



Joint and Common Market

III. MODELING OF ONT-MI PARS IN MARKET FLOW CALCULATIONS AND ENTITLEMENT CALCULATIONS

Overview

- Purpose
 - Review results of PJM's LEC and revenue analysis
 - Review results of MISO's LEC analysis
 - Provide status update on the MISO and PJM discussions
- Key Takeaways
 - MISO and PJM agree on the approach to model ONT-MI PARs in the Firm Flow Entitlement (FFE) calculations
 - RTOs have proposed different M2M market flow calculations
 - As a compromise, MISO can agree to utilize a LEC (loop flow) impact correction for LEC outside the 200 MW control band
 - After performing LEC and revenue impact analysis, PJM believes perhaps an incremental step to move forward would be to accept MISO's LEC adjustment proposal

Outline

- Background
- MISO and PJM Proposals
- PJM Analysis of LEC
- PJM Compromised Proposal
- MISO Analysis of LEC
- MISO Compromised Proposal
- Next Steps
- Appendix

Background

- ONT-MI PARs (5 PARs on 4 lines) began completely regulating ONT-MI interface flow in July 2012
 - Since July 2012, ONT-MI PARs have been modeled using the “Regulated” and “Unregulated” status in the Interchange Distribution Calculator (IDC)
- MISO, PJM and IESO have completed an analysis of the operation of the ONT-MI PARs through the first year of operation (Aug 2012 – Aug 2013)
 - Report available at: <http://www.miso-pjm.com/~media/pjm-jointcommon/downloads/ontario-michigan-interface-par-performance-evaluation-report.ashx>
 - At July JCM MISO and PJM presented their preferred approach to calculate M2M market flows
- At September JCM, PJM mentioned of performing sample revenue impact study associated with LEC

Summary of Proposals

Calculation	Description
Firm Flow Entitlements (RTOs Agree)	<ul style="list-style-type: none">In regulating status, calculate FFEs by assuming ONT-MI Interface as Fixed Flow interface.In unregulated status, calculate FFEs by assuming ONT-MI Interface as Free Flowing interface.
Market Flows	<ul style="list-style-type: none">In regulating status, calculate Market Flows by assuming ONT-MI Interface as Fixed Flow interface. PJM would also like adjust market flows for LEC impacts.In unregulated status, calculate Market Flows by assuming ONT-MI Interface as Free Flowing interface.

***Note:**

Agreement on the text in black

Ongoing discussions on the text in blue

PJM Proposal for Market Flow calculations

- Market Flows on pre-identified M2M Flowgates, which are impacted by Lake Erie Circulation (LEC), to be adjusted with the LEC impacted value. LEC is the uncontrolled loop flow across the PAR-controlled interface
 - As long as LEC is non-zero, there are unwanted impacts to M2M facilities
 - PJM and MISO need to establish a method in which LEC impacts are properly identified and settled in the M2M process
 - PJM and NYISO have implemented an equitable solution (in PJM's opinion) to address LEC impacts in the PJM-NYISO JOA and PJM proposes to adopt a similar approach
- For MISO Flowgates PJM proposes that PJM calculate market flows considering PJM's LEC contributions
- For PJM Flowgates PJM proposes that MISO calculate market flows considering all LEC contributions

MISO Proposal for Market Flow calculations

- MISO proposes to have consistent treatment of ONT-MI PARs in the IDC and the Market Flow calculations
 - Calculate RTO market flows using “Regulated” (Actual flow = Scheduled flow or Fixed Flow) or “Unregulated” (Free flowing or Fixed Tap) status (same as that in IDC)

MISO Compromised Proposal

- MISO recommends that the modeling of the ONT-MI PARs in the M2M Process should be consistent with their treatment in the IDC and their operations
- However as a compromise, MISO is agreeable to LEC adjustment in the market flow calculations for the amount outside of the 200 MW control band
 - 200 MW of control band was included in the Presidential Permit filing and approved by the Department of Energy



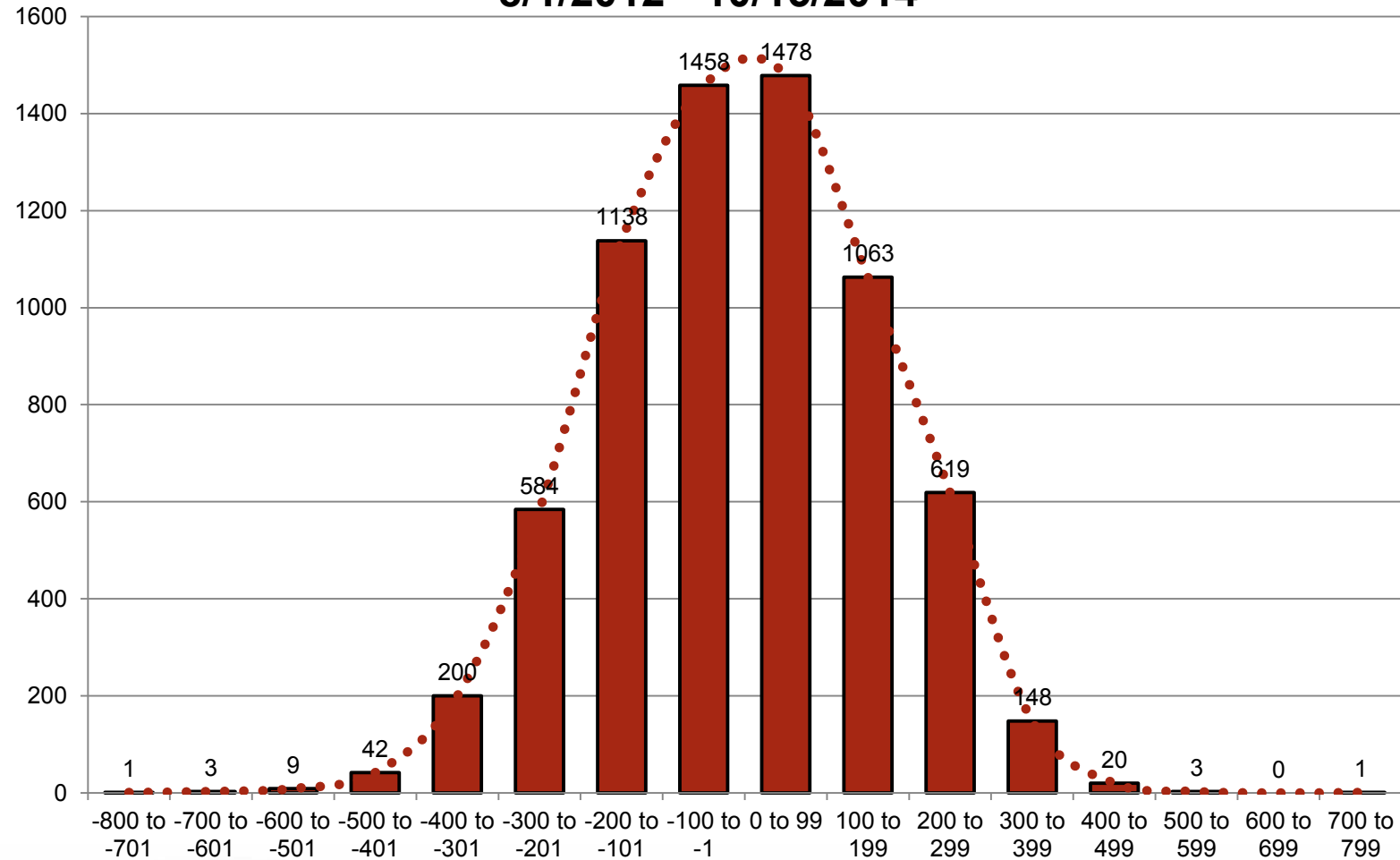
PJM Analysis



Lake Erie Circulation (LEC) Analysis

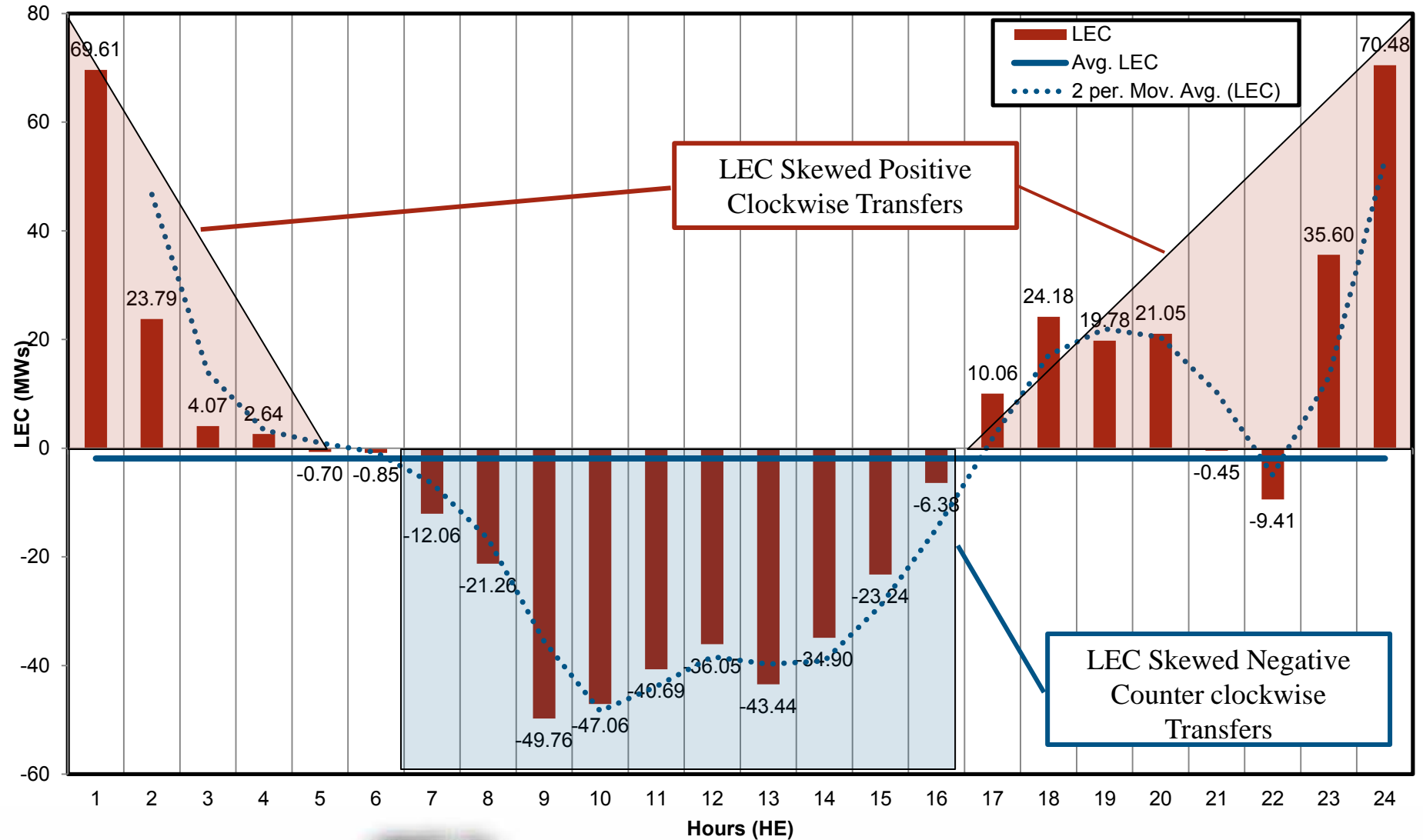
- Analysis on LEC from 8/1/2012 – 10/15/2014
- Over the given time period LEC trends to normal distribution
 - 76% of hours w/in 200MW
- Individual hourly analysis needed to better determine LEC impacts

Histogram for Lake Erie Circulation (LEC)
8/1/2012 - 10/15/2014



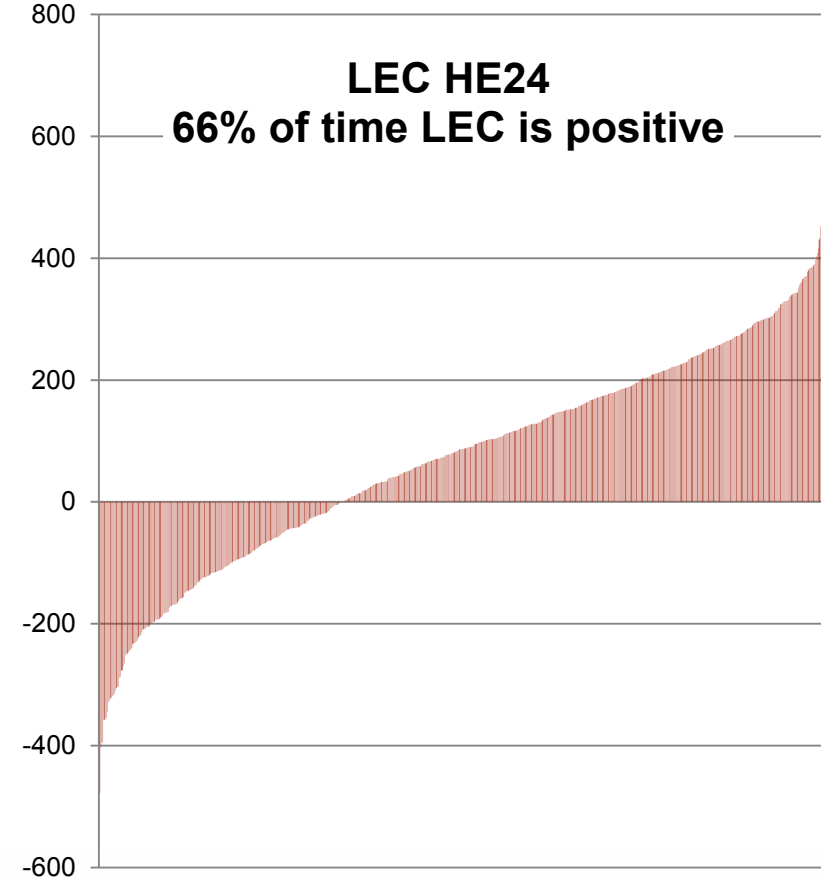
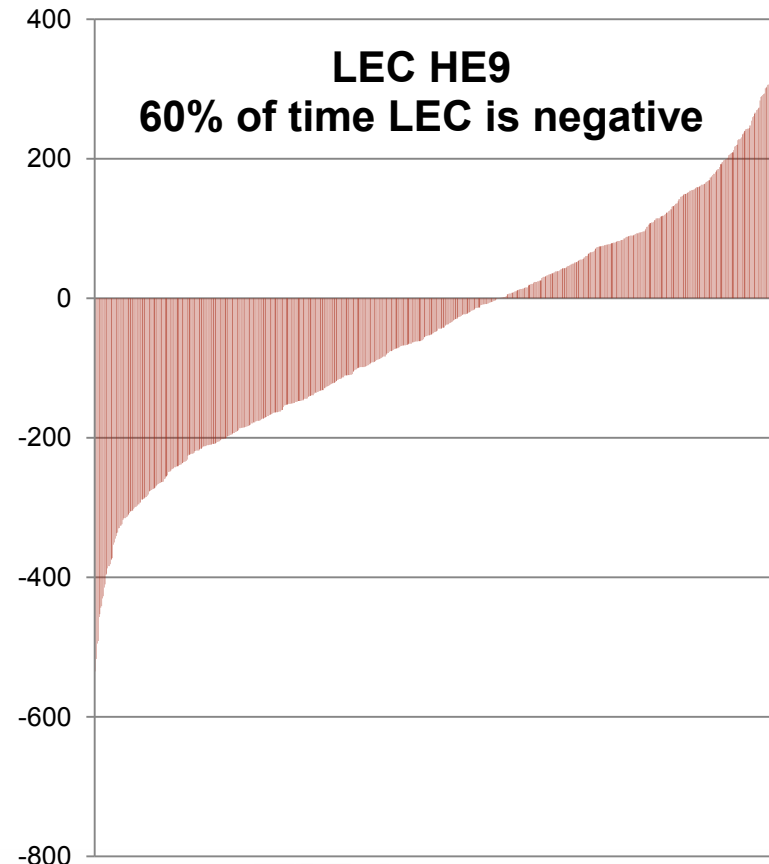
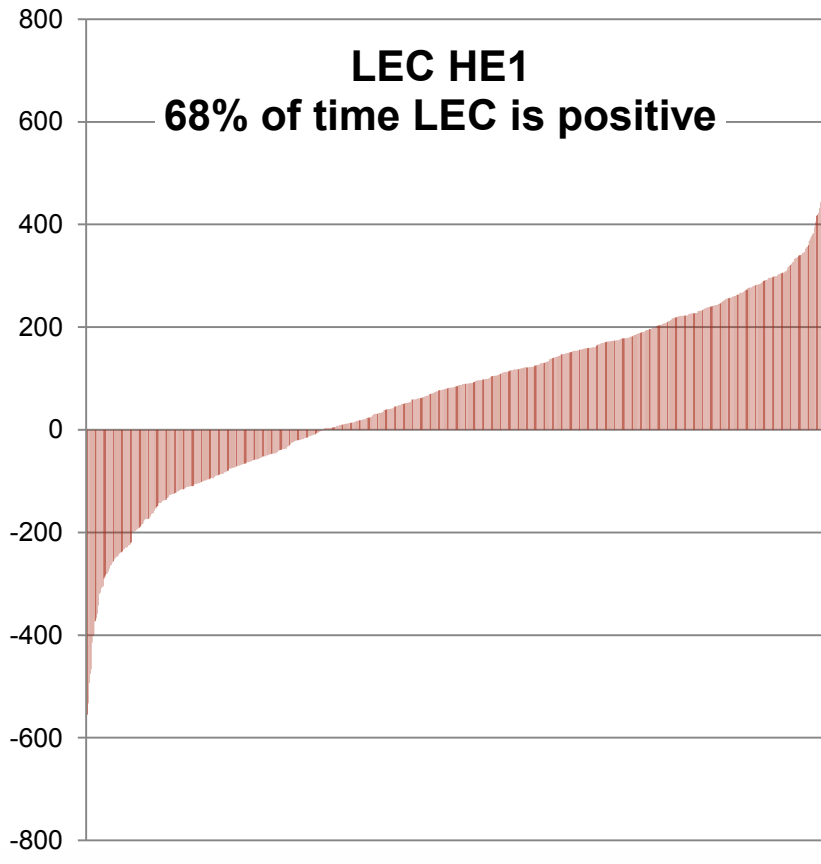
Lake Erie Circulation (LEC) Hourly Analysis

- Hourly LEC trends show consistent impacts to M2M facilities during certain hours
- Trends show skewed (+ or -) LEC hour-by-hour



Lake Erie Circulation (LEC) Hourly Analysis

- Hourly LEC trends skewed in one direction (+/-) on an hourly basis



Revenue Impact Analysis

- PJM studied 2 MISO's Palisades area M2M Flowgates
- PJM and MISO coordinate on these Flowgates regularly
- PJM concluded that LEC impacts could incur unhedged re-dispatch actions to PJM
- This study illustrated ~6% balancing congestion impacts
 - PJM incurred ~\$-60K in balancing congestion during 14 hours on 6/24, 6/29, 7/13 and 9/3/2014 between midnight and 8AM
 - PJM calculated ~\$4K is due to LEC impacts that are not accounted for

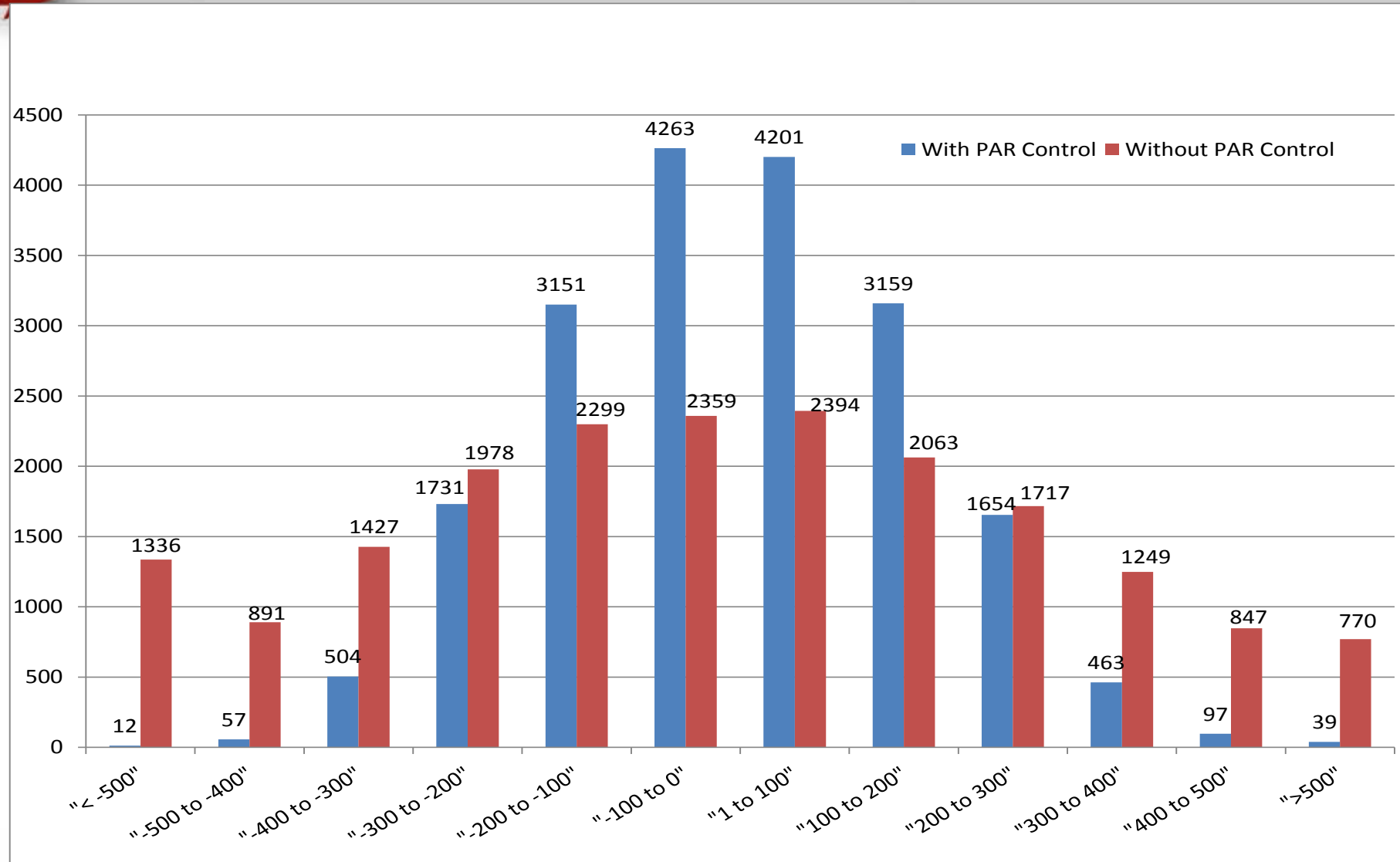
PJM's Incremental Solution

- PJM ideally would like a LEC adjustment made for any deviations:
 - PJM's FFE modeling agreement is solely based on this LEC>0 adjustment concept
 - The accurate method to resolve any congestion cost shifts associated with LEC impacts are to credit RTOs for any deviations (introducing a bandwidth will force a cost shifts to both RTOs)
- However after performing the LEC impact and revenue study PJM believes an incremental step towards resolving some of PJM's concerns would be PJM to agree on MISO's compromised solution
- PJM suggests to review the outcome of this incremental step and make any modification to MISO's LEC proposal as we gain M2M experience with this solution

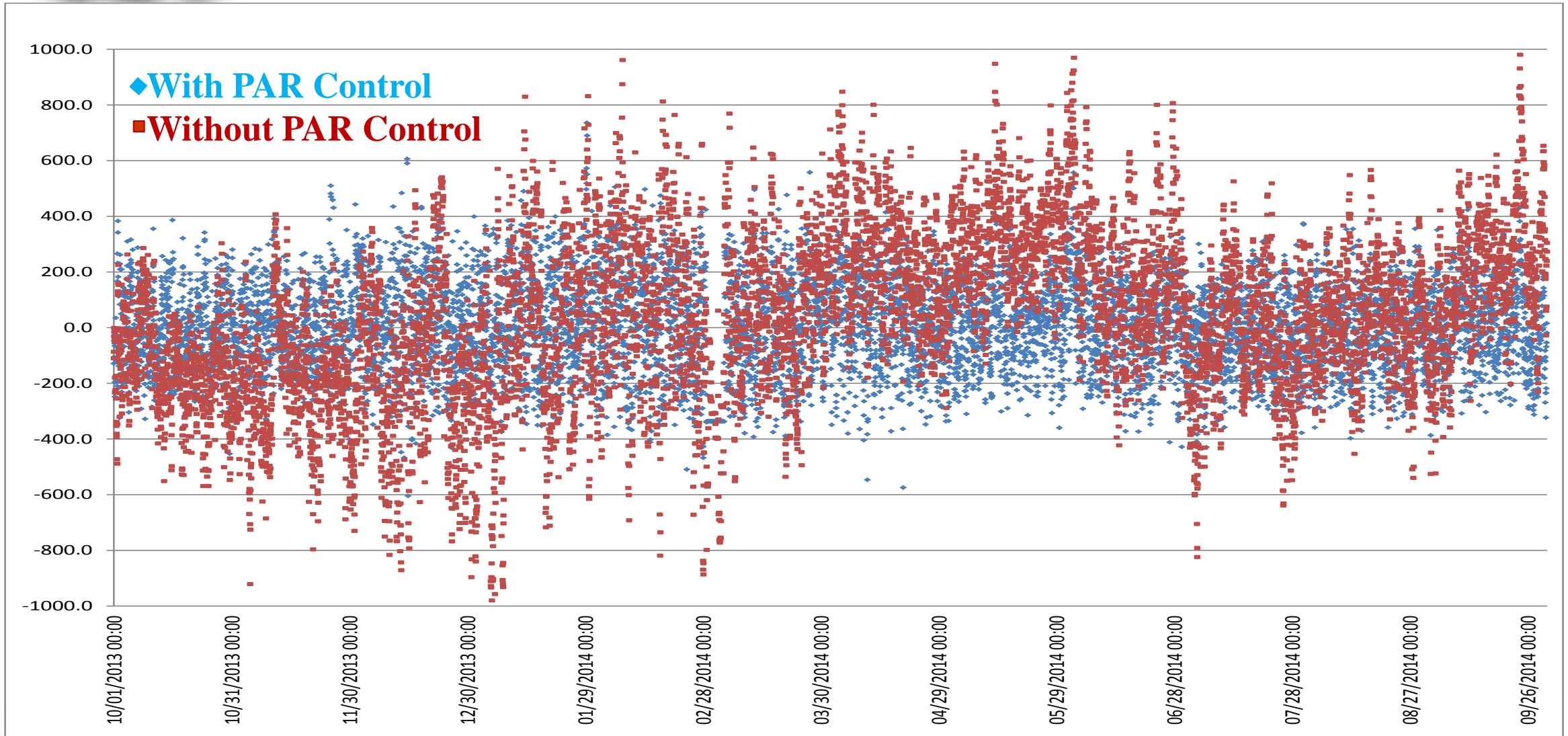


MISO Analysis

Histogram for LEC (8/1/2012 – 10/15/2014)



LEC in last one year (10/1/2013 – 9/30/2014)



REDUCTION IN TLRs

TLR History for Interface Flowgates around Lake Erie (2008 - 2014)



Next Steps

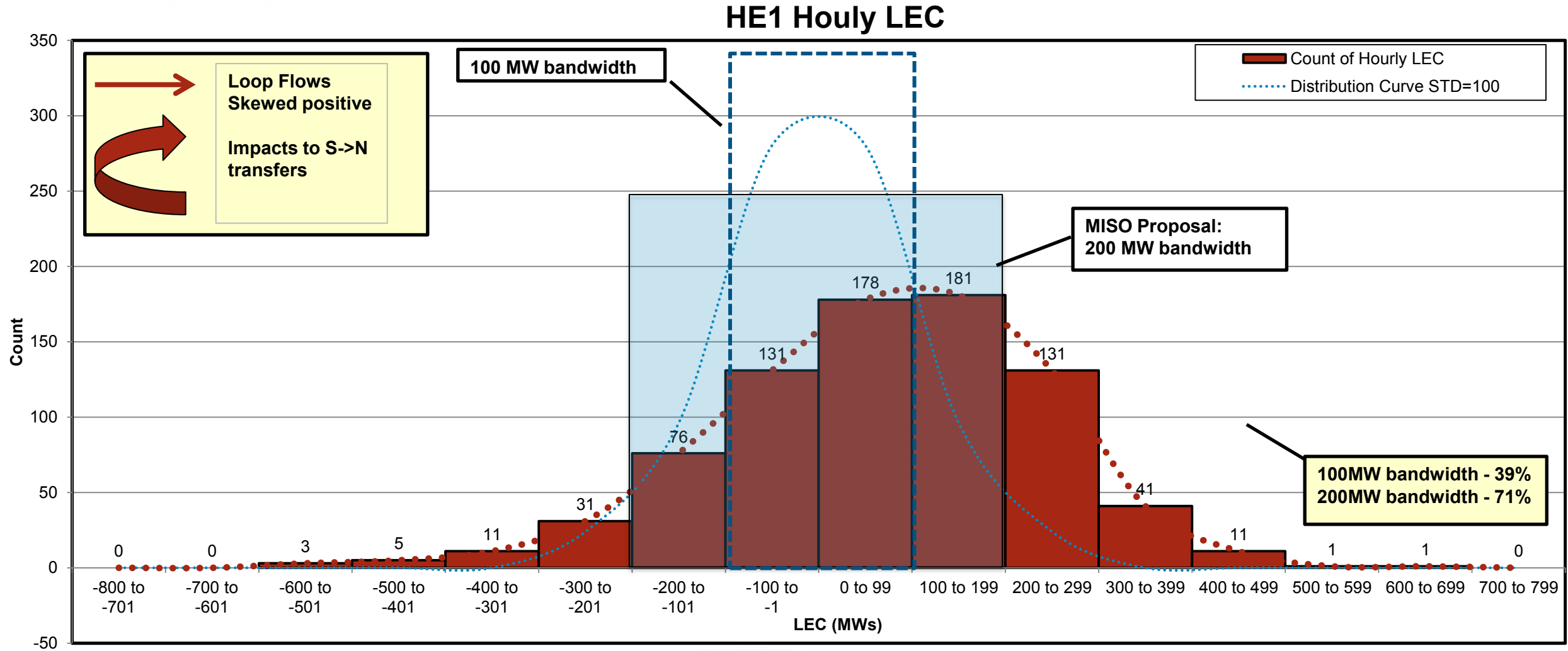
- RTOs draft JOA Language Changes (if needed) and review those changes with Stake Holders
- RTOs discuss implementation details
- Update stake holders RTOs' with incremental progress
 - Update the stake holders when the changes are applied in the M2M process
 - Update the stake holders when RTOs gain M2M experience with this proposal



APPENDIX A

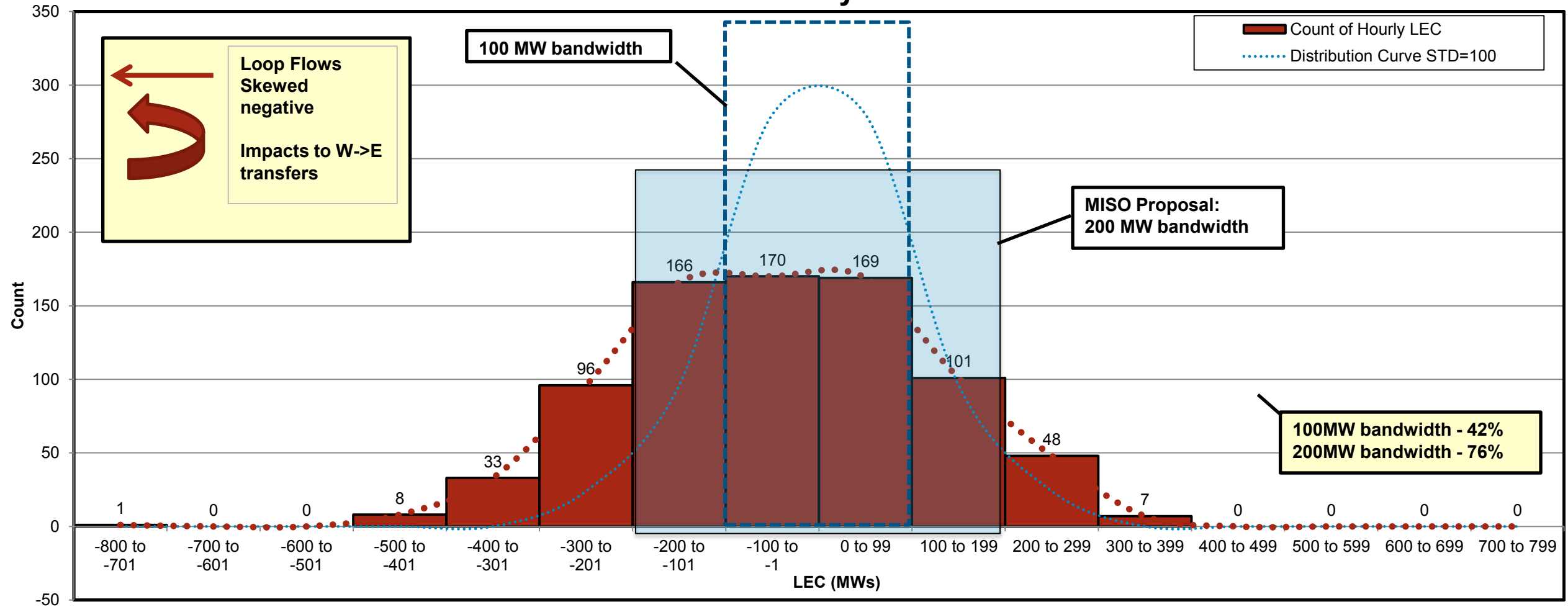


LEC Hourly Analysis Breakdown – HE1

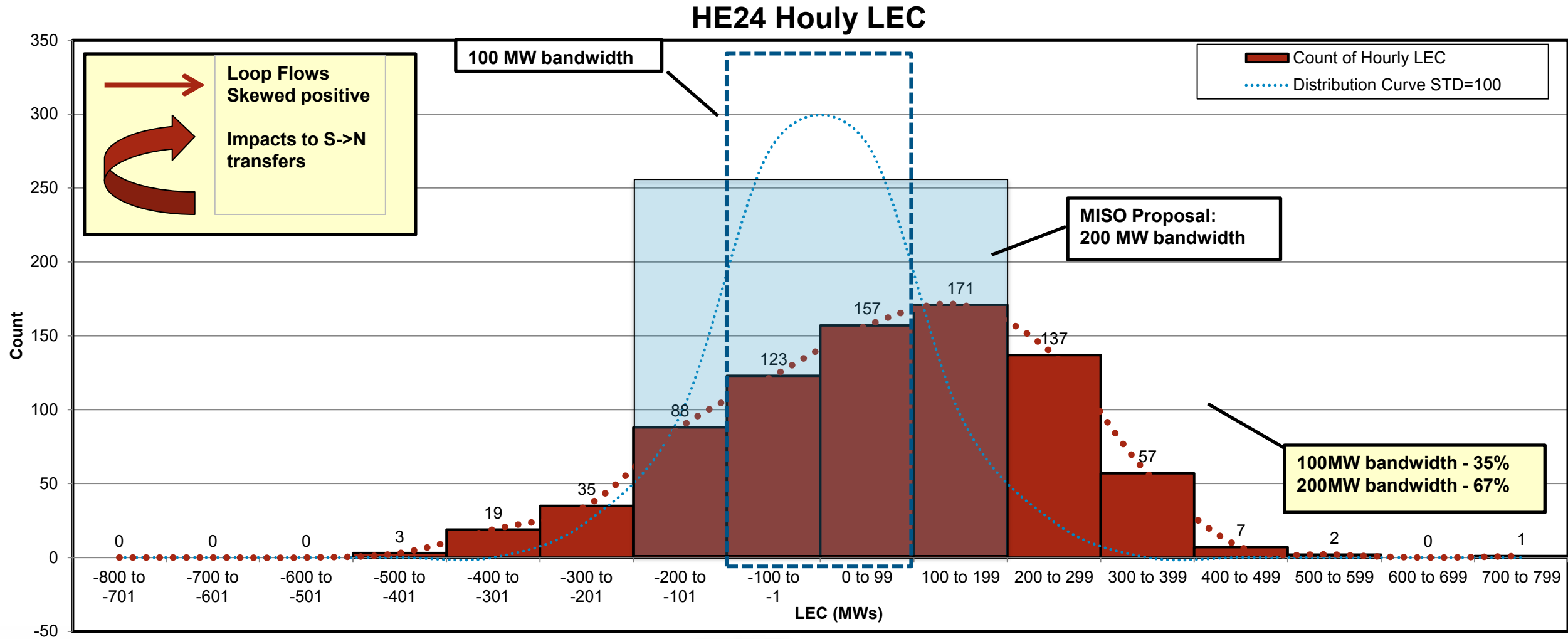


LEC Hourly Analysis Breakdown – HE13

HE13 Hourly LEC



LEC Hourly Analysis Breakdown – HE24



Revenue Impact Analysis

DATE	CONSTRAINT	AVG MIC-ONT PSF	LEC	BALANCING CONGESTION IF LEC >0	BALANCING CONGESTION IF LEC > 100	BALANCING CONGESTION IF LEC > 200
6/29/2014	Benton Harbor - Palisades 345kV I/o Cook-Palisades (DCC-PAL) 345 line	0.0929825	271.052	-7395.582741	-4667.104261	-1938.625781
6/29/2014 1:00	Benton Harbor - Palisades 345kV I/o Cook-Palisades (DCC-PAL) 345 line	0.0929825	314.927	-45.9738034	-31.3755509	-16.7772984
6/29/2014 2:00	Benton Harbor - Palisades 345kV I/o Cook-Palisades (DCC-PAL) 345 line	0.0929775	353.963	-7.240329776	-5.194824776	-3.149319776
6/29/2014 7:00	Benton Harbor - Palisades 345kV I/o Cook-Palisades (DCC-PAL) 345 line	0.092985	370.738	-104.1086993	-76.02722933	-47.94575933
7/13/2014 8:00	Benton Harbor - Palisades 345kV I/o Cook-Palisades (DCC-PAL) 345 line	0.0914625	162.546	-46.38460197	-17.84830197	0
7/14/2014 7:00	Benton Harbor - Palisades 345kV I/o Cook-Palisades (DCC-PAL) 345 line	0.0908775	147.463	-382.197509	-123.014879	0
7/30/2014 5:00	Benton Harbor - Palisades 345kV I/o Cook-Palisades (DCC-PAL) 345 line	0.035395	125.884	-24.81807313	-5.103058127	0
9/3/2014 5:00	Benton Harbor - Palisades 345kV I/o Cook-Palisades (DCC-PAL) 345 line	0.1253425	-199.457	3007.298244	1499.553312	0
9/3/2014 6:00	Benton Harbor - Palisades 345kV I/o Cook-Palisades (DCC-PAL) 345 line	0.12535	-77.9921	1861.703408	0	0
6/24/2014 1:00	Cook-Palisades 345 kV I/o Benton Harbor-Palisades (BEN-PAL1) 345 line	0.1405325	25.9797	-21.13926379	0	0
6/24/2014 5:00	Cook-Palisades 345 kV I/o Benton Harbor-Palisades (BEN-PAL1) 345 line	0.13972	42.028	-107.2255279	0	0
6/24/2014 6:00	Cook-Palisades 345 kV I/o Benton Harbor-Palisades (BEN-PAL1) 345 line	0.13972	110.486	-294.2313108	-27.92499078	0
6/24/2014 7:00	Cook-Palisades 345 kV I/o Benton Harbor-Palisades (BEN-PAL1) 345 line	0.13972	72.8426	-121.8255184	0	0
6/24/2014 8:00	Cook-Palisades 345 kV I/o Benton Harbor-Palisades (BEN-PAL1) 345 line	0.138735	148.776	-174.6176959	-57.2478859	0
			Total	-3856.343422	-3511.287669	-2006.498158

- Total Balancing Congestion = **-\$60,367.64**
- LEC Impacted Balancing Congestion = **6.388%**
- PJM's Balancing Congestion since 2012 = **~\$5 M**
- LEC Impacted Balancing Congestion Based on this assessment would be **= ~\$300K**