


Southeastern Regional Transmission Planning (SERTP)

**ECONOMIC PLANNING STUDIES
FINAL RESULTS**



Associated Electric Cooperative Inc.

Dalton
UTILITIES

DUKE ENERGY

Georgia Transmission

LGE & KU

MEAG POWER

OVEC/KEC
Ohio Valley Electric Corporation / Indiana-Kentucky Electric Corporation

POWER SOUTH
ENERGY COOPERATIVE

SOUTHERN COMPANY

TVA

December 4, 2015

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I. Overview of Economic Planning Studies

Executive Summary

The Regional Planning Stakeholder Group (“RPSG”) identified three 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. For economic study requests that involve multiple sources and/or sinks, separate analysis would be required to assess the transmission impacts of a singular source/sink included in these 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:

A. Santee Cooper Border to Duke – 500 MW

- **Year:** 2018
- **Load Level:** Summer Peak
- **Type of Transfer:** Load to Generation
- **Source:** Uniform load scale within Santee Cooper
- **Sink:** Generation within Duke Energy Carolinas

B. TVA (Shelby) to Southern/TVA/Duke – 3500 MW

- **Year:** 2020
- **Load Level:** Summer Peak
- **Type of Transfer:** Generation to Generation
- **Source:** A new generator interconnection to the existing Shelby 500 kV substation (TVA)
- **Sink:** Generation within Southern Company (1200MW), TVA (1639MW), Duke Energy Carolinas (407MW), and Duke Energy Progress (254MW)

C. Southern & SCE&G to PJM Border – 500 MW

- **Year:** 2020
- **Load Level:** Summer Peak
- **Type of Transfer:** Generation/Load to Load
- **Source:** Generation within Southern Company and uniform load scale within SCE&G using the participation factors shown in Table 1 below:
- **Sink:** Uniform load scale within PJM using the participation factors shown in Table 2 below:

Table 1: Southern Company & SCE&G – Participation Factors

Entity	Participation Factor (%)	MW Allocation
Southern Company	50.0%	250
SCE&G	50.0%	250
Total	100.0%	500

Table 2: PJM Border – Participation Factors

PJM Area #	Area #	Participation Factor (%)	MW Allocation
American Electric Power	205	33.3%	167
Commonwealth Edison	222	33.3%	167
Dominion Virginia Power	345	33.3%	166
Total		100.00%	500

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)

Case Development

- For all evaluations, the “2015 Series, Version 2 SERTP Models” were used as a starting point for the analysis of the Economic Planning Scenarios.
- For the economic planning study request sourcing from a new generator interconnection to the existing Shelby 500kV substation in TVA, a new Lagoon Creek – Jackson 500 kV transmission line in TVA was modeled per RPSG request.

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

II. Economic Planning Study Results

Santee Cooper to Duke

2018

500 MW

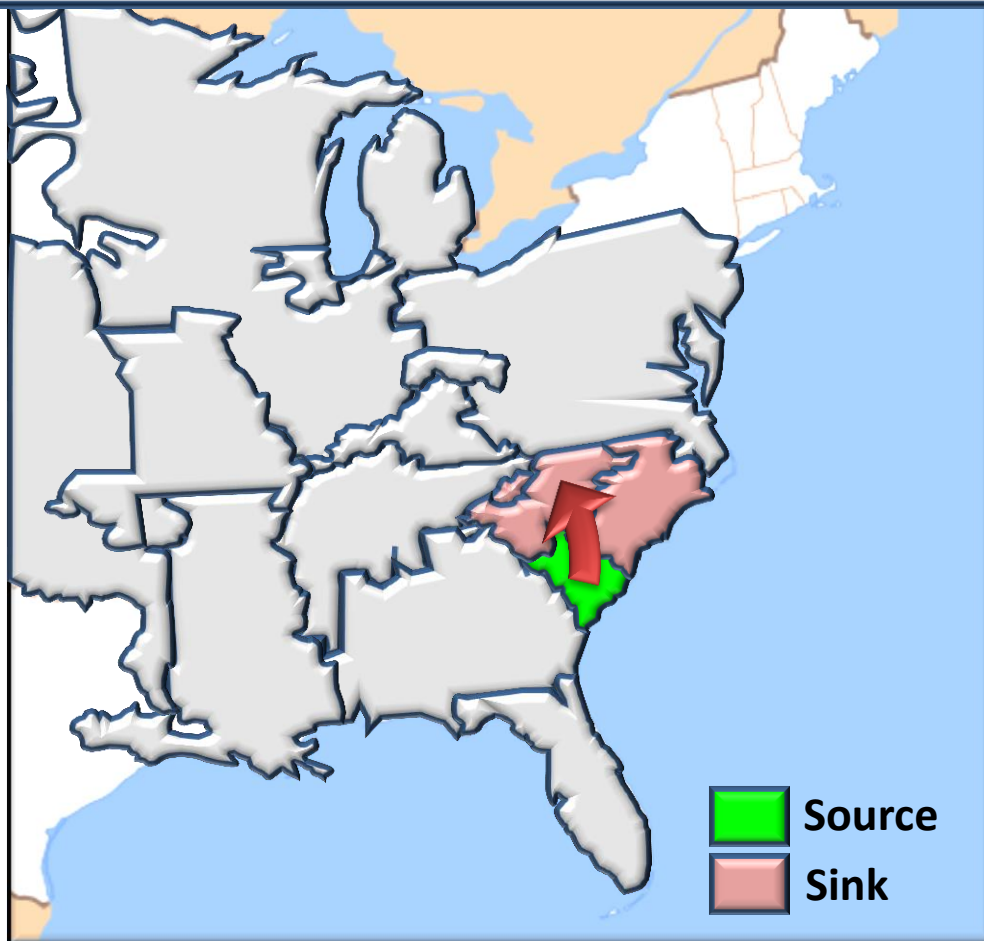
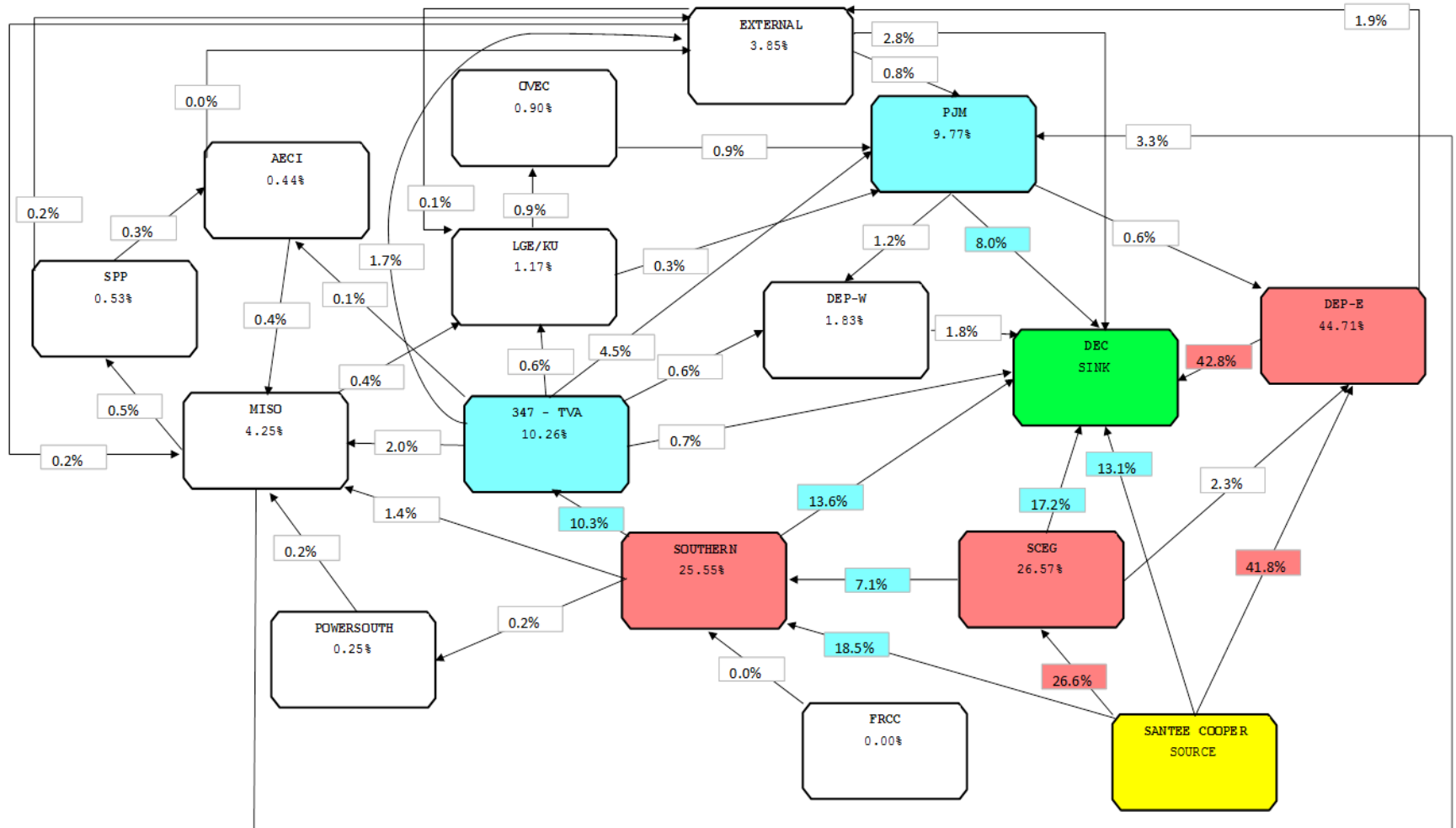


Table II.1.1 Total Cost Identified by the SERTP Sponsors

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 (SBA)	\$0
Tennessee Valley Authority (TVA)	\$0
TOTAL (\$2015)	\$0

Diagram II.1.1 Transfer Flows with the SERTP



Associated Electric Cooperative Balancing Authority (AECI) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
Santee Cooper to Duke	500 MW	Santee Cooper Border	Duke	2018
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 500 MW transfer from Santee Cooper to Duke results in no thermal constraints attributable to the requested transfer.

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

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

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

Scenario Explanations:

N/A

Table II.2.2 Potential Solutions for Identified Problems – AECI

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
AECI TOTAL (\$2015)			\$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 Duke	500 MW	Santee Cooper Border	Duke	2018
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 500 MW transfer from Santee Cooper to Duke results in no thermal constraints attributable to the requested transfer.

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

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

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%)		Contingency	Scenario	Project
			Without Request	With Request			
DEC	306041 LEE 100.00 306151 BUS 306151 100.00 1	120	86.4	94.4	306041 LEE 100.00 308492 PERRY B 100.00 1	1	--

Scenario Explanations:

1. Summer Peak Case

Table II.3.3 Potential Solutions for Identified Problems – DEC

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
DEC TOTAL (\$2015)			\$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 Duke	500 MW	Santee Cooper Border	Duke	2018
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 500 MW transfer from Santee Cooper to Duke results in no thermal constraints attributable to the requested transfer.

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

The following table depicts 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.

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%)		Contingency	Scenario	Project
			Without Request	With Request			
DEPE	304348 6ROCKHAM230T 230 304638 6WADSBOR TA1 230 1	542	91.9	93.0	304348 6ROCKHAM230T 230 305046 6E11-ELLERBE 230 1	2	--
DEPE	304020 6BRUN2 230 T 230 305005 6E1-SOUTHPOR 230 1	478	87.4	91.7	304020 6BRUN2 230 T 230 305009 6E1-DAWSCREE 230 1	1	--

Scenario Explanations:

1. Brunswick Unit #1 Offline, Summer Peak Case
2. Harris Offline, Summer Peak Case

Table II.4.2 Potential Solutions for Identified Problems – DEPE

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
DEPE TOTAL (\$2015)			\$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 Duke	500 MW	Santee Cooper Border	Duke	2018
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 500 MW transfer from Santee Cooper to Duke results in no thermal constraints attributable to the requested transfer.

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

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

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

Scenario Explanations:

N/A

Table II.5.2 Potential Solutions for Identified Problems – DEPW

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	\$0
DEPW TOTAL (\$2015)			\$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 Duke	500 MW	Santee Cooper Border	Duke	2018
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 500 MW transfer from Santee Cooper to Duke results in no thermal constraints attributable to the requested transfer.

Table II.6.1 Pass 0 – Transmission System Impacts with No Enhancements – LG&E/KU

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

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

Scenario Explanations:

N/A

Table II.6.2 Potential Solutions for Identified Problems – LG&E/KU

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
LG&E/KU TOTAL (\$2015)			\$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 Duke	500 MW	Santee Cooper Border	Duke	2018
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 500 MW transfer from Santee Cooper to Duke results in no thermal constraints attributable to the requested transfer.

Table II.7.1 Pass 0 – Transmission System Impacts with No Enhancements – OVEC

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

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

Scenario Explanations:

N/A

Table II.7.2 Potential Solutions for Identified Problems – OVEC

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
OVEC TOTAL (\$2015)			\$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 Duke	500 MW	Santee Cooper Border	Duke	2018
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 500 MW transfer from Santee Cooper to Duke results in no thermal constraints attributable to the requested transfer.

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

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

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

Scenario Explanations:

N/A

Table II.8.2 Potential Solutions for Identified Problems – PS

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
PS TOTAL (\$2015)			\$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 (SBA) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
Santee Cooper to Duke	500 MW	Santee Cooper Border	Duke	2018
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 500 MW transfer from Santee Cooper to Duke results in no thermal constraints attributable to the requested transfer.

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

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

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

Scenario Explanations:

N/A

Table II.9.2 Potential Solutions for Identified Problems – SBA

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
SBA TOTAL (\$2015)			\$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.

Interchange Assumptions – SBA

Table II.9.3 Incremental Transactions Preserved to those Modeled in Version 2 SERTP Models

OASIS Ref. #	POR	POD	Amount (MW)
NS1117	DUKE	PS LOAD on SOCO	50
NS1119	MISO	SMEPA LOAD on SOCO	125
NS1117	MISO	PS LOAD on SOCO	150
NL1112	MISO	SOCO	500
147615	DUKE	OPC LOAD	465
147613	TVA	OPC LOAD	310
NL1132	TVA	SOCO	500
NL1132	MISO	SOCO	250
79662312	SOCO	DUKE	27
80832892	SOCO	DUKE	132
80600833	SOCO	DUKE	132
959841	SOCO	DUKE	44
79822666	GTC	TVA	200
NL1112	SCPSA	SOCO	50

Table II.9.4 Capacity Benefit Margin Preserved (CBM)

SERTP Sponsor	Interface	Amount (MW)
Southern	Duke	350
Southern	TVA	400
Southern	MISO	100
Southern	SCPSA	125
Southern	SCEG	75

Table II.9.5 Transmission Reliability Margins Preserved (TRM)

SERTP Sponsor	Interface	Amount (MW)
Southern	From Duke	200
GTC	From Duke	109
MEAG	From Duke	26
Dalton	From Duke	3
Southern	From MISO	216
Southern	From TVA	218
GTC	From TVA	48
MEAG	From TVA	11
Dalton	From TVA	1

Tennessee Valley Authority Balancing Authority (TVA) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
Santee Cooper to Duke	500 MW	Santee Cooper Border	Duke	2018
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 500 MW transfer from Santee Cooper to Duke results in no thermal constraints attributable to the requested transfer.

Table II.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 (%)		Contingency	Scenario	Project
			Without Request	With Request			
TVA	None Identified	--	--	--	--	--	--

Scenario Explanations:

N/A

Table II.10.2 Potential Solutions for Identified Problems – TVA

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
TVA TOTAL (\$2015)			\$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. Economic Planning Study Results

TVA (Shelby) to Southern/TVA/Duke

2020

3500 MW

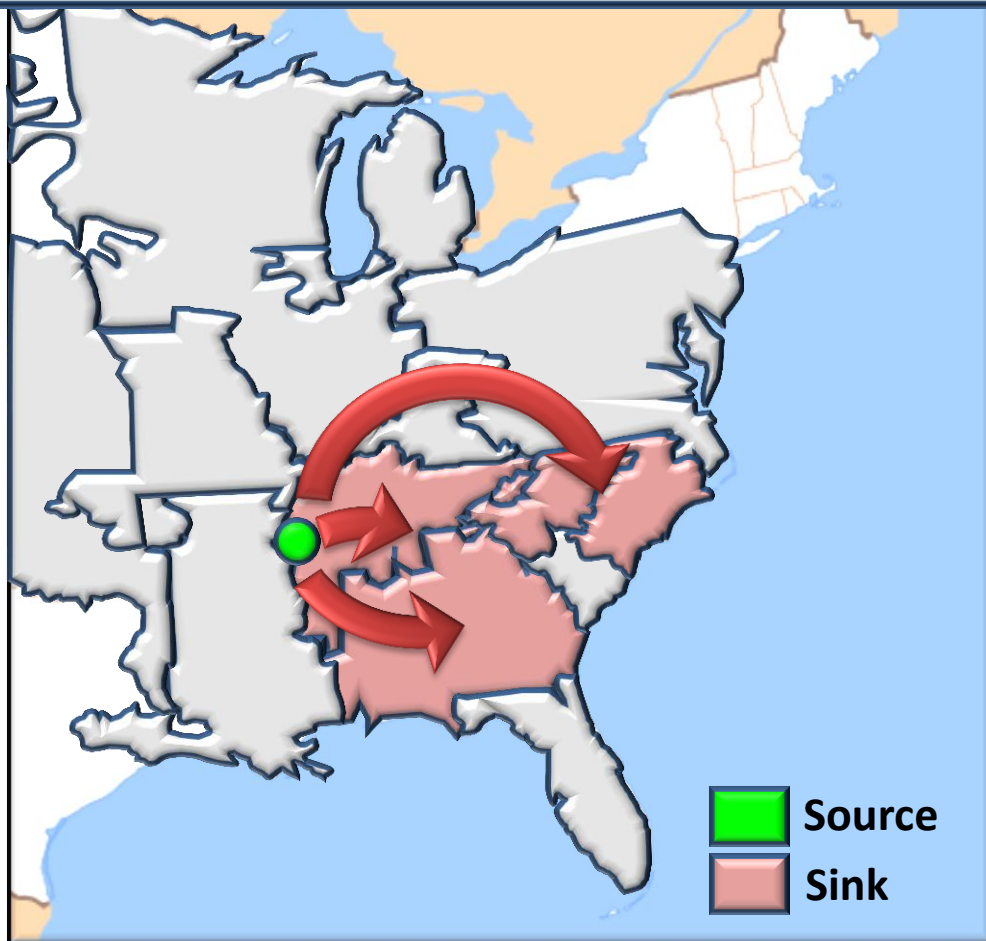
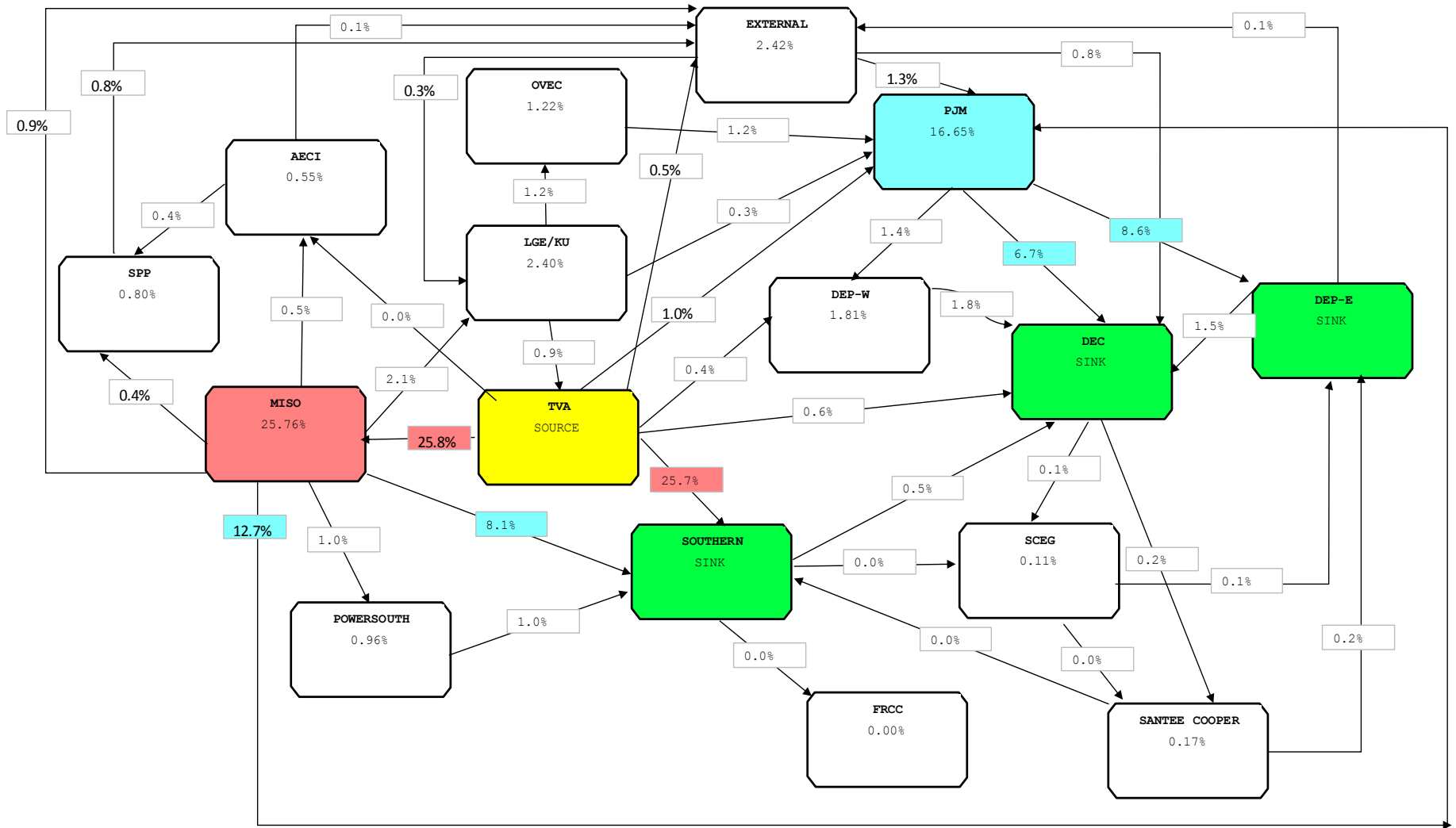


Table III.1.1. Total Cost Identified by the SERTP Sponsors

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 (SBA)	\$147,300,000
Tennessee Valley Authority (TVA)	\$141,000,000
TOTAL (\$2015)	\$288,300,000

Diagram III.1.1. Transfer Flows with the SERTP



Associated Electric Cooperative Balancing Authority (AECI) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA (Shelby) to Southern/TVA/Duke	3500 MW	TVA (Shelby)	Southern/TVA/Duke	2020
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 3500 MW transfer results in no thermal constraints attributable to the requested transfer.

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

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

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

Scenario Explanations:

N/A

Table III.2.2 Potential Solutions for Identified Problems – AECI

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
AECI TOTAL (\$2015)			\$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 (Shelby) to Southern/TVA/Duke	3500 MW	TVA (Shelby)	Southern/TVA/Duke	2020
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 3500 MW transfer results in no thermal constraints attributable to the requested transfer.

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

The following table depicts 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.

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%)		Contingency	Scenario	Project
			Without Request	With Request			
DEC	306164 HORSESHO 100.00 308740 ASHVHWYW 100.00 1	117	88.2	93.8	306164 HORSESHO 308471 NIXRDTAP 1	1	-

Scenario Explanations:

2. Cliffside Unit #5 Offline, Summer Peak Case

Table III.3.2 Potential Solutions for Identified Problems – DEC

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
DEC TOTAL (\$2015)			\$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 (Shelby) to Southern/TVA/Duke	3500 MW	TVA (Shelby)	Southern/TVA/Duke	2020
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 3500 MW transfer results in no thermal constraints attributable to the requested transfer.

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

The following table depicts 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.

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%)		Contingency	Scenario	Project
			Without Request	With Request			
DEPE	304716 3CAMDEN TAP 115 304725 3CAMDEN115 T 115 1	107	95.3	97.7	304725 3CAMDEN115 T 115 304731 3IND104 115 1	2	--
DEPE	304020 6BRUN2 230 T 230 305005 6E1-SOUTHPOR 230 1	478	89.0	93.6	304020 6BRUN2 230 T 230 305009 6E1-DAWSCREE 230 1	1	--
DEPE	304615 6BARNCRK E T 230 304621 6TOWN CRK TT 230 2	600	87.8	92.5	304020 6BRUN2 230 T 230 305005 6E1-SOUTHPOR 230 1	1	--
DEPE	304731 3IND104 115 304732 3ELGIN TAP 115 1	95	88.6	91.7	304716 3CAMDEN TAP 115 304725 3CAMDEN115 T 115 1	2	--

Scenario Explanations:

1. Brunswick Unit #1 Offline, Summer Peak Case
2. Harris Offline, Summer Peak Case

Table III.4.2 Potential Solutions for Identified Problems – DEPE

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
DEPE TOTAL (\$2015)			\$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 (Shelby) to Southern/TVA/Duke	3500 MW	TVA (Shelby)	Southern/TVA/Duke	2020
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 3500 MW transfer results in no thermal constraints attributable to the requested transfer.

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

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

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

Scenario Explanations:

N/A

Table III.5.2 Potential Solutions for Identified Problems – DEPW

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
DEPW TOTAL (\$2015)			\$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 (Shelby) to Southern/TVA/Duke	3500 MW	TVA (Shelby)	Southern/TVA/Duke	2020
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 3500 MW transfer results in no thermal constraints attributable to the requested transfer.

Table III.6.1 Pass 0 – Transmission System Impacts with No Enhancements – LG&E/KU

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

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

Scenario Explanations:

N/A

Table III.6.2 Potential Solutions for Identified Problems – LG&E/KU

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
LG&E/KU TOTAL (\$2015)			\$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 (Shelby) to Southern/TVA/Duke	3500 MW	TVA (Shelby)	Southern/TVA/Duke	2020
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 3500 MW transfer results in no thermal constraints attributable to the requested transfer.

Table III.7.1 Pass 0 – Transmission System Impacts with No Enhancements – OVEC

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

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

Scenario Explanations:

N/A

Table III.7.2 Potential Solutions for Identified Problems – OVEC

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
OVEC TOTAL (\$2015)			\$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 (Shelby) to Southern/TVA/Duke	3500 MW	TVA (Shelby)	Southern/TVA/Duke	2020
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 3500 MW transfer results in no thermal constraints attributable to the requested transfer.

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

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

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

Scenario Explanations:

N/A

Table III.8.2 Potential Solutions for Identified Problems – PS

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
PS TOTAL (\$2015)			\$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 (SBA) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA (Shelby) to Southern/TVA/Duke	3500 MW	TVA (Shelby)	Southern/TVA/Duke	2020
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

Table III.9.1 below identifies thermal constraints attributable to the requested transfer for the contingency and scenario that resulted in the highest facility loading 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 – SBA

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

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%)		Contingency	Scenario	Project
			Without Request	With Request			
SBA	384121 5FAYET TS 161 384127 5FAY COTN 161 1	193	105.6 ⁽¹⁾	133.5	384157 8MILLER8 500 385307 8WVERN SS8 500 1	5	P1
SBA	388420 3NASA 115 388426 3LOGTWN W3 115 1	216	110.7 ⁽¹⁾	120.6	388400 6KILN 6 230 388425 6LOGTWN W6 230 1	1	P2
SBA	384131 5OAKMANTP 161 384135 5GORGAS 161 1	193	93.4	123.0	384157 8MILLER8 500 385307 8WVERN SS8 500 1	5	P1
SBA	336898 3MORTON 115 388114 3FORINDT2 115 1	155	104.1 ⁽¹⁾	119.0	360631 8FRENCH CAMP 500 360654 8CHOCTAW MS 500 1	2	P3
SBA	380199 6OOSTANAULA 230 381122 6DALTON 6 230 1	664	93.6	109.4	380021 8MOSTELLER 500 382499 8CONASAUGA 500 1	3	P4
SBA	384241 6LEEDSTS6 230 385039 6ARGO DS 230 1	602	98.0	109.0	384157 8MILLER8 500 384375 8S.BESS 8 500 1	4	P5
SBA	360283 5ALBERTVILLE 161 384332 5ATTALLA5 161 1 ⁽²⁾	193	81.3	108.3	380021 8MOSTELLER 500 382499 8CONASAUGA 500 1	8	P6
SBA	303222 6ANGIE 230 388270 6HATBG SW6 230 1	463	96.1	107.6	303223 6FR_BRANCH 230 336137 6SLIDEL! 230 1	7	P7
SBA	384234 6CLAY 6 230 385039 6ARGO DS 230 1	602	92.0	104.7	384157 8MILLER8 500 384375 8S.BESS 8 500 1	4	P5
SBA	384156 6MILLER6 230 384172 6BOYLESM1 230 1	602	92.6	102.6	384157 8MILLER8 500 385312 8CLAY 8 500 1	4	P9
SBA	388702 6DANIEL6 230 388710 6MOSSPT E6 230 1	922	97.1	102.4	384642 6BIG CK 6 230 388702 6DANIEL6 230 1	1	P8
SBA	388816 3WADE SS3 115 388832 3HARLESTN 115 1	107	90.5	101.4	384642 6BIG CK 6 230 388702 6DANIEL6 230 1	1	P8
SBA	380086 6CUMMING 230 381135 6MCGRAU F B1 230 1	596	96.8	100.6	380011 8S HALL 500 382035 6S HALL LS 230 1	6	P10

- (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.
- (2) This is a tie-line constraint with TVA.

Scenario Explanations:

- | | | |
|--|---|---|
| 1. Crist Offline, Summer Peak Case | 4. Gaston Unit #5 Offline, Shoulder (93% Load Level) Case | 7. Ratcliffe Offline, Summer Peak Case |
| 2. Ratcliffe Offline, Shoulder (93% Load Level) Case | 5. Gorgas Offline, Shoulder (93% Load Level) Case | 8. Gaston Unit #5 Offline, Summer Peak Case |
| 3. Hammond Offline, Summer Peak Case | 6. Vogtle Unit #1 Offline, Summer Peak Case | |

Table III.9.2 Pass 1 – Transmission System Impacts with All Proposed Enhancements – SBA

The following table depicts loadings of SBA transmission facilities that could become potential constraints in future years or with different queuing assumptions, but are not overloaded in the study year.

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%)		Contingency	Scenario	Project
			Without Request	With Request			
SBA	384655 3N MOBILE B1 115 385942 3N MOBILE B2 115 1	415	88.4	99.9	384638 6CHICK 6 230 384642 6BIG CK 6 230 1	4	
SBA	384331 3ATTALLA3 115 384332 5ATTALLA5 161 1	108	68.2	98.9	384331 3ATTALLA3 115 384332 5ATTALLA5 161 2	5	
SBA	384156 6MILLER6 230 384157 8MILLER8 500 1	1613	90.4	98.4	384157 8MILLER8 500 384375 8S.BESS 8 500 1	6	
SBA	380196 6CARTERVL B1 230 381125 6CARTERVL B2 230 1	829	96.7	98.1	380195 6BOWEN 230 381125 6CARTERVL B2 230 1	3	
SBA	360662 8BRADLEY TN 500 382499 8CONASAUGA 500 1	2598	81.8	98.0	306008 8OCONEE 500 380011 8S HALL 500 1	7	
SBA	384638 6CHICK 6 230 384700 6BARRY 6 230 1	833	96.2	97.2	384638 6CHICK 6 230 384642 6BIG CK 6 230 1	4	
SBA	384126 5KING JCT 161 384866 5S.VERNTP 161 1	377	79.5	96.3	384157 8MILLER8 500 385307 8WVERN SS8 500 1	6	
SBA	371308 SRS2 230 380115 6VOGTLE 230 1	1017	94.4	95.8	380008 8VOGTLE 500 380009 8W MCINTOSH 500 1	1	
SBA	384374 6S.BESS 6 230 384375 8S.BESS 8 500 1	1593	92.5	95.8	385123 8BILLNGSS 500 385178 8AUTAUSS8 500 1	8	
SBA	380025 8MCGRAU FORD 500 380088 6MCGRAU F LS 230 1	2016	83.0	94.1	380020 8BOWEN 500 380021 8MOSTELLER 500 1	2	
SBA	384642 6BIG CK 6 230 389510 NEWSITE6 230 1	602	84.0	94.0	384642 6BIG CK 6 230 388702 6DANIEL6 230 1	4	
SBA	384374 6S.BESS 6 230 384950 6DUNCANVL 230 1	502	85.0	93.8	385123 8BILLNGSS 500 385178 8AUTAUSS8 500 1	10	
SBA	384233 3CLAY 3 115 384234 6CLAY 6 230 1	477	83.5	92.7	384234 6CLAY 6 230 385039 6ARGO DS 230 1	9	
SBA	388100 3NEWTON 115 388101 3HICKORY 115 1	155	72.1	91.4	388210 6LAUREL E6 230 388270 6HATBG SW6 230 1	8	
SBA	384200 3BESSEMER B2 115 384202 6BESSGRCO 230 1	392	83.0	90.9	385123 8BILLNGSS 500 385178 8AUTAUSS8 500 1	9	

Scenario Explanations:

- | | | |
|---|--|--|
| 1. McIntosh Offline, Shoulder (93% Load Level) Case | 5. Hillabee Offline, Shoulder (93% Load Level) Case | 9. Gaston Unit # 5 Offline, Shoulder (93% Load Level) Case |
| 2. Bowen Unit # 1 Offline, Summer Peak Case | 6. Gorgas Offline, Shoulder (93% Load Level) Case | 10. Ratcliffe Offline, Summer Peak Case |
| 3. McDonough Unit #5 Offline, Summer Peak Case | 7. T.A. Smith Unit #1 Offline, Summer Peak Case | |
| 4. Crist Offline, Summer Peak Case | 8. Ratcliffe Offline, Shoulder (93% Load Level) Case | |

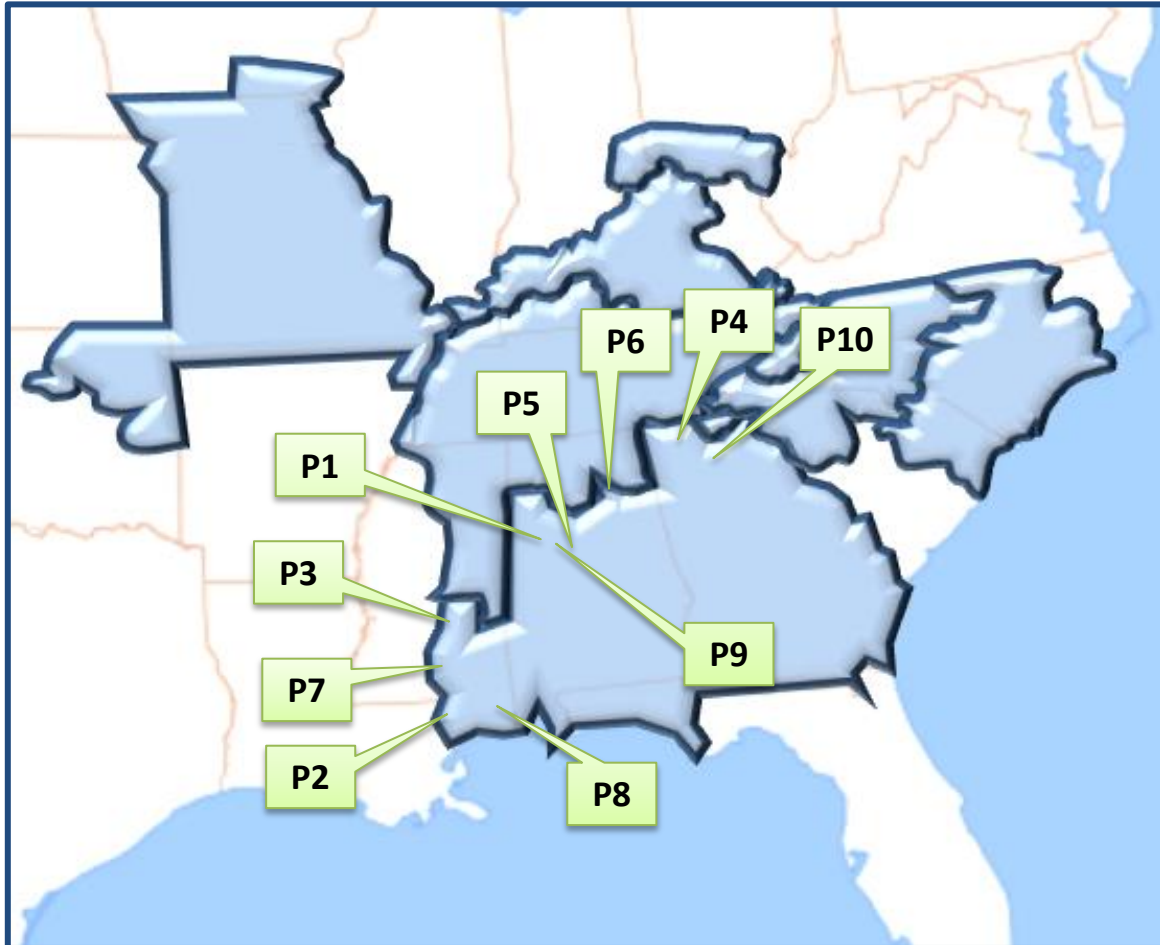
Table III.9.3. Potential Solutions for Identified Problems – SBA

The following projects are identified as potential solutions to address the identified constraints and are 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	Fayette – Gorgas 161 kV T.L. <ul style="list-style-type: none"> Rebuild approximately 36.7 miles along the Fayette – Gorgas 161 kV transmission line with 795 ACSS at 160°C. 	2020	<u>Project Cost:</u> \$37,000,000 <u>Advancement Cost:</u> \$7,900,000
P2	Nasa – Logtown 115 kV T.L. & 230/115 kV Transformer <ul style="list-style-type: none"> Reconductor approximately 3 miles along the Nasa – Logtown 115 kV transmission line with 795 ACSS at 200 °C. Install new 230/115 kV transformer at Logtown. 	2020	\$5,000,000
P3	Morton – Forest Industrial 115 kV T.L. <ul style="list-style-type: none"> Reconductor approximately 3.86 miles along the Morton – Forest Industrial 115 kV T.L. with 1033 ACSR at 100°C. 	2020	\$1,500,000 ⁽²⁾
P4	Oostanaula 230 kV Substation <ul style="list-style-type: none"> Replace the 1600 A PCB at Oostanaula on the Loopers Farm – Oostanaula 230 kV transmission line with a 3000 A PCB. 	2020	\$500,000
P5	Clay TS – Leeds TS 230 kV T.L. <ul style="list-style-type: none"> Upgrade approximately 17.3 miles along the Clay – Leeds 230 kV transmission line from 100 °C to 125 °C. 	2020	<u>Project Cost:</u> \$3,400,000 <u>Advancement Cost:</u> \$700,000
P6	Attalla – Albertville (TVA) 161 kV T.L. <ul style="list-style-type: none"> Reconductor approximately 19.6 miles with 1351 ACSR at 100°C from Attalla to Albertville 161 kV transmission line (SOCO) 	2020	\$19,500,000
P7	Angie – Hattiesburg 230 kV T.L. <ul style="list-style-type: none"> Reconductor approximately 31 miles along the Angie – Hattiesburg 230 kV transmission line with 1351 ACSS at 200 °C. 	2020	\$36,000,000 ⁽²⁾
P8	Daniel – Dawes 230 kV T.L. <ul style="list-style-type: none"> Build 24 miles of new 230 kV transmission line from Daniel to Dawes with 1351 ACSS at 200 °C and a new 230 kV SS at Dawes. 	2020	\$54,000,000
P9	Miller – Boyles 230 kV T.L. <ul style="list-style-type: none"> Upgrade approximately 17.9 miles along the Miller – Boyles 230 kV transmission line to 125°C operation. 	2020	<u>Project Cost:</u> \$3,600,000 <u>Advancement Cost:</u> \$1,200,000
P10	Cumming – McGrau Ford 230 kV T.L. <ul style="list-style-type: none"> Reconductor approximately 21.7 miles along the Cumming – McGrau Ford 230 kV T.L. with 1351 ACSS at 170°C. 	2020	\$21,000,000
SBA TOTAL (\$2015)			\$147,300,000⁽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.
- (2) This transmission solution was proposed to alleviate the loading of a tie-line constraint between the **SBA** and a non-participating transmission owner. Therefore, the cost associated with the transmission solution is only for the portion of solution that is located within the participating transmission owners' territory. This solution effectively alleviates the identified constraint(s), however, the impacts to adjacent transmission systems that are external to the participating transmission owners were not evaluated.

Diagram III.9.1. Approximate Location of Potential Solutions – SBA



Interchange Assumptions – SBA

Table III.9.4 Incremental Transactions Preserved to those Modeled in Version 2 SERTP Models

OASIS Ref. #	POR	POD	Amount (MW)
NS1117	DUKE	PS LOAD on SOCO	50
NS1119	MISO	SMEPA LOAD on SOCO	126
NS1117	MISO	PS LOAD on SOCO	150
NL1112	MISO	SOCO	500
147615	DUKE	OPC LOAD	465
147613	TVA	OPC LOAD	310
NL1132	TVA	SOCO	500
NL1132	MISO	SOCO	250
79662312	SOCO	DUKE	27
80832892	SOCO	DUKE	132
80600833	SOCO	DUKE	132
959841	SOCO	DUKE	44
79822666	GTC	TVA	200
NL1112	SCPSA	SOCO	50

Table III.9.5 Capacity Benefit Margin Preserved (CBM)

SERTP Sponsor	Interface	Amount (MW)
Southern	Duke	350
Southern	TVA	400
Southern	MISO	100
Southern	SCPSA	125
Southern	SCEG	75

Table III.9.6 Transmission Reliability Margins Preserved (TRM)

SERTP Sponsor	Interface	Amount (MW)
Southern	From Duke	200
GTC	From Duke	109
MEAG	From Duke	26
Dalton	From Duke	3
Southern	From MISO	216
Southern	From TVA	218
GTC	From TVA	48
MEAG	From TVA	11
Dalton	From TVA	1

Tennessee Valley Authority Balancing Authority (TVA) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
TVA (Shelby) to Southern/TVA/Duke	3500 MW	TVA (Shelby)	Southern/TVA/Duke	2020
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

Table III.10.1 below identifies thermal constraints attributable to the requested transfer for the contingency and scenario that resulted in the highest facility loading 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** constraints without any enhancements to the transmission system.

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%)		Contingency	Scenario	Project
			Without Request	With Request			
TVA	SHELBY - CORDOVA #1 500-KV TL	1732.1	56.0	113.6	SHELBY - CORDOVA #2 500-KV TL	1	P1
TVA	CORDOVA 500/161-kv #1 XFMR	1243.0	95.0	108.8	CORDOVA 500/161-kv #2 XFMR CORDOVA - FREEPORT 500-KV TL CORDOVA - HAYWOOD 500-kv TL	2	P2

Scenario Explanations:

1. Magnolia CC Unit #1 Offline, Summer Peak Case
2. No Unit Offline, Summer Peak Case

Table III.10.2 Pass 1 – Transmission System Impacts with All Proposed Enhancements – TVA

The following table depicts loadings of **SBA** transmission facilities that could become potential constraints in future years or with different queuing assumptions, but are not overloaded in the study year.

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%)		Contingency	Scenario	Project
			Without Request	With Request			
TVA	JACKSON 500/161-kV #1 XFMR	772.7	76.0	97.2	JACKSON 500/161-kV #2 XFMR	2	--
TVA	JACKSON 500/161-kV #2 XFMR	750.0	78.0	99.4	JACKSON 500/161-kV #1 XFMR	2	--
TVA	SHELBY - CORDOVA #2 500-KV TL	2120.9	44.0	90.2	SHELBY - CORDOVA #1 500-KV TL	1	--

Scenario Explanations:

1. Magnolia CC Unit #1 Offline, Summer Peak Case
2. No Unit Offline, Summer Peak Case

Table III.10.3 Potential Solutions for Identified Problems – TVA

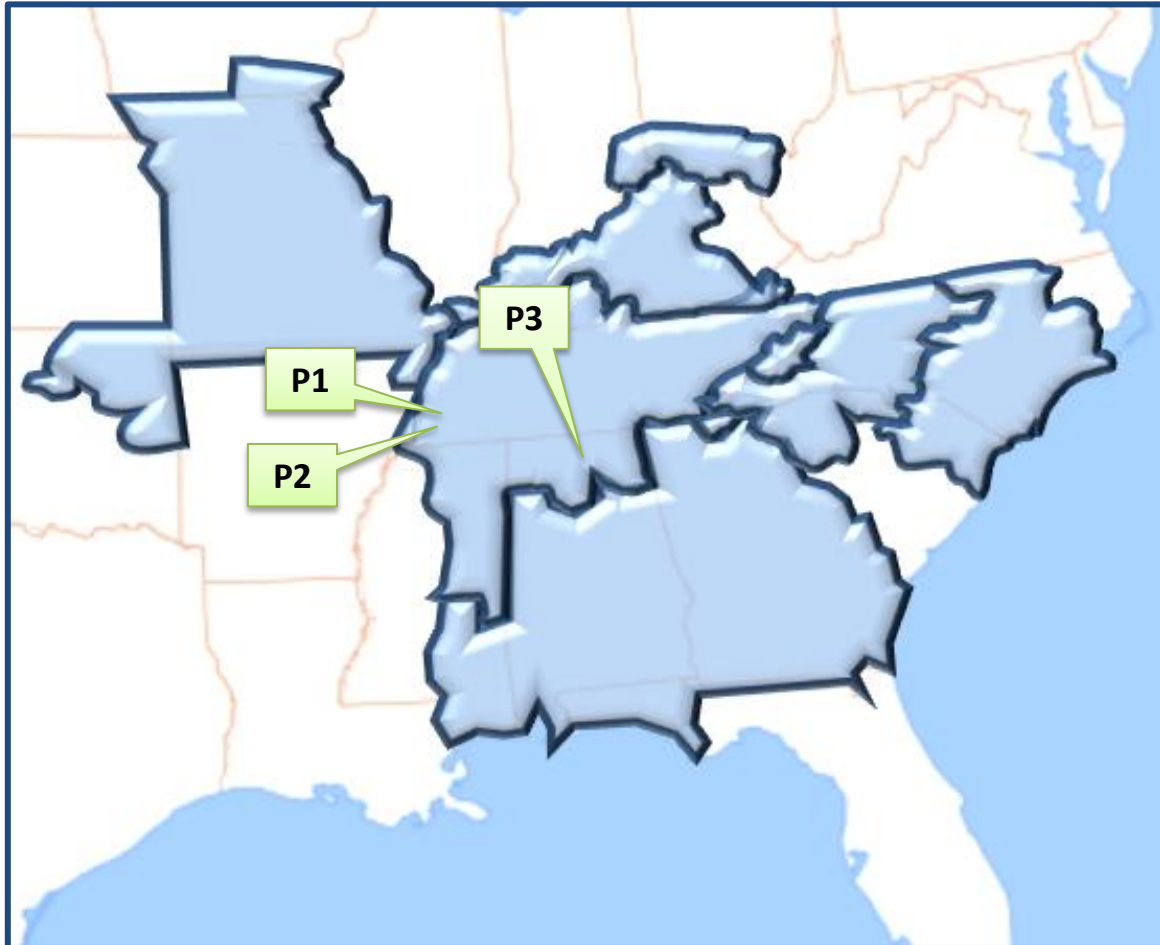
The following projects are identified as potential solutions to address the identified constraints and are based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In 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	Shelby – Cordova #1 500 kV T.L. <ul style="list-style-type: none"> • Uprate approximately 21 miles of 500 kV transmission line between Shelby and Cordova to 100°C and upgrade terminal equipment at both terminal end 500-kV substations. 	2020	\$9,000,000
P2	Cordova 500 kV Substation <ul style="list-style-type: none"> • Install 4 500-kV breakers to provide a complete double breaker configuration at Cordova. 	2020	\$8,000,000
P3	Alberville 161 kV Substation <ul style="list-style-type: none"> • Upgrade terminal equipment at Alberville 161 kV substation. 	2020	\$2,000,000
--	Lagoon Creek – Jackson 500 kV T.L. ⁽¹⁾ <ul style="list-style-type: none"> • Build approximately 37 miles of transmission line between the Lagoon Creek and Jackson 500-kV substations sagged at 100°C. 	2020	\$122,000,000
TVA TOTAL (\$2015)			\$141,000,000 ⁽²⁾

(1) This project has been modeled within the SERTP economic study at the request of the RPSG. It is not a part of TVA's expansion plan.

(2) 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 by June 1st of the study year, 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.10.1. Approximate Location of Potential Solutions – TVA



IV. Economic Planning Study Results

Southern/SCEG to PJM

2020

500 MW

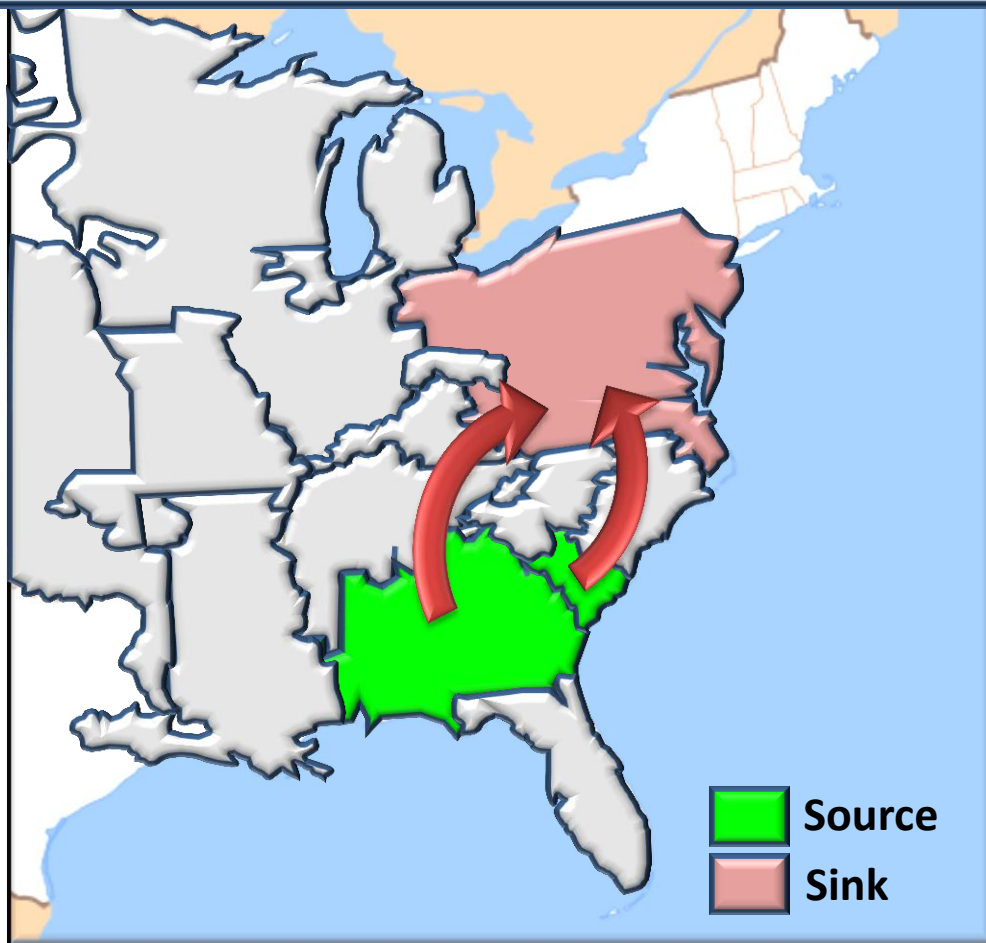
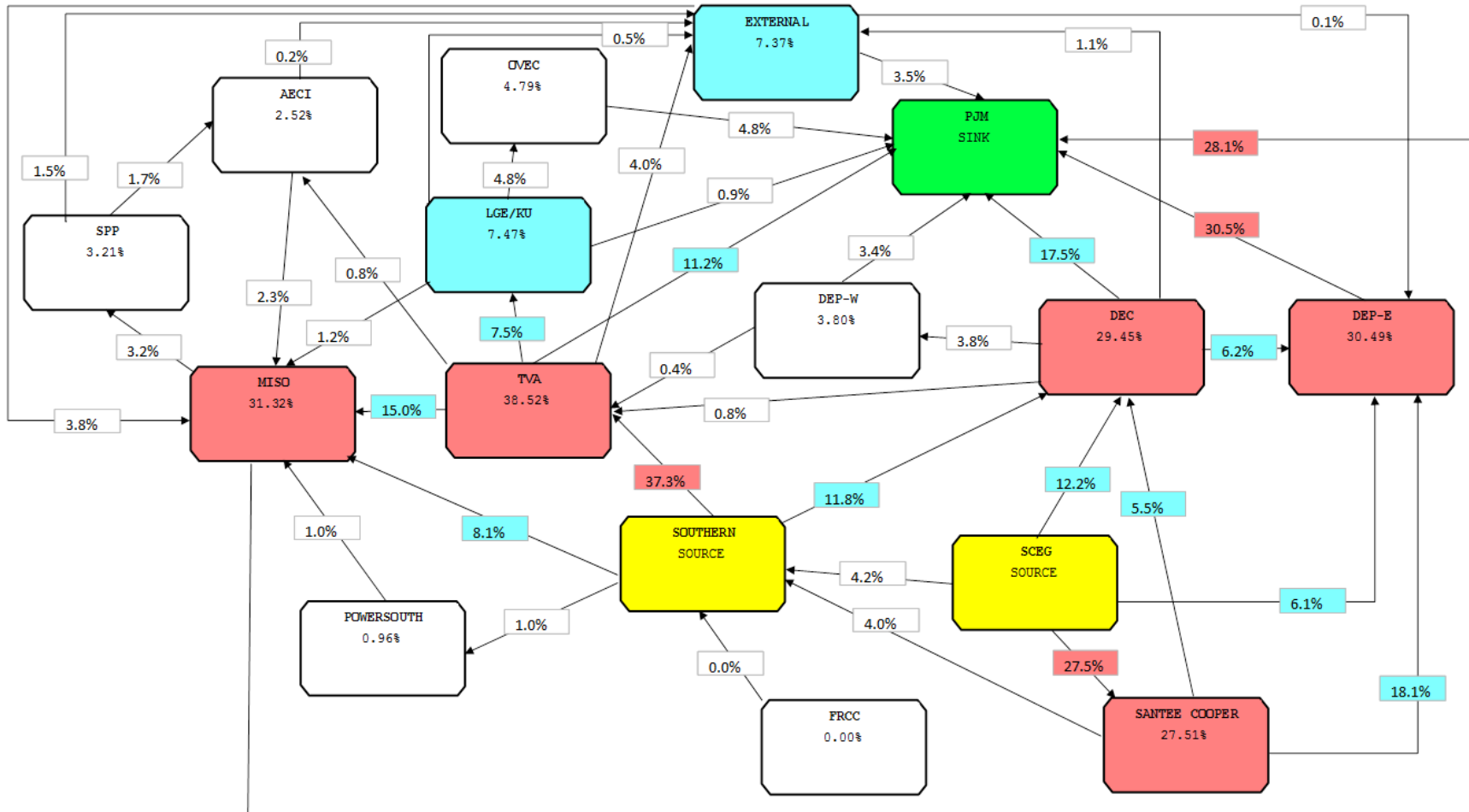


Table IV.1.1. Total Cost Identified by the SERTP Sponsors

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 (SBA)	\$0
Tennessee Valley Authority (TVA)	\$0
TOTAL (\$2015)	\$0

Diagram IV.1.1. Transfer Flows with the SERTP



Associated Electric Cooperative Balancing Authority (AECI) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
Southern/SCEG to PJM	500 MW	Southern/SCEG	PJM	2020
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 500 MW transfer from Southern Company and SCEG to PJM results in no thermal constraints attributable to the requested transfer.

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

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

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

Scenario Explanations:

N/A

Table IV.2.2 Potential Solutions for Identified Problems – AECI

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
AECI TOTAL (\$2015)			\$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/SCEG to PJM	500 MW	Southern/SCEG	PJM	2020
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 500 MW transfer from Southern Company and SCEG to PJM results in no thermal constraints attributable to the requested transfer.

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

The following table depicts 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.

AREA	Limiting Element				Rating (MVA)	Thermal Loadings (%)		Contingency		Scenario	Project
						Without Request	With Request				
DEC	306218 LAUEC30	100.00	306242 BUSH RIV	100.00	1	65	90.9	95.1	306242 BUSH RIV 308794 CLINTON 1	1	-

Scenario Explanations:

1. Lee CC Offline, Summer Peak Case

Table IV.3.2 Potential Solutions for Identified Problems – DEC

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
DEC TOTAL (\$2015)			\$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/SCEG to PJM	500 MW	Southern/SCEG	PJM	2020
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 500 MW transfer from Southern Company and SCEG to PJM results in no thermal constraints attributable to the requested transfer.

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

The following table depicts 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.

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%)		Contingency	Scenario	Project
			Without Request	With Request			
DEPE	304731 3IND104 115 304732 3ELGIN TAP 115 1	95	88.6	97.3	304716 3CAMDEN TAP 115 304725 3CAMDEN115 T 115 1	2	--
DEPE	304327 6ELLERBE 230 304638 6WADSBOR TA1 230 1	512	93.7	95.5	304348 6ROCKHAM230T 230 305046 6E11-ELLERBE 230 1	2	--
DEPE	304361 6WESTEND230T 230 305320 6EDENSOL-TAP 230 1	512	92.2	94.0	304348 6ROCKHAM230T 230 305046 6E11-ELLERBE 230 1	2	--
DEPE	304287 3GOLDSB SS T 115 305052 3E13-ARBA 115 1	147	91.1	92.7	304474 6IND053 230 304500 6WOMMACK230T 230 1	1	--
DEPE	304361 6WESTEND230T 230 305024 6E3-CNTR CRC 230 1	542	88.5	91.3	304377 8RICHMON500T 500 304391 8CUMBLND500T 500 1	2	--
DEPE	304532 3VISTA 115 304545 3CASTLEH115T 115 1	179	89.7	91.0	304550 6CASTLEH230T 230 304564 6SCOTT TAP 230 1	1	--
DEPE	304327 6ELLERBE 230 305320 6EDENSOL-TAP 230 1	512	89.0	90.9	304348 6ROCKHAM230T 230 305046 6E11-ELLERBE 230 1	2	--
DEPE	304700 6SUMTER230 T 230 370101 6WATEREE1 230 1	478	86.8	90.8	304057 6DARLCNT230T 230 312734 6S BETH 230 1	3	--
DEPE	304716 3CAMDEN TAP 115 304724 3CAMDEN CITY 115 1	107	83.6	90.6	304725 3CAMDEN115 T 115 304731 3IND104 115 1	2	--
DEPE	304732 3ELGIN TAP 115 304734 3WATEREE115T 115 1	95	81.5	90.1	304716 3CAMDEN TAP 115 304725 3CAMDEN115 T 115 1	2	--

Scenario Explanations:

1. No Unit Offline, Summer Peak Case
2. Harris Offline, Summer Peak Case
3. Robinson Unit #2 Offline, Summer Peak Case

Table IV.4.2 Potential Solutions for Identified Problems – DEPE

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
DEPE TOTAL (\$2015)			\$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/SCEG to PJM	500 MW	Southern/SCEG	PJM	2020
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 500 MW transfer from Southern Company and SCEG to PJM results in no thermal constraints attributable to the requested transfer.

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

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

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

Scenario Explanations:

N/A

Table IV.5.2 Potential Solutions for Identified Problems – DEPW

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
DEPW TOTAL (\$2015)			\$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/SCEG to PJM	500 MW	Southern/SCEG	PJM	2020
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 500 MW transfer from Southern Company and SCEG to PJM results in no thermal constraints attributable to the requested transfer.

Table IV.6.1 Pass 0 – Transmission System Impacts with No Enhancements – LG&E/KU

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

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

Scenario Explanations:

N/A

Table IV.6.2 Potential Solutions for Identified Problems – LG&E/KU

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
LG&E/KU TOTAL (\$2015)			\$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/SCEG to PJM	500 MW	Southern/SCEG	PJM	2020
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 500 MW transfer from Southern Company and SCEG to PJM results in no thermal constraints attributable to the requested transfer.

Table IV.7.1 Pass 0 – Transmission System Impacts with No Enhancements – OVEC

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

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

Scenario Explanations:

N/A

Table IV.7.2 Potential Solutions for Identified Problems – OVEC

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
OVEC TOTAL (\$2015)			\$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/SCEG to PJM	500 MW	Southern/SCEG	PJM	2020
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 500 MW transfer from Southern Company and SCEG to PJM results in no thermal constraints attributable to the requested transfer.

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

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

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

Scenario Explanations:

N/A

Table IV.8.2 Potential Solutions for Identified Problems – PS

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
PS TOTAL (\$2015)			\$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 (SBA) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
Southern/SCEG to PJM	500 MW	Southern/SCEG	PJM	2020
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 500 MW transfer from Southern Company and SCEG to PJM results in no thermal constraints attributable to the requested transfer.

Table IV.9.1 Pass 0 – Transmission System Impacts with No Enhancements – SBA

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

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

Scenario Explanations:

N/A

Table IV.9.2 Potential Solutions for Identified Problems – SBA

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. 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	None Identified	--	--
SBA TOTAL (\$2015)			\$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.

Interchange Assumptions – SBA

Table IV.9.3 Incremental Transactions Preserved to those Modeled in Version 2 SERTP Models

OASIS Ref. #	POR	POD	Amount (MW)
NS1117	DUKE	PS LOAD on SOCO	50
NS1119	MISO	SMEPA LOAD on SOCO	126
NS1117	MISO	PS LOAD on SOCO	150
NL1112	MISO	SOCO	500
147615	DUKE	OPC LOAD	465
147613	TVA	OPC LOAD	310
NL1132	TVA	SOCO	500
NL1132	MISO	SOCO	250
79662312	SOCO	DUKE	27
80832892	SOCO	DUKE	132
80600833	SOCO	DUKE	132
959841	SOCO	DUKE	44
79822666	GTC	TVA	200
NL1112	SCPSA	SOCO	50

Table IV.9.4 Capacity Benefit Margin Preserved (CBM)

SERTP Sponsor	Interface	Amount (MW)
Southern	Duke	350
Southern	TVA	400
Southern	MISO	100
Southern	SCPSA	125
Southern	SCEG	75

Table IV.9.5 Transmission Reliability Margins Preserved (TRM)

SERTP Sponsor	Interface	Amount (MW)
Southern	From Duke	200
GTC	From Duke	109
MEAG	From Duke	26
Dalton	From Duke	3
Southern	From MISO	216
Southern	From TVA	218
GTC	From TVA	48
MEAG	From TVA	11
Dalton	From TVA	1

Tennessee Valley Authority Balancing Authority (TVA) Results

Study Structure and Assumptions

Transfer Sensitivity	Amount	Source	Sink	Year
Southern/SCEG to PJM	500 MW	Southern/SCEG	PJM	2020
Load Flow Cases				
2015 Series Version 2 SERTP Models: Summer Peak				

Transmission System Impacts

The 500 MW transfer from Southern Company and SCEG to PJM results in no thermal constraints attributable to the requested transfer.

Table IV.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 (%)		Contingency	Scenario	Project
			Without Request	With Request			
TVA	None Identified	--	--	--	--	--	--

Scenario Explanations:

N/A

Table IV.10.2 Potential Solutions for Identified Problems – TVA

There were no identified constraints based on the assumptions used in this study, and therefore no potential solutions were identified. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the currently projected improvements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission expansion plans could also impact the results of this study.

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	None Identified	--	--
TVA TOTAL (\$2015)			\$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.