



MISO PJM IPSAC

October 28, 2016

- TMEP Final JOA Language
- TMEP Study Initial Results
- FERC EL13-88 Filings
- PJM Issues Review
- IPSAC Work Schedule

TMEP JOA Language

Two minor updates have been included in language:

- Clarified that outages would be considered as a mitigating factor
- Point to tariff language for exact quantification of congestion

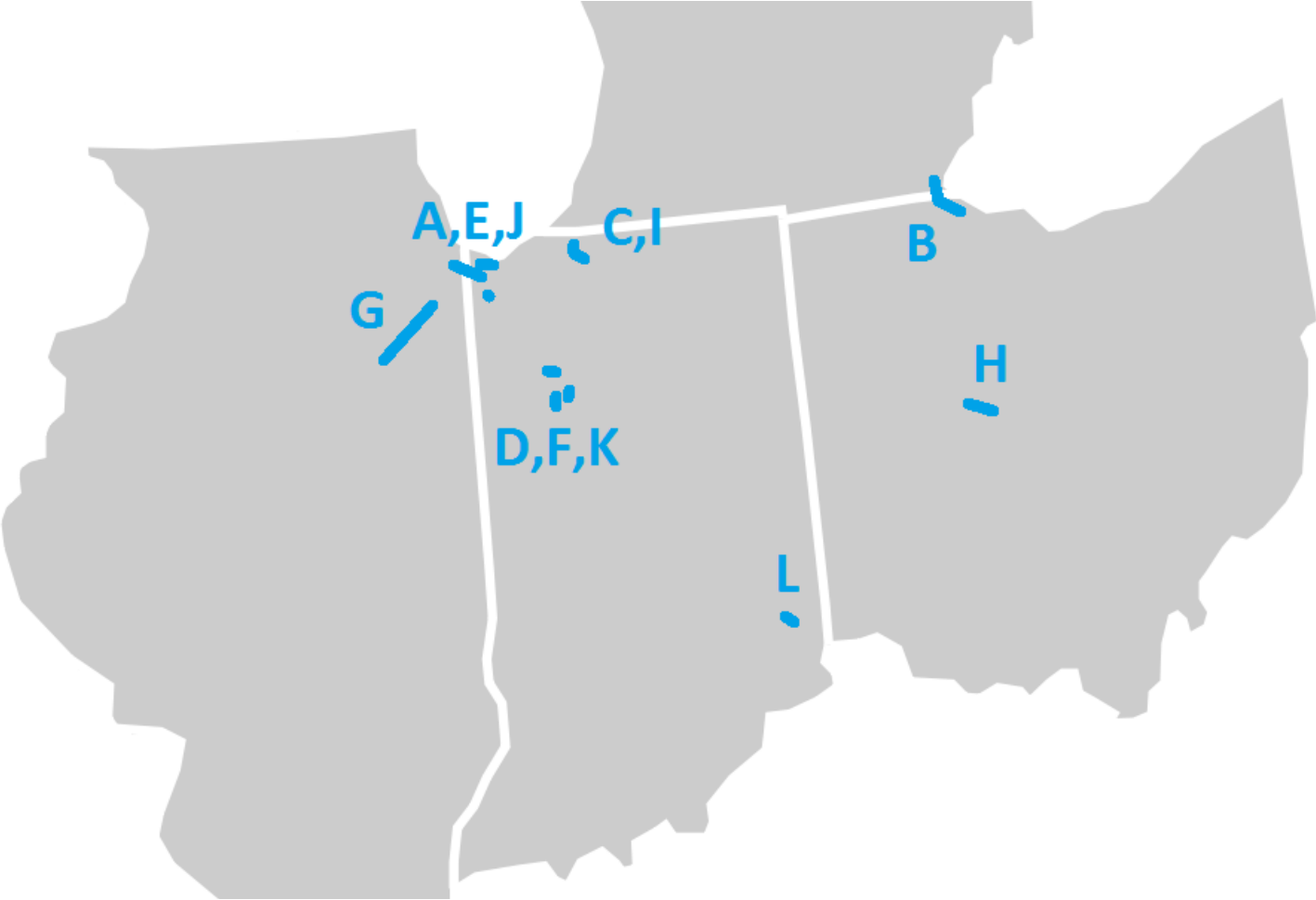
- TMEP study process, benefits, and interregional cost allocation defined
 - Corresponding JOA edits ready to file
- Still working on regional cost allocation
 - In MISO: RECB Working Group
 - MISO working on details of proposal
 - May hold a mid-November RECBWG meeting to lay out proposal
 - In PJM: PJM TOAAC
 - PJM TOAAC must give 30 day notice of proposed cost allocation

- RTO legal staff prefers filing JOA and Tariff revisions together
 - Intend to file by end of year independent of cost allocation status
 - Request 60 day response from FERC
 - Unlikely language will be in effect for December project approvals
 - Pending FERC response, submit projects to boards at first opportunity

Targeted Market Efficiency Project Study

- Facility specific information reviewed to ensure appropriate treatment of any CEII or confidential information
 - Upgrade details will be shared when RTOs are ready to submit projects to boards for approval
- Planning level cost estimates provided by transmission owners
- MISO has completed powerflow based analysis
- PJM has completed economic based analysis
- RTOs consider analysis complete and recommendations final
 - Waiting on language approval before submitting to boards

Letter	Flowgate
A	Burnham – Muster 345 kV
B	Bayshore – Monroe 345 kV
C	Michigan City – Bosserman 138 kV
D	Reynolds – Magnetation 138 kV
E	Roxana – Praxair 138 kV
F	Klondike – Purdue 138 kV
G	Braidwood – East Frankfort 345 kV
H	Marysville – Tangy 345 kV
I	Michigan City – Trail Creek 138 kV
J	Munster 345/138 kV
K	Tippecanoe – Lafayette South 138 kV
L	Batesville – Hubble 138 kV




- Changes since September IPSAC are **shown in red**
- Projects not being recommended have been moved to Appendix A

- NERC FG ID: 2286/2205
- Ownership: CE-NIPS
- Outages Impacting: None known
- Planned Upgrades Impacting: None known
- Current Rating: 1195/1195
- Upgrade Type: Upgrade to existing facility
- Upgrade Cost: **\$7M**
- Upgraded Rating: 1201/1441

Additional limitation identified on COMED side – Cost updated (+\$500k) to include projects on both sides

	PJM		MISO	
	2014	2015	2014	2015
Congestion	\$ 1,521,147	\$ 11,540,968	\$ 381,035	\$ 2,559,815
M2M Payment	\$ 398,485	\$ 684,447	\$ (398,485)	\$ (684,447)
Benefit Split	\$ 1,919,632	\$ 12,225,415	\$ -	\$ 1,875,368
Benefit Share	88%		12%	



	Base Case	Project Case
PROMOD Congestion	\$ 3.3 M	\$ 0

- Congestion moved to downstream flowgates: None
- Analysis Results: Project is effective at relieving identified congestion
- TMEP Cost: \$7M
- TMEP Benefit: \$32 M
- Conclusion: **Project Recommended**

*Note: TMEP Benefit is the average historical congestion * 4 years. See Appendix B for calculation example

- NERC FG ID: 2647
- Ownership: ATSI – ITC
- Outages Impacting: None known
- Planned Upgrades Impacting: None known
- Current Rating: 1262/1494
- Upgrade Type: Upgrade to existing facility
- Upgrade Cost: \$1M
- Upgraded Rating: 1486/1702

	PJM		MISO	
	2014	2015	2014	2015
Congestion	\$ 320,517	\$ 7,111,623	\$ -	\$ 2,059,227
M2M Payment	\$ 819,770	\$ 886,991	\$ (819,770)	\$ (886,991)
Benefit Split	\$ 1,140,287	\$ 7,998,614	\$ -	\$ 1,172,236
Benefit Share	89%		11%	


	Base Case	Project Case
PROMOD Congestion	\$10.4 M	\$4.2 M

- Congestion moved to downstream flowgates: None
- Analysis Results: Project relieves over 60% of congestion costs
- TMEP Cost: \$1M
- TMEP Benefit: \$18.9 M * 60% = \$11.3 M
- Conclusion: **Project Recommended**

Base case economic model was modified to bring congestion closer to historical value

- NERC FG ID: 2427/2540
- Ownership: NIPS – AEP
- Outages Impacting: New Carlisle (~20%)
- Planned Upgrades Impacting: None known
- Current Rating: 156/156
- Upgrade Type: Upgrade to existing facility
- Upgrade Cost: \$2.3 M
- Upgraded Rating: 156/221

	PJM		MISO	
	2014	2015	2014	2015
Congestion	\$ 9,885,624	\$ 4,424,258	\$ 2,073,320	\$ 2,106,006
M2M Payment	\$ 315,189	\$ 1,965,922	\$ (315,189)	\$ (1,965,922)
Benefit Split	\$ 10,200,813	\$ 6,390,180	\$ 1,758,131	\$ 140,084
Benefit Share	90%		10%	



	Base Case	Project Case
PROMOD Congestion	\$ 9.2 M	\$ 0

- Congestion moved to downstream flowgates: Yes, ~\$100k total increase on Michigan City – Maple and Michigan City – Trail Creek
- Analysis Results: Project is effective at relieving identified congestion, only ~1% increase on nearby flowgates
- TMEP Cost: \$2.3 M
- TMEP Benefit: \$37.0 M (-20% for outage) = \$29.6 M
- Conclusion: **Project Recommended**

- NERC FG ID: 20729/2548/2685
- Ownership: NIPS
- Outages Impacting: None known
- Planned Upgrades Impacting: None known
- Current Rating: 287/287
- Upgrade Type: Upgrade to existing facility
- Upgrade Cost: 150k
- Upgraded Rating: 287/366

	PJM		MISO	
	2014	2015	2014	2015
Congestion	\$ 17,436	\$ 1,715,417	\$ 216,330	\$ 5,302,529
M2M Payment	\$ 185,737	\$ 1,079,560	\$ (185,737)	\$ (1,079,560)
Benefit Split	\$ 203,173	\$ 2,794,977	\$ 30,593	\$ 4,222,969
Benefit Share	41%		59%	

	Base Case	Project Case
PROMOD Congestion	\$ 2.43 M	\$ 0

- Congestion moved to downstream flowgates: None
- Analysis Results: Project is effective at relieving identified congestion
- TMEP Cost: 150k
- TMEP Benefit: \$14.5 M
- Conclusion: **Project Recommended**

- NERC FG ID: 2577/2531
- Ownership: NIPS
- Outages Impacting: None known
- Planned Upgrades Impacting: None known
- Current Rating: 158/158
- Proposed Upgrade:
 - Operate Dune Acres 345/138 normally closed (replace over-dutied breakers)
 - Upgrade to existing facility (4.5M) 525 MVA rate B


	PJM		MISO	
	2014	2015	2014	2015
Congestion	\$ 128,304	\$ -	\$ 656,246	\$ 5,784,337
M2M Payment	\$ 541,002	\$ 882,612	\$ (541,002)	\$ (882,612)
Benefit Split	\$ 669,306	\$ 882,612	\$ 115,244	\$ 4,901,725
Benefit Share	24%		76%	

	Base Case	Dune Acres XFMR Closed	Dune Acres XFMR Closed + Upgrade to Existing Facility
PROMOD Congestion	\$ 1.8 M	\$ 0.9 M	\$ 0

- Congestion moved to downstream flowgates: None
- Analysis Results: Closing Dune Acres transformer resolves ~50% of congestion, TMEP upgrade relieves the remaining congestion
- TMEP Cost: \$4.5 M
- TMEP Benefit: $\$13.1 \text{ M} * 50\% = \6.5 M
- Conclusion: **MISO/NIPSCO upgrades to operate the Dune Acres transformer normally closed are planned; all station upgrades in service by 2022. TMEP Recommended based on benefit of relieving the remaining ~50% of congestion (\$6.5 M benefit)**

- NERC FG ID: 2395
- Ownership: AEP – ATSI
- Outages Impacting: Marysville – Haytop (~5%)
- Planned Upgrades Impacting: n4148 would have impacted, but project was cancelled
- Current Rating: 897/897
- Upgrade Type: Upgrade to existing facility
- Upgrade Cost: minimal
- Upgraded Rating: 1396/1667

	PJM		MISO	
	2014	2015	2014	2015
Congestion	\$ 1,543,508	\$ 4,659,996	\$ -	\$ 156,138
M2M Payment	\$ -	\$ -	\$ -	\$ -
Benefit Split	\$ 1,543,508	\$ 4,659,996	\$ -	\$ 156,138
Benefit Share	98%		2%	



	Base Case	Project Case
PROMOD Congestion	\$ 0.18 M	\$ 0

- Congestion moved to downstream flowgates: None
- Analysis Results: Project is effective at relieving identified congestion
- TMEP Cost: minimal
- TMEP Benefit: \$12.7 M (-5% outage) = \$12 M
- Conclusion: **Project Recommended**

- 50 M2M flowgates investigated
- 13 potential upgrades evaluated
- 6 projects recommended
 - \$64 Million in historical congestion (2014 + 2015)
 - \$111 Million TMEP Benefit
 - \$14.45 Million total Cost
 - 7.7 average B/C ratio

Summary of Recommended TMEPs

Facility	Transmission Owner	TMEP Cost (Million \$)	TMEP Benefit (Million \$)	Benefit Allocation (%PJM/%MISO)
Burnham - Munster 345kV	CE - NIPS	6.5	32	88/12
Bayshore - Monroe 345kV	ATSI - ITC	1	17	89/11
Michigan City – Bosserman 138kV	NIPS - AEP	2.3	29.6	90/10
Reynolds-Magnetation 138kV	NIPS	0.15	14.5	41/59
Roxana - Praxair 138kV *	NIPS	4.5	6.5	24/76
Marysville-Tangy 345kV	AEP/ATSI	"minimal"	12	98/2

FERC Order on EL13-88

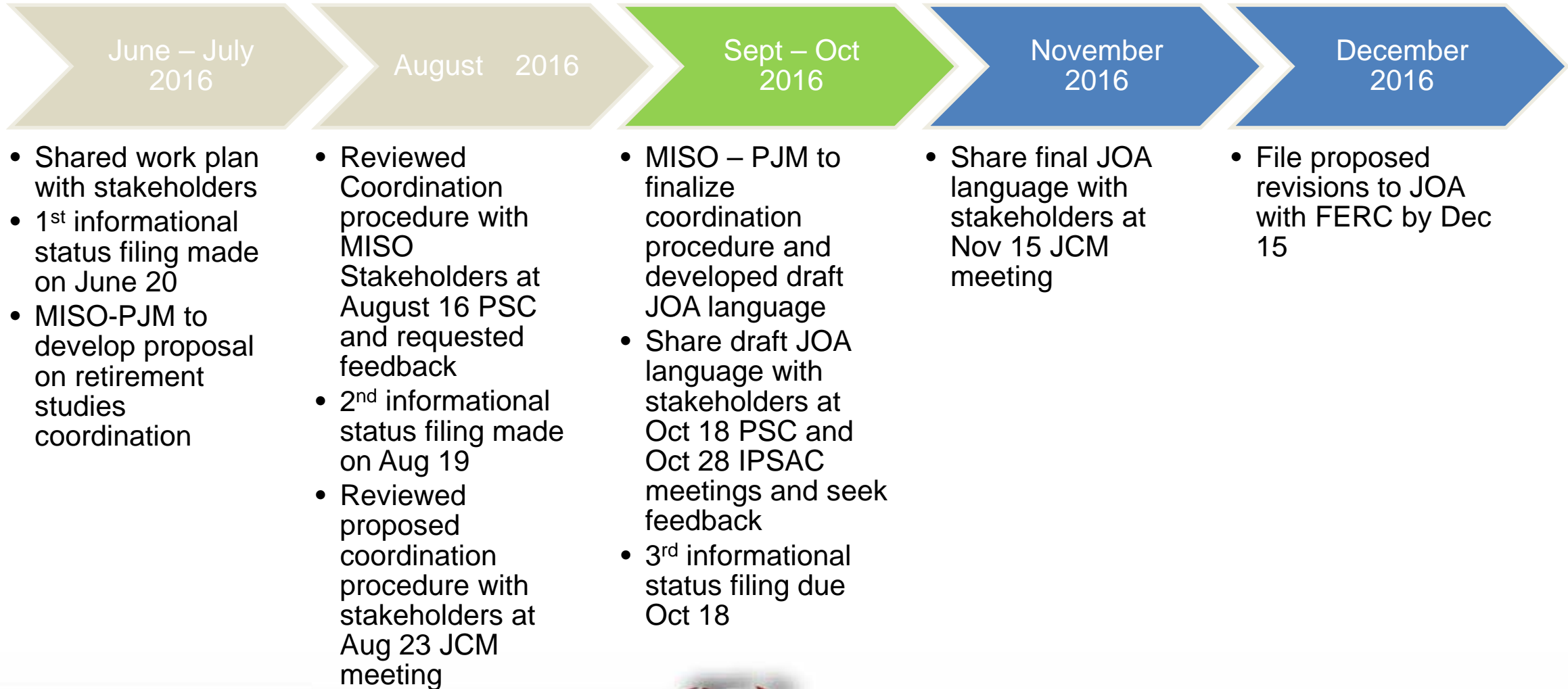
FERC Directed Stakeholder Involvement

Deliverable		Due Dates (2016)				Stakeholder Forum
		20-Jun	19-Aug	18-Oct	15-Dec	
Directive P186	Include Generator Retirement Coordination Procedures in JOA	X	X	X	X	IPSAC, PSC, PC
Informational P186	Status Reports on Gen Retirement Coordination Language					
Informational P92	Joint Model in Regional Processes			X		IPSAC, PSC, PC


No FERC Directed Stakeholder Involvement

Deliverable		Due Dates (2016)		Stakeholder Forum (Informational Updates)
		20-Jun	19-Aug	
Directive P57	Formalize Steps and Deadlines in CSP Study	X		IPSAC, PAC, TEAC
Directive P131	Lower Interregional MEP Thresholds	X		IPSAC, RECB, TEAC
Directive P132	Remove Interregional B/C Ratio	X		IPSAC, RECB, TEAC
Directive P133	Revise Benefit Calculation of Interregional MEPs	X		IPSAC, RECB, TEAC
Directive P185	Include BPM GI Coordination Procedures in JOA	X		IPSAC, PSC, TEAC
Informational P58	Aligning Interregional, MTEP, and RTEP		X	IPSAC

- Filed on October 25
- Posted with meeting materials
- Thank you to those who provided feedback
- Ultimately, MISO and PJM staff decided to explain why a common model is not feasible
 - Supported by stakeholder comments
 - Process improvement stakeholder suggestions will be considered by RTOs



PJM Issues Review

- 
- July 29, 2016 – IPSAC was notified of September PJM issues review
 - August 26, 2016 – IPSAC stakeholder input to PJM issues review was due
 - October 25, 2016 – PJM discussed potential regional issues and market efficiency window
 - <http://pjm.com/~media/committees-groups/committees/teac/20161025/20161025-market-efficiency-update.ashx>
 - October 31/2016 – PJM to post Problem Statement (issues list)
 - <http://www.pjm.com/planning/rtep-development/expansion-plan-process/ferc-order-1000/rtep-proposal-windows.aspx>
 - Final regional market efficiency case should be available 10/31:
 - <http://pjm.com/planning/rtep-development/market-efficiency.aspx>

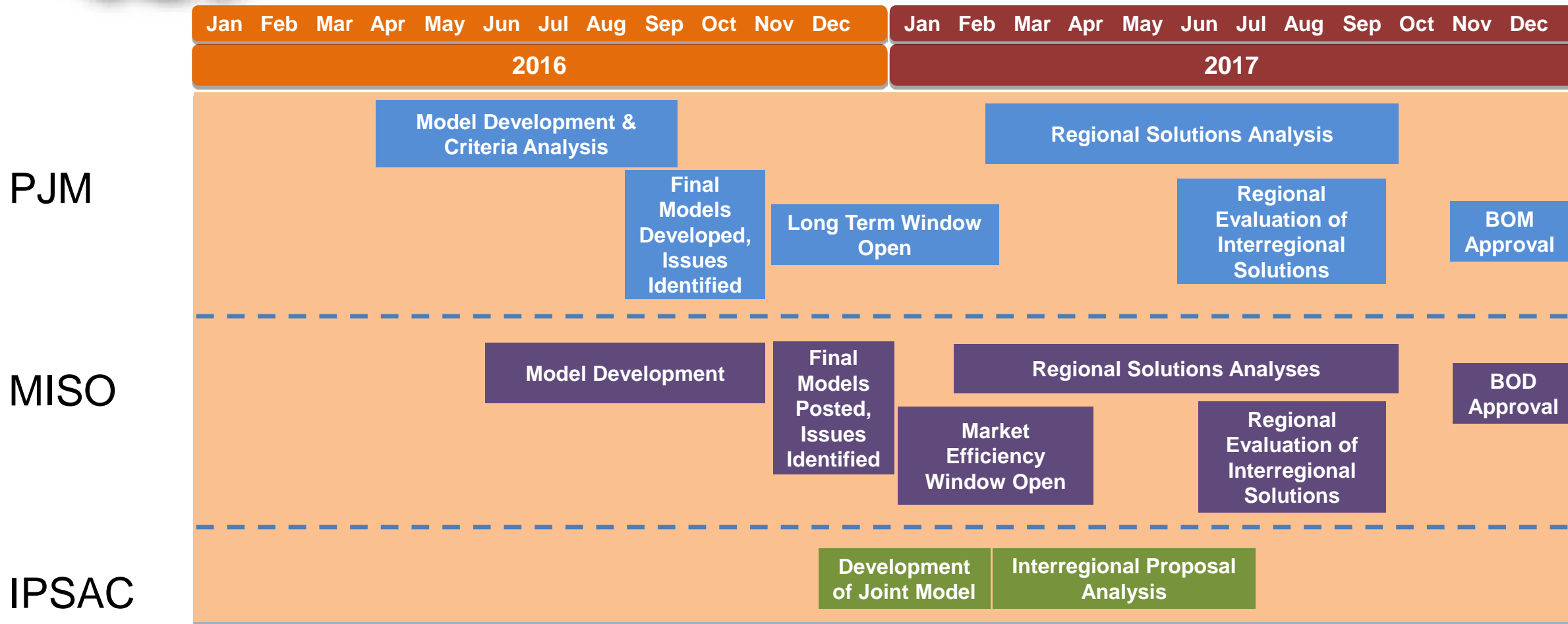
IPSAC Work Schedule




Q4 2016

- File TMEP language in JOA
- Continue MEP Metric and Process discussions with stakeholders
- Complete TMEP analysis and recommend projects as appropriate
- Identify potential longer term interregional issues from regional processes; solicit projects from stakeholders

Interregional Market Efficiency Project Timeline



*Interregional proposals must be proposed in each regional window (January & February overlap)

- 
- November 1, 2016 – PJM long-term solution proposal window opens
 - February 28, 2017 – PJM long-term solution proposal window closes

 - October 2016 – IPSAC & notice of December MISO issues review
 - November 2016 – IPSAC & stakeholder input to MISO issues review due
 - December 2016 - IPSAC review MISO issues
 - January – March 2017 – MISO solution proposals accepted

 - **December 2, 2016 – Next scheduled IPSAC meeting**

Appendix A

TMEPs Not Passing

- NERC FG ID: 2578
- Ownership: NIPS
- Outages Impacting: None known
- Planned Upgrades Impacting: None known
- Current Rating: 156/156
- Upgrade Type: Upgrade to existing facility
- Upgrade Cost: \$1.8M
- Upgraded Rating: 156/221

	PJM		MISO	
	2014	2015	2014	2015
Congestion	\$ 244,599	\$ -	\$ -	\$ 863,746
M2M Payment	\$ 447,999	\$ 2,064,646	\$ (447,999)	\$ (2,064,646)
Benefit Split	\$ 692,598	\$ 2,064,646	\$ -	\$ -
Benefit Share	100%		0%	




	Base Case	Project Case
PROMOD Congestion	\$ 2.57 M	\$ 0

- Congestion moved to downstream flowgates: Yes, significant congestion moves to Michigan City – Dune Acres
- Analysis Results: Significant congestion shifted to alternate facilities suggests that additional reinforcements may be required
- TMEP Cost: \$1.8M
- TMEP Benefit: \$2.2 M
- Conclusion: **TMEP not recommended**. Analysis of additional reinforcements required. Given low TMEP benefit, may be more successful in MEP process



- NERC FG ID: 20707/20737
- Ownership: DEI
- Outages Impacting: Multiple nearby outages to facilitate generator interconnection upgrades – 100%
- Planned Upgrades Impacting: None known
- Current Rating: 158/158
- Upgrade Type: Upgrade to existing facility
- Upgrade Cost: \$4.2M
- Upgraded Rating: 158/243

	PJM		MISO	
	2014	2015	2014	2015
Congestion	\$ 128,304	\$ -	\$ -	\$ 2,859,503
M2M Payment	\$ -	\$ -	\$ -	\$ -
Benefit Split	\$ 128,304	\$ -	\$ -	\$ 2,859,503
Benefit Share	4%		96%	




	Base Case	Project Case
PROMOD Congestion	\$ 2.28 M	\$ 0

- Congestion moved to downstream flowgates: None
- Analysis Results: Project is effective at relieving identified congestion
- TMEP Cost: \$4.2M
- TMEP Benefit: \$6.0 M (-100% outage) = \$0
- Conclusion: **TMEP not recommended; congestion was outage driven**

- NERC FG ID: 2207
- Ownership: CE
- Outages Impacting: None known
- Planned Upgrades Impacting:
 - s0756.1, replace breaker. New rating: 1334/1528. ISD 6/1/2017
 - s0756.2, replace breaker. New rating: 1334/1528. Complete
- Current Rating: 1245/1341
- Upgrade Cost: Planned supplemental projects (CE)

- NERC FG ID: 20865
- Ownership: NIPS
- Outages Impacting: Lake George – Munster (100%?)
- Planned Upgrades Impacting: None known
- Current Rating: 287/287
- Upgrade Type: Upgrade to existing facility
- Upgrade Cost: \$5.5M
- Upgraded Rating: ???/560

	PJM		MISO	
	2014	2015	2014	2015
Congestion	\$ -	\$ 1,485,379	\$ -	\$ 1,765,401
M2M Payment	\$ -	\$ 2,227,586	\$ -	\$ (2,227,586)
Benefit Split	\$ -	\$ 3,712,965	\$ -	\$ -
Benefit Share	100%		0%	



	Base Case	Project Case
PROMOD Congestion	\$ 2.44	\$ 0

- Congestion moved to downstream flowgates: None
- Analysis Results: Project is effective at relieving identified congestion
- TMEP Cost: \$5.5M
- TMEP Benefit: 0 (outage driven)
- Conclusion: **TMEP not recommended due to outages**

- NERC FG ID: 20849/21139
- Ownership: DEI
- Outages Impacting: None known
- Planned Upgrades Impacting: None known
- Current Rating: 178/178
- Upgrade Type: Upgrade to existing facility
- Upgrade Cost: \$6.6M
- Upgraded Rating: ???/301


	PJM		MISO	
	2014	2015	2014	2015
Congestion	\$ -	\$ 182,308	\$ -	\$ 247,307
M2M Payment	\$ -	\$ -	\$ -	\$ -
Benefit Split	\$ -	\$ 182,308	\$ -	\$ 247,307
Benefit Share	42%		58%	

	Base Case	Project Case
PROMOD Congestion	\$ 0.60	\$ 0

- Congestion moved to downstream flowgates: None
- Analysis Results: Project is effective at relieving identified congestion
- TMEP Cost: \$6.6M
- TMEP Benefit: \$0.9 M
- Conclusion: **TMEP not recommended**. Benefits do not justify project cost at this time. Re-evaluate next year

- NERC FG ID: 2445
- Ownership: DEI – HE
- Outages Impacting: None known
- Planned Upgrades Impacting: b2634, b2634.1 (ISD: 12/31/2017)
 - Reconfiguration of Miami Fort station; may impact flows in area
- Current Rating: 261/261
- Upgrade Type: Upgrade to existing facility
- Upgrade Cost: \$25M
- Upgraded Rating: ???/582

	PJM		MISO	
	2014	2015	2014	2015
Congestion	\$ 2,390,540	\$ 535,687	\$ 34,357	\$ 984,204
M2M Payment	\$ 605,665	\$ 4,085,757	\$ (605,665)	\$ (4,085,757)
Benefit Split	\$ 2,996,205	\$ 4,621,444	\$ -	\$ -
Benefit Share	100%		0%	



	Base Case	Project Case
PROMOD Congestion	\$ 1.65 M	\$ 0

- Congestion moved to downstream flowgates: None
- Analysis Results: Project is effective at relieving identified congestion
- TMEP Cost: \$25M
- TMEP Benefit: \$ 7.9 M
- Conclusion: **TMEP not recommended.** Benefits do not justify project cost at this time. Re-evaluate next year

- NERC FG ID: 3654
- Ownership: DEI
- Outages Impacting: None known
- Planned Upgrades Impacting: Recently rebuilt to 301 MVA
 - Upgrade recently completed. No additional work recommended at this time.



Appendix B

Example TMEP Benefit Calculation

	2014	2015
PJM Congestion	\$ 1,000,000	\$ 1,500,000
MISO Congestion	\$ 1,000,000	\$ 1,250,000
PJM M2M Payment	\$ 150,000	\$ 200,000
MISO M2M Payment	\$ (150,000)	\$ (200,000)
Total Congestion	\$ 2,000,000	\$ 2,750,000

Two years of historical values

Note M2M payments are equal and opposite

Sum of both RTOs

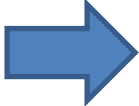
*Note: In this example M2M payments are made by PJM to MISO

*All values and project details are for illustrative purposes only

- Proposed upgrade is replacement of breakers and associated CTs and relays
 - Total cost \$2.5 Million
- Analysis shows project eliminates congestion issue

Annual benefit is average of Total Unhedged Congestion:

	2014	2015
Total Unhedged Congestion	\$ 2,000,000	\$ 2,750,000

 \$ 2,375,000

Four years of benefits exceeds the installed cost

4 years * \$ 2.375 Million = \$ 9.5 Million \$ 9.5 Million > \$ 2.5 Million

The project passes the benefit threshold

*All values and project details are for illustrative purposes only

PJM Total Benefit:	\$ 2,500,000
MISO Total Benefit:	\$ 2,250,000
PJM Total M2M Payments	\$ 350,000
MISO Total M2M Payments	\$ (350,000)
PJM Adjusted Benefit:	\$ 2,850,000
MISO Adjusted Benefit:	\$ 1,900,000
PJM pays:	60%
MISO pays:	40%

Sum of congestion for two historical years

Sum for two historical years

Total Benefit plus M2M Payments

Share of Adjusted Benefits

*All values and project details are for illustrative purposes only