



CALIFORNIA ISO

Charge Type 4511
Forward Scheduling
(Load, Generation, Import/ Export, Awarded Ancillary Services)

Release Date:
March 18, 2005

1.1.1. Version 0.2: CT 4511 GMC Forward Scheduling (Load, Generation, Import/Exports, Awarded Ancillary Services)

1.1.2. Description

Forward Scheduling contains the activities associated with accepting, processing, and validating Day-Ahead and Hour-Ahead schedules. A schedule in this context is any import, export, load, generation, or Ancillary Service bid submitted, to the Scheduling Infrastructure. The costs in this sub-function relate to providing the infrastructure and to processing schedules.

All schedules are processed for each hour regardless of the time of submission. Scheduling applications run discretely for each hour and problems are resolved for each hour. The ISO re-process each hour of a Day-Ahead schedule that rolls to the Hour-Ahead, even if it is unchanged.

The billing determinant selected for the Forward Scheduling charge is calculated using the sum of that Scheduling Coordinator's final Hour Ahead schedules, including all awarded Ancillary Service bids, with a value greater than .03Mw and less that (.03Mw) submitted to the SI/SA system. In order not to discourage SCs from modifying their Day-Ahead schedules due to better information, any changes from Day-Ahead schedules that roll over to the Hour-Ahead will not be assessed and additional charge.

1.1.3. Configuration History

The following table sets out changes in the configuration of this charge type from when it was first created until it is retired.

Version number is expressed as a sequentially increasing number for each configuration change. A new version is established for each production release after successful testing and is shown as an integer increase (0.1, 0.2, 0.3). Changes under development will be indicated by an incremental version number (that is, 1.1, 1.2, 1.3) until the production release.

The Effective Start and End dates reflect the actual trades for which the configuration applies. Update Date is the actual calendar date of configuration guide edits.

Version #	Effective Start	Effective End	Author	Update Date	Description of Changes
0.1	Stage 1	Stage 2	M. McGuffin & E. Siegel	5/30/04	Original version
0.2	Stage 1	Stage 2	E. Siegel	1/30/05	Assigned a Charge Type number. MID4 received a BAID in 01/2005 and needed to be added to exemption table. Removed PGAB 3931 from the exemption table as they will only be handled separately for Inter SC Trades.

1.1.4. ISO Charge Type Formula

The ISO formula for **Forward Scheduling GMC** for each **Scheduling Coordinator** is as follows:

$$\begin{aligned}
 \text{GMC Forward Scheduling Services Settlement Amount}_{sm} &= \text{Total Schedule Count}_{sm} * \\
 \text{GMC Forward Scheduling Services Rate}_m
 \end{aligned}$$

Where

GMC Forward Scheduling Services Rate m is the current FERC approved rate for the Control Area

And

Total Schedule Count smd = Hour Ahead Schedule Count smd + Ancillary Services Schedule Count smd

And

Hour Ahead Schedule Count smd = \sum_h (Load Schedule Count $smdh$ + Generation Schedule Count $smdh$ + Export Schedule Count $smdh$ + Import Schedule Count $smdh$) * (1 - Percent Exemption $smdh$)

And

Ancillary Services Schedule Count smd = \sum_h (Spin Schedule Count $smdh$ + Non-Spin Schedule Count $smdh$ + Replacement Reserve Schedule Count $smdh$ + Regulation Schedule Count $smdh$) * (1 - Percent Exemption $smdh$)

Where

s = Business Associate

m = Trade Month

h = Trade Hour

d = Trade Day

Equation Name	Description
Daily GMC Forward Scheduling Services Settlement Amount	The sum of all Forward Scheduling Services Settlement Amounts for a Scheduling Coordinator in a Trade Day
Hourly GMC Forward Scheduling Services Settlement Amount	Total Schedule Count multiplied by the Forward Scheduling Services Rate by Scheduling Coordinator by Trade Hour
GMC Forward Scheduling Services Rate	The current FERC approved rate for the Control Area
Hour Ahead Schedule Count	Total Load, Generation, Export, Import Schedules multiplied by any percent exemptions that may apply to the SC by Trade Hour
Ancillary Services Schedule Count	Total Spin, Non-Spin, Replacement Reserve, and Regulation Schedules multiplied by any percent exemptions that may apply to the SC by Trade Hour

Equation Name	Description
Load Schedule Count	Total Load Schedules by hour by SC
Generation Schedule Count	Total Generation Schedules by hour by SC. Includes all types of generation schedules (RMR, Must-Offer, Base-loaded, etc)
Export Schedule Count	Total Export Schedules by hour by SC
Import Schedule Count	Total Import Schedules by hour by SC
Spin Schedule Count	Total Spinning Reserve Ancillary Service Capacity Schedules by hour by SC
Non-Spin Schedule Count	Total Non-Spinning Reserve Ancillary Service Capacity Schedule by hour by SC
Replacement Reserve Schedule Count	Total Replacement Reserve Ancillary Service Capacity Schedule by hour by SC
Regulation Schedule Count	Total Regulation Ancillary Service Capacity Schedule by hour by SC
Percent Exemption	Percent exemption from forward scheduling count

1.1.5. Calculation Exceptions

The schedules for the following BA are exempt from Forward Scheduling Hour Ahead Schedule Count calculation. There are other exceptions by BA_ID, Location ID, and Interchange ID, however these exclusions are enforced through upstream data sources prior to the Settlements data transfer.

BA ID #	Scheduling Coordinator Name (Short Name)	Location ID	Interchange ID (if applicable)	Exception / Treatment	Quantity	Variable Name	Effective Start Date	Effective End Date	Comments
3933	COTP	NA	NA	Exempt from Forward Scheduling Charge	Schedules	Configuration Specialist?	1/1/04	Open	COTP Litigation
2970	Internal ISO ID used in Energy Exchange Transactions	All	All	Exclude ISO SC from All GMC charges	All	Configuration Specialist?	4/6/2001	Open	
5819	MID4	All	All	Exempt from Forward Scheduling Charge	All	Configuration Specialist?	1/1/04	Open	

1.1.6. Charge Type Bill Determinants

The following table sets out the bill determinants used by a sample charge type including details of source system, and required attributes.

Input Name	Type	Interval	Sign	Description	Source	Variable Name	Alias	Rounding	Actual Attributes	Derived Attributes
Load Schedule Count	S	Hourly	+	Unique Final Hour Ahead Load Schedules	SS_SCHEDULE S_CNT				BA_ID, TRADE_INT, TRADE_HR, PERC_EXEMPT,	
Generation Schedule Count	S	Hourly	+	Unique Final Hour Ahead Generation Schedules	SS_SCHEDULE S_CNT				BA_ID, TRADE_INT, TRADE_HR, PERC_EXEMPT,	
Import Schedule Count	S	Hourly	+	Unique Final Hour Ahead Intertie Schedules for Imports	SS_SCHEDULE S_CNT				BA_ID, TRADE_INT, TRADE_HR, PERC_EXEMPT,	
Export Schedule	S	Hourly	+	Unique Final Hour Ahead Intertie	SS_SCHEDULE				BA_ID, TRADE_INT, TRADE_HR,	

Input Name	Type	Interval	Sign	Description	Source	Variable Name	Alias	Rounding	Actual Attributes	Derived Attributes
Count				Schedules for Exports	S_CNT				PERC_EXEMPT,	
Spin Schedule Count	S	Hourly	+	Awarded Spin Bids	SS_SCHEDULE S_CNT				BA_ID, TRADE_INT, TRADE_HR, PERC_EXEMPT,	
Non-Spin Schedule Count	S	Hourly	+	Awarded Non-Spin Bids	SS_SCHEDULE S_CNT				BA_ID, TRADE_INT, TRADE_HR, PERC_EXEMPT,	
Replacement Reserve Schedule Count	S	Hourly	+	Awarded Replacement Reserve Bids	SS_SCHEDULE S_CNT				BA_ID, TRADE_INT, TRADE_HR, PERC_EXEMPT,	
Regulation Schedule Count	S	Hourly	+	Awarded Regulation Bids	SS_SCHEDULE S_CNT				BA_ID, TRADE_INT, TRADE_HR, PERC_EXEMPT,	

In reviewing this table:

- Type indicates whether the Bill determinant is provided by an external system (S) or calculated as an intermediate value by another process (I).
- Interval is the interval of the incoming record
- Source for the moment is the expected supplying system. This will be replaced with actual system names in the “as built” version of the configuration guide.
- Actual attributes are parameters used in the calculation that are expected to be supplied with the source data.

Specific Master File data used by this charge type is as follows:

Master file Data	Description	Type	Variable Name	Detail	Actual Attributes	Derived Attributes
BA	Valid Business Associate ID	Primary record		9	BA_ID	

In reviewing this table:

- Type indicates whether the Master file is one of the following:
 1. A primary record (such as SC, or resource)
 2. An association (which is a connection between any two primary records, such as ownership)
 3. An attribute (such as a flag or equivalent specific to a primary record that can be used for billing, for example resource type)
 4. A roll up group where a primary record is within a further hierarchy (such as region, zone etc, noting that locations, etc are primary records in their own right)
- Details are the actual flag or association.

These are summarized in total for settlements in Volume 3, Interface Configuration

Specific Standing data used by this calculation are as follows:

Input Name	Type	Interval	Unit of Measure	Description	Source	Variable Name	Alias	Rounding	Actual Attributes	Derived Attributes
GMC Forward Scheduling Services Rate	T	Annual	\$/MWh	Monthly rate for FERC Fee based on Schedule Count values	STLMT			9	ISO	
Percent Exemption	T	Hourly	% of Schedule Count	% of schedules exempted from Fwd Scheduling Settlement	STLMT			9	BA_ID, Trade Date, Trade Hour, % Exemption	

In reviewing this table:

- Type indicates whether the Bill determinant is standing data for a Tariff Rate (T) or a rate calculated as an intermediate value by another process (CR).
- Interval indicates the frequency with which the input is updated.
- Source for the moment is the expected supplying system. This will be replaced with actual system names in the “as built” version of the configuration guide.
- Actual attributes are parameters used in the calculation that are expected to be supplied with the source data.

1.1.7. Calculation Attributes

Billable quantity and charge type indices and summary levels must be indicated as attributes. All quantity and pricing inputs must satisfy these attributes for charges to be calculated. Attributes must be common to the Charge Group that the Charge type belongs to. An attribute table must be completed for each calculation.

Attribute Name	Order	USE	Sum	Key Value	Notes
Market Type		Y			Standard attribute, use TBD
Major group		Y			Standard attribute, use TBD
Charge Group		Y			Standard attribute, use TBD
Trade Date		Y			
Trade Hour		Y			
BA ID		Y			

Attribute Name	Value	Notes
Calculation Frequency	Hourly	
Number of Intervals	25	
Prerequisite CT / BQ	None	
Successor CT	None	

1.1.8. Calculation Flowcharts

The high-level Forward Scheduling GMC is shown below. The flow chart will have ?? levels:

1.1.9. Output Requirements and Definitions

Output requirements include details of which charge type outputs are to be reported to participants in the detailed Quantity, Price, and Charge detail format. The specific participant outputs are defined, together with any intermediate outputs needed to validate charges prior to publishing results, or used as inputs in other charge calculations

Output type	Level	Expected quantities	Unique Output	Rounding	Output	Variable Name
Detailed BQ Output	Load Schedule Count by SC by Hour	* Load Schedules * 25	Yes	9		
Detailed BQ Output	Generation Schedule Count by SC by Hour	# of BAs * Generation Schedules * 25	Yes	9		
Detailed BQ Output	Export Schedule Count by SC by Hour	# of BAs * Export Schedules * 25	Yes	9		
Detailed BQ Output	Import Schedule Count by SC by Hour	# of BAs * Import Schedules * 25	Yes	9		
Detailed BQ Output	Spin Schedule Count by SC by Hour	# of BAs * Spin Schedules * 25	Yes	9		
Detailed BQ Output	Non-Spin Schedule Count by SC by Hour	# of BAs * Non-Spin Schedules * 25	Yes			

1.1.10. Adjustments and Rounding

1.1.10.1. Adjustments

Automatic recalculation adjustments to this charge type will occur in the event of revised data input from source systems, Pass through Bill adjustment, or operator override, by performing a recalculation on the prior run.

1.1.10.2. Rounding Adjustments

As this product type is a charge calculation only, no rounding adjustment is required.

1.1.11. Validation and Testing

1.1.11.1. Validation

The table below sets out the validation checks that must occur:

Validation	Timing	Description	Applicable to
Schedule Counts must be whole numbers	Before	Calculation error if condition occurs	Initial and recalculation runs
Forward Scheduling Count Quantity must not be negative	During	Count cannot be less than 0	Initial and recalculation runs
Percent Exemption must be between 0 and 1	Before	Must be a whole number within range.	Initial and recalculation runs

1.1.11.2. Testing

The following conditions must be tested prior to release of any configuration to production:

Standard Testing

Test Condition	Description	Applicable to
Charge calculation correct at hourly level	Correct base calculation	Initial and recalculation run types
Charge sum correct at SC level	Correct SC sum	Initial and recalculation run types
Recalculation for altered inputs	Correct quantity true up	Recalculation run types

Charge Type Specific Testing

Test Condition	Description	Applicable to
Exceptions	Ensure that specified BA/ resource/interchange quantities are excluded from the Calculation	Initial and recalculation run types
Rate Changes	Ensure rate changes have correct effective dates. Charge types will not change as rates change	Initial and recalculation run types

Successor Charge Type Specific Tests

Test Condition	Description	Applicable to
N/A		