Methodology For Calculating Costs Attributable To Thunderstorm Alerts

Presented by Andrew P. Hartshorn

LECG
ECONOMICS
FINANCE

Business Issues Committee

Albany , NY

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AGENDA

This presentation describes the NYISO's proposed methodology for calculating the costs attributable to Thunderstorm Alerts (TSAs):

- Background
- Methodology
- Examples
- Next Steps

BACKGROUND - Regulatory

In response to the FERC Order (Docket ER97-1523-071) dated March 13th, 2003, the NYISO reported on April 14th, 2003 that it would:

- Develop an appropriate TSA cost identification and allocation method;
- Take the proposal to stakeholders for input and comment during May 2003;
- File necessary tariff changes associated with the identification and allocation of the TSA costs with a proposed effective date of May 1st, 2003.

BACKGROUND – Previous Analysis

LECG performed a statistical analysis of Schedule One charges comparing the levels of charges immediately before and during the TSA events. The NYISO attached this analysis to its October 30, 2002 compliance filing in this docket.

LECG found that the only statistically significant increase in 2001 Rate Schedule 1 charges that appeared to be related to TSAs were in the RT Congestion Balancing and DAM Contract Balancing charges.

LECG found no statistically significant increases in any of the Schedule One charges during the TSA events that occurred in 2002. RT Congestion Balancing showed the highest average increase of all Schedule One charges during the 2002 TSA events.

BACKGROUND – Previous Analysis

LECG has re-evaluated the DAM Contract Balancing charges during TSAs in 2001. First, they were updated to recognize the changes made in those charges as a result of FERC's approval of revised DAM Contract Balancing rules (*see* Attachment J of the Services Tariff). The update reduced the average increase in DAM Contract Balancing charges to a level that was about one third of their original level. While significantly reduced, the average increase was still deemed to be a statistically significant in 2001.

DAM CONTRACT BALANCING – Revised Analysis

LECG further reviewed unit specific DAM Contract Balancing charges before and during TSAs. This review did not reveal any evidence to suggest that the increase in DAM Contract Balancing observed during the TSA events is due to the TSA itself, although the increases in LBMPs that do result from TSAs, in some circumstances, may have exacerbated the size of the DAM Contract Balancing account. Attachment A analyzes in detail 5 of the highest increases in DAM Contract Balancing charges during the 2001 TSAs.

METHODOLOGY - Overview

Thus, the methodology proposed today identifies, for reallocation purposes, only RT congestion balancing costs as costs that are directly attributable to TSAs.

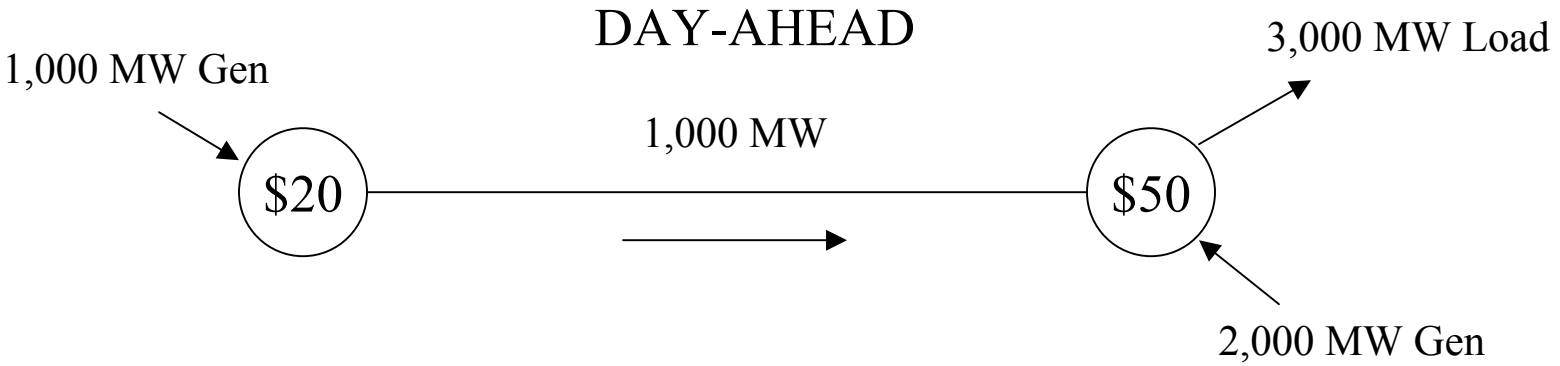
- If the changes in RT congestion balancing are significant as shown in the prior analysis for 2001 then the proposed methodology will identify those costs.
- If there are no increases in RT congestion balancing costs arising from TSAs, either because there was no congestion in real-time or because transmission system transfer capability was not reduced, then the methodology will not identify any costs for allocation.

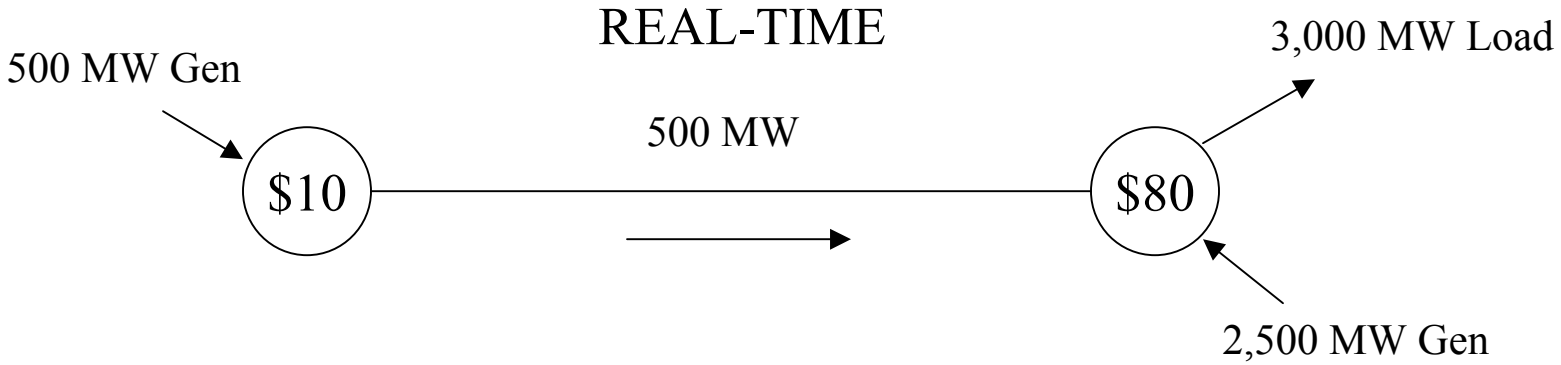
METHODOLOGY - Overview

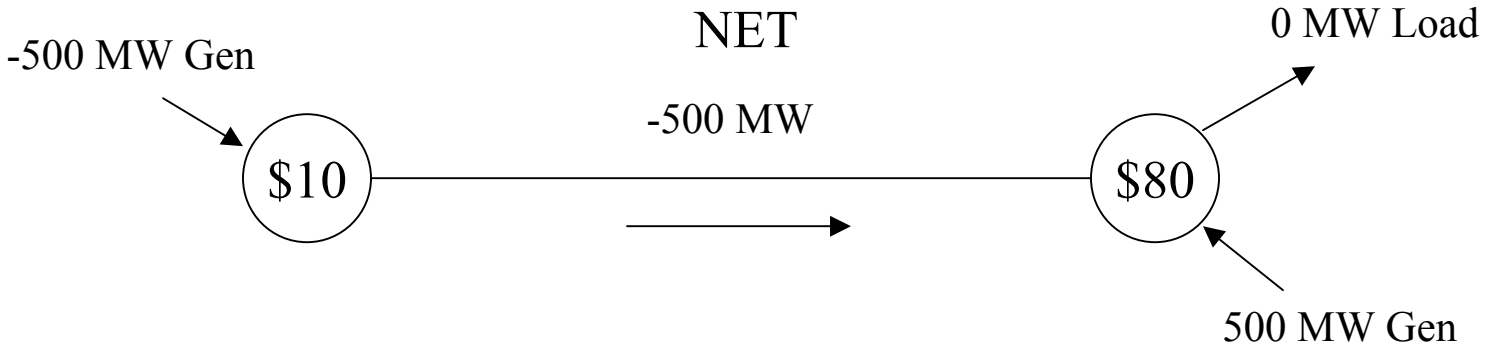
The methodology we are using to determine the TSA costs to allocate is analogous in many ways to the "Make Whole" approach that is being proposed for the allocation of transmission outage related congestion rent shortfalls.

That is, the methodology determines to what extent the outage (or in this case the reduction in transfer capability associated with the TSA) causes congestion collections by the NYISO in real-time to be significantly less than congestion payments that the NYISO must make in real time.

The congestion shortfall attributable to the TSA, separate from any other outage related costs can be determined using this approach.


DAY-AHEAD
1,000 MW Gen
1,000 MW
3,000 MW Load
$20
$50
2,000 MW Gen


REAL-TIME
500 MW Gen
500 MW
3,000 MW Load
$10
$80
2,500 MW Gen


NET
-500 MW Gen
-500 MW
0 MW Load
$10
$80
500 MW Gen

EXAMPLE 1

The tables below show the settlement associated with the example above and illustrate why this approach works. The load in the East purchased 3,000 MW in the day-ahead market at $50/MWh. In real-time, 500 MW of generation is purchased in the East at $80/MWh, due to the reduction in transfer capability from West to East, but there is no load buying power at the real-time price.

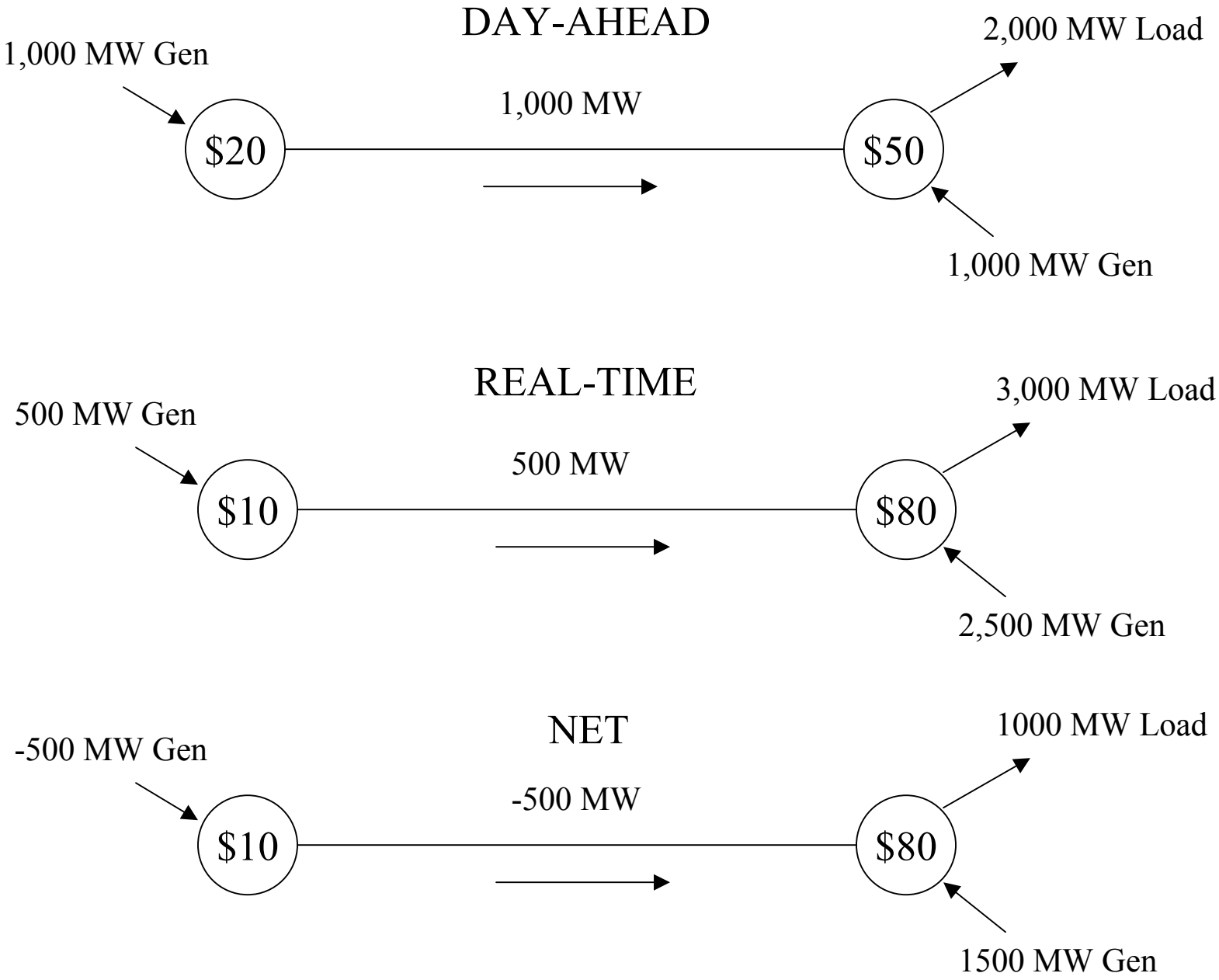
500 MW of Western generation is dispatched down in real-time and settles the difference with its day-ahead schedule at real-time prices. The difference between the real-time prices paid to East Gen and paid by West Gen has until now been recovered through Schedule One uplifts.

Day-Ahead

	MW	Price	Settlement
East Load	3000	$ 50	$ 150,000
West Gen	1000	$ 20	$ (20,000)
East Gen	2000	$ 50	$ (100,000)
		Total	$ 30,000
TCCs	1000	$ 30	$ (30,000)
		Total	$ -

Net Real-Time

	MW	Price	Settlement
East Load	0	$ 80	$ -
West Gen	-500	$ 10	$ 5,000
East Gen	500	$ 80	$ (40,000)
		Total	$ (35,000)


DAY-AHEAD
1,000 MW Gen
2,000 MW Load
1,000 MW
$20
$50
1,000 MW Gen
REAL-TIME
500 MW Gen
3,000 MW Load
500 MW
$10
$80
2,500 MW Gen
NET
-500 MW Gen
1000 MW Load
-500 MW
$10
$80
1500 MW Gen

EXAMPLE 2

Even if load in the East is not fully hedged day-ahead, and buys some power at real-time prices, the cost of the transmission reduction attributable to the TSA remains $35,000 as it was in Example 1.

Power sold back by West Gen and bought by East Load offsets some of the cost of the additional power that must be dispatched by East Gen but there are still no load counterparties to the re-dispatch costs associated with the transmission reduction.

Day-Ahead

	MW	Price	Settlement
East Load	2000	$ 50	$ 100,000
West Gen	1000	$ 20	$ (20,000)
East Gen	1000	$ 50	$ (50,000)
		Total	$ 30,000
TCCs	1000	$ 30	$ (30,000)
		Total	$ -

Net Real-Time

	MW	Price	Settlement
East Load	1000	$ 80	$ 80,000
West Gen	-500	$ 10	$ 5,000
East Gen	1500	$ 80	$ (120,000)
		Total	$ (35,000)

METHODOLOGY - Summary

The proposed methodology for identifying TSA costs has the following components:

- Determine the binding constraints in real-time that are related to the TSA call and record the shadow price and real-time flows for those binding constraints;
- Determine what the Day-Ahead flows would have been for the TSA contingencies using day-ahead scheduled injections and withdrawals and the day-ahead transmission representation;
- Calculate the difference between the Day-Ahead flows and the real-time flows and then calculate the TSA related cost by multiplying the difference in flows by the real time shadow price of the binding constraint;
- Allocate the TSA costs to New York City loads and subtract those same costs from the real-time congestion balancing account in Schedule One.

METHODOLOGY - Detail

Determine the binding constraints in real-time that are related to the TSA call and record the shadow price and real-time flows for those binding constraints

- The set of constraints associated with TSAs is well defined, typically the constraints that bind are either the UPNY-ConEd interface or one of a number of 2nd contingency constraints that are inserted into SCD during TSAs.
- The shadow prices and flows for these constraints can be obtained from SCD.
- We need to ensure that real-time limits on the constraints are not reduced for reasons other than the TSA. These shall be identified by the operators so that the non-TSA reduction can be factored into the flow difference and TSA cost identification calculation.

METHODOLOGY - Detail

Determine the Day-Ahead flows on the constraints that were binding in real-time using day-ahead scheduled injections and withdrawals and the day-ahead transmission representation

- Security analysis of final day-ahead schedules within SCUC can capture the day-ahead flows associated with the TSA constraints without actually securing for those constraints;
- These security analyses will either be run as part of standard security analysis each day or will be performed on an as necessary basis, whenever TSAs are called, by loading that days save case final schedule solution back into SCUC and running the TSA specific security analyses.

METHODOLOGY - Detail

Calculate the difference between the Day-Ahead flows and the real-time flows (adjusted as necessary for any constraint limit changes) for all constraints, i, impacted by the TSA, and then calculate the TSA related cost by multiplying the difference in flows by the real time shadow price (SP) of the constraint affected by the TSA and then further multiplying by the fraction of the hour covered by SCD dispatch period t.

$$TSA_t = \sum_i \left(DA\_FLOW_{it} - RT\_FLOW_{it}\right) \times SP_{it} \times Time_t$$

This calculation will be performed for each SCD dispatch period, t, within the TSA. This is then summed for every SCD interval spanned by a TSA over the month.

METHODOLOGY - Detail

Allocate the TSA costs to LSEs within the ConEd transmission district (ConEd) and remove those same costs from the real-time congestion balancing account in Schedule One.

- It has not been determined whether this allocation of the TSA costs to ConEd and the removal of those same costs from Real-Time Congestion Balancing will be performed on an hourly, daily or monthly basis
- It has also not been determined what the exact timing of the reallocation of costs will be relative to the billing cycle – will the analysis be completed in time to be applied to each days pre-bill, each months bill or will there need to be an adjustment carried through to the four month true-up?
- The most likely outcome is that the allocation will be monthly and will be charged as an adjustment to the initial monthly bills calculated at the end of each month.

EXAMPLES

We have created 3 further examples to illustrate:

- The methodology for identifying TSA costs;
- The impact of outages on the identification of TSA costs;
- The impact of other transmission limit changes on the identification of TSA costs.

EXAMPLE 3

In this example we consider a case where the day-ahead and real-time network configurations are identical:

- The UPNY-Coned interface is binding at a limit of 1,500 in SCD with a shadow price of $50/MWh
- The Day-ahead flow on the UPNY-Coned interface is 1,800 MW
- The flow reduction is therefore 1,800 – 1,500 or 300 MW
- The TSA cost identified by the proposed methodology, allocated to New York City loads, and removed from the real-time congestion balancing Schedule One account for a five minute SCD cycle is:
  - (300 * 50) * 5/60 = $1,250

EXAMPLE 4

In this example we consider a case where a line outage occurs between day-ahead and real-time that increases the flows on the Leeds-PV second contingency constraint:

- The Leeds-PV second contingency constraint is binding at a limit of 1,000 MW in SCD with a shadow price of $50/MWh;
- The Day-ahead flows on the Leeds-PV second contingency is 1,300 MW. Had we modeled day-ahead flows with the outage included on the day-ahead grid, the flows would have been 1,500 MW (this calculation is not done in real-time and is provided here only for information);
- The flow reduction is still 1,300 – 1,000 or 300 MW resulting in the same $1,250 TSA cost identification;
- Note that even though the outage causes an increase in flows of 200 MW across the binding constraint requiring a total flow reduction of 500 MW (1,500 – 1,000), only the 300 MW flow reduction associated with the TSA are charged to Coned.

EXAMPLE 5

In this example we consider a case where a solar magnetic disturbance occurs in real-time that impacts the limit on the Leeds-PV second contingency constraint:

- The Leeds-PV second contingency constraint is binding at a limit of 800 in SCD with a shadow price of $50/MWh. The real-time limit for the Leeds-PV second contingency constraint would have been 1000 MW in the absence of the SMD.
- The Day-ahead flow on the Leeds-PV second contingency constraint is 1,300 MW.
- The flow reduction attributable to the TSA is 1,300 – 1,000 or 300 MW resulting in the same $1,250 TSA cost identification.
- Note that even though the total flow reduction was 500 MW, 200 MW was directly attributable to the SMD and is therefore not identified using the proposed methodology.

NEXT STEPS

The next steps in the development of the TSA cost allocation methodology include:

- Presenting this proposal at the Business Issues Committee and Management Committee
- Developing tariff language to file with FERC consistent with this presentation
- Developing data and process requirements to calculate and then allocate TSA costs through adjustments to monthly bills with an effective date of May 1st, 2003.

ATTACHMENT A
DAM CONTRACT BALANCING – Revised Analysis

LECG further reviewed unit specific DAM Contract Balancing charges before and during TSAs. This review did not reveal any evidence to suggest that the increase in DAM Contract Balancing observed during the TSA events is due to the TSA itself, although the increases in LBMPs that do result from TSAs, in some circumstances may have exacerbated the size of the DAM Contract Balancing account. Attachment A analyzes in detail 5 of the highest increases in DAM Contract Balancing charges during the 2001 TSAs.

June 20th, 2001 @ 15:38

•July 11th, 2001 @ 6:50

•August 10th, 2001 @ 13:56

• August 27th, 2001 @ 14:08

• September 11th, 2001 @ 9:12

DAM CONTRACT BALANCING – Revised Analysis

June 20th, 2001 @ 15:38:

- Majority of increase was on units put OOM well before the TSA event. The increase in DAM Contract Balancing was attributable to the price increase in real time during the TSA.

July 11th, 2001 @ 6:50:

- Units are ramp constrained up moving up to their day-ahead schedules as the real-time price increases in the TSA;
- Steam units receiving DAM Contract Balancing payments due to GT block loading.

DAM CONTRACT BALANCING – Revised Analysis

August 10th, 2001 @ 13:56:

- Units are ramp constrained up moving up to their day-ahead schedules as the real-time price increases in the TSA;
- Some units are dragging relative to their basepoints, are ineligible for reserve lost opportunity costs (LOCs) but remain eligible for DAM Contract Balancing on capacity that otherwise would have been paid LOCs;
- Units outside New York City.

DAM CONTRACT BALANCING – Revised Analysis

August 27th, 2001 @ 14:08:

- Units derated well before the beginning of the the TSA. The increase in DAM Contract Balancing was attributable to the price increase in real time during the TSA.
- Some units are dragging relative to their basepoints, are ineligible for reserve lost opportunity costs (LOCs) but remain eligible for DAM Contract Balancing on capacity that otherwise would have been paid LOCs;
- Units outside New York City
- 10 minute GTs with DAM schedules not started before price increase caused by TSA

DAM CONTRACT BALANCING – Revised Analysis

September 11th, 2001 @ 9:12:

- Units derated well before the beginning of the the TSA. The increase in DAM Contract Balancing was attributable to the price increase in real time during the TSA;
- Some units are dragging relative to their basepoints, are ineligible for reserve lost opportunity costs (LOCs) but remain eligible for DAM Contract Balancing on capacity that otherwise would have been paid LOCs;
- Units outside New York City