

Order 841 Electric Storage Participation – DSS Updates for Settlements

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March 24, 2020

Agenda

- **Order 841 Electric Storage Participation**
- **Energy Storage Resources (ESRs) Data Elements for Settlements**
- **DSS Corporate Reports and Universe Updates**
- **Additional Updates**
- **Next Steps**
- **Appendix – Detailed Universe Updates**

Order 841 Electric Storage Participation

- **FERC Order Instituting Section 206 Proceeding and Directing Filing to Establish Electric Storage Participation Tariff Provisions**
 - FERC directed the NYISO to submit tariff revisions establishing a new participation model consisting of market rules for Energy Storage Resources (ESRs), that recognizing their physical and operational characteristics, facilities their participation in the NYISO-administered Energy, Ancillary Services and Installed Capacity markets.
- **In December 2019, FERC issued an order accepting the majority of the NYISO's tariff revisions establishing the ESR participation model**
 - Subject to a further compliance filing submission, the ESR participation model will become effective later this year.

Data Elements for Settlements

ESR Data Elements for Settlements

- To provide visibility within DSS for the settlement of an ESR, data elements have been added or re-named to better align with the purpose of the settlement
- Specific to settlement purposes, these data elements fall within the following categories:
 - Registration
 - Bidding
 - Out of Merit
 - Telemetry
 - Hourly Revenue Meter Data
 - Settlement Calculations

Registration Data

- **Participation Model:** equal to “ESR” for an ESR generator
- **Gen Lower Storage Limit (MWh):** the physical minimum amount of energy an ESR generator is capable of storing
- **Gen Upper Storage Limit (MWh):** the physical maximum amount of energy an ESR generator is capable of storing
- **Gen Round Trip Efficiency (%):** the ratio of energy injections to energy withdrawals for an ESR generator
- **Generation Type Desc:** identifies the fuel type used by a generator; equal to “Storage” for an ESR generator

Bid Data

- **Hr DAM Beginning Energy Level (MWh):** total MWhs stored by an ESR generator at the beginning of the market interval
- **Lower Storage Limit (MWh):** the lower storage limit of an ESR generator during the interval
 - Hr DAM Lower Storage Limit (MWh)
 - Hr RT Lower Storage Limit (MWh)
 - Eff Hr RT Lower Storage Limit (MWh)
- **Upper Storage Limit (MWh):** the upper storage limit of an ESR generator during the interval
 - Hr DAM Upper Storage Limit (MWh)
 - Hr RT Upper Storage Limit (MWh)
 - Eff Hr RT Upper Storage Limit (MWh)

Bid Data - continued

- **Energy Level Management Description:** for an ESR generator set to either “Self-Managed” or “ISO-Managed.” Set to null when the generator is not an ESR.
 - Hr DAM Gen Bid: Energy Level Mgmt Desc
 - Hr RT Gen Bid: Energy Level Mgmt Desc
 - Eff Hr RT Gen Bid: Energy Level Mgmt Desc
- **Lower Operating Limit (MW):** the minimum generation level lower operating limit for the generator during the interval
 - Hr DAM Gen Bid: Min Gen – LOL (MW)
 - Hr RT Gen Bid: Min Gen – LOL (MW)
 - Eff Hr RT Gen Bid: Min Gen – LOL (MW)
 - *This data element is a name change as part of the ESR project. Each “Min Gen” data element has been updated to include “LOL”*

Out of Merit Data

- There will be three new Out of Merit Types for Energy Storage Resources
- Out of Merit for MWh Storage Limits may occur in the same hour as a MW Out of Merit and therefore require a new data element
- **Storage Limit Type Description:** describes the reason for the Storage Limit OOM
 - Hr OOM Storage Limit Type Description
 - RTD OOM Storage Limit Type Desc (the RTD object abbreviates the word “Description”)
- **Storage Limit Type ID:** identifies the numeric value for the Storage Limit OOM
 - Hr OOM Storage Limit Type ID
 - RTD OOM Storage Limit Type ID
- **Storage Limit Types include:**
 - MWH – OOM for ISO Reliability; ID = 80
 - MWH – OOM for TO Reliability; ID = 81
 - MWH – OOM Generator Request; ID = 82

Telemetry Data

- **RTD Gen Avg Actual Injection Energy (MW):** the actual generator injection MW over the RT interval. Data used is from the NYISO Performance Tracking System (PTS)
- **RTD Gen Avg Actual Withdrawal Energy (MW):** the actual generator withdrawal MW over the RT interval. Data used is from the NYISO Performance Tracking System (PTS)

Hourly Revenue Meter Data

- **Hr Gen ISO PTS Avg Actual Injection Energy (MWh):** the actual generator injection MWs from PTS at the RTD level, integrated and summed for the hour
- **Hr Gen ISO PTS Avg Actual Withdrawal Energy (MWh):** the actual generator withdrawal MWs from PTS at the RTD level, integrated and summed for the hour
- **Hr Gen MA Reported (MWh):** the meter authority reported net MWh for the hour
 - This data element is a name change as part of the ESR project. Hr Gen Meter Energy (MW) is being renamed to **Hr Gen MA Reported (MWh)**
- **Hr Gen MA Reported Injection Energy (MWh):** the meter authority reported MWh injection for the hour
- **Hr Gen MA Reported Withdrawal Energy (MWh):** the meter authority reported MWh withdrawal for the hour

Settlement Calculation: Balancing Energy

- **RTD Gen Adjusted Injection Energy (MW):** calculated for the generator by multiplying the *RTD Gen Avg Actual Injection Energy (MW)* by the ratio of the *Hr Gen MA Reported Injection Energy (MWh)* to the *Hr Gen ISO PTS Avg Actual Injection Energy (MWh)*
- **RTD Gen Adjusted Withdrawal Energy (MW):** calculated for the generator by multiplying the *RTD Gen Avg Actual Withdrawal Energy (MW)* by the ratio of the *Hr Gen MA Reported Withdrawal Energy (MWh)* to the *Hr Gen ISO PTS Avg Actual Withdrawal Energy (MWh)*
- **RTD Gen Injection Tolerance (MW):** is three percent of the generator's applicable UOL for the given RTD interval
- **RTD Gen Withdrawal Tolerance (MW):** is three percent of the absolute value of the generator's applicable LOL for the given RTD interval
- **RTD Gen Default Balancing Basis (MW)** by basepoint plus the default injection or withdrawal tolerance

Settlement Calculation: Day-Ahead BPCG

- **Hr DAM BPCG Energy Rev (\$):** the amount of a generator's total energy revenue as calculated for the DAM BPCG settlement

Settlement Calculation: Day-Ahead Margin Assurance Payment (DAMAP)

- **RTD DAMAP Contraction DAM Bid Energy Cost (\$/Hr):** the Bid Energy Cost based on DAM bid cost between the Contraction Lower Limit and the Adjusted DAM Schedule
- **RTD DAMAP Contraction of DA Energy Margin (\$/Hr):** calculated as Revenue less Bid Cost (positive sign represents a decrease of margin, negative sign represents an increase of margin)
- **RTD DAMAP Offset RT Bid Energy Cost (\$/Hr):** the calculated RT Bid Energy Cost in excess of the Adjusted DAM Schedule, using the Offset Upper Limit (which is greater than the Adjusted DAM Schedule when injecting, and less than the Adjusted DAM Schedule when withdrawing)
- **RTD DAMAP Offset to Payment (\$/Hr):** calculated as Bid Cost less Revenue, and floored at 0 \$/Hr
- **RTD Energy DAMAP Component Branch:** indicates which path the DAMAP calculation follows for the RTD interval; Contraction, Offset, or Exclude

Settlement Calculation: Regulation Burden Penalty

- **RTD Reg Negative Injection Error (MW):** difference between the Penalty Limit for Under-Generation and the Average Actual Energy for a given generator and RTD interval
 - This data element is a name change as part of the ESR project. RTD Reg Negative Error (MW) is being renamed to **RTD Reg Negative Injection Error (MW)**
- **RTD Reg Negative Withdrawal Error (MW):** difference between the Penalty Limit for Over-Withdrawal and the Average Actual Energy for a given generator and RTD interval
- **RTD PLO (MW):** RTD Penalty Limit for Over-Withdrawal represents the minimum acceptable withdrawal level for a given generator in a given RTD interval when it is scheduled to withdraw while still avoiding a penalty

Settlement Calculation: Regulation Burden Penalty - continued

The following three new data elements sum to the existing data element *RTD Reg Penalty (\$)*

- **RTD Over-Withdrawal Reg Penalty (\$):** penalty for over withdrawals in excess of withdrawal tolerance
- **RTD Under-Generation Reg Penalty (\$):** penalty for under generating below injection tolerance
- **RTD Output-Limited Over-Generation Reg Penalty (\$):** the penalty for over generation applicable to wind units

DSS Corporate Reports and Universe Updates

Updates to DSS Corporate Reports

Within the Customer Settlements Documents folder and subfolders as represented below:

- **Power Supplier Settlement Documents/Power Supplier - Energy**
 - Settlement Details – Power Supplier – Balancing Energy
 - Settlement Details – Power Supplier – Day Ahead Bid Production Cost Guarantee

- **Power Supplier Settlement Documents/Power Supplier – DAM Margin Assurance**
 - Settlement Details – Power Supplier – DAM Margin Assurance – (Bids)
 - Settlement Details – Power Supplier – DAM Margin Assurance – (Results)

Updates to DSS Corporate Reports - continued

- **Power Supplier – Energy/Power Supplier – RT BPCG**
 - Settlement Details – Power Supplier – RT BPCG (Bids)
 - Settlement Details – Power Supplier – RT BPCG (Net Energy Cost)
- **Power Supplier – Energy/Power Supplier – Supplemental Event**
 - Settlement Details – Power Supplier – Supplemental Event Credit (Bids)
 - Settlement Details – Power Supplier – Supplemental Event Credit (Net Energy Cost)
- **Power Supplier – Energy/Power Supplier – Ancillary**
 - Settlement Details – Power Supplier – Regulation Penalty

Updates to DSS Customer Settlement Universes

The following DSS Customer Settlement Universes and classes (folders) within the universe will be updated to allow for custom reporting:

- **Power Suppliers universe**
 - Generators
 - BalMkt Energy Settlement
 - DAM BPCG Settlement
 - Real Time BPCG Settlement
 - DAMAP Settlement
 - Supplemental Event Credit
 - Generator Bid Data

Updates to DSS Customer Settlement Universes - continued

- **PowerSupplrs AncServ universe**
 - Generators
 - Regulation Service
 - Generator Bid Data

- **Detailed universe updates located in the Appendix**

Additional DSS Updates

Global Renaming of DSS Objects

- As part of the ESR project deployment, the following data objects will be renamed throughout DSS
 - Bold indicates the new object name or portion of the object name being updated

Existing Object Name	New Object Name
Hr DAM Gen Bid: Min Gen (MW)	Hr Dam Gen Bid: Min Gen - LOL (MW)
Hr RT Gen Bid: Min Gen (MW)	Hr RT Gen Bid: Min Gen - LOL (MW)
Eff Hr RT Gen Bid: Min Gen (MW)	Eff Hr RT Gen Bid: Min Gen - LOL (MW)
Hr Gen Meter Energy (MW)	Hr Gen MA Reported (MWh)
RTD Reg Negative Error (MW)	RTD Reg Negative Injection Error (MW)
RTD Gen Comp Overgen (MW)	RTD Gen Injection Tolerance (MW)
Hr DAM Sched Reg Avail (MW)	Hr DAM Sched Reg Capacity (MW)

Decimal Precision Updates

- **As part of the ESR project deployment:**
 - DSS objects are being updated to support increased precision
 - Primarily impacts MW/MWh related objects
 - Objects will be updated to reflect a precision of data up to the level of a ten-thousandth of a MW (0.0001 MW)
 - Decimal precision changes will not impact Daily Customer Statement, Hourly Customer Statement, and FERC EQR reports
 - Decimal precision changes may impact corporate reports and custom reports

Next Steps

- **April 2020 BACWG: Provide same presentation**

Appendix – Detailed Universe Updates

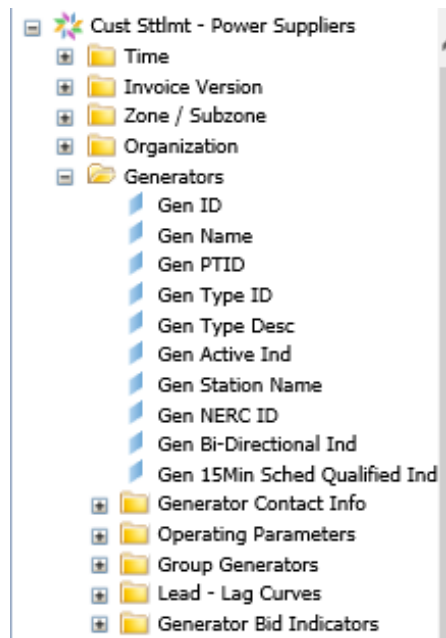
Detailed Universe Updates

Conventions used in the detailed slides:

- **Current universe structure shown on left side**
- **Additions or modifications to current structure shown on right side**
- **Bolded object names represent new or modified object names**
 - Object name descriptions found on slides 6 - 16
- **Location of the object is identified in the parenthesis following the object name**

Power Suppliers - Generators

■ Generator Class Structure



--Generators

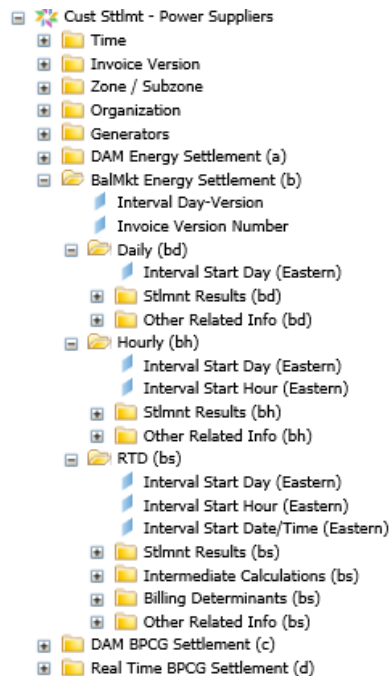
- **Generation Type Description** (below Gen Type Desc)
- **Participation Model Description** (below **Generation Type Description**)

--Operating Parameters

- Gen Lower Storage Limit (MWh)** (below Gen Voltage Class)
- Gen Upper Storage Limit (MWh)** (below **Gen Lower Storage Limit (MWh)**)
- Gen Round Trip Efficiency (%)** (below **Gen Upper Storage Limit (MWh)**)

Power Suppliers – Balmkt Energy Settlement

■ Balmkt Energy Settlement Class Structure



--Balmkt Energy Settlement

--Hourly

--Other Related Info

- Hr Gen ISO PTS Avg Actual Injection Energy (MWh) (below Hr Gen Avg Actual Energy (MW))
- Hr Gen ISO PTS Avg Actual Withdrawal Energy (MWh) (below Hr Gen Avg Actual Injection Energy (MWh))

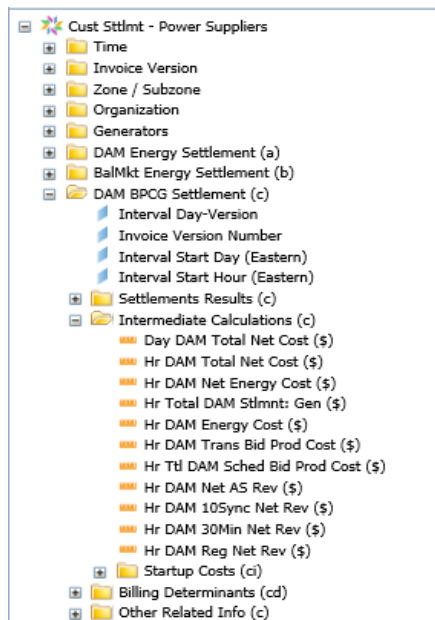
--RTD

--Billing Determinants

- RTD Gen Adjusted Injection Energy (MW) (below RTD Gen Adjusted Energy (MW))
- RTD Gen Adjusted Withdrawal Energy (MW) (below RTD Gen Adjusted Injection Energy (MW))
- RTD Gen Default Balancing Basis (MW) (below RTD Gen Adjusted Withdrawal Energy (MW))
- Hr Gen MA Reported (MWh) (Object name change from Hr Gen Meter Energy (MW))
- Hr Gen MA Reported Injection Energy (MWh) (below Hr Gen MA Reported (MW))
- Hr Gen MA Reported Withdrawal Energy (MWh) (below Hr Gen MA Reported Injection Energy (MWh))
- RTD Gen Avg Actual Injection Energy (MW) (below RTD Gen Avg Actual Energy (MW))
- RTD Gen Avg Actual Withdrawal Energy (MW) (below RTD Gen Avg Actual Injection Energy (MW))
- RTD OOM Storage Limit Type Desc (below RTD Out of Merit Type ID)
- RTD OOM Storage Limit Type ID (below RTD OOM Storage Limit Type Desc)
- RTD Gen Injection Tolerance (MW) (Object name change from RTD Gen Comp Overgen (MW))
- RTD Gen Withdrawal Tolerance (MW) (below RTD Gen Injection Tolerance (MW))

Power Suppliers – DAM BPCG Settlement

■ DAM BPCG Settlement Class Structure



--DAM BPCG Settlement

--Intermediate Calculation

-- Hr DAM BPCG Energy Rev (\$) (below Hr DAM Energy Cost (\$))

--Billing Determinants

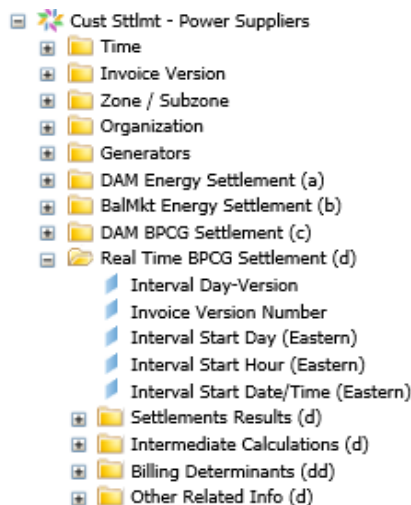
-- DAM Gen Bid

--Hr DAM Gen Bid: Energy Level Mgmt Desc (below Hr DAM Gen Bid: Unit Op ID)

--Hr DAM Gen Bid: Min Gen – LOL (MW) (Object name change from Hr DAM Gin Bid: Min Gen (MW))

Power Suppliers – RT BPCG Settlement

■ RT BPCG Settlement Class Structure



--Real Time BPCG Settlement

--Billing Determinants

--Hr OOM Storage Limit Type ID (below Hr Out of Merit Type Description)

--Hr OOM Storage Limit Type Description (below Hr OOM Storage Limit Type ID)

--Effective RT Gen Bid

--Eff Hr RT Gen Bid: Energy Level Mgmt Desc (below Eff Hr RT Gen Bid: Unit Op ID)

-- Eff Hr RT Gen Bid: Min Gen – LOL (MW) (Object name change from Eff Hr RT Gin Bid: Min Gen (MW))

--RT Gen Bid

--Hr RT Gen Bid: Energy Level Mgmt Desc (below Hr RT Gen Bid: Status ID)

-- Hr RT Gen Bid: Min Gen – LOL (MW) (Object name change from Hr RT Gin Bid: Min Gen (MW))

--DAM Gen Bid

--Hr DAM Gen Bid: Energy Level Mgmt Desc (below Hr DAM Gen Bid: Unit Op ID)

--Hr DAM Gen Bid: Min Gen – LOL (MW) (Object name change from Hr DAM Gin Bid: Min Gen (MW))

Power Suppliers – DAMAP Settlement - SMD

■ DAMAP Settlement - SMD Class Structure for Intermediate Calculations

- Real Time Bidding Settlement (d)
- DAMAP Settlement - SMD (h)
 - Interval Day-Version
 - Invoice Version Number
 - Interval Start Day (Eastern)
 - Interval Start Hour (Eastern)
 - Interval Start Date/Time (Eastern)
- Stmnt Results (h)
- Intermediate Calculations (h)
 - RTD DAM MargAsrc LRR: Total (\$)
 - RTD DAM MargAsrc: Total (\$)
 - RTD DAM MargAsrc: Reg Capacity (\$)
 - RTD DAM MargAsrc: Reg Movement (\$)
 - RTD DAM MargAsrc: 30Min Res (\$)
 - RTD DAM MargAsrc: 10NSync Res (\$)
 - RTD DAM MargAsrc: 10Sync Res (\$)
 - RTD DAM MargAsrc: Energy (\$)
 - RTD DAM MargAsrc Bid Cost (\$)
 - RTD DAM MargAsrc Upper Limit (MW)
 - RTD DAM MargAsrc Lower Limit (MW)
 - RTD Economic Op Pt (MW)
 - RTD Adj DAM Sched Reg Capacity (MW)
 - RTD Adj DAM Sched 30Min Avail (MW)
 - RTD Adj DAM Sched 10NSync Avail (MW)
 - RTD Adj DAM Sched 10Sync Avail (MW)
 - RTD Adj DAM Sched Gen (MW)
 - RTD DAM Sched Reg Act Reduct (MW)
 - RTD DAM Sched 30Min Act Reduct (MW)
 - RTD DAM Sched 10NSync Act Redct (MW)
 - RTD DAM 10Sync Act Reduct (MW)
 - RTD DAM Sched Gen Act Reduct (MW)
 - RTD DAM Total Pot Reduct (MW)
 - RTD DAM Sched Reg Pot Reduct (MW)
 - RTD DAM Sched 30Min Pot Reduct (MW)
 - RTD DAM Sched 10NSync Pot Redct (MW)
 - RTD DAM 10Sync Pot Reduct (MW)
 - RTD DAM Sched Gen Pot Reduct (MW)
 - RTD DAM Total Reduction (MW)
- Billing Determinants (h)
- DAMAP Settlement - Pre-SMD (e)

--DAMAP Settlement - SMD

--Intermediate Calculations

--Other Related Info

- RTD DAMAP Contraction DAM Bid Energy Cost (\$/Hr) (below RTD DAM MargAsrc Bid Cost (\$))
- RTD DAMAP Offset RT Bid Energy Cost (\$/Hr) (below RTD DAMAP Contraction DAM Bid Energy Cost (\$/Hr))
- RTD DAMAP Contraction of DA Energy Margin (\$/Hr) (below RTD DAMAP Offset RT Bid Energy Cost (\$/Hr))
- RTD DAMAP Offset to Payment (\$/Hr) (below RTD DAMAP Contraction of Day-Ahead Energy Margin (\$/Hr))
- RTD Energy DAMAP Component Branch (below RTD DAMAP Offset to Payment (\$/Hr))

Power Suppliers – DAMAP Settlement – SMD

- continued

■ DAMAP Settlement - SMD Class Structure for Billing Determinants

- 📁 Billing Determinants (h)
 - RTD Interval Seconds
 - 🔗 Hr DAM AS Bid: 30NSync Price (\$/MW)
 - 🔗 Hr DAM AS Bid: 30Spin Price (\$/MW)
 - 🔗 RTD RT 30Min Price (\$/MW)
 - 🔗 RTD RT Sched 30NSync Avail (MW)
 - 🔗 RTD RT Sched 30Spin Avail (MW)
 - 🔗 RTD RT Reg Capacity Price (\$/MW)
 - 🔗 Eff Hr RT AS Bid: Reg Capacity Price (\$/MW)
 - 🔗 Hr DAM AS Bid: Reg Capacity Price (\$/MW)
 - 🔗 Hr DAM AS Bid: 10NSync Price (\$/MW)
 - 🔗 RTD RT 10NSync Price (\$/MW)
 - 🔗 Hr DAM AS Bid: 10Sync Price (\$/MW)
 - 🔗 RTD RT 10Sync Price (\$/MW)
 - 🔗 RTD RT Energy Price: Gen (\$/MW)
 - 🔗 RTD RT Loss Price: Gen (\$/MW)
 - 🔗 RTD RT Cong Price: Gen (\$/MW)
 - 🔗 RTD RT Total Price: Gen (\$/MW)
 - 🔗 RTD RT Sched Reg Capacity (MW)
 - 🔗 RTD RT Sched 30Min Avail (MW)
 - 🔗 RTD RT Sched 10NSync Avail (MW)
 - 🔗 RTD RT Sched 10Sync Avail (MW)
 - 🔗 RTD Basepoint (MW)
 - 🔗 RTD Gen Upper Op Limit (MW)
 - 🔗 Hr DAM Sched Reg Capacity (MW)
 - 🔗 Hr DAM Sched 30Min Avail (MW)
 - 🔗 Hr DAM Sched 30NSync Avail (MW)
 - 🔗 Hr DAM Sched 30Spin Avail (MW)
 - 🔗 Hr DAM Sched 10NSync Avail (MW)
 - 🔗 Hr DAM Sched 10Sync Avail (MW)
 - 🔗 Hr DAM Sched Gen (MW)
 - 🔗 RTD PLU (MW)
 - 🔗 RTD Gen Adjusted Energy (MW)
 - 🔗 RTD PURPA Units Class Type
 - 🔗 RTD Out of Merit Type Desc
 - 🔗 RTD Out of Merit Type ID
 - 🔗 Hr Out of Merit Flag
 - 🔗 RTD Reserve Performance Index
 - 🔗 RTD Regulation Shortage Ind
 - 🔗 RTD Perf Index: Non-Time Weight
 - 🔗 Hr DAMAP Ineligibility Due to IBRT Ind
 - 🔗 RTD RT Reg Movement Price (\$/MW)
 - 🔗 Eff Hr RT AS Bid: Reg Movement Price (\$/MW)
 - 🔗 RTD RT Reg Movement (MW)
 - 🔗 GT Min Down Time Flag
- 📁 Effective RT Gen Bid (hd)

--Billing Determinants

--RTD PLO (MW) (below RTD PLU (MW))

--RTD OOM Storage Limit Type Desc (below RTD Out of Merit Type ID)

--RTD OOM Storage Limit Type ID (below RTD OOM Storage Limit Type Desc)

--Effective RT Gen Bid

--Eff Hr RT Gen Bid: Energy Level Mgmt Desc (below Eff Hr RT Gen Bid: Unit Op ID)

-- Eff Hr RT Gen Bid: Min Gen – LOL (MW) (Object name change from Eff Hr RT Gen Bid: Min Gen (MW))

--DAM Gen Bid

--Hr DAM Gen Bid: Energy Level Mgmt Desc (below Hr DAM Gen Bid: Unit Op ID)

--Hr DAM Gen Bid: Min Gen – LOL (MW) (Object name change from Hr DAM Gen Bid: Min Gen (MW))

Power Suppliers – Supplemental Event Credit

■ Supplemental Event Credit Class Structure

- Supplemental Event Credit (g)
 - Interval Day-Version
 - Invoice Version Number
 - Daily (gd)
 - Hourly (gh)
 - RTD (gr)
 - Interval Start Day (Eastern)
 - Interval Start Hour (Eastern)
 - Interval Start Date/Time (Eastern)
 - Stmnt Results (gr)
 - Intermediate Calculations (gr)
 - Billing Determinants (gr)
 - RTD Special Event Ind
 - RTD Interval Seconds
 - RTD RT Energy Price: Gen (\$/MW)
 - RTD RT Loss Price: Gen (\$/MW)
 - RTD RT Cong Price: Gen (\$/MW)
 - RTD RT Total Price: Gen (\$/MW)
 - RTD RT Sched Trans (MW): Gen
 - RTD Gen Adjusted Energy (MW)
 - RTD Avg Energy Limit (MW)
 - RTD AGC Basepoint (MW)
 - RTD Basepoint (MW)
 - Hr DAM Sched Gen (MW)
 - Hr DAM Sched Trans (MW): Gen
 - Hr Out of Merit Type Description
 - Hr Out of Merit Type ID
 - RTD Out of Merit Flag
 - Gen Type Desc
 - RTD On Control Ind
 - RTD In Service Ind
 - RTD PURPA Units Class Type
 - RTD RT Sched Reg Capacity (MW)
 - RTD RT Ramp Rate Constrained Ind
 - Net AS Revenue (gr)
 - Effective RT Gen Bid (gr)
 - DAM Gen Bid (gr)

--Supplemental Event Credit

--RTD

--Billing Determinants

--Hr OOM Storage Limit Type ID (below Hr Out of Merit Type Description)

--Hr OOM Storage Limit Type Description (below Hr OOM Storage Limit Type ID)

--Effective RT Gen Bid

--Eff Hr RT Gen Bid: Energy Level Mgmt Desc (below Eff Hr RT Gen Bid: Unit Op ID)

-- Eff Hr RT Gen Bid: Min Gen – LOL (MW) (Object name change from Eff Hr RT Gin Bid: Min Gen (MW))

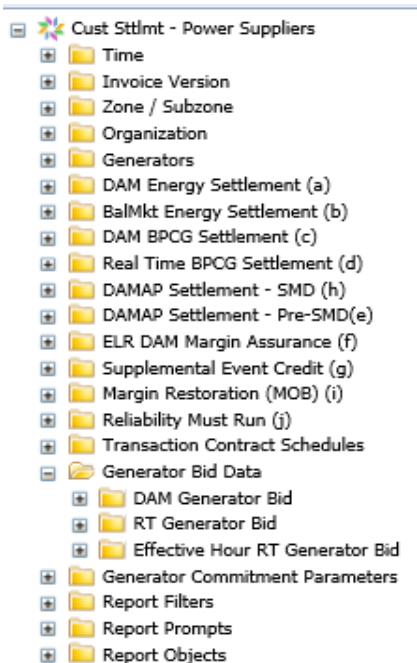
--DAM Gen Bid

--Hr DAM Gen Bid: Energy Level Mgmt Desc (below Hr DAM Gen Bid: Unit Op ID)

--Hr DAM Gen Bid: Min Gen – LOL (MW) (Object name change from Hr DAM Gin Bid: Min Gen (MW))

Power Suppliers – Generator Bid Data

■ Generator Bid Data Class Structure

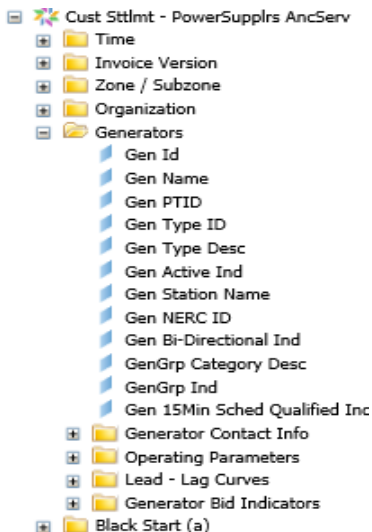


-- Generator Bid Data

- DAM Generator Bid
 - Hr **DAM Gen Bid: Energy Level Mgmt Desc** (below Hr DAM Gen Bid; Unit Op ID)
- DAM Energy Bid
 - Hr DAM Gen Bid: Min Gen – **LOL** (MW) (Object name change from Hr DAM Gin Bid: Min Gen (MW))
 - Hr **DAM Upper Storage Limit (MWh)** (below Hr DAM Normal Upper Op Limit (MW))
 - Hr **DAM Lower Storage Limit (MWh)** (below Hr **DAM Upper Storage Limit (MWh)**)
 - Hr **DAM Beginning Energy Level (MWh)** (below Hr **DAM Lower Storage Limit (MWh)**)
- RT Generator Bid
 - Hr **RT Gen Bid: Energy Level Mgmt Desc** (below Hr RT Gen Bid; Unit Op ID)
- RT Energy Bid
 - Hr RT Gen Bid: Min Gen – **LOL** (MW) (Object name change from Hr RT Gin Bid: Min Gen (MW))
 - Hr **RT Upper Storage Limit (MWh)** (below Hr RT Normal Upper Op Limit (MW))
 - Hr **RT Lower Storage Limit (MWh)** (below Hr **RT Upper Storage Limit (MWh)**)
- Effective Hour RT Generator Bid
 - Eff Hr RT Gen Bid: Energy Level Mgmt Desc** (below Eff Hr RT Gen Bid: Unit Op ID)
- Effective Hour RT Energy Bid
 - Eff Hr RT Gen Bid: Min Gen – **LOL** (MW) (Object name change from Eff Hr RT Gin Bid: Min Gen (MW))
 - Eff Hr RT Upper Storage Limit (MWh)** (below Eff Hr RT Normal Upper Op Limit (MW))
 - Eff Hr RT Lower Storage Limit (MWh)** (below **Eff Hr RT Upper Storage Limit (MWh)**)

PowerSupplrs AncServ - Generators

■ Generator Class Structure



--Generators

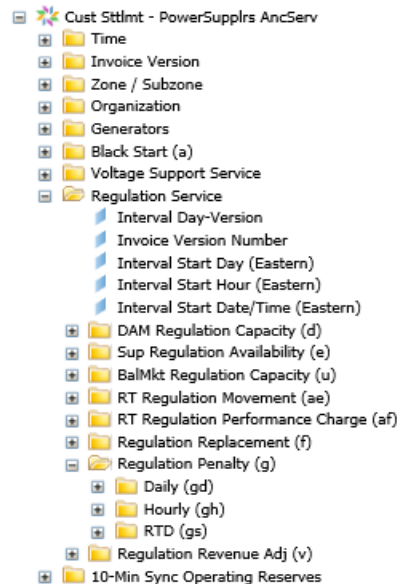
- **Generation Type Description** (below Gen Type Desc)
- **Participation Model Description** (below **Generation Type Description**)

--Operating Parameters

- Gen Lower Storage Limit (MWh)** (below Gen Voltage Class)
- Gen Upper Storage Limit (MWh)** (below **Gen Lower Storage Limit (MWh)**)
- Gen Round Trip Efficiency (%)** (below **Gen Upper Storage Limit (MWh)**)

PowerSupplrs AncServ – Regulation Service

■ Regulation Service Class Structure for Regulation Penalty



--Regulation Penalty

--RTD

--Intermediate Calculations (Create new Class folder below Stmtnt Results Class)
-- RTD Output-Limited Over-Generation Reg Penalty (\$) (put first in the list)
-- RTD Over-Withdrawal Reg Penalty (\$) (below RTD Output-Limited Over-Generation Reg Penalty (\$))
-- RTD Under-Generation Reg Penalty (\$) (below RTD Over-Withdrawal Reg Penalty (\$))

--Billing Determinants

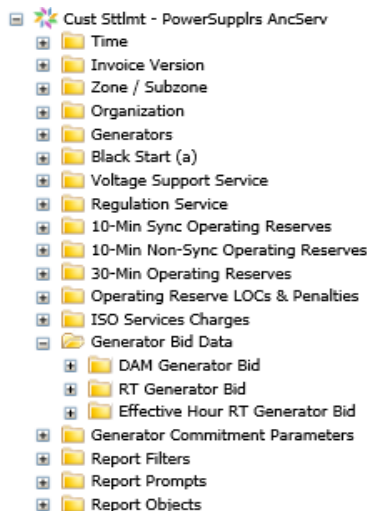
-- RTD Reg Negative Injection Error (MW) ((Object name change from RTD Reg Negative Error (MW))
-- RTD Reg Negative Withdrawal Error (MW) (below RTD Reg Negative Injection Error (MW))
--RTD OOM Storage Limit Type Desc (below RTD Out of Merit Type ID)
--RTD OOM Storage Limit Type ID (below RTD OOM Storage Limit Type Desc)
-- RTD PLO (MW) (below RTD PLU (MW))
-- Eff Hr RT Gen Bid: Min Gen – LOL (MW) (below RTD PLO MW))

--Other Related Info

-- Generation Type Description (below RTD Out of Merit Memo)
-- Participation Model Description (below Generation Type Description)

PowerSupplrs AncServ– Generator Bid Data

■ Generator Bid Data Class Structure



-- Generator Bid Data

--DAM Generator Bid
--Hr **DAM Gen Bid: Energy Level Mgmt Desc** (below Hr DAM Gen Bid; Unit Op ID)

--DAM Energy Bid
--Hr DAM Gen Bid: Min Gen – **LOL** (MW) (Object name change from Hr DAM Gin Bid: Min Gen (MW))
--Hr **DAM Upper Storage Limit (MWh)** (below Hr DAM Normal Upper Op Limit (MW))
--Hr **DAM Lower Storage Limit (MWh)** (below Hr **DAM Upper Storage Limit (MWh)**)
-- Hr **DAM Beginning Energy Level (MWh)** (below Hr **DAM Lower Storage Limit (MWh)**)

--RT Generator Bid
--Hr **RT Gen Bid: Energy Level Mgmt Desc** (below Hr RT Gen Bid; Unit Op ID)

--RT Energy Bid
-- Hr RT Gen Bid: Min Gen – **LOL** (MW) (Object name change from Hr RT Gin Bid: Min Gen (MW))
--Hr **RT Upper Storage Limit (MWh)** (below Hr RT Normal Upper Op Limit (MW))
--Hr **RT Lower Storage Limit (MWh)** (below Hr **RT Upper Storage Limit (MWh)**)

--Effective Hour RT Generator Bid
--**Eff Hr RT Gen Bid: Energy Level Mgmt Desc** (below Eff Hr RT Gen Bid: Unit Op ID)

--Effective Hour RT Energy Bid
-- Eff Hr RT Gen Bid: Min Gen – **LOL** (MW) (Object name change from Eff Hr RT Gin Bid: Min Gen (MW))
--**Eff Hr RT Upper Storage Limit (MWh)** (below Eff Hr RT Normal Upper Op Limit (MW))
--**Eff Hr RT Lower Storage Limit (MWh)** (below **Eff Hr RT Upper Storage Limit (MWh)**)

Our mission, in collaboration with our stakeholders, is to serve the public interest and provide benefit to consumers by:

- Maintaining and enhancing regional reliability
- Operating open, fair and competitive wholesale electricity markets
- Planning the power system for the future
- Providing factual information to policymakers, stakeholders and investors in the power system

