Southeastern Regional
TRANSMISSION PLANNING

SERTP – 2017 3rd Quarter Meeting

2nd RPSG Meeting

September 21st, 2017

Duke Energy Carolinas

Charlotte, NC

Process Information

- The SERTP process is a transmission planning process.

- Please contact the respective transmission provider for questions related to real-time operations or OATT transmission service.

Purposes & Goals of Meeting

- **Economic Planning Studies**
  - Preliminary Results
  - Stakeholder Input/Discussion
- **Miscellaneous Updates**
- **Next Meeting Activities**

SERTP Preliminary

Economic Planning Studies

Economic Planning Studies Process

- Economic Planning Studies were chosen by the Regional Planning Stakeholder Group "RPSG" in March at the 2017 SERTP 1st Quarter Meeting.

- Key study criteria, methodologies, and input assumptions were defined in April at the 2017 Economic Planning Study Scoping Meeting.

- These studies represent analyses of hypothetical scenarios requested by the stakeholders and do not represent an actual transmission need or commitment to build.

Economic Planning Studies Process

- **SERTP Sponsors identify the transmission requirements needed to move large amounts of power above and beyond existing long-term, firm transmission service commitments**
  - Analysis are consistent with NERC standards and company-specific planning criteria

- **Models used to perform the analysis incorporate the load forecasts and resource decisions as provided by LSEs**
  - Power flow models are made available to stakeholders to perform additional screens or analysis

Economic Planning Studies

- **Santee Cooper to PJM**
  - 300 MW (2020 Summer Peak)
- **Southern to Santee Cooper**
  - 500 MW (2020 Summer Peak)
- **TVA to FRCC**
  - 500 MW (2022 Summer Peak)
- **TVA to PJM**
  - 500 MW (2022 Winter Peak)
- **TVA to Duke Energy Carolinas**
  - 300 MW (2022 Summer Peak)

Power Flow Cases Utilized

- **Study Years:**
  - 2020 and 2022

- **Load Flow Cases:**
  - 2017 Series Version 2 SERTP Regional Models
  - Summer Peak and Winter Peak (Additional load levels evaluated as appropriate)

Preliminary Report Components

- **The SERTP reported, at a minimum, results on elements of 115 kV and greater:**
  - Thermal loadings greater than 90% for facilities that are negatively (+5%) impacted by the proposed transfers
  - Voltages appropriate to each participating transmission owner's planning criteria
  - Overloaded facilities that had a low response to the requested transfer were excluded and issues identified that are local in nature were also excluded

- **For each economic planning study request, the results of that study include:**
  1. Limit(s) to the transfer
  2. Potential transmission enhancement(s) to address the limit(s)
  3. Planning-level cost estimates and in-service dates for the selected transmission enhancement(s)

Process Information

- The following information depicts recommended enhancements for the proposed transfer levels above and beyond existing, firm commitments. Therefore, this information does not represent a commitment to proceed with the recommended enhancements nor implies that the recommended enhancements could be implemented by the study dates (2020 and 2022).

- These potential solutions only address constraints identified within the SERTP Sponsors' areas that are associated with the proposed transfers. Other Balancing Areas were not monitored which could result in additional limitations and required system enhancements.

Economic Planning Studies

Santee Cooper Border to PJM Border 300 MW

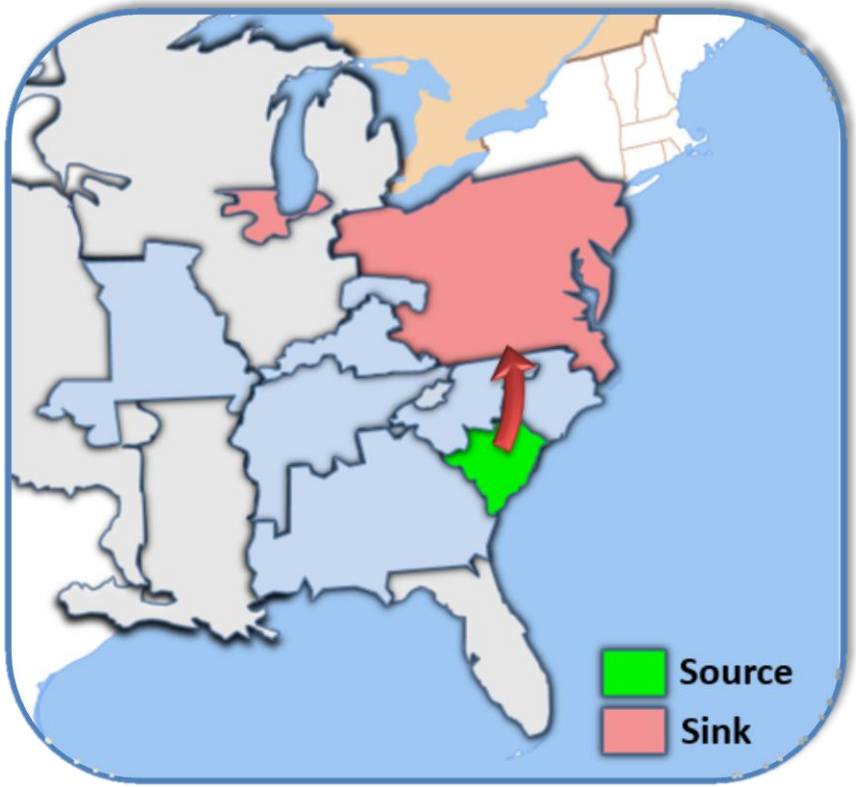
Santee Cooper to PJM – 300 MW

Study Assumptions

- **Transfer Type:** Load to Load (2020 Summer Peak)
- **Source:** Uniform load scale within Santee Cooper
- **Sink:** Uniform load scale within PJM as shown in Table 1 below:

Table 1: Uniform load Scale within PJM

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



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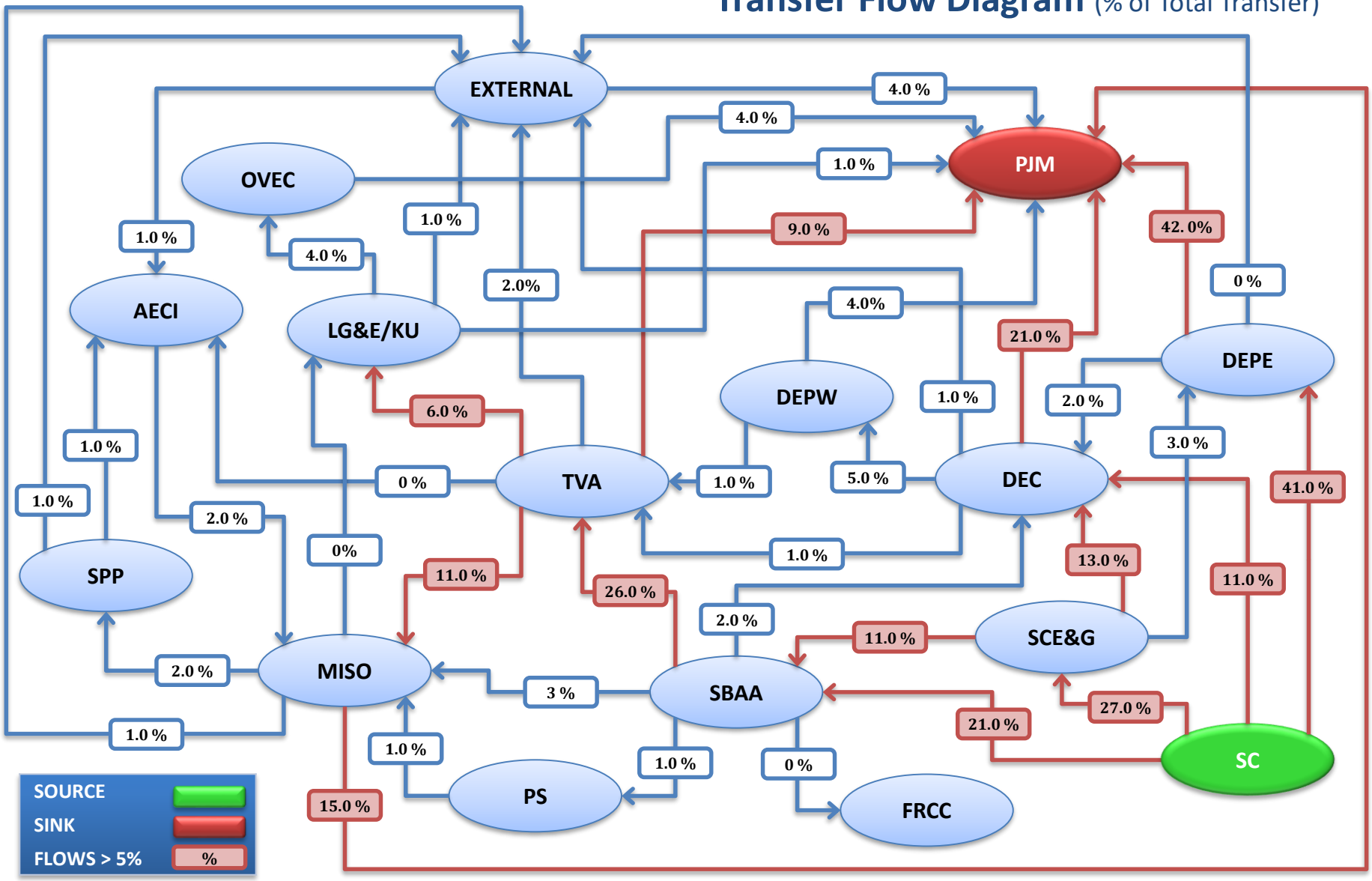
Santee Cooper to PJM – 300 MW

Transfer Flow Diagram (% of Total Transfer)



Santee Cooper to PJM – 300 MW

Transmission System Impacts – *SERTP*

- **Transmission System Impacts Identified:**
  - No significant constraints were identified in the SERTP Balancing Authority Areas

- **Potential Transmission Enhancements Identified:**
  - None Required

SERTP Total ($2017) = $0

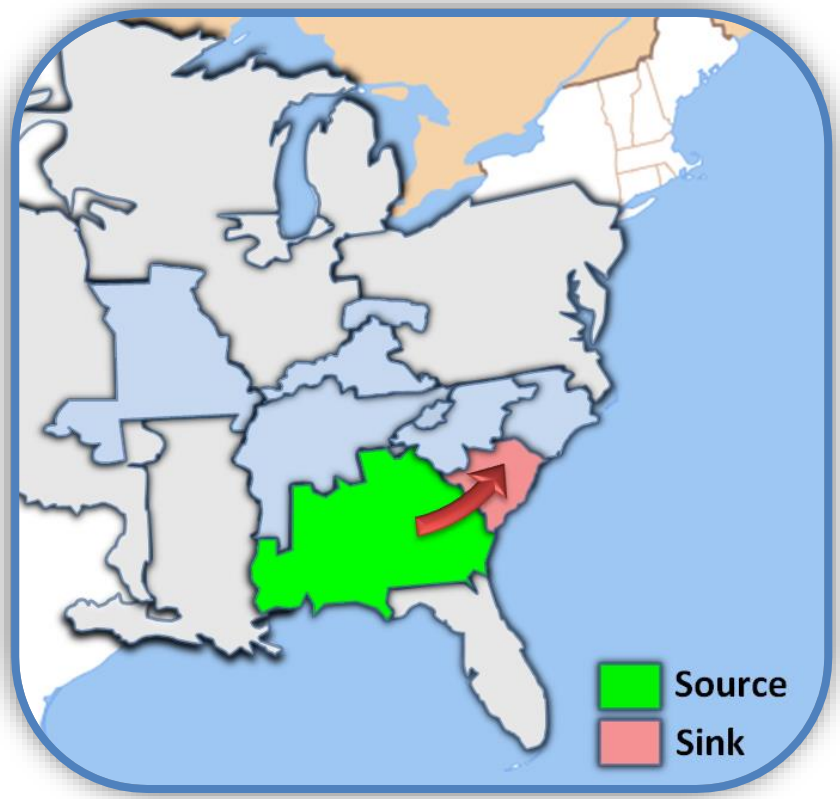
Economic Planning Studies

Southern to Santee Cooper Border 500 MW

Southern to Santee Cooper – 500 MW

Study Assumptions

- **Transfer Type:** Generation to Load (2020 Summer Peak)
- **Source:** Generation within Southern
- **Sink:** Uniform load scale within Santee Cooper



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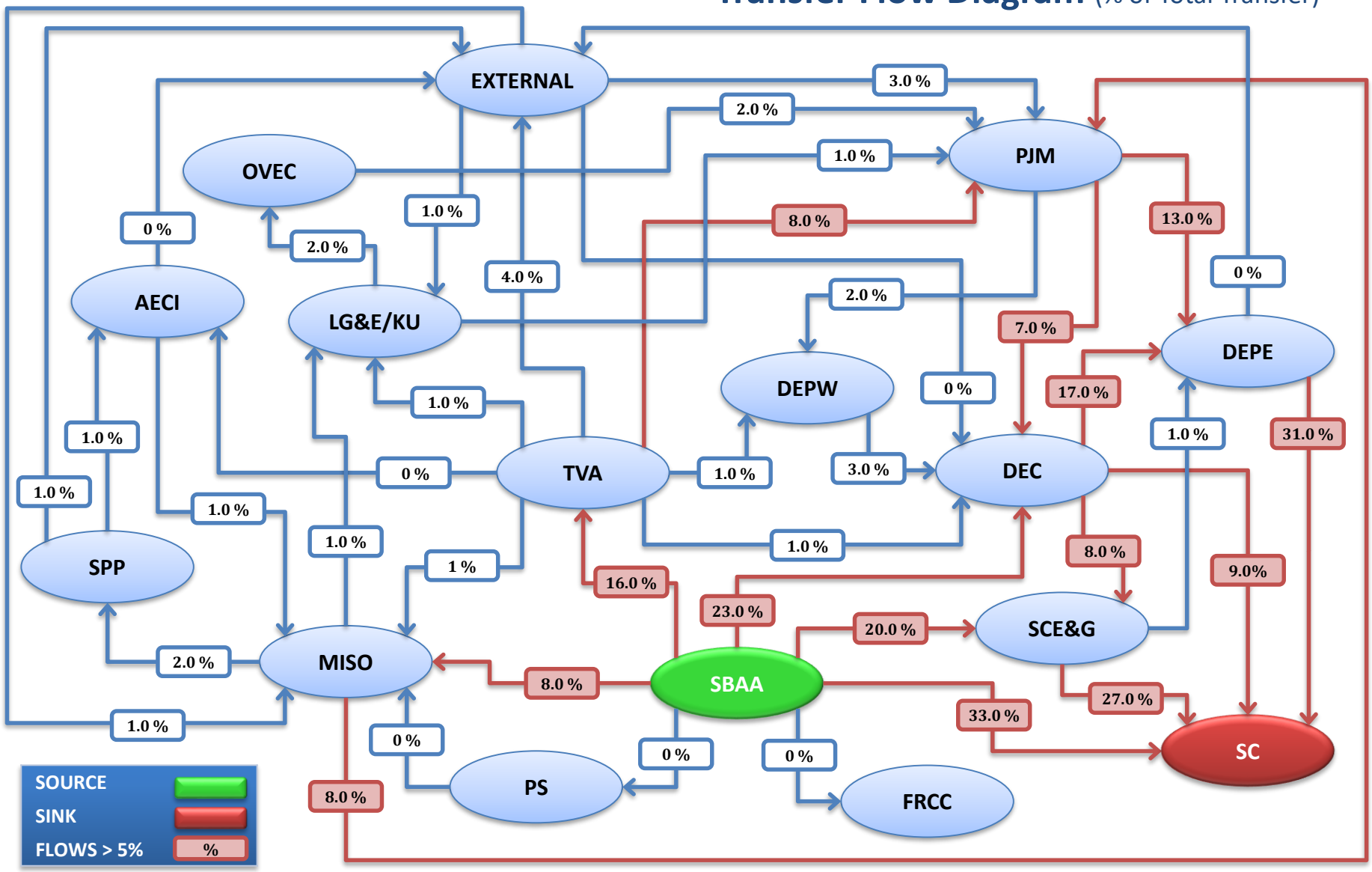
Southern to Santee Cooper – 500 MW

Transfer Flow Diagram (% of Total Transfer)



Southern to Santee Cooper – 500 MW

Transmission System Impacts – *SERTP*

- **Transmission System Impacts Identified:**
  - No significant constraints were identified in the SERTP Balancing Authority Areas

- **Potential Transmission Enhancements Identified:**
  - None Required

SERTP TOTAL ($2017) = $0

Economic Planning Studies

TVA to FRCC Border
500 MW

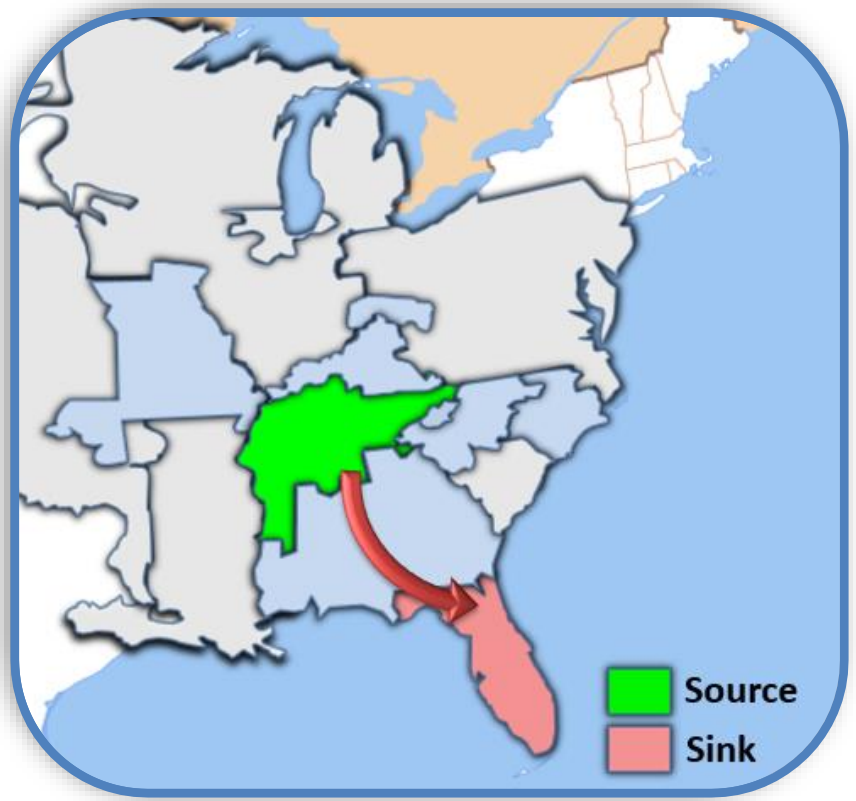
TVA to FRCC – 500 MW

Study Assumptions

- **Transfer Type:** Generation to Generation (2022 Summer Peak)
- **Source:** Generation within TVA
- **Sink:** Generation scale within FRCC as shown in Table 2 below:

Table 2: Generation scale within FRCC

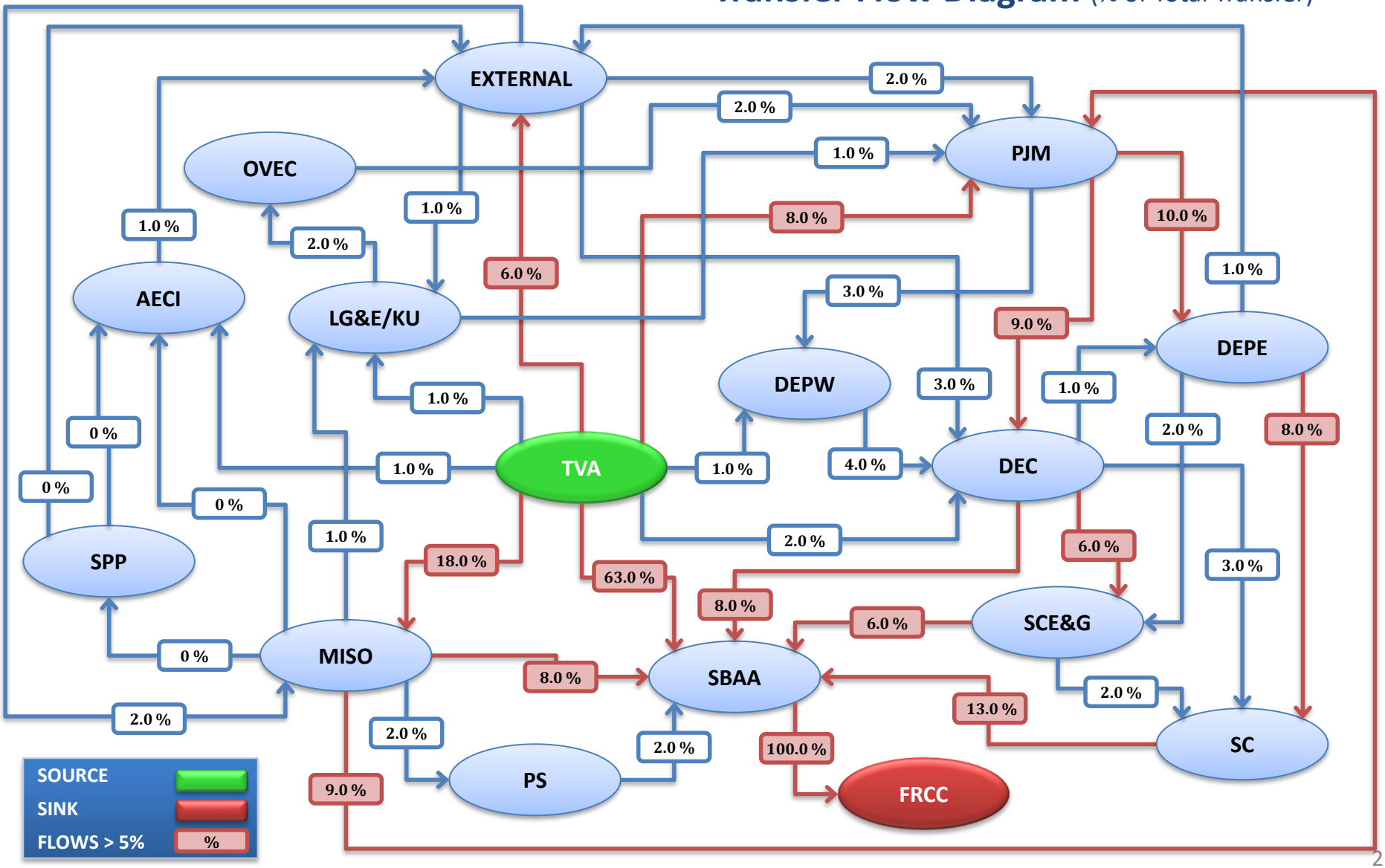
FRCC Area	Area #	MW Allocation
Florida Power & Light Company	401	208
Duke Energy Florida	402	68
Jacksonville Electric Authority	406	192
Tallahassee City Electric	415	32
Total		500



Southeastern Regional
TRANSMISSION PLANNING

TVA to FRCC – 500 MW

Transfer Flow Diagram (% of Total Transfer)



TVA to FRCC – 500 MW

Transmission System Impacts

- **Transmission System Impacts Identified:**
  - Significant constraints were identified in the following SERTP Balancing Authority Areas:
    - ***SBAA***

- **Potential Transmission Enhancements Identified:**
  - One (1) 115 kV T.L. Upgrade
  - One (1) 230 kV 3% Reactor Upgrade

SERTP TOTAL ($2017) = $6,800,000

TVA to FRCC – 500 MW

Significant Constraints Identified – *SBAA*

Table 3: Significant Constraints (P1) - SBAA

Potential Enhancement	Limiting Element	Rating (MVA)	Thermal Loadings (%)	
			Without Request	With Request
P1	Nunez Junction – Stillmore 115 kV T.L. Section	79	101.5(1)	106.1

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

Potential Enhancements Identified – *SBAA*

Table 4: Potential Enhancement (P1) - SBAA

Item	Potential Enhancement	Planning Level Cost Estimate
P1	**Statesboro Primary – Wadley Primary Upgrade** • Upgrade approximately 9.2 miles along the Nunez Junction – Stillmore section of the Statesboro – Wadley Primary 115 kV transmission line from 50°C to 100°C operation.	**$4,300,000**
SBAA TOTAL ($2017)		**$4,300,000** (1)

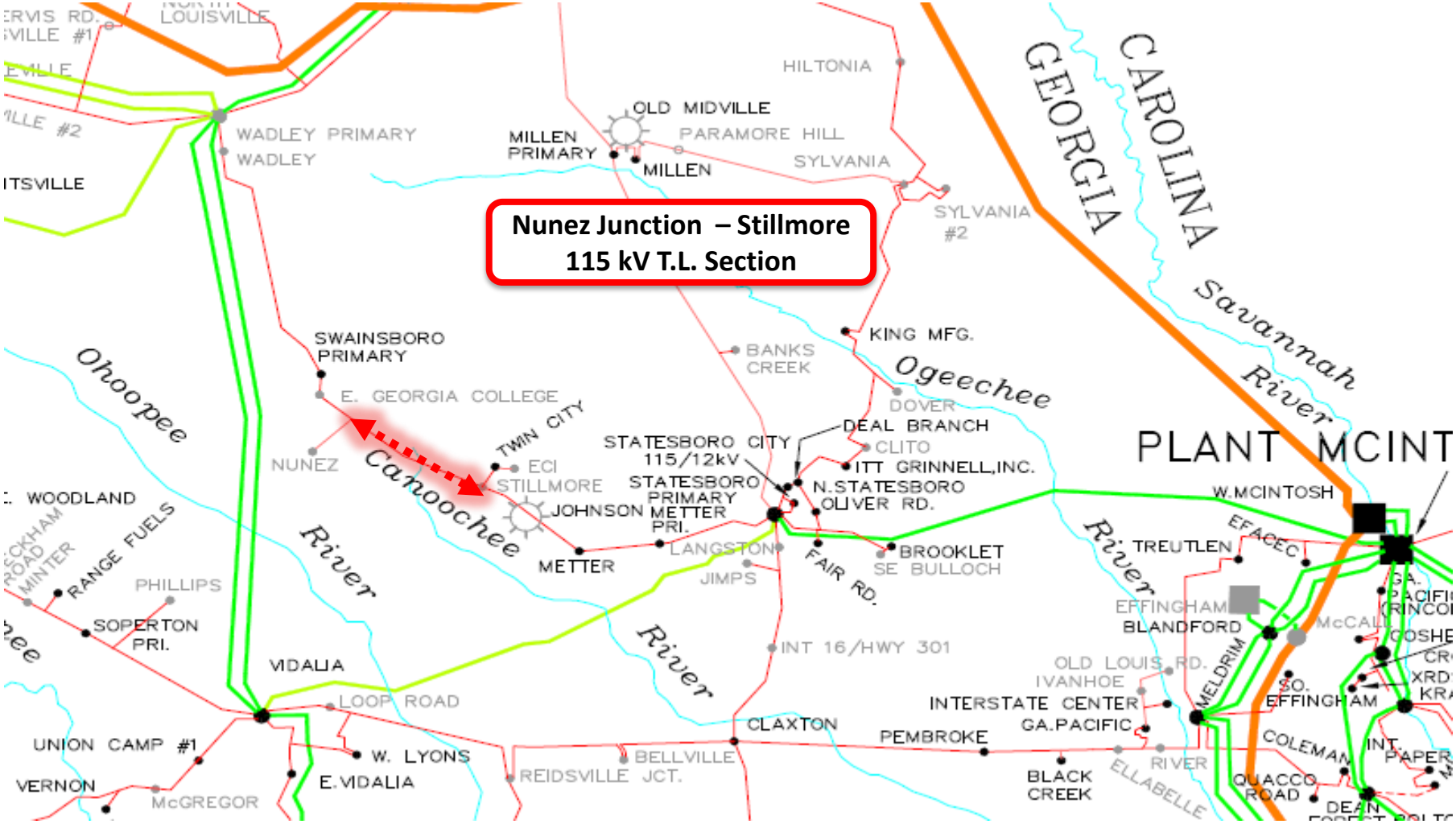
(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer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

TVA to FRCC – 500 MW

Potential Enhancement (P1) Location – *SBAA*

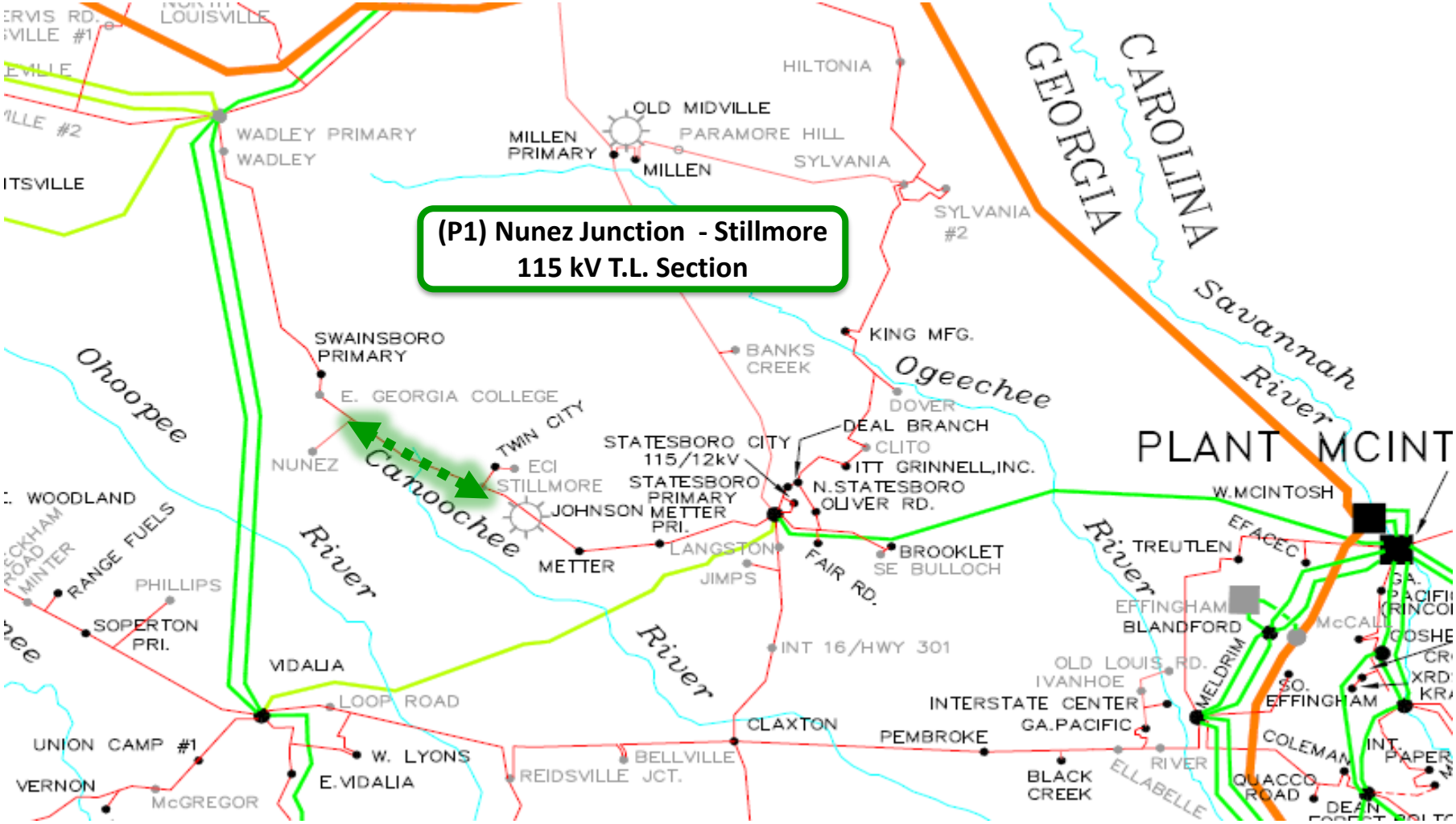
TVA to FRCC – 500 MW

Significant Constraint (P1) – *SBAA*



TVA to FRCC – 500 MW

Potential Enhancement (P1) – *SBAA*



TVA to FRCC – 500 MW

Significant Constraints Identified – *SBAA*

Table 5: Significant Constraints (P2) - SBAA

Potential Enhancement	Limiting Element	Rating (MVA)	Thermal Loadings (%)	
			Without Request	With Request
P2	North Americus – North Tifton 230 kV T.L.	220	95.4	100.7

Potential Enhancements Identified – *SBAA*

Table 6: Potential Enhancement (P2) - SBAA

Item	Potential Enhancement	Planning Level Cost Estimate
P2	**North Americus (GTC) Substation** • Replace 2% 230 kV Series Reactor with a new 3% 230 kV Series Reactor at North Americus on the North Americus – North Tifton 230 kV Line.	**$2,500,000**
SBAA TOTAL ($2017)		**$2,500,000** (1)

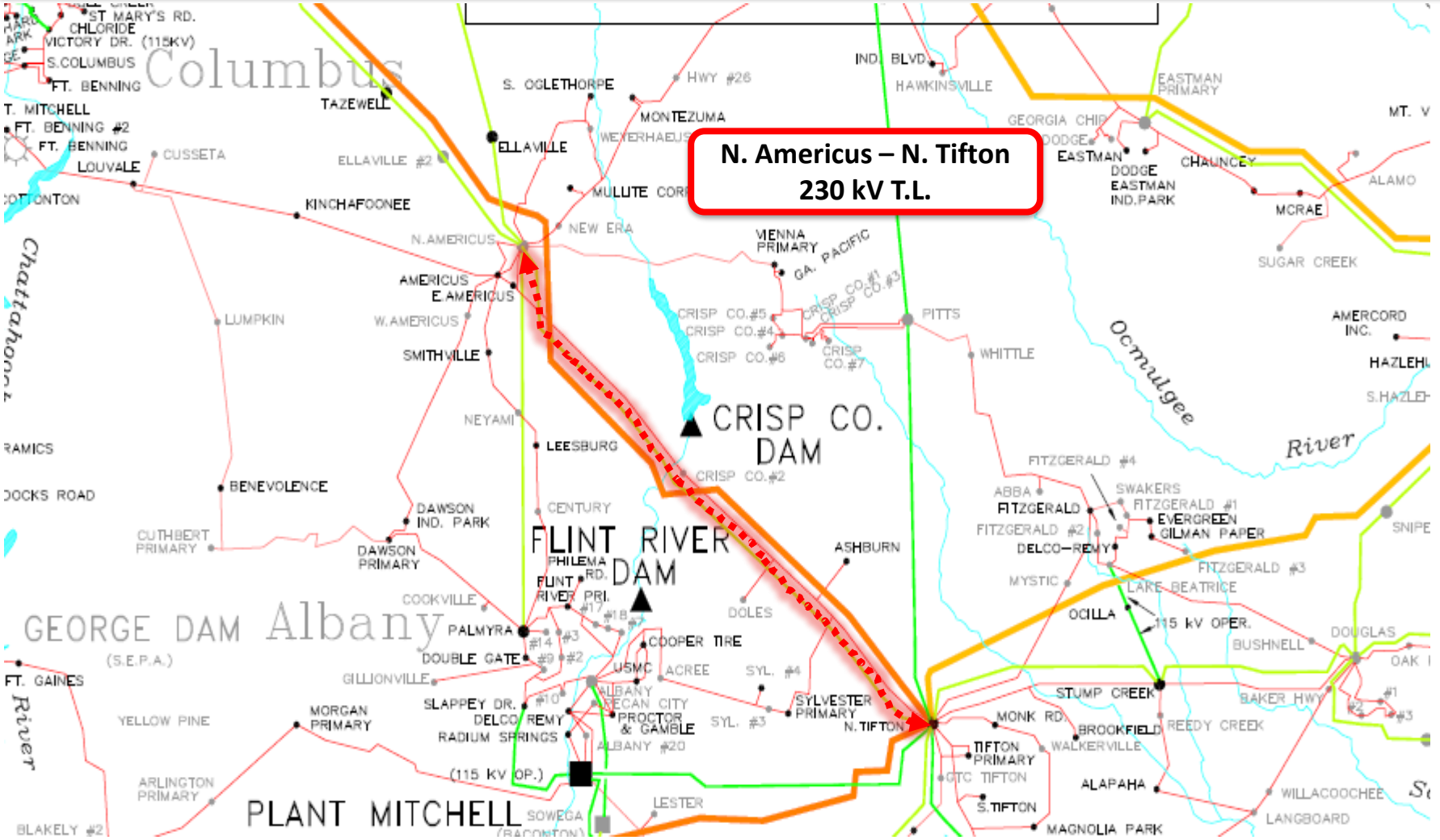
(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer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

TVA to FRCC – 500 MW

Potential Enhancement (P2) Location – *SBAA*

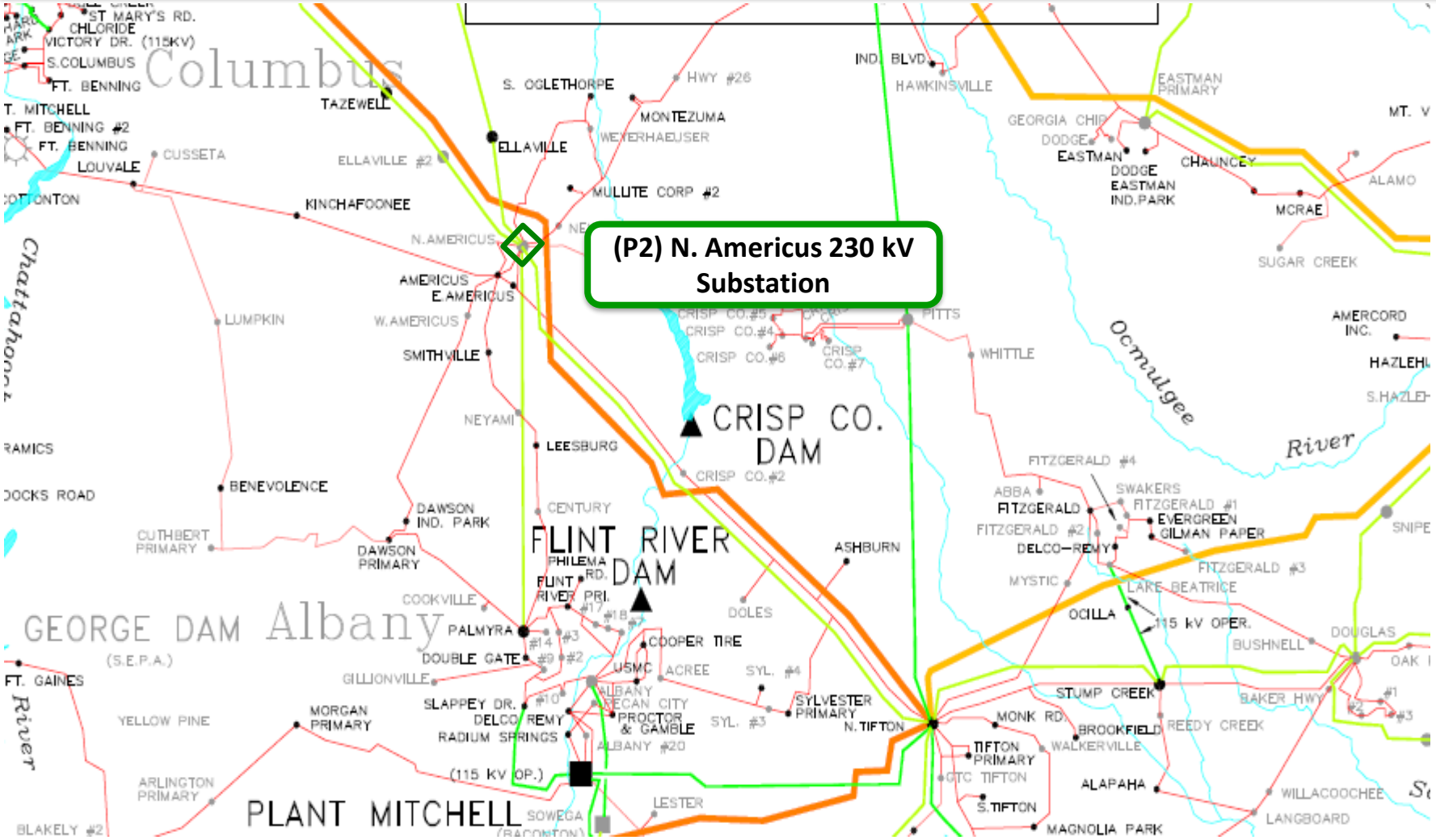
TVA to FRCC – 500 MW

Significant Constraint (P2) – *SBAA*



TVA to FRCC – 500 MW

Potential Enhancement (P2) – *SBAA*



TVA to FRCC – 500 MW

Transmission System Impacts – *SERTP*

Table 7: Transmission System Impacts - SERTP

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

Economic Planning Studies

TVA to PJM Border
500 MW

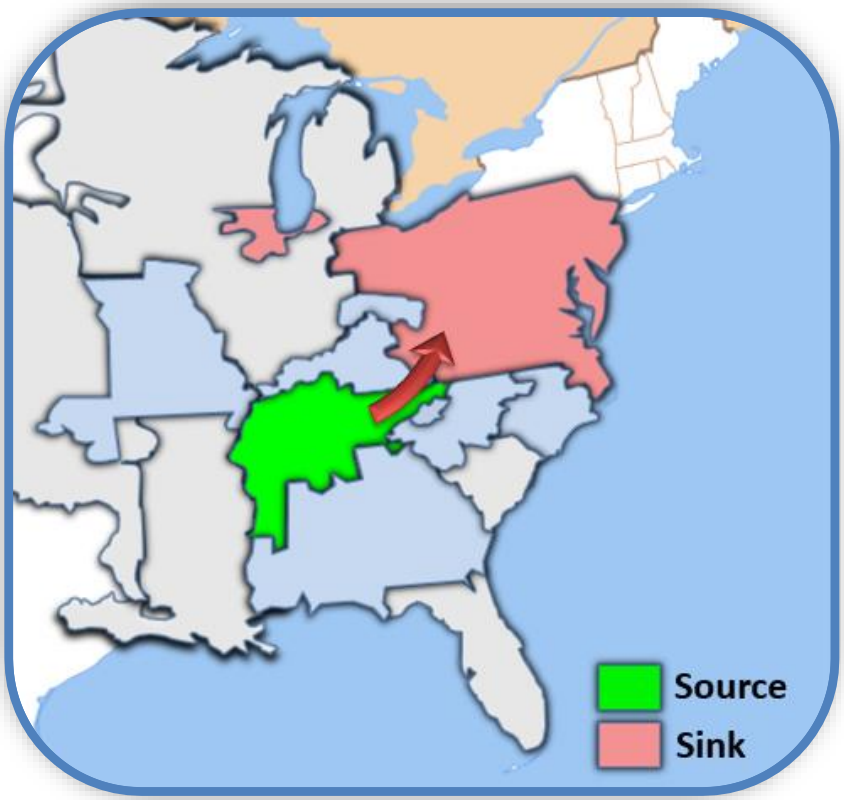
TVA to PJM Border – 500 MW

Study Assumptions

- **Transfer Type:** Generation to Load (2022 Winter Peak)
- **Source:** Generation within TVA
- **Sink:** Load scale within PJM as shown in Table 8 below:

Table 8: Load scale within PJM

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



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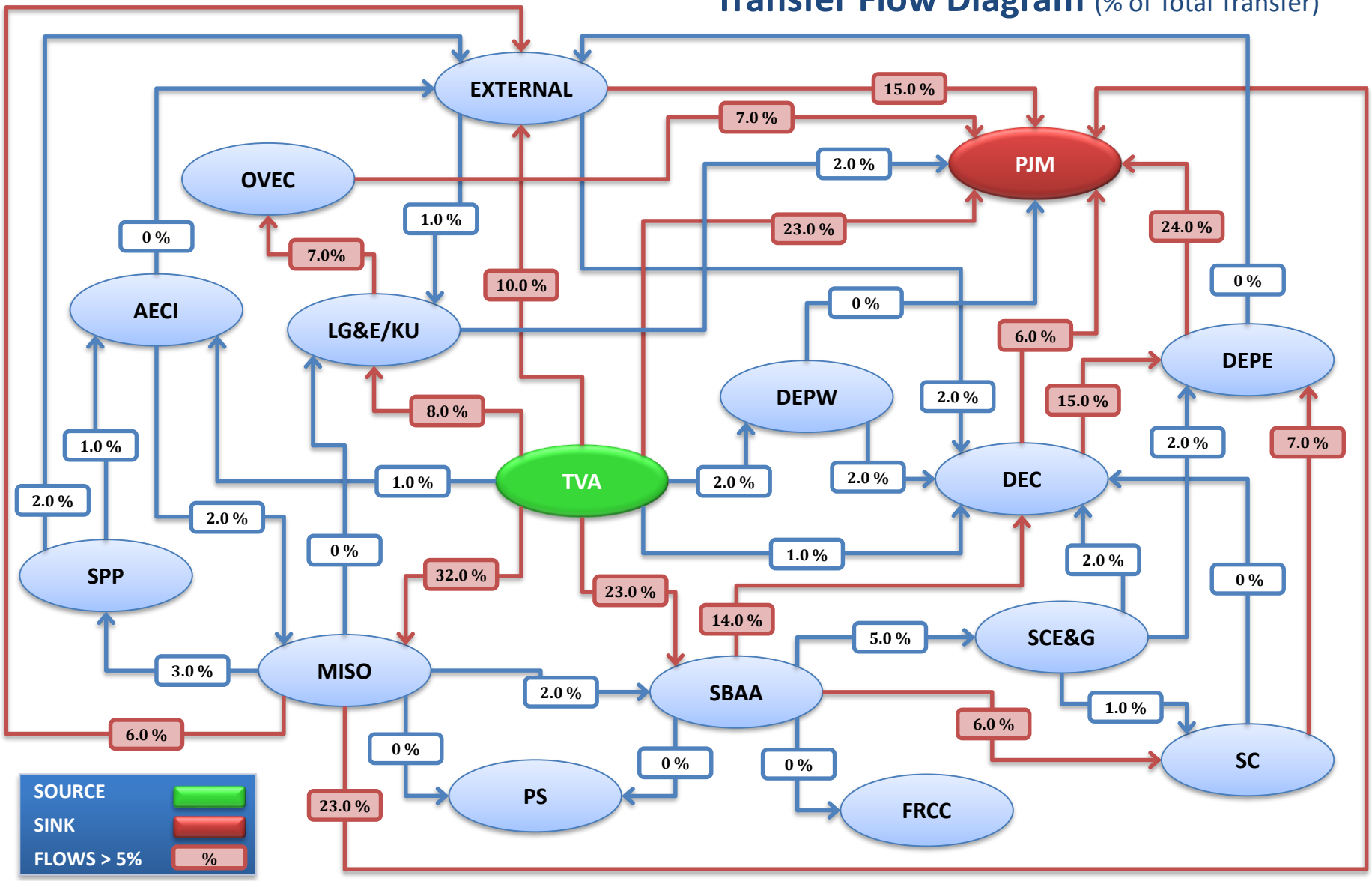
TVA to PJM Border – 500 MW

Transfer Flow Diagram (% of Total Transfer)



TVA to PJM Border – 500 MW

Transmission System Impacts – *SERTP*

- **Transmission System Impacts Identified:**
  - No significant constraints were identified in the SERTP Balancing Authority Areas

- **Potential Transmission Enhancements Identified:**
  - None Required

SERTP TOTAL ($2017) = $0

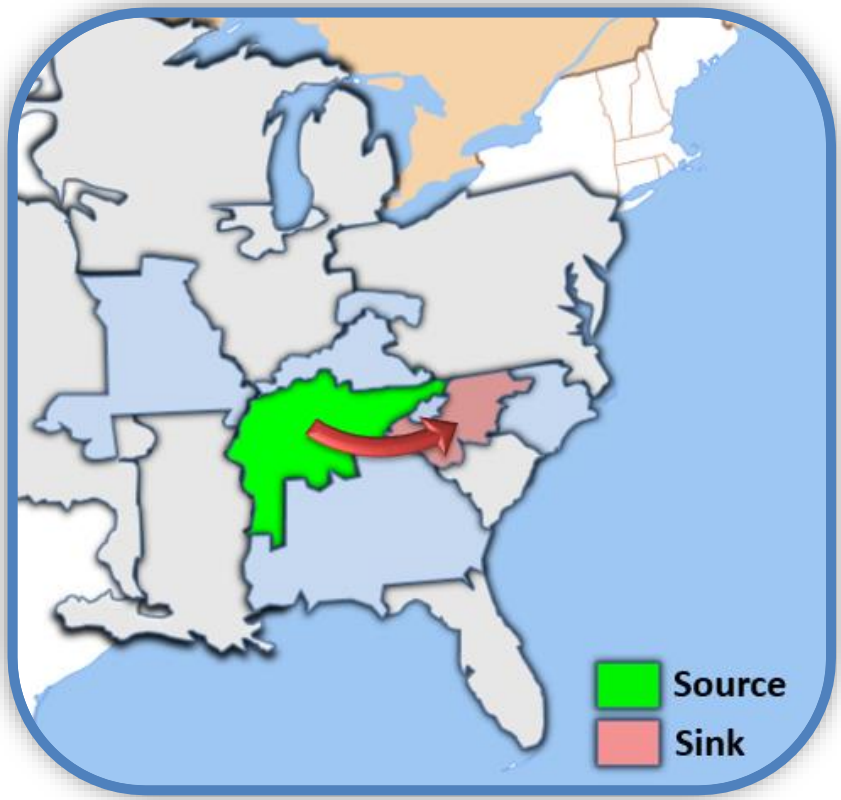
Economic Planning Studies

TVA to Duke Energy Carolinas 300 MW

TVA to Duke Energy Carolinas – 300 MW

Study Assumptions

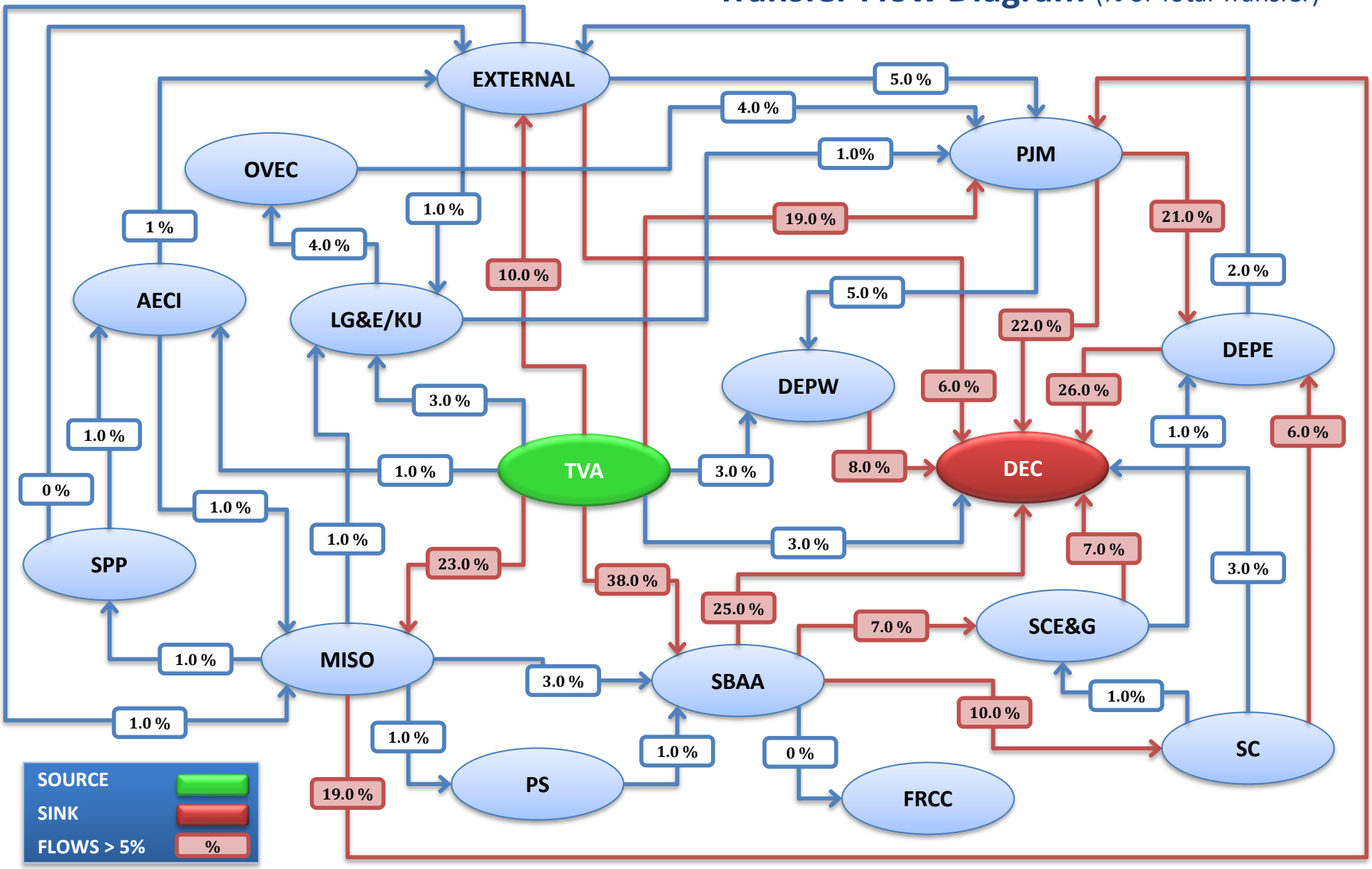
- **Transfer Type:** Generation to Generation (2022 Summer Peak)
- **Source:** Generation within TVA
- **Sink:** Generation within Duke Energy Carolinas



Southeastern Regional TRANSMISSION PLANNING

TVA to Duke Energy Carolinas – 300 MW

Transfer Flow Diagram (% of Total Transfer)



TVA to Duke Energy Carolinas – 300 MW

Transmission System Impacts – *SERTP*

- **Transmission System Impacts Identified:**
  - No significant constraints were identified in the SERTP Balancing Authority Areas

- **Potential Transmission Enhancements Identified:**
  - None Required

SERTP TOTAL ($2017) = $0

SERTP

Miscellaneous Updates

Regional Planning Update

- Version 2 SERTP Regional Models available on SERTP Website

- Plan in place to facilitate the exchange of the latest transmission models for the ten year planning horizon with FRCC
  - FRCC models will be incorporated into subsequent regional power flow models

- SERTP Sponsors beginning analyses on regional models including assessment to identify and evaluate potential regional transmission projects

2017 Regional Transmission Analyses

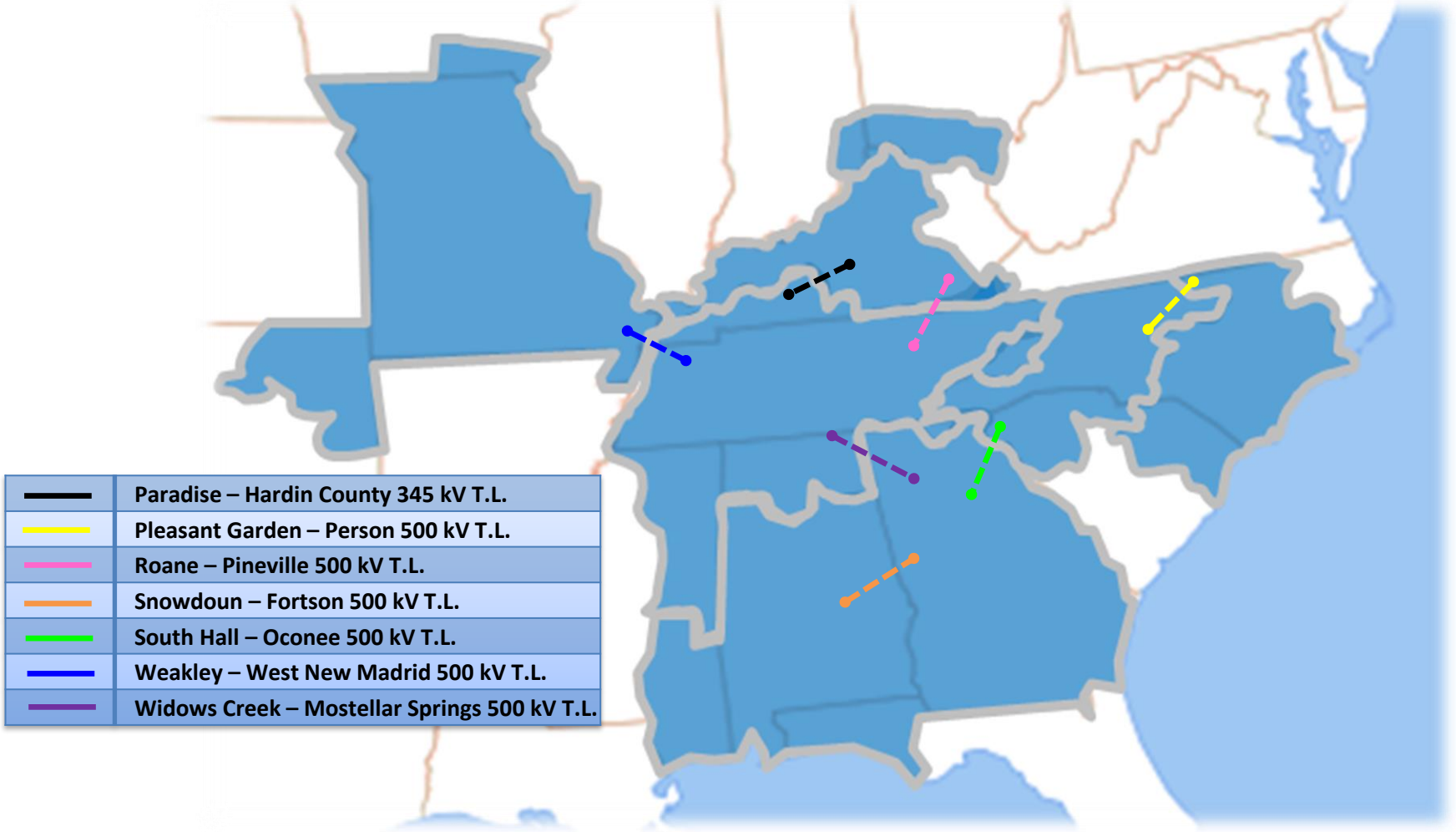
Preliminary List of Alternative Regional Transmission Projects

Table 9: Alternative Regional Transmission Projects

Alternative Regional Transmission Projects	Miles	From	To
		BAA (State)	BAA (State)
Paradise – Hardin County 345 kV T.L.	65	TVA (KY)	LG&E/KU (KY)
Pleasant Garden – Person 500kV T.L.	60	DEC (NC)	DEPE (NC)
Roane – Pineville 500 kV T.L.	70	TVA (TN)	LG&E/KU (KY)
Snowdoun – Fortson 500 kV T.L.	100	SBAA (AL)	SBAA (GA)
South Hall – Oconee 500 kV T.L. (2nd Circuit)	70	SBAA (GA)	DEC (SC)
Weakly – West New Madrid 500 kV T.L.	55	TVA (TN)	AECI (MO)
Widows Creek – Mostellar Springs 500 kV T.L.	100	TVA (AL)	SBAA (GA)

2017 Regional Transmission Analyses

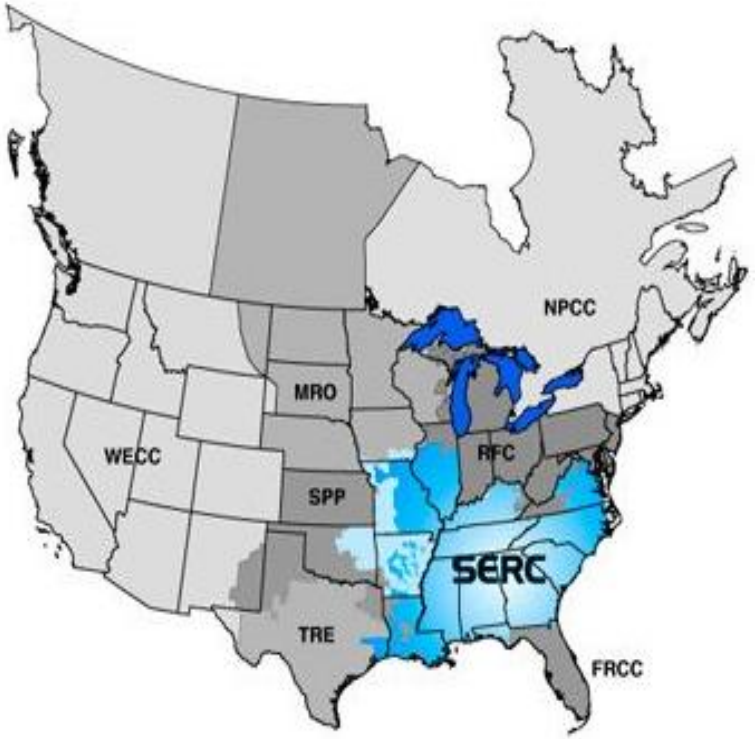
Preliminary List of Alternative Regional Transmission Projects



SERC Regional Model Development Update

- SERC is one of the eight regional electric reliability councils under the North American Electric Reliability Corporation authority (NERC).

- SERC oversees the implementation and enforcement of Reliability Standards among the bulk power system (BPS) users, owners, and operators.



SERC Regional Model Development Update

- **SERC Regional Model Development**
  - SERC Long-Term Study Group (LTSG)
    - Analyze the performance of the members' transmission systems and identify limits to power transfers occurring non-simultaneously among the SERC members.
    - Evaluate the performance of bulk power supply facilities under both normal and contingency conditions for future years.
  - Data Bank Update (DBU)
    - The DBU is held to conduct an annual update of power flow models for the SERC Region to be used for operating and future year studies.

SERC Regional Model Development Update

- **SERC Regional Model Development**
  - Eastern Interconnection Reliability Assessment Group (ERAG)
    - The SERC Models are incorporated into the power flow models of the interconnected regions and updated annually by ERAG
    - Responsible for developing a library of solved power flow models of the Eastern Interconnection (Multi-regional Modeling Work Group – MMWG).
    - The updated Regional MMWG Models serve as the starting point model for the SERTP Regional Power Flow Models
    - MOD-32 Compliance (Data for Power System Modeling and Analysis)

SERC Regional Model Development Update

- **SERC Regional Model Development**
  - LTSG Schedule of Events for 2017
    - Data Bank Update (DBU) was performed in May
    - Power flow cases were finalized in June
    - Future Study Year Case: 2022 Summer Peak Load
      - Study and Report to be completed in October
      - Steering Committee Report review
    - Final Report Scheduled for completion on December 4th
  - ERAG Schedule of Events for 2017
    - MMWG Model Update performed from August – September
    - Power flow cases finalized in October

Next Meeting Activities

- **2017 SERTP 4th Quarter Meeting** – *Annual Transmission Planning Summit & Input Assumptions Meeting*
  - **Location: MEAG Headquarters in Atlanta, GA**
  - **Date: TBD**
  - **Purpose:**
    - Final Economic Planning Study Results
    - Final Regional Transmission Plan
    - Regional Analyses
    - Assumptions Input Session

2017 SERTP

Questions?

www.southeasternrtp.com