# SERTP - 1st Quarter Meeting

*First RPSG Meeting & Interactive Training Session*

March 19th, 2024

# Agenda

- **Safety**
- **2024 SERTP Process Overview**
- **Form the "RPSG"**
  - Regional Planning Stakeholders Group
  - Committee Structure & Requirements
- **Economic Planning Studies**
  - Review Requested Sensitivities for 2024
  - RPSG to Select up to Five Economic Planning Studies
- **Interactive Training Session**
  - Model Development– Duke
- **Miscellaneous**
  - Public Policy Requirement Stakeholder Requests
- **Next Meeting Activities**

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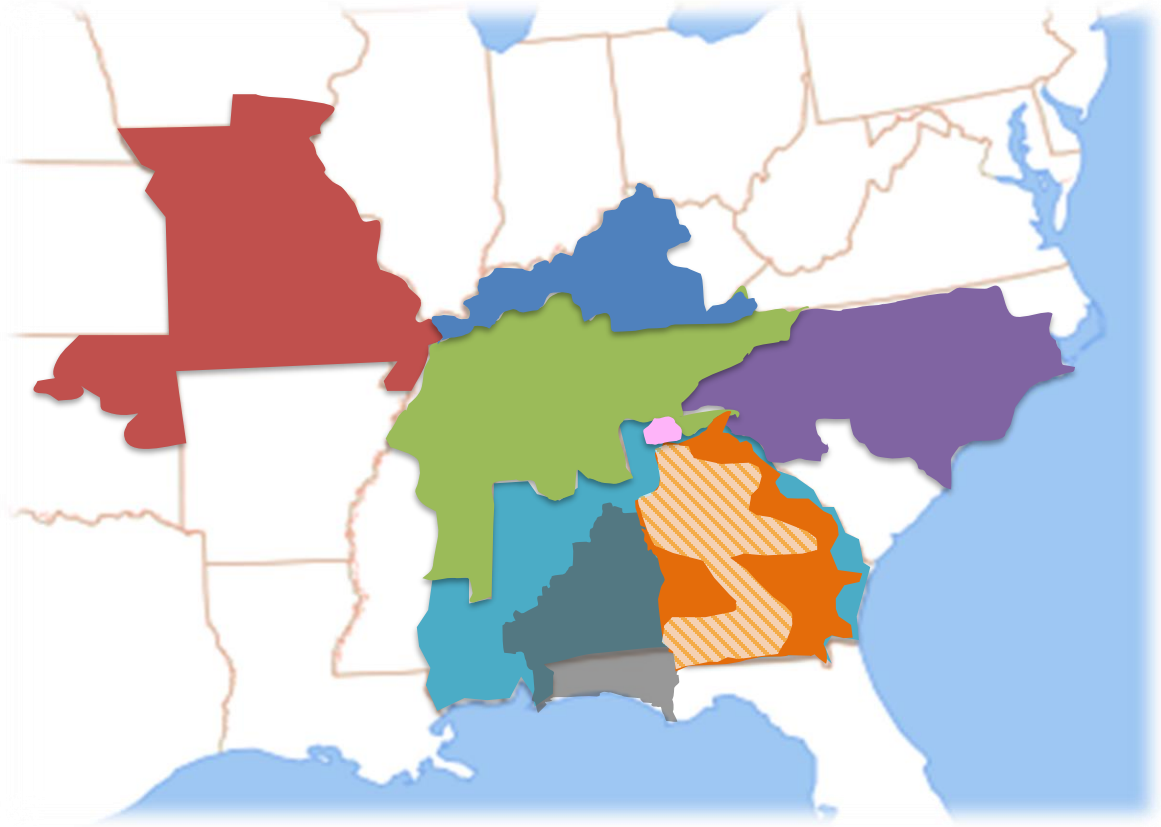
# 2024 SERTP Process Overview

# Process Information

- The SERTP process is a transmission planning process.
- Please contact the respective transmission provider for questions related to real-time operations or Open Access Transmission Tariff (OATT) transmission service.
- SERTP Website Address:
  - www.southeasternrtp.com

# Southeastern Regional Transmission Planning (SERTP)



**SERTP**

- Associated Electric Cooperative Inc.
- Dalton Utilities
- Duke Energy
- Georgia Transmission
- LG&E KU
- MEAG Power
- PowerSouth Energy Cooperative
- Southern Company
- TVA

# Upcoming 2024 SERTP Process

- **SERTP 1st Quarter – *1st RPSG Meeting & Interactive Training Session***

  **March 19th, 2024 – Charlotte, NC**

  – Form RPSG
  – Select Economic Planning Studies
  – Interactive Training Session

- **SERTP 2nd Quarter – *Preliminary Expansion Plan Meeting***

  **June 27th, 2024 – Louisville, KY**

  – Review Modeling Assumptions
  – Preliminary 10-Year Expansion Plan
  – Stakeholder Input & Feedback Regarding the Plan

# Upcoming 2024 SERTP Process

- **SERTP 3rd Quarter – *2nd RPSG Meeting***

  **September 2024 - Virtual**

  – Preliminary Results of the Economic Studies
  – Stakeholder Input & Feedback Regarding the Study Results
  – Discuss Previous Stakeholder Input on the Expansion Plan

- **SERTP 4th Quarter – *Annual Transmission Planning Summit & Input Assumptions***

  **December 2024 – Atlanta, GA**

  – Final Results of the Economic Studies
  – Regional Transmission Plan
  – Regional Analyses
  – Stakeholder Input on the 2025 Transmission Model Input Assumptions

## SERTP

# Regional Planning Stakeholder Group (RPSG)

# The SERTP Stakeholder Group

- RPSG – Regional Planning Stakeholder Group
- Serves Two Primary Purposes
  1) The RPSG is charged with determining and proposing up to five (5) Economic Planning Studies on an annual basis
  2) The RPSG serves as stakeholder representatives for the eight (8) industry sectors in interactions with the SERTP Sponsors

# RPSG Committee Structure

## RPSG Sector Representation

1. Transmission Owners / Operators
2. Transmission Service Customers
3. Cooperative Utilities
4. Municipal Utilities
5. Power Marketers
6. Generation Owner / Developers
7. Independent System Operators (ISOs) / Regional Transmission Operators (RTOs)
8. Demand Side Management / Demand Side Response

# RPSG Committee Structure

- Sector Representation Requirements
  - Maximum of two (2) representatives per sector
  - Maximum of sixteen (16) total sector members
  - A single company, and all of its affiliates, subsidiaries, and parent company, is limited to participating in a single sector

# RPSG Committee Structure

- Annual Reformation
  - Reformed annually at 1st Quarter Meeting
  - Sector members elected for a term of approximately one year
  - Term ends at start of following year's 1st Quarter SERTP Meeting
  - Sector Members shall be elected by the Stakeholders present at the 1st Quarter Meeting
  - Sector Members may serve consecutive, one-year terms if elected
  - No limit on the number of terms that a Sector Member may serve

# RPSG Committee Structure

- Simple Majority Voting
  - RPSG decision-making that will be recognized by the Transmission Provider for purposes of Attachment K shall be those authorized by a simple majority vote by then-current Sector Members
  - Voting by written proxy is allowed

# RPSG Formation

- 2022 SERTP RPSG Sector Members
- 2023 SERTP RPSG Sector Members
- 2024 SERTP RPSG Sector Members

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# Economic Planning Studies

# Economic Planning Study Process

- RSPG selects the Economic Studies in the 1st Quarter Meeting
- These studies represent analyses of hypothetical scenarios requested by the stakeholders and do not represent an actual transmission need or commitment to build
- Scoping Meeting typically held in April/May
- SERTP Sponsors identify the transmission requirements needed to move large amounts of power above and beyond existing long-term, firm transmission service commitments
  - Analysis is consistent with NERC standards and company-specific planning criteria
- Selected Economic Study Request Reports are posted on the SERTP Website in the General Documents section of the Reference Library tab

# SERTP Regional Models

- SERTP will develop 6 regional models
- Models include latest transmission planning model information within the SERTP region
- Will be available on the Secure Area of the SERTP website.

| No. | Season | Year |
|---|---|---|
| 1 | Summer | 2026 |
| 2 | | 2029 |
| 3 | | 2034 |
| 4 | Shoulder | 2029 |
| 5 | Winter | 2029 |
| 6 | | 2034 |

# RPSG Selected List of Economic Study Requests

- 2022 Economic Planning Studies
- 2023 Economic Planning Studies
- 2024 Economic Planning Studies

# SERTP – 1st Quarter Meeting Interactive Training Session

## *Model Development*

# Power Flow Modeling Basics

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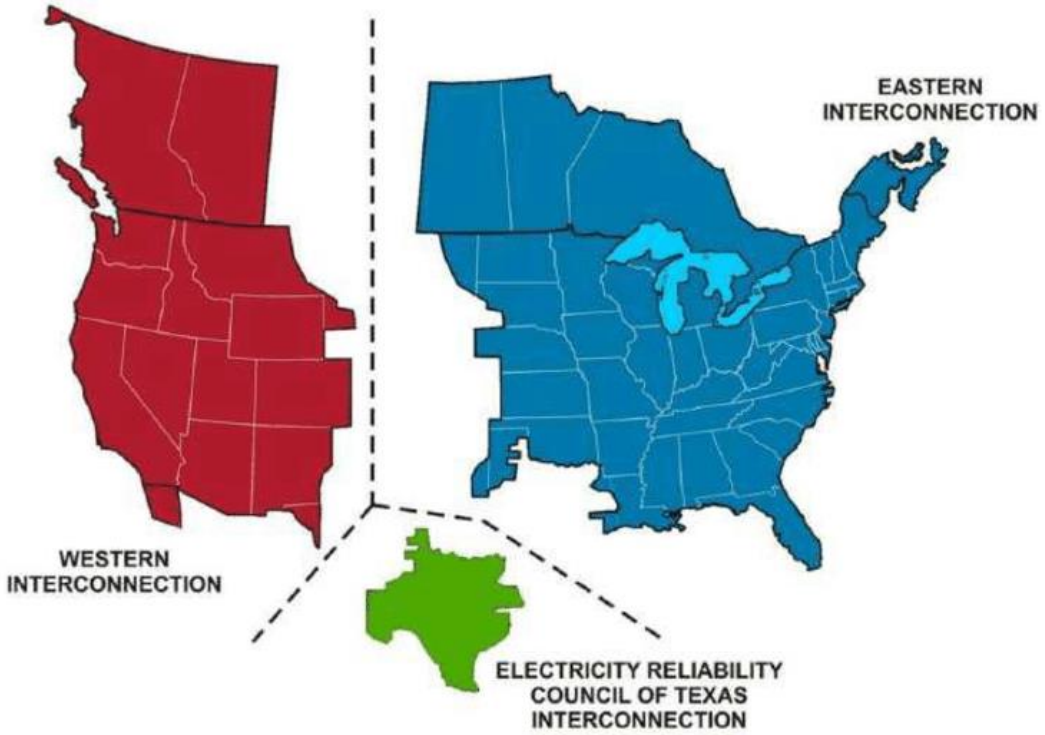
# What are Power Flow Models




- Power Flow models (also called cases) are a mathematical representation of the Bulk Electric System and consist of detailed information for each transmission element.
- Used to simulate and analyze the flow of electrical power through a transmission network.
- Models are broken down into Areas and Zones to represent individual Balancing Authority Areas and Companies.

## Fun Facts

- The Eastern Interconnection is the largest power system in the world.
- There are over 130,000 substations modeled for the Eastern Interconnection.
- The models include transmission voltages from 46 kV to 765 kV.
- To solve a power flow model requires thousands of simultaneous equations.

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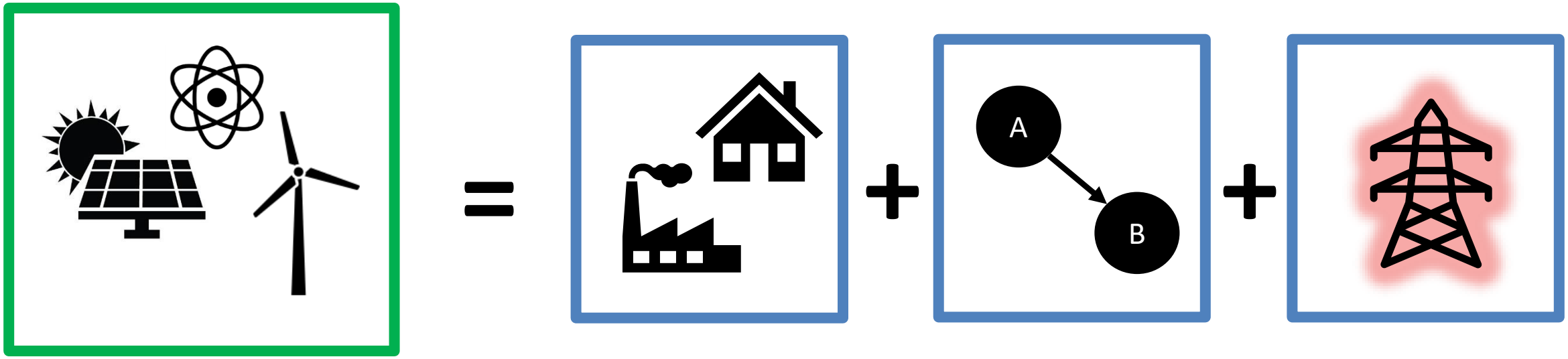
# How are Power Flow Models Used

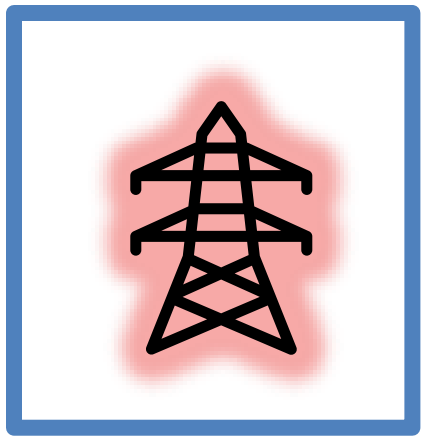
- **Assessing System Capacity and Reliability:** Power flow models are crucial for evaluating the capacity of the transmission system to handle various load scenarios, ensuring that the system can meet demand under both normal and contingency conditions without violating thermal or voltage limits.
- **Simulating Power System Operation:** Used to simulate how electricity flows through the power grid under different operating conditions, allowing planners to understand the behavior of the system and manage the routing of electricity to ensure efficient and reliable operation.
- **Long-Term Infrastructure Planning:** These models help in forecasting future needs for infrastructure investments such as new lines, transformers, or upgrades to existing facilities by testing how the system will perform with projected increases in demand or changes in generation assumptions.
- **Contingency Analysis:** Transmission planning involves analyzing "what if" scenarios, such as the loss of key system components due to faults or maintenance. Power flow models are used to predict the impact of these scenarios on system thermal loading, voltage, stability and to design appropriate mitigation strategies.
- **Enabling Generation Fleet Transition:** With the growing penetration of variable renewable energy sources, power flow models help in planning for the integration of these and other types of resources by studying their impact on power system dynamics, voltage stability, and the need for additional transmission or ancillary services.

# Power Flow Modeling: Fundamental Equation

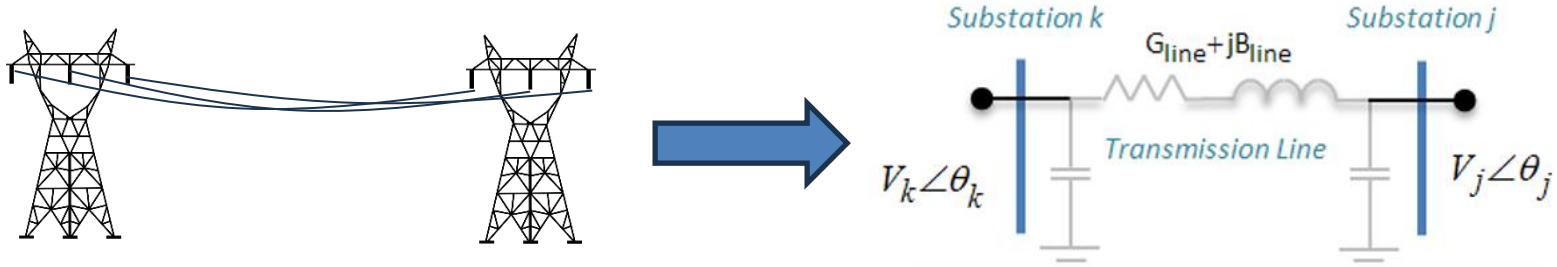



Generation = Load + Interchange + Losses

# Power Flow Model Inputs: Topology

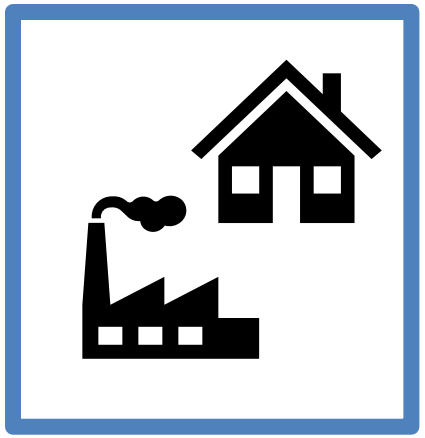


- Transmission topology refers to the configuration and interconnectivity of power lines, substations, and other infrastructure that facilitate the high-voltage transmission of electricity across the grid from generation plants to distribution networks.
- Key components in the model are:
  - Substations (aka “busses” or “nodes”)
  - Transmission Lines and Transformers
  - Load Models
  - Generators
  - Equipment such as Capacitor Banks, Static VAR Compensation

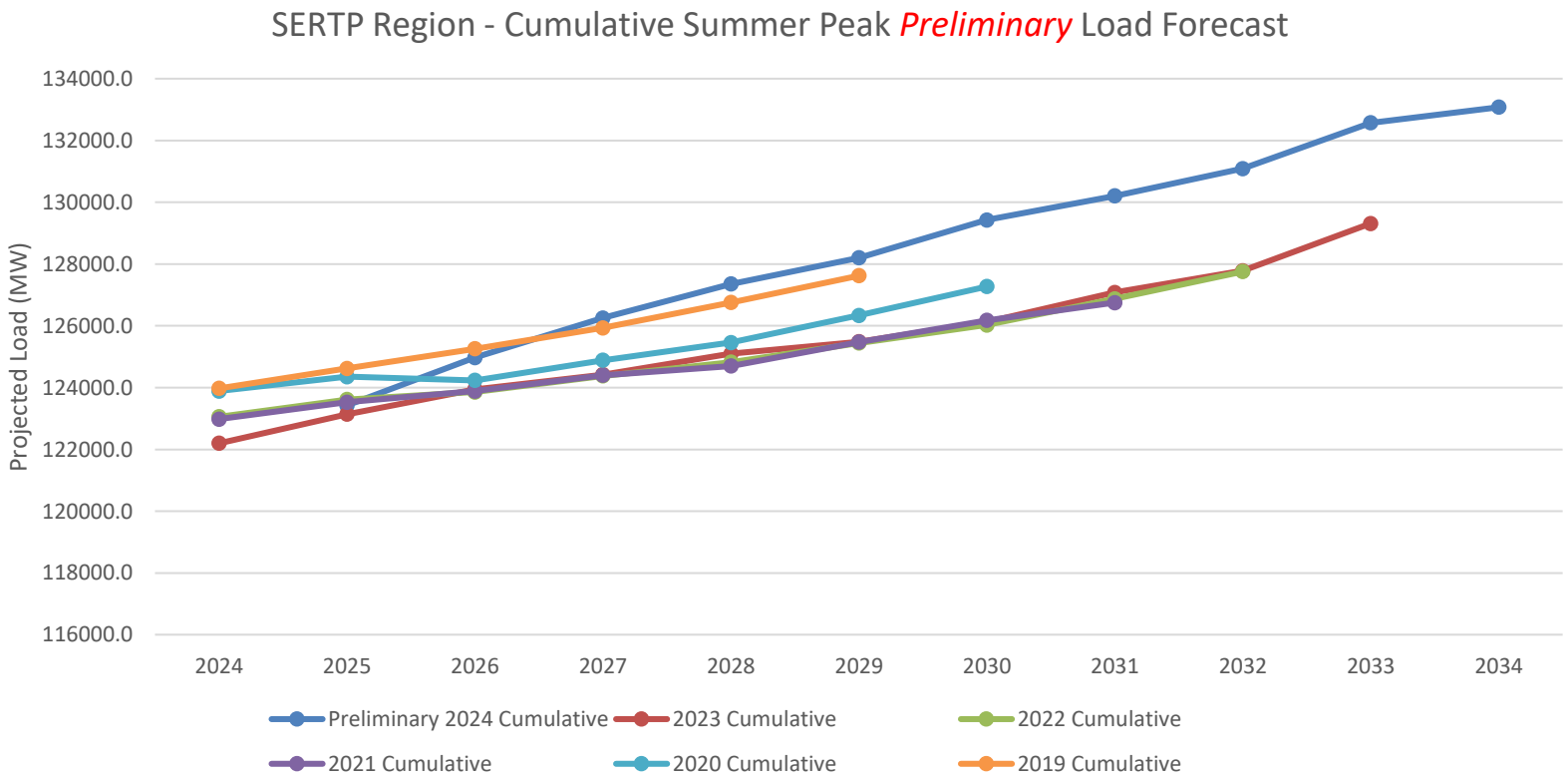


# Power Flow Model Inputs: Load Forecast

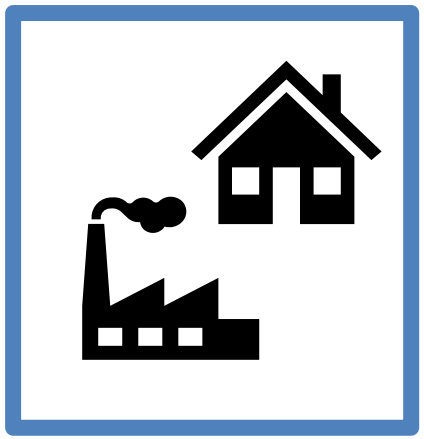
- Load Forecasts are provided by the Load Serving Entities within the Sponsors' respective areas



SERTP 2017 Load Forecast Training

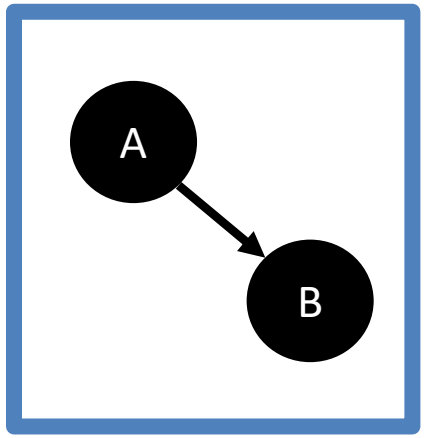


# Power Flow Model Inputs: Load Forecast



- **Energy Efficiency**
  - Continued conversion of incandescent lighting to LEDs
  - Replacement of appliances with more energy efficient versions
  - Retrofitting old buildings with newer energy efficient elements (windows, insulation, gas to electric conversions)
- **Electrification of Transportation industry**
  - Increased load from the transition from gas powered vehicles to electric vehicles
- **Onshoring of Manufacturing**
  - A “renaissance” of manufacturing has brought new large-scale customers to the Southeast
    - Car/battery manufacturing and assembly
    - Chip fabrication facilities
- **Giga Scale Datacenter Development**
  - Large-scale datacenter developments are demanding large loads (1000MW+) throughout the states
  - Virginia has a moratorium on new datacenter developments that is driving developers elsewhere. Many looking in the southeast

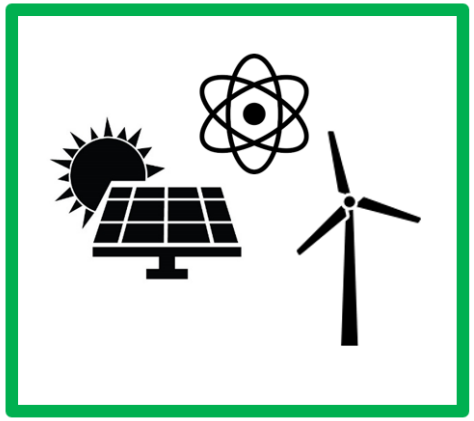
# Power Flow Model Inputs: Interchange




- Interchange refers to the transactions between areas in the power flow model
- Normally, these are confirmed, annual firm transactions with OASIS reservations and have agreement by the companies shown as the FROM and TO area to include in the model.

| FROM | FRO | TO | TO | Comments | 23L | 23S | 23W | 24L |
|---|---|---|---|---|---|---|---|---|
| From# | | To# | | Comments | 2023SLL | 2023SUM | 2023WIN | 2024SLL |
| 342 | DUK | 340 | CPLE | (NCEMC-Hamlet) [*1256] | 0.0 | 0.0 | 0.0 | 0.0 |
| 342 | DUK | 340 | CPLE | (KMEC) [91925273] | 27.0 | 27.0 | 87.0 | 87.0 |
| 342 | DUK | 343 | SCEG | (Chappells) [*1258] | -2.0 | -2.0 | -2.0 | -2.0 |
| 342 | DUK | 343 | SCEG | (KMEC) [91925421] | 5.0 | 5.0 | 5.0 | 5.0 |
| 342 | DUK | 344 | SC | (Haile) [83344767, 90023719, 90023787] | 20.0 | 20.0 | 20.0 | 20.0 |
| 342 | DUK | 344 | SC | (PMPA) [*1261] | 0.0 | -184.0 | -74.0 | 0.0 |
| 342 | DUK | 344 | SC | (Seneca) [80248341, 84177254, *1262] | -9.0 | -28.0 | -25.0 | -9.0 |
| 342 | DUK | 346 | SOCO | (NCEMC) [*1256] | 0.0 | 0.0 | 0.0 | 0.0 |
| 342 | DUK | 346 | SOCO | (EU-Miller) [*1255] | -61.0 | -61.0 | -61.0 | -61.0 |
| 342 | DUK | 353 | SEHA | (SEPA) [78002515, 84188651] | 0.0 | -181.0 | -181.0 | 0.0 |
| 342 | DUK | 355 | SETH | (SEPA) [78002562, 84188656] | 0.0 | -113.0 | -113.0 | 0.0 |

# Power Flow Model Inputs: Generation



- Generation assumptions are provided by the Load Serving Entities (LSE) and Transmission Service Customers within the Sponsors' respective Areas including:
  - Utility Integrated Resource Plans
  - Transmission Usage Projections (e.g., SOCO Attachment K, Sec 3.4)
  - Network Integrated Transmission Service (NITS) Customers
  - Generation Interconnection Process

- Proxy Generation may be used if resource decisions by LSEs are still being determined (when specific location is unknown)

| By January 1 2030 | Grid Edge | Coal Retirements | Solar | Battery | CT | CC | Onshore Wind | Pumped Storage Hydro | Advanced Nuclear | Offshore Wind |
|---|---|---|---|---|---|---|---|---|---|---|
| P1 Base | EE at least 1% of eligible retail sales | (-7.1 GW) | 6.6 GW | 5.1 GW | 1.7 GW | 2.7 GW | 0.3 GW | | | 1.6 GW |
| P2 Base | IVVC growing to 96% (DEC) & 97% (DEP) circuits | (-2.2 GW) | 4.1 GW | 0.9 GW | 2.1 GW | 1.4 GW | | | | |
| P3 Base | Winter DR & CPP | | | 0.7 GW | | | | | | |

Duke IRP from 2023

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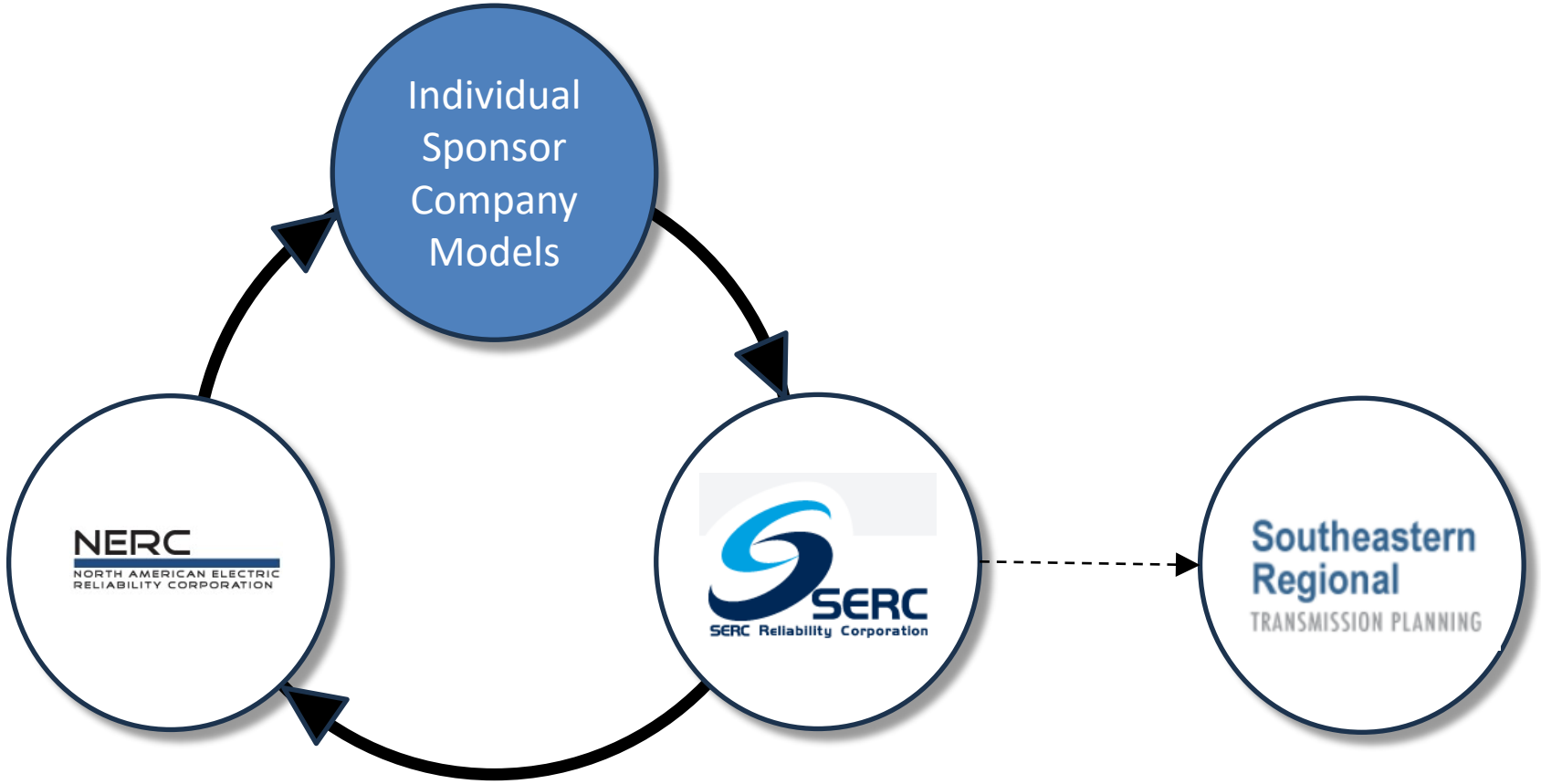
# Model Building Process

# Model Building Cycle




MMWG_Procedural_Manual_v35.pdf (rfirst.org)

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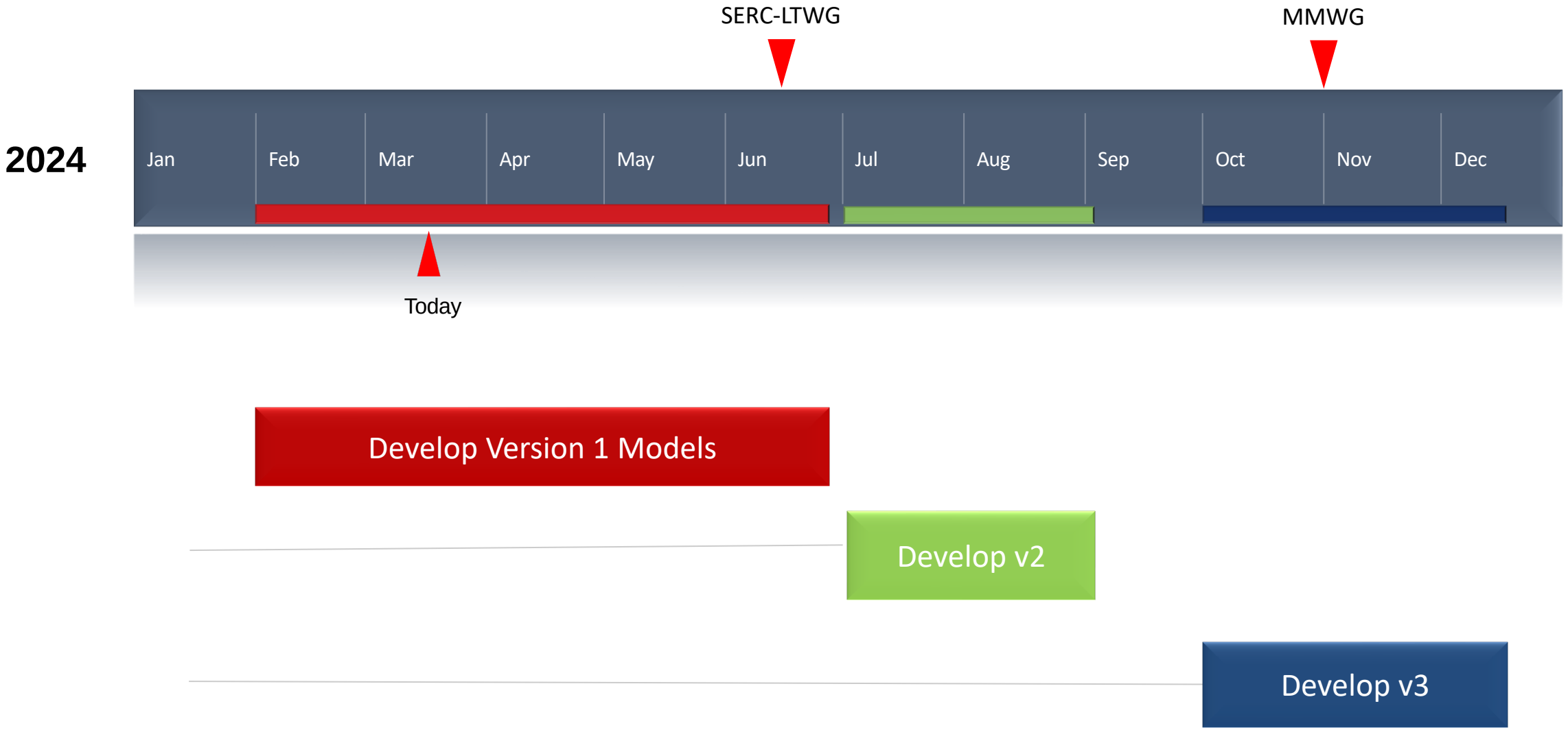
# SERTP Model Development Timeline



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# SERTP Regional Models

- SERTP will develop 6 regional models
- Models include latest transmission planning model information within the SERTP region
- Will be available on the Secure Area of the SERTP website.

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# SERTP Regional Models Case Definition

- *Summer Peak Load ("S")*
  - Summer peak load conditions
  - June 1st – August 31st
- *Shoulder Summer Peak Load ("H")*
  - Generally, 70% to 89 % of summer peak load conditions.
  - Dispatchable
    - Hydro assumptions
    - Renewable assumptions
  - June 1st – August 31st
- *Winter Peak Load ("W")*
  - Winter peak load conditions
  - December 1st – February 28th
    - Example: Winter 2029 is 12/1/2029 – 2/28/2030

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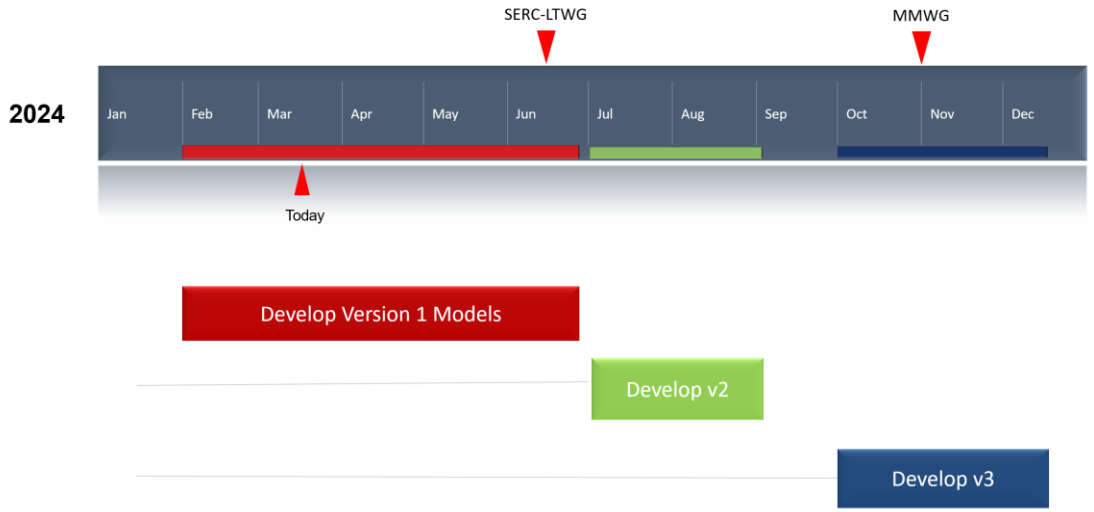
# SERTP Model Updates (V2/V3)

- SERTP's model building process allows for 2 additional updates to account for any changes sponsors decide to include
- Examples of changes would include:
  - Timelines of expansion plans
  - New projects
  - Generation additions/retirements
  - Interchange commitment changes



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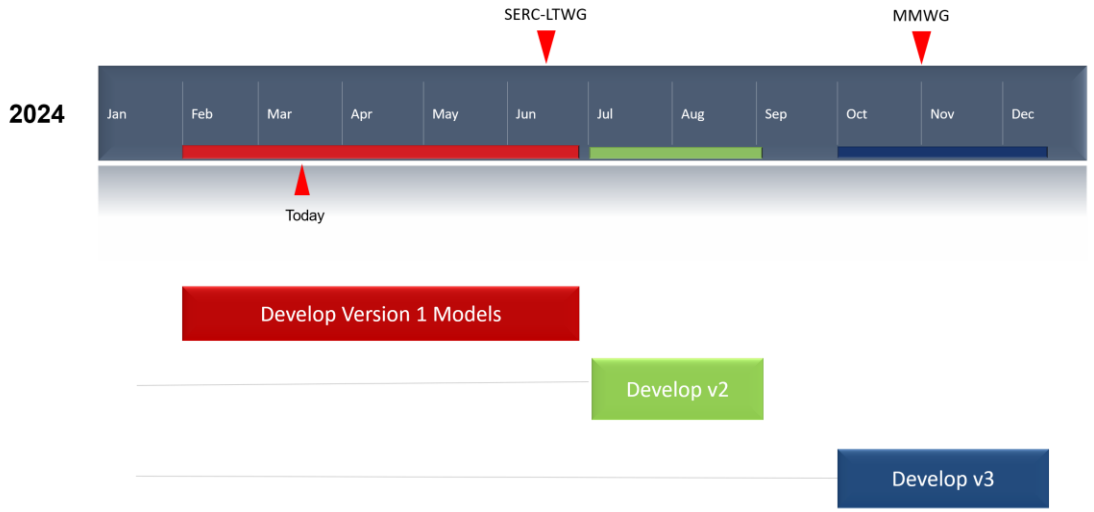
# SERTP Version Used

- Depending on when studies are performed in the SERTP, different versions of the models may be utilized
- Version 1 models:
  - Economic Studies
- Version 2 models:
  - Alternative Project Evaluation
  - Contingency Analysis (N-1)
- Version 3 models:
  - Final models published to SERTP Website



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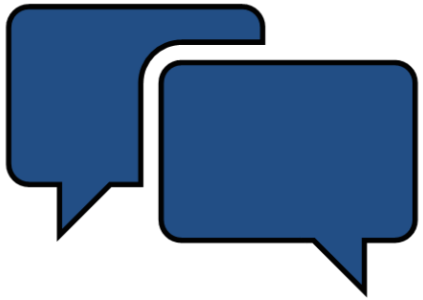
# References and Further Information

- To learn more about Power Flow Modeling
  - NATF Power Flow Modeling Reference Document
  - Eastern Reliability Assessment Group – MMWG Manual
  - NERC MOD-032 Standard



# Questions?

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# Public Policy Requirements Stakeholder Proposal

# SERTP Evaluation

## Transmission Needs Driven by Public Policy Requirements (PPRs)

- This year, the SERTP process received nine (9) submissions for needs driven by Public Policy Requirements. Submissions were related to the North Carolina Carbon Plan, Fiscal Responsibility Act, Inflation Reduction Act, various Executive Orders under President Biden, Georgia Power Company's 2023 IRP Update (Docket 55378), TVA's anticipated 2024 IRP, and a 2021 TVA Board Resolution. Submissions are being reviewed based on the criteria below and will be addressed at the 2nd Quarter SERTP Meeting.
- PPR Criteria
  - Must reference an enacted local, state, or federal law and/or regulation
  - Must include a transmission need (situation or system condition) driven by the Public Policy referenced

# Next Meeting Activities

- **2024 Economic Planning Study Scoping Meeting**
  - **Date: TBD**
  - **Held Virtual**
  - **Purpose:**
    - Review Study Assumptions for each Selected Economic Planning Study
    - RPSG Input & Feedback for Study Assumptions
- **2024 SERTP 2nd Quarter Meeting**
  - **Date: June 27th, 2024**
  - **Hosted by LG&E/KU in Louisville, KY**
  - **Purpose:**
    - Review Modeling Assumptions
    - Discuss Preliminary 10 Year Expansion Plan
    - Stakeholder Input & Feedback Regarding the Plan
    - Public Policy Requirement Evaluation Results

# Questions?

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