SCHEDULE ONE ANALYSIS
Project Update

Prepared by
Andrew P. Hartshorn and Keith N. Collins

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LECG ECONOMICS FINANCE

DRAFT for Discussion Only

The agenda for today's presentation includes:

- Status report on Schedule One verification including:
  - Outstanding accuracy issues
  - Schedule One investigations
  - Other investigations resulting from Summer review
- Summer 2002 Schedule One review

LECG made significant changes to the schedule one verification process throughout the summer. To account for these changes, LECG has rerun all cases from 6/22/02 through 9/30/02.

Rerunning the verification process introduces some time dependency problems into the analysis. Most notably related to price corrections and re-bills.

- To correct for re-bills, wherever possible LECG obtained the base daily reconciliation reports for historical data and with some exceptions analyzed this data, rather than the re-bill information.
- To correct for the price corrections, LECG used original prices wherever feasible, but in many cases this was not possible and the LECG calculations results may be slightly impacted by these price corrections.

There are a number of areas where known data accuracy issues create differences between the BAS calculations and LECG's attempts to verify those calculations. The magnitudes of these issues are generally small.

LECG is working with the NYISO to create solutions to these accuracy issues. These outstanding issues include:

- Access to Consolidated Edison Mitigated Minimum Load Block Bids
- Access to DAM Incremental Energy Bid Curves
- Access to Data on Scheduling of Grandfathered Rights

LECG currently receives in-city mitigated start-up costs and energy costs, but does not receive in-city mitigated minimum load block bids. In order to accurately replicate DAM internal BPCG payments on mitigated units, LECG would need all mitigated bid parameters.

At present, LECG calculations overstate BPCG payments when in-city mitigation occurs.

We have spot checked some individual BPCG occurrences and verified that the BAS BPCGs were consistent with the mitigated minimum load block costs.

We do not believe there is any problem in the BAS related to this issue.

The incremental energy bid curves used in billing are not the same as those used by SCUC. The MIS transforms the market participant bid curves into blocked curves that can be evaluated by SCUC.

LECG receives the SCUC blocked bid curves for DAM price verification rather than the original market participant bid curves. This causes discrepancies in the replication of day-ahead BPCG payments as the energy curves used by LECG and by NYISO billing are not the same.

The difference between the LECG BPCGs and the BAS BPCGs is at the level of the third or fourth significant digit. These discrepancies do not impact the analysis of outlying data. This is a precision issue that can be corrected for if an exact replication is necessary.

We do not believe there is any problem in the BAS related to this issue.

LECG does not receive information on which transactions have been scheduled based on Grandfathered Rights on any given day. The magnitude of this issue is typically fairly small, but needs to be addressed. While it may be difficult to incorporate Grandfathered Rights into the regular verification process, spot checks could verify that the difference between the LECG determined congestion residual and that reported in the daily reconciliation report is indeed the treatment of Grandfathered Rights.

This issue affects the ability of LECG to account for DAM TO balancing charges as well as DAM congestion residuals. Understanding the effects of Grandfathered Rights could also be relevant in determining sources of congestion shortfalls.

Schedule One Investigations

LECG and the NYISO have worked on, but not yet fully resolved issues including:

- RT residual replication
- Incorrect 4/17/02 load modeling
- DAM Contract Balancing and Lost Opportunity Cost double counting

LECG has not been able to replicate RT energy, congestion and loss residuals.

LECG and the NYISO are continuing efforts to determine the source of the difference between the numbers generated by BAS and by LECG.

The NYISO has indicated that the MIS had a problem with priced capped load bids for the 4/17/02 bill. Price capped load was rejected by the MIS which resulted in MIS not passing all load bid data.

As of the latest re-bill on 9/8/02 this problem has not been corrected. The NYISO has indicated that a fix for this problem has been implemented as of 11/15/02.

Once the re-bill has been completed, LECG will verify the new bill against the LECG calculated numbers and determine if any other issues exist with the 4/17/02 run.

LECG and the NYISO are aware that a problem exists with the modeling of lost opportunity cost for reserve providers. Units scheduled to provide reserves in BME, on the same capacity that was scheduled to provide energy in SCUC, have been paid their opportunity costs on the capacity providing reserves while also receiving DAM contract balancing payments for the energy scheduled day-ahead that they had to buy back in real-time.

The revised code, to cancel any double payment of LOC and DAM Contract Balancing payments has been implemented. An accelerated schedule will rebill all overpayments by April, 2003. The rebill will also recover DAM Contract Balancing payments made for generator-directed derates.

These changes also address issues related to DAM Contract Balancing payments made to derated units and to units not following their basepoints.

As a result of the analysis of outlying data, LECG and the NYISO have initiated a number of investigations:

- DAM GT startup costs in DAM BPCG calculations
- Setting of DAM LRR and Virtual BPCG flags
- Impact of emergency purchases on settlements
- RT BPCGs paid to off-dispatch units
- Setting of units RT LRR BPCG flags
- Settlements for units that trip and return to service
- LOC payments

Once these investigations are completed any potential problems that might be discovered will be reported back to BAWG and/or other appropriate market committees.

Analyzed Historical Outlying Results

LECG has analyzed the outlying schedule one data for each relevant allocated cost. Roughly 10 to 20 outlying data points were analyzed per allocated cost.

- LECG reviewed all dates from 3/10/02 through 9/11/02.
- As previously noted, all schedule one data has been taken from the earliest available version of the new formatted version of the MIS daily reconciliation report.
- There are a few exceptions where the pre-bill and re-bill differ significantly. This issue is discussed later in this presentation.

Created List of Driving Factors

After reviewing the completed analyses, LECG created a list of driving factors for each relevant schedule one allocated cost. In some instances LECG was not able to empirically identify the driving factors, but has listed possible causes that could account for extreme outliers.

As LECG continues to identify the causes of outliers, LECG will update or reconfirm the list of driving factors.

LECG has tracked historical reported schedule one data. The statistics for the period from 3/10/02 through 9/11/02 are outlined below.

Period	Category	Undercollection	Average	St. Dev.	Minimum	Maximum
RT	Reported Total BPCG on Internal Units	Positive	245,646.55	206,366.43	3,602.05	1,354,866.10
RT	Reported Total BPCG on External Units	Positive	32,197.37	36,725.41	1.56	217,306.34
RT	Reported BPCG on Units Committed for LRR	Positive	354,484.45	439,197.40	290.29	2,466,471.88
RT	Reported Total BPCG on Curtailed Imports	Positive	162.30	1,820.18	-	24,716.46
RT	Reported DAM Contract Balancing	Positive	77,206.62	149,389.11	2,547.06	1,707,559.61
RT	Reported RT Energy Residual	Positive	204,530.08	239,682.50	(1,206,032.75)	1,281,084.87
RT	Reported RT Congestion Residual	Positive	468,536.96	862,723.31	(144,829.78)	9,676,100.47
RT	Reported RT Loss Residual	Positive	7,698.94	41,404.10	(166,717.33)	292,831.30
DAM	Reported BPCG on Internal Units	Positive	64,065.67	77,265.55	-	418,454.12
DAM	Reported BPCG on External Units	Positive	691.42	2,324.20	-	18,994.65
DAM	Reported Virtual BPCG	Positive	3,052.96	9,655.35	-	94,576.71
DAM	Reported BPCG on Units Committed for LRR	Positive	57,003.85	68,890.94	-	515,732.17
DAM	Reported DAM Energy Residual	Positive	28,542.42	56,459.15	(13,274.17)	615,774.66
DAM	Reported DAM TO Balancing	Negative	(313,415.12)	541,240.31	(3,846,946.03)	1,124,917.53
DAM	Reported DAM Loss Residual	Positive	(620,390.49)	293,406.65	(1,667,021.94)	(130,242.14)

Some of the information required to understand schedule one charges is publicly posted on the NYISO OASIS. Links to relevant RT information are listed below.

- Information regarding SREs and OOM calls is available under Operational Announcements. This is helpful for understanding:
  - RT Internal and LRR BPCGs
- Active SCD constraint information is located under Limiting Constraints. This is helpful for understanding:
  - DAM Contract Balancing
  - RT Congestion Residuals
- Total transfer capacity (TTC) is located under the ATC/TTC link. This is helpful for:
  - DAM Contract Balancing
  - RT External BPCGs

Date	Reported Total Bid Production Guarantees on Internal Units	Comments
6/2/2002	1,354,866.10	$150k in BPCG on SRE'd units. $787k in BPCG on units taken OOM by TP.
7/4/2002	1,126,081.29	Rebill $428k.
6/26/2002	1,034,718.98	Unit SRE'd due to line trip. ISO honored SRE'd 22 hour minimum run time even though outage units expected to come back early in the day. SRE unit BPCG $400k. BME thunderstorm alert cases caused several expensive 30-minute GTs to start, 30-minute GT BPCG $550k.
7/22/2002	976,621.61	Unit SRE'd for voltage support for 18 hours. Total SRE unit BPCG $320k. Unit was paid BPCG for hour when OFF dispatch and ramping off. TP requested SREs on 3 additional units which resulted in combined BPCG of $220k.
7/1/2002	862,699.29	Unit SRE'd for all hours. SRE'd unit bid in large minimum generation for final hour. Unit receives $556k in BPCG. No DAM schedules on 2 additional units in hour 23. Combined BPCG for 2 additional units $140k. Committed by BME with large minimum load blocks.
6/17/2002	816,940.65	Unit SRE'd for line trip. Unit added for 17 hours resulting in $222k in uplift. $193k in uneconomic GT generation. GTs were called OOM. $125k of additional SRE'd generation. 2 units committed in BME with high minimum load blocks resulting in $140k in HB 23.
7/2/2002	783,822.79	Unit SRE'd for all hours resulting in $267k in BPCG. Additional unit taken OOM for ISO security results in $313k in BPCG. BME schedules 2 units with high minimum load block costs in HB 23, resulting in $118k in BPCG payments. $91k on GTs taken OOM in RT.

A positive number indicates an undercollection.

HIGHEST DAYS RT Internal BPCG

Date	Reported Total Bid Production Guarantees on Internal Units	Comments
7/30/2002	672,944.19	$586k on GTs given must run status in BME. GTs taken OOM for ISO security. $130k on 2 units scheduled by BME with high minimum load block costs. $62k on additional GTs taken OOM for ISO security.
7/3/2002	630,541.20	Unit SRE'd for 15 hours resulting $267k in BPCG. 2 units with high minimum load block bids added in BME resulting $138k in HB 23. Unit OFF dispatch and ramping down in hour results in $75k. Several GTs taken OOM for ISO security resulted in $361k in uplift.
4/18/2002	594,897.58	A lot of small uplift on several GTs. GTs taken OOM for security.
6/22/2002	567,466.23	Unit SRE'd for all hours resultinig in $308k. $55k on unit scheduled by BME in HB 23 with high minimum load cost. $54k on GTs for HB 20-23 taken OOM.
7/31/2002	554,702.97	Unit SRE'd for all hours resulting in $178k in BPCG. 2 Units added in BME with high minimum generation costs resulting in $135k in BPCG. OFF dispatch unit ramping down, no BME $22k. Several other units added OOM for ISO security.
7/5/2002	542,346.92	Rebill $308k. $150k on unit called OOM for ISO security. $58k on unit added in BME with high minimum generation costs. OFF disptach unit ramping down receives $89k. NYISO declares maximum generation emergency. State taken OOM. Several units with uplift.
7/15/2002	537,078.06	Unit SRE'd resulting in $53k in BPCG. $116k on 2 units added by BME in HB 23 with high minimum generation costs. OFF dispatch unit ramping down in HB 22 results $58k. OOM unit in HB 23 results in $54k. $226k in 30-minute GTs added in BME.
8/5/2002	526,009.48	$130k on 2 units scheduled by BME with high minimum load block in HB 23. $156k on unit added in BME with high minimum generation costs. Lots of small BPCGs.
7/19/2002	516,738.68	Unit SRE'd in several hours resulting in $65k in BPCG. $214k in GT generation due to must run status in BME. $70k for steam unit OOM. $43k unit scheduled BME in HB 23 with high minimum generation cost.

A positive number indicates an undercollection.

The main driving factors for RT Internal BPCG include:

- SREs
- ISO and TP out-of-merit (OOM) calls.
- Line trips/outages
- Unit outages

10 of the 16 highest RT Internal BPCG days were in the top 22 highest load days for the period.

Additionally, line and unit outages can require SREs and OOM calls to help provide ISO or local security.

HIGHEST DAYS

RT External BPCG

Date	Reported Total Bid Production Guarantees on External Units	Comments
7/5/2002	217,306.34	Rebill $16,000.04.
5/7/2002	195,726.15	BME Constraint Not Active, RT prices lower than BME. Externals committed at or below BME LBMP. Overall RT load higher than BME load.
3/24/2002	156,608.12	BME Constraint Not Active, RT prices lower than BME. Externals committed at or below BME LBMP. Overall BME load higher than RT load.
5/17/2002	153,772.81	BME Constraint Not Active, RT prices lower than BME. Externals committed at or below BME LBMP. Overall RT load slightly higher than BME Load.
8/26/2002	145,544.06	BME Constraint Not Active, RT prices lower than BME. Externals committed at or below BME LBMP. Overall BME load higher than RT load.
3/16/2002	138,693.93	BME Constraint Not Active, RT prices lower than BME. Externals committed at or below BME LBMP. Overall RT load slightly higher than BME Load.
5/4/2002	134,734.53	BME Constraint Not Active, RT prices lower than BME. Externals committed at or below BME LBMP. Overall BME load higher than RT load.
5/16/2002	134,618.29	BME Constraint Not Active, RT prices lower than BME. Externals committed at or below BME LBMP. Overall RT load slightly higher than BME Load.
5/8/2002	107,862.71	BME Constraint Not Active, RT prices lower than BME. Externals committed at or below BME LBMP. Overall BME load higher than RT load.
8/14/2002	107,420.42	BME Constraint Not Active, RT prices lower than BME. Externals committed at or below BME LBMP. Overall BME load higher than RT load.
6/26/2002	104,350.72	BME Constraint Not Active, RT prices lower than BME. Externals committed at or below BME LBMP. Overall BME load higher than RT load.
5/15/2002	98,804.14	BME Constraint Not Active, RT prices lower than BME. Externals committed at or below BME LBMP. Overall BME load higher than RT load.
8/13/2002	96,836.39	BME Constraint Not Active, RT prices lower than BME. Externals committed at or below BME LBMP. Overall BME load higher than RT load.
5/6/2002	96,217.81	BME Constraint Not Active, RT prices lower than BME. Externals committed at or below BME LBMP. Overall BME load higher than RT load.

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RT External BPCGs occur when imports that have offer prices greater than the RT LBMPs determined by SCD are scheduled in BME and the external interface associated with those imports is not constrained either individually or through the DNI constraint

e.g., an import scheduled by BME at an offer price of $25/MWh will receive a $5/MWh BPCG if neither the external interface constraint or DNI constraints are binding and the SCD determined RT price at the proxy bus is $20/MWh ($25 - $20 = $5).

- 7 out of the 13 highest RT External BPCGs occurred in May, a period with low seasonal load and increased resources (summer capacity period).
- 9 out of 13 times BME's load forecast was higher than the RT load over the day. In these cases, lower RT prices would be expected.

HIGHEST DAYS RT LRR BPCG

Date	Reported Total LRR Bid Production Guarantees	Comments
4/17/2002	2,466,471.88	TPs and ISO request several expensive GT units OOM for local security or for ISO security.
7/3/2002	2,137,867.55	Rebill $560k.
5/31/2002	2,065,211.24	$500k on steam units called OOM by TP and ISO for security. $1.55 million on GT units called OOM by TP and ISO for security.
6/1/2002	2,050,622.25	$1.44 million on steam units called OOM by TPs for security. Over $600k in uplift on GT units called OOM by TP or ISO.
4/19/2002	2,046,627.93	$404k on steam units added in DAM for LRR. ISO and TP several GTs OOM for local security for $844k. $204k on steam units OOM for ISO security.
4/15/2002	1,946,911.89	$640k on units added for LRR in DAM. TP requests OOM in RT. $863k on GT units added for OOM local security at TP request. $260k on GTs added OOM for ISO local security. $87k on other units called OOM, TP request.
4/16/2002	1,479,947.26	$196k on steam units added in DAM, TP request and OOM in RT. $188k for GTs added in DAM for LRR. $590k on GTs added OOM by TP or ISO.
5/25/2002	1,385,897.70	$965k on steam units committed in the DAM for LRR. $222k on SRE'd units added for local security. $206k on units called OOM by TP for local security.
5/26/2002	1,236,647.82	$600k on units added in the DAM for LRR. $470k on other steam units called OOM by TPs for local security. $74k on GTs added by TPs for local security.
4/13/2002	1,234,315.93	$700k on steam units added for LRR in DAM. $390k GTs added OOM for local security. $142k on other units added OOM for local security.
7/30/2002	1,185,085.95	Several GTs flagged as LRR units. High load day. Several OOM calls. Reasons for OOM calls not clear. 30-minute units must run status in BME.
7/2/2002	1,064,358.71	Rebill $336k. Original estimates have $421k on LRR DAM uplift GTs and $482k on other units called OOM for ISO and TP security.

A positive number indicates an undercollection.

The main driving factors for RT LRR BPCG are similar to the factors for RT Internal BPCG. These include:

- SREs for local security
- ISO and TP out-of-merit (OOM) calls.
- High seasonal load

SREs and OOM can occur in periods of high seasonal load, resulting in calls for additional local security.

HIGHEST DAYS RT BPCG on Curtailed Imports

Date	Reported Total Bid Production Guarantees on Curtailed Imports	Comments
7/5/2002	24,716.46	Rebill $143.09. Curtailed for overgeneration coming out of system emergency.
5/13/2002	1,978.86	SCD showed Central East violations. NYISO operators curtailed imports as a precaution.

A positive number indicates an undercollection.

Only two dates were evaluated for this category. The BPCG for the first date was reduced significantly in the re-bill and is no longer material. The BPCG for the second date was a result of operator actions taken to reduce Central East flows.

There is no real identifiable pattern, however, the highest re-billed BPCG was less than $2,000/day. Only 15 out of the 186 days examined included RT BPCGs arising from curtailed imports.

LECG will continue to monitor extreme values.

HIGHEST DAYS DAM Contract Balancing

Date	Reported DAM Contract Balancing	Comments
7/29/2002	1,707,559.61	High RT load, high prices. $1.1 million on 13 units out of 128 units receiving DAM Contract Balancing for units not following basepoints, derates, LOC double counting and OOM dispatch.
7/30/2002	568,249.60	High RT load, high prices. Units derated due to fire receive DAM contract balancing. Units coming back ON dispatch from derate receive DAM contract balancing payments. Unit ramping up but not performing well. Some payments due to GT block loading. 2 units with combo of GT block loading and poor ramping for combined $50k. $47k on unit for block loading and unresponsive ramp. Additional unit derate issues and OOM calls.
7/2/2002	535,088.35	High RT load, high prices. Almost half of all DAM Contract Balancing in HB 15 alone. $56k for unit derate and LOC double counting. $54k on unit for block loading, slow ramp recovery and LOC double counting. $53k for LOC double counting and block loading. $61k on 2 units for LOC double counting and OOM. Several other units with block loading, LOC double counting and called OOM.
7/31/2002	498,340.49	Fire at generator location. Several units unavailable. Western generation backed down as eastern in response to fire. $70k on unit for block loading and unresponsive ramp. $33k on unit for unresponsive ramp. $62k for unit trip in HB 13 as well as coming back from trip. $46k for unit for LOC double counting payments and OOM. $27k on another unit for LOC double counting and derate.
4/18/2002	396,692.70	High RT load in shoulder period, high prices. Unit taken OOM and LOC double counting resulting in $64k. Additional unit derated, LOC double counting resulting in $61k. Unit for LOC double counting resulting in $11k. $36k for unit derate. Unit not following dispatch resulting in $24k. $23k for unit caused by GT block loading.
7/23/2002	299,861.88	Unit tripped, ramping but not at DAM levels in HB 9, 10 and 11 for $56 as well as derate in 11. Unit with $30k for block loading and unresponsive ramping. $28k on unit for OOM and LOC double counting. $25k on unit for derate.

A positive number indicates an undercollection.

HIGHEST DAYS

DAM Contract Balancing

Date	Reported DAM Contract Balancing	Comments
7/3/2002	295,169.62	$24k for unit with LOC double counting and ramping issues. $24k for unit due to block loading and slow ramp response. $21k for unit with LOC double counting, block loading and slow ramp. $20k for unit with slow ramp and block loading. Again unit for $20k with block loading and slow/unresponsive ramp.
8/1/2002	267,294.33	$56k for unit derate and LOC double counting. $20k for unit derate. $21k for unit derate and LOC double counting. $17k for unit derate.
9/4/2002	257,076.66	High load for period, high RT prices. $45k for unit with LOC double counting. OOM unit results in $40k. OOM unit results in $23k. Other units with LOC double counting.
6/12/2002	245,003.70	$31k for unit with LOC double counting, derate and block loading issues. $12k for unit derate, block loading and unresponsive ramp. $9k for unit OOM for unit trip. Only $144,275 in payments were verified by LECG.
8/2/2002	216,878.35	$27k for unit LOC double counting. Unit LOC double counting for $10k. $21k for unit derate and LOC double counting. $20k for unit derate, OOM and slow response rate. $12k for unit LOC double counting and block loading issues.
6/24/2002	206,537.59	$20,000 for unit trip in HB 14. $38k for unit OOM and LOC double counting. $12k for unit ramping up but lagging. $19k for unit affected by block loading. Other units issues include slow/unresponsive ramp, block loading, LOC double counting and derate issues.
8/16/2002	205,090.22	$78k for unit affected by block loading and with slow response rate. $11k for slow response rate and block loading. $16k on unit 1 and $14k on unit 2 for LOC double counting. Other units affected by OOM calls.
8/15/2002	197,683.49	High load day, high in-city prices. $57k for unit with slow ramp response, block loading and unit derating. $14k for unit with slow ramp response, derate and block loading. $15k for unit with slow ramp response and LOC double counting. Unit trips early in day and as unit comes back in HB15 off DAM schedule, ramping in HB15 and HB16 resulting in $30k.

A positive number indicates an undercollection.

High DAM Contract Balancing payments are a function of:

- High load
- High prices
- Double counting of LOC
- Payments to derated units
- Payments to slow ramping units
- GT block loading
- Payments to tripped units
- OOM calls

The revised code, to cancel any double payment of LOC and DAM Contract Balancing payments has been implemented. An accelerated schedule will rebill all overpayments by April, 2003. The rebill will also recover DAM Contract Balancing payments made for generator-directed derates. The schedule one effects of slow ramp responses and unit trips are identified issues.

RT Energy Residual

Date	Reported RT Energy Residual	Comments
7/29/2002	1,281,084.87	High DAM Load.
9/4/2002	1,272,449.33	
9/3/2002	1,202,239.95	
7/30/2002	867,732.91	High DAM Load.
8/13/2002	668,722.37	High DAM Load.
8/15/2002	663,847.86	High DAM Load.
7/21/2002	649,795.12	
8/26/2002	573,285.30	
7/31/2002	569,471.99	High DAM Load.
8/1/2002	568,991.51	High DAM Load.
8/4/2002	529,143.82	
8/16/2002	526,346.99	High DAM Load.
7/1/2002	(105,102.77)	Rebill $430k. High DAM Load
9/10/2002	(112,210.83)	Rebill $525k.
7/9/2002	(113,630.50)	Rebill $290k.
7/5/2002	(153,682.32)	Rebill $417k.
7/4/2002	(252,122.45)	Rebill $577k.
7/2/2002	(762,771.48)	Rebill $1.00 million. High DAM Load
7/3/2002	(1,206,032.75)	Rebill $747k. High DAM Load

A positive number indicates an undercollection.

This category is difficult to assess as LECG and the NYISO are still investigating RT modeling issues.

LECG has confirmed that 7 out of the 12 highest RT energy residual dates are high load days.

LECG was also able to determine that for each instance where RT energy residuals were reported on the pre-bill as negative, the re-bill reported positive energy residuals. In these instances, emergency energy purchases and sales have affected pre-bill calculations.

Once the RT modeling issue and other potential issues have been solved, LECG will revisit this category to assess the driving factors.

HIGHEST DAYS RT Congestion Residual

Date	Reported RT Congestion Residual	Comments
4/17/2002	9,676,100.47	MIS load rejection. Inconsistent external generator and zonal prices in several hours. Central East limit reduced. Solar magnetic disturbance alert. Thunderstorm alert declared, UPNY-ConEd reduced.
4/18/2002	4,347,467.39	Central East reduced for loss of ISO-NE generation and to control post contingency flows. Dysinger East reduced for line outages. Solar magnetic disturbance alert throughout day.
7/30/2002	3,424,079.79	High load day. Explosion at station. Maximum generation situation. Load pocket constraints reduced to control flows.
6/27/2002	1,788,472.05	Reduced to $1.3 million on rebill. SCD limits reduced to 98% for loading issues. Cental East reduced to control voltage. Lines trip. Major emergency declared for Central East flows, eastern generation sent to max gen. Thunderstorm alert declared. Central East reduced for thunderstorm alert. Emergency transfer criteria for Leeds -- Pleasant Valley.
7/5/2002	1,698,507.33	Several lines trip due to fire. Major emergency declared. Western units derated for system overgeneration. Lines taken out of service for fire. Fire lasts for a few hours.
8/12/2002	1,520,784.83	Load pocket limits reduced to control flows on high load day.
3/16/2002	1,376,556.29	NYISO receiving bad line data during the day. SCD solving line constraints with bad data after alternate control test. Central East reduced for contingencies.
8/10/2002	1,318,049.59	UPNY CE Ties significantly reduced to control for flows. Load pocket limits reduced to control flows.

A positive number indicates an undercollection.

HIGHEST DAYS

RT Congestion Residual

Date	Reported RT Congestion Residual	Comments
8/2/2002	1,277,291.94	Solar magnetic disturbance and thunderstorm alerts declared. Central East limit reduced to control for flows. UPNY-ConEd Ties reduced.
7/19/2002	1,247,307.27	ISO in low voltage alert state. Dunwoodie South reduced. Load pockets reduced for reduced generation and activate 30-minute GTs. Thunderstorm alert alert declared, UPNY ConEd Ties reduced for thunderstorm alert. CE lines and NM lines trip briefly.
8/5/2002	1,240,845.24	Thunderstorm alert. Central East reduced to control voltage. Load pocket limits reduced to control flow.
3/17/2002	1,189,562.35	Central East reduced for loss of ISO-NE generation. Solar magnetic disturbance alert active during day.
7/15/2002	1,188,241.55	Load pocket limits reduced to control flows.
7/23/2002	1,171,693.43	Dunwoodie South reduced for out of merit dispatch. Central East reduced for voltage control. Thunderstorm alert declared UPNY-ConEd Ties reduced to control flows. Load pockets reduced to control flows.
3/21/2002	(40,133.57)	Active SCUC constraint not modelded in RT. RT constraint not active in DAM.
4/29/2002	(46,230.89)	Central East limit increased 300 MW in RT. RT constraint not active in DAM.
5/24/2002	(52,674.41)	Active SCUC constraint not modelded in RT. RT constraint not active in DAM.
3/26/2002	(60,340.86)	Active SCUC constraint not modelded in RT. RT constraint not active in DAM.
5/23/2002	(78,390.94)	Active SCUC constraint not modelded in RT. RT constraint not active in DAM.
4/24/2002	(87,310.24)	RT constraint not active in DAM.
4/23/2002	(139,588.13)	RT constraint not active in DAM.
4/16/2002	(144,829.78)	Several wheels going from ISO-NE to PJM were accepted in HAM. Congestion pattern changed from SCUC.

A positive number indicates an undercollection.

Positive RT congestion residuals are a function of any change between day-ahead and real-time that reduces transmission capability. These events include:

- Line outages
- Line reductions
- Solar magnetic disturbance alerts
- Thunderstorm alerts
- Voltage control problems

Negative RT congestion residuals are also function of congestion changes between day-ahead and real-time:

- Constraint modeling
- Congestion shifts

Date	Reported RT Loss Residual	Comments
9/3/2002	292,831.30	
8/13/2002	145,238.25	High DAM load day.
7/21/2002	119,414.10	
4/15/2002	104,661.30	
8/2/2002	87,072.75	High DAM load day.
8/12/2002	80,955.65	High DAM load day.
8/22/2002	75,028.10	
6/27/2002	73,439.04	High DAM load day.
8/16/2002	72,455.17	High DAM load day.
8/23/2002	69,304.17	
7/26/2002	63,580.58	
4/17/2002	(50,523.85)	
7/4/2002	(56,240.28)	Rebill $17,710.63.
9/10/2002	(72,423.01)	Rebill ($38,135.45).
7/29/2002	(80,158.28)	High DAM load day. Higher RT load.
8/17/2002	(88,987.45)	
7/2/2002	(96,624.34)	Rebill $94,735.55. High DAM load day.
6/24/2002	(99,938.37)	
7/3/2002	(166,717.33)	Rebill $30,497.73.

A positive number indicates an undercollection.

This category is also very difficult to assess as LECG and the NYISO are still investigating RT modeling issues.

- LECG has been able to confirm that some, but not all of the negative loss residual instances on the pre-bill are positive on the re-bill.
- When the RT modeling issues and other potential issues have been worked out, LECG will be in a better position to determine the driving factors for the RT loss residual.

Some of the information required to understand high DAM schedule one charges is publicly posted on the NYISO OASIS. Links to relevant DAM information are listed below.

- Hourly and daily day-ahead load and generation commitment levels for internals and externals are located under Daily Energy Report. This data can be helpful in for:
  - DAM Internal, External, Virtual and LRR BPCGs
  - DAM Energy and Loss Residuals
- Day-ahead constraints are located under DAM Limiting Constraints. This data can be helpful in for:
  - TO Balancing Payments
- Day-ahead scheduled line outages are located under Day Ahead Scheduled Outages. This data can be helpful in for:
  - TO Balancing Payments

Date	Reported BPCG on Internal Units	Comments
5/12/2002	418,454.12	Weekend day. Low load. Several units committed to meet operating reserves. Revenues not adequate for reserve providers.
5/11/2002	326,139.67	Weekend day. Low Load. Several units committed to meet operating reserves. Revenues not adequate for reserve providers.
6/24/2002	323,894.28	Units committed to meet operating reserves. Large steam unit unavailable for Monday load pickup. High GT start-up costs.
3/30/2002	289,524.50	Weekend day. Low load. Several units committed to meet operating reserves. Revenues not adequate for reserve providers.
6/26/2002	260,453.73	Increased load. High GT start-up costs.
3/10/2002	243,311.15	Weekend day. Low load. Several units committed to meet operating reserves. Revenues not adequate for reserve providers.
4/7/2002	241,910.57	Weekend day. Low load. Several units committed to meet operating reserves. Revenues not adequate for reserve providers.
5/13/2002	241,506.32	Low load. Several units committed to meet operating reserves. Revenues not adequate for reserve providers.

A positive number indicates an undercollection.

Date	Reported BPCG on Internal Units	Comments
4/4/2002	231,088.93	Low load. Several units committed to meet operating reserves. Revenues not adequate for reserve providers.
4/28/2002	230,628.60	Weekend day. Low load. Several units committed to meet operating reserves. Revenues not adequate for reserve providers.
3/31/2002	219,383.87	Weekend day. Low load. Several units committed to meet operating reserves. Revenues not adequate for reserve providers.
6/15/2002	208,463.80	Weekend day. Low load. Several units committed to meet operating reserves. Revenues not adequate for reserve providers.
5/19/2002	208,335.02	Weekend day. Low load. Several units committed to meet operating reserves. Revenues not adequate for reserve providers.
3/29/2002	207,052.26	Low load. Several units committed to meet operating reserves. Revenues not adequate for reserve providers.
5/26/2002	204,115.45	Weekend day. Low load. Several units committed to meet operating reserves. Revenues not adequate for reserve providers.
5/5/2002	202,210.61	Weekend day. Low load. Several units committed to meet operating reserves. Revenues not adequate for reserve providers.

A positive number indicates an undercollection.

The driving factors for DAM Internal BPCGs are:

- Low load
- Low prices
- Weekend days
- Shoulder periods
- Reserve commitments
- GT start-up cost issue in BAS

13 out of the 16 highest DAM Internal BPCG dates were in the shoulder periods of March, April and May, where load and prices tend to be lower, reducing revenues.

11 of the 16 highest DAM Internal BPCG dates were on the weekend, where prices are lower, fewer steam units are required to meet load, but reserve requirements must still be met.

The units requiring uplift were typically added to meet reserves, regulation or 10-minute spin. The NYISO MMU reviews bid behavior and mitigates where appropriate under these conditions.

Date	Reported BPCG on External Units	Comments
4/10/2002	18,994.65	6 imports scheduled for FRED. 5 imports with long minimum run times, creates lumpy SCUC solution.
8/15/2002	14,065.00	1 import with long minimum run time, creates lumpy SCUC solution. Energy required in a few high priced hours.
4/19/2002	12,523.97	1 import scheduled for FRED. 6 imports with long minimum run times, creates lumpy SCUC solution.
4/11/2002	11,019.25	5 imports added for FRED. 4 imports with long minimum run times, creates lumpy SCUC solution.

A positive number indicates an undercollection.

There are two driving factors for DAM External BPCG payments, they include:

- External Forecast Required Energy for Dispatch (FRED)
- Multi Hour Block Transactions (MHBT)

External FRED commitments are scheduled in the 4th pass of SCUC (forecast load redispatch), whereas prices are determined in the 5th pass of SCUC (bid load redispatch). The fact that FRED exists is an indication that the FRED commitment is uneconomical in the final pass. The DAM external BPCGs recover the difference between the LBMP and the bid for the transaction.

MHBT allows externals to bid in transactions like minimum load blocks. MHBTs cannot set price and must run for a specified period of time. MHBTs can be committed when LBMPs are lower than the offers made by the MHBTs.

HIGHEST DAYS DAM Virtual BPCG

Date	Reported Virtual BPCG	Comments
4/8/2002	94,576.71	Unit added for 10 hours to meet forecast load and 14 hours to meet bid load. Uplift required in all hours. All uplift included in virutal BPCG bucket. Only $37k in hours added to meet forecast load. Monday, increase in load after weekend. Unit already running, no start-up cost.
3/17/2002	36,713.73	Unit added for forecast load in all hours. Minimum run time 24 hours. Weekend day in shoulder month. Unit status ON coming into day. No start-up costs. Unit set smaller than 3/18/02. Unit committed for LRR on 3/16/02. Load higher than 3/16/02. Less external FRED energy than 3/16/02 by $40k.
4/10/2002	35,202.56	Unit added for 2 hours for forecast load, 22 for bid. Only $4,200 in hours added to meet forecast load.
6/4/2002	32,002.86	3 units all added for 1 hour each for forecast load, and 23 for bid load. Forecast BPCG $2,200, $2,100 and $2,200.
4/2/2002	29,760.03	Unit added for 3 hours for forecast load, 21 for bid load. Only $3,600 in hours added to meet forecast load.
4/1/2002	28,897.89	Unit added for 3 hours for forecast load, 21 for bid load. Only $3,800 in hours added to meet forecast load.
3/28/2002	28,760.11	Unit added for 3 hours for forecast load, 21 for bid load. Only $4,300 in hours added to meet forecast load.
5/27/2002	27,950.21	Unit added for 5 hours for forecast load, 19 for bid load. Only $2,900 in hours added to meet forecast load.

A positive number indicates an undercollection.

DAM virtual BPCG payments occur when units are added for forecast load in at least one hour and for bid load in all remaining hours. If a unit was added for an hour in the LRR pass then the BPCG would be allocated to the DAM LRR BPCG.

The drivers are largely the same as for DAM Internal BPCGs. The difference is that in at least one hour of the day the unit was added to meet forecast loads.

Date	Reported BPCG on units committed for LRR	Comments
7/30/2002	515,732.17	High DAM load. Tight supply. Minimum run time requirements. $171k for hours with forecast commitments.
4/18/2002	368,869.32	High seasonal DAM load. Tight seasonal supply. Minimum run time requirements.
6/15/2002	246,297.88	Weekend day. Low load. Fewer units added in earlier passes with the ability to meet LRR requirments.
4/10/2002	239,415.71	Shoulder period. Low load, low prices.
8/1/2002	224,793.61	High DAM load. Tight supply. $62.5k for commitments in prior passes.
4/9/2002	215,663.21	Shoulder period. Low load, low prices.
4/11/2002	208,984.43	Shoulder period. Low load, low prices. Fewer available units.
4/12/2002	191,242.47	Shoulder period. Low load, low prices.
4/13/2002	173,474.97	Weekend day. Shoulder period. Low load. Fewer units added in earlier passes with the ability to meet LRR requirments. Minimum run time requirements.
5/9/2002	170,627.08	Fewer units added in earlier passes with ability to meet LRR requirements as other units available.
4/26/2002	170,612.02	Shoulder period. Low load, low prices.
4/1/2002	164,261.51	Shoulder period. Monday, load pickup coming off weekend, fewer available units for pickup.
3/16/2002	162,255.05	Weekend day. Low load. Fewer units added in earlier passes with the ability to meet LRR requirments.

A positive number indicates an undercollection.

The driving factors for DAM LRR BPCG are:

- Minimum run time specifications
- Low load with low prices
- Shoulder periods
- Fewer available units
- High load with tight supply

Units that specify large minimum run times force commitments in hours where commitment may not have been required but the BPCGs are still honored.

LRR commitment is common in shoulder months. As in-city units go out on maintenance, the set of available LRR units is smaller. Additionally, lower load and prices reduce bid load commitment of in-city units.

HIGHEST DAYS DAM Energy Residual

Date	Reported DAM Energy Residual	Comments
4/17/2002	615,774.66	MIS load rejection issue.
4/3/2002	279,326.44	FRED commitments.
4/10/2002	189,671.44	FRED commitments.
4/8/2002	133,548.35	FRED commitments.
4/2/2002	117,961.66	FRED commitments.
4/9/2002	115,953.66	FRED commitments.
3/21/2002	114,192.98	FRED commitments.
3/28/2002	108,371.18	FRED commitments.
9/10/2002	(11,084.03)	
8/15/2002	(12,357.51)	
7/31/2002	(13,274.17)	

A positive number indicates an undercollection.

The driving factors for positive outlying DAM energy residual values are:

- External FRED
- Shoulder periods

As noted earlier, FRED occurs when units are scheduled in the forecast pass and not the bid pass of SCUC. The DAM energy residuals are a function of the monetary commitments to these transactions, up to the LBMP.

The eight most extreme values were in the shoulder months of March and April, periods where GTs are less available and external control areas can have excess energy.

At this point, LECG has not been able to explain negative outlying DAM energy residual values. Negative residuals are still under investigation.

HIGHEST DAYS DAM TO Balancing Payments

Date	Reported TO Balancing Payment (Charge)	Comments
8/9/2002	1,124,917.53	
6/12/2002	363,277.46	
7/29/2002	327,238.56	
7/12/2002	279,039.40	
7/8/2002	267,320.89	
5/21/2002	(1,029,954.38)	
5/8/2002	(1,109,408.76)	
5/15/2002	(1,116,996.81)	
5/16/2002	(1,158,735.65)	
7/14/2002	(1,271,689.01)	
5/5/2002	(1,303,986.18)	
6/1/2002	(1,331,666.44)	
6/2/2002	(1,384,086.44)	
5/6/2002	(1,396,223.30)	
8/24/2002	(1,511,282.82)	
5/7/2002	(1,534,298.00)	
5/24/2002	(1,561,659.98)	
5/22/2002	(1,574,217.00)	
5/3/2002	(1,622,886.92)	
4/29/2002	(1,681,749.61)	
8/17/2002	(1,805,380.94)	
4/30/2002	(1,865,416.65)	
5/23/2002	(1,916,816.33)	
4/17/2002	(3,846,946.03)	MIS load rejection issue.

A negative number indicates an undercollection.

The Congestion Reduction Task Force is investigating reasons for DAM TO Balancing Charges. The driving factors identified by the task force include:

- Assumptions used in the TCC auction model versus the DAM dispatch model:
  - Transmission out of service
  - Transmission limits
  - Phase Angle Regulator (PAR) settings
  - Unscheduled loop flow
  - Location of Astoria unit connections

- Billing and accounting issues:
  - Payments for FRED to DAM-scheduled imports
  - Settlement of virtual load schedules

Date	Reported DAM Loss Residual	Comments
8/2/2002	(1,667,021.94)	High load and high reference bus prices.
7/31/2002	(1,659,149.95)	High load and high reference bus prices.
8/1/2002	(1,649,655.88)	High load and high reference bus prices.
8/14/2002	(1,523,538.51)	High load and high reference bus prices.
8/15/2002	(1,515,192.91)	High load and high reference bus prices.
8/5/2002	(1,514,037.31)	High load and high reference bus prices.
8/16/2002	(1,370,598.88)	High load and high reference bus prices.
7/30/2002	(1,366,177.81)	High load and high reference bus prices.
7/29/2002	(1,273,843.41)	High load and high reference bus prices.
8/13/2002	(1,197,643.91)	High load and high reference bus prices.
8/12/2002	(1,114,076.32)	High load and high reference bus prices.
6/27/2002	(1,104,357.89)	High load and high reference bus prices.
6/26/2002	(1,097,118.98)	High load and high reference bus prices.
7/2/2002	(1,074,226.90)	High load and high reference bus prices.
7/1/2002	(1,047,591.72)	High load and high reference bus prices.
7/3/2002	(1,044,176.38)	High load and high reference bus prices.
7/18/2002	(1,003,537.60)	High load and high reference bus prices.

A positive number indicates an undercollection.

This category is very difficult to assess. Empirically, however, 17 of the most extreme DAM loss residual payments occurred in the 18 highest total DAM load dates. Additionally, these 17 extreme dates occurred in the 33 highest reference bus priced dates.

The correlation appears that the higher the DAM load and reference bus price, the higher the loss residuals.