Incremental Offers, Decrement Bids & Up To Congestion

Presented at

Technical Conference on Financial Transactions in PJM

Docket No. EL14-37-000

Presented by
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What are UTCs, Incs and Decs?

- An Inc (or incremental offer) is an offer to sell electricity in the Day-Ahead market at a stated price at a particular location . Approximately 6,700 unique nodes. Bid cap is currently +/- $2100

- A Dec (or decrement bid) is an offer to buy electricity in the Day-Ahead market at a stated price, at a particular location . Same availability and bid caps as Incs.

- A UTC (or up-to congestion transaction) is a bid to purchase transmission congestion and losses in the Day-Ahead market at a stated price spread, between two particular points. Approximately 300 unique nodes. +/- $50 bid cap.

  - Incs and Decs clear based on the LMP of the specified point.

  - UTCs clear based on the difference between LMPs at two specified points, representing the cost of transmission congestion and losses.

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UTC: A Transmission Congestion Product

- The Up To Congestion transmission product is a daily point-to-point product that can be broken down into hourly transactions and represents the transportation of congestion and losses throughout the system.

- There is no energy component associated with the product because it has a cleared injection and withdraw of equal mw's in each transaction.

- Demonstrated in:

  - PJM's descriptions of the product to FERC.

  - PJM's settlement of the product in the DA market. http://pjm.com/~/media/documents/manuals/m29.ashx

  - PJM Credit Policy. PJM has a different credit requirement for Incs/Decs and UTCs. UTC transactions are treated differently in terms of credit because they do NOT transact energy unlike Incs/Decs. http://www.pjm.com/markets-and-operations/etools/oasis/~/media/documents/agreements/pjm-credit-overview.ashx

- Rather than comparing a UTC to an Inc or Dec, a UTC may be more appropriately compared to an FTR as it is a daily transmission product.

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Is a UTC the Same as a Paired Inc and Dec?

- **NO.**
- Incs/Decs represent energy costs in the form of total LMP. While UTCs represent transmission congestion and loss costs, but not energy, in the form of the difference in price between the source and sink.
- While an Inc and a Dec could be paired together, there is no guarantee both would clear. Both "ends" of a UTC always clear.
- PJM models Incs/Decs during the Resource Scheduling Commitment (RSC) while UTCs are modeled during the Scheduling Pricing and Dispatch (SPD). http://pjm.com/~/media/committees-groups/committees/mic/20140508/20140508-item-03-day-ahead-market-clearing-process.ashx

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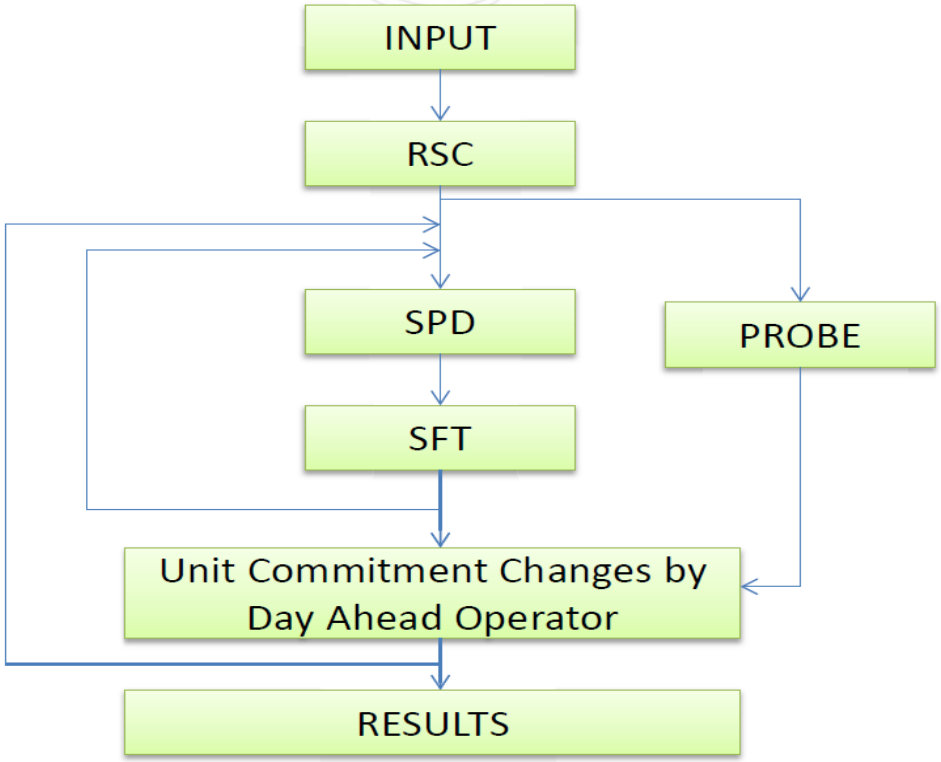
Day Ahead Market Clearing Process



UTCs are Added to the Day-Ahead Market After the Unit Commitment Run

After Day Ahead Market Close

- Resource Scheduling Commitment (RSC)
  - Major Transfer Constraints
  - No up-to congestion transactions
  - Includes increment and decrement bids
  - Unit Commitment only
- Scheduling Pricing and Dispatch (SPD)
  - All Constraints
  - up-to congestion transactions

After Day Ahead Market Close (Cont.)

- PROBE
  - Provide recommendation to DAM engineer to commit, de-commit or modify unit commitment using all constraints to determine least cost solution
  - Three pivotal supplier test

Should Incs/Decs be Charged Uplift Differently Than UTCs?

- The problem with PJM's current allocation methodology that creates the appearance of preferential treatment is that Incs/Decs are not netted as they are in ERCOT, CAISO, and MISO.
- It is worth noting that the ISOs that net Virtuals also base their cost allocation methodologies on cost causation.
- Incs/Decs can be netted in PJM, to avoid operating reserve charges for *some* market participants, but not all, with the use of Internal Bilateral Transactions (IBTs).
- The current treatment of UTCs is not incidental or accidental, it recognizes the energy neutrality of the transaction.

Can UTCs Bear an Uplift Allocation?

Report on the Impact of Virtual Transactions

Schedule 9 charges and also any uplift charges that are assessed to those bids under the current market rules in PJM.

	UTC Gross	UTC Net	INC/DEC Gross	INC/DEC Net
Cleared MWh	452,001,946	452,001,946	108,039,474	108,039,474
Average Daily Profit	$394,397	$389,828	$131,612	-$63,499
St Dev of Daily Profit	$1,266,783	$1,267,456	$783,490	$697,462
Average Profit/Cleared MWh	$0.32	$0.31	$0.44	-$0.21
%of Loss Days	39%	40%	53%	68%

*January 2013 through December 2013

Table 1: 2013 Gross and Net Financial Statistics for UTCs, INCs and DECs

- No
- UTC average gross profit is $.32.
- Average PJM uplift for deviations:
  - 2013:
    - PJM East: $3.53
    - PJM West: $1.78

http://monitoringanalytics.com/reports/PJM_State_of_the_Market/2013/2013-som-pjm-volume2-sec4.pdf @ page 139 DA + RTO Bal Dev + Bal dev LOC + East or West Adder

  - 2014 (Jan - Sept)
    - PJM East: $3.55
    - PJM West: $3.28

http://monitoringanalytics.com/reports/PJM_State_of_the_Market/2014/2014q3-som-pjm-sec4.pdf @ page 139 DA + RTO Bal Dev + Bal dev LOC + East or West Adder

- According to PJM's statistics neither can Inc/Dec transactions.

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Can Virtuals Bear the Current Uplift Allocation?

Report on the Impact of Virtual Transactions

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Table 1: 2013 Gross and Net Financial Statistics for UTCs, INCs and DECs

- No.
- Why are market participants continuing to clear Incs/Decs when they are unprofitable? Because *some* market participants are able to net out of uplift using Internal Bilateral Transactions.
- Participants are continuing to clear Incs/Decs in order to hedge physical positions.
  - 52% of all Incs clear at West Hub
  - 41% of all Decs clear at West Hub
    http://www.pjm.com/~/media/committees-groups/task-forces/emustf/20141211/20141211-item-05d-phase-2-action-item-responses.ashx @ #41
- At a minimum 41% of all Inc/Dec transactions are not impacting power balance, unit commitment, or dispatch. PJM is only clearing these transactions and charging them all uplift (unless netted with IBTs) that they have no possibility of creating.

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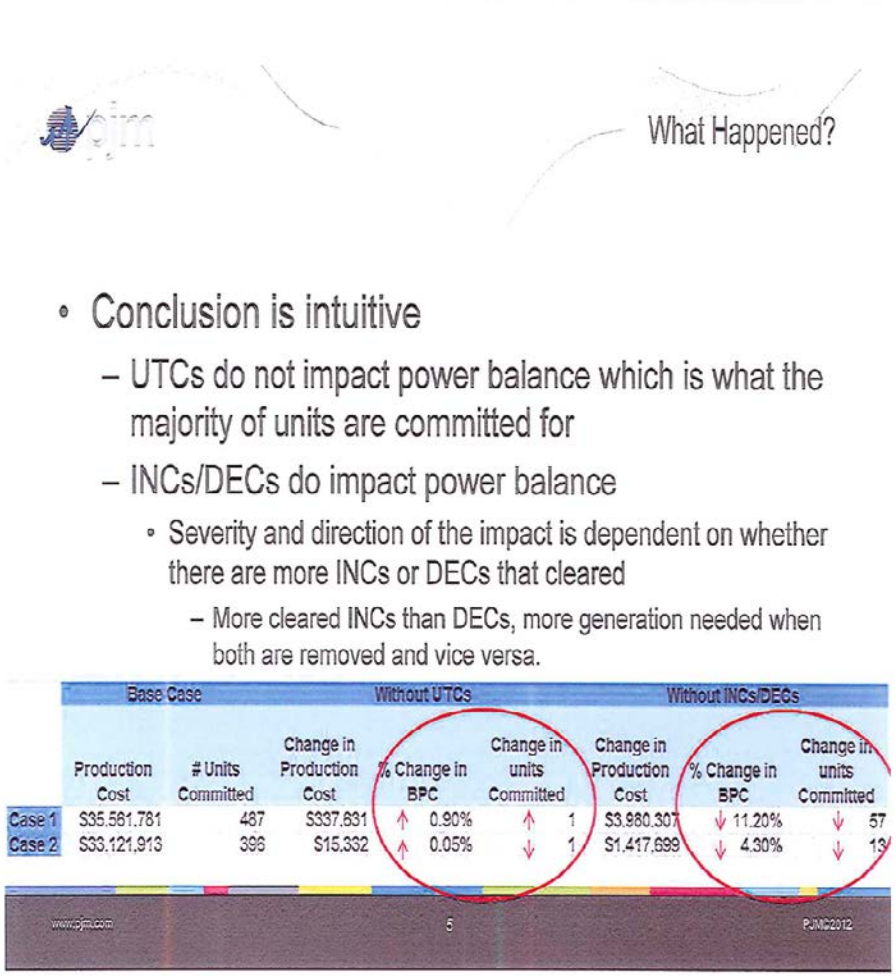
PJM DA Market Rerun 2012



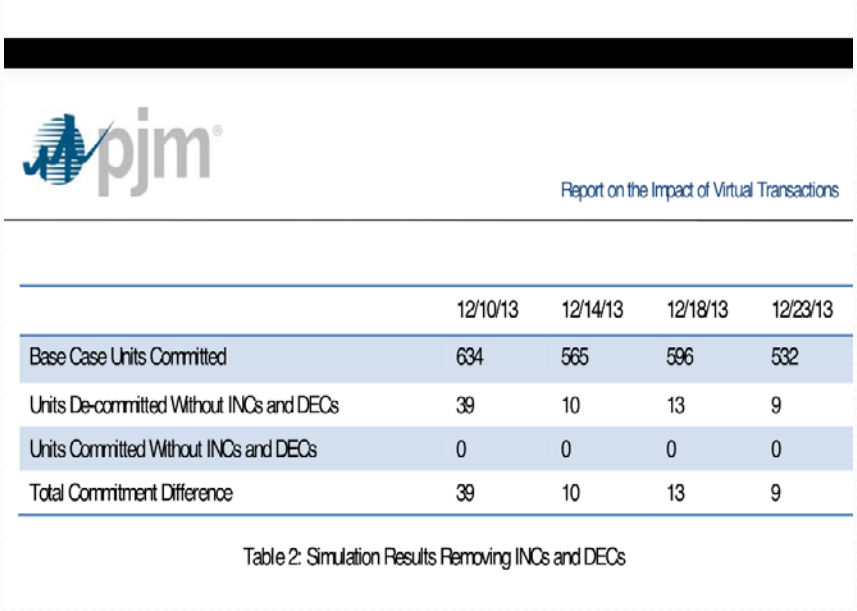
The key take away from this analysis performed by PJM is:

- More Incs than Decs may require PJM to commit more generation in the Day Ahead.
  - Incs look like generation: +1 MW
- More Decs than Incs may require PJM to commit less generation in the Day Ahead.
  - Decs look like load: -1 MW
- UTCs are neutral from a power balance perspective . UTCs financially transfer energy from one part of the system to another.
  - UTC: -1 MW+ 1 MW
  - -1 MW+ 1 MW = 0 MW
  - -1 MW+ 1 MW ≠ 2 MW
- Even if UTCs are analogous to a cleared Inc and Dec, which they are not, the impact to power balance is always zero.

- The real issue with the current PJM construct is that netting does not exist for every market participant . Energy neutral portfolios are charged uplift as if they are creating multiple simultaneous deviations even if in offsetting directions.

PJM Study on UTC and Incs/Decs and Unit Commitment 2013

Inc/Dec

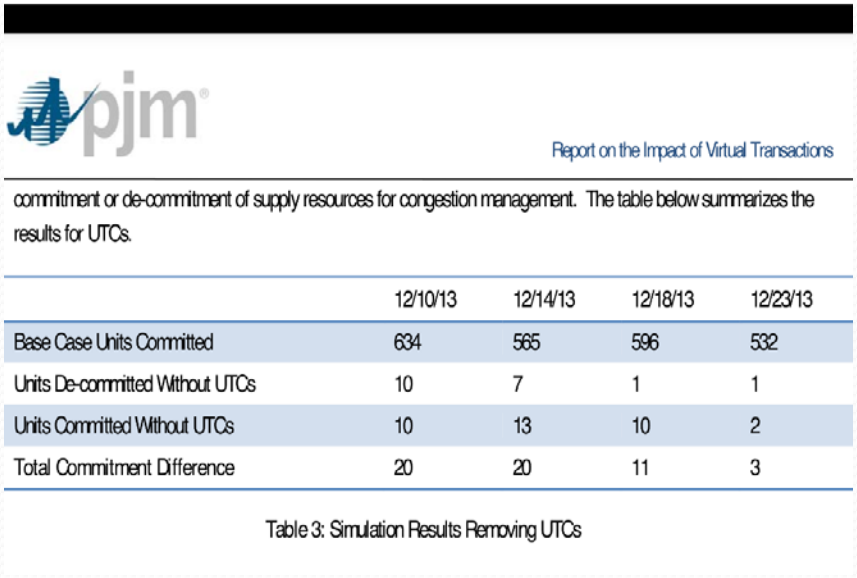


Report on the Impact of Virtual Transactions

	12/10/13	12/14/13	12/18/13	12/23/13
Base Case Units Committed	634	565	596	532
Units De-committed Without INCs and DECs	39	10	13	9
Units Committed Without INCs and DECs	0	0	0	0
Total Commitment Difference	39	10	13	9

Table 2: Simulation Results Removing INCs and DECs

UTC



Report on the Impact of Virtual Transactions

commitment or de-commitment of supply resources for congestion management. The table below summarizes the results for UTCs.

	12/10/13	12/14/13	12/18/13	12/23/13
Base Case Units Committed	634	565	596	532
Units De-committed Without UTCs	10	7	1	1
Units Committed Without UTCs	10	13	10	2
Total Commitment Difference	20	20	11	3

Table 3: Simulation Results Removing UTCs

What Do We Learn From These Studies?

- Not much
  - First the studies do not recognize the volume difference between Incs/Decs and UTCs. Approximately four times as many UTCs cleared.
  - What is the output level of the units being committed or decommited?
  - The studies show that UTCs commit and decommit units where Incs/Decs seem to impact commitment more than decommitment. This reflects the energy neutrality of UTCs.
  - Seems to imply a bias for Decs over Incs.
  - *Most Importantly*: Were the units committed by Incs/Decs and UTCs in the Day Ahead Market needed in the Real Time Market? If so, these transactions pre-positioned the Day Ahead Market and lowered uplift.

Types of Deviations

- PJM views all Incs/Decs as deviations unless they are matched with physical generation or load at the same node as the Inc/Dec.
- Broadly there are two types of deviations:
  - Helping deviations
    - Converge the DA and RT markets
    - Are profitable
    - May lower uplift
  - Harming deviations
    - Diverge the DA and RT markets
    - Are unprofitable
    - May increase uplift
- Helping and Harming Deviations can be further categorized as:
  - Energy Deviation (Impact Power Balance)
    - Unit trip
    - Load forecast error
    - Imports and Exports
    - Inc/Dec
  - Transmission Deviation (Do NOT Impact Power Balance)
    - UTC
    - Transmission wheel

Uplift in Other ISOs

ISO	Energy Products	Congestion Products		Netting	Admin Fees $/MW	Real Time Uplift	Avg uplift $/MW 2013
		Hourly	Long-term				
ERCOT	Yes, called DAM Energy Offer/Bid	Yes, called PTP	Yes, CRR	Yes	N/A	Hourly Net short	$0.02 for PTP
NYISO	Yes, Zonal	No	Yes, TCC	No	$0.10	Incs $0.003/MWh Decs: $0.00/MWh	N/A
CAISO	Yes, convergence bidding	Virtual Spread bid under consideration	Yes, CRR	Yes	$0.083	Hourly Net short	$0.26 (FMM)
MISO	Yes, Incs/Decs	Virtual Spread bid under development. MISO IMM Recommendation	Yes, FTR	Yes (Market Wide)	$0.075	DDC: Hourly Net Short CMC: Hourly Net Flows	$1.00 (DDC) $0.02 (CMC)
PJM	Yes, Incs/Decs	Yes, UTC	Yes, FTR	Yes for Physical No for Financial	$0.045	Daily Rate	$3.28 (East) $1.65 (West)
SPP	Yes, Incs/Decs	No	Yes, FTR	No	Not known	Daily Rate	$1.73 (2014 Jan-Aug)
ISO-NE	Yes, Incs/Decs	No	Yes, FTR	No	Not known	Daily Rate	$2.95

MISO is Considering Adding a UTC Product. Below is an Excerpt From MA's Presentation at MISO:

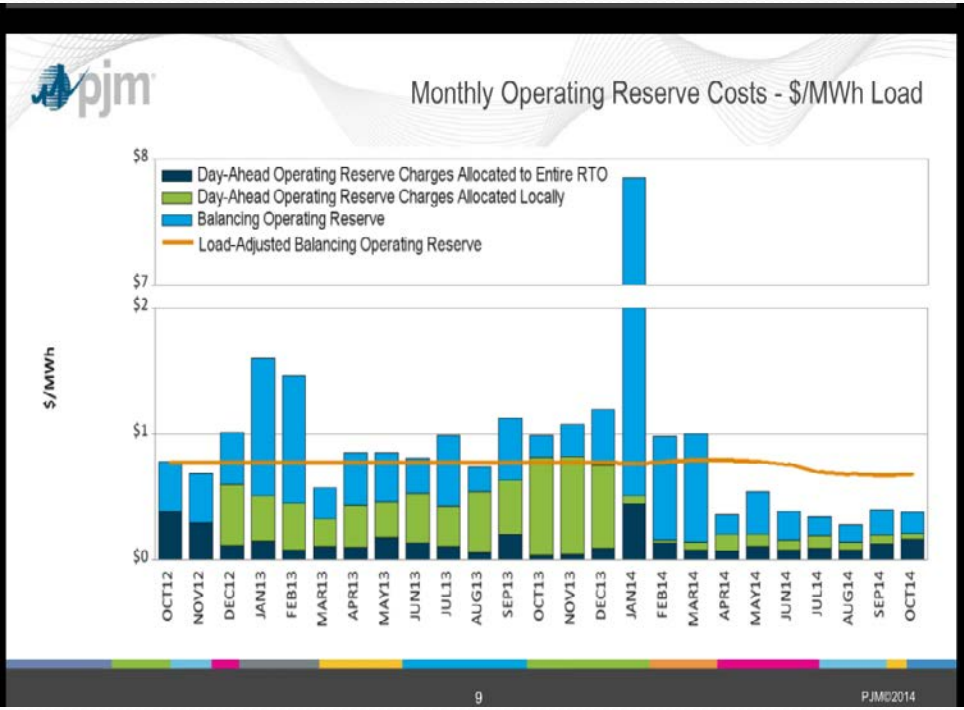
UTC: PJM Market Monitor Recommendation

- **Eliminate product from PJM market**
  - **Requires substantive resource time in clearing**
  - **Requires PJM manual adjustments to unit commitment and line limits to accommodate**
  - **No evidence that UTC contribute to price convergence**
  - **Evidence that UTC contributed to differences in day ahead and balancing congestion**
  - **Evidence that UTC contribute to FTR underfunding**

https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/Workshops%20and%20Special%20Meetings/2013/20131118%20Virtual%20Spread%20Bid%20Workshop/20131118%20Virtual%20Spread%20Bid%20Workshop%20Item%2006%20Monitoring%20Analytics%20Presentation.pdf

Two Different Views of Uplift Since EL14-37-000 Filing

Notice that the PJM presentation shows that uplift moved up slightly in September and October, while the IMM shows lower uplift since the refund effective date. Most of the dollar change in the IMM presentation is due to a decrease in Reactive and Black Start. The change in reactive and Black Start is due to the transition from Summer to Fall. Virtuals do not impact Reactive and Black Start.



PJM Presentation

Energy uplift charges eight weeks before and after September 8, 2014

Period	Day-Ahead	Balancing	Reactive	Synchronous Condensing	Black Start	Total Energy Uplift
Jul14-Sep07	$214,557	$378,789	$61,254	$68	$134,441	$789,107
Sep08-Nov02	$289,516	$306,491	$27,718	$0	$103,877	$727,602
Difference	$74,959	($72,297)	($33,536)	($68)	($30,563)	($61,505)
Difference (%)	34.9%	(19.1%)	(54.7%)	(100.0%)	(22.7%)	(7.8%)

IMM Presentation

http://www.pjm.com/~/media/committees-groups/committees/mc/20141117-webinar/20141117-item-07a-markets-report.ashx @ Slide 9

http://www.pjm.com/~/media/committees-groups/committees/mc/20141117-webinar/20141117-item-06-market-monitor-report.ashx @ Slide 15

PJM Analysis of UTCs and Convergence

Price Convergence Statistics – Total LMP

UTCs appear to be beneficial in contributing to Day-ahead vs Real-time price convergence

Date	RT – DA (w/ UTCs) ($/MWh)	RT – DA (w/o UTCs) ($/MWh)	Improvement with UTCs included ($/MWh)
May 2, 2013	3.81	4.43	0.62
May 4, 2013	0.65	1.06	0.41
May 22, 2013	6.10	6.35	0.25
May 23, 2013	0.71	-2.14	1.43
May 27, 2013	-4.51	-4.24	-0.27

Price Convergence Statistics – Congestion Component

UTCs appear to improve Day-ahead vs Real-time congestion price convergence

Date	RT – DA (w/ UTCs) ($/MWh)	RT – DA (w/o UTCs) ($/MWh)	Improvement with UTCs included ($/MWh)
May 2, 2013	0.10	-0.15	0.05
May 4, 2013	0.16	0.18	0.02
May 22, 2013	-0.22	-0.88	0.66
May 23, 2013	0.09	-1.04	0.95
May 27, 2013	0.07	0.04	-0.03

http://www.pjm.com/~/media/committees-groups/committees/mc/20130624-webinar/20130624-item-02-utc-transaction-analysis.ashx

PJM Analysis of UTCs and Convergence

Observations

- UTCs profit when they contribute to convergence of Day-Ahead and Real-Time congestion
  - When they increase congestion in DA drawing it closer to real-time, they make money
  - When they create congestion in DA that does exist in RT, they lose money
- This principles applies for both prevailing and counter-flow congestion

http://www.pjm.com/~/media/committees-groups/committees/mic/20140410/20140410-item-04b-up-to-transaction.ashx Slide 6

Findings From the FERC Staff's Analysis on Uplift in RTO and ISO Markets:

3. Impact of Day-Ahead and Real-Time Price Spreads

- To further understand the relationship between uplift credits and prices, day-ahead and real-time price differences and uplift costs were assessed. Price spreads driven by high real-time prices relative to day-ahead prices may indicate that insufficient resources were committed day-ahead to reliably operate the system in real-time. Conversely, relatively low real-time prices could indicate that more resources were committed than were needed. The difference between the resources that clear in the day-ahead market or were committed prior to the real-time and the resources that are ultimately needed for real-time operations could influence uplift costs.
- The strong correlation between uplift credits and price spreads between the day-ahead and real-time markets suggests the accuracy of commitment decisions may strongly influence uplift and day-ahead and real-time price differences in RTO and ISO markets.

EMU Update

- From the EMU Charter:
  - Explore new methodologies for the allocation of make-whole payments that may include, but are not limited to, methodologies where Operating Reserve make-whole costs are netted with other out-of-market costs and payments (e.g. such as balancing congestion, Marginal Loss Surplus, etc.), **that are consistent with cost causation/benefit principles**.
- PJM is planning to poll stakeholders on preferences of proposed allocation methodologies in order to consolidate proposals prior to voting.
- The Financial Marketers Coalition has been asking for a PJM cost causation study as the results of the study would be the basis for their allocation methodology.
- Up until now, PJM has resisted performing a cost causation study. Stating that such a study is not possible.
- PJM and the IMM's allocation methodologies seek to increase the denominator and simply spread the cost across a broader spectrum of transactions rather than align cost with causation.
  - Is not transparent.
  - Does not send appropriate price signals.
  - Does not discourage transactions that cause uplift.
  - Discourages transactions that lower uplift.
  - Ultimately this could be prohibitive for transactions that would potentially lower uplift.

EMU Update: Proposals

- PJM's current proposal is a tweak of the existing methodology. PJM's proposal removes the Lost Opportunity Credit out of the deviations bucket.
  - Daily rate rather than hourly. A deviation during a non-peak hour is treated the same as a deviation during a peak hour.
  - Treats all deviations as harmful. Deviations that lower uplift are charged uplift.
  - Transmission deviations are treated as an energy deviations. Even though they do not have an energy deviation.
  - Not consistent with cost causation principals.
- The IMM's proposal is also a tweak of the existing methodology. The IMM's proposal differentiates between Financial and Physical (Known/Unknown) deviations.
  - Daily rate rather than hourly. A deviation during a non-peak hour is treated the same as a deviation during a peak hour.
  - Treats all deviations as harmful. Deviations that lower uplift are charged uplift.
  - Transmission deviations, that do not have an energy deviation, are treated as two energy deviations.
  - Not consistent with cost causation principals.
- Red Wolf, with another market participant, have proposed the MISO allocation construct.