Granular Pricing & Market Price Delivery

Market Design Concept Proposal

James Pigeon
Manager
Distributed Resources Integration

Market Issues Working Group (MIWG)

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Agenda

- Project Description
- Granular Pricing
- Market Price Delivery

Project Description

- This project will evaluate publishing additional Nodal load prices to assist REV development opportunities and DER participation. The NYISO intends to explore and recommend additional locational attributes and data delivery technologies (in addition to csv files posted to www.nyiso.com) that establish the infrastructure and application interfaces to allow for third party access to and utilization of NYISO calculated nodal prices.
- 2017 Deliverable - Market Design Concept Proposed

Market Design Concept Proposed

- **Granular Pricing**
  - The NYISO has evaluated its transmission network model with the Joint Utilities and developed a methodology to identify transmission system load nodes for which to publish intra-zonal LBMPs
    - These additional load nodes will be used to identify intra-zonal pricing differences to encourage location-specific DER development
    - DER Aggregations will also be mapped to these transmission load nodes
    - The methodology balances DER aggregation participation with the need to recognize electrical differences between each identified transmission load node
  - The NYISO will review with each respective member of the Joint Utilities the transmission load nodes it believes have significant electrical differences
    - The respective utility will provide the NYISO with lower voltage facilities that may overload during normal operation, heavy load periods, transmission outages, or generation unavailability
    - Based on that information, the NYISO will work with the respective utility to identify the minimum set of transmission load nodes that balance DER aggregation participation and the underlying electrical system differences

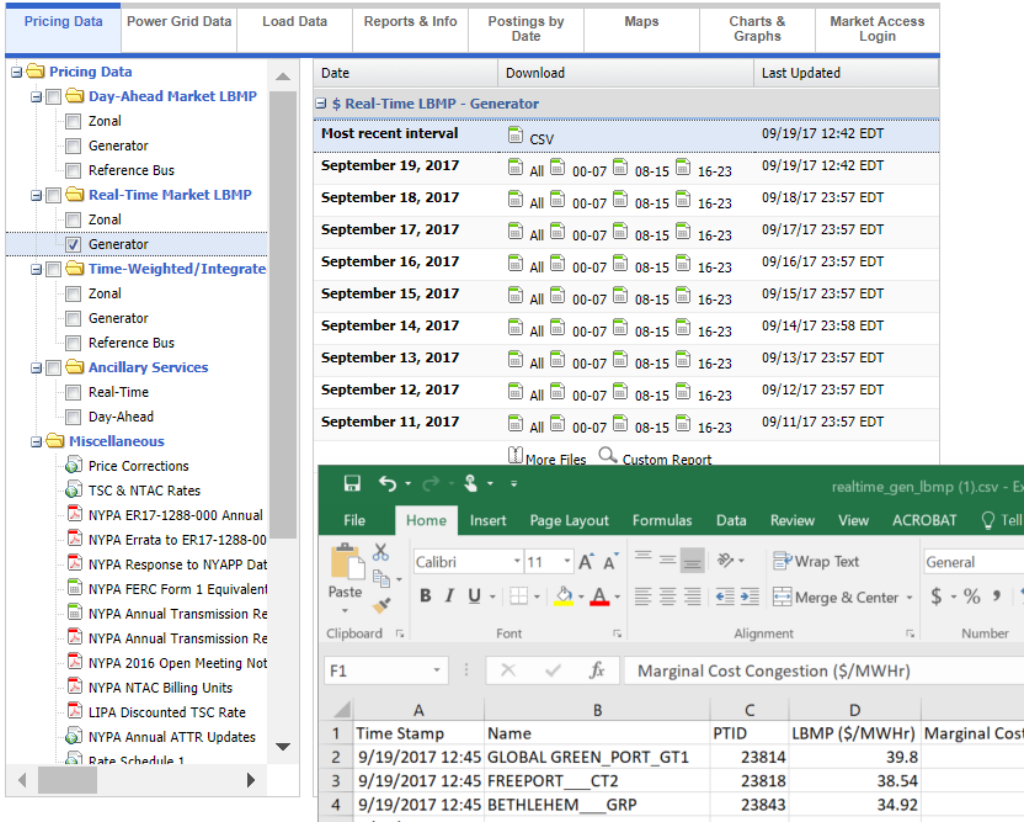
Market Design Concept Proposed
cont'd

- **Granular Pricing (cont'd)**
  - Based on current reviews between the NYISO and the Joint Utilities, it is estimated that 100-200 transmission nodes, will be made available for granular pricing and DER aggregation mapping
  - This requires software changes to calculate this transmission system load node pricing that will not be implemented until the NYISO EMS/BMS upgrade is complete (2019+)
- The designated transmission load nodes are subject to change based on future system conditions
- To the extent that transmission and/or distribution system issues arise due to DER nodal assignments (e.g., congestion, pricing, or system security), the NYISO and the impacted utility will work to alleviate the issue(s) by assigning DER to a different existing transmission load node or creating a new transmission load node(s)

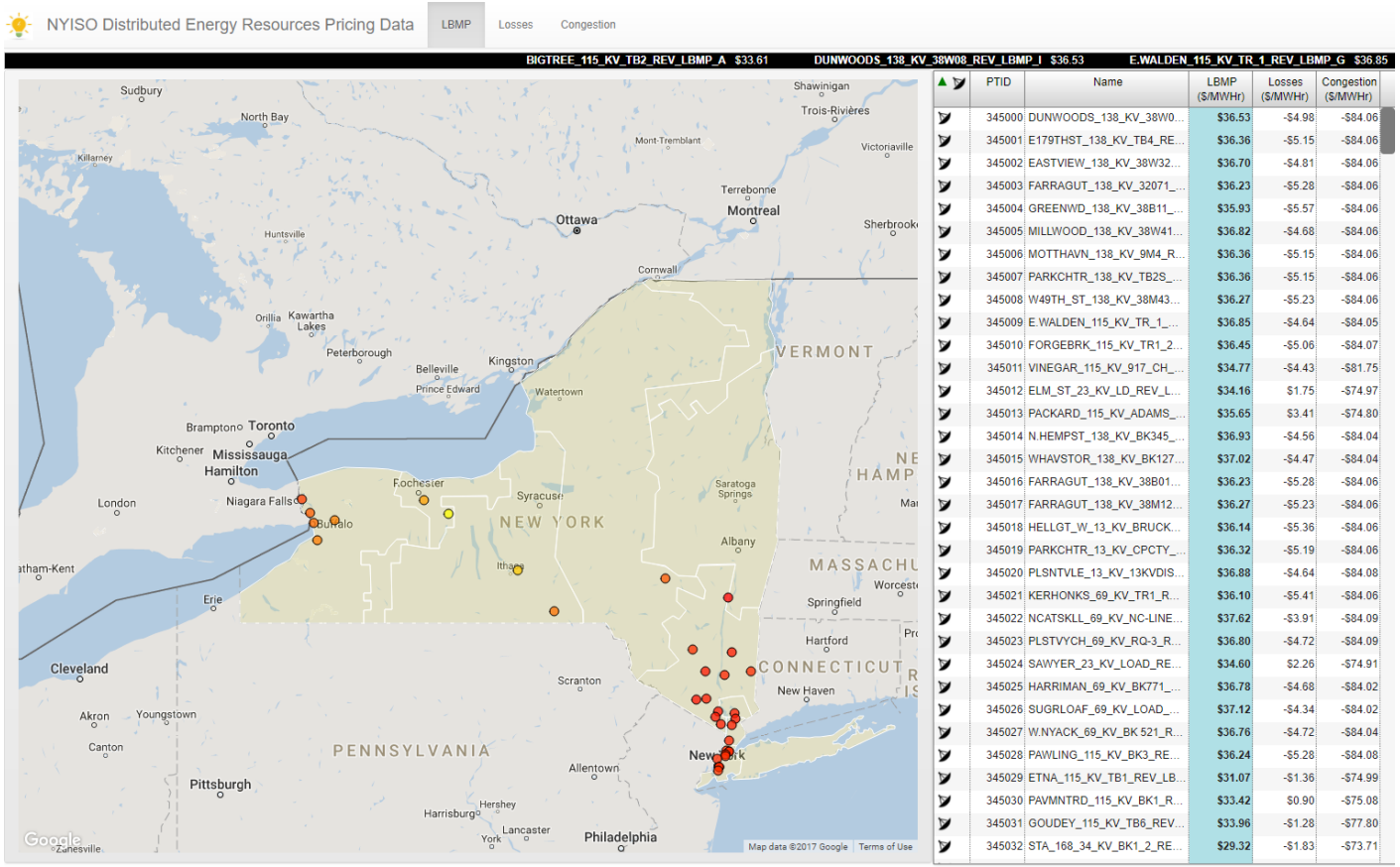
Market Design Concept Proposed
cont'd

- **Market Price Delivery**
  - Last year, the NYISO tested its ability to publish 35 new intra-zonal transmission load node prices. The prices were presented on a graphical interface by geographic location.
    - Location is determined by GPS coordinates with a precision of two decimal places (or decimal degrees) which, is on scale with a town or village
    - This locational data will provide appropriate market signals to developers and other Market Participants
  - The NYISO will implement a production version of this graphical interface in 2018
    - Initially, pricing data will be limited to all generator nodes and the 35 transmission load nodes currently available on the NYISO's market data website in csv format
  - The NYISO is also considering establishing a Restful Application Programing Interface (API) enabling 3rd parties to develop applications to programmatically retrieve prices

Pricing Data



Today's nodal pricing data access via CSV file download



PTID	Name	LBMP ($/MWHr)	Losses ($/MWHr)	Congestion ($/MWHr)
345000	DUNWOODS_138_KV_38W0...	$36.53	-$4.98	-$84.06
345001	E179THST_138_KV_TB4_RE...	$36.36	-$5.15	-$84.06
345002	EASTVIEW_138_KV_38W32...	$36.70	-$4.81	-$84.06
345003	FARRAGUT_138_KV_32071_...	$36.23	-$5.28	-$84.06
345004	GREENWD_138_KV_38B11_...	$35.93	-$5.57	-$84.06
345005	MILLWOOD_138_KV_38W41...	$36.82	-$4.68	-$84.06
345006	MOTTHAVN_138_KV_9M4_R...	$36.36	-$5.15	-$84.06
345007	PARKCHTR_138_KV_TB2S_...	$36.36	-$5.15	-$84.06
345008	W49TH_ST_138_KV_38M43...	$36.27	-$5.23	-$84.06
345009	E.WALDEN_115_KV_TR_1_...	$36.85	-$4.64	-$84.05
345010	FORGEBRK_115_KV_TR1_2...	$36.45	-$5.06	-$84.07
345011	VINEGAR_115_KV_917_CH_...	$34.77	-$4.43	-$81.75
345012	ELM_ST_23_KV_LD_REV_L...	$34.16	$1.75	-$74.97
345013	PACKARD_115_KV_ADAMS_...	$35.65	$3.41	-$74.80
345014	N.HEMPST_138_KV_BK345_...	$36.93	-$4.56	-$84.04
345015	WHAVSTOR_138_KV_BK127...	$37.02	-$4.47	-$84.04
345016	FARRAGUT_138_KV_38B01...	$36.23	-$5.28	-$84.06
345017	FARRAGUT_138_KV_38M12...	$36.27	-$5.23	-$84.06
345018	HELLGT_W_13_KV_BRUCK...	$36.14	-$5.36	-$84.06
345019	PARKCHTR_13_KV_CPCTY_...	$36.32	-$5.19	-$84.06
345020	PLSNTVLE_13_KV_13KVDIS...	$36.88	-$4.64	-$84.08
345021	KERHONKS_69_KV_TR1_R...	$36.10	-$5.41	-$84.06
345022	NCATSKLL_69_KV_NC-LINE...	$37.62	-$3.91	-$84.09
345023	PLSTVYCH_69_KV_RQ-3_R...	$36.80	-$4.72	-$84.09
345024	SAWYER_23_KV_LOAD_RE...	$34.60	$2.26	-$74.91
345025	HARRIMAN_69_KV_BK771_...	$36.78	-$4.68	-$84.02
345026	SUGRLOAF_69_KV_LOAD_...	$37.12	-$4.34	-$84.02
345027	W.NYACK_69_KV_BK 521_R...	$36.76	-$4.72	-$84.04
345028	PAWLING_115_KV_BK3_RE...	$36.24	-$5.28	-$84.08
345029	ETNA_115_KV_TB1_REV_LB...	$31.07	-$1.36	-$74.99
345030	PAVMNTRD_115_KV_BK1_R...	$33.42	$0.90	-$75.08
345031	GOUDEY_115_KV_TB6_REV...	$33.96	-$1.28	-$77.80
345032	STA_168_34_KV_BK1_2_RE...	$29.32	-$1.83	-$73.71

Tomorrow's visual locational pricing with API access to data

Link to demo

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Next Steps

- **Remaining 2017 – Q1 2018**
  - NYISO will consider any feedback and provide any updates while continuing its market design process
- **Q2 2018**
  - NYISO will implement the locational pricing web page and consider making available an API for programmatic data consumption
- **2019-2020**
  - NYISO will work the Joint Utilities to evaluate the optimal set of transmission nodes to publish prices for and implement the necessary software changes

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- Maintaining and enhancing regional reliability
- Operating open, fair and competitive wholesale electricity markets
- Planning the power system for the future
- Providing factual information to policy makers, stakeholders and investors in the power system

www.nyiso.com

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