



MISO PJM IPSAC

September 20, 2019

- IMEP Study
 - Process Review
 - MISO Results
 - PJM Results
- Next Steps

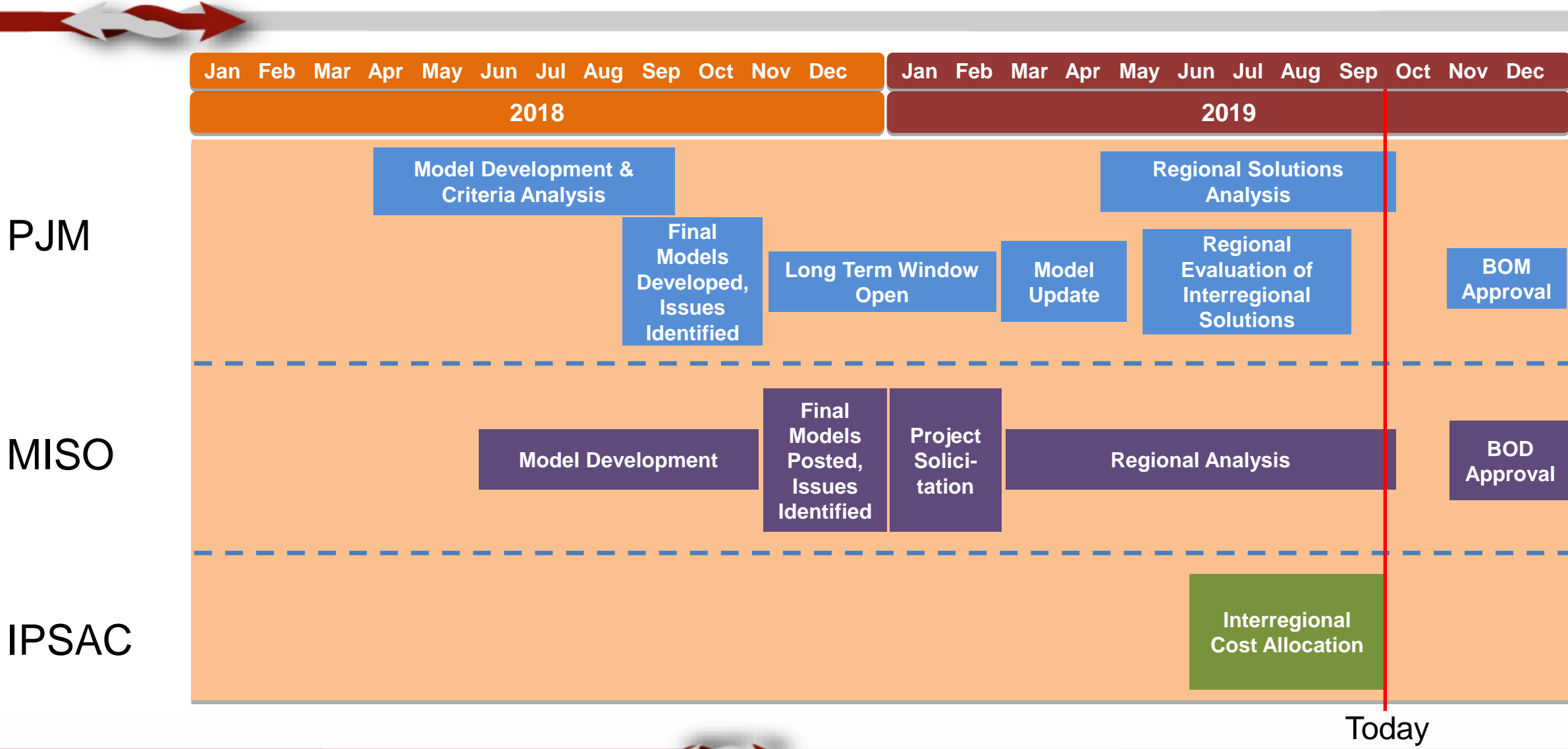


18/19 Interregional Market Efficiency Project Study

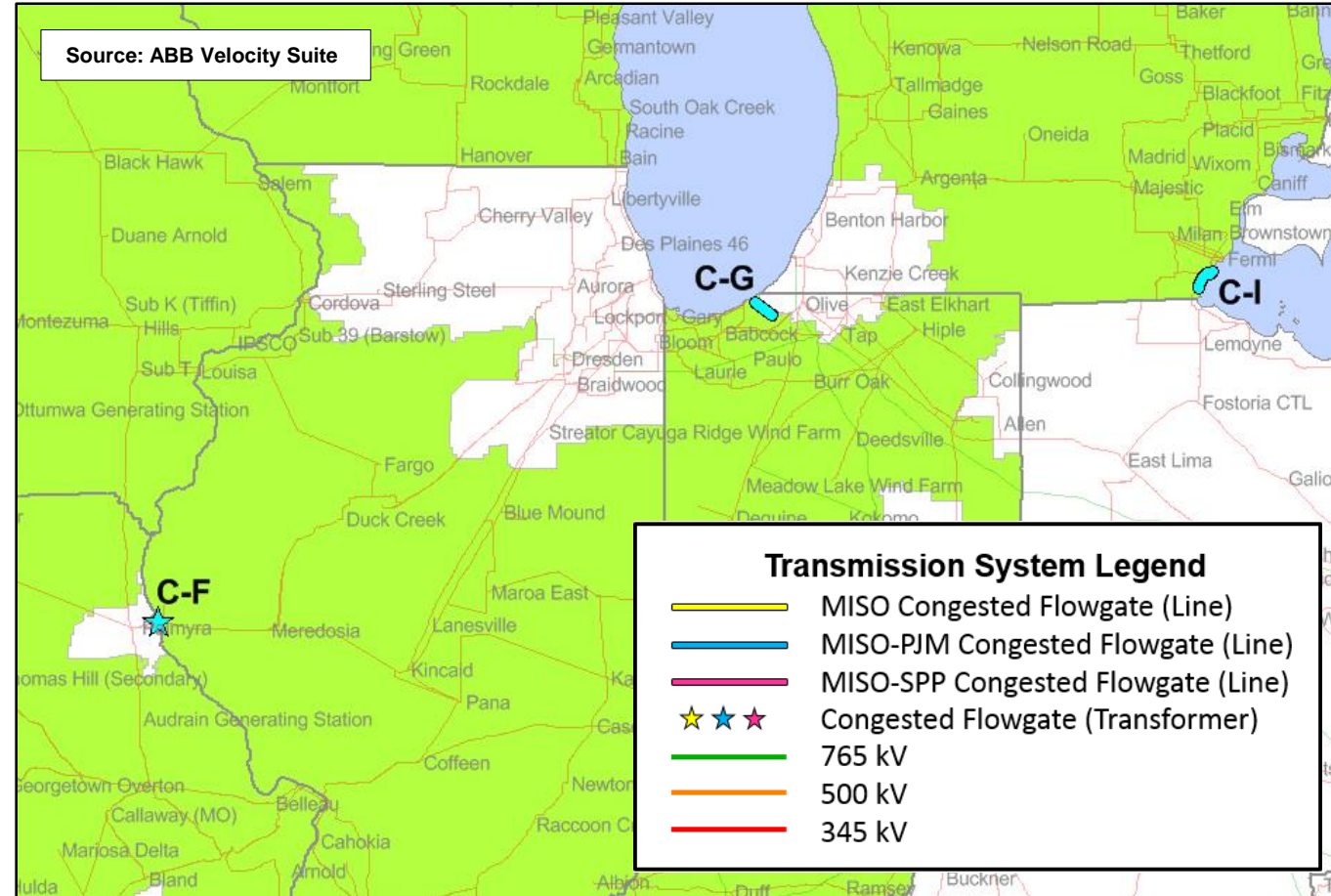
Study Status

- PJM and MISO have conducted a two-year Interregional Market Efficiency Project (IMEP) study in 2018/2019
- Issues identification and benefit determination conducted in each regional process consistent with current effective JOA
- Interregional proposals must:
 - Address at least one identified issue in each region (could be same issue if identified by both RTOs)
 - Be submitted to both regional processes

IMEP Estimated Timeline



Interregional Congestion Drivers



Flowgate C-F: Marblehead N Transformer 161/138kV (PJM Flowgate ME-6)

- Historically binding M2M constraint aggravated by coal and nuclear retirements in Illinois.

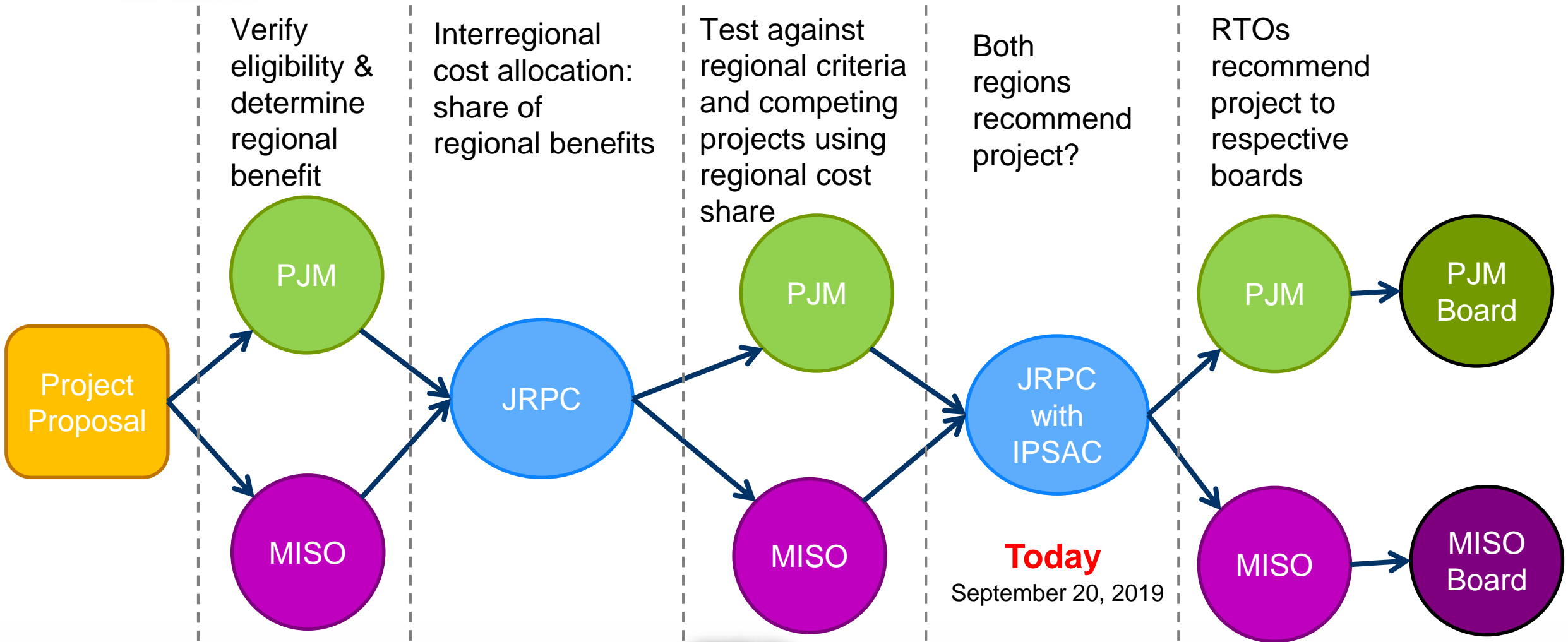
Flowgate C-G: Bosserman to Trail Creek 138kV (PJM Flowgate ME-7)

- Historically binding M2M constraint. Congestion driven by nearby retirements, which increase east to west flows in northern Indiana.

Flowgate C-I: Lallendorf to Monroe 345kV (PJM Flowgate ME-2)

- Historically binding M2M constraint driven by high transfer from north to south.

- Benefits to each RTO are determined by that RTO using their respective regional process, metrics and assumptions (Tariff)
- Costs are allocated interregionally based on pro rata share of benefits, as determined above
- Interregional projects must meet the B/C criteria in each RTO (based on allocated costs), qualify as an MEP under both the MISO and PJM process, and be approved by each RTO's board




MISO Results

Summary of MISO Economic Analysis Results

ID	Transmission Solution	Submitted Cost Estimate (2019-\$M)	Issue Addressed	Congestion Relief (%)	Comment
NC-01	Modification of Monroe to Wayne 345 kV	0.1	Lallendorf to Monroe 345kV	6.7*	Does not provide benefit to MISO
NC-02	Modification of Monroe to Wayne and Monroe to Conventry 345kV	0.1		6.5*	Does not provide benefit to MISO
NC-51	Wayne Switch Upgrades	0.41		0	Does not address identified issue
NC-05	Warnke Battery (near Trail Creek 138kV station)	43.98	Bosserman to Trail Creek 138kV	-23*	Does not provide benefit to MISO
NC-11	Rebuild Michigan city to Trail creek to Bosserman 138kV lines	21.56		100	Finalist - see next slide
NC-19	Meadow Lake to Pike Creek 345kV	225.31		58	Addressed only half the congestion on top flowgate
NC-21	Toto Switching Station	18.07		48	Addressed only half the congestion on top flowgate
NC-50	Kuchar to Luchtman 138kV	23.26		95	Finalist - see next slide
NC-48	Maywood to Herleman 345kV	34.63	Marblehead N Transformer 161/138kV	100	Finalist - see next slide
NC-49	Palmyra to Herleman 345kV	33.76		100	Finalist - see next slide

*The Congestion Relief (%) is year 2033 statistic for solutions that failed in the initial screening.



ID	Project	Submitted Cost Estimate (2019-\$M)	Issue Addressed	Proposed ISD	Weighted 20-year PV MISO Benefit (\$M)	Congestion Relief (%)
NC-11	Rebuild Michigan City to Trail Creek to Bosserman 138kV Lines	21.56*	Bosserman to Trail Creek 138kV	2023	8.42	100
NC-50	Kuchar to Luchtman 138kV	23.26		2024	9.17	95
NC-48	Maywood to Herleman 345kV	34.63	Marblehead N Transformer 161/138kV	2023	7.76	100
NC-49	Palmyra to Herleman 345kV	33.76		2023	8.27	100

MTEP19 Market Congestion Planning Study (MCPS) results presented at the third Subregional Planning Meeting (SPM 3) - [August 23, 2019 West SPM 3](#)

- See Presentation for Item 04 MTEP19 MCPS Study Updates - starting at Slide 12

* Cost was updated by submitter and reviewed by MISO Competitive Transmission team

PJM Results

- Market Efficiency Analysis performed on a base case that includes all previously approved PJM RTEP enhancements and expansions.
- Base Case corrected for the Maple – LNG line rating.
- Completed PROMOD runs
 - Projects modeled using the submitted assumptions
 - Simulated years 2019, 2023, 2026, 2029

- **Bosserman – Trail Creek 138 kV**
 - Results initially presented at August 2019 TEAC ([slide 6](#))
 - Two lower cost proposals, BT_481 and BT_129, substantially relieve congestion on the driver without shifting congestion
 - RPM benefit analysis found there are no RPM benefits for either BT_481 or BT_129 proposals
 - PJM 15-year load payment benefits are shown on the next slide
- **Marblehead Transformer**
 - Results presented at August 2019 TEAC ([slide 7](#)) and September 2019 TEAC ([slide 14](#))
- **Monroe – Wayne 345 kV**
 - None of the proposals significantly decrease the total congestion around the Monroe bus
 - Analysis presented at June 2019 TEAC ([slide 11](#))

Bosserman-Trail Creek Proposals Preliminary Results

Proposal ID	BT_481	BT_129
Proposal Description	Rebuild Michigan City-Trail Creek-Bosserman 138 kV (10.7mi)	New Kuchar station and new Kutchar-Luchtman 138kV line (10.5mi)
Project Type	Upgrade	Greenfield
B/C Ratio Metric	Lower Voltage	Lower Voltage
In-Service Cost (\$MM)**	\$20.99	\$27.62
Cost Containment	No	No
In-Service Year	2023	2023
% Cong Driver Mitigated	100%	95%
2023 Shifted Cong (\$MM)	\$0.04	-
PJM Benefit Metric (\$MM)	69.16	60.01

*BC Ratios computed using costs as submitted and benefits using Base Case updated with Maple-LNG rating increase.

**Results are preliminary as costs under review by PJM

Marblehead Transformer Proposals Preliminary Results

Proposal ID	MH_322	MH_506
Proposal Description	Rebuild Palmyra-Marblehead 161 kV and Marblehead-Herleman 138 kV lines (12mi). New 345 kV ring bus at the Palmyra substation.	Rebuild Palmyra-Marblehead 161 kV and Marblehead-Herleman 138 kV lines. New Maywood-Palmyra 345 kV line (15mi).
Project Type	Upgrade	Greenfield
B/C Ratio Metric	Lower Voltage	Lower Voltage
In-Service Cost (\$MM)*	\$35.95	\$36.02
Cost Containment	No	No
In-Service Year	2023	2023
% Cong Driver Mitigated	100%	100%
2023 Shifted Cong (\$MM)	\$0.11	\$0.13
PJM Benefit Metric (\$MM)	13.90	25.86

**BC Ratios computed using costs as submitted and benefits using Base Case updated with Maple-LNG rating increase.*

***Results are preliminary as costs under review by PJM*

IMEP Study Results

- Ten MISO-PJM interregional solutions were evaluated in the MTEP and RTEP regional process
- Significant analysis through coordinated regional processes
 - Regional results exchanged for all projects
 - Four ‘finalist’ projects jointly identified
 - Two (mutually exclusive) projects addressing Bosserman to Trail Creek 138kV congestion pass 1.25 B/C ratio

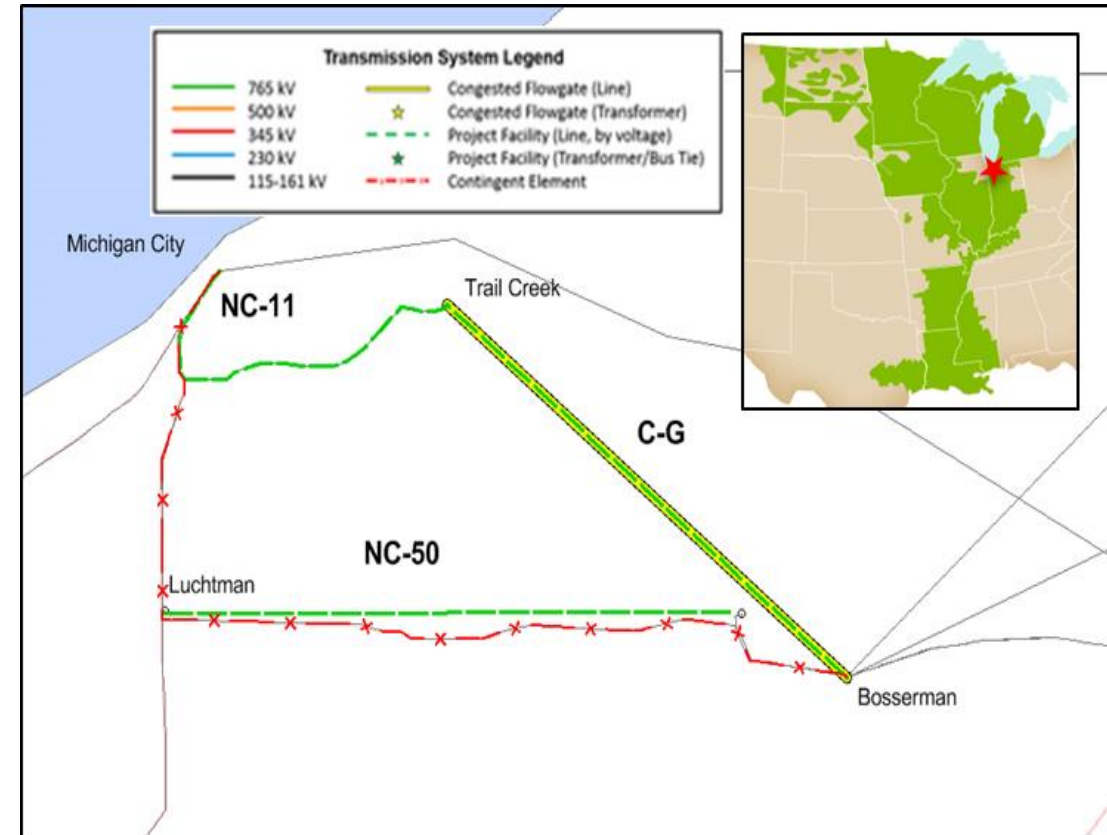
Project ID		Project Description	Benefit (Million \$)		Interregional Cost Allocation		Preliminary Regional B/C	
MISO	PJM		MISO	PJM	MISO	PJM	MISO	PJM*
NC-11	481	Rebuild Michigan City - Trail Creek - Bosserman 138kV lines	8.42	69.16	10.9%	89.1%	3.12	3.49
NC-50	129	Kuchar - Luchtman 138kV	9.17	60.01	13.3%	86.7%	2.70	2.35
NC-48	506	Maywood - Herleman 345kV	7.76	25.86	23.1%	76.9%	0.84	0.90
NC-49	322	Palmyra - Herleman 345kV	8.27	13.90	37.3%	62.7%	0.57	0.56

- Two projects addressing Bosserman – Trail Creek 138kV pass 1.25 B/C ratio in each regional process
- Projects addressing Marblehead North Transformer 161/138kV congestion do not meet 1.25 B/C threshold

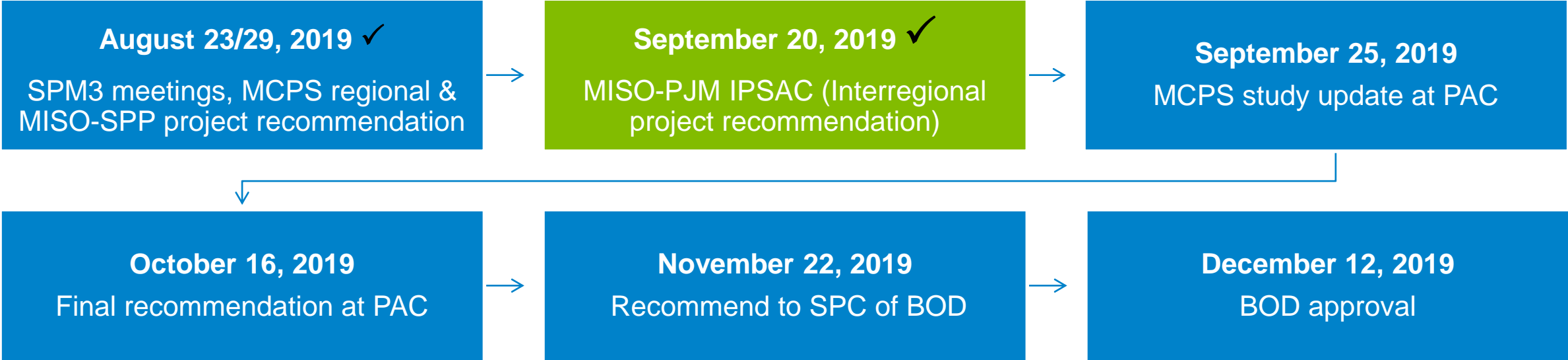
*PJM regional B/C pending final cost/constructability review

- Rebuilding Michigan City to Trail Creek to Bosserman 138kV lines is the best performing project
 - Highest B/C ratio*
 - Fully addressed congestion on identified issue
 - Passed reliability no-harm test
- Consider for recommendation as Interregional Market Efficiency Project through each regional approval process

*Pending final PJM independent cost/constructability review



- Study is complete, concluding 2019 Coordinated System Plan
- Three drivers identified:
 - Marblehead N 161/138kV Transformer
 - No proposed project met B/C criteria in either region
 - Lallendorf – Monroe 345kV
 - No proposed project effectively resolved congestion
 - Bosserman – Trail Creek 138kV
 - Rebuilding Michigan City to Trail Creek to Bosserman 138kV pending regional approvals



IPSAC – Interregional Planning Stakeholder Advisory Committee; PAC – Planning Advisory Committee;
 SPC – System Planning Committee; BOD – Board of Directors

- MISO regional forum
- Interregional forum

- Complete Cost/Constructability Analysis
- Determine the final B/C Ratio based on the final PJM costs
- Present recommendation at October TEAC

IPSAC Work Schedule

- Regional consideration/approval of IMEP
- The intent is for this to be the last IPSAC meeting of 2019
- Expect January and March IPSAC meetings to conduct the Annual Issues Review



Open Discussion

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 - Original version posted