SERTP – 2015 3rd Quarter Meeting

2nd RPSG Meeting

September 24th, 2015

APC Headquarters

Birmingham, AL

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

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
- **Scoping Meeting held in May**

Economic Planning Studies

- **Santee Cooper Border to Duke**
  - 500 MW (2018 Summer Peak)
- **TVA (Shelby) to Southern/TVA/Duke**
  - 3500 MW (2020 Summer Peak)
- **Southern & SCEG to PJM Border**
  - 500 MW (2020 Summer Peak)

Power Flow Cases Utilized

- **Study Years:**
  - 2018 and 2020
- **Load Flow Cases:**
  - 2015 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 (2018 and 2020).**

- **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.**

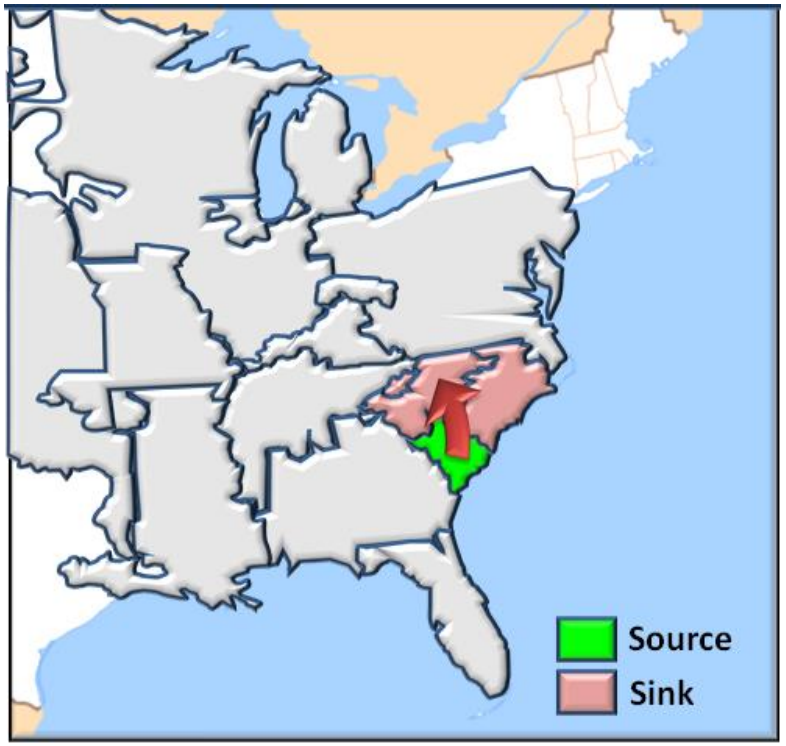
Economic Planning Studies

Santee Cooper Border to Duke 500 MW

Santee Cooper to Duke – 500 MW

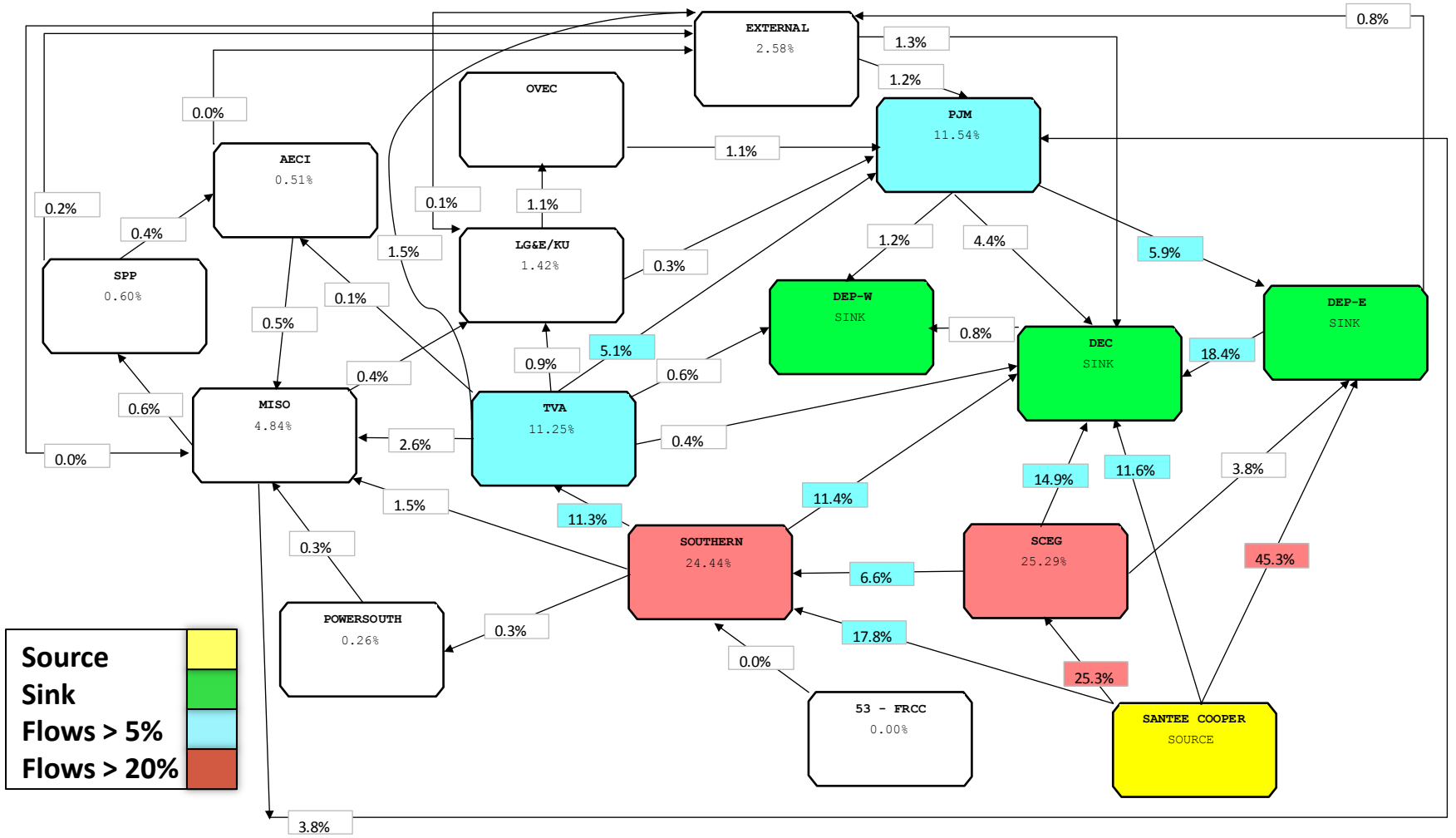
Study Assumptions

- **Transfer Type:** Load to Generation (2018 Summer Peak)
- **Source:** Uniform load scale within Santee Cooper
- **Sink:** Generation within Duke



Santee Cooper to Duke – 500 MW

Transfer Flows with the SERTP



Santee Cooper to Duke – 500 MW

Transmission System Impacts – *SERTP*

- **Thermal Constraints Identified:**
  - One (1) double circuit 100 kV T.L.

Total ($2015) = $10,000,000

Santee Cooper to Duke – 500 MW

Transmission System Impacts

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

Santee Cooper to Duke – 500 MW

Transmission System Impacts – *DEC*

- **Thermal Constraints Identified:**
  - One (1) double circuit 100 kV T.L.

Total ($2015) = $10,000,000

Santee Cooper to Duke – 500 MW

Significant Constraints – *DEC*

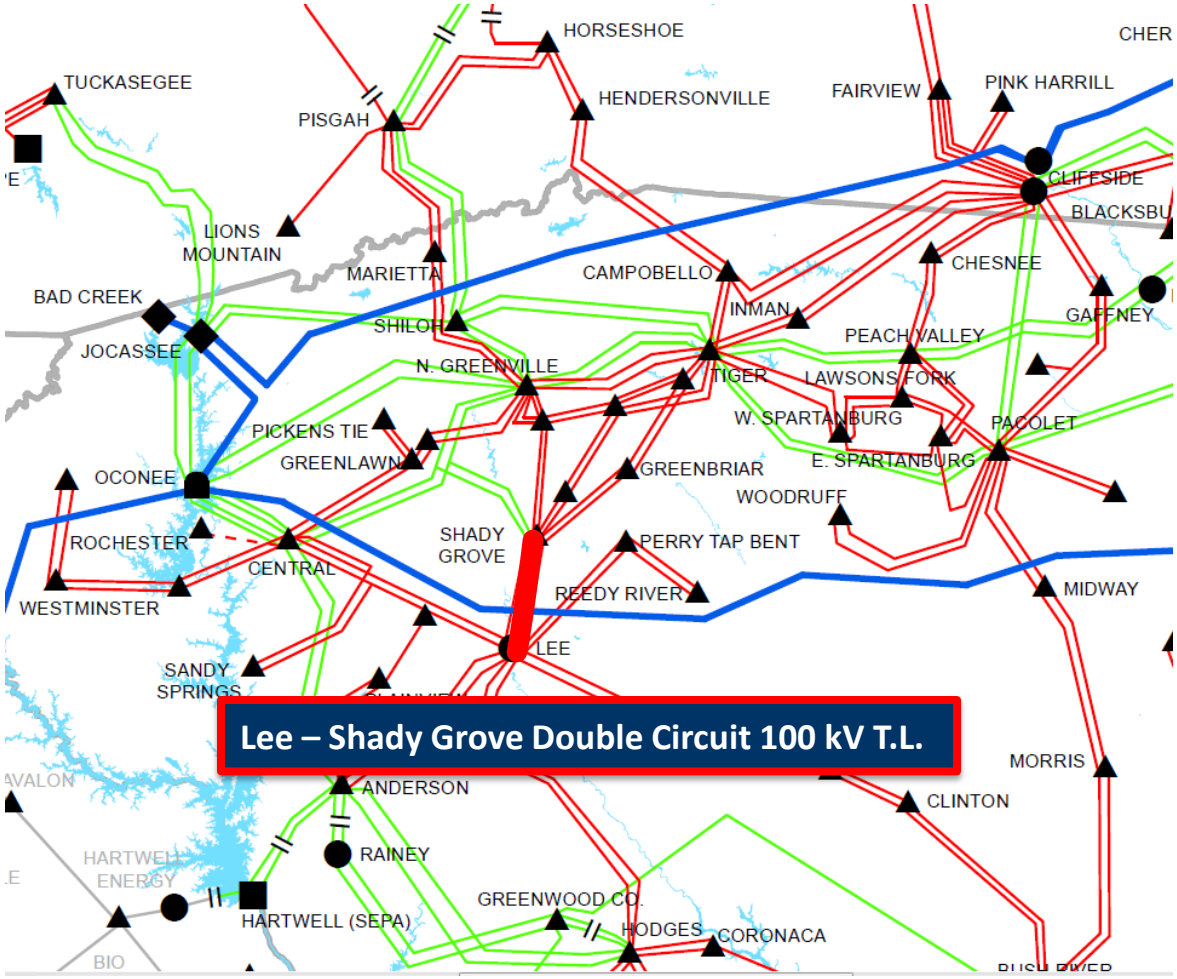
Limiting Element	Rating (MVA)	Thermal Loadings (%)	
		Without Request	With Request
Lee – Shady Grove 100 kV T.L.	65	81.0	103.3

Santee Cooper to Duke – 500 MW

Significant Constraints – *DEC*

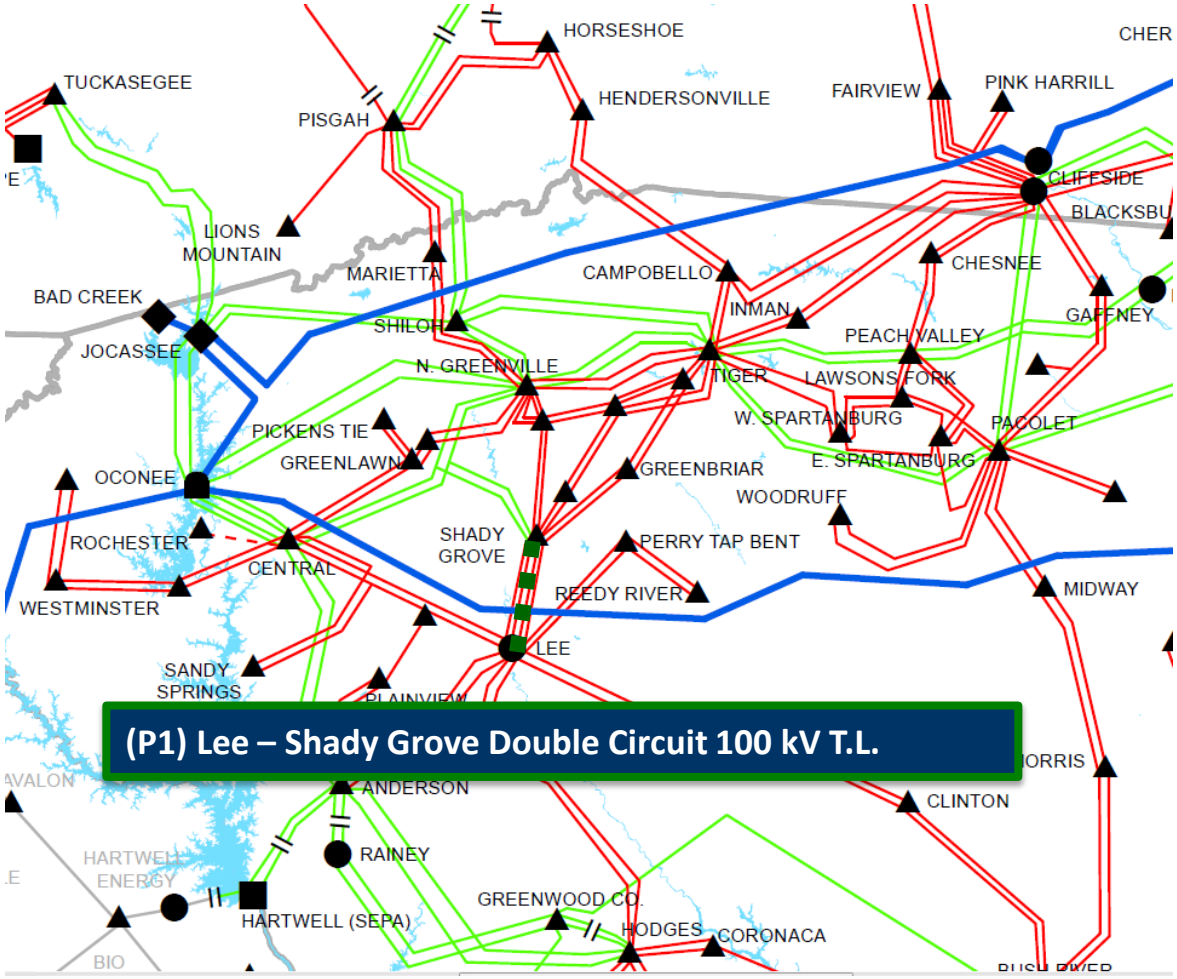
Santee Cooper to Duke – 500 MW

Significant Constraints – *DEC*



Santee Cooper to Duke – 500 MW

Proposed Enhancement – *DEC*



Santee Cooper to Duke – 500 MW

Projects Identified – *DEC*

Item	Potential Solution	Planning Level Cost Estimate
P1	**Lee – Shady Grove Double Circuit 100 kV T.L.** • Rebuild 9.62 miles of double circuit 100kV transmission lines from Lee to Estes Tap to 477 ACSS/TW	**$10,000,000**
DEC TOTAL ($2015)		**$10,000,000**

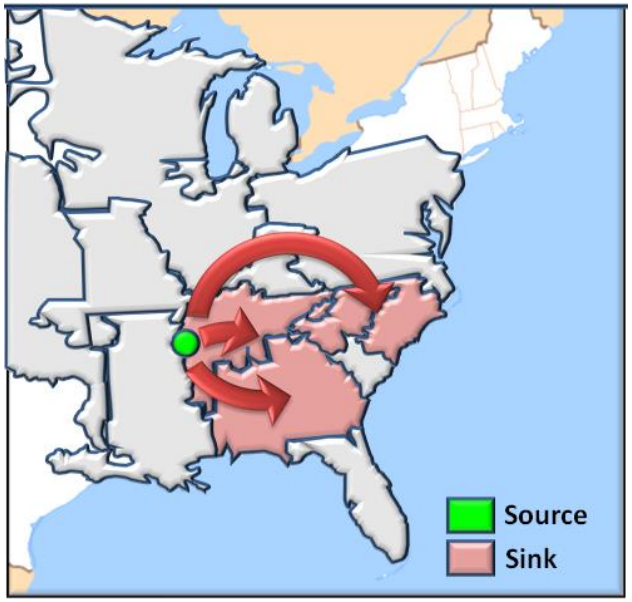
Economic Planning Studies

TVA to Southern/TVA/Duke 3500 MW

TVA to Southern/TVA/Duke – 3500 MW

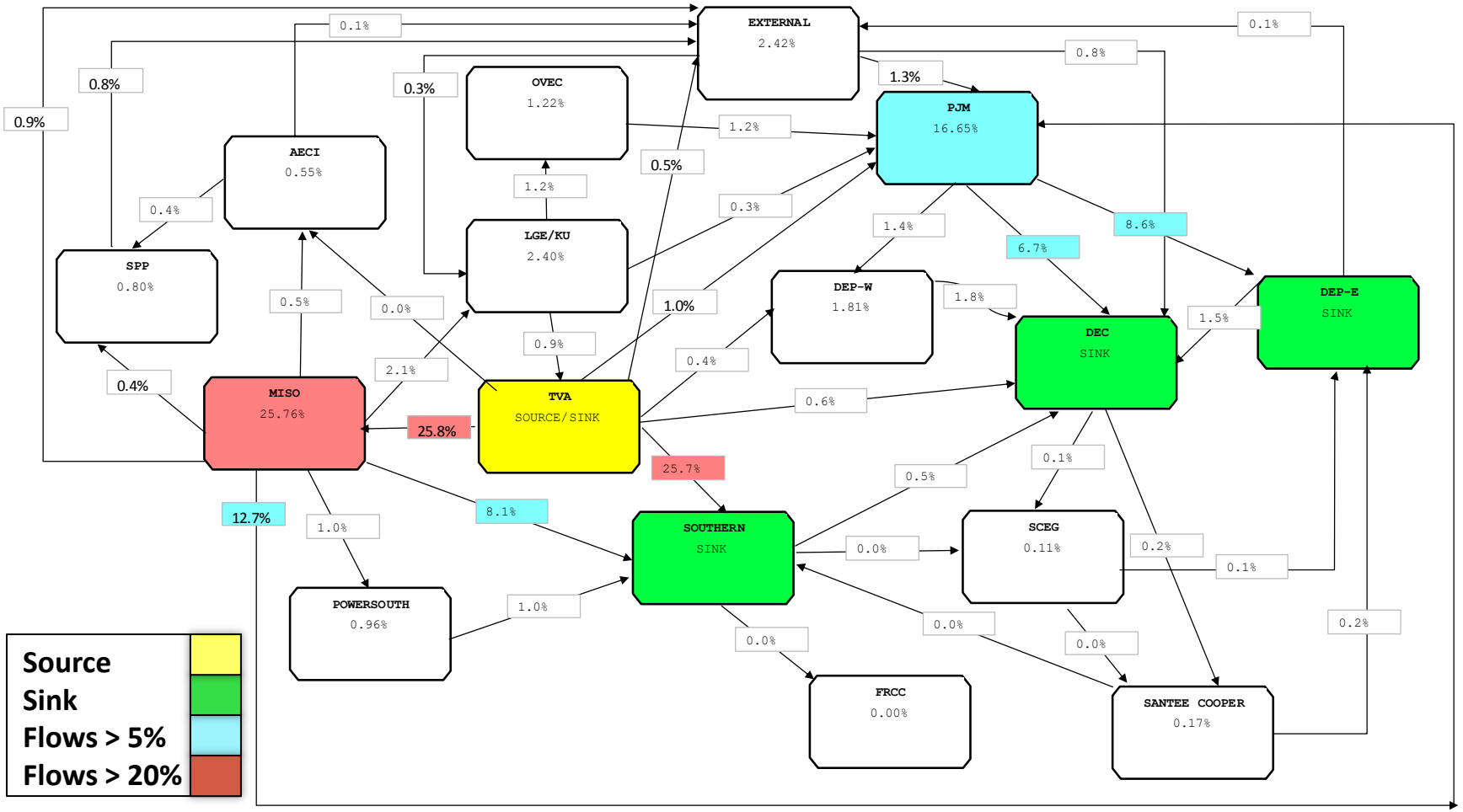
Study Assumptions

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



TVA to Southern/TVA/Duke – 3500 MW

Transfer Flows with the SERTP



TVA to Southern/TVA/Duke – 3500 MW

Transmission System Impacts – *SERTP*

- **Thermal Constraints Identified:**
  - One (1) 500 kV T.L.
  - One (1) 500/161 kV Transformer Bank
  - Six (6) 230 kV T.L.
  - Two (2) 161 kV T.L.
  - Three (3) 115 kV T.L.
- **Transmission Project Included in the Economic Study Assessment per RPSG Request:**
  - One (1) 500 kV T.L.

Total ($2015) = $322,500,000[(1)]

[(1)] This cost includes the Lagoon Creek – Jackson 500 kV T.L. project, which has been modeled within the SERTP economic study at the request of the RPSG and is not a part of TVA's expansion plan. The estimated cost of this project has been included in the total project cost of the economic study.

TVA to Southern/TVA/Duke – 3500 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 to Southern/TVA/Duke – 3500 MW

Transmission System Impacts – *SBA*

- **Thermal Constraints Identified:**
  - Six (6) 230 kV T.L.
  - Two (2) 161 kV T.L.
  - Three (3) 115 kV T.L.

Total ($2015) = $181,500,000

TVA to Southern/TVA/Duke – 3500 MW

Significant Constraints – *SBA*

Limiting Element	Rating (MVA)	Thermal Loadings (%)	
		Without Request	With Request
Fayette – Gorgas 161 kV T.L.	193	105.6(1)	133.5
Nasa – Logtown 115 kV T.L.	216	110.7(1)	120.6
Morton – Forest Industrial 115 kV T.L.	155	104.1(1)	119.0
Oostanaula – Dalton 230 kV T.L.	664	93.6	109.4
Leeds – Argo 230 kV T.L.	602	98.0	109.0
Attalla – Albertville 161 kV T.L.	193	81.3	108.3
Hattiesburg – Angie 230 kV T.L.	463	96.1	107.6
Miller – Boyles 230 kV T.L.	602	92.6	102.6

(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.

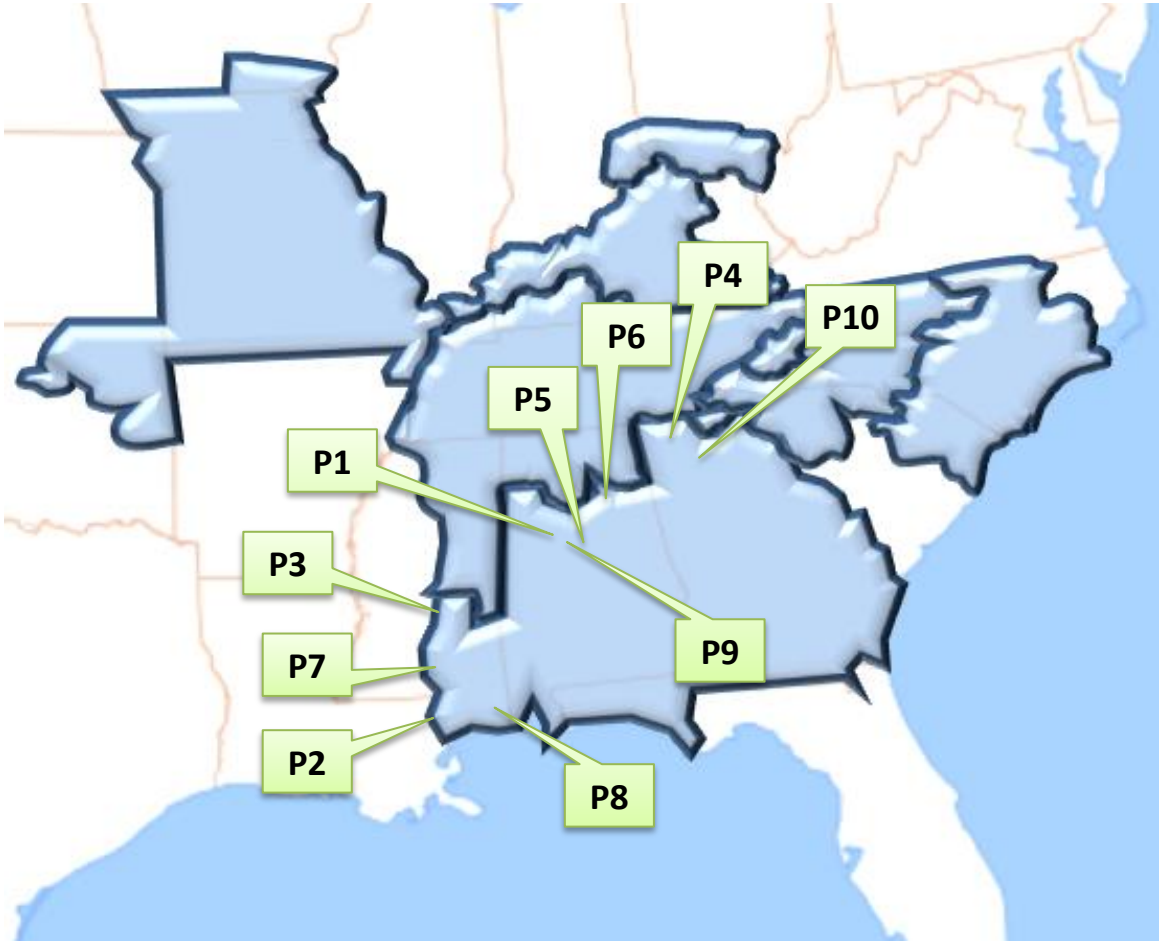
TVA to Southern/TVA/Duke – 3500 MW

Significant Constraints – *SBA*

Limiting Element	Rating (MVA)	Thermal Loadings (%)	
		Without Request	With Request
Daniel – Mosspoint 230 kV T.L.	922	97.1	102.4
Wade – Harleston 115 kV T.L.	107	90.5	101.4
Cumming – McGrau Ford 230 kV T.L.	596	96.8	100.6

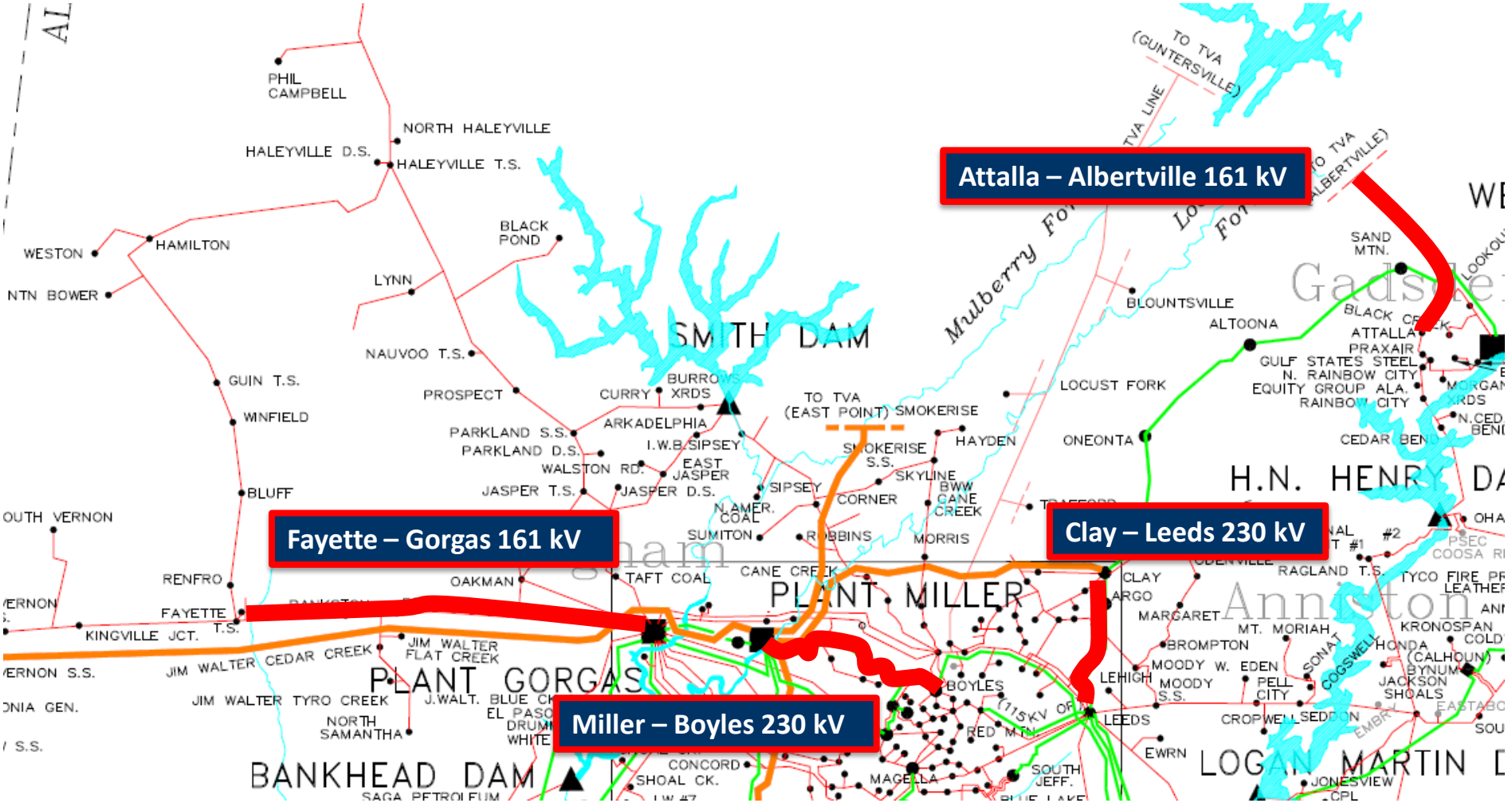
TVA to Southern/TVA/Duke – 3500 MW

Significant Constraints – *SBA*



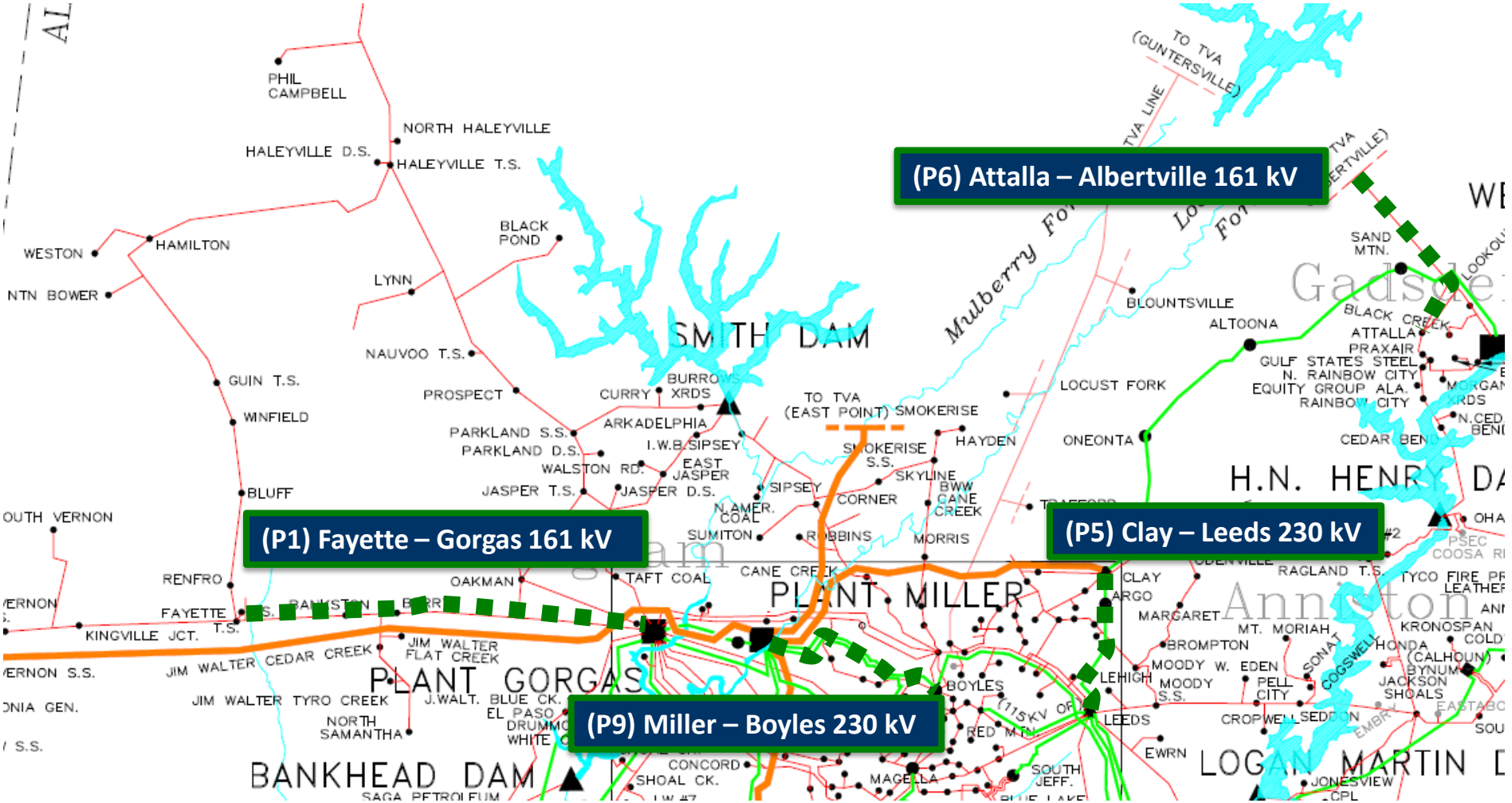
TVA to Southern/TVA/Duke – 3500 MW

Significant Constraints – *SBA*



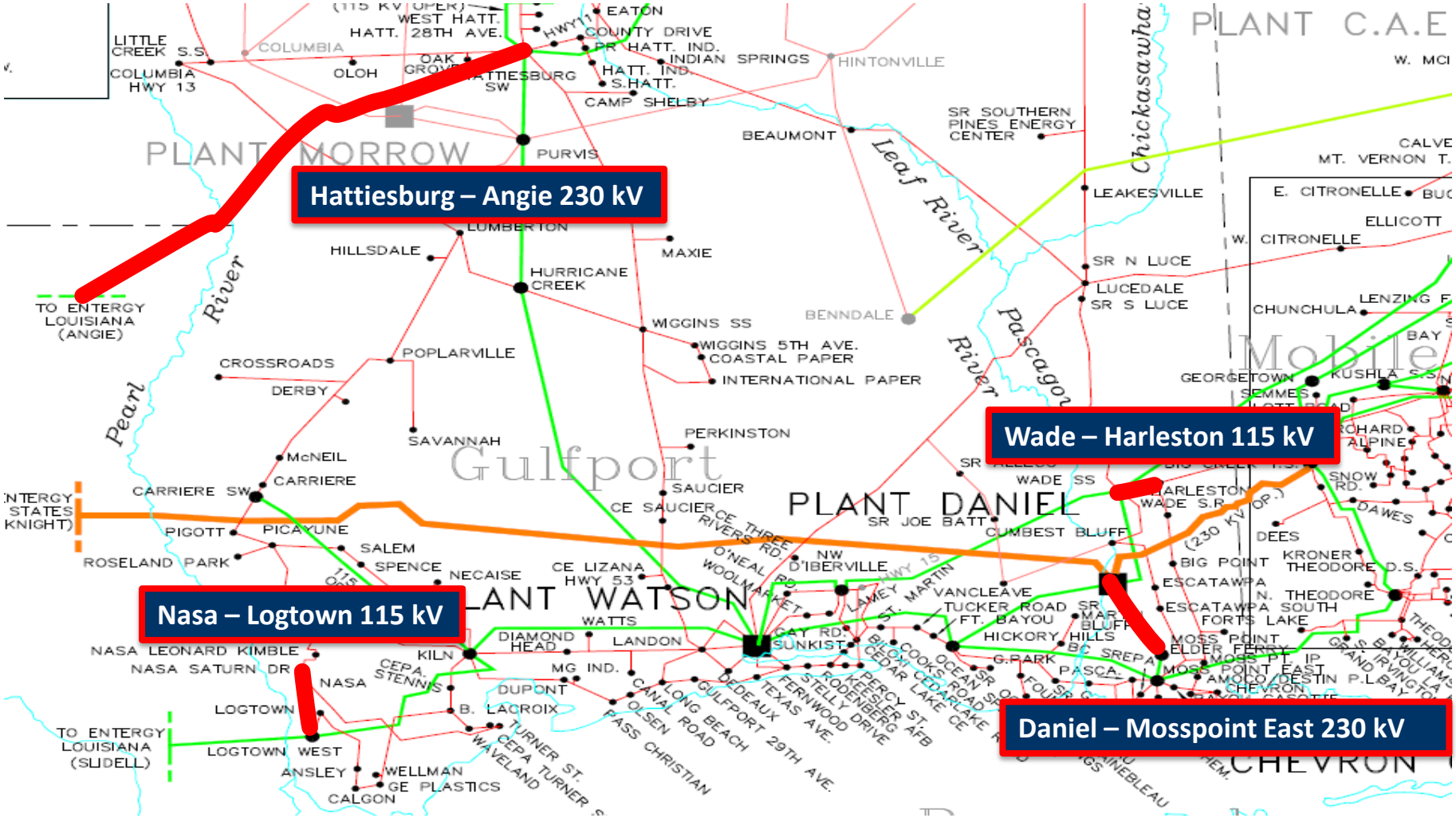
TVA to Southern/TVA/Duke – 3500 MW

Significant Constraints – *SBA*



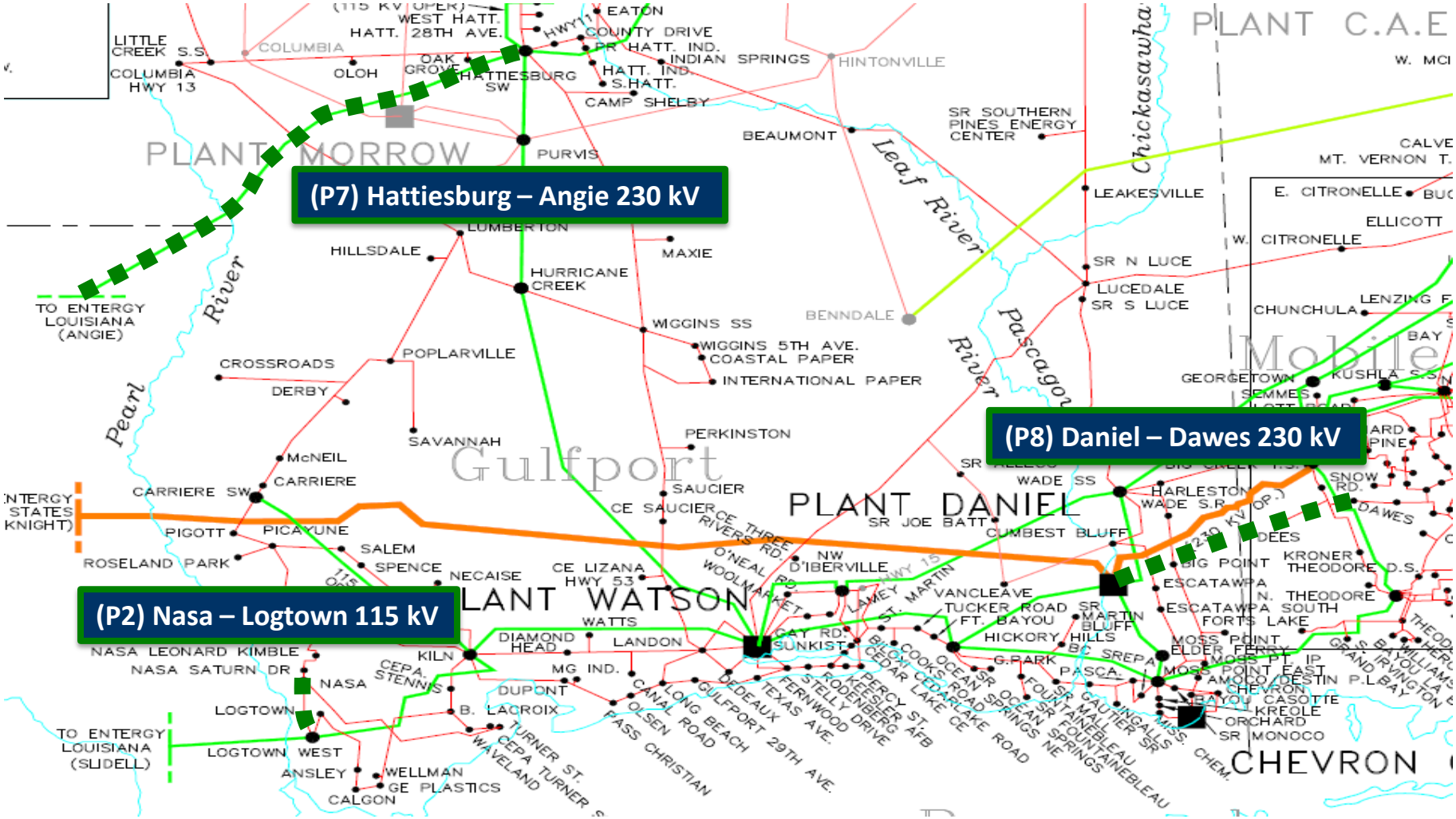
TVA to Southern/TVA/Duke – 3500 MW

Significant Constraints – *SBA*



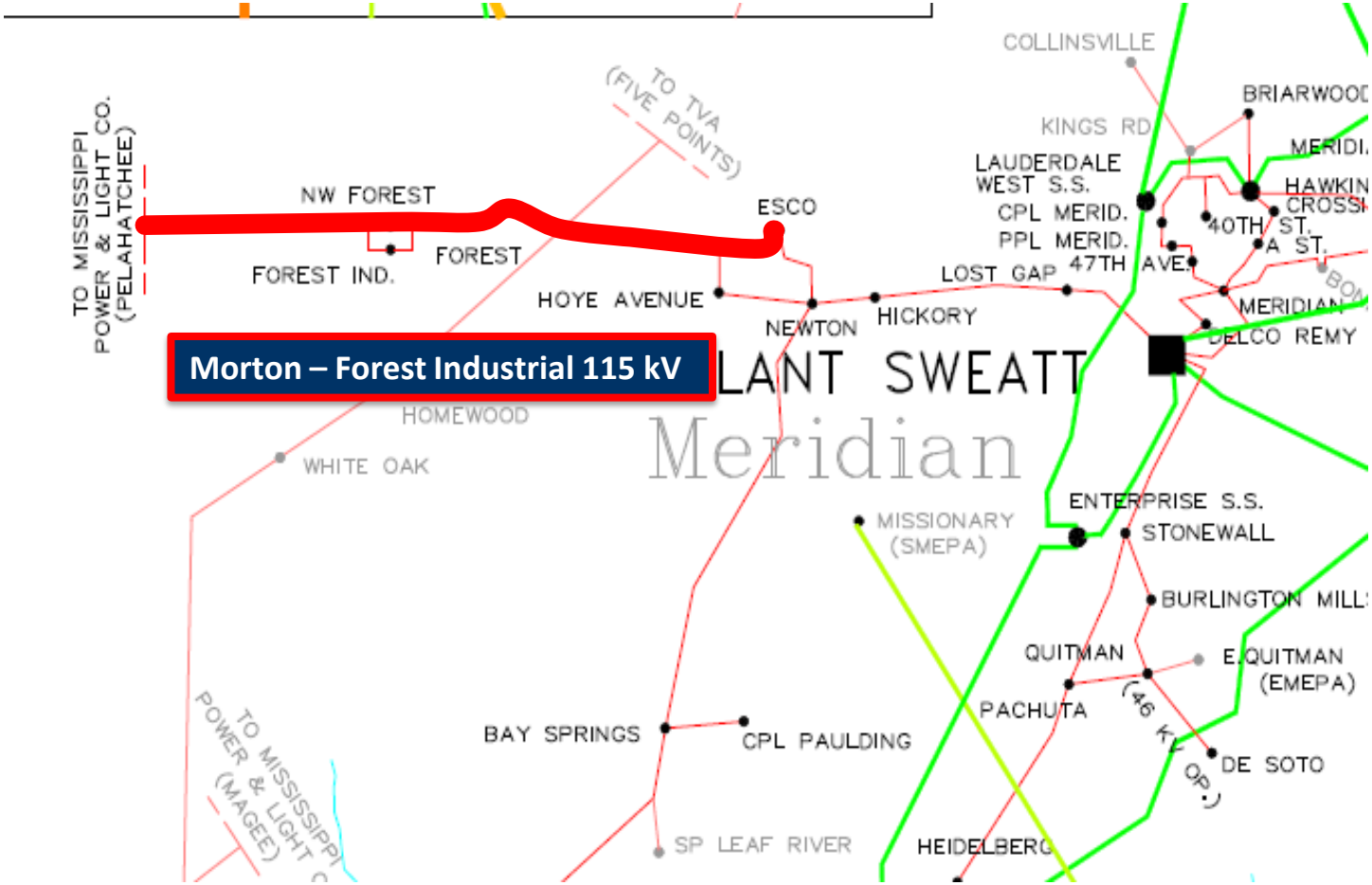
TVA to Southern/TVA/Duke – 3500 MW

Significant Constraints – *SBA*



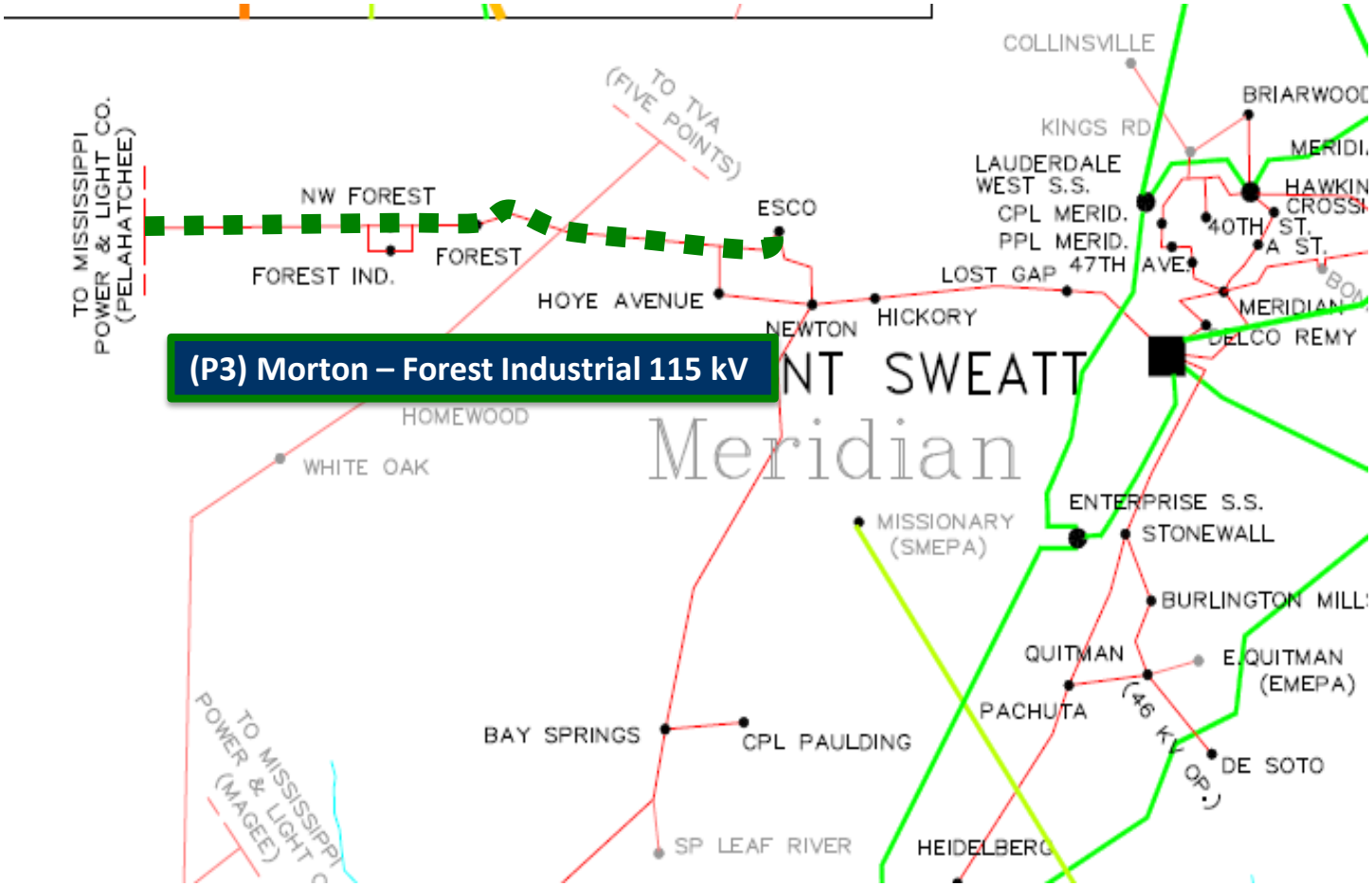
TVA to Southern/TVA/Duke – 3500 MW

Significant Constraints – *SBA*



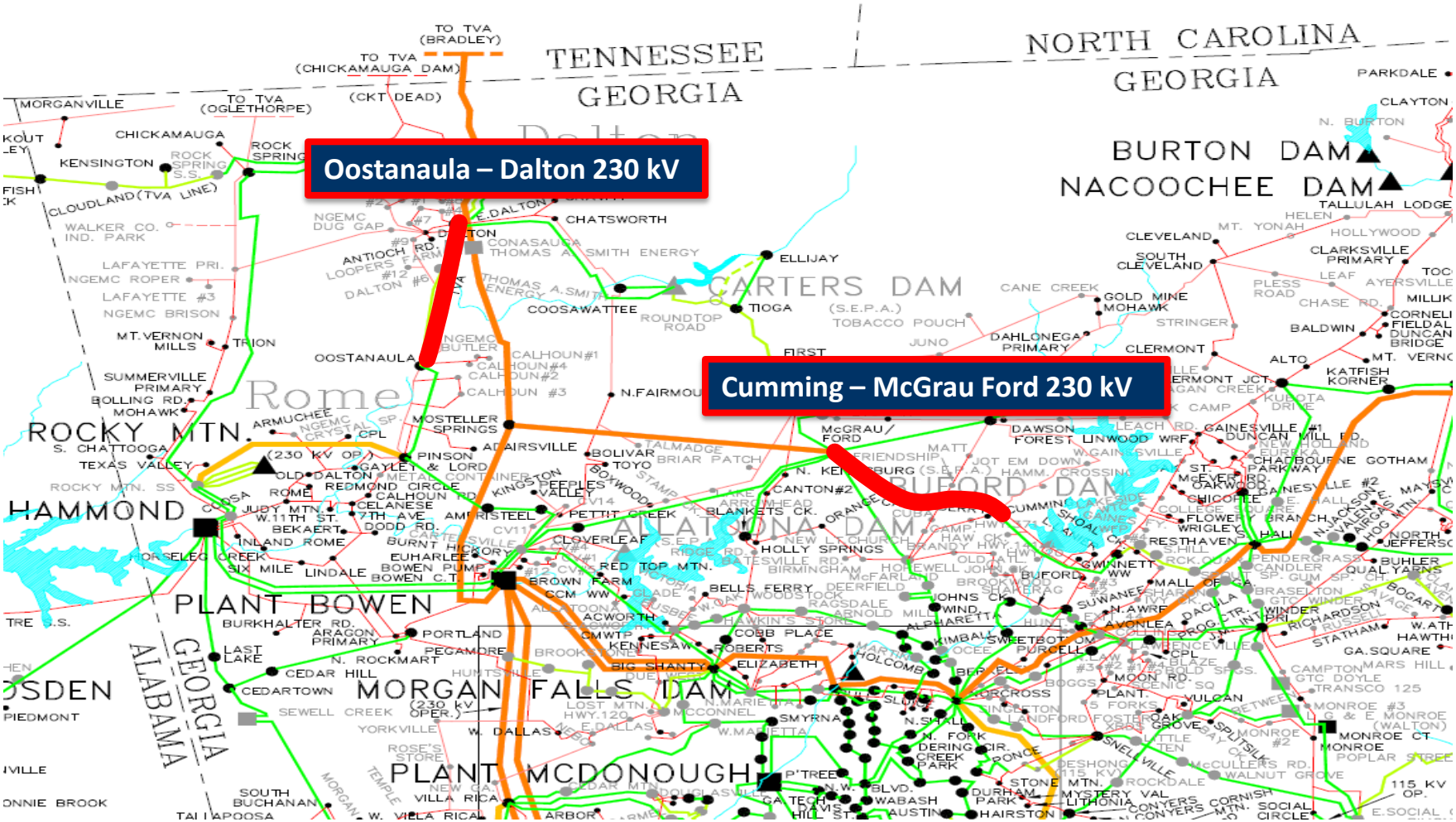
TVA to Southern/TVA/Duke – 3500 MW

Significant Constraints – *SBA*



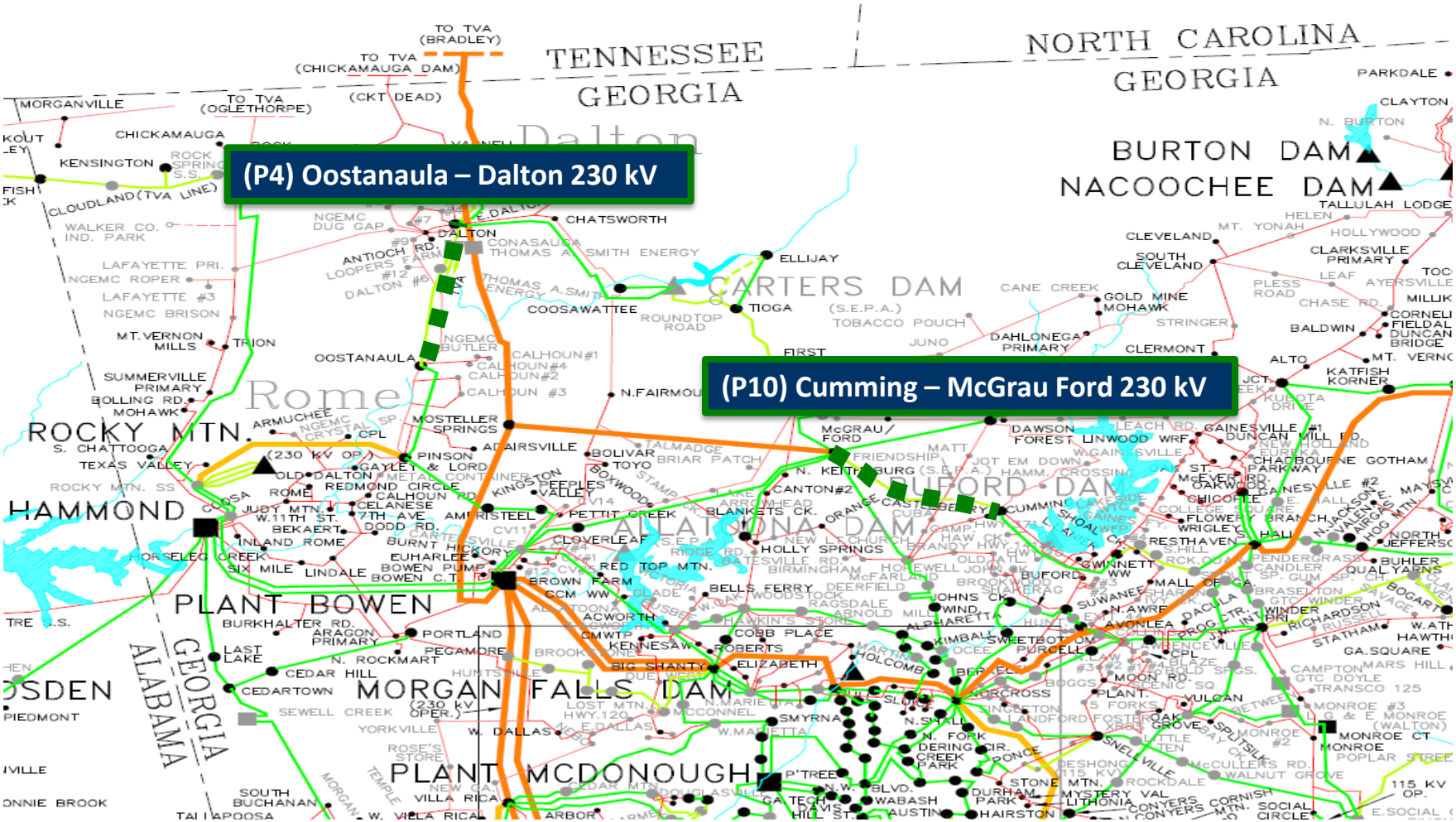
TVA to Southern/TVA/Duke – 3500 MW

Significant Constraints – *SBA*



TVA to Southern/TVA/Duke – 3500 MW

Significant Constraints – *SBA*



TVA to Southern/TVA/Duke – 3500 MW

Projects Identified – *SBA*

Item	Potential Solution	Planning Level Cost Estimate
P1	**Fayette – Gorgas 161 kV T.L.** • Rebuild approximately 36.7 miles along the Fayette – Gorgas 161 kV transmission line with 795 ACSS at 160°C.	**$37,000,000**
P2	**Nasa – Logtown 115 kV T.L. & 230/115 kV Transformer** • Reconductor approximately 3 miles along the Nasa – Logtown 115 kV transmission line with 795 ACSS at 200°C. • Install new 230/115 kV transformer at Logtown.	**$5,000,000**
P3	**Morton – Forest Industrial 115 kV T.L.** • Reconductor approximately 3.86 miles along the Morton – Forest Industrial 115 kV T.L. with 1033 ACSR at 100°C.	**$1,500,000** [(2)]
P4	**Oostanaula – Dalton 230 kV Substation** • Replace the 1600 A PCB at Oostanaula with a 3000 A PCB.	**$500,000**

[(2)] This transmission solution was proposed to alleviate the loading of a tie-line constraint between the SBA and a non-participating transmission owner. Therefore, the cost associated with the transmission solution is only for the portion of solution that is located within the participating transmission owners' territory. This solution effectively alleviates the identified constraint(s), however, the impacts to adjacent transmission systems that are external to the participating transmission owners were not evaluated.

TVA to Southern/TVA/Duke – 3500 MW

Projects Identified – *SBA*

Item	Potential Solution	Planning Level Cost Estimate
P5	**Clay TS – Leeds TS 230 kV T.L.** • Upgrade approximately 17.3 miles along the Clay – Leeds 230 kV transmission line from 100 °C to 125 °C.	**$3,400,000**
P6	**Attalla – Albertville (TVA) 161 kV T.L.** • Reconductor approximately 19.6 miles with 1351 ACSR at 100°C from Attalla to Albertville 161 kV transmission line (SOCO)	**$19,500,000**
P7	**Angie – Hattiesburg 230 kV T.L.** • Reconductor approximately 31 miles along the Angie – Hattiesburg 230 kV transmission line with 1351 ACSS at 200 °C.	**$36,000,000** [(2)]
P8	**Daniel – Dawes 230 kV T.L.** • Construct 24 miles of new 230 kV transmission line from Daniel to Dawes with 1351 ACSS at 200 °C and a new 230 kV SS at Dawes.	**$54,000,000**

[(2)] This transmission solution was proposed to alleviate the loading of a tie-line constraint between the SBA and a non-participating transmission owner. Therefore, the cost associated with the transmission solution is only for the portion of solution that is located within the participating transmission owners' territory. This solution effectively alleviates the identified constraint(s), however, the impacts to adjacent transmission systems that are external to the participating transmission owners were not evaluated.

TVA to Southern/TVA/Duke – 3500 MW

Projects Identified – *SBA*

Item	Potential Solution	Planning Level Cost Estimate
P9	**Miller – Boyles 230 kV T.L.** • Upgrade approximately 17.9 miles along the Miller – Boyles 230 kV transmission line to 125°C operation.	**$3,600,000**
P10	**Cumming – McGrau Ford 230 kV T.L.** • Reconductor approximately 21.7 miles along the Cumming – McGrau Ford 230 kV T.L. with 1351 ACSS at 170°C.	**$21,000,000**
SBA TOTAL ($2015)		**$181,500,000 (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 Southern/TVA/Duke – 3500 MW

Transmission System Impacts – *TVA*

- **Thermal Constraints Identified:**
  - One (1) 500 kV T.L.
  - One (1) 500/161 kV Transformer Bank

- **Transmission Project to be Included in the Economic Study Assessment per RPSG Request:**
  - One (1) 500 kV T.L.

Total ($2015) = $141,000,000[(1)]

[(1)] This cost includes the Lagoon Creek – Jackson 500 kV T.L. project, which has been modeled within the SERTP economic study at the request of the RPSG and is not a part of TVA's expansion plan. The estimated cost of this project has been included in the total project cost of the economic study.

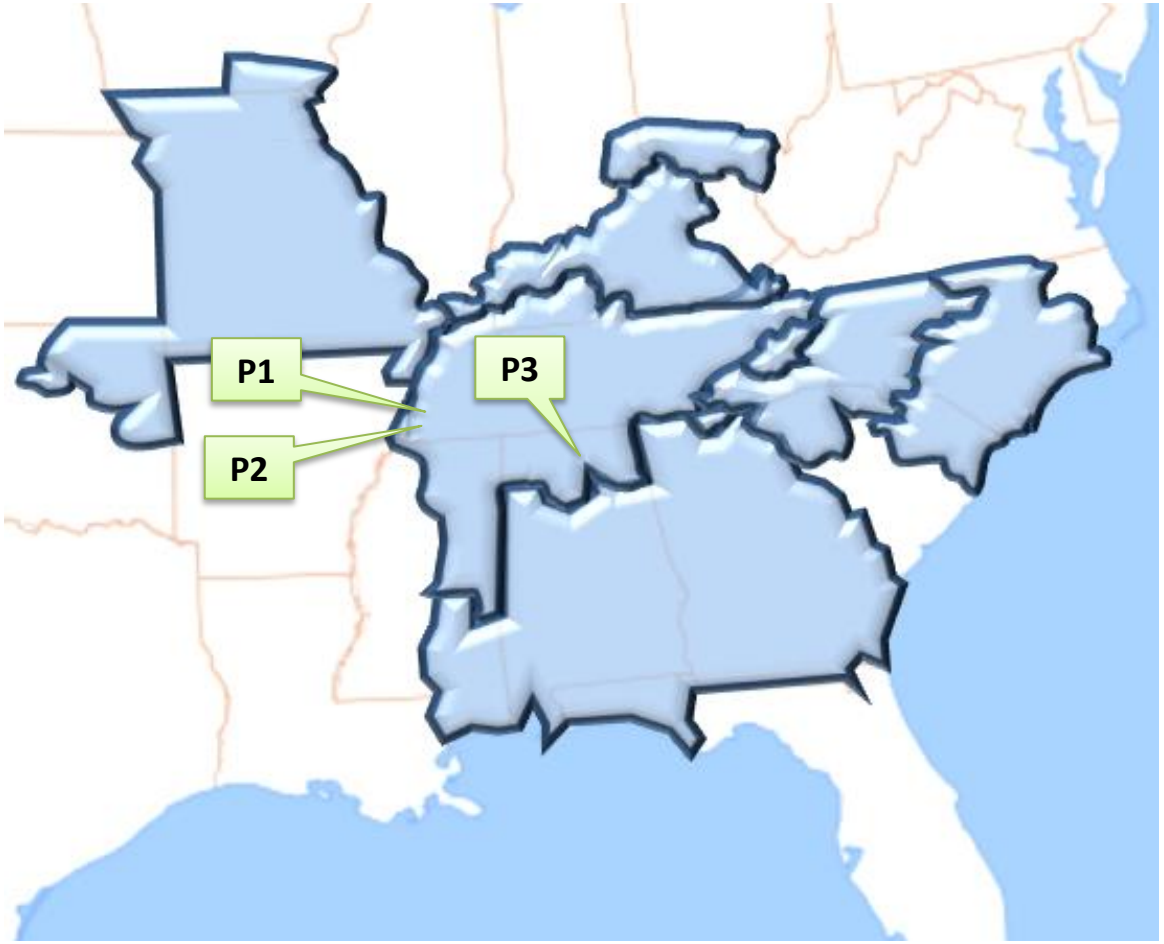
TVA to Southern/TVA/Duke – 3500 MW

Significant Constraints – *TVA*

Limiting Element	Rating (MVA)	Thermal Loadings (%)	
		Without Request	With Request
Shelby – Cordova #1 500 kV T.L.	1732	56.0	113.6
Cordova 500/161 kV Transformer Bank	1243	95.0	108.8

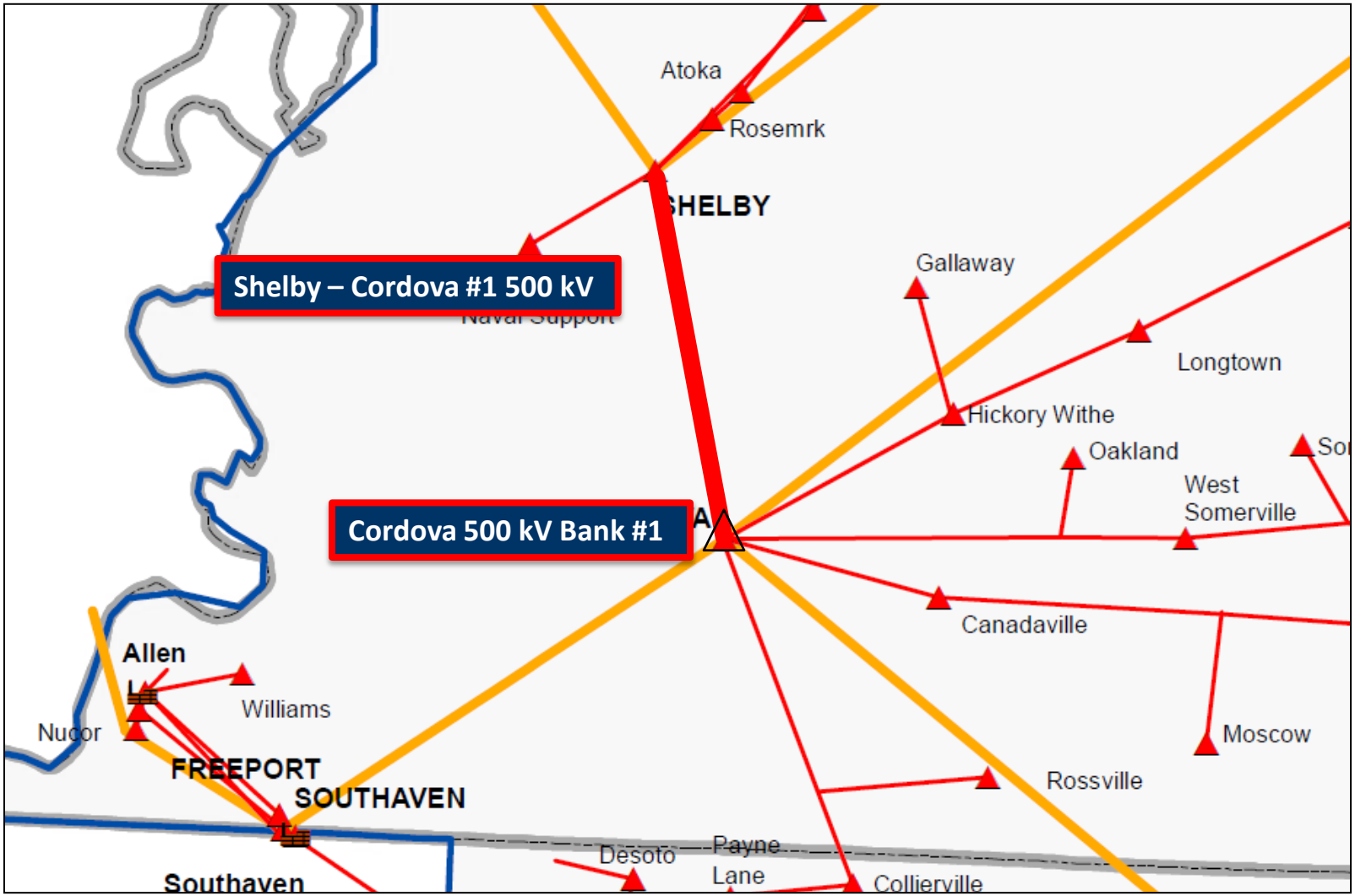
TVA to Southern/TVA/Duke – 3500 MW

Significant Constraints – *TVA*



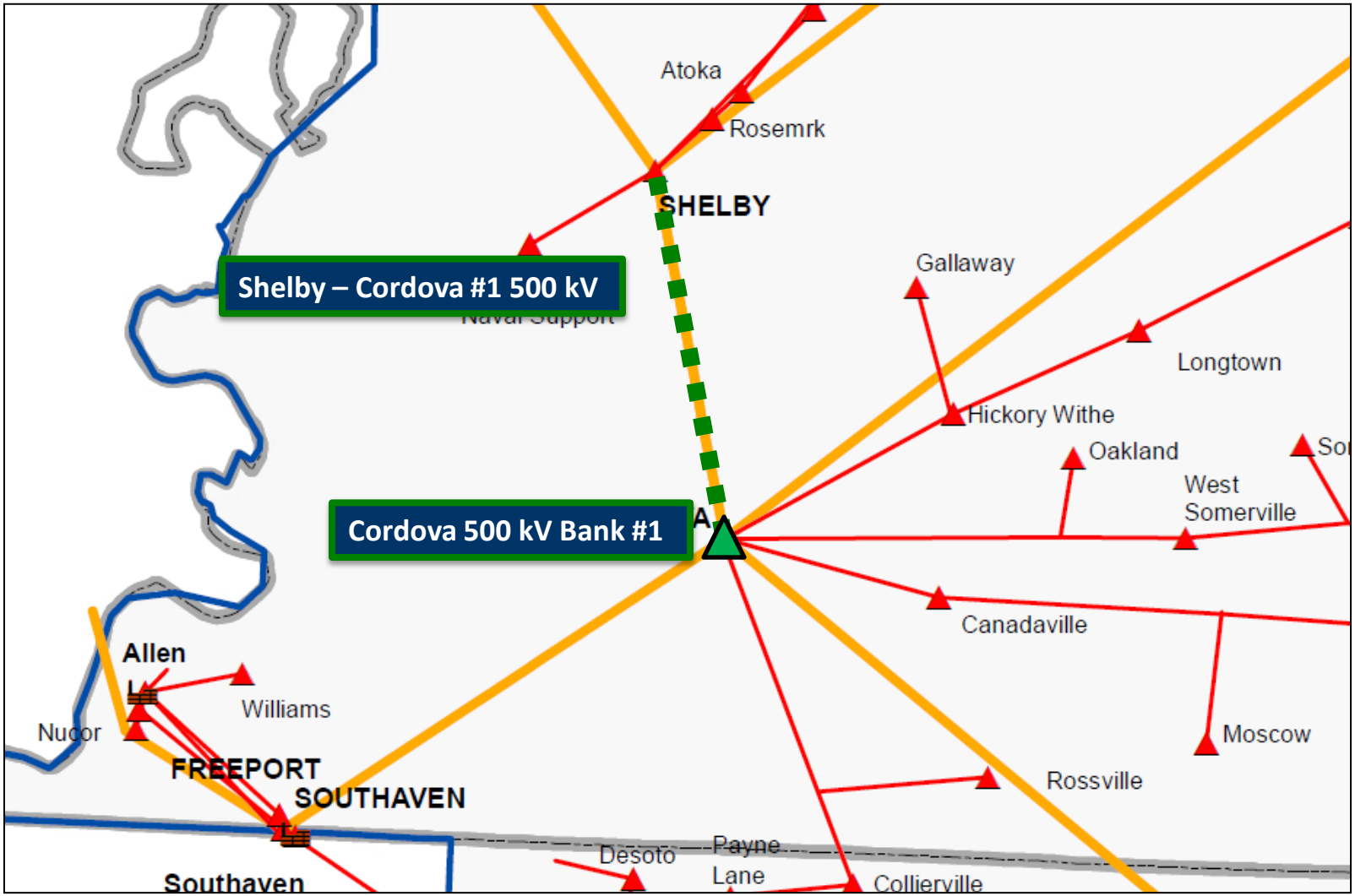
TVA to Southern/TVA/Duke – 3500 MW

Significant Constraints – *TVA*



TVA to Southern/TVA/Duke – 3500 MW

Proposed Enhancements – *TVA*



TVA to Southern/TVA/Duke – 3500 MW

Projects Identified – *TVA*

Item	Potential Solution	Planning Level Cost Estimate
P1	**Shelby – Cordova #1 500-kV T.L.** • Uprate approximately 21 miles of 500 kV transmission line between Shelby and Cordova to 100°C and upgrade terminal equipment at both terminal end 500-kV substations.	**$9,000,000**
P2	**Cordova 500-kV Substation** • Install 4 500-kV breakers to provide a complete double breaker configuration at Cordova.	**$8,000,000**
P3	**Albertville 161 kV Substation** • Upgrade terminal equipment at Albertville 161 kV substation.	**$2,000,000**
--	**Lagoon Creek – Jackson 500 kV T.L.** • Build approximately 37 miles of transmission line between the Lagoon Creek and Jackson 500-kV substations sagged at 100°C.	**$122,000,000** (2)
TVA TOTAL ($2015)		**$141,000,000** (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 project has been modeled within the SERTP economic study at the request of the RPSG and is not a part of TVA's expansion plan. The estimated cost of this project has been included in the total project cost of the economic study.**

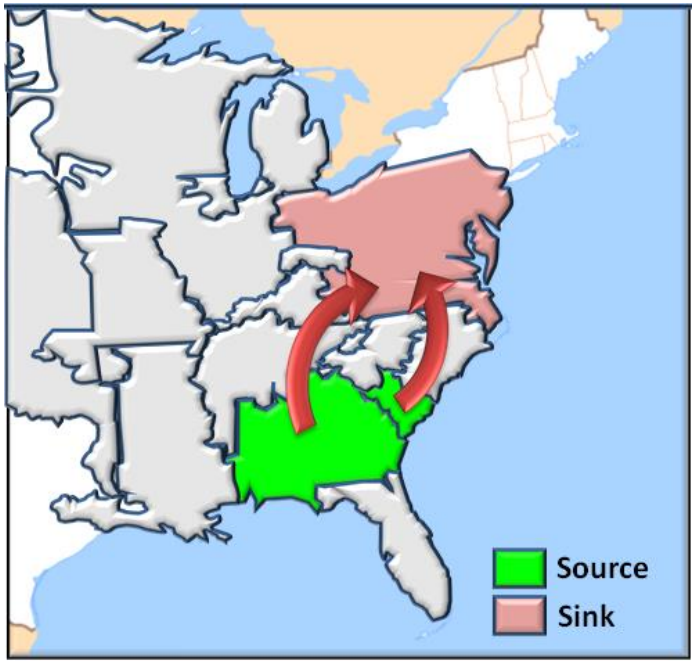
Economic Planning Studies

Southern & SCEG to PJM Border 500 MW

Southern & SCEG to PJM Border – 500 MW

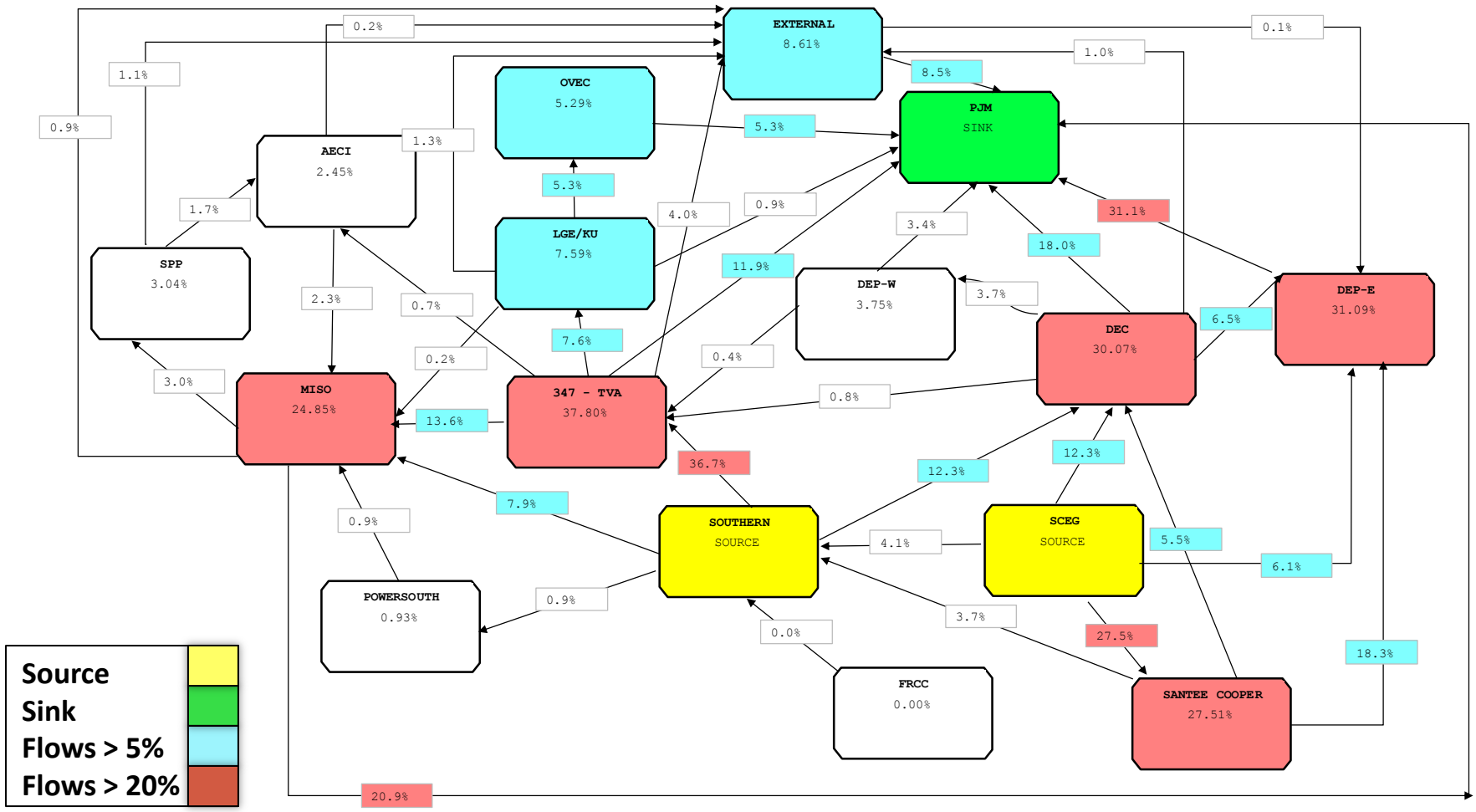
Study Assumptions

- **Transfer Type:** Generation/Load to Generation (2020 Summer Peak)
- **Source:** Generation within Southern Company and uniform load scale within SCE&G
- **Sink:** Uniform load scale within PJM



Southern & SCEG to PJM Border – 500 MW

Study Assumptions



Southern & SCEG to PJM Border – 500 MW

Transmission System Impacts – SERTP

- **Thermal Constraints Identified:**
  - None

Total ($2015) = $0

Southern & SCEG to PJM Border – 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

SERTP

Miscellaneous Updates

Order No.1000 Update

- **SERTP Regional Compliance Filing**
  - Filed 5/12/15
    - *Accepted by FERC 7/28/15*
- **SERTP Interregional Compliance Filings**
  - SCRTP and FRCC Filed 3/24/15
    - *Accepted by FERC 7/30/15*
  - SPP Filed 5/18/15
    - *Accepted by FERC 8/31/15*
  - PJM Filed 5/26/15
  - MISO Filed 6/22/15

Order No.1000 Update

- **Regional Planning Analyses**
  - 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

Regional Model 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 12 – May 14
    - 2015 Series SERC LTSG models completed
  - Linear Transfers and AC verification performed
  - Currently compiling the results into the SERC LTSG Report

Next Meeting Activities

- **2015 SERTP 4th Quarter Meeting** – *Annual Transmission Planning Summit & Input Assumptions Meeting*
  - **Location: TBD**
  - **Date: December 2015**
  - **Purpose:**
    - Final Economic Planning Study Results
    - Regional Transmission Plan
    - Regional Analyses
    - Assumptions Input Session

Questions?

www.southeasternrtp.com