**Appendix A**

**Co-located Resource**

A Generating Unit with a unique Resource ID that is part of a Generating Facility with other Generating Units. An EIM Participating Resource with a unique Resource ID that is part of a single resource with other EIM Participating Resources.

**High Sustainable Limit**

The instantaneous generating capability of a variable or intermittent Generating Unit (or component thereof), provided to the CAISO through telemetry at the Generating Unit.

**Hybrid Resource**

A Generating Unit, with a unique Resource ID at a single Point of Interconnection, with components that use different fuel sources or technologies.

**Hybrid Dynamic Limit**

A Real-Time Market Bid parameter representing the real-time capabilities of Hybrid Resources, used to ensure feasible Schedules.

### 4.6.11 Storage Operating Characteristics

Pursuant to Section 4.6.4, a Scheduling Coordinator for a storage resource participating as a Non-Generator Resource or Pumped-Storage Hydro Unit must submit to the CAISO the operational and technical constraints to the Master File representing an accurate reflection of the resource’s design capabilities and its constituent equipment when operating at maximum sustainable performance over Minimum Run Time, recognizing that resource performance may degrade over time. Non-Generator Resources, Hybrid Resources, and Pumped-Storage Hydro Units may include among their Master File parameters the constraints listed in Section 27.9 to the extent they comply with this Section.

**4.18 Hybrid Resources**

In addition to the rights and obligations of this section, Hybrid Resources are Generators subject to Section 4.6. Hybrid Resources will provide data regarding the capacity and the operating characteristics of their components as may be reasonably requested from time to time by the CAISO. All information provided to the CAISO regarding the operational and technical constraints in the Master File must be an accurate reflection of the design capabilities of the Hybrid Resources and their constituent equipment when operating at maximum sustainable performance over Minimum Run Time, recognizing that performance may degrade over time. Hybrid Resources must use the Non-Generator Resource model, but are ineligible to use Regulation Energy Management. Hybrid Resources are not considered Variable Energy Resources or Eligible Intermittent Resources; however, consistent with Section 4.8.2, Hybrid Resources that include a variable or intermittent component must provide the CAISO with the data for that component that would be required by Appendix Q. These Hybrid Resources also must provide the CAISO with telemetry and Meter Data on the variable or intermittent components in addition the Generating Facility’s metering requirements under Section 10. Hybrid Resources telemetry must include the High Sustainable Limit. Hybrid Resources that include an energy storage component must provide the CAISO with telemetry on the State of Charge.

**30.5.6.1 Hybrid Resource Bids**

In addition to the Bid components listed in this Section 30.5, Scheduling Coordinators representing Hybrid Resources will submit Hybrid Dynamic Limits representing Hybrid Resources’ upper and lower economic limits in each Real-Time Market five-minute Trading Interval. Hybrid Dynamic Limits must be based on operating capabilities such as State of Charge and resource forecast. Scheduling Coordinators should not request outages duplicative of the Hybrid Dynamic Limits. The CAISO will use reasonable efforts to issue Real-Time Market Schedules that respect Hybrid Dynamic Limits. Scheduling Coordinators may not submit Hybrid Dynamic Limits in the Day-Ahead Market.

**31.2 Day-Ahead MPM Process**

After the Market Close of the DAM, and after the CAISO has validated the Bids pursuant to Section 30.7, the CAISO will perform the MPM process, which is a single market run that occurs prior to the IFM Market Clearing run. The Day-Ahead MPM process determines which Bids need to be mitigated to the applicable Default Energy Bids in the IFM pursuant to Section 31.2.3. For Maximum Net Dependable Capacity of Legacy RMR Units, Bids will be mitigated to the RMR Proxy Bids pursuant to Section 31.2.3. The Day-Ahead MPM process optimizes resources to meet Demand reflected in Demand Bids, including Export Bids and Virtual Demand Bids, and to procure one hundred (100) percent of Ancillary Services requirements based on Supply Bids submitted to the DAM. Virtual Bids and Bids from Demand Response Resources, Participating Load, Hybrid Resources, and Non-Generator Resources are considered in the MPM process, but are not subject to Bid mitigation. Bids from Participating Load resources that are not subject to Bid mitigation will also be considered in the MPM process. Bids from resources comprised of multiple technologies that include Non-Generator Resources will remain to be subject to all applicable market power mitigation under the CAISO Tariff, including Local Market Power Mitigation. The mitigated or unmitigated Bids and RMR Proxy Bids identified in the MPM process for all resources that cleared in the MPM are then passed to the IFM. The CAISO performs the MPM process for the DAM for the twenty-four (24) hours of the targeted Trading Day.

**34.1.5 Mitigating Bids in the RTM**

**34.1.5.1 Generally**

After the Market Close of the RTM, after the CAISO has validated the Bids pursuant to Section 30.7 and Section 34.1.4, and prior to conducting any other RTM processes, the CAISO conducts a MPM process. The results are used in the RTM optimization processes. Bids on behalf of Demand Response Resources, Participating Load, Hybrid Resources, and Non-Generator Resources are considered in the MPM process but are not subject to Bid mitigation. Bids from resources comprised of multiple technologies that include Non-Generator Resources will remain to be subject to all applicable market power mitigation under the CAISO Tariff, including Local Market Power Mitigation.

**34.1.6.3 Hybrid Resources**

The CAISO will use reasonable efforts to issue Real-Time Market Schedules that respect Hybrid Resources’ Hybrid Dynamic Limits, High Sustainable Limits, State of Charge, and forecast, as applicable. Pursuant to Section 4.8.2, Hybrid Resources with a variable or intermittent component must provide the CAISO with the meteorological data for that component that would be required by Appendix Q. Hybrid Resources may elect to receive a CAISO forecast to inform their bidding, or they may elect to use their own forecast. For Hybrid Resources that have elected to use their own forecast as specified in Section 4.8.2.1.1, the responsible Scheduling Coordinator must submit to the CAISO its forecast for the variable component for the binding interval by 37.5 minutes prior to flow (the start of the applicable FMM optimization for the binding interval). If such Scheduling Coordinator does not provide such forecast to the CAISO, the CAISO will use the resource’s direct telemetry MW output for optimization purposes.

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**34.13.3 Co-located Resources and Dispatch Instructions**

Co-located Resources that are Non-Generator Resources may deviate from Dispatch Instructions only pursuant to this Section. A Co-located Resource that is a Non-Generator Resource may deviate from a Dispatch Instruction by consuming additional Energy where a co-located Eligible Intermittent Resource is producing above its Dispatch Operating Target due to meteorological conditions such that its output would exceed the Interconnection Service Capacity of the Co-located Resources, or otherwise threaten reliability or safety. Such deviations may only occur through proper control technologies that ensure the combined output of all Co-located Resources does not exceed the Generating Facility’s Interconnection Service Capacity and are subject to the CAISO’s prior approval as explained in the CAISO’s Business Practice Manuals.

All deviations from Dispatch Instruction will be subject to Uninstructed Imbalance Energy. A Co-located Resource that is a Non-Generator Resource may not deviate from a Dispatch Instruction pursuant to this section if it is providing Ancillary Services.

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### 40.9.2 Exemptions

(a) **Capacity Exempt from RAAIM – All Provisions.** The entire capacity of a resource in any of the following categories is exempt from the RAAIM provisions in Section 40.9 –

(1) Resources with a PMax less than 1.0 MW;

(2) Non-specified resources that provide Resource Adequacy Capacity under contracts for Energy delivered within the CAISO Balancing Authority Area;

(3) Participating Load that is also Pumping Load; and

(4) Legacy RMR Units.

(b) **Capacity Exempt from RAAIM – Local/System**

(1) The entire capacity of a resource in any of the following categories is exempt from the RAAIM provisions in Section 40.9 applicable to local and system Resource Adequacy Capacity –

(A) Variable Energy Resources;

(B) Combined Heat and Power Resources;

(C) Run-of-River Resources; and

(D) Hybrid Resources

(2) The capacity of a resource with a Load-following MSS as its Scheduling Coordinator that is designated on a Load-following MSS’s monthly Resource Adequacy Plan is exempt from the RAAIM provisions in Section 40.9 applicable to local and system Resource Adequacy Capacity, to the extent that the resource’s capacity is also designated as Resource Adequacy Capacity on the monthly Supply Plan of that Load-following MSS or another Load-following MSS.

(3) Resources with Existing QF Contracts or Amended QF Contracts that are Resource Adequacy Resources are exempt from the RAAIM provisions in Section 40.9 applicable to local and system capacity --

(A) if the QF resource previously provided Resource Adequacy Capacity pursuant to an Existing QF Contract that was executed prior to August 22, 2010 and remained in effect pursuant to California Public Utilities Commission Decision 07-09-040 that extended the term of expiring contracts until such time as the new contracts resulting from that decision are available; or

(B) until the QF Resource’s Existing QF Contract or Amended QF Contract terminates or if requested by the Scheduling Coordinator for the resource, whichever is earlier.

(c) **Capacity Exempt from RAAIM – Flexible Capacity.**

(1) The capacity of Use-Limited Resources in a combination under Section 40.10.3.2(b), 40.10.3.3(b) or 40.10.3.4(b) is exempt from the RAAIM provisions in Section 40.9 applicable to Flexible RA Capacity to the extent that the resources are committed to provide Flexible RA Capacity as a combination on their respective monthly Supply Plans.

(2) The Capacity of a resource with a Load-following MSS as its Scheduling Coordinator that is designated on a Load-following MSS’s monthly Flexible RA Plan is exempt from the RAAIM provisions in Section 40.10 applicable to Flexible RA Capacity, to the extent that the resource’s capacity is also designated as Flexible RA Capacity on the monthly Supply Plan of that Load-following MSS or another Load-following MSS.

\* \* \*

### 40.10.4 Effective Flexible Capacity

The CAISO shall calculate the Effective Flexible Capacity value for each resource. The CAISO shall publish the draft and final lists of the Effective Flexible Capacity values for such resources and the Flexible Capacity Categories for which each resource qualifies to provide Flexible Capacity on the CAISO Website each year in accordance with the schedule for publishing the Net Qualifying Capacity values, as set forth in the BPM, for use in the next calendar year.

**40.10.4.1 Effective Flexible Capacity Calculation**

(a) **Flexible Resources.** The CAISO will calculate the Effective Flexible Capacity value of a resource, for use (i) if a Local Regulatory Authority has not established criteria for calculating the Effective Flexible Capacity value for eligible resource types, and (ii) for determining if a cumulative deficiency exists under Sections 43A.2.7(a) and (b), as follows, except as provided in Sections 40.10.4.1 (b) through (f) –

(1) If the Start-Up Time of the resource is greater than 90 minutes, the Effective Flexible Capacity value shall be the weighted average ramp rate of the resource calculated from PMin to Net Qualifying Capacity multiplied by 180 minutes. The Effective Flexible Capacity shall not exceed the difference between the PMin and PMax of the resource.

(2) If the Start-Up Time of the resource is less than or equal to 90 minutes, the Effective Flexible Capacity value shall be the resource’s PMin plus the weighted average ramp rate of the resource calculated from PMin to Net Qualifying Capacity multiplied by the difference between 180 minutes and the resource’s Start-Up Time. The Effective Flexible Capacity shall not exceed the Net Qualifying Capacity of the resource.

(b) **Hydroelectric Generating Unit.** The Effective Flexible Capacity of a hydroelectric generating unit will be the amount of capacity from which the resource can produce Energy consistently for 6 hours assuming that the resource’s physical storage is at maximum capacity at the beginning of that six-hour period. The Effective Flexible Capacity of a hydroelectric generation unit cannot, however, exceed its Net Qualifying Capacity.

(c) **[Not Used]**

(d) **Energy Storage Resource.** The Effective Flexible Capacity value for an energy storage resource will be determined as follows –

(1) for an energy storage resource that provides Flexible RA Capacity but not Regulation Energy Management, the Effective Flexible Capacity value will be the MW output range the resource can provide over three hours of charge/discharge while constantly ramping.

(2) for an energy storage resource that provides Flexible RA Capacity and Regulation Energy Management, the Effective Flexible Capacity value will be the resource’s 15-minute energy output capability.

(e) **Multi-Stage Generating Resource.** The Effective Flexible Capacity value for a Multi-Stage Generating Resource will be calculated using the longest Start-Up Time of the resource’s configuration that has the lowest PMin.

(f) **Combined Heat and Power Resource.** The Effective Flexible Capacity value of a Combined Heat and Power Resource will be the lesser of (i) the resource’s Net Qualifying Capacity, or (ii) the MW difference between the CHP resource’s maximum output and its RMTMax, if the resource has a RMTMax, or its minimum operating level, such quantity not to exceed the quantity of generating capacity capable of being delivered over a three-hour period.

(g) **Hybrid Resource.** The Effective Flexible Capacity value of a Hybrid Resource is the sum of what the Effective Flexible Capacity values of the constituent components of the Hybrid Resource would be if those components were each a distinct Generating Unit. The Effective Flexible Capacity value of a Hybrid Resource may not, however, exceed the Hybrid Resource’s Net Qualifying Capacity.

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**Appendix F**

**Schedule 4**

**Eligible Intermittent Resources Forecast Fee**

A charge up to $.10 per MWh shall be assessed on the metered Energy from (a) Eligible Intermittent Resources and (b) the variable or intermittent component of Hybrid Resources as a Forecast Fee, provided that Generating Units smaller than 10 MW that are not Participating Intermittent Resources and that sold power pursuant to a power purchase agreement entered into pursuant to PURPA prior to entering into a PGA or Net Scheduled PGA shall be exempt from the Forecast Fee.

The rate of the Forecast Fee shall be determined so as to recover the projected annual costs related to developing Energy forecasting systems, generating forecasts, validating forecasts, and monitoring forecast performance, that are incurred by the CAISO as a direct result of participation by Eligible Intermittent Resources and the variable or intermittent component of Hybrid Resources in CAISO Markets, divided by their projected annual Energy production.

The initial Forecast Fee, and all subsequent changes as may be necessary from time to time to recover costs incurred by the CAISO for the forecasting conducted on the behalf of Eligible Intermittent Resources and the variable or intermittent component of Hybrid Resources pursuant to the foregoing rate formula, shall be set forth in a Business Practice Manual.

**Appendix K**

**Part A**

A 1.2.2.4 Ancillary Service Providers for Non-Generator Resources (whether or not the resource uses Regulation Energy Management) and Hybrid Resources shall provide CAISO the following additional telemetry data as applicable

• Resource Ramp Rate when operating as Generation (MW/min);

• Resource Ramp Rate when operating as Load (MW/min);

• The maximum instantaneous ability, *e.g.,.* High Sustainable Limit, to produce or consume Energy in MW; and

 • The maximum capability to provide Energy as expressed in MWh over a fifteen (15) minute interval where the Scheduling Coordinator has elected to provide MWh constraints pursuant to Section 27.9 of the CAISO Tariff.