Day-Ahead Demand Response Program

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In-Depth Demand Response

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Session Objectives

- Define the purpose of the Day-Ahead Demand Response Program (DADRP)
- Identify program eligibility requirements
- Explain the process for enrollment
- Define and explain how Customer Baseline Load (CBL) is calculated
- Outline the process for bidding and scheduling in the DADRP Program
- Describe the method for measuring and reporting performance
- Identify the various settlements associated with the DADRP Program

Day-Ahead Demand Response Program

- Part of NYISO's Economic based Demand Response programs
- Load reduction through interruptible loads or loads with a qualified behind-the-meter Local Generator or both
  - Response Type C
  - Response Type G
  - Response Type B
- Response is <u>mandatory</u> when offer is accepted and subsequently scheduled
- Enrolled by Day-Ahead Demand Response Program Provider
  - DADRP Provider serves as interface between the NYISO and resource

Day-Ahead Demand Response Program

- **Purpose**:
  - Allows Market Participants to offer Demand Reduction from Demand Side Resources into the NYISO's Day-Ahead Energy market to reduce Load from the New York State Transmission System

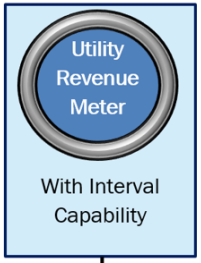
Program Eligibility Requirements

Program Eligibility Requirements

- **Size Requirement**
  - Minimum reduction of 1 MW
- **DADRP Aggregations**
  - Smaller resources with interval meters may be grouped by Load Zone *and* LSE in order to meet the minimum 1 MW reduction requirement
    - Individual resource performance still applies
  - Settlements are paid by the NYISO to the aggregators
    - Payments to individual DR resources enrolled by aggregators are managed between the aggregator and resource based on terms agreed between them

Program Eligibility Requirements

- **Metering Requirements**
  - Hourly interval metering data required
    - Net Load Meter:
      - NYSPSC approved, revenue-grade, hourly metering device to capture facility's net load
    - Local Generator Meter:
      - Required if DADRP resource has local generator, even if not using for purpose of DADRP reduction
      - Hourly interval meter that measures total output of Local Generator of the Demand Side Resource within a 2% accuracy threshold



Time Stamp	14:00	15:00	16:00
KWh	120	140	150

Program Eligibility Requirements

- **Metering Requirements Cont'd**
  - Meter Authority (MSP or MDSP) is responsible for collecting and reporting DADRP meter data to NYISO
    - Meter Data used to:
      - Calculate CBL
      - Settlement processing

Program Eligibility Requirements

- **Historical Operating Data**
  - LSEs shall be required to provide historical operating data for each load upon acceptance into DADRP
    - Loads with existing interval meters:
      - Provide minimum of 1 complete most recent billing period of hourly interval data
    - Totalized loads with existing interval meters:
      - Provide hourly interval data for minimum of 1 complete most recent billing period for all participating loads at premise
    - Newly installed load interval meters:
      - Provide prior 3 months' summary of monthly kwh consumption and demand values

Program Eligibility Requirements

- **Compliance Requirements**
  - Local Generators:
    - Must possess valid permit from NYSDEC authorizing Local Generator to operate during non-emergency conditions
    - Must comply with applicable permits, including any emissions, run-time limits, or other constraints on the plant operation imposed by federal, state, or local laws and regulatory requirements
- **Credit Requirements**
  - Collateral to be obtained by provider before program participation begins
  - Additional collateral may be requested by NYISO credit department if warranted

Let's Review

DADRP Resources can be aggregated by Load Zone to meet minimum 1 MW reduction requirement

a) True

b) False

Let's Review

If a DADRP resource has a local generator, a local generator meter is required even if DADRP resource is not using it for load reduction

a) True

b) False

DADRP – Enrollment Process

DADRP Enrollment - Provider

- DADRP Providers are responsible for enrolling demand side resources
- DADRP Providers include:
  - Host Load Serving Entities (LSEs)
  - Demand Reduction Providers (DRPs)
    - Does not have to be same LSE serving host load
  - Aggregator

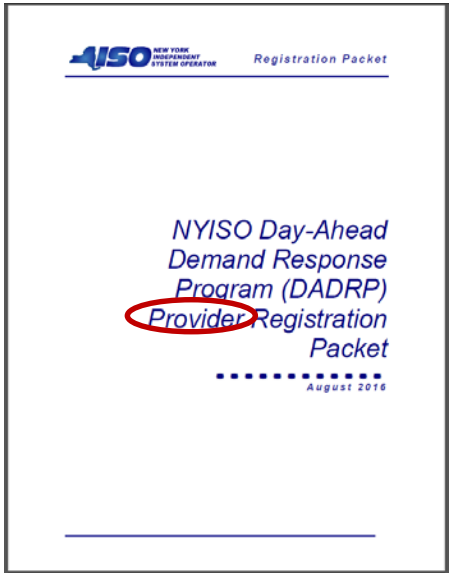
DADRP Enrollment - Provider

- Before a DADRP Provider can enroll DADRP resources, they are required to:
  - Become a NYISO customer
    - Completing NYISO Customer Registration Packet
    - Sign NYISO Tariffs
  - Be registered in the NYISO MIS as 'eligible' to participate in DADRP
  - Have a Qualified MIS status in DRIS
  - Enroll in Day-Ahead Demand Response Program as DADRP Provider
    - Completing NYISO DADRP Provider Registration Packet
  - Sign contract with one or more DADRP Resource with at least 1 MW of load curtailment capability

***A Demand Side Resource that would like to participate in DADRP directly must first register as a DADRP Provider prior to completing the DADRP Resource Registration Packet

DADRP Enrollment - Provider

- **DADRP Provider Registration Packet includes:**
  - Provider Information
  - Communication Plan
  - Data Management Plan

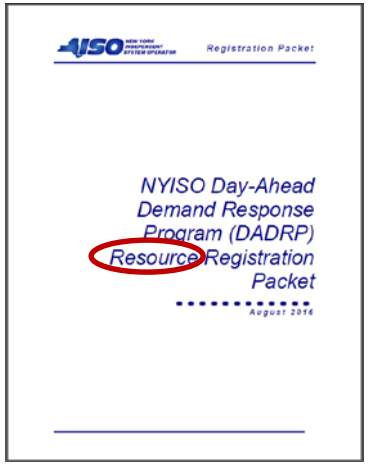

NYISO Registration Packet

NYISO Day-Ahead Demand Response Program (DADRP) Provider Registration Packet

August 2016

DADRP Enrollment - Resource

- **Once DADRP Provider has completed the provider enrollment process:**
  - DADRP Provider enrolls each DADRP Resource by completing the DADRP Resource Registration Packet
- **DADRP Resource Registration Packet includes:**
  - DADRP Provider Information
  - Modeling Form
  - Local Generator Information
  - Resource Reporting Form
  - LSE Form Letter
  - MDSP Form Letter
  - Demand Side Resource Acknowledgment Form


Registration Packet

NYISO Day-Ahead Demand Response Program (DADRP) Resource Registration Packet

August 2016

Let's Review

If a DADRP resource is participating in the program as both the DADRP provider and the DADRP resource the entity is required to complete only the DADRP resource registration packet

a) True

b) False

Baselines for Performance Measurement

Customer Baseline Load

- **Customer Baseline Load (CBL)**
  - Average hourly energy consumption used to determine level of load curtailment provided
  - Reference period used: Highest five consumption days of last ten “like” days beginning with the day that is two days before the Load reduction is scheduled
- **CBL Calculation and Response Type*:**
  - Response type B and C: Load supported by any behind the meter local generator or supply source is not included in the metered Load used to calculate resource CBL
  - Response type G: Base-load portion of generation is excluded from actual performance of generator used in CBL calculation

**Same methodology as EDRP - Refer to slides 35-60 in EDRP module of this course for details*

Recap Average Day CBL – Weekday

1. Establish CBL Window

Select 10 days prior to event from a 30 day period immediately before the event (based on specific exclusions)

2. Establish CBL Basis

Select 5 highest ranked days, based on average daily event period usage, from the 10 day CBL window

3. Calculate CBL

For each hour of the event, calculate CBL as the average hourly usage for the 5 days in the CBL Basis

Recap Average Day CBL - Weekend

1. Establish CBL Window

Select 3 prior like weekend days immediately before the event

(no exclusions)

2.Establish CBL Basis

Select the 2 highest ranked days, based on average daily event period usage, from the 3 day CBL window

3. Calculate CBL

For each hour of the event, calculate CBL as the average hourly usage for the 2 days in the CBL Basis

Recap Weather Adjusted CBL- Weekday

- For weather adjusted CBL calculation, the CBL would be adjusted upward or downward based on the actual usage for 2 hours, starting 4 hours prior to start of event
  - CBL is adjusted using the Gross Adjustment Factor

$$\text{Gross Adjustment Factor} = \frac{\text{Adjustment Basis Average Usage}}{\text{Adjustment Basis Average CBL}}$$

Adjustment Basis Average Usage : Average of actual usage for 2 hours, starting 4 hours prior to start of Event
Adjustment Basis Average CBL: Average of CBL calculated for 2 hours, starting 4 hours prior to start of Event

Recap CBL Calculation Method – Local Generator

1. Establish CBL Window

Similar to other Demand Response Resources

2. Establish CBL Basis

Select 5 lowest ranked days, based on total MWh generator output (sum of generator output for each hour in the event) for days in the CBL window

3. Calculate CBL

For each hour of the event, calculate CBL as the average generator output for the days in the CBL Basis

Day-Ahead Market Bidding & Scheduling

Day-Ahead Market Bidding

- **Demand Reduction is:**
  - Modeled as a generator in NYISO's Day-Ahead unit commitment software
    - Security Constrained Unit Commitment (SCUC)
- **LSE Offers/Bids**
  - If LSE is serving host load and offering in as a Demand Reduction Provider LSE must place two separate DAM bids in MIS
    - 1st – Normal load bid
    - 2nd – Generator bid for amount LSE is willing to curtail
- **DRP Offers/Bids**
  - If DRP is different entity from Host Load LSE, DRP is not required to submit a load bid into MIS
    - DAM load bid is responsibility of LSE serving Demand Side Resource's host load
    - DRP submits generator bid for amount of load curtailment desired to be scheduled in DAM
- **Resources scheduled in DAM provide a real-time response**

Day-Ahead Market Bidding

- Required Bidding Information
  - Load bidding portion – 'Physical Load Bid Screen'
    - LSE Forecast MW
    - LSE DAM Load Bid

Physical Load Bid

Physical Load Name:

Date: 05/31/2018 (mm/dd/yyyy)

Interruptible Type: None Selected

Time	Forecast MW	Fixed Bid MW	Price Cap #1		Price Cap #2		Price Cap #3		Interrupt Price Cap		Interrupt Fixed		Bid Status
			MW	$/MW	MW	$/MW	MW	$/MW	MW	$/MW	MW	$/MW	
00:00													
01:00													
02:00													
03:00													
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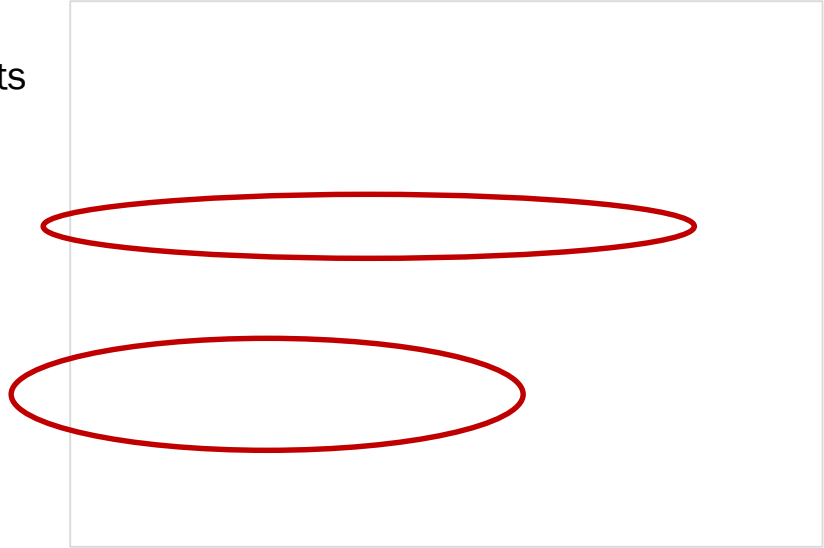
Day-Ahead Market Bidding

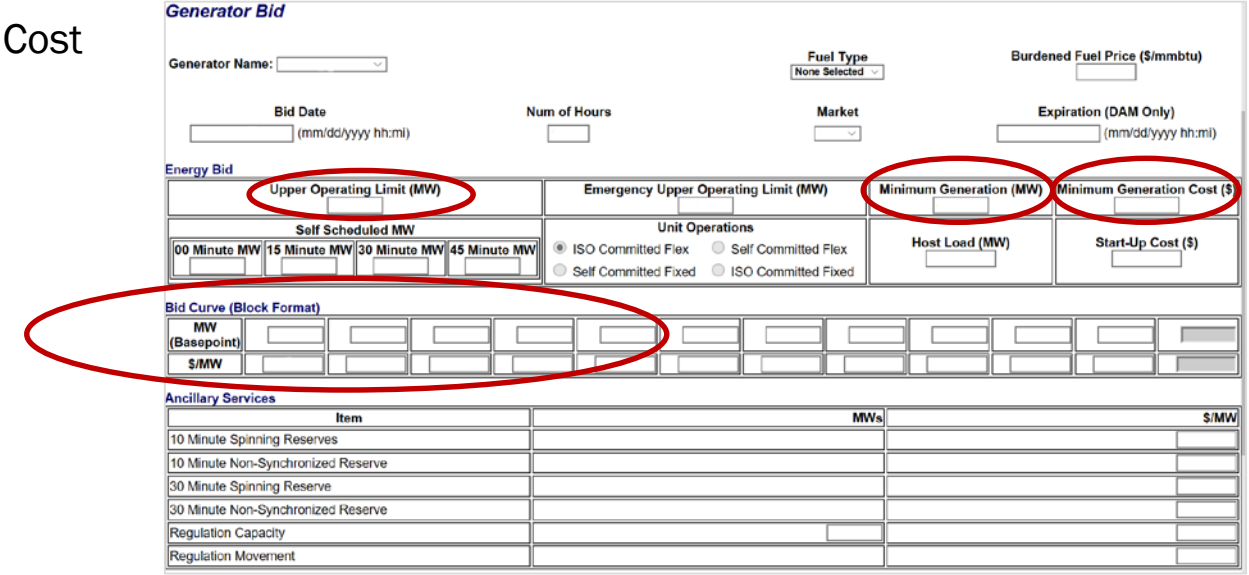
- **Required Bidding Information**
  - Generator bidding portion for **'Commitment Parameter Screen'**
    - Minimum Run Time
      - Corresponds to resource's minimum shutdown time
    - Start up costs
      - Corresponds to curtailment initiation costs
      - First and *only* point on curve



Day-Ahead Market Bidding

- **Required Bidding Information**
  - Generator bidding portion for ‘Generator Bid Screen’
    - Upper Operating Limit (UOL)
      - Corresponds to maximum amount of curtailable load being offered
    - Minimum Generation MW
    - Minimum Generation Cost
    - Bid Curve
  - If UOL = Min Gen

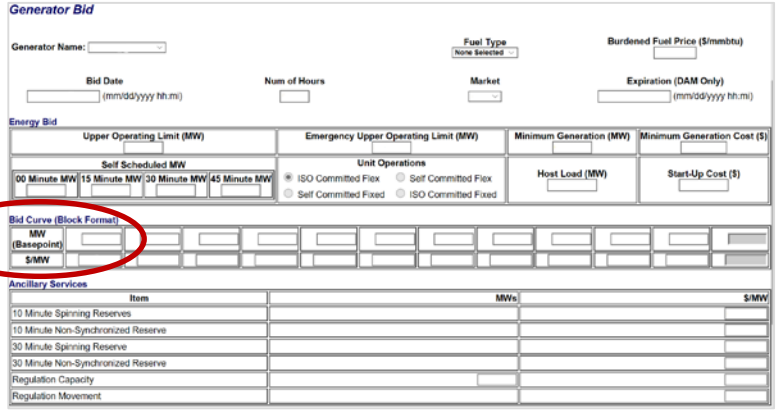
    no bid curve needed



Day-Ahead Market Bidding

- **Required Bidding Information**
  - If Completing Bid Curve on ‘Generator Bid Screen’
    - Minimum offer floor of $75/MWh
- **Purpose of Minimum Offer Floor**
  - Prevents bidding of load outages that would occur regardless of DADRP bid acceptance
  - Bids submitted below minimum offer floor are automatically rejected

Min. $75/MW



Day-Ahead Market Scheduling

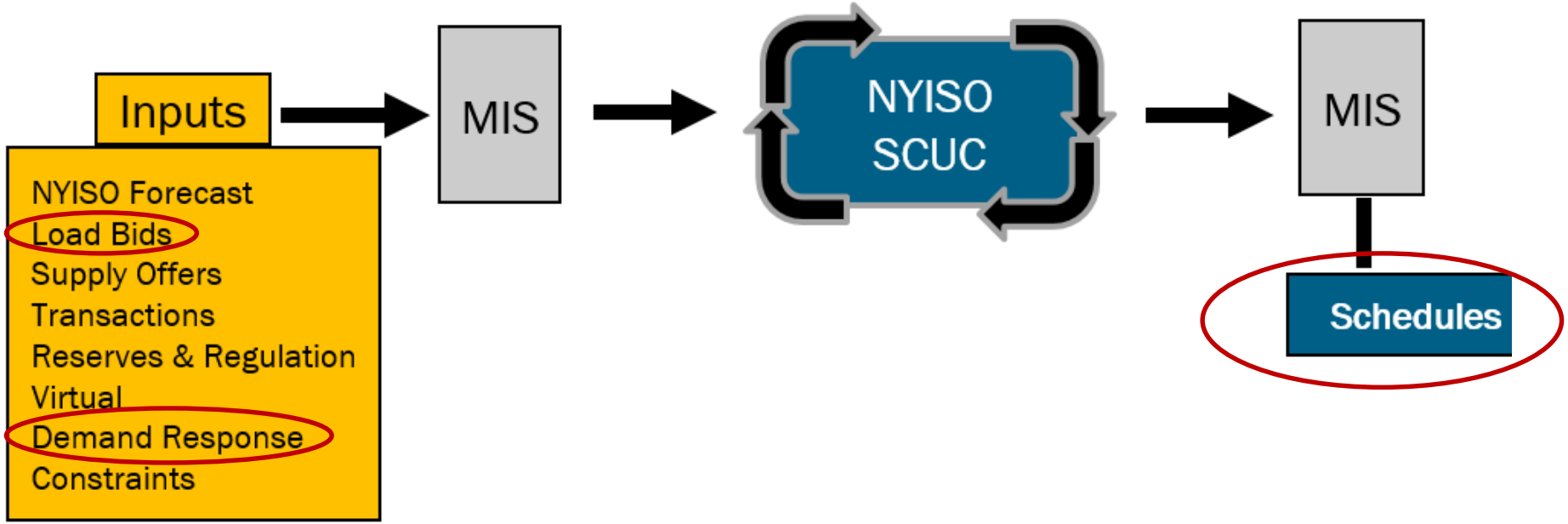
- **Bid Results**
  - Offer status posted in MIS
    - ‘Validation Passed’
      - Data acceptable, no changes necessary
    - ‘Validation Failed’
      - Data will require changes
    - Evaluating
      - After DAM closes
        - » 5 a.m. day before operating day
      - Prior to posting of accepted schedules
        - » No later than 11 a.m. day before operating day

Day-Ahead Market Scheduling

- **Bid Results Cont'd**
  - Offer status posted in MIS
    - Accepted
      - Resource is committed
      - DAM schedule posted
    - Rejected
      - Resource is not committed

Day-Ahead Market Scheduling

- Bidding & Scheduling – Putting it all together



Day-Ahead Market Scheduling

- Viewing Offer Status & Bid Results

NEW YORK INDEPENDENT SYSTEM OPERATOR
Building The Energy Markets Of Tomorrow...Today

Welcome To The Bidding & Scheduling System

Logout

Company | Newsroom | Products | Market Data | Services | Documents | Committees

Administrator Details - Change Password - Generator Commitment Parameters - Generator Details - Generator OOM - LSE Details - Load Bus Details - Log Out - Organization Details - Physical Load Bids - Review Generator Bids - Review Generator Forecasted Schedules - Review Transaction Bids - Review Transaction Contracts - Subzone Details - Tie Details - User Details - Virtual Load Bids - Virtual Supply Bids - Zone Details -

Page Ref: E

Generator Bid Results

Bid Identification				Schedules (MW)							
Date	Market	Generator	Status	Time	Energy	10 Min Spin	10 Min Non-Synch	30 Min Spin	30 Min Non-Synch	Regulation Capacity	Op Cap Reserve
10/12/2013 00:00 EDT	DAM		VALIDATION PASSED								
10/12/2013 00:00 EDT	DAM		BID ACCEPTED	00:00	3						
10/12/2013 01:00 EDT	DAM		VALIDATION PASSED								
10/12/2013 01:00 EDT	DAM		BID ACCEPTED	01:00	3						
10/12/2013 02:00 EDT	DAM		VALIDATION PASSED								
10/12/2013 02:00 EDT	DAM		BID ACCEPTED	02:00	3						
10/12/2013 03:00 EDT	DAM		VALIDATION PASSED								
10/12/2013 03:00 EDT	DAM		BID ACCEPTED	03:00	3						

Let's Review

A DRP enters both a Load Bid and a Load Curtailment Bid

a) True

b) False

Let's Review

If the UOL and the Min Gen are equivalent, no bid curve is needed for the Load Curtailment Bid

a) True

b) False

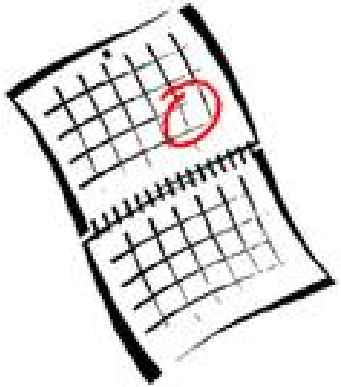
Let's Review

What is the purpose of the $75/MW minimum offer floor?

Reporting and Verifying Meter Data and CBL

Reporting & Verifying – Meter Data and CBL

- Meter Data Submittals
  - Meter data is provided to NYISO by Meter Authority
    - Within 55 days of economic schedule
  - Meter data includes net metered load and CBL



Reporting & Verifying – Meter Data and CBL

- **Performance Measurement**
  - Calculated hourly as:

CBL – Actual Net Hourly Metered Load = Hourly Demand Reduction

- **Verification**
  - Load reduction data is subject to NYISO audit
  - Disputes resolved through NYISO Dispute Resolution Procedures

Reporting & Verifying – Meter Data and CBL

- Meter Data and NYISO Settlements
  - If meter data can be obtained and CBL calculation can be performed in time for initial billing:
    - Actual meter data will be used for initial billing
  - If meter data cannot be obtained and/or CBL calculation cannot be performed in time for initial billing:
    - Demand reduction is set to scheduled demand reduction
    - Settlements will be adjusted using actual meter data in time for 4 month true-up

DADRP Settlements

DADRP Settlements

- Various Financial Settlements associated with DADRP:
  - DADRP Incentive Settlement
  - DADRP Reduction Settlement
  - DADRP Load Balance Settlement
  - DADRP Penalty Settlement
  - DADRP Bid Cost Guarantee
  - Rate Schedule 1
- Settlement Related Supports

DADRP Settlements

- **DADRP Incentive**
  - Offers an incentive payment to ***DRP*** with curtailable load for program participation

Hourly Actual Reduction MWh * DAM LBMP $ = Incentive Payment

DADRP Settlements

- **DADRP Reduction**
  - Payment to ***LSE*** to offset amount of DAM load purchase costs when a curtailable load is scheduled to reduce consumption

Hourly Scheduled Reduction MWh * DAM LBMP $ = Reduction Payment

- **DADRP Load Balance**
  - Charge to ***LSE*** to offset the amount of Balancing Market load sold back, due to actual Demand Reduction in RT Market

Hourly Actual Reduction MWh * RT LBMP $ = Load Balance Charge

DADRP Settlements

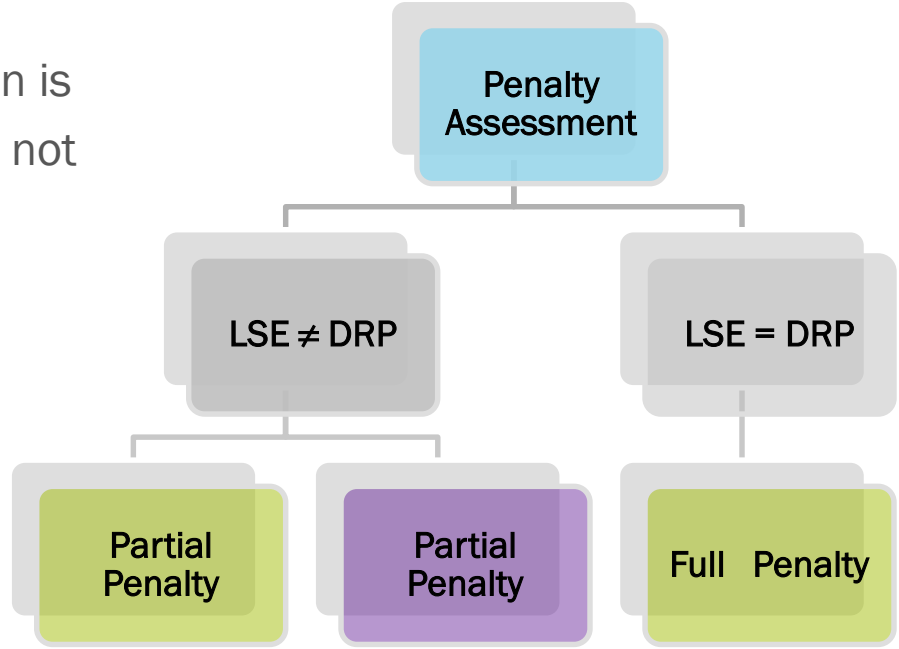
- Why is DADRP Load Balance Needed?

LSE Energy	LSE DADRP
Charged for DAM Energy Forecast:	
50 MWh	
Load Consumed in RT:	
45 MWh	
Paid back for forecasted load NOT consumed in RT:	Paid for DADRP load reduction Schedule:
5 MWh ← *Same MWs!!!* →	5 MWh
	Charged for Load Balance:
	5 MWh

****Last two intended to cancel each other out*

DADRP Settlements

- **DADRP Penalty**
  - Charged when load reduction is scheduled in DAM, but does not physically occur



DADRP Settlements

- **If LSE = DRP**
  - Full penalty is assessed to ***LSE***

(Hourly Actual Reduction – Hourly Scheduled Reduction)* Max(DAM LBMP $, RT LBMP $) = Penalty

DADRP Settlements

- **If LSE ≠ DRP**
  - Partial penalty assessed to ***LSE***

(Hourly Actual Reduction – Hourly Scheduled Reduction)* DAM LBMP $ = LSE Penalty

  - Partial penalty assessed to ***DRP***

[(Hourly Actual Reduction – Hourly Scheduled Reduction)* Max(DAM LBMP $, RT LBMP $)]
–
[(Hourly Actual Reduction – Hourly Scheduled Reduction) * DAM LBMP $] = DRP Penalty

DADRP Settlements

- **DADRP Bid Cost Guarantee**
  - Payment to ***DRP*** when NYISO schedules curtailable load in DAM and revenue earned does not out-weigh bid costs

Step 1:
Hourly Total DADRP Costs $– Hourly Total DADRP Revenue = Hourly Total DADRP Net Cost $

Step 2:
Max(∑ Hourly Total DADRP Net Cost $ for all hours in day, 0) = DADRP BCG $

DADRP Settlements

- **DADRP Rate Schedule 1**
  - Charge to ***DRP*** to recover a portion of NYISO's operating costs

Hourly Inject: Rt Schd 1 $ * Hourly Load Reduction MWh= DADRP Rt Schd 1

Let's Review

If meter data cannot be obtained in time for initial billing, the demand reduction value will be set to the scheduled demand reduction

a) True

b) False

Let's Review

The DADRP Load Balance settlement is intended to offset the amount of RT load sold back as a result of a demand reduction

a) True

b) False

Let's Review

The LSE is exclusively responsible for paying the DADRP Penalty when a DADRP resource fails to reduce its load consumption in accordance with its accepted reduction schedule

a) True

b) False

DADRP Settlement Reports

- **Supporting Reports - DADRP Incentive Settlement**
  - Accounting and Billing Manual Section 4.2
    - Appendix B
  - Advisory Billing File
    - Demand Response Incentive $
    - Hourly Bill Code 2005
    - Daily Bill Code 2011
  - DSS Corporate Report
    - Demand Response Program Customer – Incentive

DADRP Settlement Reports

- **Supporting Reports - DADRP Reduction Settlement**
  - Accounting and Billing Manual Section 4.2
    - Appendix B
  - Advisory Billing File
    - Demand Response Reduction $
    - Hourly Bill Code 2006
    - Daily Bill Code 2012
  - DSS Corporate Report
    - Demand Response Program Customer – Reduction

DADRP Settlement Reports

- **Supporting Reports - DADRP Load Balance Settlement**
  - Accounting and Billing Manual Section 4.2
    - Appendix J
  - Advisory Billing File
    - Demand Response Load Balancing $
    - Hourly Bill Code 2008
    - Daily Bill Code 2014
  - DSS Corporate Report
    - Demand Response Program Customer – Load Balance

DADRP Settlement Reports

- **Supporting Reports - DADRP Penalty Settlement**
  - DA Demand Reduction Program Manual
    - Section 4.2
  - Advisory Billing File
    - Demand Response DADRP Penalty $
    - Hourly Bill Code 2007
    - Daily Bill Code 2013
  - DSS Corporate Report
    - Demand Response Program Customer – Penalty for Demand Response Provider

DADRP Settlement Reports

- **Supporting Reports - DADRP BCG Settlement**
  - DA Demand Reduction Program Manual
    - Section 7
  - Advisory Billing File
    - Load Reduction Bid Guarantee $
    - Hourly Bill Code 2009
    - Daily Bill Code 2015
  - DSS Corporate Report
    - Demand Response Program Customer – Bid Cost Guarantee

DADRP Settlement Reports

- **Supporting Reports - DADRP Rate Schedule 1 Settlement**
  - Accounting and Billing Manual Section 4.2
    - Appendix B
  - Advisory Billing File
    - Demand Response S SC&D Charge
    - Hourly Bill Code 2031 & 2032
    - Daily Bill Code 2036 & 2037
  - Market & Operational Data
    - Miscellaneous Price Files– Rate Schedule 1

DADRP Summary

- Define the purpose of the Day-Ahead Demand Response Program (DADRP)
- Identify program eligibility requirements
- Explain the process for enrollment
- Define and explain how Customer Baseline Load (CBL) is calculated
- Outline the process for bidding and scheduling in the DADRP Program
- Describe the method for measuring and reporting performance
- Identify the various settlements associated with the DADRP Program

DADRP References

- Day-Ahead Demand Response Program Manual
- DRIS User's Guide
- Open Access Transmission Tariff (OATT)
- Market Administration & Control Area Services Tariff (MST)