO Home Page at www.caiso.com.

For all Loads of Participating Loads, Sections 2.2.3 and 2.3.4 of the Metering Protocol of the ISO Tariff require that revenue Meter Data must be recorded and submitted at 5-minute intervals for purposes of financial settlements. Pursuant to that requirement, ordinarily all Loads participating in ISO markets, including A/S and SE markets, must have revenue quality metering equipment that records data at intervals no longer than five minutes. Settlement for A/S and SE provided by Participating Loads will be based on SQMD prepared by the ISO in the case of ISO Metered Entities and by the SC in the case of SC Metered Entities. Operational Data obtained through ISO EMS Telemetry will be used to validate SQMD, but will not be used for financial settlement purposes. Discrepancies, if any, related to a difference between the ISO settlement interval and the retail meter data storage interval must be resolved at the direction of the ISO.

ISO Metered Loads of Participating Loads - Participating Loads that are ISO Metered Entities are required to obtain, install and have inspected ISO Certified Meters as outlined in the ISO Metering Protocol. ISO Certified Meters are listed on the ISO Home Page. The ISO may allow a temporary exemption for existing revenue quality interval meters that meet the requirements of the ANSI C12.20-1997 meter standards, and can generate all required Operational Data and communicate with the ISO MDAS through the ECN.

Aggregated Loads of Participating Loads - Each individual contributing Load of a Participating Load must have a certified interval meter based on the relevant Local Regulatory Authority requirements. The revenue Meter Data must be provided to the ISO as SQMD at no longer than 5-minute intervals. If the ALMDS is polling interval values to be used for contributing to aggregated ISO EMS Telemetry values, the meter must be programmed to record intervals no greater than 1 minute.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

5.2 METERING COMMUNICATION

Individual Loads of Participating Loads - ISO Metered Entities will, in accordance with the ISO Tariff and ISO Metering Protocol, use the ECN to interface directly with ISO MDAS. Meter Data will be collected regularly by ISO MDAS and Meter Data may be collected on demand.

Aggregated Loads of Participating Loads - For Settlement Quality Meter Data the SC must submit the aggregated values to MDAS when required by the ISO Payment Calendar (presently T+45 calendar days).

5.3 ACCESS TO METER DATA - INDIVIDUAL LOADS OF PARTICIPATING LOADS

The ISO, in accordance with the ISO Tariff and ISO Metering Protocol, will have complete access to the Meter Data of ISO Metered Entities recorded by the ISO Certified Meter.

Individual Loads of Participating Loads must comply with the security requirements as presented in ISO Metering Protocol Section 9.


5.4 ACCESS TO METER DATA - AGGREGATED LOADS OF PARTICIPATING LOADS

The SC is responsible for submitting SQMD for the Aggregated Loads of Participating Loads that it represents. The SC shall provide, in the format prescribed by Schedule 1 of the PLA and the implementation plan of the Participating Load, the required information with respect to the meters for all SC Metered Entities it represents in the aggregated ALMDS.

The SC, upon request, must provide the ISO with the meter reads for the individual SC Metered Entities represented and any substitution routines used in the aggregated Meter Data produced by the ALMDS.

The Participating Load and the SC shall ensure that the ISO will have access to the entire metering facilities of the individual SC Metered Entity as well as the ALMDS facilities that it represents in order to inspect, test, or otherwise audit those metering facilities.

The SC shall apply the security and validation procedures prescribed by the California Public Utilities Commission (CPUC) or other relevant Local Regulatory

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

Authority to the meter data of the SC Metered Entities that it represents. If the relevant Local Regulatory Authority has not prescribed any such procedures, the SC shall apply the procedures set forth in the ISO Metering Protocol.

5.4.1. SC Metered Entity

SC Metered Entities participating as part of Aggregated Loads may use any revenue quality interval meter that meets the standards of and is approved by the CPUC or a Local Regulatory Authority for direct access use, and that meets all other applicable ISO requirements:


- SCs must provide their Settlement Quality Meter Data (SQMD) on a 5-minute interval basis.
- SCs will be responsible for providing the ISO with SQMD for all Loads that they represent at the same granularity as scheduled.
- Individual contributor Load data that comprises aggregated SQMD must be readily available to the ISO for audit and review.
- Aggregated Loads will be treated like any other SC Metered Entity for purposes of financial settlements.
- SCs must ensure that validation, editing, and estimation are completed, and SQMD is provided to the ISO within the required schedule. SCs must also use the established mechanisms for data exchange, and must comply with all other applicable requirements in the ISO Tariff and ISO Metering Protocol.

5.5 COMPATIBLE METER DATA SERVER (CMDS)

A Participating Load may use a CMDS to either communicate Operational Data from an individual Load to the ISO Energy Management System or from an Aggregated Load to the ALMDS for aggregation with other Participating Loads. The ALMDS may be used to communicate the Operational Data to the ISO Energy Management System.

5.5.1 CMDS Requirements

Auditable procedures must be in place and periodically tested to assure the proper functioning of the CMDS. The integrity of the Operational Data

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

needs to be maintained from the meter until it is processed and sent by the CMDS.

The CMDS must provide raw, unedited Operational Data to either the ISO Energy Management System or the ALMDS. No Validation, Editing and Estimation (VEE) may occur in the CMDS, except that with Aggregated Loads substitution may occur, in accordance with substitution standards if specified by the ISO and posted on the ISO Home Page.

The CMDS must have access control measures in place. Access controls on the server should be implemented to prevent unauthorized or inadvertent access to the CMDS. A record will be available that documents who has access to the CMDS and who can authorize access.

If the CMDS becomes unavailable, the responsible SC must be notified immediately and take the appropriate action.

The CMDS must be available for audit by the ISO

Configuration control must be maintained for the CMDS. The ISO requires documentation including, but not limited to, the following: equipment manufacturer, model, other vendor information, system software manuals, firmware or software version, revisions, system design documents, design changes, and modifications.


5.6 AGGREGATING LOAD METER DATA SERVER (ALMDS)

An ALMDS will collect and combine Operational Data for Aggregated Loads or individual Loads. Aggregated data will be transmitted to the ISO Energy Management System via the Internet or ECN.

5.6.1. ALMDS Requirements

The ALMDS must provide raw, unedited Operational Data to the ISO Energy Management System. No validation, editing and estimation (VEE) may occur in the ALMDS. Load data can be substituted in accordance with the ISO substitution standards.

The ALMDS must have access control measures in place. Access controls on the server should be implemented to prevent unauthorized or inadvertent access to the ALMDS. A record should be available to document who has access to the ALMDS and who can authorize access.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

If the ALMDS becomes unavailable, the responsible SC must be automatically provided the status of communications and data quality failures. The ISO must be automatically provided status of communications and data quality failures by telemetry.


There must be a documented control process for acquiring the Operational Data from the CMDS. Auditable procedures must be in place and periodically tested to assure the proper functioning of the controls. The integrity of the Operational Data needs to be maintained from the CMDS until it is processed and sent by the ALMDS.

The ALMDS must provide to the ISO Energy Management System aggregated Operational Data for Participating Loads. This data must be available continuously to the ISO EMS for the calendar day in which they submitted a bid in the market, whether accepted or not.

The ALMDS must record all error events associated with data acquisition and aggregation and make those records available to ISO for review. The format of the log should be provided in the implementation plan for the Participating Load.

The ALMDS shall retain all individual contributor data that contributes to the aggregated values for a period of no less than 45 days and that information must be available to be provided to the ISO on demand.

The ALMDS must be available for audit by the ISO.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

6. AVAILABILITY & MAINTENANCE

6.1 ISO RELIABILITY REQUIREMENTS

The Participating Load shall be responsible for maintaining the availability of the DPG device and all plant interface systems. The Participating Load shall also be responsible for maintaining DPG device communications access to the ECN and/or the Internet.

The DPG device (including all parts thereof) is and will at all times remain the property of the Participating Load. Risk of loss, theft or damage of the DPG device will be the responsibility of the Participating Load.

A Participating Load will be solely responsible for the cost to prepare and maintain the site at which a DPG device will be installed. The Participating Load will also be solely responsible for the cost of engineering, installation, operation, and maintenance of that DPG device and all other activities associated with the installation, operation, and maintenance of that DPG device. The ISO will provide support as described herein to ensure that the DPG device properly interfaces with the ISO EMS.


The local communications access circuit generally represents the highest risk to plant interface availability. The ISO's minimum circuit requirement is a single dedicated Private Line, Frame Relay or ISDN ECN access circuit or a single Private Line, Frame Relay, DSL, or ISDN Internet access circuit. Redundant ECN or Internet access circuits are recommended.

Communications provider service level agreements establish an availability target of 99.0 percent for a single ECN access circuit. Implementation of a second ECN access circuit (optional) increases the availability target to 99.9 percent.

It is the Participating Load's responsibility to procure Internet services through a reliable provider. The ISO recommends that Participating Loads procure services through a Tier 1 Internet Service Provider (ISP).

6.2 MARKET AVAILABILITY REQUIREMENTS

A Participating Load will be solely responsible for all costs and other consequences associated with the unavailability of the DPG device and/or the inability of the DPG device to communicate with the ISO, including any financial consequences pursuant to the terms of the ISO Tariff. Such failure may result in

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

penalties for failure to perform in accordance with the terms of the ISO Tariff section 2.5.26 and other provisions of the ISO Tariff as it may be changed from time to time. Additional penalties may include, but not be limited to, an uninstructed deviation penalty. Additionally, the Participating Load’s certification to provide Ancillary Services may be affected in accordance with the provisions of ASRP 9-11 of the Ancillary Services Requirements Protocol and other provisions of the ISO Tariff.

If any operational function of the DPG device is unavailable for any reason other than a failure of (i) equipment indicated by the Operations and Maintenance Boundaries diagram as falling under the Operational and Maintenance responsibility of the ISO or the communications provider in the case where the Participating Load has selected the ECN for connectivity to the ISO or (ii) equipment indicated by the Operations and Maintenance Boundaries diagram as falling under the Operational and Maintenance responsibility of the ISO in the case where the Participating Load has selected the Internet for connectivity to the ISO, the Participating Load will not be permitted to participate in the ISO market affected by the DPG device outage.

6.3 DPG OPERATION AND MAINTENANCE

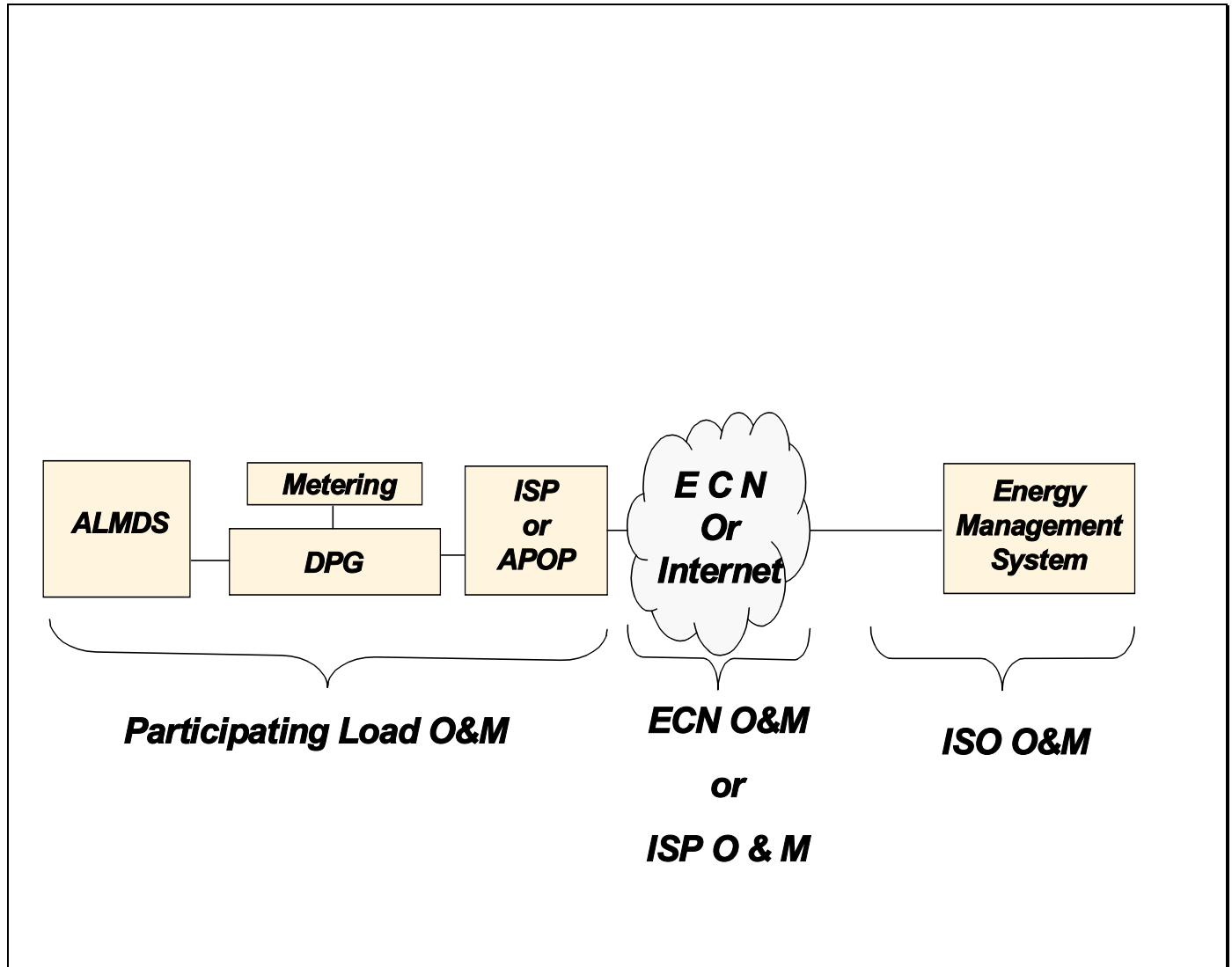
The Participating Load is responsible for all activities associated with the operation and maintenance of the DPG. The purpose of this section is to describe the notification and interface requirements for the following activities.

- Software Upgrades
- Data Base Revisions
- Routine Testing/Maintenance

The diagram below illustrates the boundaries of responsibility for maintenance of the system from the ISO to the Participating Load. Sections of the system are illustrated with responsibility assigned to either the ISO or the Participating Load. The ISO is responsible for the maintenance of the ISO systems such as the EMS and the SCADA equipment interfacing to the ECN or the Internet. The communications provider has responsibility for maintaining the ECN through contract to the ISO. The ISO as the organization securing the services of the communications provider to provide the ECN has accountability for the maintenance of the ECN. If the Internet is chosen as the method of connectivity then the Internet Service Provider (ISP) has the responsibility for operating and maintaining the ISP network. The Participating Load as the organization securing the services of the ISP has accountability for the ISP service as well.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date


Finally, the Participating Load has the responsibility of operating and maintaining the ALMDS and/or meters and the DPG.



Operation And Maintenance Boundaries

6.4 SOFTWARE CONFIGURATION AND MANAGEMENT

The intent of the following requirements is to provide a notification and approval process for the installation of software upgrades requested by a Participating

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

Load or required by the ISO, based on the understanding that overall functionality of the system must be ensured through consistency of software and software upgrades.


Each Participating Load must safeguard the DPG system software and treat it as its own confidential business property, but in no event may it use less than reasonable care to protect the confidentiality of the DPG system software. Each Participating Load must ensure: (i) that neither it nor any person having access to the DPG system or the DPG device will attempt to modify or reverse engineer the DPG system software, and (ii) that it takes reasonable steps to ensure that all persons having access to the DPG system or the DPG device will observe the Participating Load's obligations relating to the DPG system.

The Participating Load may at times require a software upgrade from the DPG vendor. In order to maintain operation of ISO systems at the Folsom and Alhambra facilities, the ISO requires prior notification and approval of all software upgrades to the DPG devices. The Participating Load shall notify the ISO at least 30 days prior to any software installation. The Participating Load shall submit a software installation approval request that clearly states the proposed software upgrade, including the revision and installation date. Should the ISO approve the software installation request, the Participating Load shall adhere to the requirements contained in Section 6.6 hereof during the installation of the new software and, if necessary, other Participating Loads will be required to make similar upgrades pursuant to this section. The Participating Load shall notify the ISO following successful installation of the software upgrade.

The ISO may make modifications to the ISO systems functionality, software, or database. The ISO will use reasonable efforts to notify each affected Participating Load thirty (30) days in advance of any such modification and to provide a detailed explanation of the modifications that will be made. In such event, the Participating Load will be responsible for making any necessary conforming changes to the DPG device to maintain the interface with the DPG system. In the event that changes are required to the DPG devices of multiple Participating Loads, the ISO will work with all affected Participating Loads to stage the work, such that no Participating Load will be impacted in its ability to provide Non-Spinning and Replacement Reserve services due to the unavailability of the human resources required to accomplish the changes. No such modifications may compromise the Participating Load's right or ability to restrict access to information associated with the Participating Load's ALMDS.

6.5 DATA BASE CONFIGURATION AND MANAGEMENT

The intent of the following requirements is to provide a process for DPG device


 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

database changes.

The ISO maintains a database for each DPG device that contains the Load data points. The DPG device database may also contain additional data as required for mapping to the ISO Energy Management System (EMS). In order to maintain operation of the EMS, the ISO requires prior notification and approval of all revisions to the DPG device database. A Participating Load may make modifications to its DPG device to support its operations, including the addition of data input/output points, which may not be made available to the ISO. A Participating Load may also add or replace hardware, as required to accomplish the Participating Load's purposes, provided that the Participating Load coordinates any modification of the DPG device database with the ISO. The Participating Load will be solely responsible for all costs and other consequences associated with the performance and/or unavailability of the DPG device and/or the inability of the DPG device to communicate with the ISO EMS, including any financial consequences pursuant to the terms of the ISO Tariff, as a result of any such modifications. The Participating Load shall notify the ISO at least 30 days prior to any database revision. The Participating Load shall submit a database revision approval request that clearly states the proposed database changes, including the revision and installation date. Following ISO approval of the database revision request, the Participating Load shall adhere to the requirements contained in Section 6.6 hereof during the installation of the new database. The Participating Load shall notify the ISO following successful installation of the new database and participate in joint testing with the ISO prior to placing the DPG device back in service.

Each Participating Load will remain solely responsible for the completeness and accuracy of all information transmitted by the ALMDS and/or meters to the DPG system. The ISO will not be responsible for the quality of the data transmitted through the DPG system and will only audit that information for accuracy. The ISO and the Participating Load will monitor the Participating Load's data transmitted through the DPG system and, upon observation of any problems with that data, must provide the other party notice of that problem and must work together to correct the problem.

In addition to the ISO, a Participating Load may set forth in written form any additional entities authorized to access the Participating Load's data communicated through the DPG system. The ISO will provide the entities with authorized access with any password or other information necessary to access the Participating Load's data held by the ISO in accordance with the provisions of the Participating Load Agreement. Except as directed by the Participating Load, the ISO will not re-transmit Load data received through the DPG system to any other entity.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

6.6 DPG ROUTINE TESTING AND MAINTENANCE

The Participating Load is responsible for all routine testing and maintenance of the DPG device. The intent of this section is to provide Participating Loads with the process to follow in order to maximize DPG system operation while periodic maintenance and or testing is performed. Minimizing the loss of DPG system communication, and thereby minimizing the period when the ALMDS and/or meters are unavailable for bidding in the Ancillary Services market, is in the best interest of both the Participating Load and the ISO.

Scheduling


Planned periodic maintenance and/or testing of the DPG devices must be scheduled with the ISO at least 48 hours in advance.

Planned periodic maintenance and/or testing of the DPG devices should be performed during unavailability of the Load of the Participating Load whenever possible.

Loss of DPG device communication will result in the inability of the Participating Load to participate in the Non-Spinning Reserve and/or Replacement Reserve markets.

Notification


The ISO Outage Coordination Office may be notified by either e-mail (e-mail address for notification is outage.folsom@caiso.com or outage.alhambra@caiso.com) or by telephone (916-351-2300). When notifying ISO about the scheduled maintenance, include a description of the activities to be performed.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

7. SECURITY AND METER DATA VALIDATION

7.1 OVERVIEW

Security requirements will apply to the transfer of data from an ALMDS to the ISO Energy Management System, or in the case of individual Loads, to the transfer of data from a CMDS to the ISO Energy Management System. Security requires support for X.509v3 Digital Certificates and SSL for authentication and encryption between the ISO Energy Management System and the CMDS or ALMDS. The ISO maintains its own certificate authority and will provide digital certificates. The ISO recommends that Participating Loads provide firewalls between their web providers and application servers. Participating Loads are required to comply with the Security Protocol attached as Appendix 1.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

8. SERVICES AND SCHEDULING

8.1 SERVICES

Participating Loads (certified by the ISO) can bid the following services:

- Non-Spinning Reserve
- Replacement Reserve
- Supplemental Energy

8.1.1 Non-Spinning Reserve

All Non-Spinning Reserve bids submitted to the ISO must contain the following information for each Load resource:

- Scheduling Coordinator name/identification code
- Load resource identification (name and location)
- Dates for which bids apply
- Time it takes to interrupt Load following the ISO's notification (min)
- Maximum allowable curtailment duration (hr)
- The Demand available for interruption within 10 minutes
- Bid price


The Load resource must be able to reduce Demand as quickly as possible to its bid value (MW) reaching the indicated value in ten (10) minutes or less after issuance of the instruction.

The Load resource must be capable of remaining off-line for at least 2 hours.

The Participating Load must indicate the maximum amount of time (minutes) between notification by the ISO and the full amount of Demand curtailment bid into the market.

The Participating Load must indicate if the Demand would be curtailed as a fixed amount or if the committed Demand would be reduced incrementally. Load resources that are reduced incrementally must also be able to fully curtail or drop within ten minutes.

The Participating Load participating in Non-Spinning Reserve must also indicate how the Demand curtailment will be accomplished (i.e. manually, automatically via RAS, hybrid schemes, etc.).

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

Participating Loads proposing to automatically curtail Demand or drop Load must have an adequate back-up plan to curtail Demand or drop Load in the event the automatic scheme is out of service. A description of the process involved in restoring all Demand curtailed or dropped Load must also be discussed.

8.1.2 Replacement Reserve

All Replacement Reserve bids submitted to the ISO must contain the following information for each Load resource:

- Scheduling Coordinator name/identification code
- Load resource identification (name and location)
- Dates for which bids apply
- Time it takes to interrupt Load following ISO's notification (min)
- Maximum allowable curtailment duration (hr)
- The Demand available for interruption within 60 minutes
- Bid price

The Load resource must be able to reduce Demand as quickly as possible to its bid value (MW) reaching the indicated value in sixty (60) minutes or less after issuance of the instruction.

The Load resource must be capable of remaining off-line for at least 2 hours.


The Participating Load participating in Replacement Reserve must also indicate how the Demand curtailment will be accomplished (i.e. manually, automatically via RAS, hybrid schemes, etc.).

Participating Loads proposing to automatically curtail Demand or drop Load must have an adequate back-up plan to curtail Demand or drop Load in the event the automatic scheme is out of service. A description of the process involved in restoring all Demand curtailed or dropped Load must also be discussed.

8.1.3 Supplemental Energy

All Supplemental Energy bids submitted to the ISO must contain the following information for each Load resource:

- Scheduling Coordinator name/identification code
- Load resource identification (name and location)

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

- Dates for which bids apply
- Time it takes to interrupt Load following ISO's notification (min)
- Maximum allowable curtailment duration (hr)
- The Demand available for interruption within 60 minutes
- Bid price

The Load resource must be able to reduce Demand as quickly as possible to its bid value (MW) reaching the indicated value in sixty (60) minutes or less after issuance of the instruction.

The Participating Load participating in the Supplemental Energy market must also indicate how the Demand curtailment will be accomplished (i.e. manually, automatically via RAS, hybrid schemes, etc.).


Participating Loads proposing to automatically curtail Demand or drop Load must have an adequate back-up plan to curtail Demand or drop Load in the event the automatic scheme is out of service. A description of the process involved in restoring all Demand curtailed or dropped Load must also be discussed.

8.2 SCHEDULING & BIDDING REQUIREMENTS

A Participating Load must have an ISO approved maximum Demand available for curtailment of 1 MW or greater to participate in ISO markets. Smaller Loads may be aggregated together to achieve the 1 MW threshold. Individual Loads or Aggregated Loads of a Participating Load must be treated as a single resource for purposes of certification, scheduling, bidding, metering, and Settlement. Loads may be added to or removed from a single resource to maintain its ISO rated capacity only with the prior consent of the ISO, as specified in Section 9.3, subject to the requirements set forth in the Participating Load's implementation plan.

The maximum amount of Load allowed to be monitored by a DPG is 1100 MW. Of the total Load monitored by a DPG, no more than 400 MW can participate in ISO A/S markets.

Either the Participating Load must be a certified Scheduling Coordinator or must make arrangements with an existing Scheduling Coordinator in order to participate in ISO markets. The Scheduling Coordinator provides the various interfaces between the Load and the ISO bidding and Settlement systems.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

Loads served under existing or future interruptible retail service arrangements are eligible to participate if both the following conditions are met:

- (1) Bidding in the ISO's A/S and SE markets is allowed under the retail service arrangement.
- (2) To assure that the Load is available for curtailment and not curtailed prior to the ISO's dispatch notice, the PLA under which such Load is represented must provide penalties that offset any incentives for prior curtailment that exist under the retail service arrangement.

The ISO may adjust the A/S and SE requirements temporarily to take into account, among other things, variation in conditions, real time dispatch constraints, contingencies, and voltage and dynamic stability assessments.


The Loads of Participating Loads providing A/S or SE must be scheduled separately from other Loads scheduled by a Scheduling Coordinator, and SQMD must be provided at the same granularity. (E.g., if a Scheduling Coordinator represents 500 meters, and 10 of those meters are Loads of a Participating Load aggregated through an ALMDS, the SC will schedule the 10 Loads of the Participating Load separately from the other 490 Loads. The SC will submit aggregated SQMD for the 10 meters of the Participating Load separate from the SQMD for the other 490 meters, but at the same granularity as scheduled.)

The location of the Load must be included in the bids submitted to the ISO. Loads posing potential Intra-Zonal Congestion problems will be identified and will not be allowed to participate. Preference would be given to Loads within areas where potential Congestion problems could be mitigated by Demand curtailment or areas where post contingency operating voltages are expected to drop to unacceptable levels following outage conditions.

Aggregation may be allowed on a Load Take-Out Point, Load group, or Demand zone basis, subject to the ISO's approval of the implementation plan, which will provide for safe and reliable operation and will ensure that no unreasonable limits are imposed on the ISO's dispatch of the associated A/S. However, the SC may not submit two Load Schedules for the same Take-Out Point, Load group, or Demand zone. (For example, if the SC is allowed to aggregate the Loads of a Participating Load by Load group, it will have to submit its schedule for the remainder of its Loads by Take-Out Point or Demand zone.)

The ISO reserves the right to determine whether a group of Loads behind an ALMDS spans or interferes with an intra-zonal path. All meters that are behind an ALMDS must have the location verified and accepted by the ISO.

The communication requirements and other rules for scheduling and dispatching of the Loads of a Participating Load are no different from those applicable to other resources providing Non-Spinning Reserves, Replacement Reserves and


 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

Supplemental Energy. SCs scheduling or bidding the Loads of a Participating Load to sell A/S or SE, or to self provide A/S, must comply with all applicable requirements for scheduling set forth in the ISO Tariff and applicable ISO Protocols.

The ISO will not dictate the mechanism by which the SC communicates instructions to its Participating Loads or the Loads of its Participating Loads. Participating Loads that fail to comply with ISO Dispatch instructions will be subject to the same financial consequences that apply in the case of any other resource providing A/S or SE that fails to comply with an ISO Dispatch instruction. The only exception to the foregoing is that Participating Loads that have responded to the Dispatch instruction will be exempt from the requirements of ISO Tariff Section 2.5.26.2.3 in the hour of the Dispatch instruction and for the following two (2) hours, to the extent provided in ISO Tariff Section 2.5.26.6.

Any combination of Loads of a Participating Load may be curtailed to meet the ISO Dispatch instruction.

Where the metering of a Load or facility is configured such that the single end-use may be served through multiple meters, all the individual meters must be aggregated by the same Participating Load. This requirement is necessary so that a Load that is curtailed does not substitute that service through another meter not included in the Loads of that Participating Load.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

9. IMPLEMENTATION

9.1 OVERVIEW

To participate in the ISO's markets, including the SE and A/S markets, each Participating Load must execute a PLA. In addition, each Participating Load must execute the applicable Meter Service Agreement.

A Participating Load and/or the SC for that Participating Load will be required to submit to the ISO its implementation plan for complying with the applicable requirements for Participating Loads. Once the ISO has approved the implementation plan, a Participating Load and/or its SC can proceed with implementation of necessary systems. In addition, before A/S can be provided, the Participating Load and/or SC will have to successfully complete A/S testing and certification. Additional implementation detail may be found using the link:

<http://www.caiso.com/clientserv/load/>.

9.2 CONTRACTUAL REQUIREMENTS – PARTICIPATING LOAD AGREEMENT (PLA)

All Loads for which A/S bids, self-provision Schedules, or SE bids are submitted to the ISO must be bound to the ISO Tariff by the PLA between the Participating Load and the ISO. Several Loads may be represented in a single Participating Load Agreement, with each individual Load (or each contributing Aggregated Load component) listed in Schedule 1 of the PLA or the associated implementation plan.


The terms of the PLA will be the same for all types of Loads.

9.3 CONTRACTUAL REQUIREMENTS – METERING AGREEMENTS

An individual Load of a Participating Load must be represented in Schedule 1 of a Meter Service Agreement for ISO Metered Entities (MSA ISOME).

Individual contributing Loads of an Aggregated Load may not be added to or removed from an ALMDS without prior consent of the ISO, subject to the requirements of the Participating Load's implementation plan. If Loads are added to or removed from an ALMDS, re-certification may be required by the ISO.

An ALMDS must be represented in a MSA ISOME.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

9.4 CERTIFICATION OF SERVICES

Any resource wishing to participate in the ISO Ancillary Services markets must be certified for the services that it intends to provide. Properly certified Load resources may participate in either the Non-Spinning Reserve or Replacement Reserve markets. Currently Ancillary Services certification is not required for participation in the Supplemental Energy market. All Participating Loads wishing to participate in ISO markets must submit an implementation plan that includes a discussion of how they intend to comply with ISO Dispatch instructions. The Demand certification procedure section of [ISO Operating Procedure G-213](#) (Management of Ancillary Services Tests), which is located on the ISO Home Page, details both the request for Ancillary Services certification and the testing processes.


9.4.1 Non-Spinning Reserve Requirements

Declaration of Certified Demand – The Participating Load must declare the Demand that it intends to certify as available for Non-Spinning Reserve. This Demand is the amount of Load that can be interrupted within ten (10) minutes of when the ISO issues a Dispatch instruction. This Demand is the maximum quantity that may be bid as Non-Spinning Reserve. It is acceptable to bid a quantity less than that which is certified. Any Demand that is interrupted more than ten (10) minutes after the ISO issues a Dispatch instruction may not be included in the Non-Spinning Reserve certified Demand.

Load Participation Implementation Plan - An implementation plan indicating the operator actions required to interrupt the Load must be submitted to the ISO. The ISO reserves the right to perform an on-site inspection of the Load in order to verify that the implementation plan is feasible and that the operating personnel are capable of carrying out the plan within ten (10) minutes of the ISO Dispatch instruction.

Successful Completion of Certification Test – Prior to receiving its Ancillary Service certification, the Participating Load must schedule to perform a certification test. Such test shall include, but not be limited to, the following:

- Confirmation of telemetry – The ISO will observe that the Load telemetry is in place and operational and providing required data points;

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

- Confirmation of the Load telemetry meets Scan Rates and processing cycle requirements;
- Confirmation of voice communication – The ISO, the SC, and the Participating Load will test communications on primary and secondary voice communication circuits; and
- Confirmation of Load control performance – The Participating Load will demonstrate its ability to adjust its Demand by a quantity mutually agreeable by the ISO, Participating Load, and SC.


9.4.2 Replacement Reserve Requirements

Declaration of Certified Demand – The Participating Load must declare the Demand that it intends to certify as available for Replacement Reserve. This Demand is the amount of Load that can be interrupted within sixty (60) minutes of when the ISO issues a Dispatch instruction. This Demand is the maximum quantity that may be bid as Replacement Reserve. It is acceptable to bid a quantity less than that which is certified. Any Demand that is interrupted more than sixty (60) minutes after the ISO issues a Dispatch instruction may not be included in the Replacement Reserve certified Demand.

Load Participation Implementation Plan – An implementation plan indicating the operator actions required to interrupt the Load must be submitted to the ISO. The ISO reserves the right to perform an on-site inspection of the Load in order to verify that the implementation plan is feasible and that the operating personnel are capable of carrying out the plan within sixty (60) minutes of the ISO Dispatch instruction.

Successful Completion of Certification Test – Prior to receiving its Ancillary Service certification, the Participating Load must schedule to perform a certification test. Such test shall include, but not be limited to, the following:

- Confirmation of telemetry – The ISO will observe that the Load telemetry is in place and operational and providing required data points;
- Confirmation of the Load telemetry meets Scan Rates and processing cycle requirements;
- Confirmation of voice communication – The ISO, the SC, and the Participating Load will test communications on primary and secondary voice communication circuits; and

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

- Confirmation of Load control performance – The Participating Load will demonstrate its ability to adjust its Demand by a quantity mutually agreeable to the ISO, Participating Load, and SC.

9.4.3 Supplemental Energy Requirements

The resource must state its maximum Demand available for curtailment. This Demand is the maximum amount of Demand that the Load expects to curtail within sixty (60) minutes of receiving a Dispatch instruction for Supplemental Energy. The Participating Load may bid any quantity of Demand up to and including this maximum value into the Supplemental Energy market.

The Participating Load intending to provide Supplemental Energy to the ISO must submit a Load participation implementation plan that is acceptable to the ISO.


Although there is no certification test for Supplemental Energy, prior to participating in the Supplemental Energy market, the Participating Load must demonstrate the following:

- Confirmation of voice communication - the ISO, the SC and the Participating Load will test communication on primary and secondary voice communications circuits.

9.5 IMPLEMENTATION PLAN


The implementation plan describes in detail the steps, switching actions and/or operating activities that must be accomplished to curtail the Demand in the time required for the service being delivered. The following principles should be followed in developing the implementation plan:

- The plan should indicate how the Demand would be monitored in real-time to enable queries about the quantity of Demand available for curtailment at any given time.
- The plan should indicate the availability of operating personnel to perform the curtailment should it be requested.
- The plan should indicate the operator steps and switching actions required to curtail the Demand. Each step or action should be accompanied by a best estimate of the time required to perform the operation as well as a best estimate of any expected delays between operations.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

- The plan should indicate a timeline for curtailing the Demand that indicates the total reduction in Demand over the period of the service requested.
- The plan should allow for a reasonable communication delay from ISO to Scheduling Coordinator to Load of no less than one minute. The ten (10) minute clock for Non-Spinning Reserve and the sixty (60) minute clock for Replacement Reserve and Supplemental Energy begin when the ISO issues a Dispatch instruction.

The ISO reserves the right to perform an on-site inspection of the Load facility including a dry run (no actual curtailment of Demand will occur) of the operator actions required to curtail the Demand.

 California ISO <small>Your Link to Power</small>	Technical Standard	Revision Date Revision No.	2/20/2007 6.1
		Participating Load Technical Standard	Print Date Effective Date

APPENDIX 1 - ISO SECURITY POLICY

1. SECURITY

ISO has information security documents relevant to each project. The Participating Load Technical Standard document is inclusive of the following security documents (please select link to access the applicable documents):

1. Public Key Infrastructure Integration Requirements and Specifications for Data Processing Gateways

<http://www.caiso.com/docs/2003/02/18/200302181600117192.html>