Helping to keep the lights on, businesses running and communities strong.

2017 10-Year Assessment
Preliminary Study Design

November 2, 2016

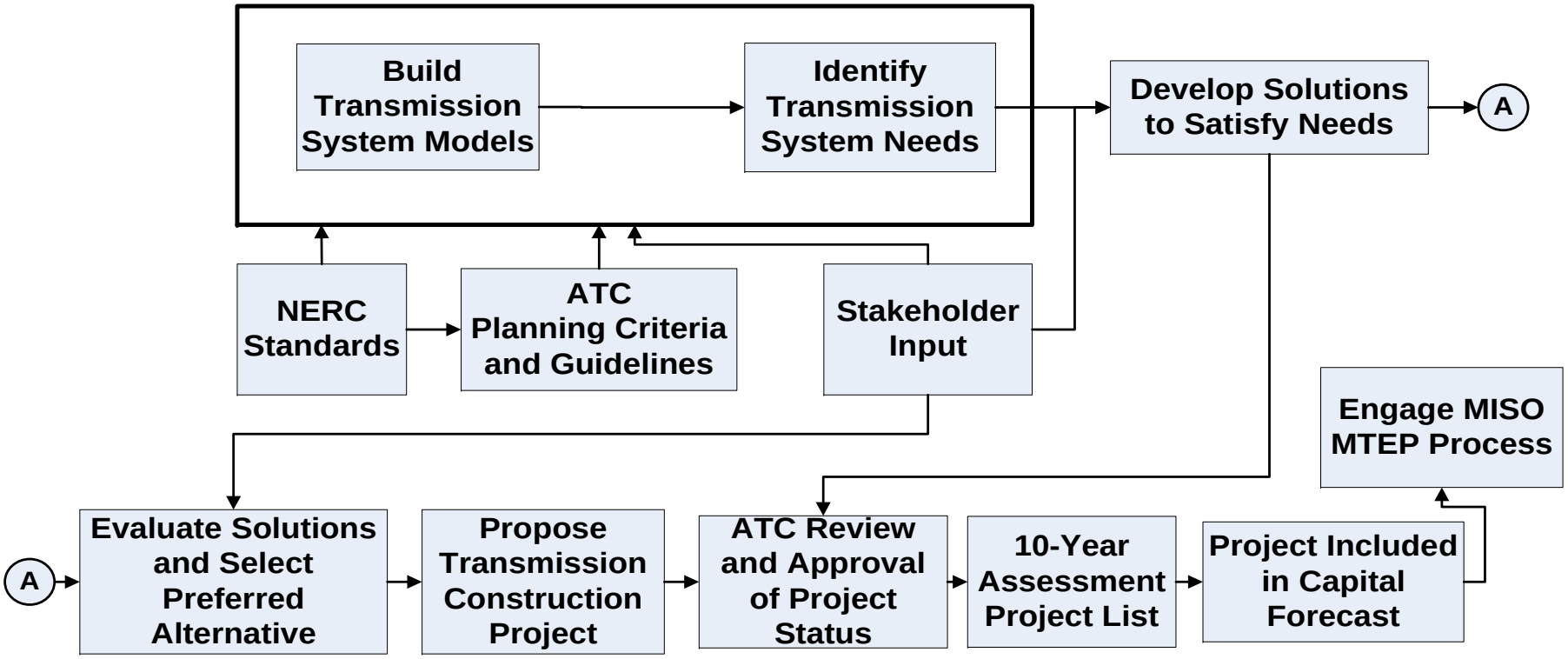
Stakeholder and Customer Webcast

atcllc.com

Purpose

- Solicit Study Design Input
  - 2017 Assessment Process
  - 2017 Assessment Assumptions
  - Public Policy Requirements
- Project List Update Proposal

ATC Transmission Planning Process



Project Status

Strategic

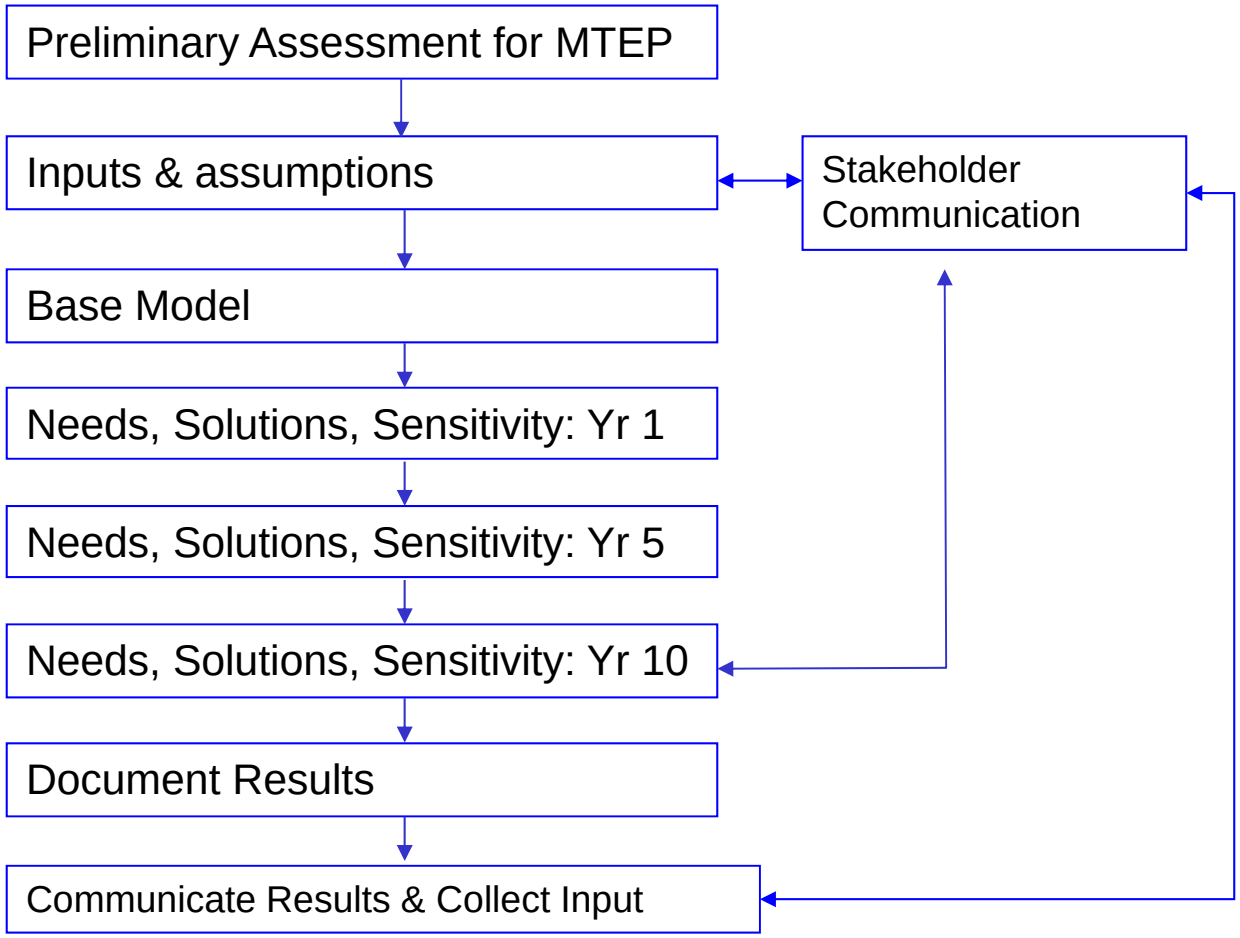
Provisional

Proposed

Planned

In-Service

Assessment Process



Planning Criteria & Assessment Practices

- NERC Standards, particularly TPL-001, version 4
- ATC Planning Criteria/Assessment Practices
  - http://www.atc10yearplan.com (About tab)
  - To be updated after the November FERC audit

Public Policy Requirements

- Following 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
- For the 2017 10-Year Assessment, assessing combined impacts using:
  - Expected load forecasts from LSEs
  - Confirmed generation additions
  - Confirmed generation retirements
  - Multiple year analysis over a range load levels
    - Minimum
    - Shoulder
    - Peak
    - High Load Sensitivity
- Any public policy driven needs that may not be covered by the Assessment process?

Model Years

- 2017 (As-planned)
- 2018
- 2022
- 2027

- All models will likely be completed by the Spring of 2017

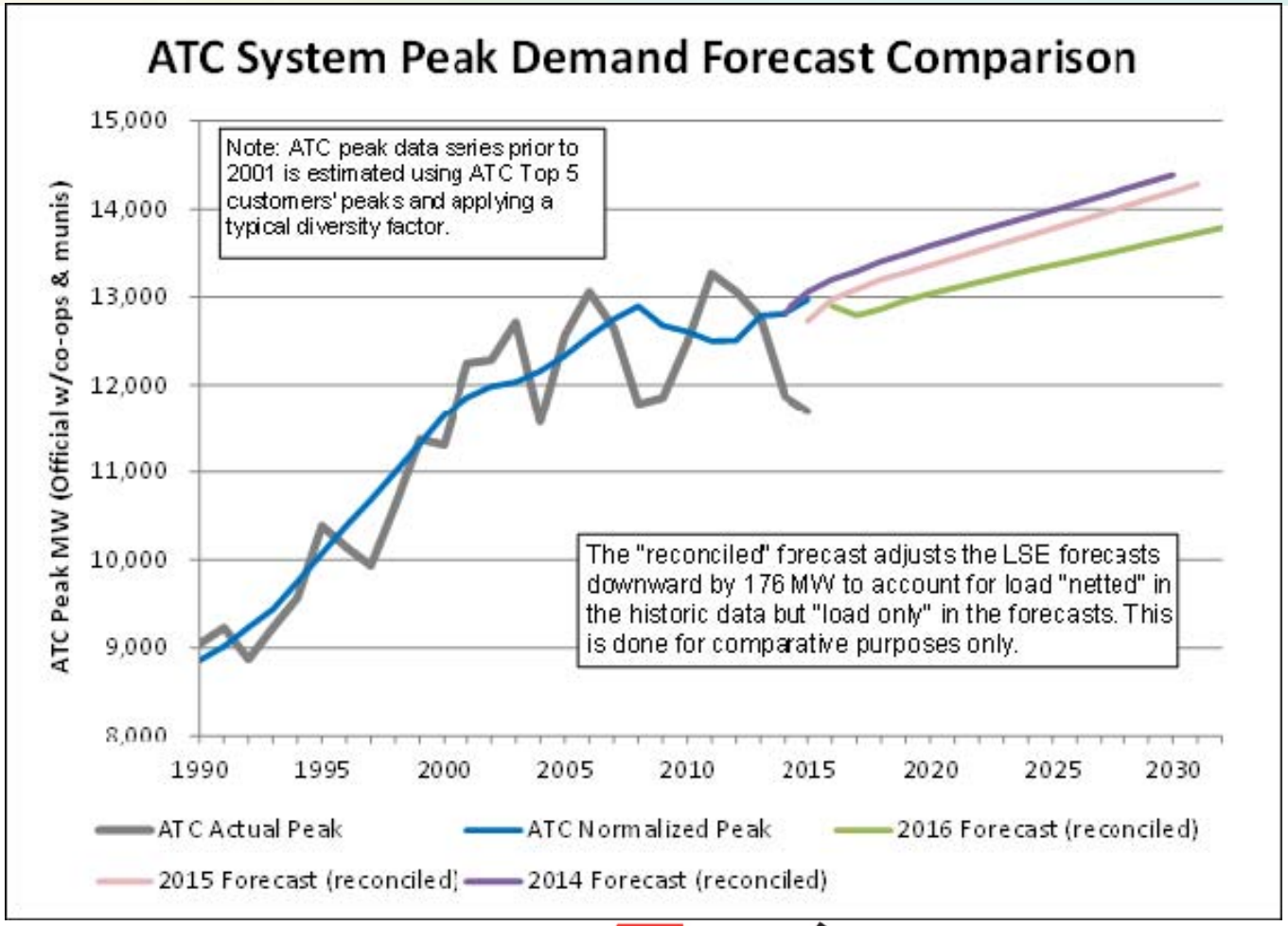
Load - Historical

- Requested September 28, 2016
  - Summer peak
  - Winter peak
  - Light load
  - Shoulder load
- Receive November 1, 2016
- Add to databases

Load – Expected Forecast

- Requested LDC forecasts February 2016
  - 11 years
  - Consistent with resource planning forecast
  - Considered expected (50/50 probability)
- Received in April 2016
- ATC compiles
  - Comparisons to previous forecasts
  - Differences confirmed with LDCs
  - Finalized copy to LDCs – September 2016
  - Forecasted load is what the system is planned for

Load Forecast Trends



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
  - MISO queue suspended generators with signed IAs
    - included in after 18 months
- Generation retirements
  - generators with a completed MISO Attachment Y are modeled as retired, unless there is an SSR agreement

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.
- Wind Farms
  - Align with MISO MTEP models:
    - Peak: 16%
    - Off-peak: 40%
  - Historical
    - Peak: ~25%
    - Off-Peak
      - Shoulder: ~30%
      - Minimum: ~35%

Reactive Power Resources

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

2017 Assessment – Capital Project Drivers

- Preliminary MTEP 17 Support Studies
- No Load Loss Contingency Needs – 3 years
- Multiple Outage Screening
- Generation - Transmission Studies
- Distribution - Transmission Studies
- Economic Benefits Studies
- Regional Reliability
- Public Policy Requirements, part of studies above
- Asset Renewal Studies

Preliminary MTEP17 Support Studies

- Initial screening (reduced generator reactive capability)
  - Summer peak (5 and 10 year models)
  - 2016 load forecast
  - 2016 TYA outside world (2015 MMWG cases)

- To support MTEP17 database development
  - No load loss allowed contingencies
  - Completed August 2016

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

Sensitivities

- Load Forecast – 90/10
- High W-E Bias Flows Scenario?
  - Future wind farms to the west in MISO DPP Cycle
  - Bias system to approximate potential wind locations?
  - ATC import level?
  - W-E bias level through ATC?
  - MUST or TARA type analysis?

Project List Updates – Before Next Annual

- Why?
  - Address changing needs quicker for new or changed projects
  - Keep 10-Year Assessment aligned with MTEP process
- Process
  - After annual update, before end of Q4 or Q1
  - New or revised Project Request (PR) is the trigger
  - AIM PR approval if needed
  - Manager PR and MTEP project approval
  - Collect until one month before quarter end
  - Present potential list to AIM
  - Post on 10-Year Assessment website
  - Send notice to stakeholders soliciting comments
  - Submit additions to MTEP before quarter end
- Types of Projects
  - Mostly D-T
  - Generally small projects
- When? Q4 2016?

Schedule

- Expected Load Forecast – October 2016
- Criteria and Methodology Update – November 2016
- Preliminary MTEP17 Support Study – Done
- Posted 2017 TYA Preliminary Study Design – November 2016
- Stakeholder Study Design Meeting – November 2, 2016
- Stakeholder Design Comments Due – December 1, 2016
- Study Design Completion – December 2016
- Model Development Completion – March 2017
- Preliminary Needs Meeting – February 2017
- Preliminary Solutions Meeting – April 2017
- Document and Publish – September 2017

Thank you for Participating

To provide solicited comments or for more information, please contact

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By December 1, 2016