SRRTEP Meeting – 2023 Assumptions for Exelon Utilities

December 14, 2022 – Mid-Atlantic
December 16, 2022 – West

Agenda

1. Base Case Power Flow Model
2. Baseline Analysis
3. FERC 715 Analysis
4. Supplemental Project Drivers
5. Asset Management Guidelines and Practices
6. Retirement of Existing Facilities

Base Case Power Flow Model

- **Use PJM developed RTEP power flow models for all assessments if available**
  - Updated with latest information including updated project status and distribution load profiles, etc.
- **Use most recent ERAG MMWG series power flow models if PJM RTEP cases not available**
- **Loads will be modeled consistently with the 2023 PJM Load Forecast Report**

Baseline Analysis

- **All Exelon utilities study their respective transmission systems to identify the need for baseline reliability upgrades:**
  - NERC Planning Criteria
  - PJM Criteria (Manual 14B)
  - Exelon Utilities' FERC Form 715 Planning Criteria
- **Exelon utilities work with PJM to analyze and validate results**
- **Potential violations are included in a PJM Open Window per schedule 6 of the PJM Operating Agreement**
- **Proposed solutions are presented at TEAC or Sub-Regional RTEP and, once confirmed, become baseline projects**
- **All applicable cases, analysis files and available results can be made accessible through PJM's CEII process.**

FERC Form 715 Planning Criteria

- There have been no Exelon Utility Planning Criteria changes from the March 2021 FERC Form 715 annual submittal
- The specific details of the Planning Criteria established for the Exelon Utilities can be found through the following link.

Exelon Utilities Planning Criteria

- Exelon Utilities' Transmission Planning Criteria compliments PJM planning criteria detailed in attachments D and G of Manual 14B
- Exelon Utilities specific planning criteria include: contingency analysis on lower voltage transmission facilities, additional 90/10 load analysis studies, additional voltage recovery and stability studies, and the system impacts due to the variability of wind generation.

Supplemental Project Drivers

#	Driver	Definition
1	**Equipment Material Condition, Performance and Risk**	Degraded equipment performance, material condition, obsolescence, equipment failure, employee and public safety and environmental impact.
2	**Operational Flexibility and Efficiency**	Optimizing system configuration, equipment duty cycles and restoration capability, minimize outages.
3	**Infrastructure Resilience**	Improve system ability to anticipate, absorb, adapt to, and/or rapidly recover from a potentially disruptive event, including severe weather, geo-magnetic disturbances, physical and cyber security challenges, critical infrastructure reduction.
4	**Customer Service**	Service to new and existing customers. Interconnect new customer load. Address customer transmission & distribution load growth, outage exposure, and equipment loading.
5	**Other**	Meet objectives not included in other definitions including: industry recommendations, potential generation retirements, technological pilot projects, and governmental / utility commission regulations, & State policy goals.

Drivers: Equipment Material Condition, Performance and Risk

- **Equipment Material Condition, Performance and Risk:**
  Degraded equipment performance, material condition, obsolescence, equipment failure, employee and public safety and environmental impact

- **Refer to EU Asset Management Guidelines & Practices**
  Identify and make the needed investments to ensure the safe and reliable operation of the transmission system. These decisions can be based on equipment performance, obsolescence and expected service life concerns, condition of equipment, reliability impact, increased maintenance costs, and engineering recommendations.

- **Project drivers can include:**
  - Employee and public safety
  - Transmission infrastructure replacements (EOL/condition/obsolescence) that are consistent with efficient asset management decisions
  - Programmatic review and/or replacement of breakers, relays, wood poles, etc.
  - Environmental drivers
  - Supply Strategy guidance resulting in standard conductor sizes and other standard equipment
  - Building new facilities giving consideration for future higher voltage conversion
  - Eliminating 69kV in areas with dense load pockets, stranded load, or where there have been capacity and reliability performance issues
  - Facility Relocation

Drivers: Operational Flexibility and Efficiency

- **Operational Flexibility and Efficiency:**
  Optimizing system configuration, equipment duty cycles and restoration capability, minimize outages

  Planning teams coordinate with Operations to identify needed improvements on the transmission system that will provide for improved operating flexibility. These projects can reduce the impact and limit exposure to our customers for planned or forced events and can facilitate improved restoration times. These projects can opportunistically bring the system up to current standards and design principals.

- **Project drivers can include:**
  - Internal and/or regulatory recommended design guidelines or standards
  - Enhancing system functionality, flexibility, visibility, or operability
  - Removal of existing SPS/RAS/LPS
  - Networking existing radial facilities
  - Diversifying multiple radial circuits on the same structures from the same sources
  - Limiting the number of taps on a transmission line
  - Increasing system capacity
  - Remedy recurring operational problems
  - Provide Operations more options to deal with non-standard operating conditions
  - Eliminating three terminal line configurations

Drivers: Infrastructure Resilience

- **Infrastructure Resilience:**
  Improve system ability to anticipate, absorb, adapt to, and/or rapidly recover from a potentially disruptive event, including severe weather, geo-magnetic disturbances, physical and cyber security challenges, critical infrastructure reduction

  Improving the resilience of the system is an important consideration in the design of the transmission system and these projects are designed to reduce the impact to our customers for disruptive natural or man-made events. These projects can also improve the operability of the system and will reduce customer exposure.

- **Project drivers can include:**
  - Resiliency enhancements
  - Regulatory recommendations and/or requirements
  - Network existing radial facilities
  - Diversify multiple radial circuits on the same structures from the same sources
  - Limit the number of taps on a transmission line
  - Building new facilities giving consideration for future higher voltage conversion
  - Eliminating 69kV in areas with dense load pockets, stranded load, or where there have been capacity and reliability performance issues

Drivers: Customer Service

- **Customer Service:**
  Service to new and existing customers. Interconnect new customer load. Address Transmission & Distribution load growth, customer outage exposure, equipment loading

  Projects that accommodate new, increasing, or future load so that the system can reliably address customer needs. Also includes improvements to facilities that serve our customers.

- **Project drivers can include:**
  - Transmission System configuration changes due to new or expansion of existing distribution substations
  - New customer interconnections or modification to an existing customer
  - Building to support future economic growth

- **Refer to Exelon Utilities Technical Standards for each TO:**

Drivers: Other

- **Other:**
  Meet objectives not included in other definitions

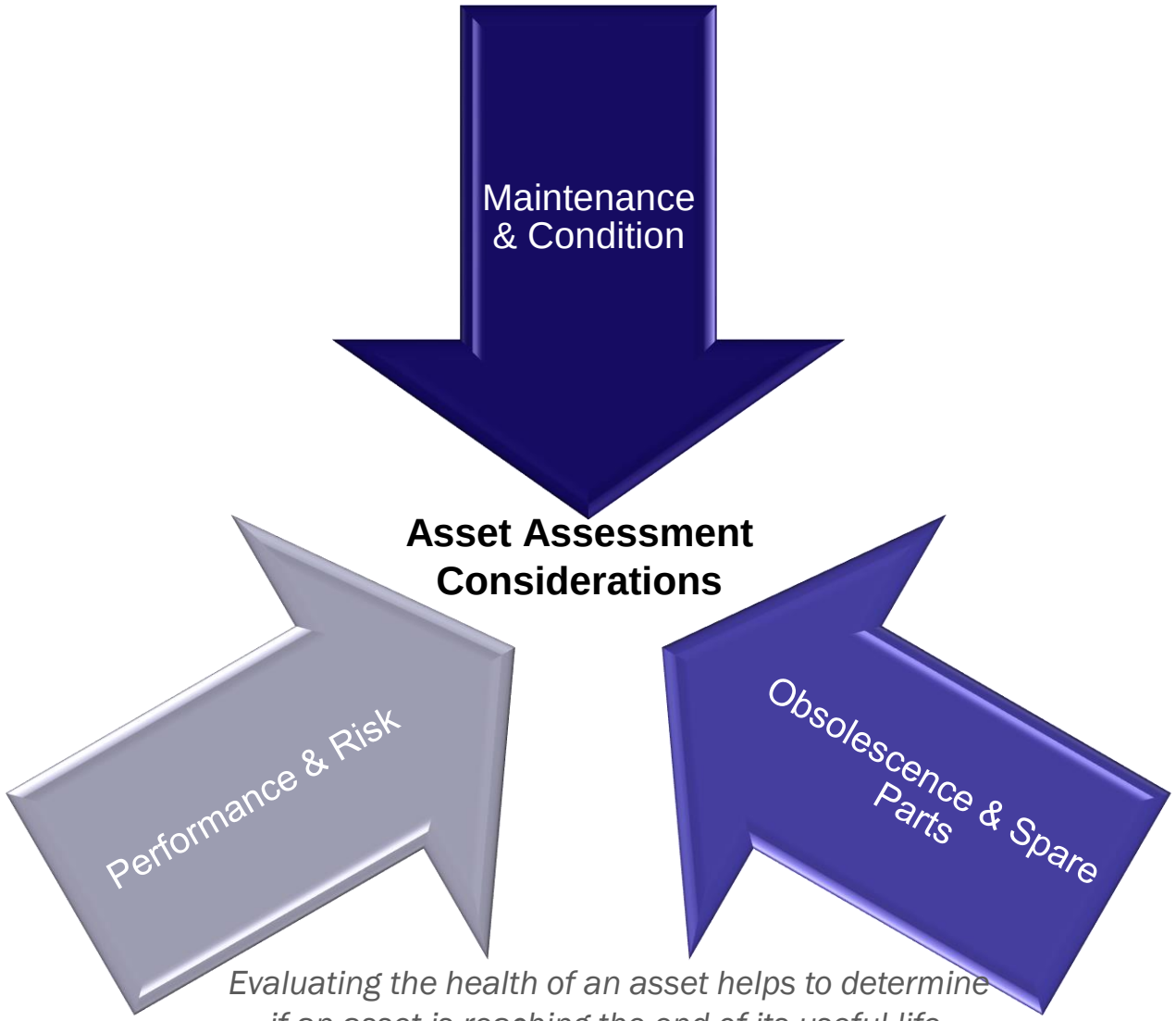
  Projects that accommodate new, increasing, or future load so that the system can reliably address customer needs. Also includes improvements to facilities that serve our customers.

- **Project drivers can include:**
  - Industry recommendations
  - Potential generation retirements
  - Technological pilot projects
  - Governmental / Utility Commission Regulations
  - State policy goals such as such as clean energy and transportation electrification etc.
  - Others

Exelon Utilities Asset Management Guidelines & Practices

Asset Management Supports Reliability

- **Asset management activities considers the point at which infrastructure will or is at risk of failing based on various contributing factors.**
- **The replacement of an asset that is near or at the end of its useful life provides for the following benefits**
  - Maintains and improves the safety and reliability of the bulk electric system
  - Reduces outage duration and frequency which improves service to customers
  - Improves operations by increasing system flexibility
- **The Asset Management Replacement Process provides for a holistic approach of identifying EOL needs and solutions, taking into account other system drivers.**



Evaluating the health of an asset helps to determine if an asset is reaching the end of its useful life.

Asset Replacement Process

Asset Health

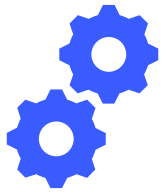
Condition

History

Risk

Obsolescence

Safety



Additional Needs Identification

Customer Service

Operational Flexibility & Efficiency

Resilience

Other

Solution Determination

Multi-driver considerations

Engineering

Design Standards

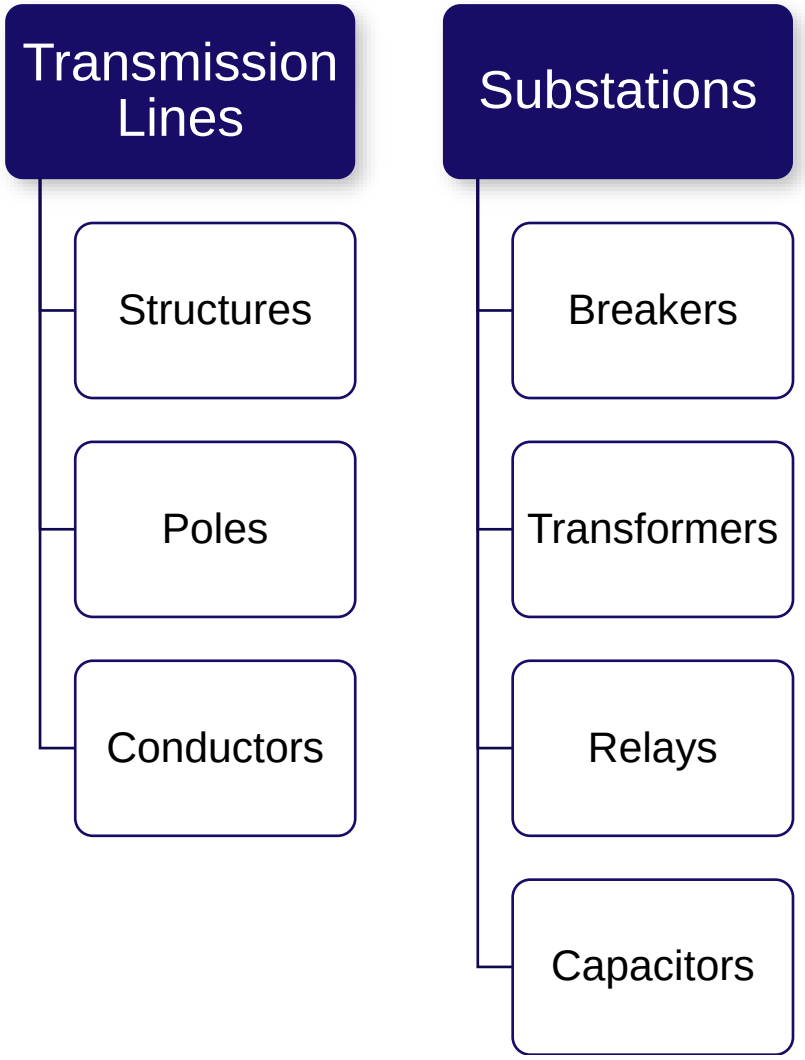
Cost Effectiveness

Project Scheduling

Asset Replacement Considerations

- **Asset management decisions are driven by asset condition, maintenance, operational improvements, obsolescence/spare part availability, cost effectiveness, outage impacts, geography, safety, and other factors**
- Transmission facility replacement is an asset management decision made by utilities based on good engineering judgement, taking into account safety, reliability, risk, impact, and customer concerns
- Refer to Exelon Utilities Asset Management Guidelines and Practices document found here

Major Types of Assets Considered



Retirement of Existing Facilities

Statement:

The purpose of transmission planning is to ensure that the capacity of the existing transmission system is maintained or expanded as needed to ensure the reliability, efficiency, safety, resilience and security of the transmission system for the benefit of customers. There are no national, regional or local standards or criteria driving the retirement and not replacement of existing facilities. Although in specific situations, facilities may be removed and not replaced as dictated by system and/or customer needs, or the design and construction of new or replacement transmission projects, decisions to not replace individual facilities may have the cumulative effect of negatively impacting the reliability, efficiency, safety, resilience and security of the transmission system. That cumulative negative impact could also drive the need for additional facilities to be constructed to compensate for those removed, including greenfield installations. Accordingly, existing facilities are maintained in service or retired based on Good Utility Practice.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