

Energy Market Accounting Day-Ahead and Real-Time

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Market Analysis and Settlements

New England Electricity Market

Summary Statistics

New England Electricity Markets & Capacity Payments 2010	
Day-Ahead Energy	\$7 Billion
Real-Time Energy	\$0.2 Billion
Total	\$7.2 Billion
Day-Ahead NCPC	\$11 Million
Real-Time NCPC	\$84 Million
Reserve Market	\$130 Million
Regulation	\$14 Million
FTR Auction	\$30 Million
Total	\$269 Million
ICAP Transition Payments	\$790 Million
Forward Capacity Market	\$857 Million
Grand Total	\$9.1 Billion

Learning Objectives

- To understand how charges and credits are determined in the Energy settlement.
- To view the big picture of how the money moves through the Energy Market.
- To understand how the ISO uses the Market Information Server system to provide information to Participants.



Energy Market

Governing Documents



- Market Rule 1, Section 3
- ISO New England Manual 28
 - Sections 3, 6, 7, 8, 10

Energy Markets Overview

Day-Ahead Market

- Cleared Day-Ahead Market (DAM) quantities are binding financial commitments for the Market Participants based upon bids and offers.
 - Majority of New England Energy market activity is in the DAM
 - DAM clearing results are released in advance of the operating day; usually at 16:00.



Energy Markets Overview

Real-Time Market

- Real-Time Market (RTM) or Balancing Market quantities are based upon how Participants' actual operation deviates from their Day-Ahead (DA) Energy positions.
 - Real-Time Energy Market is the Balancing Market
 - Finalized hourly Real-Time (RT) LMPs for every pricing point in New England are published after the close of the Operating Day.



Energy Settlement Overview

- DA and RT Energy Market Settlements are performed by calculating the charges and credits for all of the market activity that occurs at every pricing location on an hourly basis throughout New England.
- Energy Market uses a multi-settlement system with distinct DA and RT Energy Settlements, each with distinct Market activities:
 - DAM activity includes cleared Generation Offers, cleared Load Bids, cleared Virtual transactions, cleared Imports and Exports, and Bilateral Transactions.
 - RTM activity includes Metered Generation and Load, Scheduled Imports and Exports, and Bilateral Transactions.

Market Settlements Data Requirements

Demand Bids

Participants can submit Demand Bid data to ISO for the DAM by noon each day.

Supply Offers

Participants submit supply offers for generating resources to the ISO for the DAM by noon each day; re-offer period for RTM is normally from 16:00-18:00

Market Settlements Data Requirements (cont.)

Virtual Transactions

Participants can submit virtual transactions for supply and demand (Incremental Offers/ Decremental Bids) to the ISO by noon each day

Bilateral Transactions

Participants can submit various types of transactions to the ISO

- Internal Bilateral for Market (IBM)
- Internal Bilateral for Load (IBL)
- External Transactions
 - Different deadlines for different types of transactions (e.g., Internal, External, DAM, RT. See Appendix for detail.)

Market Settlements Data Requirements

- Meter Data*
 - Participants or their assignees are using automated data collection systems to interrogate thousands of metering points every night. Meters are calibrated and tested to qualify as “Revenue Quality.”
 - Meter data submittals are due at 1:00 p.m. on the second business day following the operating day. The submittals contain 24 hourly readings for the day.
 - Approximately 300 Generators, 300 Settlement Only Generators, 750 Load Assets, and 250 Tie Line Assets are reported each day.



* More information on Meter Data will be shown at the end of the session.

How are Energy Market Settlements Data Requirements Used?

- Day-Ahead Energy Market Variables – Price & Quantity
 - Price - DA LMPs (\$/MWh)
 - Quantity - DA Cleared Schedules (MWh)
 - Participant Cleared Locational Generation and Load Obligations
 - Participant Internal and External Transaction Obligations
 - Participant Cleared Virtual Transactions

How are Energy Market Settlements Data Requirements Used? (cont.)

- Real-Time Energy Market Variables – Price & Quantity
 - Price - Real-Time LMPs (\$/MWh)
 - Quantity - Deviations from DA Cleared Schedules (MWh)
 - Participant Metered Generation and Load
 - Participant Internal and External Transactions

Energy Balancing Market Examples

Participant ABC: Generation, Load, Virtual Transactions, Bilateral Transaction

Hour	Asset or Activity	Location	DA Cleared (MWh)	DA LMP (\$/MWh)	DA (Charge)/Credit	RT Metered (MWh)	Deviation from DA (MWh)	RT LMP (\$/MWh)	RT (Charge)/Credit	Net Settlement
1	Generator A	Node 111	100	55	\$5,500	100	0	50	0	\$5,500
1	Generator B	Node 122	100	56	\$5,600	0	-100	51	-\$5,100	\$500
1	Generator C	Node 133	0	57	\$0	100	100	52	\$5,200	\$5,200
1	Load	CT Zone	-100	58	-\$5,800	-90	10	53	\$530	-\$5,270
1	Inc Offer	Node 222	100	59	\$5,900	0	-100	54	-\$5,400	\$500
1	Dec Bid	Node 333	-100	60	-\$6,000	0	100	55	\$5,500	-\$500
1	Bilateral	Hub	100	50	\$5,000	100	0	45	\$0	\$5,000

Market Information Server Report Conventions:

Demand (Load) is represented by negative values, e.g., -\$20,000, -200 MWh

Supply (Generation) is represented by positive values, e.g., \$20,000, 200 MWh

Energy Market Balancing Examples (cont.)

Extreme examples for further illustration of balancing market mechanics.

Hour	Asset or Activity	Location	DA Cleared (MWh)	DA LMP (\$/MWh)	DA (Charge)/Credit	RT Metered (MWh)	Deviation from DA (MWh)	RT LMP (\$/MWh)	RT (Charge)/Credit	Net Settlement
10	Generator A	Node 111	100	20	\$2,000	100	0	200	0	\$2,000
10	Generator B	Node 122	100	25	\$2,500	0	-100	210	-\$21,000	-\$18,500
10	Generator C	Node 133	0	25	\$0	100	100	210	\$21,000	\$21,000
10	Load	CT Zone	-100	26	-\$2,600	-90	10	220	\$2,200	-\$400
10	Inc Offer	Node 222	100	27	\$2,700	0	-100	230	-\$23,000	-\$20,300
10	Dec Bid	Node 333	-100	28	-\$2,800	0	100	240	\$24,000	\$21,200

Hour	Asset or Activity	Location	DA Cleared (MWh)	DA LMP (\$/MWh)	DA (Charge)/Credit	RT Metered (MWh)	Deviation from DA (MWh)	RT LMP (\$/MWh)	RT (Charge)/Credit	Net Settlement
17	Generator A	Node 111	100	200	\$20,000	100	0	20	0	\$20,000
17	Generator B	Node 122	100	210	\$21,000	0	-100	25	-\$2,500	\$18,500
17	Generator C	Node 133	0	210	\$0	100	100	25	\$2,500	\$2,500
17	Load	CT Zone	-100	220	-\$22,000	-90	10	26	\$260	-\$21,740
17	Inc Offer	Node 222	100	230	\$23,000	0	-100	27	-\$2,700	\$20,300
17	Dec Bid	Node 333	-100	240	-\$24,000	0	100	28	\$2,800	-\$21,200

Energy Market Balancing Examples (cont.)

- Remember that the net settlement shown in these examples refers to the interchange in the ISO Settlement only. The Participant's expenses or revenues outside the interchange with the market are not part of the Settlement.
- For Example:
 - The generator owner's obligation to pay for cost of the fuel burned is not included here.
 - The revenue that will be collected from customers when they pay their electric bills is not included here.

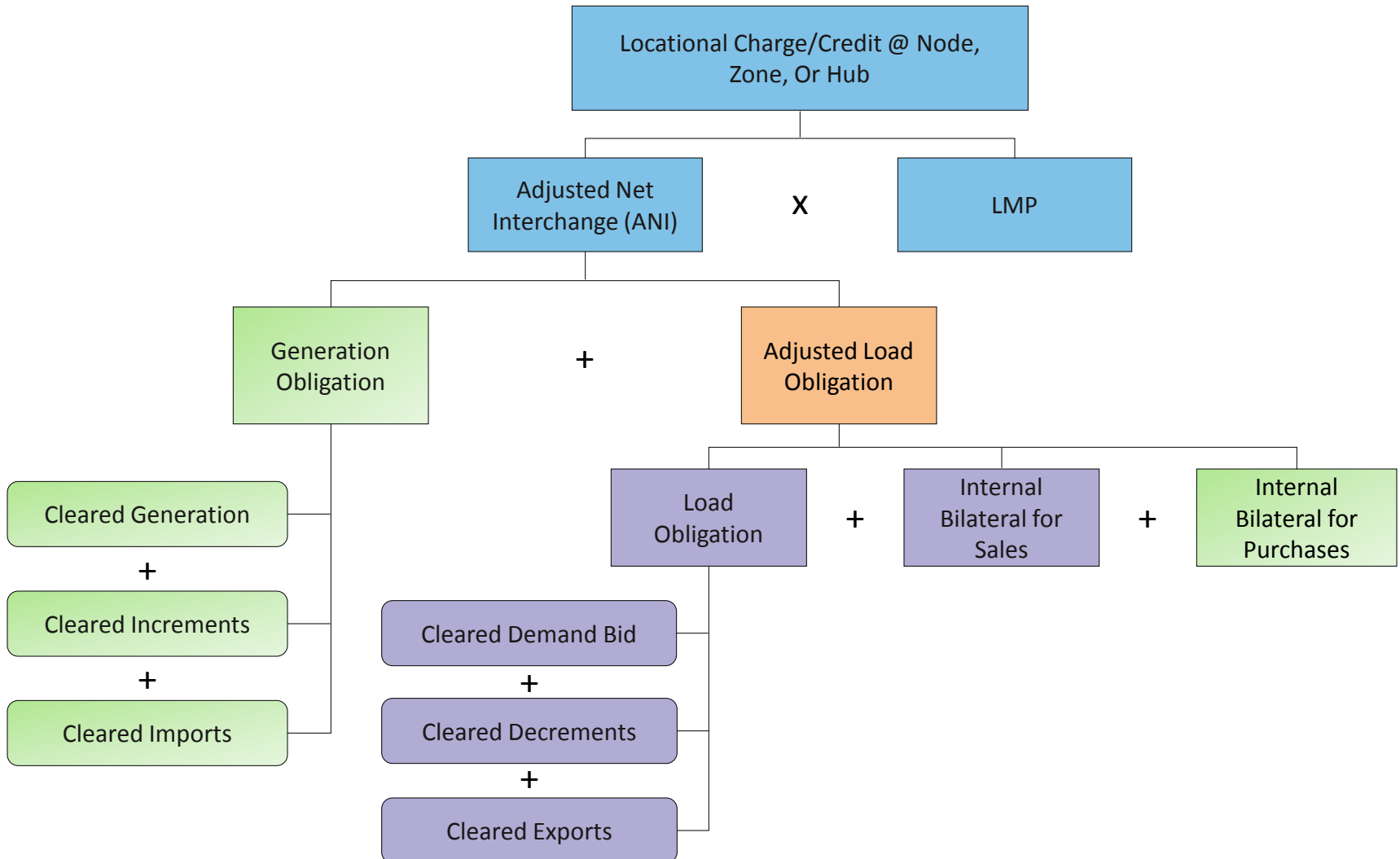
Energy Balancing Market Exercise

Participant XYZ – Hour 12 – MM/DD/YY

Asset or Activity	Location	DA Cleared (MWh)	DA LMP (\$/MWh)	DA (Charge)/Credit	RT Metered (MWh)	Deviation from DA (MWh)*	RT LMP (\$/MWh)	RT (Charge)/Credit	Net Settlement
Unit XXX	Node 123	100	100		50		110		
Unit ZZ	Node 456	0	105		100		120		
Load	WCMA Zone	-200	100		-190		110		
Load	CT Zone	-100	110		-120		125		
Inc Offer	Node 789	100	100		0		110		
Dec Bid	Node 987	-100	110		0		130		

*RT MWh – DA MWh

Calculate Day-Ahead Energy Charges and Credits at Each Pricing Location



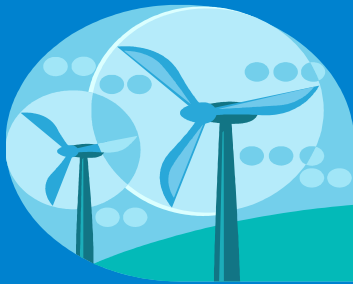
Now, Let's Follow the Money

- Market Settlements are a “Zero Sum” game
 - All credits and charges net to zero
 - In the Energy Market, Load essentially pays for its demand; Generation is paid for its supply
- All DA and RT settlement quantities are calculated by the LMP component



LMP Components

Locational Marginal Pricing



Energy



Congestion



Losses

Each LMP can be **split** into three components.

...Back to “...Following the Money”



- Balancing Market examples on previous slides showed “big picture” settlement on LMP
 - The settlement is accounted for by each activity MWh quantity multiplied by the three LMP components: Energy, Congestion, Loss. This results in the same costs as when the LMP is used in the calculation, but allows for the tracking of costs by LMP component category.

Following the Money

- Settlement on Energy Component of the LMP
 - Energy Component is identical at every pricing location and each hour in a given market.
 - All DA Energy components are the same in any hour
 - All RT Energy components are the same in any hour
 - Credit and Charges in DAM do not net to zero; cleared generation not equal to cleared demand due to losses
 - Credit and Charges in RTM do not net to zero, deviations between DA and RT generation and demand
 - These imbalances are credited or charged to the Marginal Loss Revenue Fund



LMP Energy Component Settlement

With only the Energy Component of the LMP settlement, there is not enough money to pay the generation

INCOMPLETE



Note: Graphics represent settlement concepts; the proportion of under collection is not to scale.

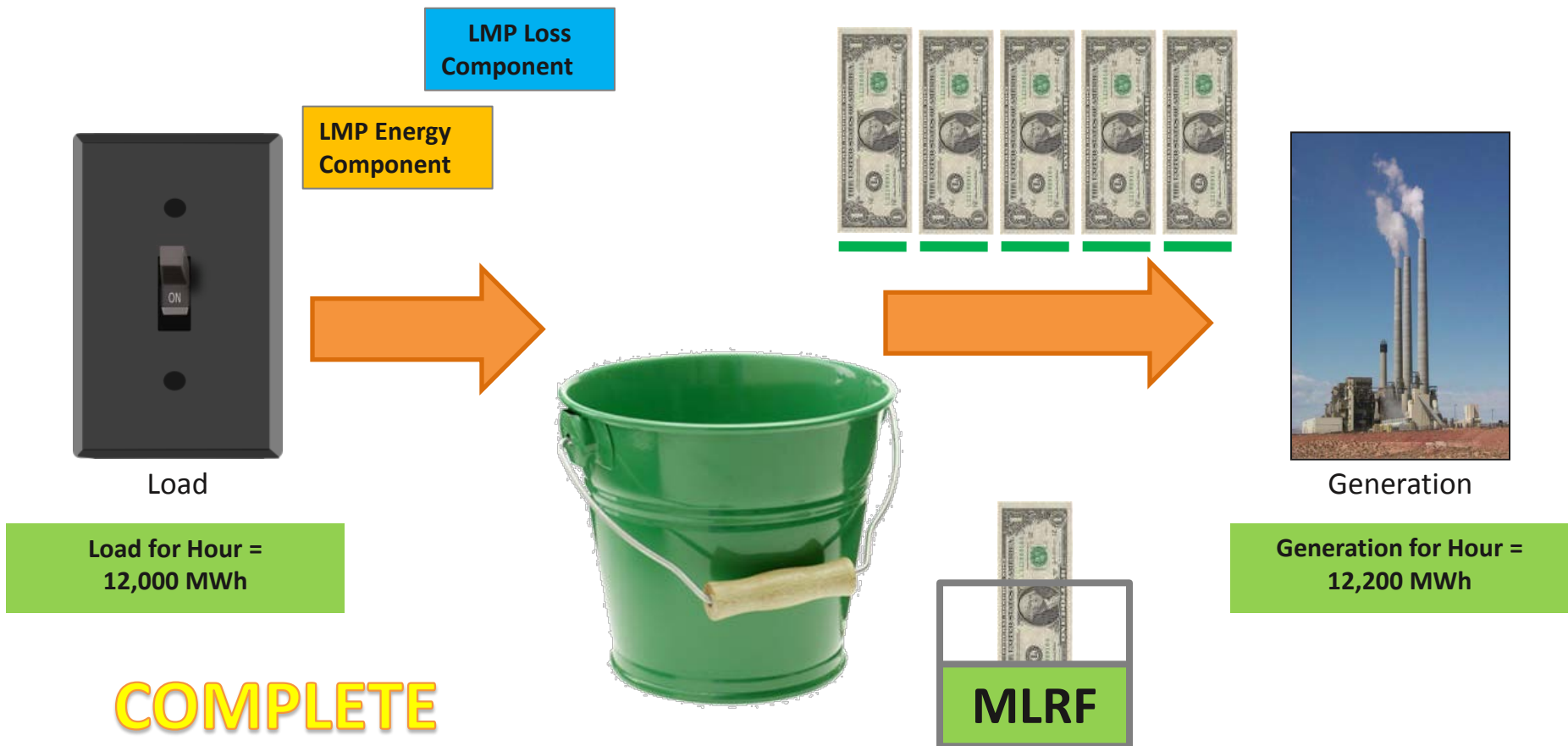
Following the Money (cont.)

- Settlement on Loss Component of the LMP
 - Loss components are individually calculated for every pricing location each hour; no uniformity can be expected across pricing locations.
 - Credit and Charges in DAM do not net to zero, due to difference in generation and supply quantity and due to design of the Loss Component. Losses settlement generally results in surplus funds after all generation is paid.
 - Credit and Charges in RTM do not net to zero, due to difference in deviation quantity and due to design of the Loss Component. Losses settlement generally results in surplus funds after all generation is paid.
 - These imbalances are credited (or charged) to the Marginal Loss Revenue Fund



LMP Energy and Loss Component Settlement

With both the Energy Component and the Loss Component of the LMP settlement, there is enough money to pay the generation, and some surplus for the Marginal Loss Revenue Fund (MLRF)



Note: Graphics represent settlement concepts; the proportion of “surplus” collection is not to scale.

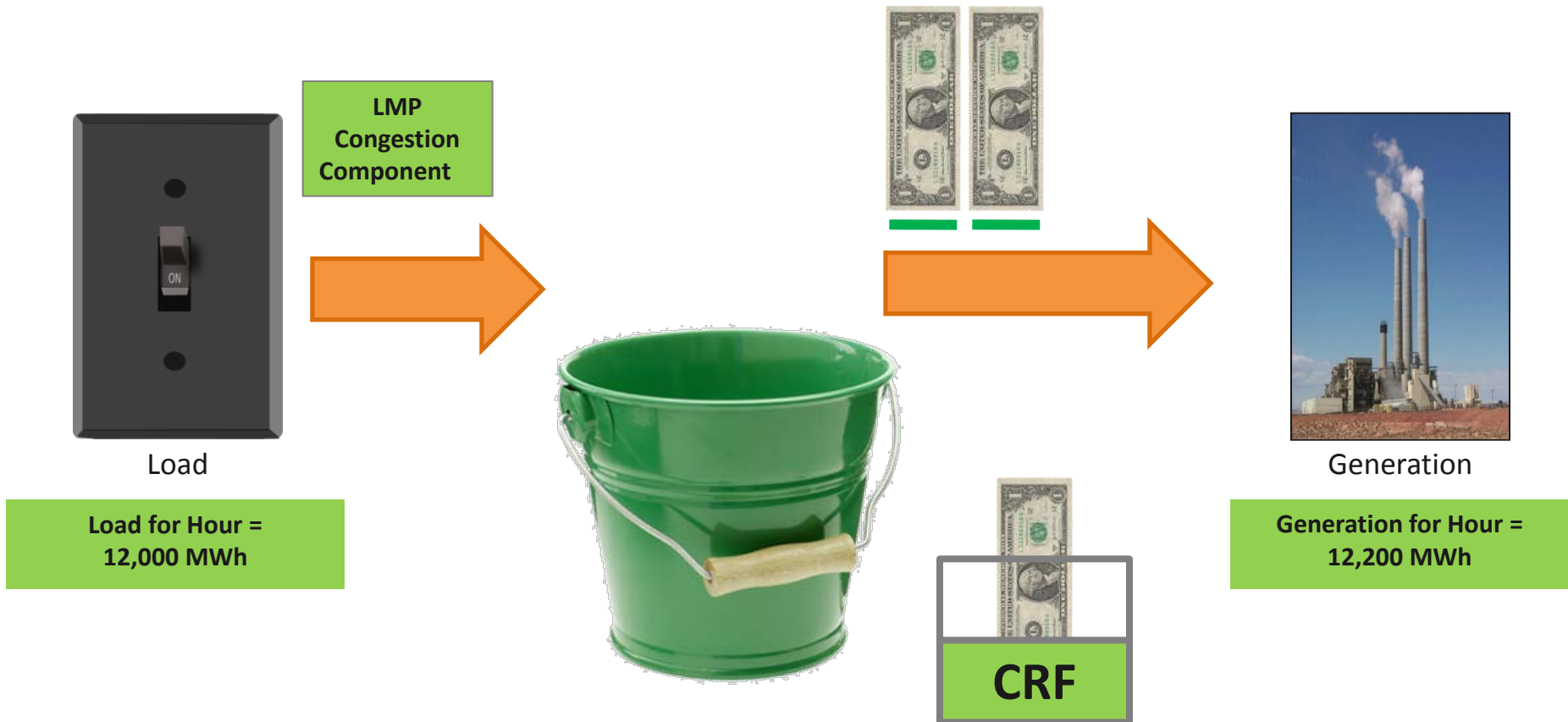
Following the Money

- Settlement on the Congestion Component of the LMP
 - Congestion components are individually calculated at each pricing location.
 - Credits and Charges on the Congestion Component of the LMP do not net to zero in the DAM or RTM. There is imbalance due to difference in supply and demand quantities; and in the difference in the value of the Congestion Components at the different pricing locations, but Congestion Component settlement is designed to result in surplus congestion funds after generation is paid.
 - The imbalance is credited or charged to the Congestion Revenue Fund (CRF).



LMP Congestion Component Settlement

The Congestion Component of the LMP settlement provides enough money to pay the generation, and some surplus for the Congestion Revenue Fund (CRF).



Note: Graphics represent settlement concepts; the proportion of "surplus" collection is not to scale.

Marginal Loss Revenue Fund

- Marginal Loss Revenue Fund (MLRF) is the sum of the imbalances in the total Energy and Loss Component settlements.
- In 2010, MLRF averaged ~ \$5.7 million/month; less than 0.1% of the total DA and RT Energy Market.
- Marginal Loss Revenue Fund is allocated to Market Participants hourly on RT Adjusted Load Obligation.

Marginal Loss Revenue Fund (cont.)

- Prior to the allocation, any Emergency Energy funds are credited or charged to the MLRF.
 - Emergency transactions are billed/paid to External Control Area
- Prior to the allocation, Inadvertent Energy funds are credited or charged to the MLRF
 - Inadvertent Energy funds are billed/paid to Participants based on total Generation and Load
 - See Appendix for more information on Inadvertent Energy

Congestion Revenue Fund

- Congestion Revenue Fund (CRF) contains the sum of the imbalances in the Congestion Component settlements.
 - In 2010, Congestion Component revenue collection averaged ~ \$3.2 million/month
 - Interest on Congestion Revenue collection is also accrued to the CRF
- CRF is used to pay “congestion rents” to Financial Transmission Rights (FTR) holders.
 - FTR market will be discussed in detail later in WEM 101
 - FTR holders are paid the difference in DA congestion costs between two defined pricing points

Congestion Revenue Fund (cont.)

- CRF has another source of money in addition to the Congestion Component settlement, which is the negative target FTR allocations from FTR holders who owe congestion rents on their FTRs. (Generally expect that these FTR holders were paid to own the FTRs; reflecting cleared negative FTR bids.)
 - In 2009, the negative target allocation collection averaged ~ \$1 million/month
 - This concept will be discussed further during the FTR discussion.

Following the Money

Summary

- All load is charged and all generation is credited by multiplying the appropriate MWh quantity by each of the three LMP components at the pricing location in that hour.
 - In the DAM, the MWh is the cleared MWh of Load or Generation
 - In the DAM, the DA LMP at the location of the cleared MWh is used to charge or credit
 - In the RTM, the MWh is the deviation of the Actual Metered amount from the MWh cleared in the DAM
 - In the RTM, the RT LMP at the location of the deviation MWh is used to charge or credit



Following the Money

Summary (cont.)

- In both the DAM and RTM:
 - Most Load is located and priced in one of the load zones, and gets a zonal LMP
 - Generation clears at the generator node, and gets the nodal LMP



Following the Money

Summary (cont.)

- Differences between charges and credits in both the DAM and RTM are handled as follows:
 - Any difference between the charges and credits on the Energy component of the LMP is allocated to the Marginal Loss Revenue Fund
 - Any difference between the charges and credits on the Loss Component of the LMP is allocated to the Marginal Loss Revenue Fund
 - The Marginal Loss Revenue Fund is allocated to RT Adjusted Load Obligation each hour
 - Any difference between the charges and credits on the Congestion component of the LMP is allocated to the Congestion Revenue Fund
 - The Congestion Revenue Fund is used to pay FTR Holders after the operating month is complete



Reporting Mechanism

Market Information Server (MIS) Reports

- ISO publishes reports to Participants on a secure FTP site termed the Market Information Server (MIS).
- Each Participant only has access to their own confidential information.

Reporting Mechanism

MIS Reports (cont.)

- About 150 MIS reports are published to the FTP site.
 - Approximately 40 hourly market settlement reports and 70 monthly market settlement reports. Other reports include invoice summary and details, Forward Capacity Auction information, Financial Transmission Rights and Forward Reserve Auctions, meter reading echo data and quarterly data for FERC reporting.
 - Half a dozen operational data reports are also released at various intervals to the MIS FTP server; these reports include the ISO's forecast of Participant's generator dispatch, and hourly echo of the telemetry of the actual operation of the Participant's resources.
 - Market Participants will have reports that pertain to their market activities.

Reporting Mechanism

MIS Reports (cont.)

- MIS reports are in “CSV” format, allowing for direct upload into the Participant’s database.
- Formats and data descriptions of the reports are posted on the ISO-NE website at: [Understanding the Bill > Report Descriptions, Templates & Samples](#)

MIS Summary Reports:

Energy Market Settlement

Day-Ahead Market

- SR_DALOCSUM
 - All asset and transaction activity for each location, each hour of the day.
- SR_DACUSTSUM
 - Summed activity across all locations for each hour of the day.

Real-Time Market

- SR_RTLOCSUM
 - All asset and transaction activity for each location, each hour of the day
- SR_RTCUSTSUM
 - Summed activity across all locations for each hour of the day.

MIS Report Examples

SR_DALOCSUM

Trading Interval	Locational Info			Day-ahead Generation Obligation				Day-ahead Load Obligation			Day-ahead Adjusted Load Obligation				
	Location Id	Location Name	Location Type	Day Ahead Cleared Generation (A)	Day Ahead Cleared Increments (B)	Day Ahead Cleared Imports (C)	Day Ahead Generation Obligation (D)	Day Ahead Cleared Demand Bids (E)	Day Ahead Cleared Decrements (F)	Day Ahead Cleared Exports (G)	Day Ahead Load Obligation (H)	Day Ahead Internal Bilateral For Purchases (I)	Day Ahead Internal Bilateral For Sales (J)	Day Ahead Adjusted Load Obligation (K)	Day Ahead Adjusted Net Interchange (L)
Hour End	Number	String	String	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh
1	4008	Z.NEMASSBOST	LOAD_ZONE	0.000	0.000	0.000	0.000	-200.000	0.000	0.000	-200.000	0.000	-10.000	-210.000	-210.000
1	1111	UN.GARFIELD	NETWORK_NODE	100.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000

LMP Components						
Day Ahead Energy Component	Day Ahead Congestion Component	Day Ahead Marginal Loss Component	Day Ahead Energy Charge / Credit	Day Ahead Congestion Charge / Credit	Day Ahead Loss Charge / Credit	Day Ahead Cleared Asset Related Demand Bids
\$	\$	\$	\$	\$	\$	MWh
80.00	5.00	0.50	-16800.00	-1050.00	-105.00	0.000
80.00	5.00	0.50	8000.00	500.00	50.00	0.000

SR_DACUSTSUM

Trading Interval	Customer Values					Pool Values			
	Day Ahead Load Obligation	Day Ahead Energy Charge / Credit	Day Ahead Congestion Charge / Credit	Day Ahead Loss Charge / Credit	Day Ahead Net Energy Settlement	Day Ahead Energy Settlement	Day Ahead Congestion Revenue	Day Ahead Loss Revenue	Day Ahead Marginal Loss Revenue
Hour End	MWh	\$	\$	\$	\$	\$	\$	\$	\$
1	200.00	-8800.00	-550.00	-55.00	-9405.00	22257.65	-4024.09	-21743.94	-513.71

MIS Report Examples (cont.)

SR_RTLOCSUM

Trading Interval	Locational Info			Real-time Generation Obligation			Real-time Load Obligation				Real-time Adjusted Load Obligation		
	Location Id	Location Name	Location Type	Revenue Metered Generation (A)	Scheduled Imports (B)	Real Time Generation Obligation (C=A+B)	Revenue Metered Load (D)	Scheduled Exports (E)	Internal Bilateral For Load (F)	Real Time Load Obligation (G=D+E+F)	Real Time Internal Bilateral For Market Purchases (H)	Real Time Internal Bilateral For Market Sales (I)	Real Time Adjusted Load Obligation (J=G+H+I)
Hour End	Number	String	String	MWh	MWh	MWh	MWh (-)	MWh (-)	MWh (+/-)	MWh (-)	MWh (+)	MWh (-)	MWh
1	4008	Z.NEMASSBOST	LOAD_ZONE	0.000	0.000	0.000	-190.750	0.000	0.000	-190.750	0.000	-10.000	-200.750
1	1111	UN.GARFIELD	NETWORK_NODE	95.000	0.000	95.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

LMP Components							
Real Time Adjusted Net Interchange (H=C+J)	Adjusted Net Interchange Deviation	Real Time Energy Component	Real Time Congestion Component	Real Time Marginal Loss Component	Real Time Energy Charge / Credit	Real Time Congestion Charge/Credit	Real Time Loss Charge / Credit
MWh	MWh	\$	\$	\$	\$	\$	\$
-200.750	9.250	75.00	0.00	-0.25	693.75	0.00	-2.31
95.000	-5.000	75.00	0.00	-0.25	-375.00	0.00	1.25

SR_RTCUSTSUM

Trading Interval	Customer Values									
	Real Time Generation Obligation	Real Time Load Obligation	Real Time Adjusted Load Obligation	Real Time Adjusted Net Interchange	Real Time Energy/ Charge Credit	Real Time Congestion Charge / Credit	Real Time Loss Charge / Credit	Real Time Marginal Loss Revenue Allocation	External Inadvertent Cost Distribution	Real Time Net Energy Settlement
Hour End	MWh	MWh	MWh	MWh	\$	\$	\$	\$	\$	\$
1	95.000	-190.750	-200.750	-105.750	318.75	0.00	-1.06	172.00	-15.42	474.27

Pool Values									
Real Time Generation Obligation	Real Time Load Obligation	Real Time Adjusted Load Obligation	Real Time Energy Settlement	Real Time Congestion Revenue	Real Time Loss Revenue	Real Time Emergency Cost	External Inadvertent Cost	Real Time Marginal Loss Revenue	Day Ahead Marginal Loss Revenue
MWh	MWh	MWh	\$	\$	\$	\$	\$	\$	\$
14106.227	-13916.990	-13916.990	-11210.63	0.00	285.51	0.00	-1512.71	12437.83	-513.71

MIS Detail Reports

Energy Market Settlement

Day-Ahead Market

- SD_DACLEARED
 - All cleared offers and bids
- SD_DATRANSACT
 - All DAM transaction activity

Real-Time Market

- SD_RTLOAD, SD_RTUNITASM
 - Load and asset details for each location, each hour of the day
- SD_RTTRANSACT
 - RTM Transaction activity

MIS Report Location Information

SMD MIS FTP Access

- Web site address: misftp.iso-ne.com
- ISO-NE Customer Service provides Participants with information on how to access their secure ftp sites.

SMD MIS WWW Access

- Web site address: www.iso-ne.com
- Menu
 - Settlements
 - ISO and RTO Tariff
 - Tariff Settlement Reports

Determination of Meter Values for Load Assets

Determination of Meter Values for Load Assets

- Metering “101”
- Presentation of broad concepts only
- Load Asset meter values are determined by “Host Participant” transmission companies

Determination of Meter Values for Load

Example: Transmission Company ABC – Service Territory XYZ “Metering Domain”



houses

substations

businesses

What is in this service territory?

generating stations

municipal buildings

Determination of Meter Values for Load

Example: Transmission Company ABC – Service Territory XYZ “Metering Domain”



After midnight, Transmission Company ABC electronically interrogates meters that are storing data.

substation meters

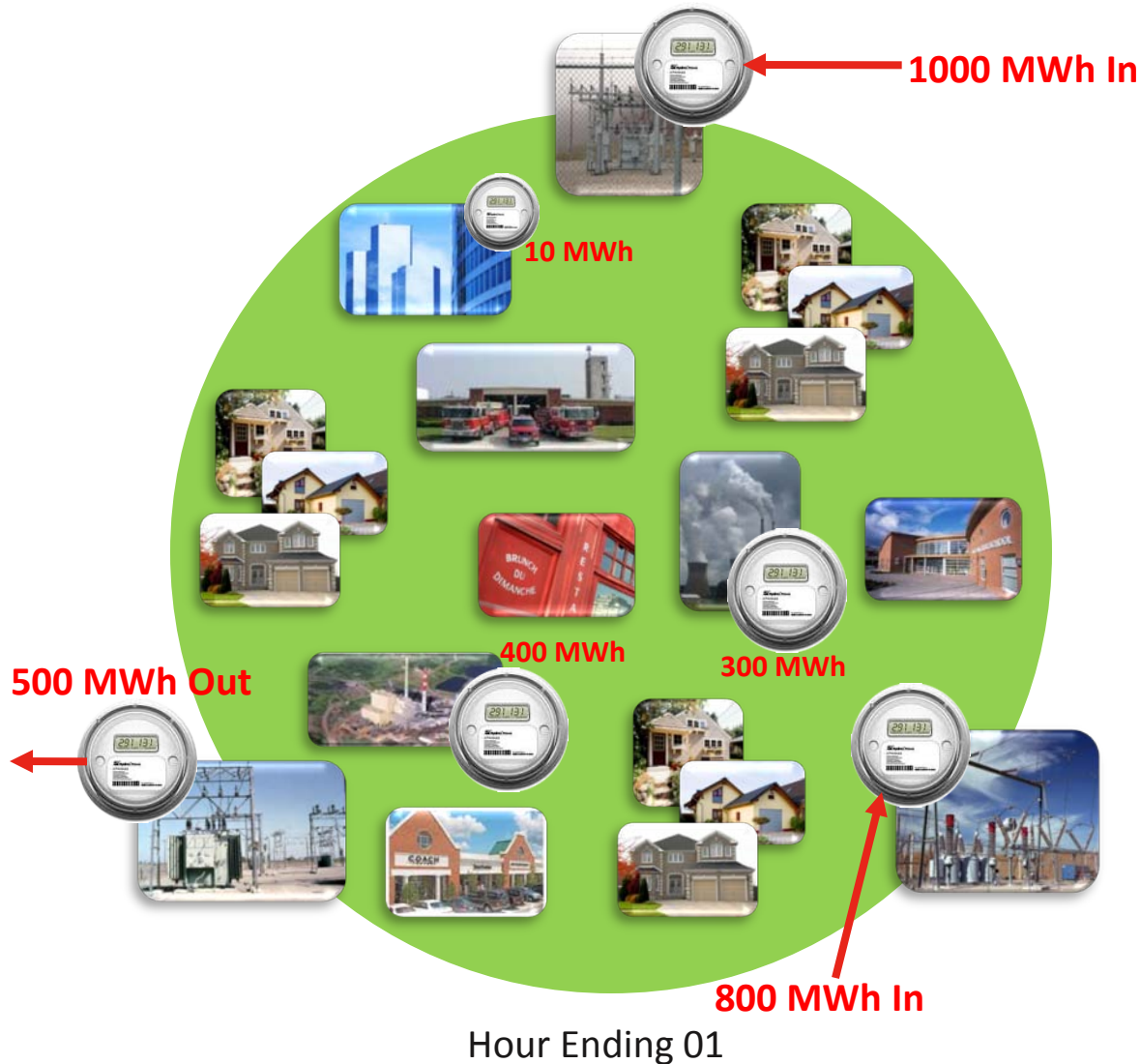
generating station meters

customer meters

Conceptual Representation Only – Information is not intended to be “to scale”

Determination of Meter Values for Load

Example: Transmission Company ABC – Service Territory XYZ “Metering Domain”

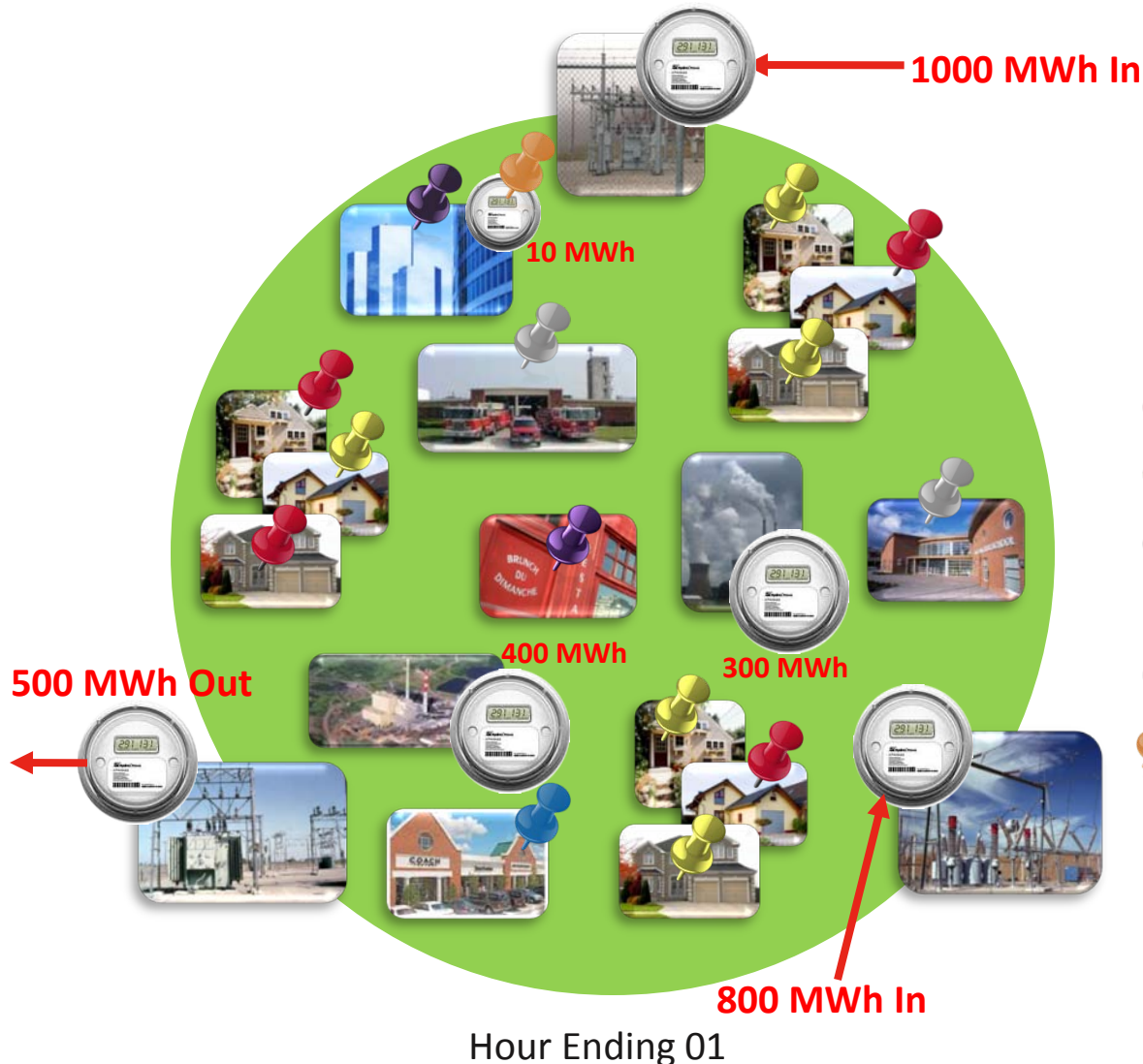


What does Transmission Company ABC know about Hour Ending 01?







Load Flow In:	1000 MWh
Load Flow In:	800 MWh
Load Flow Out:	-500 MWh
Generation:	300 MWh
Generation:	<u>400 MWh</u>
Total:	2000 MWh
Loss Data from ISO:	<u>-20 MWh</u>
Total Usage:	1980 MWh
<u>Directly Metered</u>	
Customer Meter:	10 MWh
<u>Not Directly Metered</u>	
1980 MWh - 10MWh:	1970 MWh

Determination of Meter Values for Load

Example: Transmission Company ABC – Service Territory XYZ “Metering Domain”



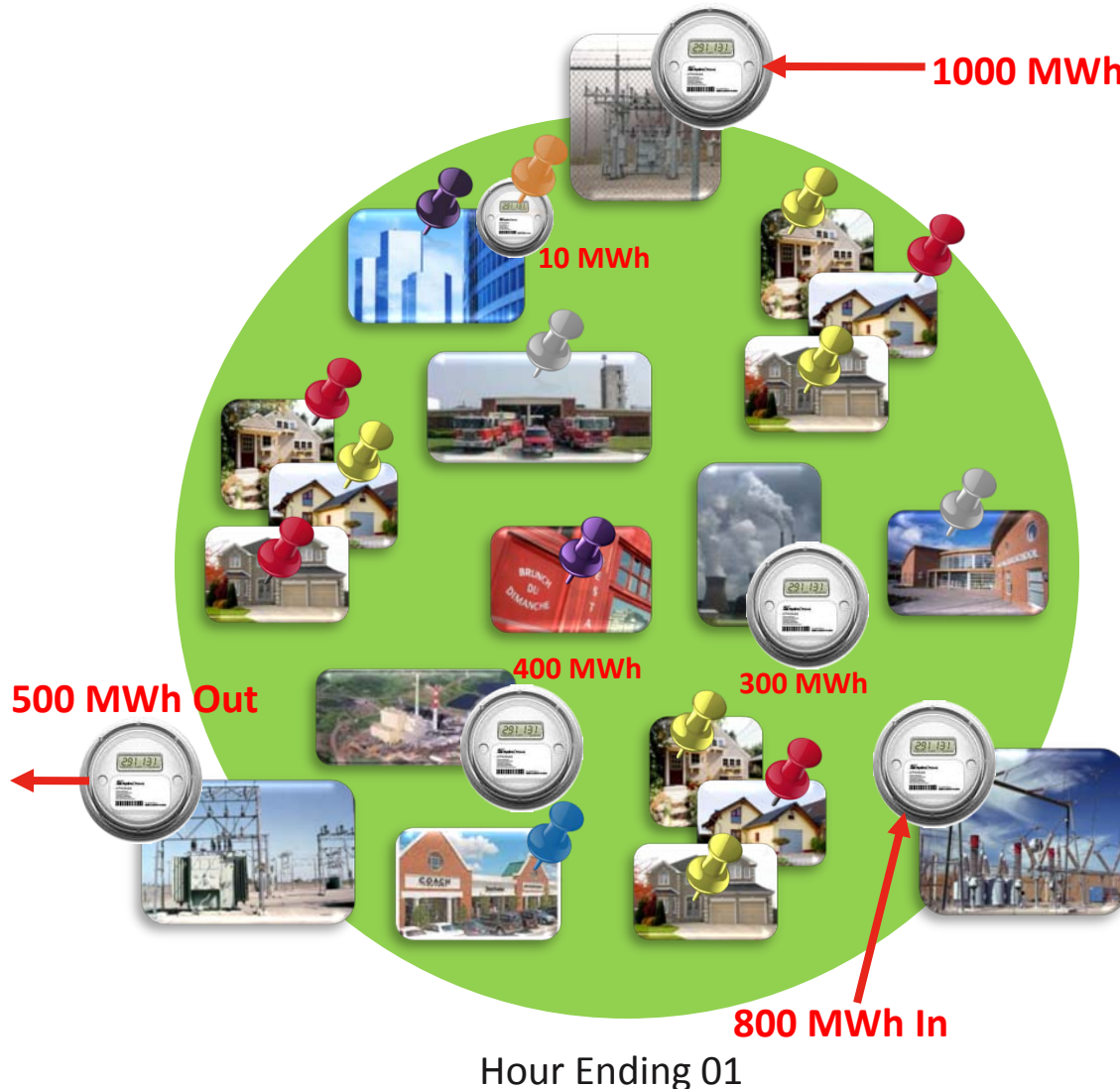
What does Transmission Company ABC know about load assets in area XYZ?

	<u>Value</u>
 Load Asset Residential 1: Share of 1970 MWh	
 Load Asset Residential 2: Share of 1970 MWh	
 Load Asset Commercial 1: Share of 1970 MWh	
 Load Asset Commercial 2: Share of 1970 MWh	
 Load Asset Municipal: Share of 1970 MWh	
 Load Asset Metered Cust: 10 MWh	

Conceptual Representation Only – Information is not intended to be “to scale”

Determination of Meter Values for Load

Example: Transmission Company ABC – Service Territory XYZ “Metering Domain”



Determination of Hourly Asset Meter Values:

-  Load Asset Residential 1: Share of 1970 MWh
-  Load Asset Residential 2: Share of 1970 MWh
-  Load Asset Commercial 1: Share of 1970 MWh
-  Load Asset Commercial 2: Share of 1970 MWh
-  Load Asset Municipal: Share of 1970 MWh
-  Load Asset Metered Cust: 10 MWh

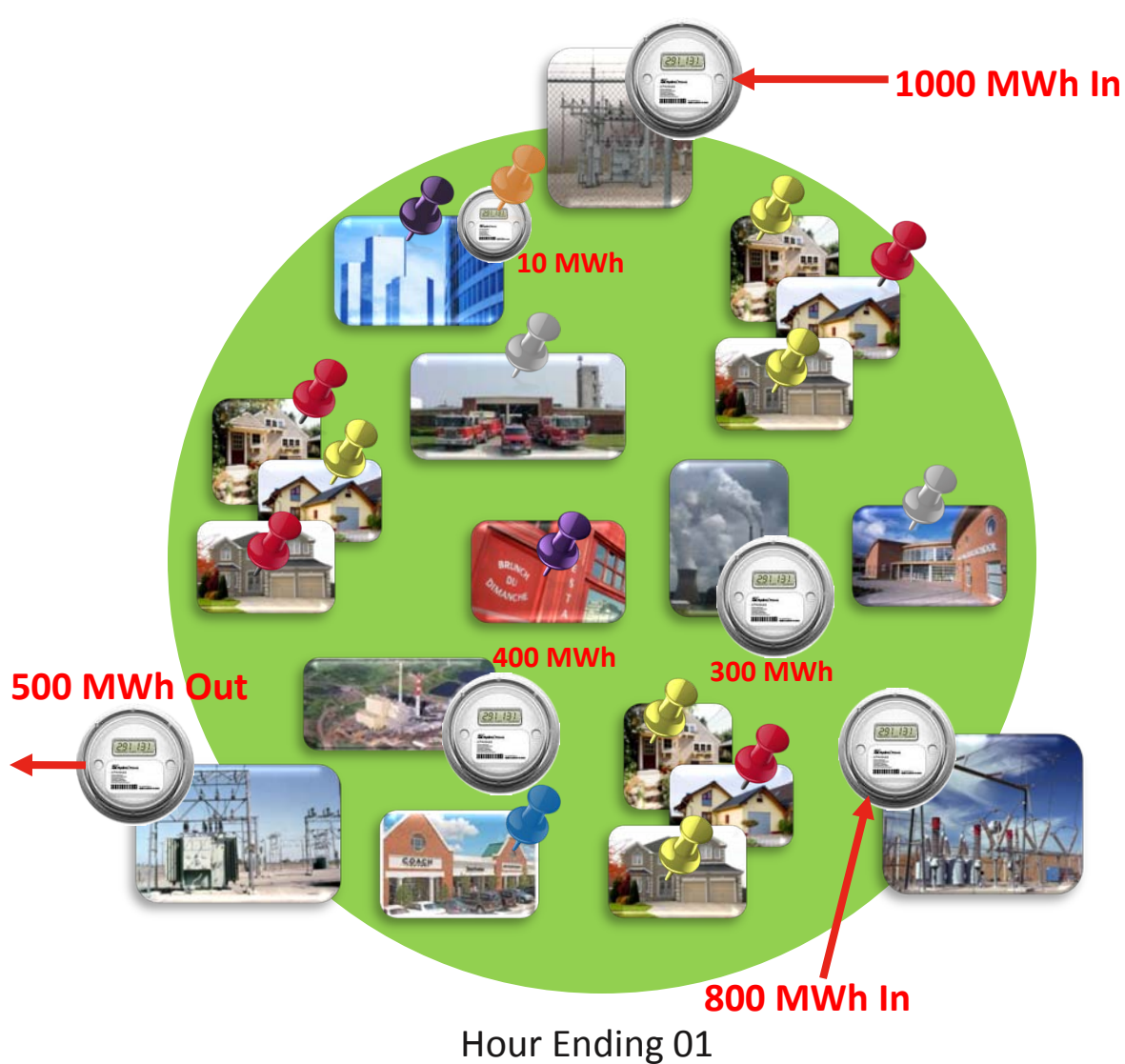


Load Modeling/Profiling

★ Metered customer information used as input to model.

Determination of Meter Values for Load

Example: Transmission Company ABC – Service Territory XYZ “Metering Domain”



Load Modeling/Profiling



Initial Meter Data Submittal
(37 business hours after operating day)

Modeled Assets	
Load Asset Residential 1	600
Load Asset Residential 2	900
Load Asset Commercial 1	300
Load Asset Commercial 2	100
Load Asset Municipal	70
Directly Metered Assets	
Load Asset Metered Cust	10

1970

Conceptual Representation Only –
Information is not intended to be “to scale”

Determination of Meter Values for Load

Example: Transmission Company ABC – Service Territory XYZ “Metering Domain”

-  Load Asset Residential 1: Share of 1970 MWh
-  Load Asset Residential 2: Share of 1970 MWh
-  Load Asset Commercial 1: Share of 1970 MWh
-  Load Asset Commercial 2: Share of 1970 MWh
-  Load Asset Municipal: Share of 1970 MWh
-  Load Asset Metered Cust: 10 MWh



Load Modeling/Profiling

Data Reconciliation Process

Meter Data Submittal

Deadlines in accordance with ISO New England Manual 28

Modeled Assets	
Load Asset Residential 1	750
Load Asset Residential 2	750
Load Asset Commercial 1	320
Load Asset Commercial 2	90
Load Asset Municipal	60
Directly Metered Assets	
Load Asset Metered Cust	10

1970



Retail customers are billed for electricity usage on a monthly cycle, based on actual monthly meter reads.

Conceptual Representation Only – Information is not intended to be “to scale”

Meter Data Information Reporting

- Assigned Meter Readers (AMRs) submit data to ISO-NE by 1:00 p.m. of second business day after operating day
 - Host Participant AMRs are responsible for the majority of the meter reading submittals to ISO-NE
 - Host Participants (HP) are the New England Transmission Owners; meters read by HPs include boundary meters that enable each HP to determine the entire load in their service territory
 - Each HP's service territory is modeled as one or more Metering Domains in the ISO-NE Power System.
 - Each metering domain is assigned a share of the hourly losses on the pool transmission system by the ISO's Energy Management System
 - The HPs determine the total energy balance in their Metering Domain(s) each hour, incorporating all meter reads and losses

Meter Data Information Reporting (cont.)

- Generator Asset Meter Readings
 - Generators are directly metered; the meters at the generator station can be read each night to determine the generator output each hour in the previous day
 - If the AMR for a generator asset is not the HP, the AMR must submit the generator meter readings to the HP for the Meter Domain energy balance calculation

Meter Data Information Reporting (cont.)

- Load Asset Meter Readings can be more complex to determine
 - Under retail choice, customers that are located next to one another may have selected different suppliers
 - Individual customer meters are not interrogated every night
 - Many customer meters are read monthly
 - Host Participants are the AMRs for Load Assets in New England
 - Host Participants own and interrogate the meters that define the meter domain demand values

Meter Data Information Reporting (cont.)

- Load Assets
 - Load Assets are composed of many individual customer loads; all of the loads in a load asset are served by the same supplier
 - Load Assets are registered with ISO-NE such that each supplier will have the correct load in its portfolio; any customer that a supplier has contracted to serve is reflected in one of its load assets
 - Note that the composition of the individual customers within a load asset may change over time as a Supplier acquires or loses customers; the Supplier and Host Participant communicate on all changes so that the Host Participant can properly develop the meter readings for each load asset each day
 - Load Assets may be retired and replaced as necessary

Meter Data Information Reporting (cont.)

- Load Asset Types
 - Directly Metered Load Asset
 - Example: All of the load in an entire town in Massachusetts is served by its Municipal Light Department. The boundary meters at the substations in the town can be read to determine the load.
 - Profiled Load Asset
 - Example: Supplier ABC is serving certain commercial loads in Connecticut. Grocery Store Chain “Great Food, Inc” is one of ABC’s commercial customer loads
 - The individual store loads are not read daily. The Host Participant uses statistical techniques to develop the appropriate hourly load value for the “Great Food” stores, and includes it in the hourly reads for an asset registered to Supplier ABC.

Meter Data Reporting

Hourly Values for Each Operating Day

- Initial Submittal
 - All Meter Data is due at ISO-NE by 1:00 p.m. on second business day after the operating day

Meter Data Reporting

Hourly Values for Each Operating Day (cont.)

- Data Reconciliation
 - After the operating month is complete, the Host Participants and Assigned Meter Readers have a data reconciliation period to review and resubmit the daily meter readings for that month
 - The data reconciliation process has a number of intermediate deadlines, spanning more than 3 months after the close of the operating month
 - Final actual meter readings for individual customers can now be incorporated into the calculation of the hourly meter reads for each day.
 - Resettlement of all markets is performed using the new meter values; all customers receive complete new sets of MIS settlement reports and will be billed the difference from the original settlement. Data reconciliation is included in the bill issued 5 months after the operating month.
 - This process was formerly known as the “90-Day Resettlement”
 - New term is “Data Reconciliation Process”

Appendix

Additional Information for Energy Settlement presentation

Energy Balancing Market Exercise

Answer Key

Participant XYZ – Hour 12 – MM/DD/YY

Asset or Activity	Location	DA Cleared (MWh)	DA LMP (\$/MWh)	DA (Charge)/Credit	RT Metered (MWh)	Deviation from DA (MWh)*	RT LMP \$/(MWh)	RT (Charge)/Credit	Net Settlement
Unit XXX	Node 123	100	100	\$10,000	50	-50	110	-\$5,500	\$4,500
Unit ZZ	Node 456	0	105	\$0	100	100	120	\$12,000	\$12,000
Load	WCMA Zone	-200	100	-\$20,000	-190	10	110	\$1,100	-\$18,900
Load	CT Zone	-100	110	-\$11,000	-120	-20	125	-\$2,500	-\$13,500
Inc Offer	Node 789	100	100	\$10,000	0	-100	110	-\$11,000	-\$1,000
Dec Bid	Node 987	-100	110	-\$11,000	0	100	130	\$13,000	\$2,000

*RT MWh – DA MWh

Deadlines for Transactions

- Day-Ahead Markets
 - By no later than noon on the day before the Operating Day, Participants must submit DA External Contracts to the Enhanced Energy Scheduler (EES)
 - By no later than 5PM on the first business day after the Operating day, Participants must have all Day-Ahead Internal Bilateral Contracts (IBT) submitted to the Settlements Market System (SMS)

Deadlines for Transactions (cont.)

- Real-Time Markets
 - By no later than noon on the day before the Operating Day, Participants must submit RT External Contracts to the EES Interface.
 - During the operating day, Participants can modify MW associated with Dispatchable contracts one hour before the contract start time.
 - During the operating day, Participants can submit new fixed contracts one hour before the contract start time.
 - By no later than 5 PM on the 2nd business day after the Operating day, Participants must have all Real-Time Internal Bilateral Contracts (IBT) submitted to SMS

Inadvertent Energy

- Inadvertent Energy was introduced briefly in the discussion of the Marginal Loss Revenue Fund
- Inadvertent Energy is the difference between the scheduled amounts of External Transactions and their actual delivery
 - The DAM and RTM settlements are calculated using the expected scheduled amounts of contracts between New England and neighboring control areas
 - Example: In Hour 1, 10 different Participants have scheduled RTM external contracts at various external pricing points (e.g., New York, Hydro Quebec, New Brunswick).
 - The net flow scheduled for these contracts is 150 MW.
 - When the boundary metering between NE and the adjacent control areas are read, the actual flow into New England was 149 MW.

Inadvertent Energy (cont.)

- Inadvertent Energy in the preceding example is -1 MW; this is the difference between scheduled and actual delivery
 - The RTM balancing market calculations were performed assuming that the net 150 MW had flowed in to New England
 - The amount of money associated with the 1 MW is calculated and allocated to the Participants pro-rata on the sum of their RT Generation and Load
 - All load and generation share equivalently in the credit or charge for these inadvertent imbalances.

