Inter-regional Planning Update

Transmission Expansion Advisory Committee

November 9, 2017

EIPC

- Production Cost Database Assembly
  - Trial 5 results under review
  - Database renewal and potential next steps under discussion
- Responsibility for developing Eastern Interconnection frequency response case accepted
  - Working group assembled
  - Timeline and scope being developed
- EIPC-NERC Designated Entity Agreement is under development

Interregional Update

- PJM-MISO IPSAC - http://www.pjm.com/committees-and-groups/stakeholder-meetings/ipsac-midwest.aspx
  - Next meeting TBD
- NE Protocol IPSAC - http://www.pjm.com/committees-and-groups/stakeholder-meetings/ipsac-ny-ne.aspx
  - IPSAC December 11, 2017 – regional updates, NCSP scope, 2018 work plan
- PJM/NYISO Joint Transmission Benefits & Cost Allocation - http://pjm.com/committees-and-groups/stakeholder-meetings/pjm-nyiso.aspx
  - October 31 meeting was postponed, New date TBD
- SERTP- regional process: www.southeasternrtp.com
  - 4th Quarter meeting December 12, 2017
  - Next biennial review – Spring 2018

Targeted Market Efficiency Projects

TMEP Key Attributes

- Limited to historically binding M2M flowgates
- Projects must by in service by 3rd summer peak
- Projects over $20 million not eligible (must go through MEP process)
- Benefits based on relieving 2 years of historical congestion (DA + Balancing/ECF)
- Four years worth of benefits must completely cover project's installed capital cost
- Discount/inflation rate not necessary as all project are near term
- Interregional cost allocation based on congestion relief in each RTO
  - Adjusted by M2M payments

DA = Day Ahead, ECF = Excess Congestion Fund (MISO) equivalent to Balancing (PJM)

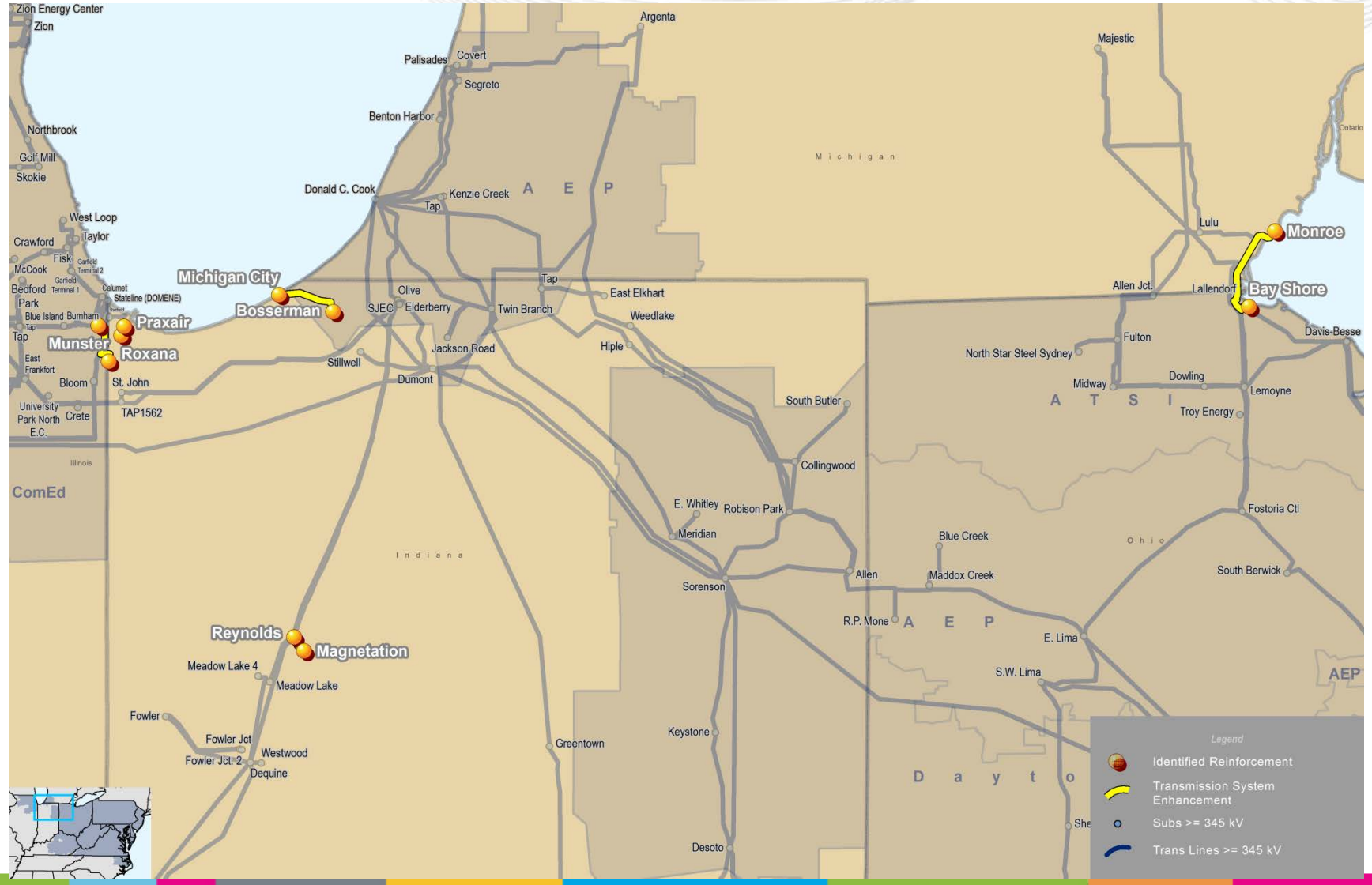
Study History

- TMEP study was conducted throughout 2016
- Regular updates and stakeholder interaction though IPSAC
- Five TMEPs recommended for board approval as result of study
- FERC accepted TMEP process subject to conditions on October 3, 2017
  - Minor JOA compliance updates filed November 2
  - Expect projects to go to PJM and MISO December Board meetings for approval

TMEP Analysis Summary

- 50 M2M flowgates investigated
- 13 potential upgrades evaluated
- 5 projects recommended
  - $ 59 Million in historical congestion (2014 + 2015)
  - $ 99.6 Million TMEP Benefit
  - $ 17.25 Million total Cost
  - 5.8 average B/C ratio

Location of Recommended TMEPs



Burnham – Munster 345kV

- NERC FG ID: 2286/2205
- Ownership: CE-NIPS
- Outages Impacting: None known
- Planned Upgrades Impacting: None known
- Current Rating: 1195/1195
- Upgrade: b2971 - Reconfigure Munster as ring bus (NIPSCO)
- Upgraded Rating: 1201/1441
- Upgrade ISD: 6/1/2020
- TMEP Cost: $7M
- TMEP Benefit: $32M
- Interregional Cost Split: 88% PJM / 12% MISO

Bayshore – Monroe 345kV

- NERC FG ID: 2647
- Ownership: ATSI – ITC
- Outages Impacting: None known
- Planned Upgrades Impacting: None known
- Current Rating: 1262/1494
- Upgrade: b2972 - Replace conductor on river-crossing span (FE)
- Upgraded Rating: 1486/1702
- Upgrade ISD: TBD (tentative Fall 2019)
- TMEP Cost: $1M
- TMEP Benefit: $11.3 M
- Interregional Cost Split: 89% PJM / 11 % MISO

Michigan City – Bosserman 138kV

- NERC FG ID: 2427/2540
- Ownership: NIPS – AEP
- Outages Impacting: New Carlisle (~20%)
- Planned Upgrades Impacting: None known
- Current Rating: 156/156
- Upgrade: b2973 - Reconductor (NIPSCO)
- Upgraded Rating: 186/221
- Upgrade ISD: 2019
- TMEP Cost: $4.6 M
- TMEP Benefit: $29.6 M
- Interregional Cost Split: 90% PJM / 10% MISO

Reynolds – Magnetation 138kV

- NERC FG ID: 20729/2548/2685
- Ownership: NIPS
- Outages Impacting: None known
- Planned Upgrades Impacting: None known
- Current Rating: 287/287
- Upgrade: b2974 - Replace terminal equipment at Reynolds (NIPSCO)
- Upgraded Rating: 305/366
- Upgrade ISD: 6/1/2019
- TMEP Cost: $150 k
- TMEP Benefit: $14.5 M
- Interregional Cost Split: 41% PJM / 59% MISO

Roxana – Praxair 138kV

- NERC FG ID: 2577/2531
- Ownership: NIPS
- Outages Impacting: None known
- Planned Upgrades Impacting: None known
- Current Rating: 158/158
- Upgrade: b2975 - Reconductor (NIPSCO)
- Upgraded Rating: 434/525
- Upgrade ISD: 6/1/2020
- TMEP Cost: $4.5 M
- TMEP Benefit: $6.5 M
- Interregional Cost Split: 24% PJM / 76% MISO

Interregional Market Efficiency Projects

Study Process

- FERC directed PJM and MISO to eliminate the joint model evaluation and use the regional ME processes to determine benefits (EL13-88)
- Common proposal window with regional MEPs
- Proposals evaluated in each regional process consistent with each RTO's tariff
- An Interregional Market Efficiency Project must
  - Meet criteria as laid out in the JOA
  - Qualify as a Market Efficiency Project in PJM
  - Qualify as a Market Efficiency Project in MISO

- Final results were presented at October 20 IPSAC

Study Summary

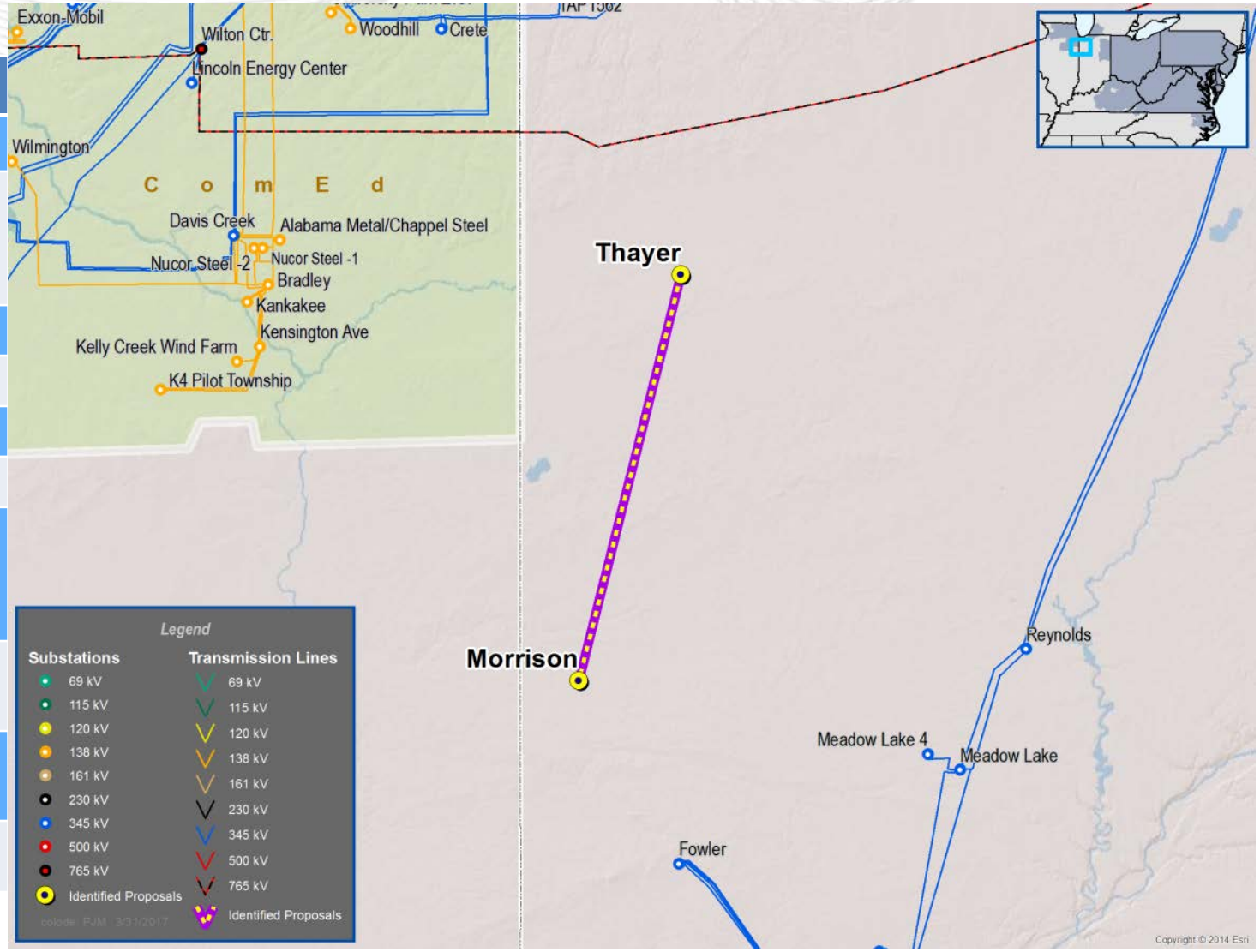
- 8 projects received and evaluated consistent with Regional MEP proposals
- 6 targeted Olive – Bosserman 138kV
  - No proposal met the local AEP needs and passed the B/C test
  - AEP supplemental (s1279) is the best solution for local needs
  - No proposals passed B/C test incremental to supplemental project
- 1 targeted Tanners Creek – Miami Fort 345kV
  - Fails B/C criteria in both regions
- 1 targeted Paxton – Gifford 138kV
  - Passes B/C criteria in both regions
  - Fails JOA materiality (GLDF) test
    - GLDF was applied by PJM and MISO on their respective planning power flows since the joint power flow was not necessary in this study
  - Does not qualify as a regional MEP in PJM

IMEP Summary

Project Details					Study Results					
					PJM			MISO		
PJM	MISO	Submitter	Capital Cost (Million $ [in-service year $])	Constraint	Regional Benefit ($M in service year $'s)	PJM Cost Share	Regional B/C Ratio (PV)	Regional Benefit ($M 2017 $'s)	MISO Cost Share	Regional B/C Ratio (PV)
201617_1-1A	prj1	WPPI	$ 2.5	Olive-Bosserman 138 kV	$35.72	100.0%	0.31	0	N/A	N/A
201617_1-9A	prj2	NIPSCO	$ 8.00	Olive-Bosserman 138 kV	0	N/A	N/A	0	N/A	N/A
201617_1-9B	prj3	NIPSCO	$ 61.8	Paxton-Gifford 138 kV	$47.85	38.5%	1.36	$ 76.45	61.5%	1.86
Modified 201617_1-12D	Modified prj4	AEP NIPSCO	$ 17.00	Olive-Bosserman 138 kV	$24.48	100.0%	1.06	0	N/A	N/A
201617_1-10B	prj5	Nextera	$ 19.2	Olive-Bosserman 138 kV	$24.87	100.0%	0.95	0	N/A	N/A
201617_1-17B	prj6	AEP Exelon	$ 197.97	Olive-Bosserman 138 kV	$49.02	72.8%	0.24	$ 18.32	27.2%	0.32
201617_1-13H	prj7	Transource	$ 71.89	Tanners Creek - Miami Fort 345 kV	$26.55	100.0%	0.27	0	N/A	N/A
201617_1-18S	prj8	Northeast Transmission Development	$ 17.4	Olive-Bosserman 138 kV	$10.07	84.5%	0.47	$ 1.85	15.5%	0.59

NIPSCO 1-9B

Project ID: 201617_1-9B
Proposed by: NIPSCO
Proposed Solution: Greenfield New NIPSCO line section between Thayer and Morrison 138kV substations.
kV Level: 138 kV
In-Service Cost ($M): $61.8
In-Service Date: 2022
Target Zone: AML COMED NIPSCO
ME Constraints: PAXTON - GIFFORD 138 kV (for PJM) GOODLAND – REYNOLDS 138 kV (for MISO)
PJM Benefit ($M): 47.8 B/C: 1.36 MISO Benefit ($M): 76.5 B/C: 1.86
PJM Cost Allocation: 38.5% MISO Cost Allocation: 61.5%
Passes B/C criteria in each RTO



Thayer – Morrison 138kV

- Proposed to address congestion on Paxton - Gifford 138 kV (AMIL) for PJM and Goodland – Reynolds 138kV (NIPSCO) for MISO
  - Neither of these constraints were PJM recommended congestion drivers
- Ameren provided update to the MTEP 16 ratings used by PJM, which relieved the constraint, removing the proposed congestion driver
- Moved congestion to Goodland – Reynolds (NIPSCO)
- Project effectively addresses this MISO flowgate
  - PROMOD identifies benefits to both RTOs from relieving this MISO constraint

JOA Criteria

- JOA 9.4.4.1.3 (iii) [IMEPs must meet the following criteria:]
  - "Addresses one or more constraints for which at least one dispatchable generator in the adjacent market has a GLDF of 5% or greater with respect to serving load in that adjacent market, as determined using the Coordinated System Plan power flow model."
- RTOs did not develop the Coordinated System Plan power flow model as result of recent FERC ruling (EL13-88)
  - JOA has not yet been updated to fully reflect the impact of the ruling
- GLDF test conducted on each regional model (MTEP & RTEP)
  - Consistent results between PJM and MISO regional cases
- GLDF criteria is not met for binding Goodland – Remington contingency

PJM and MISO Modeled Congestion Relief

Monitored Facility	Contingency	Congestion Savings
Goodland 138/69kV XFMR (NIPS)	Goodland – Reynolds 138kV (NIPS)	$750,801
Graceton – Bagley 230kV (BGE)	Graceton – Bagley 230kV (BGE)	$340,939
Goodland – Reynolds 138kV (NIPS)	Goodland – Remington 69kV (NIPS)	$285,239
Glen Arm – Windy Edge 115kV (BGE)	Glen Arm – Windy Edge 115kV (BGE)	$115,821
Ashburn – Pleasant View 230kV (DOM)	Shellhorn – Enterprise 230kV (DOM)	$75,032
Central Interface (PJM)	Base Case	$59,457
AP South (PJM)	Bedington – Black Oak 500kV (AP)	$50,795

*Congestion Savings is the average annual congestion savings based on the four modeled study years

Potential PJM Regional Beneficiaries

- The two NIPSCO constraints are not M2M flowgates
  - PJM does not dispatch off cost for these constraints
  - In Market Operations PJM would not see benefits of relieving these constraints
- Graceton – Bagley
  - Only significant PJM congestion beneficiary
  - Many other proposals will more efficiently resolve this constraint

PJM Regional Criteria

- Interregional Market Efficiency Projects must resolve regional congestion issue
- Model shows congestion occurs on MISO flowgate Goodland – Reynolds for loss of Goodland - Remington
  - This flowgate is not a M2M coordinated flowgate
  - PJM does not operate off cost for this flowgate
  - This proposal is not eligible as an interregional project in the absence of targeted PJM market congestion and material impacts on PJM generators

Interregional MEP Criteria

- JOA Criteria
  - Project does not meet GLDF test

- MISO Regional Process
  - Project meets criteria in MISO regional process
    - May require additional cost allocation work

- PJM Regional Process
  - Project lacks benefits due to PJM congestion drivers

Next Steps

- Interregional MEP analysis is complete
- No projects meet criteria to be recommended as an IMEP
- MISO may pursue Thayer – Morrison project in MISO Regional process
- IPSAC to discuss potential JOA updates/changes
  - EL13-88 (NIPSCO Order) compliance
  - Experience of recent IMEP study
- Next Interregional MEP proposal window: November 2018 – February 2019

Revision History

- V1 – 11/3/2017 – Original Version Posted to PJM.com
- V2 – 11/6/2017
  - Added ‘Upgraded Rating’ to slides 11-13
  - Added baseline IDs to slides 9-13