SERTP Southeastern Regional Transmission Planning

Economic Planning Studies
Final Results

Associated Electric Cooperative Inc.

Dalton UTILITIES

DUKE ENERGY

GeorgiaTransmission

LG&E KU

MEAG POWER

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

PowerSouth ENERGY COOPERATIVE

Southern Company

TVA

December 5, 2016

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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. 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:

1) **SCPSA Border to Duke Progress West – 300 MW**
   - **Year:** 2019
   - **Load Level:** Summer Peak
   - **Type of Transfer:** Load to Generation
   - **Source:** Uniform load scale within SCPSA
   - **Sink:** Generation within Duke Progress West

2) **SCPSA Border to GTC – 300 MW**
   - **Year:** 2019
   - **Load Level:** Summer Peak
   - **Type of Transfer:** Load to Generation
   - **Source:** Uniform load scale within SCPSA
   - **Sink:** Generation within GTC

3) **Southern to FRCC Border – 500 MW**
   - **Year:** 2019
   - **Load Level:** Summer Peak
   - **Type of Transfer:** Generation to Load
   - **Source:** Generation within Southern Company
   - **Sink:** Load scale within FRCC as shown in Table 1 below:

Table 1: FRCC Sink – Participation Factors

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) **Southern to SCPSA/SCE&G Border – 500 MW**
   - **Year:** 2019
   - **Load Level:** Summer Peak
   - **Type of Transfer:** Generation to Generation
   - **Source:** Generation within Southern Company
   - **Sink:** Generation within SCPSA (250 MW) and SCE&G (250 MW)

5) **Southern/SCE&G Border to PJM Border – 1500 MW**
   - **Year:** 2021
   - **Load Level:** Summer Peak
   - **Type of Transfer:** Generation/Load to Load
   - **Source:** Generation within Southern Company (750 MW) and uniform load scale within SCE&G (750 MW)
   - **Sink:** Load scale within PJM as shown in Table 2 below:

Table 2: PJM Sink – Participation Factors

PJM Area	Area #	MW Allocation
American Electric Power	205	500
Commonwealth Edison	222	500
Dominion Virginia Power	345	500
Total		1500

Case Development

- For all evaluations, the ***2016 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

SCPSA to Duke Progress West

2019

300 MW

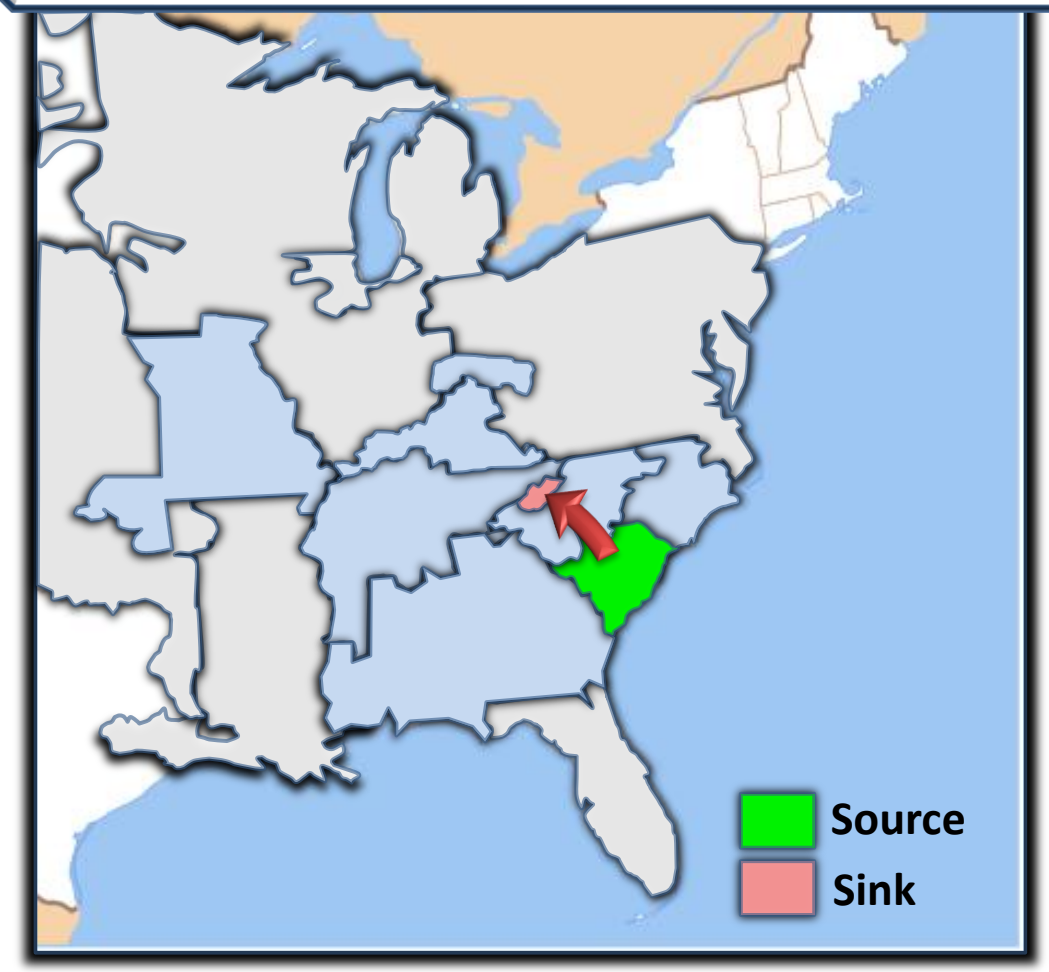
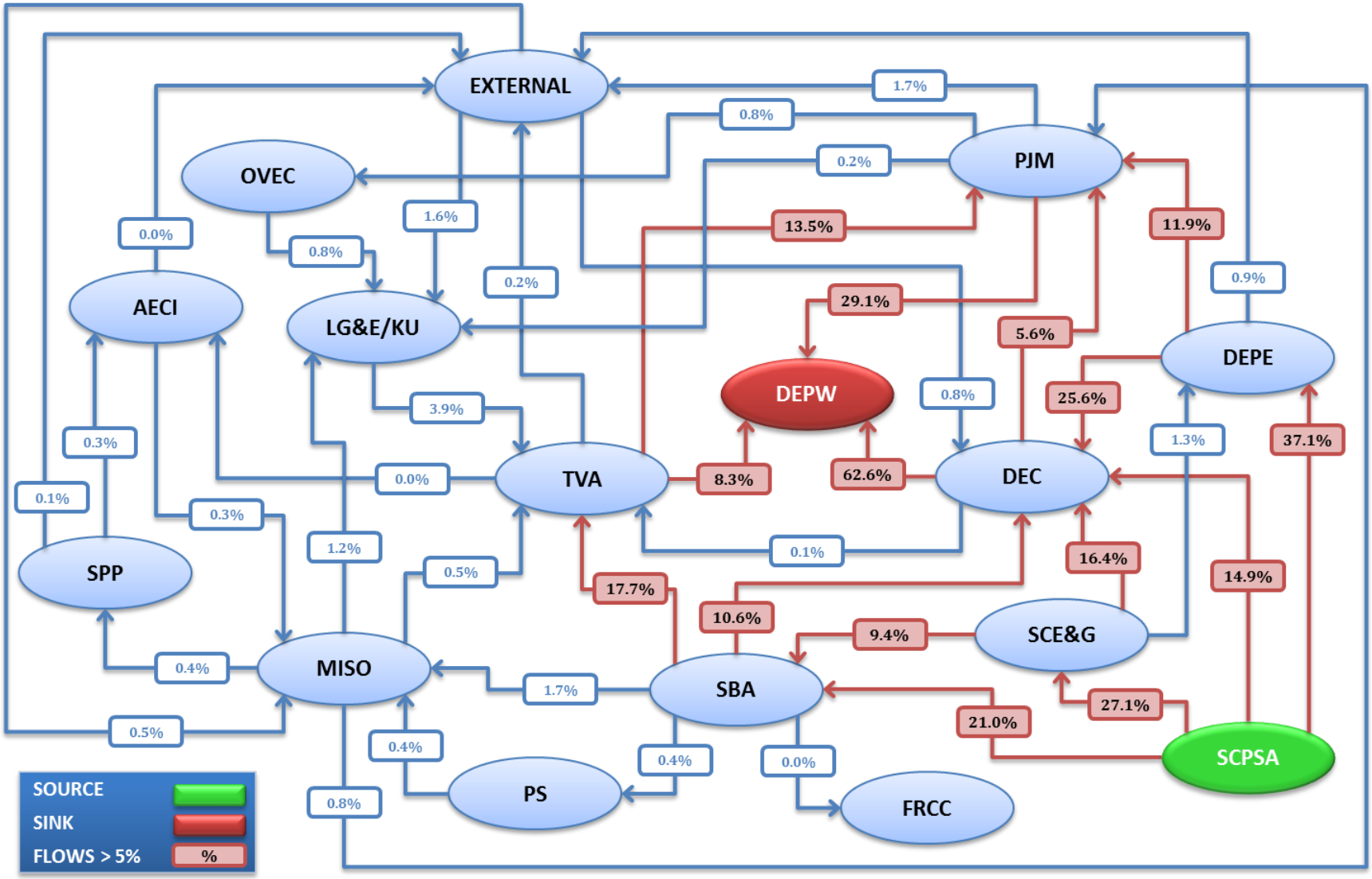


Table I.1.1 Total Cost Identified by the SERTP Sponsors

Balancing Authority	Planning Level Cost Estimate
Associated Electric Cooperative (AECI)	$0
Duke Carolinas (DEC)	$0
Duke Progress East (DEPE)	$0
Duke Progress West (DEPW)	$200,000,000
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 ($2016)	**$200,000,000**

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



Associated Electric Cooperative Balancing Authority (AECI) Results

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.

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

Scenario Explanations:

1. N/A

Table I.2.2 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 Identified**	--	--
AECI TOTAL ($2016)			**$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

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.

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

Scenario Explanations:

1. No Unit Offline, Summer Peak Case

Table I.3.2 Pass 0 – 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	306041 LEE 100 BUS 306151 100	120	93.5	97.1	306041 LEE 100 306157 GREENBRIAR 100	1	--
DEC	306041 LEE 100 306195 SHADY GR 100	120	87.3	90.8	306041 LEE 100 306157 GREENBRIAR 100	1	--
DEC	306041 LEE 100 307583 MATRIX 100	132	86.8	90.3	306041 LEE 100 306157 GREENBRIAR 100	1	--

Scenario Explanations:

1. No Unit Offline, Summer Peak Case

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 Identified**	--	--
DEC TOTAL ($2016)			**$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 – *DEC*

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 I.3.4 Additional Transactions

OASIS Ref. #	POR	POD	Amount (MW)
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Table I.3.5 Capacity Benefit Margin (CBM)

SERTP Sponsor	Interface	Amount (MW)
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Table I.3.6 Transmission Reliability Margin (TRM)

SERTP Sponsor	Interface	Amount (MW)
DEC	Export to CPLE, SCE&G, or SCPSA	490
DEC	Import from CPLE	383
DEC	Import from SCE&G	185
DEC	Import from SCPSA	192

Duke Progress East Balancing Authority (DEPE) Results

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.

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

Scenario Explanations:

1. N/A

Table I.4.2 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 Identified**	--	--
DEPE TOTAL ($2016)			**$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

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.a Pass 0 – Transmission System Impacts with No Enhancements – *DEPW*

The following table identifies significant **DEPW** thermal constraints without any 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.5.1.b Pass 0 – Transmission System Impacts with No Enhancements – *DEPW*

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

		Voltage (P.U.)				
AREA	**Limiting Bus**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
DEPW	304752 3MAGGIE V SU	≥0.95	0.8474	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304748 3HAZELWOOD	≥0.95	0.8495	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304746 3WAYNSVILE 1	≥0.95	0.8495	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304749 3WAYNSVILE 2	≥0.95	0.8501	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304745 3LAKE JUNALU	≥0.95	0.8511	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	305198 3E8-STH CLYD	≥0.95	0.8562	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304815 3SWANNANOA	≥0.95	0.8623	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304816 3BLACK MOUNT	≥0.95	0.8633	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304809 3NEWSALEM SU	≥0.95	0.8635	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304750 3PISGAH	≥0.95	0.8643	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	305196 3E8-CRADLE	≥0.95	0.8656	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1

AREA	Limiting Bus	Voltage (P.U.) Without Request	Voltage (P.U.) With Request	Contingency	Scenario	Project
DEPW	304758 3IND108	≥0.95	0.8657	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304805 3ASH ROCK HI	≥0.95	0.8664	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304817 3FAIRVIEW1	≥0.95	0.8670	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304743 3CANTON115 T	≥0.95	0.8673	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304806 3OTEEN SS T	≥0.95	0.8678	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304796 3REYNOLDS	≥0.95	0.8689	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304793 3BILTMORE	≥0.95	0.8692	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304803 6ASHVLE230 T	≥0.95	0.8696	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304860 6ASH DUM GEN	≥0.95	0.8696	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	305195 3E8-CANDLER	≥0.95	0.8696	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304760 3CANDLER	≥0.95	0.8696	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304763 6ENKA230SS T	≥0.95	0.8701	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304797 3MILLS GAP	≥0.95	0.8709	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304818 3BALDWIN1	≥0.95	0.8718	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304757 3IND107	≥0.95	0.8720	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304790 3VANDERBLT T	≥0.95	0.8720	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304767 3ASH BENT CR	≥0.95	0.8721	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304761 3IND109	≥0.95	0.8721	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304792 3IND112	≥0.95	0.8721	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304762 3ENKA115SS T	≥0.95	0.8721	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304794 3ARDEN	≥0.95	0.8723	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304764 3MONTE VISTA	≥0.95	0.8725	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304799 3AVERY CRK	≥0.95	0.8726	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304791 3WESTASHEV T	≥0.95	0.8729	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304804 3SKYLAND1	≥0.95	0.8730	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304802 3ASHV STIE T	≥0.95	0.8734	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304801 3ASHV NTIE T	≥0.95	0.8738	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304800 3ASHVLE115 T	≥0.95	0.8739	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304789 3EMMA	≥0.95	0.8754	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304759 3LEICESTER	≥0.95	0.8761	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304770 3BEAVERDAM	≥0.95	0.8767	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304740 4WALTERS138	≥0.95	0.8779	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1

AREA	Limiting Bus	Voltage (P.U.) Without Request	Voltage (P.U.) With Request	Contingency	Scenario	Project
DEPW	304766 3ELK MOUNTAI	≥0.95	0.8796	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	305183 3E5-CEDARHIL	≥0.95	0.8796	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304765 3CRAGGY115 T	≥0.95	0.8806	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304773 3MARSHALL T	≥0.95	0.8812	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304771 3WEAVERVILLE	≥0.95	0.8812	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304779 3IND111	≥0.95	0.8814	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	305185 3E5-MARSHAL	≥0.95	0.8819	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	305188 3E5-WEAVER	≥0.95	0.8833	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	305187 3E5-PETERSBR	≥0.95	0.8839	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304769 6CRAGGY230 T	≥0.95	0.8840	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	305197 3E8-FINES CR	≥0.95	0.8842	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304772 3BARNARDSVIL	≥0.95	0.8882	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304777 3IND110	≥0.95	0.8884	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304788 3SPRUCE PINE	≥0.95	0.8895	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	305184 3E5-MARS HIL	≥0.95	0.8902	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	305186 3E5-MICAVILL	≥0.95	0.8961	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304787 3MICAVILLE	≥0.95	0.8962	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304741 3WALTERS115T	≥0.95	0.9021	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	305182 3E5-BURNSVIL	≥0.95	0.9036	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304747 5WALTERS	≥0.95	0.9048	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	305181 3E5-BAKERSCR	≥0.95	0.9067	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304780 3CANERV115 T	≥0.95	0.9077	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1
DEPW	304781 6CANERV230 T	≥0.95	0.9079	306108 6PISGAH 230 306110 6SHILOH 230 1&2	1	P1

Scenario Explanations:
1. Summer Peak Case

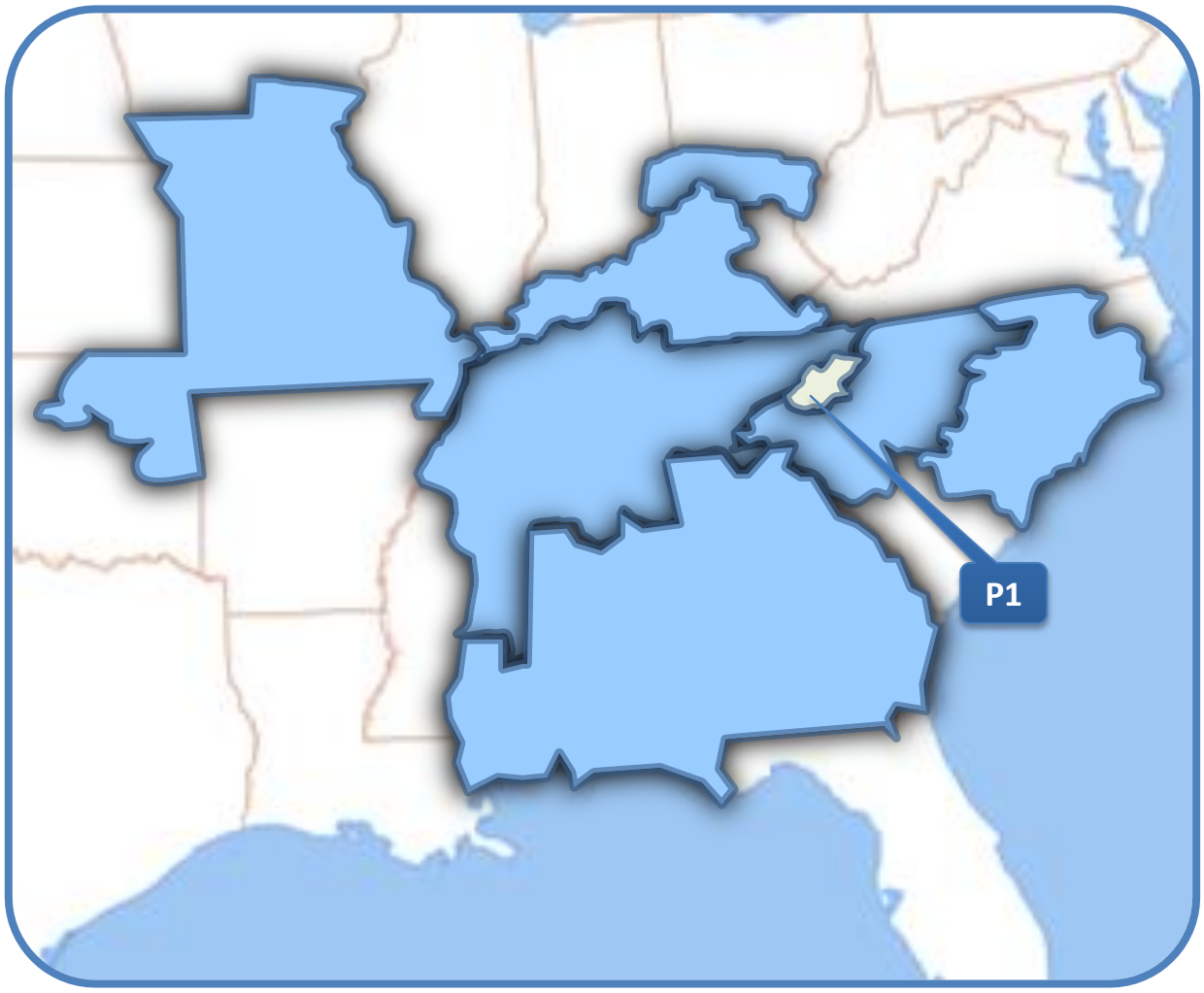
Table I.5.2 Potential Solutions for Identified Problems – *DEPW*

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
P1	**New Asheville 230 kV T.L. and Substation** • Construct approximately 50 miles of new 230 kV transmission line from Asheville to a new 230 kV switching station in the Spartanburg County, SC area with 6-1590 ACSR	2019	$200,000,000
DEPW TOTAL ($2016)			**$200,000,000** (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 I.5.1. Approximate Location of Potential Solutions – *DEPW*



Economic Planning Study Additional Interchange Assumptions – ***DEPW***

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 I.5.3 Additional Transactions

OASIS Ref. #	POR	POD	Amount (MW)
73399080	DUK	CPLW	250
71239830	DUK	CPLW	150
Pre-OASIS	TVA	CPLW	13

Table I.5.4 Capacity Benefit Margin (CBM)

SERTP Sponsor	Interface	Amount (MW)
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Table I.5.5 Transmission Reliability Margin (TRM)

SERTP Sponsor	Interface	Amount (MW)
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Louisville Gas & Electric and Kentucky Utilities Balancing Authority (LG&E/KU) Results

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.

			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.6.2 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 Identified**	--	--
LG&E/KU TOTAL ($2016)			**$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

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.

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

Scenario Explanations:

1. N/A

Table I.7.2 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 Identified**	--	--
OVEC TOTAL ($2016)			**$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

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 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 Identified**	--	--
PS TOTAL ($2016)			**$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

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 – *SBA*

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

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

Scenario Explanations:

1. N/A

Table I.9.2. Potential Solutions for Identified Problems – *SBA*

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

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	**None Identified**	--	--
SBA TOTAL ($2016)			**$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

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** constraints without any 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.10.2 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 Identified**	--	--
TVA TOTAL ($2016)			**$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

SCPSA to GTC

2019

300 MW

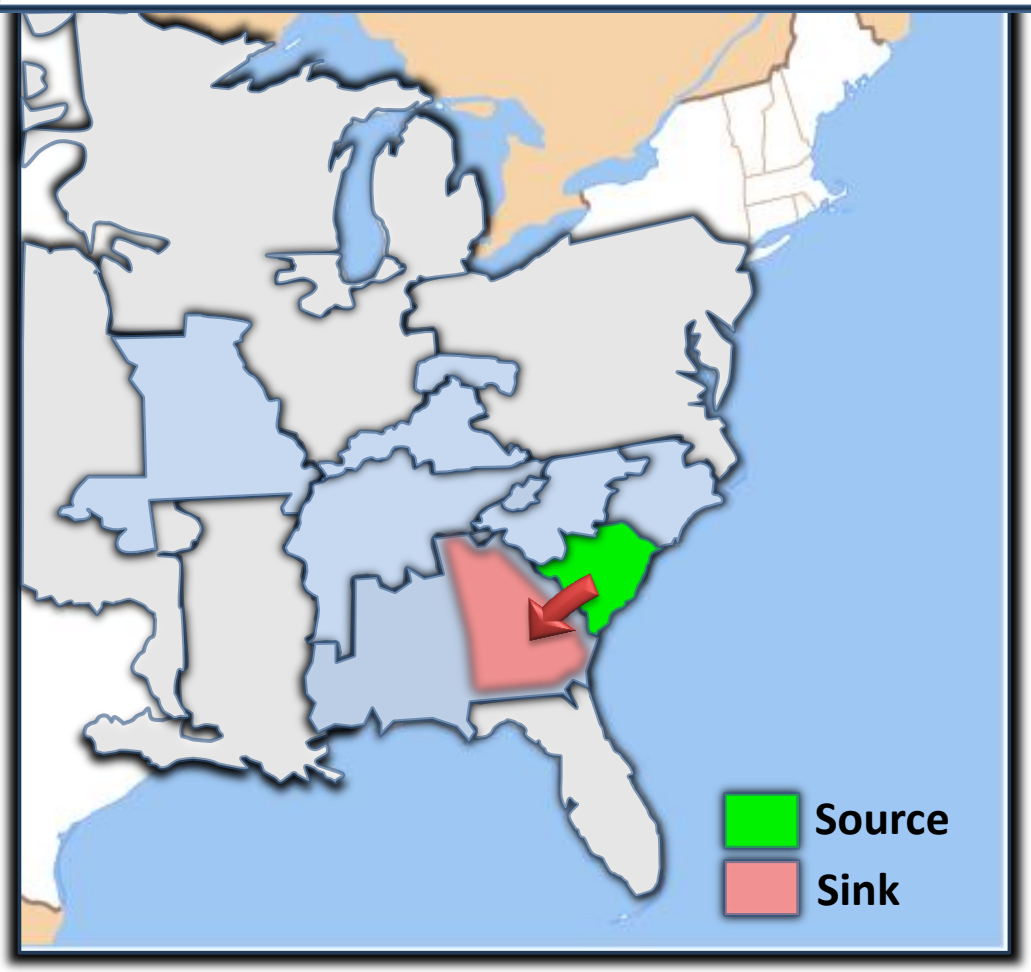
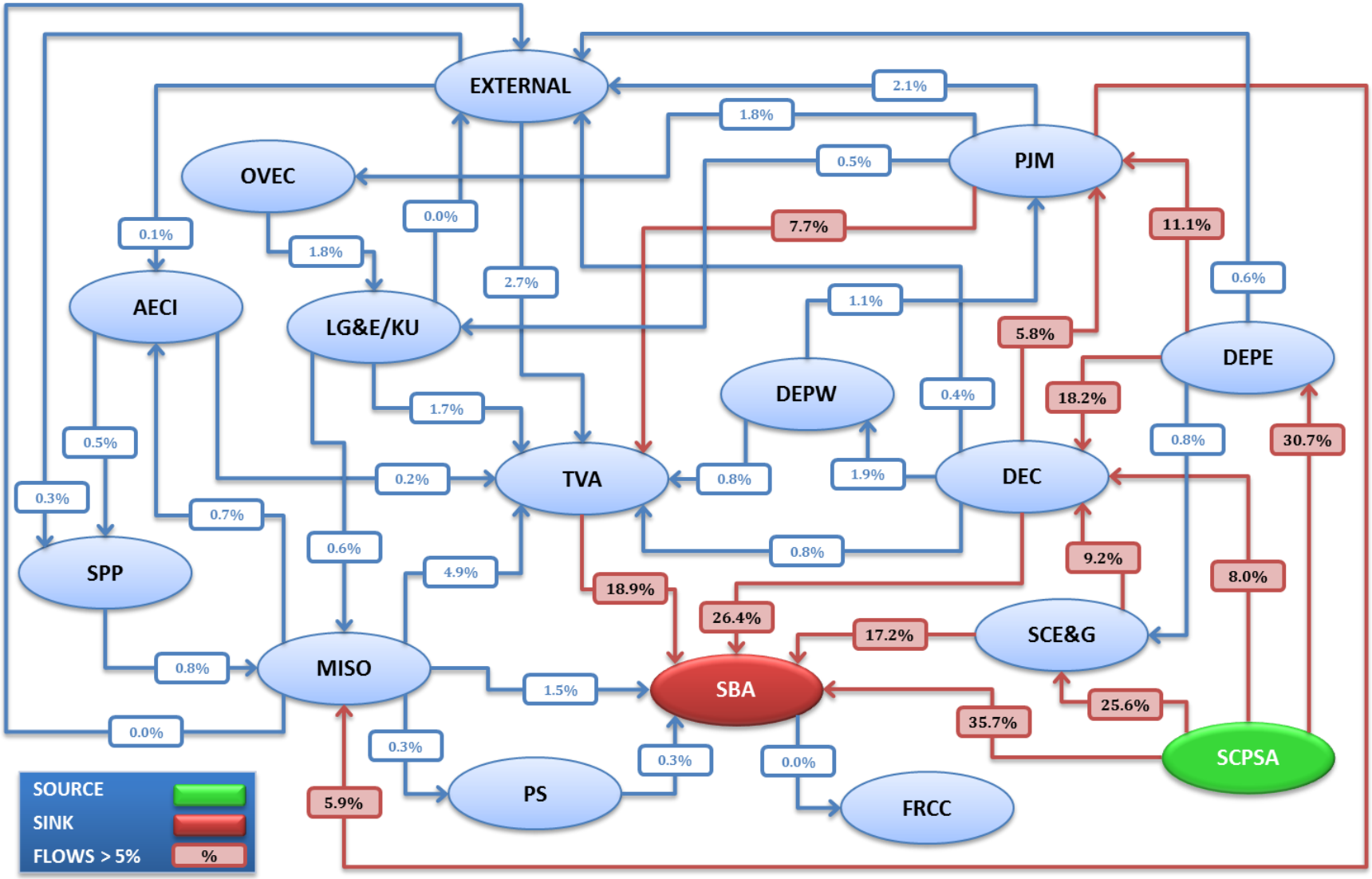


Table II.1.1 Total Cost Identified by the SERTP Sponsors

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)	$25,000
Tennessee Valley Authority (TVA)	$0
TOTAL ($2016)	**$25,000**

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



Associated Electric Cooperative Balancing Authority (AECI) Results

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.

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

Scenario Explanations:

1. N/A

Table II.2.2 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 Identified	--	--
AECI TOTAL ($2016)			**$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

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.

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

Scenario Explanations:

1. N/A

Table II.3.2 Potential Solutions for Identified Problems – *DEC*

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

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	**None Identified**	--	--
DEC TOTAL ($2016)			**$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

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 (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
DEPE	None Identified	--	--	--	--	--	--

Scenario Explanations:

1. N/A

Table II.4.2 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 Identified**	--	--
DEPE TOTAL ($2016)			**$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

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.

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

Scenario Explanations:

1. N/A

Table II.5.2 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 Identified**	--	$0
DEPW TOTAL ($2016)			**$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

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 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 Identified**	--	--
LG&E/KU TOTAL ($2016)			**$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

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 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 Identified**	--	--
OVEC TOTAL ($2016)			**$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

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 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 Identified**	--	--
PS TOTAL ($2016)			**$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

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 – *SBA*

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

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
SBA	380472 3AIRLINE 115 380473 3BIO B1 115	249	98.4	101.0	380094 6BIO 230 380105 6VANNA 230	1	P1

Scenario Explanations:

1. McDonough Unit #5 Offline, Summer Peak Case

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

The following table depicts thermal 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 with all proposed enhancements to the transmission system.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
SBA	380514 3WARRENTON 115 381669 3BUFFALO RD 115	57	97.7	98.9	380821 3MILLEDGEVL 115 381652 3MERIWTHR J 115	2	
SBA	380957 3WOODSTOCK 115 381954 3LITTLERIVER 115	188	94.3	95.9	380025 8MCGRAU FORD500 380088 6MCGRAU F LS230	3	
SBA	380094 6BIO 230 380105 6VANNA 230	433	92.1	95.6	306008 8OCONEE 500 380011 8S HALL 500	6	
SBA	380748 3SPALDING 115 380876 3BROOKS 115	145	91.8	93.8	381629 6WOOLSEY 230 382771 6OHARA B1 230	1	
SBA	380199 6OOSTANAULA 230 381122 6DALTON 6 230	664	92.5	93.4	380021 8MOSTELLER 500 382499 8CONASAUGA 500	7	
SBA	339100 6RUSSEL 230 380104 6LEXINGTON 230	596	87.8	91.9	306008 8OCONEE 500 380011 8S HALL 500	6	
SBA	380086 6CUMMING 230 381135 6MCGRAU F B1 230	596	90.2	91.8	380011 8S HALL 500 382035 6S HALL LS 230	5	
SBA	380736 3OHARA B2 115 382773 6OHARA B2 230	300	90.4	91.5	380171 6OHARA LS 230 382771 6OHARA B1 230	4	

Scenario Explanations:

1. Hatch Unit #1 Offline, Summer Peak Case
2. McIntosh Unit # 1 Offline, Shoulder (93% Load level) Case
3. Loopers Unit #2 Offline, Shoulder (93% Load level) Case
4. McDonough Unit #6 Offline, Summer Peak Case
5. Hartwell Unit #1 Offline, Summer Peak Case
6. McDonough Unit #5 Offline, Summer Peak Case
7. Bowen Unit #1 Offline, Summer Peak Case

Table II.9.3. Potential Solutions for Identified Problems – *SBA*

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	**Bio 115 KV Breaker Replacement** • Replace the 1200 A 115 kV breaker at Bio Substation with a 2000 A breaker	2019	Project Cost: $300,000 Advancement Cost: $25,000
SBA TOTAL ($2016)			**$25,000** (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 II.9.1. Approximate Location of Potential Solutions – *SBA*

Economic Planning Study Additional Interchange Assumptions – *SBA*

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)
NS1119	MISO	SMEPA LOAD on SOCO	58
NS1117	MISO	PS LOAD on SOCO	150
NL1112	MISO	SOCO	544
147615	DUKE	OPC LOAD	465
147613	TVA	OPC LOAD	310
NL1132	TVA	SOCO	200
79662312	SOCO	DUKE	27
80832892	SOCO	DUKE	132
959841	SOCO	DUKE	44
79822666	GTC	TVA	200
NL1112	SCPSA	SOCO	50

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	186
GTC	Import from Duke	113
MEAG	Import from Duke	25
Dalton	Import from Duke	3
Southern	Import from MISO	223
Southern	Import from TVA	244
GTC	Import from TVA	61
MEAG	Import from TVA	13
Dalton	Import from TVA	2

Tennessee Valley Authority Balancing Authority (TVA) Results

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** constraints without any 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.10.2 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 Identified**	--	--
TVA TOTAL ($2016)			**$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

Southern to FRCC

2019

500 MW

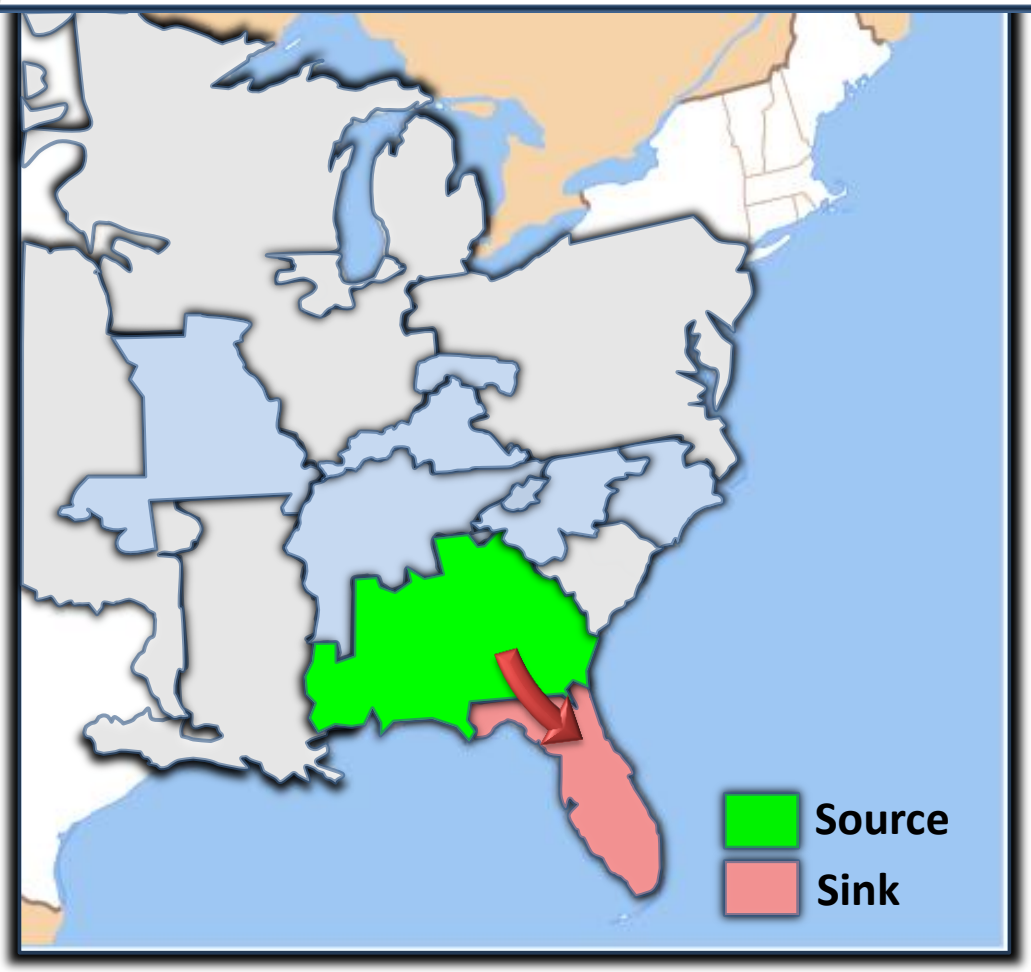
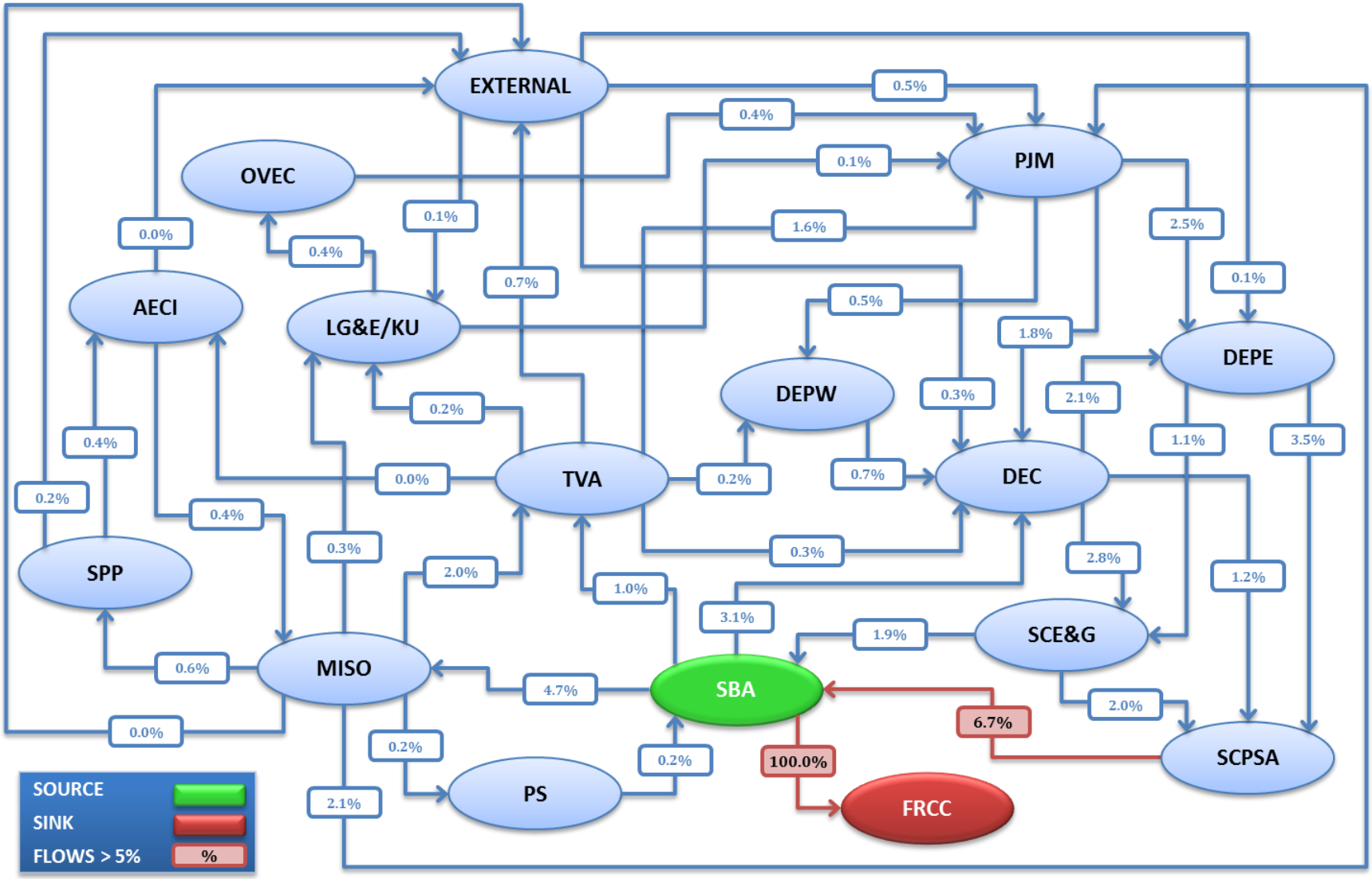


Table III.1.1 Total Cost Identified by the SERTP Sponsors

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 (SBA)	$750,000
Tennessee Valley Authority (TVA)	$0
TOTAL ($2016)	**$750,000**

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



Associated Electric Cooperative Balancing Authority (AECI) Results

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.

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

Scenario Explanations:

1. N/A

Table III.2.2 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 Identified**	--	--
AECI TOTAL ($2016)			**$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

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 Potential Solutions for Identified Problems – *DEC*

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

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	**None Identified**	--	--
DEC TOTAL ($2016)			**$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

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.

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

Scenario Explanations:

1. N/A

Table III.4.2 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 Identified**	--	--
DEPE TOTAL ($2016)			**$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

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.

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

Scenario Explanations:

1. N/A

Table III.5.2 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 Identified**	--	$0
DEPW TOTAL ($2016)			**$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

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 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 Identified**	--	--
LG&E/KU TOTAL ($2016)			**$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

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.

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

Scenario Explanations:

1. N/A

Table III.7.2 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 Identified**	--	--
OVEC TOTAL ($2016)			**$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

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 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 Identified**	--	--
PS TOTAL ($2016)			**$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

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 – *SBA*

The following table identifies significant **SBA** 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
SBA	380571 3SYLVANIA 115 380581 3KING MFG 115	63	93.7	100.4	380008 8VOGTLE 500 382113 8S_VOG_W MAC 500	1	P1

Scenario Explanations:

1. No Unit Offline, Summer Peak Case

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

The following table depicts thermal 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 with all proposed enhancements to the transmission system.

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
SBA	380692 3BLAKELY 2 115 381890 3ROARING BR 115	125	96.5	98.8	380715 3CEDAR SP J 115 384594 3WEBB 3 115	7	
SBA	381890 3ROARING BR 115 381893 3FT GAINES 115	125	96.0	98.7	380715 3CEDAR SP J 115 384594 3WEBB 3 115	2	
SBA	381565 6R_NANTIFTON 230 381878 6N TIFTON B2 230	220	91.8	97.4	380024 8N TIFTON 500 380222 6N TIFTON LS 230	4	
SBA	380581 3KING MFG 115 381483 3DOVER TP 115	63	91.2	97.0	380009 8W MCINTOSH 500 382113 8S_VOG_W MAC500	3	
SBA	380692 3BLAKELY 2 115 381890 3ROARING BR 115	125	94.1	96.7	380715 3CEDAR SP J 115 384594 3WEBB 3 115	2	
SBA	382566 6KINGSLND B2 230 382570 3KINGSLND B2 115	160	87.6	96.6	380166 6KINGSLND B1 230 382566 6KINGSLND B2 230	1	
SBA	382218 6BOX SPRINGS 230 383039 6TALBOT CO 2 23	433	90.6	93.4	380136 6ELLAVILLE 230 383105 6RUSTIN LAKE 230	5	
SBA	380024 8N TIFTON 500 380222 6N TIFTON LS 230	1536	89.9	92.0	382500 8RACCOON CK 500 382510 6RACCOON CK 230	6	
SBA	381592 6TAZEWELL 230 382218 6BOX SPRINGS 230	433	88.5	91.2	380136 6ELLAVILLE 230 383105 6RUSTIN LAKE 230	5	
SBA	317212 3BLUEWTER 115 387320 3NICEVLE 115	216	85.0	90.9	387310 6SHOAL RV6 230 387915 6SHAKY JO 230	1	
SBA	380134 6BUTLER 230 380135 6GAILLARD PR 230	433	88.7	90.5	380013 8BONAIRE 500 380018 8SCHERER 500	6	

Scenario Explanations:

1. Smith Unit #3 Offline, Summer Peak Case
2. Hatch Unit #2 Offline, Summer Peak Case
3. Jasper Offline, Summer Peak Case
4. Hatch Unit #1 Offline, Summer Peak Case
5. Farley Unit #2 Offline, Summer Peak Case
6. Mid-Georgia Offline, Summer Peak Case
7. No Unit Offline, Summer Peak Case

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

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
P2	**DEAL BRANCH – SYLVANIA 115 KV T.L.** • Upgrade 16.4 miles of the Sylvania to Dover Tap section of the Deal Branch – Sylvania 115 kV transmission line to 100°C operation	2019	Project Cost: $9,500,000 Advancement Cost: $750,000
SBA TOTAL ($2016)			**$750,000** (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 – *SBA*

Economic Planning Study Additional Interchange Assumptions – *SBA*

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)
NS1119	MISO	SMEPA LOAD on SOCO	58
NS1117	MISO	PS LOAD on SOCO	150
NL1112	MISO	SOCO	544
147615	DUKE	OPC LOAD	465
147613	TVA	OPC LOAD	310
NL1132	TVA	SOCO	200
79662312	SOCO	DUKE	27
80832892	SOCO	DUKE	132
959841	SOCO	DUKE	44
79822666	GTC	TVA	200
NL1112	SCPSA	SOCO	50
80579397	GTC	FPL	754
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	186
GTC	Import from Duke	113
MEAG	Import from Duke	25
Dalton	Import from Duke	3
Southern	Import from MISO	223
Southern	Import from TVA	244
GTC	Import from TVA	61
MEAG	Import from TVA	13
Dalton	Import from TVA	2

Tennessee Valley Authority Balancing Authority (TVA) Results

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** constraints without any 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.10.2 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 Identified**	--	--
TVA TOTAL ($2016)			**$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

Southern to SCPSA/SCE&G

2019

500 MW

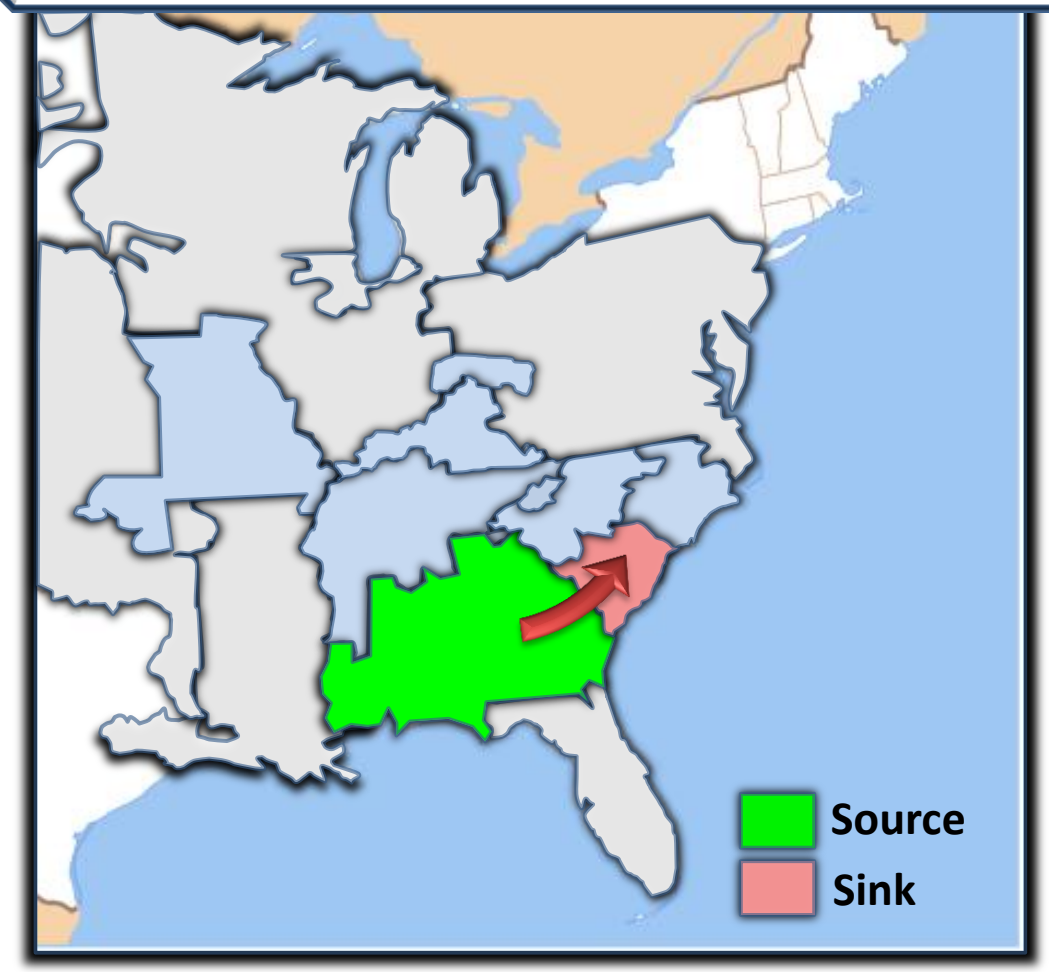
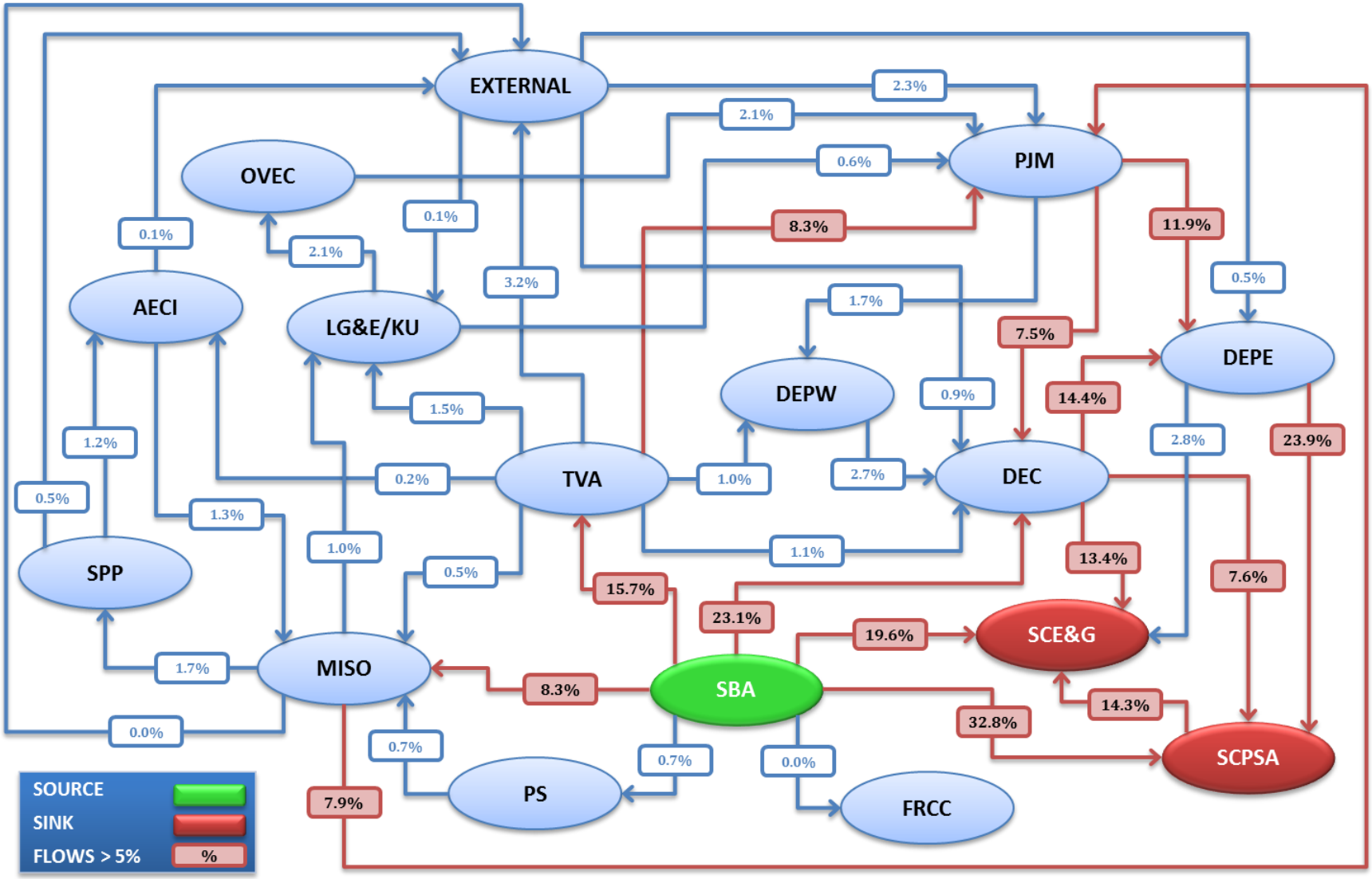


Table IV.1.1 Total Cost Identified by the SERTP Sponsors

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 ($2016)	**$0**

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



Associated Electric Cooperative Balancing Authority (AECI) Results

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 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 Identified**	--	--
AECI TOTAL ($2016)			**$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

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 Potential Solutions for Identified Problems – *DEC*

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

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	**None Identified**	--	--
DEC TOTAL ($2016)			**$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

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.

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

Scenario Explanations:

1. N/A

Table IV.4.2 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 Identified**	--	--
DEPE TOTAL ($2016)			**$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

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 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 Identified**	--	$0
DEPW TOTAL ($2016)			**$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

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 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 Identified**	--	--
LG&E/KU TOTAL ($2016)			**$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

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 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 Identified**	--	--
OVEC TOTAL ($2016)			**$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

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 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 Identified**	--	--
PS TOTAL ($2016)			**$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

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 – *SBA*

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

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

Scenario Explanations:

1. N/A

Table IV.9.2 Pass 0 – Potential Future Transmission System Impacts – *SBA*

The following table depicts thermal 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 with all proposed enhancements to the transmission system.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
SBA	380571 3SYLVANIA 115 380581 3KING MFG 115	63	96.3	97.3	380008 8VOGTLE 500 382113 8S_VOG_W MAC 500	1	
SBA	384135 5GORGAS 161 384153 3GORGAS#1 115	200	95.2	97.3	384135 5GORGAS 161 384153 3GORGAS#1 115	4	
SBA	389001 6MCINTOSH 230 389021 3MCINTOSH 115	319	90.5	92.7	370402 6JASPER1 230 371407 6YEMASSE2 230	2	
SBA	388816 3WADE SS3 115 388832 3HARLESTN 115	107	86.6	90.7	384642 6BIG CK 6 230 388702 6DANIEL6 230	3	

Scenario Explanations:

1. McIntosh Unit # 1 Offline, Summer Peak Case
2. Loopers Unit #2 Offline, Summer Peak Case
3. Crist Offline, Summer Peak Case
4. Conasauga Offline, Shoulder (93% Load Level) Case

Table IV.9.3. Potential Solutions for Identified Problems – *SBA*

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

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	**None Identified**	--	--
SBA TOTAL ($2016)			**$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 – *SBA*

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 IV.9.4 Additional Transactions

OASIS Ref. #	POR	POD	Amount (MW)
NS1119	MISO	SMEPA LOAD on SOCO	58
NS1117	MISO	PS LOAD on SOCO	150
NL1112	MISO	SOCO	544
147615	DUKE	OPC LOAD	465
147613	TVA	OPC LOAD	310
NL1132	TVA	SOCO	200
79662312	SOCO	DUKE	27
80832892	SOCO	DUKE	132
959841	SOCO	DUKE	44
79822666	GTC	TVA	200
NL1112	SCPSA	SOCO	50

Table IV.9.5 Capacity Benefit Margin (CBM)

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

Table IV.9.6 Transmission Reliability Margin (TRM)

SERTP Sponsor	Interface	Amount (MW)
Southern	Import from Duke	186
GTC	Import from Duke	113
MEAG	Import from Duke	25
Dalton	Import from Duke	3
Southern	Import from MISO	223
Southern	Import from TVA	244
GTC	Import from TVA	61
MEAG	Import from TVA	13
Dalton	Import from TVA	2

Tennessee Valley Authority Balancing Authority (TVA) Results

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** 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 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 Identified**	--	--
TVA TOTAL ($2016)			**$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

Southern/SCE&G to PJM

2021

1500 MW

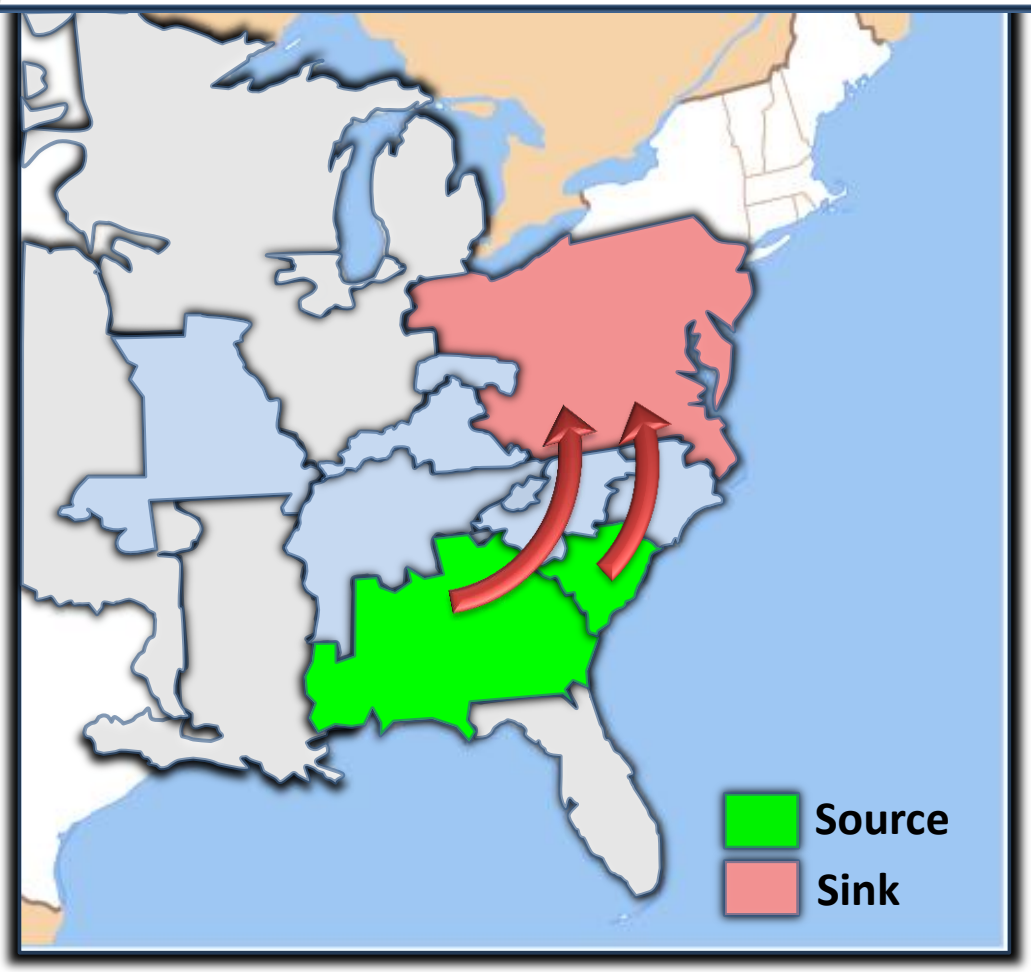
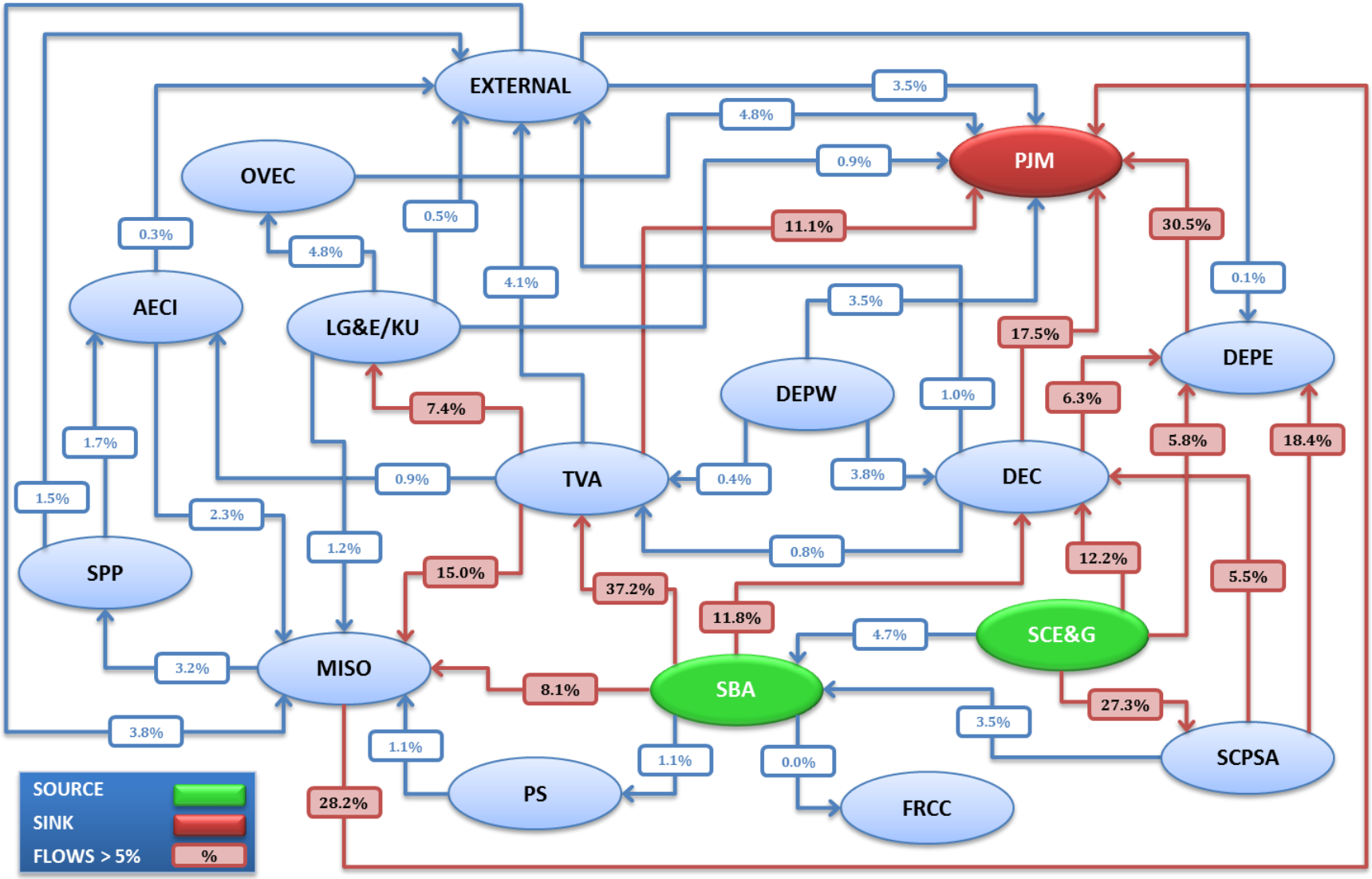


Table V.1.1 Total Cost Identified by the SERTP Sponsors

Balancing Authority	Planning Level Cost Estimate
Associated Electric Cooperative (AECI)	$0
Duke Carolinas (DEC)	$0
Duke Progress East (DEPE)	$26,000,000
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)	$8,000,000
TOTAL ($2016)	**$34,000,000**

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



Associated Electric Cooperative Balancing Authority (AECI) Results

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.

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

Scenario Explanations:

1. N/A

Table V.2.2 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 Identified**	--	--
AECI TOTAL ($2016)			**$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

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 **DEPE** thermal constraints without any 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.3.2 Pass 0 – Potential Future Transmission System Impacts – *SBA*

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	306066 TOXAWAY 100 307617 LAUEC41 100	105	87.7	94.7	308622 LEECC 306066 TOXAWAY P1	1	
DEC	306066 TOXAWAY 100 308622 LEE CC 100	96	87.5	94.0	309460 1SHADY 2 306109 6 SHADY G / 306109 6SHADY G 306105 6 SHADYTW P6	1	
DEC	306375 GTFALL1 100 306416 WATEREE 100	58	70.6	92.4	N/A	2	

Scenario Explanations:

1. Lee CC Plant Offline, Summer Peak Case
2. No Unit Offline, Summer Peak Case

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 Identified**	--	--
DEC TOTAL ($2016)			**$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 – *DEC*

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 V.3.4 Additional Transactions

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

Table V.3.5 Capacity Benefit Margin (CBM)

SERTP Sponsor	Interface	Amount (MW)
--	--	--

Table V.3.6 Transmission Reliability Margin (TRM)

SERTP Sponsor	Interface	Amount (MW)
DEC	Export to CPLE, SCE&G, or SCPSA	490
DEC	Import from CPLE	383
DEC	Import from SCE&G	185
DEC	Import from SCPSA	192

Duke Progress East Balancing Authority (DEPE) Results

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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
DEPE	304632 3MARION115 T 115 304653 3DILLON TAP 115	97	96.0	116.2	304663 6LATTA SS T 230 304682 6DILLONMP TA 230	1	P1
DEPE	304696 3SHAW AFB TA 115 370238 3EASTOVER 115	123	94.1	107.9	SMTCONT-SUMMRTN230_&_SUMT-WATEREE230	2	P2
DEPE	304725 3CAMDEN115 T 115 304731 3IND104 115	107	< 90.0	100.7	304716 3CAMDEN TAP 115 304725 3CAMDEN115 T 115	3	P3

Scenario Explanations:

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

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	304348 6ROCKHAM230T 230 304638 6WADSBOR TA1 230	542	95.0	100.1[(1)]	304348 6ROCKHAM230T 230 305046 6E11-ELLERBE 230	2	--
DEPE	304716 3CAMDEN TAP 115 304725 3CAMDEN115 T 115	107	< 90.0	97.4	304725 3CAMDEN115 T 115 304731 3IND104 115	2	--
DEPE	304327 6ELLERBE 230 304638 6WADSBOR TA1 230	512	< 90.0	94.8	304348 6ROCKHAM230T 230 305046 6E11-ELLERBE 230	2	--
DEPE	304057 6DARLCNT230T 230 312734 6S BETH 230	478	< 90.0	94.6	304698 6IND101 304699 6SUMMERTON TA 230 & 304700 6SUMTER 370101 6WATEREE1 230	1	--
DEPE	304361 6WESTEND230T 230 305320 6EDENSOL-TAP 230	512	< 90.0	93.3	304348 6ROCKHAM230T 230 305046 6E11-ELLERBE 230	2	--

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
DEPE	304688 3IND096 115 304694 3KINGS HWY 115	120	< 90.0	92.2	304698 6IND101 304699 6SUMMERTON TA 230 & 304700 6SUMTER 370101 6WATEREE1 230	1	--
DEPE	304694 3KINGS HWY 115 304696 3SHAW AFB TA 115	120	< 90.0	92.2	304698 6IND101 304699 6SUMMERTON TA 230 & 304700 6SUMTER 370101 6WATEREE1 230	1	--
DEPE	304686 3SUMTER115 T 115 304688 3IND096 115	120	< 90.0	92.0	304698 6IND101 304699 6SUMMERTON TA 230 & 304700 6SUMTER 370101 6WATEREE1 230	1	--
DEPE	304287 3GOLDSB SS T 115 305052 3E13-ARBA 115	147	< 90.0	91.7	304474 6IND053 230 304500 6WOMMACK230T 230	3	--
DEPE	304474 6IND053 230 304500 6WOMMACK230T 230	179	< 90.0	90.5	304550 6CASTLEH230T 230 304564 6SCOTT TAP 230	3	--
DEPE	304361 6WESTEND230T 230 305024 6E3-CNTR CRC 230	542	< 90.0	90.5	304377 8RICHMON500T 500 304391 8CUMBLND500T 500	2	--
DEPE	304327 6ELLERBE 230 305320 6EDENSOL-TAP 230	512	< 90.0	90.3	304348 6ROCKHAM230T 230 305046 6E11-ELLERBE 230	2	--

(1) A current operating procedure is sufficient to alleviate this identified constraint without the addition of the proposed transfer.

Scenario Explanations:

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

Table V.4.3 Potential Solutions for Identified Problems – *DEPE*

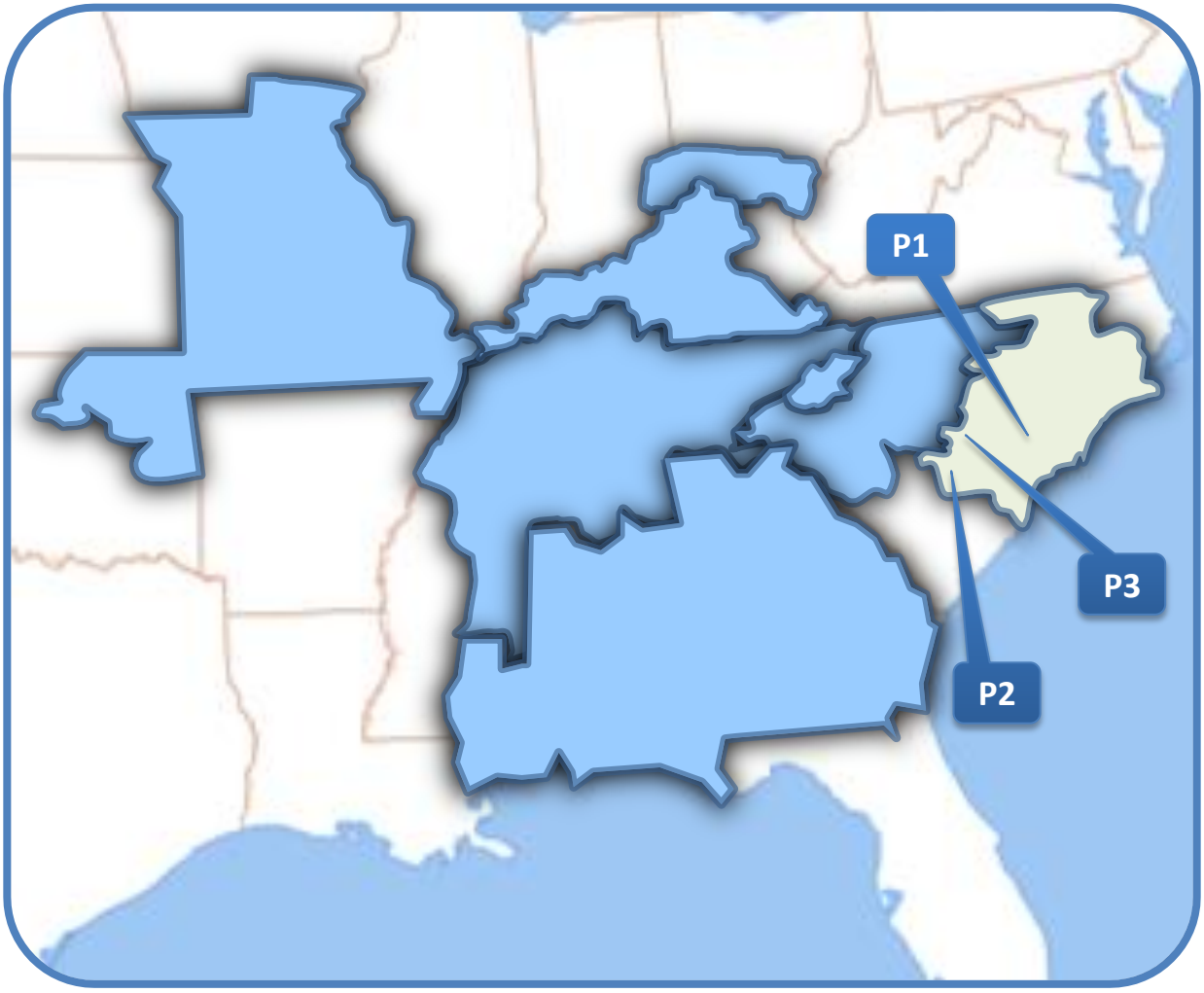
The following table lists any potential solutions that were identified to address the attributable constraints based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. 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
P1	**Weatherspoon Plant – Marion 115 kV T.L.** • Rebuild approximately 14.6 miles of the Marion to Dillon segment of the Weatherspoon Plant – Marion 115 kV TL with 3-795 ACSR.	2021	$15,000,000
P2	**Sumter – (SCE&G) Eastover 115 kV T.L.** • Reconductor approximately 7.4 miles of the Eastover to Shaw Field Tap segment of the Sumter – Eastover 115 kV TL with 3-795 ACSR.	2021	$10,000,000 (2)
P3	**Camden – Ind104 115 kV T.L.** • Reconductor approximately 0.73 miles of 115 kV transmission line with 3-795 ACSR	2021	$1,000,000
DEPE TOTAL ($2016)			**$26,000,000** (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 **DEPE** 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 V.4.1. **Approximate Location of Potential Solutions – *DEPE***



Economic Planning Study Additional Interchange Assumptions – *DEPE*

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 V.4.4 Additional Transactions

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

Table V.4.5 Capacity Benefit Margin (CBM)

SERTP Sponsor	Interface	Amount (MW)
--	--	--

Table V.4.6 Transmission Reliability Margin (TRM)

SERTP Sponsor	Interface	Amount (MW)
DEPE	DEPE-DUK	773
DEPE	DEPE-SCEG	200
DEPE	DEPE-SCPSA	326
DEPE	DEPE-DVP	427
DEPE	DEPE-AEP	100

Duke Progress West (DEPW) Results

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.

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

Scenario Explanations:

1. N/A

Table V.5.2 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 Identified**	--	$0
DEPW TOTAL ($2016)			**$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

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.

			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.6.2 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 Identified**	--	--
LG&E/KU TOTAL ($2016)			**$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

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 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 Identified**	--	--
OVEC TOTAL ($2016)			**$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

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 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 Identified**	--	--
PS TOTAL ($2016)			**$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

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 – *SBA*

The following table identifies significant **SBA** 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
--	None Identified	--	--	--	--	--	--

Scenario Explanations:

1. N/A

Table V.9.2 Pass 0 – Potential Future Transmission System Impacts – *SBA*

The following table depicts thermal 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 with all proposed enhancements to the transmission system.

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
SBA	382668 6KLONDIKE B1230 382705 6MORROW B2 230	539	93.6	96.8	KLONDIKE AUTO	2	
SBA	384135 5GORGAS 161 384153 3GORGAS#1 115 2	200	88.4	96.1	384135 5GORGAS 161 384153 3GORGAS#1 115	3	
SBA	381260 3MARIETTA JW115 381985 3N MARIET B3115	149	90.4	94.9	381262 3MAR 14 JB 115 381988 3SMYRNA B2 115	1	
SBA	381912 6JONESBORO 230 382771 6OHARA B1 230	155	90.3	93.1	KLONDIKE BREAKER	2	

Scenario Explanations:

1. Gorgas Offline, Shoulder (93% Load Level) Case
2. McIntosh Unit # 1 Offline, Summer Peak Case
3. Bowen Unit #4 Offline, Shoulder (93% Load Level) Case

Table V.9.3. Potential Solutions for Identified Problems – *SBA*

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

Item	Potential Solution	Estimated Need Date	Planning Level Cost Estimate
--	**None Identified**	--	--
SBA TOTAL ($2016)			**$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 – *SBA*

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 V.9.4 Additional Transactions

OASIS Ref. #	POR	POD	Amount (MW)
NS1119	MISO	SMEPA LOAD on SOCO	58
NS1117	MISO	PS LOAD on SOCO	150
NL1112	MISO	SOCO	544
147615	DUKE	OPC LOAD	465
147613	TVA	OPC LOAD	310
NL1132	TVA	SOCO	200
79662312	SOCO	DUKE	27
80832892	SOCO	DUKE	132
959841	SOCO	DUKE	44
79822666	GTC	TVA	200
NL1112	SCPSA	SOCO	50

Table V.9.5 Capacity Benefit Margin (CBM)

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

Table V.9.6 Transmission Reliability Margin (TRM)

SERTP Sponsor	Interface	Amount (MW)
Southern	Import from Duke	186
GTC	Import from Duke	113
MEAG	Import from Duke	25
Dalton	Import from Duke	3
Southern	Import from MISO	223
Southern	Import from TVA	244
GTC	Import from TVA	61
MEAG	Import from TVA	13
Dalton	Import from TVA	2

Tennessee Valley Authority Balancing Authority (TVA) Results

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.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
TVA	360527 EAST KNOX – 360133 DUMPLIN VALLEY 161 KV TL	363.6	99.0	110.1	360097 – 360102 500 KV TL	1	P1

Scenario Explanations:

1. John Sevier CC Steam Unit Offline, Summer Peak Case

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	360061 Madison – 360294 Huntsville #1 161 KV TL	289.5	91.0	95.0	360281 – 361637 161-kV line section	1	--
TVA	360432 Kingston – 360694 Bethel Valley 161 KV TL	237.3	92.0	94.0	360432 – 360431 161-kV line section	1	--

Scenario Explanations:

1. No Unit Offline, Summer Peak Case

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
P1	**East Knox – Dumplin Valley 161 kV TL** • Reconductor approximately 9.2 miles of the Dumplin Valley – East Knox 161 kV transmission line with bundled 954 ACSR conductor.	2021	$8,000,000
TVA TOTAL ($2016)			**$8,000,000** (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 V.10.1. Approximate Location of Potential Solutions – *TVA*