October 23, 2020

The Honorable Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Re: California Independent System Operator Corporation
Docket No. ER21-___-000

Tariff Amendment on Excess Behind the Meter Production

Dear Secretary Bose:

The California Independent System Operator Corporation ("CAISO") submits this tariff amendment[1] to clarify its metering and settlement rules for Excess Behind the Meter Production[2] and Gross Load. Excess behind-the-meter production is energy generated by behind the meter resources exceeding the host customer's onsite consumption. This energy generally comes from rooftop solar during the Spring in the early afternoon hours when demand is low and solar generation is high. The CAISO proposes to define Excess Behind the Meter Production and require scheduling coordinators representing load-serving entities to report it. Additionally, the CAISO proposes to clarify its definition of Gross Load to expressly include demand served by Excess Behind the Meter Production.

Scheduling coordinators have reported Gross Load inconsistently because the current Gross Load definition is obscure. Gross Load is an important billing determinant used for several settlement charges for transmission and reliability services, including the CAISO's Regional Access Charge. The CAISO allocates its transmission owners' high-voltage transmission revenue requirements to utilities based upon their Gross

[1] The CAISO submits this filing pursuant to section 205 of the Federal Power Act ("FPA"), 16 U.S.C. § 824d. Capitalized terms not otherwise defined herein have the meanings set forth in the CAISO tariff, and references to specific sections, articles, and appendices are references to sections, articles, and appendices in the current CAISO tariff and as revised or proposed in this filing, unless otherwise indicated.

[2] The CAISO proposes to define Excess Behind the Meter Production as "Energy from an End-Use Customer in excess of its onsite Demand." Proposed Appendix A to the CAISO tariff.

Load, so different reporting practices cause inappropriate cost shifts among ratepayers. Clarifying the definition of Gross Load will ensure consistent compliance with the CAISO tariff and avoid these cost shifts. No stakeholder opposed the proposed tariff revisions.

The CAISO respectfully requests the Commission accept the tariff revisions proposed in this filing as just and reasonable effective January 1, 2021. This effective date will allow CAISO transmission owners to align the proposed tariff revisions with their annual rate schedules.

I. Background

A. Excess Behind the Meter Production

Distributed energy resources and rooftop solar have increased rapidly throughout the CAISO balancing authority area during the last decade. There are currently 8,200 MW of non-utility behind the meter rooftop solar installed in the CAISO, with nearly 5,000 MW installed since 2016.[3] With rooftop solar required for all new residential buildings in California, the CAISO expects this trend to continue and accelerate.[4]

Rooftop solar and other behind the meter resources have affected how utilities report load for CAISO settlement. Specifically, the CAISO has observed inconsistencies in how scheduling coordinators reported Gross Load. Gross Load is a metric used as the billing determinant to allocate several settlement charges for transmission and reliability services, including the CAISO's Regional Access Charge.[5] Based on an obscure definition of Gross Load, some scheduling coordinators submitted Gross Load figures that netted Excess Behind the Meter Production from Gross Load, while others submitted gross figures that excluded Excess Behind the Meter Production.

Excess Behind the Meter Production refers to energy generated by behind the meter resources exceeding the host customer's onsite demand. Excess Behind the Meter Production occurs when a household or building with a behind the meter resource produces more energy than the building is consuming. The Excess Behind the Meter Production is injected onto the grid and consumed by other customers. Unlike behind

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[3] https://www.californiadgstats.ca.gov.

[4] *See* California Energy Commission, "2019 Building Efficiency Standards" (Dec. 2018), *available at* https://ww2.energy.ca.gov/2018publications/CEC-400-2018-020/CEC-400-2018-020-CMF.pdf.

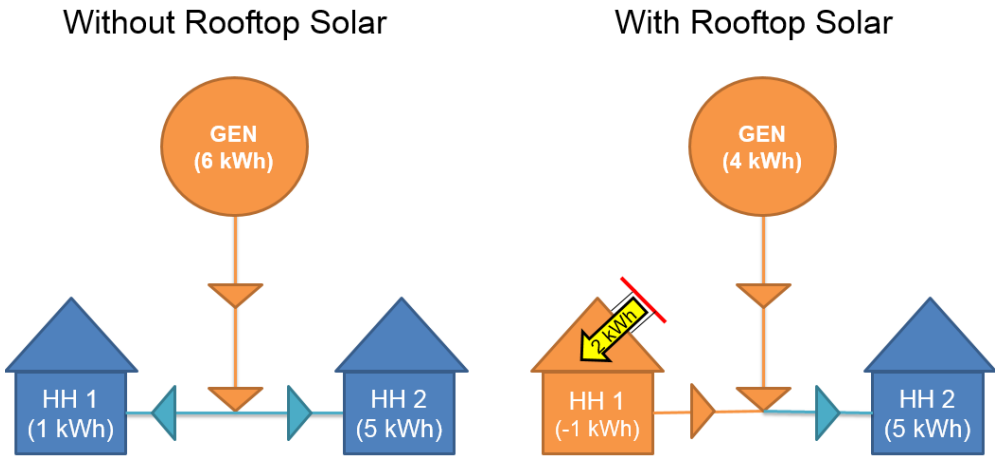
[5] The Regional Access Charge allocates costs for transmission owners' high-voltage transmission revenue requirements, as explained below.

the meter production that serves onsite demand, modern smart meters can detect and meter Excess Behind the Meter Production because it reverses the normal flow across the meter in proportion to the amount exported.

Excess Behind the Meter Production is uncommon most of the year. It usually manifests in the Winter and Spring when air conditioning demand is low but solar radiation is high. Even then, it is usually limited to early afternoon hours—before the ramp-up to the late afternoon demand peak—when net demand is low and solar generation is at its highest. Although most behind the meter production curtails onsite demand, Excess Behind the Meter Production can affect CAISO settlement and cost allocation. Based on the CAISO's analysis, at its highest, Excess Behind the Meter Production can serve between one and five percent of demand. The CAISO expects this figure to grow as solar prices decline and rooftop solar proliferates.

To help illustrate these concepts, the CAISO provides the following example. This example assumes a snapshot in time to demonstrate periods that display occurrences of excess behind the meter production. In this example we can imagine a set of two households. The first household consumes 1 kWh of energy, but has a rooftop solar panel capable of generating 2 kWh of energy when the sun is shining. The second household simply consumes 5 kWh of energy. Figure 1 is a simplified line diagram representing the two households with the left half depicting energy flows without sun and the right half depicting energy flows when the sun is shining, and household 1 is generating solar energy.

Figure 1
Simple Line Diagram



There are several takeaways from Figure 1:

- Both households consume the same energy with and without solar generation
- With solar generation household 1 injects 1 kWh of energy onto the grid, which reduces the generation from the traditional generator from 6 kWh to 4 kWh
- *Excess Behind The Meter Production* with solar generation is 1 kWh, or the energy exported by household 1
- The *Gross Load* with solar generation is 5 kWh, or the energy consumed by household 2
- The 1 kWh of rooftop solar that curtailed the onsite demand of household 1 is *not* Excess Behind the Meter Production, nor is that 1 kWh of onsite demand accounted for by any metric[6]

Table 2 summarizes the same information outlined in Figure 1. In this table, row [A] represents the total energy consumed by each household, and row [B] represents the total amount of solar output from each household. Generally, for households with rooftop solar, these amounts are unknown because energy measured at the household meter is the net of the onsite generation and onsite demand. In other words, meters only detect the energy that actually flows across them. Consumer meters thus only detect how much energy is flowing from or onto the distribution grid. Although the meter has different "channels" to detect the energy flows going in or out, the energy only flows across the meter in one direction at any time.

In this example, the meter on household 1 reads 1 kWh on the export channel, and 0 kWh on the load channel (because the onsite generation has met onsite demand). Table 2 shows these observed meter values in row [C] and row [D]. In this example, household 1 has a meter reading of 1 kWh on the export channel, while household 2 shows a meter reading of 5 kWh on the load channel of the meter.

[6] In other words, when onsite generation curtails onsite demand, that demand is not metered or accounted for in Gross Load or Measured Demand. The only way the CAISO could be aware of it is if the end user participated in a demand response program that meters behind the meter production, such as the metering generator output methodology or the load-shift methodology. Even then, the demand would not be Gross Load or Measured Demand; only an element of that demand response resource's customer load baseline.

Table 2
Gross Load reporting approach impacts example inputs

		Reported/observed value (kWhs)	
		Household 1	**Household 2**
Load	[A]	1 kWh	5 kWh
Rooftop Solar Output	[B]	2 kWh	0 kWh
Instantaneous Meter Read Load Channel	[C]	0 kWh	5 kWh
Instantaneous Meter Read Export Channel	[D]	1 kWh	0 kWh

B. Excess Behind the Meter Production's Impact on Gross Load

Table 3 demonstrates how Excess Behind the Meter Production can affect how scheduling coordinators could report Gross Load. Essentially, there are two possible approaches: (a) include the demand served by Excess Behind the Meter Production by simply adding all of the meter data from the load channels;[7] or (b) remove the demand served by Excess Behind the Meter Production by reducing the meter data from the load channels by meter data from the export channels.[8] In Table 3, Row [E] sums the actual consumption for both household 1 and 2. As mentioned above, this value may not be known because each meter reports the summation of energy at the household level—either the total amount consumed or the total injected onto the grid—rather than both numbers. In this example, the total consumption is 6 kWh, or 1 kWh from household 1 and 5 kWh from household 2. Row [F] sums the total of the load channels from both households, in this case 5 kWh. Row [G] calculates the difference between the total consumption at each household less the total solar generation, *i.e.*, the net

[7] *I.e.*, consumption only.

[8] *I.e.*, consumption minus Excess Behind the Meter Production.

consumption at each household, which is 4 kWh. The lower half of Table 3 shows how Gross Load could be calculated and reported if excess behind the meter production was netted (row [H]) from these values, and how Gross Load could be reported if excess behind the meter production was not netted from these values (row [I]).

Table 3
Gross Load reporting approach example settlement impacts outputs

			Reported/observed value (kWhs)
Σ Load	[E]	[A1 + A2]	1 kWh + 5 kWh = 6 kWh
Metered Load (Σ load channels)	[F]	[C1 + C2]	0 kWh + 5 kWh = 5 kWh
Σ of Load - Σ of Rooftop Solar Output	[G]	[(A1 + A2) - (B1 + B2)]	6 kWh – 2 kWh = 4 kWh
Gross Load with "netting excess BTM production"	[H]	[(C1 + C2) – (D1 + D2)]	5 kWh – 1 kWh = **4 kWh**
Gross Load with "non-netting of excess BTM production"	[I]	[C1 + C2]	0 kWh + 5 kWh = **5 kWh**

When scheduling coordinators subtract demand served by Excess Behind the Meter Production from Gross Load, the CAISO loses visibility on actual demand and the level of Excess Behind the Meter Production that serves that demand. In the example above, if scheduling coordinators subtract demand served by Excess Behind the Meter Production from Gross Load, the CAISO would receive Gross Load values of 4 kWh. If instead, scheduling coordinators report Gross Load as consumption only (without netting Excess Behind the Meter Production), the Gross Load value received would be 5 kWh, and 1 kWh would be captured as unaccounted for energy.[9] Although the

[9] The CAISO settles unaccounted for energy at the relevant locational marginal price, so scheduling coordinators are compensated for that energy regardless of its source. *See* Section 11.5.3 of the CAISO tariff. (Again, behind the meter production that serves *onsite* demand is not unaccounted for energy, nor does the CAISO require scheduling coordinators to report the onsite demand served by behind the meter production.)

difference in Gross Load is only 1 kWh in this example, that 1 kWh is a 20 percent difference in Gross Load values. Moreover, where the scheduling coordinators net Excess Behind the Meter Production from Gross Load, the CAISO loses visibility of potential system demand. This makes it more difficult for the CAISO to create accurate short-term forecasting and meteorological models. The CAISO relies on such models to have sufficient generation schedules and reserves in the event cloud cover causes rooftop solar generation to drop, thereby increasing demand.

C. Cost Allocation

The CAISO uses Gross Load as the billing determinant to allocate several settlement charges. Foremost among these is the CAISO's Regional Access Charge.[10] Each participating transmission owner recovers its high voltage[11] transmission revenue requirement from the revenues collected by the CAISO through the Regional Access Charge.[12] The Regional Access Charge is a uniform rate for all utilities. The CAISO calculates the Regional Access Charge by summing the participating transmission owners' high voltage revenue requirements, then dividing by the sum of their annual Gross Loads.

[10] Appendix A to the CAISO tariff defines the Regional Access Charge as "The Access Charge applicable under Section 26.1 to recover the Regional Transmission Revenue Requirements of each Participating TO."

[11] At or above 200 kV.

[12] *See* Section 26 of the CAISO tariff. Low voltage transmission revenue requirements are recovered through the Local Access Charge, the rate for which is unique to each transmission owner based upon its revenue requirement and Gross Load.

Table 4
Regional Access Charge as of August 2020[13]

	Filed Annual TRR ($)	Filed Annual Gross Load (MWh)	TAC Rate ($/MWH)	TAC Amount ($)
PG&E	$ 788,444,596	85,012,937	$ 12.6247	$ 1,073,262,756
SCE	$ 861,655,306	87,036,035	$ 12.6247	$ 1,098,803,759
SDG&E	$ 504,820,290	18,589,407	$ 12.6247	$ 234,685,671
Anaheim	$ 33,007,290	2,290,689	$ 12.6247	$ 28,919,260
Azusa	$ 1,196,600	257,416	$ 12.6247	$ 3,249,800
Banning	$ 812,736	144,652	$ 12.6247	$ 1,826,188
Pasadena	$ 16,032,939	1,065,579	$ 12.6247	$ 13,452,614
Riverside	$ 32,542,140	2,180,985	$ 12.6247	$ 27,534,280
Vernon	$ 3,139,029	1,119,215	$ 12.6247	$ 14,129,753
DATC Path 15	$ 26,071,625	-	$ 12.6247	$ 0
Startrans IO	$ 3,391,289	-	$ 12.6247	$ 0
Trans Bay Cable	$ 147,653,357	-	$ 12.6247	$ 0
Citizens Sunrise	$ 14,351,558	-	$ 12.6247	$ 0
Colton	$ 1,210,682	372,179	$ 12.6247	$ 4,698,648
VEA	$ -	544,970	$ 12.6247	$ 6,880,082
GLW	$ 39,852,144	-	$ 12.6247	$ 0
MCCT	$ 2,594,182	-	$ 12.6247	$ 0
CSPT	$ 3,952,903	-	$ 12.6247	$ 0
HZWT	$ 5,751,076	-	$ 12.6247	$ 0
DSLK	$ 20,963,068	-	$ 12.6247	$ 0
ISO Total	**$ 2,507,442,810**	**198,614,064**		**$ 2,507,442,810**

[13] CAISO, Transmission Operations, http://www.caiso.com/market/Pages/TransmissionOperations/Default.aspx. Not all transmission owners are load-serving entities, hence several transmission owners do not have Gross Load. (The Regional Access Charge is sometimes referred to as the Transmission Access Charge, or TAC, but that term actually refers to all transmission charges, including the Regional Access Charge and the Local Access Charge.)

Table 4 shows the CAISO collects approximately $2.5 billion for the transmission owners' annual high voltage transmission revenue requirements. To do so, the CAISO assesses the Regional Access Charge ($12.62/MWh) on scheduling coordinators for utilities based upon their Gross Load. It is easy to understand why reporting Gross Load consistently and accurately is critical. Assume two scheduling coordinators have end users just like those in the above example. If one scheduling coordinator nets its meter channels so it does not report demand served by Excess Behind the Meter Production, and the other scheduling coordinator does not, the latter scheduling coordinator reports higher Gross Load even though both have the same demand. The CAISO will assess the latter scheduling coordinator more of the Regional Access Charge based upon its higher Gross Load. Its ratepayers will pay more toward high-voltage transmission costs even though both scheduling coordinators' ratepayers benefit equally. Even a small difference in reporting over time can cause a substantial cost shift for ratepayers. For this reason, it is critical to have clear, precise definitions of Excess Behind the Meter Production and Gross Load to ensure scheduling coordinators report Gross Load consistently.

II. Proposed Tariff Revisions

A. Excess Behind the Meter Production Definition

The CAISO proposes to define Excess Behind the Meter Production as "Energy from an End-Use Customer in excess of its onsite Demand."[14] This provides a defined term for a growing type of energy in the West. Residences and businesses with rooftop solar and behind the meter generation frequently provide Excess Behind the Meter Production when solar radiation is high but demand is low, most commonly in the Spring when days are longer but air conditioning is unnecessary. Excess Behind the Meter Production serves nearby demand, offsetting the energy required from the CAISO markets. As described below, reporting Excess Behind the Meter Production and accounting for it in the CAISO's settlement processes will provide greater transparency for the CAISO markets and ensure accurate cost allocation.

B. Gross Load Definition

The CAISO also proposes to revise the tariff definition of Gross Load to clarify that Gross Load should include demand served by Excess Behind the Meter

[14] Proposed "Excess Behind the Meter Production," Appendix A to the CAISO tariff.

Production.[15] Although the current tariff definition suggests as much, it is obscure. The current definition of Gross Load is found in Appendix A to the CAISO tariff:

> For the purposes of calculating the transmission Access Charge, Gross Load is all Energy (adjusted for distribution losses) delivered for the supply of End-Use Customer Loads directly connected to the transmission facilities or directly connected to the Distribution System of a Utility Distribution Company or MSS Operator located in a PTO Service Territory. Gross Load shall exclude (1) Load with respect to which the Wheeling Access Charge is payable; (2) Load that is exempt from the Access Charge pursuant to Section 4.1 of Appendix I; and (3) the portion of the Load of an individual retail customer of a Utility Distribution Company, Small Utility Distribution Company, or MSS Operator that is served by a Generating Unit that: (a) is located on the customer's site or provides service to the customer's site through arrangements as authorized by Section 218 of the California Public Utilities Code; (b) is a qualifying small power production facility or qualifying cogeneration facility, as those terms are defined in the FERC's regulations implementing Section 201 of the Public Utility Regulatory Policies Act of 1978; and (c) secures Standby Service from a Participating TO under terms approved by a Local Regulatory Authority or FERC, as applicable, or can be curtailed concurrently with an Outage of the Generating Unit serving the Load. Gross Load forecasts consistent with filed Transmission Revenue Requirements will be provided by each Participating TO to the CAISO.

This definition excludes demand served by the customer's own onsite generation, but does not expressly include demand served by energy that leaves the customer site, leaving the policy somewhat unclear. As explained below, the definition would benefit from additional clarifications. The CAISO proposes the following revisions to the definition of Gross Load to help clarify the issues discussed herein:

> ~~For the purposes of calculating the transmission Access Charge, Gross Load is all Energy~~ Demand (adjusted for distribution losses) ~~delivered for the supply~~ of End-Use Customer Loads directly connected to the transmission facilities or directly connected to the Distribution System of a Utility Distribution Company or MSS Operator located in a PTO Service Territory. Gross Load includes Load served by Excess Behind the Meter Production. Excess Behind the Meter

[15] It is critical to remember that Excess Behind the Meter Production only pertains to energy that exceeds onsite load and serves demand for other customers. Behind-the-meter production that serves onsite demand for the host customer, on the other hand, is netted from any meter or settlement value. In fact, the demand that would have existed but for the behind-the-meter production generally is invisible to utilities.

Production shall not be netted against End-Use Customer Load in determining Gross Load. Gross Load ~~shall~~ excludes:

(1) Load with respect to which the Wheeling Access Charge is payable;
(2) Load that is exempt from the Access Charge pursuant to Section 4.1 of Appendix I; ~~and~~
~~(3) the portion of the~~ Load of an individual retail customer served by its own onsite Generating Unit or energy storage device, or as authorized by Section 218 of the California Public Utilities Code;
~~of a Utility Distribution Company, Small Utility Distribution Company, or MSS Operator that is served by a Generating Unit that: (a) is located on the customer's site or provides service to the customer's site through arrangements as authorized by Section 218 of the California Public Utilities Code;~~
(4~~b~~) Onsite Load served by ~~is~~ a qualifying small power production facility or qualifying cogeneration facility, as those terms are defined in the FERC's regulations implementing Section 201 of the Public Utility Regulatory Policies Act of 1978; and
(5~~c~~) Load secured~~s~~ by Standby Service from a Participating TO under terms approved by a Local Regulatory Authority or FERC, as applicable, or can be curtailed concurrently with an Outage of the Generating Unit serving the Load.

Gross Load forecasts consistent with filed Transmission Revenue Requirements will be provided by each Participating TO to the CAISO. For purposes of this definition, Generating Units, storage devices, and Loads will be considered onsite where they share, or are sub-metered behind, the same meter.

These revisions result in several improvements.[16] First, the revisions remove the introductory clause stating this definition is for purposes of calculating the Access Charge, which implies this definition is *only* relevant to the Access Charge. Gross Load is the billing determinant for several settlement charges.[17] Second, these revisions clarify that "Gross Load" does not actually refer to Energy, which is "the electrical energy produced, flowing or supplied by generation, transmission or distribution facilities, being the integral with respect to time of the instantaneous power,"[18] but to a

[16] Beyond the enhancements discussed, the CAISO is not otherwise changing its rates, terms, or conditions for Gross Load.

[17] Including settlement charges for voltage support, blackstart services, emissions cost recovery, and ancillary services costs.

[18] "Energy," Appendix A to the CAISO tariff.

measured subset of Demand, which is the "instantaneous amount of energy that is delivered to Loads and Scheduling Points by generation, transmission, or distribution facilities."[19] This allows removing the words "delivered for the supply of," which are superfluous and confusing. Third, the proposed revisions expressly provide that Gross Load includes Load served by Excess Behind the Meter Production, as defined above. This clarification is consistent with the CAISO's existing policy, but it provides unambiguous direction for market participants. Fourth, the revisions re-format the definition to list each exclusion clearly, rather than having a list of exclusions with its own list of inclusions. This also allows removing the reiteration of locations in the (former) third exclusion. Finally, for entities in the definition outlined above, the proposed revisions specify how loads and resources—now expressly including storage—must be "onsite," which the CAISO defines as sharing or being sub-metered behind the same meter. The generator and the load must be electrically connected at the same point. This further avoids confusion regarding sub-metered load or generation behind a customer facility meter. Such loads should continue to be treated as onsite and therefore excluded from Gross Load.

In simple terms, the revised definition clarifies that Gross Load excludes onsite demand served by onsite generation, such as when rooftop solar offsets the demand of the home. In fact, that demand does not appear on a customer meter, and is invisible to the utility. On the other hand, when that generation exceeds onsite demand, the meter detects that the home is exporting energy back onto the grid, thus serving other customers. This is Excess Behind the Meter Production, and the demand served by it should still be included in Gross Load values for cost allocation purposes. Gross Load is used for settlement charges pertaining to reliability and grid services, and netting demand served by Excess Behind the Meter Production would ignore a portion of the customer's consumption that benefits from having access to the transmission system.[20] Moreover, by clarifying the Gross Load definition and monitoring reported values, the CAISO can ensure utilities report Gross Load consistently, thereby preventing them from adopting different practices that would inappropriately shift costs to others.

[19] "Demand," Appendix A to the CAISO tariff.

[20] To be sure, load-serving entities are only charged for the energy purchased from the CAISO markets according to their measured demand; not Gross Load. Excess Behind the Meter Production appropriately offsets measured demand.

C. Losses

The CAISO notes its current tariff language already requires scheduling coordinators to account for distribution losses in reporting Gross Load.[21] This requires scheduling coordinators to gross-up reported load values to capture the energy lost between the transmission-distribution interface and end-users' household meters.[22] Excess Behind the Meter Production exported onto the distribution system likely will be consumed by other loads and neighboring households on the distribution system. It is unlikely this energy will ever reach the transmission system or be stepped up to a higher voltage, which would generate meaningful losses. As such, the CAISO has *not* included tariff provisions applying loss factors to Excess Behind the Meter Production. Nevertheless, energy from Excess Behind the Meter Production offsets demand. Where there is Excess Behind the Meter Production, there are smaller losses due to less energy moving from the transmission system to the distribution grid to serve load. As a result, scheduling coordinators should apply their distribution loss factor only to that portion of Gross Load served by the CAISO, and not by Excess Behind the Meter Production.[23]

D. Reporting Requirement

The CAISO proposes to require scheduling coordinators that report Gross Load to report any measured Excess Behind the Meter Production as well.[24] The CAISO proposes that scheduling coordinators submit Excess Behind the Meter Production values at their load's respective default or custom load aggregation point ("DLAP") level, consistent with how they report Gross Load today.[25] The CAISO will publish Excess Behind the Meter Production values on OASIS.[26] This will provide the CAISO and

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21 "Gross Load," Appendix A to the CAISO tariff.

22 Similar loss factors apply to generating resources to reflect the amount of energy that is lost between the generator and the point of injection onto the transmission or distribution system. (Neither this type of losses factor nor distribution losses should be confused with transmission losses, which are an element of locational-marginal price).

23 Calculating distribution loss factors and applying them in reporting Gross Load are explained in detail in the CAISO's Business Practice Manuals. The CAISO reviews distribution loss factor calculations through its Settlement Quality Meter Data Plan requirements. *See* Section 10.3.7.1 of the CAISO tariff.

24 Proposed sections 11.11.3 and 26.1(g) of the CAISO tariff.

25 Excess Behind the Meter Production generally originates from end users. End users do not require specific PNodes (like wholesale generators), and modeling each of them at PNodes would not be feasible for the CAISO's optimization processes.

26 *Id*.

market participants greater transparency on system demand and how that demand is served.

These revisions are just and reasonable and not unduly discriminatory. The CAISO and stakeholders believe it is essential to clarify the definition of Gross Load and report Excess Behind the Meter Production. Doing so will ensure similar treatment of similarly situated entities and consistent application of several settlement charges, especially the Regional Access Charge.

E. Settlement Charges

As part of this stakeholder initiative, the CAISO also reviewed its settlement tariff provisions to ensure they provided the correct load term: Gross Load or Measured Demand. Appendix A defines Measured Demand as "The metered CAISO Demand plus Real-Time Interchange Export Schedules, excluding that portion of Demand of Non-Generator Resources dispatched as Regulation through Regulation Energy Management." Measured Demand refers to the demand served by participating generators. In contrast to Gross Load, Measured Demand excludes demand served by Excess Behind the Meter Production.

The CAISO believes energy-based services[27] should use Measured Demand as the billing determinant, but reliability and transmission-related services should use Gross Load as the billing determinant because the need for those reliability and transmission services is not offset by Excess Behind the Meter Production. Consumers benefit equally from reliability and transmission services regardless of where their energy originated. As such, subtracting any demand served by Excess Behind the Meter Production would inappropriately shift costs. Nearly all of the CAISO's reliability and transmission-related service settlement provisions already use Gross Load as the billing determinant. However, in reviewing the CAISO's settlement provisions, the CAISO identified three settlement provisions for revision.

First, the CAISO proposes to revise the billing determinant for Voltage Support from Measured Demand to Gross Load. Voltage Support comes from CAISO generators and transmission facilities such as shunt capacitors, static VAR compensators, and synchronous condensers required to maintain established grid voltage criteria. Currently the tariff states the Voltage Support user rate for any Settlement Period are based on the sum of Voltage Support payments made to scheduling coordinators in accordance with Section 11.10.1.4, divided by Measured

[27] *E.g.*, energy and ancillary service charges.

Demand. The CAISO proposes to change the billing determinant to Gross Load because Voltage Support is a reliability and transmission-related service. Load-serving entities and consumers benefit from Voltage Support regardless of whether their demand is met by generation from the transmission grid or behind-the-meter generation.

Second, the CAISO proposes to clarify the calculation of real-time market congestion credits for existing transmission contracts ("ETCs")[28] and transmission ownership rights ("TORs").[29] ETCs and TORs coordinate the use of CAISO transmission capacity outside of the CAISO markets. They generally represent bilateral transmission contracts that predate the CAISO, originate from non-participating transmission owners, or both. Congestion credits make ETCs and TORs whole when they are exposed to the congestion costs.[30] In calculating the congestion credits, the CAISO tariff currently uses "metered CAISO Demand" to calculate demand. But using metered CAISO Demand could inappropriately expose ETCs and TORs to congestion costs where there is Excess Behind the Meter Production. To ensure this does not occur, the CAISO proposes to change this reference to Gross Load. Using the Gross Load figure will ensure the congestion calculation is consistent with the intent of this tariff provision.

Finally, the CAISO found that some subsections of Section 43A.8 of the tariff were ambiguous because they were referred to "Load" instead of Gross Load. The CAISO proposes to clarify these provisions by specifying that they refer to Gross Load instead of merely Load.[31] These are clarifications only, and do not change CAISO policy or practice.[32]

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[28] Defined in Appendix A to the CAISO tariff as "The contracts which grant transmission service rights in existence on the CAISO Operations Date (including any contracts entered into pursuant to such contracts) as may be amended in accordance with their terms or by agreement between the parties thereto from time to time."

[29] Defined in Appendix A to the CAISO tariff as "The ownership or joint ownership right to transmission facilities within the CAISO Balancing Authority Area of a Non-Participating TO that has not executed the Transmission Control Agreement, which transmission facilities are not incorporated into the CAISO Controlled Grid."

[30] *See* Section 11.5.7.1 of the CAISO tariff.

[31] *See* proposed sections 43A.8.

[32] The CAISO also proposes to add numbering and punctuation to Section 11.8.1 to clarify the meaning of that provision.

III. Stakeholder Process

The stakeholder process that resulted in this filing included:

- Four issue papers issued by the CAISO;
- Developing draft tariff provisions;
- Five stakeholder meetings and conference calls to discuss the CAISO papers and the draft tariff provisions; and
- Five opportunities to submit written comments on the CAISO papers and the draft tariff provisions.[33]

The proposals were presented to the CAISO Board during its public meeting on May 15, 2019. The Board voted unanimously to authorize this filing.[34] Stakeholders generally supported the CAISO's proposed tariff revisions to bring visibility to Excess Behind the Meter Generation and ensure consistent reporting of Gross Load. The CAISO's Department of Market Monitoring and the California Public Utilities Commission Public Advocates Office had some questions about the extent the CAISO's proposed tariff revisions would apply to metered subsystems and other publicly owned utilities. This question goes to two issues: (1) jurisdiction over retail metering, and (2) the metered subsystem arrangement for energy and demand.

First, local regulatory authorities generally have jurisdiction over retail meter installations. The tariff revisions described in this filing only would require scheduling coordinators to report Excess Behind the Meter Generation to the extent the utility has that data. The CAISO would not require the installation of retail smart meters where they are not already in place. But smart meters are becoming commonplace throughout California, especially for consumers with behind the meter generation.

Second, metered subsystems generally are municipal or public entities that are participating transmission owners metered and settled at the "citygate" level for energy and demand. The CAISO tariff defines a metered subsystem as

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[33] Materials regarding the stakeholder initiative are available on the CAISO website at https://stakeholdercenter.caiso.com/StakeholderInitiatives/Excess-behind-the-meter-production.

[34] Materials related to the Board's authorization to prepare and submit this filing are available on the CAISO website at http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=AAD6E63F-E9C5-4DEC-AF02-1413CE86FD3A. The memorandum provided to the Board regarding the proposals in this filing is contained in Attachment D to this filing.

> A geographically contiguous system located within a single zone which has been operating as an electric utility for a number of years prior to the CAISO Operations Date as a municipal utility, water district, irrigation district, state agency or federal power marketing authority subsumed within the CAISO Balancing Authority Area and encompassed by CAISO certified revenue quality meters at each interface point with the CAISO Controlled Grid and CAISO certified revenue quality meters on all Generating Units or, if aggregated, each individual resource, Participating Load, Reliability Demand Response Resource, and Proxy Demand Resource internal to the system, which is operated in accordance with a MSS Agreement described in Section 4.9.1.[35]

The CAISO settles metered subsystems for energy they provide beyond their own demand, or for any demand when their own generation cannot meet their own demand.[36] Moreover, because metered subsystems generally are municipal utilities, whether they have adopted smart meters varies. In any case, altering their fundamental treatment for metering and settling energy and demand was not part of the CAISO's stakeholder initiative.[37] The tariff revisions described in this filing only would require scheduling coordinators for metered subsystems to report Excess Behind the Meter Generation to the extent the metered subsystems have that data, and any other changes to metered subsystems' metering and settlement arrangements are beyond scope.

PG&E also noted that grid topology is evolving, and argued that the CAISO should allow scheduling coordinators to apply distribution losses to Excess Behind the Meter Production. The CAISO is not foreclosed to future consideration of this issue; however, at this time there is no evidence Excess Behind the Meter Production accrues losses. Excess Behind the Meter Production generally comes from residential rooftop solar, and serves the nearest source of demand without going through any transformer.

IV. Effective Date and Request for Order

The CAISO requests that the Commission accept the tariff revisions proposed in this filing effective January 1, 2021. This effective date will allow affected transmission owners to align the proposed tariff revisions with their annual rate schedules.

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35 "Metered Subsystem," Appendix A to the CAISO tariff.

36 *See* Section 11.7 of the CAISO tariff;

37 As shown on Table 4, above, all metered subsystems combined comprise only 3.5 percent of the CAISO's annual Gross Load.

V. Communications

In accordance to Rule 203(b)(3) to the Commission's Rules of Practice and Procedure,[38] the CAISO respectfully requests that correspondence and other communications regarding this filing should be directed to:

Roger E. Collanton
General Counsel
Sidney L. Mannheim
Assistant General Counsel
William H. Weaver
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California Independent System
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VI. Service

The CAISO has served copies of this filing on the California Public Utilities Commission, the California Energy Commission, and all parties with scheduling coordinator agreements under the CAISO tariff. In addition, the CAISO has posted a copy of this filing on the CAISO website.

[38] 18 C.F.R. § 385.203(b)(3).

VII. Contents of Filing

Besides this transmittal letter, this filing includes these attachments:

Attachment A	Clean CAISO tariff sheets incorporating this tariff amendment;
Attachment B	Red-lined document showing the revisions in this tariff amendment;
Attachment C	Final policy papers on this tariff amendment; and
Attachment D	Board memorandum.

VIII. Conclusion

For the reasons set forth in this filing, the CAISO respectfully requests that the Commission accept the tariff revisions proposed in the filing effective January 1, 2021.

Respectfully submitted,

/s/ William H. Weaver

Roger E. Collanton
General Counsel
Sidney L. Mannheim
Assistant General Counsel
William H. Weaver
Senior Counsel

Counsel for the California Independent
System Operator Corporation

Attachment A – Clean Tariff

Excess Behind the Meter Production

California Independent System Operator Corporation

October 23, 2020

Appendix A

* * * * *

- Excess Behind the Meter Production

Energy from an End-Use Customer in excess of its onsite Demand

*** * * * ***

- Gross Load

Demand (adjusted for distribution losses) of End-Use Customer Loads directly connected to the transmission facilities or directly connected to the Distribution System of a Utility Distribution Company or MSS Operator located in a PTO Service Territory. Gross Load includes Load served by Excess Behind the Meter Production. Excess Behind the Meter Production shall not be netted against End-Use Customer Load in determining Gross Load. Gross Load excludes:

(1) Load with respect to which the Wheeling Access Charge is payable;

(2) Load that is exempt from the Access Charge pursuant to Section 4.1 of Appendix I;

(3) Load of an individual retail customer served by its own onsite Generating Unit or energy storage device, or as authorized by Section 218 of the California Public Utilities Code;

(4) Onsite Load served by a qualifying small power production facility or qualifying cogeneration facility, as those terms are defined in the FERC's regulations implementing Section 201 of the Public Utility Regulatory Policies Act of 1978; and

(5) Load secured by Standby Service from a Participating TO under terms approved by a Local Regulatory Authority or FERC, as applicable, or can be curtailed concurrently with an Outage of the Generating Unit serving the Load.

Gross Load forecasts consistent with filed Transmission Revenue Requirements will be provided by each Participating TO to the CAISO. For purposes of this definition, Generating Units, storage devices, and Loads will be considered onsite where they share, or are sub-metered behind, the same meter.

* * * * *

Section 11

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11.5.7 Congestion Credit and Marginal Credit of Losses Credit

11.5.7.1 RTM Congestion Credit for ETCs and TORs

The CAISO shall not apply charges or payments to Scheduling Coordinators related to the MCC associated with all Points of Receipt and Points of Delivery pairs associated with valid and balanced ETC Self-Schedules or TOR Self-Schedules after the Day-Ahead Market. The balanced portion for each ETC or TOR contract for each Settlement Interval will be based on the difference between: (1) the minimum of (a) the total Demand, (b) the total ETC or TOR Supply Self-Schedule submitted in RTM, including changes after twenty (20) minutes before the applicable Trading Hour if such change is permitted by the Existing Contract, or (c) the Existing Contract maximum capacity as specified in the TRTC Instructions; and (2) the valid and balanced portion of the Day-Ahead Schedule. In determining the balanced portions, the CAISO evaluates the amounts based on the following variables: (a) for exports and imports, the CAISO

shall use the schedule quantity specified in the Interchange schedule used for check out between CAISO and other Balancing Authority Areas; (b) for CAISO Demand, the CAISO shall use the Gross Load associated with the applicable ETC or TOR; and (c) for all Generation the CAISO shall use the quantity specified in the Dispatch Instructions. For each Scheduling Coordinator, the CAISO shall determine for each Settlement Interval the applicable RTM Congestion Credit for FMM Instructed Imbalance Energy or RTD Instructed Imbalance Energy, which can be positive or negative, as the sum of the product of the relevant MWh quantity and the applicable weighted average MCC at each Point of Receipt and Point of Delivery associated with the valid and balanced portions of that Scheduling Coordinator's ETC or TOR Self-Schedules. The weights in the two markets will be based on the absolute values of the (a) deviation of the FMM Schedule or the CAISO Forecast of CAISO Demand used in the FMM from Day-Ahead Schedules and (b) deviation of the RTD schedule or the CAISO Forecast of CAISO Demand used in the RTD from Day-Ahead Schedules.

*** * * * ***

11.10.7 Voltage Support

The Voltage Support user rate for any Settlement Period shall be calculated based on the sum of Voltage Support payments made to Scheduling Coordinators in accordance with Section 11.10.1.4, divided by Gross Load, excluding metered Demand inside an MSS except as provided by Section 4.9.4.4. The Voltage Support charge for any Settlement Period payable by a Scheduling Coordinator is the Voltage Support user rate multiplied by the quantity of Gross Load, excluding Demand within an MSS except as provided by Section 4.9.4.4, for which that Scheduling Coordinator is responsible in that Settlement Period.

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11.11 RACs and Wheeling Transactions

11.11.1 Regional Access Charge

Regional Access Charges will be levied in accordance with Section 26.1 and Appendix F, Schedule 3.

11.11.2 Wheeling Through and Wheeling Out Transactions

The CAISO shall calculate, account for and settle charges and payments for Wheeling Through and Wheeling Out transactions in accordance with Section 26.1.4 and Appendix F, Schedule 3, Section 14.

11.11.3 Reporting Gross Load and Excess Behind the Meter Production

In reporting Gross Load to the CAISO, each Scheduling Coordinator also will report the extent to which Excess Behind the Meter Production served that Gross Load. The value for Excess Behind the Meter Production will be reported as a separate value, and Scheduling Coordinators must include Load served by Excess Behind the Meter Production in reporting Gross Load. The CAISO will use Excess Behind the Meter Production values for informational purposes and to ensure Scheduling Coordinators report Gross Load accurately. The CAISO will publish Excess Behind the Meter Production values on OASIS.

* * * * *

11.18 Emissions Costs

11.18.1 Obligation to Pay Emissions Costs Charges

Each Scheduling Coordinator shall be obligated to pay a charge in accordance with this Section 11.18, which will be used to pay the verified Emissions Costs incurred by an Emissions Eligible Generator during a CAISO Commitment Period. The CAISO shall levy this administrative charge (the Emissions Cost charge) each month, against all Scheduling Coordinators based

upon each Scheduling Coordinator's (1) Balancing Authority Area Gross Load, and (2) Demand within California outside of the CAISO Balancing Authority Area that is served by exports from the CAISO Balancing Authority Area. Scheduling Coordinators shall make payment for all Emissions Cost charges in accordance with the CAISO Payments Calendar.

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Section 26

26. Transmission Rates and Charges

26.1 Access Charge

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(g) **Reporting Gross Load and Excess Behind the Meter Production.** In reporting Gross Load to the CAISO, each Scheduling Coordinator also will report the extent to which Excess Behind the Meter Production served that Gross Load. The value for Excess Behind the Meter Production will be reported as a separate value, and Scheduling Coordinators must include Load served by Excess Behind the Meter Production in reporting Gross Load. The CAISO will use Excess Behind the Meter Production values for informational purposes and to ensure Scheduling Coordinators report Gross Load accurately. The CAISO will publish Excess Behind the Meter Production values on OASIS.

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Section 43A

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43A.8.3 Collective Deficiency in Local Capacity Area Resources

If the CAISO makes designations under Section 43A.2.2 the CAISO shall allocate the costs of such designations to all Scheduling Coordinators for LSEs serving Load in the TAC Area(s) in which the deficient Local Capacity Area was located. The allocation will be based on the Scheduling Coordinators' proportionate share of Gross Load in such TAC Area(s) as determined in accordance with Section 40.3.2, excluding Scheduling Coordinators for LSEs that procured additional capacity in accordance with Section 43A.2.1.2 on a proportionate basis, to the extent of their additional procurement.

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43A.8.5 Allocation of CPM Significant Event Costs

If the CAISO makes any CPM Significant Event designations under Section 43A.2.4, the CAISO shall allocate the costs of such designations to all Scheduling Coordinators for LSEs that serve Load in the TAC Area(s) in which the CPM Significant Event caused or threatened to cause a failure to meet Reliability Criteria based on the percentage of actual Gross Load of each LSE represented by the Scheduling Coordinator in the TAC Area(s) to total Gross Load in the TAC Area(s) as recorded in the CAISO Settlement system for the actual days during any Settlement month period over which the designation has occurred.

43A.8.6 Allocation of Exceptional Dispatch CPMs

If the CAISO makes any Exceptional Dispatch CPM designations under Section 43A.2.5, the CAISO shall allocate the costs of such designations to all Scheduling Coordinators for LSEs that

serve Load in the TAC Area(s) in which the need for the Exceptional Dispatch CPM arose based on the percentage of actual Gross Load of each LSE represented by the Scheduling Coordinator in the TAC Area(s) to total Gross Load in the TAC Area(s) as recorded in the CAISO Settlement system for the actual days during any Settlement month period over which the designation has occurred.

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Attachment B – Tariff Redlines

Excess Behind the Meter Production

California Independent System Operator Corporation

October 23, 2020

Appendix A

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- Excess Behind the Meter Production

Energy from an End-Use Customer in excess of its onsite Demand

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- Gross Load

~~For the purposes of calculating the transmission Access Charge, Gross Load is all Energy~~ Demand (adjusted for distribution losses) ~~delivered for the supply~~ of End-Use Customer Loads directly connected to the transmission facilities or directly connected to the Distribution System of a Utility Distribution Company or MSS Operator located in a PTO Service Territory. Gross Load includes Load served by Excess Behind the Meter Production. Excess Behind the Meter Production shall not be netted against End-Use Customer Load in determining Gross Load.

Gross Load ~~shall~~ excludes:

(1) Load with respect to which the Wheeling Access Charge is payable;

(2) Load that is exempt from the Access Charge pursuant to Section 4.1 of Appendix I; ~~and~~

(3) ~~the portion of the~~ Load of an individual retail customer served by its own onsite Generating Unit or energy storage device, or as authorized by Section 218 of the California Public Utilities Code;

~~of a Utility Distribution Company, Small Utility Distribution Company, or MSS Operator that is served by a Generating Unit that: (a) is located on the customer's~~

~~site or provides service to the customer's site through arrangements as authorized by Section 218 of the California Public Utilities Code;~~

(4~~b~~) Onsite Load served by ~~is~~ a qualifying small power production facility or qualifying cogeneration facility, as those terms are defined in the FERC's regulations implementing Section 201 of the Public Utility Regulatory Policies Act of 1978; and

(5~~c~~) Load secured~~s~~ by Standby Service from a Participating TO under terms approved by a Local Regulatory Authority or FERC, as applicable, or can be curtailed concurrently with an Outage of the Generating Unit serving the Load.

Gross Load forecasts consistent with filed Transmission Revenue Requirements will be provided by each Participating TO to the CAISO. For purposes of this definition, Generating Units, storage devices, and Loads will be considered onsite where they share, or are sub-metered behind, the same meter.

* * * * *

Section 11

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11.5.7 Congestion Credit and Marginal Credit of Losses Credit

11.5.7.1 RTM Congestion Credit for ETCs and TORs

The CAISO shall not apply charges or payments to Scheduling Coordinators related to the MCC associated with all Points of Receipt and Points of Delivery pairs associated with valid and balanced ETC Self-Schedules or TOR Self-Schedules after the Day-Ahead Market. The balanced portion for each ETC or TOR contract for each Settlement Interval will be based on

the difference between: (1) the minimum of (a) the total Demand, (b) the total ETC or TOR Supply Self-Schedule submitted in RTM, including changes after twenty (20) minutes before the applicable Trading Hour if such change is permitted by the Existing Contract, or (c) the Existing Contract maximum capacity as specified in the TRTC Instructions; and (2) the valid and balanced portion of the Day-Ahead Schedule. In determining the balanced portions, the CAISO evaluates the amounts based on the following variables: (a) for exports and imports, the CAISO shall use the schedule quantity specified in the Interchange schedule used for check out between CAISO and other Balancing Authority Areas; (b) for CAISO Demand, the CAISO shall use the ~~metered CAISO Demand~~Gross Load associated with the applicable ETC or TOR; and (c) for all Generation the CAISO shall use the quantity specified in the Dispatch Instructions. For each Scheduling Coordinator, the CAISO shall determine for each Settlement Interval the applicable RTM Congestion Credit for FMM Instructed Imbalance Energy or RTD Instructed Imbalance Energy, which can be positive or negative, as the sum of the product of the relevant MWh quantity and the applicable weighted average MCC at each Point of Receipt and Point of Delivery associated with the valid and balanced portions of that Scheduling Coordinator's ETC or TOR Self-Schedules. The weights in the two markets will be based on the absolute values of the (a) deviation of the FMM Schedule or the CAISO Forecast of CAISO Demand used in the FMM from Day-Ahead Schedules and (b) deviation of the RTD schedule or the CAISO Forecast of CAISO Demand used in the RTD from Day-Ahead Schedules.

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11.10.7 Voltage Support

The Voltage Support user rate for any Settlement Period shall be calculated based on the sum of Voltage Support payments made to Scheduling Coordinators in accordance with Section 11.10.1.4, divided by ~~Measured Demand~~Gross Load, excluding metered Demand inside an

MSS except as provided by Section 4.9.4.4. The Voltage Support charge for any Settlement Period payable by a Scheduling Coordinator is the Voltage Support user rate multiplied by the quantity of ~~Measured Demand~~Gross Load, excluding Demand within an MSS except as provided by Section 4.9.4.4, for which that Scheduling Coordinator is responsible in that Settlement Period.

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11.11 RACs and Wheeling Transactions

11.11.1 Regional Access Charge

Regional Access Charges will be levied in accordance with Section 26.1 and Appendix F, Schedule 3.

11.11.2 Wheeling Through and Wheeling Out Transactions

The CAISO shall calculate, account for and settle charges and payments for Wheeling Through and Wheeling Out transactions in accordance with Section 26.1.4 and Appendix F, Schedule 3, Section 14.

11.11.3 Reporting Gross Load and Excess Behind the Meter Production

In reporting Gross Load to the CAISO, each Scheduling Coordinator also will report the extent to which Excess Behind the Meter Production served that Gross Load. The value for Excess Behind the Meter Production will be reported as a separate value, and Scheduling Coordinators must include Load served by Excess Behind the Meter Production in reporting Gross Load. The CAISO will use Excess Behind the Meter Production values for informational purposes and to ensure Scheduling Coordinators report Gross Load accurately. The CAISO will publish Excess Behind the Meter Production values on OASIS.

* * * * *

11.18 Emissions Costs

11.18.1 Obligation to Pay Emissions Costs Charges

Each Scheduling Coordinator shall be obligated to pay a charge in accordance with this Section 11.18, which will be used to pay the verified Emissions Costs incurred by an Emissions Eligible Generator during a CAISO Commitment Period. The CAISO shall levy this administrative charge (the Emissions Cost charge) each month, against all Scheduling Coordinators based upon each Scheduling Coordinator's (1) Balancing Authority Area Gross Load, and (2) Demand within California outside of the CAISO Balancing Authority Area that is served by exports from the CAISO Balancing Authority Area. Scheduling Coordinators shall make payment for all Emissions Cost charges in accordance with the CAISO Payments Calendar.

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Section 26

26. Transmission Rates and Charges

26.1 Access Charge

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(g) **Reporting Gross Load and Excess Behind the Meter Production.** In reporting Gross Load to the CAISO, each Scheduling Coordinator also will report the extent to which Excess Behind the Meter Production served that Gross Load. The value for Excess Behind the Meter Production will be reported as a separate value, and Scheduling Coordinators must include Load served by Excess Behind

the Meter Production in reporting Gross Load. The CAISO will use Excess Behind the Meter Production values for informational purposes and to ensure Scheduling Coordinators report Gross Load accurately. The CAISO will publish Excess Behind the Meter Production values on OASIS.

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Section 43A

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43A.8.3 Collective Deficiency in Local Capacity Area Resources

If the CAISO makes designations under Section 43A.2.2 the CAISO shall allocate the costs of such designations to all Scheduling Coordinators for LSEs serving Load in the TAC Area(s) in which the deficient Local Capacity Area was located. The allocation will be based on the Scheduling Coordinators' proportionate share of Gross Load in such TAC Area(s) as determined in accordance with Section 40.3.2, excluding Scheduling Coordinators for LSEs that procured additional capacity in accordance with Section 43A.2.1.2 on a proportionate basis, to the extent of their additional procurement.

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43A.8.5 Allocation of CPM Significant Event Costs

If the CAISO makes any CPM Significant Event designations under Section 43A.2.4, the CAISO shall allocate the costs of such designations to all Scheduling Coordinators for LSEs that serve Load in the TAC Area(s) in which the CPM Significant Event caused or threatened to cause a

failure to meet Reliability Criteria based on the percentage of actual Gross Load of each LSE represented by the Scheduling Coordinator in the TAC Area(s) to total Gross Load in the TAC Area(s) as recorded in the CAISO Settlement system for the actual days during any Settlement month period over which the designation has occurred.

43A.8.6 Allocation of Exceptional Dispatch CPMs

If the CAISO makes any Exceptional Dispatch CPM designations under Section 43A.2.5, the CAISO shall allocate the costs of such designations to all Scheduling Coordinators for LSEs that serve Load in the TAC Area(s) in which the need for the Exceptional Dispatch CPM arose based on the percentage of actual Gross Load of each LSE represented by the Scheduling Coordinator in the TAC Area(s) to total Gross Load in the TAC Area(s) as recorded in the CAISO Settlement system for the actual days during any Settlement month period over which the designation has occurred.

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Attachment C – Final Policy Papers

Excess Behind the Meter Production

California Independent System Operator Corporation

October 23, 2020

California ISO

Excess BTM Production

Draft Final Proposal

Date paper published: December 12, 2018

Table of Contents

1 Executive Summary

The frequency and magnitude of excess behind the meter (BTM) production – periods when a customer's behind the meter resources generate output above host load – are increasing as more behind the meter resources are integrated into the system. The treatment of excess behind the meter production directly impacts downstream financial settlement allocations based on Gross Load figures that scheduling coordinators submit to the ISO. Because of these settlement impacts, it is critical that scheduling coordinators report Gross Load values to the ISO in a consistent manner.

The ISO observed inconsistencies in how scheduling coordinators report Gross Load. Sometimes scheduling coordinators report Gross Load after netting excess behind the meter production, and other times without netting excess behind the meter production. When excess behind the meter production is not netted from Gross Load, the values are captured in unaccounted for energy, and when Gross Load is reported inconsistently it results in disproportionate allocations of all load based charges, which includes the Transmission Access Charge (TAC).[1] Finally, the ISO has no visibility into how much, if any, excess behind the meter production energy is embedded in the Gross Load or unaccounted for energy currently.

Through this initiative, the ISO intends to address the following items:

1. Clarify the tariff definition of Gross Load and ensure scheduling coordinators are reporting it consistently
2. Create a clear tariff definition for excess behind the meter production
3. Specify how scheduling coordinators must report excess behind the meter production and how it is settled

This straw proposal outlines an updated definition for Gross Load. This definition specifically states that Gross Load must not have any excess behind the meter production included in the figure reported to the ISO. Gross Load values should be roughly equal to the aggregate consumption measured by retail meters.

This straw proposal also includes details on a new tariff term called "Excess Behind the Meter Production." Values for excess behind the meter production must be reported to the ISO by the applicable scheduling coordinators. This figure captures the sum of the energy sent to the grid during periods when a customer's behind the meter resource generates above the host load.

Finally, this straw proposal outlines how excess behind the meter production will be treated by the ISO. In this straw proposal, the ISO is not proposing any changes to the way the Gross Load is currently treated. Appendix A outlines the list of charge codes that will be settled on Gross Load going forward. The ISO proposes that excess behind the meter production will be reported and settled as a negative load at its respective default load aggregation point (DLAP) or custom load aggregation point (CLAP).

[1] Load based charge codes are included in Appendix A for reference.

By implementing these three proposed changes, the ISO will eliminate inconsistent reporting of Gross Load and require scheduling coordinators report excess behind the meter production values to the ISO by default or custom load aggregation point. Making these changes and including a measure for excess behind the meter production will result in more accurate settlement figures more representative of true market conditions.

2 Plan for Stakeholder Engagement

This stakeholder initiative is organized to allow time for careful consideration of issues surrounding excess behind the meter production. The ISO intends to present its draft final proposal at the May 2019 ISO Board of Governors meeting. The currently planned schedule for this initiative is shown below.

Table 1 – Stakeholder initiative schedule

Milestone	Date
Post Issue Paper	6/28/2018
Stakeholder Call	7/10/2018
Stakeholder Written Comments Due	7/18/2018
Post Straw Proposal	9/4/2018
Stakeholder Call	9/12/2018
Stakeholder Written Comments Due	9/26/2018
Revised Straw Proposal Posted	11/5/2018
Stakeholder Call	11/13/2018
Stakeholder Written Comments Due	11/27/2018
Draft Final Proposal Posted	12/12/2018
Stakeholder Call	12/19/2018
Stakeholder Written Comments Due	1/16/2019
Board of Governors Meeting	May 16-17, 2019

3 Changes and Feedback from the Revised Straw Proposal

The primary goals of the initiative and most of the implementation details remain unchanged from the revised straw proposal. In this version of the paper the ISO made some additional changes and added clarifying details in response to stakeholder comments. Changes made since the straw proposal are detailed below.

1. Clarify that the treatment of smaller POUs and MSSs is out of scope for this initiative.

The ISO's proposal for excess BTM production would not apply to certain entities that have metering arrangements negotiated and implemented before the ISO's inception, such as some smaller POUs and certain MSS entities. These entities generally have load figures that are calculated at a citygate metering point from various inputs. Further, these entities generally report Gross Load figures that account for visible distributed resource production. They also do not have requirements to install automated metering infrastructure (AMI) smart meters or other enhanced metering infrastructure to capture values for excess behind the meter production. Nor does the ISO have jurisdiction to require retail metering changes on such entities. In any case, overhauling the long-standing metering rules for these entities is out of scope for an issue that only nominally affects their metering.

2. Provide response to feedback on losses.

Pacific Gas and Electric indicated that it would like the ISO to continue consideration of the treatment of losses through this initiative:

> PG&E agrees with the characterization that if EBTMP goes to serve load in a neighboring household within the same distribution line, there should be avoided loss IF that energy would have come from the transmission-connected generator otherwise. The amount of avoided loss, however, is dependent on amount of loss that occurs traveling from one point on the distribution node to another. While that assumption still mostly holds, California's distribution grid is rapidly changing, and a one-way power flow system is increasingly not the norm.

Although there may currently be rare instances when excess behind the meter production is not offsetting energy from transmission-connected generation, this is by far the exception rather than the rule. The ISO believes that the treatment of losses outlined in this proposal is a reasonable approach for current conditions. PG&E raises a valid concern that the makeup of the grid is changing in ways that likely impact the actual accrual of losses on the grid; however, the ISO remains committed to accurately modelling losses in a manner that reflects realistic assumptions for energy flow. As conditions continue to evolve, the ISO will continue to evaluate.

4 Background and Issue

The proliferation of distributed energy resources, particularly behind the meter rooftop solar, increased rapidly throughout the ISO balancing area during the last decade. The ISO expects the continued expansion of behind the meter resources in the future. There are currently about 6,200 MW of non-utility behind the meter rooftop solar installed in the ISO balancing area, with over 2,500 MW installed since 2016.[2] Because of the recent and vigorous adoption of these resources, a number of potential issues related to their impact on various aspects of the ISO markets and operations have become more relevant and now require addressing.

The ISO observed inconsistencies in how Gross Load data was submitted to the ISO, where some data was submitted with excess behind the meter production netted from totals and some where it was not netted. In response to these findings, the ISO began this initiative to determine what parts of the tariff should be clarified, and how excess behind the meter production should be treated for resources in the ISO.

Excess behind the meter production refers to energy generated by behind the meter resources above host customers' load. This occurs during periods when a household or customer site with a behind the meter resource produces more energy than the household or customer site is consuming. Any excess behind the meter production is injected back onto the grid and consumed by other customers.

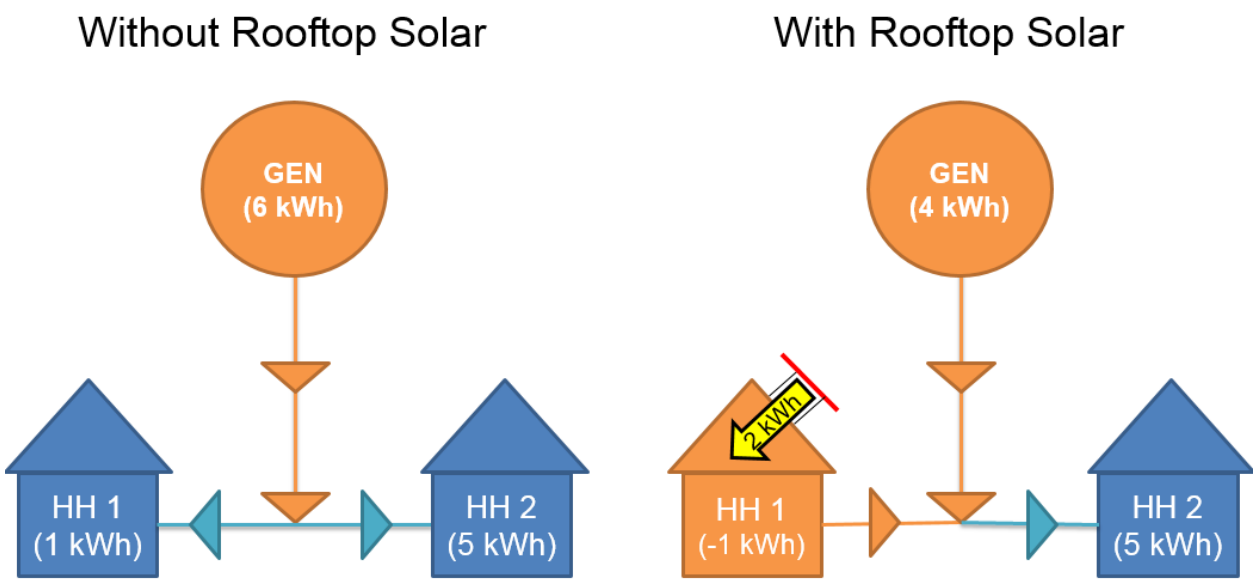
To help illustrate these concepts, the ISO provides the following example to illustrate excess behind the meter production. This example assumes a snapshot in time to demonstrate periods that display occurrences of excess behind the meter production. In this example we can imagine a set of two households. The second household consumes 5 kWh of energy, while the first household consumes 1 kWh of energy, but has a rooftop solar panel capable of generating 2 kWh of energy when the sun is shining. Figure 1 is a simplified line diagram representing the two households with the left half depicting energy flows without sun and the right half depicting energy flows when the sun is shining and household 1 is generating solar energy.

There are a few key takeaways from Figure 1 worth noting, which are listed below:

- Both households consume the same amount of energy with and without solar generation
- With solar generation household 1 injects 1 kWh of energy back onto the grid, which reduces the generation from the traditional generator from 6 kWh to 4 kWh
- **Excess behind the meter production** with solar generation is 1 kWh, or the amount of energy exported by household 1
- The **Gross Load** with solar generation is 5 kWh, or the amount of energy consumed by household 2

Figure 1 – Simple line diagram example

[2] https://www.californiadgstats.ca.gov.



The ISO also provides the following descriptions and tables to further describe and clarify these examples. Table 2 summarizes the same information outlined in Figure 1 when the sun is shining. In this table, row [A] represents the total energy consumed by each household, and row [B] represents the total amount of solar output from each of the households. Generally, for households with rooftop solar generation, these amounts may be unknown because energy measured at the household meter are reported as the summation of solar generation and host load. This means, when the sun is shining the meter on household 1 reads 1 kWh on the export channel, and 0 kWh on the load channel. Table 2 also shows these observed meter values in row [C] and row [D]. In this case, household 1 has a meter reading of 1 kWh on the export channel, while household 2 shows a meter reading of 5 kWh on the load channel of the meter.

Table 3 illustrates additional useful calculations for this example. Row [E] simply sums the actual consumption for both household 1 and 2. As mentioned above, this value may not be known, because each meter reports the summation of energy at the household level – either the total amount consumed or the total injected back onto the grid – rather than both numbers. In this example the total consumption is 6 kWh, or 1 kWh from household 1 and 5 kWh from household 2. Row [F] sums the total of the load channels from both households, in this case 5 kWh. Row [G] calculates the difference between the total consumption at each household less the total solar generation, or the net consumption at each household. In this example the total is 4 kWh.

On the lower half of Table 3, we show additional calculations including how Gross Load could be calculated and reported if excess behind the meter production was netted (row [H]) from these values, and how Gross Load could be reported if excess behind the meter production was not netted from these values (row [I]).

Table 2 – Gross Load reporting approach impacts example inputs

		Reported/observed value (kWhs)	
		Household 1	**Household 2**
Load	[A]	1 kWh	5 kWh
Rooftop Solar Output	[B]	2 kWh	0 kWh
Instantaneous Meter Read Load Channel	[C]	0 kWh	5 kWh
Instantaneous Meter Read Export Channel	[D]	1 kWh	0 kWh

When Gross Loads are reported to the ISO with excess behind the meter production netted from submissions, the ISO does not receive any data about the amount of excess behind the meter production. In the example above, if loads were reported to the ISO net of excess behind the meter production, the ISO would receive load values of 4 kWh, or the sum of all load less excess behind the meter production, without insight into the magnitude of the latter component.

If instead, loads are reported to the ISO without netting excess behind the meter production, the load values received would be 5 kWh, and 1 kWh would be captured as unaccounted for energy. In actual market scenarios, these unaccounted for energy values would be indistinguishable from other unaccounted for energy, and offer little insight into the actual amount of excess behind the meter production.

Table 3 - Gross Load reporting approach example settlement impacts outputs

			Reported/observed value (kWhs)
Σ Load	[E]	[A1 + A2]	1 kWh + 5 kWh = 6 kWh
Metered Load (Σ load channels)	[F]	[C1 + C2]	0 kWh + 5 kWh = 5 kWh
Σ of Load - Σ of Rooftop Solar Output	[G]	[(A1 + A2) - (B1 + B2)]	6 kWh – 2 kWh = 4 kWh
Gross Load with "netting excess BTM production"	[H]	[(C1 + C2) – (D1 + D2)]	5 kWh – 1 kWh = 4 kWh
Gross Load with "non-netting of excess BTM production"	[I]	[C1 + C2]	0 kWh + 5 kWh = 5 kWh

Finally, if both Gross Load (either with or without netting excess behind the meter production) and excess behind the meter production are reported to the ISO, both 5 kWh of total energy from summing the load channel energy and the 1 kWh of total excess behind the meter production from summing the generation channel energy are reported, it will provide load and excess behind the meter production visibility to the ISO.

In addition to issues of incomplete data, when some scheduling coordinators report loads that are net of excess behind the meter production and others report loads that are not net of excess behind the meter production, additional settlement issues can arise. Again, referencing the example above, suppose that two scheduling coordinators are reporting load, with the first reporting load net of excess behind the meter production, and the second reporting load without netting excess behind the meter production. The first would report a total load of 4 kWh, while the second would report a total of 5 kWh. In this simple example, charges, such as the transmission access charge, would be disproportionately allocated to load between the two entities, while actual system conditions would be identical. Additionally, the second scheduling coordinator would also incur additional charges and credits related to unaccounted for energy, where the first would not. This impact results in cost shifting among reporting areas.

The impacts of reporting load data differently as illustrated in this simple example demonstrate the need to clarify the definition of Gross Load so that it is reported consistently and uniformly to the ISO in all cases. It also highlights the need to clarify how excess behind the meter production is reported to the ISO.

5 Scope

The scope of this initiative has been carefully considered to address the issues outlined below, and does not include items addressed in other ongoing stakeholder initiatives (particularly the transmission access charge initiative) or ancillary topics.

Issues to be included in scope of this initiative:

The ISO proposes the scope of this initiative will include the following items:

1. Clarify a standard reporting practice for Gross Load
    - Specifically establish that these values should be consistently reported across the ISO and should not be reported net of excess behind the meter production
2. Establish a new tariff definition for excess behind the meter production
3. Establish how excess behind the meter production will be reported and settled
    - Excess behind the meter production will be paid the locational price where it is reported
    - Excess behind the meter production will not be 'grossed up' to include losses
    - Scheduling coordinators will report excess behind the meter production to the ISO generally using the same resource ID as load
4. Determine appropriate practice for representation of excess behind the meter production in ISO market processes
5. Explore potential impacts of reporting Gross Load and excess behind the meter production on Scheduling Coordinators that submit meter data to the ISO

Issues not in scope of this initiative:

This initiative will not address the following items:

1. Telemetry for the excess behind the meter production and the transmission access charge will not be addressed in this initiative
2. Collecting actual generation values from residential rooftop solar units, or any other residential or retail behind the meter resources. The focus of this effort is to clarify and receive accurate gross load data submissions only on those metering values currently available at household meters, such as channel 1 and channel 4.
3. Modifications to any generation or load involving distributed energy resource aggregations, demand response resources, wholesale Qualified Facilities and co-generation or combined heat and power (CHP) resources, or any other resources participating in ISO markets.
4. How excess behind the meter production impacts ISO short-term load forecasting processes or setting operating reserve requirements. The ISO notes that these processes and requirements utilize real-time data. Metering and settlements data is not utilized for the development of short term load forecasts or operating reserve requirements. However, pending the developments under this initiative, these processes may be informed by some of the resulting market changes and settlements data – *i.e.*,

this data could be used to improve some aspects of load forecasting and setting reserve requirements through other future efforts.

6 Proposal

As discussed above, it is important that load data is accurately and consistently reported to the ISO. Below, in Section 6.1, the ISO discusses the proposed clarifications to the tariff definition for Gross Load. Section 6.2 introduces an outline for the tariff term “Excess Behind the Meter Production”, and Section 6.3 discusses how the reported excess behind the meter production figures will be treated in the ISO settlement process. Section 6.4 outlines changes to the determination for unaccounted for energy. Section 6.5 discusses the application of losses related to excess behind the meter production.

6.1 Clarification to the Gross Load definition

A key issue central to a number of items addressed in this initiative is the inconsistent interpretation of the Gross Load definition in the ISO tariff. As noted above, the ISO recently became aware of inconsistencies in how excess behind the meter production was being reported to the ISO in Gross Load data submittals.

The ISO will clarify the Tariff definition of Gross Load through this initiative to specify that any excess behind the meter production should not be included in Gross Load (*i.e.*, behind the meter production will not be netted from Gross Load data submittals). It is not appropriate to net excess behind the meter production from Gross Load because such treatment would ignore a portion of the customer’s consumption that benefits from having access to, and use of, the transmission system. The ISO believes that distributed energy resource (DER) energy production should not be netted from the Gross Load values used for allocation of transmission access charges because the transmission system provides reliability and capacity services to all loads and supports the delivery of local generation.

The current definition of Gross Load is found in Appendix A to the ISO tariff:

> For the purposes of calculating the transmission Access Charge, Gross Load is all Energy (adjusted for distribution losses) delivered for the supply of End-Use Customer Loads directly connected to the transmission facilities or directly connected to the Distribution System of a Utility Distribution Company or MSS Operator located in a PTO Service Territory. Gross Load shall exclude (1) Load with respect to which the Wheeling Access Charge is payable; (2) Load that is exempt from the Access Charge pursuant to Section 4.1 of Appendix I; and (3) the portion of the Load of an individual retail customer of a Utility Distribution Company, Small Utility Distribution Company, or MSS Operator that is served by a Generating Unit that: (a) is located on the customer’s site or provides service to the customer’s site through arrangements as authorized by Section 218 of the California Public Utilities Code; (b) is a qualifying small power production facility or qualifying cogeneration facility, as those terms are defined in the FERC's

regulations implementing Section 201 of the Public Utility Regulatory Policies Act of 1978; and (c) secures Standby Service from a Participating TO under terms approved by a Local Regulatory Authority or FERC, as applicable, or can be curtailed concurrently with an Outage of the Generating Unit serving the Load. Gross Load forecasts consistent with filed Transmission Revenue Requirements will be provided by each Participating TO to the CAISO.[3]

The ISO proposes the following tariff revisions to the definition of Gross Load to help clarify the issues discussed herein:

~~For the purposes of calculating the transmission Access Charge, Gross Load is all Energy~~ Demand (adjusted for distribution losses) ~~delivered for the supply~~ of End-Use Customer Loads directly connected to the transmission facilities or directly connected to the Distribution System of a Utility Distribution Company or MSS Operator located in a PTO Service Territory. Gross Load includes Load served by Excess Behind the Meter Production. Excess Behind the Meter Production shall not be netted against End-Use Customer Load in determining Gross Load.~~Excess Behind the Production is not a component of Gross Load, and shall not be netted against End-Use Customer Load in determining Gross Load.~~ Gross Load ~~shall~~ excludes:

(1) Load with respect to which the Wheeling Access Charge is payable;

(2) Load that is exempt from the Access Charge pursuant to Section 4.1 of Appendix I; ~~and~~

(3) ~~the portion of the~~ Load of an individual retail customer served by its own onsite Generating Unit or energy storage device, or as authorized by Section 218 of the California Public Utilities Code;

~~of a Utility Distribution Company, Small Utility Distribution Company, or MSS Operator that is served by a Generating Unit that: (a) is located on the customer's site or provides service to the customer's site through arrangements as authorized by Section 218 of the California Public Utilities Code;~~

(~~4b~~) Onsite Load served by ~~is~~ a qualifying small power production facility or qualifying cogeneration facility, as those terms are defined in the FERC's regulations implementing Section 201 of the Public Utility Regulatory Policies Act of 1978; and

(~~5c~~) Load secure~~ds~~ by Standby Service from a Participating TO under terms approved by a Local Regulatory Authority or FERC, as applicable, or can be curtailed concurrently with an Outage of the Generating Unit serving the Load.

[3] http://www.caiso.com/Documents/AppendixA_MasterDefinitionSupplement_asof_Mar16_2018.pdf

Gross Load forecasts consistent with filed Transmission Revenue Requirements will be provided by each Participating TO to the CAISO. For purposes of this definition, Generating Units, storage devices, and Loads will be considered onsite where they share, or are sub-metered behind, the same meter.

These revisions are intended to do the following:

- Remove the introductory clause stating that this definition is for purposes of calculating the TAC, which implies that this definition is *only* relevant to the TAC. As discussed herein, Gross Load impacts a number of settlement charges, independent of the TAC settlement calculation.
- Clarify that "Gross Load" does not actually refer to Energy, which is "the electrical energy produced, flowing or supplied by generation, transmission or distribution facilities, being the integral with respect to time of the instantaneous power," but a measured subset of Demand, which is the instantaneous amount of energy that is delivered to Loads and Scheduling Points by generation, transmission or distribution facilities. This allows the removal of additional language that is both superfluous and confusing.
- Include an express provision that Gross Load includes Load served by Excess Behind the Meter Production, as defined below. This provision provides unambiguous direction on the treatment of such load.
- Re-format the definition to list each exclusion clearly, rather than having a list of exclusions with its own list of inclusions. This also allows the removal of the reiteration of locations in the third exclusion.
- For entities in the definition outlined above, specify how loads and resources—now expressly including storage—must be co-located, or "onsite," which the ISO defines as sharing or being sub-metered behind the same meter. The Generating Unit and the load must be electrically connected at the same point provided that the Generating Unit is on-line. The ISO seeks to avoid confusion regarding sub-metered load or generation behind a customer facility meter. Such loads should continue to be treated as onsite and therefore excluded from Gross Load.

6.2 Establish and define: Excess Behind the Meter Production

A critical goal for this initiative is to establish a clear and concise standard for reporting the excess behind the meter production quantities to ensure a uniform reporting practice going forward. The ISO proposes the introduction of a new term to the tariff called: Excess Behind the Meter Production. This term will be used to represent the amount of generation that exceeds host consumption. This value will be reported to the ISO in a similar fashion, but separately, to load figures.

The ISO proposes to define Excess Behind the Meter Production as: "Energy from an End-Use Customer in excess of its onsite Demand."

6.3 Excess Behind the Meter Production Settlement

In addition to establishing the new term, Excess Behind the Meter Production, in the tariff, the ISO also proposes that these values be treated by the ISO settlement system similar to negative load. Scheduling Coordinators that currently report load to the ISO will be required to report both Gross Load and Excess Behind the Meter Production values to the ISO going forward.[4] Both values will be subject to the LMP for load at the locations where they are reported to the ISO. Like load, the ISO proposes that scheduling coordinators submit Excess Behind the Meter Production values at their load's respective default or custom load aggregation point (DLAP) level rather than the pricing node (Pnode) or connectivity node (Cnode) level. Further, the values for Gross Load and Excess Behind the Meter Production should generally be reported at a single resource ID.

Appendix A lists charge codes that will be allocated based on the updated definition of Gross Load. Other charge codes, such as those for uplift and neutrality, will continue to be allocated based on demand. Demand will be calculated as the combined values of Gross Load and Excess Behind the Meter Production. In the case that Excess Behind the Meter Production exceeds Gross Load, settlement allocation for applicable charge codes will be completed as if the demand was 0, instead of a negative value. This is similar to the way the settlement system treats generation currently.

6.4 Unaccounted for Energy determination

As described above, today excess behind the meter production is not separately reported to the ISO, but instead is incorporated within load or unaccounted for energy values. Therefore, in addition to updating the definition of Gross Load to expressly exclude excess behind the meter production, the determination for Unaccounted For Energy will also need to be updated.

Current determination for UFE BY UDC:

UFE QUANTITY = GENERATION METER + INTERTIE IMPORT METER – (LOAD METER + EXPORT INTERTIE METER + RTD LOSS MW)

Updated determination for UFE BY UDC:

[4] This proposed modification would not apply to certain entities that have preexisting metering arrangements with the ISO, such as some smaller POUs and certain MSS entities. These entities generally have load figures that are calculated at a citygate metering point from various inputs. Further, these entities generally report Gross Load figures that account for visible distributed resource production. They also do not have requirements to install automated metering infrastructure (AMI) smart meters or other enhanced metering infrastructure to capture values for excess behind the meter production. Addressing these long-standing, comprehensive metering arrangements for these entities is out of scope for this issue.

UFE QUANTITY = GENERATION METER + INTERTIE IMPORT METER – ((GROSS LOAD METER – EXCESS BTM PRODUCTION METER) + EXPORT INTERTIE METER + RTD LOSS MW)[5]

6.5 Application of losses

Currently, a distribution loss factor (DLF) may be applied to 'gross up' load values that are reported to the ISO. Loss factors are meant to capture the amount of energy lost between the transmission-distribution (T-D) interface and end-user's household meters. Similarly, loss factors also may be applied to generating resources to reflect the amount of energy that is lost between the generator and the point of injection onto the transmission or distribution system. These factors are usually specific to a particular resource based upon its location and point of injection.

Excess behind the meter production is likely to travel very short distances and remain on low voltage lines after passing from a retail meter on the export channel. Energy coming from residential solar panels may be consumed by neighboring households and will generally not make it onto the transmission system or be stepped up to higher voltages, which is usually associated with losses. Because of this, losses associated with excess behind the meter production should not be considered when reporting excess behind the meter production to the ISO. The ISO believes that any losses are likely small. The ISO also believes that the energy from excess behind the meter production reduces the overall losses associated with serving load, and that this should be accounted for. This concept is explained in greater detail below.

When distribution loss factors are applied to load, they capture the losses between the transmission-distribution interface on the bulk electricity grid and the metered end-user. When there is excess behind the meter production there is likely less energy moving from the distribution grid to serve load, and thus less energy that losses should be applied to. The ISO proposes that the losses be applied on the difference between gross load and excess behind the meter production, to account for the losses that the excess behind the meter production offsets. Once losses are calculated, they may be included in the gross load figures reported to the ISO. An example of the loss calculation is illustrated in Figure 2 and Table 4 below.

Figure 2 – Simple line diagram example with a 10% loss factor

[5] GROSS LOAD METER – EXCESS BEHIND THE METER PRODCUTION METER is GROSS LOAD.

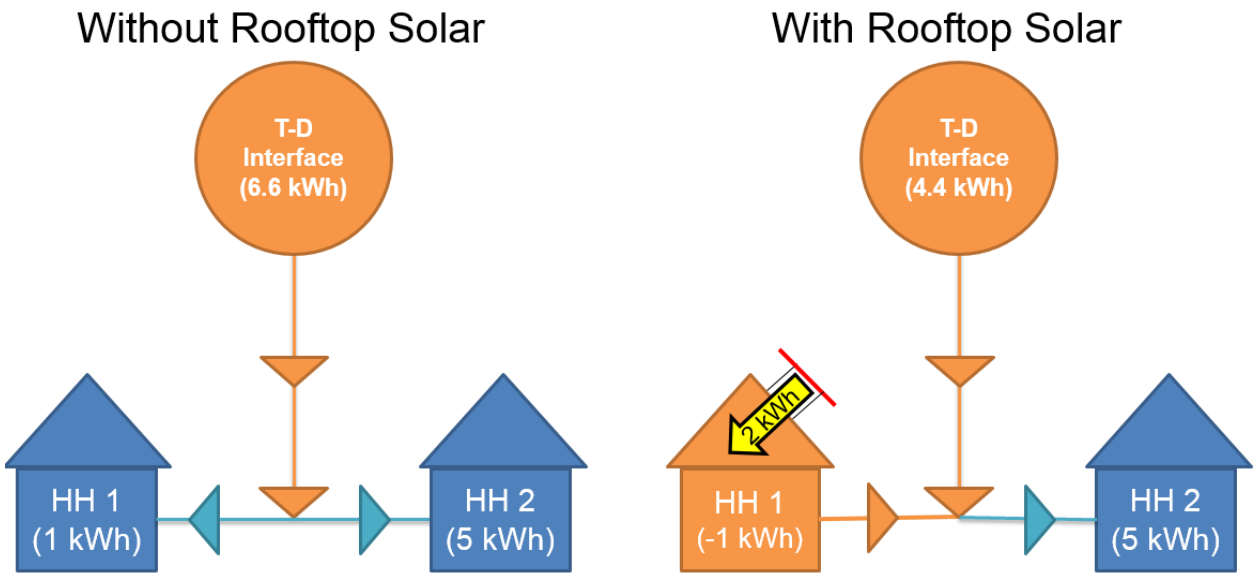


Figure 2 shows a similar example to the one already outlined earlier in this paper, but with losses applied to energy withdrawn from the transmission-distribution interface used to serve the households. In this example, losses associated with energy coming from the transmission-distribution interface to retail meters are assumed to be 10%. The left hand side of the figure shows retail consumers without solar generation, and the right hand side shows the same example with excess behind the meter production.

On the left side of Figure 2, losses are calculated as 10% of the entire metered load, or 6 kWh * .1 = .6 kWh. This results in a total amount of load 'grossed up' for losses of 6.6 kWh, corresponding to 6 kWh of actual consumption at the retail meters.

The right side of this example assumes that losses for excess behind the meter production are 0 and therefore the excess behind the meter production offsets exactly 1 kWh of consumption from household 2. An additional 4 kWh of energy is needed at the household 2 meter to make up the remaining consumption. This 4 kWh will still be subject to a 10% loss, and therefore requires 4.4 kWh of energy from the transmission-distribution interface. The right side of this example shows that the 1 kWh of energy from excess behind the meter production offsets .1 kWh of losses that would otherwise be realized.

Table 4 outlines how these calculations are carried out for the example on the right side of Figure 2. Gross Load (row [I]) and excess behind the meter production (row [J]) reflect 5kWh and 1 kWh, respectively. Losses applicable to gross load (row [K]) can be calculated by multiplying the distribution loss factor by gross load. Similarly, the losses avoided because of excess behind the meter production (row [L]) can also be calculated by multiplying the excess behind the meter production by the loss factor. Finally, Gross Load (row [M]) may be reported to the ISO, after applying both loss factors associated with the losses from the transmission-distribution interface and the avoided losses from excess behind the meter production.

An illustration of this formula for submitting losses is:

Gross Load (with Gross Up) = (Gross Load * (1 + DLF)) – (EBtMP * DLF);

where DLF is the appropriate distribution loss factor, and EBtMP is the excess behind the meter production.

Table 4 – Loss calculations and load 'gross up'

			Reported/observed value (kWhs)
Gross Load	[I]		5 kWh
Excess Behind the Meter Production	[J]		1 kWh
Distribution Loss Factor	[DLF]		.1
Losses from Gross Load	[K]	[I] * [DLF]	5 kWh * .1 = .5 kWh
Losses Avoided from Excess BTM Production	[L]	[J] * [DLF]	1 kWh * .1 = .1 kWh
Gross Load with "Gross Up"	[M]	[I] + [K] – [L]	5 kWh + .5 kWh - .1 kWh = 5.4 kWh

7 EIM Designation

The ISO plans to seek approval of the policy resulting from this initiative from the ISO Board only. This initiative falls outside the scope of the EIM Governing Body's advisory role, because the initiative does not propose changes to either real-time market rules or rules that govern all ISO markets. This proposal is limited to addressing load metering and how load-based charges are allocated to entities within the ISO BAA.

8 Next Steps

The ISO will discuss this draft final proposal with stakeholders during a call on December 19, 2018. Stakeholders are asked to submit written comments by January16, 2019 to initiativecomments@caiso.com.

9 Appendix A

Below is a table listing the proposed charge codes that will be allocated according to load. This table is included to show the downstream charge codes that are impacted by Gross Load. As indicated in this proposal, the determination – rather than the allocation – for unaccounted for energy will also be updated. These charge codes reflect charges that are related to reliability, rather than energy use, and should therefore be allocated based on gross load.

Table A1 – Proposed charge codes for allocation on Gross Load

372	High Voltage Access Charge Allocation
382	High Voltage Wheeling Allocation
383	Low Voltage Wheeling Allocation
591	Emissions Cost Recovery
1101	Black Start Capability Allocation
1302	Long Term Voltage Support Allocation
1303	Supplemental Reactive Energy Allocation
6090	Ancillary Service Upward Neutrality Allocation
6194	Spinning Reserve Obligation Settlement
6196	Spinning Reserve Neutrality Allocation
6294	Non-Spinning Reserve Obligation Settlement
6296	Non-Spinning Reserve Neutrality Allocation
6594	Regulation Up Obligation Settlement
6596	Regulation Up Neutrality Allocation
6694	Regulation Down Obligation Settlement
6696	Regulation Down Neutrality Allocation
7256	Regulation Up Mileage Allocation
7266	Regulation Down Mileage Allocation
7896	Monthly CPM Allocation

Attachment D – Board Memorandum

Excess Behind the Meter Production

California Independent System Operator Corporation

October 23, 2020

Memorandum

To: ISO Board of Governors

From: Keith Casey, Vice President, Market & Infrastructure Development

Date: May 8, 2019

Re: **Decision on the excess behind the meter production proposal**

This memorandum requires Board action.

EXECUTIVE SUMMARY

The proliferation of rooftop solar throughout California has highlighted an inconsistency in how load serving entities define and report load values to the ISO. It is important that load serving entities have clear rules for reporting load to the ISO as these values are used to allocate costs and to provide transparency about grid conditions. The current inconsistency in reported load values stems from the fact that load can be defined and reported as "net load" or "gross load" for retail customers with behind the meter generation (e.g., rooftop solar). Net load is the net energy transmitted through the retail meter, i.e. it is the customer's metered load minus any metered energy exported back to the grid. Gross load is the amount of energy a customer consumes directly from the grid net of any energy consumed from behind the meter generation output. Excess behind the meter energy production is the amount of energy that is exported to the grid when a customer's behind the meter energy production exceeds that customer's onsite load. Excess behind the meter production is not included in gross load. Currently, some load serving entities are providing gross load data to the ISO while others are providing net load data.

Reported load values are key inputs to many of the ISO's settlement calculations. Under the current tariff provisions there is a lack of clarity around how a load serving entity is required to report load values to the ISO. Specifically, it is unclear if load serving entities are allowed to net excess behind the meter energy production when reporting gross load values to the ISO. Currently, the magnitude of this problem is relatively small, but as the grid continues to increase adoption of behind the meter solar resources, the impact of these inconsistencies and reporting problems will grow. To address these inconsistencies and gain visibility to the quantity of exported behind the meter production, Management proposes the following:

1. Clarify tariff language to ensure consistent reporting of gross load;
2. Create a tariff definition for excess behind the meter production;

3. Add a reporting requirement for excess behind the meter production and specify how it should be reported to the ISO; and
4. Identify required changes to ISO settlement system charge codes.

The proposed updated tariff definition of gross load specifically states that scheduling coordinators may not net excess behind the meter production from the gross load values they report to the ISO. The proposed new tariff definition for excess behind the meter production requires these values to be reported to the ISO in addition to gross load values. Moreover, the proposed tariff changes provide which reliability based settlement charge codes will continue to be allocated based on gross load, and which energy based settlement charge codes will be allocated on net gross load and excess behind the meter production. Finally, the proposal also outlines updates to the process for calculating unaccounted for energy (UFE), and for the treatment of losses with regard to reporting load.

Management proposes the following motion:

> ***Moved, that the ISO Board of Governors approves the excess behind the meter production proposal described in the memorandum dated May 8, 2019; and***
>
> ***Moved, that the ISO Board of Governors authorizes Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the proposal described in the memorandum, including any filings that implement the overarching initiative policy but contain discrete revisions to incorporate Commission guidance in any initial ruling on the proposed tariff amendment.***

BACKGROUND

The proliferation of distributed energy resources, particularly behind the meter rooftop solar, increased rapidly throughout the ISO balancing area during the last decade. The ISO expects behind the meter resources will continue to grow. There are currently about 7,500 MW of non-utility behind the meter rooftop solar installed in the ISO balancing area, with over 2,500 MW installed since 2016. This proliferation has led to inconsistencies in how gross load data is reported and submitted for settlement. Some load serving entities submitted gross load data with excess behind the meter production netted from the total while others did not. In response to this inconsistent reporting, Management began this initiative to determine which tariff provisions need clarification and how excess behind the meter production should be treated and reported to the ISO.

Excess behind the meter production refers to energy generated by behind the meter resources that exceeds the host customers' load. This occurs during periods when a household or customer site with a behind the meter resource produces more energy

than the same household or customer site is consuming. Any excess behind the meter production is injected as an export back onto the grid and consumed by other customers.

When load is reported to the ISO with excess behind the meter production netted, the ISO does not receive any data about the amount of excess behind the meter production that occurred. For example, if a customer's household load was 5 kWh and excess behind the meter production was 1 kWh and load was reported to the ISO net of excess behind the meter production, the ISO would receive a load value of 4 kWh (and 0 kWh of generation). If instead, this load is reported to the ISO without netting excess behind the meter production, the load value received would be 5 kWh (vs. 4 kWh), with 1 kWh of excess energy production materializing inappropriately as unaccounted for energy. Both of the above accounting and reporting practices are deficient.

Additionally, if load is reported inconsistently by multiple entities, charge codes affected by those values will be inconsistently allocated. For example, if there are two identical entities with 5 kWh of load and 1 kWh of excess behind the meter production and one reports to the ISO a load of 5 kWh and the other reports a load of 4 kWh, then 5/9 of all load-based charges will be allocated to the first entity and 4/9 to the second entity. This creates a clear settlement inconsistency.

MANAGEMENT'S PROPOSAL

Gross load clarification

Management proposes to clarify the definition of gross load. Gross load must not include the netting of any excess behind the meter production because such treatment ignores that customer's benefit from having access to, and use of, the transmission system.

Excess behind the meter production definition

Management proposes to establish a clear and concise standard for reporting excess behind the meter production quantities to ensure a uniform reporting practice. Management proposes to include a new term in the tariff called "excess behind the meter production." This term represents the amount of generation that exceeds host consumption and will be reported to the ISO separately from gross load values.

Excess behind the meter production settlement

Management proposes that excess behind the meter production values be treated by the ISO settlement system similar to negative load. Scheduling coordinators that report load to the ISO will be required to report both gross load and excess behind the meter

production values going forward. Both values will be charged (or paid) the locational marginal price for load at the locations where they are reported to the ISO. Like load, Management proposes that scheduling coordinators submit excess behind the meter production values at their load's respective default or custom load aggregation point.

Identify required changes to ISO settlement system charge codes

Reliability service charges will be allocated to load serving entities based on the updated definition of gross load. Other charges, such as those for uplift and neutrality, will continue to be allocated based on demand. Demand will be calculated as the combined values of gross load and excess behind the meter production.

Management proposes that these modifications not apply to certain entities that have preexisting metering arrangements with the ISO, such as some local publicly owned electric utilities and certain metered subsystem entities. These entities generally have load figures that are determined at a citygate metering point from various inputs. Further, these entities generally report gross load figures that account for visible distributed resource production and do not have requirements to install automated metering infrastructure, i.e. smart meters or other enhanced metering infrastructure to capture excess behind the meter production.

APPLICATION OF LOSSES

Currently, a distribution loss factor may be applied to 'gross up' load values that are reported to the ISO. Loss factors are meant to capture the amount of energy lost between the transmission-distribution interface and end-users' household meters. Similarly, loss factors may also be applied to generating resources to reflect the amount of energy that is lost between the generator and the point of injection onto the transmission or distribution system. These factors are usually specific to a particular resource based upon its location and point of injection.

Excess behind the meter production exported onto the distribution system will likely be consumed by other loads and neighboring households on the distribution system; it is unlikely this energy will ever reach the transmission system or be stepped up to a higher voltage, which would generate losses. Because of this unlikelihood, Management proposes the complexity of figuring and applying losses associated with excess behind the meter production not be considered when reporting excess behind the meter production to the ISO.

Energy from excess behind the meter production does however reduce the overall losses associated with serving load. When distribution loss factors are applied to load, they capture the losses between the transmission-distribution interface on the bulk electricity grid and the metered end-user. When there is excess behind the meter production, there are smaller losses due to less energy moving from the transmission system to the distribution grid to serve load. As a result, Management proposes that losses be applied on the difference between gross load and excess behind the meter

production to account for the reduction in losses that the excess behind the meter production provides.

POSITIONS OF THE PARTIES

Stakeholders are generally supportive of the excess behind the meter production proposal, with certain exceptions.

The Department of Market Monitoring and the Public Advocates Office raised concerns about the exclusion of some local publicly owned electric utilities and metered subsystem entities that had metering arrangements negotiated and implemented before the ISO's inception. In response, Management notes that these entities generally have load figures that are calculated at a citygate metering point from various inputs. Further, these entities generally report gross load figures that account for visible distributed resource production. They also do not have requirements to install automated metering infrastructure, i.e. smart meters or other enhanced metering infrastructure to capture values for excess behind the meter production, which would be necessary for the proposed provisions to apply.

PG&E noted that the makeup of the grid is changing in ways that will likely impact the actual accrual of losses on the grid and advocate for a methodology to include losses in excess behind the meter production values. Management does not foreclose future consideration of this treatment, but for now believes it is important to accurately model losses in a manner that reflects realistic energy flow assumptions today. As conditions continue to evolve, the ISO will continue to evaluate the most accurate way to account for losses. Management believes that the treatment of losses outlined in this proposal is a reasonable approach for current conditions.

CONCLUSION

Management requests the Board approve its proposal for excess behind the meter production. The proposed enhancements will result in more accurate accounting for gross load and excess behind the meter production, visibility for the ISO into these values, and equitable allocation of related charges.