SERTP Southeastern Regional Transmission Planning

Economic Planning Studies
Preliminary Results

Associated Electric Cooperative Inc.

Dalton Utilities

Duke Energy

Georgia Transmission

LG&E KU

MEAG Power

OVEC IKEC

PowerSouth Energy Cooperative

Southern Company

TVA

September 7, 2017

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Overview of Economic Planning Studies

Executive Summary

The Regional Planning Stakeholder Group ("RPSG") identified five (5) 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 particular year identified below, as selected by the RPSG
- The following economic planning studies were assessed:

1) **Santee Cooper Border to PJM Border – 300 MW**
   - **Year:** 2020
   - **Load Level:** Summer Peak
   - **Type of Transfer:** Load to Load
   - **Source:** Uniform load scale within Santee Cooper
   - **Sink:** Uniform Load scale within PJM as shown in Table 1 below:

Table 1: PJM Border

PJM Area	Area #	MW Allocation
American Electric Power	205	150
Dominion Virginia Power	345	150
Total		300

2) **Southern to Santee Cooper Border – 500 MW**
   - **Year:** 2020
   - **Load Level:** Summer Peak
   - **Type of Transfer:** Generation to Load
   - **Source:** Generation within Southern
   - **Sink:** Uniform load scale within Santee Cooper

3) **TVA to FRCC Border – 500 MW**
   - **Year:** 2022
   - **Load Level:** Summer Peak
   - **Type of Transfer:** Generation to Generation
   - **Source:** Generation within TVA
   - **Sink:** Generation scale within FRCC as shown in Table 2 below:

Table 2: FRCC Border

FRCC Area	Area #	MW Allocation
Florida Power & Light Company	401	208
Duke Energy Florida	402	68
Jacksonville Electric Authority	406	192
Tallahassee City Electric	415	32
Total		500

4) **TVA to PJM Border – 500 MW**
   - **Year:** 2022
   - **Load Level:** Winter Peak
   - **Type of Transfer:** Generation to Load
   - **Source:** Generation within TVA
   - **Sink:** Load scale within PJM as shown in Table 3 below:

Table 3: PJM Border

PJM Area	Area #	MW Allocation
PSE & G	231	167
PECO Energy Company	230	167
Dominion Virginia Power	345	166
Total		500

5) **TVA to Duke Energy Carolinas – 300 MW**
   - **Year:** 2022
   - **Load Level:** Summer Peak
   - **Type of Transfer:** Generation to Generation
   - **Source:** Generation within TVA
   - **Sink:** Generation within Duke Energy Carolinas

Case Development

- For all evaluations, the ***2017 Series Version 2 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 on elements of 115 kV and greater 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 in order 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

Santee Cooper to PJM

2020

300 MW

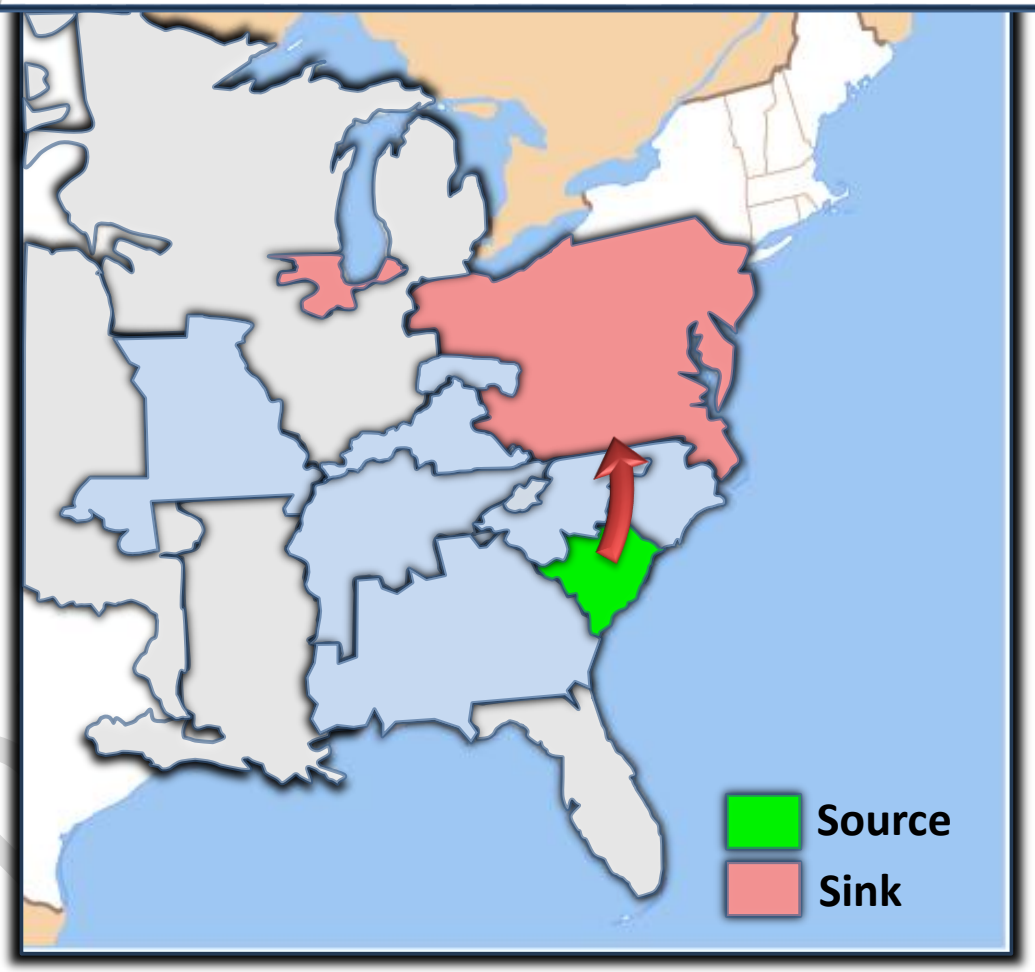
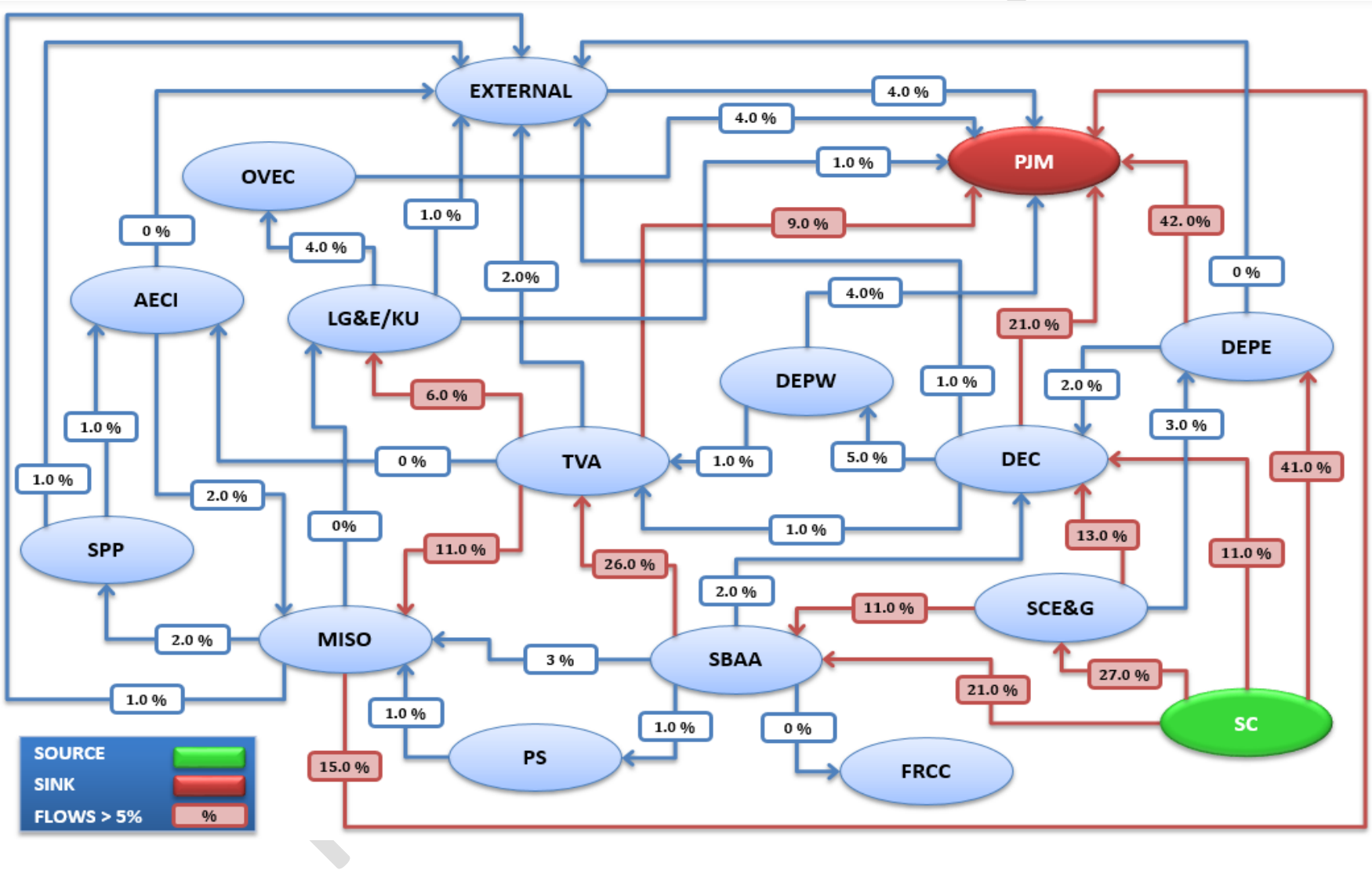


Table I.1.1. Total Cost Identified by the SERTP Sponsors

Balancing Authority	Planning Level Cost Estimate
Associated Electric Cooperative (AECI)	$0
Duke Carolinas (DEC)	$0
Duke Progress East (DEPE)	$0
Duke Progress West (DEPW)	$0
Louisville Gas & Electric and Kentucky Utilities (LG&E/KU)	$0
Ohio Valley Electric Cooperative (OVEC)	$0
PowerSouth (PS)	$0
Southern (SBAA)	$0
Tennessee Valley Authority (TVA)	$0
TOTAL ($2017)	**$0**

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



Associated Electric Cooperative Balancing Authority (AECI) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
Santee Cooper to PJM	300 MW	Santee Cooper	PJM	2020
Load Flow Cases				
2017 Series Version 2 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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
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 ($2017)			**$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 (DEC) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
Santee Cooper to PJM	300 MW	Santee Cooper	PJM	2020
Load Flow Cases				
2017 Series Version 2 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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
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**	--	--
DEC TOTAL ($2017)			**$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 (DEPE) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
Santee Cooper to PJM	300 MW	Santee Cooper	PJM	2020
Load Flow Cases				
2017 Series Version 2 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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
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 ($2017)			**$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
Santee Cooper to PJM	300 MW	Santee Cooper	PJM	2020
Load Flow Cases				
2017 Series Version 2 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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
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 ($2017)			**$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 (LG&E/KU) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
Santee Cooper to PJM	300 MW	Santee Cooper	PJM	2020
Load Flow Cases				
2017 Series Version 2 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 – *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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
LG&E/KU	None Identified	--	--	--	--	--	--

Scenario Explanations:

1. N/A

Table I.6.2. 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.

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

Scenario Explanations:

1. N/A

Table I.6.3. 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 ($2017)			**$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.

Ohio Valley Electric Corporation Balancing Authority (OVEC) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
Santee Cooper to PJM	300 MW	Santee Cooper	PJM	2020
Load Flow Cases				
2017 Series Version 2 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 – *OVEC*

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

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
OVEC	None Identified	--	--	--	--	--	--

Scenario Explanations:

1. N/A

Table I.7.2. Pass 1 – Potential Future Transmission System Impacts – *OVEC*

The following table depicts thermal loadings of ***OVEC*** 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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
OVEC	None Identified	--	--	--	--	--	--

Scenario Explanations:

1. N/A

Table I.7.3. Potential Solutions for Identified Problems – *OVEC*

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**	--	--
OVEC TOTAL ($2017)			**$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 (PS) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
Santee Cooper to PJM	300 MW	Santee Cooper	PJM	2020
Load Flow Cases				
2017 Series Version 2 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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
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 ($2017)			**$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 (SBAA) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
Santee Cooper to PJM	300 MW	Santee Cooper	PJM	2020
Load Flow Cases				
2017 Series Version 2 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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
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 ($2017)			**$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 (TVA) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
Santee Cooper to PJM	300 MW	Santee Cooper	PJM	2020
Load Flow Cases				
2017 Series Version 2 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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
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 ($2017)			**$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

Southern to Santee Cooper

2020

500 MW

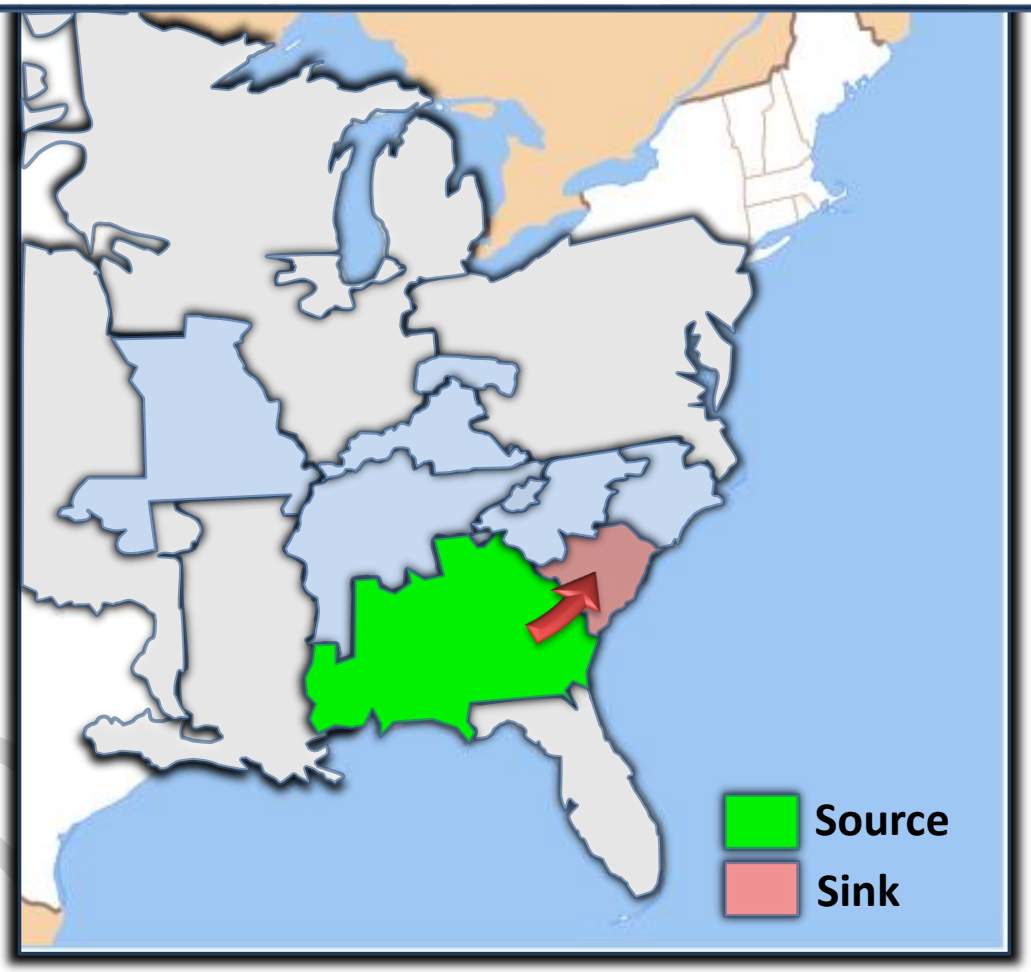
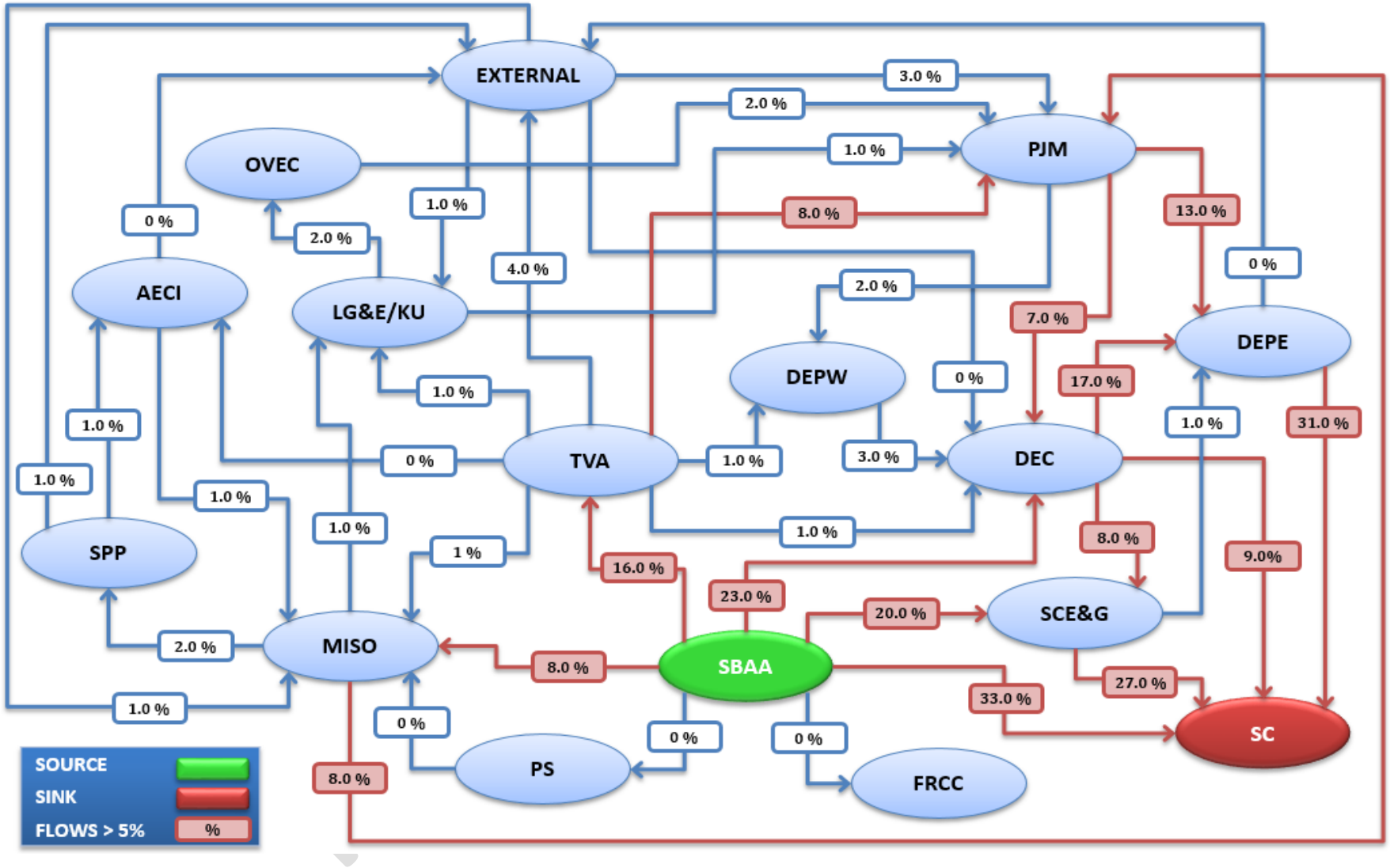


Table II.1.1. Total Cost Identified by the SERTP Sponsors

Balancing Authority	Planning Level Cost Estimate
Associated Electric Cooperative (AECI)	$0
Duke Carolinas (DEC)	$0
Duke Progress East (DEPE)	$0
Duke Progress West (DEPW)	$0
Louisville Gas & Electric and Kentucky Utilities (LG&E/KU)	$0
Ohio Valley Electric Cooperative (OVEC)	$0
PowerSouth (PS)	$0
Southern (SBAA)	$0
Tennessee Valley Authority (TVA)	$0
TOTAL ($2017)	**$0**

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



Associated Electric Cooperative Balancing Authority (AECI) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
Southern to Santee Cooper	500 MW	Southern	Santee Cooper	2020
Load Flow Cases				
2017 Series Version 2 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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
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 ($2017)			**$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 (DEC) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
Southern to Santee Cooper	500 MW	Southern	Santee Cooper	2020
Load Flow Cases				
2017 Series Version 2 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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
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 Required**	--	--
DEC TOTAL ($2017)			**$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 (DEPE) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
Southern to Santee Cooper	500 MW	Southern	Santee Cooper	2020
Load Flow Cases				
2017 Series Version 2 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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
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 ($2017)			**$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
Southern to Santee Cooper	500 MW	Southern	Santee Cooper	2020
Load Flow Cases				
2017 Series Version 2 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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
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 ($2017)			**$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 (LG&E/KU) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
Southern to Santee Cooper	500 MW	Southern	Santee Cooper	2020
Load Flow Cases				
2017 Series Version 2 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 – *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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
LG&E/KU	None Identified	--	--	--	--	--	--

Scenario Explanations:

1. N/A

Table II.6.2. 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.

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

Scenario Explanations:

1. N/A

Table II.6.3. 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 ($2017)			**$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.

Ohio Valley Electric Corporation Balancing Authority (OVEC) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
Southern to Santee Cooper	500 MW	Southern	Santee Cooper	2020
Load Flow Cases				
2017 Series Version 2 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 – *OVEC*

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

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
OVEC	None Identified	--	--	--	--	--	--

Scenario Explanations:

1. N/A

Table II.7.2. Pass 1 – Potential Future Transmission System Impacts – *OVEC*

The following table depicts thermal loadings of ***OVEC*** 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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
OVEC	None Identified	--	--	--	--	--	--

Scenario Explanations:

1. N/A

Table II.7.3. Potential Solutions for Identified Problems – *OVEC*

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**	--	--
OVEC TOTAL ($2017)			**$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 (PS) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
Southern to Santee Cooper	500 MW	Southern	Santee Cooper	2020
Load Flow Cases				
2017 Series Version 2 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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
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 ($2017)			**$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 (SBAA) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
Southern to Santee Cooper	500 MW	Southern	Santee Cooper	2020
Load Flow Cases				
2017 Series Version 2 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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
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	387070 3BRENTWD 115 - 387091 3S HILLS2 115	251	96.8	99.0	387060 6CRIST6 230 - 387064 3CRIST3 B4 115	1	--
SBAA	384153 3GORGAS#1 115 - 384155 6GORGAS 6 230	480	94.5	96.3	384156 6MILLER6 230 - 384172 6BOYLESM1 230	2	--
SBAA	381378 6BOGGS RD 230 - 382031 6PURCELL RD 230	509	92.6	95.4	381350 6SWEETBOTOM 230 - 382623 6NORCROSS B3 230	3	--
SBAA	380379 3MORELAND AV 115 - 381915 3KIRKWOOD 115	96	90.7	94.5	380368 3ELLENWOOD 115 - 382707 3MORROW B3 115	4	--
SBAA	381927 3SHOAL CREEK 115 - 382094 3GWINCO WFP 115	114	90.1	94.1	380011 8S HALL 500 - 382035 6S HALL LS 230	4	--
SBAA	385930 3ANISTON3 B2 115 - 385931 6ANISTON6 B2 230	392	90.4	93.8	384305 6ANISTON6 B1 230 - 385931 6ANISTON6 B2 230	5	--
SBAA	380208 6NELSON 230 - 380954 3NELSON 115	176	91.4	93.6	380208 6NELSON 230 - 380954 3NELSON 115	4	--

Scenario Explanations:

1. Crist Common Scrubber Offline, Shoulder (93% Load Level) Case
2. Gaston Unit #5 Offline, Shoulder (93% Load Level) Case
3. Rocky Mountain Unit #1 Offline, Summer Peak Case
4. Vogtle Unit #1 Offline, Summer Peak Case
5. McDonough Unit #4 Offline, Shoulder (93% Load Level) Case

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 ($2017)			**$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.

Economic Planning Study Additional Interchange Assumptions – *SBAA*

The following tables below list any interface reservations that were preserved in the economic planning studies in addition to those modeled in the Version 2 SERTP Models.

Table II.9.4. Additional Transactions

OASIS Ref. #	POR	POD	Amount (MW)
--	--	--	--

Table II.9.5. Capacity Benefit Margin (CBM)

SERTP Sponsor	Interface	Amount (MW)
Southern	Duke	350
Southern	TVA	300
Southern	MISO	100
Southern	SCPSA	50

Table II.9.6. Transmission Reliability Margin (TRM)

SERTP Sponsor	Interface	Amount (MW)
Southern	Import from Duke	167
GTC	Import from Duke	102
MEAG	Import from Duke	22
Dalton	Import from Duke	3
Southern	Import from MISO	209
Southern	Import from TVA	266
GTC	Import from TVA	67
MEAG	Import from TVA	15
Dalton	Import from TVA	2

Tennessee Valley Authority Balancing Authority (TVA) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
Southern to Santee Cooper	500 MW	Southern	Santee Cooper	2020
Load Flow Cases				
2017 Series Version 2 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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
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 ($2017)			**$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 FRCC

2022

500 MW

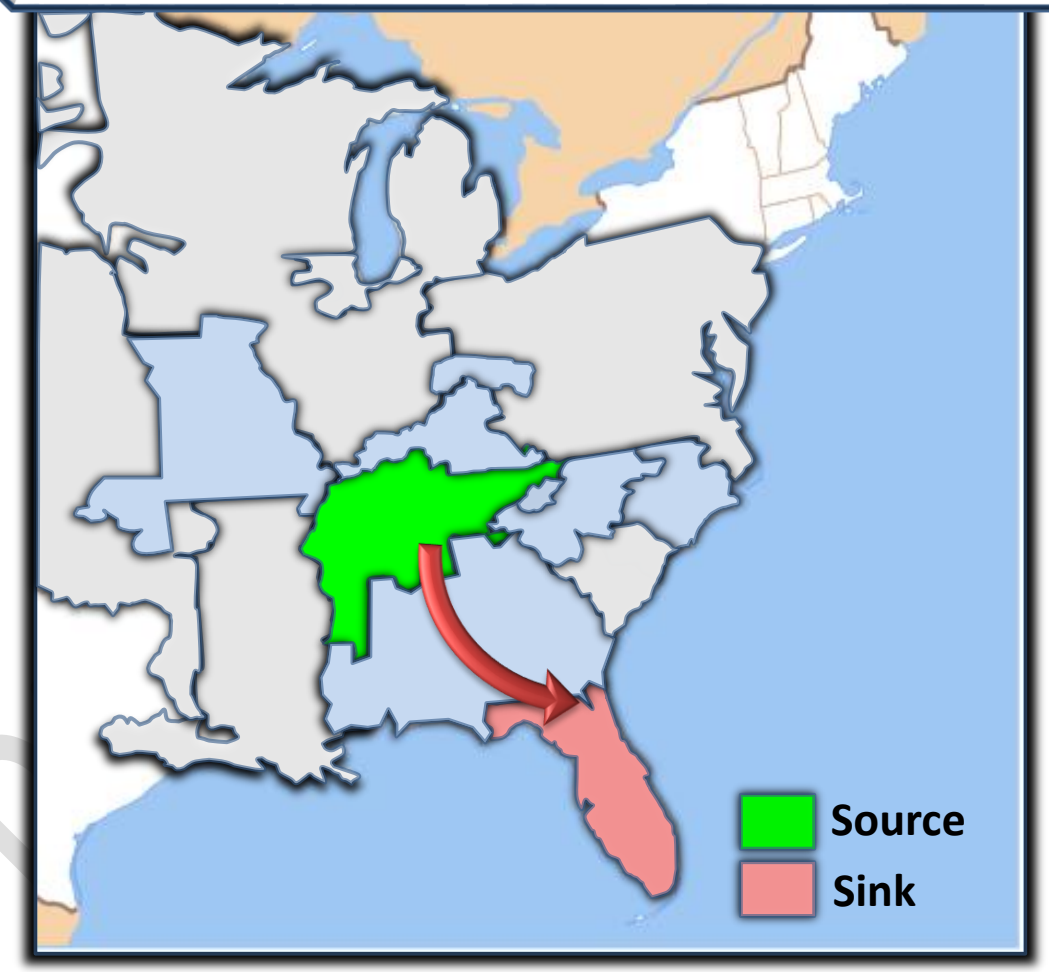
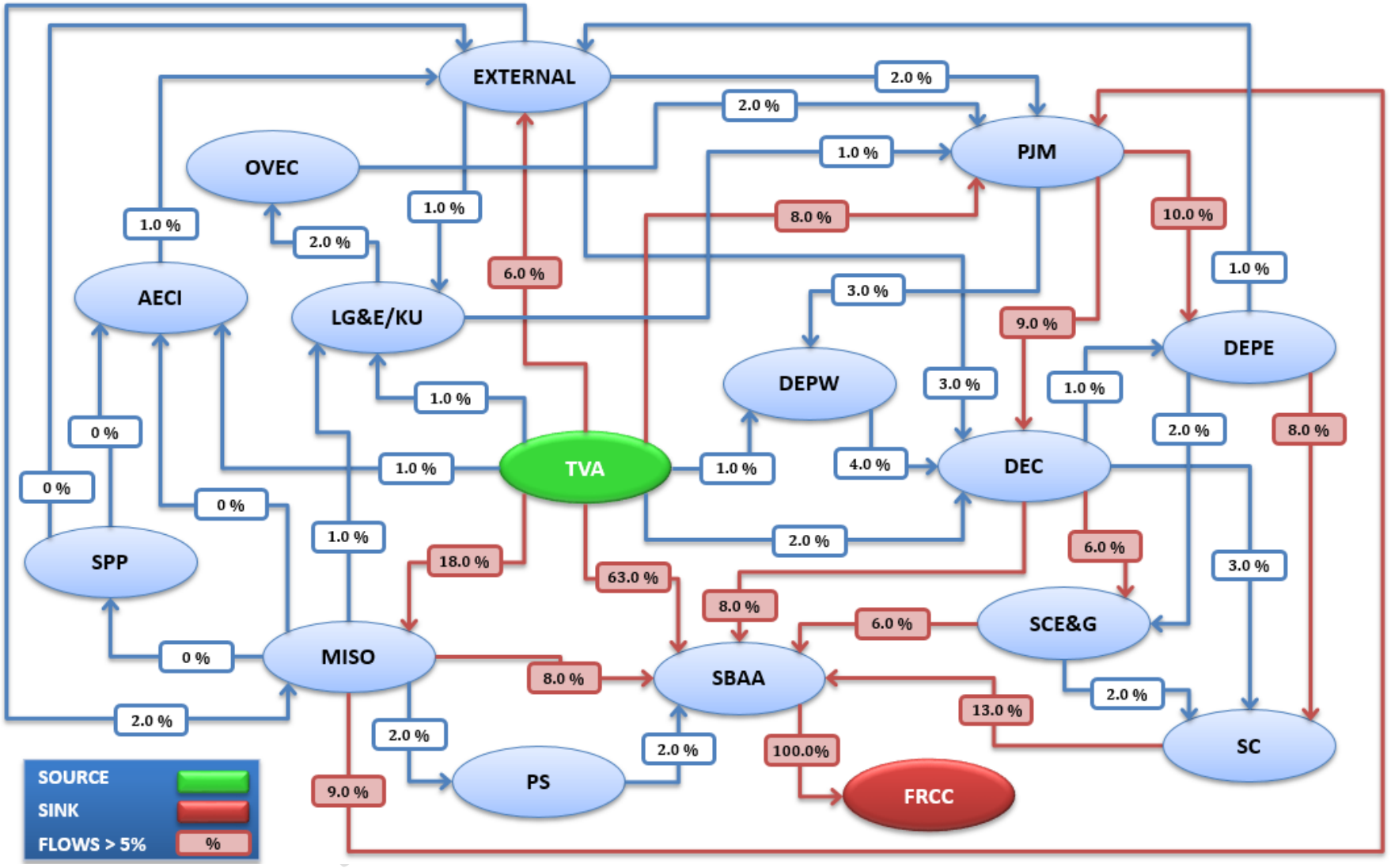


Table III.1.1. Total Cost Identified by the SERTP Sponsors

Balancing Authority	Planning Level Cost Estimate
Associated Electric Cooperative (AECI)	$0
Duke Carolinas (DEC)	$0
Duke Progress East (DEPE)	$0
Duke Progress West (DEPW)	$0
Louisville Gas & Electric and Kentucky Utilities (LG&E/KU)	$0
Ohio Valley Electric Cooperative (OVEC)	$0
PowerSouth (PS)	$0
Southern (SBAA)	$6,800,000
Tennessee Valley Authority (TVA)	$0
TOTAL ($2017)	**$6,800,000**

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



Associated Electric Cooperative Balancing Authority (AECI) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to FRCC	500 MW	TVA	FRCC	2022
Load Flow Cases				
2017 Series Version 2 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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
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 ($2017)			**$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 (DEC) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to FRCC	500 MW	TVA	FRCC	2022
Load Flow Cases				
2017 Series Version 2 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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
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 Required**	--	--
DEC TOTAL ($2017)			**$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 (DEPE) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to FRCC	500 MW	TVA	FRCC	2022
Load Flow Cases				
2017 Series Version 2 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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
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 ($2017)			**$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 FRCC	500 MW	TVA	FRCC	2022
Load Flow Cases				
2017 Series Version 2 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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
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 ($2017)			**$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 (LG&E/KU) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to FRCC	500 MW	TVA	FRCC	2022
Load Flow Cases				
2017 Series Version 2 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 – *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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
LG&E/KU	None Identified	–	–	–	–	–	–

Scenario Explanations:

1. N/A

Table III.6.2. 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.

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

Scenario Explanations:

1. N/A

Table III.6.3. 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 ($2017)			**$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.

Ohio Valley Electric Corporation Balancing Authority (OVEC) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to FRCC	500 MW	TVA	FRCC	2022
Load Flow Cases				
2017 Series Version 2 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 – *OVEC*

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

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
OVEC	None Identified	–	–	–	–	–	–

Scenario Explanations:

1. N/A

Table III.7.2. Pass 1 – Potential Future Transmission System Impacts – *OVEC*

The following table depicts thermal loadings of ***OVEC*** 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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
OVEC	None Identified	--	--	--	--	--	--

Scenario Explanations:

1. N/A

Table III.7.3. Potential Solutions for Identified Problems – *OVEC*

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**	--	--
OVEC TOTAL ($2017)			**$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 (PS) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to FRCC	500 MW	TVA	FRCC	2022
Load Flow Cases				
2017 Series Version 2 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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
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 ($2017)			**$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 (SBAA) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to FRCC	500 MW	TVA	FRCC	2022
Load Flow Cases				
2017 Series Version 2 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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
SBAA	381419 3NUNEZ J 115 – 381445 3 STILLMORE 115	79	101.5(1)	106.1	380009 8W MCINTOSH 500 – 382113 8S_VOG_W MAC500	1	1
SBAA	381565 6R_NANTIFTON 230 - 381878 6N TIFTON B2 230	220	95.4	100.7	380024 8N TIFTON 500 - 380222 6N TIFTON LS 230	2	2

(1) A current operating procedure is sufficient to alleviate this identified constraint without the addition of the proposed transfer. However, the additional transfer exacerbates the loading on this transmission facility such that the operating procedure becomes insufficient.

Scenario Explanations:

1. McIntosh Unit #10 Offline, Shoulder (93% Load Level) Case
2. Hatch Unit #1 Offline, Summer Peak Case

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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
SBAA	380722 3SANDY BOTTM 115 - 381872 3N LAKELAND 115	47	98.2	99.2	381871 6ADEL 5 230 - 381878 6N TIFTON B2 230	1	--
SBAA	380888 3DALTON 115 - 380892 3E DALTON B2 115	180	97.3	98.3	380888 3DALTON 115 - 380892 3E DALTON B2 115	2	--
SBAA	380580 3CLITO 115 - 381483 3DOVER TP 115	63	91.8	97.0	380008 8VOGTLE 500 - 382113 8S_VOG_W MAC 500	3	--
SBAA	380847 3BAXLEY 115 - 381098 3BRENTWOOD 115	85	90.5	93.9	380009 8W MCINTOSH 500 - 382113 8S_VOG_W MAC 500	3	--

Scenario Explanations:

1. Lansing Smith Unit #3 Offline, Summer Peak Case
2. Rocky Mountain Unit #1 Offline, Summer Peak Case
3. McIntosh Unit #10 Offline, Summer Peak Case

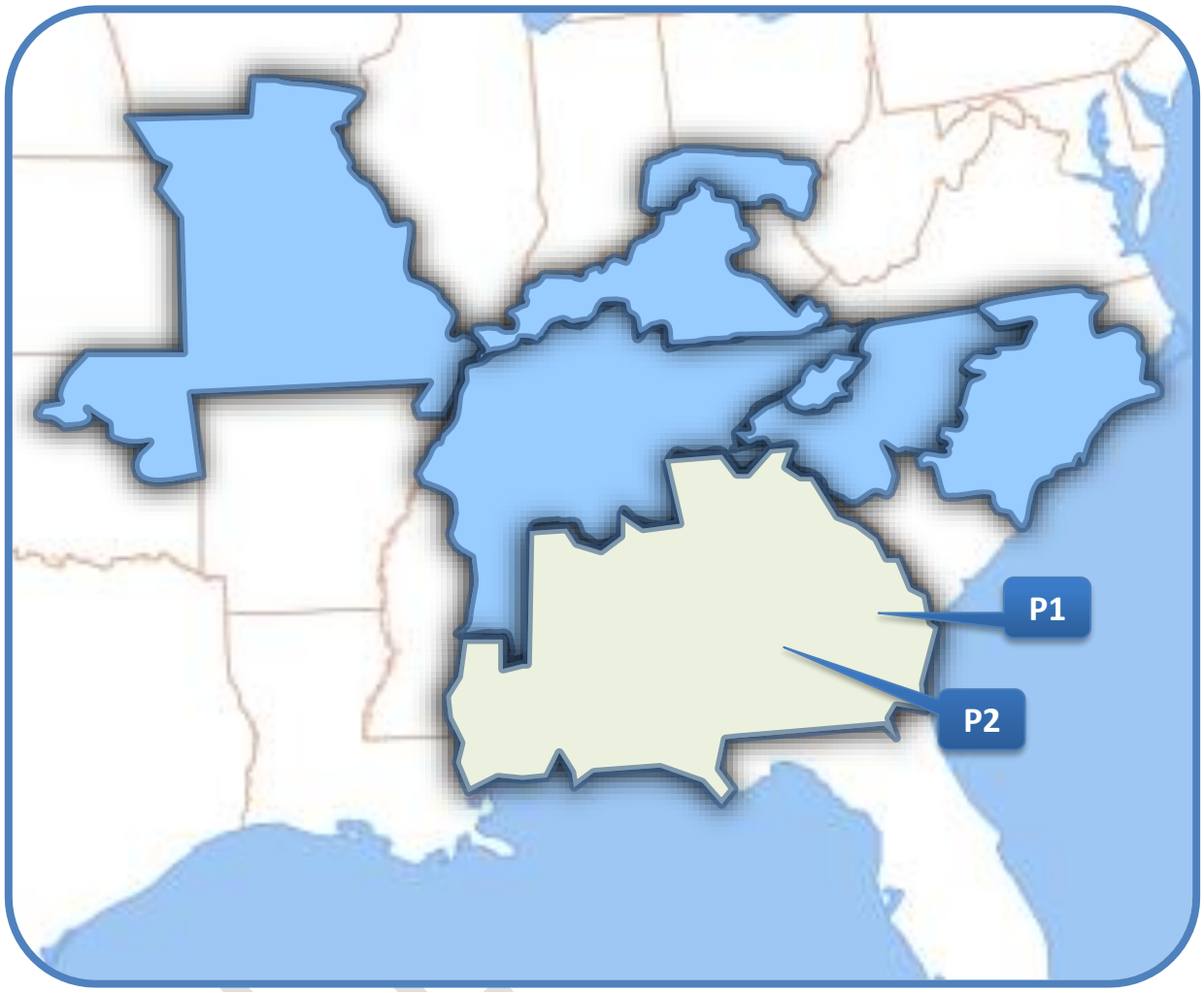
Table III.9.3. Potential Solutions for Identified Problems – *SBAA*

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
P1	**Statesboro Primary – Wadley Primary 115 kV T.L.** • Upgrade approximately 9.2 miles along the Nunez Junction – Stillmore section of the Statesboro – Wadley Primary 115 kV transmission line from 50°C to 100°C operation.	2022	$4,300,000
P2	**North Americus (GTC) 230 kV Substation** • Replace 2% 230 kV Reactor with a new 3% 230 kV Reactor at North Americus on the North Tifton – North Americus 230 kV Line.	2022	$2,500,000
SBAA TOTAL ($2017)			**$6,800,000** (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.

Diagram III.9.1. Approximate Location of Potential Solutions – *SBAA*



Economic Planning Study Additional Interchange Assumptions – *SBAA*

The following tables below list any interface reservations that were preserved in the economic planning studies in addition to those modeled in the Version 2 SERTP Models.

Table III.9.4. Additional Transactions

OASIS Ref. #	POR	POD	Amount (MW)
80579397	GTC	FPL	654
799236	SOCO	JEA	103
72136700	SOCO	JEA	275

Table III.9.5. Capacity Benefit Margin (CBM)

SERTP Sponsor	Interface	Amount (MW)
Southern	Duke	350
Southern	TVA	300
Southern	MISO	100
Southern	SCPSA	50

Table III.9.6. Transmission Reliability Margin (TRM)

SERTP Sponsor	Interface	Amount (MW)
Southern	Import from Duke	167
GTC	Import from Duke	102
MEAG	Import from Duke	22
Dalton	Import from Duke	3
Southern	Import from MISO	209
Southern	Import from TVA	266
GTC	Import from TVA	67
MEAG	Import from TVA	15
Dalton	Import from TVA	2

Tennessee Valley Authority Balancing Authority (TVA) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to FRCC	500 MW	TVA	FRCC	2022
Load Flow Cases				
2017 Series Version 2 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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
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 ($2017)			**$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.

IV. Study Request 4 Results

TVA to PJM Border

2022

500 MW

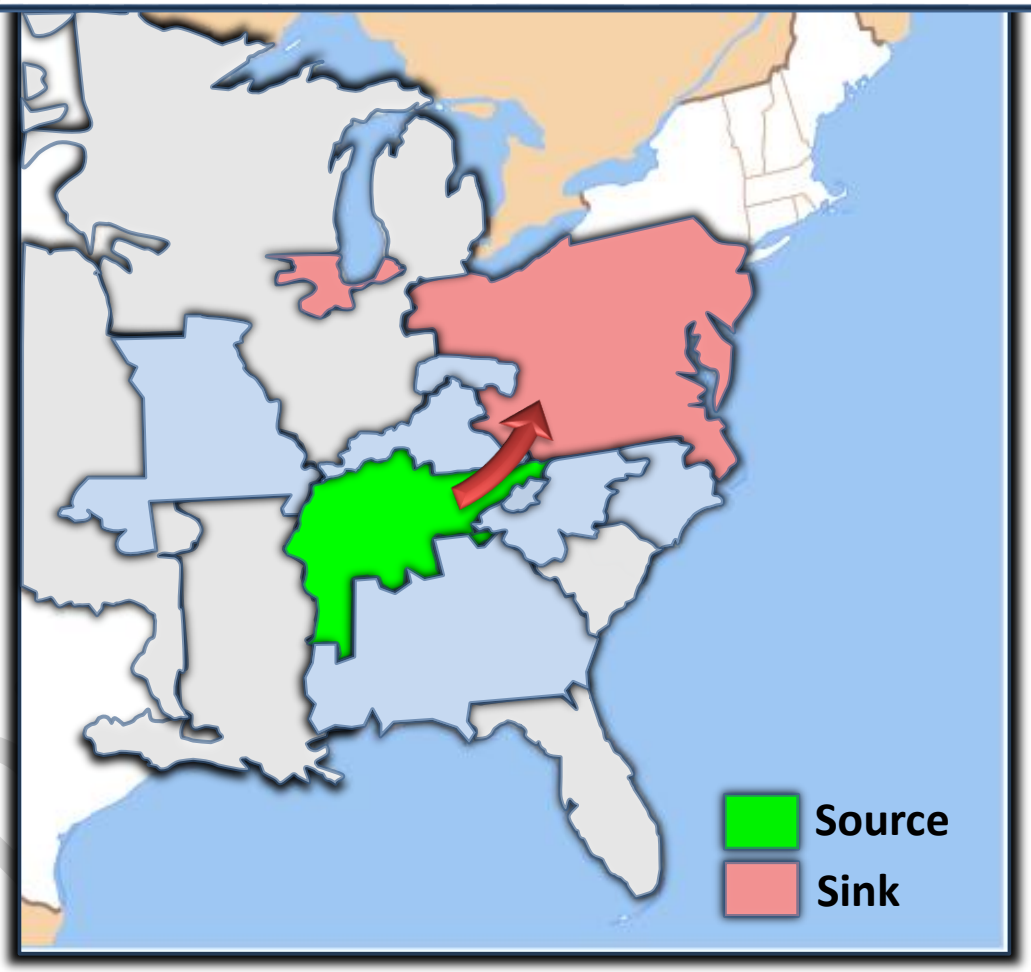
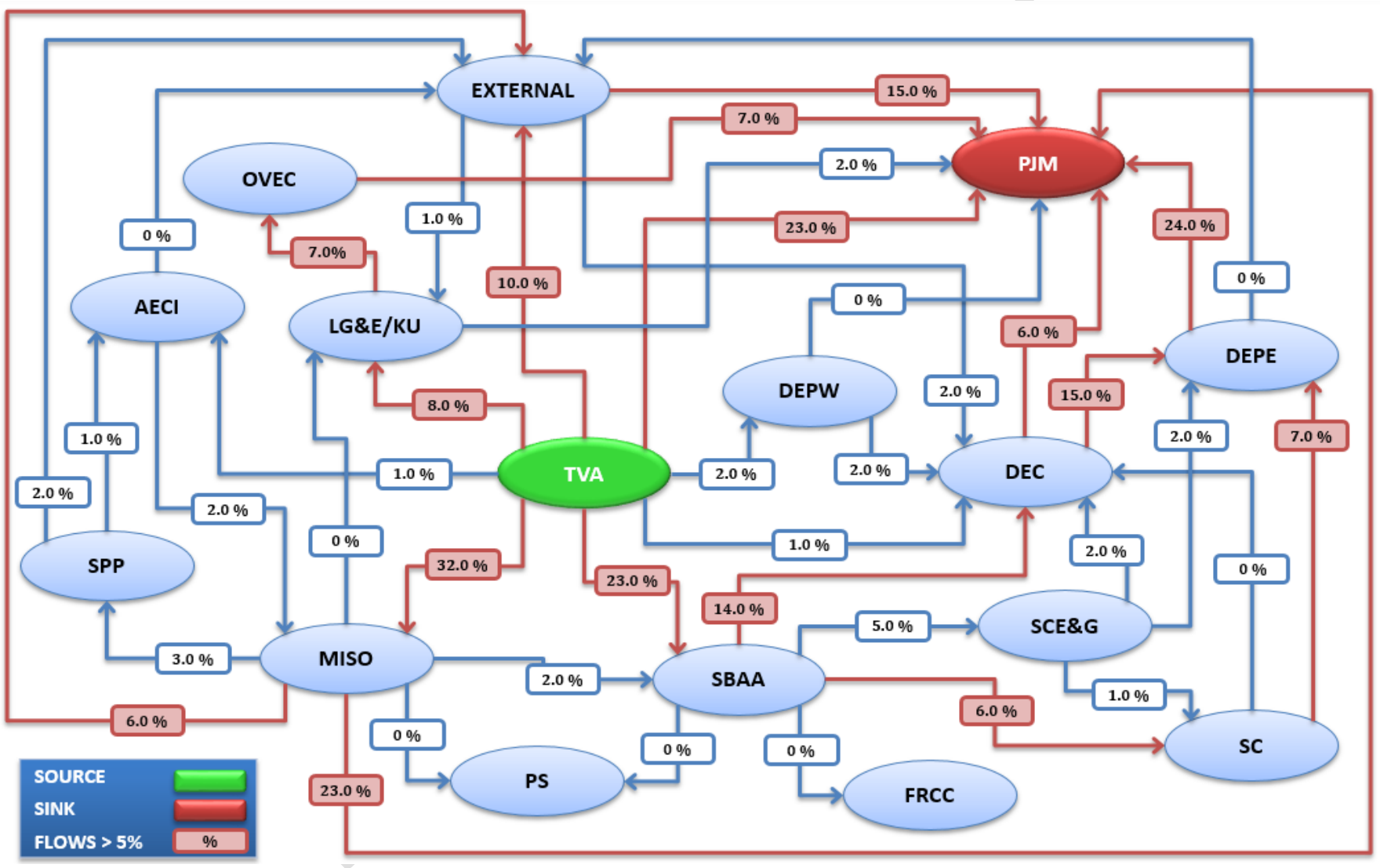


Table IV.1.1. Total Cost Identified by the SERTP Sponsors

Balancing Authority	Planning Level Cost Estimate
Associated Electric Cooperative (AECI)	$0
Duke Carolinas (DEC)	$0
Duke Progress East (DEPE)	$0
Duke Progress West (DEPW)	$0
Louisville Gas & Electric and Kentucky Utilities (LG&E/KU)	$0
Ohio Valley Electric Cooperative (OVEC)	$0
PowerSouth (PS)	$0
Southern (SBAA)	$0
Tennessee Valley Authority (TVA)	$0
TOTAL ($2017)	**$0**

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



Associated Electric Cooperative Balancing Authority (AECI) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to PJM	500 MW	TVA	PJM	2022
Load Flow Cases				
2017 Series Version 2 SERTP Models: Winter 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 IV.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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
AECI	None Identified	–	–	–	–	–	–

Scenario Explanations:

1. N/A

Table IV.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.

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

Scenario Explanations:

1. N/A

Table IV.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 ($2017)			**$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 (DEC) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to PJM	500 MW	TVA	PJM	2022
Load Flow Cases				
2017 Series Version 2 SERTP Models: Winter 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 IV.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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
DEC	None Identified	–	–	–	–	–	–

Scenario Explanations:

1. N/A

Table IV.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.

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

Scenario Explanations:

1. N/A

Table IV.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**	--	--
DEC TOTAL ($2017)			**$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 (DEPE) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to PJM	500 MW	TVA	PJM	2022
Load Flow Cases				
2017 Series Version 2 SERTP Models: Winter 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 IV.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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
DEPE	None Identified	–	–	–	–	–	–

Scenario Explanations:

1. N/A

Table IV.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.

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

Scenario Explanations:

1. N/A

Table IV.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 ($2017)			**$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 PJM	500 MW	TVA	PJM	2022
Load Flow Cases				
2017 Series Version 2 SERTP Models: Winter 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 IV.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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
DEPW	None Identified	–	–	–	–	–	–

Scenario Explanations:

1. N/A

Table IV.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.

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

Scenario Explanations:

1. N/A

Table IV.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 ($2017)			**$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 (LG&E/KU) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to PJM	500 MW	TVA	PJM	2022
Load Flow Cases				
2017 Series Version 2 SERTP Models: Winter 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 IV.6.1. 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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
LG&E/KU	None Identified	–	–	–	–	–	–

Scenario Explanations:

1. N/A

Table IV.6.2. 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.

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

Scenario Explanations:

1. N/A

Table IV.6.3. 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 ($2017)			**$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.

Ohio Valley Electric Corporation Balancing Authority (OVEC) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to PJM	500 MW	TVA	PJM	2022
Load Flow Cases				
2017 Series Version 2 SERTP Models: Winter 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 IV.7.1. Pass 0 – Transmission System Impacts with No Enhancements – *OVEC*

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

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
OVEC	None Identified	–	–	–	–	–	–

Scenario Explanations:

1. N/A

Table IV.7.2. Pass 1 – Potential Future Transmission System Impacts – *OVEC*

The following table depicts thermal loadings of ***OVEC*** 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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
OVEC	None Identified	--	--	--	--	--	--

Scenario Explanations:

1. N/A

Table IV.7.3. Potential Solutions for Identified Problems – *OVEC*

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**	--	--
OVEC TOTAL ($2017)			**$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 (PS) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to PJM	500 MW	TVA	PJM	2022
Load Flow Cases				
2017 Series Version 2 SERTP Models: Winter 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 IV.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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
PS	None Identified	–	–	–	–	–	–

Scenario Explanations:

1. N/A

Table IV.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.

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

Scenario Explanations:

1. N/A

Table IV.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 ($2017)			**$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 (SBAA) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to PJM	500 MW	TVA	PJM	2022
Load Flow Cases				
2017 Series Version 2 SERTP Models: Winter 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 IV.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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
SBAA	None Identified	--	--	--	--	--	--

Scenario Explanations:

1. N/A

Table IV.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.

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

Scenario Explanations:

1. N/A

Table IV.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 ($2017)			**$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 (TVA) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to PJM	500 MW	TVA	PJM	2022
Load Flow Cases				
2017 Series Version 2 SERTP Models: Winter 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 IV.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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
TVA	None Identified	–	–	–	–	–	–

Scenario Explanations:

1. N/A

Table IV.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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
TVA	360331 5BOWLING GRN 161 - 360332 5E BOWLGREEN 161	387.1	94.5	97.3	360043 - 340624 & 360043 - 361032 & 360043 - 361471	3	--
TVA	360072 5WILSON TN 161 - 361020 5GLADEVL TP 161	234.5	91.0	95.0	360352 - 360072	1	--
TVA	360453 5LAFOLLET TN 161 - 360455 5NORRIS HP 161	308.4	91.0	95.0	360102 - 360106 & 360102 - 242521 & 360102 - 324073	4	--
TVA	360093 8BULL RUN FP 500 - 360097 8VOLUNTEER 500	2598.1	86.0	90.0	360097 - 360085	2	--
TVA	360453 5LAFOLLET TN 161 - 360455 5NORRIS HP 161	308.4	86.0	90.0	360102 - 360097	2	--

Scenario Explanations:

1. Gallatin FP Unit 1 Offline + Load U1 + 161kV/24kV Transformer, Winter Peak Case
2. John Sevier Unit 4 Offline, Winter Peak Case
3. Switch Shunt at 360043 5 PARADISE FP Offline, Winter Peak Case
4. Winter Peak Case

Table IV.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 ($2017)			**$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.

V. Study Request 5 Results

TVA to Duke Energy Carolinas

2022

300 MW

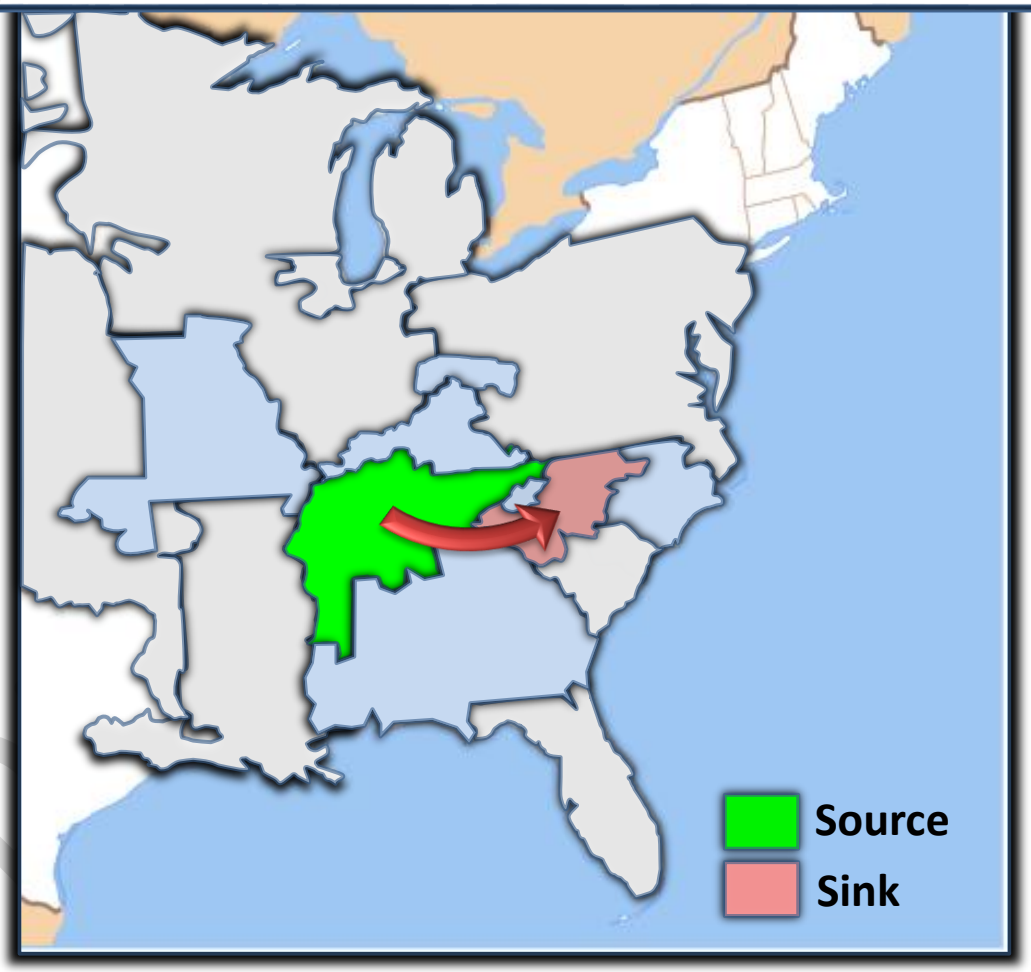
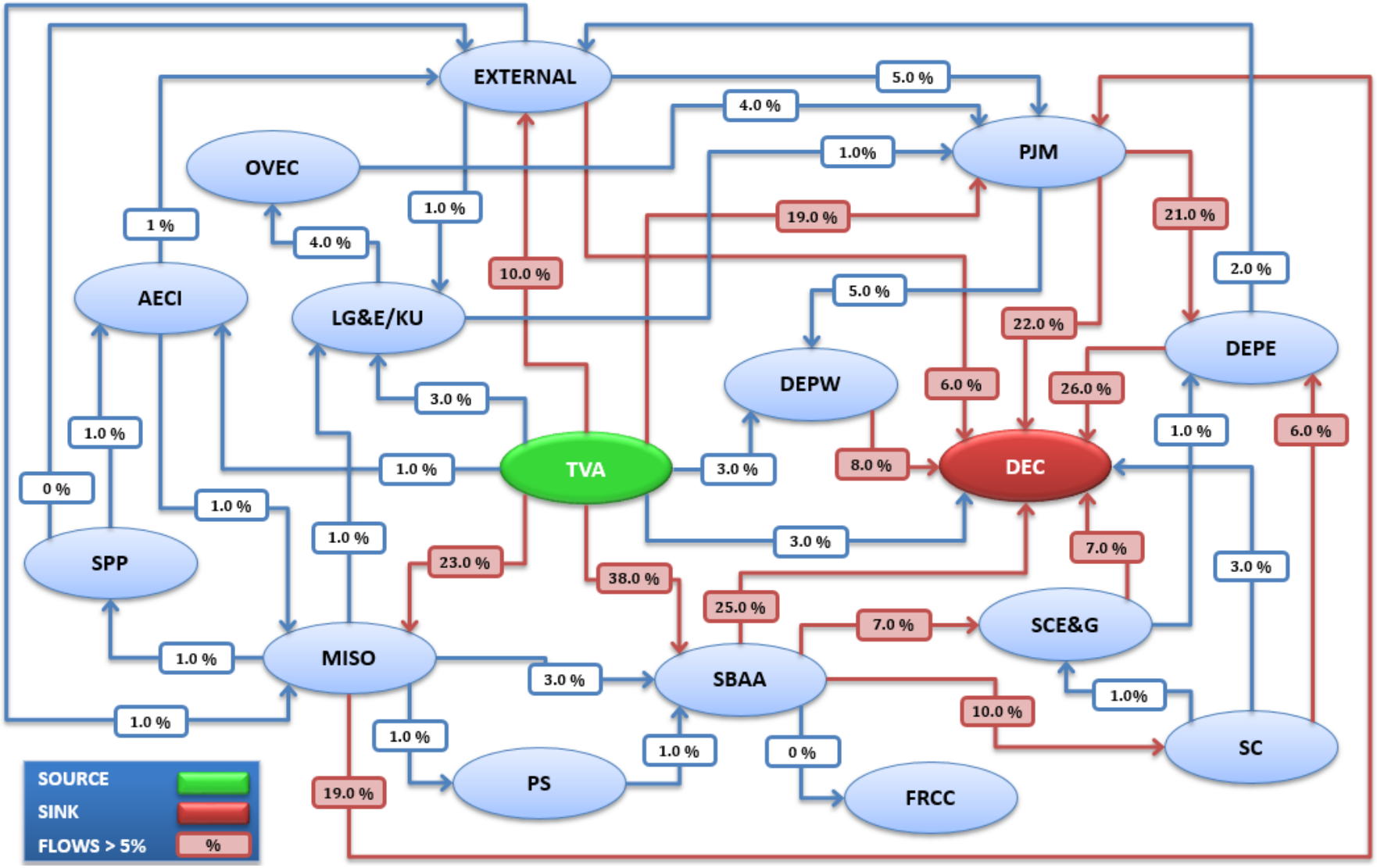


Table V.1.1. Total Cost Identified by the SERTP Sponsors

Balancing Authority	Planning Level Cost Estimate
Associated Electric Cooperative (AECI)	$0
Duke Carolinas (DEC)	$0
Duke Progress East (DEPE)	$0
Duke Progress West (DEPW)	$0
Louisville Gas & Electric and Kentucky Utilities (LG&E/KU)	$0
Ohio Valley Electric Cooperative (OVEC)	$0
PowerSouth (PS)	$0
Southern (SBAA)	$0
Tennessee Valley Authority (TVA)	$0
TOTAL ($2017)	**$0**

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



Associated Electric Cooperative Balancing Authority (AECI) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to DEC	300 MW	TVA	DEC	2022
Load Flow Cases				
2017 Series Version 2 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 V.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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
AECI	None Identified	–	–	–	–	–	–

Scenario Explanations:

1. N/A

Table V.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.

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

Scenario Explanations:

1. N/A

Table V.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 ($2017)			**$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 (DEC) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to DEC	300 MW	TVA	DEC	2022
Load Flow Cases				
2017 Series Version 2 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 V.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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
DEC	None Identified	--	--	--	--	--	--

Scenario Explanations:

1. N/A

Table V.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.

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

Scenario Explanations:

1. N/A

Table V.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**	--	--
DEC TOTAL ($2017)			**$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 (DEPE) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to DEC	300 MW	TVA	DEC	2022
Load Flow Cases				
2017 Series Version 2 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 V.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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
DEPE	None Identified	--	--	--	--	--	--

Scenario Explanations:

1. N/A

Table V.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.

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

Scenario Explanations:

1. N/A

Table V.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 ($2017)			**$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.

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Duke Progress West (DEPW) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to DEC	300 MW	TVA	DEC	2022
Load Flow Cases				
2017 Series Version 2 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 V.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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
DEPW	None Identified	–	–	–	–	–	–

Scenario Explanations:

1. N/A

Table V.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.

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

Scenario Explanations:

1. N/A

Table V.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 ($2017)			**$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 (LG&E/KU) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to DEC	300 MW	TVA	DEC	2022
Load Flow Cases				
2017 Series Version 2 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 V.6.1. 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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
LG&E/KU	None Identified	--	--	--	--	--	--

Scenario Explanations:

1. N/A

Table V.6.2. 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.

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

Scenario Explanations:

1. N/A

Table V.6.3. 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 ($2017)			**$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.

Ohio Valley Electric Corporation Balancing Authority (OVEC) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to DEC	300 MW	TVA	DEC	2022
Load Flow Cases				
2017 Series Version 2 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 V.7.1. Pass 0 – Transmission System Impacts with No Enhancements – *OVEC*

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

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
OVEC	None Identified	--	--	--	--	--	--

Scenario Explanations:

1. N/A

Table V.7.2. Pass 1 – Potential Future Transmission System Impacts – *OVEC*

The following table depicts thermal loadings of ***OVEC*** 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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
OVEC	None Identified	--	--	--	--	--	--

Scenario Explanations:

1. N/A

Table V.7.3. Potential Solutions for Identified Problems – *OVEC*

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**	--	--
OVEC TOTAL ($2017)			**$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 (PS) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to DEC	300 MW	TVA	DEC	2022
Load Flow Cases				
2017 Series Version 2 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 V.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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
PS	None Identified	--	--	--	--	--	--

Scenario Explanations:

1. N/A

Table V.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.

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

Scenario Explanations:

1. N/A

Table V.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 ($2017)			**$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 (SBAA) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to DEC	300 MW	TVA	DEC	2022
Load Flow Cases				
2017 Series Version 2 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 V.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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
SBAA	None Identified	--	--	--	--	--	--

Scenario Explanations:

1. N/A

Table V.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.

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

Scenario Explanations:

1. N/A

Table V.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 ($2017)			**$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 (TVA) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA to DEC	300 MW	TVA	DEC	2022
Load Flow Cases				
2017 Series Version 2 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 V.10.1. Pass 0 – Transmission System Impacts with No Enhancements – *TVA*

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

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

Scenario Explanations:

1. N/A

Table V.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.

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

Scenario Explanations:

1. N/A

Table V.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 ($2017)			**$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.