Joint Stakeholder Meeting

ISO-NE and NYISO Inter-Regional Interchange Scheduling (IRIS)

March 7, 2011 / Springfield, MA

Agenda

Today:

- Welcome and Overview
- External Interface: Congestion and FTRs
- Cross-Border Fee Impacts
- Capacity Import Issues
- Q & A Generally
- DBD Summary

Joint Stakeholder Meetings

Purpose:

- **Discuss** white paper's options, pros/cons, how they work, rationale, & likely impact on the markets
- **Gather stakeholder input** on merits, concerns, questions
- **Forge consensus** on a design option the ISOs can implement

Joint ISO white paper:

- **Presents** in-depth analysis of problems, solution options, rationales, and joint ISO recommendations for reforms.

Presentation Plan for Element Details

Day 1 (1/21, AM): Current system and IRIS benefit analysis

(1/21, PM): RT scheduling system (Tie Opt & CTS)

Day 2 (2/14): RT Scheduling (CTS), DA & RT market linkages; DA external transactions; interface settlements & pricing

Day 3 (3/7): FTRs and congestion, NCPC & fee recommendations, conforming capacity rule changes

Day 4 & 5 (3/28, 4/28): Q&A, follow-up's on additional detail as requested, discussion of DBD elements

Solution Options: Main Elements

Solution Options: Six Key Elements

1. **New RT Inter-Regional Interchange System** (IRIS)
   - *Two IRIS options for stakeholder consideration (next).*
2. **Higher-frequency** schedule changes (15 min)
3. **Eliminate NCPC** credits/debits & fees on ext. txns
4. **DA market:** External txn remain similar to today, *plus:*
5. **Congestion pricing** (DA & RT) at external nodes
6. **FTRs** at external interfaces (NY/NE)

Real-Time Interface Scheduling (IRIS)

- **Design Objectives:**
  1. **Equalize LMPs** at interface at time schedule is set;
  2. **Update** real-time schedule as frequently as feasible.
- **Two design options** for real-time interface scheduling with greatest potential for efficiency improvement:
  - **Tie Optimization** (TO)
  - **Coordinated Transaction Scheduling** (CTS)
- **Both are market-based solutions, but differ** in the market information they require of market participants.

DA Congestion and TCC/FTRs

The Main Points

- **NY and NE Day-Ahead markets clear separately**
  - DA market offers submitted *separately* to each ISO's market
- **Each DA market will establish a congestion price at the external interface** (a component of the LMP)
  - DA congestion price set same way under either IRIS option
- **Each ISO's DA congestion revenue** flows to holders of its FTR/TCCs to/from the external interface and internal locations

Day Ahead Congestion Examples

- **Next**: An example of **DA market clearing** and **congestion pricing** at the external interface.

- **This will show** how money flows between:
  - **Participants scheduling DA** at a congested interface
  - The **TCC/FTR holders** to/from interface in each ISO.

- **Then: Use DA examples** to show **RT congestion pricing** and settlements under IRIS

About Day Ahead Examples

- The following DA market examples show clearing at the external interface **separately for each ISO.**
- Examples show how clearing with DA congestion would work **under IRIS** (either design option)
  - **Process differs** from how it works today in NE (a lot)
  - **Process similar** to how it works today in NY
- Examples assume **no losses and no *internal* congestion** (for simplicity)

NYISO DA Congestion Example: Offers

Gen ID NY	Gen MW NY	Gen $/MW NY
123	100	$48.00
234	190	$48.25
345	210	$48.75
456	100	$48.85
567	325	$49.00
678	200	$50.00
789	100	$53.00
890	275	$55.00
901	150	$56.00
912	290	$58.00

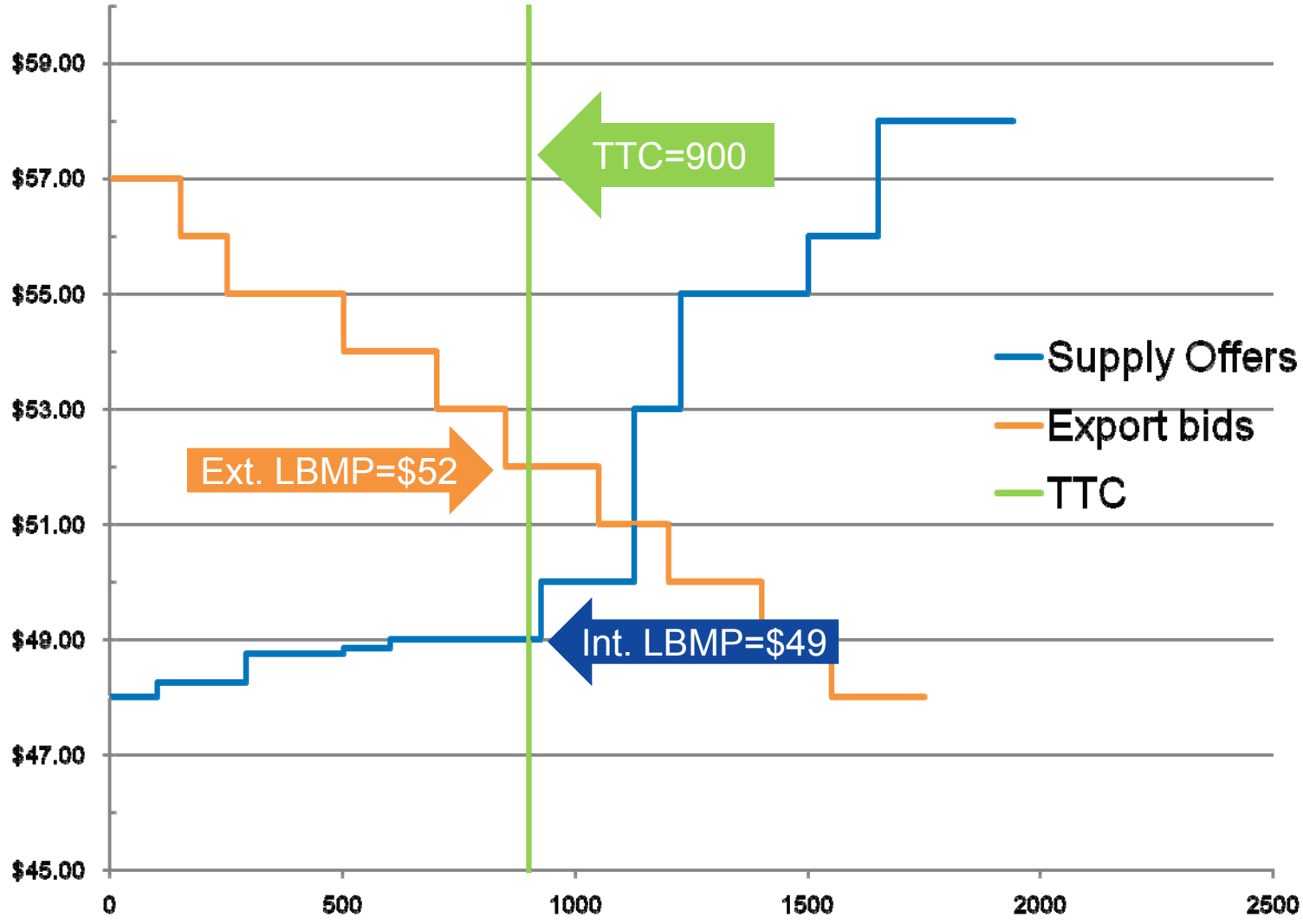
Note:
NY gen stack shown is *above* the gen needed to meet NY DA load

TTC = 900 MW

Exp. Part. ID	Exp. MW	Exp. $/MW
A	150	$57.00
G	100	$56.00
C	250	$55.00
D	200	$54.00
E	150	$53.00
F	200	$52.00
X	150	$51.00
H	200	$50.00
I	150	$49.00
J	200	$48.00

What clears? What is LMP?

NYISO DAM: External Interface Clearing



NYISO DA Example – *What Cleared?*

Gen ID NY	Gen MW NY	Gen $/MW NY
123	100	$48.00
234	190	$48.25
345	210	$48.75
456	100	$48.85
567	325	$49.00
678	200	$50.00
789	100	$53.00
890	275	$55.00
901	150	$56.00
912	290	$58.00

Marginal Seller

Marginal Buyer

TTC = 900 MW

Exp Part Id	Exp. MW	Exp. $/MW
A	150	$57.00
G	100	$56.00
C	250	$55.00
D	200	$54.00
E	150	$53.00
F	200	$52.00
X	150	$51.00
H	200	$50.00
I	150	$49.00
J	200	$48.00

NY Internal LBMP = **$49**

NY External LBMP = **$52**

NYISO DA Example - Summary

- **The economic principle:**
  - External node congestion charge ($/MWh) = difference in marginal buyer and sellers' offer prices (at TTC limit)
- **This example**:
  - External node NY DA LMP = $52 / MWh (*marginal buyer*)
  - Internal NY DA LMP = $49 / MWh (*marginal seller*)
  - NY DA congestion charge = **$ 3** / MWh at interface
- **NY DA congestion surplus** at external interface?
  - $3 / MWh x 900 MW net export [TTC] = **$2700** / hr

A Second DA Example: ISO-NE side

- **DA clearing at the other ISO's external interface:**
  - Need to see credits/charges of a participant in other ISO DA market to walk-thru its net financial position
- **In general: DA market results at the same external interface can differ** in NYISO and ISO-NE:
  - Each ISO's DA market clears its External Transactions **against a different internal generation stacks**
  - **Can produce different DA congestion prices**

ISO-NE DA Congestion Example – Offers

Imp Part ID	Imp. MW	Imp. $/MW
G	100	$50.00
H	250	$51.00
I	200	$51.25
J	200	$51.50
K	250	$52.00
L	200	$52.50
M	150	$52.75
N	200	$53.00
O	150	$54.00
A	200	$55.00

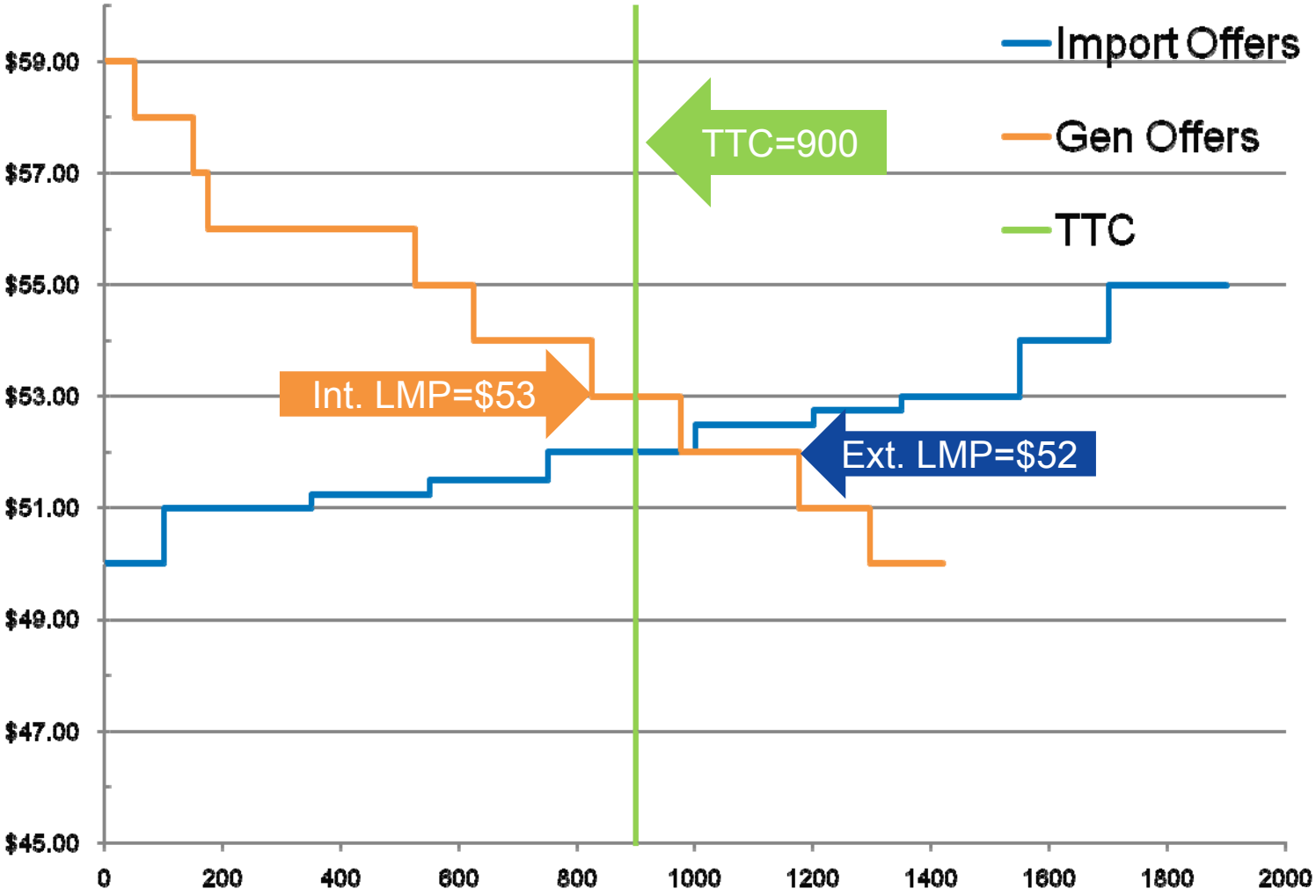
Note:
Offers shown compete to meet top portion of NE day-ahead load (infra-marginal gen stack is omitted)

TTC = 900 MW

Gen ID NE	Gen MW NE	Gen $/MW NE
999	125	$50.00
944	120	$51.00
888	200	$52.00
777	150	$53.00
666	200	$54.00
555	100	$55.00
444	350	$56.00
333	25	$57.00
222	100	$58.00
111	50	$59.00

What clears? What is LMP?

ISO-NE DAM: External Interface Clearing



ISO-NE DA Example – *What Cleared?*

Imp. Part. ID	Imp. MW	Imp. $/MW
G	100	$50.00
H	250	$51.00
I	200	$51.25
J	200	$51.50
K	250	$52.00
L	200	$52.50
M	150	$52.75
N	200	$53.00
O	150	$54.00
A	200	$55.00

NE External LMP = $52

Marginal Offer

Marginal Offer

TTC = 900 MW

Gen ID NE	Gen MW NE	Gen $/MW NE
999	125	$50.00
944	120	$51.00
888	200	$52.00
777	150	$53.00
666	200	$54.00
555	100	$55.00
444	350	$56.00
333	25	$57.00
222	100	$58.00
111	50	$59.00

NE Internal LMP = $53

ISO-NE DA Example - Summary

- **This example**:
  - External node NE DA LMP = $52 / MWh (*marginal seller*)
  - Internal NE DA LMP = $53 / MWh (*marginal buyer*)
  - NE DA congestion charge = **$ -1** / MWh at interface
- **NE DA congestion surplus** at external interface?
  - $ -1 / MWh x -900 MW net import [TTC] = **$900** / hr
- **Now:** Who pays what?
- **And:** Where does that congestion money go?

Settle a Participant Across Markets: Part I

- What does a participant get paid (or pay) in each ISO's DA market settlement?
- Let's consider Participant G's position in detail
  - **In DA markets:**
    - It offered to buy (export) 100 MW in NY
    - It offered to sell (import) 100 MW in NE
    - **Both offers cleared**
- What happens in DA market settlements?

Example: Participant "G" DA transaction

- **DA Settlements:**
  - In NY: "G" Bought 100 MW @ $52 = ($5200) charge
  - In NE: "G" Sold 100 MW @ $52 = **$5200** credit
  - A **net credit of $0 DA** on the external transaction
- **DA internal LMPs (energy): $49 in NY, $53 in NE**
  - **Did "G" get a $4 / MWh profit** by "moving power" from lower → higher cost region with its external transaction?
  - **No.** It was charged $4 / MWh to move power across the congested interface into NE.

Summary Points *So Far*

- **Parties that wish to schedule** DA external transactions do so like today.
- **Each DA market will establish a congestion price at the external interface** (a component of the LMP)
  - In general, DA LMPs and congestion charge at external interface **could be different** in each ISO's DA market
- **Each ISO's DA congestion revenue** flows to holders of its FTR/TCCs to/from the external interface and internal locations (*NEXT…)*

TCC / FTR at External Interface:

How the money flows

Main Points

- **Today:** Each ISO (separately) issues TCC/FTRs between its external nodes and internal locations
- **A TCC/FTR holder** is paid (or pays) the difference in the DA LMP congestion component (CC) between:
  - The external node *v.* the internal location (node/hub/zone)
  - **This is true today** and under IRIS (either design option)
- **What changes?** If DA CC at ext. interface changes, the value of a TCC/FTR to/from it will change.

Links from DA LMP to FTR/TCC at Interface

TCC/FTR Examples:

- **Next**: We again consider a (simple) example at the level of an individual participant with a DA position.
- **Then:** We consider how congestion surplus accrues at the level of ISO settlements in each ISO
- There is no "common" congestion revenue fund under IRIS: Each ISO's separate FTR/TCC rules apply.

Settle a Participant Across Markets: Part II

- **What if Participant G held a TCC/FTR** to/from the external interface to "cover" its DA ext. transaction?
- Let's now assume Participant G holds:
  - **100 MW TCCs** in NYISO that sink at the interface
  - **100 MW FTRs** in ISO-NE that source at the interface
- **What is "G"s net position?**

Settlements of Participant "G"

- **In NY:**
  - "G" Bought (exported) 100 MW @ $52 = ($5200) charge
  - "G" credited for 100 MW of TCC @ $3 = **$300** credit
  - **Net NY settlement** = ($4900) charge
- **In NE:**
  - "G" Sold (imported) 100 MW @ $52 = **$5200** credit
  - "G" debited for 100 MW of FTR @ $-1 = **$100** credit
  - **Net NE settlement** = **$5300** credit
- "G"s net position = **$400** credit
- FTR/TCC 'covered' the interface congestion charges

ISO-Level Settlement Examples

- **Purpose:** Show how DA congestion surplus at external interface flows thru to TCC / FTR holders
- Work through some of the previous examples to show the **how the money balances** between all participants
- **Same assumptions:**
  - DA prices and cleared MW same as previous examples
  - No losses or *internal* congestion (for simplicity)
    … *Internal congestion adds a lot more numbers, no insights*

NYISO DAM Settlements Overview

	DA External LMP	**$52**
1	Export MW (From NY DAM Example)	-900
2	Charges to Exports (@ DA energy + CC = $52/MWh)	($46,800)
	DA Internal LMP	**$49**
3	Internal Load MW (Assumed)	-20,000
4	Charges to Internal Load	($980,000)
5	Internal Generator MW	20,900
6	Credits to Internal Generators	$1,024,100
7	Congestion Surplus to TCC holders	$2700
8	**Net Settlement (Credits – Charges)**	**$0**

NY DA market net settles to zero, as required

ISO-NE DAM Settlements Overview

	DA External LMP	**$52**
1	Import MW (From NE DAM Example)	900
2	Credits to Exports (@ DA energy + CC = $52/MWh)	$46,800
	DA Internal LMP	**$53**
3	Internal Load MW (Assumed)	-16,000
4	Charges to Internal Load	($848,000)
5	Internal Generator MW	15,100
6	Credits to Internal Generators	$800,300
7	Congestion Surplus to FTR holders	$900
8	**Net Settlement (Credits – Charges)**	**$0**

NE DA market net settles to zero, as required

Summary Points

- Each ISO's DA market sets a **congestion component** of the market-clearing LMP at **external interface**
- **DA congestion revenue** flows to TCC/FTR holders
- **Issuance and admin** of TCC/FTRs **same as today**
  - **Separately administered** by each ISO
  - **Defined** between external node and internal locations
- **Value of TCC/FTR will change**, b/c value of congestion component at external interface may change

RT Congestion Prices Under IRIS

The Big Picture

- **Most congestion revenue** accrues in DA markets
  - RT congestion residuals (revenue) are relatively small
- **Setting correct RT congestion prices** matters:
  - **Affects DA market** bids and prices
  - **Signals (marginal) value** of transmission capacity in RT
  - **Affects RT settlements** in specific situations
    - E.g., RT transmission constraints bind, and the participant's DA cleared MW ≠ RT cleared MW)

The Problem Today

At External Interfaces:

- Each ISO **does not have info necessary** to determine (economically efficient) RT congestion prices
  - NE doesn't even try (no external congestion component at all)

Why? Setting (econ-efficient) RT congest. Prices requires

- RT marginal resource(s) on each side of the interface;
- Coordinated clearing/dispatch that identifies the '*shadow cost*' of binding Transmission constraint(s) at an external interface.

IRIS Solutions

- **Economic principle:** Total RT congestion price should equal difference in RT LMPs of marginal resource on each side of the transmission constraint
  - **Why?** That is marginal value of transmission capacity in reducing total system production costs.
- **Tie Optimization** can set economically-correct RT congestion charges across NY/NE interfaces
- **CTS** sets "approx. correct" RT congestion charges.
  - "Approx" becomes "correct" if interface bids are zero.

Practicalities

- **Suppose** total RT congestion cost equals difference in RT LMPs of marginal resource on each side
- **Practice:** Can't have each ISO charge this total – it would charge participants using interface *twice.*
- **Issue:** How should each ISO set the congestion component of its RT LMP at external node so that:
  a) No double-counting issues arise, and
  b) Total (sum of ISO's) congestion charges equals the economically correct total congestion cost across interface?

Practicalities, Resolved

Simplest Option

- Each ISO sets an LMP congestion component equal to ½ of the total RT congestion cost across interface.
- **Why this approach?**
  - Simple, transparent, efficient (under Tie Optimization)
  - Gets total congestion charge economically correct
  - Equal allocation of any RT congestion revenue to each region
- **Some examples will illustrate this, next.**

RT Congestion Prices:

Tie Optimization Examples

Tie Optimization RT Examples

- **Two examples** show how RT congestion prices are set with Tie Optimization of NY/NE interface.
- **Same assumptions:**
  - DA prices, gen stacks, and cleared MW as previous examples
  - No losses or *internal* congestion (for simplicity)
- **Example 1:** RT and DA constrained, at same TTC
- **Example 2:** RT TTC < DA TTC (e.g. RT de-rating)

RT Congestion Examples: Gen Stacks in NY & NE

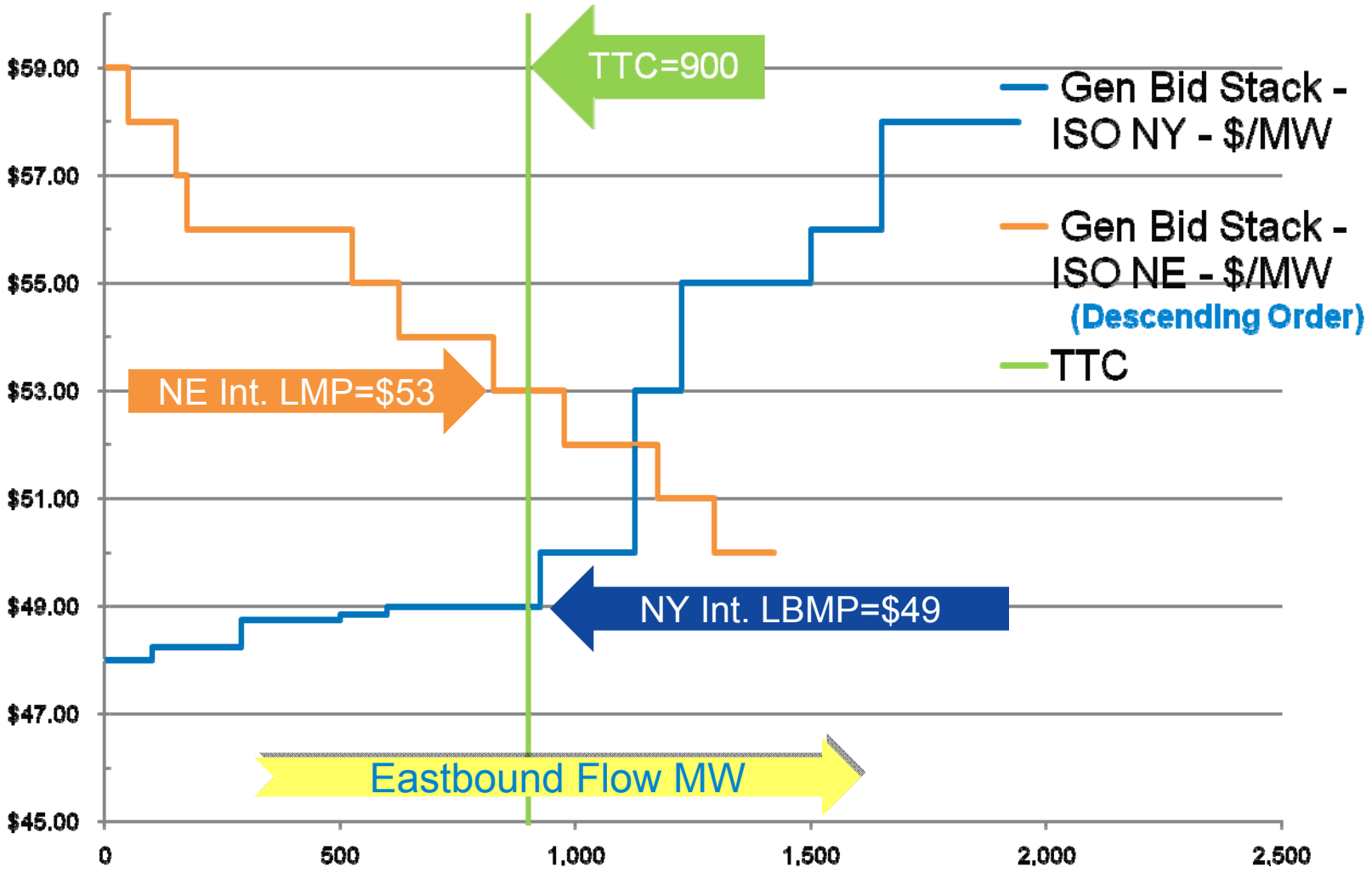
Gen ID NY	Gen MW NY	Gen $/MW NY
123	100	$48.00
234	190	$48.25
345	210	$48.75
456	100	$48.85
567	325	$49.00
678	200	$50.00
789	100	$53.00
890	275	$55.00
901	150	$56.00
912	290	$58.00

RT TTC = 900 MW

Gen ID NE	Gen MW NE	Gen $/MW NE
111	50	$59.00
222	100	$58.00
333	25	$57.00
444	350	$56.00
555	100	$55.00
666	200	$54.00
777	150	$53.00
888	200	$52.00
944	120	$51.00
999	125	$50.00

What are LMPs and Congest. Prices?

RT Congestion Example 1: Tie Optimization



RT Congestion Example 1: Tie Optimization

Gen ID NY	Gen MW NY	Gen $/MW NY
123	100	$48.00
234	190	$48.25
345	210	$48.75
456	100	$48.85
567	325	$49.00
678	200	$50.00
789	100	$53.00
890	275	$55.00
901	150	$56.00
912	290	$58.00

NY Internal LMP = $49

RT TTC = 900 MW

Quantity Cleared at Interface = 900 MW

Partially Cleared

Partially Cleared

Congestion Prices?

Gen ID NE	Gen MW NE	Gen $/MW NE
111	50	$59.00
222	100	$58.00
333	25	$57.00
444	350	$56.00
555	100	$55.00
666	200	$54.00
777	150	$53.00
888	200	$52.00
944	120	$51.00
999	125	$50.00

NE Internal LMP = $53

RT Congestion Example 1 - Summary

- **This example**:
  - Internal NE RT LMP = **$53** / MWh (*marginal resource*)
  - Internal NY RT LMP = **$49** / MWh (*marginal resource*)
  - "True" RT congestion cost = **$ 4** / MWh at interface
- **Congestion component** of RT LMP at external nodes:
  - NY RT Congest Price = **$ 2**, External NY RT LMP = **$51**
  - NE RT Congest Price = **$-2**, External NE RT LMP = **$51**
- **Now:** Who pays what?
- **And:** How do these prices affect RT settlement?

Example 1: RT Settlements – Tie Optimization

- **In Example 1:**
  - Quantity that cleared DAM (both) at interface = **900** MW
  - Quantity that is scheduled in RT by Tie Optim = **900** MW
  - With Tie Optimization, all participants' DA external transactions (that clear both markets) are **deemed to flow** for RT settlement purposes.
- **With zero deviations?** RT settlements are all zeros
- This illustrates how **congestion accrues in DA** markets, not in RT settlements (typically).

Example 2: RT TTC changes from DA

When do RT congest. prices affect RT settlement?

- **If (and only if):**
  a) RT TTC is **binding** @ interface; and
  b) RT TTC **differs** from DA cleared MW at interface
- **Example:** Change the previous example from
  900 MW TTC → **500** MW RT TTC (*de-rating*)
- **Only in RT** we see changes in participants' cash flows.
- RT congestion revenue can be **positive or negative**

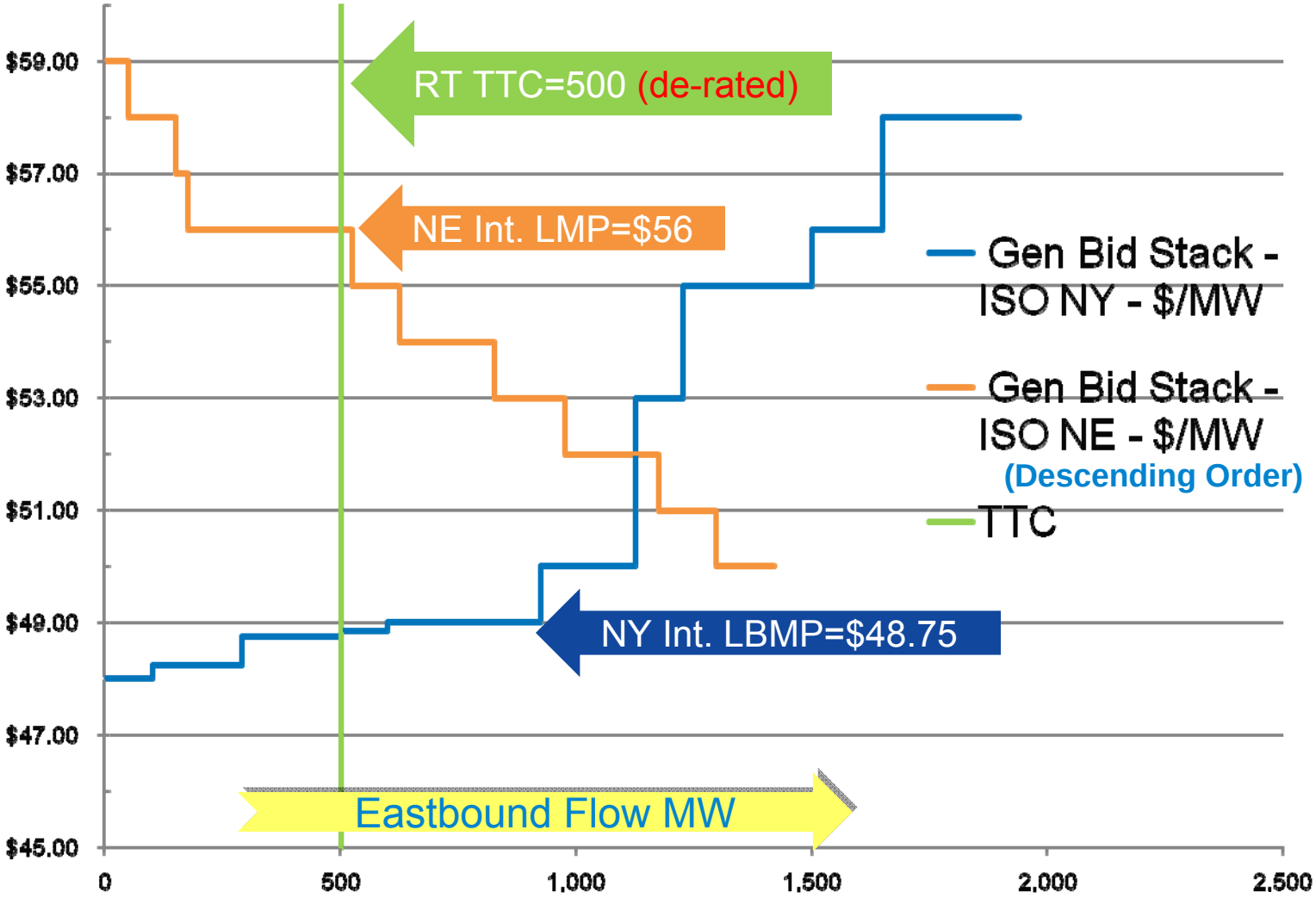
RT Gen Stacks in NY & NE – Same as Previous

Gen ID NY	Gen MW NY	Gen $/MW NY
123	100	$48.00
234	190	$48.25
345	210	$48.75
456	100	$48.85
567	325	$49.00
678	200	$50.00
789	100	$53.00
890	275	$55.00
901	150	$56.00
912	290	$58.00

TTC = 500 MW

Gen ID NE	Gen MW NE	Gen $/MW NE
111	50	$59.00
222	100	$58.00
333	25	$57.00
444	350	$56.00
555	100	$55.00
666	200	$54.00
777	150	$53.00
888	200	$52.00
944	120	$51.00
999	125	$50.00

RT Congestion Example 2 – Tie Optimization



RT Prices – under Tie Optimization –Congestion

Gen ID NY	Gen MW NY	Gen $/MW NY
123	100	$48.00
234	190	$48.25
345	210	$48.75
456	100	$48.85
567	325	$49.00
678	200	$50.00
789	100	$53.00
890	275	$55.00
901	150	$56.00
912	290	$58.00

NY Internal LMP = **$48.75**

RT TTC = **500** MW
Quantity Cleared
Interface = **500** MW

Partially Cleared

Partially Cleared

Congestion Prices?

Gen ID NE	Gen MW NE	Gen $/MW NE
111	50	$59.00
222	100	$58.00
333	25	$57.00
444	350	$56.00
555	100	$55.00
666	200	$54.00
777	150	$53.00
888	200	$52.00
944	120	$51.00
999	125	$50.00

NE Internal LMP = **$56**

RT Congestion Example 2 - Summary

- **This example**:
  - Internal NE RT LMP = **$56** / MW (*marginal resource*)
  - Internal NY RT LMP = **$48.75** / MWh (*marginal resource*)
  - "True" RT congestion cost = **$ 7.25** / MWh at interface
- **Congestion component** of RT LMP at external nodes:
  - NY RT Congest Price = **$ 3.625**, External NY RT LMP = **$52.375**
  - NE RT Congest Price = **$-3.625**, External NE RT LMP = **$52.375**
- **Now: How do these prices affect RT settlements?**

RT Congestion Example 2 – RT Settlements

- **Assume:** De-rating of TTC in RT (to 500 MW) from DA (900 MW) is only cause of RT deviations from DA
- **RT Generation changes** due to the reduced flow:
  - **Down in NY** by 400 MW due to the **reduced exports**
  - **Up in NE** by 400 MW due to the **reduced imports**
- **Under Tie Optimization**: All DA cleared external transactions are "deemed to flow" in RT, no deviations
- **400 MW reduced flow settles as counterflow** of scheduled in RT by Tie Optimization.

NYISO RT Settlements: Tie Optimization

	RT External LMP	**$52.375**
1	Tie Optimization Incremental RT Import MW	+400
2	Inter-ISO Settlement Account Credit (for RT Import)	$20,950
3	DA External Transactions that Flow-Thru MW Deviations	0
4	Charges to External Transactions Deviations	$0
	RT Internal LMP	**$48.75**
5	Internal Load MW Deviations (Assumed)	0
6	Charges to Internal Load Deviations	$0
7	Internal Generator MW Deviations	-400
8	Charges to Internal Generators	($19,500)
9	NYISO RT Congestion Fund Charge	($1450)
10	Net Settlement (Credits – Charges)	$0

ISO-NE RT Settlements: Tie Optimization

	RT External LMP	**$52.375**
1	Tie Optimization Incremental RT Export MW	-400
2	Inter-ISO Settlement Account Charge (for RT Export)	($20,950)
3	DA External Transactions that Flow-Thru MW Deviations	0
4	Charges to External Transactions Deviations	$0
	RT Internal LMP	**$56.00**
5	Internal Load MW Deviations (Assumed)	0
6	Charges to Internal Load Deviations	$0
7	Internal Generator MW Deviations	+400
8	Credit to Internal Generators	$22,400
9	ISO-NE RT Congestion Fund Charge	($1450)
10	**Net Settlement (Credits – Charges)**	**$0**

Key Observations

1. **RT congestion prices under Tie Optimization:**
   - **Simple and transparent** (relative to today, that is)
   - **Economics right:** Total RT congestion cost is correct
   - Allocates RT congestion accruals (if any) in equal measure to each ISO
2. **Who pays/receives** RT congestion **within each ISO?**
   - **No change to 'within ISO' allocations:** Each ISOs existing (and different) rules for allocating RT congestion accruals to participants can stay same.

RT Congestion Prices:

CTS Option Examples

RT Congestion Example 3: Interface Bids

- **Example 3** shows how RT congestion prices are set with Interface Bidding at NY/NE interface.
- **Issue:** RT congestion prices must change to account for Interface Bids, even if all else is same
- **Affects:** DA ETs that do not clear an Interface Bid in RT (even if RT TTC does not change from DA)
- **Assumptions:**
  - DA prices, gen stacks, and cleared MW as previous examples
  - No losses or *internal* congestion (for simplicity)
  - RT and DA constrained, at same TTC (like RT Example 1)

RT Congestion Examples: With Interface Bids

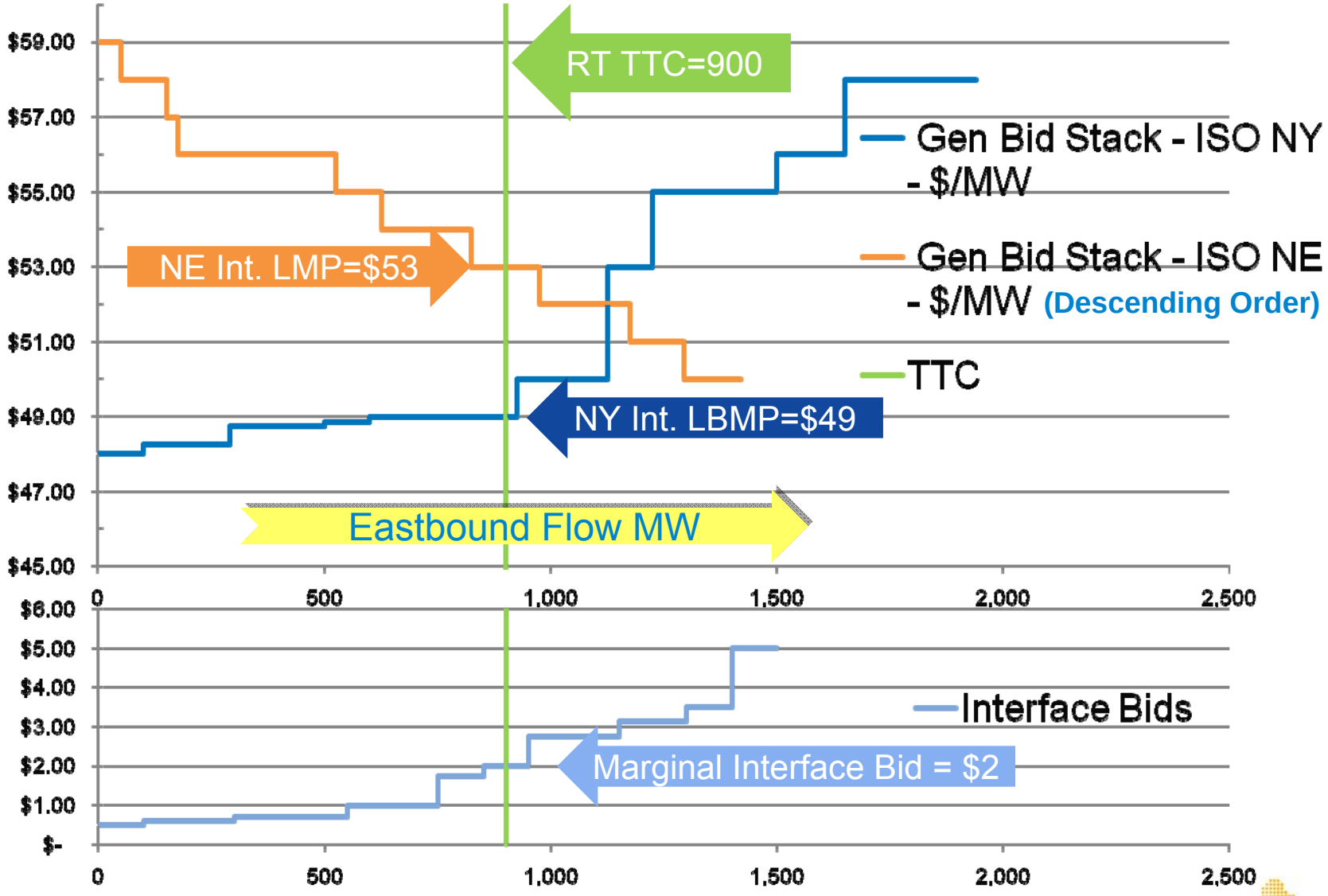
Gen ID NY	Gen MW NY	Gen $/MW NY
123	100	$48.00
234	190	$48.25
345	210	$48.75
456	100	$48.85
567	325	$49.00
678	200	$50.00
789	100	$53.00
890	275	$55.00
901	150	$56.00
912	290	$58.00

IB ID	IB MW NY>NE	IB $/MW
AAA	100	$0.50
BBB	200	$0.60
CCC	250	$0.70
DDD	200	$1.00
EEE	100	$1.75
FFF	100	$2.00
GGG	200	$2.75
HHH	150	$3.15
III	100	$3.50
JJJ	100	$5.00

Gen ID NE	Gen MW NE	Gen $/MW NE
111	50	$59.00
222	100	$58.00
333	25	$57.00
444	350	$56.00
555	100	$55.00
666	200	$54.00
777	150	$53.00
888	200	$52.00
944	120	$51.00
999	125	$50.00

RT TTC = 900 MW

RT Example – CTS – Congestion



RT Congestion Example 3 – CTS

Gen ID NY	Gen MW NY	Gen $/MW NY
123	100	$48.00
234	190	$48.25
345	210	$48.75
456	100	$48.85
567	325	**$49.00**
678	200	$50.00
789	100	$53.00
890	275	$55.00
901	150	$56.00
912	290	$58.00

Int ID	Int MW NY>NE	Int $/MW
AAA	100	$0.50
BBB	200	$0.60
CCC	250	$0.70
DDD	200	$1.00
EEE	100	$1.75
FFF	100	**$2.00**
GGG	200	$2.75
HHH	150	$3.15
III	100	$3.50
JJJ	100	$5.00

Gen ID NE	Gen MW NE	Gen $/MW NE
111	50	$59.00
222	100	$58.00
333	25	$57.00
444	350	$56.00
555	100	$55.00
666	200	$54.00
777	150	**$53.00**
888	200	$52.00
944	120	$51.00
999	125	$50.00

NY Internal LBMP = $49
NY External LBMP = $50

TTC = 900

Partially Cleared

NE Internal LMP = $53
NE External LMP = $52

Example 3: How are congestion prices set?

- "**True" RT congestion** cost is **$4** / MWh
- **Interface Bids** that was Marginal = **$2** / MWh
- **Under CTS, $2** times the RT cleared MW needs to be "set aside" to pay the cleared Interface Bids
- **Means:** Only **$2** in total remains for RT congestion ("true" RT congestion cost, less interface bid pmts)
- **Each ISO** sets its RT congestion price = **$1** / MWh
- **External LMP = Energy LMP + Congestion,** as always.

RT Congestion Example 3 – The #s, again

- **This example**:
  - Internal NE RT LMP = **$53** / MWh (*marginal resource*)
  - Internal NY RT LMP = **$49** / MWh (*marginal resource*)
  - "True" RT congestion cost = **$ 4** / MWh at interface
- **But: We must "set aside" $2 to pay Interface Bids**
  - **Leaves: $2** total congestion charge, with **½ by each ISO**
- **Congestion component** of RT LMP at external nodes:
  - NY RT Congest Price = **$ 1**, External NY RT LMP = **$50**
  - NE RT Congest Price = **$-1**, External NE RT LMP = **$52**

Example 3: Settle a Participant

- **Let's continue to follow Participant G's** settlement between markets into RT
- **Recall:** "G" cleared 100 MW both DAMs, NY → NE
- **G must clear** a matching **Interface Bid** to avoid RT balancing charges
- **If G submitted the IB identified as AAA (cleared):** 100 MW NY RT export position & NE RT import pos'n
- **No deviations in position** between DA and RT, so "G" has $0 net charges in either ISO's RT settlements.

But Wait… Settle a Participant, Part II

- **What if G did not submit an IB**, or submitted IB identified as JJJ (which did not clear)?
- **If G did not clear an IB**, then it would have RT export MW of 0 in NY and import MW of 0 in NE
- **The NY 0 creates a RT deviation** of +100 MW, credited at the NY RT price of **$50** = **$5000**
- **The NE 0 creates a RT deviation** of -100 MW, debited at the NE RT price of **$52** = ($5200)
- **Participant "G" net RT charges** are ($200).

CTS – Key Observations

- RT congestion prices with Interface Bids are **not simple, nor transparent.**
- CTS RT congestion prices **do not reflect "true" economic cost of congestion** at external interface
  - Congestion prices are 'distorted' by interface bids
- If DA markets predict RT prices (on avg), then **TCC/FTR** holders will tend to receive **less congestion revenue under CTS** than under Tie Optimization
  - Expected profit of IB's tends to reduce congestion revenue

Cross Border Fee Impacts

Cross-Border Transaction Fees

- **Proposal to eliminate fees** allocated to external transactions at Roseton/Sandy Pond and 1385 nodes
- **Why?** Reciprocal elimination of charges will lower barriers to economically efficient interchange
- **Applies** to both Tie Optimization (TO) and Coordinated Transaction Scheduling (CTS) proposals

A Road Map

- **Next slides detail:**
  - **ISO-NE** fees and charges impacted
  - **NYISO** fees and charges impacted
  - **Rationale** for eliminating allocation of these fees and charges to NY/NE external transactions

What ISO-NE Fees are Affected?

Four Main Elements:

1. **DA NCPC** at NY/NE interfaces (Roseton & 1385 nodes)
   - *Includes 'in lieu of congestion' credits/debits at these nodes*
2. **RT NCPC** at NY/NE interfaces (Roseton & 1385 nodes)
3. **ISO Self-Funding Tariff Fees** (Roseton & 1385 nodes)
4. **Two Ancillary Services Costs** (Roseton & 1385 nodes)

About ISO-NE Fees and Charges

- **Allocation:** Each of these fees/charges are allocated to (slightly) different 'pools' of market participants
- **Next slides** indicate for ISO-NE:
  - Applicable participant 'pool' for each affected fee or charge
  - 2010 dollar amounts for (1) the two NY/NE external nodes; and (2) the total pool (ISO-NE), if applicable
- **If eliminated at NY/NE nodes:** Most affected fees & charges fall to remaining 'pool' of participants under current cost allocation rules.

ISO-NE Cross Border Fees

1. DA Net Commitment Period Compensation

- *Two types:*

1.A. "Economic" DA NCPC (Pool-wide)

- Covers unrecovered startup, no-load, costs of suppliers in DAM
- Presently allocated to total DA load obligations

- "Economic" NCPC is small DA in NE (most incurred in RT)
- **2010 total DA "Economic" NCPC charges allocated to:**
  - All nodes and Participants pool-wide: **<$5.7 M**
  - ETs at NY/NE interface (Roseton & 1385 nodes) : **<$200K**

ISO-NE Cross Border Fees – *continued*

DA NCPC, Second Type:

1.B. "Non-Economic" DA NCPC (External nodes only)

- Arises from the way the external transactions clear in the *absence of a congestion component* in ISO-NE's external node LMP.
- "Non-Economic" DA NCPC is charged and credited to ET and VT at these nodes only, **not market participants generally**
- **DA congestion pricing** at the NY/NE external nodes **will replace** this category of NCPC.
- 2010 total "Non-Economic" DA NCPC allocated to:
  - ETs at all ISO-NE external nodes: **$4.6 M**
  - ETs at NY/NE interface (Roseton & 1385 nodes only) : **$3.5 M**

ISO-NE Cross Border Fees – *continued*

2. RT "Economic" NCPC

- **RT NCPC** arises because of unrecovered startup, no-load, and other (e.g. canceled start) costs of suppliers
- Presently allocated to total RT **deviations** from DA cleared MW positions (primarily load; but also VT, uninstr gen dev, etc)

- **2010 total RT NCPC charges** allocated to:
  - All nodes and participants pool-wide: **$74 M**
  - ETs at NY/NE (Roseton & 1385 nodes): **$6.5 M***

***** *Value is overestimated. Netting and "other elements" forgiveness not accounted for.*

ISO-NE Cross Border Fees – *continued*

3. ISO Self-Funding Tariff Fees

- Fund ISO operations
- Presently allocated (primarily) to load (Sch. 1), exports (Sch. 1 & 3), and energy mkt transactions (Sch. 2)

- **2010 total charges** allocated to:
  - All participants & nodes pool-wide: **$146.5M**
  - ETs at NE/NY (Roseton & 1385 nodes): **$4.8M (3.3%** of total)

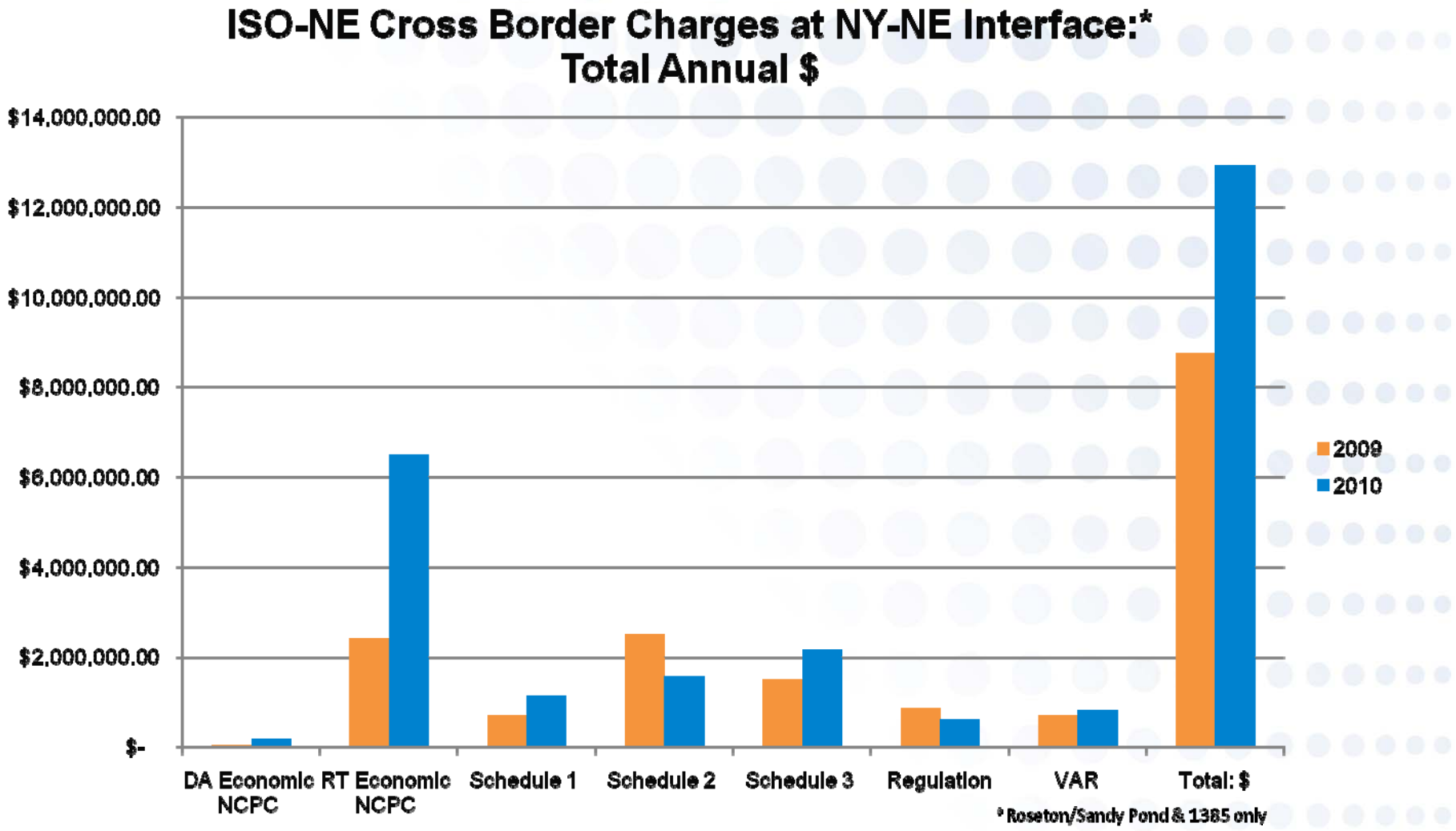
ISO-NE Cross Border Fees – *continued*

4. A/S Costs Allocated to External Transactions

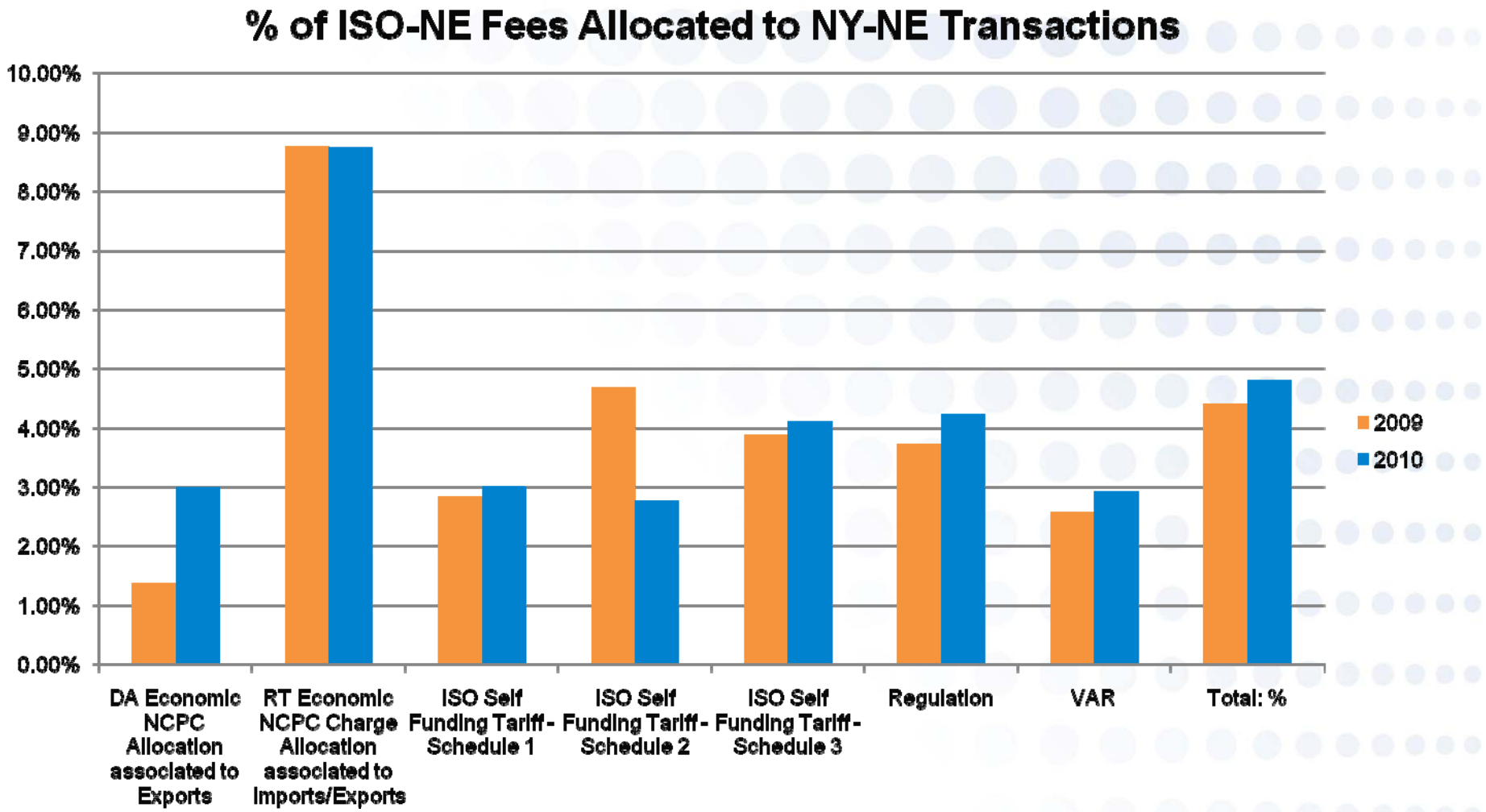
- **Exports** are allocated a portion of two pool-wide A/S costs:
  - Regulation service
  - VAR costs

- **Combined 2010 charges** (Reg + VAR) allocated to:
  - All participants & nodes pool-wide: **$42.2 M**
  - ETs at NE/NY (Roseton & 1385 nodes): **$1.4M (3%** of total)
  - Breakdown by type shown in tables/graph slides (below)

Historic ISO-NE Cross Border Fees –Total $



ISO-NE Cross Border Fees in Proportion



ISO-NE: RT NCPC Impact in $/MWh

Interpretation

- Largest ISO-NE affected fee/charge is RT NCPC
- **If eliminated at NY/NE Interfaces** (Roseton & 1385):

What would be the impact on a
"$ per MWh of RT Deviation" basis?

- 2010: **$2.10** → **$2.30**; overall a $0.201 increase
- 2009: **$0.71** → **$0.77**; overall a $0.068 increase

NYISO Cross Border Fees

- Bid Production Cost Guarantees (BPCG)
  - Generators and Importers are guaranteed to receive Bid Costs over the Service Day
  - Comparable to ISO-NE “economic” NCPC
  - 2010: $1.2 M (Roseton/Sandy Pond & 1385 only)
- Margin Assurance Payments
  - Protection to suppliers for ISO instructed real-time deviations from day-ahead position
  - 2010: $530 K (Roseton/Sandy Pond & 1385 only)

NYISO Cross Border Fees -*continued*

- Operating Reserves
  - Availability payment to suppliers to maintain capacity available for conversion to energy
  - 2010: $786 K (Roseton/Sandy Pond & 1385 only)
- Voltage Support (VSS)
  - Availability payment to suppliers to maintain capability to provide voltage support to grid
  - 2010: $1.7 M (Roseton/Sandy Pond & 1385 only)

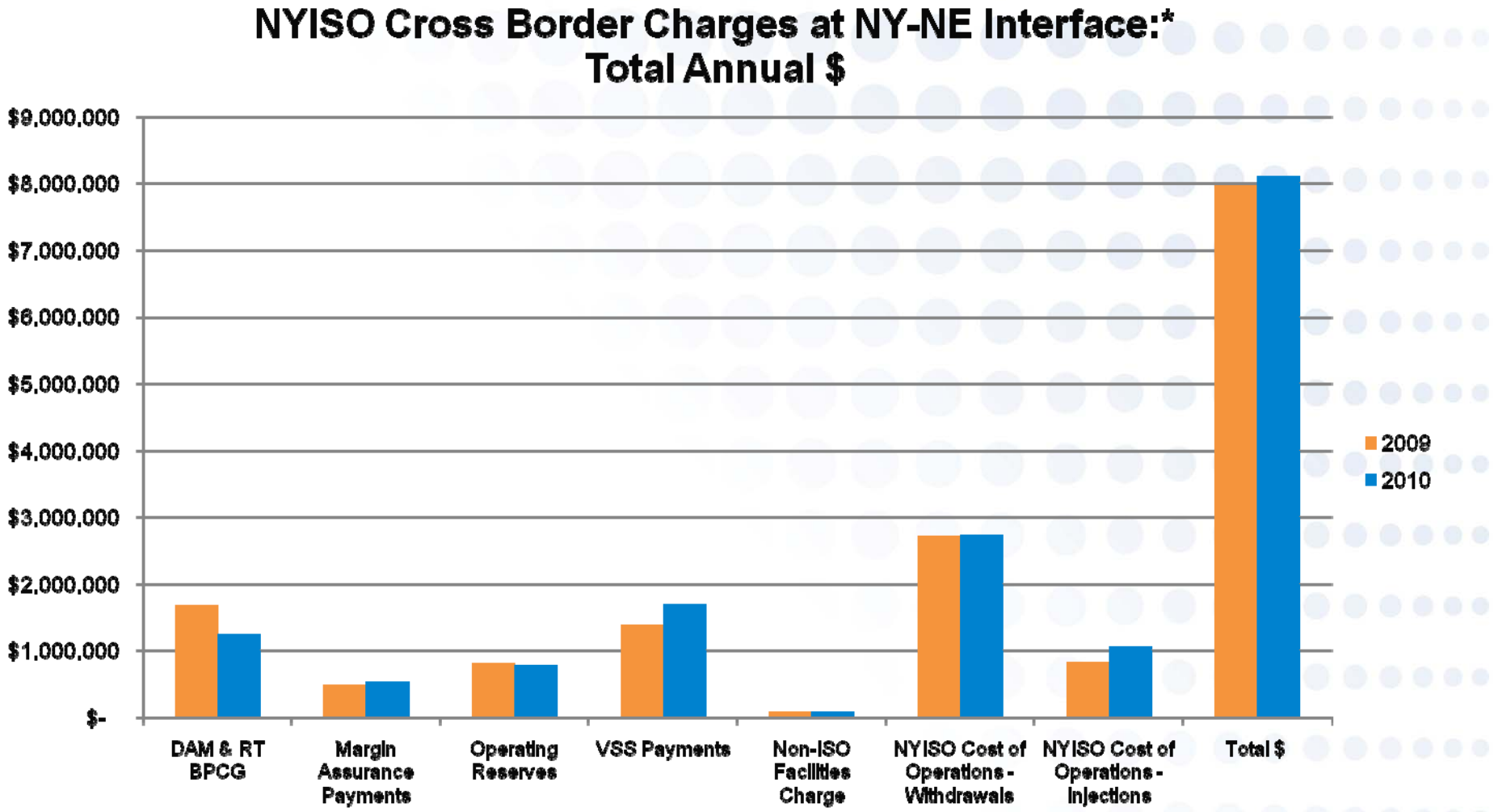
NYISO Cross Border Fees -*continued*

- Non-ISO Facilities Charge
  - Operating costs for Ramapo PAR, Station 80 Capacitor Bank
  - 2010: $77 K (Roseton/Sandy Pond & 1385 only)
- NYISO Cost of Operations:
  - Pay for NYISO annual budget and FERC fees
  - Withdrawals allocated 80% of NYISO cost of operations; includes internal load, exports, wheels (out)
  - Injections allocated 20% of NYISO cost of operations; includes internal generation, imports, wheels (in)
  - 2010: $3.8 M (Roseton/Sandy Pond & 1385 only)

How are NY Cross-Border Fees Allocated?

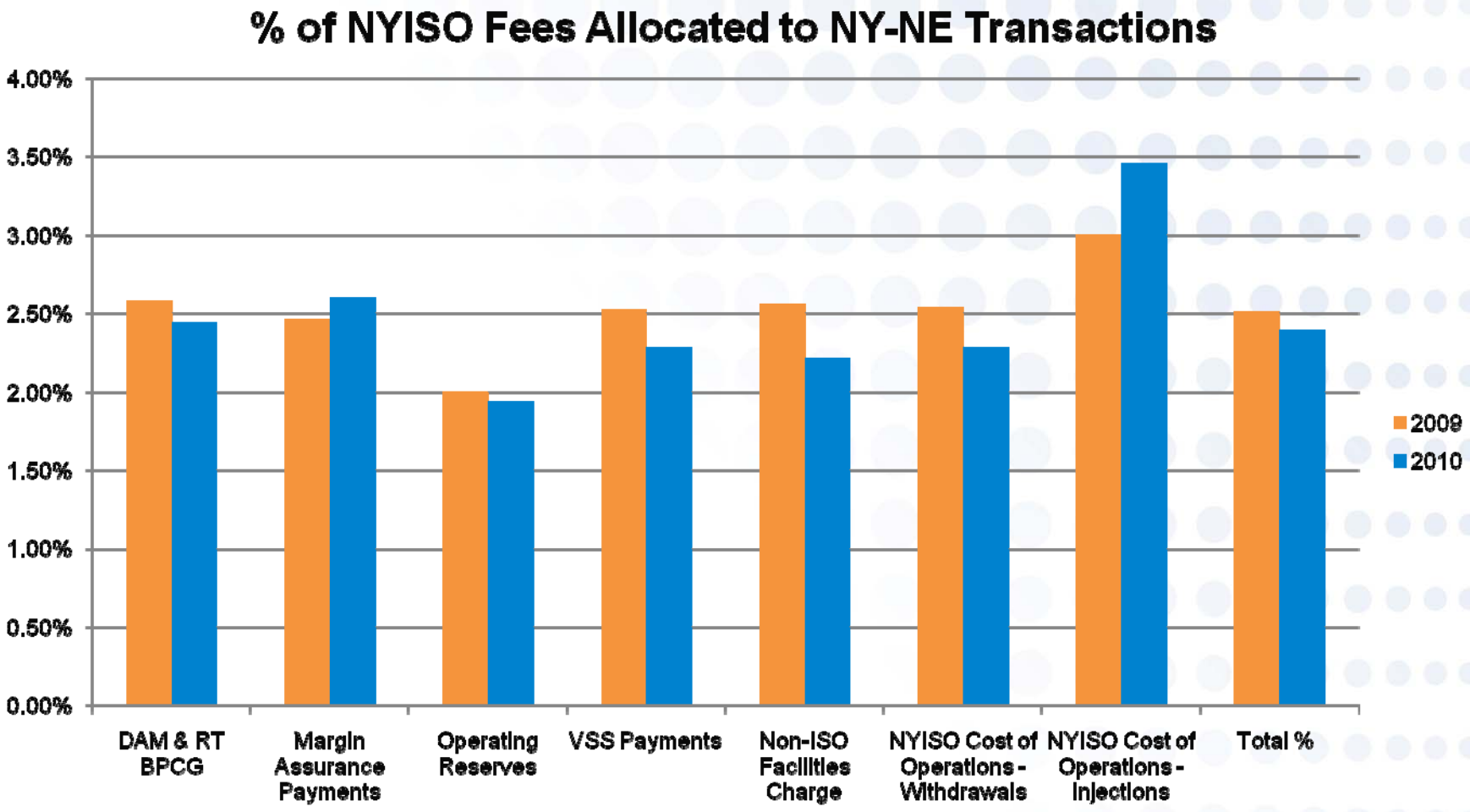
- Pro-rata share of MWh: internal load, exports, wheels
  - BPCG, Margin Assurance
- Pro-rata share of MWh: internal load, exports
  - Operating Reserves
- Fixed annual rates:
  - VSS –internal load, exports, wheels
  - Non-NYISO Facility Charges –internal load, exports, wheels
  - NYISO cost of operations
    - internal load, exports, wheels (out): 80%
    - internal generation, imports, wheels (in): 20%

Historic NYISO Cross Border Fees –Total $



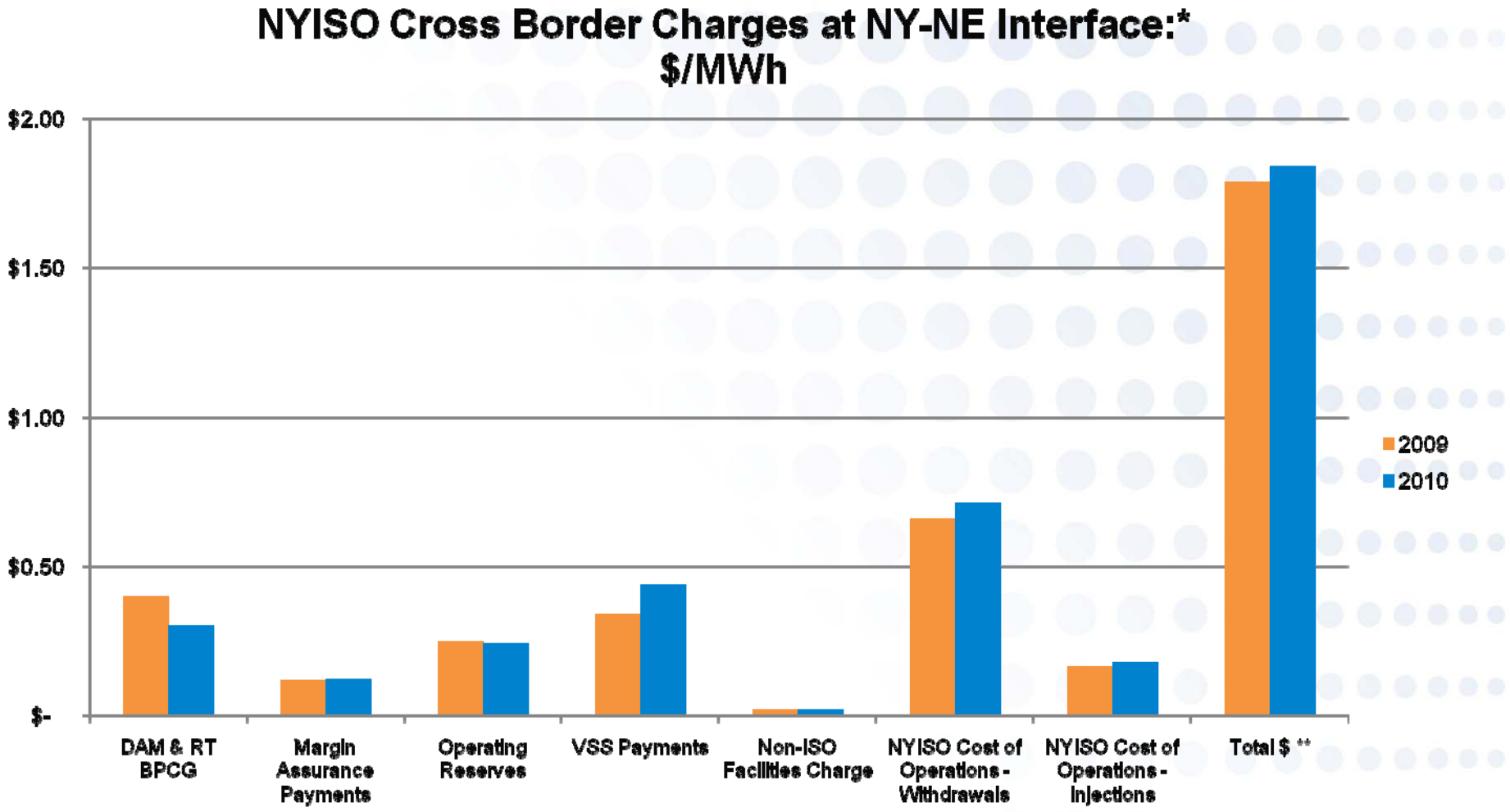
*Roseton/Sandy Pond & 1385 only

NYISO Cross Border Fees in Proportion *



*Roseton/Sandy Pond & 1385 only

Historic NYISO Cross Border Fees –$/MWh**



* Roseton/Sandy Pond & 1385 only

** Does not include NYISO Cost of Operations -Injections

How Much Could Fees be Expected to Increase?

- For NYISO fees
- $/MWh total adjusted for elimination at NY-NE border
  - 2010: $1.84 → $1.88; overall a $0.042 increase
  - 2009: $1.79 → $1.83; overall a $0.045 increase

Bottom Line: Interpretation

- **Total affected fees and (net) charges** on external transactions were approximately:
  - **$8M** (2009, 2010) in **New York**
  - **$8M** (2009), **$12M** (2010) in **NE** (*excl. 'in lieu of congestion')*
  - Under current rules, this would instead be allocated to other participants (in large part, but not entirely, to loads)
- **Re-allocation** would reduce the individual benefits of IRIS to some participants (by the costs reallocated)
- For loads: Potomac Economics estimate of near-term annual benefit under IRIS is **$100M+**

Why Eliminate Fees at Border?

- Reciprocal fee elimination
  - Removal of offsetting charges
  - Removal of fee impacts from LBMPs
- Fee elimination is a continuation of efforts originally pursued with the removal of transaction wheeling charges in 2004.

Why Eliminate Fees at Border?

- Markets are more efficient when prices converge
  - Fees result in a price spread between markets to cover the expected allocation
  - Market will operate to a higher total production cost and under utilize the transmission system
  - Uplift allocations can be highly variable, resulting in significant trading risk and greater price divergences (more likely at times when significant interface scheduling is desired)

Capacity Imports under IRIS

Capacity Imports under IRIS

- IRIS fundamentally changes how energy transfers between the NY and NE areas are determined.
  - The real time external transaction functionality in place today is eliminated under TO and replaced with an alternative economic construct under CTS.
- This necessitates corresponding changes to the existing capacity import rules to complement TO and CTS.
- Goal of capacity-related changes is to maintain both ISO and Participant requirements for managing capacity imports.

Capacity Imports Impacts

- ISOs Operational Requirements
  - External transactions are the mechanism that the ISOs use to access energy from external capacity.
- Market Participant Capacity Requirements
  - External transactions are the mechanism that participants use to meet the requirements to offer and deliver energy from capacity imports. Requirements vary by market.
  - The status of a Real Time external transaction is an input into capacity market penalty assessment.

ISO Operational Requirements

- Today, during capacity deficient conditions, each ISO can gain access to energy backed by import capacity through real-time external transactions
  - In ISO-NE, can request import transactions backed by Import Capacity Resources
  - In NYISO, can request market participants to make capacity available and offer import transactions into the real-time market.

ISO Operational Requirements

- ISOs must continue to have real-time visibility and access to external capacity under IRIS.
- Mechanism attributes include:
  - ISO access to summary and status of external capacity resources
  - Ability to ensure delivery of external capacity when necessary to ensure reliability.

Market Participant Capacity Requirements

- Today, a Market Participant with an import capacity obligation must submit both DA and RT ETs into 'sink' market and schedule energy when requested.
  - In ISO-NE, obligation to offer applies to both DA and RT
  - In NYISO, obligation to offer applies to DA, and when requested for capacity deficiencies in RT

Market Participant Capacity Requirements

- Under IRIS:
  - Market Participant must continue to offer DA ETs into 'sink' market.
  - Market Participant RT obligations must be adjusted to coordinate with scheduling practices, under either IRIS option

- The ISOs are evaluating potential requirement changes in order to meet the capacity market obligations. Details will be discussed in future stakeholder meetings.

Summary: Design Basis Document

Summary for Today

RT Scheduling Under IRIS

- **Tie Optimization & CTS** use market-based bids to:
  - **Increase** gen in **lower-cost** region in RT, and
  - **Decrease** gen in **higher-cost** region in RT.
- **Tie Optimization does more** of this, CTS does **less**
- Both set RT flows in **economically-efficient direction**
  - **ISOs have the information** needed to optimize **physical power flows;** traders cannot see bid stacks, transm. in RT.

Congestion and TCC/FTRs

- **Each ISO (separately) issues TCC/FTRs** for paths in their area, including the External Interface, as they do today
- **Each ISO will continue to pay TCC/FTR holders** DA congestion revenue based upon DA clearing prices
- **ISO New England** will enable congestion pricing to occur at the interface under IRIS (not allowed today)
- **RT congestion** accrues in equal measure in each ISO and flows thru according to existing tariff provisions

Cross-Border Fee Elimination

- **Reciprocal elimination of fees & charges at the external interface** will lower barriers to economically efficient interchange
  - Markets are more efficient when prices converge
- **Applies to both** Tie Optimization (TO) and Coordinated Transaction Scheduling (CTS) proposals

Capacity Import Conforming Changes

- Due to elimination of Real-Time Transactions (as submitted today), Tie Optimization option will require changes to allow Capacity Imports to continue to meet their RT requirements.
- ISOs will amend and improve, as appropriate, protocols governing information and communication regarding capacity import availability and delivery during (actual or predicted) capacity deficiencies.

Final Points:

Upcoming Joint Schedule and Logistics

Stakeholder Review & Discussion

Next joint stakeholder meetings:

- Understand options in detail, gather feedback, refine into preferred design basis document (DBD) by April-May.
- ISOs need *common DBD* on IRIS due to coordination issue
- **Next Meeting Schedule:**
  - Feb 14 (ISO-NE hosting)
  - March 7 (ISO-NE hosting)
  - March 28 (NYISO hosting)
  - April 28 (NYISO hosting)

Remaining Presentation Plan

March 28: Q&A, follow-up's on additional detail as requested, stakeholder discussion of draft DBD

April 28: Q&A, follow-up's on additional detail as requested, stakeholder discussion of draft DBD

Next Steps: 2011+ Schedule

- **Jan-Apr:** Joint stakeholder meetings
- **Apr-May:** Advisory votes on design options (DBD) *from both NEPOOL and NYISO stakeholders*
- **June-Oct:** Stakeholder tariff & market rule processes (separate but parallel timing)
- **Dec 2011:** Target FERC filings (ISO-NE & NYISO)
- **Spring 2013 (est):** Implementation complete

Questions?

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