Midwest Market Initiative

Market Overview

October 29, 2003

Market Overview Agenda

TIME	LESSON
1300 – 1345	Lesson One: Bids and Offers
1345 – 1430	Lesson Two: Physical and Financial Schedules
1430 – 1445	Break
1445 – 1500	Lesson Three: Financial Transmission Rights
1500 – 1530	Lesson Four: Settlements
1530 – 1600	Lesson Five: Market Transition

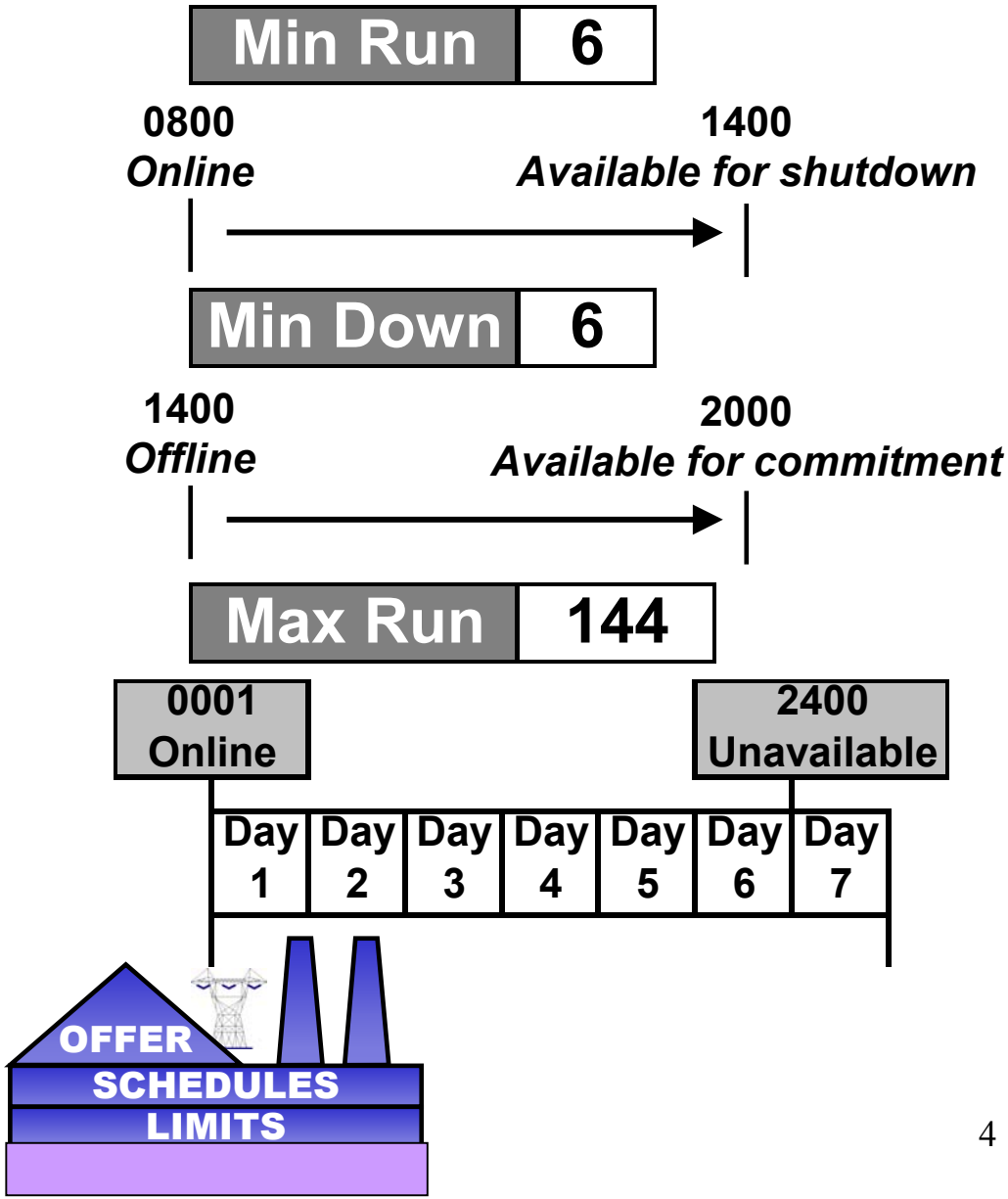
Key Assumptions

- This material is based on the current system and process designs which are subject to change based on stakeholder input
- This is not a stakeholder meeting. The purpose of this training is **NOT** to make or to debate market design decisions, policies, or rules (ask "how" not "why")
- Participants will actively participate in the training by asking constructive questions in an effort to improve the overall learning experience
- Participants are familiar with the general concepts and principles that were covered Market Concepts II

Market Overview
Course Outline

- Lesson 1: Bids and Offers
- Lesson 2: Physical and Financial Schedules
- Lesson 3: Financial Transmission Rights
- Lesson 4: Settlements
- Lesson 5: Market Transition

Run Times
Background

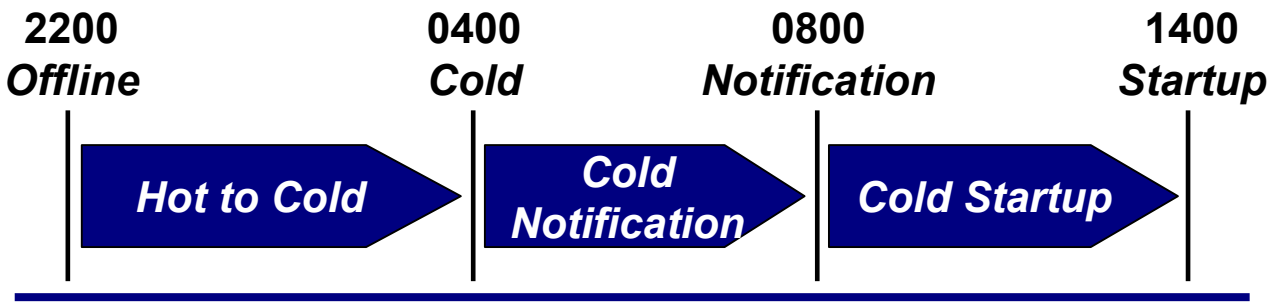


- Day-ahead market resource commitment schedules are for consecutive hours that are equal to or greater than the Minimum Run Time
- Resources clearing in the day-ahead market will have commitment schedules that do not violate the Minimum Down Time

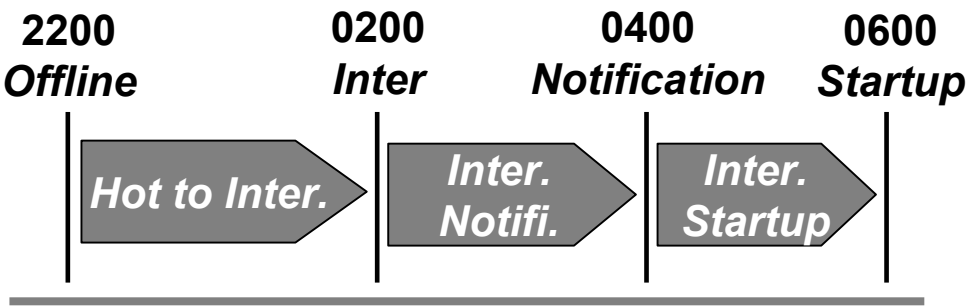
Start Times
Background

Condition + Notification Time + Startup Time = Temporal Commitment Constraint

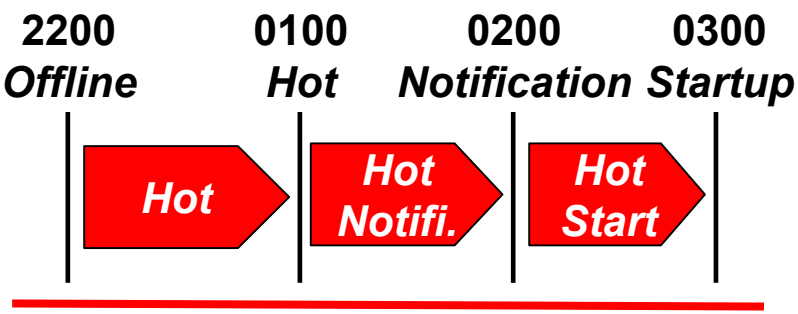
Cold	
Hot to Cold Time	6
Cold Notification Time	4
Cold Startup Time	6



Intermediate	
Hot to Inter. Time	4
Inter. Notification Time	2
Inter. Startup Time	2



Hot	
Hot Notification Time	1
Hot Startup Time	1



Maximum Starts

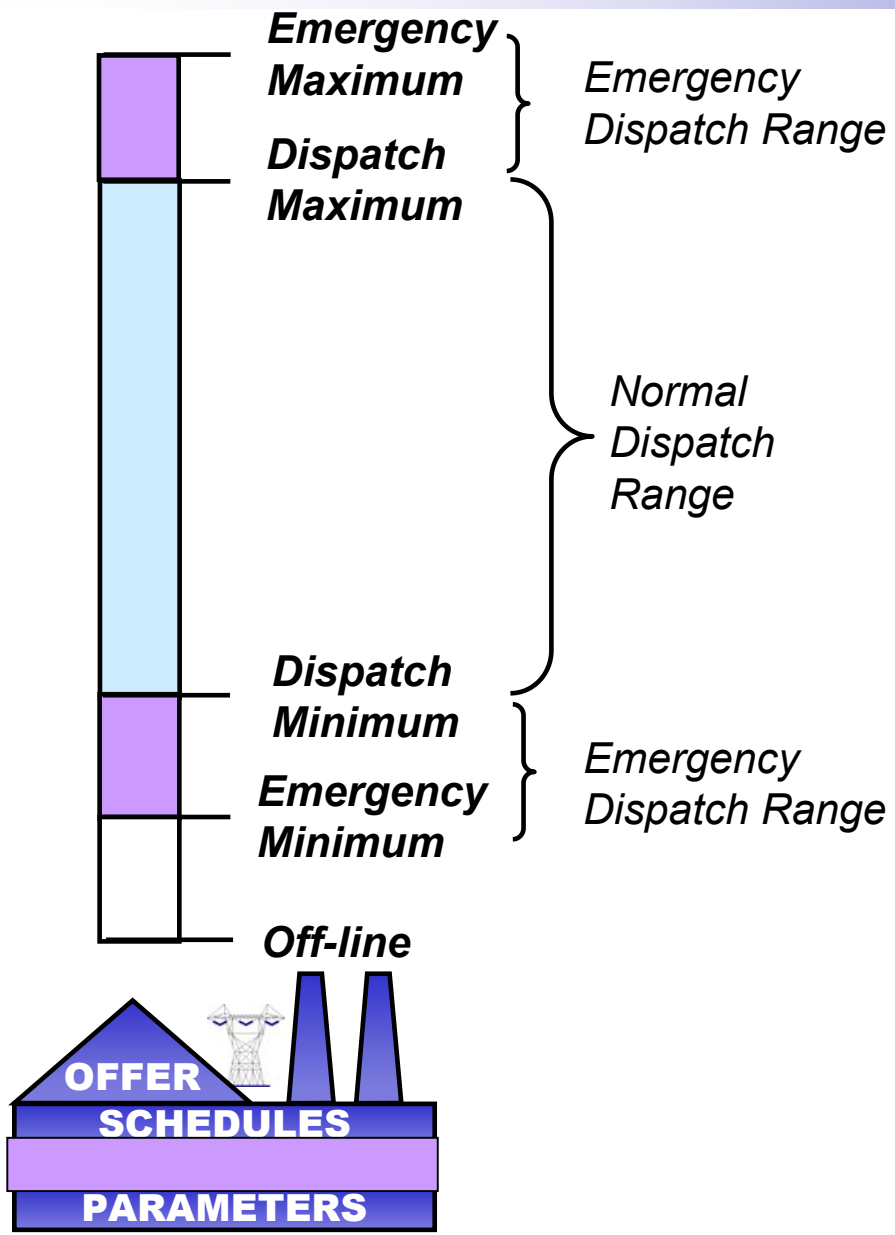
Max Daily	2
Max Weekly	6

	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
0500		Start	Start				
0600	Start			Start			
1000		Stop		Stop			
1600				Start			
1700		Start					
2200			Stop				
2300	Stop	Stop		Stop			
Total Daily	1	2	1	2			
Total Weekly	1	3	4	6			

- Maximum Weekly Starts is the maximum number of times a unit can be started in one week (default is infinity)
- Maximum Daily Starts is the maximum number of times that a unit can be started in a day (default is one)
- Maximum Daily Starts <= Maximum Weekly Starts

Unit Limits

Background

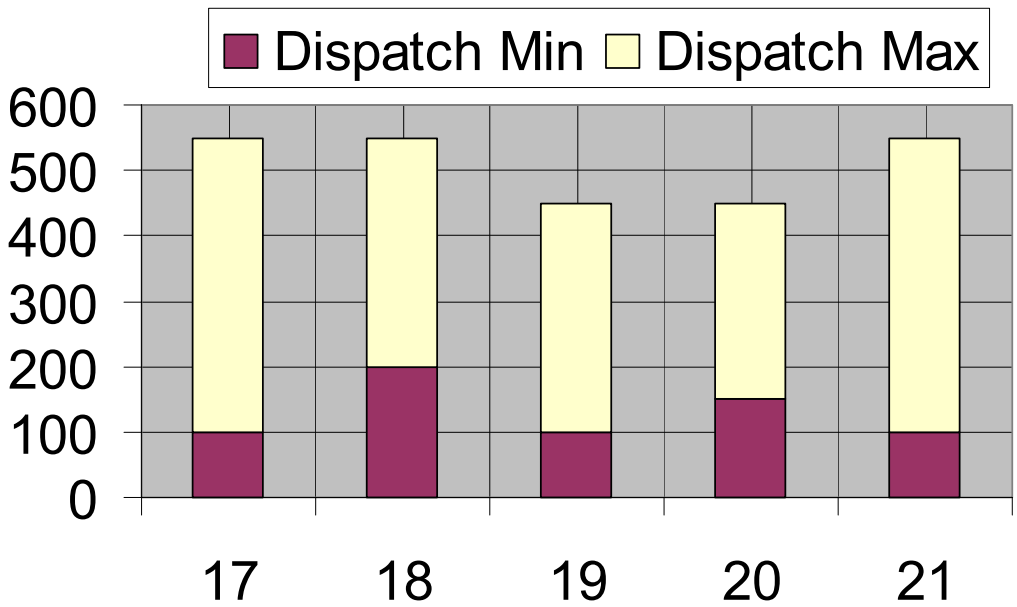


- Emergency Maximum (EMAX) must be >= to the Dispatch Maximum (DMAX) must be > = Dispatch Minimum (DMIN) must be >= Emergency Minimum (EMIN)
- The real-time market unit basepoint will generally be between DMIN and DMAX (exceptions might include start-up, shutdown, ramp to new self-schedule, etc.)
- For non-dispatchable units DMIN must = DMAX

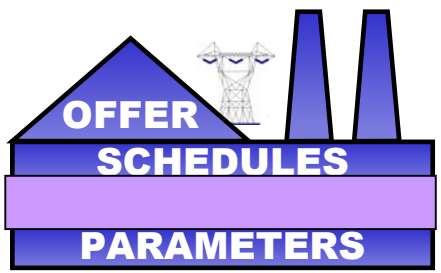
MISO

Unit Limits

Scenario



- Actual capability of the unit to operate along its offer curve
- HE 19 and HE 20 Unit loses mill, submits updated hourly dispatch maximum of 450
- HE 21 restores mill, and restores dispatch maximum to 550
- Intra-hour updates made via phone call to MISO real-time market operator



Submission

- *Updated by Default Schedule or Hourly or phone call*

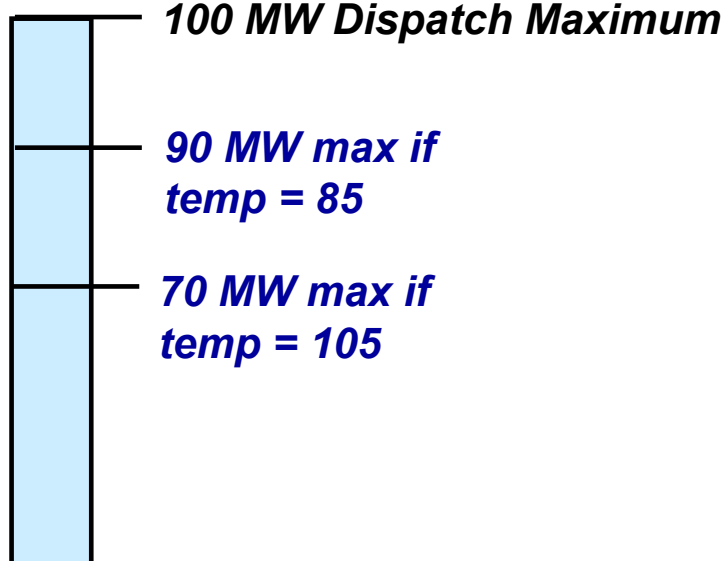
Midwest Market Initiative

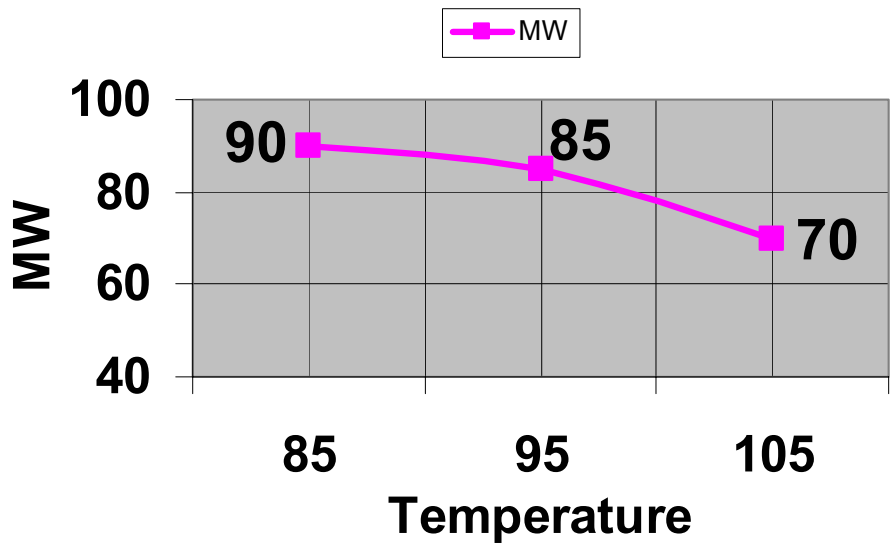
Temperature Sensitive Limits

- Weather curves for CTs or CCCTs submitted as default limits
- Forecast weather points consist of a day-time and a night-time temperature
- If the Market Participant does not submit a forecast then default or schedule dispatch maximum is used

Submission

- *Updated by updating Default (must be done prior to market submission deadline)*





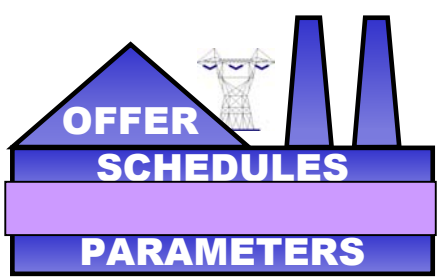
Ramp Rate
Background

Single Ramp Rate

Response Rate:	10.0

Ramp Rate Blocks

MW	RR
100	5
150	7
175	8
200	10
450	12
550	15

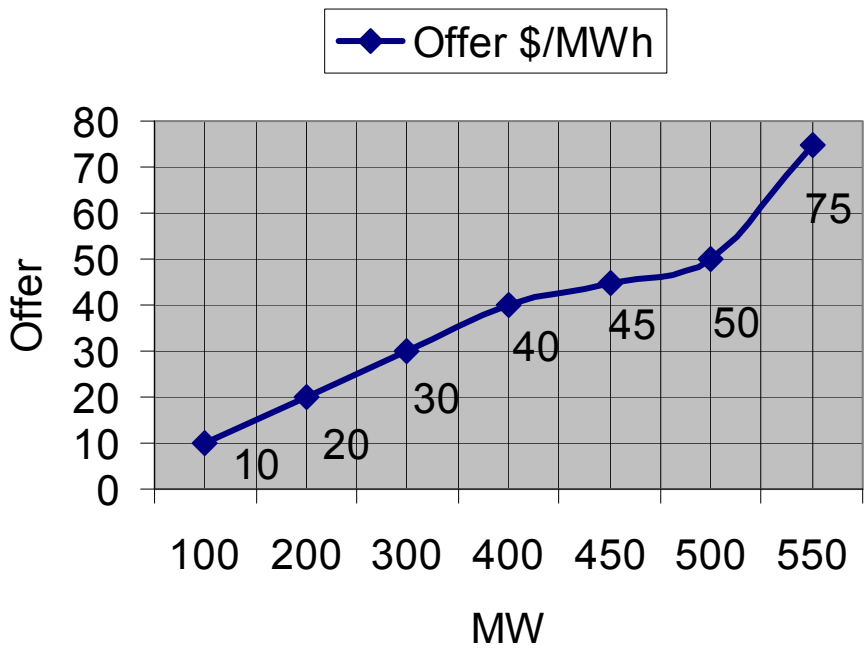


- Submitted as a *single value default ramp rate*
- May be submitted to 10th decimal point
- Ramp Rate Blocks may also be submitted which overwrite the Single Ramp Rate
- For Ramp Rate Blocks, a straight average is used in the day-ahead market (9.5 in this example) and an “up-to” function is used in the real-time market (Output is 125, ramp rate for dispatch cycle is 7)

Submission

- *Updated by updating Default (must be done prior to market submission deadline)*

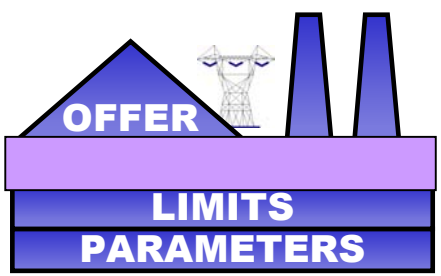
Economic



- Economic status places the unit in consideration for economic commitment and dispatch
- Default status for all units is economic
- Includes values for offer curve, startup and no load costs and set of valid parameters and limits

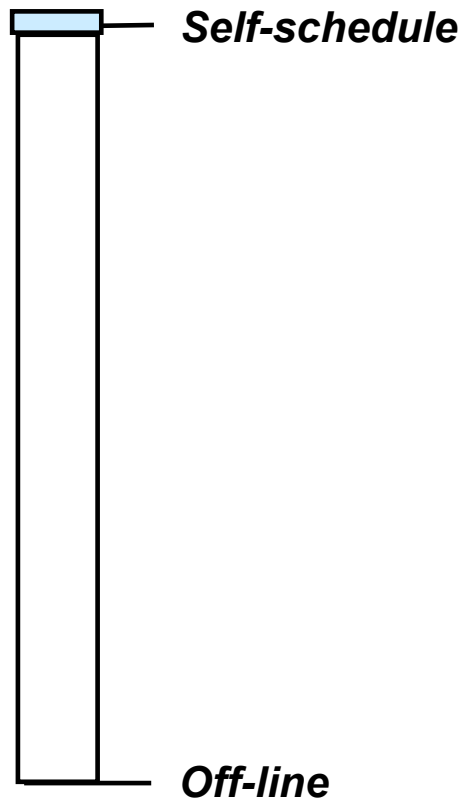
Submission

- *Updated by Default, Schedule, or Hourly*

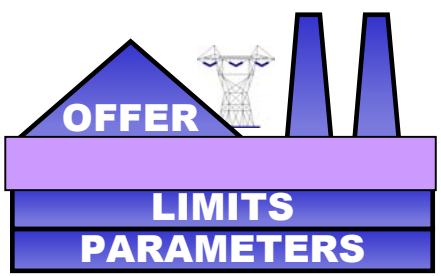


Non-dispatchable
Background

Dispatch Maximum = Dispatch Minimum
Or
Self-schedule



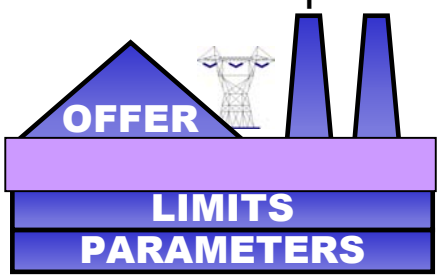
- Setting dispatch maximum = dispatch minimum is same as submitting self-schedule
- Price taker at dispatch basepoint which equals dispatch maximum and dispatch minimum
- May be submitted as Economic (MISO commit) or Must Run (self-commit)
- Limits and self-schedule may be updated in real-time 30 minutes prior to the top of hour

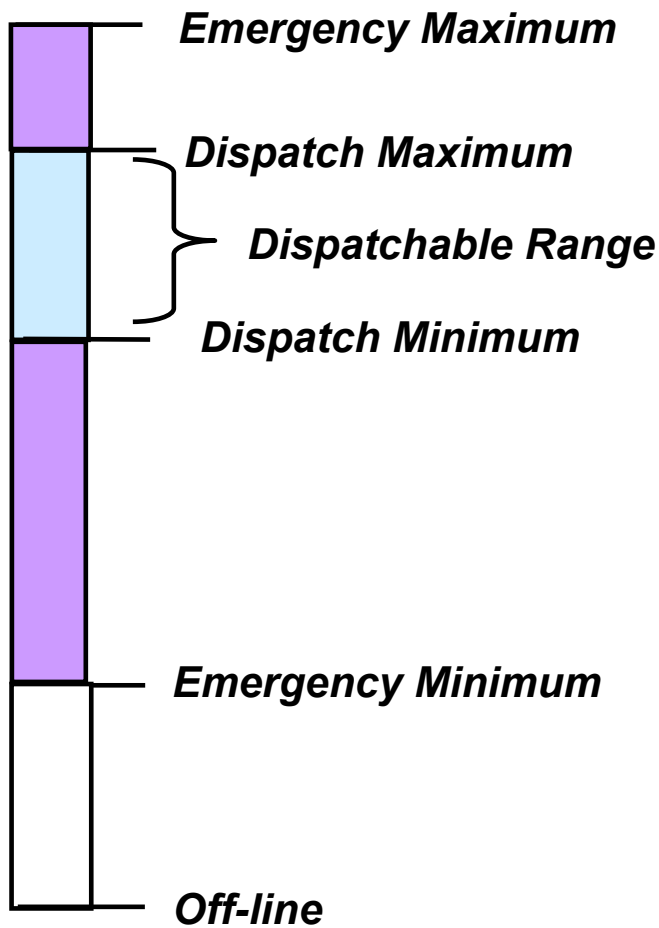


Dispatchable
Background

Dispatch Maximum > Dispatch Minimum

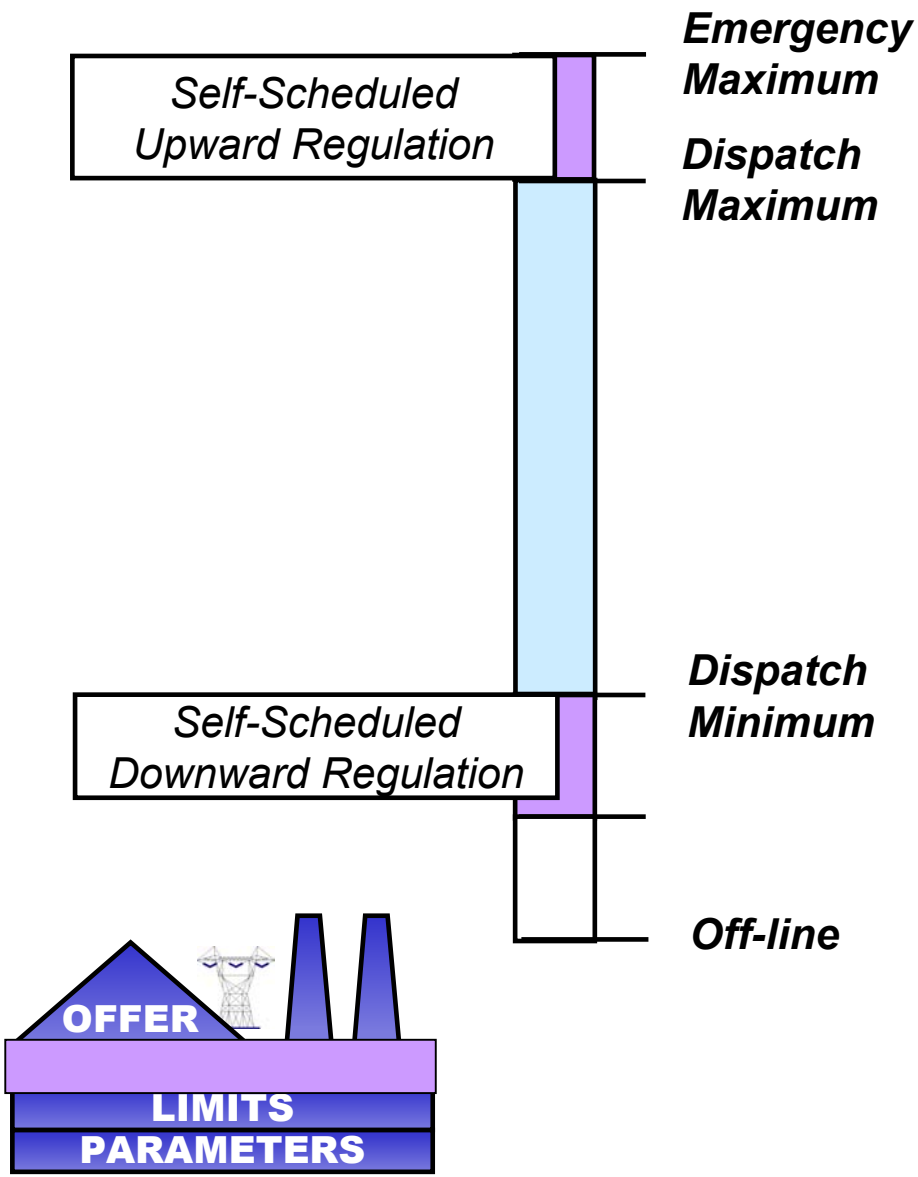
- Price taker at dispatch minimum values and potentially price setter within dispatchable range
- Must submit offer curve for MWs in dispatchable range
- May change dispatch minimum every hour of day
- May be submitted as Economic (MISO commit) or Must Run (self-commit)
- Limits may be updated in real-time 30 minutes prior to the top of hour





Regulation Schedule

Background



- Dispatch Maximum must be <= Emergency Maximum (EMAX) less the Self-scheduled Upward Regulation
- Dispatch Minimum must be >= Emergency Minimum (EMIN) plus the Self-scheduled Downward Regulation
- Self-scheduled Upward and Self-scheduled Downward cannot be greater than EMAX-EMIN

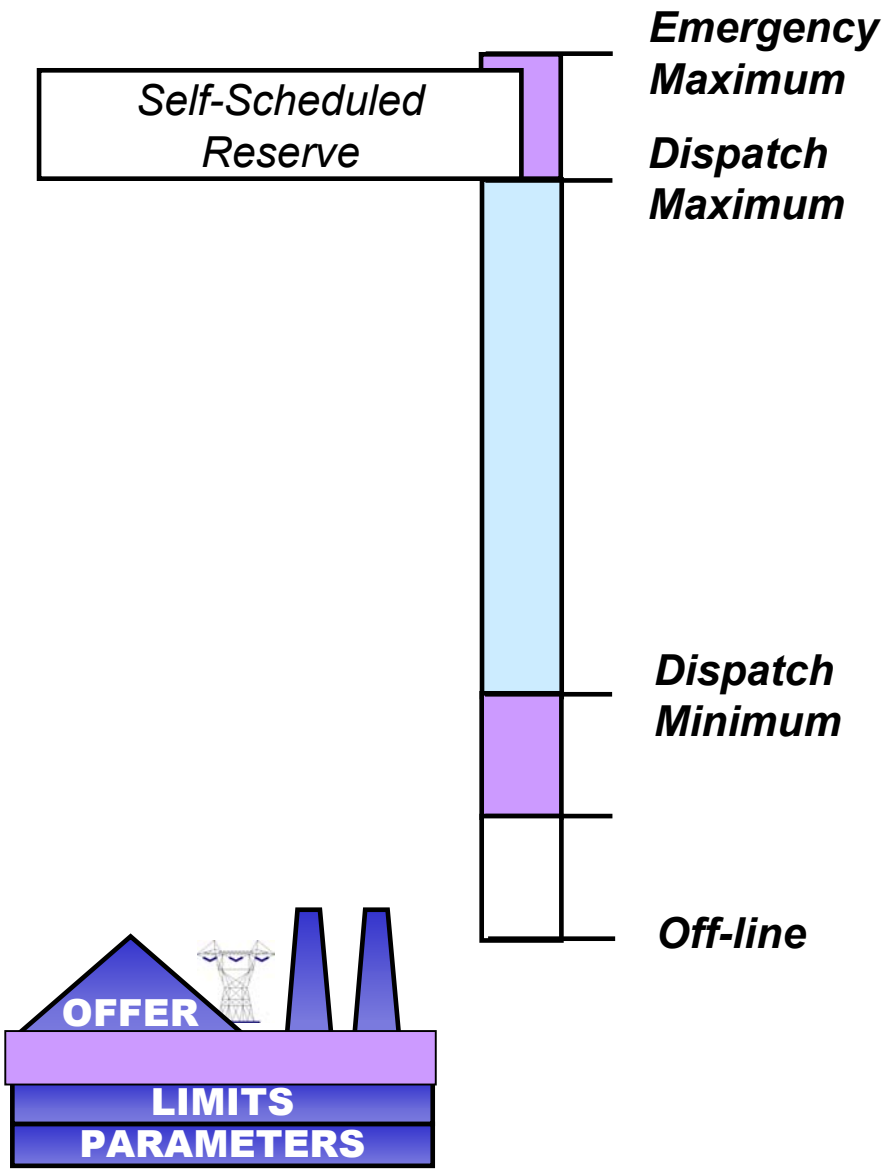
Submission

- *Submitted and updated by Hourly*

MISO

Reserve Schedule

Background

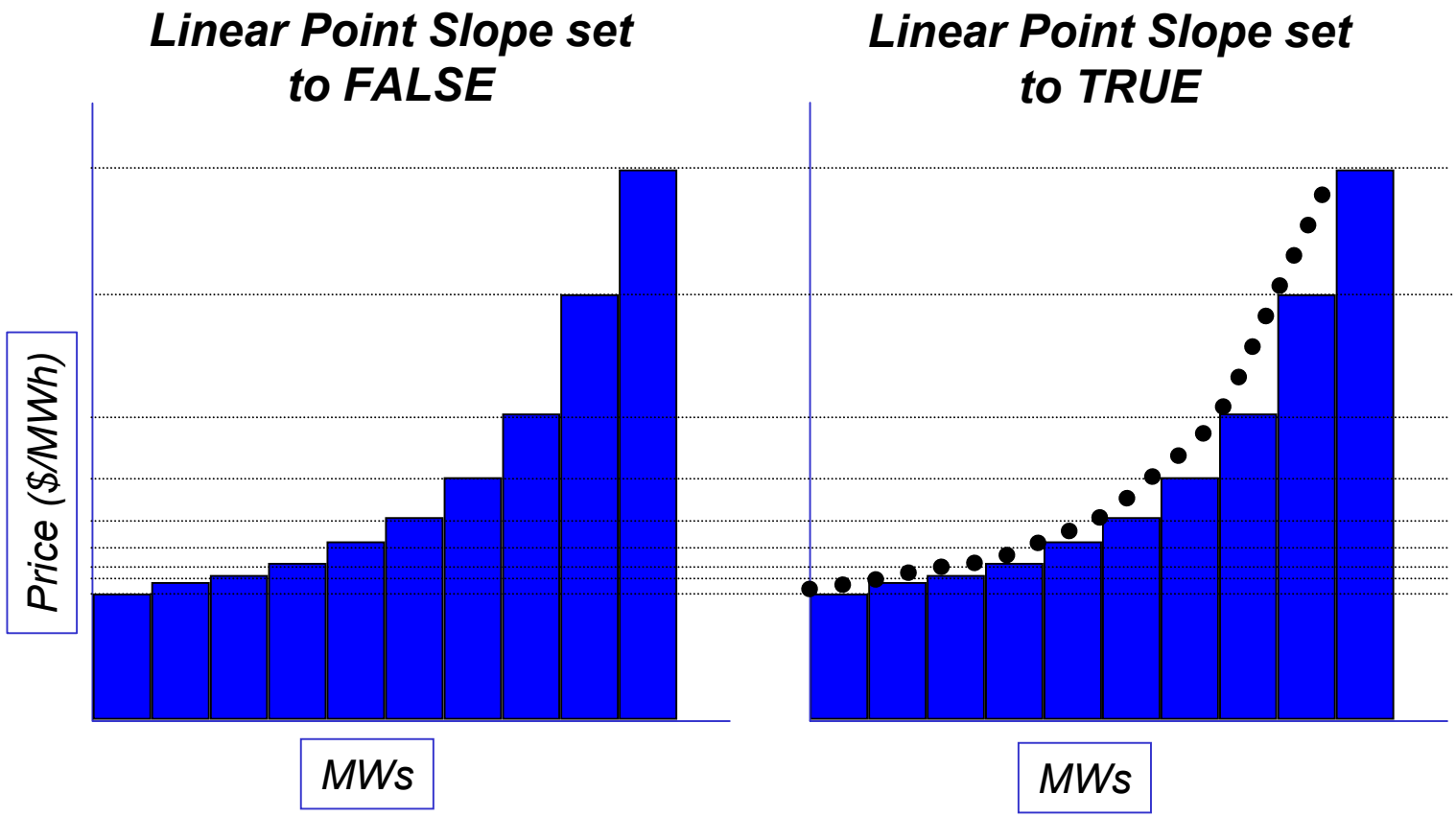


- Self-scheduled Spinning Reserve amount must be < = to the difference between EMAX and 0
- Reserve amount results in a ceiling for economic dispatch
- Initial submission due by 0900 for day-ahead market clearing
- Reserve amounts as well as units carrying reserve may be updated throughout real-time 30 minutes prior to the top of the hour

Submission

- *Submitted and updated by Hourly*

Schedule Offers



Monotonically non-decreasing slope of up to 10 MW points at 10 $ amounts

SCHEDULES
LIMITS
PARAMETERS

Startup

- Used strictly in MISO economic commitment decisions in the day-ahead market and reliability assessment
- Cost to startup the unit based on the unit status (cold, intermediate or hot) and the commitment start time

	Cost ($)
Cold Startup Cost	$10,000
Intermediate Startup Cost	$5,000
Hot Startup Cost	$1,000

Submission

- *Updated by Default or Schedule*

SCHEDULES
LIMITS
PARAMETERS

MISO

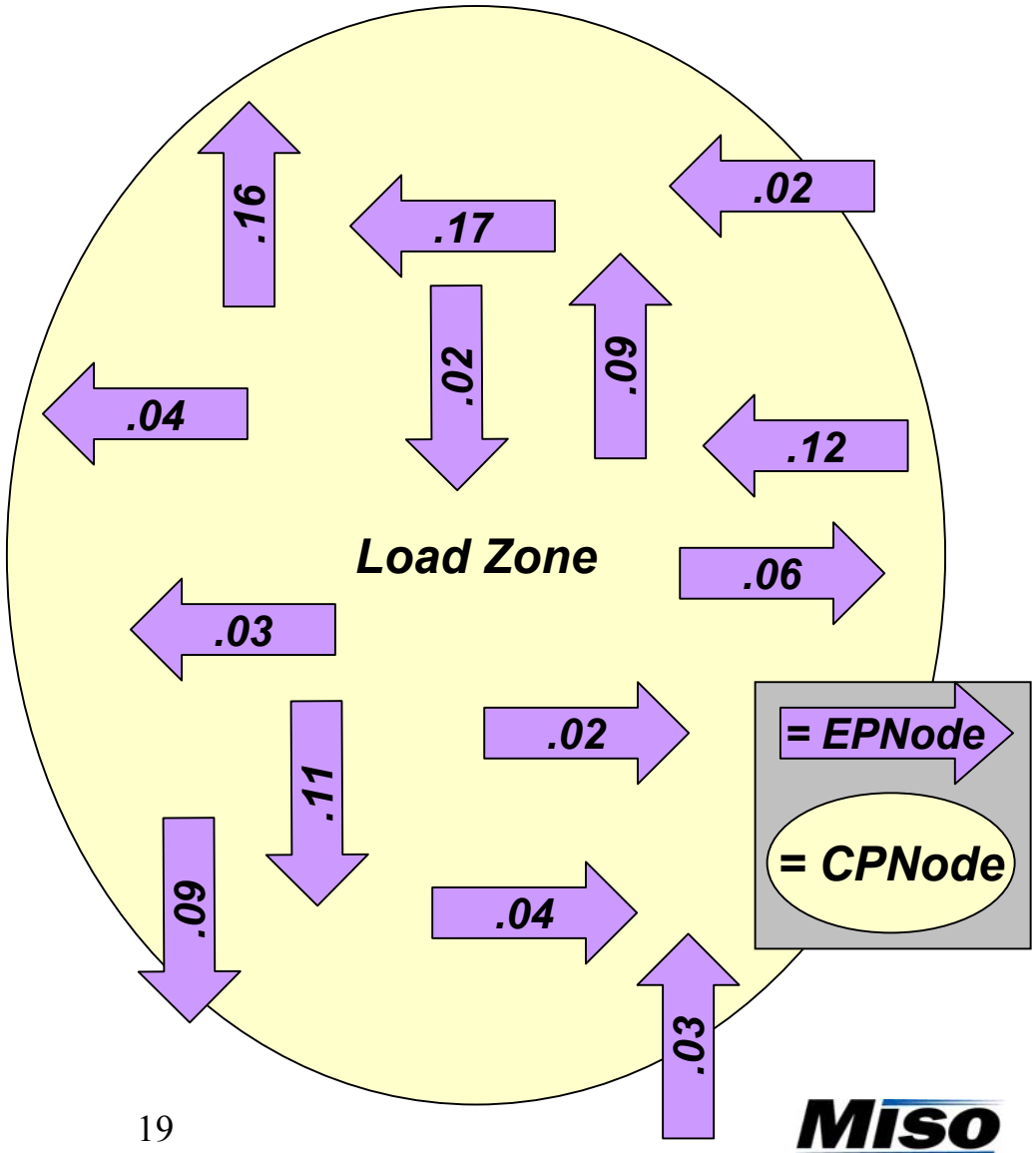
No Load

- No load is a market participant $ amount associated with operating a unit at zero output
- The cost to operate at dispatch minimum is calculated as the sum of the no load plus the area under the energy offer from 0 MW to dispatch minimum
- No load may submitted as individual $ amounts for each hour of the day
- Used in conjunction with the start-up offers to determine rank order for unit commitment

Hour Ending	Cost ($)
01	500
02	550
03	600
04	775
05	800
06	850
07	900
08	1000
09	1000
10	1000
11	1000
12	1000
13	1000
14	1000
15	1000
17	1500
18	1600
19	1500
20	1000
21	1000
22	1000
23	770
24	600

Aggregation
Background

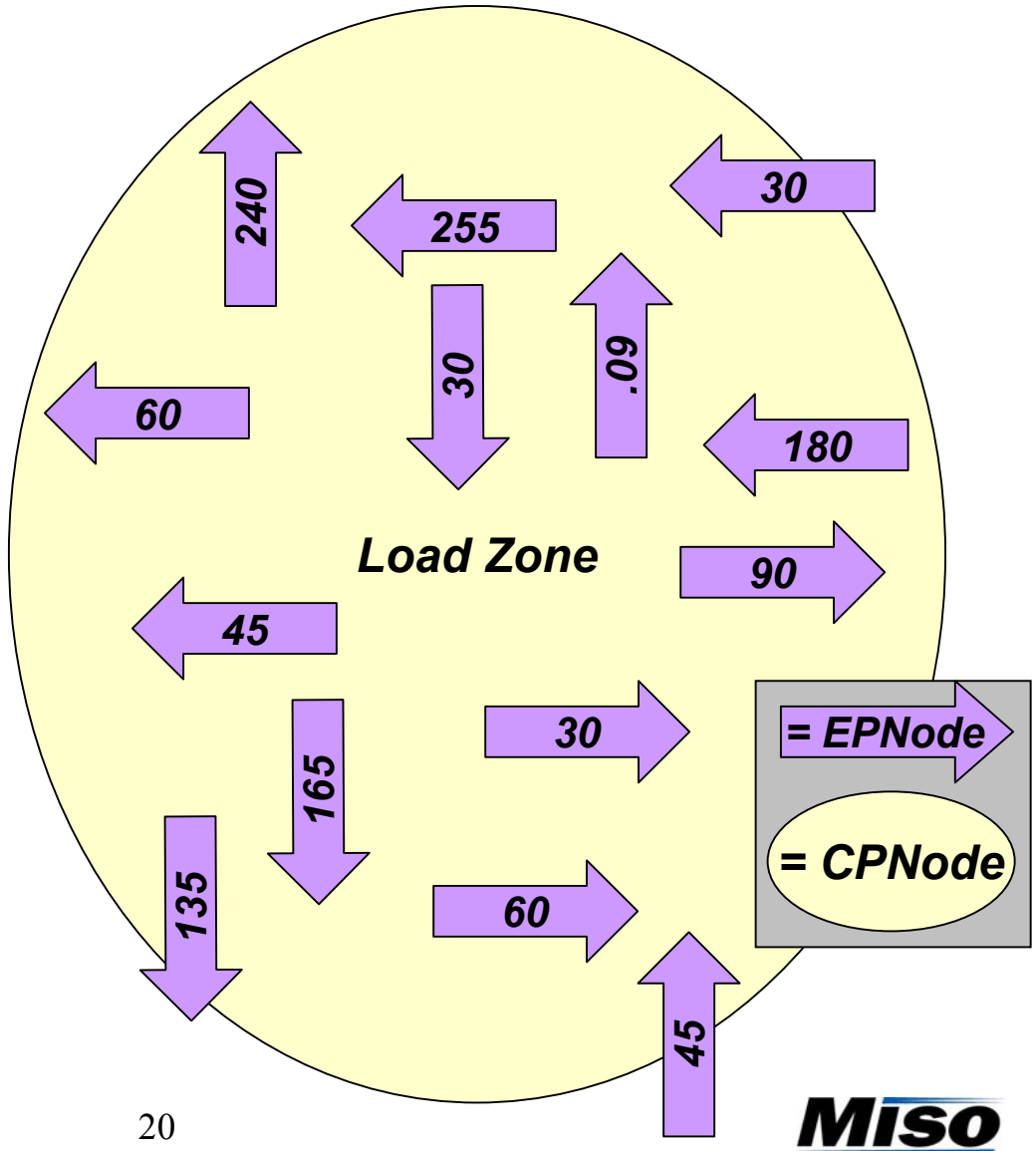
- Load distribution factors used for load busses in system to breakdown day-ahead market demand bids across the load zones
- Based on average of state estimator results over 24 hours of 7th day previous
- Can be viewed but not updated by Market Participants



MISO

Aggregation
Scenario

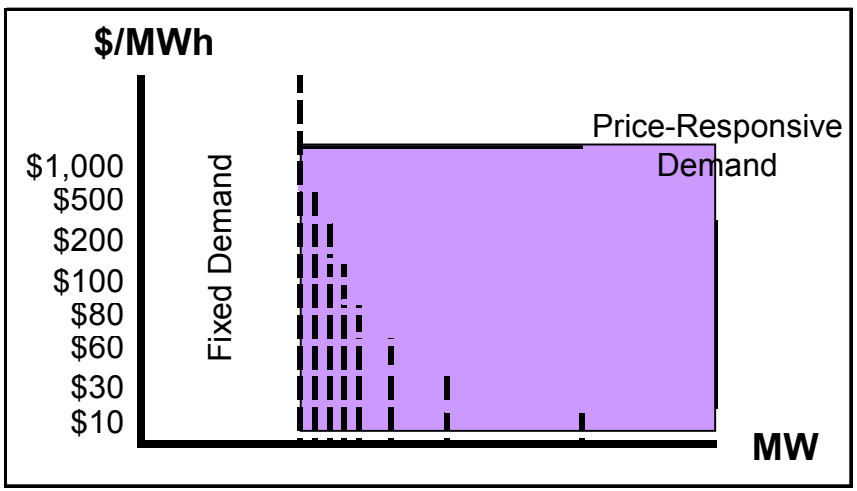
Distri-butionFactor	1000 MW Demand Bid	500 MW Demand Bid	Total Load Zone Demand
0.16	160	80	240
0.04	40	20	60
0.17	170	85	255
0.02	20	10	30
0.12	120	60	180
0.02	20	10	30
0.09	90	45	135
0.03	30	15	45
0.06	60	30	90
0.09	90	45	135
0.11	110	55	165
0.02	20	10	30
0.03	30	15	45
0.04	40	20	60
1	1000	500	1500



MISO

Fixed Demand

Background



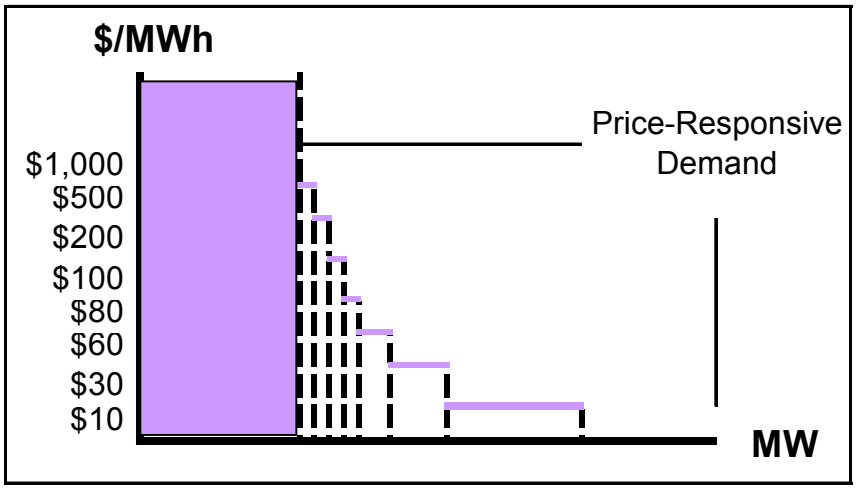
- Only Market Participants with registered load may submit Fixed Demand Bids
- Purchase of energy at day-ahead price
- Must specify:
  - MW quantity
  - Location (zone or node) for LSEs' registered load
  - Hour (s)
- Fixed demand effectively shifts the demand curve to the right

Submission

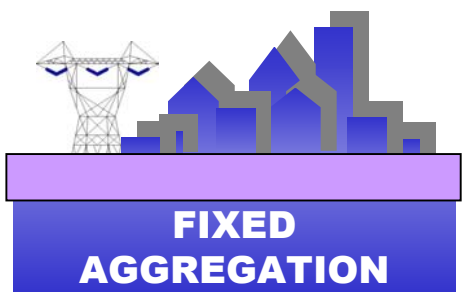
- *Daily submittal for each hour*

Price-Responsive Demand

Background



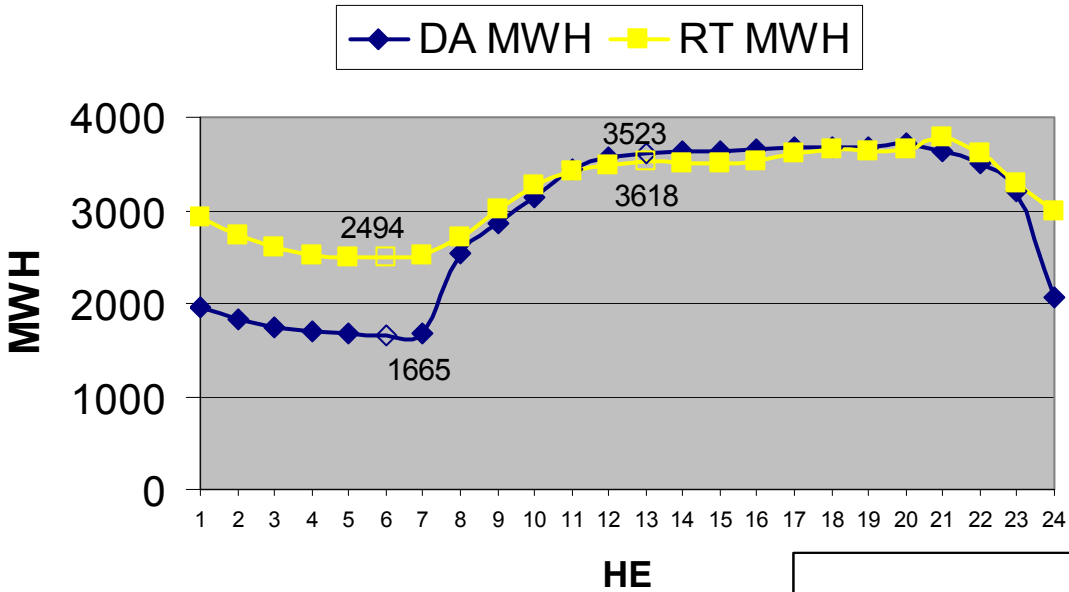
- Only Market Participants with registered load may submit Price-Responsive Demand Bids
- Purchase of energy at day-ahead price ***at price at or below maximum willing to pay***
- Must specify:
  - MW quantity/ ***Price pair (up to 9)***
  - Location (zone or node) for LSEs' registered load
  - Hour (s)
- Bids are accepted in separate block width MW – up to 9 at a location



Submission

- *Daily submittal for each*

Demand
Scenarios

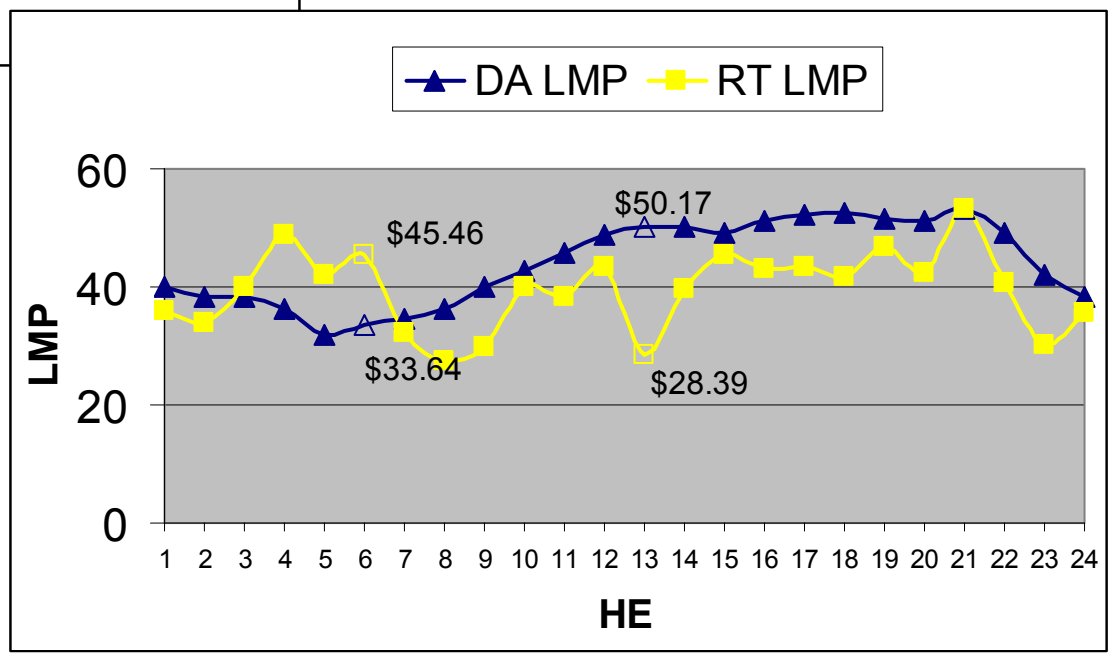


DA Demand vs. RT Load

- DA demand might clear at, above, or below expected/actual RT load
- Amount cleared DA vs. RT varies hour-by-hour, day-by-day

DA LMP vs. RT LMP

- DA prices might be at, above, or below RT prices
- Cleared DA demand and DA LMP are only two of many indicators as to what RT prices might be

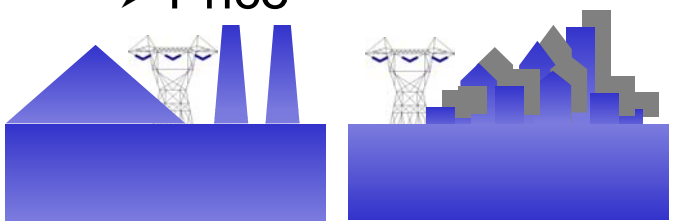


Virtual Transactions

Background

Virtual Demand Bids

- Virtual Demand Bids are bids to buy energy in the day-ahead market ***at or below price willing to buy***
- Virtual Demand Bids must specify:
  - MW quantity, with a minimum value of 10 MW
  - Location (hub, zone or node)
  - Hour (s) for which the bid applies
  - Price



Virtual Supply Offers

- Virtual Supply Offers are offers to supply energy in the Day-Ahead market ***at or above price willing to sell***
- Virtual Supply Offers must specify:
  - MW quantity, with a minimum value of 10 MW
  - Location (hub, zone or node)
  - Hour (s) for which the offer applies
  - Price

Virtual Transactions

Scenarios (1 of 3)

Day-ahead Market

Demand Bid
10 MW @ $25

Cleared 10 MW at $20 LMP

Buy

10 MW	x	$ 20.00 LMP	=	$ 200.00 CHG

Real-time Market

Actual Load
0 MW

LMP
$25/MW

Sell

(0 MW	-	10 MW)	x	$ 25.00 LMP	=	-$250.00 CREDIT

- **Expectation that DA LMP will be less than RT LMP**
- **Virtual Demand to buy low, sell high**

NET TO CUSTOMER	-$50.00 CREDIT

Virtual Transactions

Scenarios (2 of 3)

Day-ahead Market

Supply Offer
10 MW @ $10

Cleared 10 MW at $20 LMP

Sell

Real-time Market

Actual Generation
0 MW

LMP
$18/MW

Buy

-10 MW	x	$ 20.00 LMP	=	-$200.00 CREDIT

- **Expectation that DA LMP will be greater than RT LMP**
- **Virtual Supply to sell high, buy low**

(	0 MW	-	-10 MW	)	x	$ 18.00 LMP	=	$180.00 CHG

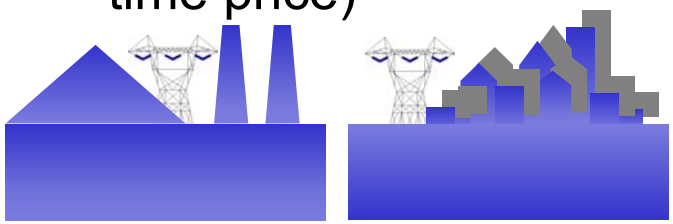
NET TO CUSTOMER	-$20.00 CREDIT

Virtual Transactions

Scenarios (3 of 3)

Objective: Protect Generation Offer

- Deviation from the day-ahead market is 200 MW of generation ("pushed" settlement of generation to real-time market)
- Price above $35 demand threshold would have settled the supply in the day-ahead market
- Price below $20 supply threshold still would of cleared virtual demand (could supply with own generation or sell back at real-time price)



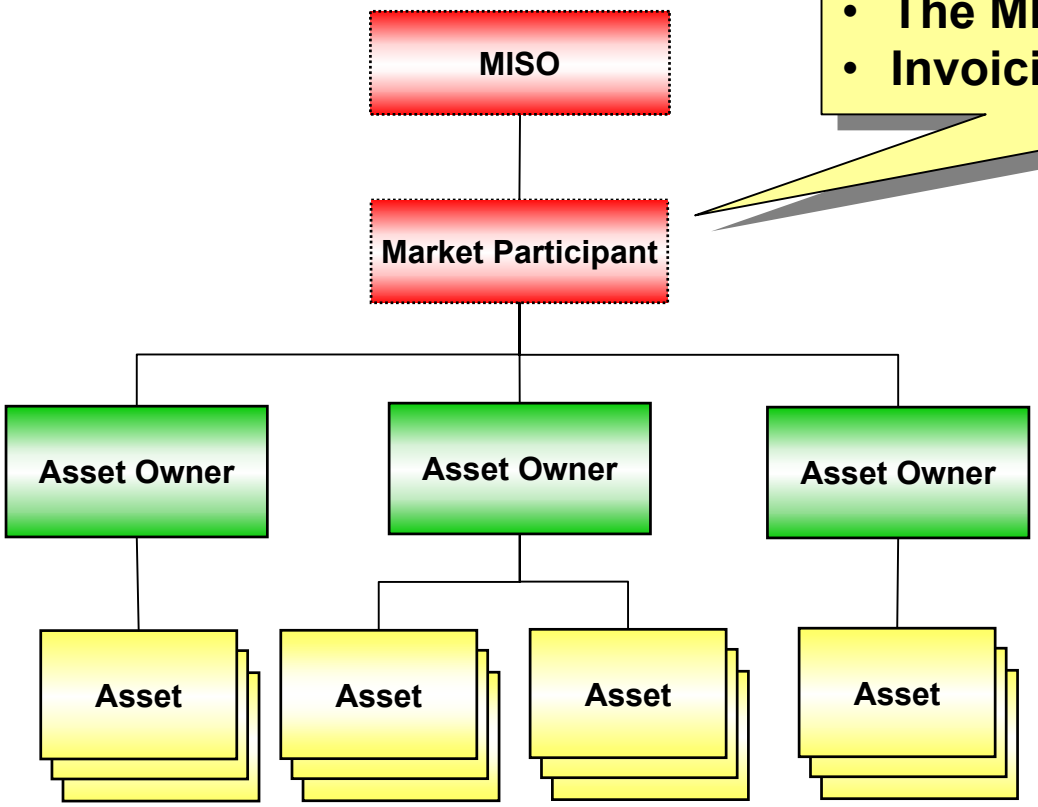
Day-ahead market submission			
	MW		Offer
Supply Offer	200	@	$20
Virtual Demand	200	@	$35

Day-ahead market results			
	MW		LMP
Cleared Supply	-200	X	$30
Cleared Demand	200	X	$30
		Net:	$0

Real-time market results			
	MW		LMP
Supply Provided	-200	X	$56
		Total Net:	-$11,100

- Lesson 1: Bids and Offers
- Lesson 2: Physical and Financial Schedules
- Lesson 3: Financial Transmission Rights
- Lesson 4: Settlements
- Lesson 5: Market Transition

Market Participant Configuration



- The MP is financially liable to MISO
- Invoicing occurs at this level

- Asset Owner levels are designated by the MP during registration
- Physical Schedules and Financial Schedules are entered for specific asset owners

- Assets are used as the Source and Sink for Financial Schedules

"Schedules" - Common Uses

Type of Schedule	Description
Physical Schedule (Bilateral)	• Used to bring energy across the MISO border • Entered by MP via Tags • Represents physical energy
Financial Schedule (Bilateral)	• Used for transactions within the MISO border • Entered by MP via FinSched • Do not represent physical Energy
Market Schedules	• Used by MISO to **dispatch** specific units in Day-Ahead and Real-Time • Created by MISO based on Bids and Offers received
- Self Schedules	• Self-Schedules are a type of Market Schedule • Fixes output of unit, may be self-committed or MISO-committed

Bilateral Schedule Comparison

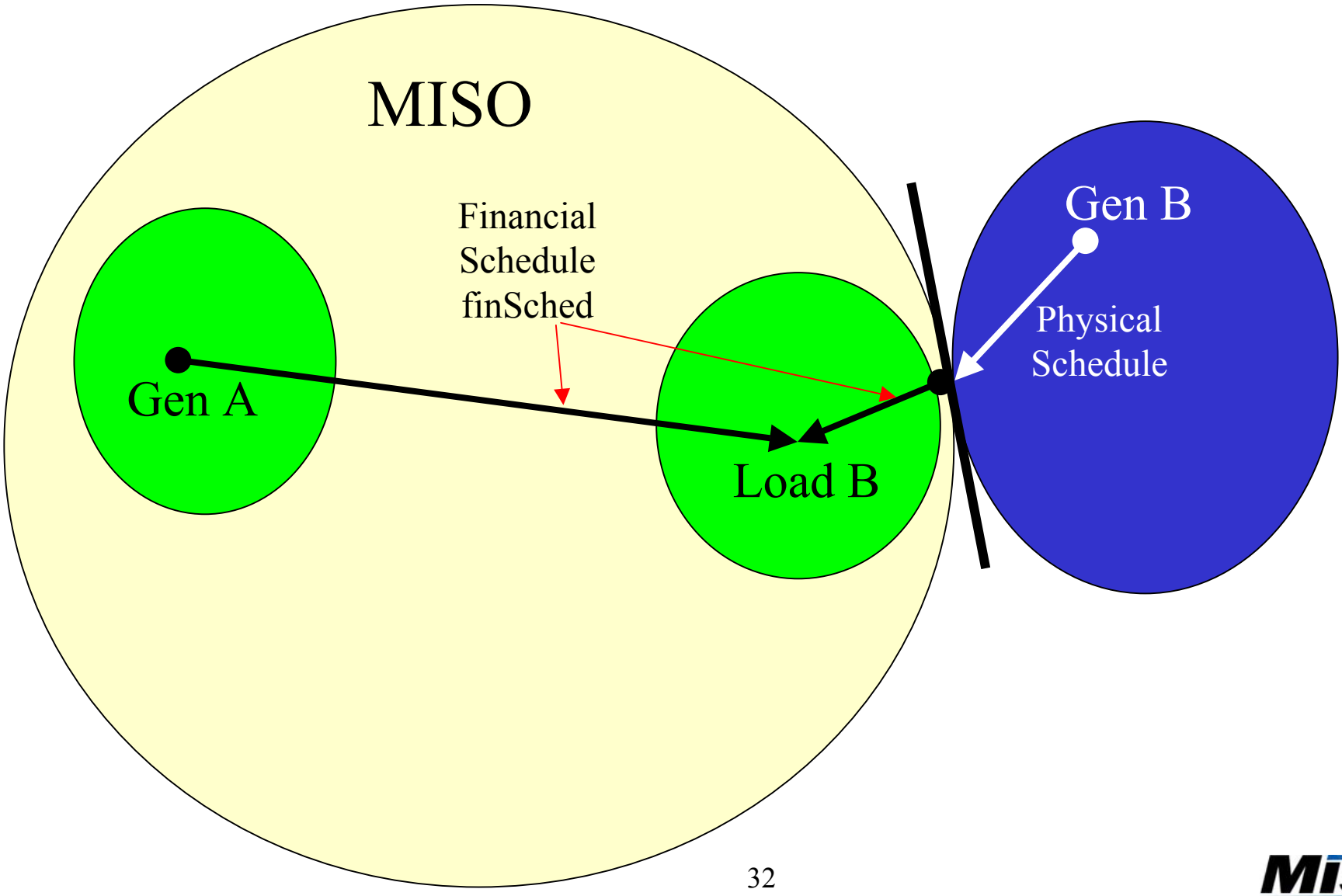
External (Physical)

- Used for transactions that cross the MISO border
- Created via Tags
- OASIS Reservation required
- Are subject to the entire LMP at the MISO border
- Can occur in DA or RT
- Represent physical energy flow
- Impact LMP calculation

Internal (Financial)

- Used for transactions within the MISO border
- Entered in FinSched
- No OASIS Reservation required
- Use the Marginal Congestion and Loss components of the LMP
- Can occur in DA or RT
- Do not represent physical energy flow
- Do not Impact LMP calculation

Physical vs. Financial Schedules

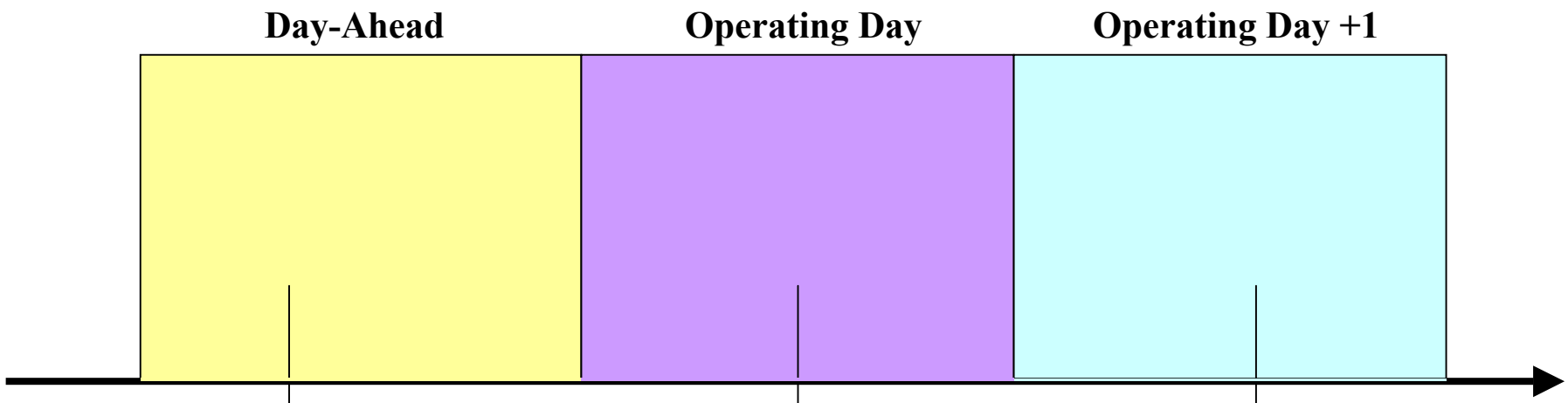


Financial Schedules vs. Market Schedules

- MISO does not dispatch units based on Financial Schedules. If a unit only has a Financial Schedule and does not have a Market Schedule, the unit will not be dispatched.
- MISO dispatches units based on Market Schedules.
  - Day-Ahead Market Schedules are produced by MISO based on Bids and Offers received in the Day-Ahead Market.
  - Real-Time Market Schedules are determined by MISO based on actual load and Real-Time offers and are sent to the MP in the form of Dispatch Instructions.

Midwest Market Initiative

Financial Schedule Timing Considerations



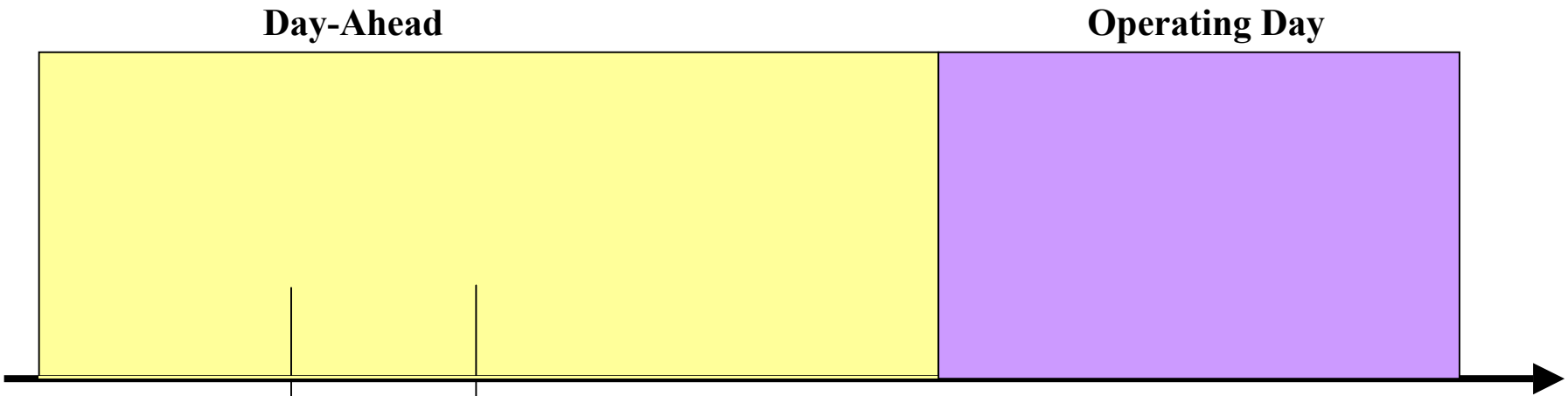
- Deadline for submitting Day-Ahead Bids, Offers, and Physical Schedules

- Deadline for submitting Day-Ahead Financial Schedules

- Deadline for submitting Real-Time Financial Schedules

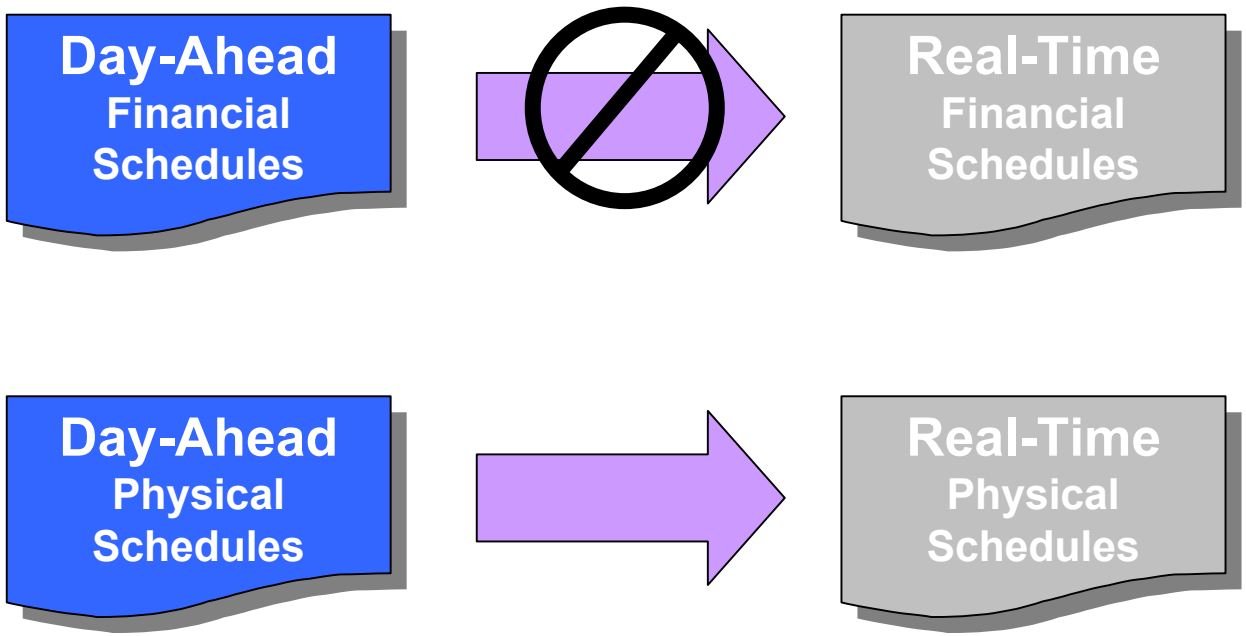
MISO

Physical Schedule Timing Considerations

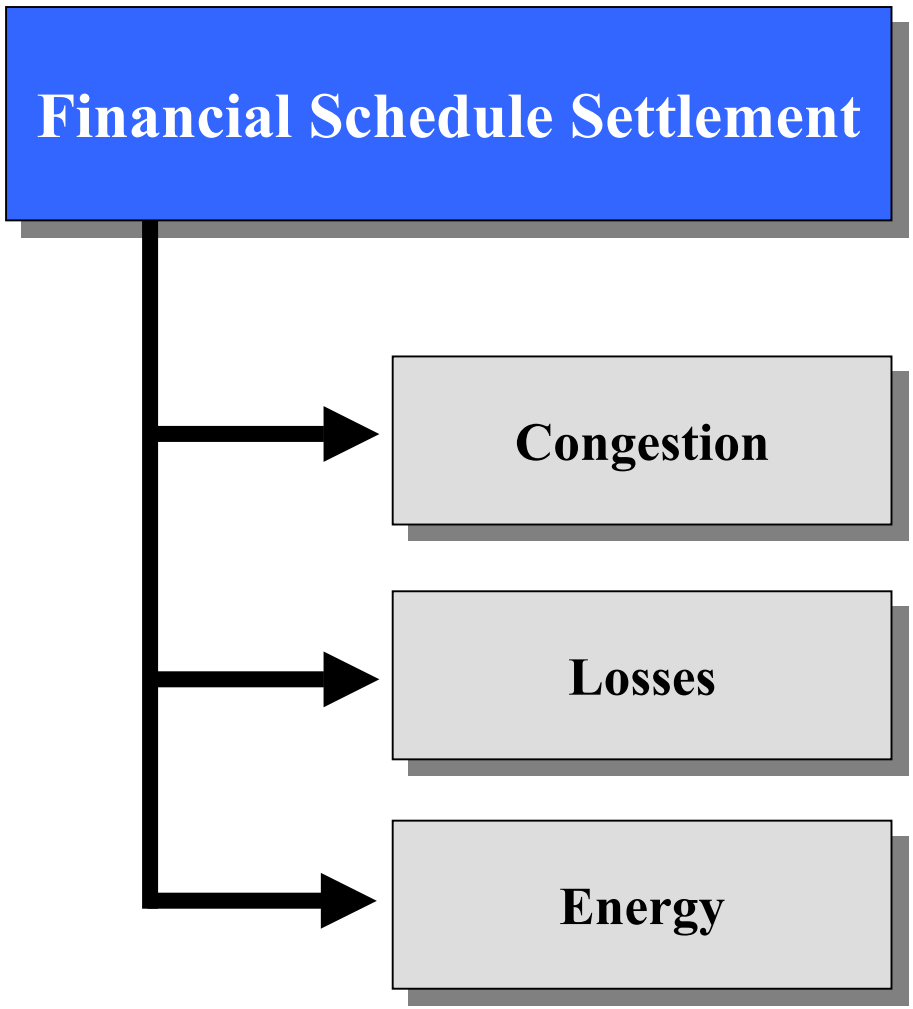


- Deadline for submitting Day-Ahead Physical Schedules with "Known" approval status
- Deadline for submitting Day-Ahead Physical Schedules
- Real-Time Physical Schedules can be changed up to 30 minutes prior to the operating hour

Scheduling and the DA/RT Markets

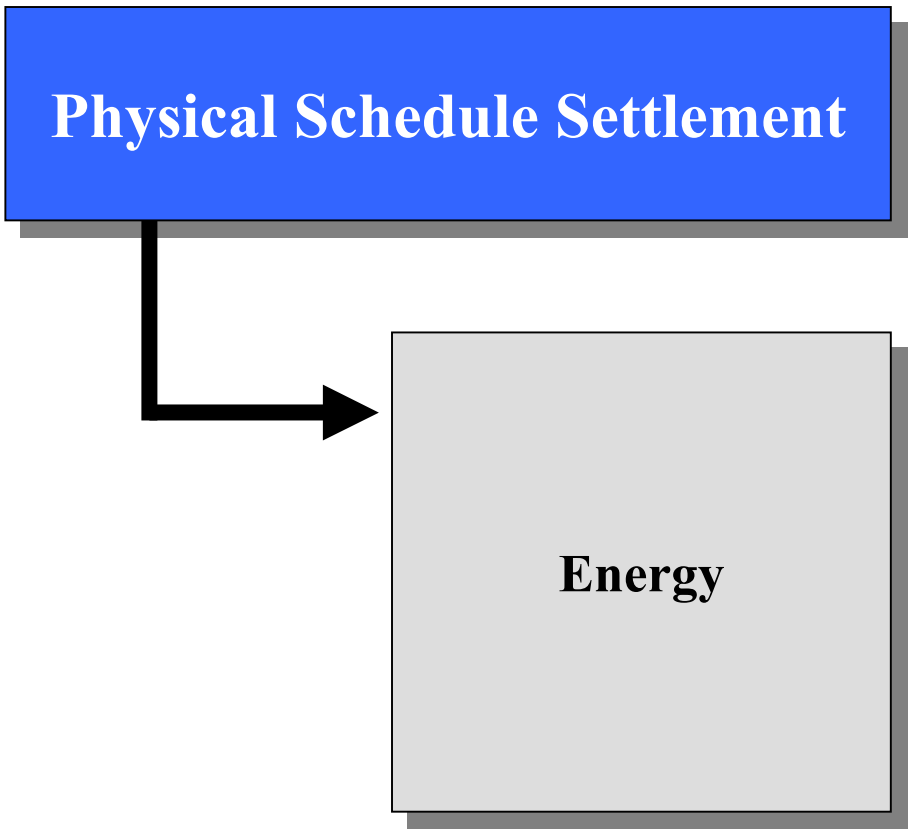


Components of Financial Schedule Settlement



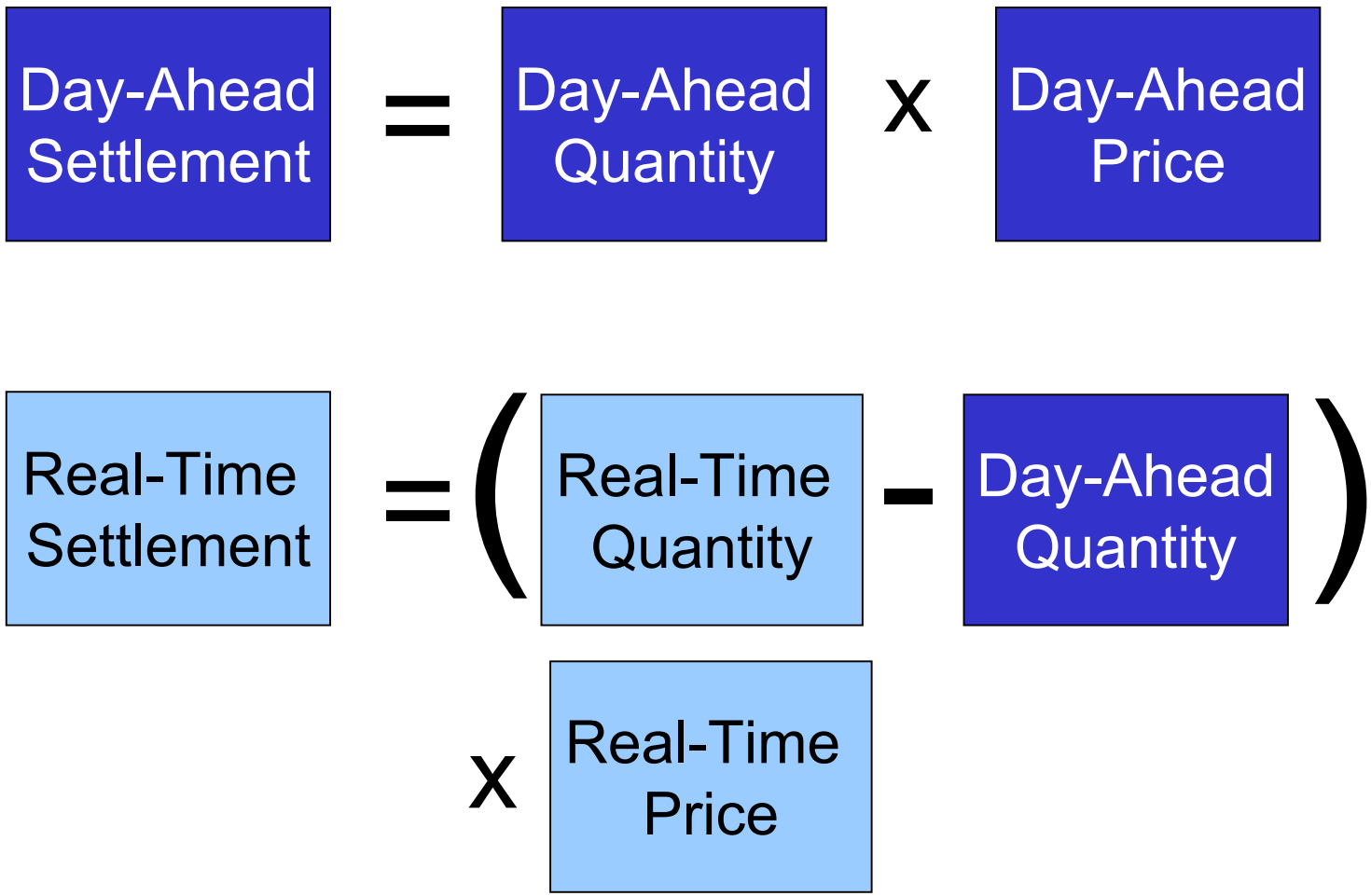
- Congestion between Source and Sink
- Losses between Source and Sink
- The energy settlement at the Source and Sink Nodes is adjusted to reflect the bilateral transaction

Components of Physical Schedule Settlement



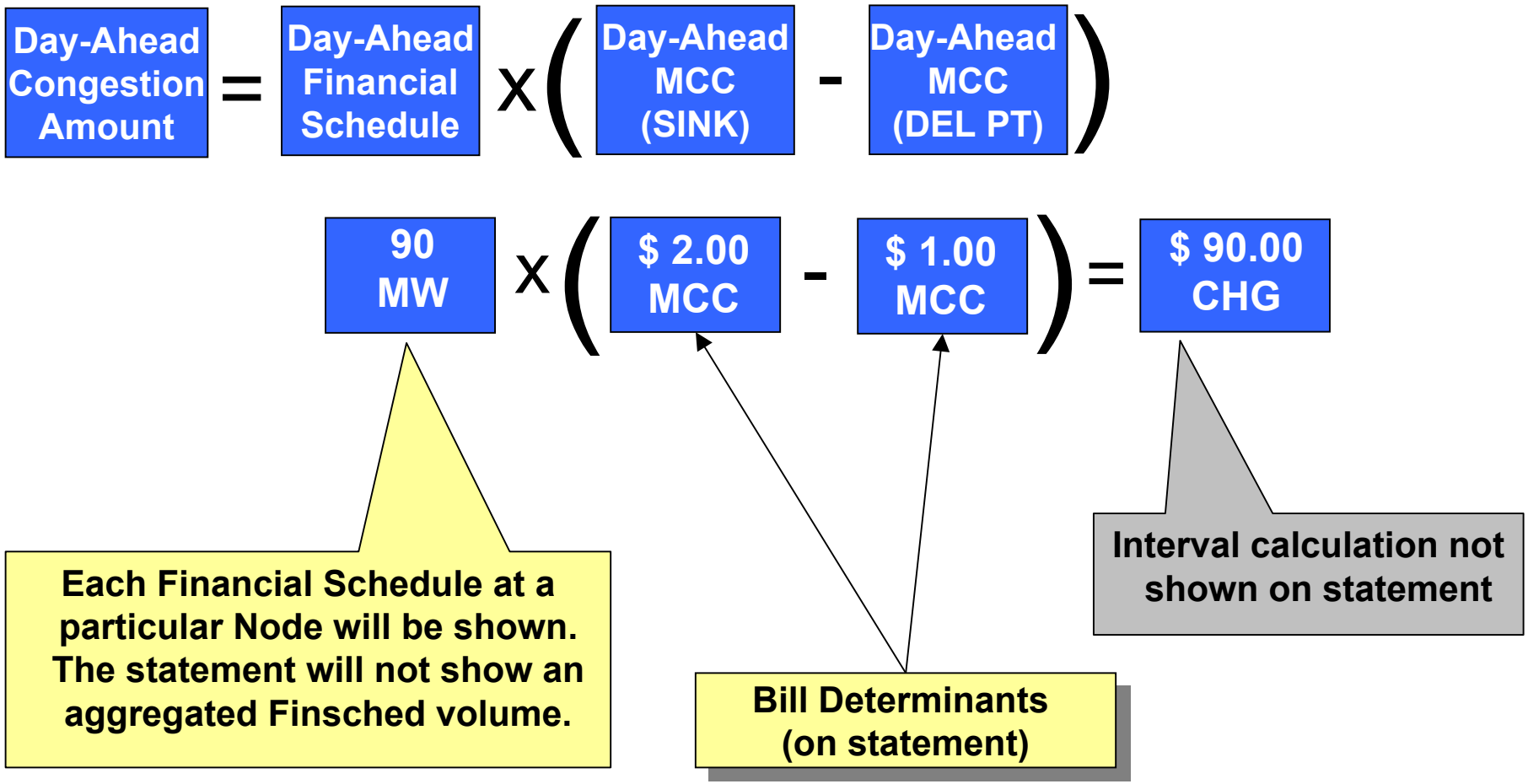
- Physical Schedules are settled based on the MW quantity and the LMP at the injection/withdrawal point.
- Injections are settled like generation
- Withdrawals are settled like load

Day Ahead vs. Real Time Settlement



DA Financial Schedule Congestion Charges

Day-Ahead CONGESTION AMOUNT *for a* BUYER



RT Financial Schedule Congestion Charges

Real-Time CONGESTION AMOUNT *for a* BUYER

Real-Time Congestion Amount = ((**Real-Time Financial Schedule** − **Day-Ahead Financial Schedule**) x (**Real-Time MCC (SINK)** − **Real-Time MCC (DEL PT)**))

((**90 MW** − **90 MW**) x (**$ 3.00 MCC** − **$ 2.50 MCC**)) = **$ 0.00**

Each Financial Schedule at a particular Node will be shown. The statement will not show an aggregated Finsched volume.

Bill Determinants (on statement)

Interval calculation not shown on statement

Day-Ahead Financial Schedule Loss Charge

Day-Ahead LOSS AMOUNT *for a* BUYER

Day-Ahead Loss Amount = **Day-Ahead Financial Schedule** x (**Day-Ahead MLC (SINK)** - **Day-Ahead MLC (DEL PT)**)

90 MW x (**$ 1.00 MLC** - **$ .50 MLC**) = **$ 45.00 CHG**

Each Financial Schedule at a particular Node will be shown. The statement will not show an aggregated Finsched volume.

Bill Determinants (on statement)

Interval calculation not shown on statement

Real-Time Financial Schedule Loss Charge

Real-Time LOSS AMOUNT *for a* BUYER

Real-Time Loss Amount = ((**Real-Time Financial Schedule** - **Day-Ahead Financial Schedule**) x (**Real-Time MLC (SINK)** - **Real-Time MLC (DEL PT)**))

((**88 MW** - **90 MW**) x (**$ 2.00 MLC** - **$ 1.00 MLC**)) = **-$ 2.00 CREDIT**

Each Financial Schedule at a particular Node will be shown. The statement will not show an aggregated Finsched volume.

Bill Determinants (on statement)

Interval calculation not shown on statement

Day-Ahead Spot Schedule (Generation)

Day-Ahead Obligation from Financial Schedules

Day-Ahead Financial Schedule Obligation = Day-Ahead Financial Schedule (Seller) - Day-Ahead Financial Schedule (Buyer) → 80 MW - 0 = 80 MWh

Day-Ahead Spot Schedule Amount

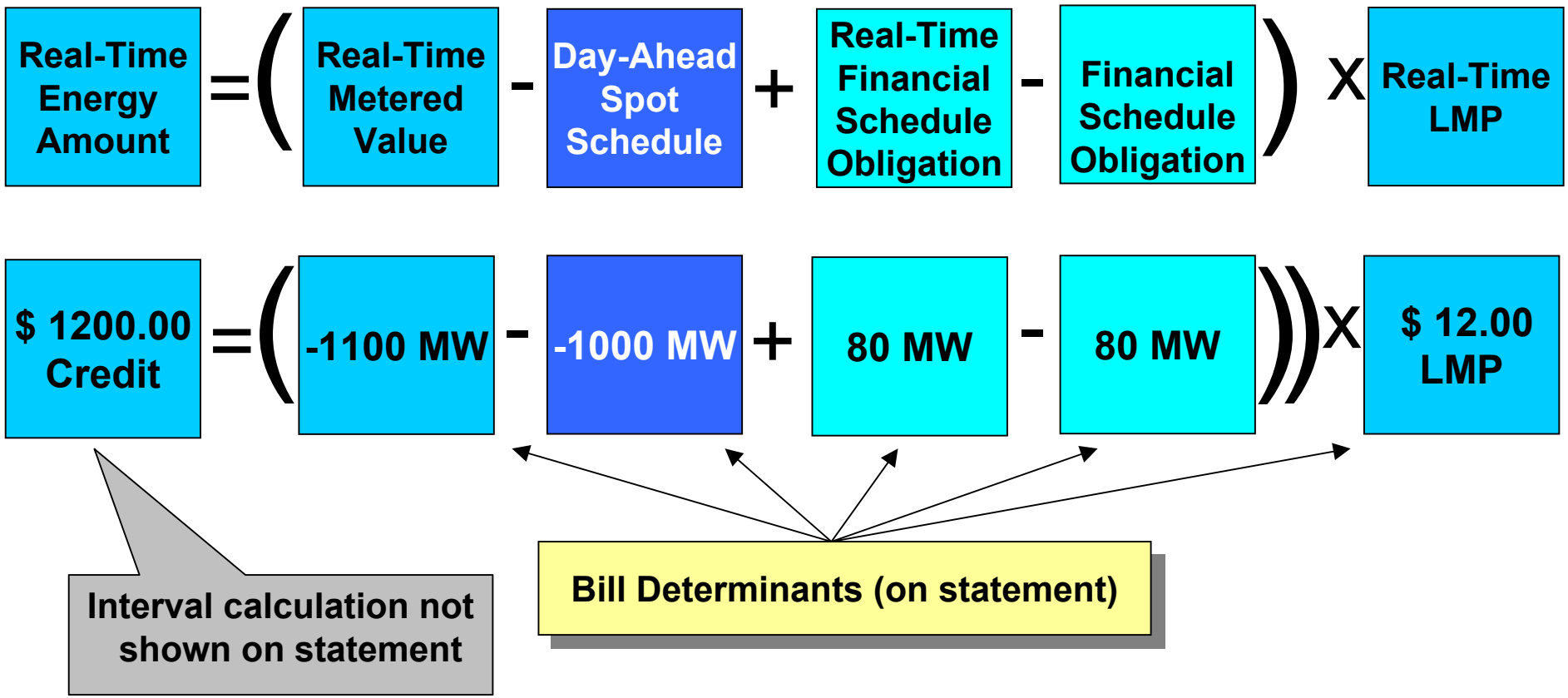
Day-Ahead Energy Amount = (Day-Ahead Spot Schedule + Day-Ahead Financial Schedule Obligation) x Day-Ahead LMP

$ -9200.00 CREDIT = (-1000 MW + 80 MW) x $ 10.00 LMP

Not on statement

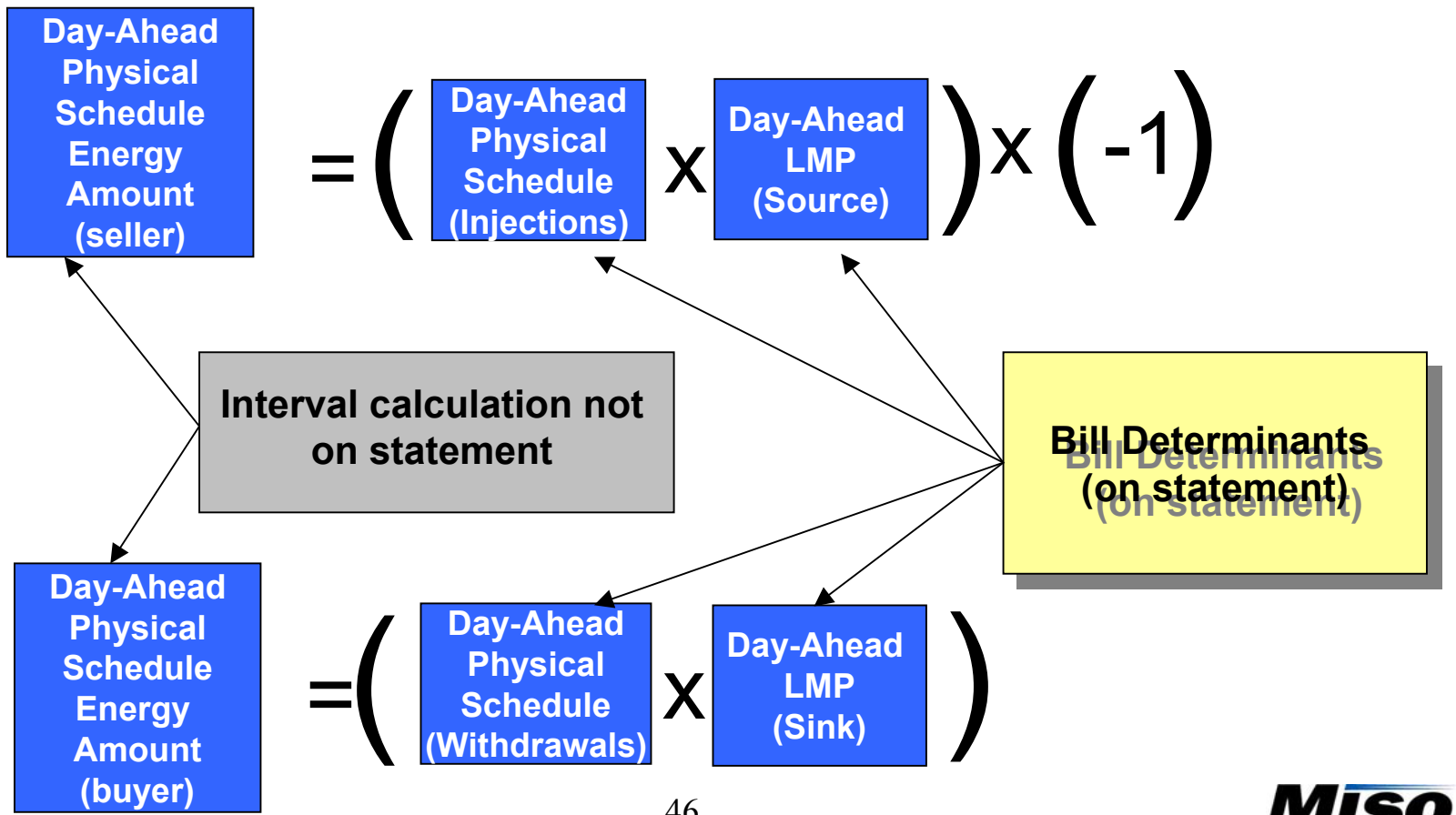
Bill Determinants (on statement)

Real-Time Energy Amount (Generation)

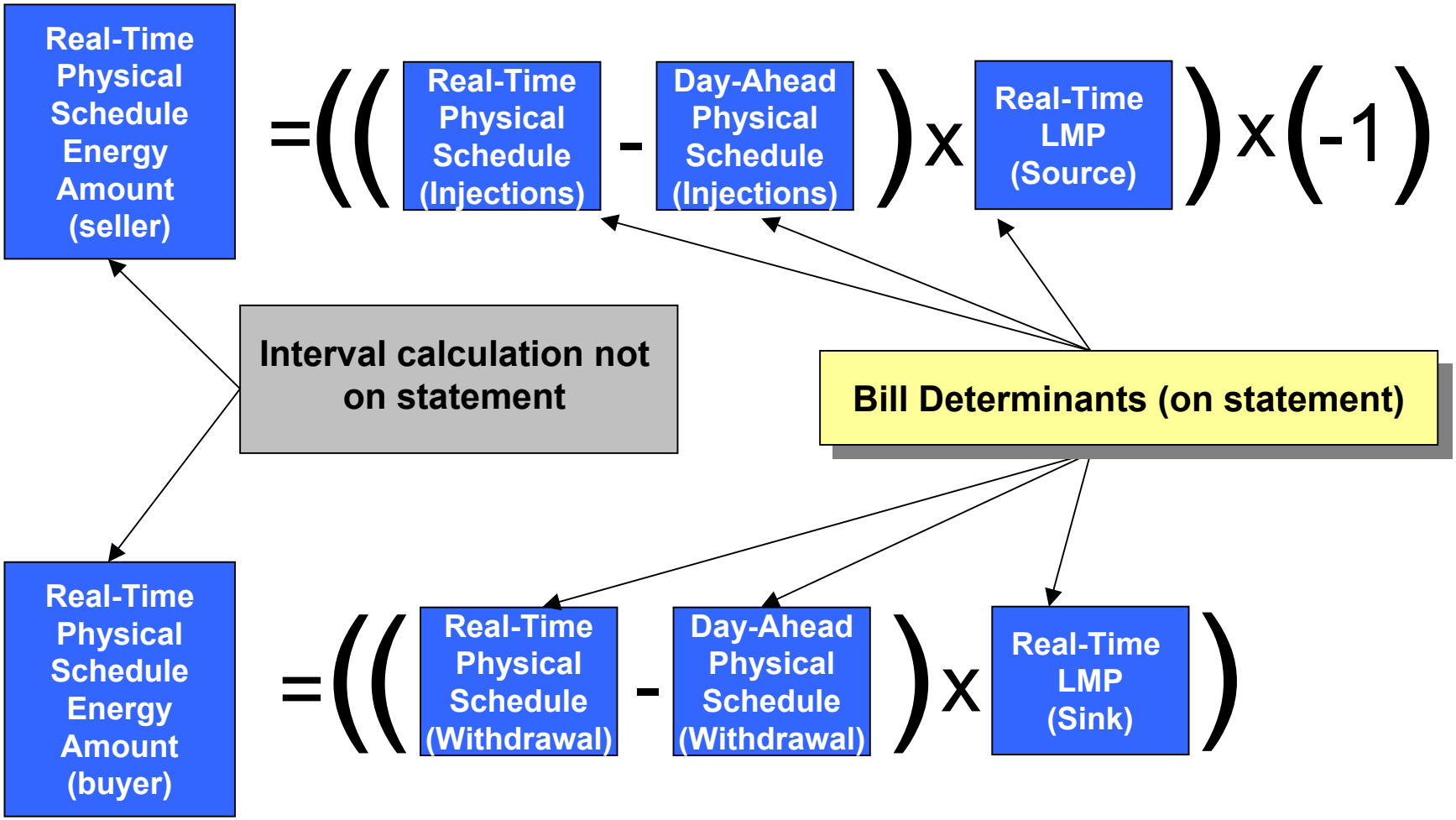


DA Physical Schedule Energy

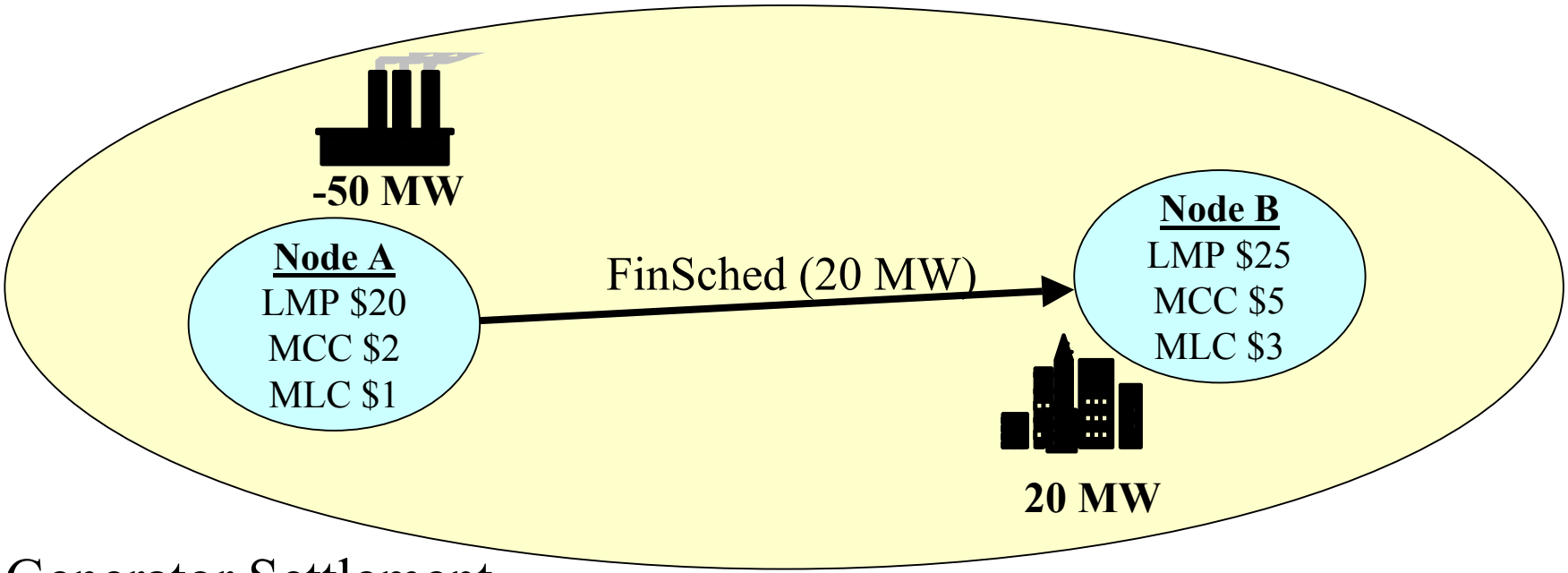
- For each Physical transaction, the Injection or Withdrawal amount will be provided in the settlement statement along with the LMP for the node



RT Physical Schedule Energy



Financial Schedule Example



Generator Settlement

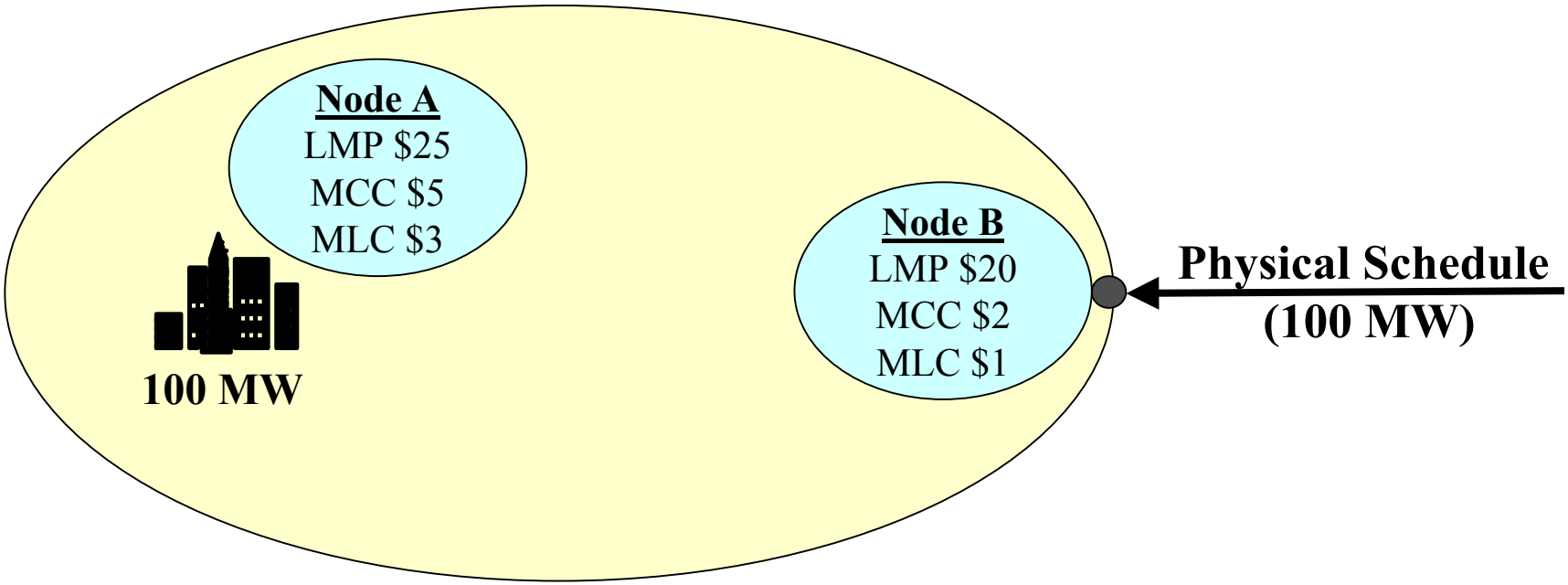
Congestion = (MCCsink – MCCsource) * MW = ($5-$2)*20 = $60

Losses = (MLCsink – MLCsource) * MW = ($3-$1)*20 = $40

Energy = (Actual Gen – Finsched) * LMP = (50 - 20)*$20 = $600

*Bilateral Energy = FinSched Amount * Negotiated Price*

Physical Schedule Example 2

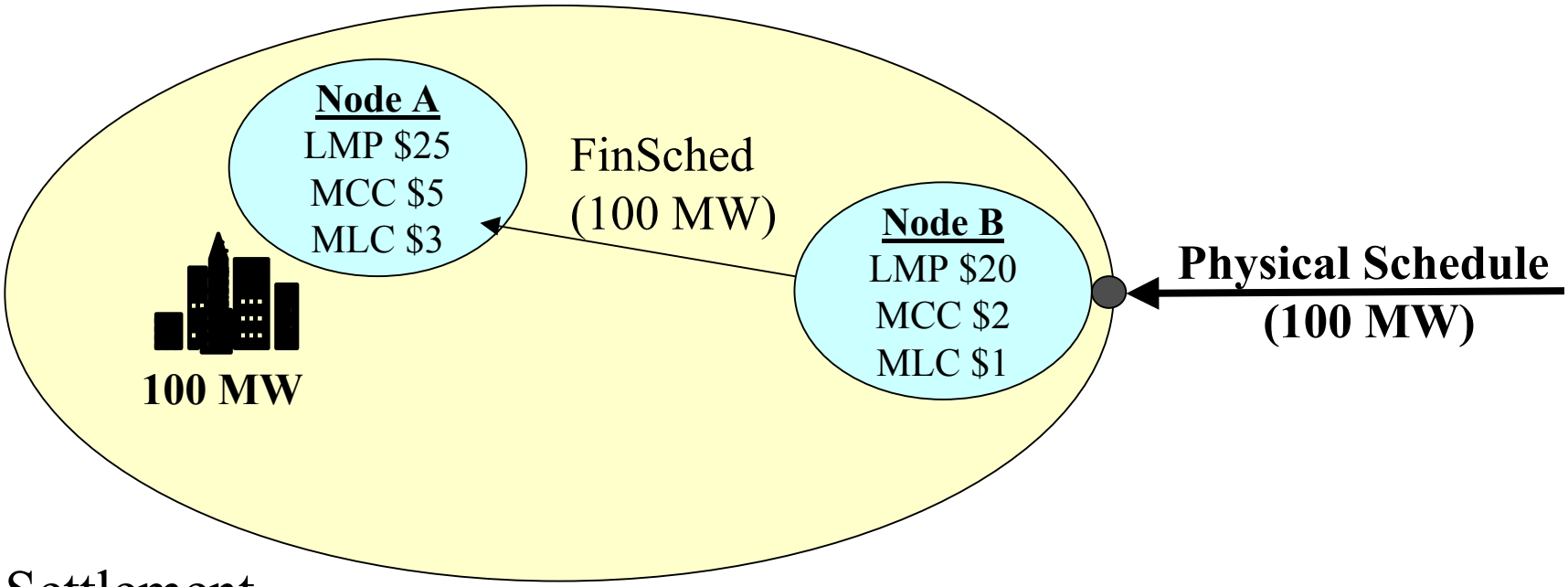


Settlement

Physical Schedule (Node B) = (MW) * LMP = 100 MW * $20 = $2000

Load (Node A) = MW * LMP = 100MW * $25 = $2500

Physical & Financial Example 3



Settlement

Congestion = (MCCsink – MCCsource) * MW = ($5-$2)*100 = $300

Losses = (MLCsink – MLCsource) * MW = ($3-$1)*100 = $200

Energy (Node B) = (Actual Gen - Finsched) = 0

Energy (Node A) = (Actual Load - Finsched) = 0

- Lesson 1: Bids and Offers
- Lesson 2: Physical and Financial Schedules
- Lesson 3: Financial Transmission Rights
- Lesson 4: Settlements
- Lesson 5: Market Transition

FTR Overview

Financial Transmission Rights (FTRs):

- Provide a financial hedging mechanism to manage the risk of congestion charges that may arise from the use of the transmission system in the Day-Ahead market
- Entitle the holder to a stream of revenues or charges based on the congestion over the FTR path
- Provides a greater degree of price certainty by minimizing the impact of congestion in the Day-Ahead market

FTR Overview (continued)

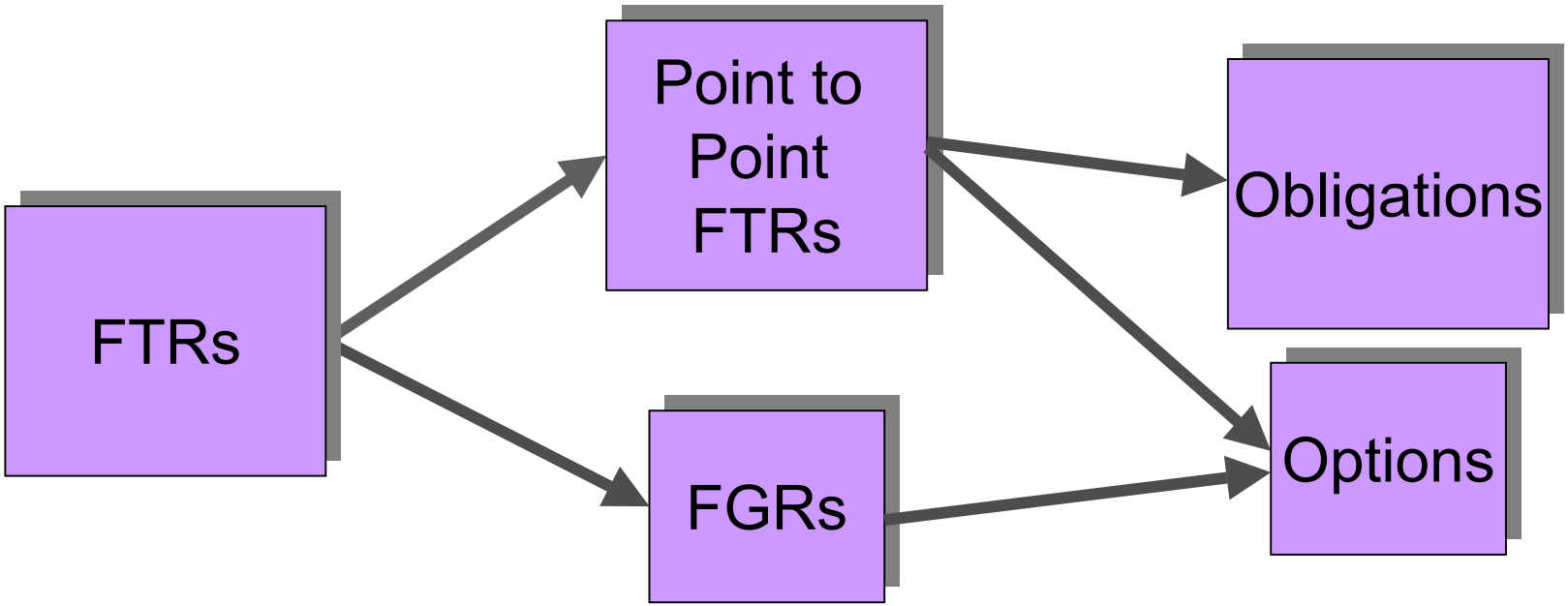
Will not protect Market Participants from congestion charges related to scheduling power in the Real-Time market, or deviating from Day-Ahead schedule

FTRs do not hedge against transmission loss charges

FTRs are independent of fees associated with transmission service reservations

FTRs are not tied to physical delivery, financial only

FTR Types



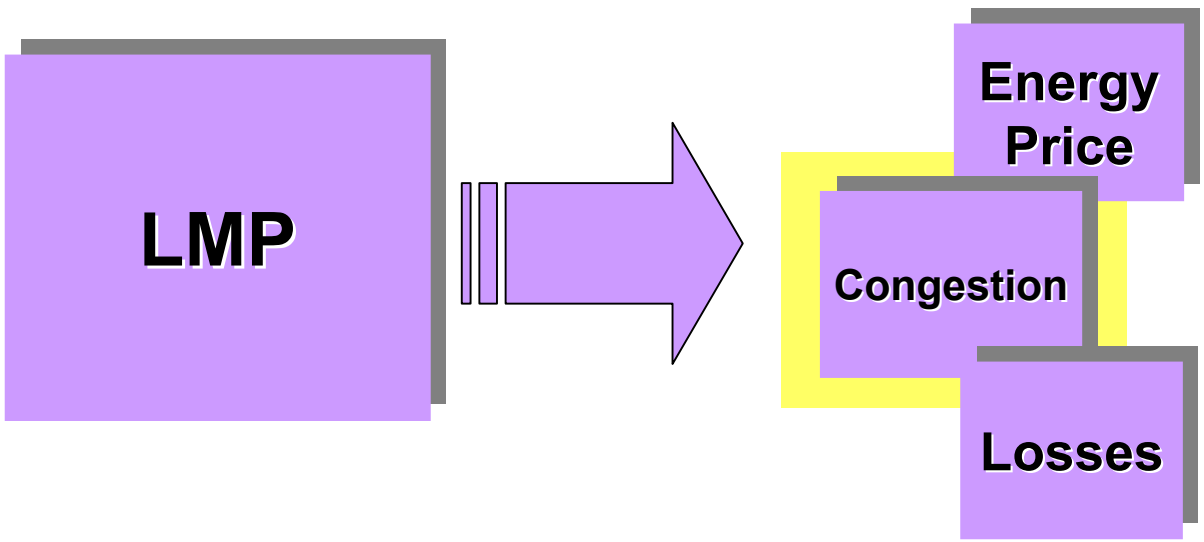
Most FTRs will be Point to Point FTRs

- The initial allocation will only award Point to Point FTRs
  - Obligations initially, and to the extent feasible Options

FGRs will be available in the Annual and Monthly Auctions (residual capacity)

Valuation of FTRs

- Point to Point FTRs are settled based on the difference between the marginal congestion component of the DA LMP at the source and sink



- FGRs are settled based on the shadow price of a flowgate in the specified direction (which will be a positive value when there is binding constraint in the specified direction of the flowgate)

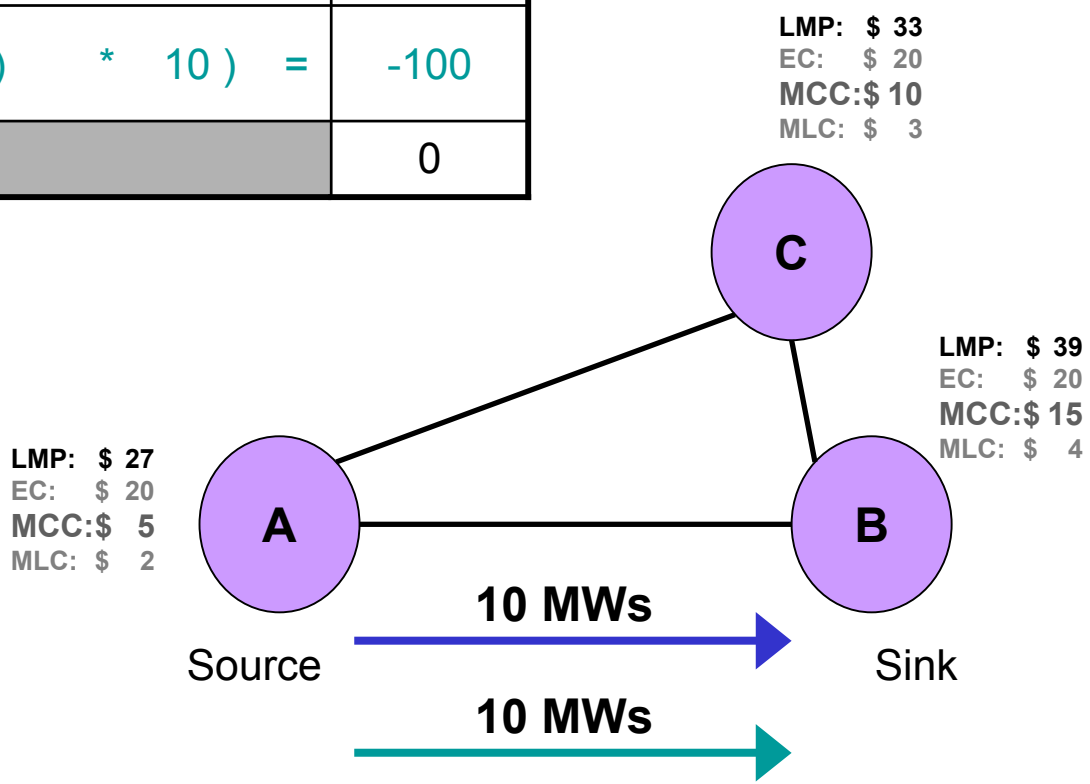
FTR Hedging

- Depending on the location, type and MW amount of the FTR, hedges may be
  - Partial
    - The FTR payments from MISO cancel out a portion of the transmission congestion charge payable to MISO
  - Complete
    - The FTR payments from MISO exactly cancel the transmission congestion charges payable to MISO
    - The net congestion charges and their uncertainty are zero
  - Excess (over-hedged)
    - The FTR payments from MISO exceed the transmission congestion charges payable to MISO

FTR Example (full hedge)

Description	Sink		Source		MW		Total
Transaction Congestion Charge	(15	-	5)	*	10	=	100
FTR Target Credit	- ((15	-	5)	*	10)	=	-100
NET							0

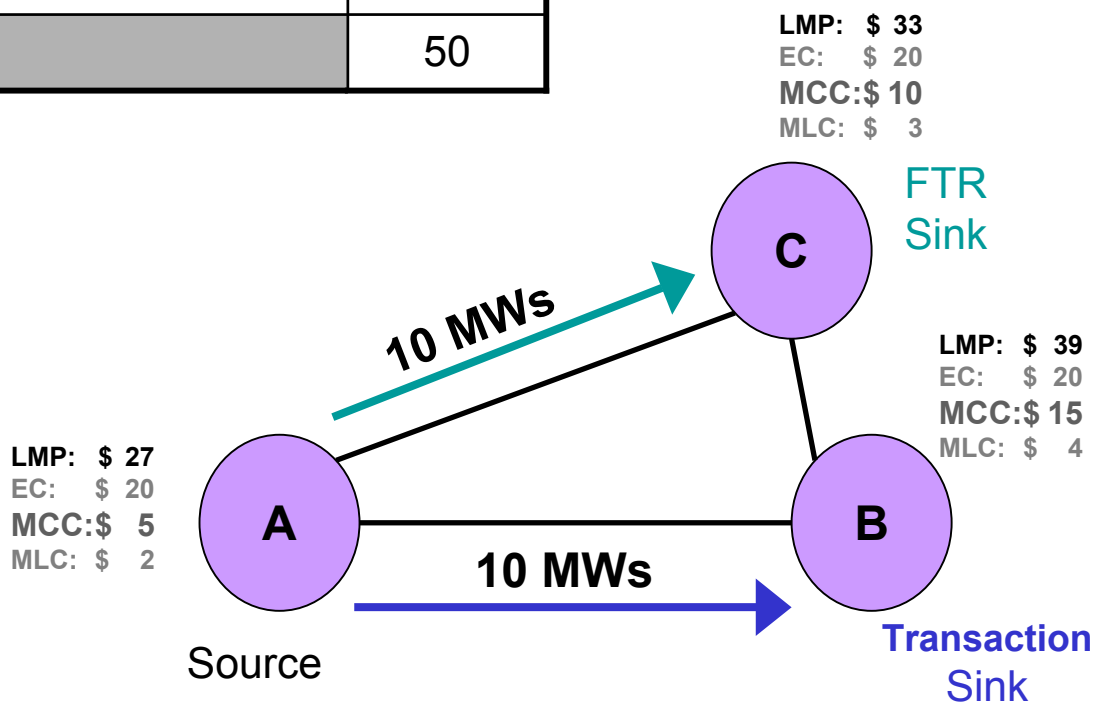
- **Bilateral Transaction** from A to B for 10 MWs
- **Point to Point FTR** owned on the same path and for the same amount
- Exposure is limited to losses when the FTR and Transaction match



FTR Example (partial hedge)

Description	Sink		Source		MW		Total
Transaction Congestion Charge	(15	-	5)	*	10	=	100
FTR Target Credit	- ((10	-	5)	*	10)	=	-50
NET							50

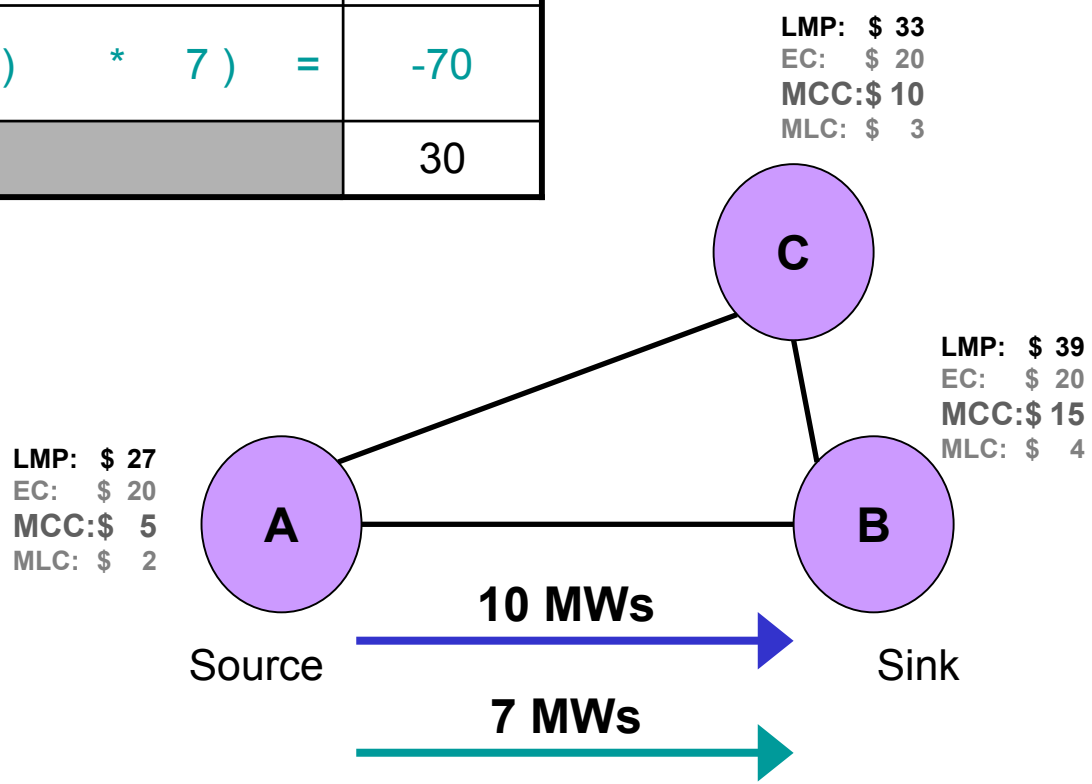
- **Bilateral Transaction** from A to B for 10 MWs
- **Point to Point FTR** owned for the same amount but on a different path
- FTR provides a partial hedge for the congestion costs incurred by the transaction



FTR Example (partial hedge)

Description	Sink	Source	MW	Total
Transaction Congestion Charge	(15	- 5)	* 10 =	100
FTR Target Credit	- ((15	- 5)	* 7) =	-70
NET				30

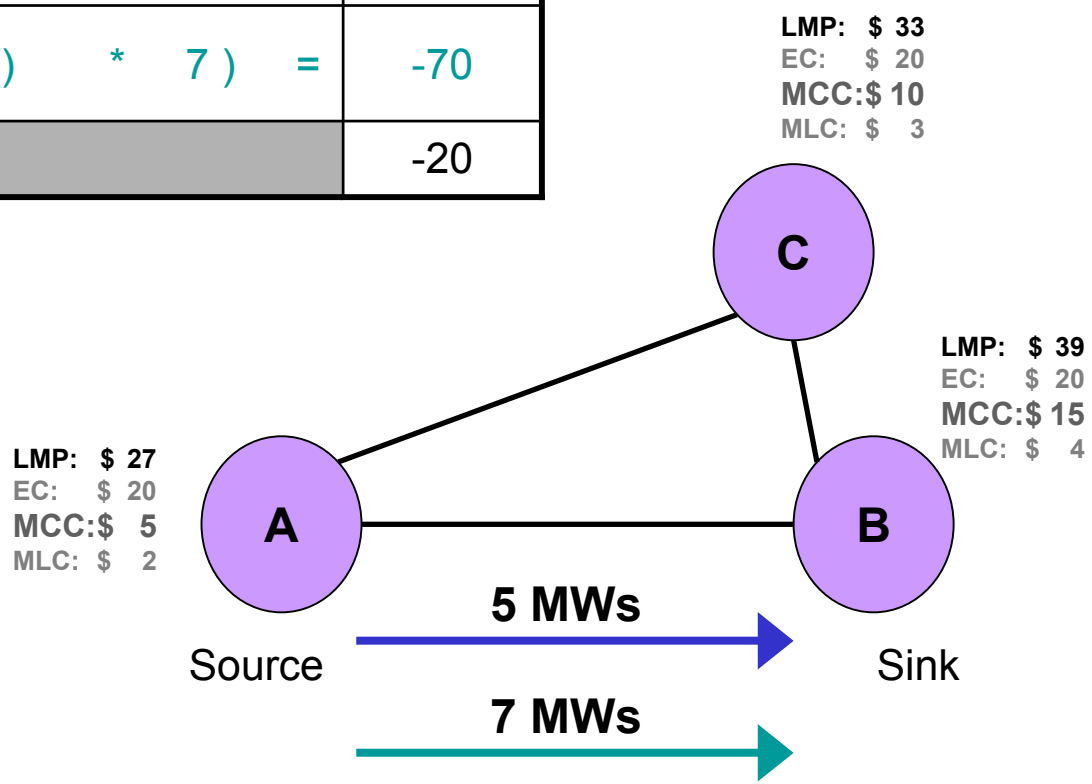
- **Bilateral Transaction** from A to B for 10 MWs
- **Point to Point FTR** owned on the same path, yet for a portion of the transaction amount
- Results in a partial hedge as there is some exposure to congestion costs



FTR Example (over hedged)

Description	Sink		Source		MW		Total
Transaction Congestion Charge	(15	-	5)	*	5	=	50
FTR Target Credit	- ((15	-	5)	*	7)	=	-70
NET							-20

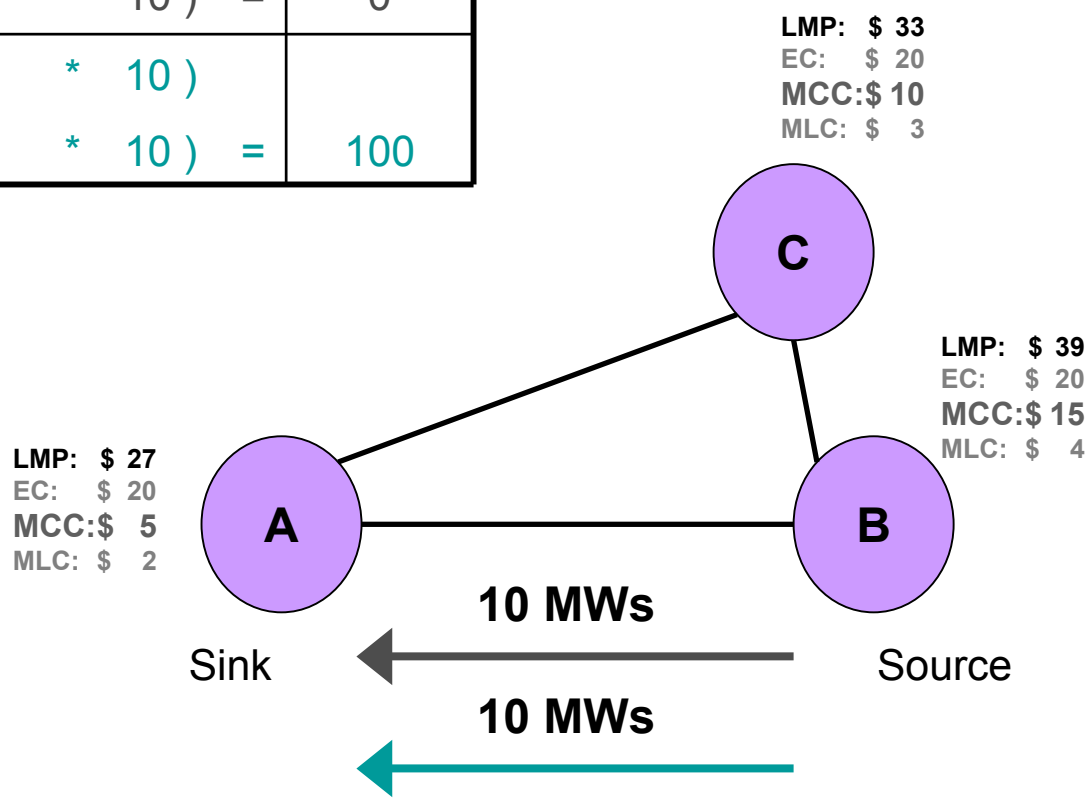
- **Bilateral Transaction** from A to B for 5 MWs
- **Point to Point FTR** owned on the same path, yet for more than the transaction amount
- Results in a over hedging for the FTR amounts that exceed the transaction



FTR Example (Obligations vs. Options)

Description	Sink	Source	MW		Total
FTR Option	- (MAX((5	- 15) , 0)	* 10)		
		- (0	* 10)	=	0
FTR Obligation	- ((5	- 15)	* 10)		
		- (-10	* 10)	=	100

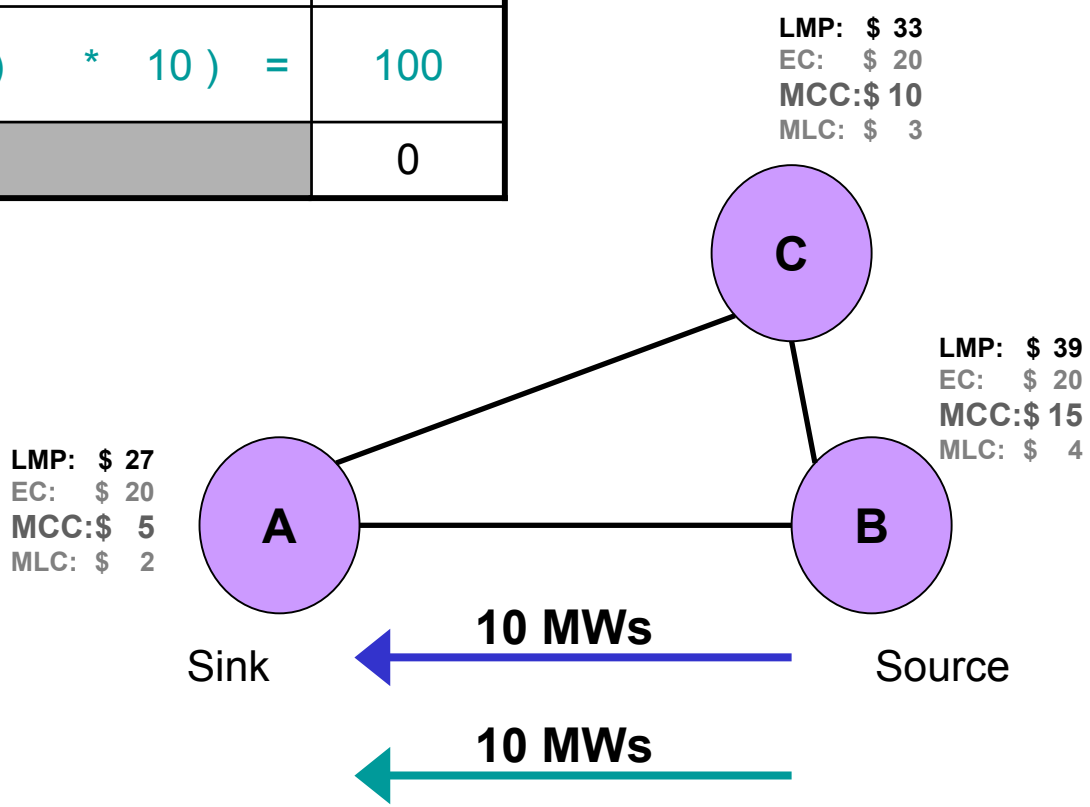
- **FTR Option** from B to A for 10 MWs
- **FTR Obligation** owned on the same path and for the same amount
- When congestion is in the opposite direction as the FTR, Options are zeroed out while Obligations require a payment (a matching schedule would offset the charge)



FTR Obligation Example (Opposite Congestion)

Description	Sink	Source	MW	Total
Transaction Congestion Charge	(5	- 15)	* 10 =	-100
FTR Target Credit	- ((5	- 15)	* 10) =	100
NET				0

- **Bilateral Transaction** from B to A for 10 MWs
- **Point to Point FTR** owned on the same path and for the same amount
- Exposure is limited to losses when the FTR and Transaction match; a matching schedule offsets charges that may arise with FTR Obligations



FTR Acquisition

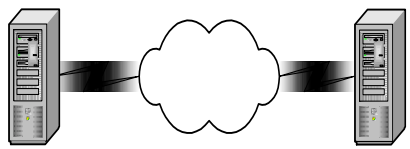
- Ownership of an FTR is acquired
  - When allocated by MISO
    - In the initial allocation
    - In monthly true-ups
    - In the annual reallocation
    - After any transmission expansion or upgrade
  - When purchased
    - In a monthly or annual MISO FTR auction
    - In a secondary FTR market
    - In association with new transmission service

- Lesson 1: Bids and Offers
- Lesson 2: Physical and Financial Schedules
- Lesson 3: Financial Transmission Rights
- Lesson 4: Settlements
- Lesson 5: Market Transition

Settlement Information Exchange

- Portal
  - Retrieve market settlements statements and summaries
  - Retrieve public data (LMP, trading points)
  - Submit disputes
  - Submit metering data

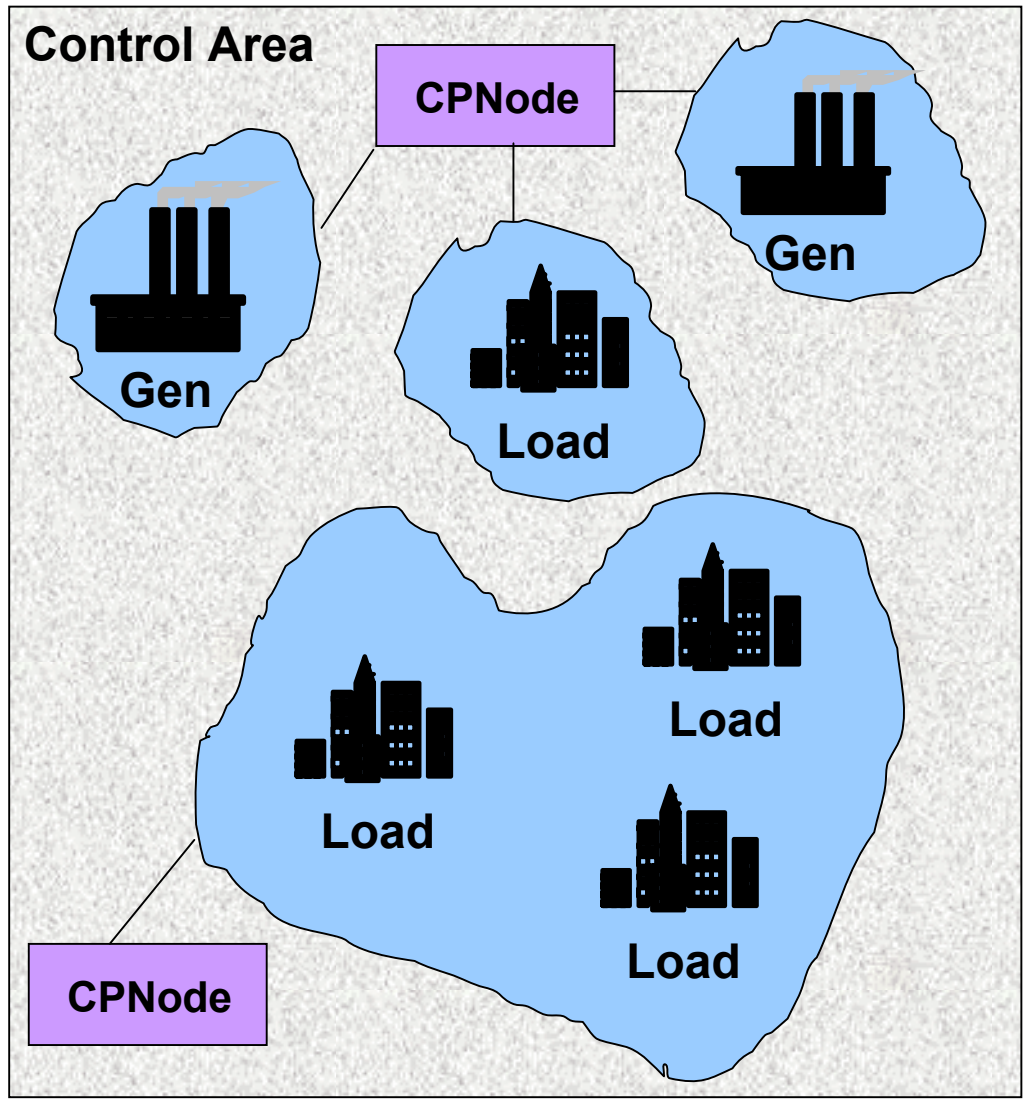
- Programmatic Interface*
  - Retrieve market settlements statements and summaries
  - Retrieve public data (LMP, trading points)
  - Submit meter data



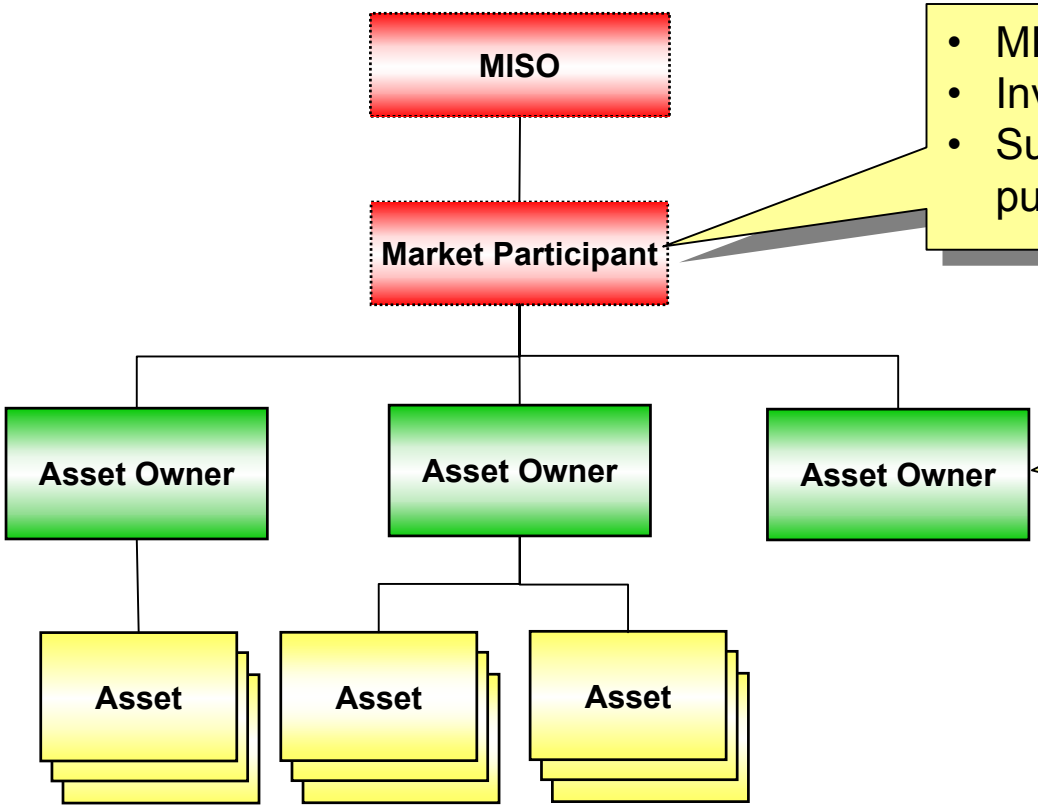
** The market participant is responsible for the development of the programmatic interface*

Settlements/Metering Relationship

- A Commercial Pricing Node (CPNode) represents an aggregate price at a given Hub, Load Zone, or Generation Zone
- The Day-Ahead and Real-Time Markets will assign the Day-Ahead and Real-Time LMPs to each CPNode.
- These CPNodes are used for financial and trading purposes within the market
- Generation Resources and Load can only associate their injections and withdrawals to a single CPNode



Market Participant Configuration



- MP is financially liable to MISO
- Invoicing occurs at MP Level
- Summary statements will be published at MP Level

- Asset Owner levels are designated by MP during registration
- Summary statements and detailed settlement statements will be published at Asset Owner level

- Settlements statements will have asset level detail per interval
- Examples (Load Zones, Generation Units, FTRs)

Settlements Definitions

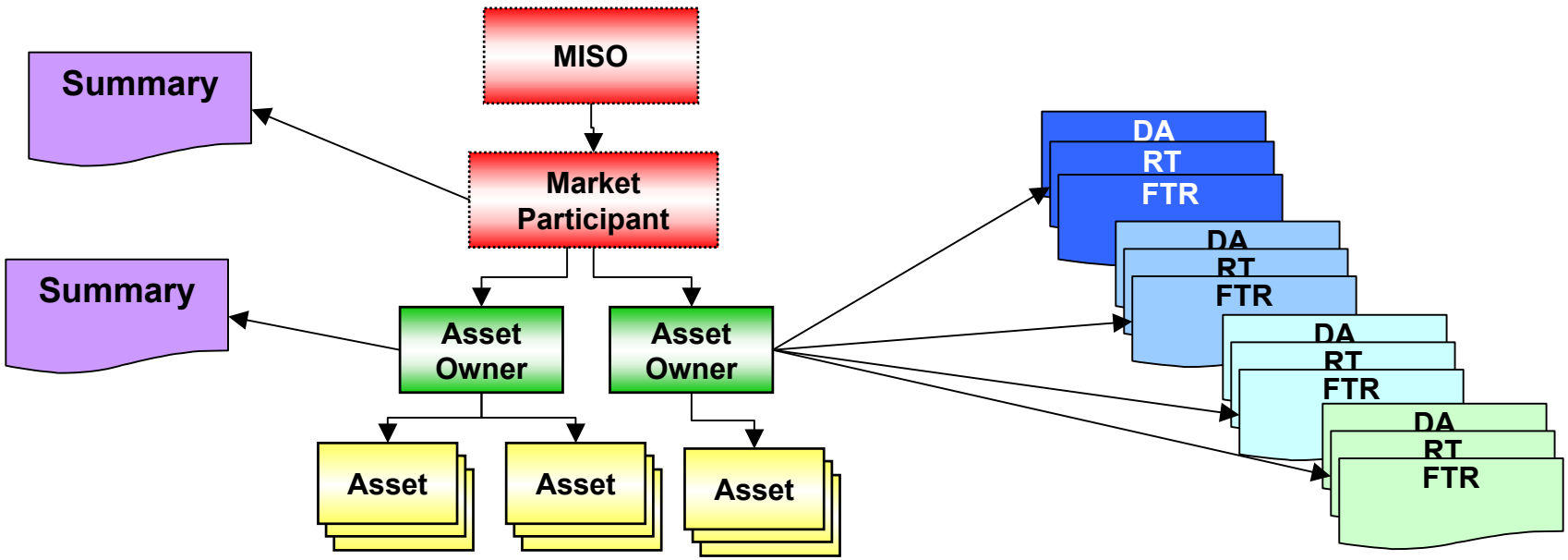
- Operating Day - day that energy flows and transactions occur

- Execution Day - time period that MISO performs settlements calculations, generates settlement statements and reviews statement data for accuracy

- Posting Day - day settlement statements and summaries are made available on MISO portal. Posting Day is typically business day after Execution Day

Types of Settlements Statements

- Summary Statements
  - MP level
  - Asset Owner level
- Detailed Settlement Statements
  - Asset Owner level
    - By Market

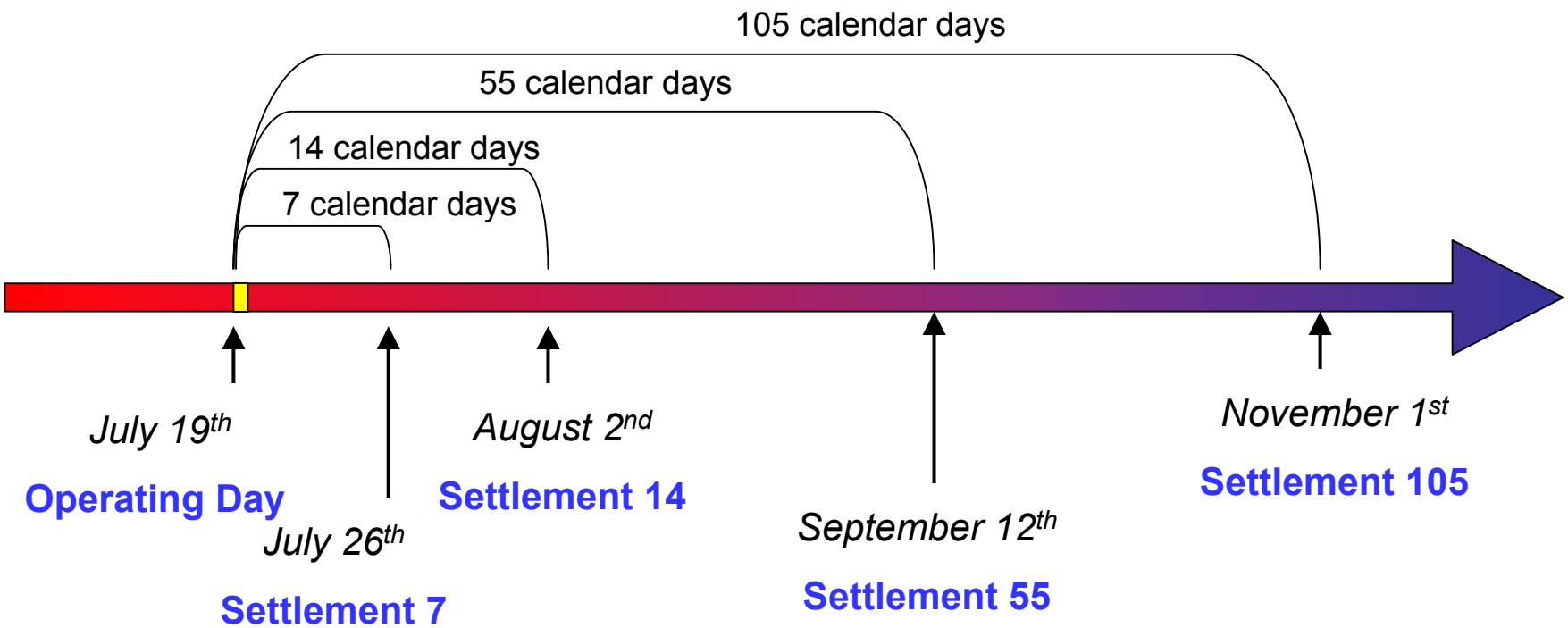


Types of Settlement Statements (continued)

- For each operating day and market (DA, RT, or FTR), Asset Owners will receive a settlement statement executed:
  - Settlement 7: 7 calendar days after the operating day
  - Settlement 14: 14 calendar days after the operating day
  - Settlement 55: 55 calendar days after the operating day
  - Settlement 105: 105 calendar days after the operating day
  - Resettlement: Typically triggered by MISO resolved ADR
- All statements are posted the end of the next business day

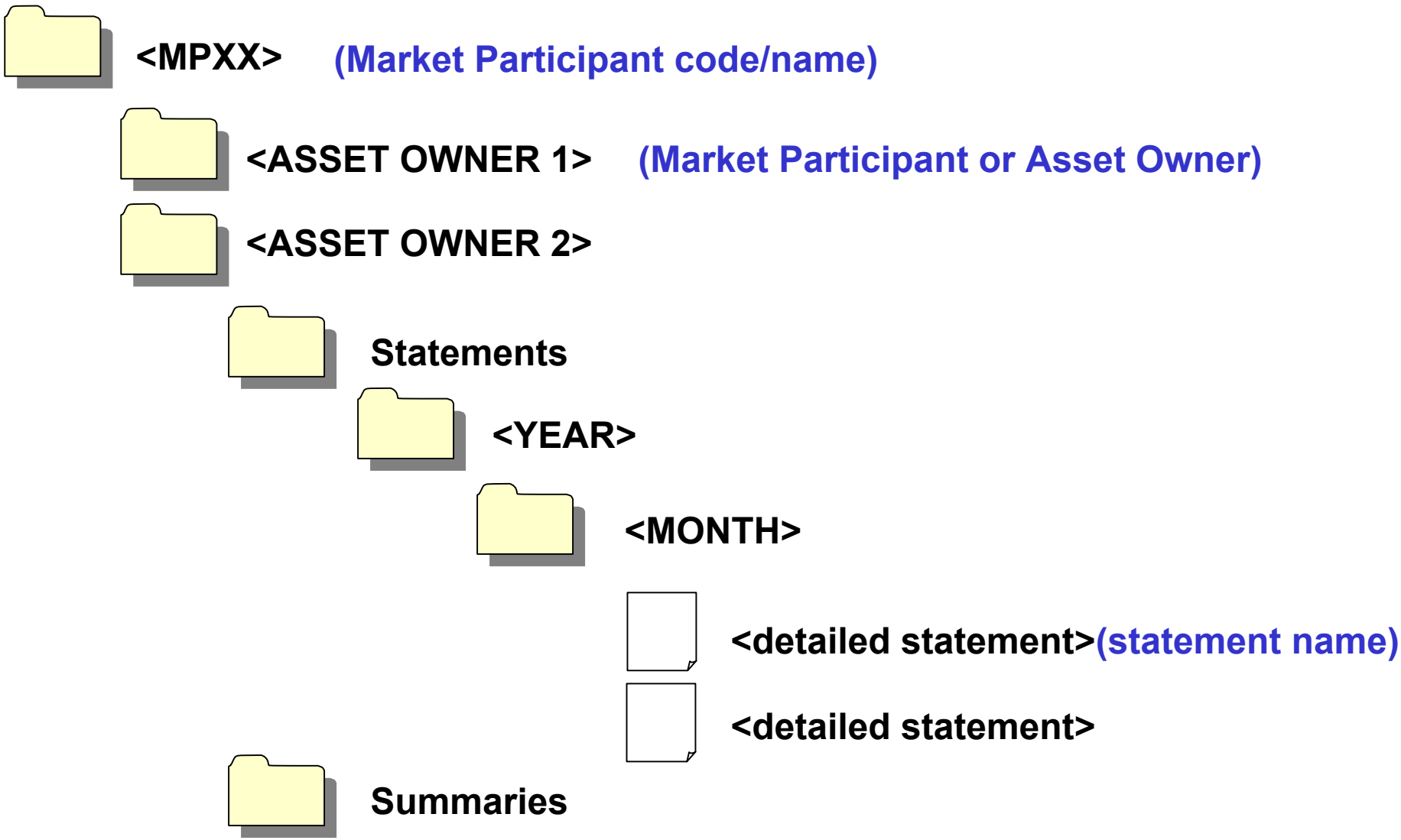
Settlements Calendar – Example (Execution Days)

Calendar Year 2004



- **Note:** **Resettlements can occur after Settlement 105 and are typically triggered by MISO resolved ADR**

Market Statement Portal Directory Structure



Statement XML File Naming Structure

Settlement Statement

<MKT>_<Asset Owner>_<Operation Date>-<Statement Type>.xml

DA_GENCO3_03012005-S7.xml

DA_GENCO3_03012005-S14.xml

Settlement Summary

<Asset Owner>_<Execution Date>_SUMM.xml

GENCO3_03012005_SUMM.xml

GENCO3_03022005_SUMM.xml

Midwest Market Initiative

Settlement Statement Timing (Posting Day)

OD100	OD101	OD102*	OD103*	OD104*	OD105*	OD106*
SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
		OD092 - 7 OD093 - 7 (SAT) OD094 - 7 (SUN)	OD095 - 7	OD096 - 7	OD097 - 7	OD098 - 7

*14 and 55 Day Statements Not Shown

OD107	OD108	OD109	OD110	OD111	OD112	OD113
SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
		OD099 - 7 OD100 - 7 (Sat) OD101 - 7 (Sun) OD092 - 14 OD093 - 14 (Sat) OD094 - 14 (Sun) OD051 - 55 OD052 - 55 (Sat) OD053 - 55 (Sun) OD001 - 105 OD002 - 105 (Sat) OD003 - 105 (Sun)	OD102 - 7 OD095 - 14 OD054 - 55 OD004 - 105	OD103 - 7 OD096 - 14 OD055 - 55 OD005 - 105	OD104 - 7 OD097 - 14 OD056 - 55 OD006 - 105	OD105 - 7 OD098 - 14 OD057 - 55 OD007 - 105

OD114	OD115	OD116	OD117	OD118	OD119	OD120
SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
		OD106 - 7 OD107 - 7 (Sat) OD108 - 7 (Sun) OD099 - 14 OD100 - 14 (Sat) OD101 - 14 (Sun) OD058 - 55 OD059 - 55 (Sat) OD060 - 55 (Sun) OD008 - 105 OD009 - 105 (Sat) OD010 - 105 (Sun)	OD109 - 7 OD102 - 14 OD061 - 55 OD011 - 105	OD110 - 7 OD103 - 14 OD062- 55 OD012 - 105	OD111 - 7 OD104 - 14 OD063 - 55 OD013 - 105	OD112 - 7 OD105 - 14 OD064 - 55 OD014 - 105

This represents a subset of a settlements calendar developed for training purposes ONLY

MISO

Midwest Market Initiative

Invoice Timing and Content (Posting Day)

OD100	OD101	OD102*	OD103*	OD104*	OD105*	OD106*
SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
		OD092 - 7 OD093 - 7 (SAT) OD094 - 7 (SUN)	OD095 - 7	OD096 - 7	OD097 - 7	OD098 - 7

*14 and 55 Day Statements Not Shown

OD107	OD108	OD109	OD110	OD111	OD112	OD113
SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
		OD099 - 7 OD100 - 7 (Sat) OD101 - 7 (Sun) OD092 - 14 OD093 - 14 (Sat) OD094 - 14 (Sun) OD051 - 55 OD052 - 55 (Sat) OD053 - 55 (Sun) OD001 - 105 OD002 - 105 (Sat) OD003 - 105 (Sun)	OD102 - 7 OD095 - 14 OD054 - 55 OD004 - 105	OD103 - 7 OD096 - 14 OD055 - 55 OD005 - 105	OD104 - 7 OD097 - 14 OD056 - 55 OD006 - 105	OD105 - 7 OD098 - 14 OD057 - 55 OD007 - 105

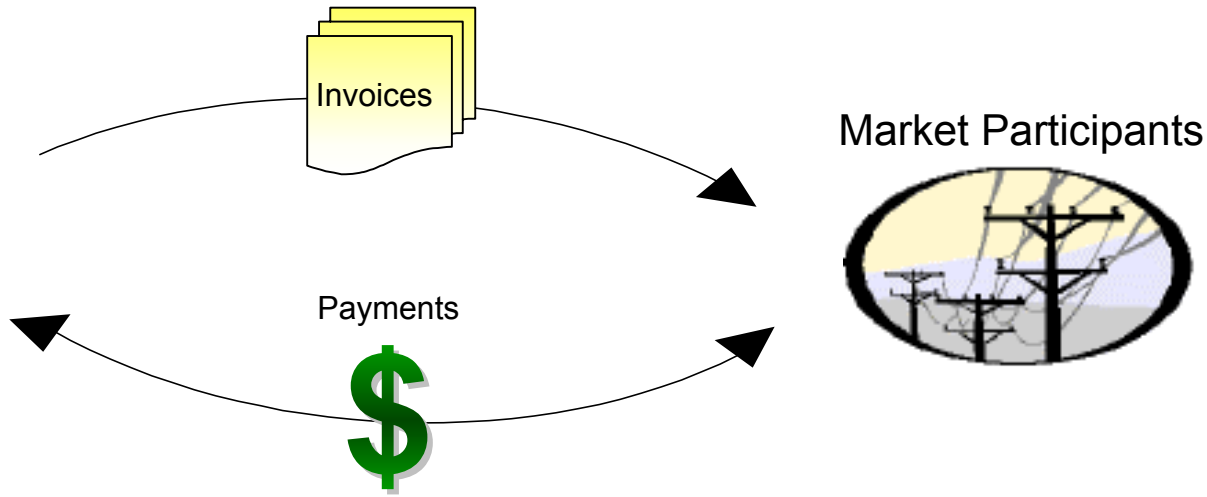
OD114	OD115	OD116	OD117	OD118	OD119	OD120
SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
		OD106 - 7 OD107 - 7 (Sat) OD108 - 7 (Sun) OD099 - 14 OD100 - 14 (Sat) OD101 - 14 (Sun) OD058 - 55 OD059 - 55 (Sat) OD060 - 55 (Sun) OD008 - 105 OD009 - 105 (Sat) OD010 - 105 (Sun)	OD109 - 7 OD102 - 14 OD061 - 55 OD011 - 105	OD110 - 7 OD103 - 14 OD062- 55 OD012 - 105	OD111 - 7 OD104 - 14 OD063 - 55 OD013 - 105	OD112 - 7 OD105 - 14 OD064 - 55 OD014 - 105

Invoice

This represents a subset of a settlements calendar developed for training purposes ONLY

MISO

Invoice Payment Process



- Payments for settlements are triggered by invoices administered by MISO
- Net Invoices are distributed each Tuesday and will include charges/credits associated to the prior week's (Monday - Friday) Settlement 14, Settlement 55, and Settlement 105 activity, as well as Settlement 7 activity from previous week
- Payments to and from MISO will occur using immediately available funds
- MISO only distributes revenue owed to MPs in an amount equal to revenue received from MPs

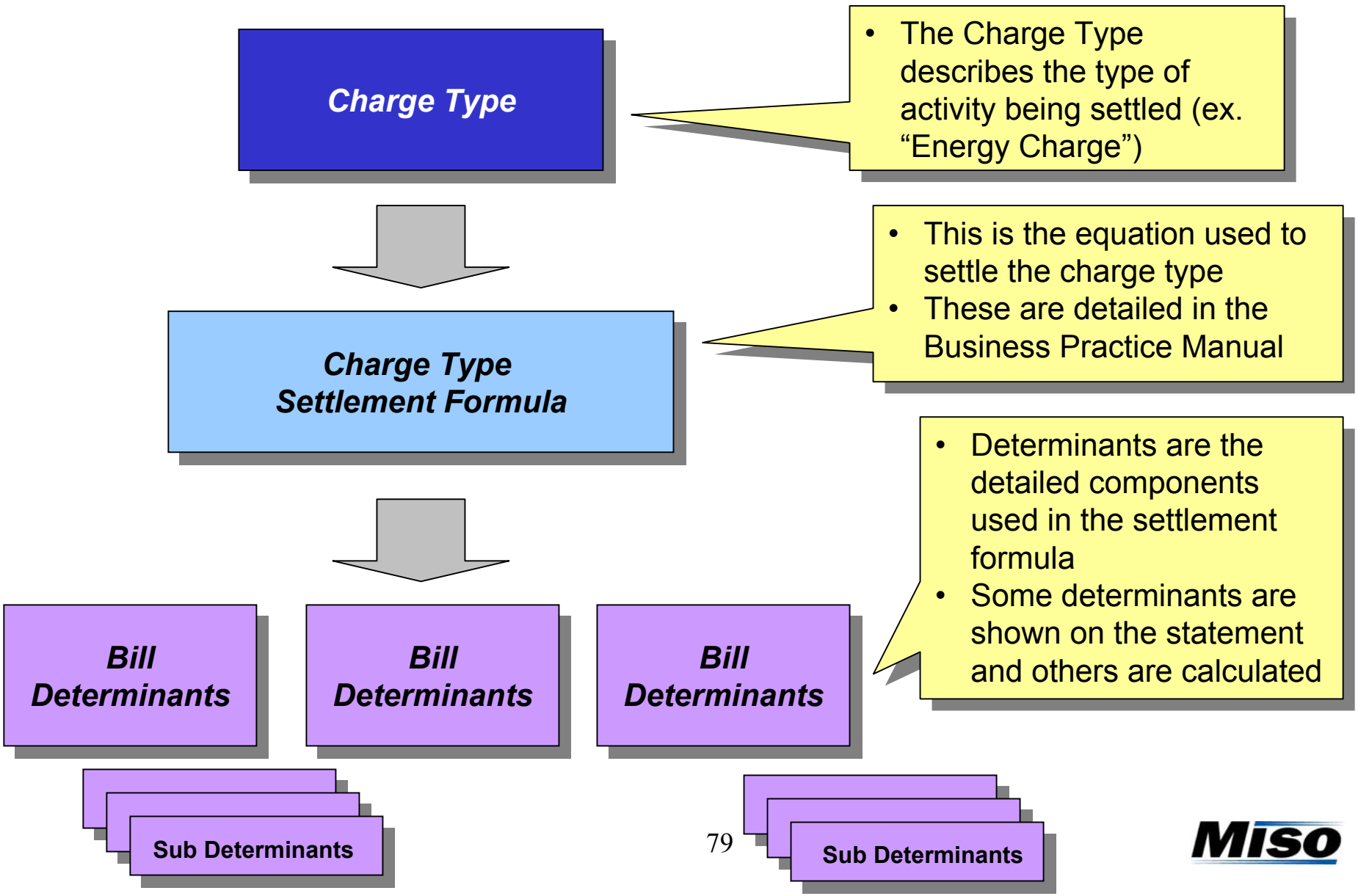
Market Net Invoices

- Invoices are summarized by Charge Type not by Operating day
- Invoices are due 7 calendar days after invoice is received
- MISO anticipates distributing payments owed to the MP between 24 and 48 hours after receiving payments from MPs
- MP is considered to be ‘Default’ if payment is not received by three days after due date

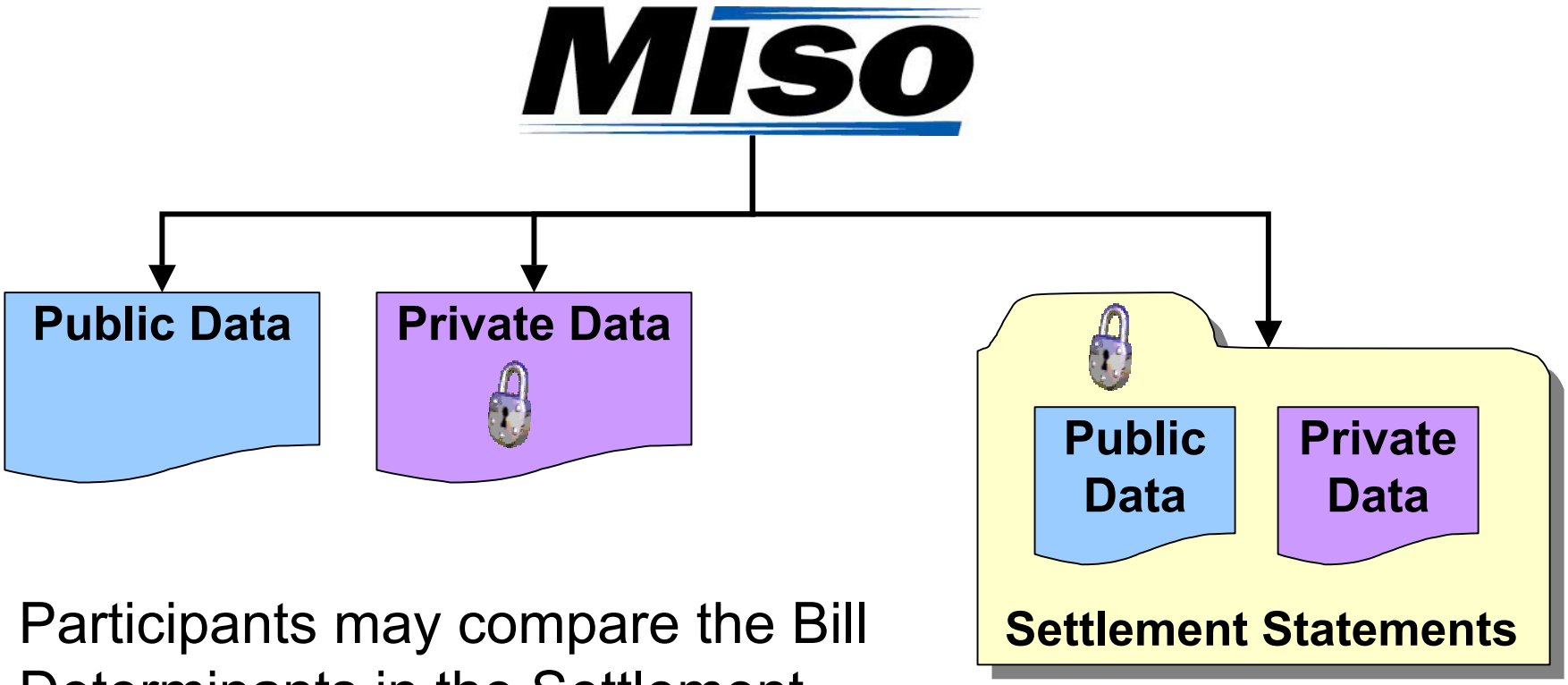
Market Net Invoices
(continued)

- Each invoice will consist of three pages
  - Summary page
  - Current billing period (S7 & S14)
  - Previous billing period (S55 & S105)
- Charge types
  - Grouped as Revenue or Charges
  - Separated into Real-Time and Day-Ahead
- MISO Administration Fees, (schedule 16 and 17)
  - Not be included in the net market invoices
  - Charged on a separate invoice

Settlement Components

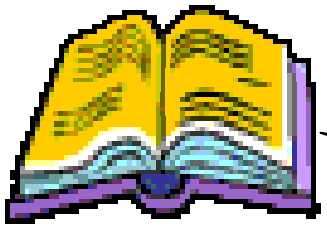


Billing Determinant Validation



- Participants may compare the Bill Determinants in the Settlement Statements with the original source data posted by MISO or with other “internal” data

Inside the Settlement Statement



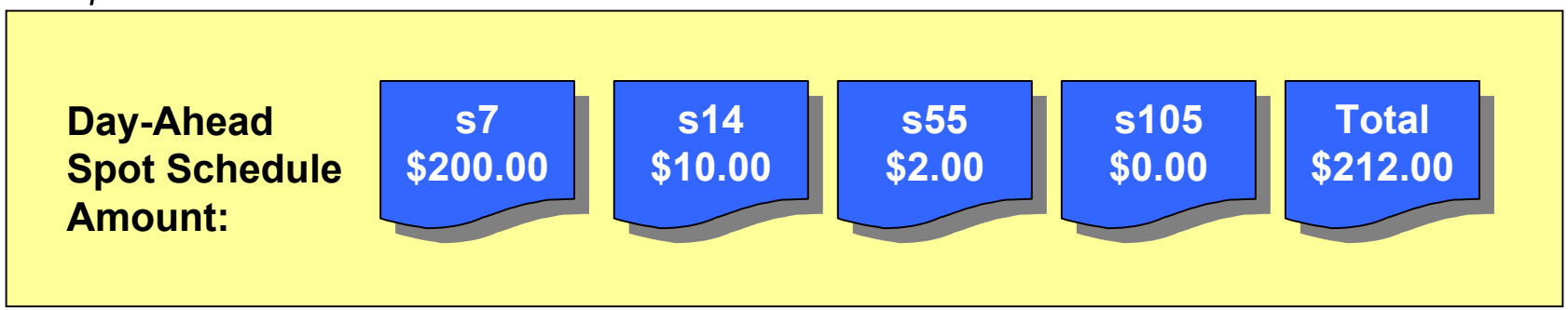
Day-Ahead Statement

- **LINE_ITEMS** – Contains total dollar amount, by Charge Type, in XML file
- **MKT_DET_TYP** – Contains market wide Billing Determinants that are not specific to Asset Owner or CPNode
- **MP** – Contains Billing Determinants that are specific to Asset Owner or CPNode

Settlement Statement LINE_ITEMS Section

- The total dollars for each charge type is shown.
- This section does not break down charge summaries by Asset or by Interval
- Each statement (S7, S14, S55, S105) subtotal is shown as well as the net total amount

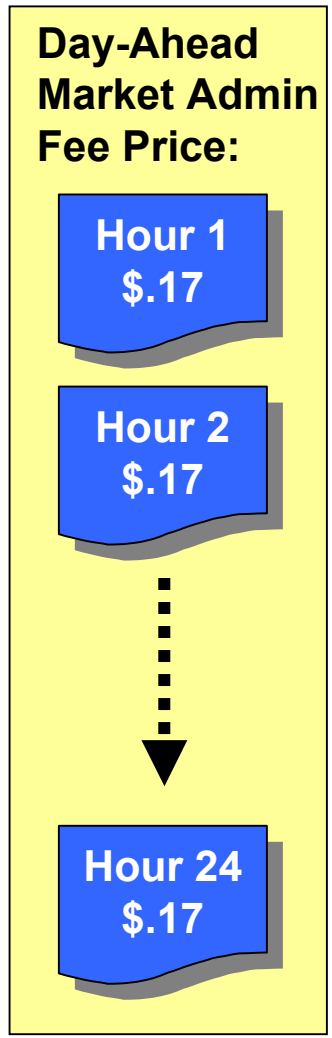
Sample Illustration



Settlement Statement MKT_DET_TYP Section

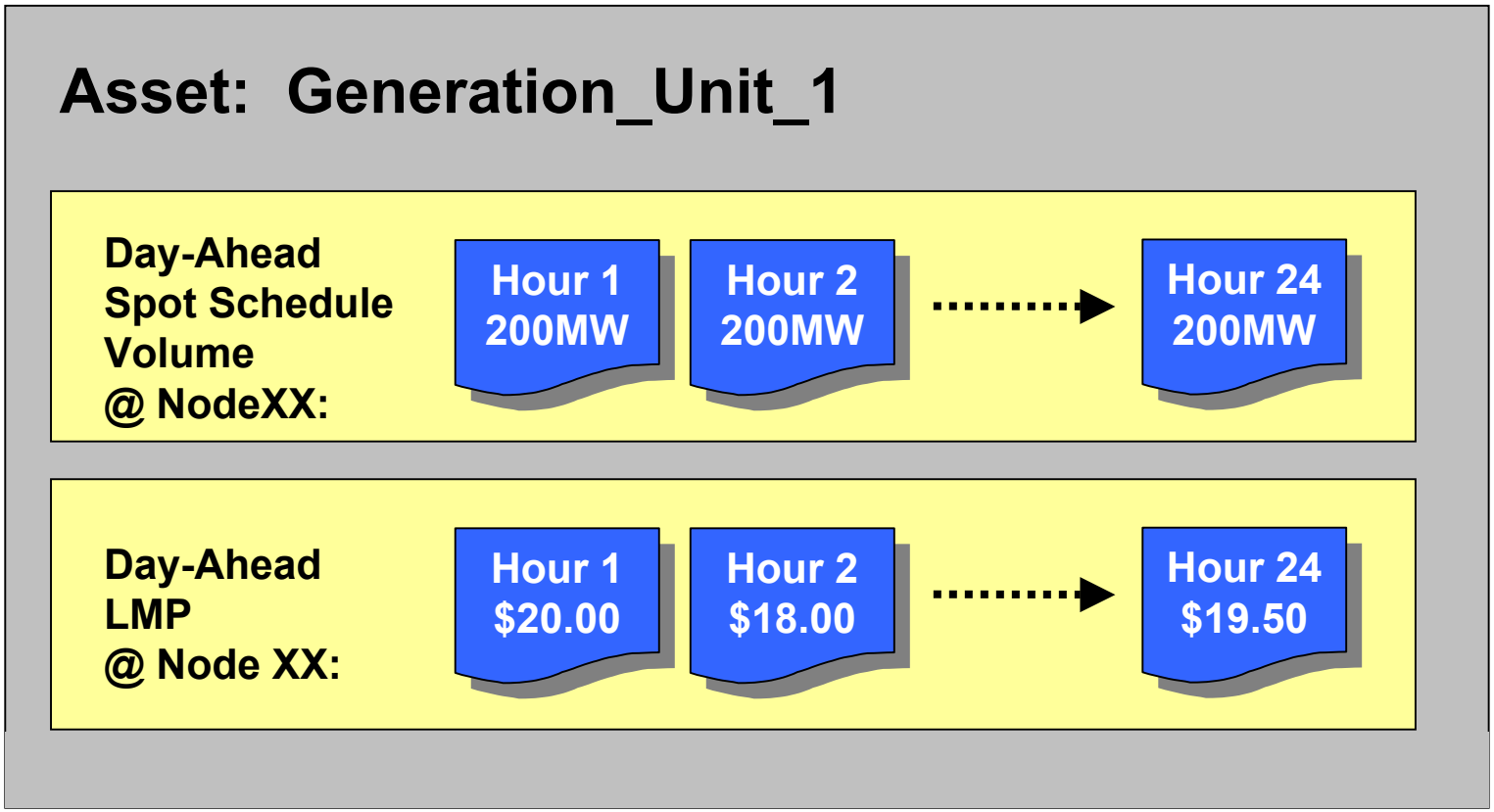
- Billing Determinants in this section are the same for the entire market, regardless of participant or location
- Each Billing Determinant value is shown to the interval level
- Unit (ex. MW, %, $) varies depending on Billing Determinant

Sample Illustration



Settlement Statement MP Section

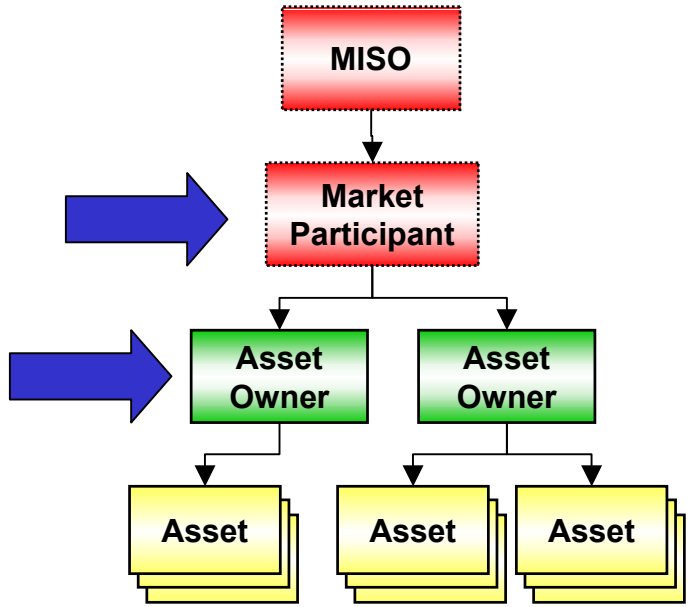
- Billing Determinants in this section are specific to an Asset or CPNode. (Examples include Locational Marginal Prices, Meter Volumes, Schedule Volumes, etc)



Sample Illustration

Summary Statements

- Summary Statements occur at Asset Owner level and MP Level
- Summary Statements contain an aggregated dollar amount for each charge type for entire execution day



Sample Illustration

Day-Ahead Spot Schedule Amount:	s7 $200.00	s14 $10.00	s55 $2.00	s105 $0.00	Total $212.00

Portal XML Viewer: Settlement Statements

- MP must have a valid digital certificate and Internet Explorer v6.0 or higher
- Viewer is an interface that provides a “user friendly” view of statements posted on MISO portal
- Settlement statements are formatted into Header, Summary Information or Statement Line Items, Market Wide determinants, Asset Owner billing determinants sections
- Summary statements are formatted into Header and Summary Information sections

Day-Ahead Spot Schedule Amount

- This charge type is associated with generation or load that cleared in the Day-Ahead market. This could be the result of a Price-Sensitive Bid/Offer or a Self-Schedule
- There will be a DA Spot Schedule charge type line item for each Asset (load or generation) cleared in the Day-Ahead
- Charges are calculated by multiplying the Day-Ahead Spot Schedule by the Day-Ahead LMP at the node of the asset

Additional Information

Calculation Inputs

Example 1 – (Generation)

Example 2 – (Load)

Day-Ahead Spot Schedule Calculation Inputs

Data Description	Data Source	Data Location
• Day-Ahead Spot Schedule (Gen or Load)	• MISO publishes DA cleared bids/offers at 1500h each day	• DA Schedule is sent directly to the MP
• Day-Ahead Financial Schedule	• Sent by MP to MISO	• Financial Schedules can be viewed in FinSched tool
• Day-Ahead LMP	• MISO publishes Day-Ahead LMP for each CPNode at 1500h	• MISO Portal

Day-Ahead Spot Schedule Example 1 – (Generation)

Day-Ahead Obligation from Financial Schedules

Day-Ahead Financial Schedule Obligation = Day-Ahead Financial Schedule (Seller) - Day-Ahead Financial Schedule (Buyer) → 80 MW - 0 = 80 MWh

Day-Ahead Spot Schedule Amount

Day-Ahead Energy Amount = (Day-Ahead Spot Schedule + Day-Ahead Financial Schedule Obligation) x Day-Ahead LMP

$ -9200.00 CREDIT = (-1000 MW + 80 MW) x $ 10.00 LMP

Not on statement

Bill Determinants (on statement)

Real-Time Energy Amount

- This charge type is associated with generation or load that occurs in the Real-Time. The load and generation quantities are the actual or estimated meter values submitted by the MDMA (minus the Day-Ahead Schedule)
- There will be a Real-Time Energy Amount charge type line item for each Asset (load or generation)
- Charges are calculated by determining deviation from the Day-Ahead Spot Schedule and multiplying the deviation by the Real-Time LMP

Additional Information

Calculation Inputs

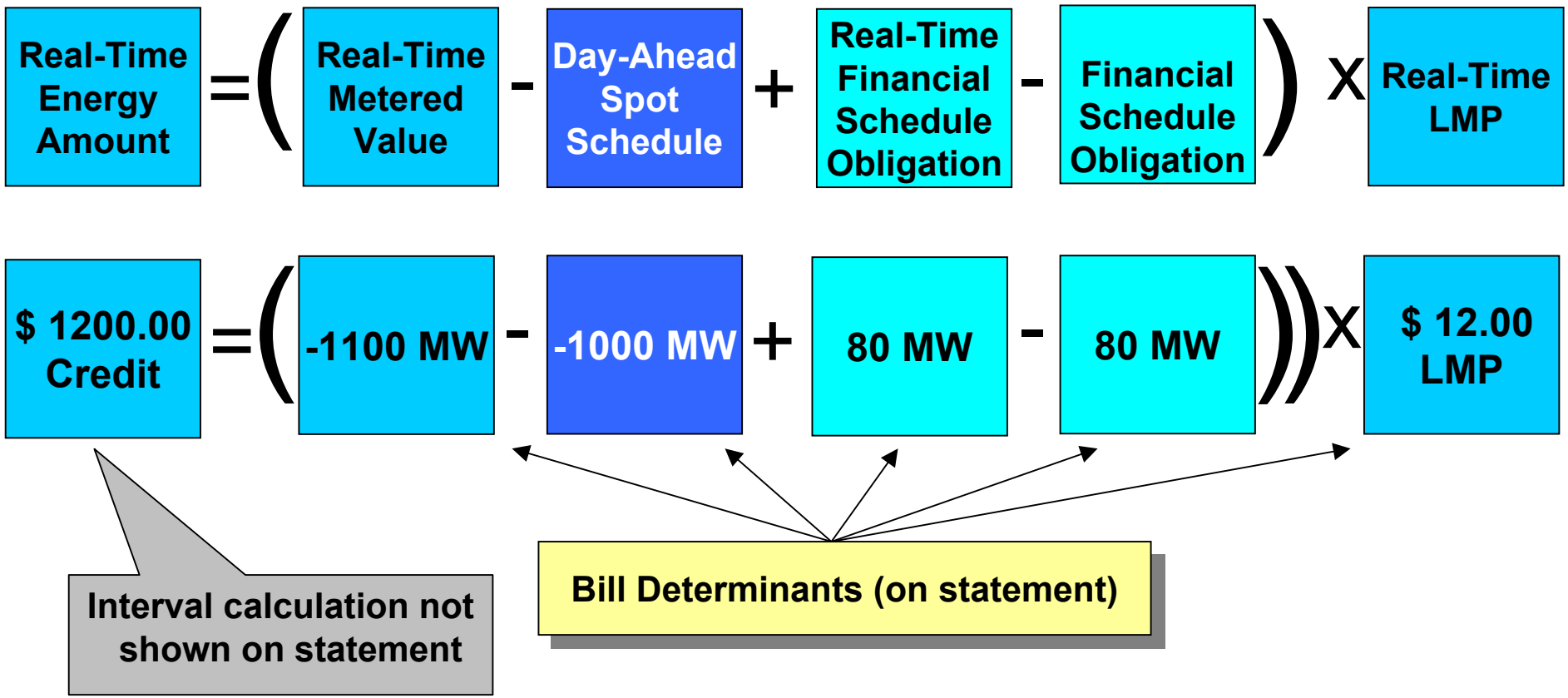
Example 1 – (Generation)

Example 2 – (Load)

Real-Time Energy Amount Calculation Inputs

Data Description	Data Source	Data Location
• Day-Ahead Spot Schedule (Gen or Load)	• MISO publishes DA cleared bids/offers at 1500h each day	• DA Schedule is sent directly to the MP
• Day-Ahead and Real-Time Financial Schedules	• Sent by MP to MISO	• Financial Schedules can be viewed in FinSched tool
• Real-Time Generation/Load	• Sent by MDMA to MISO • MISO Estimates if necessary	• The MP must obtain this from the MDMA. MISO does not post meter data (private)
• Real Time LMP	• MISO publishes RT LMPs for each CPnode (1-6 Days)	• MISO Portal

Real-Time Energy Amount (Generation)



Settlement Dispute Objectives

- Provide an understanding of the participant roles associated with Settlement Disputes
- Describe the dispute process and timeline
- Describe the various dispute statuses and activities
- Describe how to submit and withdraw Settlement Disputes

Settlement Disputes

- A settlement dispute is a means through which a Market Participant may challenge factors utilized by MISO to produce charges and credits on settlement statements or invoices for a specific Operating Day.

Overview of Settlement Disputes

- Settlement Disputes (Service Request) are submitted by Market Participants via the MISO Portal
- A Settlement Statement or Invoice recipient must submit disputes via the Portal within 10 calendar days from the date of issue.
- MISO will make a reasonable attempt to resolve the dispute within 30 calendar days after submission. If more time is needed, the statement or invoice recipient will be notified.
- The necessary adjustments for each dispute will be posted on the next scheduled settlement statement, or via a Resettlement if necessary.

Settlement Dispute Roles

Market Participant

- Review and validate Settlement Statements and Invoices
- When discrepancies occur, submit a Settlement Dispute via the MISO Portal, including any supporting documentation
- Monitor dispute status via the MISO Portal

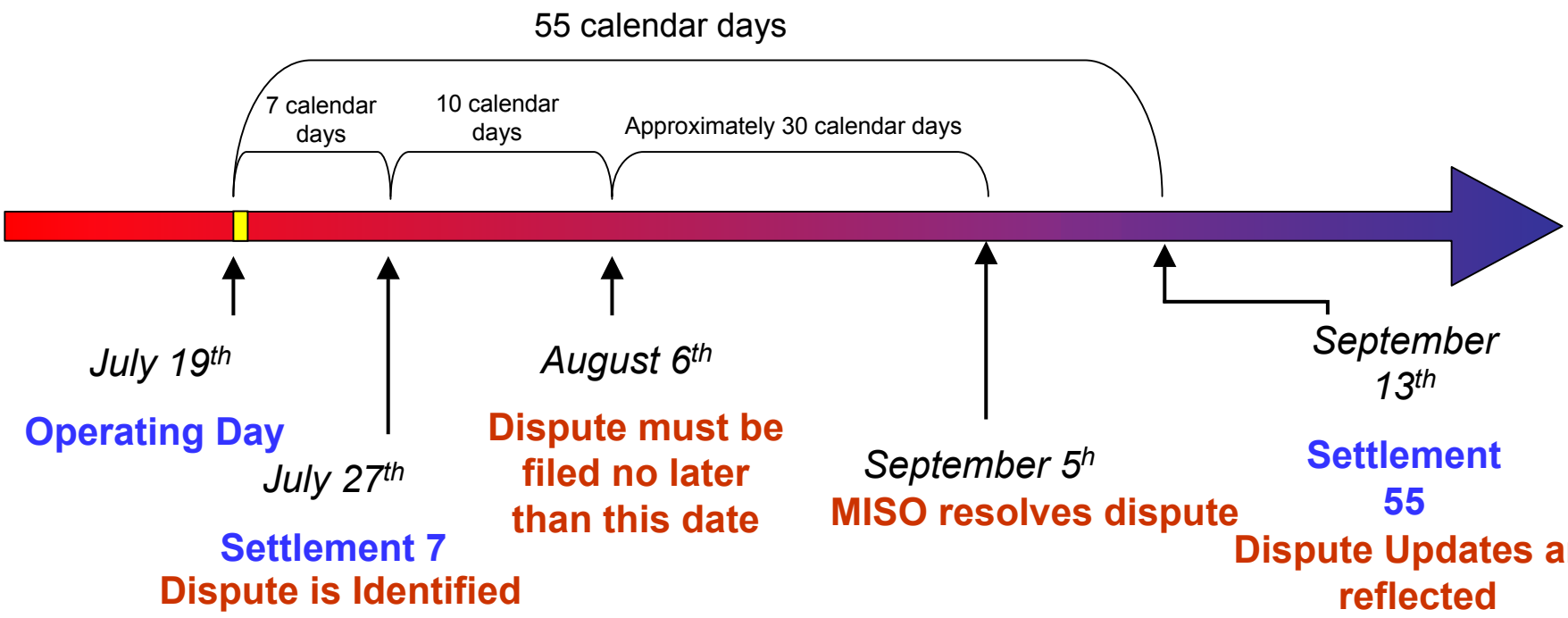
Settlement Dispute Roles

MISO

- Receive dispute and verifying it for timeliness and proper supporting information
- Research dispute and make all reasonable efforts to resolve the dispute within 30 days of receipt
- Communicate any dispute status updates to Market Participants via the MISO Portal
- Make any necessary adjustments on the next available Settlement Statement for that Operating Day

Settlement Dispute Calendar Example

Calendar Year 2004



Settlement Dispute Statuses

- Each dispute is tracked throughout the process and assigned the following statuses:
  - New
  - Open
  - Deferred
  - Denied
  - Closed
  - Granted
  - Granted with Exceptions
  - Withdrawn

Settlement Disputes: Data Requirements

- Request Type
- Statement Type
- Dispute Amount
- Statement ID
- Charge Type
- Operating Date
- Start/End Interval
- Node
- Market Participant
- Description
  - Proposed Resolution

Disputes

- Upon submitting a dispute the Market Participant will receive a confirmation and an Request ID
- Submitted disputes can be found on the MISO portal through a Search tool
  - Request ID
  - Other Criteria
- Updating submitted disputes
- Withdrawing a submitted dispute
- MP will receive an email upon any change in dispute status

- Lesson 1: Bids and Offers
- Lesson 2: Physical and Financial Schedules
- Lesson 3: Financial Transmission Rights
- Lesson 4: Settlements
- Lesson 5: Market Transition

Schedule

October 2003

November 2003

December 2003

January 2004

Control Area Readiness

Data Exchange XML	
Scheduled Start	Scheduled Finish
5/19/03	10/31/03

Data Exchange ICCP	
Scheduled Start	Scheduled Finish
9/22/03	10/17/03

Control Area Reimbursement	
Scheduled Start	Scheduled Finish
10/20/03	11/14/03

Control Area Interface

Open Loop Control	
Scheduled Start	Scheduled Finish
12/1/03	12/19/03

Closed Loop Control	
Scheduled Start	Scheduled Finish
12/1/03	12/19/03

Day Ahead and Hourly Interface	
Scheduled Start	Scheduled Finish
1/5/04	1/16/04

Market Participant Readiness

Security Test	
Scheduled Start	Scheduled Finish
5/19/03	10/31/03

Data Exchange XML	
Scheduled Start	Scheduled Finish
6/23/03	10/31/03

Market Participant Interface

Data Submittal and Query	
Scheduled Start	Scheduled Finish
11/03/03	11/14/03

Data Notification	
Scheduled Start	Scheduled Finish
11/10/03	11/21/03

Market Participant Day in a Life (Basic)

Day-Ahead Assessment	
Scheduled Start	Scheduled Finish
1/5/04	1/16/04

FTR Allocation and Auction	
Scheduled Start	Scheduled Finish
12/15/03	12/19/03

Real-time Market	
Scheduled Start	Scheduled Finish
1/5/04	1/16/04

Settlements and Invoicing	
Scheduled Start	Scheduled Finish
1/19/04	1/30/04

MISO Operational Readiness

Performance Testing	
Scheduled Start	Scheduled Finish
9/8/03	10/3/03

End-to-End Test	
Scheduled Start	Scheduled Finish
10/6/03	10/31/03

MP Interface Scope

October 2003 | November 2003 | December 2003 | January 2004 | February 2004

Market Participant Interface

Data Submittal and Query		Data Notification	
Scheduled Start	Scheduled Finish	Scheduled Start	Scheduled Finish
11/03/03	11/14/03	11/10/03	11/21/03

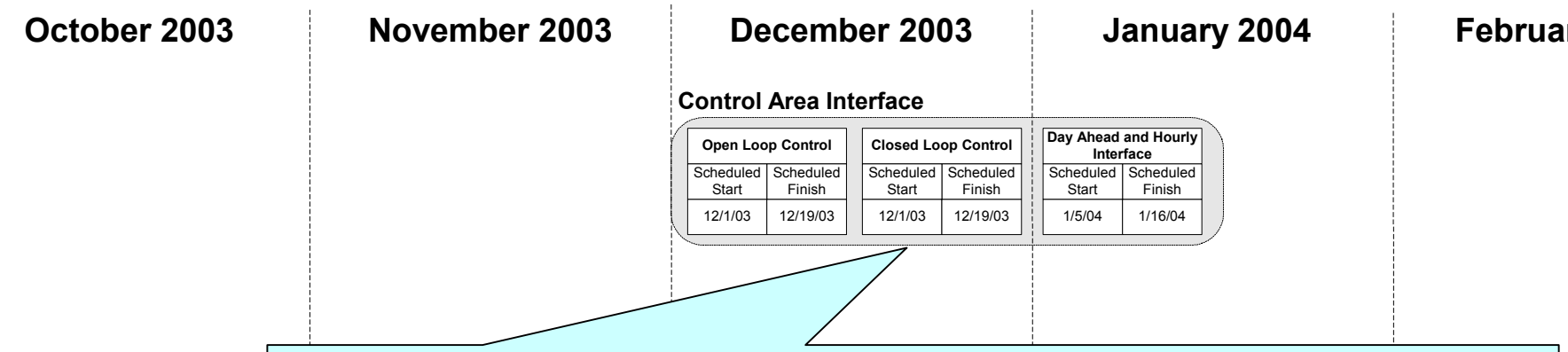
Objective

Market Participant Interface Testing helps ensure that Market Participants can properly exchange XML data with MISO. The test also introduces Market Participants to the MMI Portal.

Benefits

- Tests XML connectivity, security, and data exchange.
- Introduces data required by MISO to run market.
- Helps identify market participants that require additional assistance to participate in market transition.

CA Interface Test Scope



Objective

The Control Area Interface Tests provide Control Areas with opportunities to interact in a simulated Day-Ahead and Hourly environment and to maintain Area Control Error in a simulated Real-Time environment.

Benefits

- Provides operational test of ICCP and XML interface.
- Introduces data required by MISO to run market.
- Verifies the Control Area's ability to follow the market timeline.

Midwest Market Initiative

Day in the Life Scope

October 2003 | November 2003 | December 2003 | January 2004 | February 2004

Market Participant Day in a Life (Basic)

FTR Allocation and Auction		Day-Ahead Assessment		Real-time Market		Settlements and Invoicing	
Scheduled Start	Scheduled Finish	Scheduled Start	Scheduled Finish	Scheduled Start	Scheduled Finish	Scheduled Start	Scheduled Finish
12/15/03	12/19/03	1/5/04	1/16/04	1/5/04		1/19/04	1/30/04

Market Participant Day in a Life (Enhanced)

Day-Ahead Assessment		Real-Time Market		Settlements and Invoicing	
Scheduled Start	Scheduled Finish	Scheduled Start	Scheduled Finish	Scheduled Start	Scheduled Finish
2/2/04	2/13/04	2/2/04	2/13/04	2/16/04	2/27/04

Objective

The Day in the Life Tests provide Market Participants with opportunities to interact in simulated Day-Ahead and Real-Time market environments. Basic and enhanced business scenarios will be scripted.

Benefits

- Provides operational test of core MMI systems.
- Verifies the Market Participant's ability to follow the market timeline.
- Provides "End-to-End" results for external training and confidence.

MISO

Questions