SERTP – 2016 3rd Quarter Meeting

2nd RPSG Meeting

September 29th, 2016

The Chattanoogan Hotel

Chattanooga, TN

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

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

SERTP Preliminary

Economic Planning Studies

Economic Planning Study Process

- **Economic Planning Studies were chosen by the Regional Planning Stakeholder Group "RPSG" in March 2016**
- **These studies represent analyses of hypothetical scenarios requested by the stakeholders and do not represent an actual transmission need or commitment to build**
- **Scoping meeting held in May**

Economic Planning Study 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 is 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

- **SCPSA to Duke Progress West**
  - 300 MW (2019 Summer Peak)
- **SCPSA to GTC**
  - 300 MW (2019 Summer Peak)
- **Southern to FRCC**
  - 500 MW (2019 Summer Peak)
- **Southern to SCPSA/SCE&G**
  - 500 MW (2019 Summer Peak)
- **Southern/SCE&G to PJM Border**
  - 1500 MW (2021 Summer Peak)

Power Flow Cases Utilized

- **Study Years:**
  - 2019 and 2021
- **Load Flow Cases:**
  - 2016 Series Version 2 SERTP Models
  - Summer Peak (Additional load levels evaluated as appropriate)

Preliminary Report Components

- **Thermal Analysis**
  - Contingency analysis to identify constrained elements/contingency pairs
- **Interface Transfer Capability Analysis**
- **Potential Solutions**
  - Transmission enhancements and cost estimates

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 (2019 and 2021).**

- **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.**

- **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.**

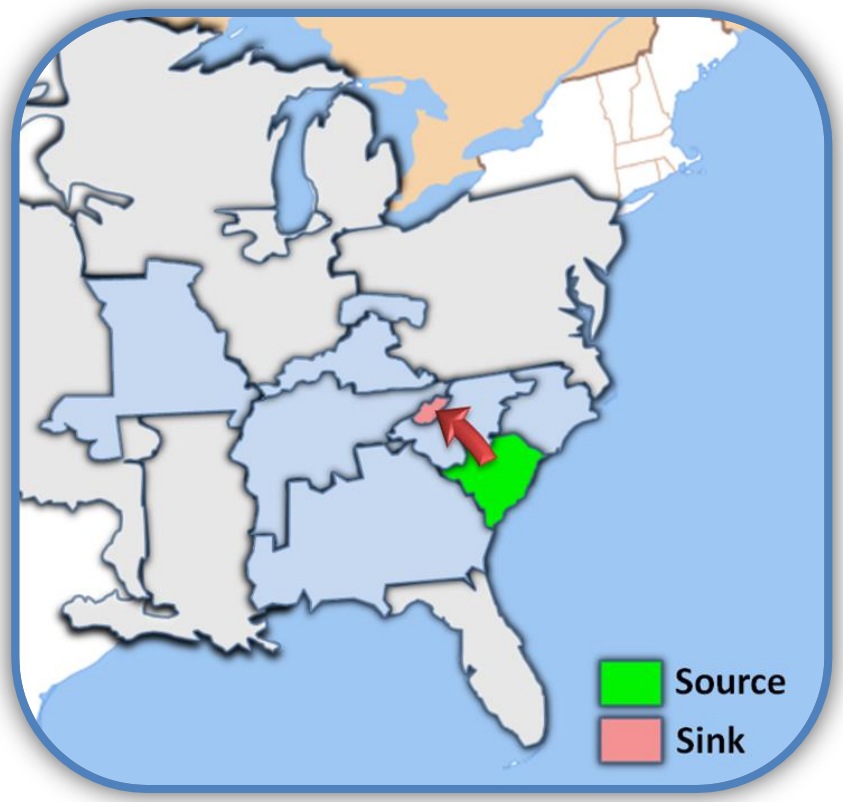
Economic Planning Studies

SCPSA to Duke Progress West 300 MW

SCPSA to Duke Progress West – 300 MW

Study Assumptions

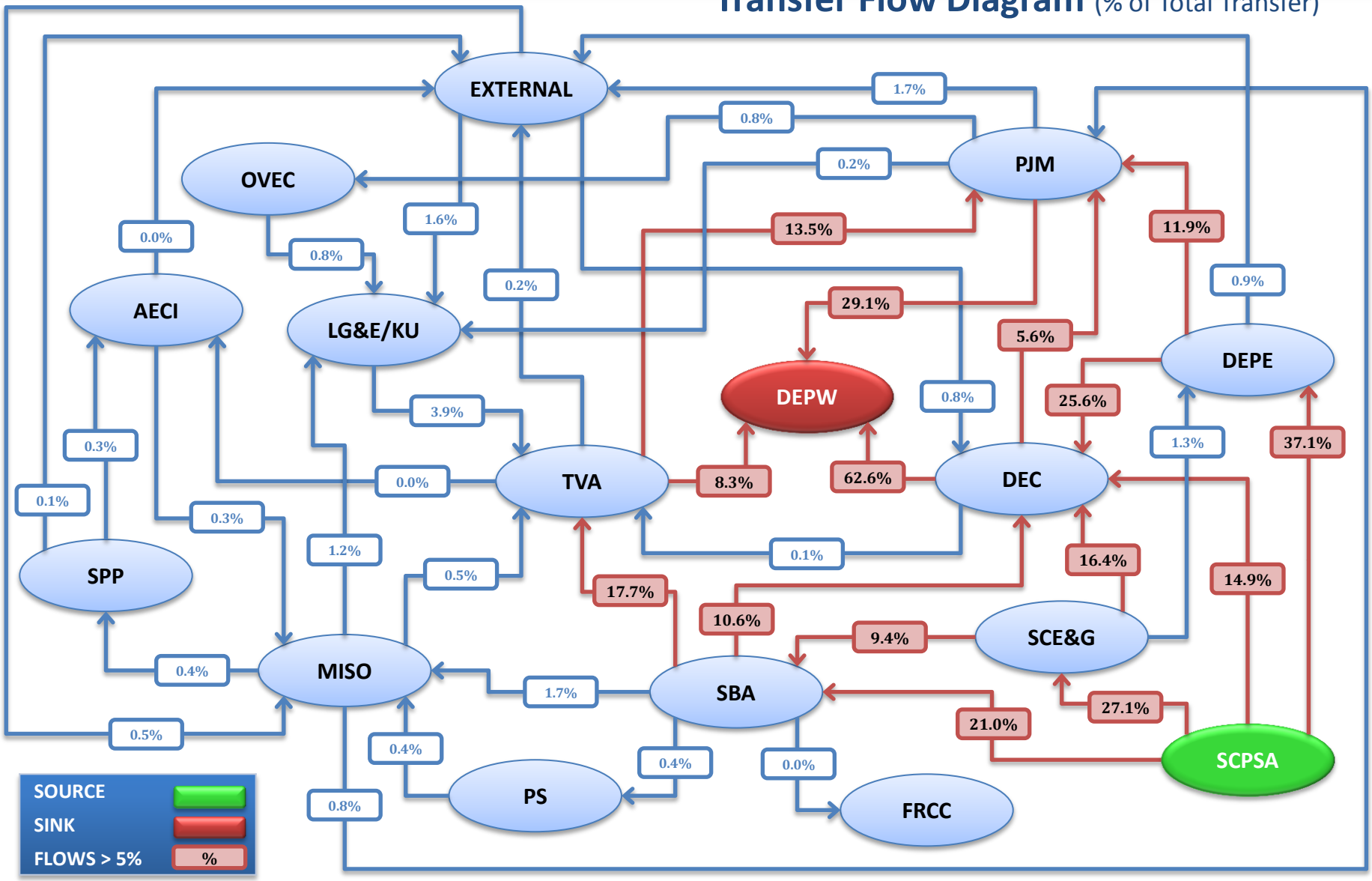
- **Transfer Type:** Load to Generation (2019 Summer Peak)
- **Source:** Uniform load scale within SCPSA
- **Sink:** Generation within Duke Progress West



Southeastern Regional TRANSMISSION PLANNING

SCPSA to Duke Progress West – 300 MW

Transfer Flow Diagram (% of Total Transfer)



SCPSA to Duke Progress West – 300 MW

Transmission System Impacts – *SERTP*

- **Potential Transmission Solutions Identified:**
  - One (1) 230 kV T.L.
  - One (1) 230 kV Substation

SBA Total ($2016) **= $200,000,000**

SCPSA to Duke Progress West – 300 MW

Transmission System Impacts

- **No constraints were identified in the following SERTP Balancing Authority Areas:**
  - AECI
  - DEC
  - DEPE
  - LG&E/KU
  - OVEC
  - PS
  - SBA
  - TVA

SCPSA to Duke Progress West – 300 MW

Significant Constraints – *DEPW*

Limiting Element (1)	Voltage (P.U.)	
	Without Request	With Request
PISGAH	≥0.95	0.8643
NEWSALEM SU	≥0.95	0.8635
BLACK MOUNT	≥0.95	0.8633
S WANNANOA	≥0.95	0.8623
E8-STH CLYD	≥0.95	0.8562
LAKE JUNALU	≥0.95	0.8511
WAYNSVILE 2	≥0.95	0.8501
WAYNSVILE 1	≥0.95	0.8495
HAZELWOOD	≥0.95	0.8495
MAGGIE V SU	≥0.95	0.8474

(1) Multiple buses with similar voltage results were identified as being negatively impacted by the transfer in addition to those shown above. The posted study report contains a complete listing of constraints.

SCPSA to Duke Progress West – 300 MW

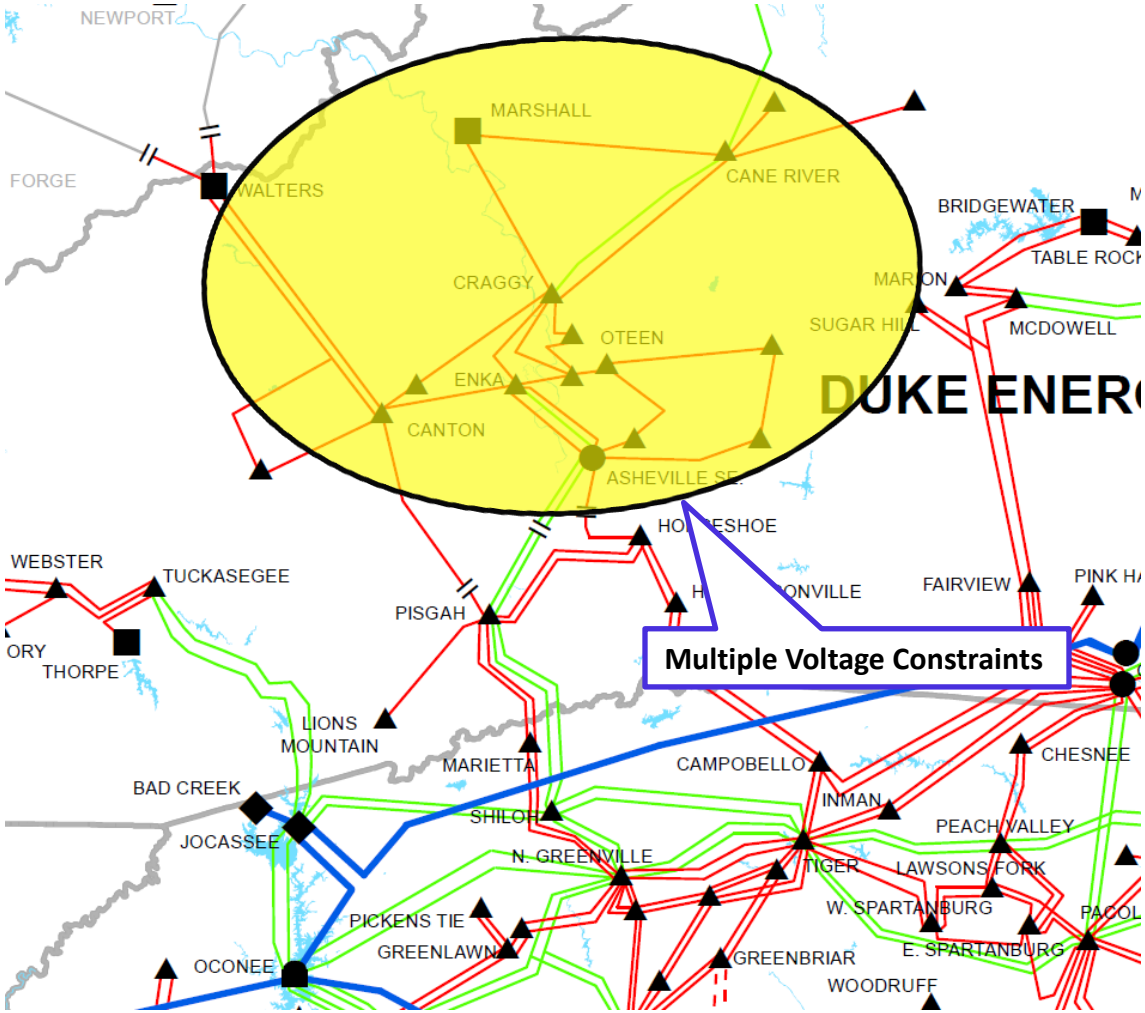
Projects Identified – *DEPW*

Item	Potential Solution	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	**$200,000,000**
SBA 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.

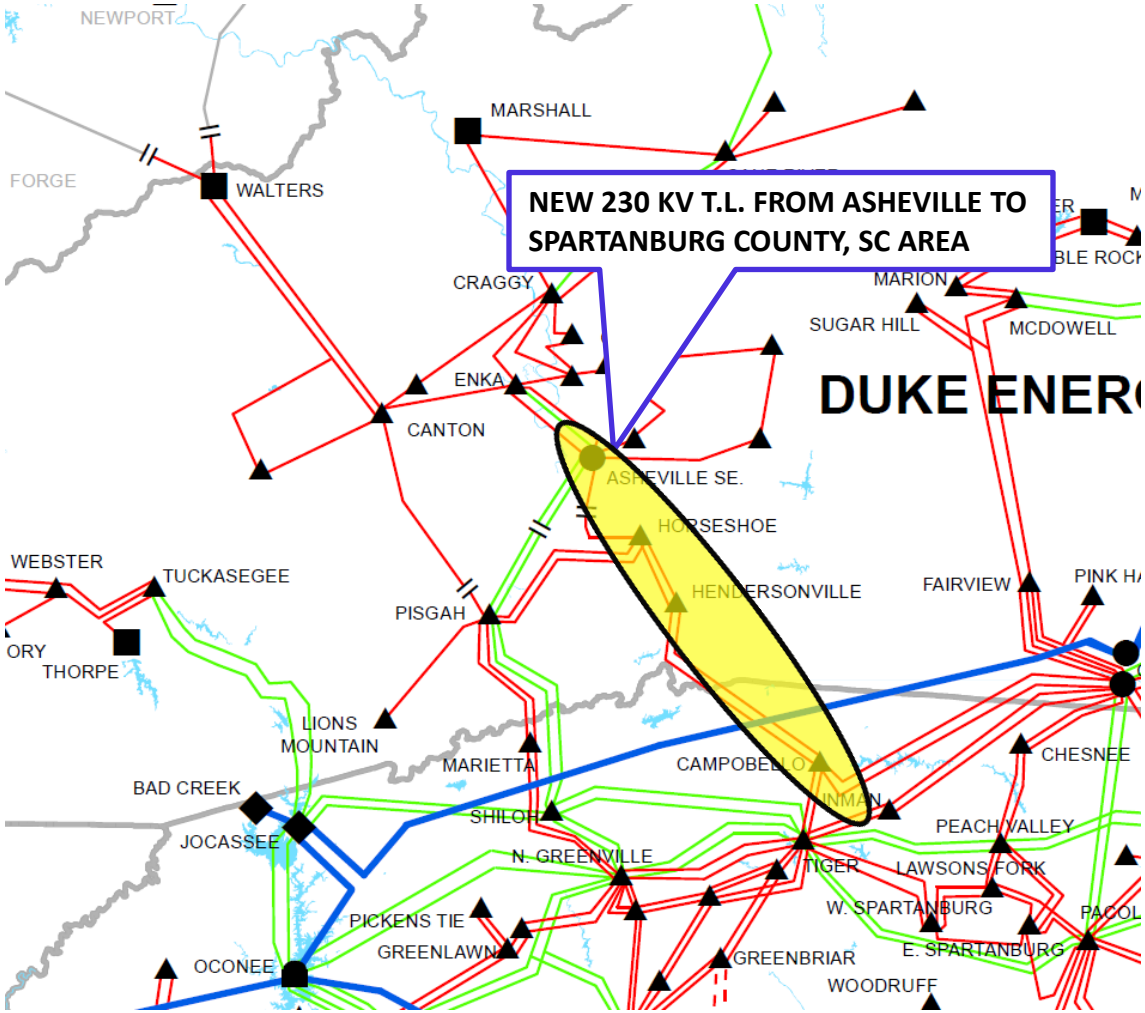
SCPSA to Duke Progress West – 300 MW

Significant Constraints – *DEPW*



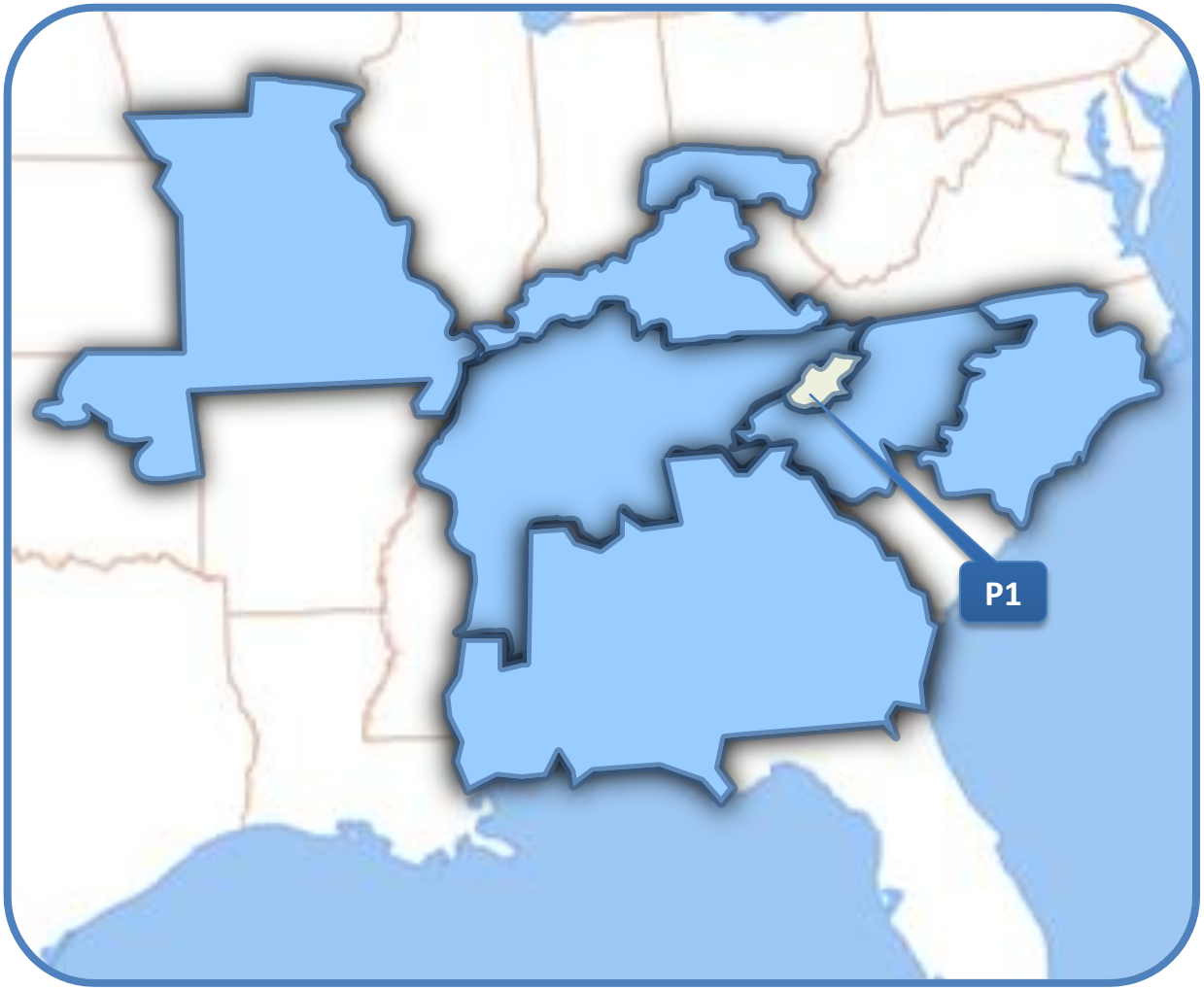
SCPSA to Duke Progress West – 300 MW

Potential Solutions – *DEPW*



SCPSA to Duke Progress West – 300 MW

Project Locations – *DEPW*



Economic Planning Studies

SCPSA to GTC

300 MW

SCPSA to GTC – 300 MW

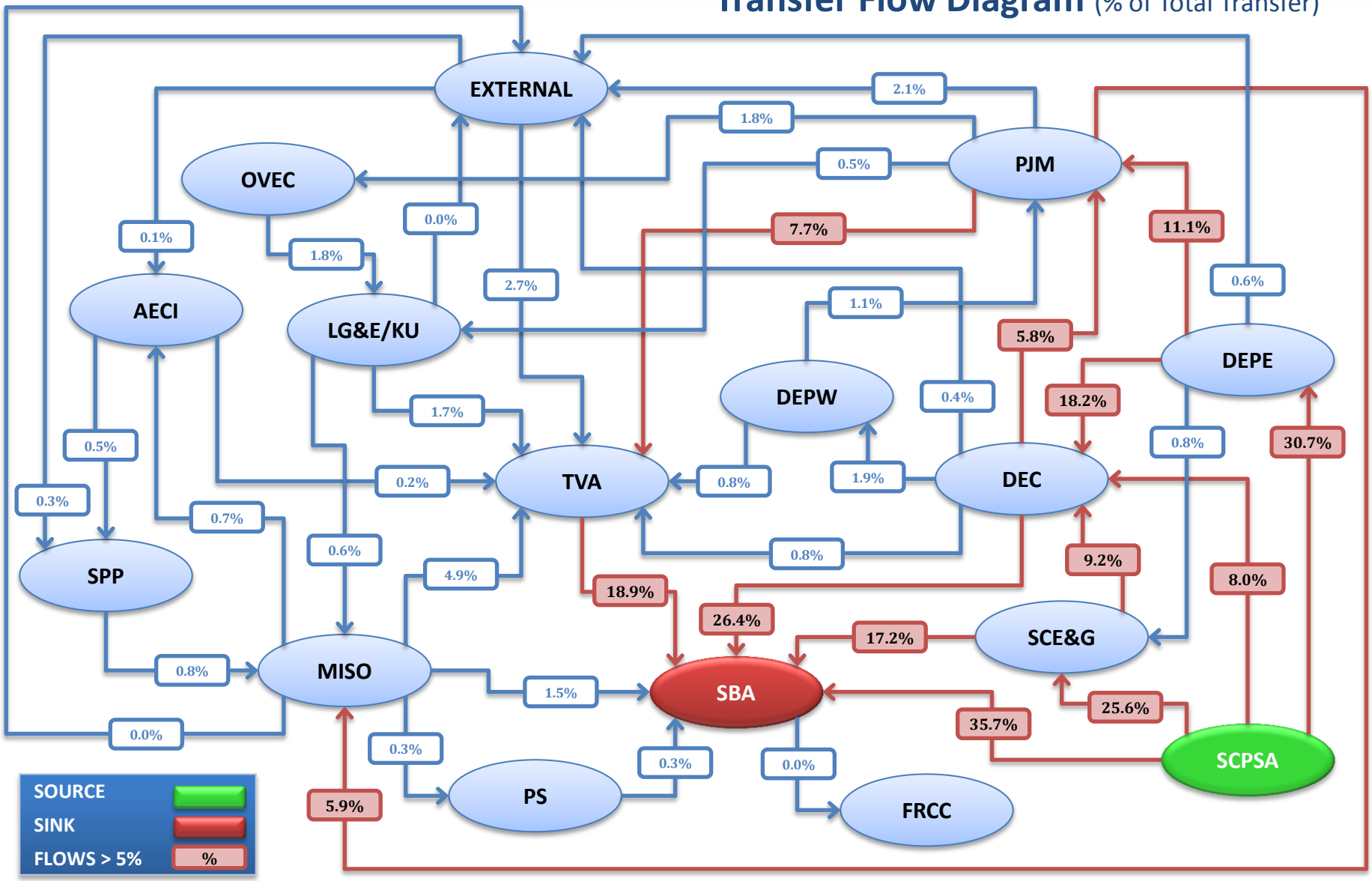
Study Assumptions

- **Transfer Type:** Load to Generation (2019 Summer Peak)
- **Source:** Uniform load scale within SCPSA
- **Sink:** Generation within GTC

Southeastern Regional
TRANSMISSION PLANNING

SCPSA to GTC – 300 MW

Transfer Flow Diagram (% of Total Transfer)



SCPSA to GTC – 300 MW

Transmission System Impacts – *SERTP*

- **Potential Transmission Solutions Identified:**
  - One (1) 115 kV Breaker Replacement

SERTP TOTAL ($2016) **= $300,000**

SCPSA to GTC – 300 MW

Transmission System Impacts

- **No constraints were identified in the following SERTP Balancing Authority Areas:**
  - AECI
  - DEC
  - DEPE
  - DEPW
  - LG&E/KU
  - OVEC
  - PS
  - TVA

SCPSA to GTC – 300 MW

Significant Constraints – *SBA*

Limiting Element	Rating (MVA)	Thermal Loadings (%)	
		Without Request	With Request
Airline – Bio 115 kV T.L.	**249**	**98.4**	**101.0**

SCPSA to GTC – 300 MW

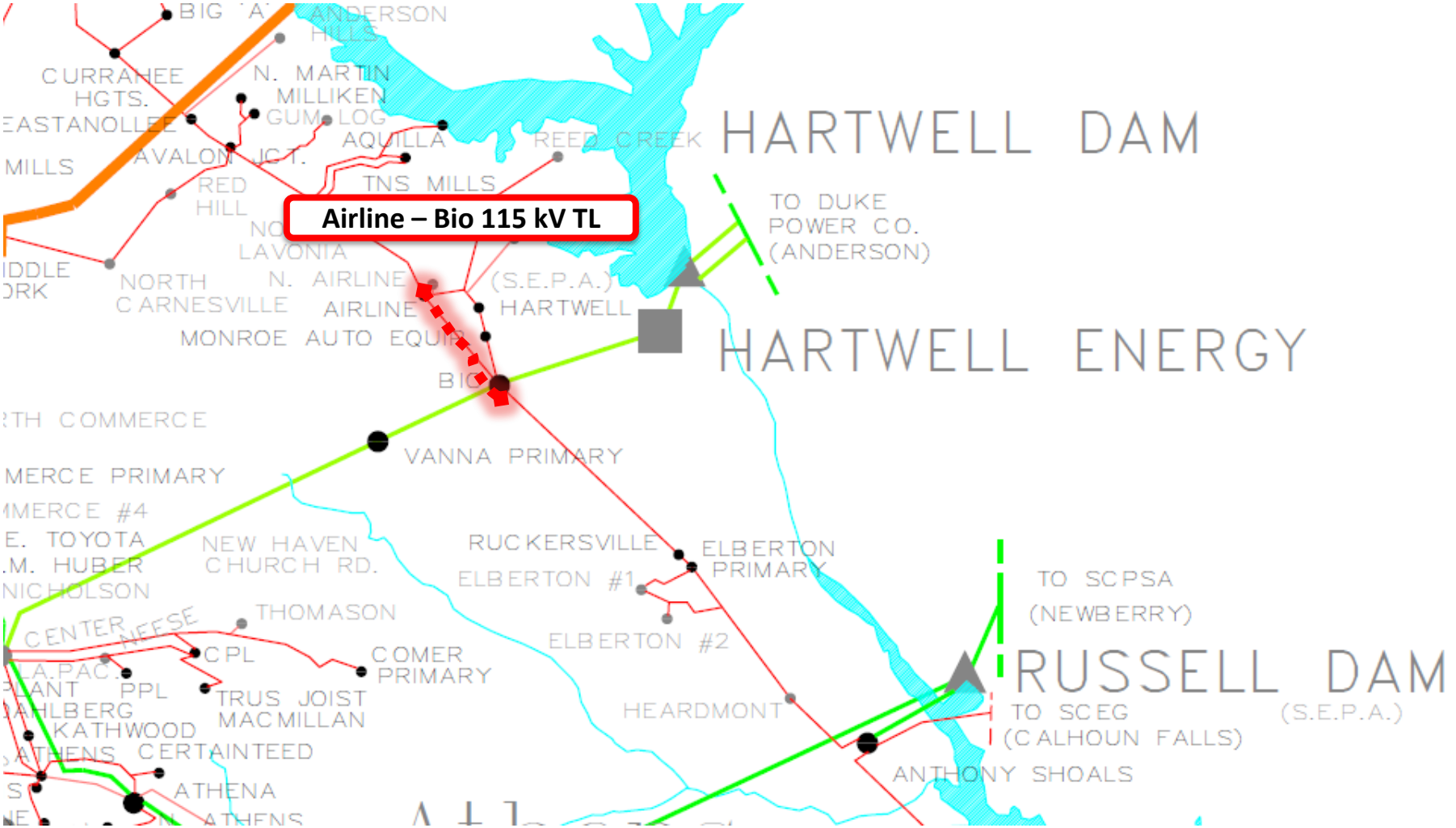
Projects Identified – *SBA*

Item	Potential Solution	Planning Level Cost Estimate
P1	**Bio Breaker Replacement** • Upgrade 1200 A 115 kV breaker at Bio Substation to 2000 A breaker	**$300,000**
SBA TOTAL ($2016)		**$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.

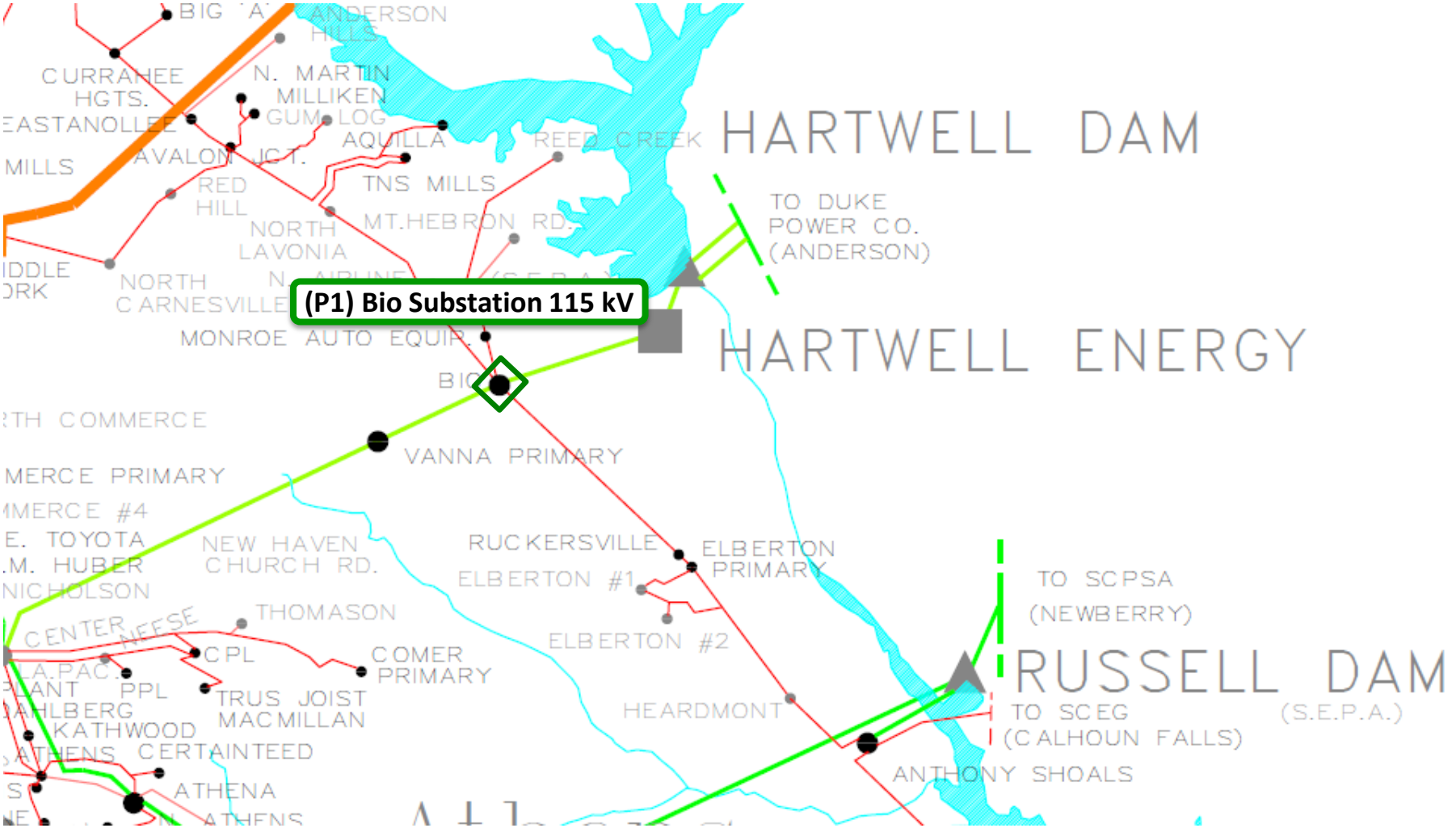
SCPSA to GTC – 300 MW

Significant Constraints – *SBA*



SCPSA to GTC – 300 MW

Significant Constraints – *SBA*



SCPSA to GTC – 300 MW

Project Locations – *SBA*

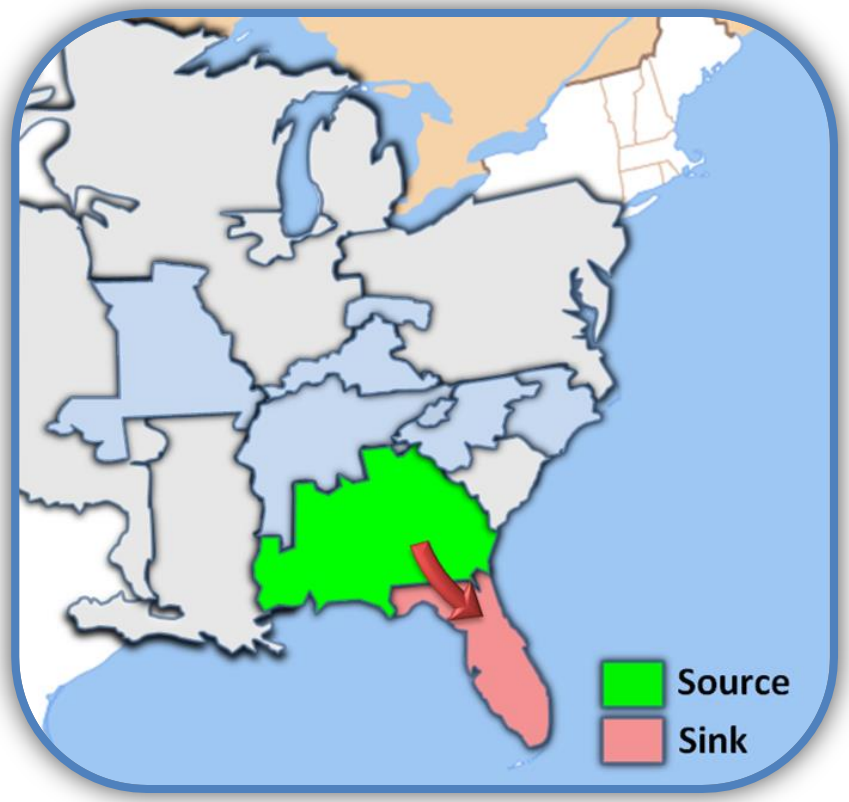
Economic Planning Studies

Southern to FRCC
500 MW

Southern to FRCC – 500 MW

Study Assumptions

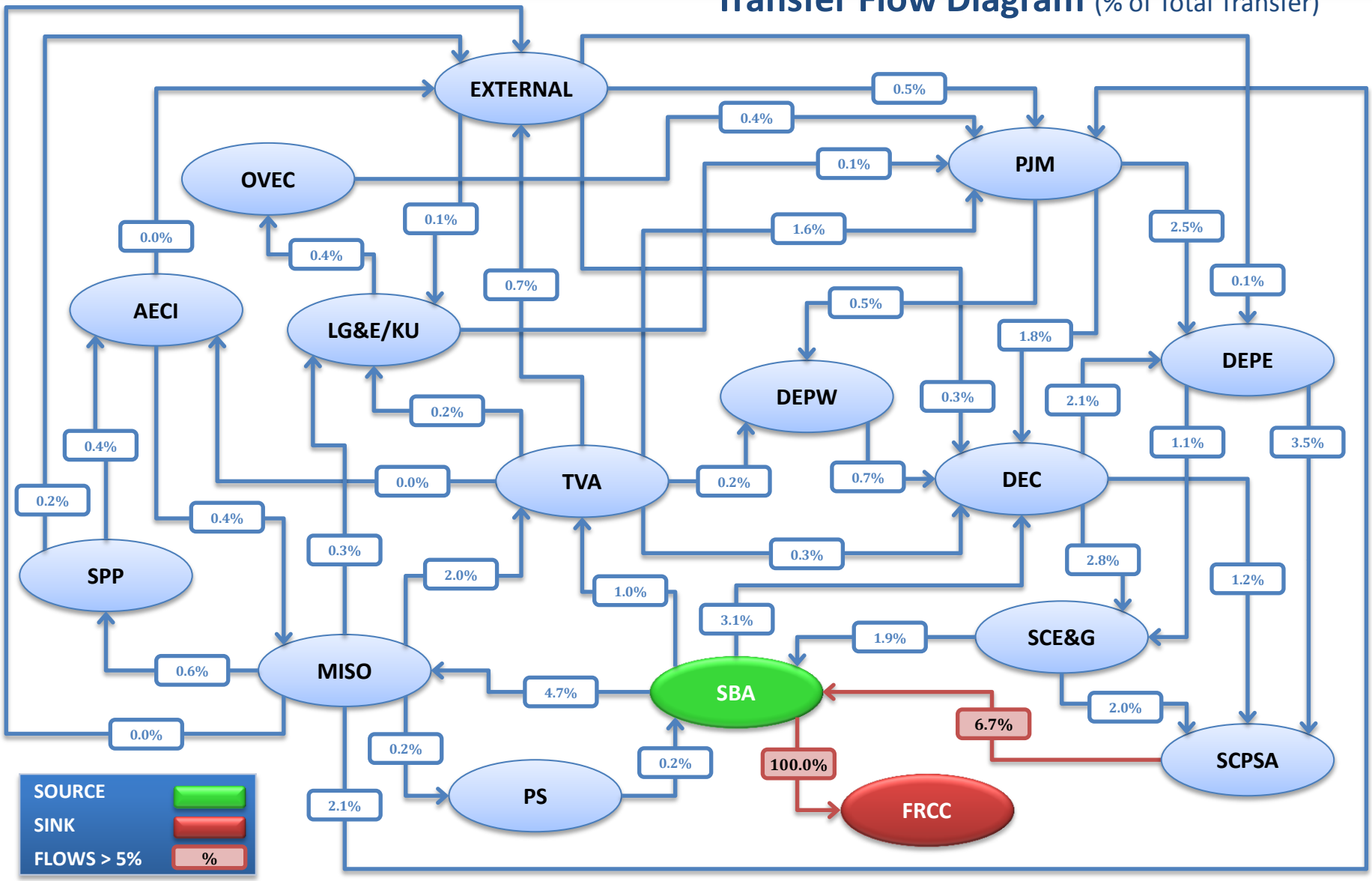
- **Transfer Type:** Generation to Load (2019 Summer Peak)
- **Source:** Generation within Southern
- **Sink:** Load scale within FRCC



Southeastern Regional TRANSMISSION PLANNING

Southern to FRCC – 500 MW

Transfer Flow Diagram (% of Total Transfer)



Southern to FRCC – 500 MW

Transmission System Impacts – *SERTP*

- **Potential Transmission Solutions Identified:**
  - One (1) 115 kV T.L. Upgrade

SERTP TOTAL ($2016) **= $9,500,000**

Southern to FRCC – 500 MW

Transmission System Impacts

- **No constraints were identified in the following SERTP Balancing Authority Areas:**
  - AECI
  - DEC
  - DEPE
  - DEPW
  - LG&E/KU
  - OVEC
  - PS
  - TVA

Southern to FRCC – 500 MW

Significant Constraints – *SBA*

Limiting Element	Rating (MVA)	Thermal Loadings (%)	
		Without Request	With Request
Sylvania – King Mfg 115 kV T.L.	63	93.7	100.4

Southern to FRCC – 500 MW

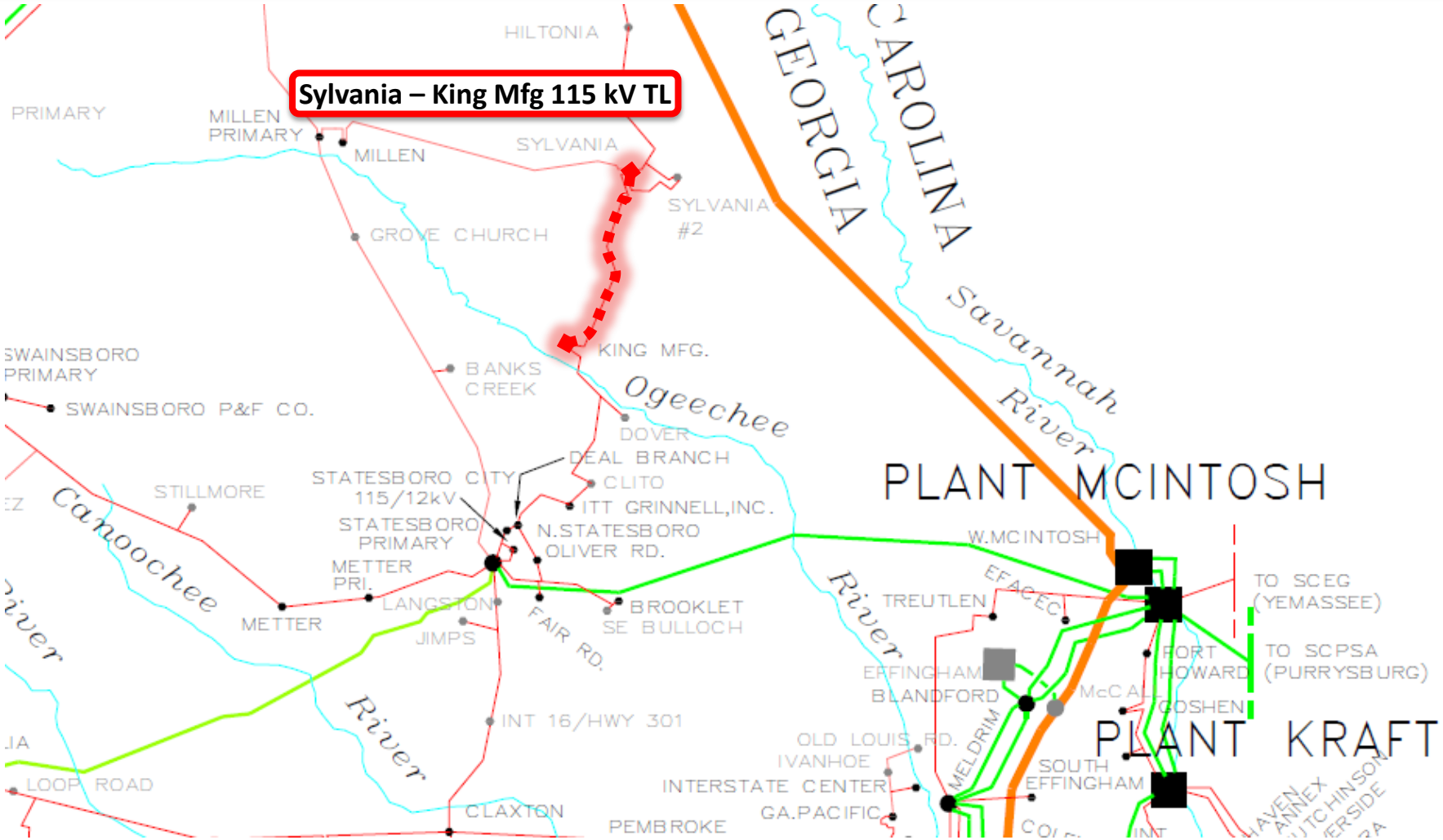
Projects Identified – *SBA*

Item	Potential Solution	Planning Level Cost Estimate
P1	**Deal Branch – Sylvania 115 kV T.L.** • Upgrade 16.4 miles of the Deal Branch – Sylvania – Dover Tap 115 kV transmission line to 100°C operation	**$9,500,000**
SBA TOTAL ($2016)		**$9,500,000** (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.

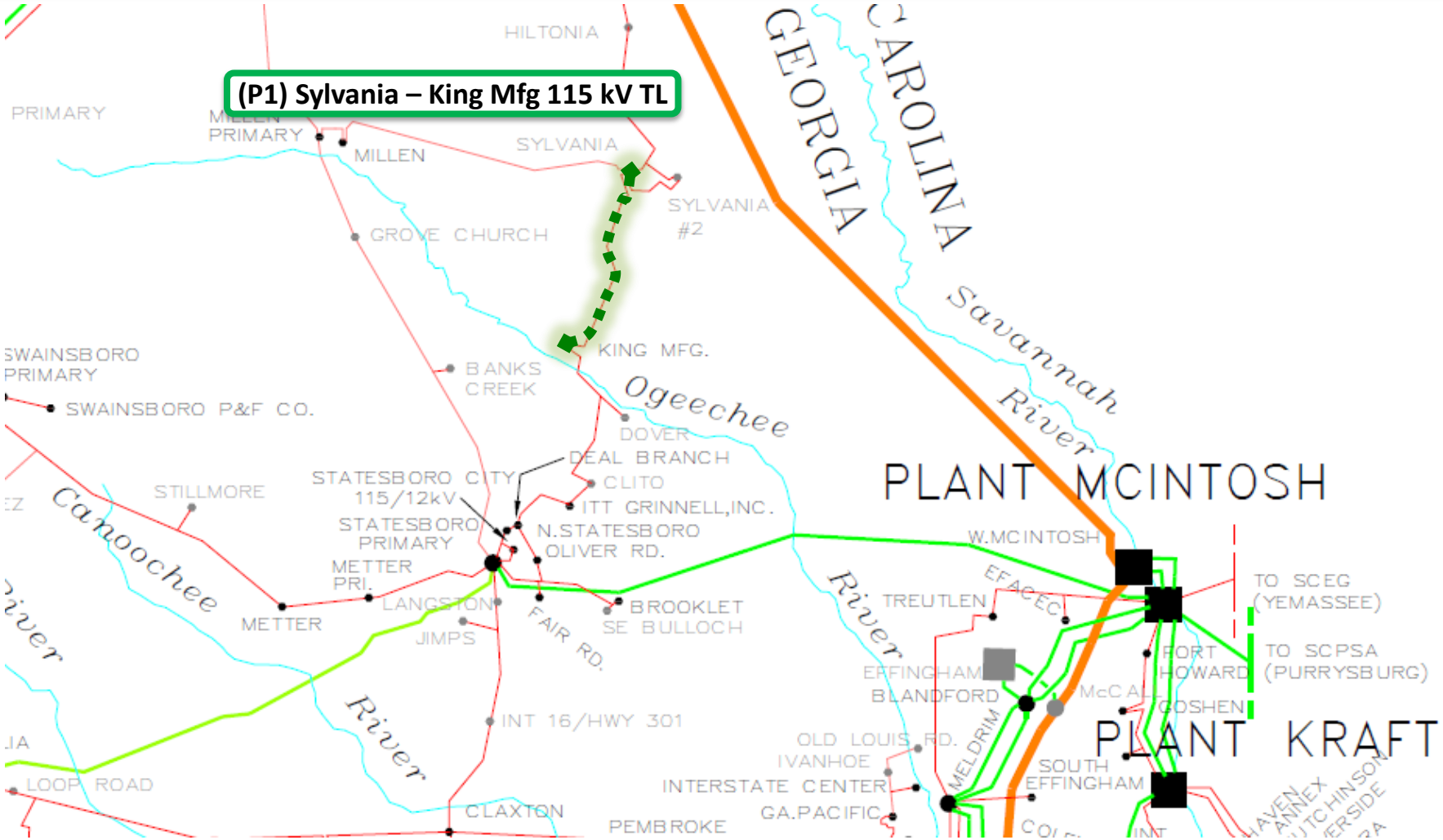
Southern to FRCC – 500 MW

Significant Constraints – *SBA*



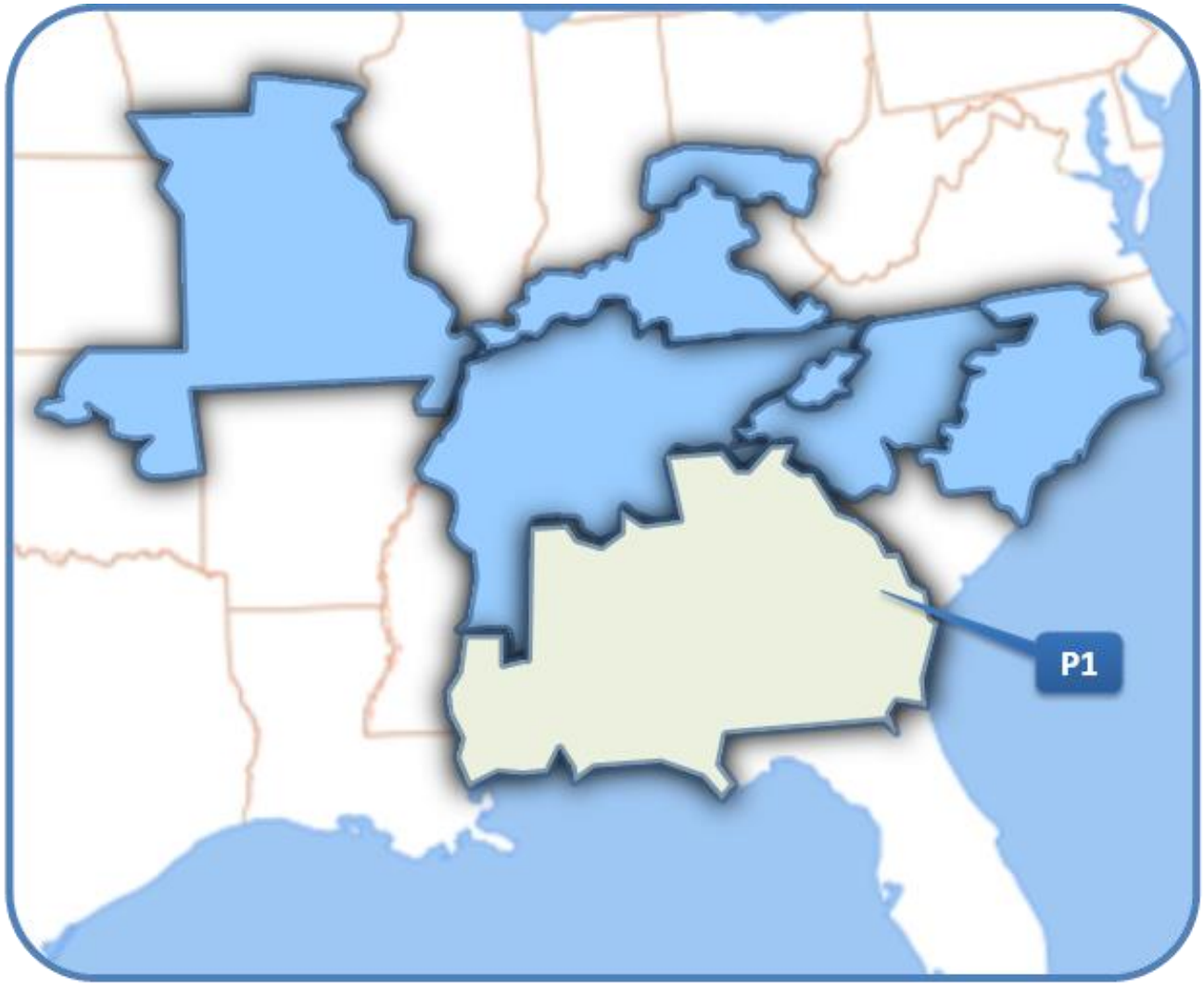
Southern to FRCC – 500 MW

Potential Solutions – *SBA*



Southern to FRCC – 500 MW

Project Locations – *SBA*



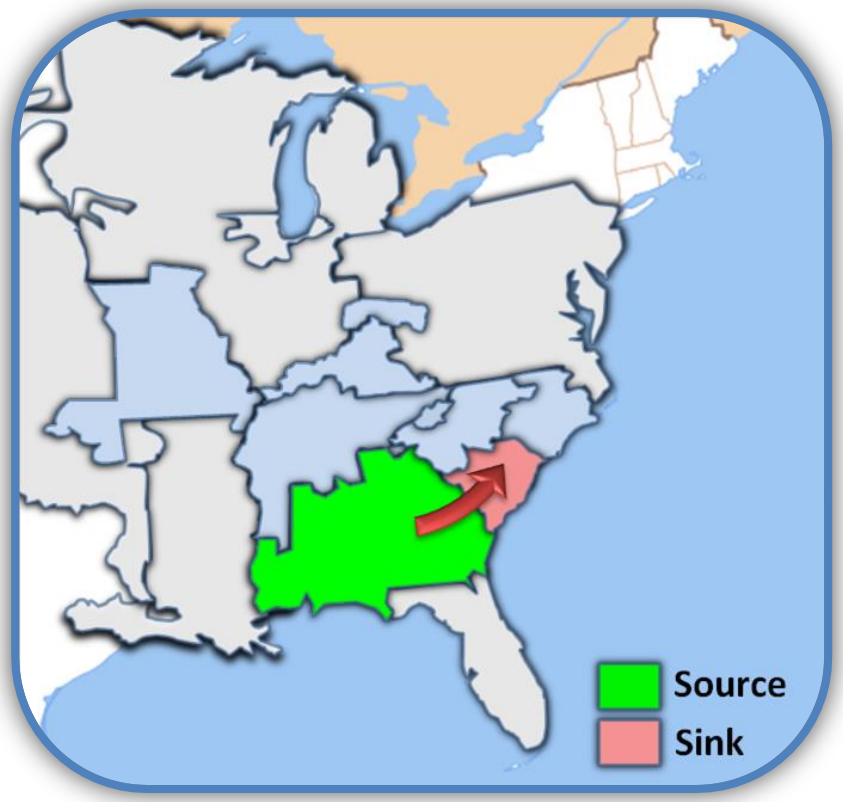
Economic Planning Studies

Southern to SCPSA/SCE&G
500 MW

Southern to SCPSA/SCE&G – 500 MW

Study Assumptions

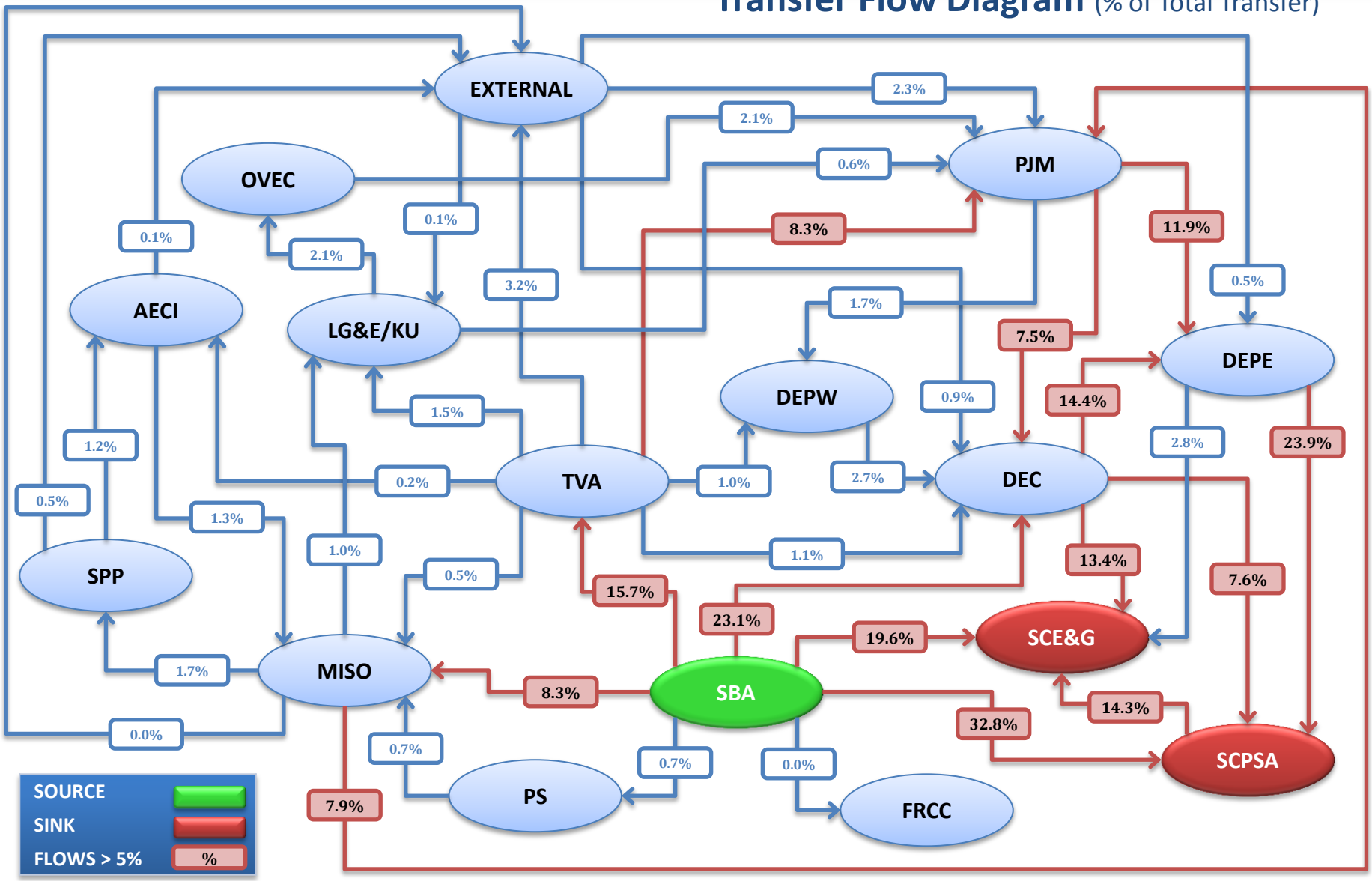
- **Transfer Type:** Generation to Generation (2019 Summer Peak)
- **Source:** Generation within Southern
- **Sink:** Generation within SCPSA/SCE&G



Southeastern Regional TRANSMISSION PLANNING

Southern to SCPSA/SCE&G – 500 MW

Transfer Flow Diagram (% of Total Transfer)



Southern to SCPSA/SCE&G – 500 MW

Transmission System Impacts – *SERTP*

- **Potential Transmission Solutions Identified:**
  - None Identified

SERTP TOTAL ($2016) **= $0**

Southern to SCPSA/SCE&G – 500 MW

Transmission System Impacts

- **No constraints were identified in the following SERTP Balancing Authority Areas:**
  - AECI
  - DEC
  - DEPE
  - DEPW
  - LG&E/KU
  - OVEC
  - PS
  - SBA
  - TVA

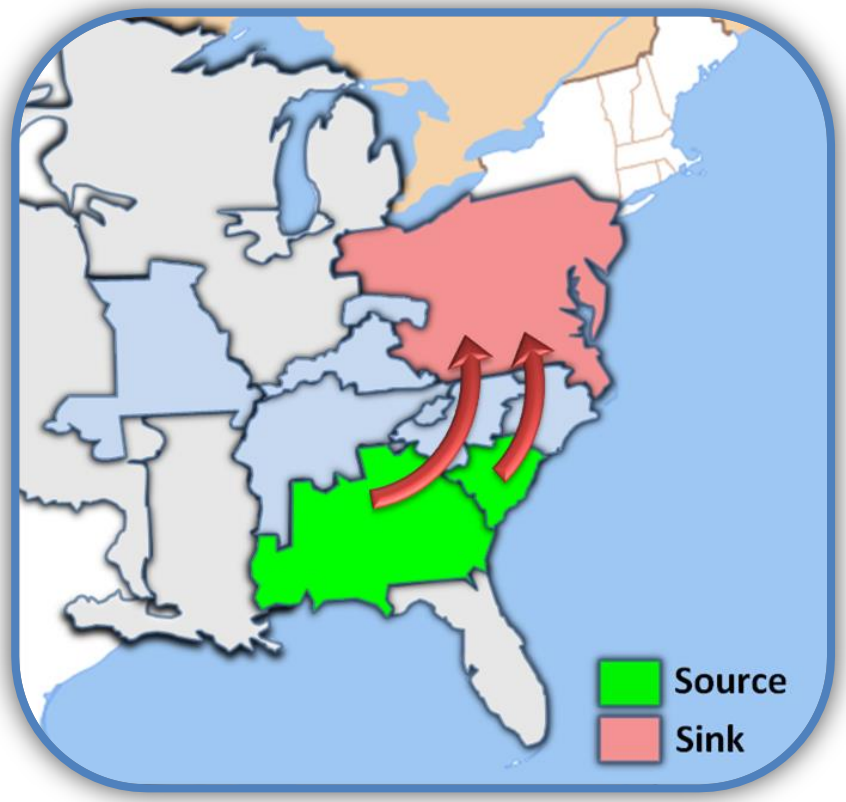
Economic Planning Studies

Southern/SCE&G to PJM 1500 MW

Southern/SCE&G to PJM – 1500 MW

Study Assumptions

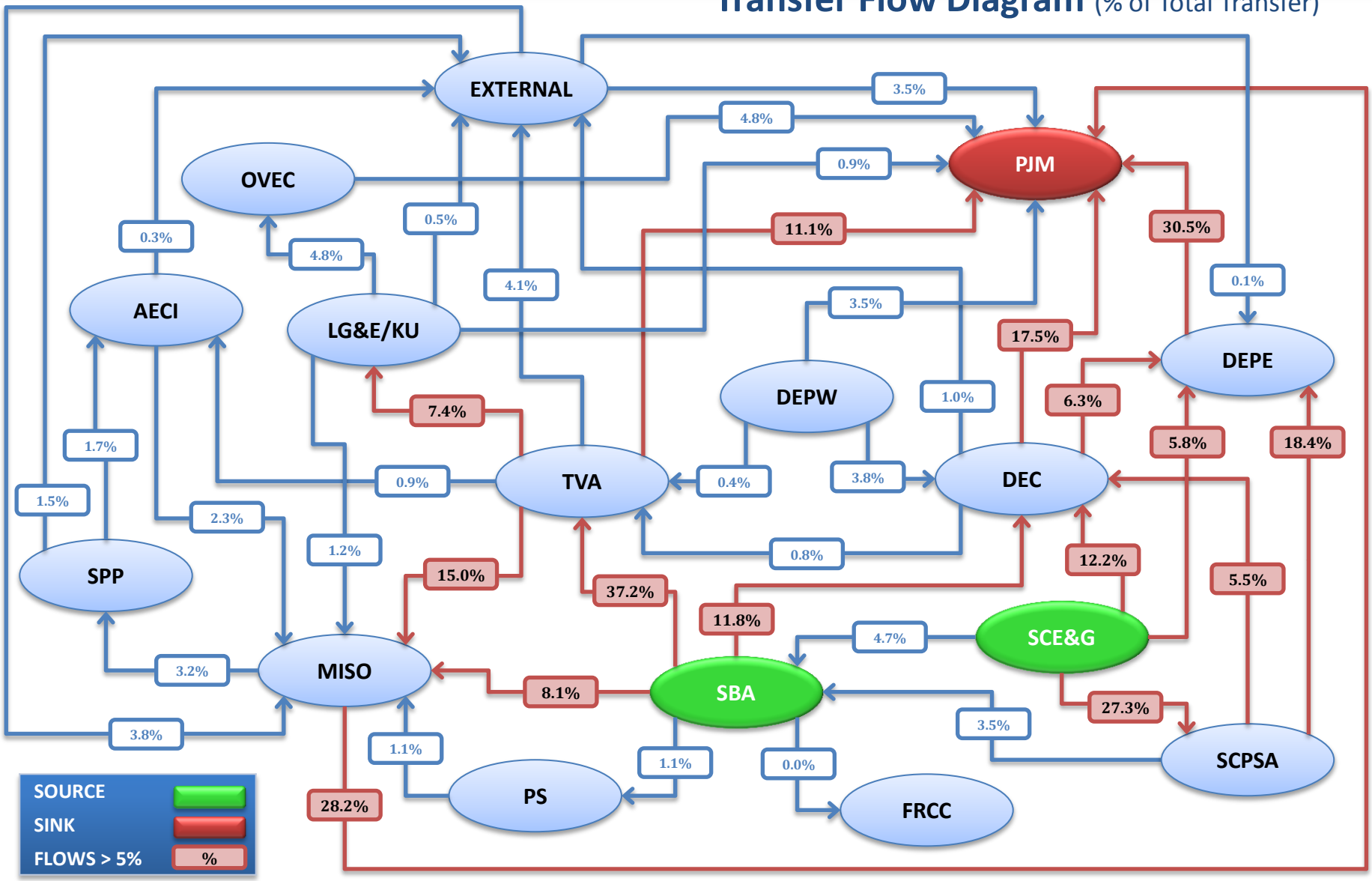
- **Transfer Type:** Generation/Load to Load (2021 Summer Peak)
- **Source:** Generation within Southern/Uniform load scale within SCE&G
- **Sink:** Load scale within PJM



Southeastern Regional TRANSMISSION PLANNING

Southern/SCE&G to PJM – 1500 MW

Transfer Flow Diagram (% of Total Transfer)



Southern/SCE&G to PJM – 1500 MW

Transmission System Impacts – *SERTP*

- **Potential Transmission Solutions Identified:**
  - Three (3) 115 kV T.L. Reconductor
  - One (1) 161 kV T.L. Reconductor

SERTP TOTAL ($2016) **= $41,000,000**

Southern/SCE&G to PJM – 1500 MW

Transmission System Impacts

- **No constraints were identified in the following SERTP Balancing Authority Areas:**
  - AECI
  - DEC
  - DEPW
  - LG&E/KU
  - OVEC
  - PS
  - SBA

Southern/SCE&G to PJM – 1500 MW

Significant Constraints – *DEPE*

Limiting Element	Rating (MVA)	Thermal Loadings (%)	
		Without Request	With Request
Marion – Dillon Tap 115 kV T.L.	97	96.0	116.2
Shaw AFB – Eastover 115 kV T.L.	123	94.1	107.9
Camden – Ind 115 kV T.L.	107	< 90.0	100.7

Southern/SCE&G to PJM – 1500 MW

Projects Identified – *DEPE*

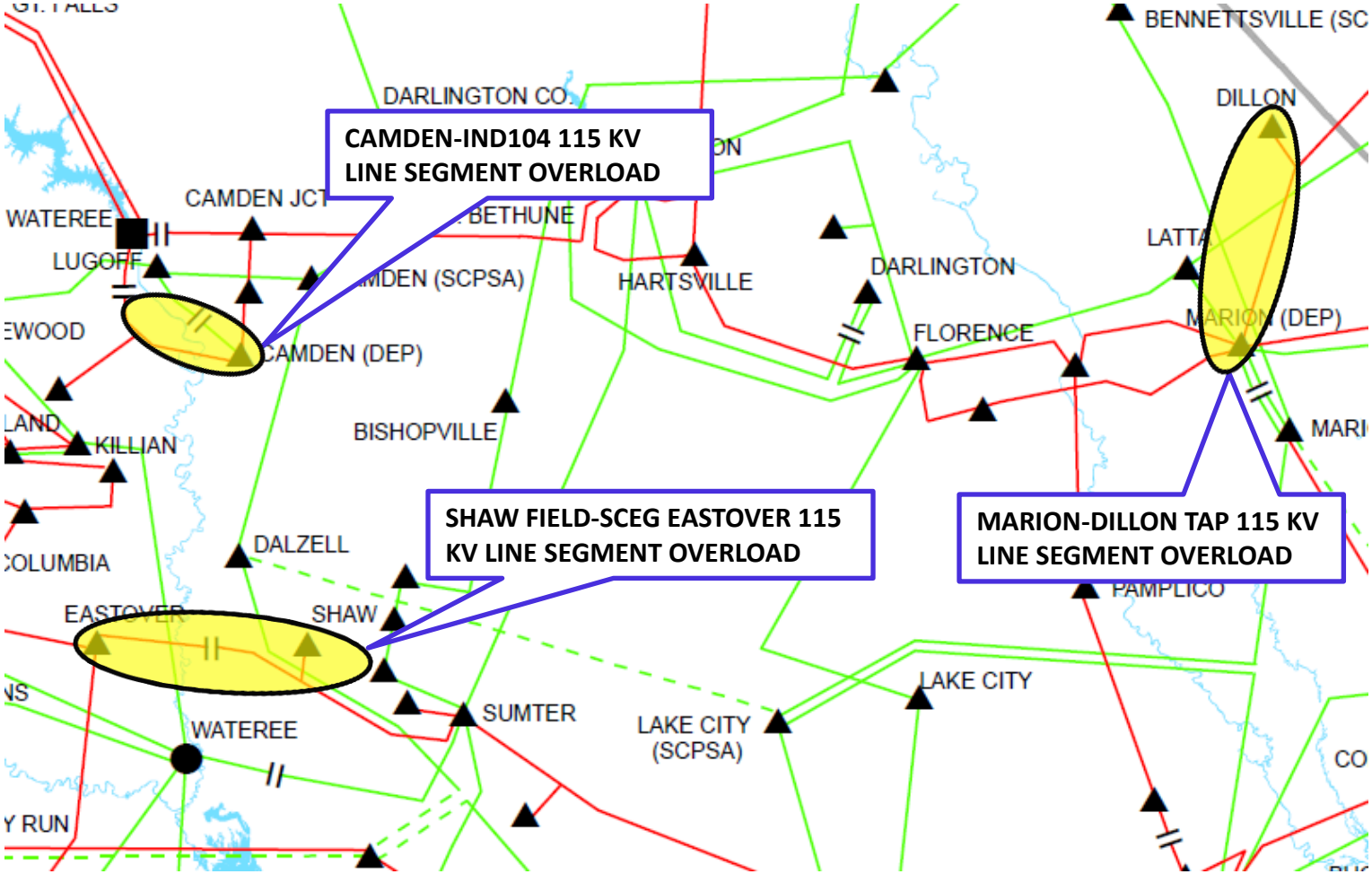
Item	Potential Solution	Planning Level Cost Estimate
P1	**Weatherspoon Plant – Marion 115 kV T.L.** • Reconductor approximately 14.6 miles of the Marion to Dillon segment of the Weatherspoon Plant – Marion 115 kV TL with 3-795 ACSR.	**$22,000,000**
P2	**Sumter – (SCE&G) Eastover 115 kV T.L.** • Reconductor approximately 7.4 miles of the Eastover to Shaw Field Tap segment of the Sumter – Eastover 115 kV TL with 3-795 ACSR.	**$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	**$1,000,000**
SBA TOTAL ($2016)		**$33,000,000** (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 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.

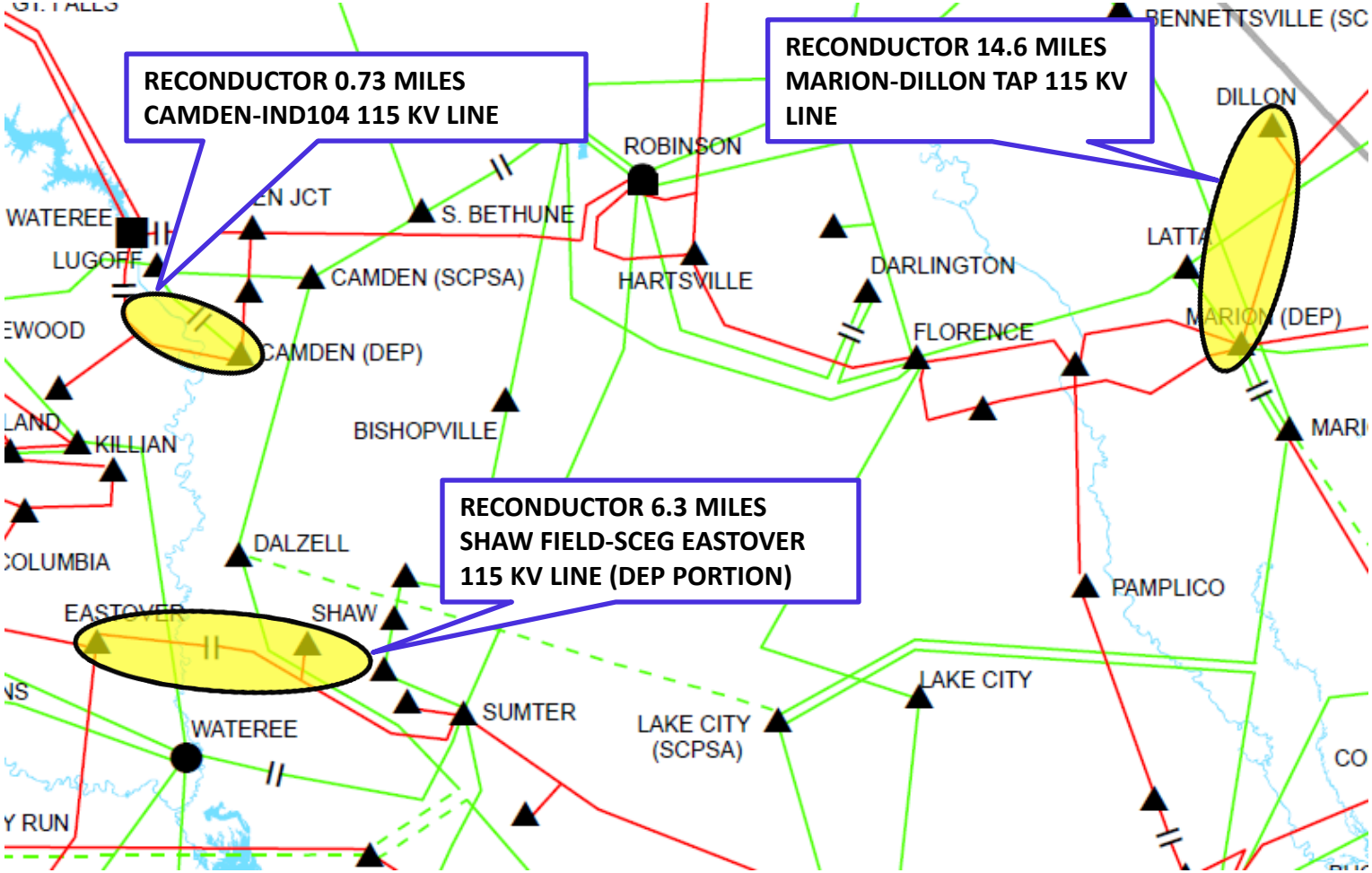
Southern/SCE&G to PJM – 1500 MW

Significant Constraints – *DEPE*



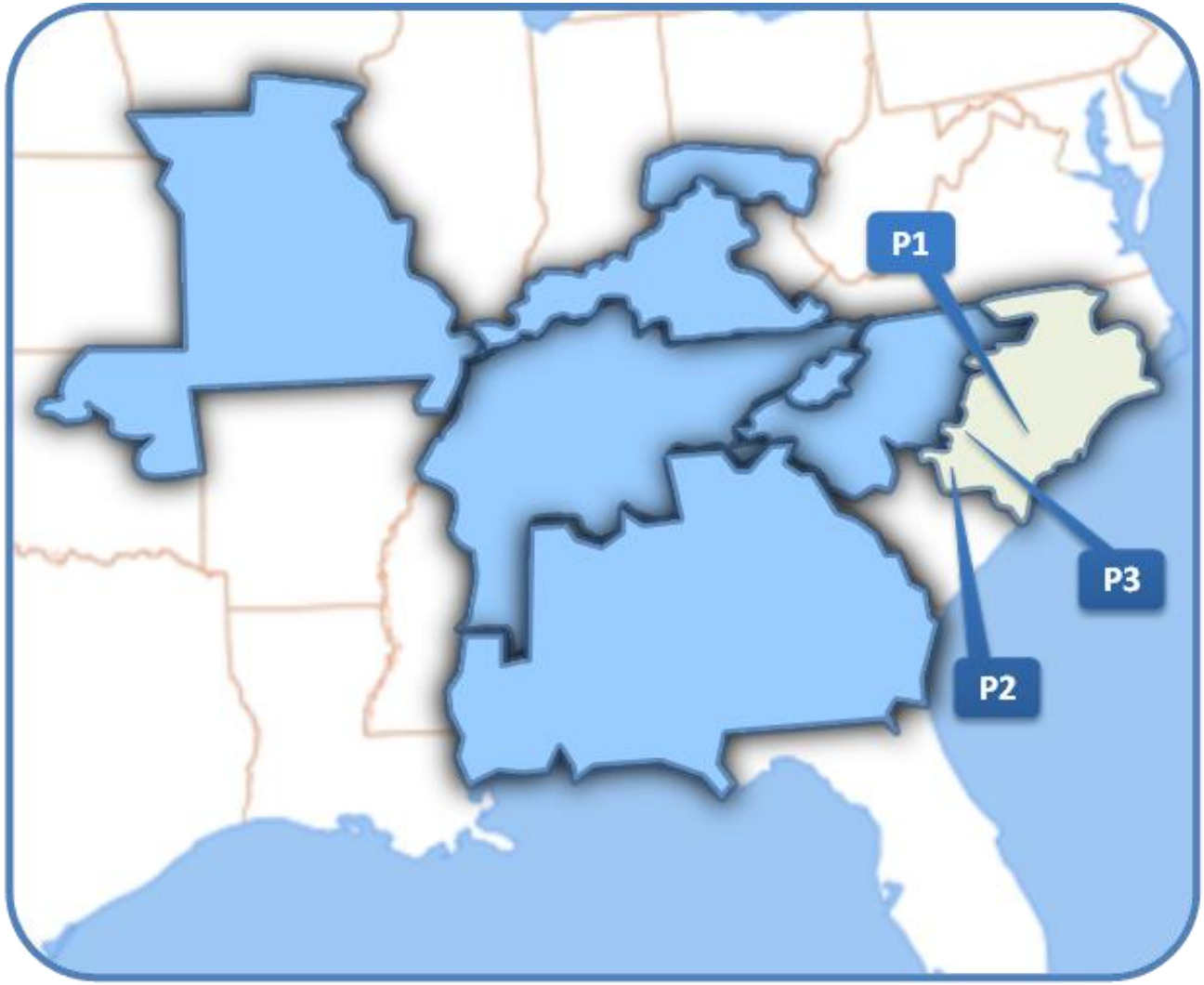
Southern/SCE&G to PJM – 1500 MW

Potential Solutions – *DEPE*



Southern/SCE&G to PJM – 1500 MW

Project Locations – *DEPE*



Southern/SCE&G to PJM – 1500 MW

Significant Constraints – *TVA*

Limiting Element	Rating (MVA)	Thermal Loadings (%)	
		Without Request	With Request
East Knox – Dumplin Valley 161 kV T.L.	363.6	99.0	110.1

Southern/SCE&G to PJM – 1500 MW

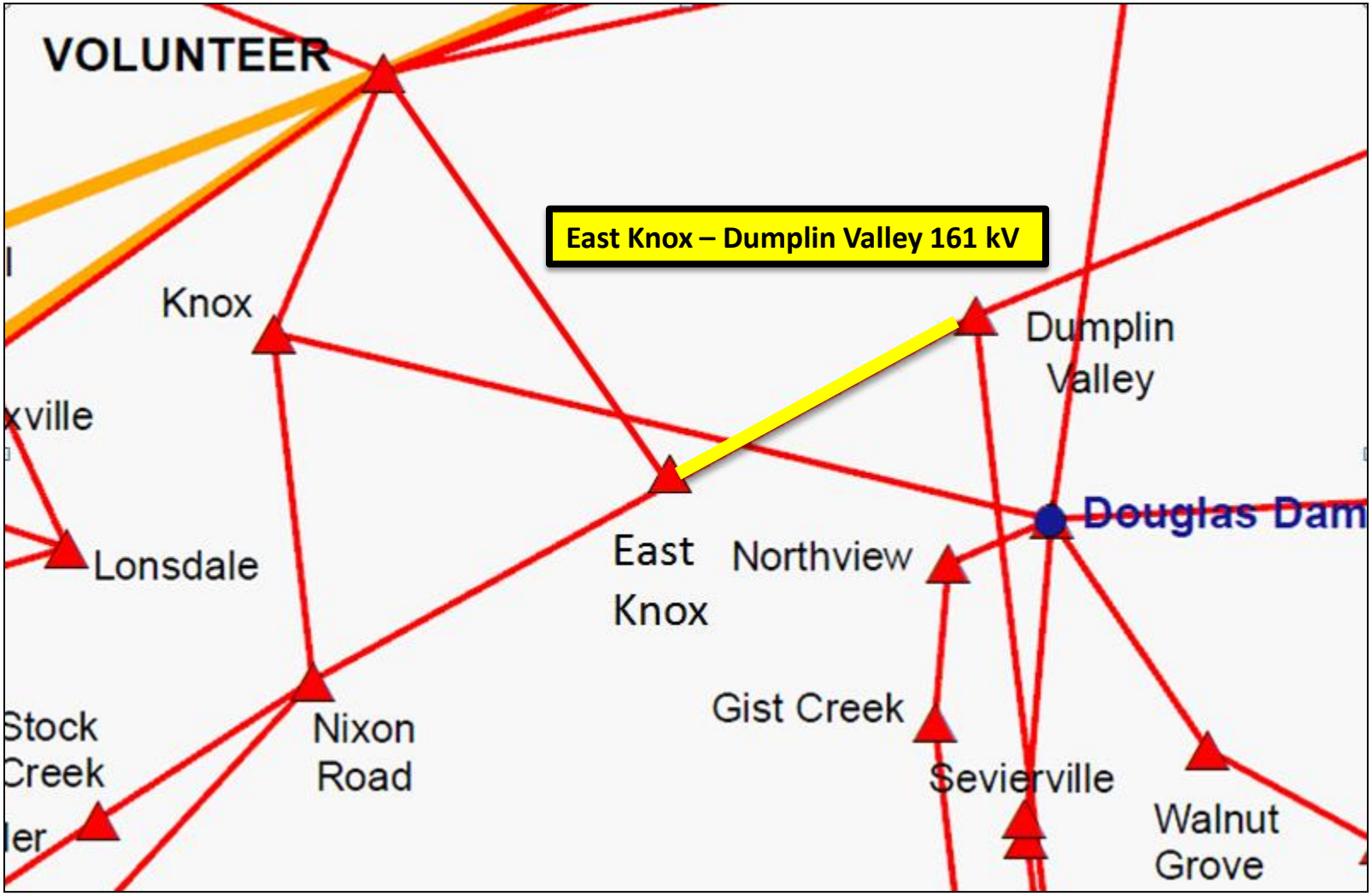
Projects Identified – *TVA*

Item	Potential Solution	Planning Level Cost Estimate
P1	**East Knox – Dumplin Valley 161 kV T.L.** • Reconductor approximately 9.2 miles of the Dumplin Valley – East Knox 161 kV transmission line using double bundled 954 ACSR conductor.	**$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.

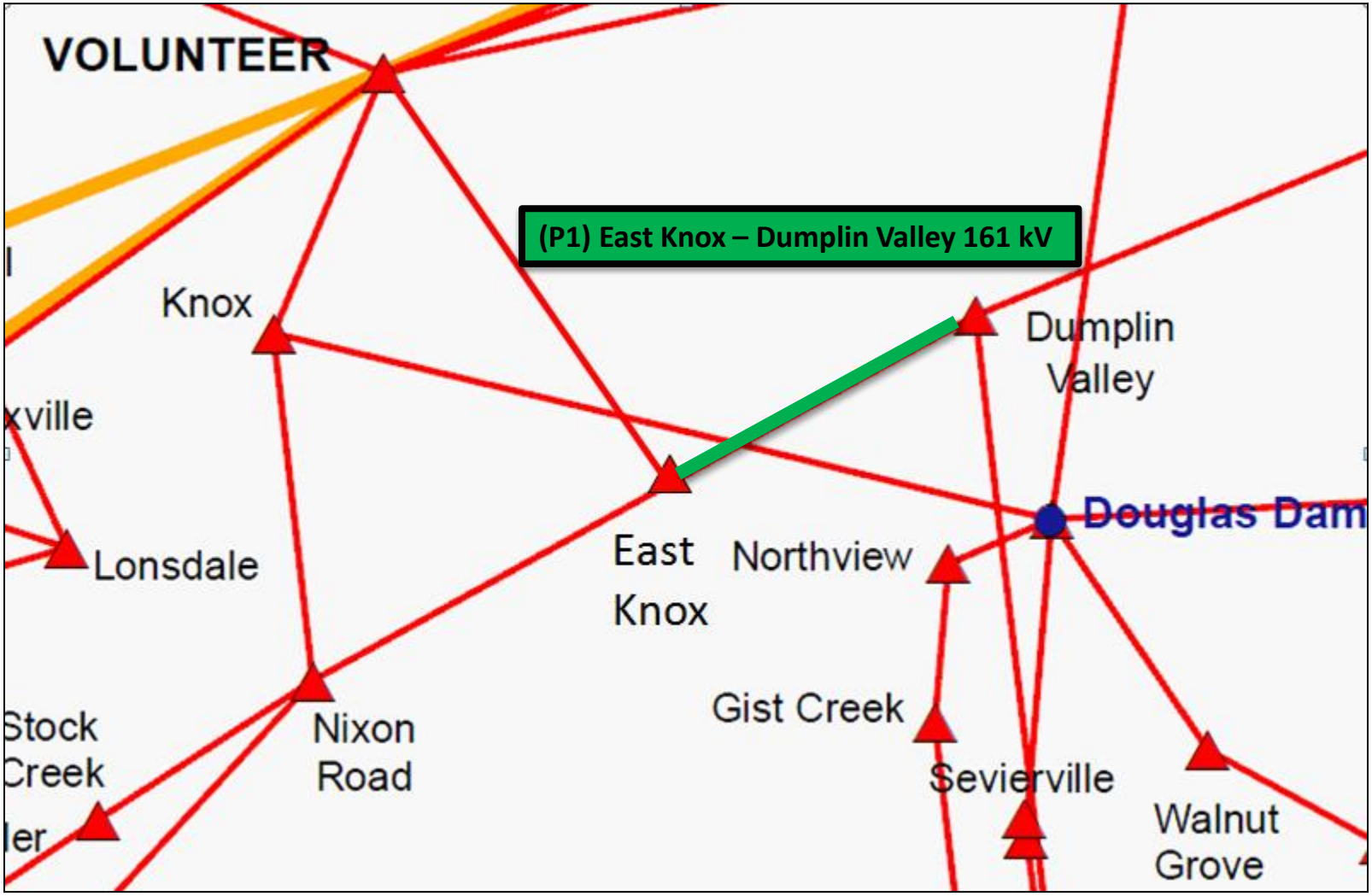
Southern/SCE&G to PJM – 1500 MW

Significant Constraints – *TVA*



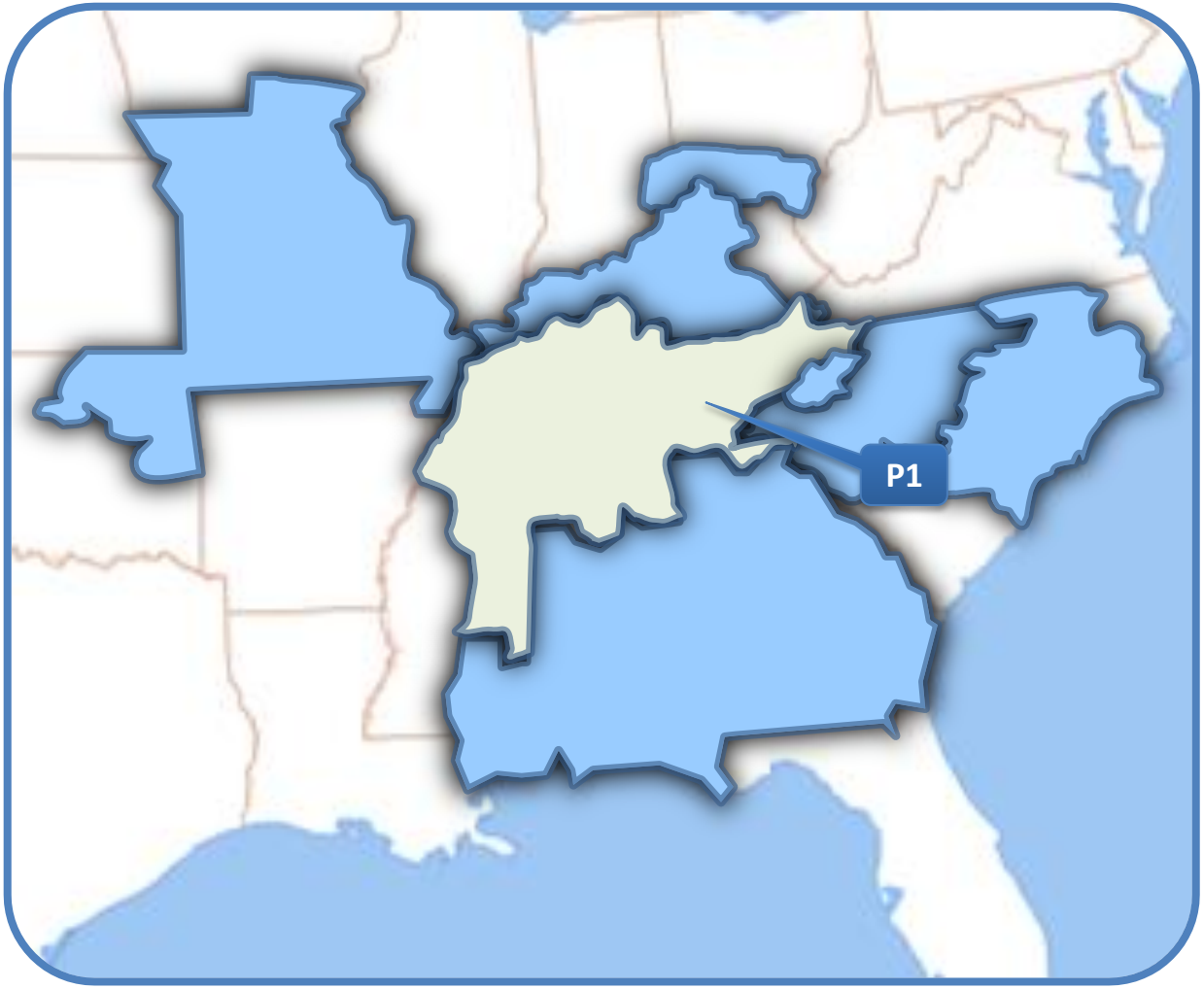
Southern/SCE&G to PJM – 1500 MW

Potential Solutions – *TVA*



Southern/SCE&G to PJM – 1500 MW

Project Locations – *TVA*



SERTP

Miscellaneous Updates

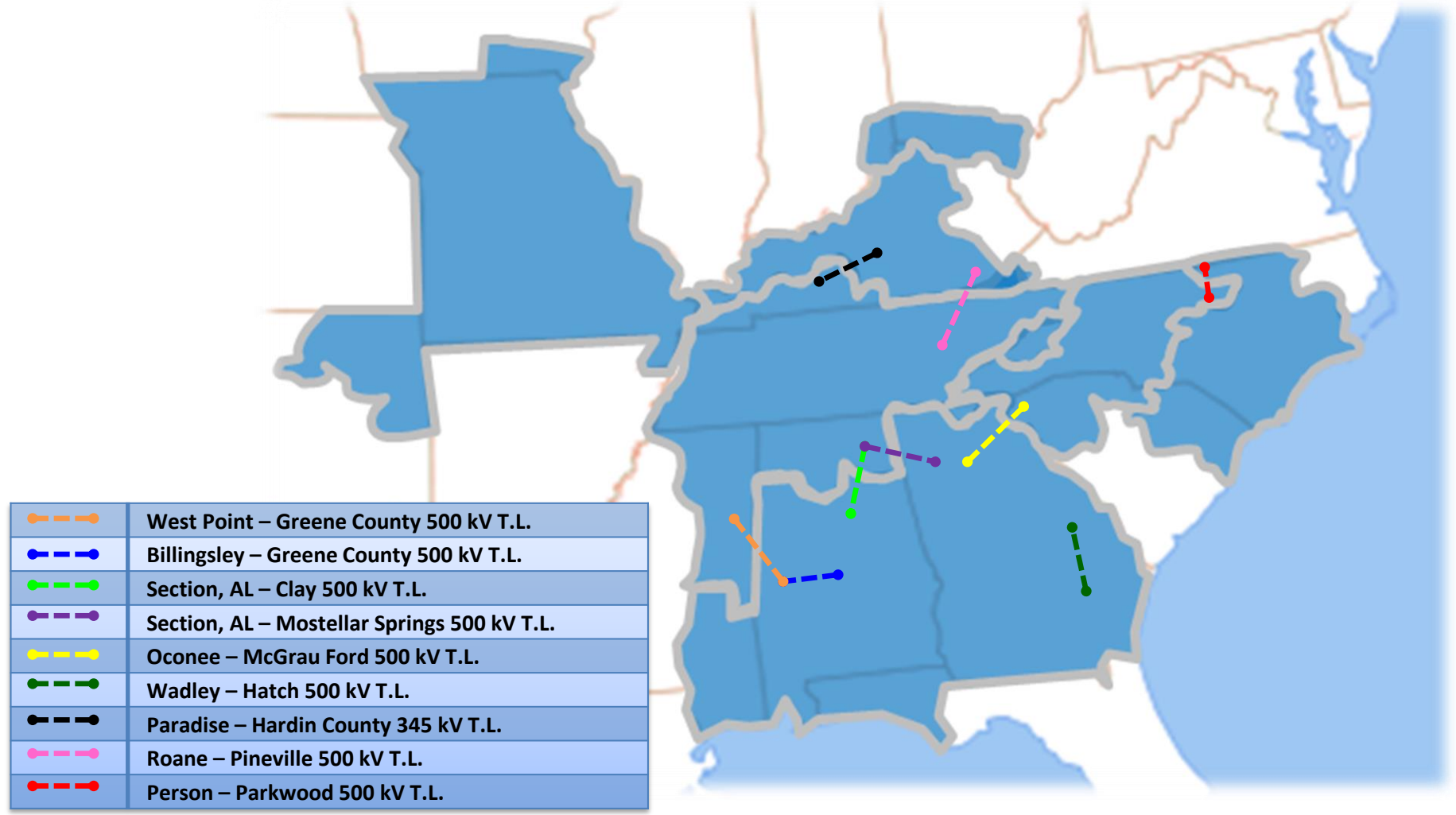
Regional Planning Analyses Update

- **Version 2 SERTP Regional Models available on SERTP Website**

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

2016 Regional Transmission Analyses

Preliminary List of Alternative Regional Transmission Projects



Miscellaneous Regional Update

- **Exchanged the latest transmission models for the ten year planning horizon with FRCC**
  - FRCC models will be incorporated into subsequent base cases
- **SERC Regional Model Development**
  - Data Bank Update ("DBU")
    - May 24 – May 26
    - 2016 Series SERC LTSG models completed
  - Linear Transfers and AC verification performed
  - Currently compiling the results into the SERC LTSG Report

Next Meeting Activities

- **2016 SERTP 4th Quarter Meeting** – *Annual Transmission Planning Summit & Input Assumptions Meeting*
  - **Location: GTC Headquarters in Tucker, GA**
  - **Date: December 2016**
  - **Purpose:**
    - Final Economic Planning Study Results
    - Regional Transmission Plan
    - Regional Analyses
    - Assumptions Input Session

Questions?

www.southeasternrtp.com