

## SERTP – 3<sup>rd</sup> Quarter Meeting

### *2nd RPSG Meeting*

September 26<sup>th</sup>, 2019

Web Conference

## Process Information

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- 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.
- SERTP Website Address:
  - [www.southeasternrtp.com](http://www.southeasternrtp.com)

## Purposes & Goals of Meeting

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

# Economic Planning Studies

SERTP Preliminary

Economic Planning Studies

## Economic Planning Studies Process

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- Economic Planning Studies were chosen by the Regional Planning Stakeholder Group “RPSG” in March at the 2019 SERTP 1<sup>st</sup> Quarter Meeting.
- Key study criteria, methodologies, and input assumptions were finalized in May.
- 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

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- **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

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- **Southern BAA to Santee Cooper Border**
  - 500 MW (2020 Summer Peak)
- **Duke Energy Carolinas to Santee Cooper Border**
  - 500 MW (2020 Summer Peak)
- **Southern BAA to Santee Cooper Border**
  - 800 MW (2020 Summer Peak)
- **Duke Energy Carolinas to Santee Cooper Border**
  - 500 MW (2024 Winter Peak)
- **Southern BAA to Santee Cooper Border**
  - 1000 MW (2024 Winter Peak)

## Power Flow Cases Utilized

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- **Study Years:**
  - 2020 and 2024
  
- **Load Flow Cases:**
  - 2019 Series Version 2 SERTP Regional Models
  - Summer Peak and Winter Peak



## Preliminary Report Components

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- **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 potential transmission enhancement(s)

## Process Information

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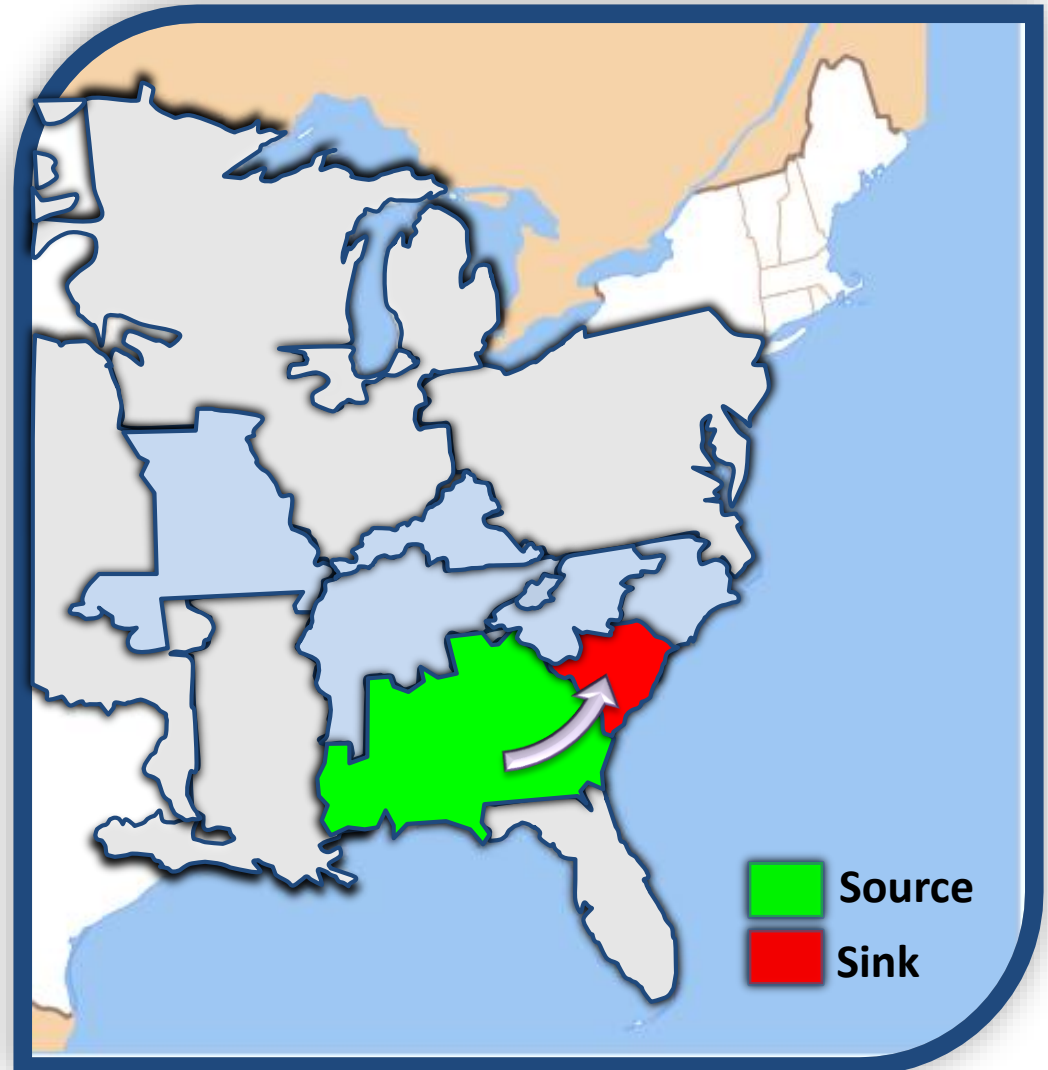
- The following information depicts potential enhancements for the proposed transfer levels above and beyond existing, firm commitments. Therefore, this information does not represent a commitment to proceed with the recommended enhancements nor implies that the recommended enhancements could be implemented by the study dates (2020 or 2024).
- 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 – Preliminary Results

**Southern BAA to Santee Cooper Border  
500 MW**

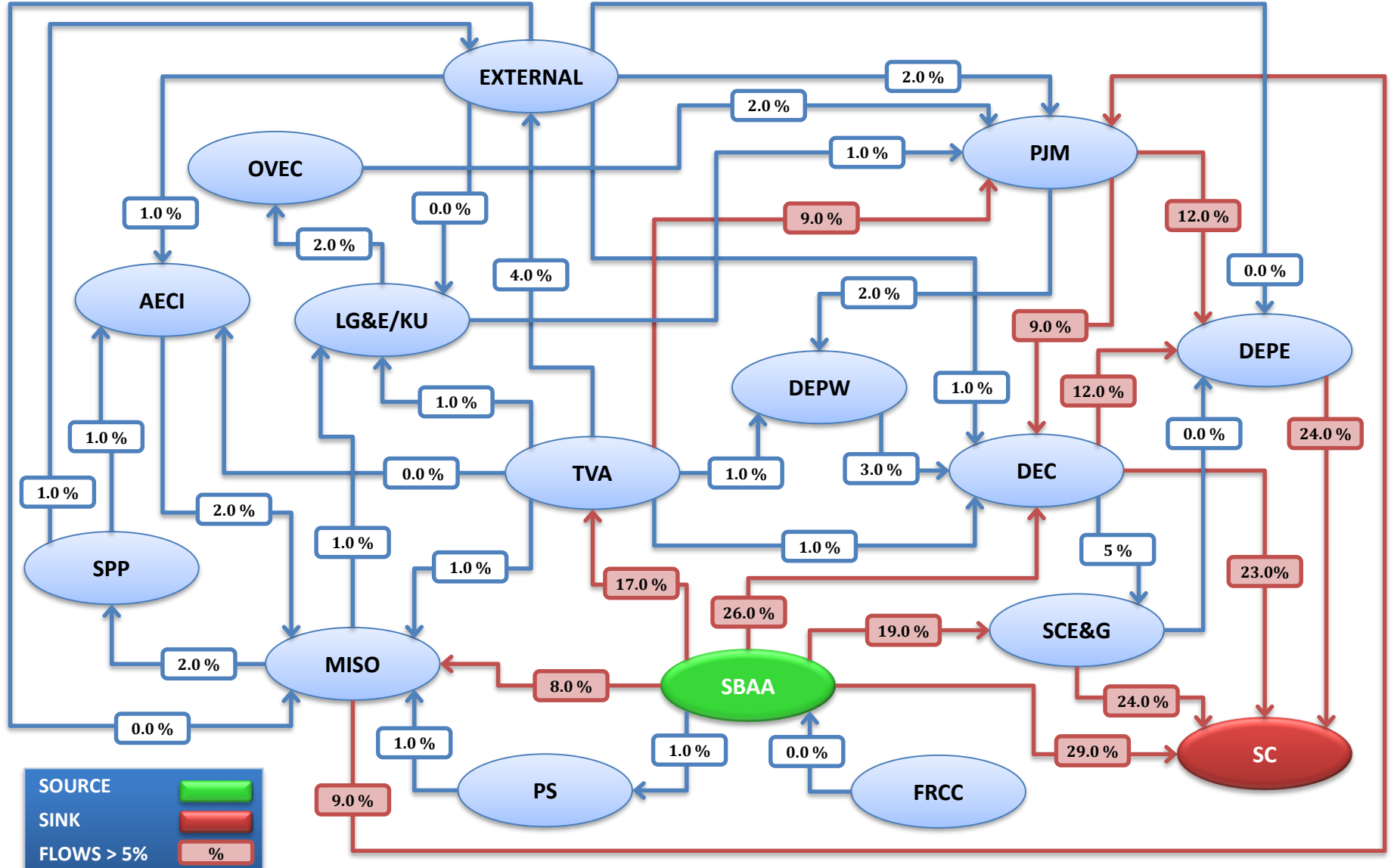
## Study Assumptions

- **Source**: Generation within Southern BAA
- **Sink**: Uniform generation scale within Santee Cooper
- **Transfer Type**: Generation to Generation
- **Year**: 2020
- **Load Level**: Summer Peak



# Southern BAA to Santee Cooper – 500 MW

Transfer Flow Diagram (% of Total Transfer)



## Transmission System Impacts

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- **Transmission System Impacts Identified:**
  - Significant constraints were identified in the following SERTP Balancing Authority Areas:
    - DEC
- **Potential Transmission Enhancements Identified:**
  - (DEC) Two (2) 100kV Transmission Line Upgrades

**SERTP TOTAL (\$2019) = \$11,000,000**

## Significant Constraints Identified – *DEC*

Table 1: Significant Constraints - DEC

Potential Enhancement	Limiting Element	Rating (MVA)	Thermal Loadings (%)	
			Without Request	With Request
P1	Bush River Tie – Saluda Hydro 100kV T.L.	79	101.5	107.4
P2	Laurens Tie – Bush River Tie 100kV T.L.	65	93.9	100.1

## Potential Enhancements Identified – DEC

Table 2: Potential Enhancements - DEC

Item	Potential Enhancement	Planning Level Cost Estimate
P1	<p><b>Bush River Tie – Saluda Hydro 100kV double circuit T.L.</b></p> <ul style="list-style-type: none"> <li>Rebuild the 2.7 miles of Bush River Tie – Saluda Hydro 100kV double circuit transmission line with 954 ACSR conductors rated to 120°C</li> </ul>	<b>\$4,900,000</b>
P2	<p><b>Laurens Tie – Bush River Tie 100kV double circuit T.L.</b></p> <ul style="list-style-type: none"> <li>Rebuild approximately 2.8 miles of Laurens Tie – Bush River Tie 100kV double circuit transmission line with 954 ACSR conductors rated to 120°C.</li> </ul>	<b>\$5,100,000</b>
<b>DEC TOTAL (\$2019)</b>		<b>\$ 11,000,000<sup>(1)</sup></b>

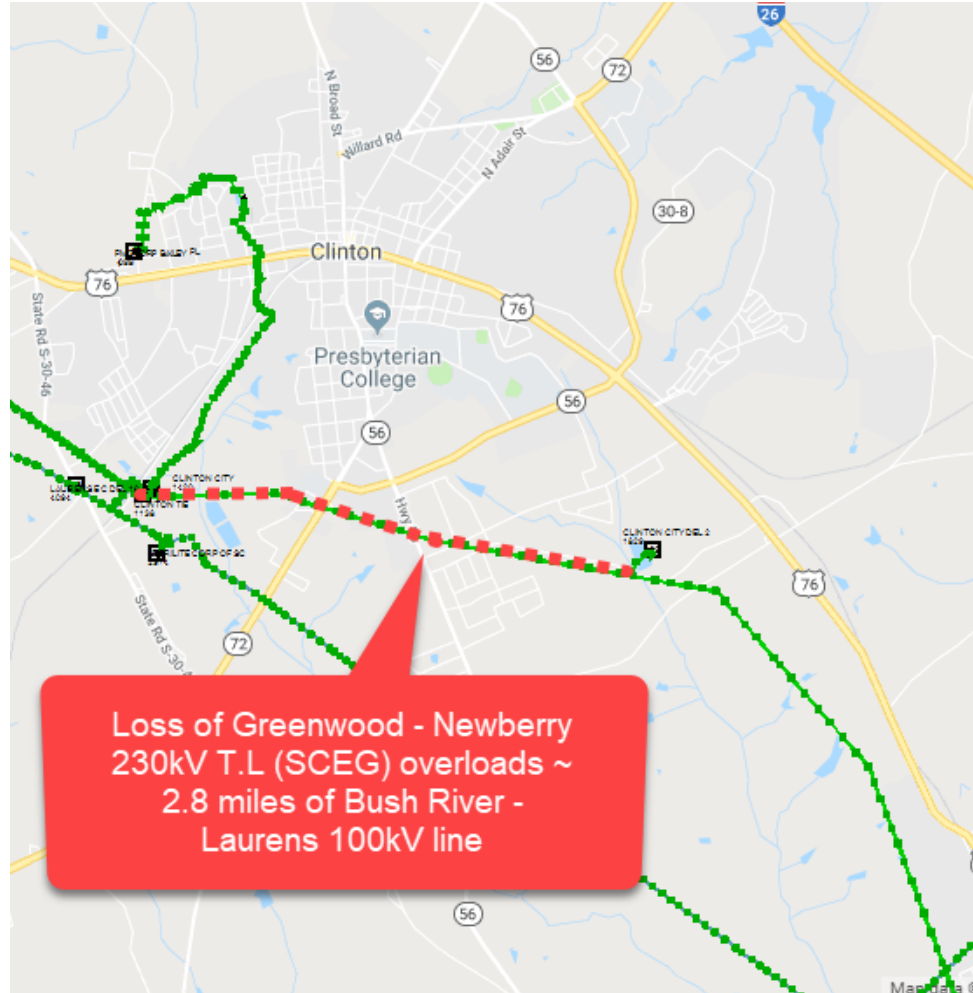
(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer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



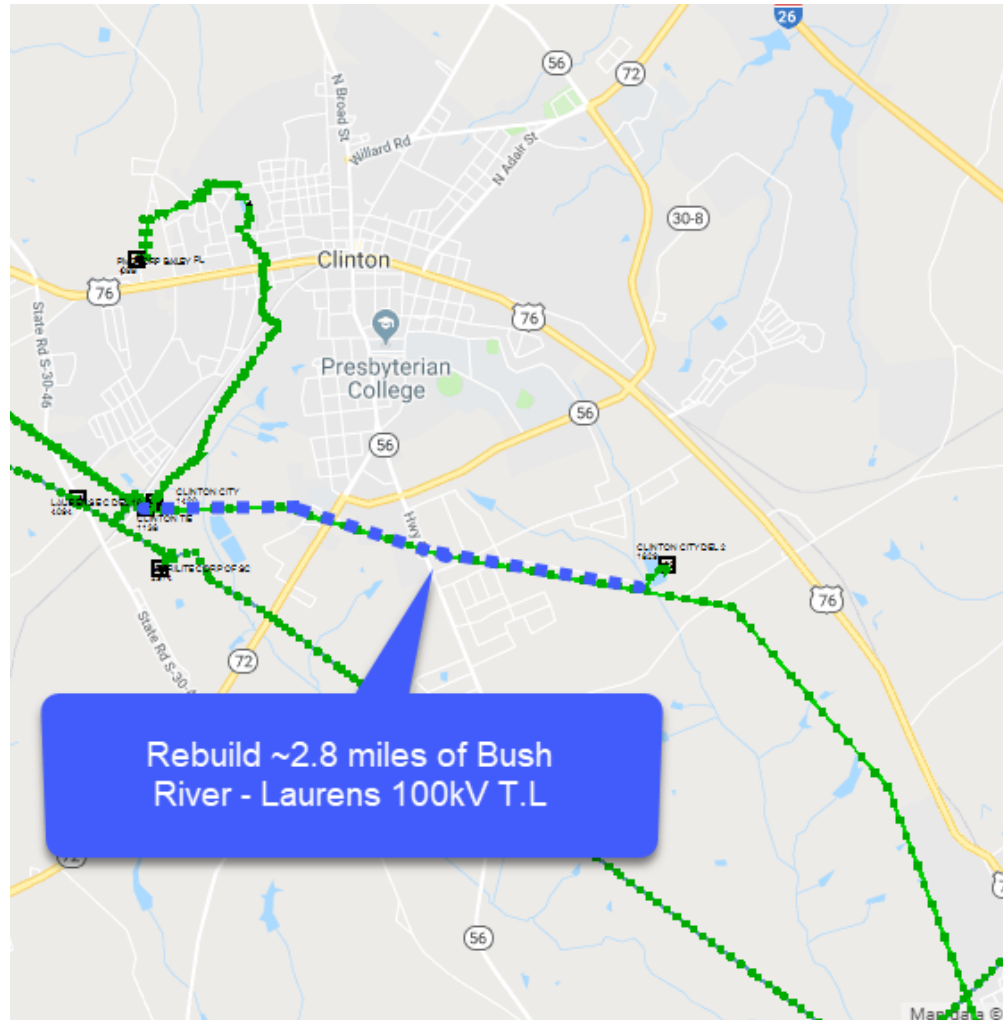
## Potential Enhancement Locations – *DEC*



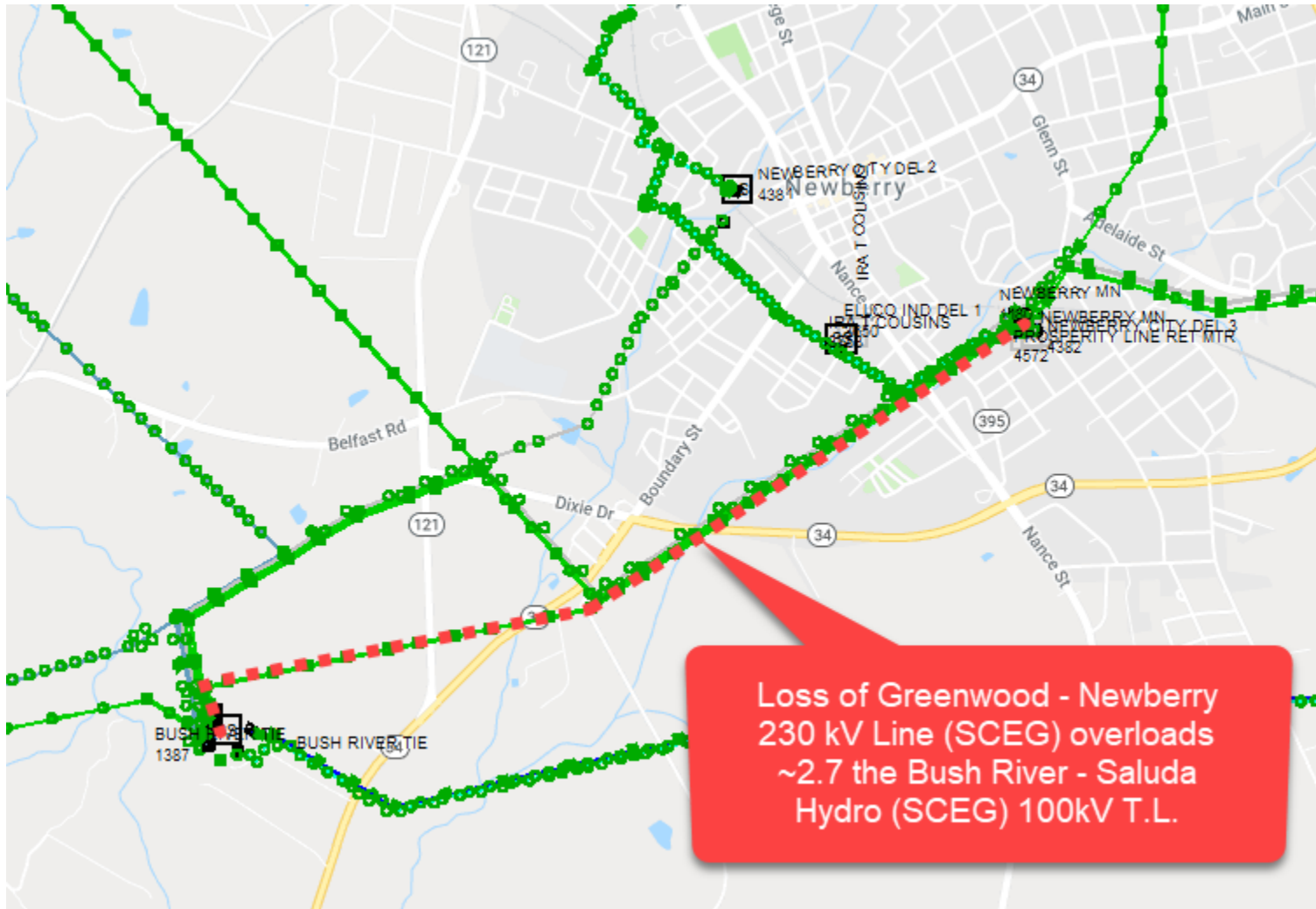
## Significant Constraint (P1) – *DEC*



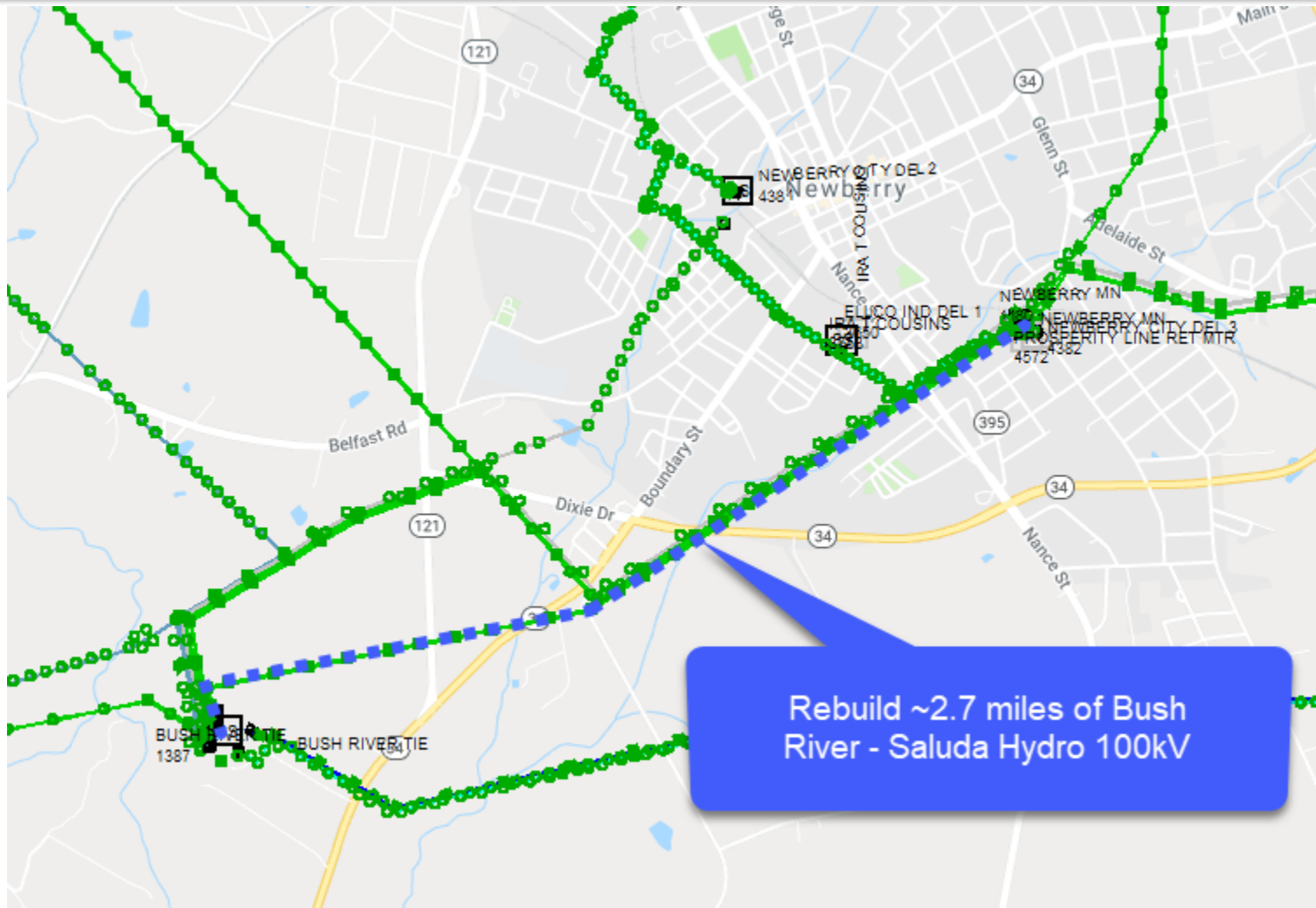
## Potential Enhancement (P1) – DEC



## Significant Constraint (P2) – DEC



## Potential Enhancement (P2) – DEC



## Transmission System Impacts – SERTP

Table 3: Transmission System Impacts - SERTP

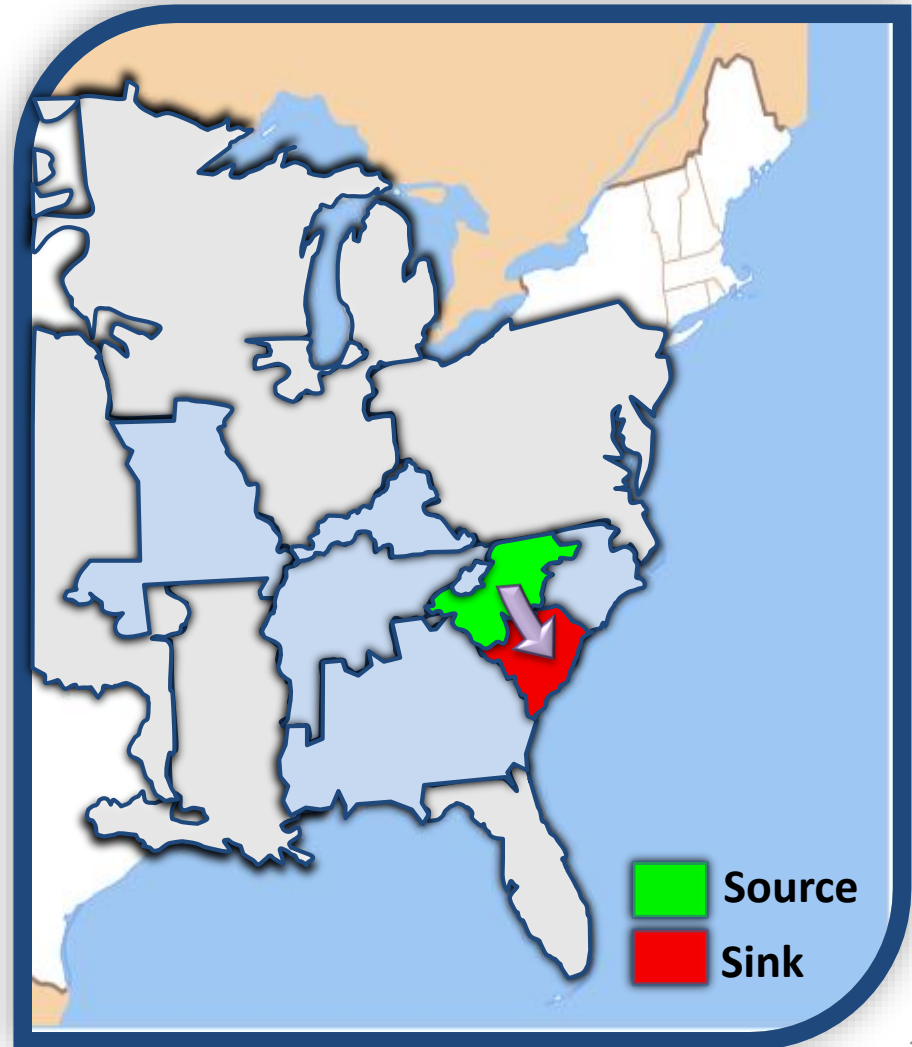
Balancing Authority	Planning Level Cost Estimate
Associated Electric Cooperative (AECI)	\$0
Duke Carolinas (DEC)	\$11,000,000
Duke Progress East (DEPE)	\$0
Duke Progress West (DEPW)	\$0
Louisville Gas & Electric and Kentucky Utilities (LG&E/KU)	\$0
PowerSouth (PS)	\$0
Southern (SBAA)	\$0
Tennessee Valley Authority (TVA)	\$0
<b>SERTP TOTAL (\$2019)</b>	<b>\$11,000,000</b>

## Economic Planning Studies – Preliminary Results

Duke Energy Carolinas to Santee  
Cooper Border  
500 MW

## Study Assumptions

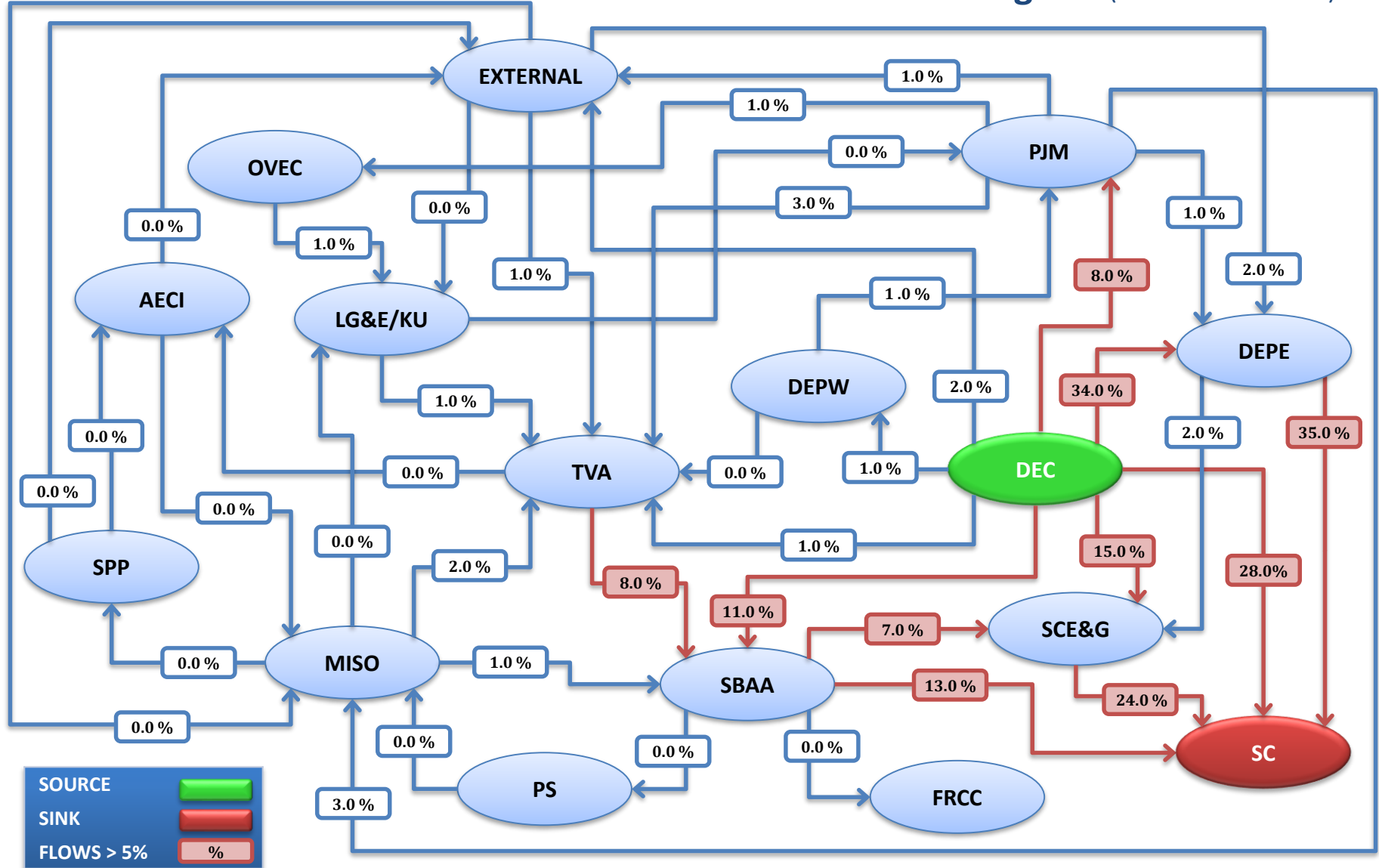
- **Source**: Generation within Duke Energy Carolinas
- **Sink**: Uniform generation scale within Santee Cooper
- **Transfer Type**: Generation to Generation
- **Year**: 2020
- **Load Level**: Summer Peak





# Duke Energy to Santee Cooper – 500 MW

### Transfer Flow Diagram (% of Total Transfer)



## Transmission System Impacts – *SERTP*

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- **Transmission System Impacts Identified:**
  - Significant constraints were identified in the following SERTP Balancing Authority Areas:
    - *DEC*
- **Potential Transmission Enhancements Identified:**
  - (DEC) Two (2) 100kV Transmission Line Upgrades

**SERTP Total (\$2019) = \$11,000,000**

## Significant Constraints Identified – *DEC*

Table 4: Significant Constraints - DEC

Potential Enhancement	Limiting Element	Rating (MVA)	Thermal Loadings (%)	
			Without Request	With Request
P1	Bush River Tie – Saluda Hydro 100kV T.L.	79	101.5	108
P2	Laurens Tie – Bush River Tie 100kV T.L.	65	93.9	100.2

## Potential Enhancements Identified – DEC

Table 5: Potential Enhancements - DEC

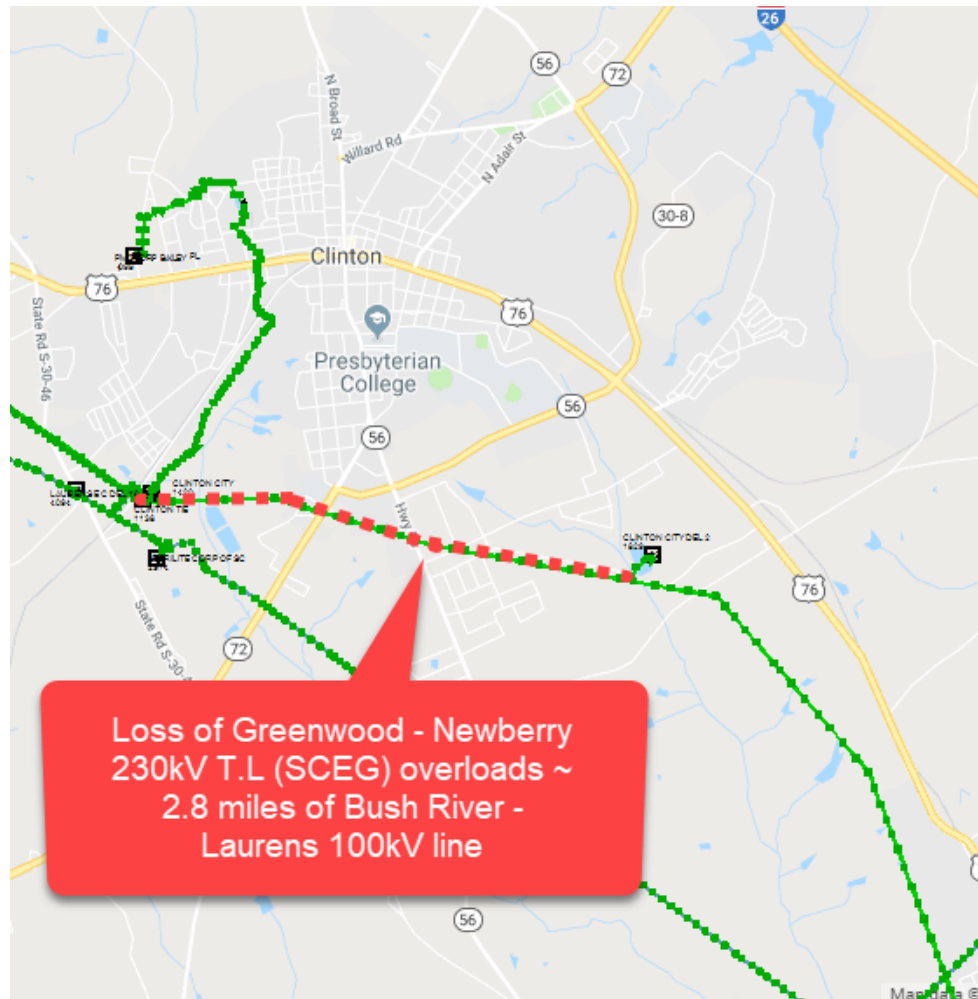
Item	Potential Enhancement	Planning Level Cost Estimate
P1	<p><b>Bush River Tie – Saluda Hydro 100kV double circuit T.L.</b></p> <ul style="list-style-type: none"> <li>Rebuild the 2.7 miles of Bush River Tie – Saluda Hydro 100kV double circuit transmission line with 954 ACSR conductors rated to 120°C</li> </ul>	\$4,900,000
P2	<p><b>Laurens Tie – Bush River Tie 100kV double circuit T.L.</b></p> <ul style="list-style-type: none"> <li>Rebuild approximately 2.8 miles of Laurens Tie – Bush River Tie 100kV double circuit transmission line with 954 ACSR conductors rated to 120°C.</li> </ul>	\$5,100,000
<b>DEC TOTAL (\$2019)</b>		<b>\$ 11,000,000<sup>(1)</sup></b>

(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.

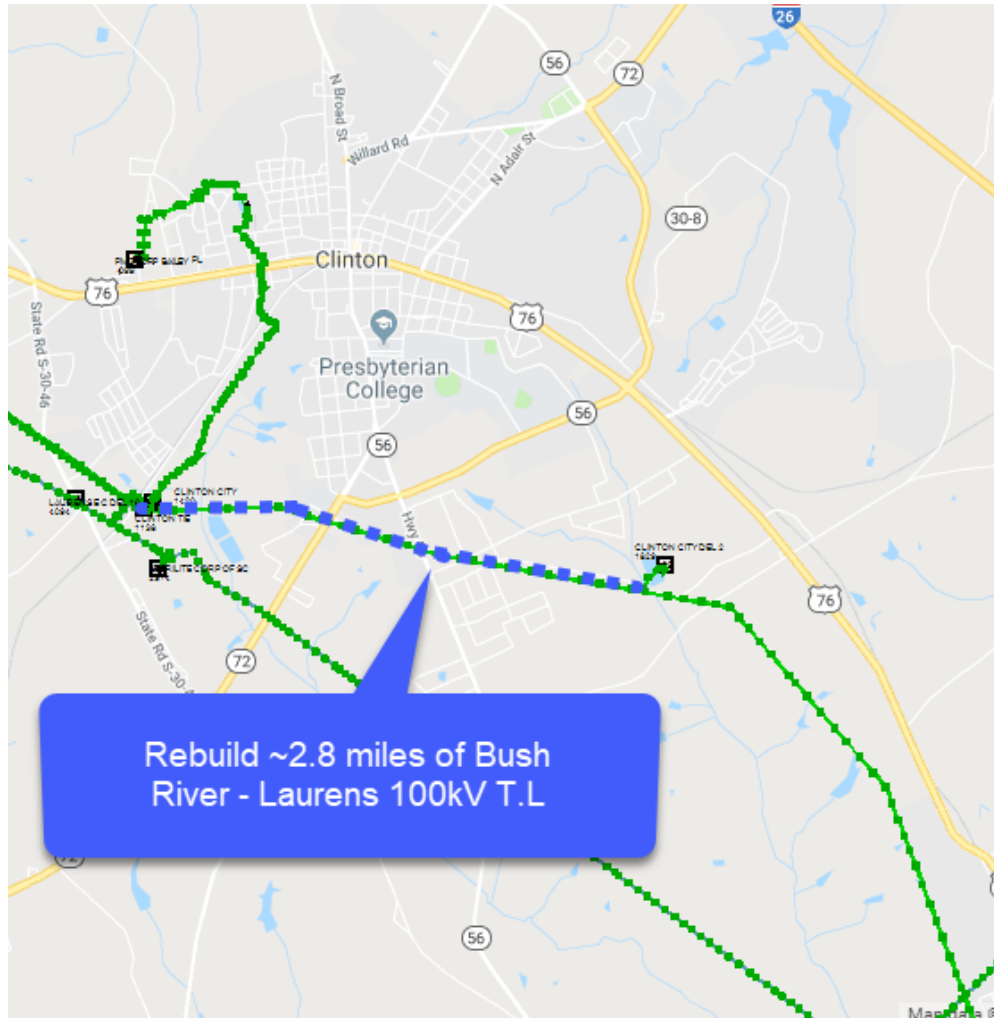
## Potential Enhancement Locations – *DEC*



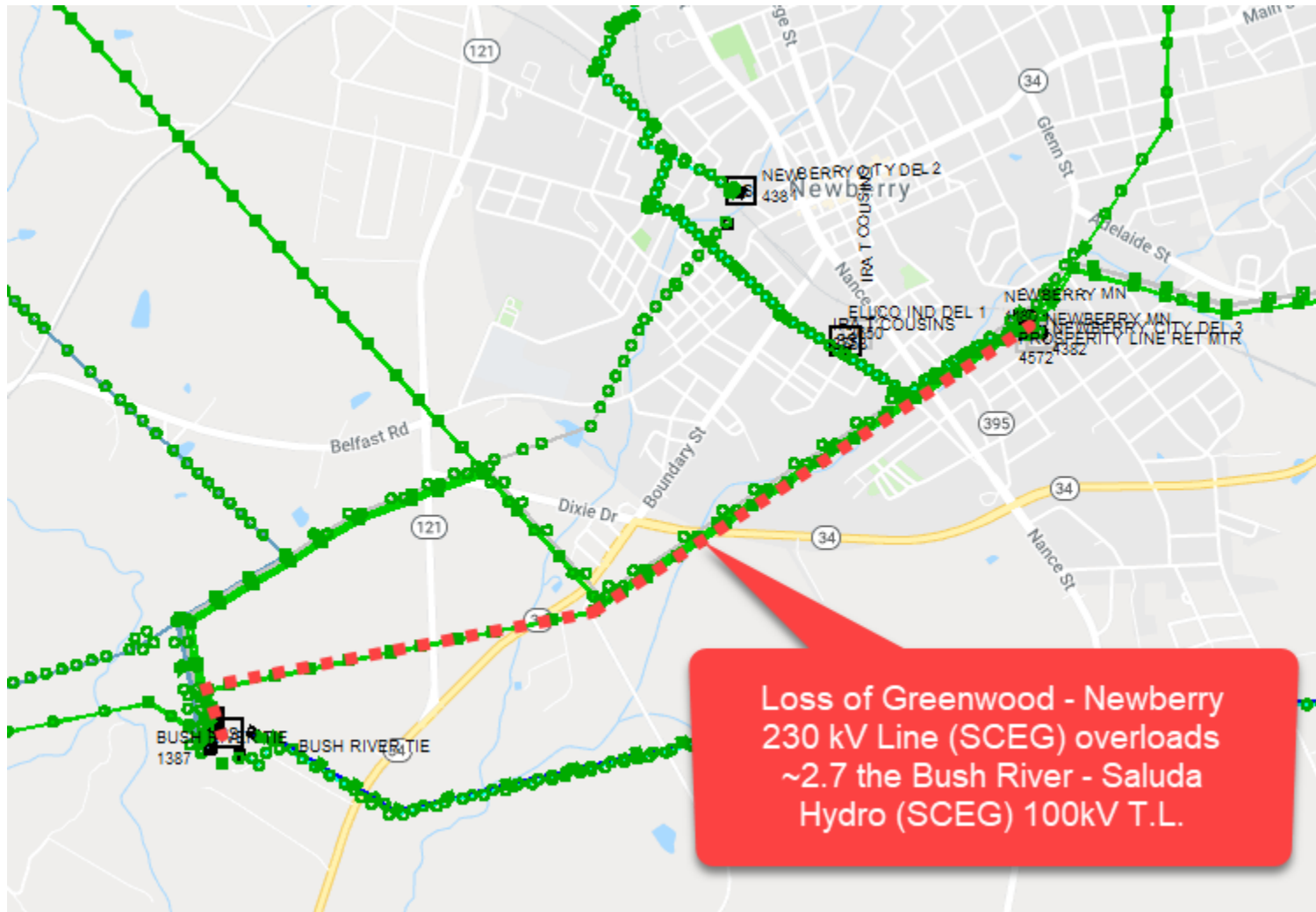
## Significant Constraint (P1) – *DEC*



## Potential Enhancement (P1) – DEC

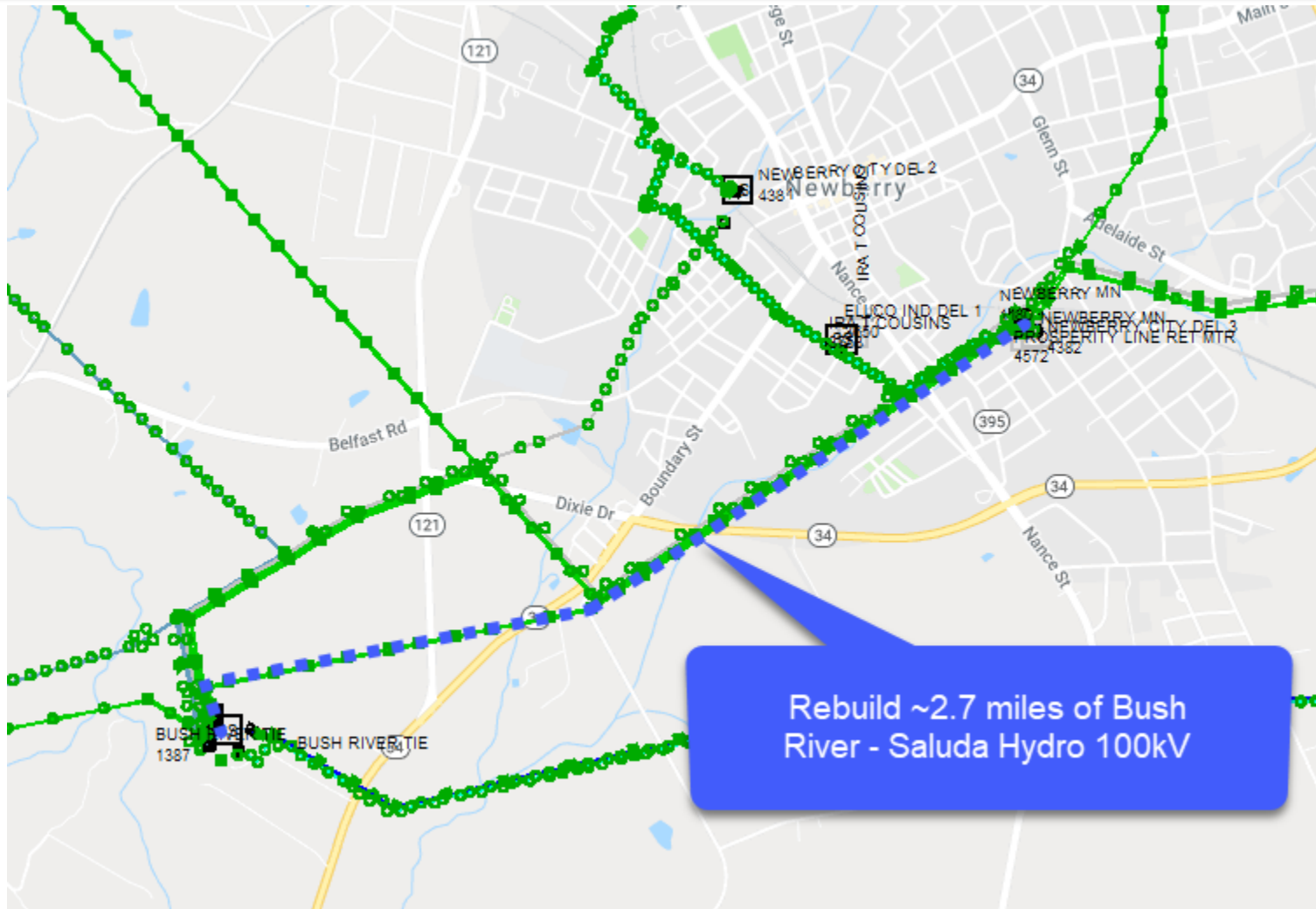


## Significant Constraint (P2) – DEC





## Potential Enhancement (P2) – DEC



## Transmission System Impacts – SERTP

Table 6: Transmission System Impacts - SERTP

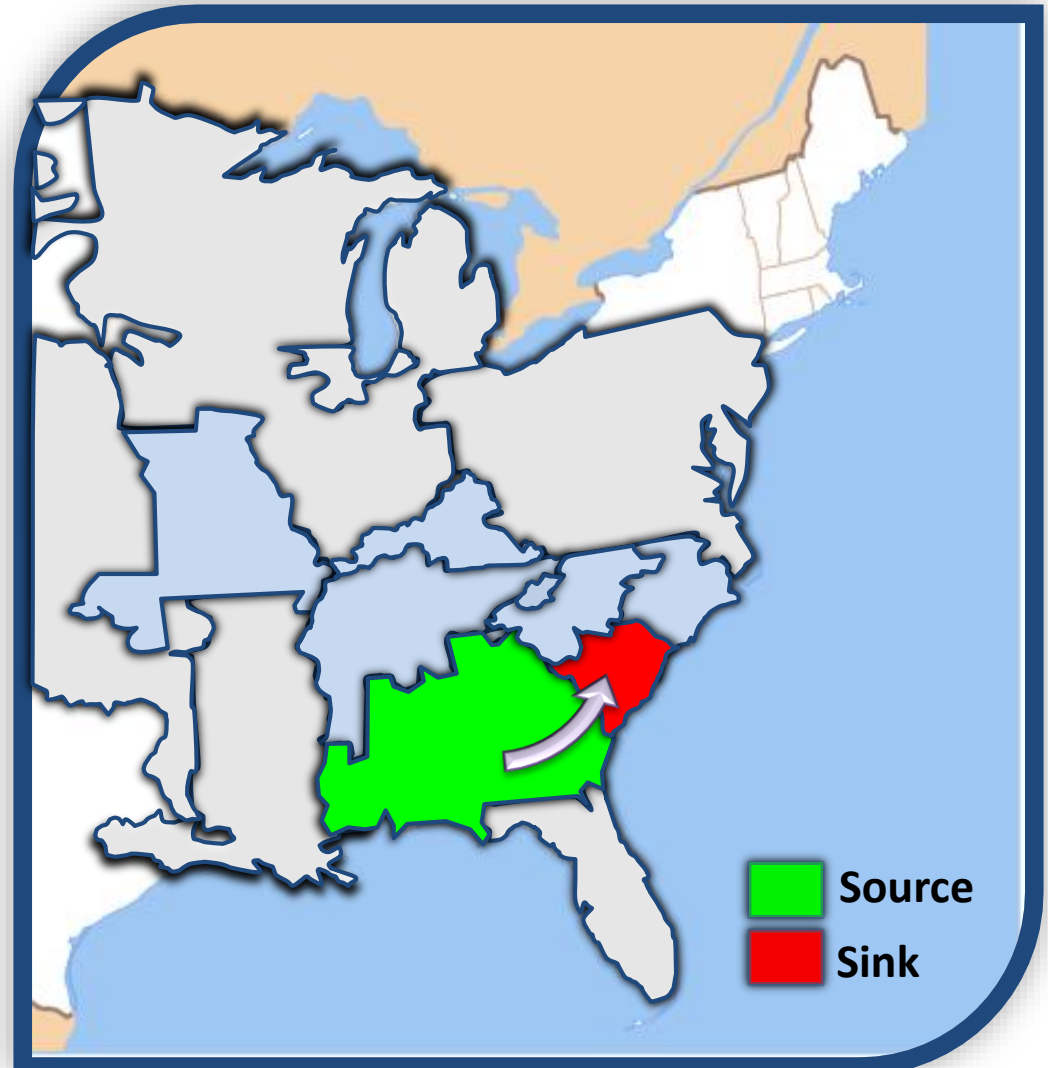
Balancing Authority	Planning Level Cost Estimate
Associated Electric Cooperative (AECI)	\$0
Duke Carolinas (DEC)	\$11,000,000
Duke Progress East (DEPE)	\$0
Duke Progress West (DEPW)	\$0
Louisville Gas & Electric and Kentucky Utilities (LG&E/KU)	\$0
PowerSouth (PS)	\$0
Southern (SBAA)	\$0
Tennessee Valley Authority (TVA)	\$0
<b>SERTP TOTAL (\$2019)</b>	<b>\$11,000,000</b>

## Economic Planning Studies – Preliminary Results

**Southern BAA to Santee Cooper Border  
800 MW**

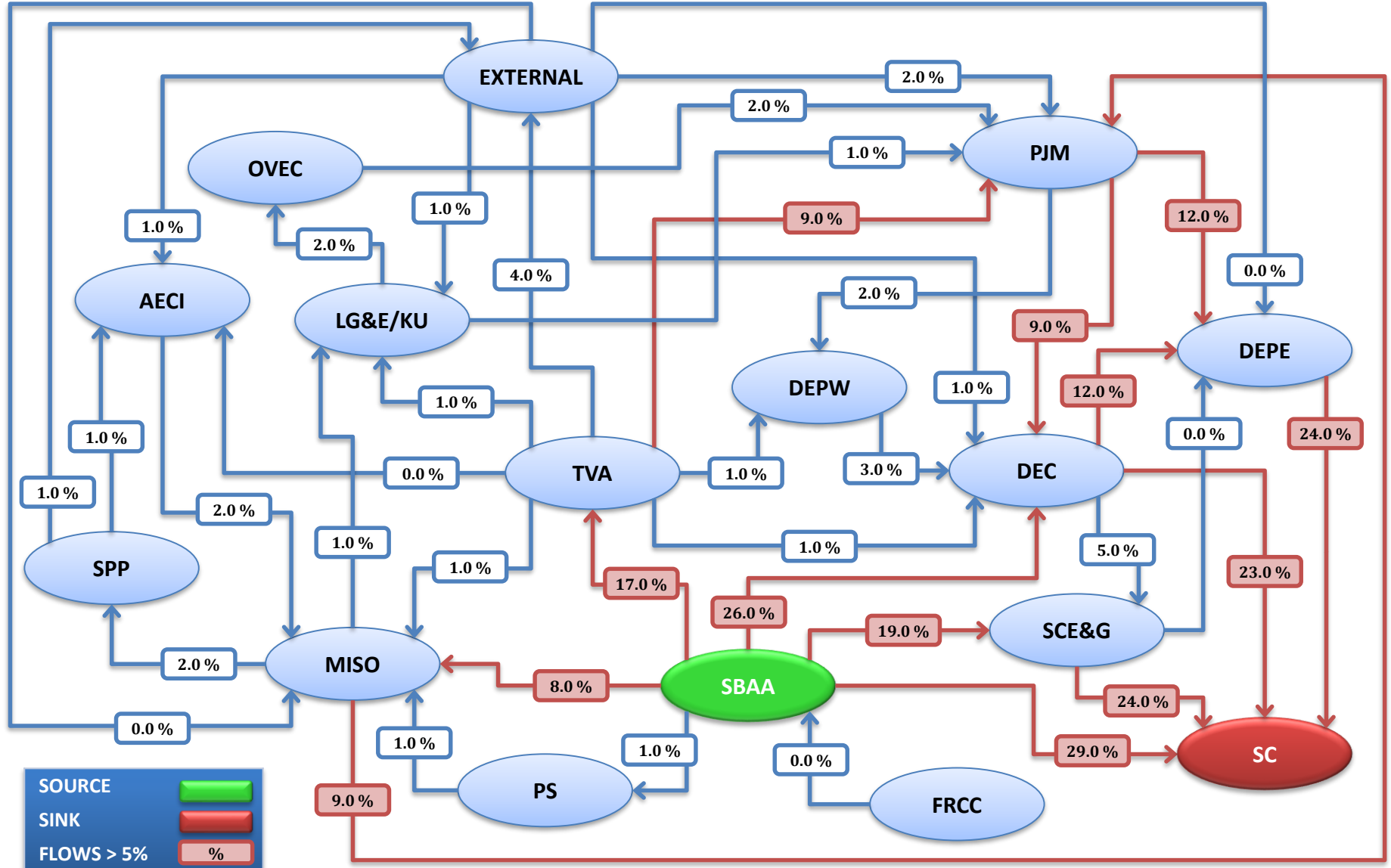
## Study Assumptions

- **Source**: Generation within Southern BAA
- **Sink**: Uniform generation scale within Santee Cooper
- **Transfer Type**: Generation to Generation
- **Year**: 2020
- **Load Level**: Summer Peak



# Southern BAA to Santee Cooper – 800 MW

Transfer Flow Diagram (% of Total Transfer)



## Transmission System Impacts – *SERTP*

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- **Transmission System Impacts Identified:**
  - Significant constraints were identified in the following SERTP Balancing Authority Areas:
    - *DEC*
    - *SBAA*
- **Potential Transmission Enhancements Identified:**
  - (DEC) Two (2) 100kV Transmission Line Upgrades
  - (SBAA) One (1) 115kV Transmission Line Rebuild

**SERTP Total (\$2019) = \$22,000,000**

## Significant Constraints Identified – *DEC*

Table 7: Significant Constraints - DEC

Potential Enhancement	Limiting Element	Rating (MVA)	Thermal Loadings (%)	
			Without Request	With Request
P1	Bush River Tie – Saluda Hydro 100kV T.L.	79	101.5	110.8
P2	Laurens Tie – Bush River Tie 100kV T.L.	65	93.9	103.1

## Potential Enhancements Identified – DEC

Table 8: Potential Enhancements - DEC

Item	Potential Enhancement	Planning Level Cost Estimate
P1	<p><b>Bush River Tie – Saluda Hydro 100kV double circuit T.L.</b></p> <ul style="list-style-type: none"> <li>Rebuild the 2.7 miles of Bush River Tie – Saluda Hydro 100kV double circuit transmission line with 954 ACSR conductors rated to 120°C</li> </ul>	\$4,900,000
P2	<p><b>Laurens Tie – Bush River Tie 100kV double circuit T.L.</b></p> <ul style="list-style-type: none"> <li>Rebuild approximately 2.8 miles of Laurens Tie – Bush River Tie 100kV double circuit transmission line with 954 ACSR conductors rated to 120°C.</li> </ul>	\$5,100,000
<b>DEC TOTAL (\$2019)</b>		<b>\$ 11,000,000<sup>(1)</sup></b>

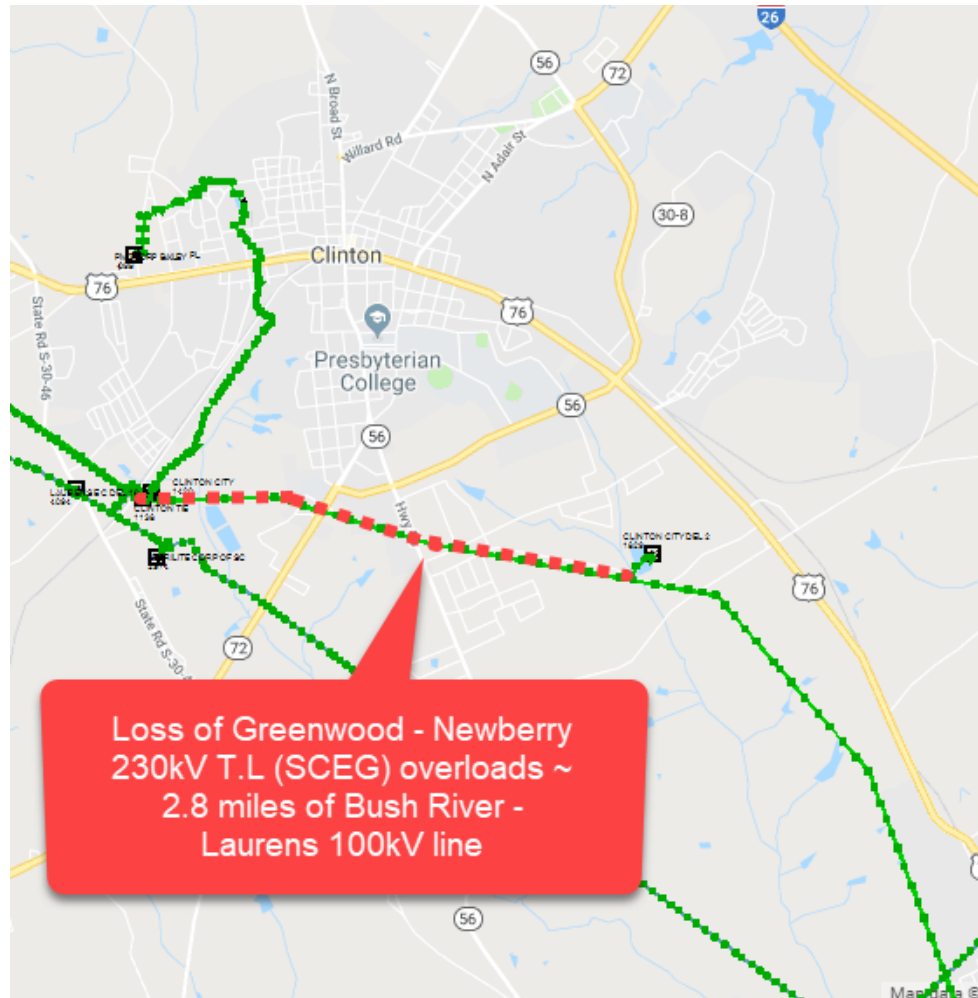
(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer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



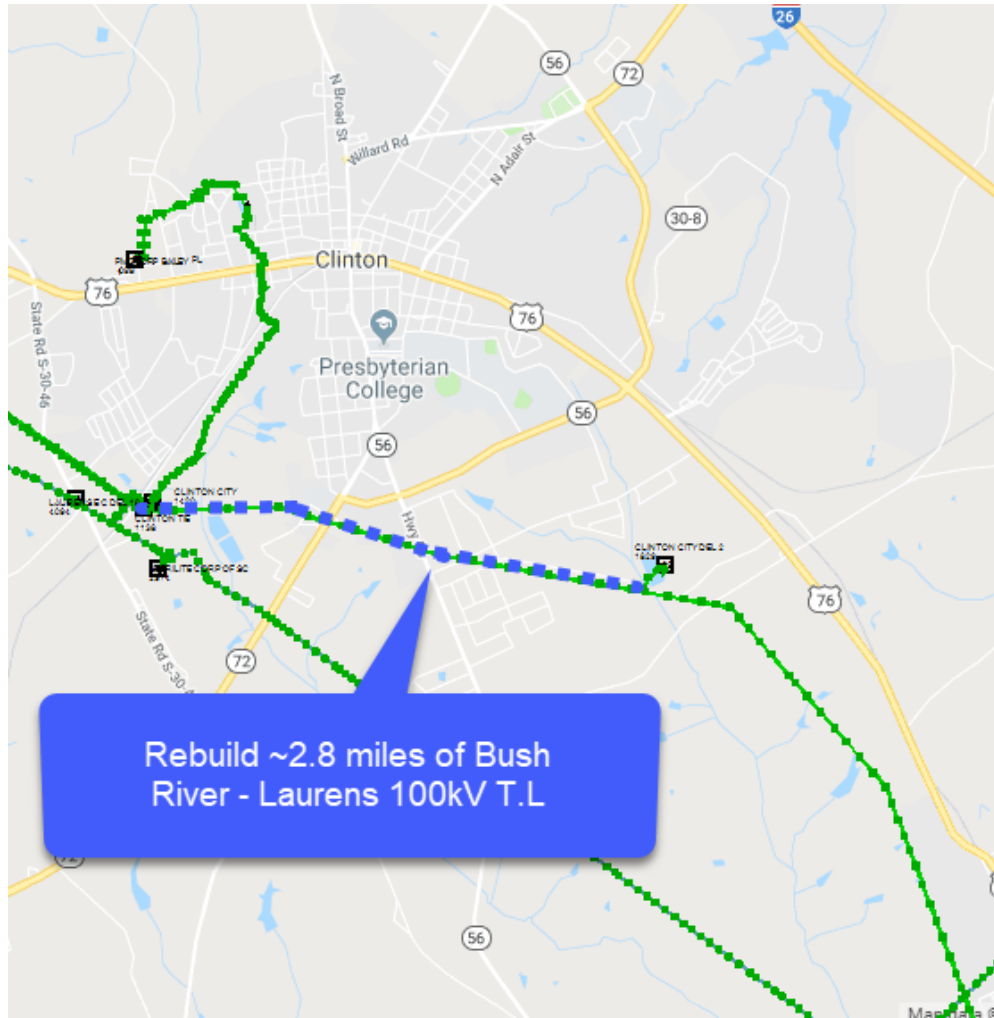
## Potential Enhancement Locations – *DEC*



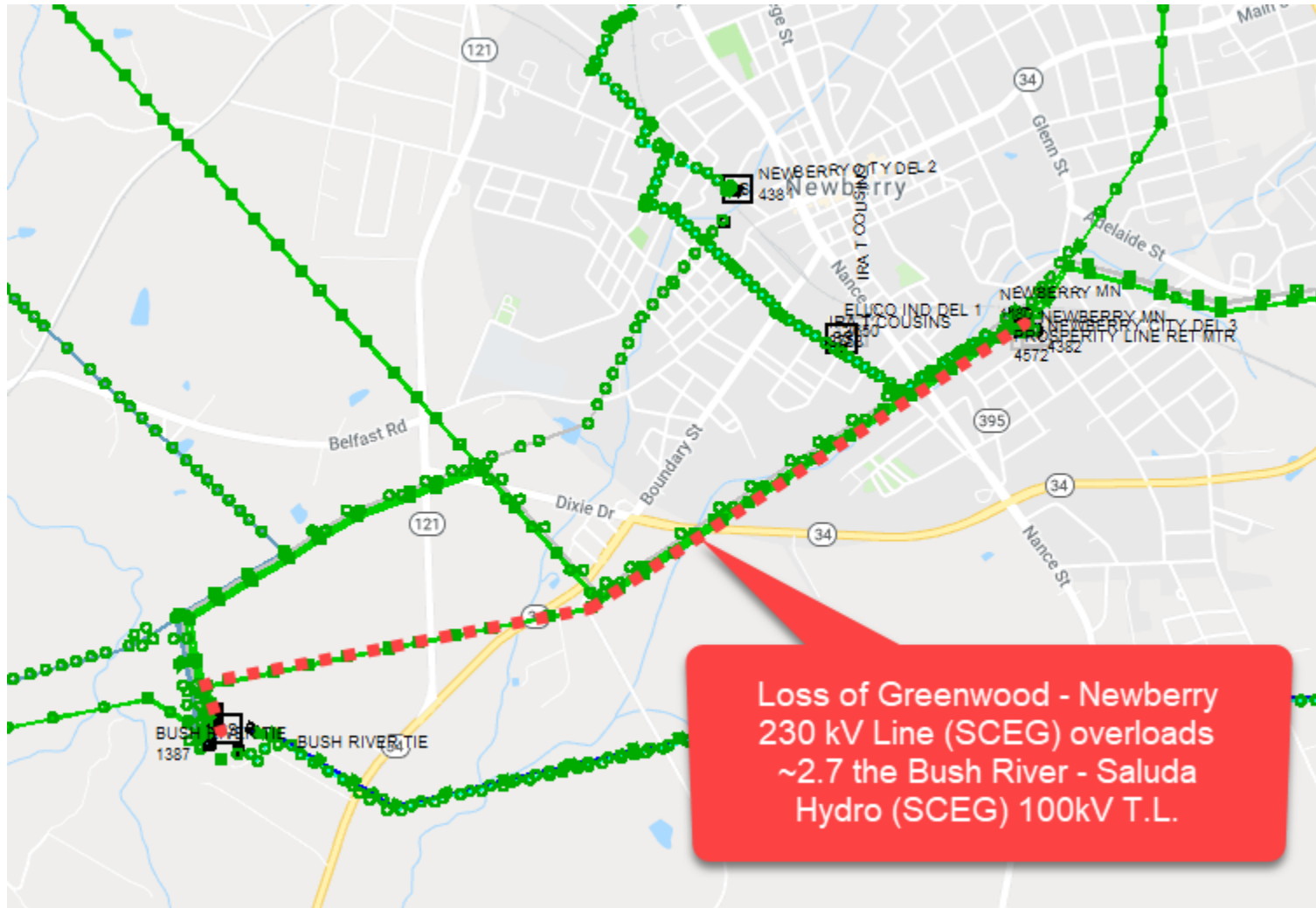
## Significant Constraint (P1) – *DEC*



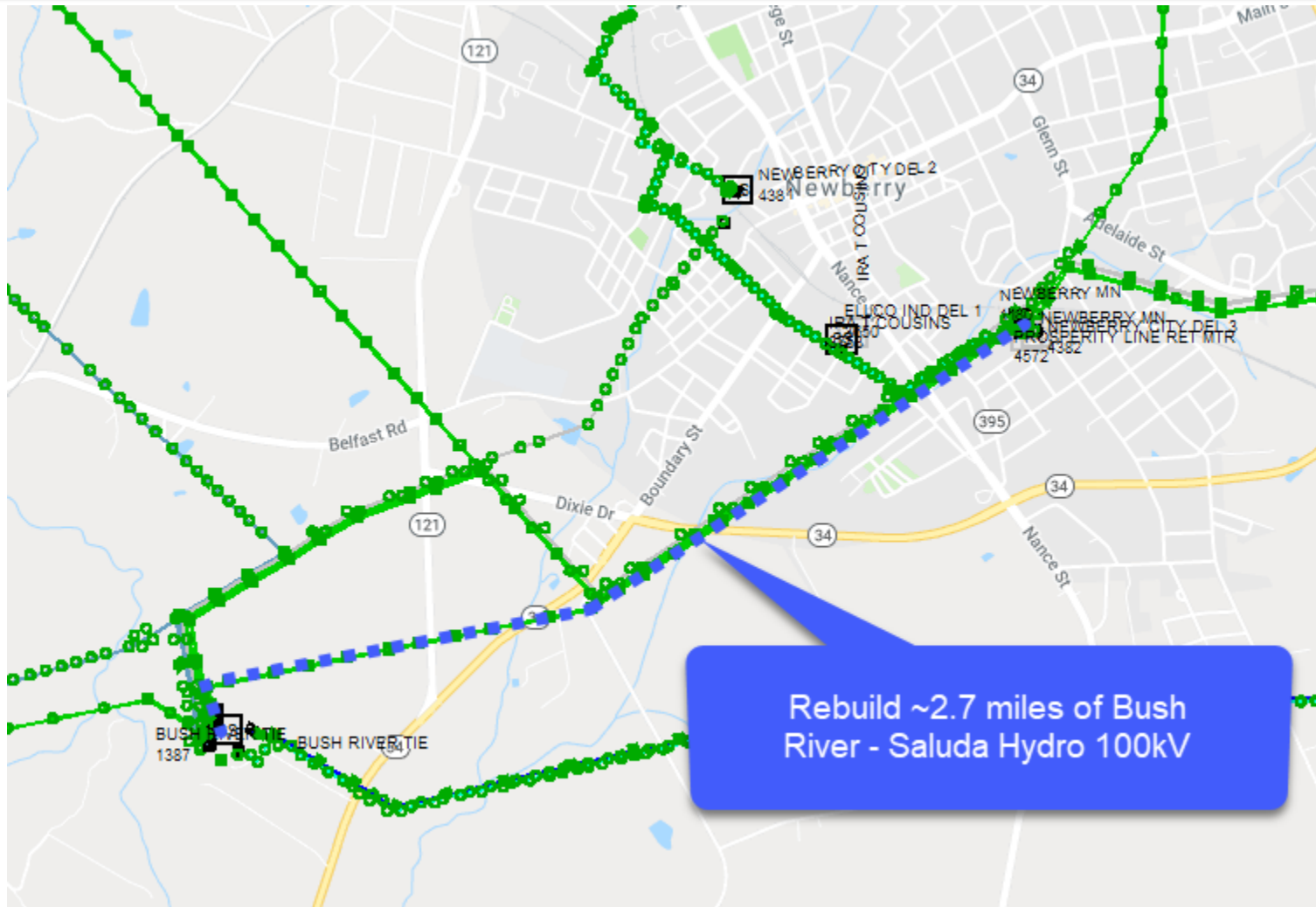
## Potential Enhancement (P1) – DEC



## Significant Constraint (P2) – DEC



## Potential Enhancement (P2) – DEC



## Significant Constraints Identified – SBAA

Table 9: Significant Constraints - SBAA

Potential Enhancement	Limiting Element	Rating (MVA)	Thermal Loadings (%)	
			Without Request	With Request
P1	Baxley – Pine Grove 115kV T.L.	114	99	104

## Potential Enhancements Identified – SBAA

Table 10: Potential Enhancements - SBAA

Item	Potential Enhancement	Planning Level Cost Estimate
P1	<p><b>Baxley – Hazelhurst 115kV Transmission Line Rebuild</b></p> <ul style="list-style-type: none"> <li>Rebuild approximately 11.2 miles of Baxley – Hazelhurst 115kV Transmission Line with 100°C 795 ACSR</li> </ul>	\$11,000,000
<b>SBAA TOTAL (\$2019)</b>		<b>\$ 11,000,000<sup>(1)</sup></b>

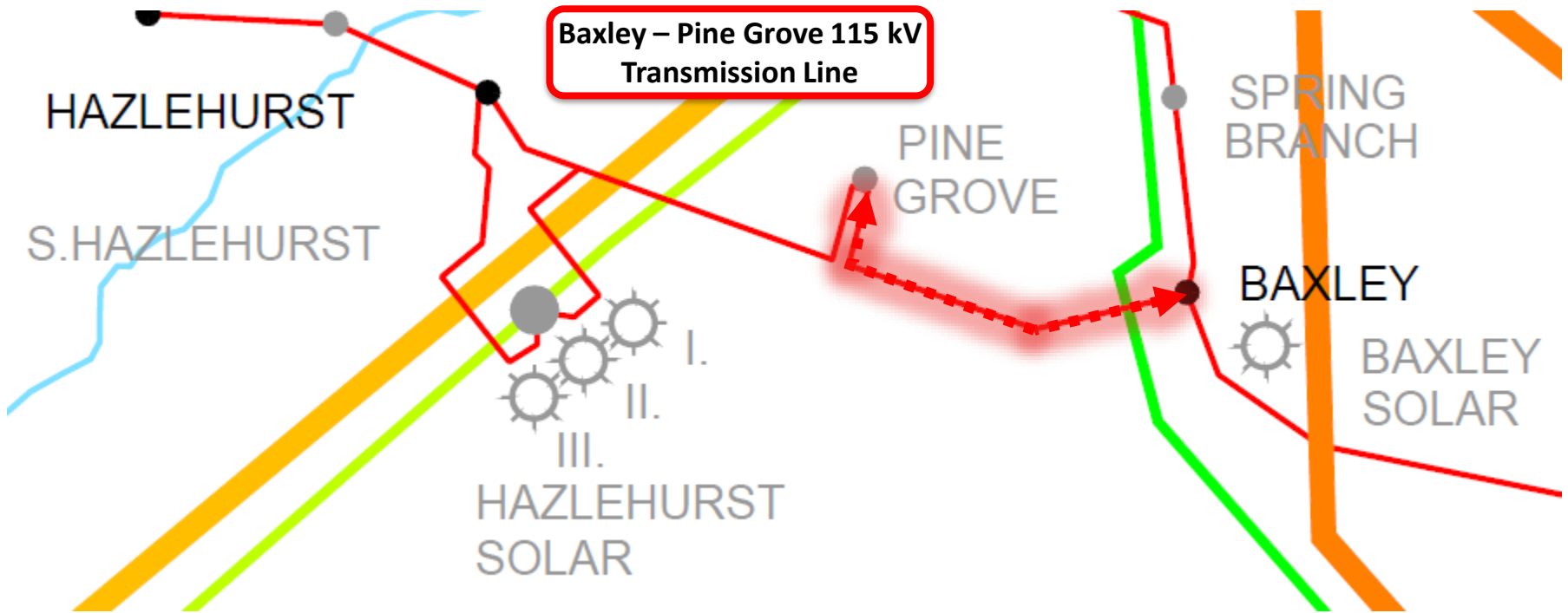
(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer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

## Potential Enhancement (P1) Location – SBAA

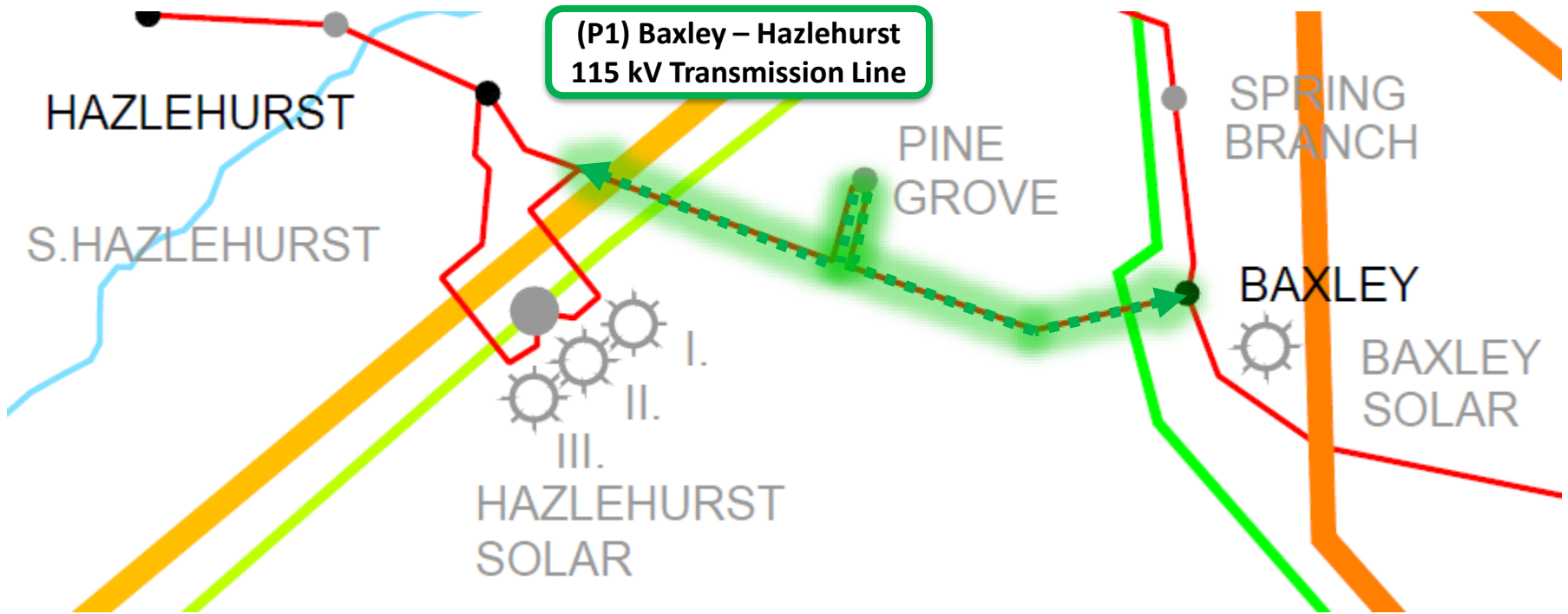




## Significant Constraint (P1) – SBAA



## Potential Enhancement (P1) – SBAA



## Transmission System Impacts – SERTP

Table 11: Transmission System Impacts - SERTP

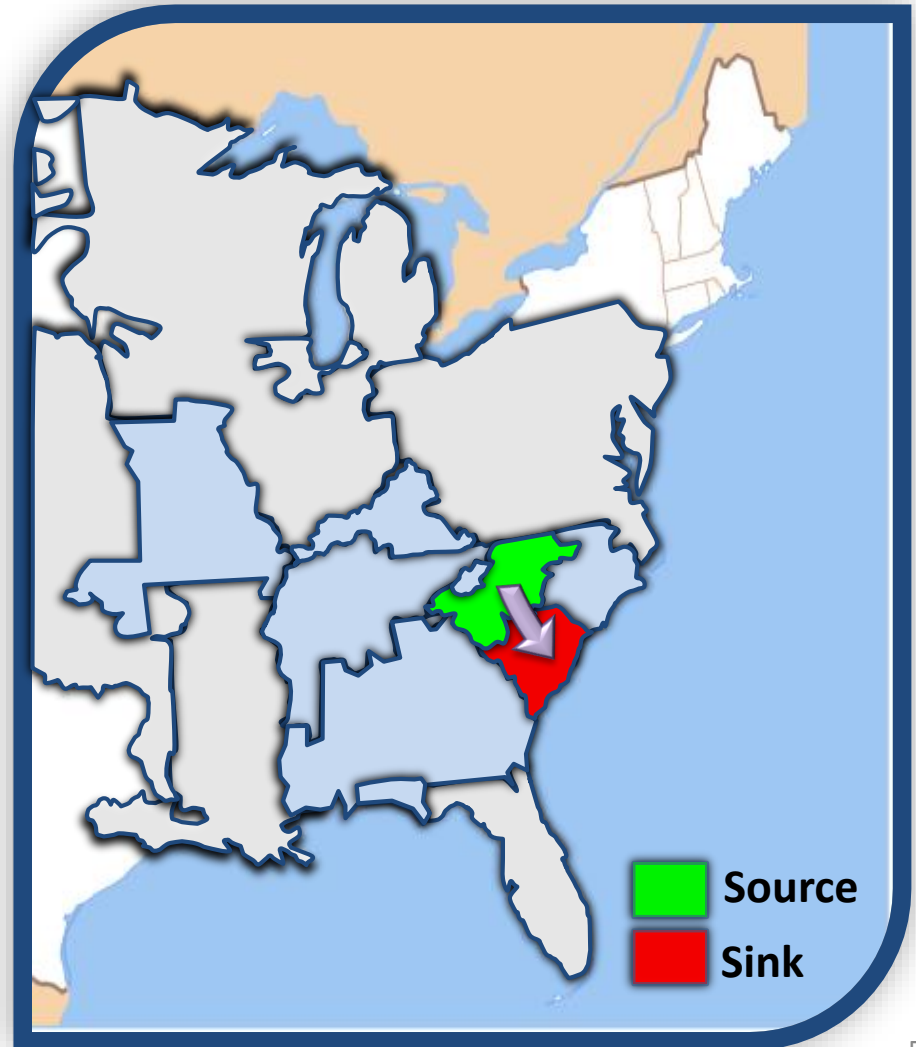
Balancing Authority	Planning Level Cost Estimate
Associated Electric Cooperative (AECI)	\$0
Duke Carolinas (DEC)	\$11,000,000
Duke Progress East (DEPE)	\$0
Duke Progress West (DEPW)	\$0
Louisville Gas & Electric and Kentucky Utilities (LG&E/KU)	\$0
PowerSouth (PS)	\$0
Southern (SBAA)	\$11,000,000
Tennessee Valley Authority (TVA)	\$0
<b>SERTP TOTAL (\$2019)</b>	<b>\$22,000,000</b>

## Economic Planning Studies – Preliminary Results

Duke Energy Carolinas to Santee  
Cooper Border  
500 MW

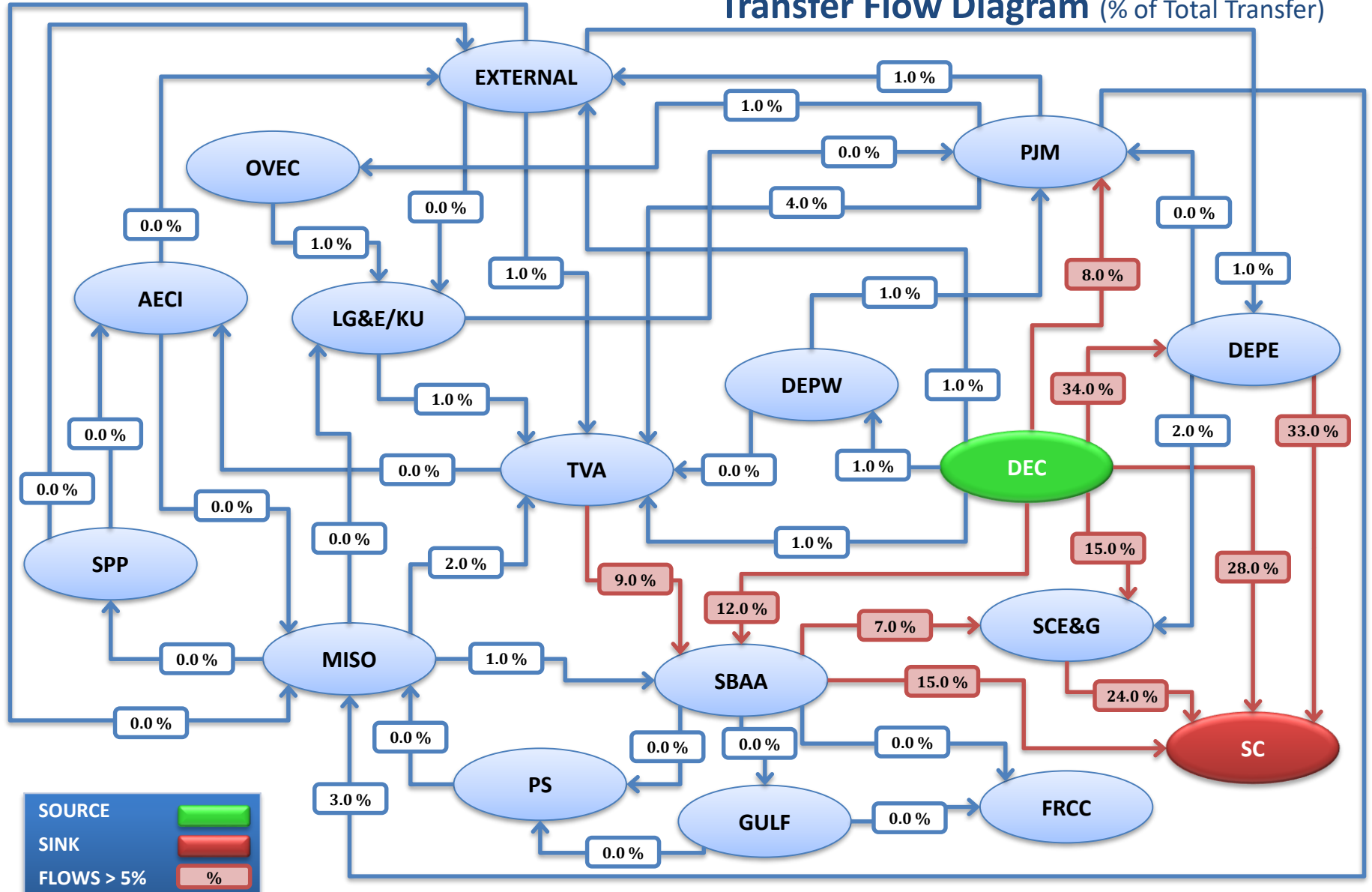
## Study Assumptions

- **Source**: Generation within Duke Energy Carolinas
- **Sink**: Uniform generation scale within Santee Cooper
- **Transfer Type**: Generation to Generation
- **Year**: 2024
- **Load Level**: Winter Peak



# Duke Energy to Santee Cooper – 500 MW

Transfer Flow Diagram (% of Total Transfer)



## Transmission System Impacts – *SERTP*

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- **Transmission System Impacts Identified:**
  - Significant constraints were identified in the following SERTP Balancing Authority Areas:
    - *DEPE*
- **Potential Transmission Enhancements Identified:**
  - (DEPE) One (1) Substation Upgrade

**SERTP Total (\$2019) = \$6,500,000**

## Significant Constraints Identified – *DEPE*

Table 12: Significant Constraints - DEPE

Potential Enhancement	Limiting Element	Rating (MVA)	Thermal Loadings (%)	
			Without Request	With Request
P1	Wateree 115/100kV Transformers	150	93	103



## Potential Enhancements Identified – *DEPE*

**Table 13: Potential Enhancements - DEPE**

Item	Potential Enhancement	Planning Level Cost Estimate
P1	<b>Wateree 115/100kV Transformers</b> <ul style="list-style-type: none"> <li>Replace existing 150 MVA 115/100kV transformer bank with 336 MVA 115/100kV transformer bank</li> </ul>	\$6,500,000
<b>DEPE TOTAL (\$2019)</b>		<b>\$6,500,000 <sup>(1)</sup></b>

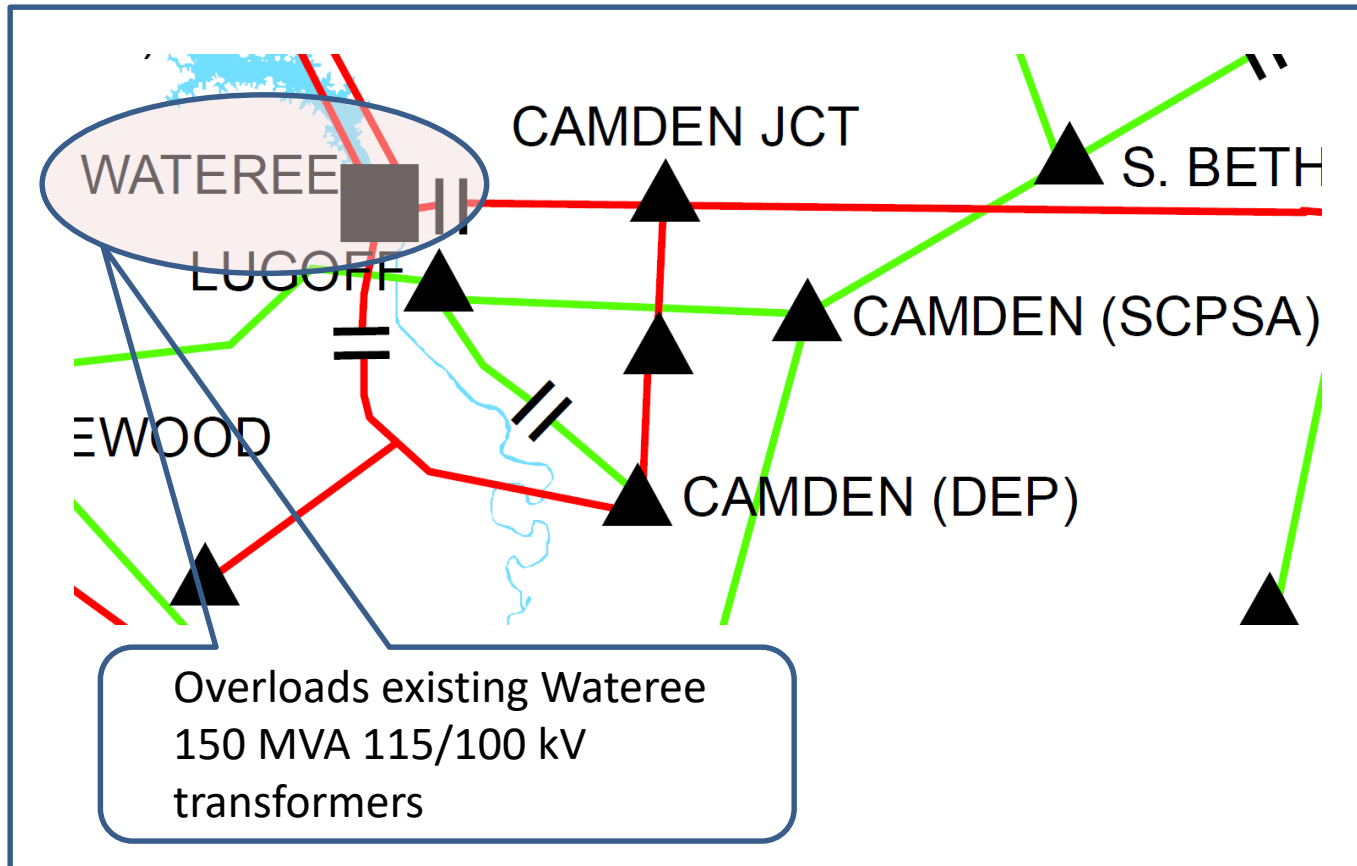
(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by winter of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer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

## Potential Enhancement Locations – *DEPE*

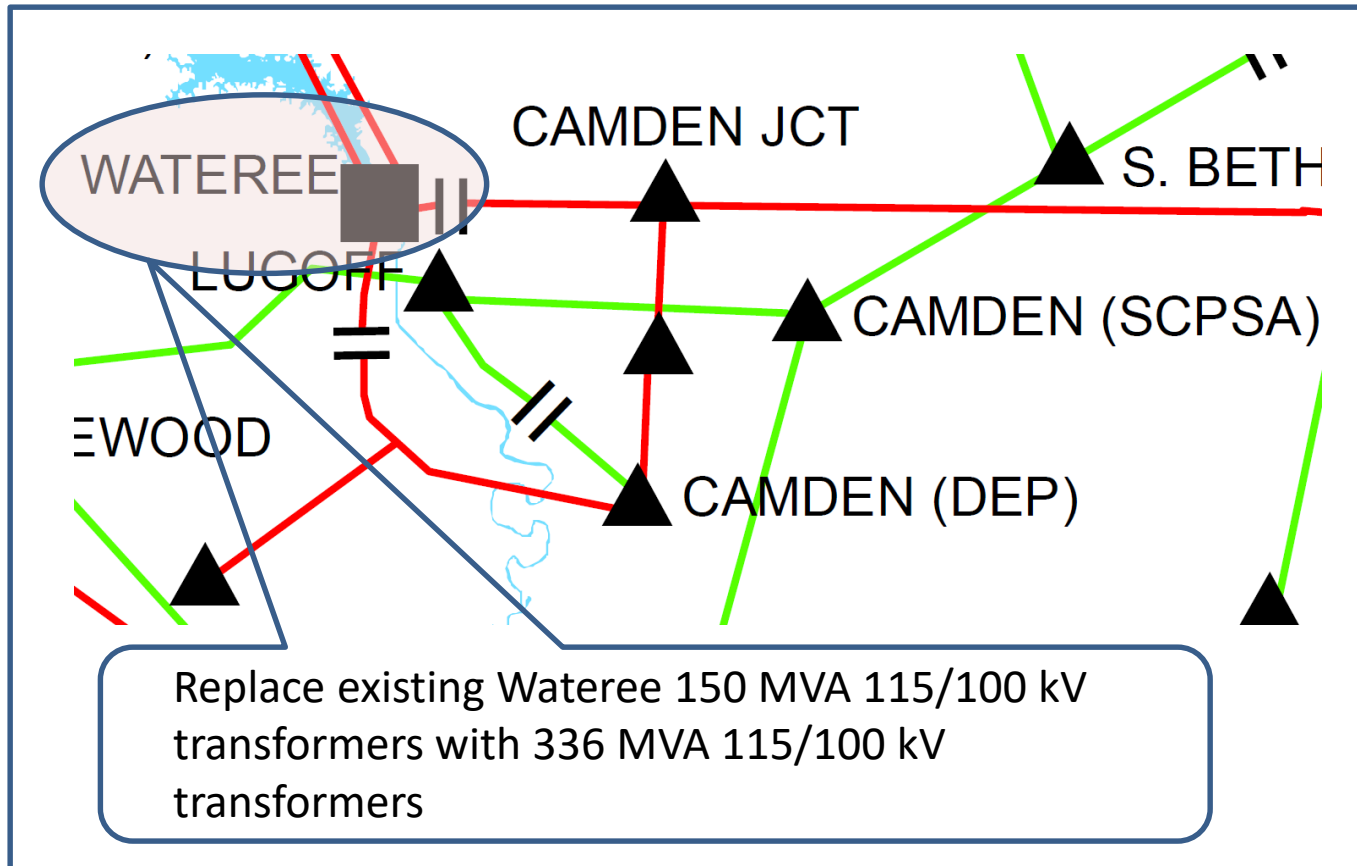
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## Significant Constraints (P1) – DEPE



## Potential Enhancement (P1) – *DEPE*



## Transmission System Impacts – SERTP

Table 14: Transmission System Impacts - SERTP

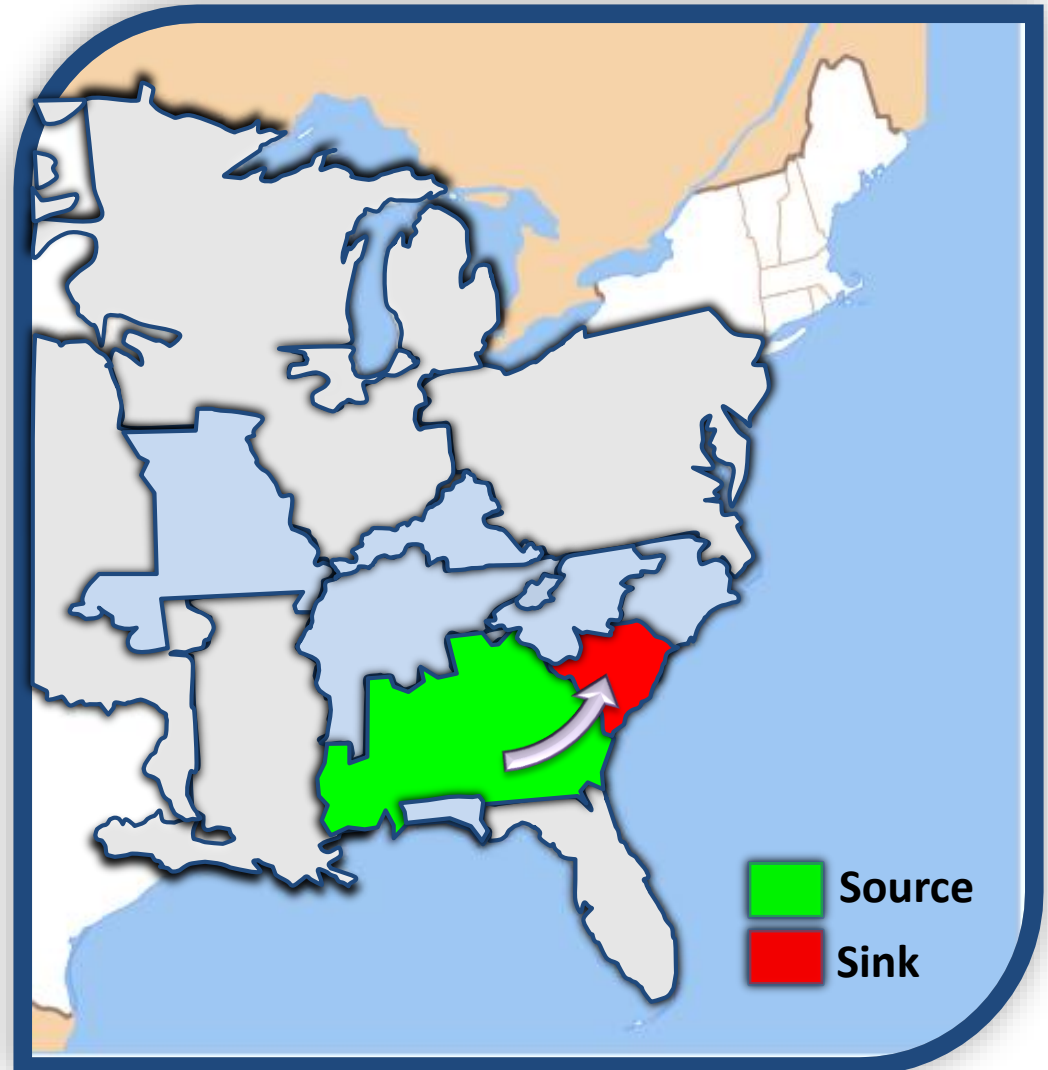
Balancing Authority	Planning Level Cost Estimate
Associated Electric Cooperative (AECI)	\$0
Duke Carolinas (DEC)	\$0
Duke Progress East (DEPE)	\$6,500,000
Duke Progress West (DEPW)	\$0
Gulf Power (GULF)	\$0
Louisville Gas & Electric and Kentucky Utilities (LG&E/KU)	\$0
PowerSouth (PS)	\$0
Southern (SBAA)	\$0
Tennessee Valley Authority (TVA)	\$0
<b>SERTP TOTAL (\$2019)</b>	<b>\$6,500,000</b>

## Economic Planning Studies – Preliminary Results

**Southern BAA to Santee Cooper Border  
1000 MW**

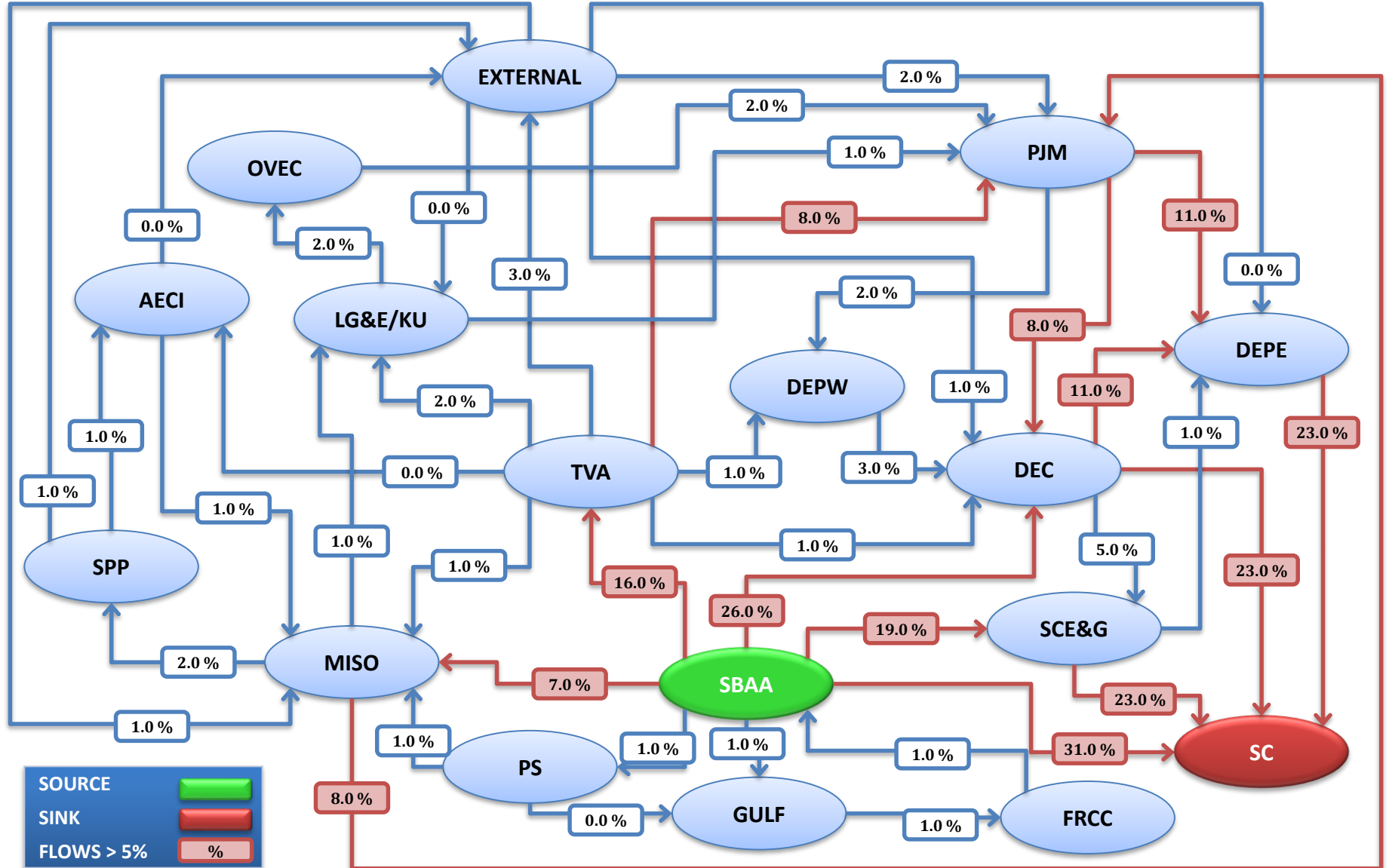
## Study Assumptions

- **Source**: Generation within Southern BAA
- **Sink**: Uniform generation scale within Santee Cooper
- **Transfer Type**: Generation to Generation
- **Year**: 2024
- **Load Level**: Winter Peak



# Southern BAA to Santee Cooper – 1000 MW

Transfer Flow Diagram (% of Total Transfer)





## Transmission System Impacts – *SERTP*

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- **Transmission System Impacts Identified:**
  - No significant constraints were identified in the SERTP Balancing Authority Areas
- **Potential Transmission Enhancements Identified:**
  - None Required

**SERTP Total (\$2019) = \$0**

SERTP

## Miscellaneous Updates

## Regional Planning Update

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- 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

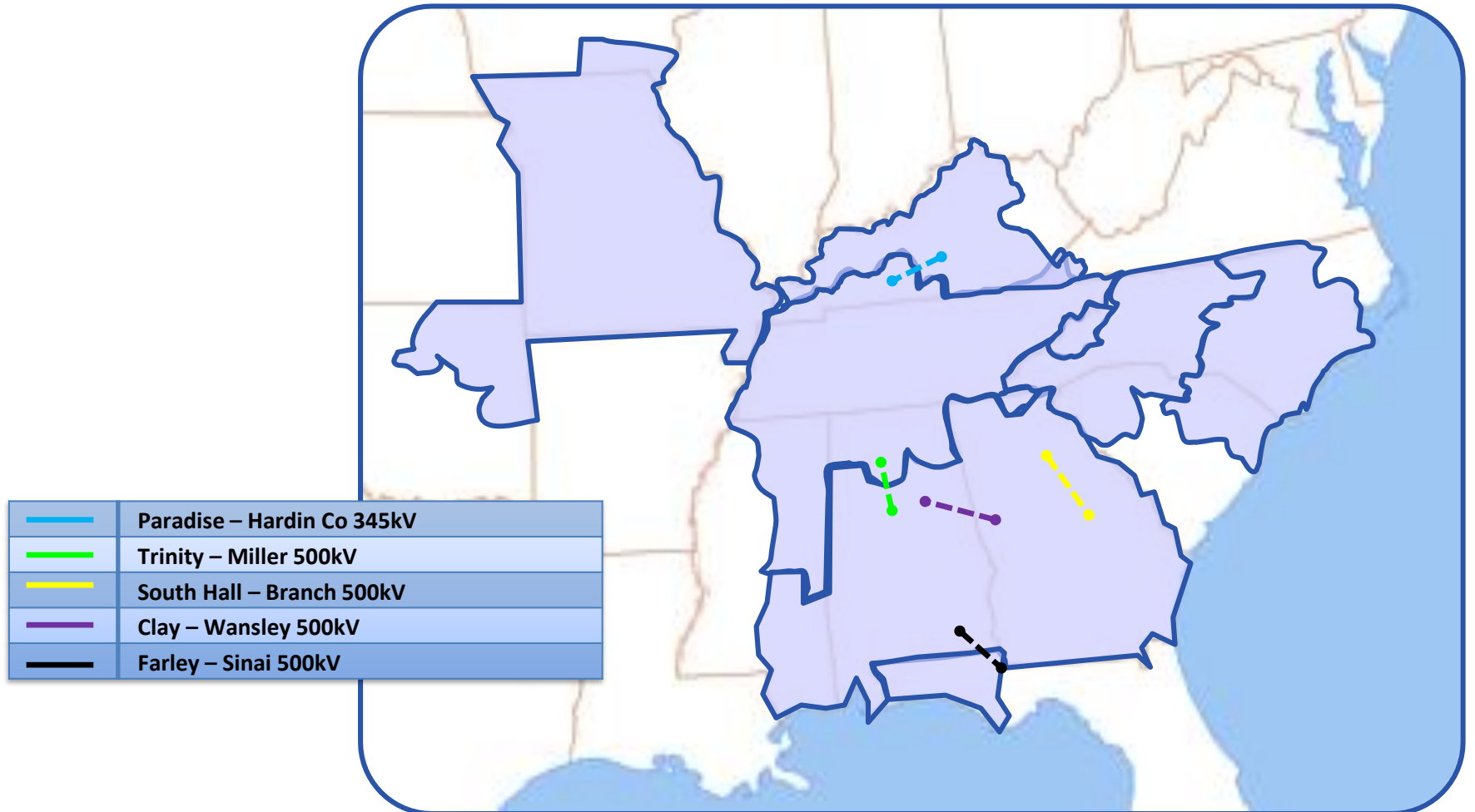
# 2019 Regional Transmission Analyses

## Preliminary List of Alternative Regional Transmission Projects

Alternative Regional Transmission Projects	Miles	From	To
		BAA (State)	BAA (State)
Paradise – Hardin Co 345kV	65	TVA (KY)	LG&E/KU (KY)
Trinity – Miller 500kV	68	TVA (AL)	SBAA (AL)
Clay – Wansley 500kV	90	SBAA (AL)	SBAA (GA)
South Hall – Branch 500kV	78	SBAA (GA)	SBAA (GA)
Farley – Sinai 500kV	50	SBAA (AL)	Gulf (FL)

# 2019 Regional Transmission Analyses

## Preliminary List of Alternative Regional Transmission Projects



## Planning Study Updates

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- Coordination study currently on-going to assess the impact of the proposed tie line between FPL and Gulf Power with a 850MW transfer between FPL and Gulf Power
- A coordination study group has started to prepare for Vogtle 3 and 4 coming online.

## SERC Regional Model Development Update

- SERC is one of the six 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

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- **SERC Regional Model Development**
  - SERC Long-Term Working Group (LTWG)
    - 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

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

## SERC Regional Model Development Update

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- **SERC Regional Model Development**
  - LTWG Schedule of Events for 2019
    - Data Bank Update (DBU) was performed in June
    - Power flow cases were finalized in June
    - Future Study Year Case: 2024 Summer Peak Load
      - Nonpublic Study and Report to be completed in October
      - Steering Committee Report review
    - Final Report Scheduled for completion on December 6<sup>th</sup>
  - MMWG Schedule of Events for 2019
    - MMWG Model Update performed from August – September
    - Power flow cases finalized in October

## Next Meeting Activities

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- **2019 SERTP 4<sup>th</sup> Quarter Meeting** – *Annual Transmission Planning Summit & Input Assumptions Meeting*
  - **Location: MEAG Headquarters in Atlanta, GA**
  - **Date: December 12<sup>th</sup>, 2019**
  - **Purpose:**
    - Final Economic Planning Study Results
    - Final Regional Transmission Plan
    - Regional Analyses Results
    - 2020 Assumptions Input Session



# Questions?

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