2018 10-Year Assessment
Preliminary Study Design

October 24, 2017
Stakeholder and Customer Webcast
Jeremy Voigt, System Planning
Purpose

• Summarize ATC’s project development processes
• Solicit input for the 2018 Assessment Study Design
• Solicit input on Public Policy Requirements
ATC’s Project Development Processes

• Local Transmission Planning
  – Asset Renewal
  – Interconnections
  – Network
    • Planning Reliability Criteria
    • Sectionalizing Guidelines
    • Economic Benefits Considerations

• Other Solution Considerations, including Distributed Energy Resources (DER)

• Regional Planning

• Public Policy Requirements
Timeline

10-Year Assessment '19

10-Year Assessment '18

Request Load Forecast

Preliminary Needs / Solutions Development

Stakeholder Meeting 2017 Summary, 2018 Study Design

Confirm LF and Finalize Planning Criteria

Stakeholder Preliminary Needs Meeting

Stakeholder Preliminary Solutions Meeting

Post Assessment on Web

MTEP 18 Reliability

TO'S Submit Projects/Appendices to Database

1st SPM Presentation of Projects

2nd SPM MISO Review of Needs and Solutions

3rd SPM Presentation of Final Projects List

Stakeholder Review of 1st Draft Report

MISO BOD Review and Approval

ATC Economic Planning

MTEP Promod Models

Prioritize Study Requests and Assumptions

Identify Economic Study, Assumptions, Comments

Provide Summary of Study Results to Stakeholders

Finalize 2 Areas of Economic Study / Assumptions / Models

American Transmission Company

atcllc.com
Local Transmission Planning Process

1. NERC Standards
2. ATC Planning Criteria
3. ATC Asset Renewal Criteria
4. Stakeholder Input
5. Evaluate Solutions and Select Preferred Alternative
6. Propose Transmission Construction Project
7. ATC Review and Approval of Project Status
8. 10-Year Assessment Project List
9. Project Included in Capital Forecast
10. ATC Review and Approval of Project Status
11. Develop Solutions to Satisfy Needs

Engage MISO MTEP Process
Asset Renewal Program Objectives

- Safety – Public and worker
- Minimize total life cycle cost
- Compliance
- Manage risk of aging infrastructure
- Reliability performance improvements
- Environmental performance improvements
Asset Renewal Criteria

Safety/Compliance
- Public and Worker Safety
- NERC
- NESC Clearances
- NESC Strengths

Reliability Performance
- Historical Performance
- Condition
- Corporate Reliability Goals
- Industry Trends/Bad Actors
Asset Renewal Considerations

• Is the asset still needed?
  – Assess area needs
  – Obtain cross-functional and distribution provider input
  – Consider removal of lines (full/partial retirement)

• What ratings are needed?

• Investing prudently using defensible criteria
Asset Renewal Considerations – E-83/B-2

- ATC team and affected distribution provider assessed area needs

- Found potential for full or partial retirement
  - Option being considered: move substations nearby existing 138 kV lines
  - Evaluation in progress
    - Determining costs and distribution impacts
    - Preferred solution expected by 2018
Interconnections

- **G-T**
  - Support MISO Attachment X and Y Processes

- **D-T**
  - Collaboration with distribution providers through Load Interconnection Request Form (LIRF) and BVP process

- **T-T**
  - Collaboration with other Transmission Owners
Network Planning Objectives

• Compliance with NERC regional and local criteria
• Best Value Plan (BVP)
• Customer involvement
• Address Public Policy requirements
• Maintain or improve the adequacy and reliability of the electric transmission system
Network Planning Assessment Process

1. Preliminary Assessment for MTEP
2. Inputs & assumptions
3. Base Model
4. Needs, Solutions, Sensitivity: Yr 1
5. Needs, Solutions, Sensitivity: Yr 5
6. Needs, Solutions, Sensitivity: Yr 10
7. Document Results
8. Communicate Results & Collect Input
9. Stakeholder Communication
Planning Criteria & Assessment Practices

- NERC Standards, particularly [TPL-001, version 4](#)

- ATC Planning Criteria/Assessment Practices
  - [http://www.atc10yearplan.com](http://www.atc10yearplan.com) (About tab)
  - Updated to Planning Criteria v19 & Planning Assessment Practices v6

- Sectionalizing Guidelines
  - Developed with distribution providers early in ATC’s history
Planning Criteria & Assessment Practices Updates

• Planning Criteria v19
  – Added non-BES facilities in some parts of section 1.1.6 General Steady State Performance Criteria
  – Added section 1.6 Generating Facility Power Factor and Voltage Regulation

• Planning Assessment Practices v6
  – Added section 6 Facility Condition Methodology
  – Added section 13.7 Other ATC Interconnection Studies and Considerations
  – Added text to section 13.6.1 Generator Interconnection Studies regarding dispatch modeling assumptions, power factor and voltage schedule
2018 Studies and Assumptions

• Preliminary 2017 Load Forecast Confirmation and MTEP18 Support Studies

• Modeling Assumptions
  – Model Years
  – Load
  – Generation
  – No Load Loss Allowed Contingency Analysis

• Additional Studies
Preliminary Load Forecast and MTEP18 Support Studies

• Initial screening (reduced generator reactive capability)
  – Summer peak (5 and 10 year models)
  – 2017 load forecast
  – 2017 TYA outside world (2016 MMWG cases)

• To confirm 2017 Load Forecast and support MTEP18 database development
  – No load loss allowed contingencies
  – Completed July 2017
Projects Submitted to MTEP18

- MTEP18 Active Project List
2018 TYA Model Years

- 2018 (As-planned)
- 2019
- 2023
- 2028

- All models will likely be completed by the Spring of 2018
Load - Historical

• Requested September 27, 2017
  – Summer peak
  – Winter peak
  – Light load
  – Shoulder load

• Receive November 1, 2017

• Add to databases
Load – Expected Forecast

• Requested LDC forecasts February 2017
  – 11 years
  – Consistent with resource planning forecast
  – Considered expected (50/50 probability)

• Received in April 2017

• ATC compiles
  – Comparisons to previous forecasts
  – Differences confirmed with LDCs
  – Finalized copy to LDCs – August 2017
  – Forecasted load is what the system is planned for
Load Forecast Trends

ATC System Peak Demand Forecast Comparison

Note: ATC peak data series prior to 2001 is estimated using ATC Top 5 customers' peaks and applying a typical diversity factor.

The "reconciled" forecast adjusts the LSE forecasts downward by 169 MW to account for load "netted" in the historic data but "load only" in the forecasts. This is done for comparative purposes only.
## Load Forecast Trends, Continued

<table>
<thead>
<tr>
<th>Model</th>
<th>ATC Load (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2016 Assessment</td>
</tr>
<tr>
<td>Year 1 Summer Peak</td>
<td>13,400</td>
</tr>
<tr>
<td>Year 5 Summer Peak</td>
<td>+300</td>
</tr>
<tr>
<td>Year 10 Summer Peak</td>
<td>+700</td>
</tr>
<tr>
<td>Year 5 Shoulder</td>
<td>9,800</td>
</tr>
<tr>
<td>Year 10 Shoulder</td>
<td>+300</td>
</tr>
</tbody>
</table>
Generation Modeling

- **Existing generator data**
  - Annual updates requested from GOs in Q3 of each year

- **Generation additions**
  - Only add generators with signed interconnection agreements
  - Additions modeled at MISO Facility study location

- **Generation retirements**
  - Generators with a completed MISO Attachment Y are modeled as retired, unless there is an SSR agreement

- **Intact system and outage conditions**
  - Maintain voltage criteria for
    - 90% maximum generator reactive power output
    - 90% minimum generator reactive power consumption
Generation Dispatch

• **Local Balancing Area merit order dispatch:**
  – Used for Assessment summer peak and shoulder models. Local Balancing Area dispatch from merit order provided by LBA

• **ATC-wide merit order dispatch:**
  – Minimum load models
  – ATC-wide merit order dispatch determined with PROMOD

• **Generators without scheduled transactions:**
  – If signed IA, generation included in the host Local Balancing Area.
No Load Loss Allowed Contingency Analysis

• **Peak**
  – 1, 5, and 10 year out models

• **Shoulder (firm)**
  – 5 and 10 year out models
  – 70% load except for Zone 2 (90% load) and northern Zone 4 (80% load)
  – Shoulder rating methodology

• **Minimum load**
  – 1 and 5 year out model
  – 40% load
Additional Network Planning Studies

• Load Loss Allowed

• Existing Generator Stability Reviews

• Annual Fault Study

• High Bias Study
  – Identify next few limiters
  – Just informational
Other Solution Considerations

• Preliminary process developing with our stakeholders

• Two ways process can be initiated
  – Need initiated by local distribution provider
    • Identify T or D related reliability/service concerns
    • Develop needs and solutions
    • Communicate with ATC to promote collaboration
      – Use existing D-T or G-T processes
  – Need initiated by ATC
    • 10-Year Assessment screening – develop Needs/Limitations lists
    • Customers/stakeholders engage ATC with ideas
    • Collaborate to identify possible DER options from customers
    • Open project development discussions
    • Use modified BVP practices to balance comparison of appropriate alternatives
# Needs Table Example (Sample)

<table>
<thead>
<tr>
<th>Model</th>
<th>Planning Zone</th>
<th>Monitored Facility</th>
<th>Category</th>
<th>% of Facility Rating</th>
<th>% of Nominal Bus Voltage</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2023 Peak</td>
<td>5</td>
<td>Port Washington - Saukville 138-kV line 742</td>
<td>P12</td>
<td>101.3%</td>
<td>--</td>
<td>2021 Port Washington - Saukville: Rebuild Line 762 to a double circuit</td>
</tr>
<tr>
<td>2023 Peak</td>
<td>3</td>
<td>Portage - Columbia 138-kV line X-13</td>
<td>P12</td>
<td>103.3%</td>
<td>--</td>
<td>Transitional Rating until 2023 Cardinal - Hickory Creek 345-kV line construction</td>
</tr>
<tr>
<td>2023 Peak</td>
<td>4</td>
<td>Plymouth 4 138-kV Bus</td>
<td>P21</td>
<td>--</td>
<td>78%</td>
<td>Holland Substation, UVLS Relaying Addition</td>
</tr>
<tr>
<td>2023 Peak</td>
<td>4</td>
<td>Howards Grove 138-kV Bus</td>
<td>P21</td>
<td>--</td>
<td>81%</td>
<td>Holland Substation, UVLS Relaying Addition</td>
</tr>
<tr>
<td>2028 Peak</td>
<td>5</td>
<td>Port Washington - Saukville 138-kV line 752</td>
<td>P12</td>
<td>100.8%</td>
<td>--</td>
<td>2021 Port Washington - Saukville: Rebuild Line 762 to a double circuit</td>
</tr>
<tr>
<td>2028 Peak</td>
<td>5</td>
<td>Charter Industrial 138-kV Bus</td>
<td>P21</td>
<td>--</td>
<td>68%</td>
<td>Holland Substation, UVLS Relaying Addition</td>
</tr>
<tr>
<td>2028 Peak</td>
<td>4</td>
<td>Holland 138-kV Bus</td>
<td>P21</td>
<td>--</td>
<td>73%</td>
<td>Holland Substation, UVLS Relaying Addition</td>
</tr>
</tbody>
</table>
Regional Planning

• MTEP
  – Preliminary screening helps ATC to better prepare for upcoming MTEP cycle

• MISO Coordinated Seasonal Assessments
• ERAG/MMWG Seasonal Assessments
• RF Seasonal Assessments
Public Policy Requirements

• Following MISO Tariff (Attachment FF) Processes

• Previously identified requirements
  – State Renewable Portfolio Standard (RPS) mandates
  – EPA regulations
  – State mandates and goals for energy efficiency (EE) and demand side management (DSM) programs

• Any public policy requirements not identified in ATC or MISO processes?
Schedule

• Expected Load Forecast – Done
• Criteria and Methodology Update – Done
• Preliminary MTEP18 Support Study – Done
• Post 2018 TYA Preliminary Study Design – Done
• Stakeholder Study Design Meeting – October 24, 2017
• Stakeholder Design Comments Due – December 1, 2017
• Study Design Completion – December 2017
• Model Development Completion – March 2018
• Preliminary Needs Meeting – March 1, 2018
• Preliminary Solutions Meeting – May 3, 2018
• Document and Publish – September 2018
Thank you for Participating

To provide solicited comments or for more information, please contact

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By December 1, 2017