

Integrating Public Policy Phase 2: Initial Energy Market Simulation Results and Process Update

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Market Issues Working Group

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Agenda

- **Review of Integrating Public Policy Project Phase 2 Process**
- **Real-time Market Simulation Progress**
- **Preliminary Results Pricing Anomalies Investigation and Solutions**
- **Achieving Better Price Convergence for Preliminary Runs**
 - Updated Day-Ahead Market (DAM) Result
 - Real-time Market (RTM) Result
- **Adjustments Proposed for Final Simulations**
- **Next steps**

Background

Date	Working Group	Discussion points and links to materials
9-12-16	Budget & Priorities Working Group (BPWG)	Presentation of stakeholder feedback, proposed scope of the project
10-19-16	Market Issues Working Group (MIWG)	Presentation providing more detail on the scope and timeline of the project
11-22-16	Market Issues Working Group (MIWG)	Presentation updating project status -- consultant selection and goals of Phases 1 and 2
12-14-16	Market Issues Working Group (MIWG)	Consultant's Project Introduction and solicitation of input (Phase 1)
1-31-17	Market Issues Working Group (MIWG)	Integrating Public Policy Update (Phases 1 and 2)
2-16-17	Market Issues Working Group (MIWG)	Phase 2: Study Description and Assumptions Review
3-28-17	Market Issues Working Group (MIWG)	Phase 2: Study Description and Assumption Update
4-24-17	Market Issues Working Group (MIWG)	Phase 2: Preliminary DAM Results
6-21-17	Market Issues Working Group (MIWG)	Phase 2: Real-time Study Description and Assumptions

Real-time Simulations

Market Simulation Methodology Review

- **Cases from 2016 retrieved and modified**
 - Existing bids unchanged except for a small sub-set of resources that offer based on lost opportunity costs
 - Imports and Exports set to production values to prevent balancing against external control areas
 - Incremental renewable generation added as zonal virtual supply (-\$10)
- **Real-time Simulations**
 - Simulated DAM commitment overwrites real-time unit bid mode
 - Fast Start units re-evaluated using their RTM bids and non-fast-start units set to either “must run” or “unavailable” based on day-ahead commitment
 - Simulations are not linked to the prior day or the next day, therefore Real-time simulations can only calculate LBMPs from 00:30 to 21:40

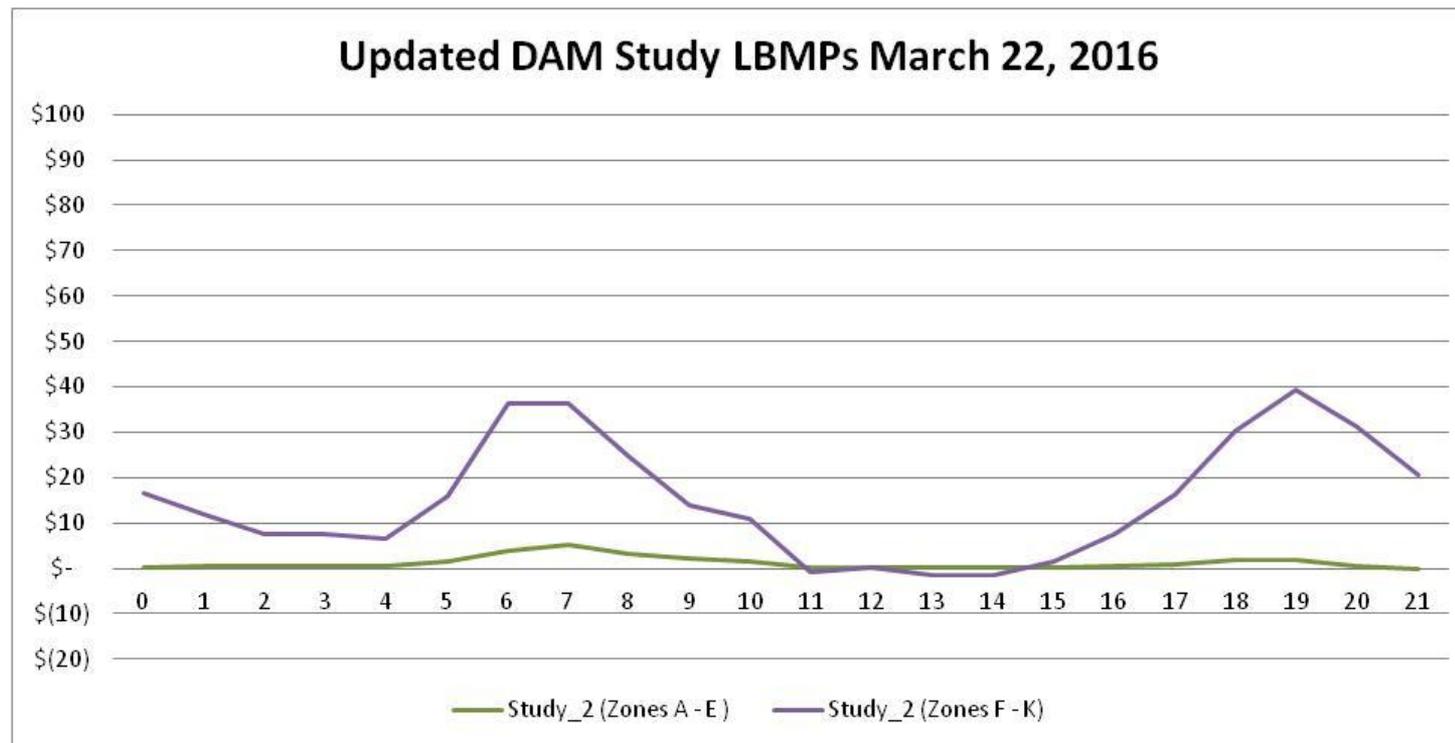
Real-Time Market Simulation Validation

- **Initial RTM results had high volatility in some intervals**
 - Mostly extreme negative prices due to too much generation
- **Further investigation showed real-time pricing anomalies primarily caused by Day-Ahead Market simulations allowed excessive Export**
 - Some additional pricing anomalies caused by data inconsistencies in some intervals

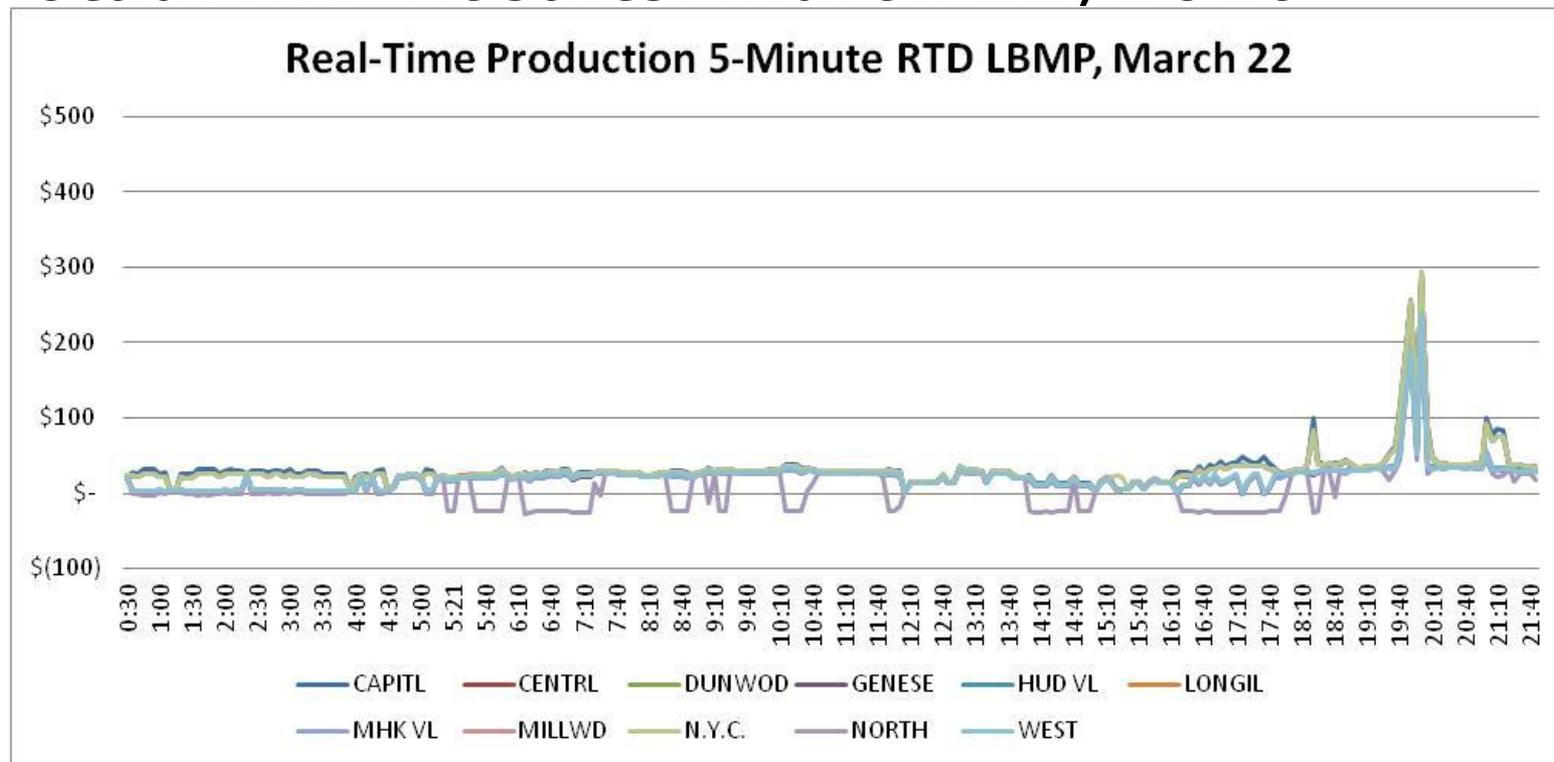
Simulation Development and Adjustments

- Preliminary DAM re-run with Imports and Exports correctly held to production values
 - Only HQ Imports/Exports evaluated economically
- Improved data interchange created to pass DAM commitments and SCADA/EMS data to RTM simulations
 - Additional code developed to validate and correct, if necessary, unit bid mode, initial condition status, telemetry values, etc.

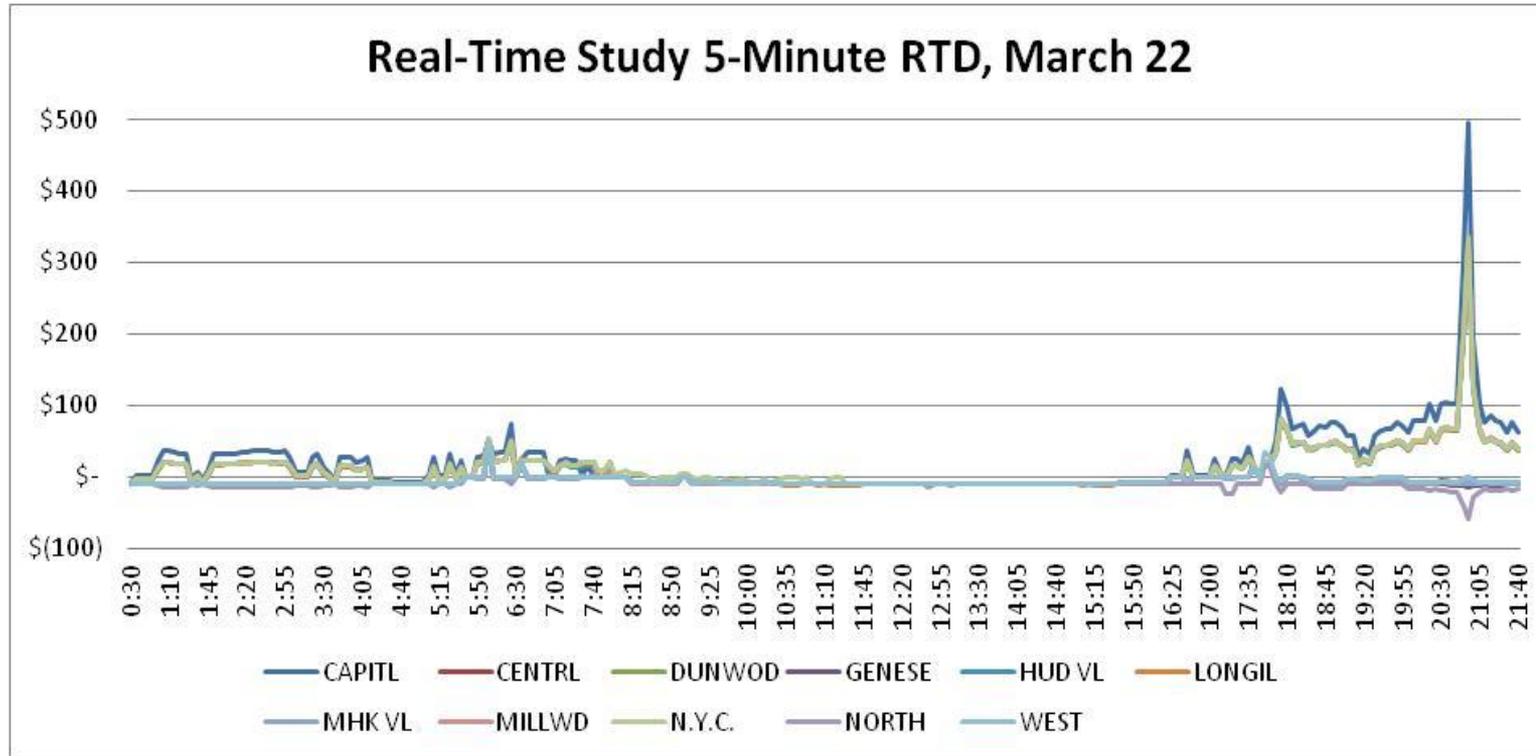
Updated DAM Results: March 22, 2016



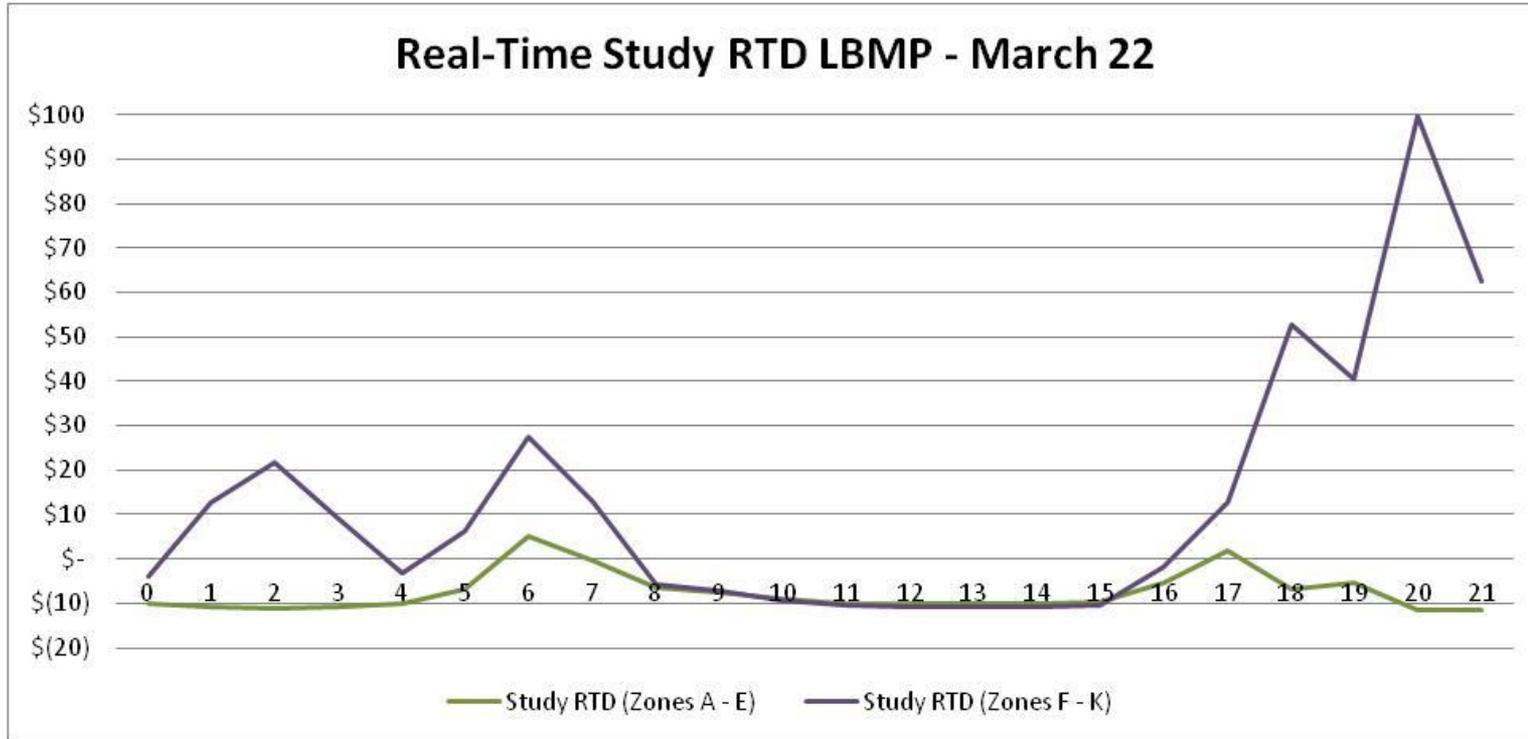
Actual RTD Results: March 22, 2016



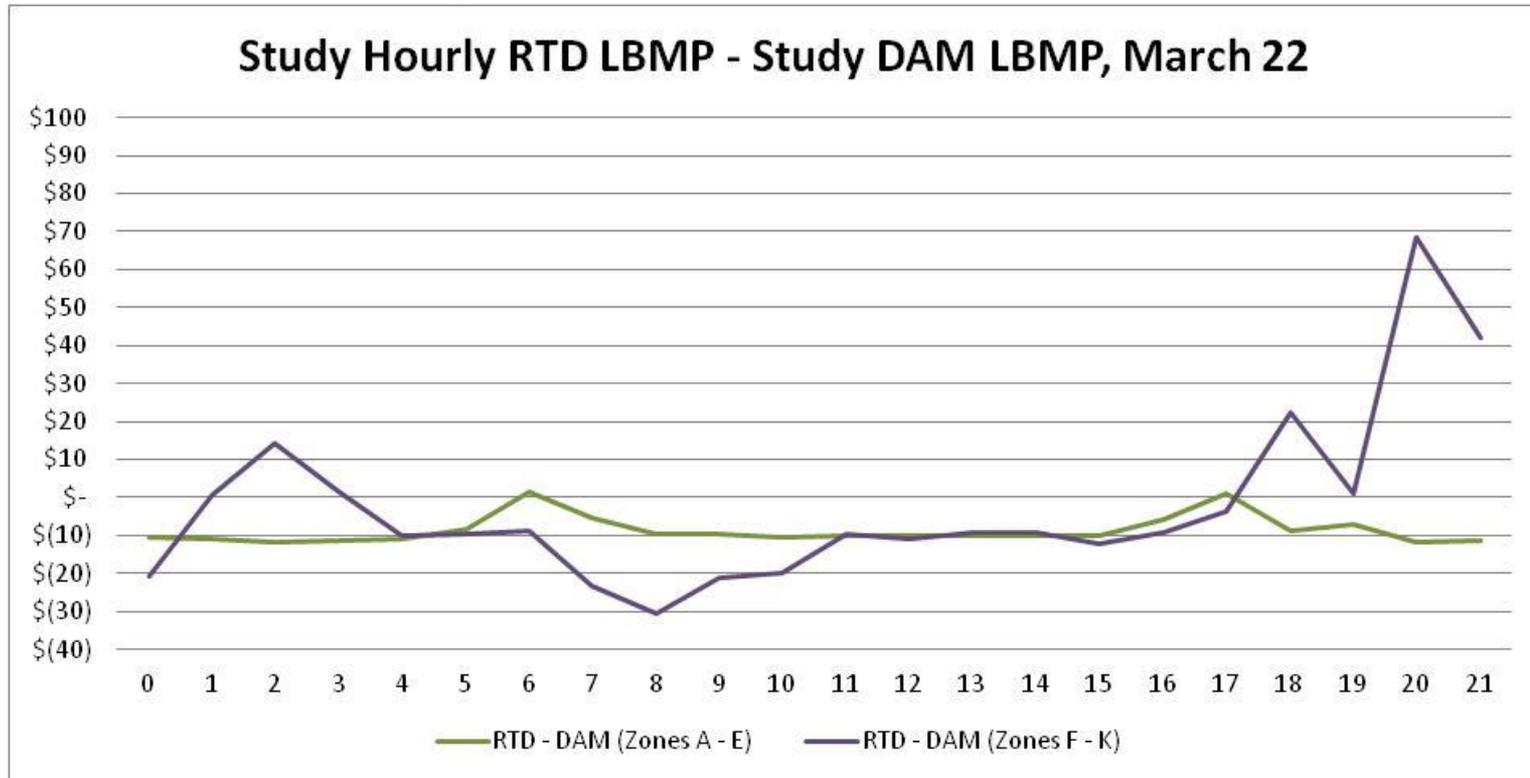
Preliminary RTD Results: March 22, 2016



Preliminary Hourly RTM Results: March 22



Price Convergence in Simulations: March 22



Next steps

- **Re-run and validate all four preliminary DAM and RTM cases**
- **Re-run Final simulations with updated assumptions:**
 - Re-scale lost-opportunity cost and “as bid” virtuals based on Preliminary pricing results
 - Simulate off-shore wind forecast error
 - Reduce simulation virtual bid for incremental renewable resources from negative \$10 to negative \$47, which equals the sum of the 2016 Production Tax Credit plus the average NYSERDA Renewable Energy Credit
- **Present full analysis of day-ahead and real-time simulations, including impacts on unit commitment and dispatch, prices for energy and reserves and regulation, performance, etc.**

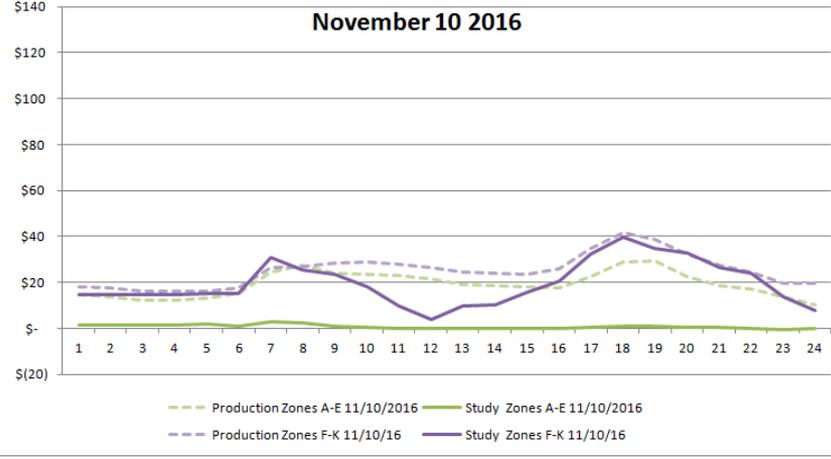
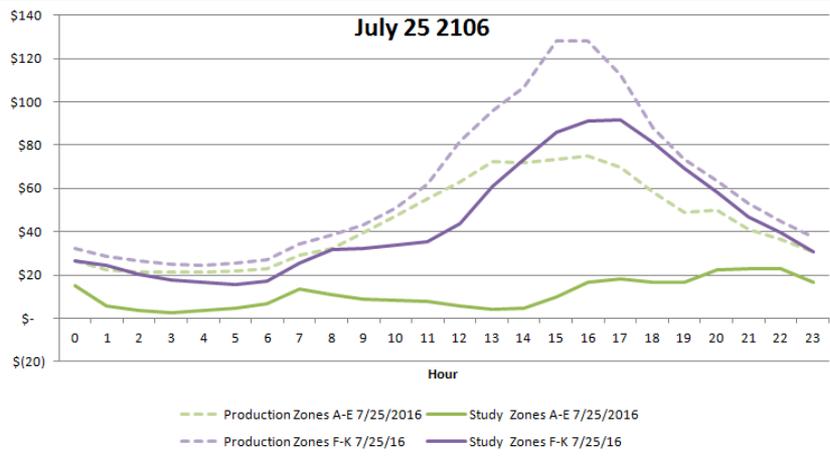
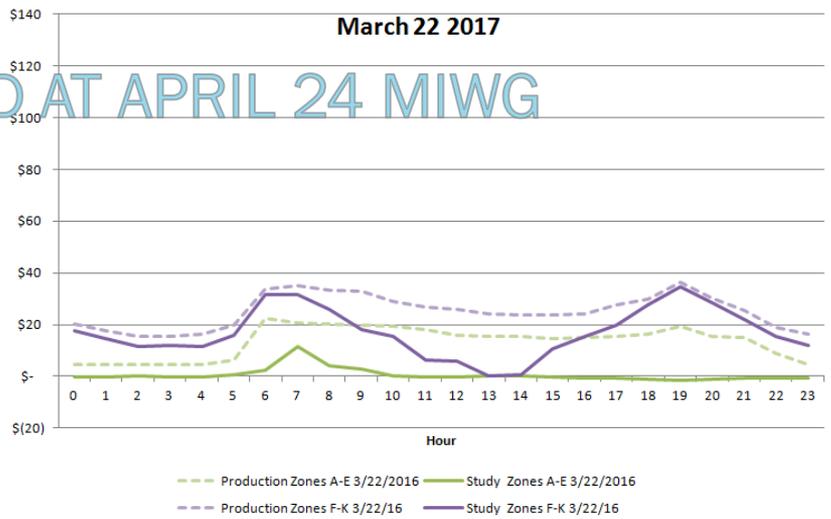
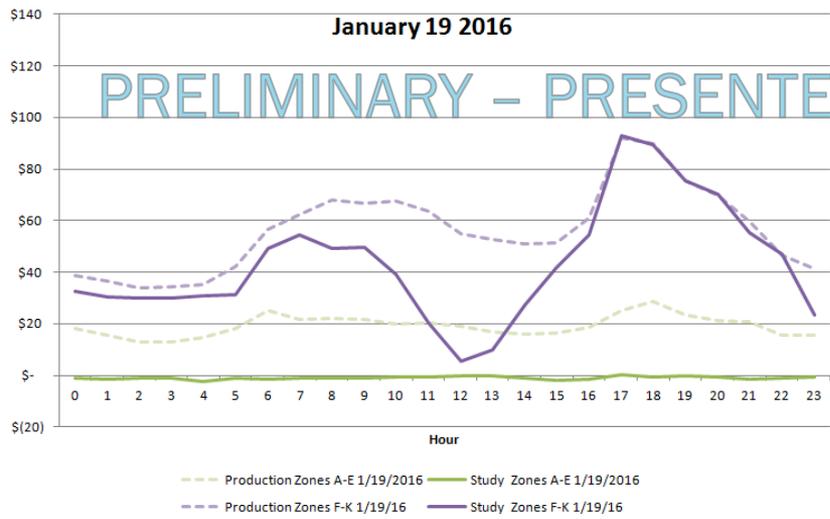
Questions?

Additional feedback from stakeholders can be emailed to:
IPP_feedback@nyiso.com

Appendix: Previous DAM Results

LBMPS – Zones A-E and F-K

PRELIMINARY – PRESENTED AT APRIL 24 MIWG



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OR