

SERTP Southeastern Regional Transmission Planning

Economic Planning Studies Final Results

**Associated Electric
Cooperative Inc.**



**Dalton
UTILITIES**



**DUKE
ENERGY.**



Georgia Transmission



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Overview of Economic Planning Studies

Executive Summary

The Regional Planning Stakeholder Group (“RPSG”) identified two (2) economic planning studies to be evaluated under the Southeastern Regional Transmission Planning (“SERTP”) process. The SERTP Sponsors have performed analyses to assess potential constraints on the transmission systems of the participating transmission owners for the stakeholder requested economic planning studies selected by the Regional Planning Stakeholder Group (“RPSG”). The assessments include the identification of potentially limiting facilities, the impact of the transfers on these facilities, and the contingency conditions causing the limitations. The assessments also identify potential transmission enhancements within the footprint of the participating transmission owners necessary to accommodate the economic planning study requests, planning-level cost estimates, and the projected need-date for projects to accommodate the economic planning study requests. The information contained in this report does not represent a commitment to proceed with the recommended enhancements nor implies that the recommended enhancements could be implemented by the study dates. The assessment cases model the currently projected improvements to the transmission system. However, changes to system conditions and/or the transmission system expansion plans could also impact the results of this study. Planning staff of the participating transmission owners performed the assessments and the results are summarized in this report.

Study Assumptions

The specific assumptions selected for these evaluations were:

- The load levels evaluated were Summer Peak unless otherwise indicated below. Additional load levels were evaluated as appropriate.
- Each request was evaluated for the year identified below, as selected by the RPSG
- The following economic planning studies were assessed:

- 1) **MISO North to LG&E/KU – 300 MW**
 - **Year:** 2025
 - **Load Level:** Summer Peak
 - **Type of Transfer:** Generation to Generation
 - **Source:** Generation scale within MISO North
 - **Sink:** Generation scale within LG&E/KU

- 2) **PJM to LG&E/KU – 300 MW**
 - **Year:** 2025
 - **Load Level:** Summer Peak
 - **Type of Transfer:** Generation to Generation
 - **Source:** Generation scale within PJM
 - **Sink:** Generation scale within LG&E/KU

- 3) **TVA to LG&E/KU – 300 MW**
 - **Year:** 2025
 - **Load Level:** Summer Peak
 - **Type of Transfer:** Generation to Generation
 - **Source:** Generation scale within TVA
 - **Sink:** Generation scale within LG&E/KU

Case Development

- For all evaluations, the **2021 Series Version 1 SERTP Regional Models** were used as a starting point load flow cases for the analysis of the Economic Planning Scenarios.

Study Criteria

The study criteria with which results were evaluated included the following reliability elements:

- NERC Reliability Standards
- Individual company criteria (voltage, thermal, stability, and short circuit as applicable)

Methodology

Initially, power flow analyses were performed based on the assumption that thermal limits were the controlling limit for the reliability plan. Voltage, stability, and short circuit studies were performed if circumstances warranted.

Technical Analysis and Study Results

The technical analysis was performed in accordance with the study methodology. Results from the technical analysis were reported throughout the study area to identify transmission elements approaching their limits such that all participating transmission owners and stakeholders would be aware of any potential issues and, as such, suggest appropriate solutions to address the potential issues if necessary. The SERTP reported, at a minimum, results for monitored transmission elements within the participating transmission owners' footprint based on:

- Thermal loadings greater than 90% for facilities that are negatively impacted by the proposed transfers and change by +5% of applicable rating with the addition of the transfer(s)
- Voltages appropriate to each participating transmission owner's planning criteria (with potential solutions if criteria were violated)

Assessment and Problem Identification

The participating transmission owners ran assessments to identify any constraints within the participating transmission owners' footprint as a result of the economic planning study requests. Each participating transmission owner applied their respective reliability criteria for its facilities and any constraints identified were documented and reviewed by each participating transmission owner.

Solution Development

- The participating transmission owners, with input from the stakeholders, will develop potential solution alternatives due to the economic planning studies requested by the RPSG.
- The participating transmission owners will test the effectiveness of the potential solution alternatives using the same cases, methodologies, assumptions and criteria described above.
- The participating transmission owners will develop rough, planning-level cost estimates and in-service dates for the selected solution alternatives.

Report on the Study Results

The participating transmission owners compiled all the study results and prepared a report for review by the stakeholders. The report contains the following:

- A description of the study approach and key assumptions for the Economic Planning Scenarios

- For each economic planning study request, the results of that study including:
 1. Limit(s) to the transfer
 2. Selected solution alternatives to address the limit(s)
 3. Rough, planning-level cost estimates and in-service dates for the selected transmission solution alternatives

I. Study Request 1 Results

MISO North to LGEE

2025

300 MW

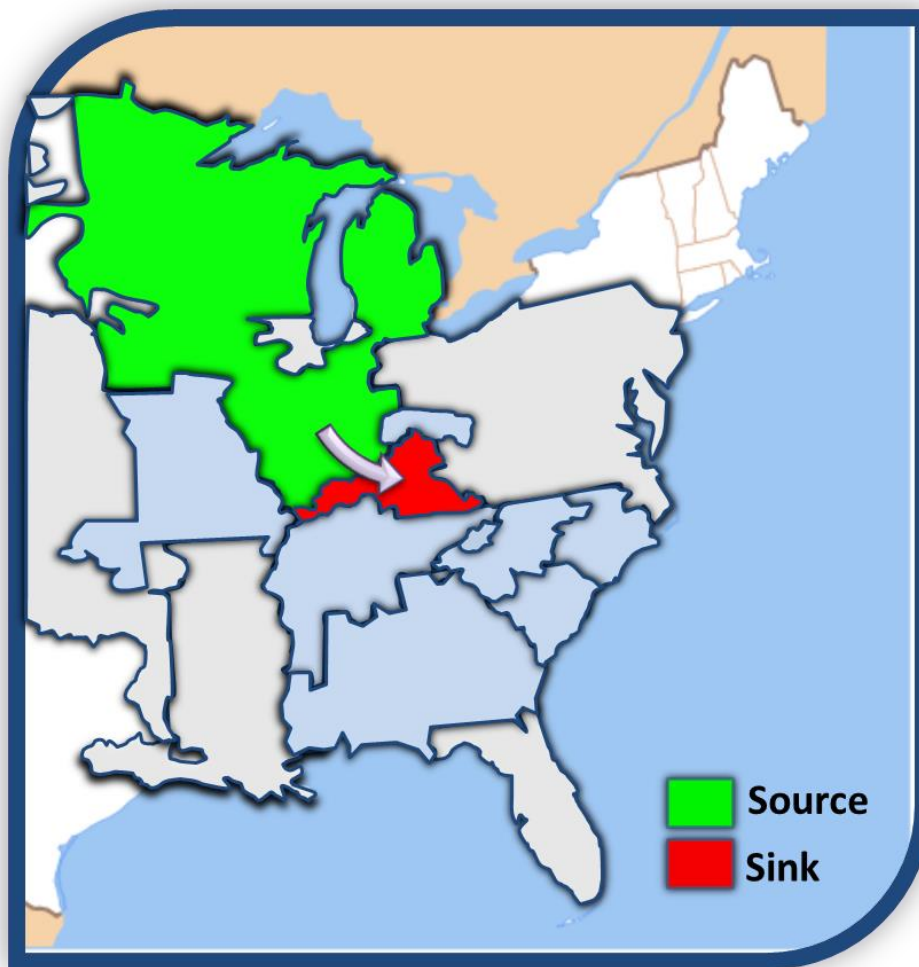
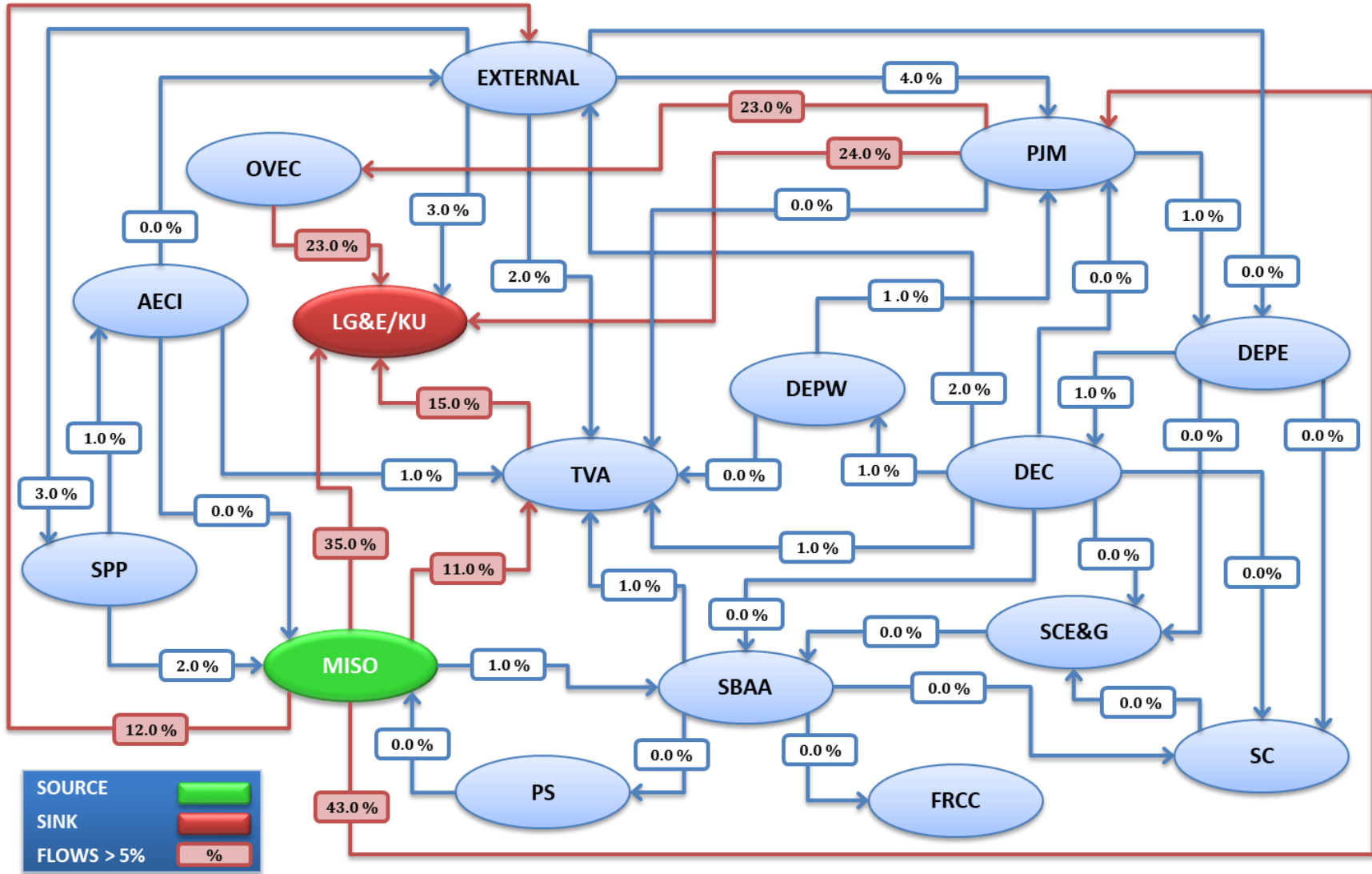


Table I.1.1. Total Cost Identified by the SERTP Sponsors

| Balancing Authority Area | Planning Level Cost Estimate |
|------------------------------------------------------------|------------------------------|
| Associated Electric Cooperative (AECI) | \$0 |
| Duke Carolinas (DEC) | \$0 |
| Duke Progress East (DEPE) | \$0 |
| Duke Progress West (DEPW) | \$0 |
| Gulf Power (GP) | \$0 |
| Louisville Gas & Electric and Kentucky Utilities (LG&E/KU) | \$0 |
| PowerSouth (PS) | \$0 |
| Southern (SBAA) | \$0 |
| Tennessee Valley Authority (TVA) | \$0 |
| TOTAL (\$2021) | \$0 |

Diagram I.1.1. Transfer Flow Diagram (% of Total Transfer)



Associated Electric Cooperative Balancing Authority Area (AECI) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|------------|---------|------|
| MISO North to LG&E/KU | 300 MW | MISO North | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table I.2.1. Pass 0 – Transmission System Impacts with No Enhancements – AECI

The following table identifies significant **AECI** thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| AECI | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table I.2.2. Pass 1 – Potential Future Transmission System Impacts – AECI

The following table depicts thermal loadings of **AECI** transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| AECI | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table I.2.3. Potential Solutions for Identified Problems – AECI

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|----------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | -- |
| AECI TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

Duke Carolinas Balancing Authority Area (DEC) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|------------|---------|------|
| MISO North to LG&E/KU | 300 MW | MISO North | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table I.3.1. Pass 0 – Transmission System Impacts with No Enhancements – DEC

The following table identifies significant *DEC* thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| DEC | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table I.3.2. Pass 1 – Potential Future Transmission System Impacts – DEC

The following table depicts thermal loadings of *DEC* transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| DEC | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table I.3.3. Potential Solutions for Identified Problems – DEC

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|---------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | \$0 |
| DEC TOTAL (\$2021) | | | \$0⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

Duke Progress East Balancing Authority Area (DEPE) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|------------|---------|------|
| MISO North to LG&E/KU | 300 MW | MISO North | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table I.4.1. Pass 0 – Transmission System Impacts with No Enhancements – DEPE

The following table identifies significant *DEPE* thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| DEPE | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table I.4.2. Pass 1 – Potential Future Transmission System Impacts – DEPE

The following table depicts thermal loadings of *DEPE* transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| DEPE | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table I.4.3. Potential Solutions for Identified Problems – DEPE

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|----------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | -- |
| DEPE TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

Duke Progress West (DEPW) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|------------|---------|------|
| MISO North to LG&E/KU | 300 MW | MISO North | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table I.5.1. Pass 0 – Transmission System Impacts with No Enhancements – DEPW

The following table identifies significant *DEPW* thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| DEPW | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table I.5.2. Pass 1 – Potential Future Transmission System Impacts – DEPW

The following table depicts thermal loadings of **DEPW** transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| DEPW | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table I.5.3. Potential Solutions for Identified Problems – DEPW

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|----------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | -- |
| DEPW TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

Gulf Power (GP) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|------------|---------|------|
| MISO North to LG&E/KU | 300 MW | MISO North | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table I.6.1. Pass 0 – Transmission System Impacts with No Enhancements – GP

The following table identifies significant **GP** thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| GP | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table I.6.2. Pass 1 – Potential Future Transmission System Impacts – GP

The following table depicts thermal loadings of *LG&E/KU* transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| GP | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table I.6.3. Potential Solutions for Identified Problems – GP

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|--------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | -- |
| GP TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

Louisville Gas & Electric and Kentucky Utilities Balancing Authority Area (LG&E/KU) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|------------|---------|------|
| MISO North to LG&E/KU | 300 MW | MISO North | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table I.7.1. Pass 0 – Transmission System Impacts with No Enhancements – LG&E/KU

The following table identifies significant *LG&E/KU* thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|---------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| LG&E/KU | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table I.7.2. Pass 1 – Potential Future Transmission System Impacts – LG&E/KU

The following table depicts thermal loadings of **LG&E/KU** transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|---------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| LG&E/KU | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table I.7.3. Potential Solutions for Identified Problems – LG&E/KU

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|-----------------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | -- |
| LG&E/KU TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

PowerSouth Balancing Authority Area (PS) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|------------|---------|------|
| MISO North to LG&E/KU | 300 MW | MISO North | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table I.8.1. Pass 0 – Transmission System Impacts with No Enhancements – PS

The following table identifies significant *PS* thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| PS | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table I.8.2. Pass 1 – Potential Future Transmission System Impacts – PS

The following table depicts thermal loadings of *PS* transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| PS | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table I.8.3. Potential Solutions for Identified Problems – PS

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|--------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | -- |
| PS TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

Southern Balancing Authority Area (SBAA) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|------------|---------|------|
| MISO North to LG&E/KU | 300 MW | MISO North | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table I.9.1. Pass 0 – Transmission System Impacts with No Enhancements – SBAA

The following table identifies significant SBAA thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| SBAA | None Identified | – | – | – | – | – | – |

Scenario Explanations:

1. N/A

Table I.9.2. Pass 1 – Potential Future Transmission System Impacts – SBAA

The following table depicts thermal loadings of **SBAA** transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| SBAA | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table I.9.3. Potential Solutions for Identified Problems – SBAA

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|----------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | -- |
| SBAA TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

Tennessee Valley Authority Balancing Authority Area (TVA) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|------------|---------|------|
| MISO North to LG&E/KU | 300 MW | MISO North | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table I.10.1. Pass 0 – Transmission System Impacts with No Enhancements – TVA

The following table identifies significant *TVA* thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| TVA | None Identified | – | – | – | – | – | – |

Scenario Explanations:

1. N/A

Table I.10.2. Pass 1 – Potential Future Transmission System Impacts – TVA

The following table depicts thermal loadings of **TVA** transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| TVA | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table I.10.3. Potential Solutions for Identified Problems – TVA

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|---------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | -- |
| TVA TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

II. Study Request 2 Results

PJM to LG&E/KU
2025
300 MW

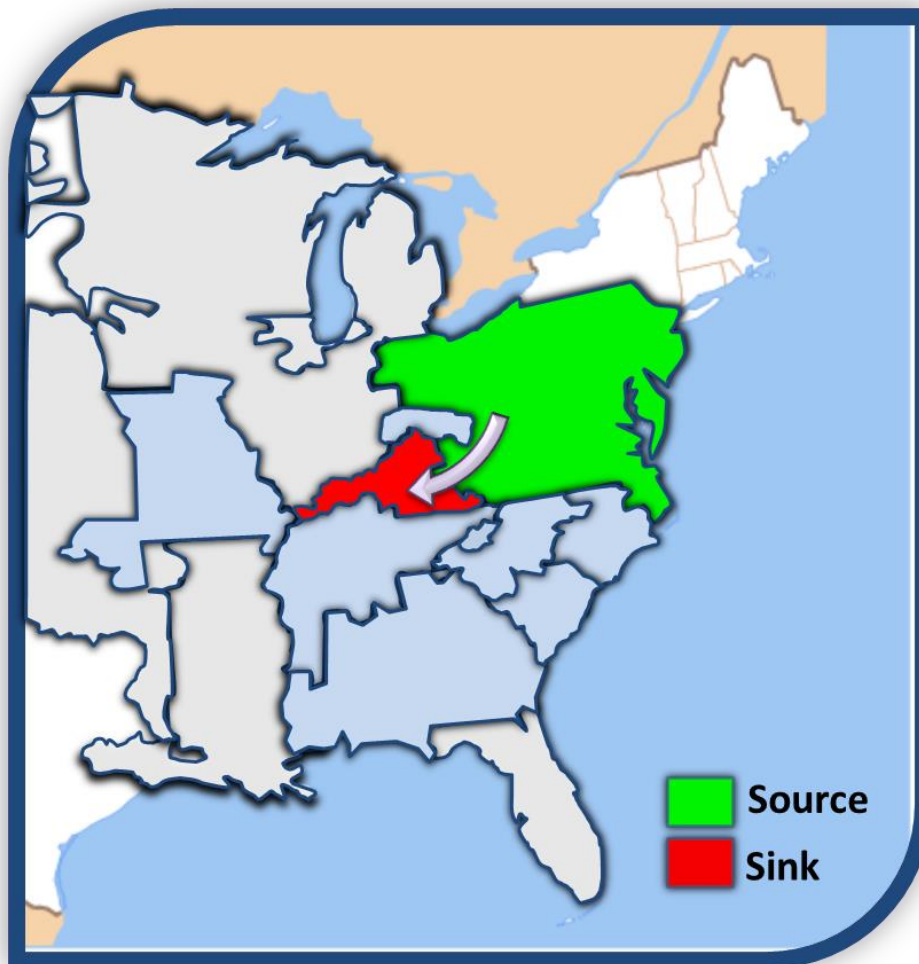


Table II.1.1.1. Total Cost Identified by the SERTP Sponsors

| Balancing Authority Area | Planning Level Cost Estimate |
|------------------------------------------------------------|------------------------------|
| Associated Electric Cooperative (AECI) | \$0 |
| Duke Carolinas (DEC) | \$0 |
| Duke Progress East (DEPE) | \$0 |
| Duke Progress West (DEPW) | \$0 |
| Gulf Power (GP) | \$0 |
| Louisville Gas & Electric and Kentucky Utilities (LG&E/KU) | \$0 |
| PowerSouth (PS) | \$0 |
| Southern (SBAA) | \$0 |
| Tennessee Valley Authority (TVA) | \$0 |
| TOTAL (\$2021) | \$0 |

Associated Electric Cooperative Balancing Authority Area (AECI) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|--------|---------|------|
| PJM to LG&E/KU | 300 MW | PJM | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table II.2.1. Pass 0 – Transmission System Impacts with No Enhancements – AECI

The following table identifies significant **AECI** thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| AECI | None Identified | – | – | – | – | – | – |

Scenario Explanations:

1. N/A

Table II.2.2. Pass 1 – Potential Future Transmission System Impacts – AECI

The following table depicts thermal loadings of **AECI** transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| AECI | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table II.2.3. Potential Solutions for Identified Problems – AECI

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|----------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | -- |
| AECI TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

Duke Carolinas Balancing Authority Area (DEC) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|--------|---------|------|
| PJM to LG&E/KU | 300 MW | PJM | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table II.3.1. Pass 0 – Transmission System Impacts with No Enhancements – DEC

The following table identifies significant **DEC** thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| DEC | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table II.3.2. Pass 1 – Potential Future Transmission System Impacts – DEC

The following table depicts thermal loadings of *DEC* transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| DEC | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table II.3.3. Potential Solutions for Identified Problems – DEC

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|---------------------------|--------------------|---------------------|------------------------------|
| -- | None Identified | -- | \$0 |
| DEC TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

Duke Progress East Balancing Authority Area (DEPE) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|--------|---------|------|
| PJM to LG&E/KU | 300 MW | PJM | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table II.4.1. Pass 0 – Transmission System Impacts with No Enhancements – DEPE

The following table identifies significant **DEPE** thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| DEPE | None Identified | – | – | – | – | – | – |

Scenario Explanations:

1. N/A

Table II.4.2. Pass 1 – Potential Future Transmission System Impacts – DEPE

The following table depicts thermal loadings of *DEPE* transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| DEPE | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table II.4.3. Potential Solutions for Identified Problems – DEPE

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|----------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | -- |
| DEPE TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

Duke Progress West (DEPW) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|--------|---------|------|
| PJM to LG&E/KU | 300 MW | PJM | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table II.5.1. Pass 0 – Transmission System Impacts with No Enhancements – DEPW

The following table identifies significant *DEPW* thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| DEPW | None Identified | – | – | – | – | – | – |

Scenario Explanations:

1. N/A

Table II.5.2. Pass 1 – Potential Future Transmission System Impacts – DEPW

The following table depicts thermal loadings of *DEPW* transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| DEPW | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table II.5.3. Potential Solutions for Identified Problems – DEPW

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|----------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | \$0 |
| DEPW TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

Gulf Power (GP) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|--------|---------|------|
| PJM to LG&E/KU | 300 MW | PJM | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table II.6.1. Pass 0 – Transmission System Impacts with No Enhancements – GP

The following table identifies significant **GP** thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| GP | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table II.6.2. Pass 1 – Potential Future Transmission System Impacts – GP

The following table depicts thermal loadings of **GP** transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| GP | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table II.6.3. Potential Solutions for Identified Problems – GP

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|--------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | -- |
| GP TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

Louisville Gas & Electric and Kentucky Utilities Balancing Authority Area (LG&E/KU) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|--------|---------|------|
| PJM to LG&E/KU | 300 MW | PJM | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table II.7.1. Pass 0 – Transmission System Impacts with No Enhancements – LG&E/KU

The following table identifies significant *LG&E/KU* thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|---------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| LG&E/KU | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table II.7.2. Pass 1 – Potential Future Transmission System Impacts – LG&E/KU

The following table depicts thermal loadings of **LG&E/KU** transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|---------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| LG&E/KU | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table II.7.3. Potential Solutions for Identified Problems – LG&E/KU

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|-----------------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | -- |
| LG&E/KU TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

PowerSouth Balancing Authority Area (PS) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|--------|---------|------|
| PJM to LG&E/KU | 300 MW | PJM | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table II.8.1. Pass 0 – Transmission System Impacts with No Enhancements – PS

The following table identifies significant *PS* thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| PS | None Identified | – | – | – | – | – | – |

Scenario Explanations:

1. N/A

Table II.8.2. Pass 1 – Potential Future Transmission System Impacts – PS

The following table depicts thermal loadings of *PS* transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| PS | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table II.8.3. Potential Solutions for Identified Problems – PS

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|--------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | -- |
| PS TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

Southern Balancing Authority Area (SBAA) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|--------|---------|------|
| PJM to LG&E/KU | 300 MW | PJM | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table II.9.1. Pass 0 – Transmission System Impacts with No Enhancements – SBAA

The following table identifies significant **SBAA** thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| SBAA | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table II.9.2. Pass 1 – Potential Future Transmission System Impacts – SBAA

The following table depicts thermal loadings of **SBAA** transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| SBAA | | | | | | | - |

Scenario Explanations:

1. N/A

Table II.9.3. Potential Solutions for Identified Problems – SBAA

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|----------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | -- |
| SBAA TOTAL (\$2021) | | | \$0⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

Tennessee Valley Authority Balancing Authority Area (TVA) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|--------|---------|------|
| PJM to LG&E/KU | 300 MW | PJM | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table II.10.1. Pass 0 – Transmission System Impacts with No Enhancements – TVA

The following table identifies significant **TVA** thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| TVA | None Identified | – | – | – | – | – | – |

Scenario Explanations:

1. N/A

Table II.10.2. Pass 1 – Potential Future Transmission System Impacts – TVA

The following table depicts thermal loadings of **TVA** transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| TVA | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table II.10.3. Potential Solutions for Identified Problems – TVA

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|---------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | -- |
| TVA TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

III. Study Request 3 Results

TVA to LG&E/KU
2025
300 MW

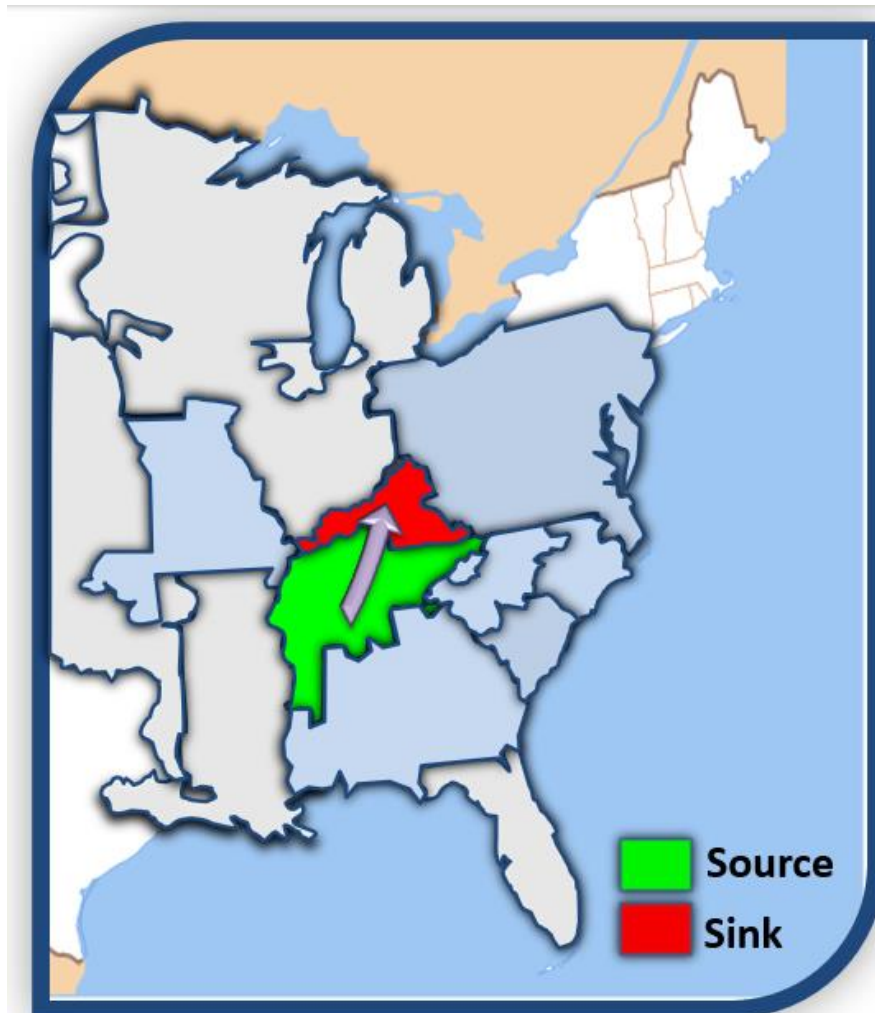
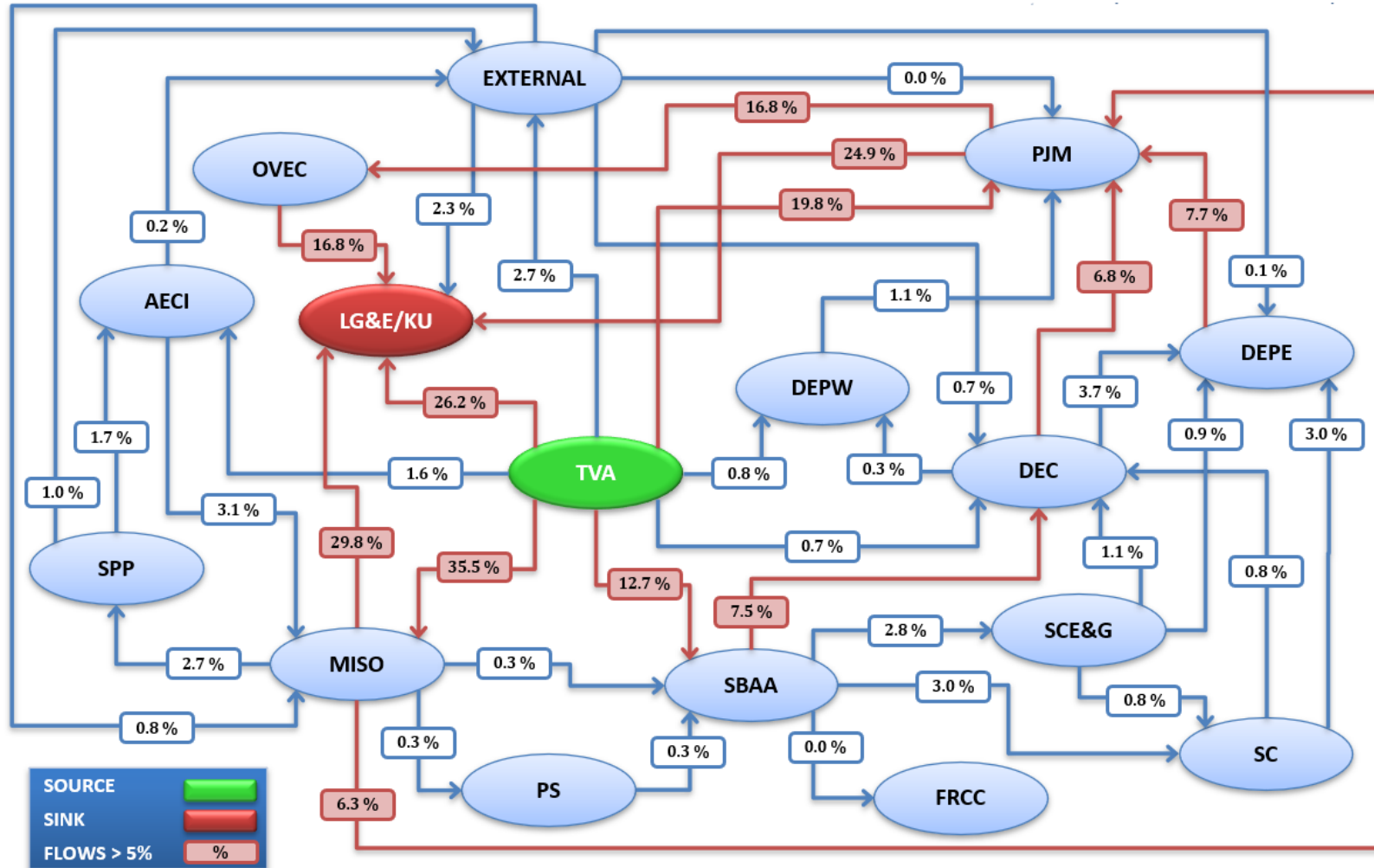


Table III.1.1. Total Cost Identified by the SERTP Sponsors

| Balancing Authority Area | Planning Level Cost Estimate |
|------------------------------------------------------------|------------------------------|
| Associated Electric Cooperative (AECI) | \$0 |
| Duke Carolinas (DEC) | \$0 |
| Duke Progress East (DEPE) | \$0 |
| Duke Progress West (DEPW) | \$0 |
| Gulf Power (GP) | \$0 |
| Louisville Gas & Electric and Kentucky Utilities (LG&E/KU) | \$0 |
| PowerSouth (PS) | \$0 |
| Southern (SBAA) | \$0 |
| Tennessee Valley Authority (TVA) | \$0 |
| TOTAL (\$2021) | \$0 |

Diagram III.1.1. Transfer Flow Diagram (% of Total Transfer)



Associated Electric Cooperative Balancing Authority Area (AECI) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|--------|---------|------|
| TVA to LG&E/KU | 300 MW | TVA | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table III.2.1. Pass 0 – Transmission System Impacts with No Enhancements – AECI

The following table identifies significant **AECI** thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| AECI | None Identified | – | – | – | – | – | – |

Scenario Explanations:

1. N/A

Table III.2.2. Pass 1 – Potential Future Transmission System Impacts – AECI

The following table depicts thermal loadings of **AECI** transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| AECI | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table III.2.3. Potential Solutions for Identified Problems – AECI

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|----------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | -- |
| AECI TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

Duke Carolinas Balancing Authority Area (DEC) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|--------|---------|------|
| TVA to LG&E/KU | 300 MW | TVA | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table III.3.1. Pass 0 – Transmission System Impacts with No Enhancements – DEC

The following table identifies significant **DEC** thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| DEC | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table III.3.2. Pass 1 – Potential Future Transmission System Impacts – DEC

The following table depicts thermal loadings of *DEC* transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| DEC | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table III.3.3. Potential Solutions for Identified Problems – DEC

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|---------------------------|--------------------|---------------------|------------------------------|
| -- | None Identified | -- | \$0 |
| DEC TOTAL (\$2021) | | | \$0⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

Duke Progress East Balancing Authority Area (DEPE) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|--------|---------|------|
| TVA to LG&E/KU | 300 MW | TVA | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table III.4.1. Pass 0 – Transmission System Impacts with No Enhancements – DEPE

The following table identifies significant **DEPE** thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| DEPE | None Identified | – | – | – | – | – | – |

Scenario Explanations:

1. N/A

Table III.4.2. Pass 1 – Potential Future Transmission System Impacts – DEPE

The following table depicts thermal loadings of *DEPE* transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| DEPE | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table III.4.3. Potential Solutions for Identified Problems – DEPE

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|----------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | -- |
| DEPE TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

Duke Progress West (DEPW) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|--------|---------|------|
| TVA to LG&E/KU | 300 MW | TVA | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table III.5.1. Pass 0 – Transmission System Impacts with No Enhancements – DEPW

The following table identifies significant *DEPW* thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| DEPW | None Identified | – | – | – | – | – | – |

Scenario Explanations:

1. N/A

Table III.5.2. Pass 1 – Potential Future Transmission System Impacts – DEPW

The following table depicts thermal loadings of *DEPW* transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| DEPW | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table III.5.3. Potential Solutions for Identified Problems – DEPW

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|----------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | \$0 |
| DEPW TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

Gulf Power (GP) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|--------|---------|------|
| TVA to LG&E/KU | 300 MW | TVA | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table III.6.1. Pass 0 – Transmission System Impacts with No Enhancements – GP

The following table identifies significant **GP** thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| GP | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table III.6.2. Pass 1 – Potential Future Transmission System Impacts – GP

The following table depicts thermal loadings of **GP** transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| GP | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table III.6.3. Potential Solutions for Identified Problems – GP

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|--------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | -- |
| GP TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

Louisville Gas & Electric and Kentucky Utilities Balancing Authority Area (LG&E/KU) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|--------|---------|------|
| TVA to LG&E/KU | 300 MW | TVA | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table III.7.1. Pass 0 – Transmission System Impacts with No Enhancements – LG&E/KU

The following table identifies significant *LG&E/KU* thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|---------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| LG&E/KU | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table III.7.2. Pass 1 – Potential Future Transmission System Impacts – LG&E/KU

The following table depicts thermal loadings of **LG&E/KU** transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|---------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| LG&E/KU | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table III.7.3. Potential Solutions for Identified Problems – LG&E/KU

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|-----------------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | -- |
| LG&E/KU TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

PowerSouth Balancing Authority Area (PS) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|--------|---------|------|
| TVA to LG&E/KU | 300 MW | TVA | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table III.8.1. Pass 0 – Transmission System Impacts with No Enhancements – PS

The following table identifies significant **PS** thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| PS | None Identified | – | – | – | – | – | – |

Scenario Explanations:

1. N/A

Table III.8.2. Pass 1 – Potential Future Transmission System Impacts – PS

The following table depicts thermal loadings of *PS* transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| PS | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table III.8.3. Potential Solutions for Identified Problems – PS

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|--------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | -- |
| PS TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

Southern Balancing Authority Area (SBAA) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|--------|---------|------|
| TVA to LG&E/KU | 300 MW | TVA | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table III.9.1. Pass 0 – Transmission System Impacts with No Enhancements – SBAA

The following table identifies significant **SBAA** thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| SBAA | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table III.9.2. Pass 1 – Potential Future Transmission System Impacts – SBAA

The following table depicts thermal loadings of **SBAA** transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| SBAA | | | | | | | - |

Scenario Explanations:

1. N/A

Table III.9.3. Potential Solutions for Identified Problems – SBAA

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|----------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | -- |
| SBAA TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.

Tennessee Valley Authority Balancing Authority Area (TVA) Results

Study Structure and Assumptions

| Transfer Sensitivity | Amount | Source | Sink | Year |
|-------------------------------------------------|--------|--------|---------|------|
| TVA to LG&E/KU | 300 MW | TVA | LG&E/KU | 2025 |
| Load Flow Cases | | | | |
| 2021 Series Version 1 SERTP Models: Summer Peak | | | | |

Transmission System Impacts

The following tables below identify any constraints attributable to the requested transfer for the contingency and scenario that resulted in the most significant loadings for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Table III.10.1. Pass 0 – Transmission System Impacts with No Enhancements – TVA

The following table identifies significant *TVA* thermal constraints without any enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| TVA | None Identified | – | – | – | – | – | – |

Scenario Explanations:

1. N/A

Table III.10.2. Pass 1 – Potential Future Transmission System Impacts – TVA

The following table depicts thermal loadings of **TVA** transmission facilities that could become potential constraints in future years or with different queuing assumptions but are not overloaded in the study year with all proposed enhancements to the transmission system.

| Area | Limiting Element | Rating (MVA) | Thermal Loadings (%) | | Contingency | Scenario | Project |
|------|------------------|--------------|----------------------|--------------|-------------|----------|---------|
| | | | Without Request | With Request | | | |
| TVA | None Identified | -- | -- | -- | -- | -- | -- |

Scenario Explanations:

1. N/A

Table III.10.3. Potential Solutions for Identified Problems – TVA

The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

| Item | Potential Solution | Estimated Need Date | Planning Level Cost Estimate |
|---------------------------|--------------------|---------------------|------------------------------|
| -- | None Required | -- | -- |
| TVA TOTAL (\$2021) | | | \$0 ⁽¹⁾ |

(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer could be greater than the total shown above if any of these projects are delayed or cancelled.