Version 5.10.0

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# Purpose of Document

The purpose of this document is to capture the requirements and design specification for a Charge Code in one document.

# Introduction

## Background

Holders of existing Transmission Contract (ETC), and Transmission Ownership Right (TOR), through their representative SCs, may submit their Self-Schedules for such contracts in the Day Ahead Market (DAM) or RTM.

While ETC/TOR/CVR Holders shall be charged or paid the LMP at Resource Locations just like most Market Participants, the Congestion Charges at sources and sinks associated with the valid and balanced portion of contract Self-Schedules shall be reversed in the Day-Ahead Market or Real-Time Market Settlements. Congestion credits can be positive or negative as these are simply the reversal of the original Congestion Charges or Congestion payments. In the Day-Ahead Market, Congestion credits associated with a valid Day-Ahead ETC or TOR shall be credited hourly within CC 6011 (Day-Ahead Energy, Congestion, Loss Settlement).

In the Real-Time Market, Congestion credits associated with a valid post-Day-Ahead TOR and ETC Schedule change (including changes submitted to the RTM and changes submitted closer to Real-Time where allowed by the contract) shall be credited per Settlement Interval within CC 6788 (RTM Congestion Credit Settlement).

Congestion credits to ETC/TOR are credited only to the Billing SC (also called the designated SC or Responsible SC) of each contract even if it is possible that other SCs may make use of the same contract when submitting an ETC/TOR Self-Schedule.

Within this document, the valid and balanced portion of contract Self-Schedules that are eligible for Congestion credits shall be called eligible quantities.

## Description

This Pre-calculation provides per resource, per contract, the valid and balanced portion of ETC, or TOR Self-Schedules eligible for IFM Congestion credits that are credited within CC 6011. It also computes for ETC, or TOR eligible quantities for RTM Congestion credits that are credited within CC 6788. In addition, this Pre-calculation computes for the portions of DA, and RT AS QSP quantities that are eligible or ineligible for exemption of congestion charges in the DA, and RT AS Imports Congestion charge codes. Furthermore, it computes for quantities to be used for several demand and supply exemptions in successor charge codes - Measured Demand, BCR allocation, Wheel Export Quantity, HVAC Metered Load, IFM MLS Credit Allocation, RT Congestion Offset, and RT Imbalance Energy Offset.

The valid and balanced portion of Self-Schedules for ETC/TOR that are eligible for Congestion credits shall be called eligible quantities. Self-Schedules for ETC/TOR are also termed as contract Schedules and each implementation of an ETC/TOR contract is identified by a Contract Reference Number (CRN) or a Chain CRN. A Chain CRN is a linking of CRNs with a specific sequence, and thus has a starting CRN and an ending CRN. All segment CRNs within the chain inherit the scheduling resources (supply and demand side) of the chain as well as the scheduler, and the quantity of contract self-schedule from the chain. By doing the previously described inheritance for individual CRNs forming a CRN chain, the CRN eligible quantities effectively consider both self-schedules from CRN chain (to which the CRN is a segment of) and from single or-non-Chain CRN.

For each Contract Reference Number (CRN), balancing of overall source and sink quantities is enforced for: (1) the Day-Ahead Schedules, and (2) post-Day-Ahead Schedules and changes; per hour and per Settlement Interval, respectively.

For Day-Ahead Schedules, balancing of sources and sinks is needed for each CRN in order to obtain eligible quantities for the DAM. Each balanced value does not exceed the maximum MW Entitlement per CRN.

For the post-Day-Ahead Schedules and ETC/TOR Self-Schedule changes, this calculation will first need to combine the RTM schedules or Dispatch Instructions that include the Day-Ahead Self-Schedules for the same CRN. Balancing of sources and sinks is then done on the RTM quantity, capping it at the contract maximum Entitlement. The RTM eligible quantities (also called post-DA changes) are derived from this post-Day-Ahead balanced quantity, taking out any Day-Ahead eligible quantities.

Eligible quantities for the Day-Ahead at all possible resources are settled hourly in CC 6011 using Day-Ahead MCCs. RTM eligible quantities are settled in CC 6788 for each 10-min interval based on the difference of the MCCs between the financial sink and financial source of the contract.

The remaining contract entitlement capacity beyond the Energy balanced contract self-schedules shall be made available for DA and RT Upward AS QSP that makes use of TOR/ETC contracts. The QSP portion of DA and RT Upward AS that shall be charged for AS Imports Congestion shall be identified within this charge, whereas the congestion charges shall be provided in the DA, and RT AS Imports Congestion charge codes (CC 6710, 6720, 6750, 6711, 6721, 6715, 6725, and 6755).

Demand or supply quantity exemptions are computed as the valid and balanced portion of contract self-schedules at the resource and CRN where these were scheduled at.

# 3. Charge Code Requirements

## Business Rules

| Bus Req ID | Business Rule |
| --- | --- |
| 1.0 | For the Day-Ahead Market, the hourly ETC/TOR quantity eligible for Congestion credits per CRN per resource shall be the valid and balanced portion of submitted Day-Ahead contract Self-Schedule (considering the reductions made by IFM). |
| 1.1 | Not used. |
| 1.2 | For the RTM, the Settlement Interval ETC/TOR quantity eligible for Congestion credits per contract at a possible source resource for the contract shall be based on the post-Day-Ahead change to contract Schedule (considering the reductions made by /RTM). |
| 1.2.1 | For the RTM, the Settlement Interval ETC/TOR quantity eligible for Congestion credits per contract at a possible sink resource for the contract shall be based on the metered CAISO Demand quantity for a Load and the Deemed Delivered quantity for an Export resource. |
| 1.3 | The Day-Ahead accepted Self-Schedule for the ETCs/TORs per resource per hour is obtained from the Day-Ahead Schedule per resource. (Fact) |
| 1.3.1 | If there was no uneconomic reduction to Self-Schedules in the Day-Ahead Schedule for a resource, then the valid and balanced schedules are the submitted balanced contract Schedules at the resource.  |
| 1.3.2 | If there was a reduction to Self-Schedules in the Day-Ahead Schedule for a resource, then there is a need to allocate the Day-Ahead Schedule into per contract values using the Day-Ahead SIBR Bids as the basis of distribution. SIBR stands for Scheduling Infrastructure Business Rules system. (Fact) |
| 1.4.1 | The post-Day-Ahead contract Schedule per System Resource per Settlement Interval shall be provided by an upstream system and the value is based on the intertie schedule considering any adjustments closer to real-time where allowed by the contract. (Fact) |
| 1.4.2 | The post-Day-Ahead contract schedule per generator resource per Settlement Interval shall be calculated by disaggregating the RTM “sum of contracts per resource” award into per contract values using the RTM SIBR Clean Bids as the basis of distribution. Any Exceptional Dispatch instruction of type TOR/ETC consisting of schedule changes up to T-20 or closer to real-time, if allowed by the contract, shall replace this calculated value, and such new value shall not exceed the maximum resource scheduling limit for the contract at the given resource. (Fact) |
| 1.5 | Wheeling Self-Schedules and Energy Export Self-Schedules that make use of TORs and ETCs can be accepted in the DAM, and RTM. (Fact) |
| 2.0 | A contract reference number ID (CRN) uniquely identifies a particular implementation of an ETC, or TOR contract. (Fact) |
| 2.1 | CRNs can also be linked to facilitate the implementation of certain contracts that require interconnection across transmission rights. A linking of CRNs is called a CRN chain, and each chain is identified by a unique Chain CRN ID. (Fact) |
| 2.1.1 | A Chain CRN links CRNs in a specific sequence, and thus has a starting CRN and an ending CRN. The valid physical sources for the chain are those associated with the starting CRN, and the valid physical sinks for the chain are those associated with the ending CRN. For charge calculations other than congestion or loss credits, only the valid physical sources associated with the starting CRN and the valid physical sinks associated with the ending CRN of the Chain CRN shall be recognized. (Fact) |
| 2.1.2 | For congestion or loss credits computation, all segment CRNs within the chain inherit the scheduling resources (supply and demand side) of the chain as well as the scheduler SC, and the quantity of contract self-schedule from the chain. This segmentation of the chain and inheritance for the component CRNs shall be done prior to computing the valid and balanced portion of self-schedules for each CRN. Effectively, CRN chain self-schedules are combined with any self-schedules made separately at the single CRNs to form the total self-schedule at the individual CRN level, and from thereon the computation for eligible quantities occurs only at the individual CRN level. (Fact) |
| 2.2 | It is assumed that SIBR rules validate that: (1) all Day-Ahead Self-Schedules for the ETCs/TORs at possible source resources of such contract sum up to at most the maximum Entitlements;(2) all Day-Ahead Self- Schedules for the ETCs/TORs at possible sink resources of such contract sum up to at most the maximum Entitlements; and(3) the sum of MWh of Supply given by (1), and the sum of MWh of Demand given by (2), are equal, without accounting for losses.  |
| 3.0 | Only one Billing SC shall represent each ETC/TOR contract, and the CAISO shall settle with that Billing SC for Congestion credits to such contract.  |
| 3.1 | The designated SC or Billing SC for each contract shall be assigned all the Congestion credits at possible sources and sinks for the same contract. If the contract is eligible for (Marginal) Loss credits, the Billing SC shall also get all the applicable Loss credits. (Fact) |
| 3.2 | For the case of a CRN chain, any congestion or loss credits coming out of such would have been assigned to each Billing SC of the CRN segments, since the CRN chain self-schedule was segmented and assigned to the different CRN segments of the CRN chain, when determining the valid and balanced self-schedule quantities. (Fact) |
| 4.0 | The ETC/TOR Schedule for a resource is determined by allocating the resource’s Schedule, Dispatch Instruction, or relevant Metered Quantity respecting the TOR/ETC scheduling priority.  |
| 4.1 | The order of scheduling priority from highest to lowest is as follows:(a) RMR Schedules;(b) TOR Self Schedules;(c) ETC Self Schedules – there may be different ETC sub-priorities as indicated by their relative global priority level in their Master File registry;(d) CVR Self Schedules (Day-Ahead only) – a CVR may also be considered as an ETC, and will be of the same priority level as the ETC Self Schedules, but these prioritization to CVR schedules shall only be accorded in the Day-Ahead market;(e) Other Self Schedules.  |
| 4.1.1 | All TOR Self Schedules shall be of the same level and have the same priority within that level, and all ETC Self-Schedules shall be of the same level, but maybe of different sub-priorities within that level.  |
| 4.1.2 | For cases where the resource Schedule quantity to be allocated to a set of contract Schedules within the same priority level is less than the sum of all submitted contract Schedules for that level, pro-rata allocation shall be made.  |
| 5.0 | Balancing of sources and sinks quantities per contract shall be enforced for the Day-Ahead Schedules. |
| 5.1 | Balancing of sources and sinks quantities per contract shall be enforced for the post-Day-Ahead Self Schedules. Post-Day-Ahead values are absolute quantities, inclusive of Day-Ahead values. |
| 5.2 | The post-Day-Ahead balancing of sources and sinks per contract considers the relevant FMM and RTM Schedules, Deemed Delivered Energy Exports, any allowable schedule changes closer to Real-Time, and Metered Quantities at the sources and sinks. |
| 5.3 | The total balanced quantity of a contract is determined by the lower of:the total source quantities, (the total sink quantities)\*(-1), or the applicable contract Entitlement for the relevant contract, Settlement Period or Settlement Interval, and market.  |
| 5.4 | The adjusted individual ETC/TOR Schedules of the associated sink and source resources are determined pro-rata from the total balanced quantity per contract. |
| 5.5 | The valid and balanced contract Self-Schedule quantities are also termed the eligible quantities.  |
| 5.6 | For the Day-Ahead, for each ETC/TOR contract, the total eligible quantity at the contract source equals that at the contract sink and these are both equal to the total Day-Ahead balanced quantity for that contract. (Fact) |
| 5.7 | For the RTM, for each TOR/ETC contract, the eligible quantity at the contract source equals that at the contract sink and are both equal to the difference between DA and post-DA balanced quantity (termed as PostDAChangeBalanceCapacity) for that contract. (Fact) |
| 6.0 | Valid and balanced ETC/TOR Self-Schedule for Day-Ahead, Post-Day-Ahead, and Day-Ahead incremental/decremental (or Post-DA change) shall be computed within this Pre-calculation. |
| 7.0 | PTB Adjustment logic does not apply to this Pre-calculation. |
| 8.0 | Each physical resource of a contract is uniquely associated with a financial source or with a financial sink. |
| 8.1 | For each contract, there can be one or more financial sources, and there can be one or more financial sinks. (Fact) |
| 8.2 | Each CRN or Chain CRN shall have at least one physical resource attached or assigned to it. (Fact) |
| 9.0 | The remaining contract entitlement capacity beyond the Energy balanced contract self-schedules shall be made available for DA, and RT Upward AS QSP that makes use of TOR/ETC contracts. In particular, for any trading hour, the remaining contract capacity available for Upward AS is:the contract maximum entitlement less the Energy balanced contract self-schedulesplus DA Regulation Down QSPplus positive incremental RT Regulation Down QSP)for such trading hour, provided this resulting value is positive. |
| 9.1 | The remaining contract capacity available for Upward AS shall be spread across the following list, in proportion to the MW values of QSP:DA Spin Import QSP,DA Non-spin Import QSP,DA Regulation Up Import QSP,RT Incremental Spin Import QSP, only when positive (ignored when negative),RT Incremental Non-spin Import QSP, only when positive (ignored when negative), andRT Incremental Regulation Up Import QSP, only when positive (ignored when negative). |
| 9.2 | The remaining contract capacity allocated to the following Upward AS shall not exceed the original QSP amount.DA Spin Import QSP,DA Non-spin Import QSP,DA Regulation Up Import QSP,RT Incremental Spin Import QSP, only when positive (ignored when negative),RT Incremental Non-spin Import QSP, only when positive (ignored when negative), andRT Incremental Regulation Up Import QSP, only when positive (ignored when negative). |
| 9.3 | The QSP quantities eligible for perfect hedge treatment or the exemption of congestion charges for the import of different Ancillary Services for all the markets shall be computed in this Precalculation. |
| 9.4 | The portion of Day-Ahead Upward Ancillary Service QSP quantities not eligible for the perfect hedge treatment or exemption of congestion charges shall be computed in this Precalculation. The computed values shall be used in successor charge codes in assessing AS Imports congestion charges. |
| 10.0 | A resource-level eligible quantity at the resource and CRN (single or Chain) at which the schedule was made is required for use in exemption calculations by successor charge codes. This value is computed in this Precalculation and shall be compiled as the basis for inputs to the following:(a) Measured Demand – and dependent charge codes – for allocation basis;(b) BCR allocation;(c) HVAC Metered Load; and(d) Wheel Export Quantity. |
| 10.1 | The single CRN resource-level eligible quantity is the portion of individual CRN resource- level eligible quantities that came from single (or non-Chain) self-schedule. |
| 10.2 | The Chain CRN resource-level eligible quantity is calculated based on the portion of individual CRN resource-level eligible quantity that came from the Chain self-schedule. |
| 10.2.1 | The Chain CRN resource-level eligible quantity is computed at each resource, as the minimum across each resource-level individual CRN segment’s eligible quantity. The value inside the minimum function is only that portion identified in the previous business rule. |
| 10.3 | If the contract rights do not terminate completely at the physical sink scheduling location, then the resource-level eligible quantity cannot be used for exemption purposes. |
| 10.4 | If the contract rights do not start exactly at the physical source scheduling location, then the resource-level eligible quantity cannot be used for exemption purposes.  |
| 10.5 | There is no particular contract type for a Chain CRN at the Chain level. However, there can be a contract type for a Chain CRN at the resource level, and the contract type is derived in this Precalculation for use in successor charge codes. The resource level contract type of a Chain CRN: 1. is the contract type of the first CRN segment (or leg) of the Chain, if the resource being considered is a source/supply resource; or
2. is the contract type of the last CRN segment (or leg) of the Chain, if the resource being considered is a sink/demand resource.
 |
| 11.0 | The BA total IFM and RTM contract demand quantity for which DA or Post-DA change Energy contract Loss Credits are to be provided shall be computed in this charge code. Only load and export quantities are considered. The loss demand quantity is provided to the scheduler BA which made the contract self-schedule. |
| 11.1 | The resource level total IFM and RTM contract demand quantity for which DA or Post-DA change Energy contract Loss Credits are to be provided shall be computed in this charge code. Only load and export quantities are considered. The loss demand quantity is provided to the scheduler BA which made the contract self-schedule. |
| 12.0 | All SCs with contracts having contract type TOR or ETC are required to come back in Real-Time in order to re-assert, increase, or decrease their Day-Ahead contract self-schedules. No Real-Time SIBR contract self-schedules shall mean zero contracts self-schedules in Real-Time and is taken to mean that the SC does not want to use its contracts. Also, no Real-Time SIBR contract self-schedules will negate or zero out whatever the SC has as its balanced Day-Ahead contract self-schedules and this negating of values shall be reflected in its balanced Post-DA contract self-schedules. Since Load contract self-schedules cannot be made in Real-Time, the SC can signify its intent to reduce usage of the Load resources for its contract in Real-Time through the contract sources or export resources associated with the Load. This particular bidding or tagging is relevant for identifying the meter allocation base discussed in business rules 14.1 and 14.3, and impacts SCs that share usage of a Load resource.For example, assuming there is a Day-Ahead contract self-schedule at a Load resource and no ETIE resources associated with the Load, in order to effect a zero contract self-schedule at this Load resource in Real-Time and so free up for other SCs or other contracts the use of that Load resource, the SC must bid zero in SIBR or tag with zero in ITS the specified contract usage on the contract source(s) that sinks into the subject Load. If the contract sources do not have a zero value and their Day-Ahead schedules are not modified in Real-Time, the meter allocation base for the Load resource will default to the Day-Ahead contract self-schedule quantity (this is covered by business rule 14.1). In this case usage of the Load will not be relinquished for other contracts and will result in other contracts being subject to a pro-rata allocation reduction in the meter usage at the shared Load resource. On the other hand, bidding or tagging with zero at the contract source(s) in Real-Time signals the Post-DA contract self-schedule change and business rule 14.3 will be invoked, meter allocation base for the contract will be zero, and the meter allocation base for other contracts will not be reduced. (Fact) |
| 12.1 | SCs utilizing contracts at system resources are expected to tag their Control Area Schedules (CAS) with CRNs, if the CRNs are being stipulated as a RTM change in scheduled contract rights, in order for the CRNs to apply to the schedules. This data will be used for Post-DA balancing of contracts, and applies to contracts of type TOR or ETC. (Fact) |
| 12.2 | For TOR and ETC contracts asserted with IFM or RTM self-schedules, the RTM SIBR-specified contract rights will apply if the associated CRN(s) are not scheduled in CAS. (Fact) |
| 13.0 |  NA |
| 14.0 | The total metered load of a resource is allocated to each individual Contract Reference Number (CRN) pro-rata based on its allocation base, defined in the following rules. (Fact) |
| 14.1 | If the CRN is associated with a DA schedule only, then the allocation base is equal to the DA schedule for the CRN at the load resource. (Fact) |
| 14.2 | If the CRN is not associated with a DA schedule, i.e. Post-DA supply and/or export self-schedule only, then the allocation base is equal to the Masterfile registered maximum scheduling limit but normalized to the CRN Post-DA supply self-schedule less any ETIE resource usage. The normalization is performed in order that the total allocation bases over all resources for the same CRN will not exceed the total CRN supply Self-Schedule less any ETIE resource usage. (Fact) |
| 14.3 | If the CRN is associated with a DA schedule, but Self-Schedule changes are made after DA, then the allocation base is equal to the DA schedule but normalized to the CRN’s final schedule, which is the Post-DA CRN Self-Schedule for supply resources less any ETIE resource usage. The normalization is performed in order that the total allocation bases over all resources for the same CRN will not exceed the total Post-DA CRN supply Self-Schedule less any export resource usage. (Fact) |
| 14.4 | (Load usage is secondary to export resource usage in Post-DA settlement.) In the last two business rules, export resource usage takes precedence over Load resources. This is because export resource usage is provided through ITS tags or through RT SIBR contract self-schedule and the information is available whereas Load usage is not available in Real-time – that is, Load usage is not bid in Real-Time through SIBR.  (Fact) |
| 14.5 | For the purposes of meter allocation or breakdown for contracts, in the determination of the allocation basis, the scheduling priorities shall be respected for the TOR or ETC Self Schedules at each particular resource. The meter input shall be allocated to CRNs with higher scheduling priorities before any portion of the meter input is applied to CRNs with lower scheduling priorities. CRNs with the same scheduling priorities (or those at the same priority level) shall receive pro-rata allocation. (Fact) |
| 14.6 | The priorities of TOR, and ETC contracts for a particular resource are provided in the Masterfile. (Fact) |
| 14.7 | In the ordering of contracts by scheduling priority, TOR contracts are ranked higher than and ETC contracts. (Fact) |
| 15.0 | Contract entitlements are usually calculated on or before T-20 minutes. However, for some transmission contracts allowed by CAISO Tariff to make updates to their entitlements after T-20 minutes, the following treatment shall apply. For these specific contracts, if the ITS e-tag for the source resource (or total e-tags of source resources for the same contract) of such contract is higher than the ETCC entitlement on or before T-20 minutes, then the ITS e-tag total for such contract serves as the final or new entitlement value for the contract. If not higher, then the entitlement value at or before T-20 minutes stays as the entitlement value for such contract. |
| 16.0 | A current Transmission Exchange Agreement (“TEA”) by WAPA with CAISO and PGAE allows WAPA to sell part or all of its contract rights. This is implemented using what is called sub-CRNs to each of the parent CRNs for the portion sold. The rules below are followed:1. If a chain CRN is sold, then its subdivisions or sub-CRNs will also each be a chain CRN.
2. If a segment CRN is sold, then its subdivisions or sub-CRNs will also be only for a corresponding segment CRN.
3. In each case above, sub-CRNs will inherit from the parent CRN attributes:
4. the associated financial sources and sinks (i.e. physical sources and physical sinks will be associated with the original parent CRN’s financial sources and sinks, respectively.)
5. the specific treatment, such as perfect hedge for congestion, and measured demand allocation exemptions.
6. the CRNs can only schedule in the DAM and any unscheduled capacity is available for optimization after DA awards.
7. outages and transmission derates
8. settlement rules and requirements listed above that applies to the parent CRN
9. In case a sub-CRN utilizes a load instead of an ETIE (export system resources) as the physical sink, a load resource shall have a lower priority than ETIEs in post-DA settlement since load cannot self-schedule in RTM. Please refer to rules under business rule 14.4 on load usage being secondary to export resource usage.

Further for each sub-CRN, load contract self-schedules will have equal weights against each other even though the magnitude of each load schedules (under the same sub-CRN) would have been different to start with. This is because an otherwise Masterfile maximum scheduling limit for the resource for the contract is unavailable, and each load value would be substituted by the ETCC derived scheduling limit for the sub-CRN.Buyers of TEA contracts are highly encouraged to use export resources only as physical sinks for the sub-CRNs. If this cannot be avoided and instead load resource is used for physical sinks, then it is highly recommended, the load resource(s) always have day-ahead contract self-schedules (since these cannot SIBR schedule in RTM). This allows more accurate representation of contract usage, and avoid approximation from processing via the preceding business rule. |
| 17.0 | EDAM BAA legacy transmission contracts of CRN\_TYPE = ‘TOR’ or ‘ETC’ shall be considered in this pre-calculations. |
| 17.1 | These EDAM BAA legacy transmission contracts cannot be part of a transmission chain contracts, as contract balancing will be restricted within the same EDAM BAA. |
| 17.2 | These EDAM BAA legacy transmission contracts are eligible for financial hedge also known as congestion credits. |
| 17.3 | These EDAM BAA legacy transmission contracts are eligible for Measured Demand exemptions for the valid and balanced portion of the contract usage, particularly for Day-Ahead Energy, Real-Time Energy, and BCR uplift cost allocations. These exclude High Voltage Access Charge, or Wheeling Access Charge cost allocation exemptions. |
| 17.4 | These EDAM BAA legacy transmission contracts are NOT eligible for High Voltage Access Charge, or Wheeling Access Charge cost allocation exemptions. |
| 18.0 | Transfer System Resources (TSR) of TSR\_TYPE = ‘1’ and CRN\_TYPE = ‘TOR’ or ‘ETC’ shall be considered in this pre-calculations. |
| 18.1 | The contracts using TSR Type 1 and CRN\_TYPE = ‘TOR’ or ‘ETC’ cannot be part of a transmission chain contracts, as contract balancing will be restricted within the same BAA where the TSR belongs. |
| 18.2 | The contracts using TSR Type 1 and CRN\_TYPE = ‘TOR’ or ‘ETC’ are eligible for financial hedge. |
| 18.3 | TSRs of TSR\_Type 1 and CRN\_TYPE are NOT eligible for other contract usage exemptions, such as Measured Demand exemptions, or WAC for the valid and balanced portion of the contract usage, since TSRs are not considered physical resources. |

## Predecessor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| PC\_ System Resource Deemed Delivered Energy Quantity |
| PC\_ MSS Netting |
| PC Ancillary Service |

## Successor Charge Codes

| Charge Code/ Pre-calc Name |
| --- |
| PC Measured Demand Black Start Excluding Exports |
| PC Measured Demand Emissions Over Control Area Excluding External Exports |
| PC Measured Demand Over Control Area |
| PC Measured Demand Over Control Area Excluding MSS Energy |
| PC Measured Demand Over Control Area Excluding Transmission Loss Adjustment |
| PC Wheel Export Quantity |
| PC HVAC Metered Load |
| CC 6011 – Day Ahead Energy, Congestion, Loss Settlement |
| CC 6788 – Real Time Market Congestion Credit Settlement |
| CC 6984 – RTM Net Marginal Loss Assessment per CAISO Agreement |
| CC 6710 – Day-Ahead Congestion – AS Spinning Reserve Import Settlement |
| CC 6720 – Day-Ahead Congestion – AS Non-Spinning Reserve Import Settlement |
| CC 6750 – Day-Ahead Congestion – AS Regulation Up Import Settlement |
| CC 6715 – Real-Time Congestion – AS Spinning Reserve Import Settlement |
| CC 6725 – Real-Time Congestion – AS Non-Spinning Reserve Import Settlement |
| CC 6755 – Real-Time Congestion – AS Regulation Up Import Settlement |
| CC 6636 – IFM Bid Cost Recovery Tier 1 Allocation |
| CC 4560 – GMC Market Services Charge |

## Inputs – External Systems

| Row # | Variable Name | Description |
| --- | --- | --- |
| 1.1 | BAAAcceptedDAContractSS **BrtQ’AA’QpNz’mdh** | The CAISO accepted portion of Day-Ahead Self-Schedule using contract N. The quantity remains with the original scheduler SC B and not yet assigned to the Billing SC for the contract N. Attribute (AA’Qp, Pnode p, APnode A, or in combination with intertie Q) is the financial node ID associated with the physical resource r given contract N. (MWh).This input is negative for resources r, which are of resource type t = “LOAD” or “ETIE”.The value is arrived at by adding single CRN schedules and Chain CRN schedules with its segment containing the same CRN N. This will not match CMRI report which shows it at the individual CRN and Chain CRN separately, and where Chain CRNs are not segmented.The component CRN segments of a Chain CRN can be obtained - outside of Settlements data - from the TRTC instructions submitted by SCs to CAISO.Includes TSR Type 1 with CRN\_IDs, as well as EDAM Legacy transmission contracts.Excludes CRN\_Types:OATT1, OATT2 |
| 1.2 | BAABASettlementIntervalResourcePostDAContractScheduleQuantity **BrtQ’AA’QpNz'mdhcif** | The CAISO accepted portion of FMM/RTD and closer to real-time Self-Schedule using contract N. The quantity remains with the original scheduler SC B, and are defined for resource types t = “ITIE”, “ETIE”, or “GEN”. This value also represents the associated meter value in the case of resource type = “LOAD”. Attribute (AA’Qp, Pnode p, APnode A, or in combination with intertie Q) is the financial node ID associated with the physical resource r given contract N. (MWh)This input is negative for resource type (t) = “ETIE” or “LOAD”.By convention, this Post-DA quantity is a gross value inclusive of any DA values. It is defined only for TORs and ETCs, and not for CVRs.The value is arrived at by adding single CRN schedules and Chain CRN schedules with its segment containing the same CRN N. This will not match CMRI report which shows it at the individual CRN and Chain CRN separately, and where Chain CRNs are not segmented.The component CRN segments of a Chain CRN can be obtained - outside of Settlements data - from the TRTC instructions submitted by SCs to CAISO.Includes TSR Type 1 with CRN\_IDs, as well as EDAM Legacy transmission contracts.Excludes CRN\_Types:OATT1, OATT2 |
| 1.3.1 | DAContractMaxEntitlement **Nz’mdh** | The maximum Entitlement for contract N for Trading Hour h in the Day-Ahead Market. (MWh) This is used for Day-Ahead Energy contract balancing.This comes from the ETCC Data payload.For dynamically created contracts, this data comes from SIBR through CleanBidSet payload.Excludes CRN\_Types:OATT1, OATT2 |
| 1.3.2 | ContractMaxEntitlement **Nz’mdh** | The maximum Entitlement for contract N for Trading Hour h. (MWh)This comes from the ETCC Data payload, except for few cases that allow up to T-20 minutes contract entitlement changeFor dynamically created contracts, this data comes from SIBR through CleanBidSet payload.Excludes CRN\_Types:OATT1, OATT2 |
| 1.4 | SmallContractSSTol md | Tolerance for small contract Self-Schedule amountStanding data – default value is 0.0001 (in MWh) |
| 1.5 | BAHourlyResourceDAEnergyCRNSchedulePercentage **BrtAA’Qpg'Nz'mdh** | The percentage of accepted schedule to aggregated accepted schedule for self-schedules coming from each CRN chain or from single CRNs, for contract N of contract type z’ for the Day-Ahead market.Values for these are derived from a single CRN schedule or from a Chain CRN schedule, the latter after segmenting and assigning to the component CRNs the schedule coming from the Chain CRN.For example, if 5 MW came from CRN1 and another 3 MW from Chain CRN A containing CRN1 as a segment, and another 2 MW from Chain CRN B also containing CRN1 as a segment, then the percentages are: 50% at the single CRN1 schedule, 30% at Chain CRN A schedule, and 20% at Chain CRN B schedule. These percentages data are shown in decimal terms. For the given example, these are 0.5, 0.3, and 0.2 respectively. |
| 1.6 | BASettlementIntervalResourcePostDAEnergyCRNSchedulePercentage **BrtAA’Qpg'Nz'mdhcif** | The percentage of accepted schedule to aggregated accepted schedule for self-schedules coming from each CRN chain or from single CRN for contract N for all markets.Values for these are derived from a single CRN schedule or from a Chain CRN schedule, the latter after segmenting and assigning to the component CRNs the schedule coming from the Chain CRN.The data is derived similar to the previous raw input. This value is also provided in decimal terms. |
| 2.1 | HourlyTotalDASourceContractSchdQty **Nz'mdh** | Sum of all accepted Self-Schedules using contract N for Trading Hour h of the DAM, over all supply resources or Scheduling Points. (MWh) |
| 2.2 | HourlyTotalDASinkContractSchdQty **Nz'mdh** | Sum of all accepted Self-Schedules using contract N for Trading Hour h of the DAM, over all demand/sink resources or Scheduling Points. (MWh) |
| 2.3 | HourlyDAContractBalanceQty **Nz'mdh** | The Day-Ahead valid and balanced portion of Self-Schedules using contract N. This represents the total quantity eligible for Congestion credits, and is equal for both the supply-side and demand-side Self-Schedules for contract N for Trading Hour h of the DAM. (MWh) |
| 2.4 | HourlyDASourceBalFactor **Nz'mdh** | A multiplier or factor to effect the balancing of source and sink Self-Schedules using contract N, in the DAM. |
| 2.5 | HourlyDASinkBalFactor **Nz'mdh** | A multiplier or factor to effect the balancing of source and sink Self-Schedules using contract N, in the DAM. |
| 2.6 | BAHourlyResourceDABalanceContractSchdQty **BrtAA’QpNz'mdh** | The valid and balanced ETC/TOR/CVR schedules for contract N for resource r for hour h of the DAM. This includes schedules from Chain CRNs and its contribution to the individual CRN components. (MWh) |
| 2.7 | TotalSettlementIntervalPostDASourceContractSchdQty **Nz'mdhcif** | Sum of all accepted Self-Schedules using contract N in the Post-DA, over all supply resources or Scheduling Points. (MWh) |
| 2.8 | TotalSettlementIntervalPostDASinkContractSchdQty **Nz'mdhcif** | Sum of all accepted Self-Schedules using contract N in the Post-DA, over all demand or sink resources or Scheduling Points. (MWh) |
| 2.9 | PostDASettlementIntervalBalanceContractSchdQty **Nz'mdhcif** | The post-Day-Ahead valid and balanced portion of Self-Schedules using contract N. This represents the total quantity eligible for Congestion credits, and is equal for both the supply-side and the demand-side Self-Schedules for contract N for Trading Hour h Settlement Interval i in the Post-DA. (MWh) |
| 2.10 | PostDASettlementIntervalSourceBalFactor **Nz'mdhcif** | A multiplier or factor to effect the balancing of source and sink Self-Schedules using contract N in the Post-DA. |
| 2.11 | PostDASettlementIntervalSinkBalFactor **Nz'mdhcif** | A multiplier or factor to effect the balancing of source and sink Self-Schedules using contract N in the Post-DA. |
| 2.12 | BASettlementIntervalResourceFinalBalanceContractSchdQty **BrtAA’QpNz'mdhcif** | The valid and balanced Self-Schedules using contract N scheduled by Business Associate B for resource r per Settlement Interval i in the Post DA. (MWh) |
| 2.13 | BAHourlyResourceDAEnergySingleCRNBalancedQty **BrtNz’mdh** | The DA valid and balanced portion of contract self-schedule, attributable to the single or non-chain contract N. (MWh) |
| 2.14 | BASettlementIntervalResourcePostDAEnergySingleCRNBalancedQty **BrtNz’mdhcif** | The Post-DA valid and balanced portion of contract self-schedule. (MWh) |
| 2.15 | BAHourlyResourceDAEnergyChainCRNLegBalancedQty **Brtg’Nz’mdh** | The DA valid and balanced portion of contract self-schedule. (MWh) |
| 2.16 | BASettlementIntervalResourcePostDAEnergyChainCRNLegBalancedQty **Brtg’Nz’mdhcif** | The Post DA valid and balanced portion of contract self-schedule. (MWh) |
| 2.17 | BAHourlyResourceDAEnergyChainCRNSourceBalancedQty **BrtNz’mdh** | The valid and balanced contract quantity at source resource r for the Day-Ahead Market, for contract N which is a Chain CRN. Contract type z’ is the contract type of the first CRN leg of the Chain. Attributes BA ID B, resource type t, and Trading Hour h are also provided. This is defined for source resource r, having resource type t = “GEN” or “ITIE”. |
| 2.18 | BASettlementIntervalResourcePostDAEnergyChainCRNSourceBalancedQty **BrtNz’mdhcif** | The valid and balanced contract quantity at source resource r for the Post DA, for contract N which is a Chain CRN. Contract type z’ is the contract type of the first CRN leg of the Chain. This is defined for source resource r, having resource type t = “GEN” or “ITIE”. |
| 2.19 | BAHourlyResourceDAEnergyChainCRNSinkBalancedQty **BrtNz’mdh** | The valid and balanced contract quantity at sink resource r for the Day-Ahead Market, for contract N which is a Chain CRN. Contract type z’ is the contract type of the last CRN leg of the Chain. This is defined for sink resource r, having resource type t = “LOAD” or “ETIE”. |
| 2.20 | BASettlementIntervalResourcePostDAEnergyChainCRNSinkBalancedQty **BrtNz’mdhcif** | The valid and balanced contract quantity at sink resource r for the Post DA, for contract N which is a Chain CRN. Contract type z’ is the contract type of the last CRN leg of the Chain. This is defined for sink resource r, having resource type t = “LOAD” or “ETIE”. |
| 3 | BADailyResourceCRNExemptionEligibilityFlag **BrtNmd** | A flag with value of 1 when contract right of CRN N extends from or up to the scheduling location r. Otherwise its value is 0 or this bill determinant does not exist. This is a daily value. |
| 4 | DailyContractFinancialMap **BrtAA’QpNz’md** | Data for contract N showing scheduler SC B, possible physical resource r, financial node or nodal location (source/sink, which is a Pnode p, APnode A, or Pnode/APnode in combination with intertie Q) , and contract type z’. This has a value of 1 for each 1-1 map between r and (A,A’, Q,p) given contract N.Chain CRNs are segmented for this mapping.  |
| 5 | ContractDailyTORLossCreditInclusionFlag **Nz’md** | This flag identifies that TOR contract N of contract type z’ is to be accorded the TOR loss credit for the Trading Day d, whenever the flag value is 1. The actual loss credit amount for the TOR contract shall eventually go the Billing SC for the contract. This value can change at most daily. |
| 6.0 | TSRBAAAcceptedDAContractSS **BrtQ’AA’QpNz’mdh** | For TSR Type 1, the CAISO accepted portion of Day-Ahead Self-Schedule using contract N. The quantity remains with the original scheduler SC B and not yet assigned to the Billing SC for the contract N. Attribute (AA’Qp, Pnode p, APnode A, or in combination with intertie Q) is the financial node ID associated with the physical resource r given contract N. (MWh).This input is negative for resources r, which are of resource type t = “ETIE”. Excludes CRN\_Types:OATT1, OATT2 |
| 6.1 | TSRBAAAcceptedPostDAContractScheduleQuantity **BrtQ’AA’QpNz'mdhcif** | The CAISO accepted portion of FMM/RTD and closer to real-time Self-Schedule using contract N. The quantity remains with the original scheduler SC B, and are defined for resource types t = “ITIE”, “ETIE”. Attribute (AA’Qp, Pnode p, APnode A, or in combination with intertie Q) is the financial node ID associated with the physical resource r given contract N. (MWh)This input is negative for resource type (t) = “ETIE”.By convention, this Post-DA quantity is a gross value inclusive of any DA values. It is defined only for TORs and ETCs.Excludes CRN\_Types:OATT1, OATT2 |
| 7.0 | CRUSB\_DispatchIntervalCheckedOutInterchangeQuantity **BrtEuT’I’Q’M’AA’R’pPW’Qd’Nz’OVvHn’L’qq’mdhcif** | The input represents the final (Real Time) Checked Out Dispatch Interval Interchange Schedule quantity (in MW) for all CISO and EIM system resources except pseudo gensIncludes data for tags for EDAM legacy contracts, and TSR tags, including a mirror record for the part of a TSR pair that doesn’t tag.  |

## Inputs - Predecessor Charge Codes or Pre-calculations

| Row # | Variable Name | Predecessor Charge Code/ Pre-calc Configuration |
| --- | --- | --- |
| 1 | SettlementIntervalDeemedDeliveredInterchangeEnergyQuantity **BrtEuT’I’Q’M’AA’F’R’pPW’QS’d’Nz’OVvHn’L’mdhcif** | System Resource Deemed Delivered Energy Pre-calculationAttributes m and d will be hidden as usual in this charge code, while all others would be summed over within the formula section. This ETC Precalculation Configuration Guide assumes this quantity to be negative for resource type t = “ETIE”.  |
| 2 | BAResEntitySettlementIntervalMeteredCAISODemandQuantity **BrtT’Q’uI’M’AA’R’pW’QF’S’d’n’Nz’HvPVL’mdhcif** | MSS Netting PrecalculationThis ETC Precalculation Configuration Guide assumes this quantity to be negative. |
| 3 | DASpinImportQSP **BrtF’S’Nz’mdh** | Ancillary Services Precalculation |
| 4 | DANonSpinImportQSP **BrtF’S’Nz’mdh** | Ancillary Services Precalculation |
| 5 | DARegUpImportQSP **BrtF’S’Nz’mdh** | Ancillary Services Precalculation |
| 6 | RTSpinImportQSP **BrtF’S’Nz’mdh** | Ancillary Services Precalculation |
| 7 | RTNonSpinImportQSP **BrtF’S’Nz’mdh** | Ancillary Services Precalculation |
| 8 | RTRegUpImportQSP **BrtF’S’Nz’mdh** | Ancillary Services Precalculation |
| 9 | DARegDownImportQSP **BrtF’S’Nz’mdh** | Ancillary Services Precalculation |
| 10 | RTRegDownImportQSP **BrtF’S’Nz’mdh** | Ancillary Services Precalculation |

## CAISO Formula

The formulas are presented in this Pre-calculation in a **bottom-up** manner.

Note: In all instances in this document, the demand-side resource type t = Load currently refer to “LOAD”, Pump Storage (“PMPST”), and Pump Hydro (“PUMP”) whenever consuming Energy. Other resource types similar to “LOAD” may be added later to this grouping. However, it is and will always be differentiated from export (“ETIE”).

* + 1. A stored procedure is used to calculate the balancing of contracts, and related calculations. The outputs of the stored procedure and the logic for these calculations are shown below. These outputs are to be used as raw inputs into the next set of formulas, which are actually configured and available in Configuration File.

A. Do balancing of contract Schedules per contract for the DAM

0.1 AcceptedDAContractSS BrtAA’QpNz’mdh = Sum (Q’) BAAAcceptedDAContractSS BrtQ’AA’QpNz’mdh

1. HourlyTotalDASourceContractSchdQty Nz’mdh =

Sum (B, r, t, A, A’, Q, p) AcceptedDAContractSS BrtAA’QpNz’mdh

Where resource type (t) = “GEN” or “ITIE”

2. HourlyTotalDASinkContractSchdQty Nz’mdh =

 Sum (B, r, t, A, A’, Q, p) AcceptedDAContractSS BrtAA’QpNz’mdh

Where resource type (t) = “LOAD” or “ETIE”

3. HourlyDAContractBalanceQty Nz’mdh =

Min (HourlyTotalDASourceContractSchdQty Nz'h, (-1)\*HourlyTotalDASinkContractSchdQty Nz’mdh , DAContractMaxEntitlement Nz’mdh )

Note: This recognizes the maximum entitlement used in the Day-Ahead market.

4. HourlyDASourceBalFactor Nz’mdh =

IF HourlyDAContractBalanceQty Nz’mdh < SmallContractSSTol

THEN

HourlyDASourceBalFactor Nz’mdh = 0

ELSE

HourlyDASourceBalFactor Nz’mdh =

HourlyDAContractBalanceQty Nz’mdh / HourlyTotalDASourceContractSchdQty Nz'mdh

5. HourlyDASinkBalFactor Nz’mdh =

IF HourlyDAContractBalanceQty Nz’mdh < SmallContractSSTol

THEN

HourlyDASinkBalFactor Nz’mdh = 0

ELSE

HourlyDASinkBalFactor Nz’mdh =

[HourlyDAContractBalanceQty Nz’mdh /((-1)\*HourlyTotalDASinkContractSchdQty Nz'mdh)]

6. BAHourlyResourceDABalanceContractSchdQty BrtAA’QpNz’mdh =

IF resource type (t) = “GEN” or “ITIE”

THEN

BAHourlyResourceDABalanceContractSchdQty BrtAA’QpNz’mdh =

AcceptedDAContractSS BrtAA’QpNz’mdh \* HourlyDASourceBalFactor Nz'mdh

ELSE

BAHourlyResourceDABalanceContractSchdQty BrtAA’QpNz’mdh =

AcceptedDAContractSS BrtAA’QpNz’mdh \* HourlyDASinkBalFactor Nz'mdh

END IF

B. Do balancing of contract Schedules per contract for the Post-DA

6.1 BASettlementIntervalResourcePostDAContractScheduleQuantity BrtAA’QpNz'mdhcif = Sum (Q’) BAABASettlementIntervalResourcePostDAContractScheduleQuantity BrtQ’AA’QpNz'mdhcif

7. TotalSettlementIntervalPostDASourceContractSchdQty Nz'mdhcif =

 Sum (B, r, t, A, A’, Q, p) BASettlementIntervalResourcePostDAContractScheduleQuantity BrtAA’QpNz'mdhcif

Where resource type (t) = “GEN” or “ITIE”

8. TotalSettlementIntervalPostDASinkContractSchdQty Nz'mdhcif =

 Sum (B, r, t, A, A’, Q, p) BASettlementIntervalResourcePostDAContractScheduleQuantity BrtAA’QpNz'mdhcif

Where resource type (t) = “LOAD” or “ETIE”

9. PostDASettlementIntervalBalanceContractSchdQty Nz'mdhcif =

Min (TotalSettlementIntervalPostDASourceContractSchdQty Nz'mdhcif , (-1)\* TotalSettlementIntervalPostDASinkContractSchdQty Nz'mdhcif , ContractMaxEntitlement Nz’h/12 )

10. PostDASettlementIntervalSourceBalFactor Nz'mdhcif =

IF PostDASettlementIntervalBalanceContractSchdQty Nz'mdhcif < SmallContractSSTol

THEN

PostDASettlementIntervalSourceBalFactor Nz'mdhcif = 0

ELSE

PostDASettlementIntervalSourceBalFactor Nz'mdhcif =

(PostDASettlementIntervalBalanceContractSchdQty Nz'mdhcif / TotalSettlementIntervalPostDASourceContractSchdQty Nz'mdhcif )

11. PostDASettlementIntervalSinkBalFactor Nz'mdhcif =

IF PostDASettlementIntervalBalanceContractSchdQty Nz'mdhcif < SmallContractSSTol

THEN

PostDASettlementIntervalSinkBalFactor Nz'mdhcif = 0

ELSE

PostDASettlementIntervalSinkBalFactor Nz'mdhcif =

[PostDASettlementIntervalBalanceContractSchdQty Nz'mdhcif / ((-1)\*TotalSettlementIntervalPostDASinkContractSchdQty Nz'mdhcif )]

12. BASettlementIntervalResourceFinalBalanceContractSchdQty BrtAA’QpNz'mdhcif =

IF resource type (t) = “GEN” or “ITIE”

THEN

BASettlementIntervalResourceFinalBalanceContractSchdQty BrtAA’QpNz'mdhcif =

BASettlementIntervalResourcePostDAContractScheduleQuantity BrtAA’QpNz'mdhcif \* PostDASettlementIntervalSourceBalFactor Nz'mdhcif

ELSE

BASettlementIntervalResourceFinalBalanceContractSchdQty BrtAA’QpNz'mdhcif =

BASettlementIntervalResourcePostDAContractScheduleQuantity BrtAA’QpNz'mdhcif \* PostDASettlementIntervalSinkBalFactor Nz'mdhcif

END IF

C. CHAIN CRN CALCULATIONS

(i) Split the balanced quantities into single and chain:

13. BAHourlyResourceDAEnergySingleCRNBalancedQty BrtNz’mdh =

 (BAHourlyResourceDAEnergyCRNSchedulePercentage BrtAA’Qpg'Nz’mdh \*

 BAHourlyResourceDABalanceContractSchdQty BrtAA’QpNz’mdh )

Where Chain CRN ID (g’) is NULL

And Financial node (attributes A, A’, Q, and p) is to be dropped.

14. BASettlementIntervalResourcePostDAEnergySingleCRNBalancedQty BrtNz’mdhcif =

BASettlementIntervalResourcePostDAEnergyCRNSchedulePercentage BrtAA’Qpg'Nz'mdhcif \* BASettlementIntervalResourceFinalBalanceContractSchdQty BrtAA’QpNz'mdhcif

Where Chain CRN ID (g’) is NULL

And Financial node (attributes A, A’, Q, and p) is to be dropped

15. BAHourlyResourceDAEnergyChainCRNLegBalancedQty Brtg’Nz’mdh =

 (BAHourlyResourceDAEnergyCRNSchedulePercentage BrtAA’Qpg'Nz’mdh \*

 BAHourlyResourceDABalanceContractSchdQty BrtAA’QpNz’mdh )

Where Chain CRN ID (g’) is NOT NULL;

And Financial node (attributes A, A’, Q, and p) is to be dropped.

16. BASettlementIntervalResourcePostDAEnergyChainCRNLegBalancedQty Brtg’Nz’mdhcif =

(BASettlementIntervalResourcePostDAEnergyCRNSchedulePercentage BrtAA’Qpg'Nz'mdhcif \*

 BASettlementIntervalResourceFinalBalanceContractSchdQty BrtAA’QpNz'mdhcif )

Where Chain CRN ID (g’) is NOT NULL;

And Financial node (attributes A, A’, Q, and p) is to be dropped.

(ii) Calculate the resource level Chain balanced schedules. Also identify whether source or sink resource, assign contract types of first or last leg CRNs, respectively:

17. BAHourlyResourceDAEnergyChainCRNSourceBalancedQty BrtNz’mdh

At each resource r having resource type (t) = “GEN” or “ITIE”, calculate the

Min (BAHourlyResourceDAEnergyChainCRNLegBalancedQty Brtg’Nz’mdh ) across all segments N of Chain CRN g’.

Pick up contract type z' of the first CRN leg of the Chain.

This intermediate result is the resource level Chain CRN balance quantity and is defined for the Chain CRN g’. Now, label this Chain CRN (g’) attribute as the new contract attribute N for this bill determinant. Thus, the value of attribute N in this calculated charge type is a Chain CRN contract.

18. BASettlementIntervalResourcePostDAEnergyChainCRNSourceBalancedQty BrtNz’mdhcif

At each resource r having resource type (t) = “GEN” or “ITIE”, calculate the

Min (BASettlementIntervalResourcePostDAEnergyChainCRNLegBalancedQty Brtg’Nz’mdhcif) across all segments N of Chain CRN g’.

Pick up contract type z' of the first CRN leg of the Chain.

This intermediate result is the resource level Chain CRN balance quantity and is defined for the Chain CRN g’. Now, label this Chain CRN (g’) attribute as the new contract attribute N for this bill determinant. Thus, the value of attribute N in this calculated charge type is a Chain CRN contract.

19. BAHourlyResourceDAEnergyChainCRNSinkBalancedQty BrtNz’mdh

At each resource r having resource type (t) = “LOAD” or “ETIE”, calculate the

Max (BAHourlyResourceDAEnergyChainCRNLegBalancedQty Brtg’Nz’mdh ) across all segments N of Chain CRN g’.

Pick up contract type z' of the last CRN leg of the Chain.

This intermediate result is the resource level Chain CRN balance quantity and is defined for the Chain CRN g’. Now, label this Chain CRN (g’) attribute as the new contract attribute N for this bill determinant. Thus, the value of attribute N in this calculated charge type is a Chain CRN contract.

20. BASettlementIntervalResourcePostDAEnergyChainCRNSinkBalancedQty BrtNz’mdhcif

At each resource r having resource type (t) = “LOAD” or “ETIE”, calculate the

Max (BASettlementIntervalResourcePostDAEnergyChainCRNLegBalancedQty Brtg’Nz’mdhcif) across all segments N of Chain CRN g’.

Pick up contract type z' of the last CRN leg of the Chain.

This intermediate result is the resource level Chain CRN balance quantity and is defined for the Chain CRN g’. Now, label this Chain CRN (g’) attribute as the new contract attribute N for this bill determinant. Thus, the value of attribute N in this calculated charge type is a Chain CRN contract.

Note: The following formulas form part of the Configuration and are using inputs from the outputs of the stored procedure identified above.

* + 1. Map resources to physical sources and sinks per contract, per DAM, per relevant Settlement Period, over all resources r

If r is of resource type (t = “GEN” or “ITIE”) Then

 AcceptedDAContractSourceSS **Brt**AA’Qp**Nz’mdh**  = AcceptedDAContractSS **Brt**AA’Qp**Nz’mdh**

If r is of resource type (t = Load or “ETIE”) Then

 AcceptedDAContractSinkSS **Brt**AA’Qp**Nz’mdh**  = AcceptedDAContractSS **Brt**AA’Qp**Nz’mdh**

* + 1. Valid and balanced contract Self-Schedules for the DAM

DASumSource **Nz’mdh**  = HourlyTotalDASourceContractSchdQty **Nz’mdh**

DASumSink **Nz’mdh**  = HourlyTotalDASinkContractSchdQty **Nz’mdh**

Note: The above two charge types, DASumSource **Nz’mdh** and DASumSink **Nz’mdh** are not used in any successive calculation and are not reportable. However, the pass-through raw inputs, HourlyTotalDASourceContractSchdQty **Nz’mdh** and HourlyTotalDASinkContractSchdQty **Nz’mdh ,** are reportable.

DABalanceCapacity **Nz’mdh** = HourlyDAContractBalanceQty **Nz’mdh**

Note: The above raw input is not reportable but the charge type containing it will be reportable. It will be seen by the BA which is also the designated Contract Billing SC for the contract, and for which congestion credits is settled.

DASourceFactor **Nz’mdh** = HourlyDASourceBalFactor **Nz’mdh**

DASinkFactor **Nz’mdh** = HourlyDASinkBalFactor **Nz’mdh**

Note: The above two charge types, DASourceFactor **Nz’mdh** and DASinkFactor **Nz’mdh** are not used in any successive calculation and are not reportable. However, the pass-through raw inputs, HourlyDASourceBalFactor **Nz’mdh** and HourlyDASinkBalFactor **Nz’mdh ,** are reportable.

HourlyResourceDABalancedContractScheduleEnergy **Brt**AA’Qp**Nz’mdh** =

BAHourlyResourceDABalanceContractSchdQty **Brt**AA’Qp**Nz’mdh**

* + 1. Valid and balanced contract Self-Schedules for actual flow in Real-Time (called Post-DA), combining FMM/ RTD quantities and any adjustments for all possible resources r and for all Settlement Interval of each Trading Hour (h) for each contract N

SettlementIntervalContractMaxEntitlement Nz’mdhcif = (1/12)\* (ContractMaxEntitlement Nz’h)

Where z’ = “TOR” or “ETC”

Note: The charge type, SettlementIntervalContractMaxEntitlement Nz’mdhcif is not used in any successive calculation and is not reportable. However, the raw input, ContractMaxEntitlement Nz’mdh , is reportable.

If r is of resource type t = “ITIE” or “GEN”, Then

PostDAContractSourceSS **Brt**AA’Qp**Nz’mdhcif** =

 BASettlementIntervalResourcePostDAContractScheduleQuantity **Brt**AA’Qp**Nz'mdhcif**

If r is of resource type t = “ETIE” or “LOAD”, Then

PostDAContractSinkSS **Brt**AA’Qp**Nz’mdhcif** =

 BASettlementIntervalResourcePostDAContractScheduleQuantity **Brt**AA’Qp**Nz'mdhcif**

PostDASumSource Nz’mdhcif = TotalSettlementIntervalPostDASourceContractSchdQty **Nz'mdhcif**

PostDASumSink Nz’mdhcif = TotalSettlementIntervalPostDASinkContractSchdQty **Nz'mdhcif**

Note: The two charge types, PostDASumSource Nz’mdhcif and PostDASumSink Nz’mdhcif are not used in any successive calculation and are not reportable. However, the pass-through raw inputs, TotalSettlementIntervalPostDASourceContractSchdQty **Nz'mdhcif** and TotalSettlementIntervalPostDASinkContractSchdQty **Nz'mdhcif ,** are reportable.

PostDABalanceCapacity Nz’mdhcif =

PostDASettlementIntervalBalanceContractSchdQty **Nz'mdhcif**

Note: The above raw input is not reportable but the charge type containing it will be reportable. It will be seen by the BA which is also the designated Contract Billing SC for the contract, and for which congestion credits is settled.

PostDASourceFactor Nz’mdhcif =

PostDASettlementIntervalSourceBalFactor **Nz'mdhcif**

PostDASinkFactor Nz’mdhcif =

PostDASettlementIntervalSinkBalFactor **Nz'mdhcif**

Note: The two charge types, PostDASourceFactor Nz’mdhcif and PostDASinkFactor Nz’mdhcif are not used in any successive calculation and are not reportable. However, the pass-through raw inputs, PostDASettlementIntervalSourceBalFactor **Nz'mdhcif** and PostDASettlementIntervalSinkBalFactor **Nz'mdhcif ,** are reportable.

BASettlementIntervalResourceFinalBalancedContractScheduleQuantity **Brt**AA’Qp**Nz’mdhcif** =

BASettlementIntervalResourceFinalBalanceContractSchdQty **Brt**AA’Qp**Nz'mdhcif**

SettlementIntervalPostDAChangeBalancedContractSS BrtAA’QpNz’mdhcif =

[BASettlementIntervalResourceFinalBalancedContractScheduleQuantity **Brt**AA’Qp**Nz’mdhcif**

- (1/12)\*(HourlyResourceDABalancedContractScheduleEnergy **Brt**AA’Qp**Nz’mdh**)]

 Where z’ = “TOR” or “ETC”

PostDAChangeBalanceCapacity Nz’mdhcif =

PostDABalanceCapacity **Nz’mdhcif** - (1/12)\*DABalanceCapacity **Nz’mdh**

Where z’ = “TOR” or “ETC”

* + 1. Balanced quantities for individual CRN classified into single and chain:

BAHourlyResourceDAEnergySingleCRNBalancedQuantity BrtNz’mdh =

BAHourlyResourceDAEnergySingleCRNBalancedQty **BrtNz’mdh**

BASettlementIntervalResourcePostDAEnergySingleCRNBalancedQuantity BrtNz’mdhcif=

BASettlementIntervalResourcePostDAEnergySingleCRNBalancedQty **BrtNz’mdhcif**

BAHourlyResourceDAEnergyChainCRNLegBalancedQuantity Brtg’Nz’mdh =

BAHourlyResourceDAEnergyChainCRNLegBalancedQty **Brtg’Nz’mdh**

BASettlementIntervalResourcePostDAEnergyChainCRNLegBalancedQuantity Brtg’Nz’mdhcif=

BASettlementIntervalResourcePostDAEnergyChainCRNLegBalancedQty **Brtg’Nz’mdhcif**

* + 1. Calculated resource level Chain balanced schedules

BAHourlyResourceDAEnergyChainCRNSourceBalancedQuantity BrtNz’mdh =

BAHourlyResourceDAEnergyChainCRNSourceBalancedQty BrtNz’mdh

BASettlementIntervalResourcePostDAEnergyChainCRNSourceBalancedQuantity BrtNz’mdhcif =

BASettlementIntervalResourcePostDAEnergyChainCRNSourceBalancedQty BrtNz’mdhcif

BAHourlyResourceDAEnergyChainCRNSinkBalancedQuantity BrtNz’mdh =

BAHourlyResourceDAEnergyChainCRNSinkBalancedQty BrtNz’mdh

BASettlementIntervalResourcePostDAEnergyChainCRNSinkBalancedQuantity BrtNz’mdhcif =

BASettlementIntervalResourcePostDAEnergyChainCRNSinkBalancedQty BrtNz’mdhcif

BAHourlyResourceDAEnergyChainCRNBalancedQuantity BrtNz’mdh =

(BAHourlyResourceDAEnergyChainCRNSourceBalancedQuantity BrtNz’mdh

 + BAHourlyResourceDAEnergyChainCRNSinkBalancedQuantity BrtNz’mdh**)**

 Note: The addition is intended to combine the two BDs into a single BD.

BASettlementIntervalResourcePostDAEnergyChainCRNBalancedQuantity BrtNz’mdhcif =

(BASettlementIntervalResourcePostDAEnergyChainCRNSourceBalancedQuantity BrtNz’mdhcif + BASettlementIntervalResourcePostDAEnergyChainCRNSinkBalancedQuantity BrtNz’mdhcif**)**

Note: The addition is intended to combine the two BDs into a single BD.

* + 1. Charge types for successors other than for congestion/loss credits; single and Chain CRNs are combined into common bill determinants

BAHourlyResourceDABalancedContractCRNFilteredQuantity Brtmdh

 Sum(N,z’) {BAHourlyResourceDABalancedContractCRNQuantity BrtNz’mdh}

BAHourlyResourceDABalancedContractCRNQuantity BrtNz’mdh =

[(BAHourlyResourceDAEnergySingleCRNBalancedQuantity BrtNz’mdh  +

BAHourlyResourceDAEnergyChainCRNBalancedQuantity BrtNz’mdh) \*

BADailyResourceCRNExemptionEligibilityFlag BrtNmd ]

BASettlementIntervalResourcePostDAChangeBalancedContractCRNQuantity BrtNz’mdhcif =

[(BASettlementIntervalResourcePostDAEnergySingleCRNBalancedQuantity BrtNz’mdhcif + BASettlementIntervalResourcePostDAEnergyChainCRNBalancedQuantity BrtNz’mdhcif ) \* BADailyResourceCRNExemptionEligibilityFlag BrtNd - (1/12)\*( BAHourlyResourceDABalancedContractCRNQuantity BrtNz’mdh )]

Where z’ = “TOR” or “ETC”

BASettlementIntervalResourceFinalBalancedContractCRNFilteredQuantity Brtmdhcif

Sum(N,z’) {BASettlementIntervalResourceFinalBalancedContractCRNQuantityBrtNz’mdhcif}

BASettlementIntervalResourceFinalBalancedContractCRNQuantity BrtNz’mdhcif =

[(1/12)\* BAHourlyResourceDABalancedContractCRNQuantity BrtNz’mdh + BASettlementIntervalResourcePostDAChangeBalancedContractCRNQuantity BrtNz’mdhcif]

HourlyResourceDABalancedContractAtScheduleEnergy BrtNh =

(BAHourlyResourceDAEnergySingleCRNBalancedQuantity BrtNz’mdh  +

BAHourlyResourceDAEnergyChainCRNBalancedQuantity BrtNz’mdh)

BASettlementIntervalResourcePostDAChangeBalancedContractQuantity BrtNmdhcif =

BASettlementIntervalResourcePostDAChangeBalancedContractCRNQuantity BrtNz’mdhcif

BAHourlyResourceContractDASupplyQuantity Brtz’mdh =

 (BAHourlyResourceDABalancedContractCRNQuantity BrtNz’mdh )

where t = “GEN” or “ITIE”.

BAHourlyResourceContractDADemandQuantity Brtz’mdh =

 (BAHourlyResourceDABalancedContractCRNQuantity BrtNz’mdh )

where t = “LOAD” or “ETIE”.

BASettlementIntervalFinalBalancedContractAtScheduleQuantity BrtNmdhcif =

 BASettlementIntervalResourceFinalBalancedContractCRNQuantity BrtNz’mdhcif

Implementation Note: Exclude resources belonging to this BD,

ResourceEDAMLegacyTransmissionContractFlag rNz’md

BASettlementIntervalFinalBalancedContractHVACMeterQuantity BrtNmdhcif =

 BASettlementIntervalResourceFinalBalancedContractCRNQuantity BrtNz’mdhcif

where contract type z’ =”ETC” or “TOR”

and resource type t = “LOAD”

Implementation Note: Exclude resources belonging to this BD,

ResourceEDAMLegacyTransmissionContractFlag rNz’md

* + 1. Specific Measured Demand quantities for demand resource types by contract type.

TSRContractSSCountQuantity rtQ’AA’QpNz’md =

Sum (B, m, d, h, c, i, f) {0\*TSRBAAAcceptedDAContractSS BrtQ’AA’QpNz’mdh +

0\*TSRBAAAcceptedPostDAContractScheduleQuantity BrtQ’AA’QpNz'mdhcif + 1}

TSRContractBAANodeFlag rtQ’AA’QpNz’md =

Min(1, TSRContractSSCountQuantity rtQ’AA’QpNz’md)

ResourceDailyTSRType1Flag rtNz’md =

Max ( Q’, A, A’, Q, p) { TSRContractBAANodeFlag rtQ’AA’QpNz’md }

ResourceBAATransmissionContractCountQuantity rQ’Nz’md =

Sum (B,,t, A, A’, Q, p, h) {0\* BAAAcceptedDAContractSS BrtQ’AA’QpNz’mdh +

0\* BAABASettlementIntervalResourcePostDAContractScheduleQuantity BrtQ’AA’QpNz'mdhcif+1}

ResourceBAATransmissionContractFlag rQ’Nz’md =

Min (1, ResourceBAATransmissionContractCountQuantity rQ’Nz’md)

ResourceEDAMLegacyTransmissionContractFlag rNz’md =

Max (Q’) { ResourceBAATransmissionContractFlag rQ’Nz’md}

Where Q’ <> ‘CISO’

EDAMLegacyTransmissionContractFlag Nz'md =

Max (r) { ResourceEDAMLegacyTransmissionContractFlag rNz’md }

SettlementIntervalResourceContractMD **Brtz’mdhcif** =

 (BASettlementIntervalResourceFinalBalancedContractCRNQuantity BrtNz’mdhcif)

Where t = “LOAD” or “ETIE”

Implementation Note: Exclude resources belonging to this BD, ResourceDailyTSRType1Flag rtNz’md

BA10MResourceContractMD **Brtz’mdhi** =

 SettlementIntervalResourceContractMD **Brtz’mdhcif**

SettlementIntervalResourceRTContractMD **Brtz’mdhcif** =

 (BASettlementIntervalResourcePostDAChangeBalancedContractCRNQuantity BrtNz’mdhcif )

Where t = “LOAD” or “ETIE”

Implementation Note: Exclude resources belonging to this BD, ResourceDailyTSRType1Flag rtNz’md

SettlementIntervalResourceECAAttributeSumDemandQuantity **BrtQ’QF’S’z’mdhcif**

= (

BAResEntitySettlementIntervalMeteredCAISODemandQuantity

B**rtT’Q’uI’M’AA’R’pW’QF’S’d’n’Nz’HvPVL’mdhcif**

 + 

SettlementIntervalDeemedDeliveredInterchangeEnergyQuantity

**BrtEuT’I’Q’M’AA’F’R’pPW’QS’d’Nz’OVvHn’L’mdhcif**)

Where t = “LOAD” or “ETIE”

And Q’ = “CISO”

Implementation Note: Exclude resources belonging to this BD, ResourceDailyTSRType1Flag rtNz’md

SettlementIntervalResourceECAAttributeFactor **BrtQ’QF’S’z’mdhcif**

IF SettlementIntervalResourceECAAttributeSumDemandQuantity **BrtQ’QF’S’z’mdhcif** <> 0

THEN SettlementIntervalResourceECAAttributeFactor **BrtQ’QF’S’z’mdhcif** = 1

ELSE SettlementIntervalResourceECAAttributeFactor **BrtQ’QF’S’z’mdhcif** = 0

SettlementIntervalResourceContractMDforECA **BrtQ’QF’S’z’mdhcif** =

(SettlementIntervalResourceContractMD **Brtz’mdhcif** \*

 SettlementIntervalResourceECAAttributeFactor **BrtQ’QF’S’z’mdhcif** )

Where t = “LOAD” or “ETIE”

BA10MResourceContractMDforECA **BrtQ’QF’S’z’mdhi** =

SettlementIntervalResourceContractMDforECA **BrtQ’QF’S’z’mdhcif**

SettlementIntervalResourceRTContractMDforECA **BrtQ’QF’S’z’mdhcif** =

(SettlementIntervalResourceRTContractMD **Brtz’mdhcif** \*

SettlementIntervalResourceECAAttributeFactor **BrtQ’QF’S’z’mdhcif** )

Where t = “LOAD” or “ETIE”

* + 1. TOR demand quantities eligible for contract Loss Credits, on the SC that made the contract self-schedule.

BAHourlyResourceDAEnergyLossCreditEligibleCRNDemandQuantity **Brtz’mdh** =

 ** ( BAHourlyResourceDABalancedContractCRNQuantity BrtNz’mdh

 **\*** ContractDailyTORLossCreditInclusionFlag **Nz’md**)

where resource type t = “LOAD” or “ETIE”

Implementation Note: Exclude resources belonging to this BD, ResourceDailyTSRType1Flag rtNz’md

BASettlementIntervalResourcePostDAChangeEnergyLossCreditEligibleCRNDemandQuantity **Brtz’mdhcif** =

 ** ( BASettlementIntervalResourcePostDAChangeBalancedContractCRNQuantity BrtNz’mdhcif

 **\*** ContractDailyTORLossCreditInclusionFlag **Nz’md**)

where resource type t = “LOAD” or “ETIE”

Implementation Note: Exclude resources belonging to this BD, ResourceDailyTSRType1Flag rtNz’md

BASettlementIntervalResourceEnergyLossCreditEligibleCRNDemandQuantity **Brtz’mdhcif** =

[(1/12)\*BAHourlyResourceDAEnergyLossCreditEligibleCRNDemandQuantity **Brtz’mdh** + BASettlementIntervalResourcePostDAChangeEnergyLossCreditEligibleCRNDemandQuantity **Brtz’mdhcif** ]

BAHourlyEnergyLossCreditEligibleContractDemandQuantity **Bmdh** =

** BASettlementIntervalResourceEnergyLossCreditEligibleCRNDemandQuantity **Brtz’mdhcif**

where contract type z’ = “TOR”

* + 1. ETC/TOR A/S calculations

AvailableContractCapacityforUpwardAS **Nz’mdh** =

Max(0, ContractMaxEntitlement **Nz’mdh** - HourlyEnergyBalancedContractUsage **Nz’mdh**

+ HourlyTotalRegDownQSPContractUsage **Nz’mdh** )

Where z’ = “TOR” or “ETC”

* + - * 1. And Where HourlyEnergyBalancedContractUsage **Nz’mdh** =

PostDABalanceCapacity **Nz’mdhcif**

* + - * 1. And Where HourlyTotalRegDownQSPContractUsage **Nz’mdh** =

 (DARegDownImportQSP **BrtF’S’Nz’mdh**

+ max(0,RTRegDownImportQSP **BrtF’S’Nz’mdh** ))

TotalContractPositiveUpwardASQSP **Nz’mdh** =

 [DASpinImportQSP **BrtF’S’Nz’mdh**

+ DANonSpinImportQSP **BrtF’S’Nz’mdh**

+ DARegUpImportQSP **BrtF’S’Nz’mdh**

+ max(0, RTSpinImportQSP **BrtF’S’Nz’mdh**)

+ max(0, RTNonSpinImportQSP **BrtF’S’Nz’mdh**)

+ max(0, RTRegUpImportQSP **BrtF’S’Nz’mdh**) ]

Where z’ = “TOR” or “ETC”

UpwardASQSPContractCongestionRebateFactor **Nz’mdh**

IF TotalContractPositiveUpwardASQSP **Nz’mdh**  = 0

THEN

 UpwardASQSPContractCongestionRebateFactor **Nz’mdh**  = 0

ELSE

 UpwardASQSPContractCongestionRebateFactor **Nz’mdh**  =

Min[ 1, (AvailableContractCapacityforUpwardAS **Nz’mdh** /

 TotalContractPositiveUpwardASQSP **Nz’mdh** ) ]

Where z’ = “TOR” or “ETC”

Upward AS Eligible Quantity for congestion charge rebate

* + - * 1. DASpinContractEligibleQty **BrtF’S’Nz’mdh** =

DASpinImportQSP **BrtF’S’Nz’mdh**\* UpwardASQSPContractCongestionRebateFactor **Nz’mdh**

* + - * 1. DANonSpinContractEligibleQty **BrtF’S’Nz’mdh** =

DANonSpinImportQSP **BrtF’S’Nz’mdh**\* UpwardASQSPContractCongestionRebateFactor **Nz’mdh**

* + - * 1. DARegUpContractEligibleQty **BrtF’S’Nz’mdh** =

DARegUpImportQSP **BrtF’S’Nz’mdh**\* UpwardASQSPContractCongestionRebateFactor **Nz’mdh**

* + - * 1. RTSpinContractEligibleQty **BrtF’S’Nz’mdh** =

Max(0, RTSpinImportQSP **BrtF’S’Nz’mdh**)

\* UpwardASQSPContractCongestionRebateFactor **Nz’mdh**

* + - * 1. RTNonSpinContractEligibleQty **BrtF’S’Nz’mdh** =

Max(0, RTNonSpinImportQSP **BrtF’S’Nz’mdh**)

\* UpwardASQSPContractCongestionRebateFactor **Nz’mdh**

* + - * 1. RTRegUpContractEligibleQty **BrtF’S’Nz’mdh** =

Max(0, RTRegUpImportQSP **BrtF’S’Nz’mdh**)

\* UpwardASQSPContractCongestionRebateFactor **Nz’mdh**

QSP not eligible for congestion rebate; the MW value provided to the scheduler SC

* + - * 1. DASpinNonContractEligibleQSP **BrtF’S’mdh** =

 (DASpinImportQSP **BrtF’S’Nz’mdh**- DASpinContractEligibleQty **BrtF’S’Nz’mdh** )

* + - * 1. DANonSpinNonContractEligibleQSP **BrtF’S’mdh** =

 (DANonSpinImportQSP **BrtF’S’Nz’mdh**- DANonSpinContractEligibleQty **BrtF’S’Nz’mdh** )

* + - * 1. DARegUpNonContractEligibleQSP **BrtF’S’mdh** =

 (DARegUpImportQSP **BrtF’S’Nz’mdh**- DARegUpContractEligibleQty **BrtF’S’Nz’mdh** )

* + - * 1. RTSpinNonContractEligibleQSP **BrtF’S’mdh** =

 max(0, (RTSpinImportQSP **BrtF’S’Nz’mdh**- RTSpinContractEligibleQty **BrtF’S’Nz’mdh** ))

* + - * 1. RTNonSpinNonContractEligibleQSP **BrtF’S’mdh** =

 max(0, (RTNonSpinImportQSP **BrtF’S’Nz’mdh**- RTNonSpinContractEligibleQty **BrtF’S’Nz’mdh** ))

* + - * 1. RTRegUpNonContractEligibleQSP **BrtF’S’mdh** =

 max(0, (RTRegUpImportQSP **BrtF’S’Nz’mdh**- RTRegUpContractEligibleQty **BrtF’S’Nz’mdh** ))

* + 1. Miscellaneous ETC Calculations

DailyContractResourceFinancialNodeMap **rt**AA’Qp**Nz’md** =

 (DailyContractFinancialMap **Brt**AA’Qp**Nz’md** )\*0 + 1

where this charge type will only be computed when DailyContractFinancialMap **Brt**AA’Qp**Nz’md** = 1.

Note: This charge type effectively drops attribute BA ID B from the raw input.

BASettlementIntervalResourcePostDAChangeEnergyCRNSchedulePercentage BrtAA’Qpg'Nz'mdhcif =

BASettlementIntervalResourcePostDAEnergyCRNSchedulePercentage **Brt**AA’Qp**g'Nz'mdhcif**

CAISOContractSSToleranceQuantity md = SmallContractSSTol md

## Outputs

| Output ID | Name | Description |
| --- | --- | --- |
|  | In addition to any outputs listed below, all inputs shall be included as outputs. |  |
|  | AcceptedDAContractSourceSS **Brt**AA’Qp**Nz’mdh** | The accepted Self-Schedule for Contract Reference Number (CRN) N for BA B at source resource r for Trading Hour h of the DAM. (MWh) |
|  | AcceptedDAContractSinkSS **Brt**AA’Qp**Nz’mdh** | The accepted Self-Schedule for contract N for BA B at sink resource r for Trading Hour h of the DAM. (MWh) |
|  | DASumSource **Nz’mdh** | Sum of all accepted Self-Schedules using contract N for Trading Hour h of the DAM, over all supply resources or Scheduling Points. (MWh)Note: This is not reportable. |
|  | DASumSink **Nz’mdh** | Sum of all accepted Self-Schedules using contract N for Trading Hour h of the DAM, over all demand/sink resources or Scheduling Points. (MWh)Note: This is not reportable. |
|  | DABalanceCapacity **Nz’mdh** | The Day-Ahead valid and balanced portion of Self-Schedules using contract N. This represents the total quantity eligible for Congestion credits, and is equal for both the supply-side and demand-side Self-Schedules for contract N for Trading Hour h of the DAM. (MWh) |
|  | DASourceFactor **Nz’mdh** | A multiplier or factor to effect the balancing of source and sink Self-Schedules using contract N, in the DAM.Note: This is not reportable. |
|  | DASinkFactor **Nz’mdh** | A multiplier or factor to effect the balancing of source and sink Self-Schedules using contract N, in the DAM.Note: This is not reportable. |
|  | HourlyResourceDABalancedContractScheduleEnergy **Brt**AA’Qp**Nz’mdh** | The valid and balanced ETC/TOR/CVR schedules for contract N for resource r for hour h of the DAM. This includes schedules from Chain CRNs and its contribution to the individual CRN components. (MWh) |
|  | SettlementIntervalContractMaxEntitlement **Nz’mdhcif** | The maximum Entitlement for CRN N at 5-min intervals. (MWh)Note: This is not reportable. |
|  | PostDAContractSourceSS **Brt**AA’Qp**Nz’mdhcif** | The accepted Post-DA Self-Schedule at source resource. (MWh) |
|  | PostDAContractSinkSS **Brt**AA’Qp**Nz’mdhcif** | The accepted Post-DA Self-Schedule or meter quantity at sink resource. (MWh) |
|  | PostDASumSource **Nz’mdhcif** | Sum of all accepted Post-DA Self-Schedules using contract N over all its supply resources or Scheduling Points. (MWh)Note: This is not reportable. |
|  | PostDASumSink **Nz’mdhcif** | Sum of all accepted Post-DA Self-Schedules using contract N over all its demand/sink resources or Scheduling Points. (MWh)Note: This is not reportable. |
|  | PostDABalanceCapacity **Nz’mdhcif** | Valid and balanced portion of real-time flow associated with the Self-Schedules for contract N. This is inclusive of the DABalanceCapacity for contract N. |
|  | PostDASourceFactor **Nz’mdhcif** | A multiplier or factor to effect the balancing of source and sink Self-Schedules using contract N in the Post-DA.Note: This is not reportable. |
|  | PostDASinkFactor **Nz’mdhcif** | A multiplier or factor to effect the balancing of source and sink Self-Schedules using contract N in the Post-DA.Note: This is not reportable. |
|  | BASettlementIntervalResourceFinalBalancedContractScheduleQuantity **Brt**AA’Qp**Nz’mdhcif** | The final valid and balanced portion of contract usage, covering the Day-Ahead and any Post-Day-Ahead change. |
|  | SettlementIntervalPostDAChangeBalancedContractSS **Brt**AA’Qp**Nz’mdhcif** | The valid and balanced Self-Schedules using contract N scheduled in the Post-DA. (MWh) |
|  | PostDAChangeBalanceCapacity **Nz’mdhcif** | The post-Day-Ahead valid and balanced portion of Self-Schedules using contract N. This represents the total quantity eligible for Congestion credits, and is equal for both the supply-side and the demand-side Self-Schedules for contract N in the FMM/RTM. (MWh) |
|  | BAHourlyResourceDAEnergySingleCRNBalancedQuantity **BrtNz’mdh** | The valid and balanced contract quantity at resource r for the Day-Ahead, coming from the schedule at a Single CRN, not a Chain CRN.  |
|  | BASettlementIntervalResourcePostDAEnergySingleCRNBalancedQuantity **BrtNz’mdhcif** | The valid and balanced contract quantity at resource r for all markets, coming from the schedule at a Single CRN, not a Chain CRN.  |
|  | BAHourlyResourceDAEnergyChainCRNLegBalancedQuantity **Brtg’Nz’mdh** | The valid and balanced contract quantity at resource r for the Day-Ahead, coming from the schedule at a Chain CRN g’ containing contract N.  |
|  | BASettlementIntervalResourcePostDAEnergyChainCRNLegBalancedQuantity **Brtg’Nz’mdhcif** | The valid and balanced contract quantity at resource r for all markets, coming from the schedule at a Chain CRN g’ containing contract N.  |
|  | BAHourlyResourceDAEnergyChainCRNSourceBalancedQuantity **BrtNz’mdh** | The valid and balanced contract quantity at resource r for the Day-Ahead Market, for contract N which is a Chain CRN. Contract type z’ is the contract type of the first CRN leg of the Chain.  |
|  | BASettlementIntervalResourcePostDAEnergyChainCRNSourceBalancedQuantity **BrtNz’mdhcif** | The valid and balanced contract quantity at source resource r for the Post DA, for contract N which is a Chain CRN. Contract type z’ is the contract type of the first CRN leg of the Chain.  |
|  | BAHourlyResourceDAEnergyChainCRNSinkBalancedQuantity **BrtNz’mdh** | The valid and balanced contract quantity at sink resource r for the Day-Ahead Market, for contract N which is a Chain CRN. Contract type z’ is the contract type of the last CRN leg of the Chain.  |
|  | BASettlementIntervalResourcePostDAEnergyChainCRNSinkBalancedQuantity **BrtNz’mdhcif** | The valid and balanced contract quantity at sink resource r for the Post DA, for contract N which is a Chain CRN. Contract type z’ is the contract type of the last CRN leg of the Chain.  |
|  | BAHourlyResourceDAEnergyChainCRNBalancedQuantity **BrtNz’mdh** | The valid and balanced contract quantity at resource r for the Day-Ahead Market, for contract N which is a Chain CRN. Contract type z’ is either the contract type of the first CRN leg of the Chain, if resource type t is “GEN” or “ITIE”; or the contract type of the last CRN leg of the Chain, if resource type t is “LOAD” or “ETIE”.  |
|  | BASettlementIntervalResourcePostDAEnergyChainCRNBalancedQuantity **BrtNz’mdhcif** | The valid and balanced contract quantity at resource r for the Post DA, for contract N which is a Chain CRN. Contract type z’ is either the contract type of the first CRN leg of the Chain, if resource type t is “GEN” or “ITIE”; or the contract type of the last CRN leg of the Chain, if resource type t is “LOAD” or “ETIE”.  |
|  | BAHourlyResourceDABalancedContractCRNFilteredQuantity Brtmdh | The valid and balanced contract quantity at resource r for the Day-Ahead Market. |
|  | BAHourlyResourceDABalancedContractCRNQuantity **BrtNz’mdh** | The valid and balanced contract quantity at resource r for the Day-Ahead Market, for a Single or Chain contract N. If contract N is a Chain CRN, then contract type z’ is either the contract type of the first CRN leg of the Chain, if resource type t is “GEN” or “ITIE”; or the contract type of the last CRN leg of the Chain, if resource type t is “LOAD” or “ETIE”.  |
|  | BASettlementIntervalResourceFinalBalancedContractCRNFilteredQuantity Brtmdhcif  | The final valid and balanced contract quantity at resource r across all markets, |
|  | BASettlementIntervalResourceFinalBalancedContractCRNQuantity **BrtNz’mdhcif** | The final valid and balanced contract quantity at resource r across all markets for a Single or Chain contract N. If contract N is a Chain CRN, then contract type z’ is either the contract type of the first CRN leg of the Chain, if resource type t is “GEN” or “ITIE”; or the contract type of the last CRN leg of the Chain, if resource type t is “LOAD” or “ETIE”.  |
|  | BASettlementIntervalResourcePostDAChangeBalancedContractCRNQuantity **BrtNz’mdhcif** | The valid and balanced contract quantity at resource r after the close of the Day-Ahead Market, for a Single or Chain contract N. If contract N is a Chain CRN, then contract type z’ is either the contract type of the first CRN leg of the Chain, if resource type t is “GEN” or “ITIE”; or the contract type of the last CRN leg of the Chain, if resource type t is “LOAD” or “ETIE”.  |
|  | HourlyResourceDABalancedContractAtScheduleEnergy **BrtNmdh** | The valid and balanced ETC/TOR/CVR schedules for contract N for resource r for hour h of the DAM. Contract N is at the CRN ID (single or Chain CRN) on which the contract self-schedule was made. (MWh) |
|  | BASettlementIntervalResourcePostDAChangeBalancedContractQuantity BrtNmdhcif | The valid and balanced contract quantity at resource r after the close of Day-Ahead Market for a Single or Chain contract N.  |
|  | BAHourlyResourceContractDASupplyQuantity **Brtz’mdh** | The supply-side valid and balanced portion of contract usage for the Day-Ahead. |
|  | BAHourlyResourceContractDADemandQuantity **Brtz’mdh** | The demand-side valid and balanced portion of contract usage for the Day-Ahead. |
|  | BASettlementIntervalFinalBalancedContractAtScheduleQuantity **BrtNmdhcif** | The final valid and balanced portion of contract usage covering the Day-Ahead and any Post-Day-Ahead change. |
|  | BASettlementIntervalFinalBalancedContractHVACMeterQuantity **BrtNmdhcif** | The final valid and balanced portion of contract usage covering the Day-Ahead and any Post-Day-Ahead change. This value is for HVAC Meter Quantity, includes TORs and ETCs, and excludes CVR contract types. |
|  | TSRContractSSCountQuantity rtQ’AA’QpNz’md | TSR Type 1 contract self-schedule interim calculation. |
|  | TSRContractBAANodeFlag rtQ’AA’QpNz’md | Flag for a TSR Type 1 contract self-schedule at the resource and node level, and includes BAA attribute. |
|  | ResourceDailyTSRType1Flag rtNz’md | Flag for a TSR Type 1 contract self-schedule at the resource level. |
|  | ResourceBAATransmissionContractCountQuantity rQ’Nz’md | Interim calculation using all accepted transmission contract self-schedules in the DA and Post-DA for the Trading day. |
|  | ResourceBAATransmissionContractFlag rQ’Nz’md | Flag for all transmission contracts used for the day 1 at the resource and node level, and includes BAA attribute. |
|  | ResourceEDAMLegacyTransmissionContractFlag rNz’md | EDAM legacy transmission contracts used for the Trading Day given at resource level. |
|  | EDAMLegacyTransmissionContractFlag Nz’md | EDAM legacy transmission contracts used for the Trading Day. |
|  | SettlementIntervalResourceContractMD **Brtz’mdhcif** | The demand-side final valid and balanced portion of contract usage covering the Day-Ahead and any Post-Day-Ahead change. |
|  | BA10MResourceContractMD **Brtz’mdhi** | The demand-side final valid and balanced portion of contract usage covering the Day-Ahead and any Post-Day-Ahead change. |
|  | SettlementIntervalResourceRTContractMD **Brtz’mdhcif** | The valid and balanced portion of contract usage incremental to the Day-Ahead at demand resource r (“LOAD” or “ETIE”). |
|  | SettlementIntervalResourceECAAttributeSumDemandQuantity **BrtQ’QF’S’z’mdhcif** | Sum of Measured Demand or Deemed Delivered quantity at resource r.  |
|  | SettlementIntervalResourceECAAttributeFactor **BrtQ’QF’S’z’mdhcif** | Factor with a value of 1 when MeasuredDemand or DeemedDelivered values exist . |
|  | SettlementIntervalResourceContractMDforECA **BrtQ’QF’S’z’mdhcif** | The final valid and balanced portion of contract usage covering the Day-Ahead and any Post-Day-Ahead change.This output has a negative sign in this document. |
|  | BA10MContractMDforECA **BrtQ’QF’S’z’mdhi** | The final valid and balanced portion of contract usage covering the Day-Ahead and any Post-Day-Ahead change.This output has a negative sign in this document. |
|  | SettlementIntervalResourceRTContractMDforECA **BrtQ’QF’S’z’mdhcif** | The valid and balanced portion of contract usage incremental to the Day-Ahead.This output has a negative sign in this document. |
|  | BAHourlyResourceDAEnergyLossCreditEligibleCRNDemandQuantity **Brtz’mdh** | The resource-level IFM contract demand quantity for which DA Energy contract Loss Credits are to be provided. This applies only to a load or export resource (r) . Also, BA ID B here is the original scheduler BA utilizing the contract, not necessarily the designated Billing SC nor the entity that will receive the contract loss credits. (MWh) |
|  | BASettlementIntervalResourcePostDAChangeEnergyLossCreditEligibleCRNDemandQuantity **Brtz’mdhcif** | The resource-level RTM contract demand quantity eligible for contract Loss Credits, by SC B that made the contract self-schedule. This applies only to a load or export resource (r). (MWh) |
|  | BASettlementIntervalResourceEnergyLossCreditEligibleContractDemandQuantity **Brtz’mdhcif** | The resource-level total IFM and RTM contract demand quantity eligible for contract Loss Credits, by SC B that made the contract self-schedule. This applies only to a load or export resource (r). (MWh) |
|  | BAHourlyEnergyLossCreditEligibleContractDemandQuantity **Bmdh** | The BA total IFM and RTM contract demand quantity eligible for contract Loss Credits, by SC B that made the contract self-schedule. (MWh) |
|  | AvailableContractCapacityforUpwardAS **Nz’mdh**  | The remaining contract capacity available for Upward AS for contract reference number N. |
|  | HourlyEnergyBalancedContractUsage **Nz’mdh** | Portion of contract maximum entitlement capacity used for balanced self-schedules of Energy for contract reference number. |
|  | HourlyTotalRegDownQSPContractUsage **Nz’mdh** | The total Reg Down QSP capacity utilizing contract reference number N. |
|  | TotalContractPositiveUpwardASQSP **Nz’mdh** | The sum of the following QSPs: (a) DA Spin Import QSP, (b) DA Non-spin Import QSP, (c) DA Regulation Up Import QSP, (f) RT Incremental Spinning Reserve Import QSP, only when positive (ignored when negative), (g) RT Incremental Non-Spinning Reserve Import QSP, only when positive (ignored when negative), (h) RT Incremental Regulation Up Import QSP, only when positive (ignored when negative). |
|  | UpwardASQSPContractCongestionRebateFactor **Nz’mdh** | The ratio of AvailableContractCapacityforUpwardAS to the TotalContractPositiveUpwardASQSP. |
|  | DASpinContractEligibleQty **BrtF’S’Nz’mdh** | The portion of DA Spin Import QSP eligible for DA AS Spin Imports Congestion Charge rebate under contracts. |
|  | DANonSpinContractEligibleQty **BrtF’S’Nz’mdh** | The portion of DA Non-Spin Import QSP eligible for DA AS Non-Spin Imports Congestion Charge rebate under contracts. |
|  | DARegUpContractEligibleQty **BrtF’S’Nz’mdh** | The portion of DA Regulation Up Import QSP eligible for DA AS Regulation Up Imports Congestion Charge rebate under contracts. |
|  | RTSpinContractEligibleQty **BrtF’S’Nz’mdh** | The portion of RT Incremental Spin Import QSP eligible for RT Spin Imports Congestion Charge rebate under contracts. |
|  | RTNonSpinContractEligibleQty **BrtF’S’Nz’mdh** | The portion of RT Incremental Non-Spin Import QSP eligible for RT Non-Spin Imports Congestion Charge rebate under contracts. |
|  | RTRegUpContractEligibleQty **BrtF’S’Nz’mdh** | The portion of RT Incremental Regulation Up Import QSP eligible for RT Regulation Up Imports Congestion Charge rebate under contracts. |
|  | DASpinNonContractEligibleQSP **BrtF’S’mdh** | The portion of DA Spin Import QSP which is not eligible for DA AS Spin Imports Congestion Charge hedge under contracts and shall thus be charged for congestion. |
|  | DANonSpinNonContractEligibleQSP **BrtF’S’mdh** | The portion of DA Non-Spin Import QSP which is not eligible for DA AS Non-Spin Imports Congestion Charge hedge under contracts and shall thus be charged for congestion. |
|  | DARegUpNonContractEligibleQSP **BrtF’S’mdh** | The portion of DA Regulation Up Import QSP which is not eligible for DA AS Regulation Up Imports Congestion Charge hedge under contracts and shall thus be charged for congestion. |
|  | RTSpinNonContractEligibleQSP **BrtF’S’mdh** | The portion of positive incremental RT Spin Import QSP which is not eligible for RT AS Spin Imports Congestion Charge hedge under contracts and shall thus be charged for congestion. |
|  | RTNonSpinNonContractEligibleQSP **BrtF’S’mdh** | The portion of positive incremental RT Non-Spin Import QSP which is not eligible for RT AS Non-Spin Imports Congestion Charge hedge under contracts and shall thus be charged for congestion. |
|  | RTRegUpNonContractEligibleQSP **BrtF’S’mdh** | The portion of positive incremental RT Regulation Up Import QSP which is not eligible for RT AS Regulation Up Imports Congestion Charge hedge under contracts and shall thus be charged for congestion. |
|  | DailyContractResourceFinancialNodeMap **rt**AA’Qp**Nz’md** | The 1-1 mapping between a resource r and the financial node or nodal location (AA’Qp), for a specified contract N. |
|  | BASettlementIntervalResourcePostDAChangeEnergyCRNSchedulePercentage BrtAA’Qpg'Nz'mdhcif | The percentage of accepted schedule to aggregated accepted schedule for self-schedules coming from each CRN chain or from single CRN , for contract N after the close of the Day-Ahead market.This data is provided in decimal terms. |
|  | CAISOContractSSToleranceQuantitymd | A pass-through of the factor data input SmallContractSSTol. |

# 4. Charge Code Effective Dates

| Charge Code/Pre-calc Name | Document Version | Effective Start Date | Effective End Date | Version Update Type |
| --- | --- | --- | --- | --- |
| ETC/TOR/CVR Quantity Pre-calculation | 5.0 | 04/01/09 | 3/31/09 | Documentation Impacted |
| ETC/TOR/CVR Quantity Pre-calculation | 5.1 | 04/01/09 | 3/31/09 | Configuration Impacted |
| ETC/TOR/CVR Quantity Pre-calculation | 5.2 | 04/01/09 | 12/31/11 | Configuration Impacted |
| ETC/TOR/CVR Quantity Pre-calculation | 5.2a | 01/01/12 | 3/31/09 | Documentation Only |
| ETC/TOR/CVR Quantity Pre-calculation | 5.2b | 4/01/09 | 4/30/14 | Documentation Only |
| ETC/TOR/CVR Quantity Pre-calculation | 5.3 | 5/01/14 | 9/30/14 | Configuration Impacted |
| ETC/TOR/CVR Quantity Pre-calculation | 5.4 | 10/01/14 | 10/3114 | Configuration Impacted |
| ETC/TOR/CVR Quantity Pre-calculation | 5.5 | 11/01/14 | 6/30/15 | Configuration Impacted |
| ETC/TOR/CVR Quantity Pre-calculation | 5.6 | 7/01/15 | 1/31/21 | Configuration Impacted |
| ETC/TOR/CVR Quantity Pre-calculation | 5.7 | 2/1/2021 | 10/31/21 | Configuration Impacted |
| ETC/TOR/CVR Quantity Pre-calculation | 5.8.0a | 11/1/2021 | 6/30/24 | Documentation only change |
| ETC/TOR/CVR Quantity Pre-calculation | 5.9.0a | 7/1/2024 | 4/30/2026 | Documentation only change |
| ETC/TOR/CVR Quantity Pre-calculation | 5.10.0 | 5/1/2026 | Open | Configuration Impacted |