

Financial Costs of SE Accuracy

Johnny MC to the C to the O to M to the B

- PJM's DA Market engine solves DA LMP for all the nodes in the Market.
- Generators receive DA LMP settlement in given hour for their DA MWh cleared thru eMKT multiplied by the Unit's DA LMP.
- Nodal Load customers are charged at DA LMP for their cleared DA Demand MWh multiplied by the nodal location's DA LMP.
- Residual Priced Load customers are charge at DA LMP for their cleared DA Demand MWh multiplied by the given RESID_AGG location's DA LMP.
 - DA Definition for RESID_AGG location for given day is fixed weighted based on the load distribution within from the day one week prior. Load distribution is based on State Estimator solution



Balancing LMP Settlement for Generators is also basically straight forward

- RT MWh for Generators to be used in LMP settlements is reported to PJM via PowerMeter.
- Generator's Balancing LMP settlement for given hour =
 - Unit's RT LMP * (RT PowerMeter MWh minus DA eMKT MWh)
- Accuracy of the solution for a given generator's RT LMP is dependent on the accuracy of that unit's RT telemetry in conjunction with accuracy or RT telemetry in the surrounding area.

- RT MWh for Nodal Load LSEs to be used in LMP settlements is reported to PJM via InSchedule. (Submitted Inclusive of applicable losses, then de-rated by PJM for LMP billing)
- Nodal Load Balancing LMP settlement for given hour =
 - Nodal RT LMP * (RT LoadwoLoss MWh minus DA Demand MWh)
- Nodal locations have fixed weighted aggregate definitions.
- Accuracy of the solution for the RT LMPs of the underlying pnodes that make up the Nodal location's definition are dependent on the accuracy of the RT telemetry in the relative and surrounding area.

Affect of Inaccurate Telemetry on LMP solution is _____

- Normal hour where SE solution for Gen is in line with customer PowerMeter value
 - RT LMP solution therefore would likely be accurate in this hour.

Pnode Pnodeid	Pnode Pnodename	GMT Hour Begin	Pnodertvalues Semwh	
1234	SubX 69 KV LOAD1	/ /2015 03:00:00	2.7	<SE Load solution for use is RESID_AGG defintions
1235	SubX 69 KV LOAD2	/ /2015 03:00:00	0	<SE Load solution for use is RESID_AGG defintions
1236	SubX 69 KV LOAD3	/ /2015 03:00:00	-0.4	<SE Load solution for use is RESID_AGG defintions
1237	SubX 69 KV GENA	/ /2015 03:00:00	2.2	2.537 <PowerMeter reported value

- Versus an hour where Gen telemetry had an issue, and in turn skews SE Load
 - RT LMP solution therefore is likely less accurate for these pnodes.

Pnode Pnodeid	Pnode Pnodename	GMT Hour Begin	Pnodertvalues Semwh	
1234	SubX 69 KV LOAD1	/ /2015 04:00:00	2.7	<SE Load solution for use is RESID_AGG defintions
1235	SubX 69 KV LOAD2	/ /2015 04:00:00	-0.6	<SE Load solution for use is RESID_AGG defintions
1236	SubX 69 KV LOAD3	/ /2015 04:00:00	13.1	<SE Load solution for use is RESID_AGG defintions
1237	SubX 69 KV GENA	/ /2015 04:00:00	15.3	2.705 <PowerMeter reported value

- For RESID_AGG_LOAD, its RT Load Weight AVG LMP is not directly used in the Balancing LMP settlements for Congestion and Loss Charges
- Rather it occurs by individual load pnode bus, since the RT definition for the RESID_AGG is different each hour based on the State Estimator solution's load distribution.
- Balancing Congestion and Loss settlement occurs by individual bus. =Sum for hour:
Load Pnode's RT LMP * (RT Load allocated to pnode minus DA Demand DA def allocation)
- The magnitude of the difference between simulating using the overall RT LMP versus the actual bus-by-bus method is proportional to the spread of congestion and losses in given EDC, coupled with the bus by bus difference between DA and RT definition factors.
- Circling back to Nodal Load, their locations have the same definitions for DA & RT, therefore they are not subject to this RESID_AGG specific implicit balancing affect.

- The bus pnode level breakdown detail is available, via the Implicit Congestion and Loss Charge Detail report, under the Locational Congestion/Loss Details category in MSRS.
- This report provides the granular calculation components behind the Implicit related column values in the Congestion and Loss Charge Summary reports in MSRS.
- For participants wishing to fully simulate the pnode bus level implicit settlement calculations, additional postings are available...

- DA and RT Definitions for Zone/RESID aggregates can be retrieved via the Zonal Aggregate Definitions report under the Locational Congestion/Loss Details category in MSRS.
- Aggregate definition factors for nodal locations are available via the Fixed Weighted-Average Aggregate Definitions posting on the public PJM website, from www.pjm.com, under Markets & Operations, under Energy Market, under LMP Model Information;
- <http://www.pjm.com/markets-and-operations/energy/imp-model-info/fwaad.aspx>
- Note, due to the potentially massive size of the Implicit Congestion & Loss Charge Detail, and Zonal Aggregate Definition reports, both are limited to a single day per download request when manually selecting via MSRS.



- Using this example again, in an hour where the SE solution was "good"...
 - The "correct" amount of Load at these busses will weight accordingly into the RT definition for the related RESID Load location.

Pnode Pnodeid	Pnode Pnodename	GMT Hour Begin	Pnodertvalues Semwh	
1234	SubX 69 KV LOAD1	/ /2015 03:00:00	2.7	<SE Load solution for use is RESID_AGG defintions
1235	SubX 69 KV LOAD2	/ /2015 03:00:00	0	<SE Load solution for use is RESID_AGG defintions
1236	SubX 69 KV LOAD3	/ /2015 03:00:00	-0.4	<SE Load solution for use is RESID_AGG defintions
1237	SubX 69 KV GENA	/ /2015 03:00:00	2.2	2.537 <PowerMeter reported value

- Versus an hour where telemetry "skewed" the SE Load MWh solution...
 - An incorrect amount of Load at pnode3 will weight itself more heavily into the RT definition for the related RESID Load location. As well as potentially factor more heavily into the RESID location's DA definition next week.

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1234	SubX 69 KV LOAD1	/ /2015 04:00:00	2.7	<SE Load solution for use is RESID_AGG defintions
1235	SubX 69 KV LOAD2	/ /2015 04:00:00	-0.6	<SE Load solution for use is RESID_AGG defintions
1236	SubX 69 KV LOAD3	/ /2015 04 00:00	13.1	<SE Load solution for use is RESID_AGG defintions
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