Southeastern Regional
TRANSMISSION PLANNING

SERTP – 2017 4th Quarter Meeting

Annual Transmission Planning Summit & Assumptions Input Meeting

December 12th, 2017

MEAG Headquarters

Atlanta, GA

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
  - Final Results
- Ten (10) Year Regional Transmission Plan
- 2018 Preliminary Modeling Input Assumptions
- SERTP Regional Transmission Analyses
- Miscellaneous Updates
- Upcoming 2018 SERTP Process

SERTP

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.

- The Preliminary results were presented in September at the 2017 SERTP 3rd Quarter 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 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

- **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

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

Final 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

- **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

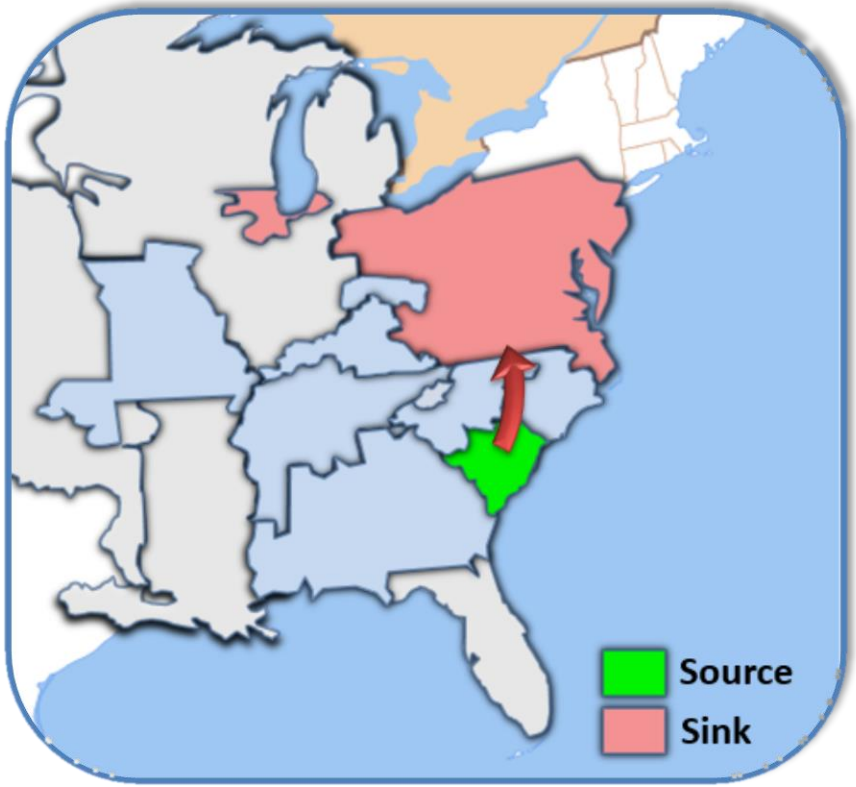
Santee Cooper to PJM – 300 MW

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

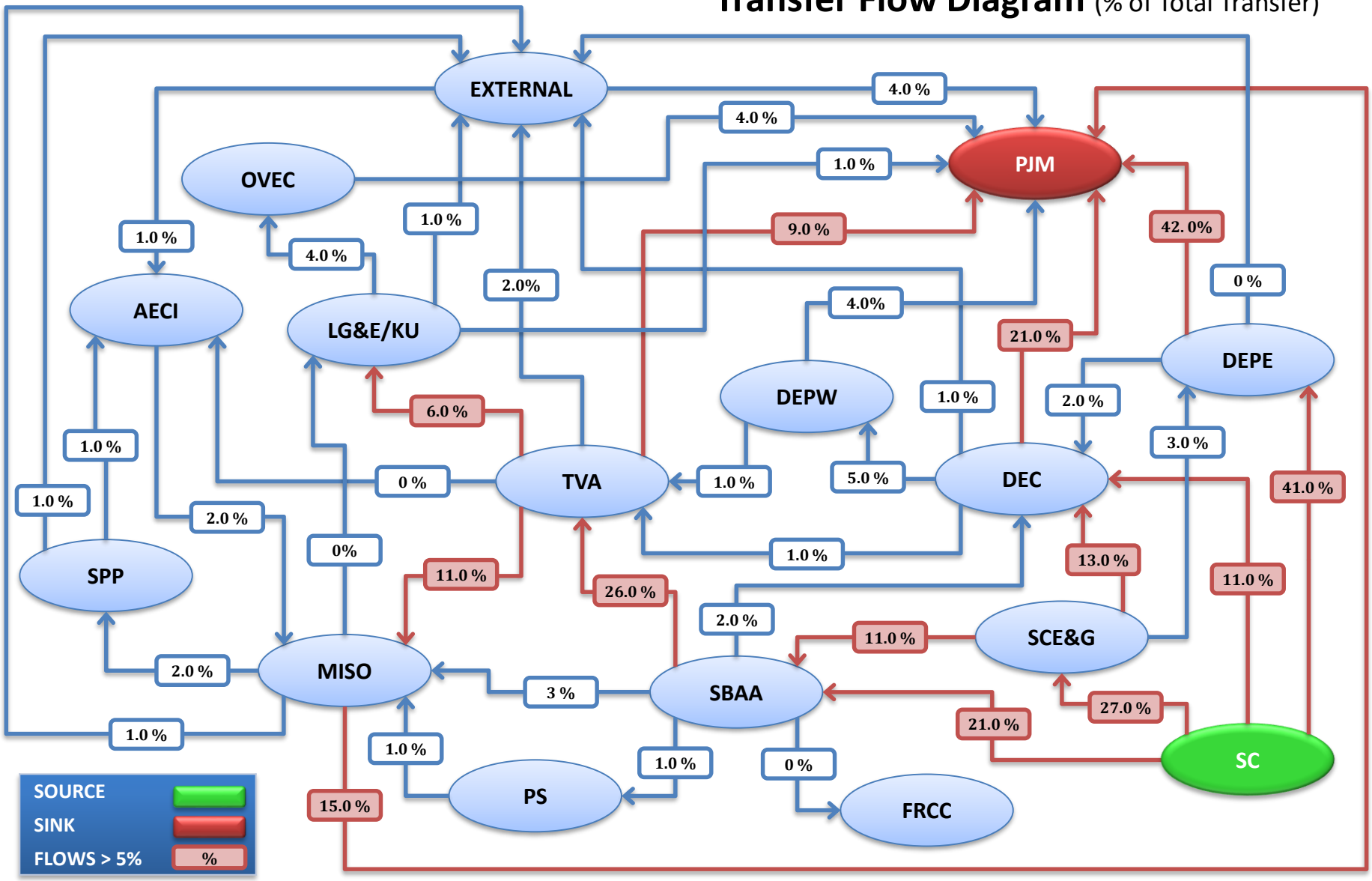
PJM Area	Area #	MW Allocation
American Electric Power	205	150
Dominion Virginia Power	345	150
Total		300



Southeastern Regional TRANSMISSION PLANNING

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

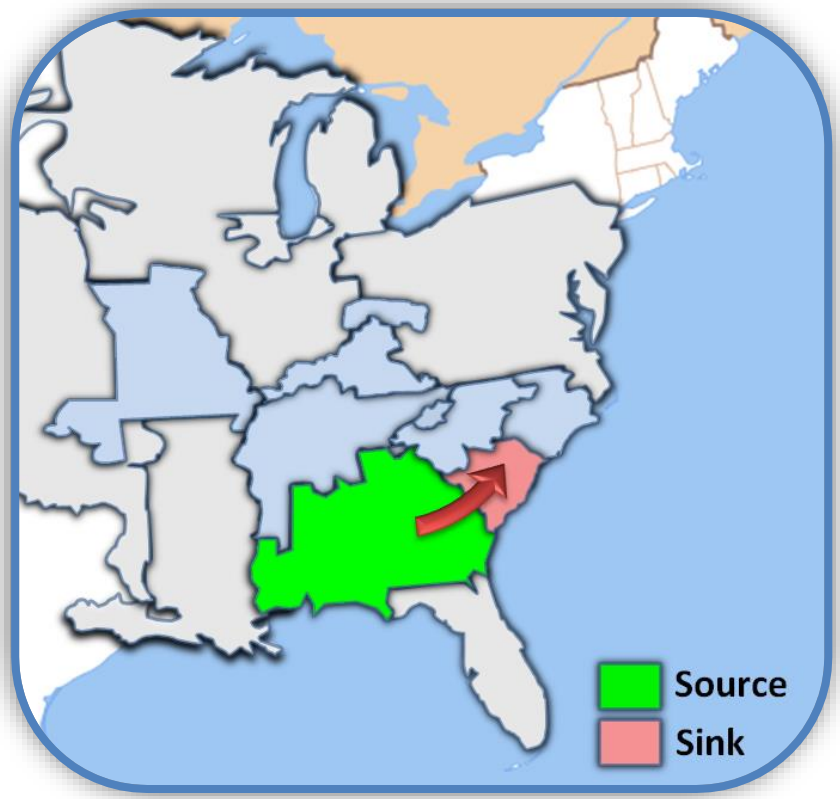
Economic Planning Studies

Southern to Santee Cooper Border 500 MW

Southern to Santee Cooper – 500 MW

Study Assumptions

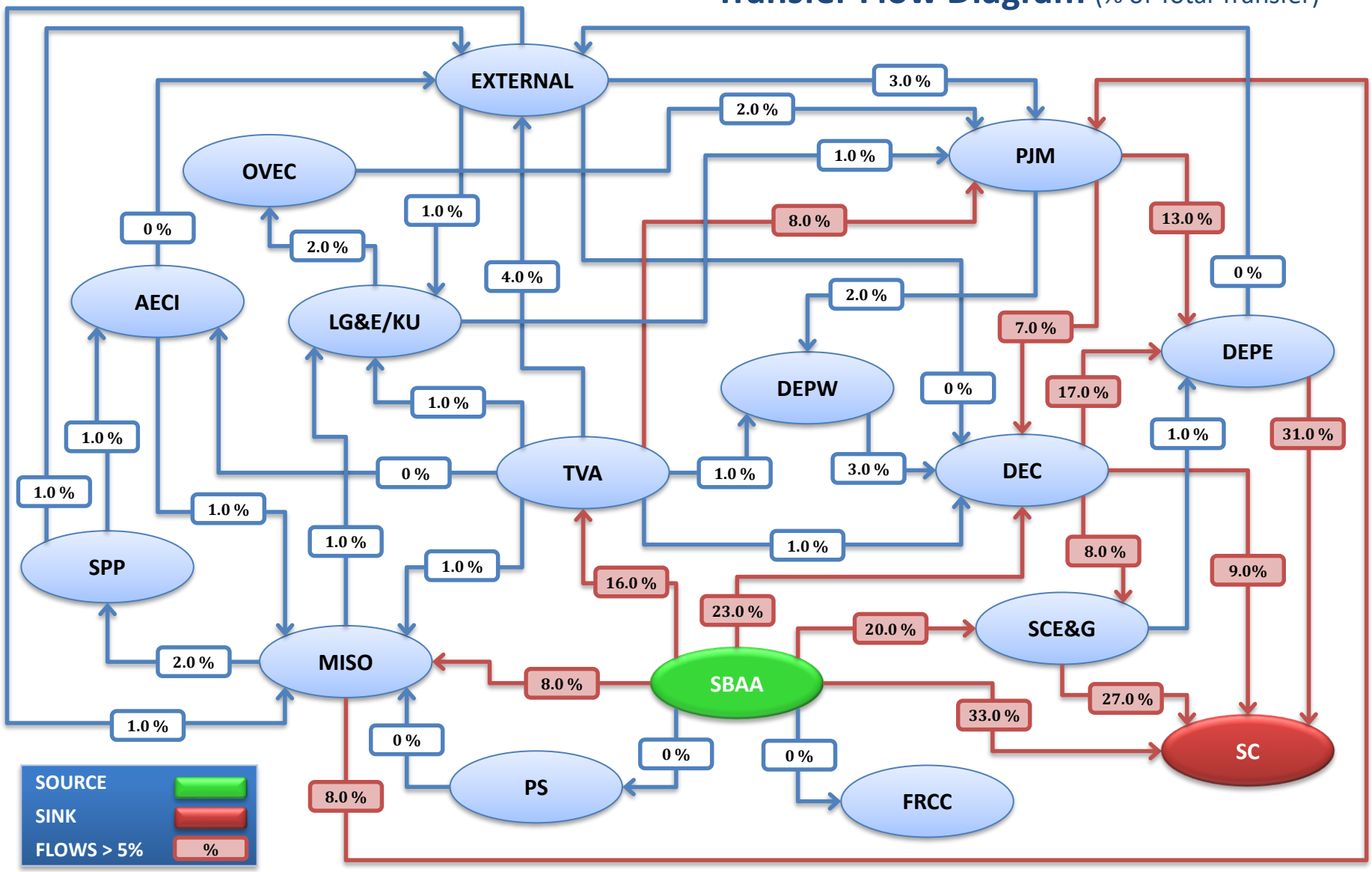
- **Transfer Type:** Generation to Load (2020 Summer Peak)
- **Source:** Generation within Southern
- **Sink:** Uniform load scale within Santee Cooper



Southeastern Regional TRANSMISSION PLANNING

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

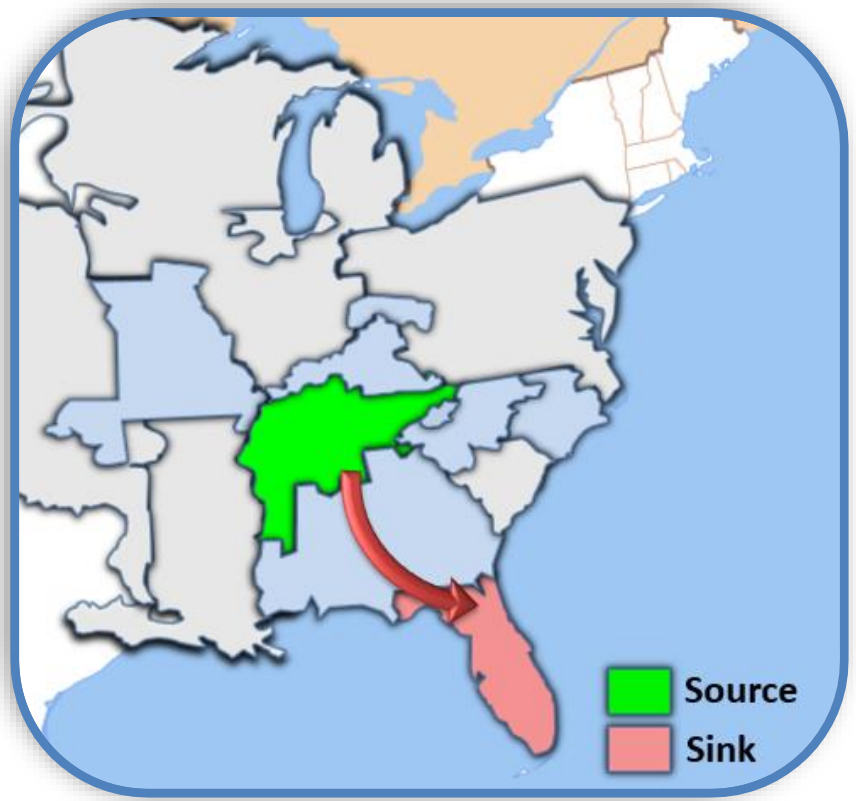
TVA to FRCC – 500 MW

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

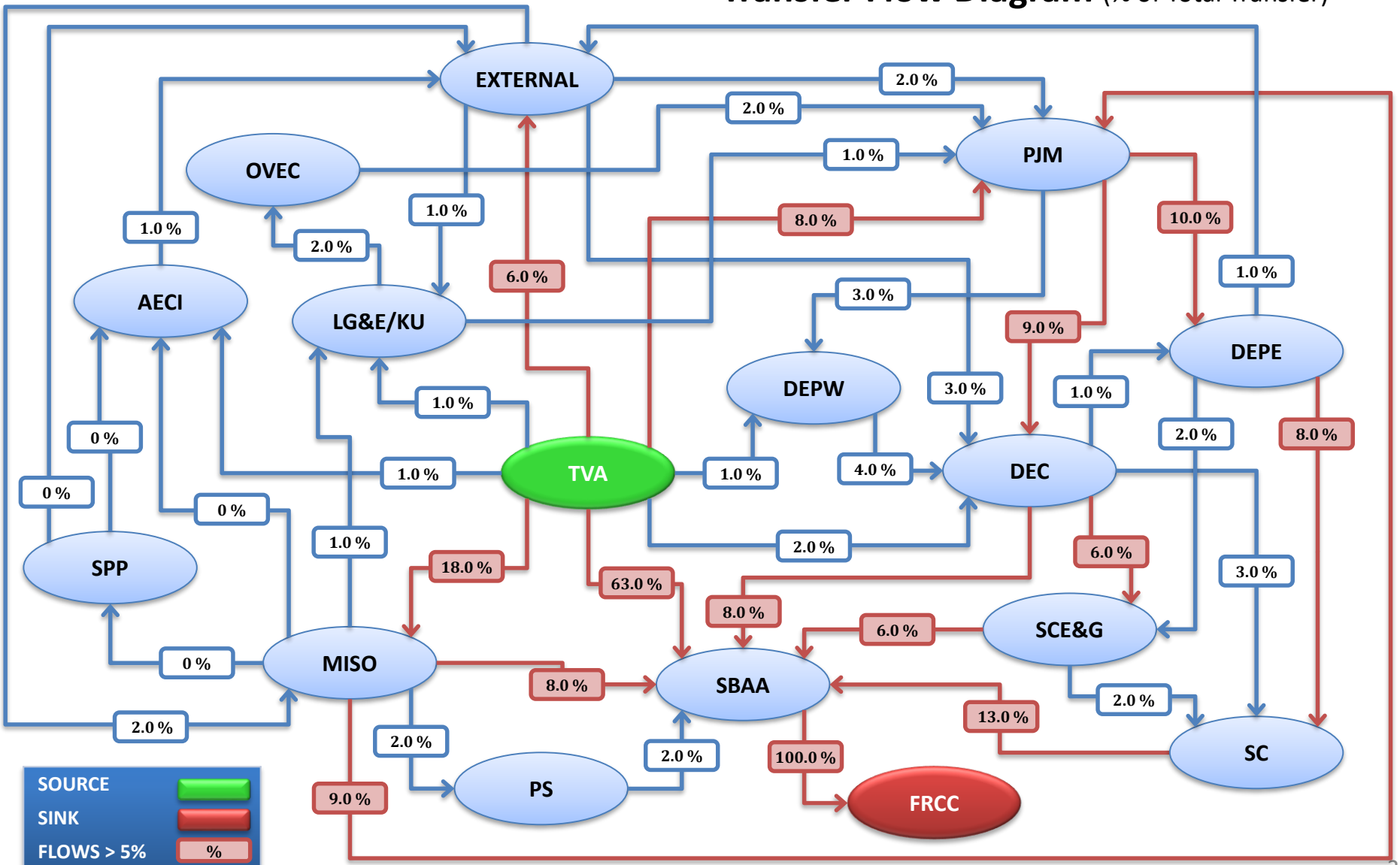
FRCC Area	Area #	MW Allocation
Florida Power & Light Company	401	208
Duke Energy Florida	402	68
Jacksonville Electric Authority	406	192
Tallahassee City Electric	415	32
Total		500



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)

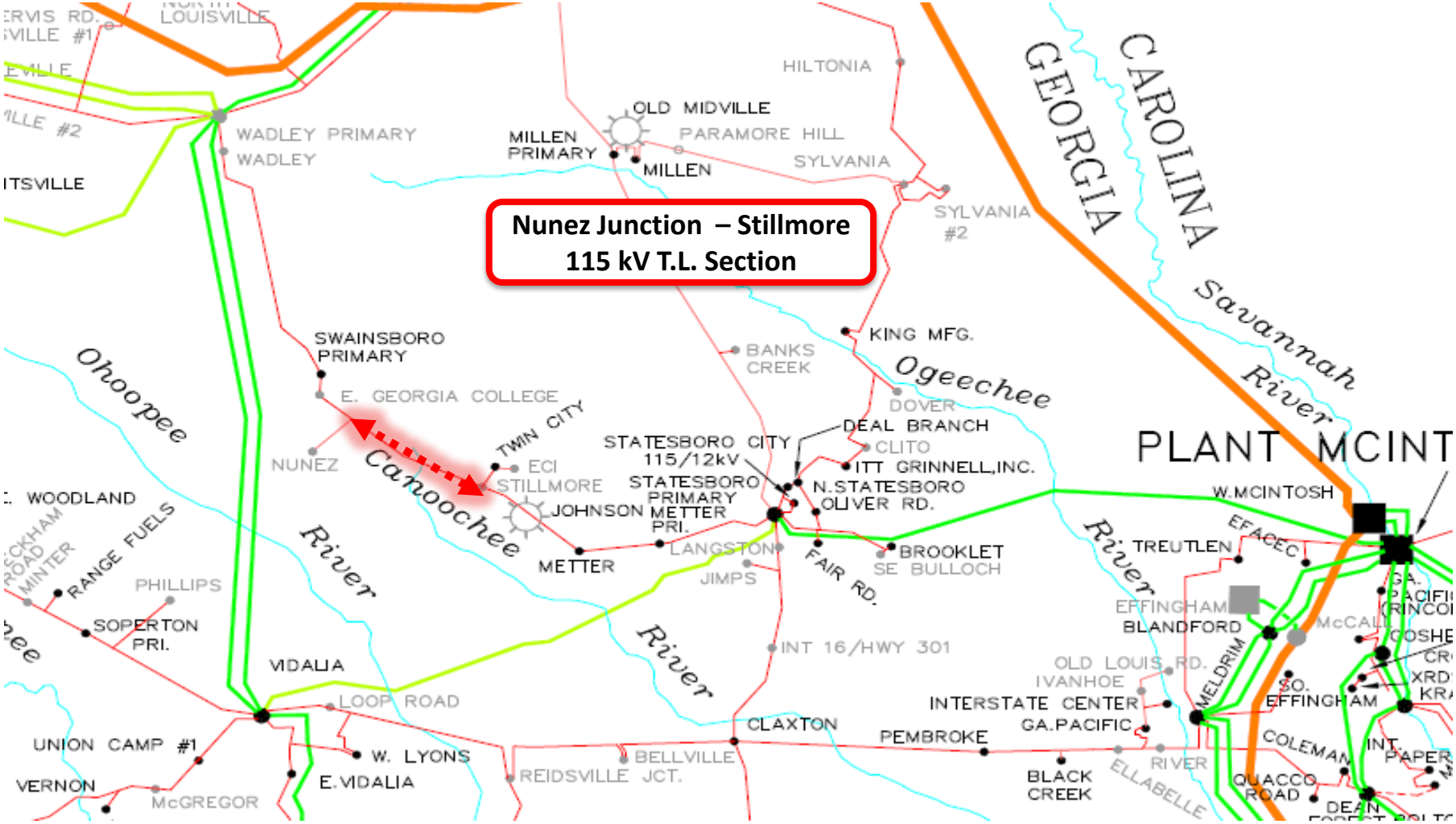
(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer 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*

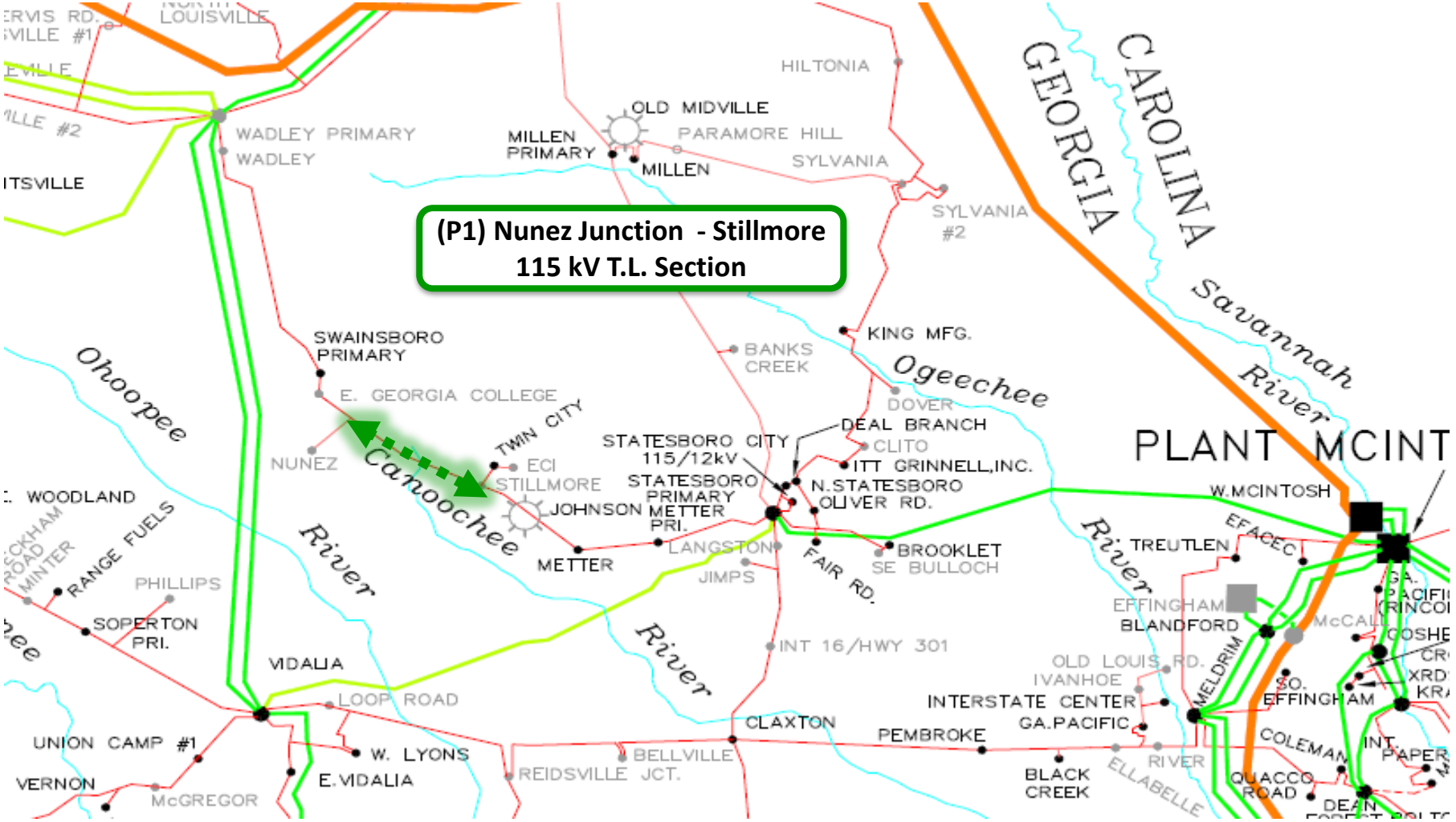
TVA to FRCC – 500 MW

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)

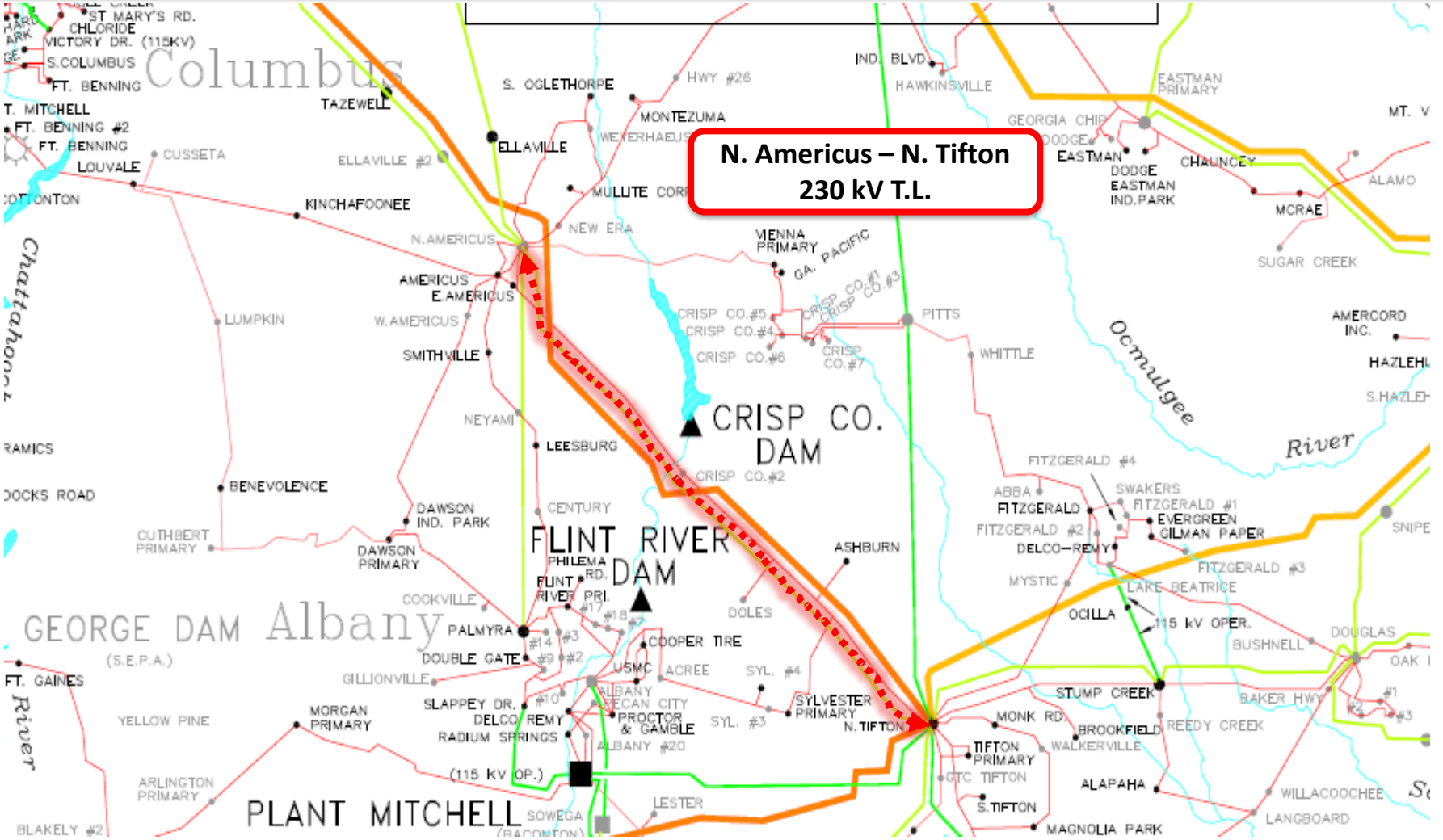
(1) Total planning level cost estimate does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by June 1st of the study year. The studied transfer depends on these projects being in-service, and the cost to support the study transfer 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*

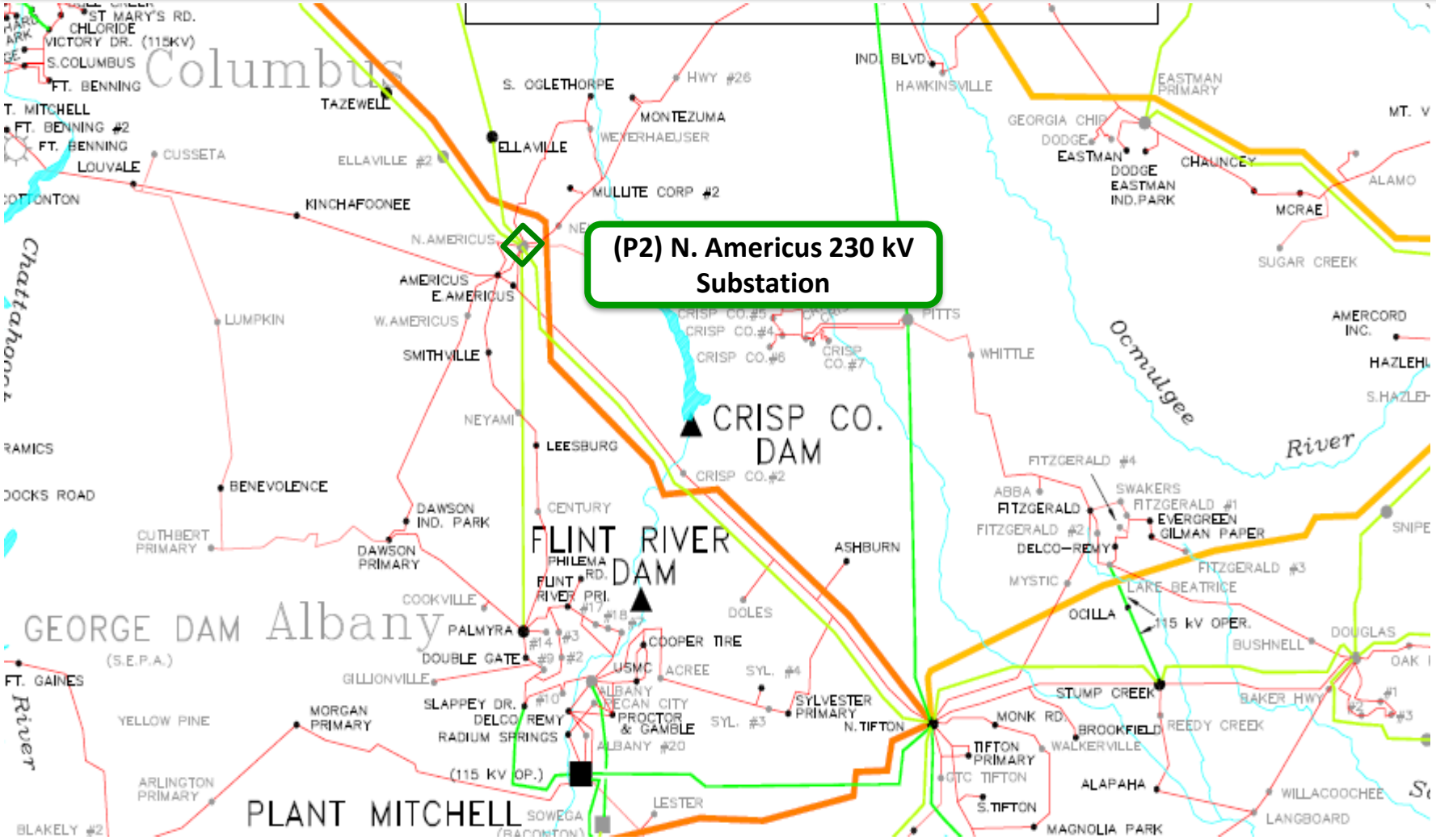
TVA to FRCC – 500 MW

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

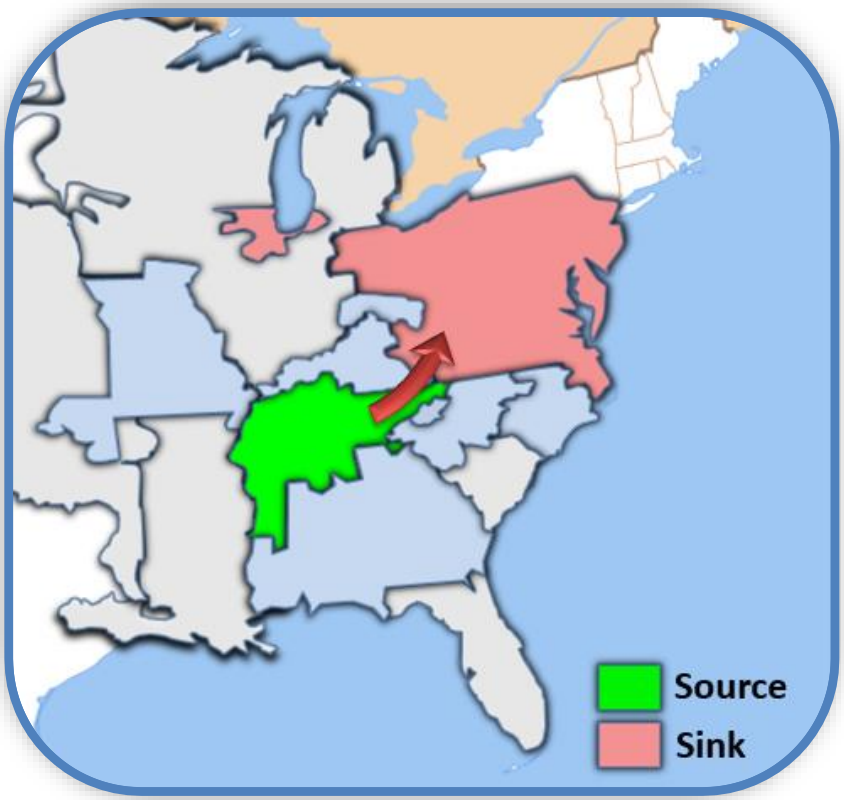
TVA to PJM Border – 500 MW

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

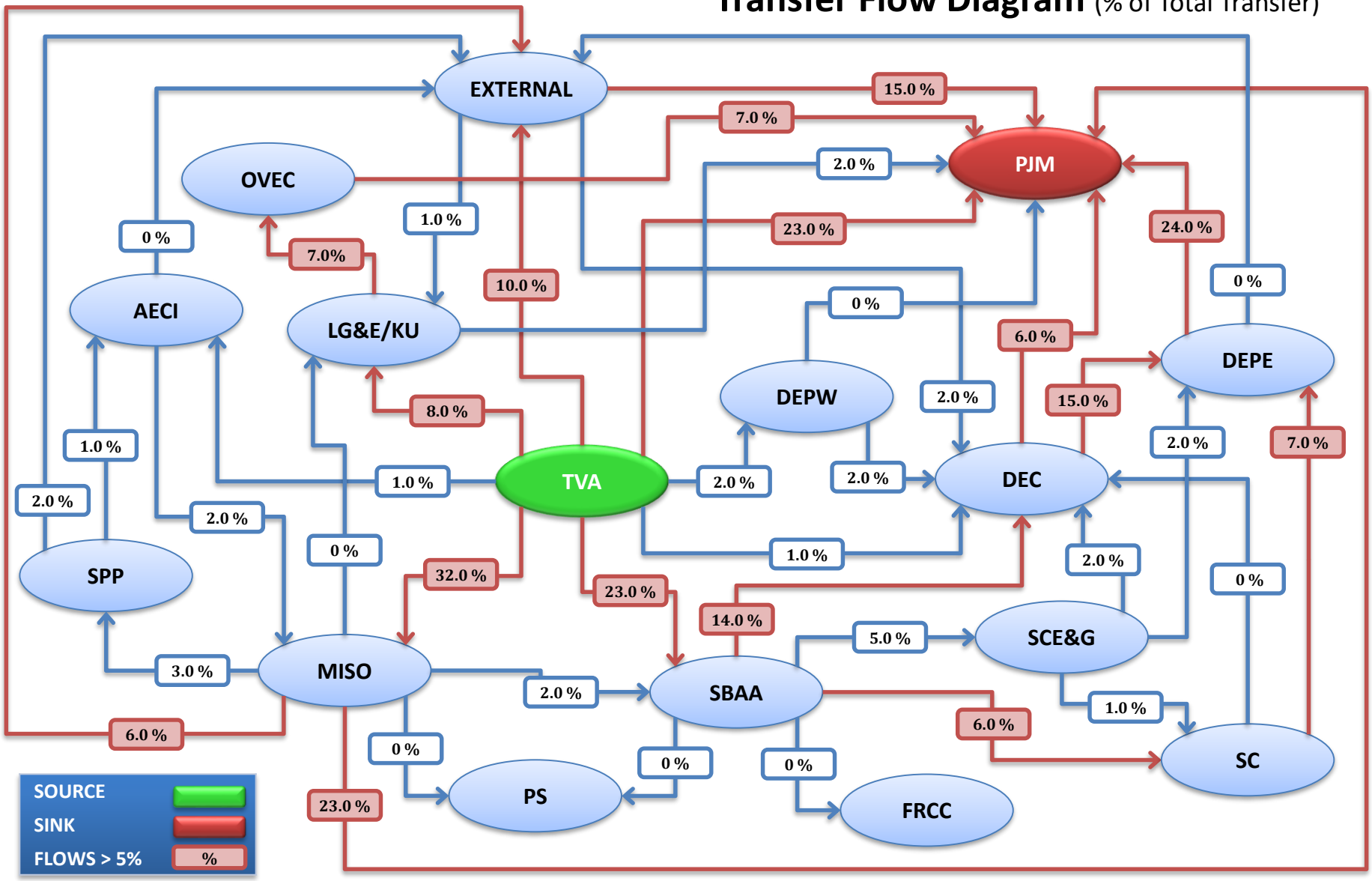
PJM Area	Area #	MW Allocation
PSE & G	231	167
PECO Energy Company	230	167
Dominion Virginia Power	345	166
Total		500



Southeastern Regional TRANSMISSION PLANNING

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

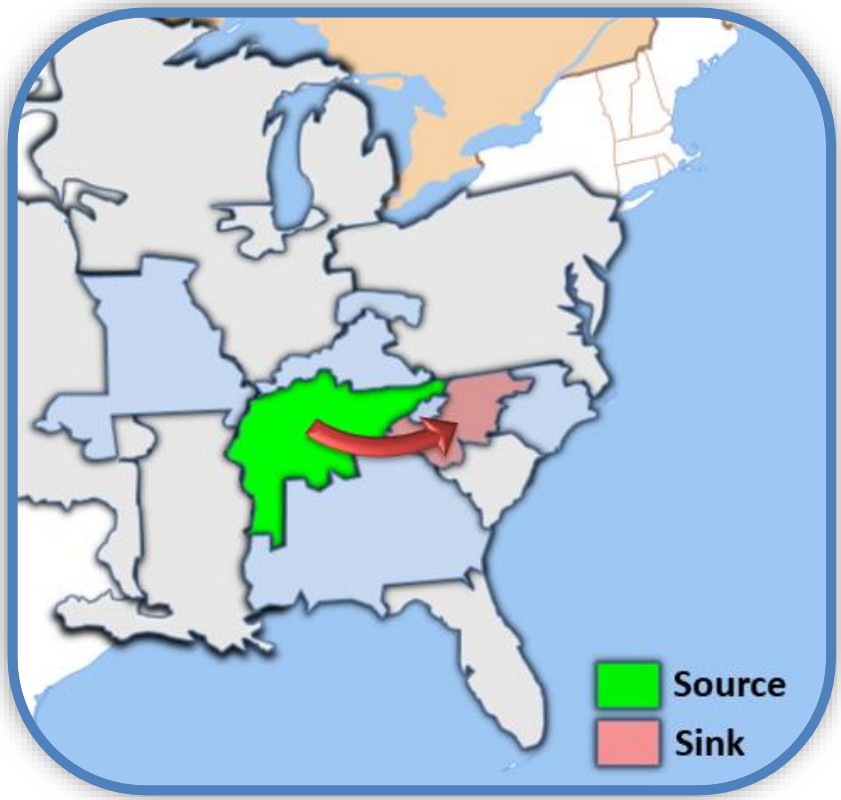
Economic Planning Studies

TVA to Duke Energy Carolinas 300 MW

TVA to Duke Energy Carolinas – 300 MW

Study Assumptions

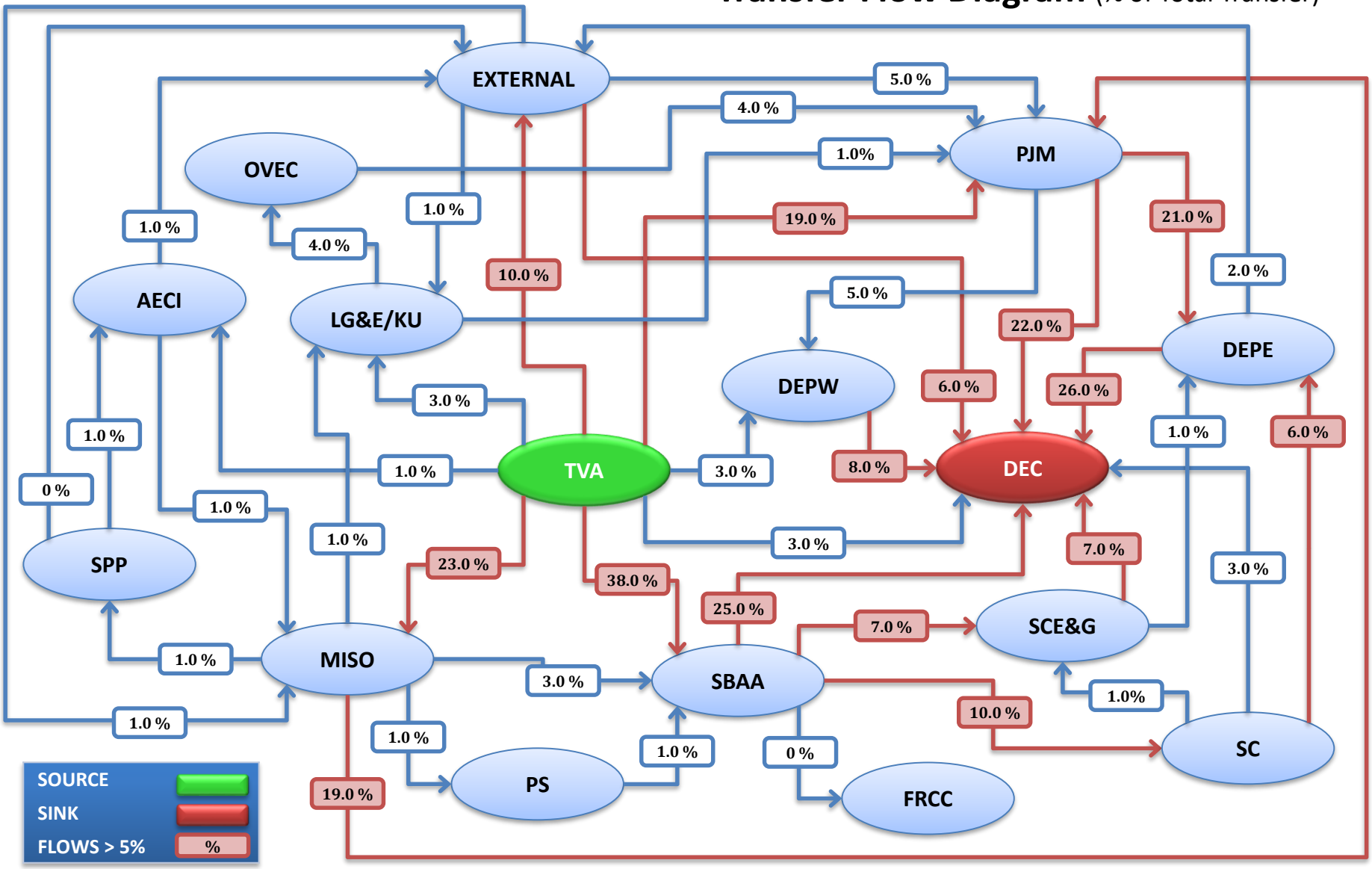
- **Transfer Type:** Generation to Generation (2022 Summer Peak)
- **Source:** Generation within TVA
- **Sink:** Generation within Duke Energy Carolinas



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

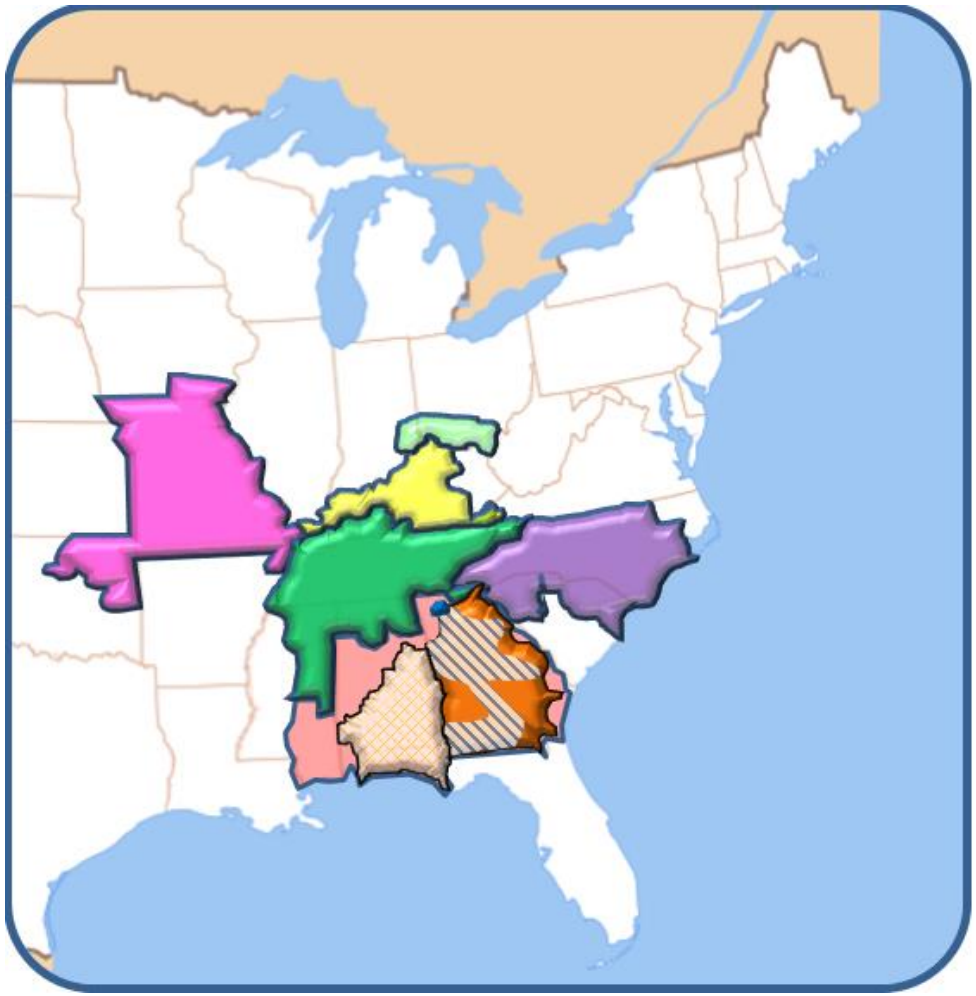
SERTP

Regional Modeling Assumptions

SERTP

Regional Transmission Plan

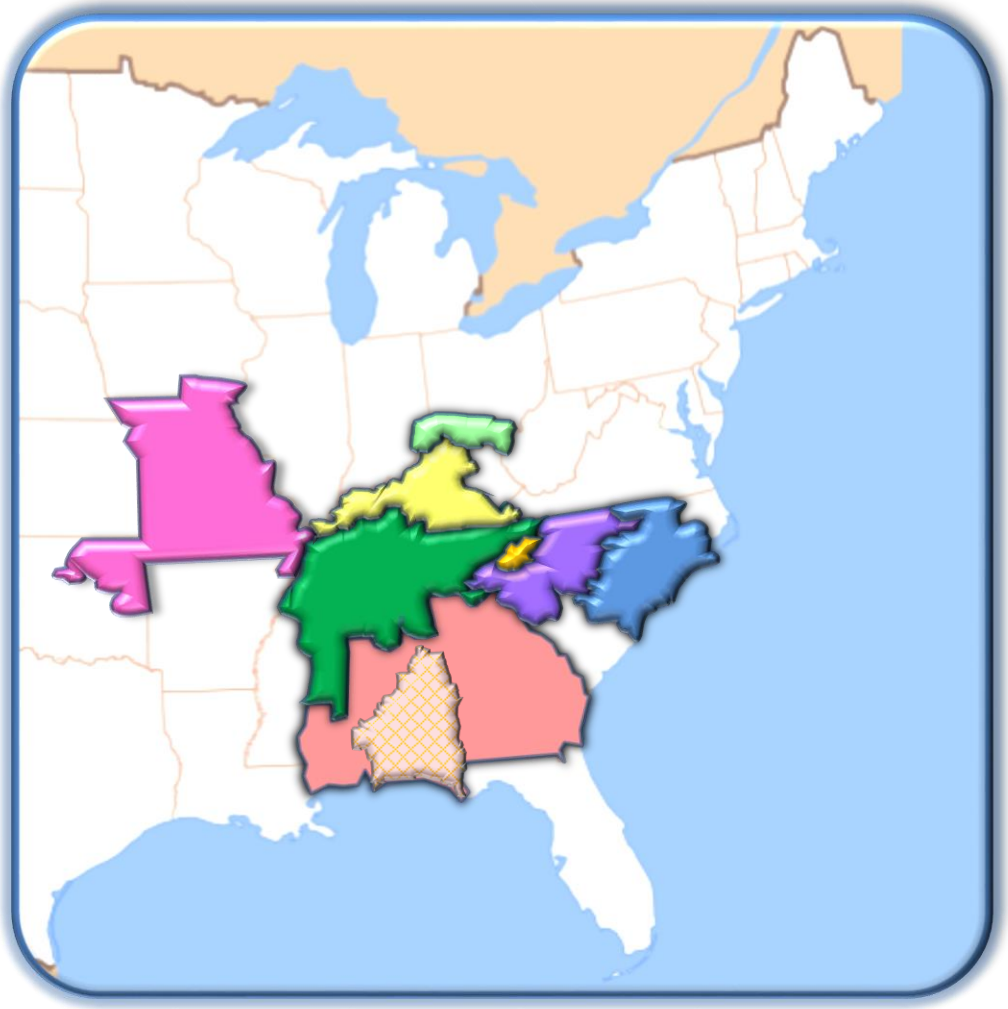
Southeastern Regional Transmission Planning (SERTP)



SERTP Sponsors

- AECI
- Dalton
- Duke Energy
- GTC
- LG&E / KU
- MEAG
- OVEC
- PowerSouth
- Southern
- TVA

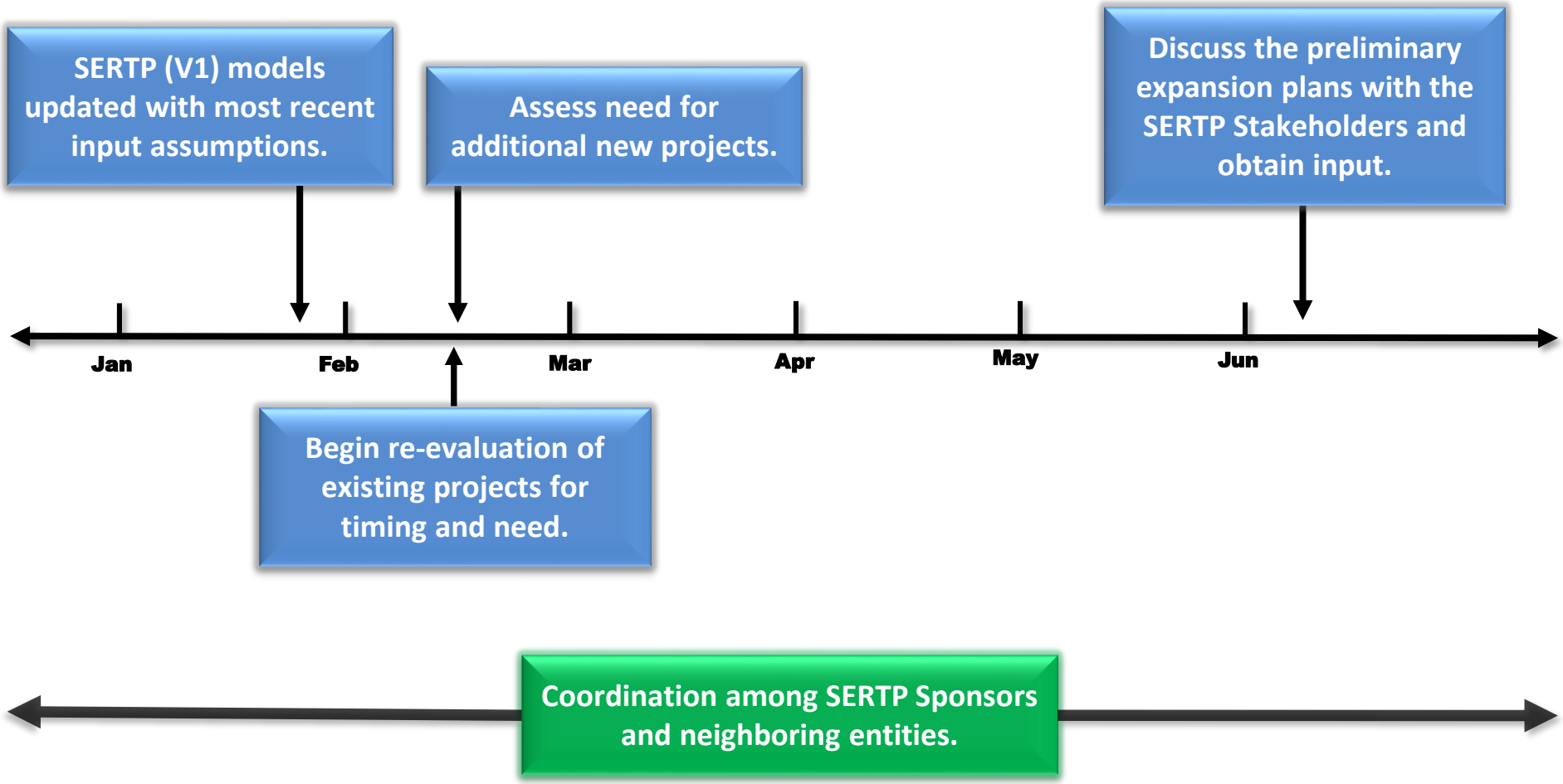
Southeastern Regional Transmission Planning (SERTP)



Balancing Authority Areas

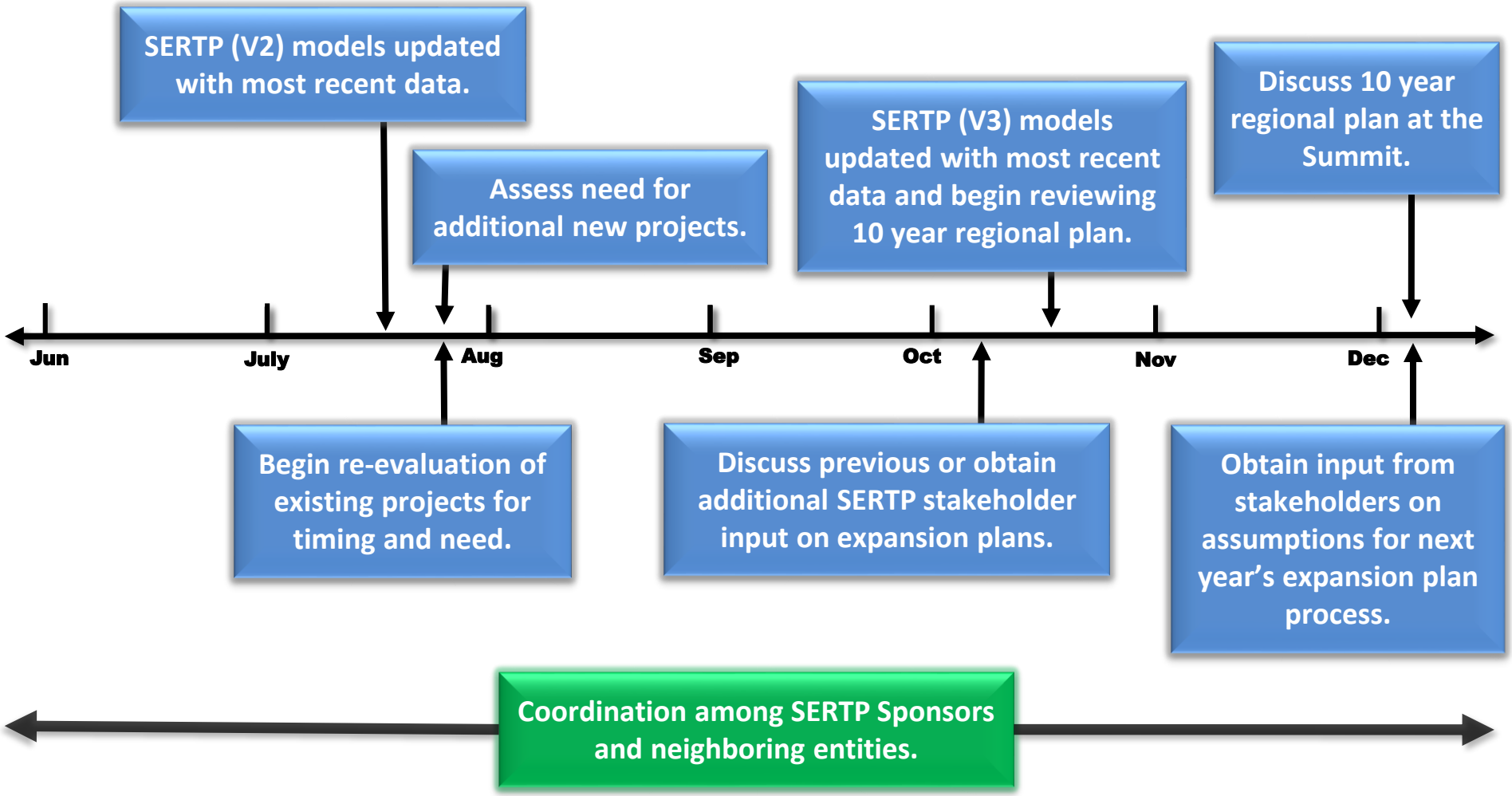
- AECI
- DUKE – Carolinas
- DUKE – Progress East
- DUKE – Progress West
- LG&E/KU
- OVEC
- PowerSouth
- Southern
- TVA

10 Year Regional Transmission Expansion Plan Process

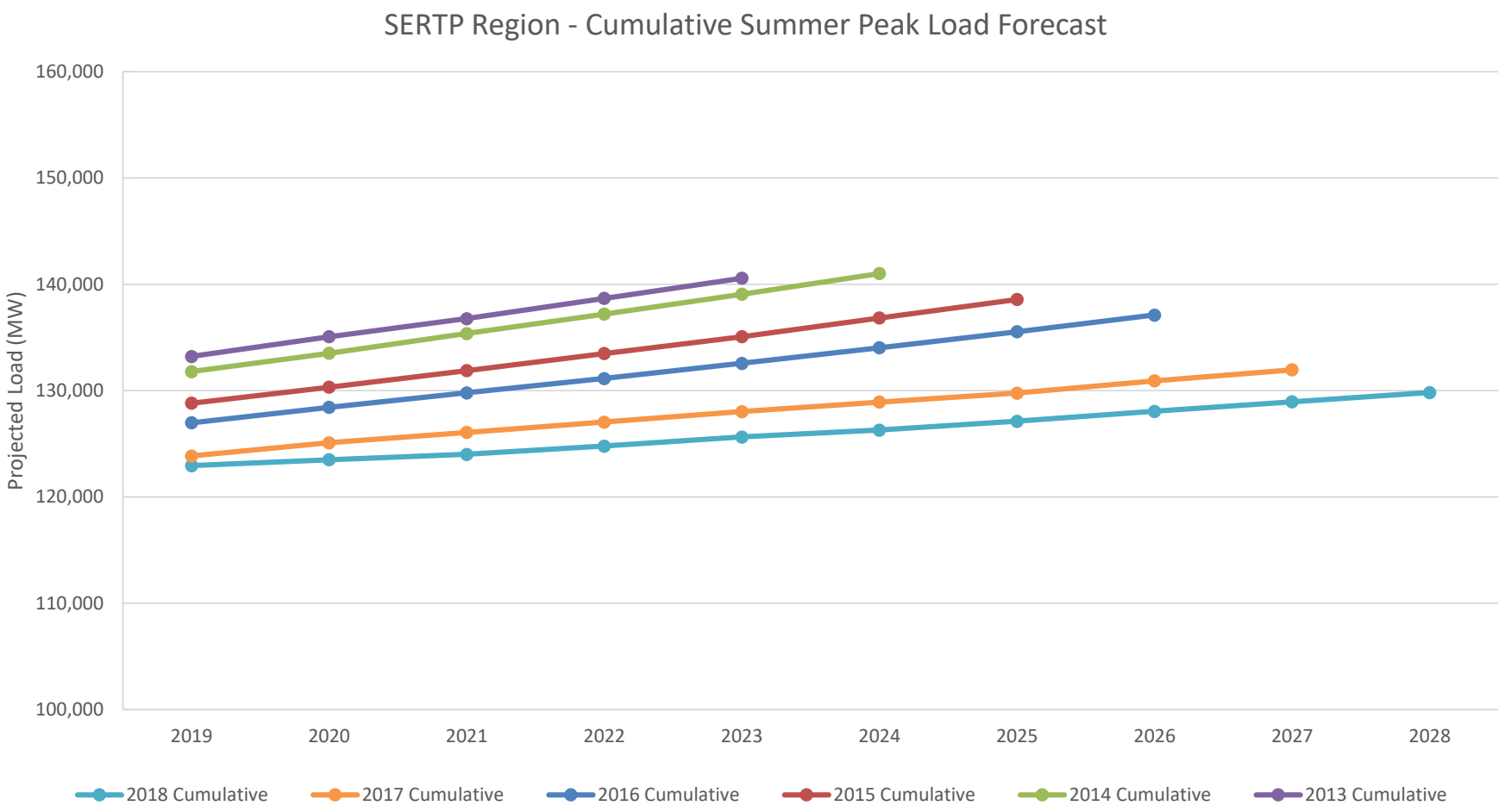


2017 SERTP

10 Year Regional Transmission Expansion Plan Process



SERTP Cumulative Summer Peak Load Forecast



Regional Transmission Expansion Plans

The projects described in this presentation represent the regional ten (10) year transmission expansion plans. The transmission expansion plans are periodically reviewed and may be revised due to changes in assumptions. This presentation does not represent a commitment to build for projects listed in the future.

AECI Balancing Authority

2017 Generation Assumptions

* AECI has no generation assumptions that change throughout the ten year planning horizon for the 2017 SERTP Process.

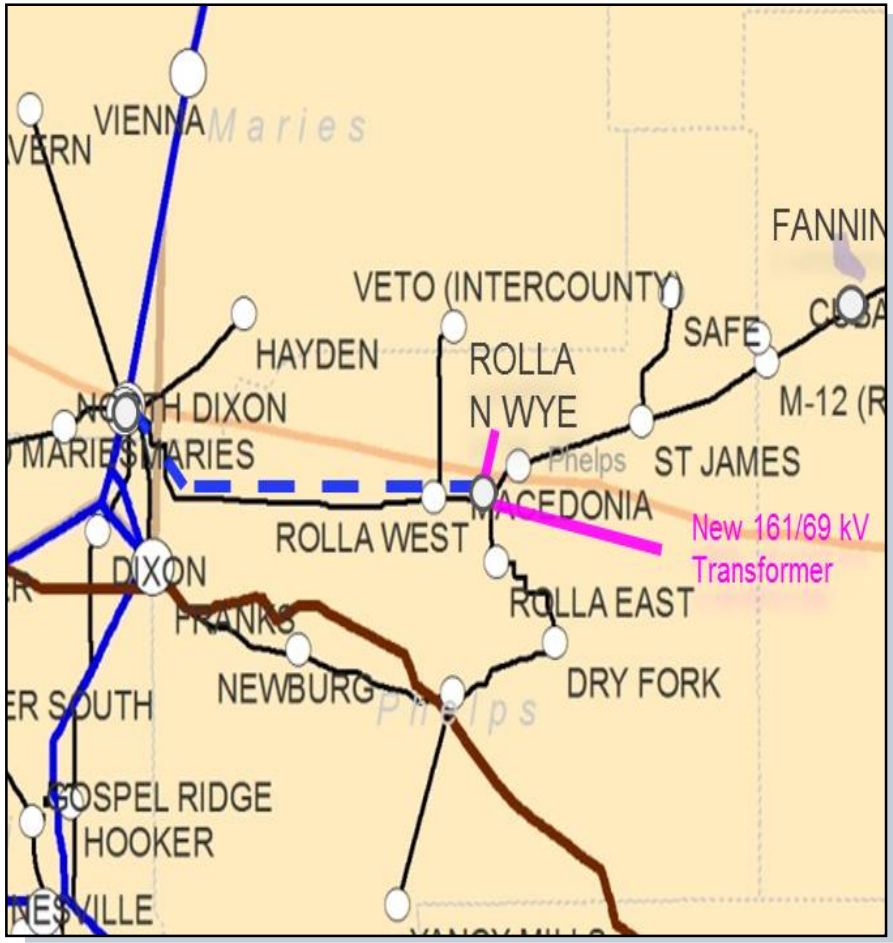
AECI Balancing Authority

SERTP Regional Transmission Expansion Plan

AECI Balancing Authority

AECI – 1 2018

MARIES – ROLLA NORTH WYE 161 KV T.L. & ROLLA NORTH WYE 161 KV SUBSTATION

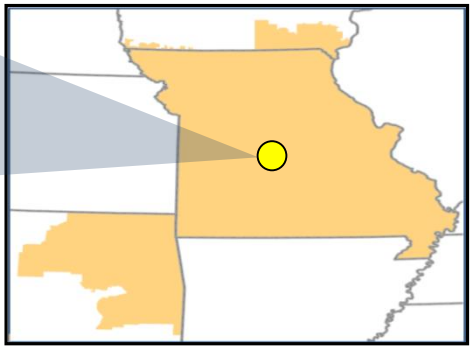


DESCRIPTION:

Construct approximately 21 miles of 161 kV transmission line from Maries to Rolla North Wye with 795 ACSR at 100°C and install a 56 MVA 161/69 kV transformer at Rolla North Wye.

SUPPORTING STATEMENT:

The Maries – Rolla North Wye transmission line overloads under contingency and additional voltage support is needed in the Maries and Rolla North Wye areas under contingency.



AECI Balancing Authority

AECI – 2 2020

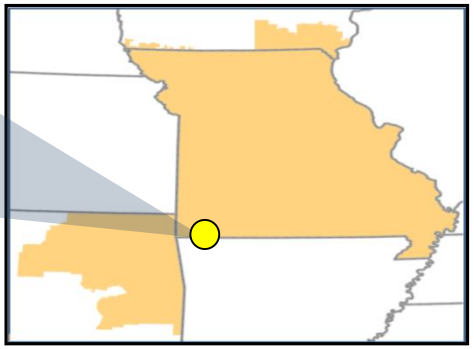
WHEATON – CASSVILLE 161 KV T.L. & STELLA 345/161 KV SUBSTATION

DESCRIPTION:

Construct a 345/161 kV Substation on the Brookline – Flintcreek 345 kV transmission line. Construct approximately 15 miles of 795 ACSR 161 kV transmission line at 100°C from Wheaton – Cassville, and install a 161/69 kV transformer at Cassville.

SUPPORTING STATEMENT:

The Neosho and Washburn 161/69 kV transformers overload under contingency.



AECI Balancing Authority

Upcoming 2018 Generation Assumptions

* AECI has no generation assumptions expected to change throughout the ten year planning horizon for the 2018 SERTP Process.

DUKE CAROLINAS Balancing Authority

2017 Generation Assumptions

DUKE CAROLINAS – Generation Assumptions

The following diagram depicts the location of generation assumptions <u>that change</u> throughout the ten year planning horizon for the 2017 SERTP Process.

DUKE CAROLINAS – Generation Assumptions

The following table depicts the generation assumptions that change throughout the ten year planning horizon for the 2017 SERTP Process. The years shown represent Summer Peak conditions.

SITE	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
ALLEN 1	174	174	174	174	174	174	174	0	--	--
ALLEN 2	172	172	172	172	172	172	172	0	--	--
ALLEN 3	271	271	271	271	271	271	271	0	--	--
KINGS MOUNTAIN ENERGY CENTER	452	452	452	452	452	452	452	452	452	452
LEE CC	776	776	776	776	776	776	776	776	776	776

DUKE CAROLINAS – Generation Assumptions (Point-to-Point)

The following table depicts generation assumptions based upon expected long-term firm point-to-point commitments. The years shown represent Summer Peak conditions.

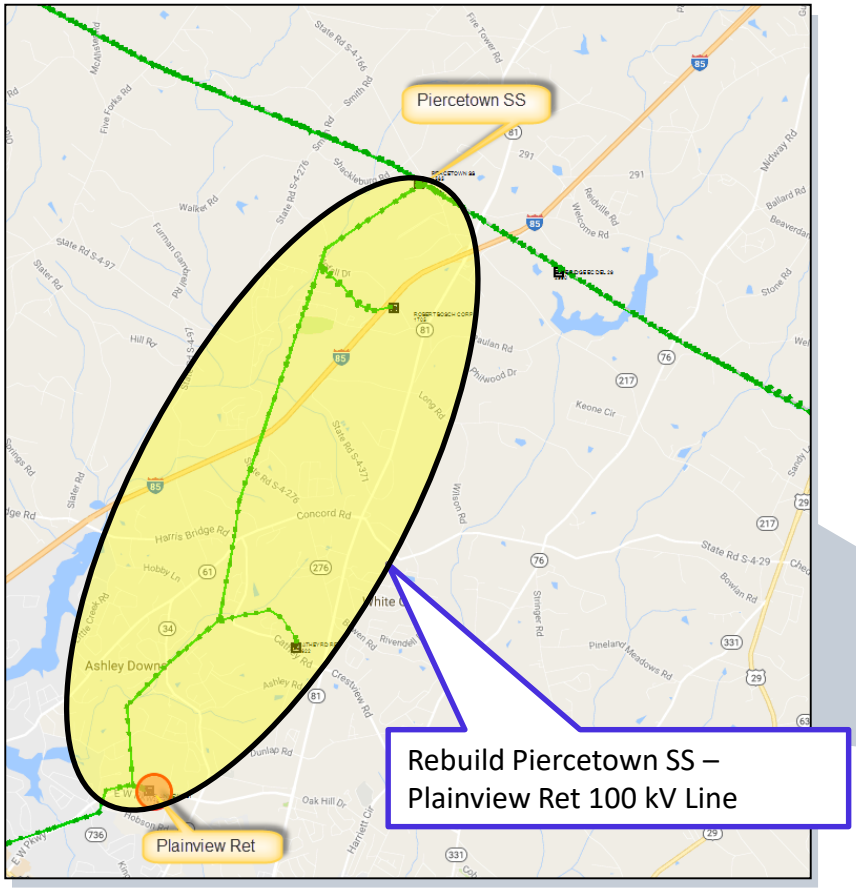
SITE	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
BROAD RIVER	850	850	850	850	850	850	850	850	850	850
CATAWBA	155	155	155	155	155	155	155	155	155	155
DUKE FLEET	100	100	100	100	100	100	100	100	100	100
ROWAN	150	150	150	150	150	150	150	150	150	150

DUKE CAROLINAS Balancing Authority

SERTP Regional Transmission Expansion Plan

DUKE CAROLINAS – 1 2018

PIERCETOWN SS – PLAINVIEW RET 100 KV T.L.

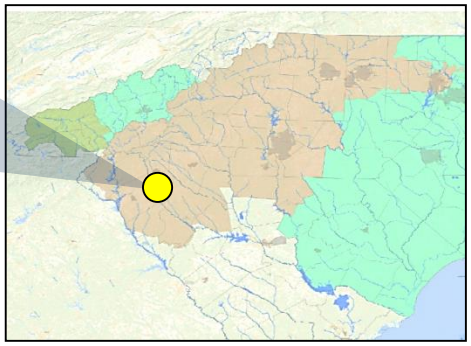


DESCRIPTION:

Rebuild the 6.7 mile Piercetown SS - Plainview Retail 100 kV transmission line into a double circuit transmission line with 954 ACSR at 120°C, and network with the Anderson Tie - Plainview Retail 100 kV transmission line.

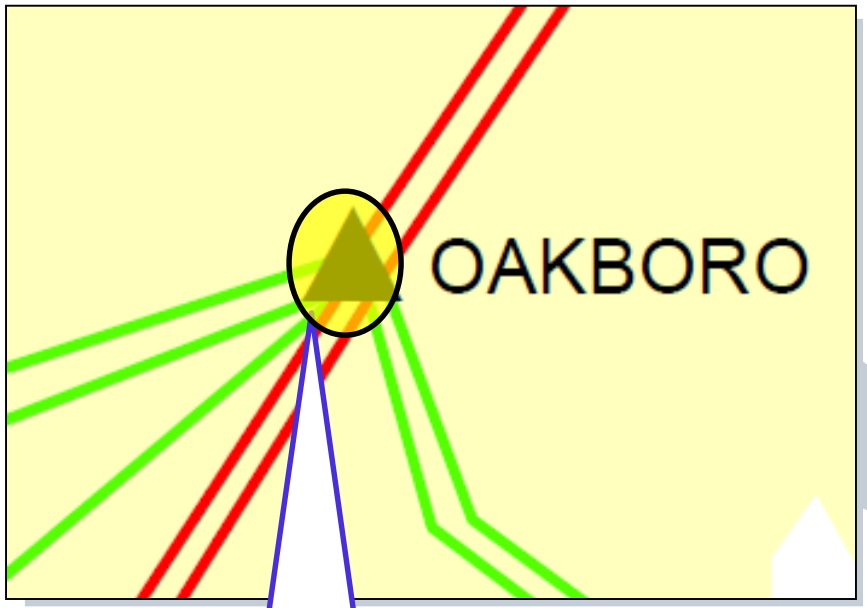
SUPPORTING STATEMENT:

Anderson Tie - Plainview Retail 100 kV transmission line is approaching capacity. Networking the Piercetown SS - Plainview Retail 100 kV transmission line provides additional capacity to the area.



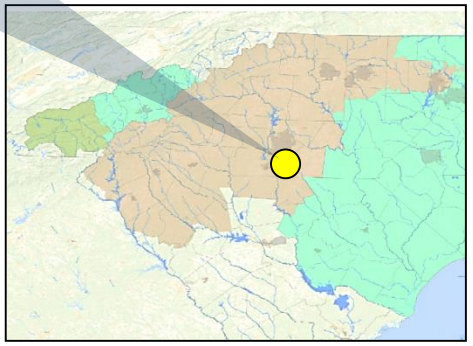
DUKE CAROLINAS – 2 2018

OAKBORO 230/100 KV TIE



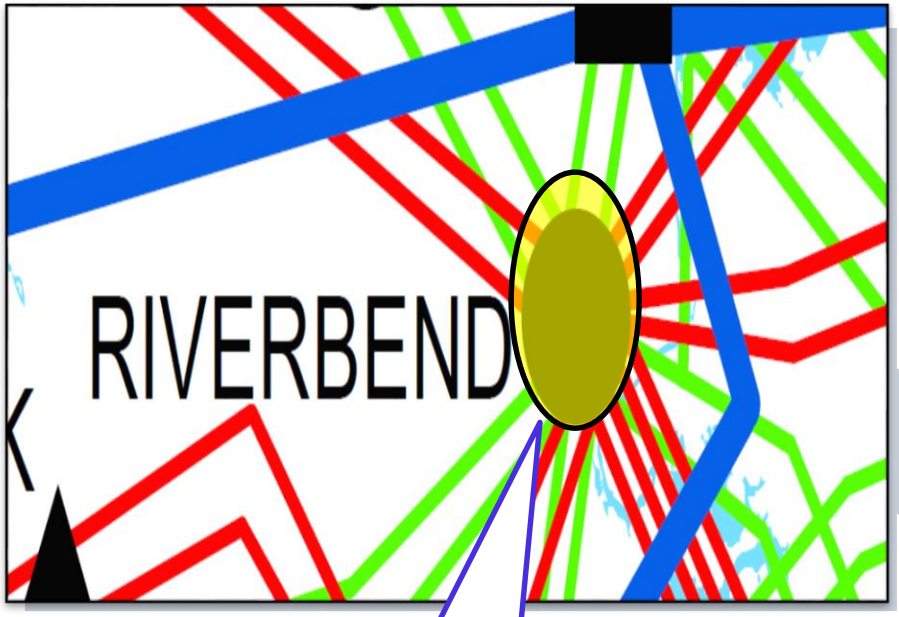
DESCRIPTION:
Install a fourth 230/100 kV, 200 MVA transformer to Oakboro Substation.

SUPPORTING STATEMENT:
The Oakboro 230/100 kV transformer overloads under contingency.



DUKE CAROLINAS – 3 2018

RIVERBEND STEAM STATION

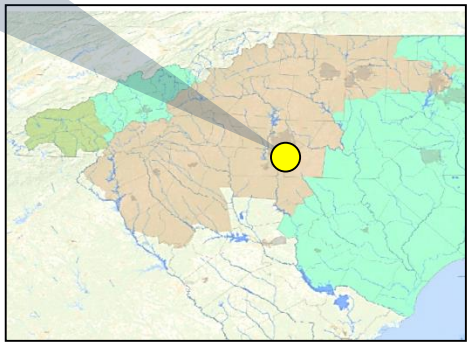


DESCRIPTION:

Install two 230/100 kV, 400 MVA transformers at Riverbend Steam Station.

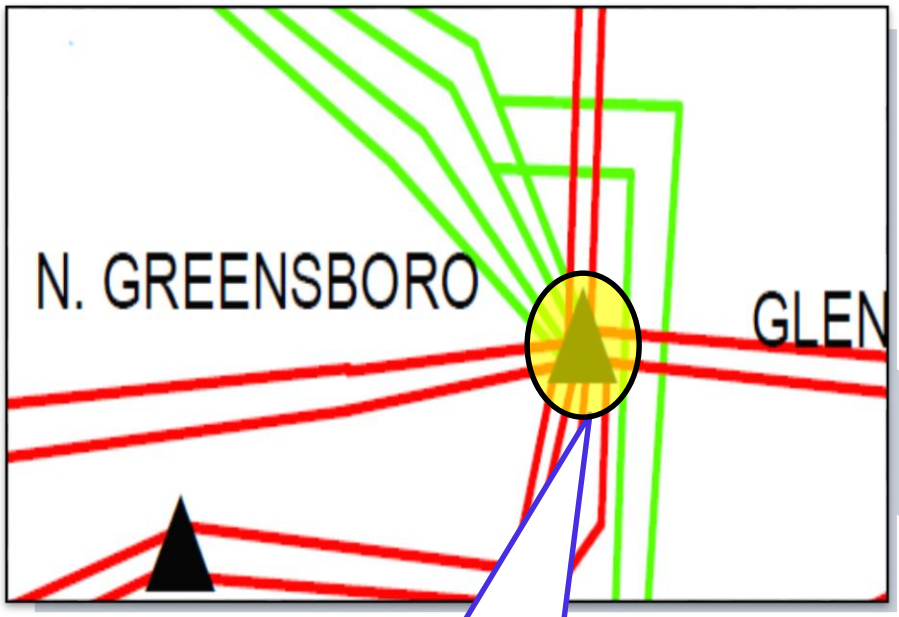
SUPPORTING STATEMENT:

Retirement of Riverbend Steam Station generation causes multiple transmission lines to overload under contingency and causes the need for additional voltage support in the Riverbend area.



DUKE CAROLINAS – 4 2018

NORTH GREENSBORO SUBSTATION

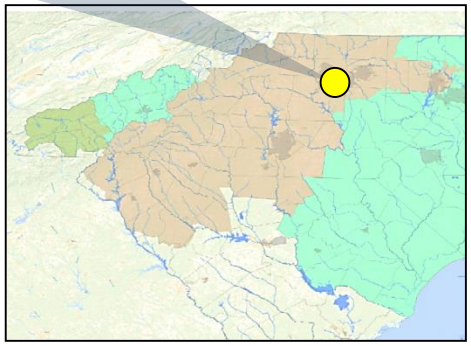


DESCRIPTION:

Install a fourth 230/100 kV, 448 MVA transformer at North Greensboro Substation.

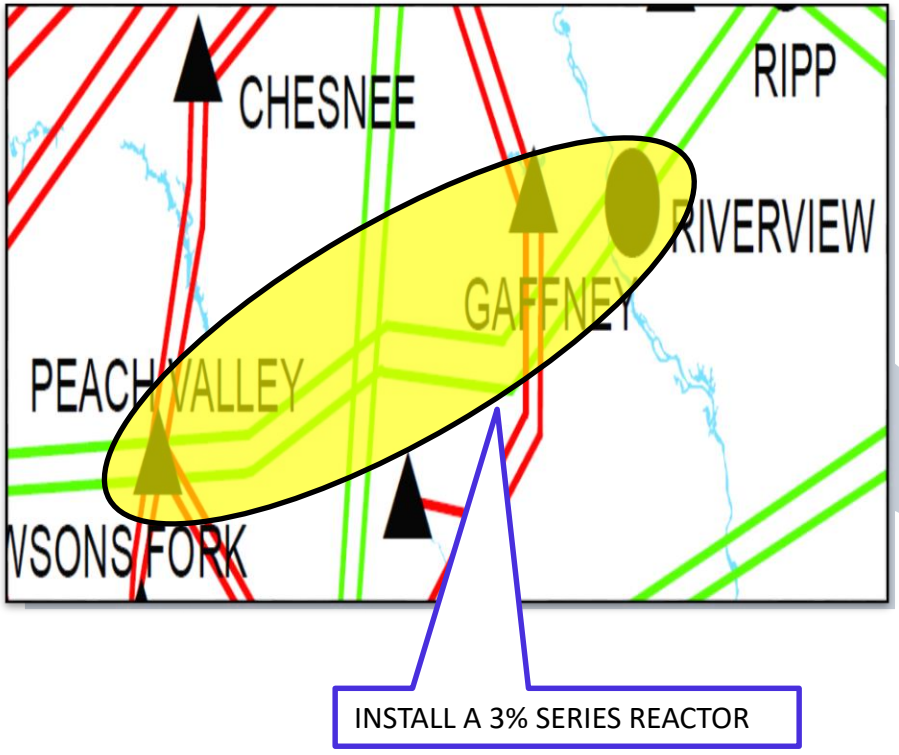
SUPPORTING STATEMENT:

North Greensboro 230/100 kV transformer overloads under contingency.



DUKE CAROLINAS – 5 2018

PEACH VALLEY – RIVERVIEW 230 KV T.L.

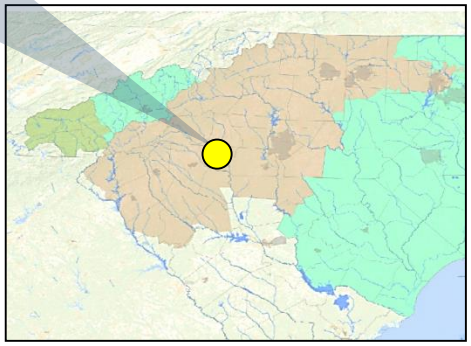


DESCRIPTION:

Install a 3% series reactor on the Peach Valley – Riverview 230 kV transmission line.

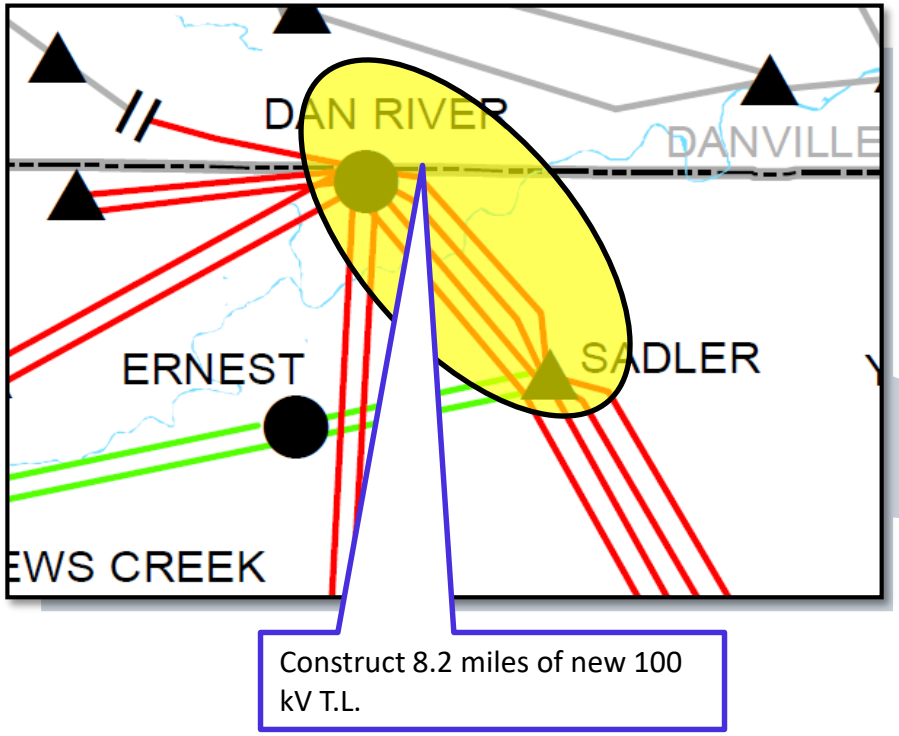
SUPPORTING STATEMENT:

The Peach Valley – Riverview 230 kV transmission line overloads under contingency.



DUKE CAROLINAS – 6 2019

SADLER TIE – DAN RIVER 100 KV T.L.

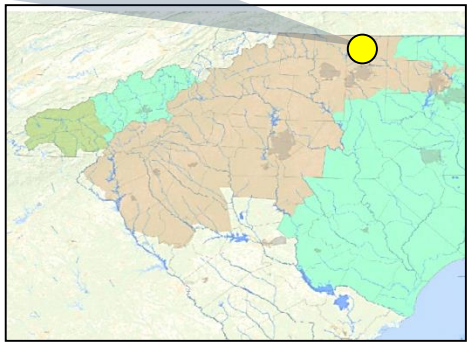


DESCRIPTION:

Construct approximately 8.2 miles of new 100 kV transmission line between Dan River Combined Cycle Station and Sadler Tie with 795 ACSS at 200°C.

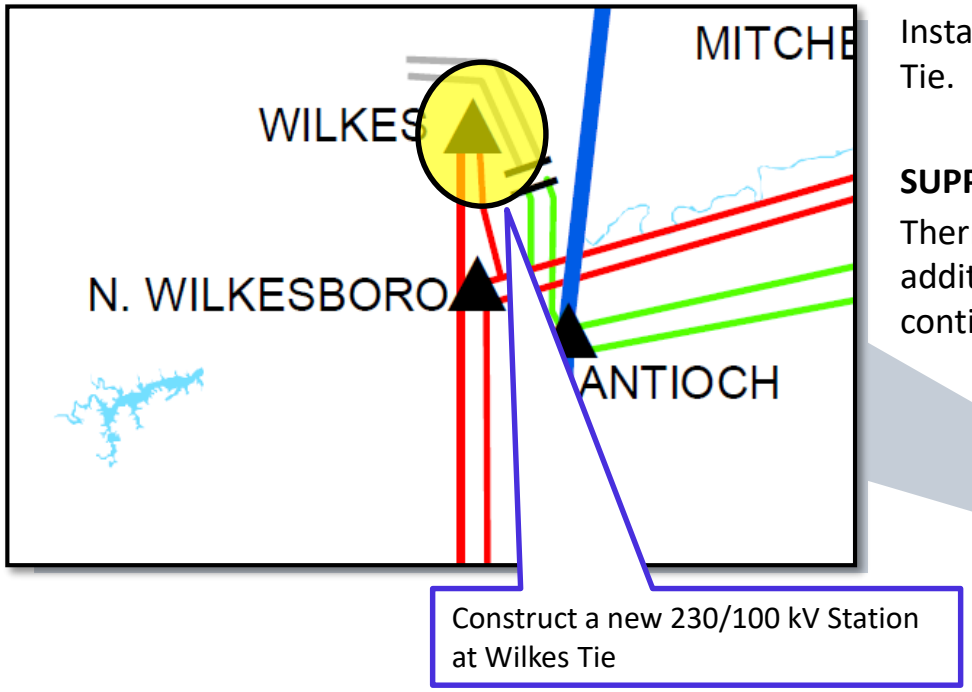
SUPPORTING STATEMENT:

Thermal overloads occur around Dan River Steam Station and Dan River Combined Cycle Station under contingency.



DUKE CAROLINAS – 7 2020

WILKES TIE 230 KV SUBSTATION

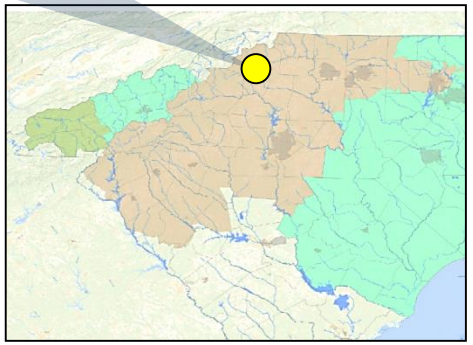


DESCRIPTION:

Install a new 230/100 kV, 448 MVA transformer at Wilkes Tie.

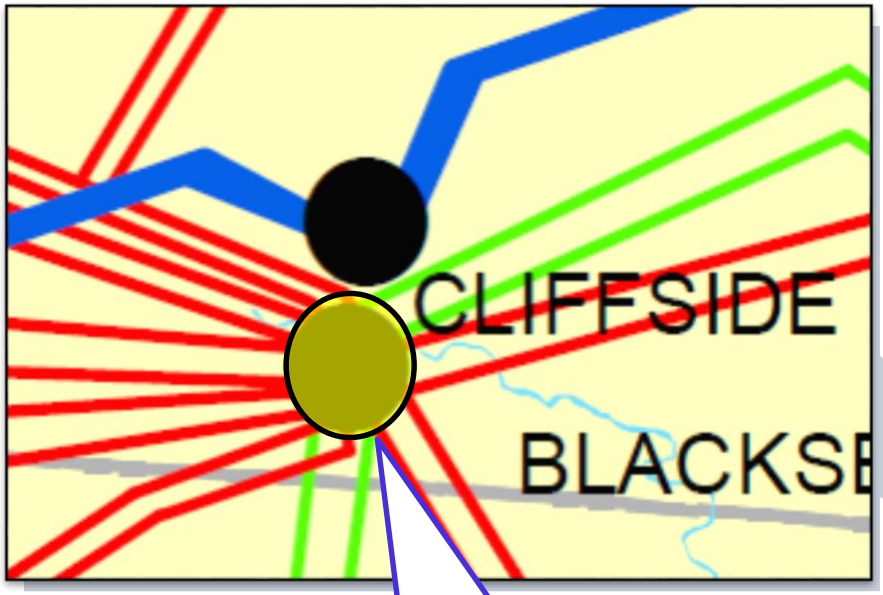
SUPPORTING STATEMENT:

Thermal overloads occur near North Wilkesboro Tie and additional voltage support is needed in the area under contingency.



DUKE CAROLINAS – 8 2020

CLIFFSIDE STEAM STATION



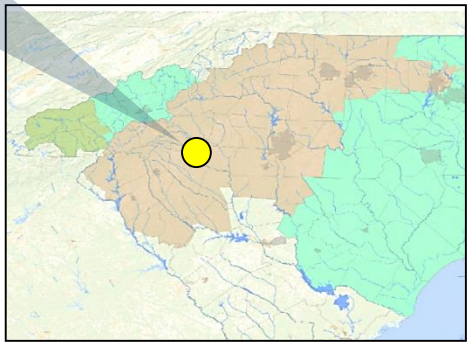
Install A THIRD 230/100 KV, 448 MVA TRANSFORMER AT CLIFFSIDE STEAM STATION

DESCRIPTION:

Install a third 230/100 kV, 448 MVA transformer at Cliffside Steam Station.

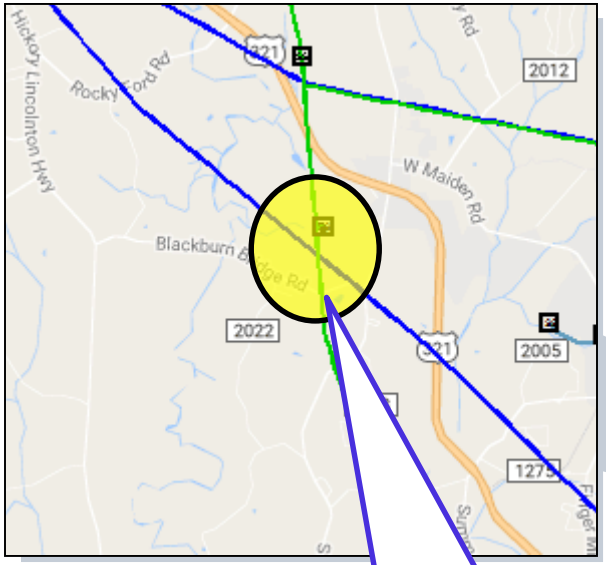
SUPPORTING STATEMENT:

Cliffside Steam Station 230/100 kV transformer overloads under contingency.



DUKE CAROLINAS – 9 2020

NEW 230/100 KV TIE, EAST OF MAIDEN NC



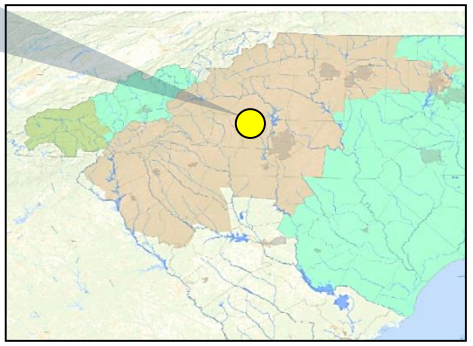
Construct a new 230/100 kV Tie East of Maiden, NC

DESCRIPTION:

Construct a new 230/100 kV Tie station between the Lincoln CT – Longview 230 kV double circuit lines and the Lincolnton Tie – Hickory Tie 100 kV double circuit lines

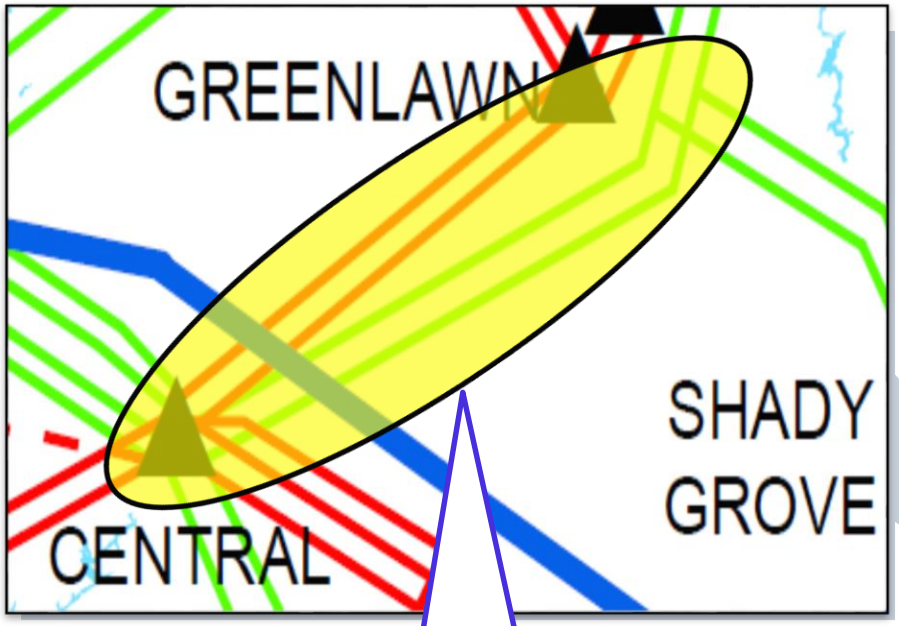
SUPPORTING STATEMENT:

To support additional load growth in the area.



DUKE CAROLINAS – 10 2022

CENTRAL – SHADY GROVE 230 KV T.L.



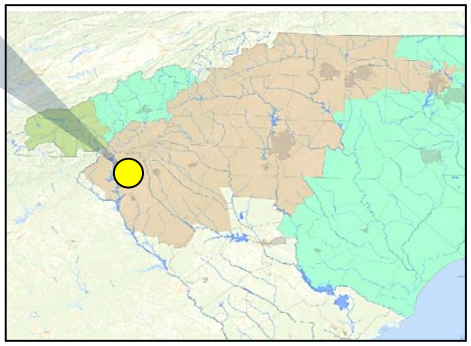
RECONDUCTOR 18 MILES OF THE CENTRAL – SHADY GROVE 230 KV TL WITH BUNDLED 954 ACSR AT 120°C

DESCRIPTION:

Reconductor approximately 18 miles of the Central – Shady Grove 230 kV transmission line with bundled 954 ACSR at 120°C.

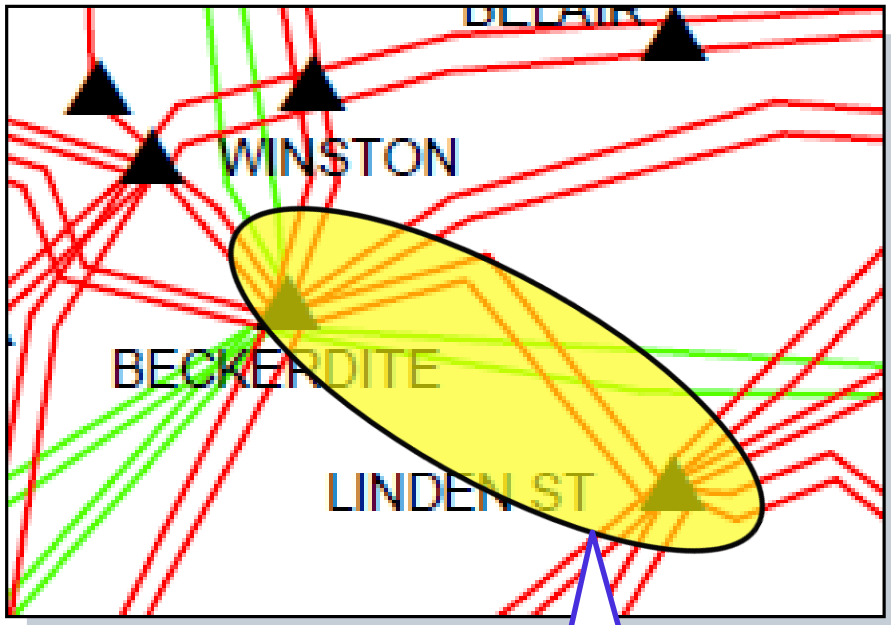
SUPPORTING STATEMENT:

The Central – Shady Grove 230 kV transmission line overloads under contingency.



DUKE CAROLINAS – 11 2023

BECKERDITE – LINDEN STREET 100 KV T.L.



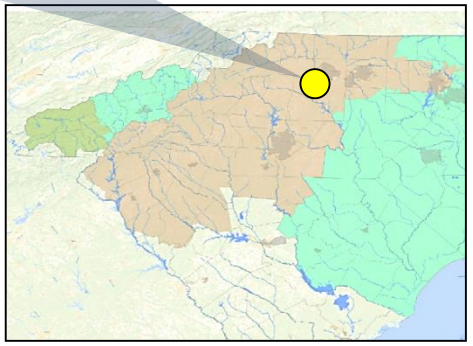
RECONDUCTOR 16 MILES OF THE BECKERDITE – LINDEN STREET 100 KV TL WITH BUNDLED 477 ACSR

DESCRIPTION:

Reconductor approximately 16 miles of the double circuit Beckerdite – Linden St 100 kV transmission line with bundled 477 ACSR.

SUPPORTING STATEMENT:

The Beckerdite – Linden Street 100 kV transmission line overloads under contingency.

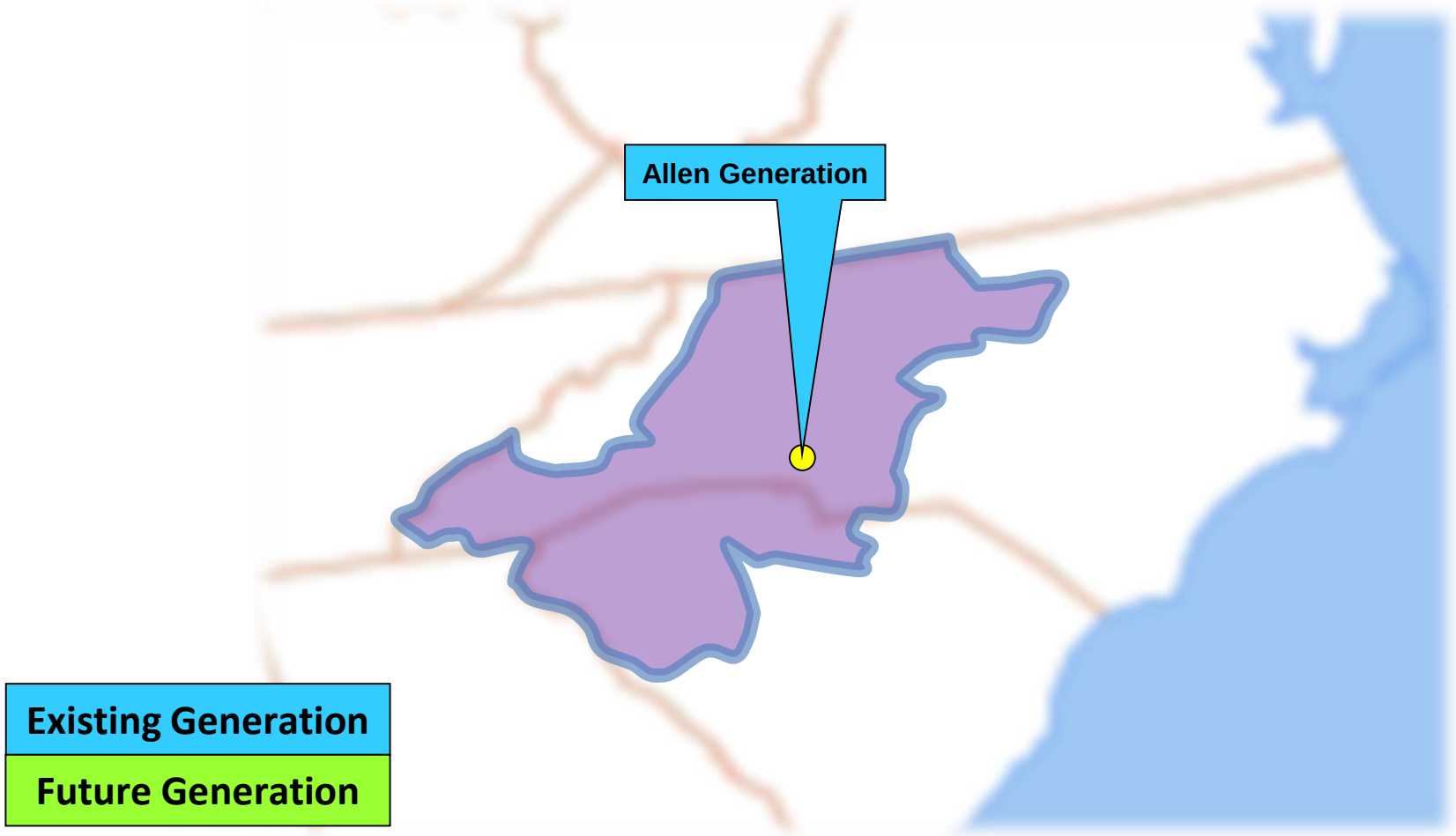


DUKE CAROLINAS Balancing Authority

Upcoming 2018 Generation Assumptions

DUKE CAROLINAS – Generation Assumptions

The following diagram depicts the location of generation assumptions <u>that change</u> throughout the ten year planning horizon for the 2018 SERTP Process.



DUKE CAROLINAS – Generation Assumptions

The following table depicts the generation assumptions that change throughout the ten year planning horizon for the 2018 SERTP Process. The years shown represent Summer Peak conditions.

SITE	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
ALLEN 1	174	174	174	174	174	174	0	--	--	--
ALLEN 2	172	172	172	172	172	172	0	--	--	--
ALLEN 3	271	271	271	271	271	271	0	--	--	--

DUKE CAROLINAS – Generation Assumptions (Point-to-Point)

The following table depicts generation assumptions based upon expected long-term firm point-to-point commitments. The years shown represent Summer Peak conditions.

SITE	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
BROAD RIVER	850	850	850	850	850	850	850	850	850	850
CATAWBA	155	155	155	155	155	155	155	155	155	155
ROWAN	150	150	150	150	150	150	150	150	150	150

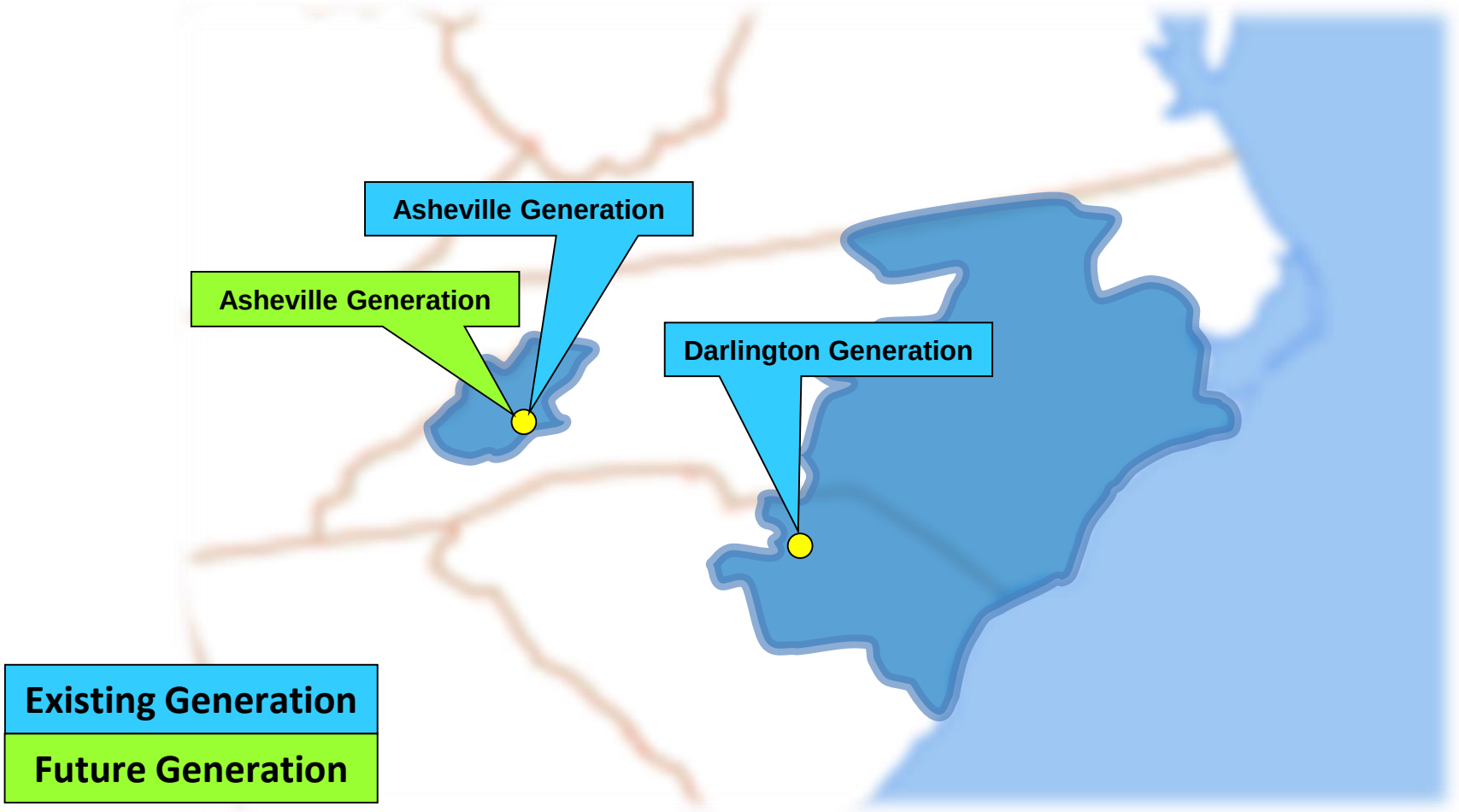
DUKE PROGRESS EAST/WEST

Balancing Authorities

2017 Generation Assumptions

DUKE PROGRESS – Generation Assumptions

The following diagram depicts the location of generation assumptions that change throughout the ten year planning horizon for the 2017 SERTP Process.



DUKE PROGRESS – Generation Assumptions

The following table depicts the generation assumptions <u>that change</u> throughout the ten year planning horizon for the 2017 SERTP Process. The years shown represent Summer Peak conditions.

SITE	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
ASHEVILLE #1 COAL	191	191	0	--	--	--	--	--	--	--
ASHEVILLE #2 COAL	185	185	0	--	--	--	--	--	--	--
ASHEVILLE CC #1	--	--	260	260	260	260	260	260	260	260
ASHEVILLE CC #2	--	--	260	260	260	260	260	260	260	260
DARLINGTON CT #1	52	52	0	--	--	--	--	--	--	--
DARLINGTON CT #2	48	48	0	--	--	--	--	--	--	--
DARLINGTON CT #3	52	52	0	--	--	--	--	--	--	--
DARLINGTON CT #4	50	50	0	--	--	--	--	--	--	--
DARLINGTON CT #5	52	52	0	--	--	--	--	--	--	--
DARLINGTON CT #6	45	45	0	--	--	--	--	--	--	--

DUKE PROGRESS – Generation Assumptions (Cont.)

The following table depicts the generation assumptions that change throughout the ten year planning horizon for the 2017 SERTP Process. The years shown represent Summer Peak conditions.

SITE	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
DARLINGTON CT #7	51	51	0	--	--	--	--	--	--	--
DARLINGTON CT #8	48	48	0	--	--	--	--	--	--	--
DARLINGTON CT #9	52	52	0	--	--	--	--	--	--	--
DARLINGTON CT #10	51	51	0	--	--	--	--	--	--	--
DARLINGTON CT #11	0	--	--	--	--	--	--	--	--	--

DUKE PROGRESS – Generation Assumptions (Point-to-Point)

The following table depicts generation assumptions based upon expected long-term firm point-to-point commitments. The years shown represent Summer Peak conditions.

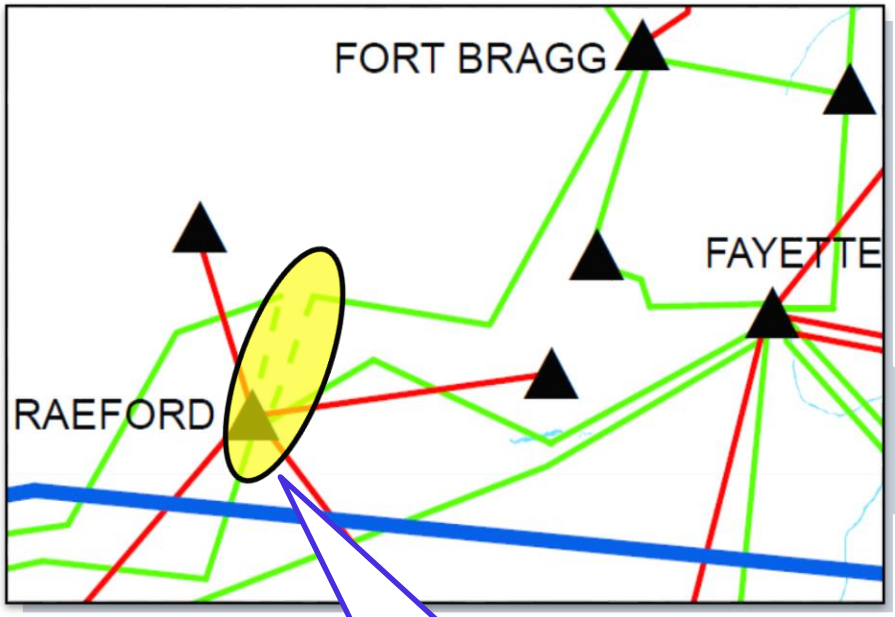
SITE	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
HAMLET #1	55	55	55	55	55	55	55	55	55	55
HAMLET #2	55	55	55	55	55	55	55	55	55	55
HAMLET #3	55	55	55	55	55	55	55	55	55	55
INGENCO	6	6	6	6	6	6	6	6	6	6

DUKE PROGRESS EAST Balancing Authority

SERTP Regional Transmission Expansion Plan

DUKE PROGRESS EAST – 1 2018

RAEFORD 230 KV SUBSTATION

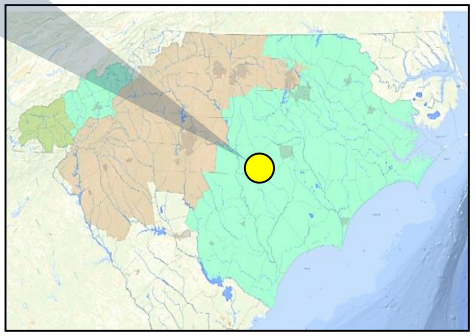


DESCRIPTION:

Loop in the Richmond – Ft. Bragg Woodruff St. 230 kV transmission line at Raeford 230/115 kV substation and **install** a 300 MVA transformer.

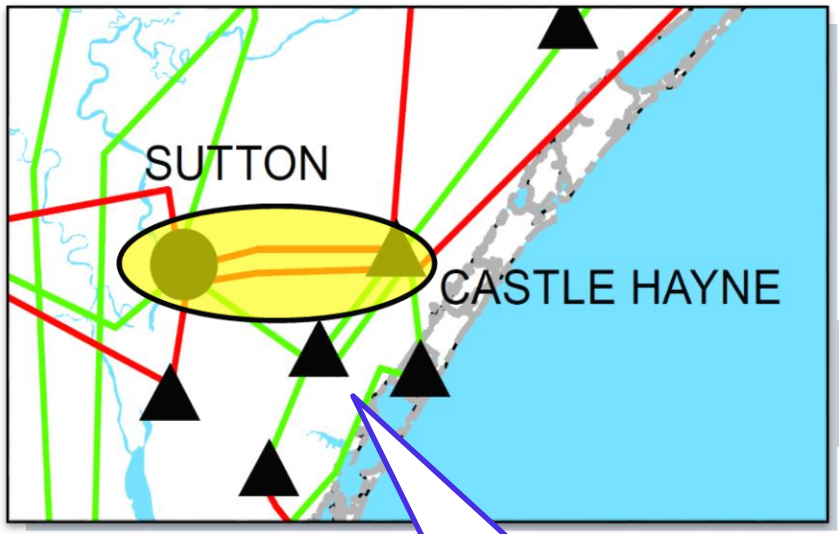
SUPPORTING STATEMENT:

The Raeford 230/115 kV transformers and Weatherspoon – Raeford 115 kV transmission line overload under contingency.



DUKE PROGRESS EAST – 2 2019

SUTTON PLANT – CASTLE HAYNE 115 KV NORTH T.L.

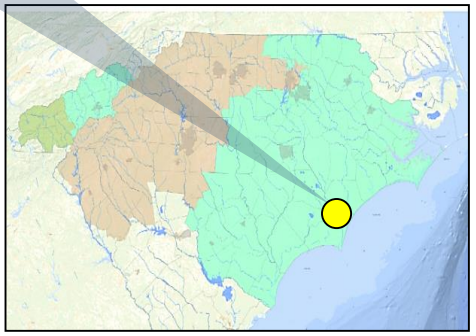


DESCRIPTION:

Rebuild approximately 8 miles of the Sutton Plant – Castle Hayne 115 kV North transmission line using 1272 ACSR rated for 239 MVA.

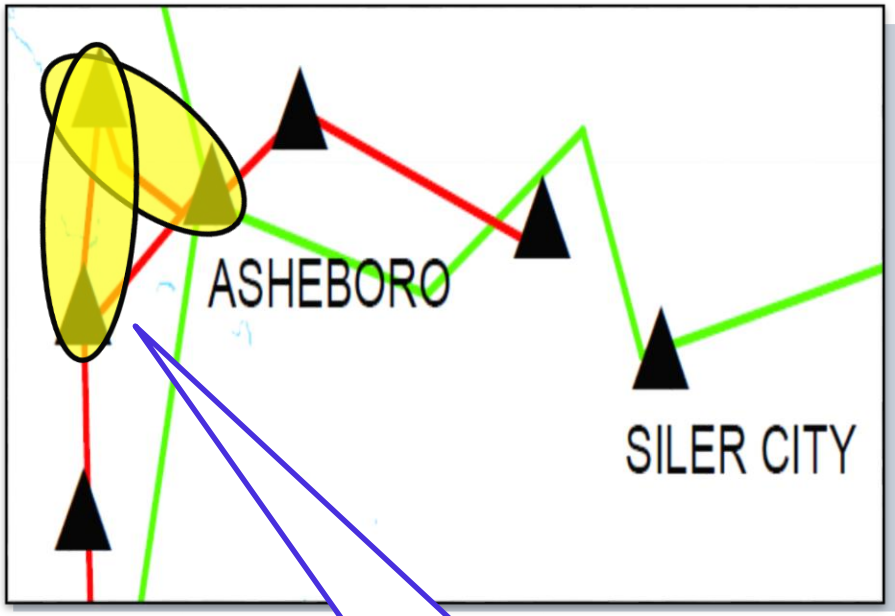
SUPPORTING STATEMENT:

The Sutton Plant – Castle Hayne 115 kV North transmission line overloads under contingency.



DUKE PROGRESS EAST – 3 2019

ASHEBORO – ASHEBORO EAST (NORTH) 115 KV T.L.

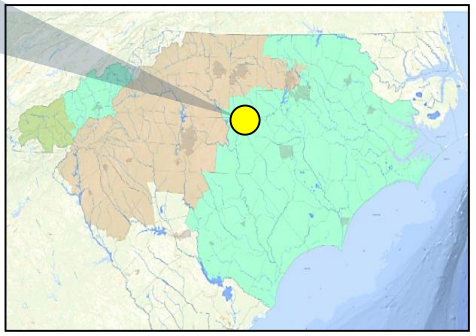


DESCRIPTION:

Rebuild approximately 6.5 miles of the Asheboro – Asheboro East (North) 115 kV transmission line using 3-1590 ACSR rated for 307 MVA. Replace disconnect switches at Asheboro 230 kV and both the breaker and the disconnect switches at Asheboro East 115 kV with equipment of at least 2000 A capability.

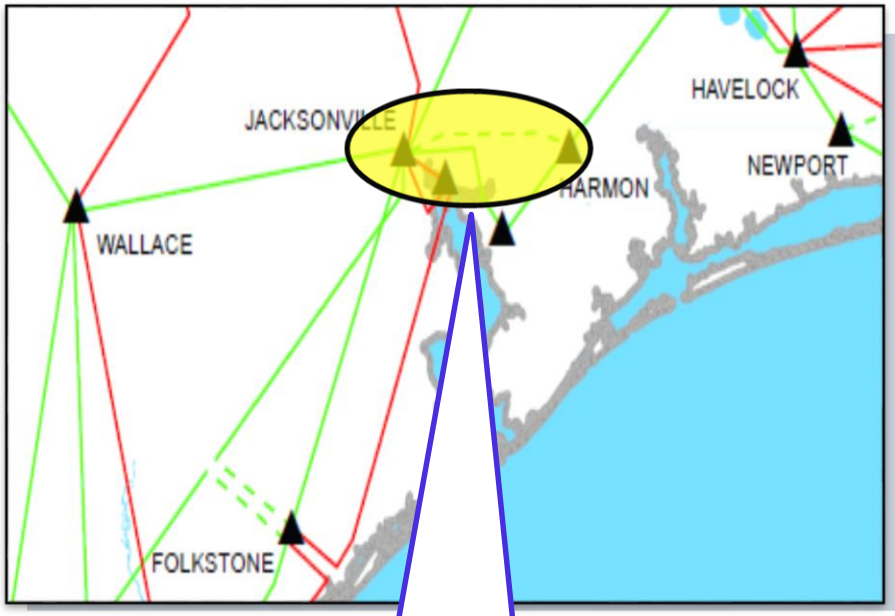
SUPPORTING STATEMENT:

The Asheboro – Asheboro East (North) 115 kV transmission line overloads under contingency.



DUKE PROGRESS EAST – 4 2020

GRANT'S CREEK - JACKSONVILLE 230 KV T.L.



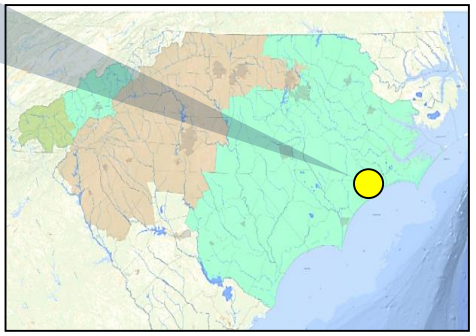
NEW 230 KV TL WITH 6-1590 ACSR OR EQUIVALENT CONDUCTOR. NEW 230 KV SUBSTATION WITH A 230/115 KV, 300 MVA TRANSFORMER

DESCRIPTION:

Construct approximately 12 miles of new 230 kV transmission line from Jacksonville 230 kV substation to a new 230 kV substation at Grant's Creek with bundled 6-1590 ACSR or equivalent conductor rated for 1195 MVA. Build the new 230 kV Grant's Creek substation with four 230 kV breakers and a new **230/115 kV, 300 MVA** transformer.

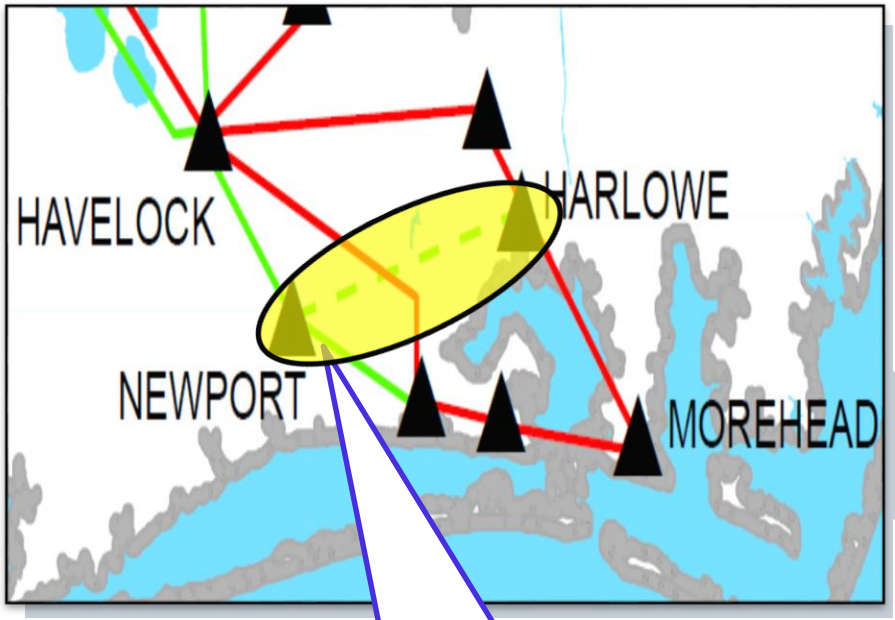
SUPPORTING STATEMENT:

The Havelock – Jacksonville 230 kV transmission line overloads under contingency and additional voltage support is needed in the Jacksonville area.



DUKE PROGRESS EAST – 5 2020

HARLOWE – NEWPORT 230 KV T.L.



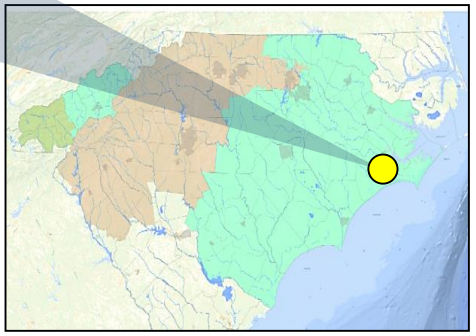
NEW 230 KV SWITCHING STATION. NEW 230 KV SUBSTATION. NEW 230 KV T.L. WITH 3-1590 ACSR OR EQUIVALENT CONDUCTOR

DESCRIPTION:

Construct a new 230 kV switching station at Newport, construct a new 230 kV substation in the Harlowe Area, and construct approximately 10 miles of new 230 kV transmission line from the Harlowe – Newport with 3-1590 ACSR or equivalent conductor rated for 680 MVA.

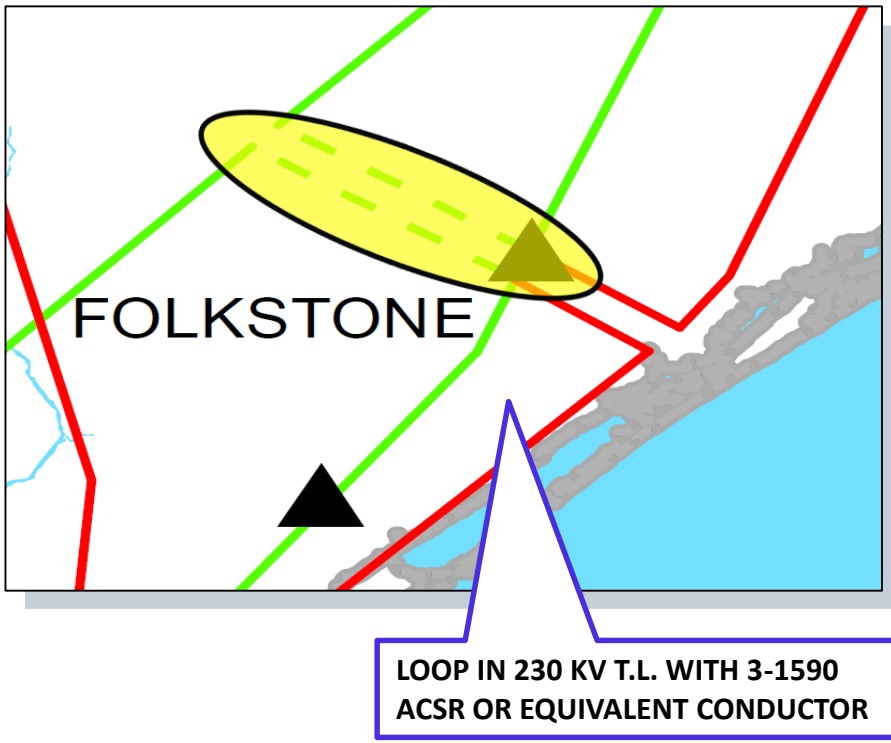
SUPPORTING STATEMENT:

Additional voltage support is needed in Havelock – Morehead area under contingency.



DUKE PROGRESS EAST – 6 2024

BRUNSWICK #1 – JACKSONVILLE 230 KV T.L.

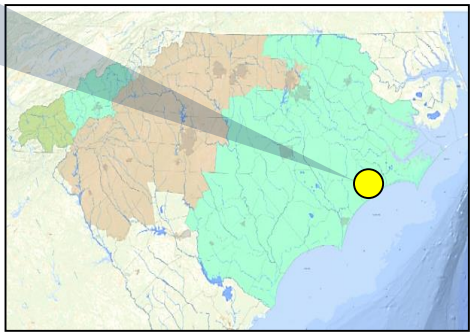


DESCRIPTION:

Loop existing Brunswick Plant Unit 1 – Jacksonville 230 kV transmission line into the Folkstone 230 kV Substation. Also, convert the Folkstone 230 kV bus configuration to breaker-and-one-half by installing three (3) new 230 kV breakers.

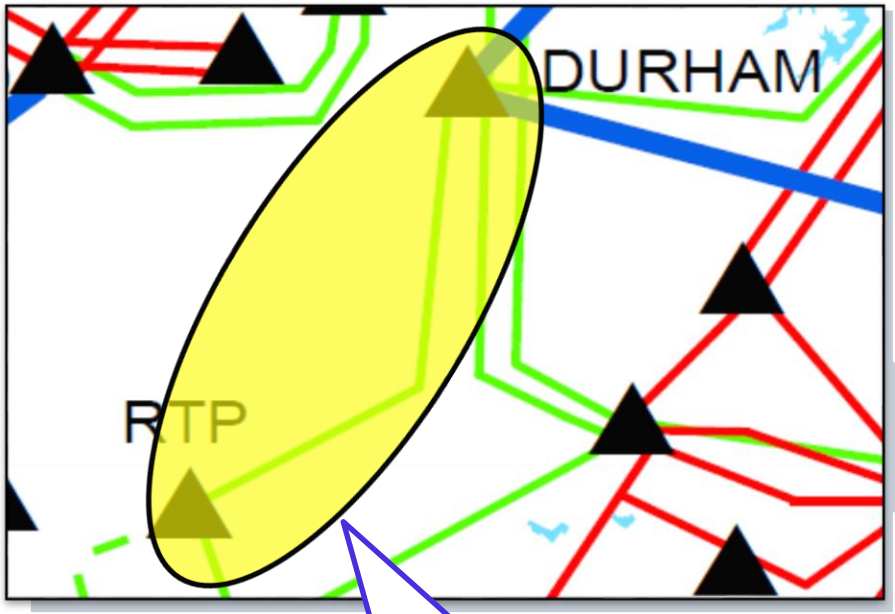
SUPPORTING STATEMENT:

The Castle Hayne – Folkstone 115 kV transmission line overloads under contingency.



DUKE PROGRESS EAST – 7 2025

DURHAM – RTP 230 KV T.L.

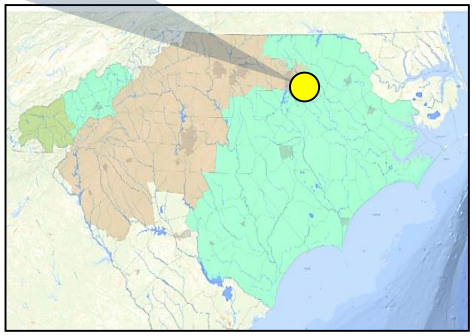


DESCRIPTION:

Reconductor approximately 10 miles of the Durham – RTP 230 kV transmission line with bundled 6-1590 ACSR rated for 1195 MVA.

SUPPORTING STATEMENT:

The Durham – RTP 230 kV transmission line overloads under contingency.

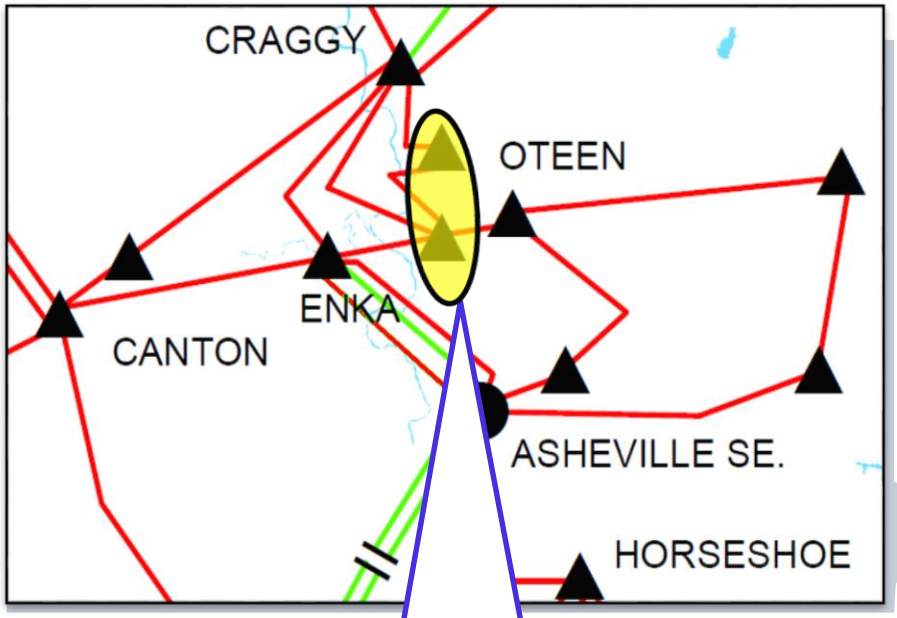


DUKE PROGRESS WEST Balancing Authority

SERTP Regional Transmission Expansion Plan

DUKE PROGRESS WEST – 1 2018

VANDERBILT – WEST ASHEVILLE 115 KV T.L.



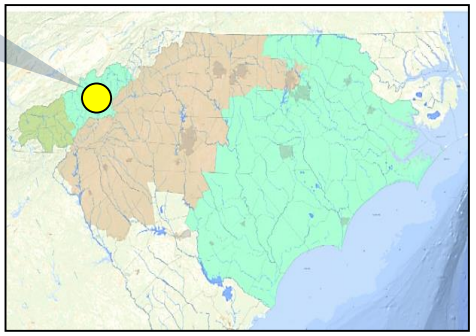
RECONDUCTOR 2.69 MILES OF 115 KV TL WITH 3-795 OR EQUIVALENT. REPLACE 115 KV BREAKERS AND SWITCHES

DESCRIPTION:

Reconductor approximately 2.7 miles of the Vanderbilt – West Asheville 115 kV transmission line with 3-795 ACSR rated for 300 MVA. Replace one 115 kV breaker, two 115 kV disconnect switches, and one 115 kV switch at Vanderbilt.

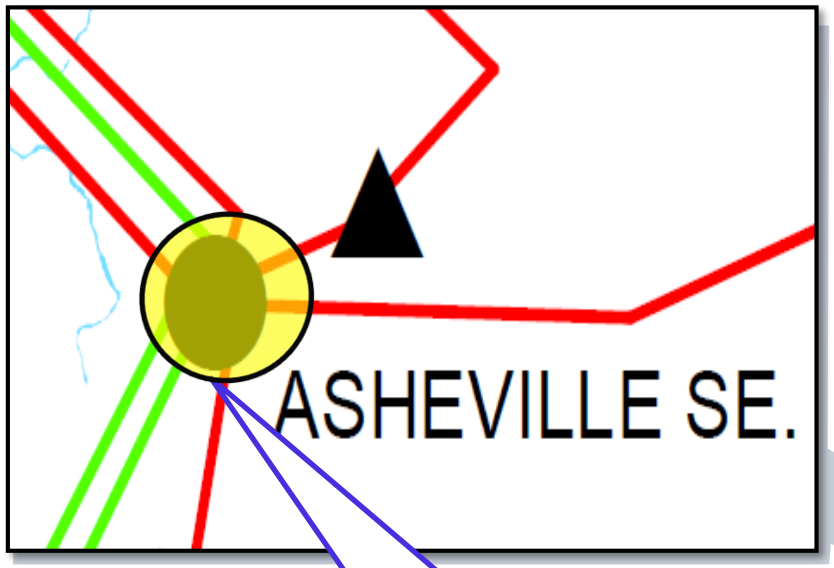
SUPPORTING STATEMENT:

The Vanderbilt – West Asheville 115 kV transmission line overloads under contingency.



DUKE PROGRESS WEST – 2 2019

ASHEVILLE SE PLANT



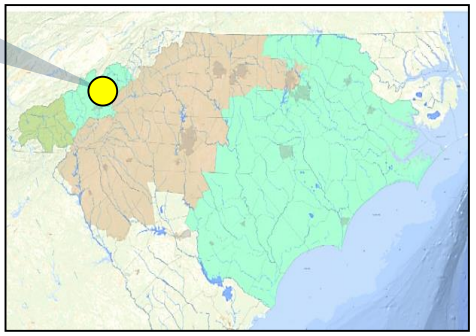
REPLACE TRANSFORMERS. REBUILD 1.2 MILES 0F 115 KV TL WITH 1590 ACSR. REPLACE BREAKERS WITH 3000 A BREAKERS. INSTALL 72 MVAR CAPACITOR BANK.

DESCRIPTION:

Upgrade the two existing 230/115 kV transformers to 400 MVA each, reconductor approximately 1.2 miles of the 115 kV north and south transformer tie lines with 1590 ACSR at 100°C, replace the existing breakers with 3000 A breakers, and install a 72 MVAR 230 kV capacitor bank.

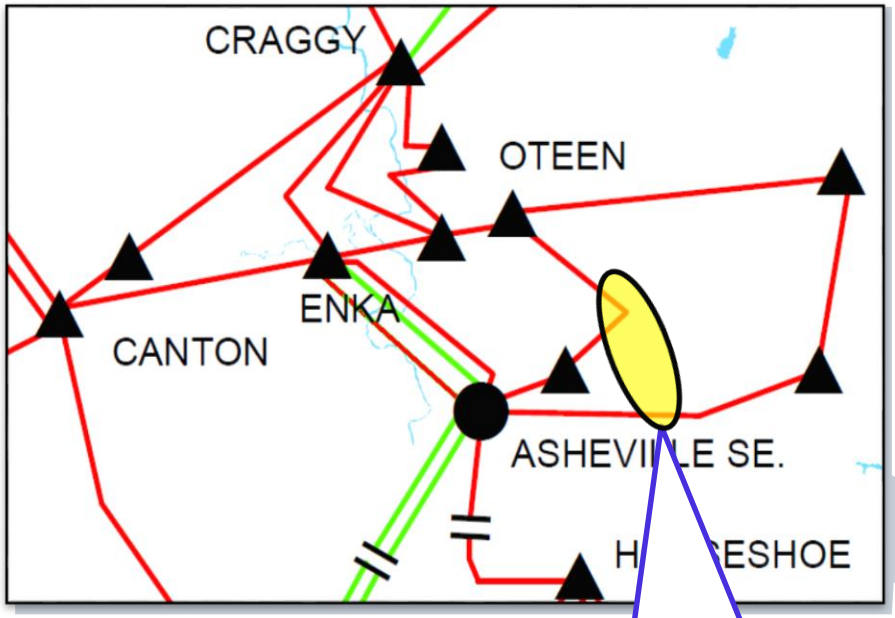
SUPPORTING STATEMENT:

Necessary upgrades to allow for the interconnection of two combined cycle units at Asheville Plant.



DUKE PROGRESS WEST – 3 2022

ASHEVILLE PLANT – OTEEN WEST 115 KV T.L., BALDWIN TAP



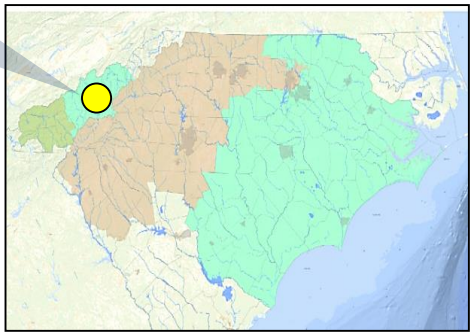
CONSTRUCT 2.2 MILES OF 115 KV TRANSMISSION LINE WITH 795 ACSR. RECONNECT THE BALDWIN 115 KV SUBSTATION.

DESCRIPTION:

Construct approximately 2.2 miles of new 115 kV transmission line from the Asheville Plant – Oteen West 115 kV transmission line to the Asheville Plant – Oteen East 115 kV transmission line with 795 ACSR. The Baldwin 115 kV substation will be reconnected to this new tap line.

SUPPORTING STATEMENT:

Additional voltage support is needed in the Baldwin area.



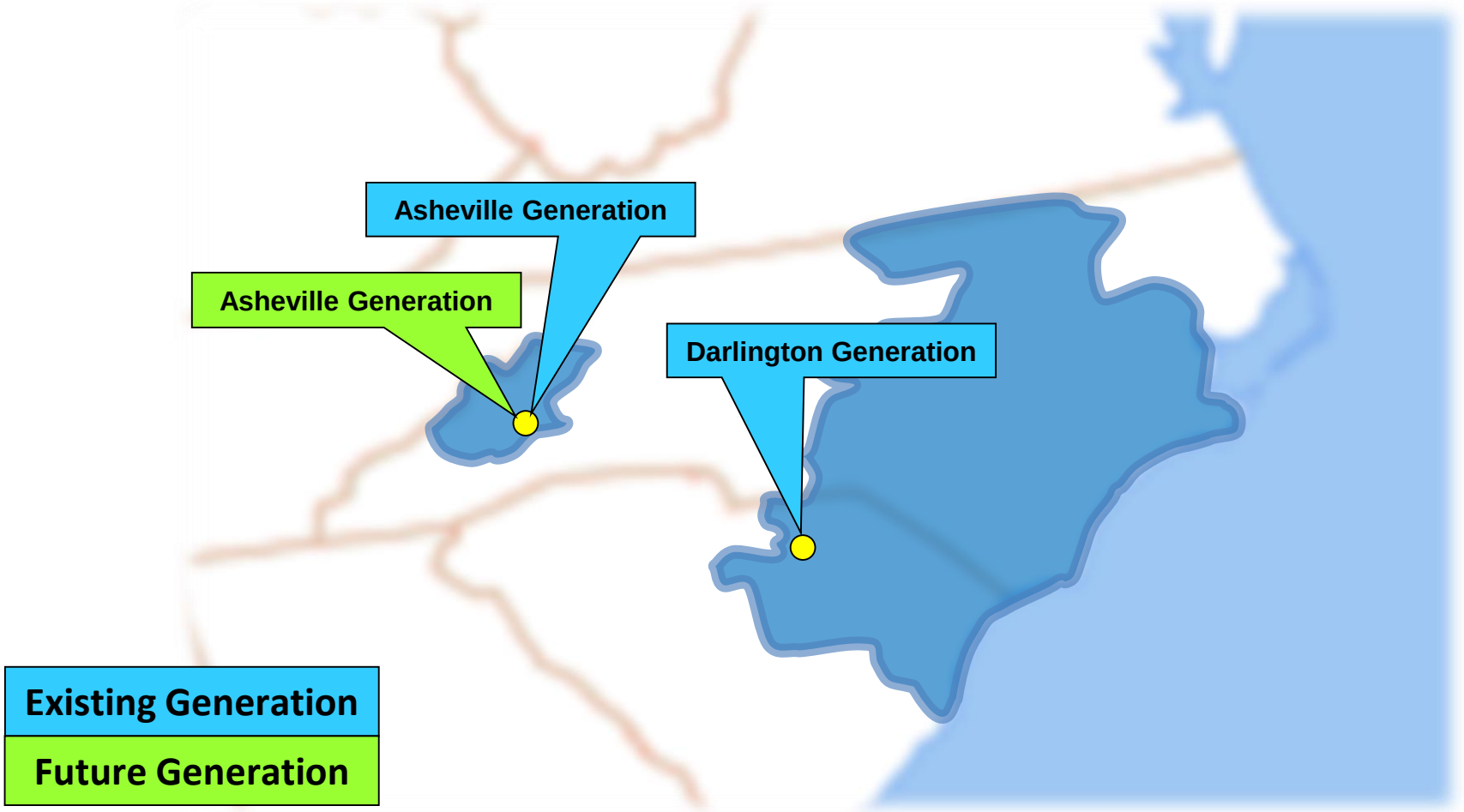
DUKE PROGRESS EAST/WEST

Balancing Authorities

Upcoming 2018 Generation Assumptions

DUKE PROGRESS – Generation Assumptions

The following diagram depicts the location of generation assumptions that change throughout the ten year planning horizon for the 2018 SERTP Process.



DUKE PROGRESS – Generation Assumptions

The following table depicts the generation assumptions that change throughout the ten year planning horizon for the 2018 SERTP Process. The years shown represent Summer Peak conditions.

SITE	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
ASHEVILLE #1 COAL	191	0	--	--	--	--	--	--	--	--
ASHEVILLE #2 COAL	185	0	--	--	--	--	--	--	--	--
ASHEVILLE CC #1	--	260	260	260	260	260	260	260	260	260
ASHEVILLE CC #2	--	260	260	260	260	260	260	260	260	260
DARLINGTON CT #1	52	0	--	--	--	--	--	--	--	--
DARLINGTON CT #2	48	0	--	--	--	--	--	--	--	--
DARLINGTON CT #3	52	0	--	--	--	--	--	--	--	--
DARLINGTON CT #4	50	0	--	--	--	--	--	--	--	--
DARLINGTON CT #5	52	0	--	--	--	--	--	--	--	--
DARLINGTON CT #6	45	0	--	--	--	--	--	--	--	--

DUKE PROGRESS – Generation Assumptions (Cont.)

The following table depicts the generation assumptions that change throughout the ten year planning horizon for the 2018 SERTP Process. The years shown represent Summer Peak conditions.

SITE	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
DARLINGTON CT #7	51	0	--	--	--	--	--	--	--	--
DARLINGTON CT #8	48	0	--	--	--	--	--	--	--	--
DARLINGTON CT #9	52	0	--	--	--	--	--	--	--	--
DARLINGTON CT #10	51	0	--	--	--	--	--	--	--	--
DARLINGTON CT #11	--	--	--	--	--	--	--	--	--	--

DUKE PROGRESS – Generation Assumptions (Point-to-Point)

The following table depicts generation assumptions based upon expected long-term firm point-to-point commitments. The years shown represent Summer Peak conditions.

SITE	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
HAMLET #1	55	55	55	55	55	55	55	55	55	55
HAMLET #2	55	55	55	55	55	55	55	55	55	55
HAMLET #3	55	55	55	55	55	55	55	55	55	55
INGENCO	6	6	6	6	6	6	6	6	6	6

LG&E/KU Balancing Authority

2017 Generation Assumptions

* LG&E/KU has no generation assumptions that change throughout the ten year planning horizon for the 2017 SERTP Process.

LG&E/KU – Generation Assumptions (Point-to-Point)

The following table depicts generation assumptions based upon expected long-term firm point-to-point commitments. The years shown represent Summer Peak conditions.

SITE	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
TRIMBLE COUNTY	324	324	324	324	324	324	324	324	324	324

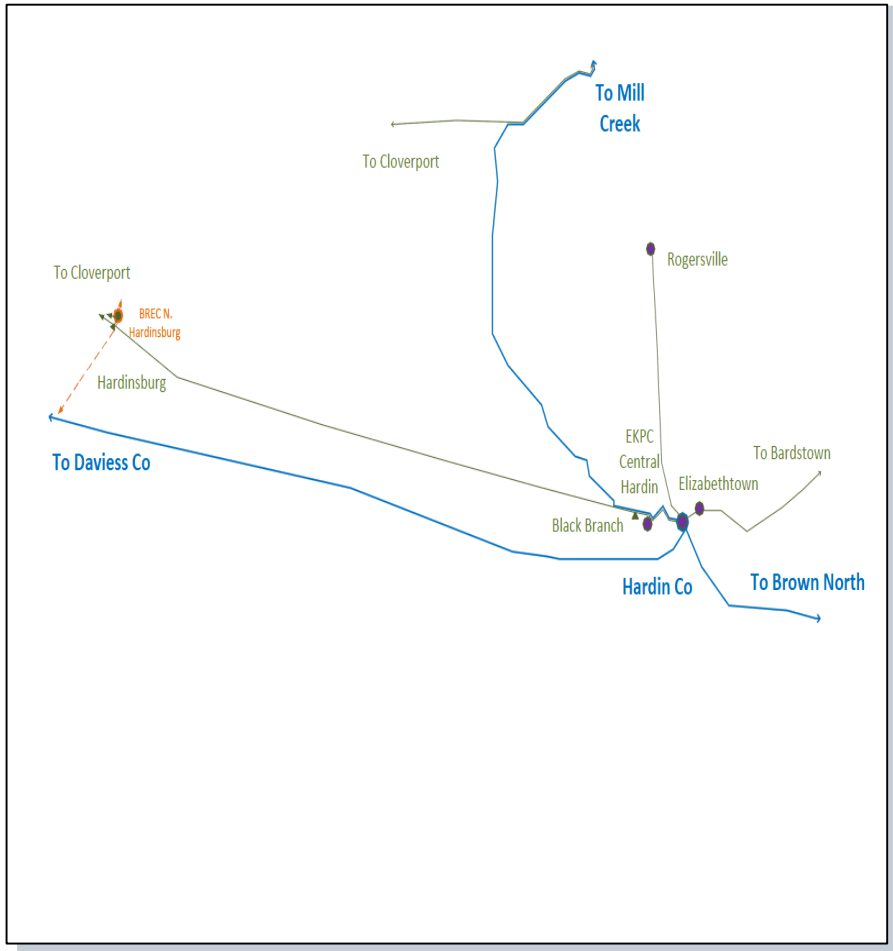
LG&E/KU Balancing Authority

SERTP Regional Transmission Expansion Plan

LG&E/KU – 1

2018

HARDINSBURG – BLACK BRANCH 138 KV T.L.

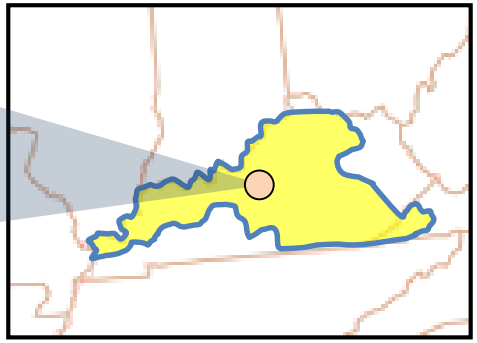


DESCRIPTION:

Replace 138 kV terminal equipment, rated less than or equal to 237 MVA, on the Hardinsburg - Black Branch 138 kV transmission line with equipment capable of a minimum of 265 MVA summer emergency rating.

SUPPORTING STATEMENT:

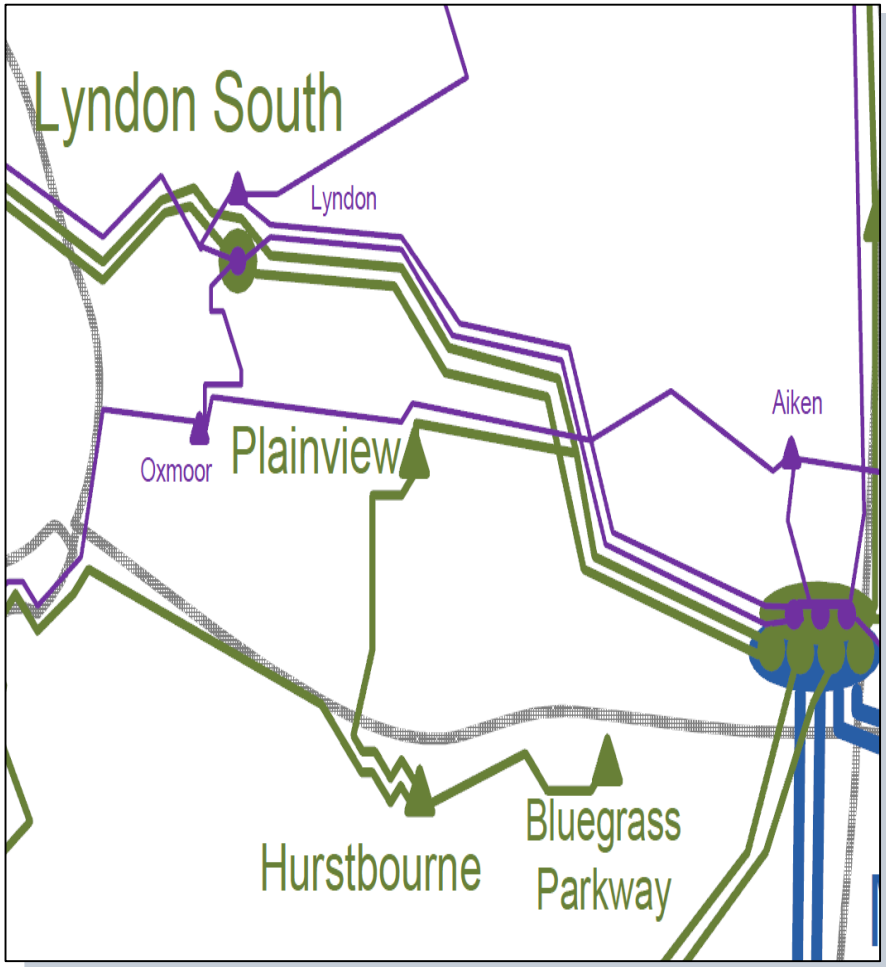
The Hardinsburg – Black Branch 138 kV transmission line becomes overloaded under contingency.



LG&E/KU – 2

2021

PLAINVIEW – PLAINVIEW TAP 138 KV T.L.

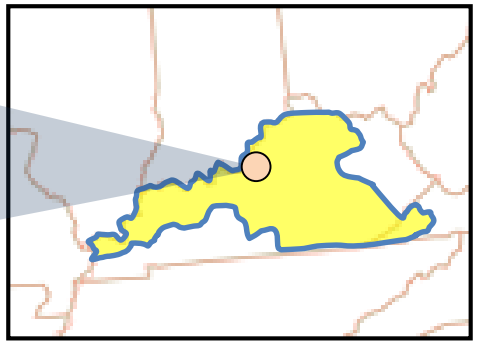


DESCRIPTION:

Replace approximately 1.57 miles of 1272 AA conductor in the Plainview - Plainview Tap section of the Middletown to Beargrass 138 kV transmission line with 1272 ACSR capable of at least 341 MVA.

SUPPORTING STATEMENT:

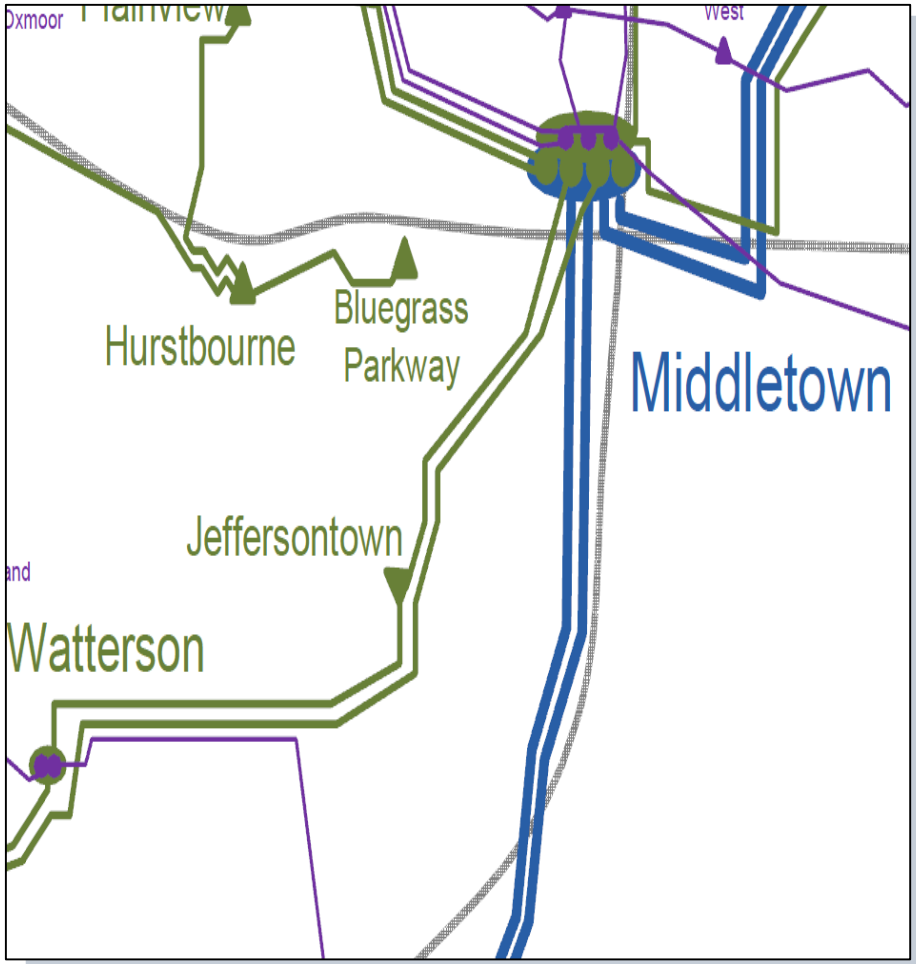
The Plainview – Plainview Tap 138 kV transmission line overloads under contingency.



LG&E/KU – 3

2021

WATTERSON - JEFFERSON TAP 138 KV T.L.

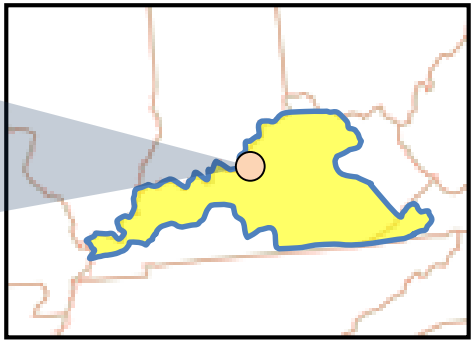


DESCRIPTION:

Replace 138 kV terminal equipment rated less than or equal to 306 MVA summer emergency ratings at Watterson on the Watterson – Jefferson 138 kV **line with equipment capable of a minimum of 341 MVA summer emergency rating.**

SUPPORTING STATEMENT:

The Watterson – Jefferson Tap 138 kV transmission line overloads under contingency.



LG&E/KU Balancing Authority

Upcoming 2018 Generation Assumptions

* LG&E/KU has no generation assumptions that change throughout the ten year planning horizon for the 2018 SERTP Process.

LG&E/KU – Generation Assumptions (Point-to-Point)

The following table depicts generation assumptions based upon expected long-term firm point-to-point commitments. The years shown represent Summer Peak conditions.

SITE	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
TRIMBLE COUNTY	324	324	324	324	324	324	324	324	324	324

OVEC Balancing Authority

SERTP Regional Transmission Expansion Plan & Generation Assumptions

* OVEC has no transmission projects included in the 2017 SERTP Regional Transmission Expansion Plan. In addition, OVEC has no generation assumptions expected to change throughout the ten year planning horizon for the 2017 and 2018 SERTP Planning Processes.

POWERSOUTH Balancing Authority

2017 Generation Assumptions

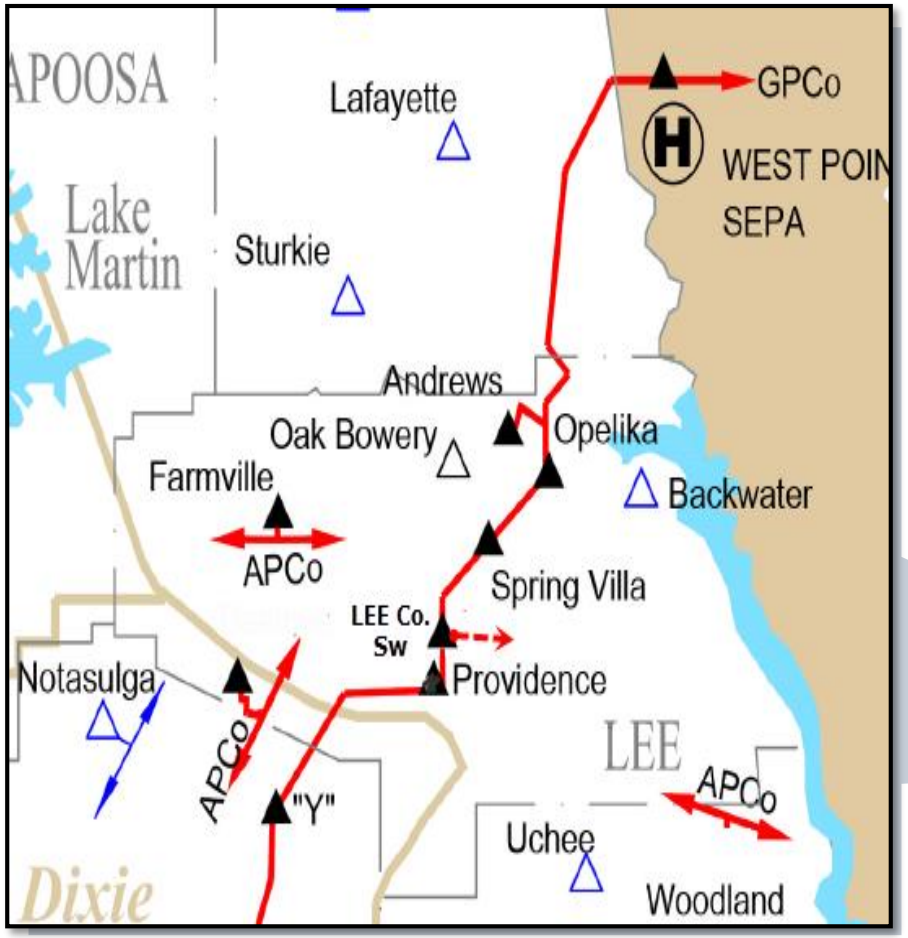
* POWERSOUTH has no generation assumptions expected to change throughout the ten year planning horizon for the 2017 SERTP Process.

POWERSOUTH Balancing Authority

SERTP Regional Transmission Expansion Plan

POWERSOUTH – 1 2018

LEE CO. 115 KV SWITCHING STATION

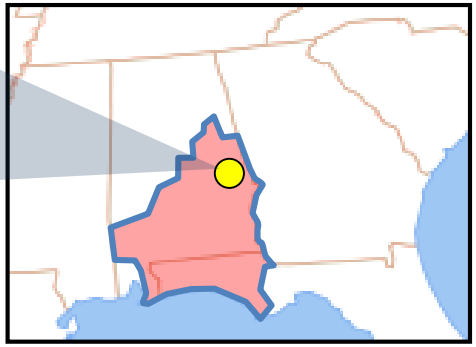


DESCRIPTION:

Construct a new 115 kV switching station that taps the existing Dublin – West Point 115 kV transmission line to facilitate the Lee County – Fuller Road 115 kV transmission line.

SUPPORTING STATEMENT:

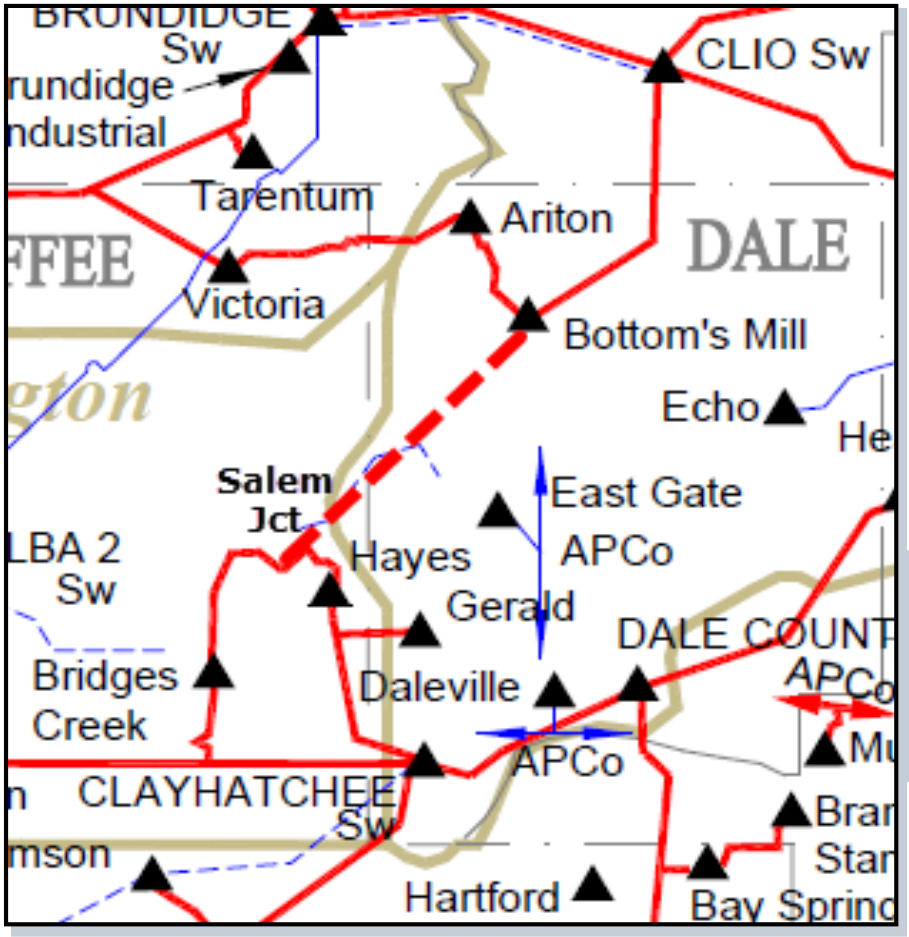
Additional voltage support is needed on the Dublin – West Point 115 kV transmission line under contingency.



POWERSOUTH – 2

2018

SALEM JUNCTION – BOTTOMS MILL 115 KV T.L.

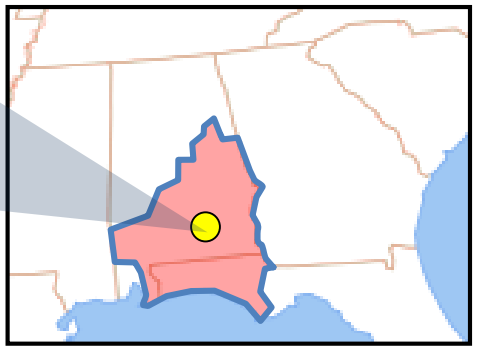


DESCRIPTION:

Construct approximately 16 miles of new 115 kV transmission line from Bottom's Mill - Salem Junction with 795 ACSR at 100°C.

SUPPORTING STATEMENT:

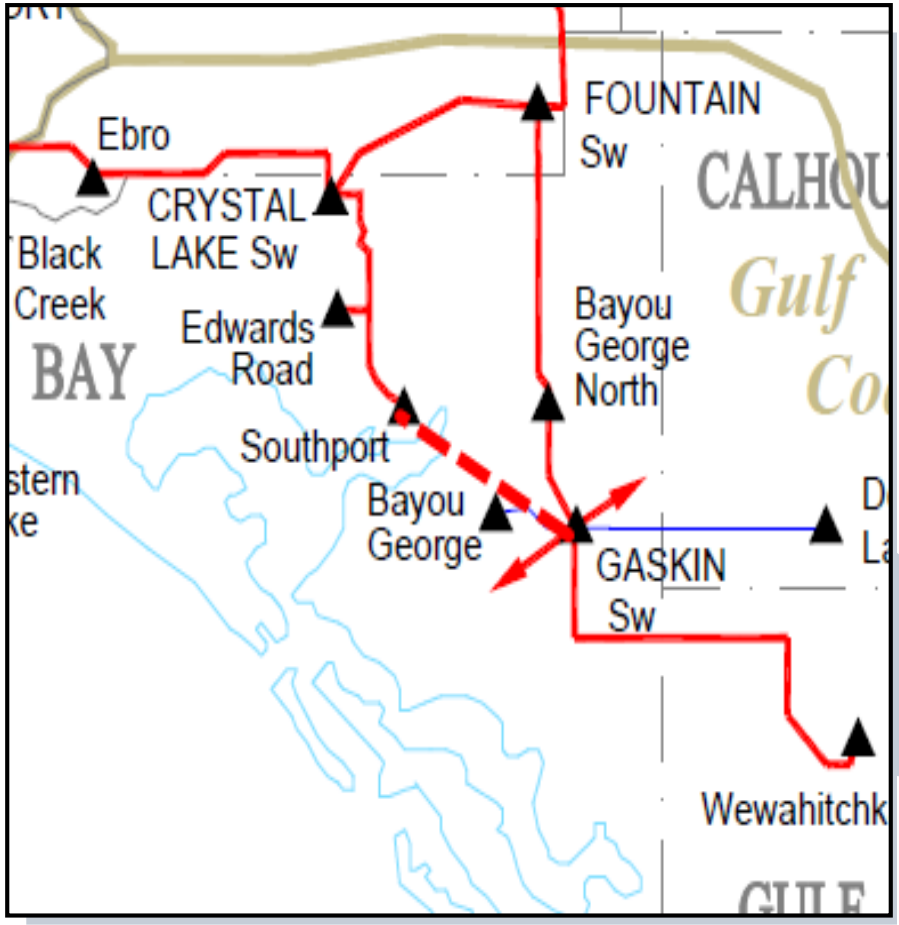
Additional voltage support needed in the Dublin, Kyzar, Brundidge, Clio, and Victoria areas under contingency.



POWERSOUTH – 3

2018

GASKIN – SOUTHPORT 115 KV T.L.

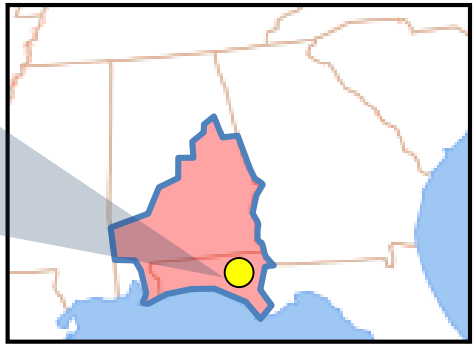


DESCRIPTION:

Construct approximately 9 miles of new 115 kV transmission line from Gaskin Switching Station – Southport Substation with 795 ACSR at 100°C.

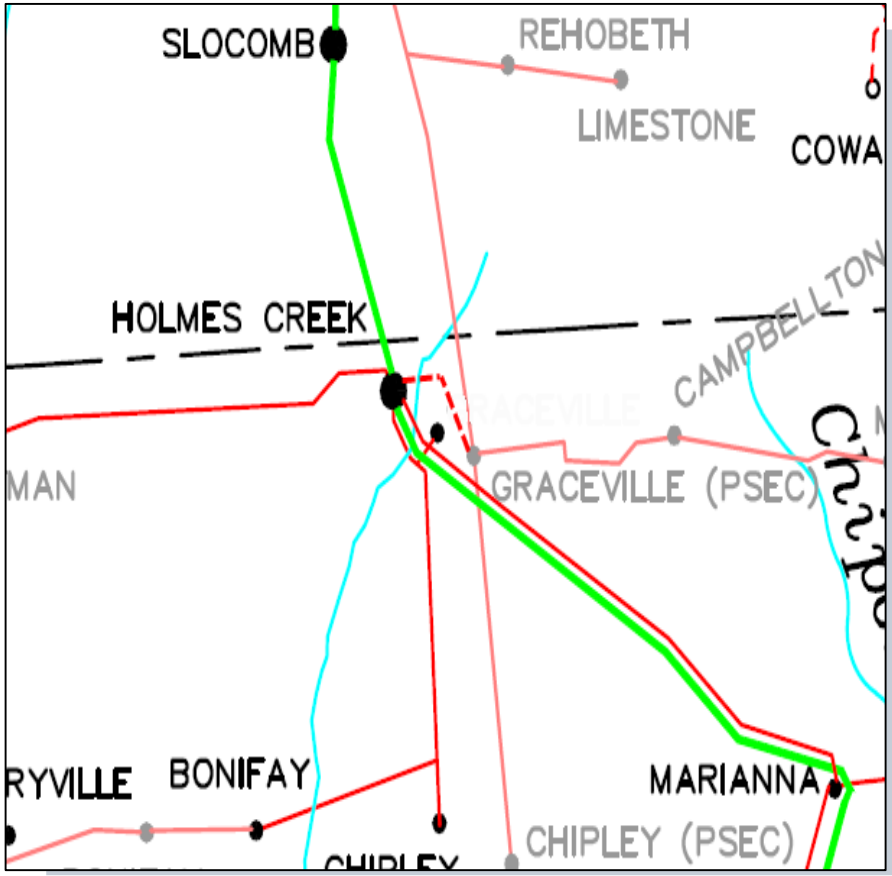
SUPPORTING STATEMENT:

Improve the reliability of Gulf Coast Electric's substations by providing a looped service feed.



POWERSOUTH – 4 2018

GRACEVILLE – HOLMES CREEK 115 KV T.L.



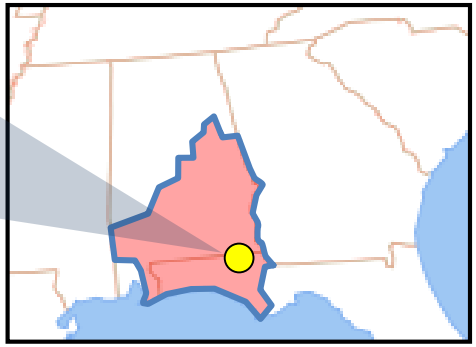
DESCRIPTION:

Construct approximately 1 mile of new 115 kV transmission line from Graceville

115 kV substation to Gulf Power Holmes Creek substation with 795 ACSR at 100°C.

SUPPORTING STATEMENT:

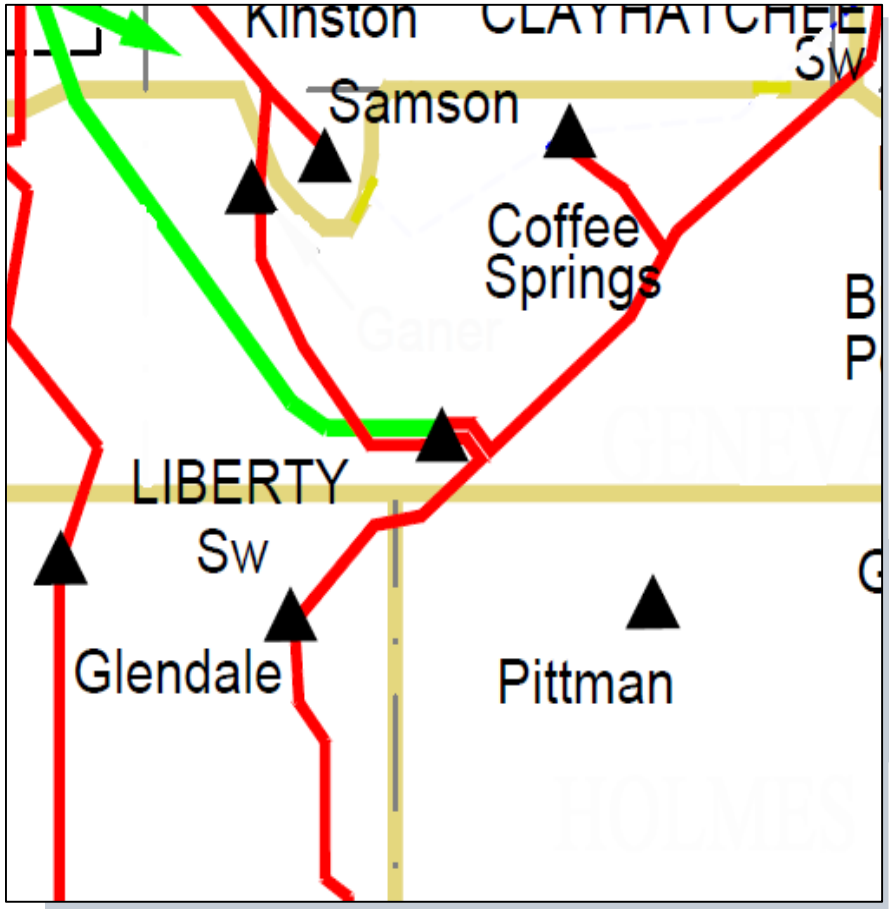
Additional voltage support is needed at Graceville and Fountain under contingency.



POWERSOUTH – 5

2019

LIBERTY 230/115 KV TRANSFORMER UPGRADE

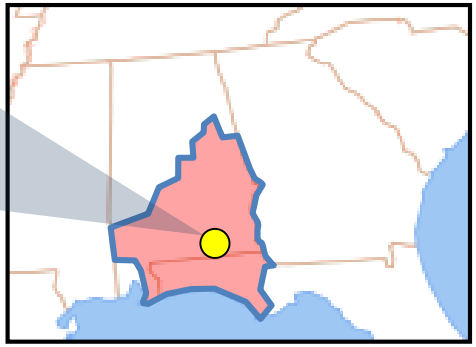


DESCRIPTION:

Replace the existing 230/115 kV, 150 MVA transformers with 400 MVA transformers.

SUPPORTING STATEMENT:

The **existing 150 MVA transformers at Liberty Substation** overload under contingency.



POWERSOUTH Balancing Authority

Upcoming 2018 Generation Assumptions

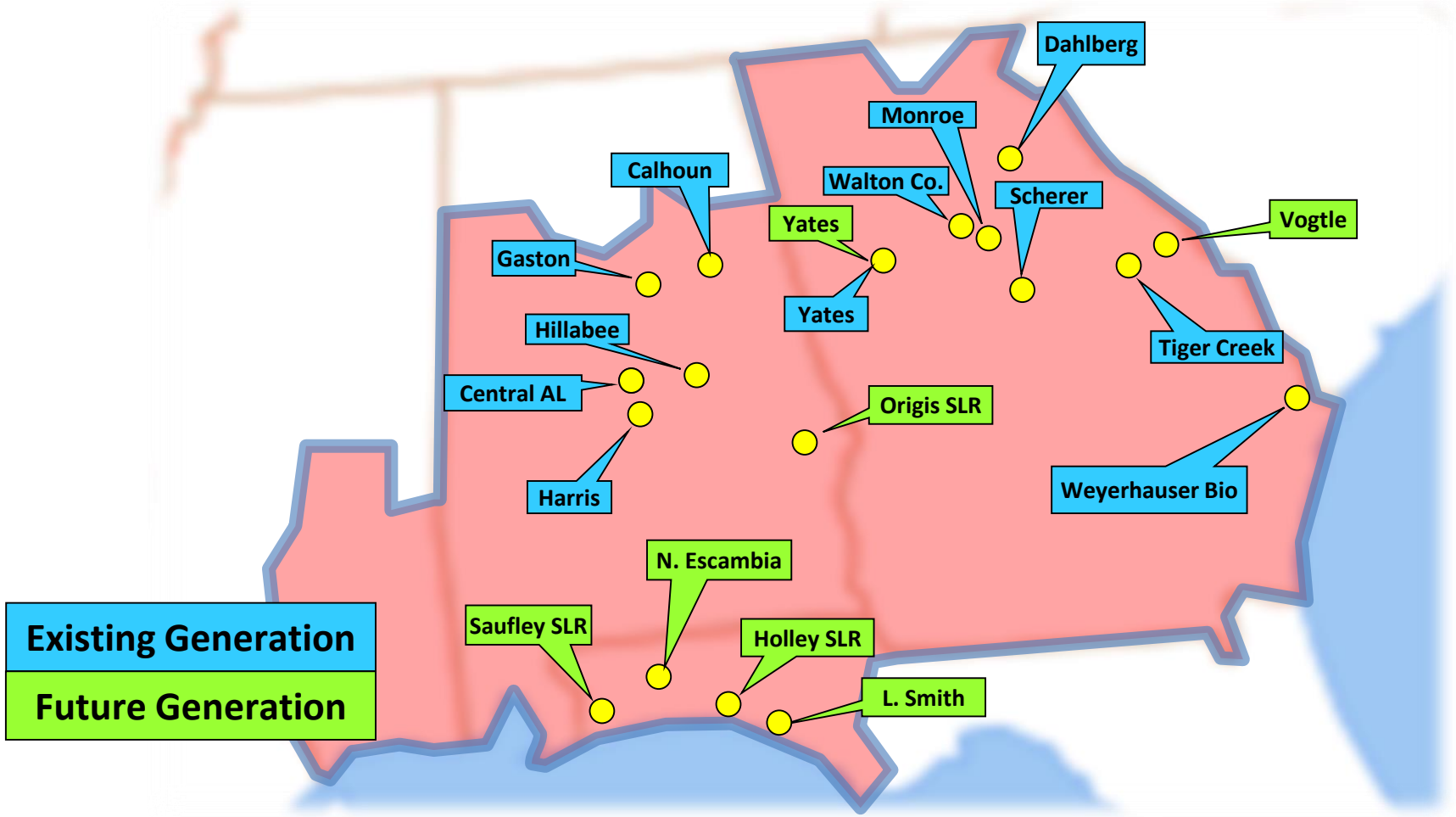
* POWERSOUTH has no generation assumptions expected to change throughout the ten year planning horizon for the 2018 SERTP Process.

SOUTHERN Balancing Authority

2017 Generation Assumptions

SOUTHERN – Generation Assumptions

The following diagram depicts the location of generation assumptions <u>that change</u> throughout the ten year planning horizon for the 2017 SERTP Process.



Southern Company – Generation Assumptions

The following table depicts the generation assumptions <u>that change</u> throughout the ten year planning horizon for the 2017 SERTP Process. The years shown represent Summer Peak conditions.

SITE	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
CALHOUN 1-4	632	632	632	632	632	0	--	--	--	--
CENTRAL ALABAMA	885	885	885	885	885	0	--	--	--	--
DAHLBERG 2, 6, 8, 10	298	298	298	298	298	298	298	0	--	--
GASTON 1-4	979	979	979	979	979	979	1029	1029	1029	1029
HARRIS 2	649	0	--	--	--	--	--	--	--	--
HOLLEY SOLAR	40	40	40	40	40	40	40	40	40	40
MONROE	309	309	309	309	309	309	0	--	--	--
ORIGIS SOLAR	80	80	80	80	80	80	80	80	80	80
SAUFLEY SOLAR	50	50	50	50	50	50	50	50	50	50
SCHERER 3	668	668	742	742	742	742	742	742	742	742

Southern Company – Generation Assumptions (Cont.)

The following table depicts the generation assumptions that change throughout the ten year planning horizon for the 2017 SERTP Process. The years shown represent Summer Peak conditions.

SITE	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
TIGER CREEK 1&4	313	313	313	313	313	313	0	--	--	--
VOGTLE 3	--	--	504	504	504	504	504	504	504	504
VOGTLE 4	--	--	504	504	504	504	504	504	504	504
WALTON COUNTY	436	436	436	436	436	436	0	--	--	--
WEYERHAUSER PW BIOMASS	20	20	20	20	20	20	20	20	20	0
YATES 6-7	649	649	649	649	649	649	714	714	714	714

Southern Company – Generation Assumptions

The following table depicts future generation assumptions that change throughout the ten year planning horizon for the 2017 SERTP Process. The years shown represent Summer Peak conditions.

SITE	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
LANSING SMITH[1]	--	--	--	--	--	230	230	230	230	230
NORTH ESCAMBIA [1]	--	--	--	--	--	460	460	460	460	460
YATES[1]	--	--	--	--	--	--	--	1200	1200	1200

(1) This assumption may be modified as resource decisions are made by the corresponding LSEs pursuant to applicable regulatory processes.

Southern Company – Generation Assumptions (Point-to-Point)

The following table depicts generation assumptions based upon expected long-term firm point-to-point commitments. The years shown represent Summer Peak conditions.

SITE	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
BOWEN	159	159	159	159	159	159	159	159	159	159
DAHLBERG	494	494	494	494	494	494	494	494	494	494
FRANKLIN	424	424	424	424	424	424	424	424	424	424
HAMMOND	10	10	10	10	10	10	10	10	10	10
HILLABEE	350	350	350	350	350	350	350	350	350	350
LINDSAY HILL	300	300	300	300	300	300	300	300	300	300
SCHERER	911	911	911	911	911	911	911	911	911	911
VOGTLE	206	206	206	206	206	206	206	206	206	206

GTC – Generation Assumptions

The following table depicts the generation assumptions <u>that change</u> throughout the ten year planning horizon for the 2017 SERTP Process. The years shown represent Summer Peak conditions.

SITE	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
SCHERER 3	129	129	55	55	55	55	55	55	55	55
VOGTLE 3	--	--	330	330	330	330	330	330	330	330
VOGTLE 4	--	--	330	330	330	330	330	330	330	330

MEAG – Generation Assumptions

The following table depicts the generation assumptions <u>that change</u> throughout the ten year planning horizon for the 2017 SERTP Process. The years shown represent Summer Peak conditions.

SITE	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
VOGTLE 3	--	--	250	250	250	250	250	250	250	250
VOGTLE 4	--	--	250	250	250	250	250	250	250	250

DALTON – Generation Assumptions

The following table depicts the generation assumptions that change throughout the ten year planning horizon for the 2017 SERTP Process. The years shown represent Summer Peak conditions.

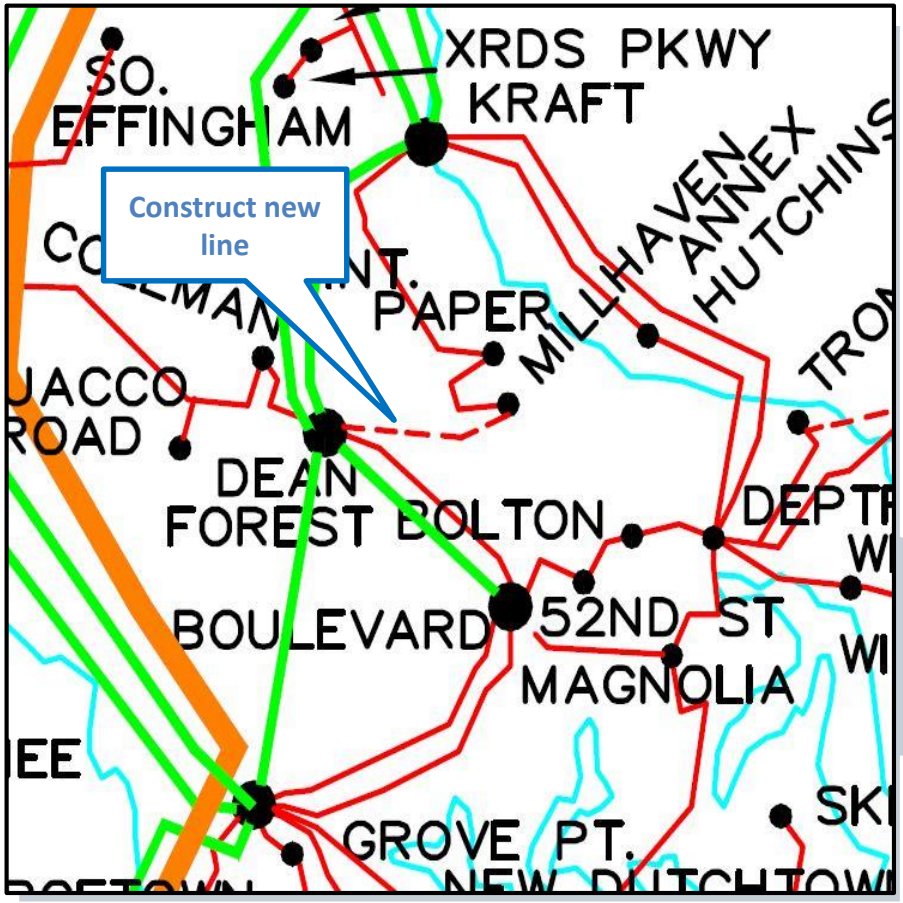
SITE	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
VOGTLE 3	--	--	19	19	19	19	19	19	19	19
VOGTLE 4	--	--	19	19	19	19	19	19	19	19

SOUTHERN (EAST) Balancing Authority

SERTP Regional Transmission Expansion Plan

SOUTHERN – 1E 2018

DEAN FOREST – MILLHAVEN ANNEX 115 KV T.L.

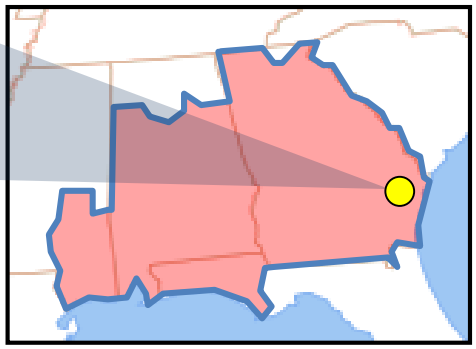


DESCRIPTION:

Construct approximately 5.3 miles of 795 ACSR 115 kV transmission line from Dean Forest to Millhaven Annex at 100°C operation.

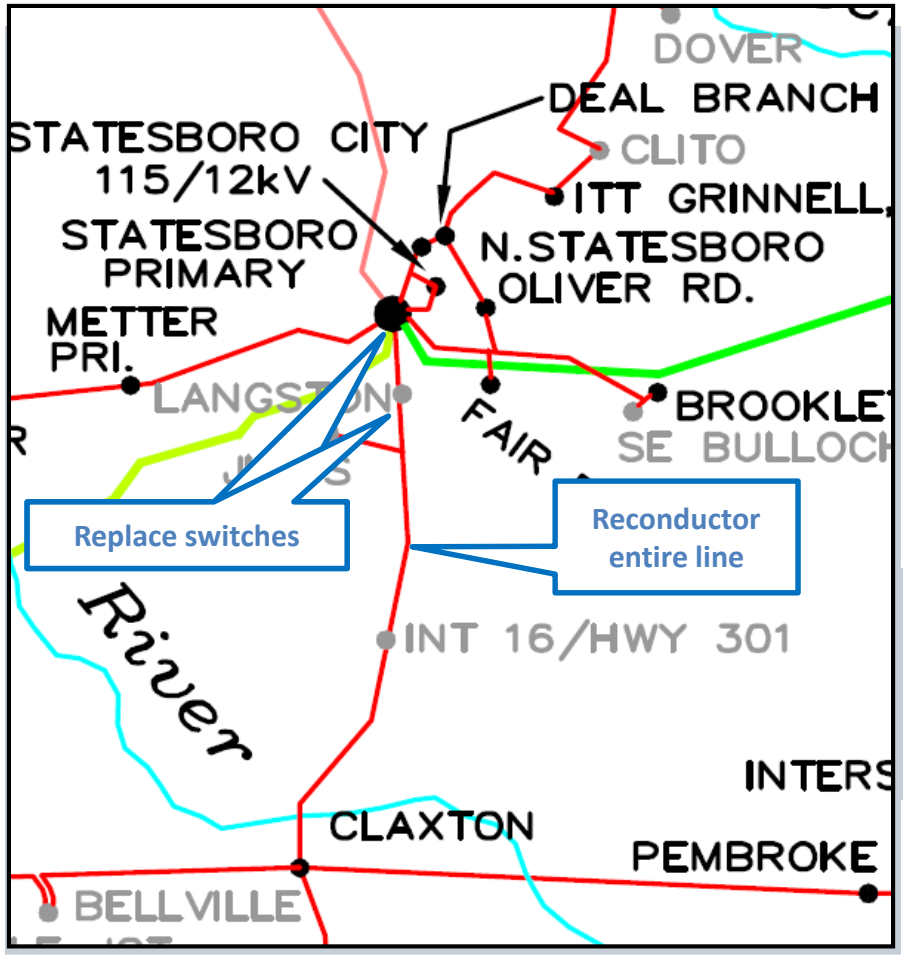
SUPPORTING STATEMENT:

Additional voltage support is needed in the Millhaven area under contingency.



SOUTHERN – 2E 2019

CLAXTON – STATESBORO PRIMARY 115 KV T.L.

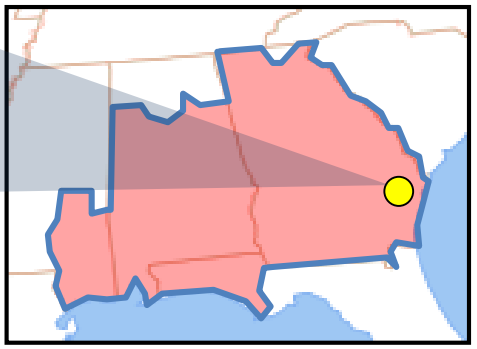


DESCRIPTION:

Reconductor approximately 17.8 miles, along the Claxton – Statesboro Primary 115 kV transmission line with 795 ACSR at 100°C. Replace 600A switches at Langston and Statesboro with 2000A switches.

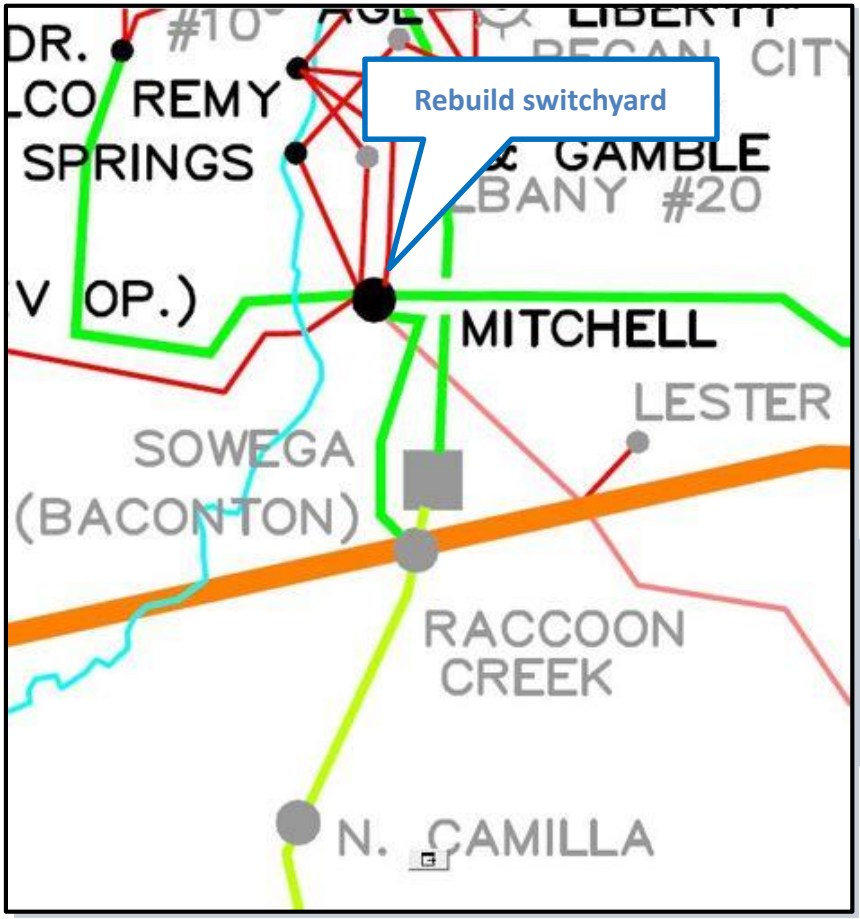
SUPPORTING STATEMENT:

The Claxton – Statesboro 115 kV transmission line overloads under contingency.



SOUTHERN – 3E 2019

MITCHELL 230 KV REBUILD

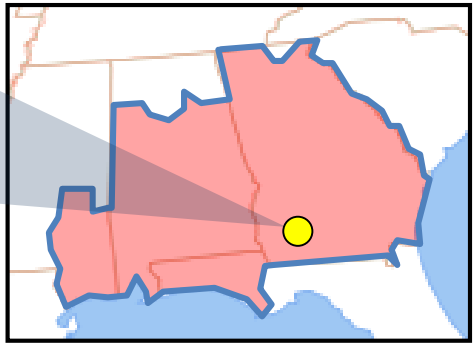


DESCRIPTION:

Rebuild of the Plant Mitchell switchyard to allow the spare transformer and the new transformer to both be in-service.

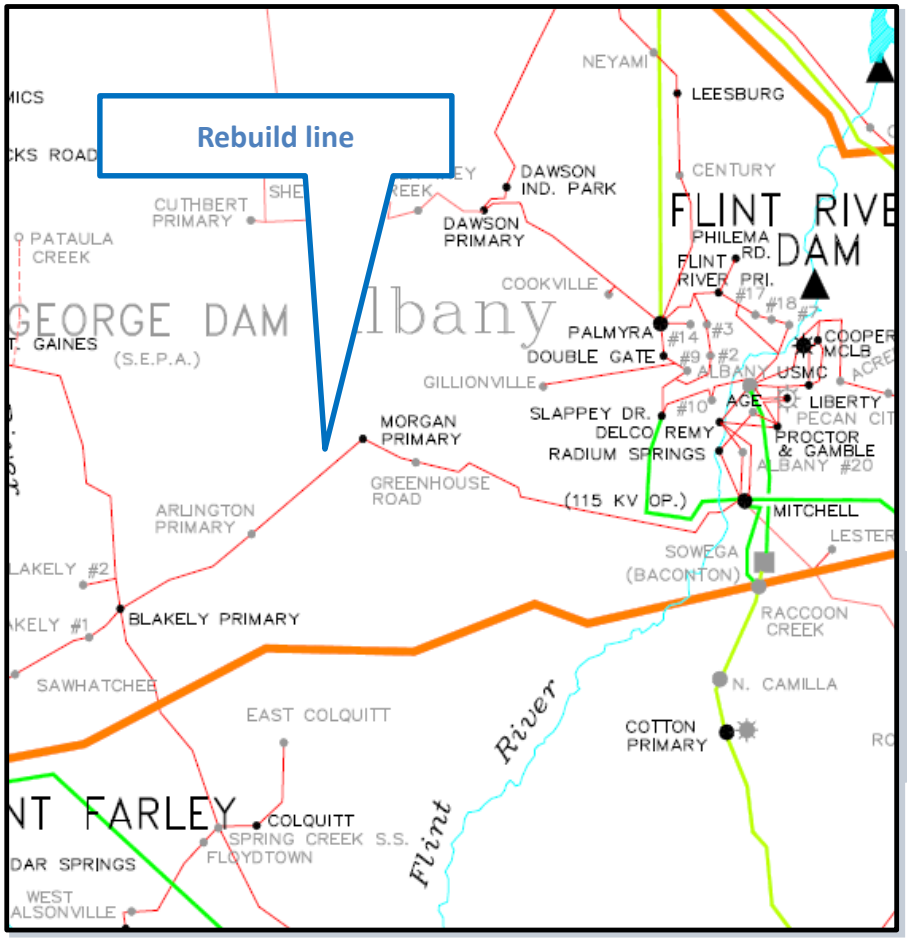
SUPPORTING STATEMENT:

Additional voltage support is needed in the Albany area under contingency.



SOUTHERN – 4E 2020

BLAKELY - MITCHELL 115 KV T.L.

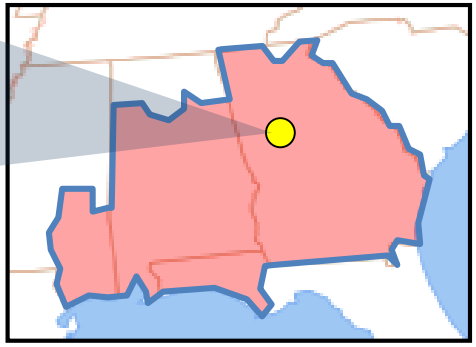


DESCRIPTION:

Rebuild 48.2 miles of 50°C 266ACSR with 100°C 795 ACSR from Blakely Primary to Mitchell.

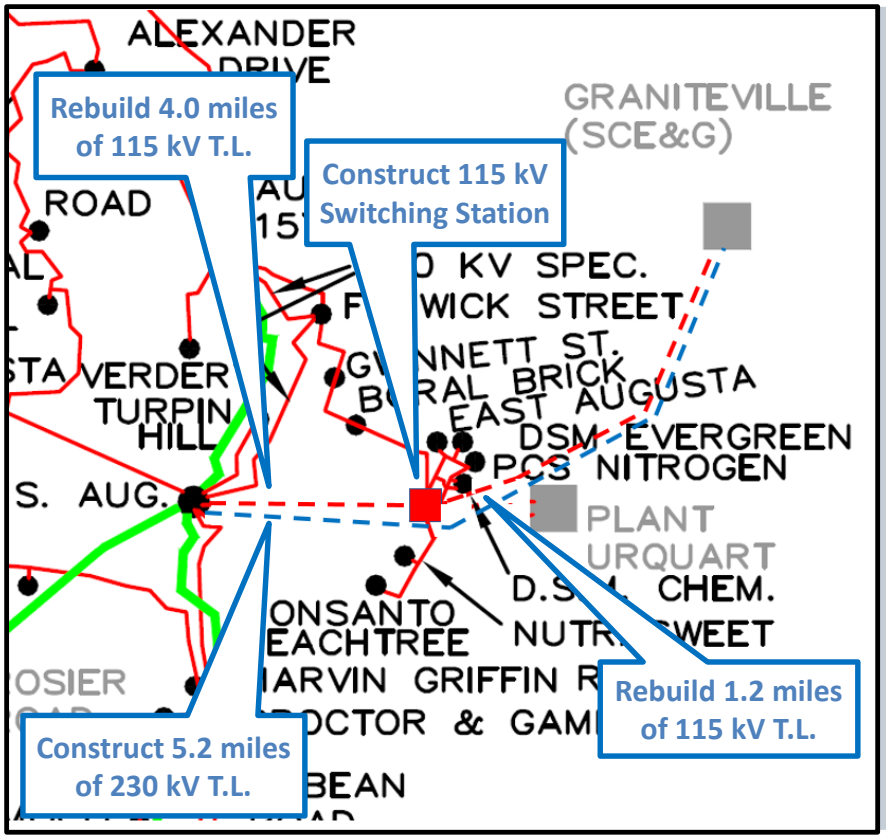
SUPPORTING STATEMENT:

The Blakely Primary – Mitchell 115 kV transmission line overloads under contingency.



SOUTHERN – 5E 2020

GRANITEVILLE - SOUTH AUGUSTA 115 & 230 KV T.L.

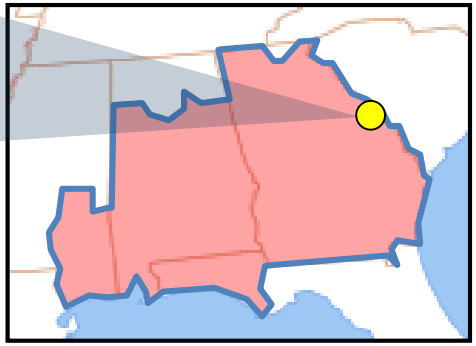


DESCRIPTION:

Construct a new 5.2 mile 230 kV tie-line (GPC to SCE&G) from the South Augusta 230/115 kV substation to the GA/SC state-line with bundled 1351 ACSR at 100°C. Construct a 5-breaker 115 kV switching station. Rebuild existing transmission line from the switching station to the GA/SC state line (1.2 miles) with 1351 ACSR at 100°C. Rebuild 4.0 miles of existing line between South Augusta and the new switching station with 1351 ACSR at 100°C.

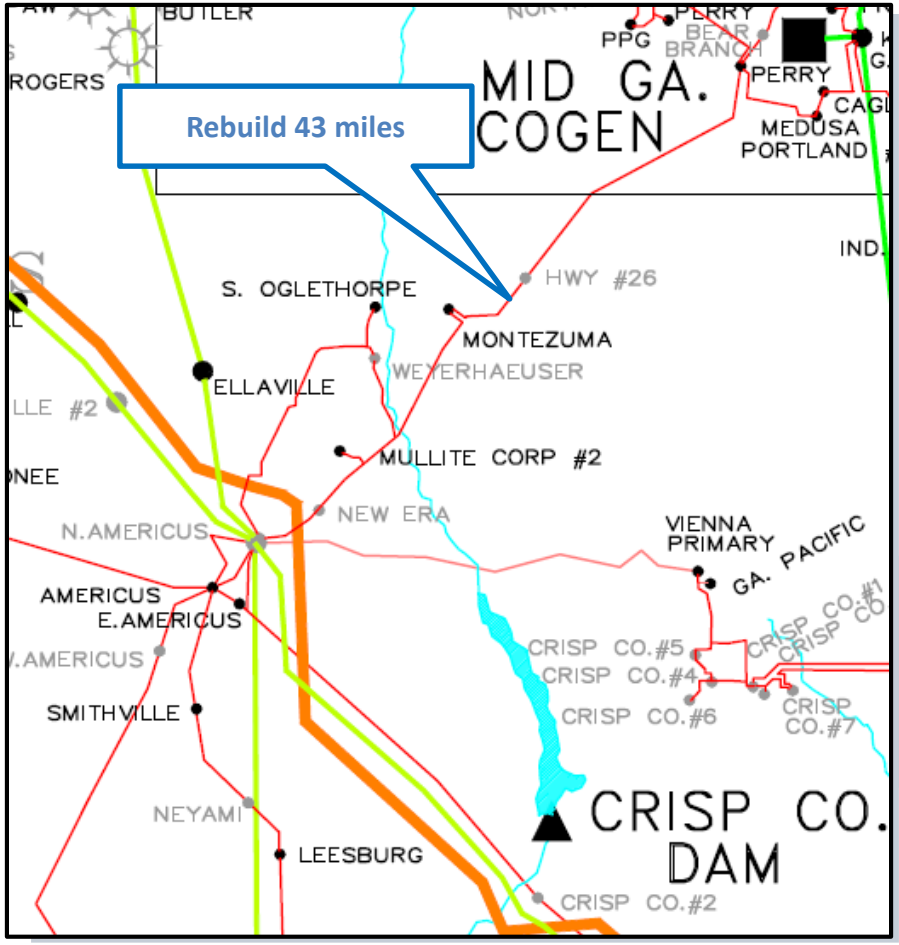
SUPPORTING STATEMENT:

The Savannah River (SCE&G) – Vogtle 230 kV tie – line and multiple other transmission facilities on the SCE&G system overload under contingency.



SOUTHERN – 6E 2020

NORTH AMERICUS – PERRY 115 KV T.L.

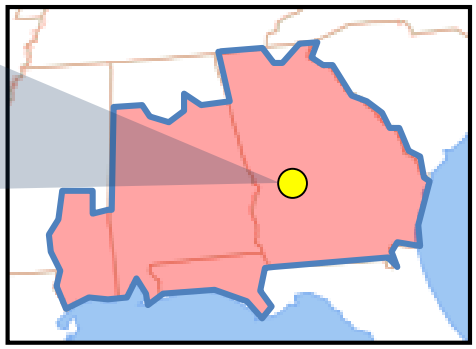


DESCRIPTION:

Rebuild approximately 43.0 miles of the existing 115 kV transmission line from North Americus to Perry substation with 795 ACSR at 100°C.

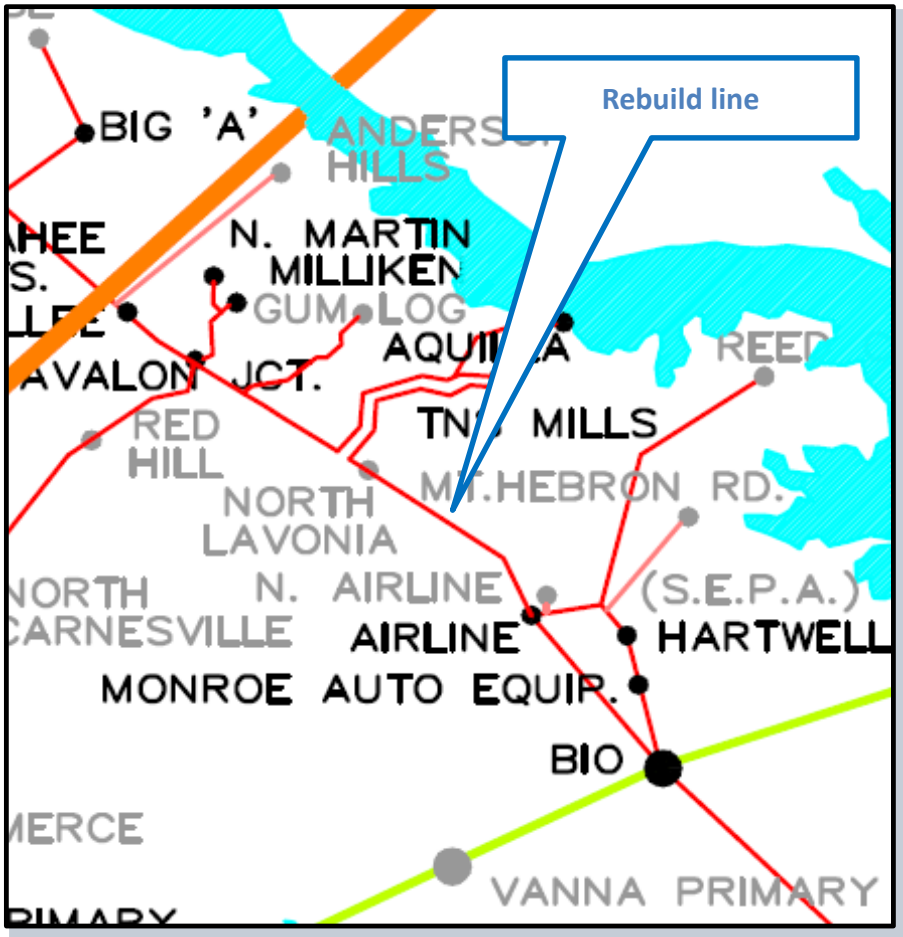
SUPPORTING STATEMENT:

The North Americus – Perry 115 kV transmission line overloads under contingency.



SOUTHERN – 7E 2022

AVALON JUNCTION – BIO 115 KV LINE

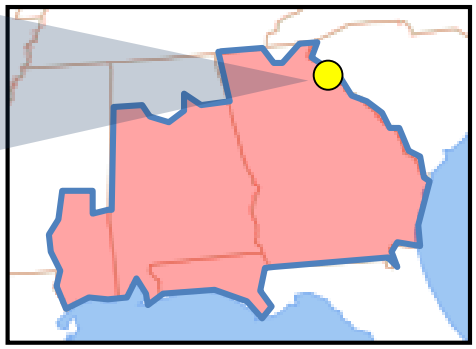


DESCRIPTION:

Rebuild approximately 20.5 miles of the Avalon Junction - Bio 115 kV line (636 ACSR/795ACSR) with 100° 1351 ACSR and replace the terminal equipment at various substations.

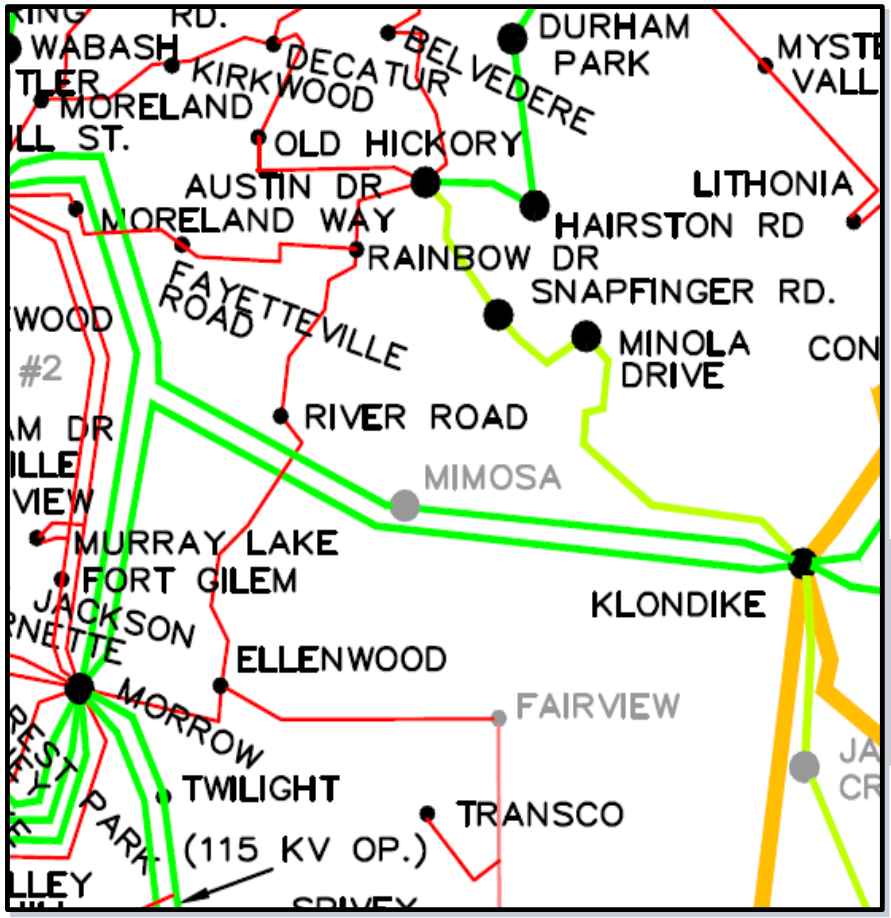
SUPPORTING STATEMENT:

The Avalon Junction – Bio 115 kV transmission line overloads under contingency.



SOUTHERN – 8E 2024

KLONDIKE – MORROW 230 KV T.L.

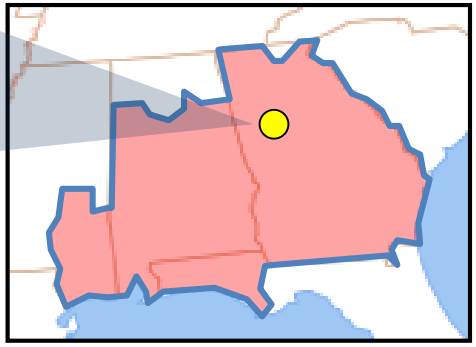


DESCRIPTION:

Reconductor approximately 11.2 miles of 1351 ACSR with 2-795 ACSR conductor on the Klondike - Morrow 230kV line and replace terminal equipment at both substations.

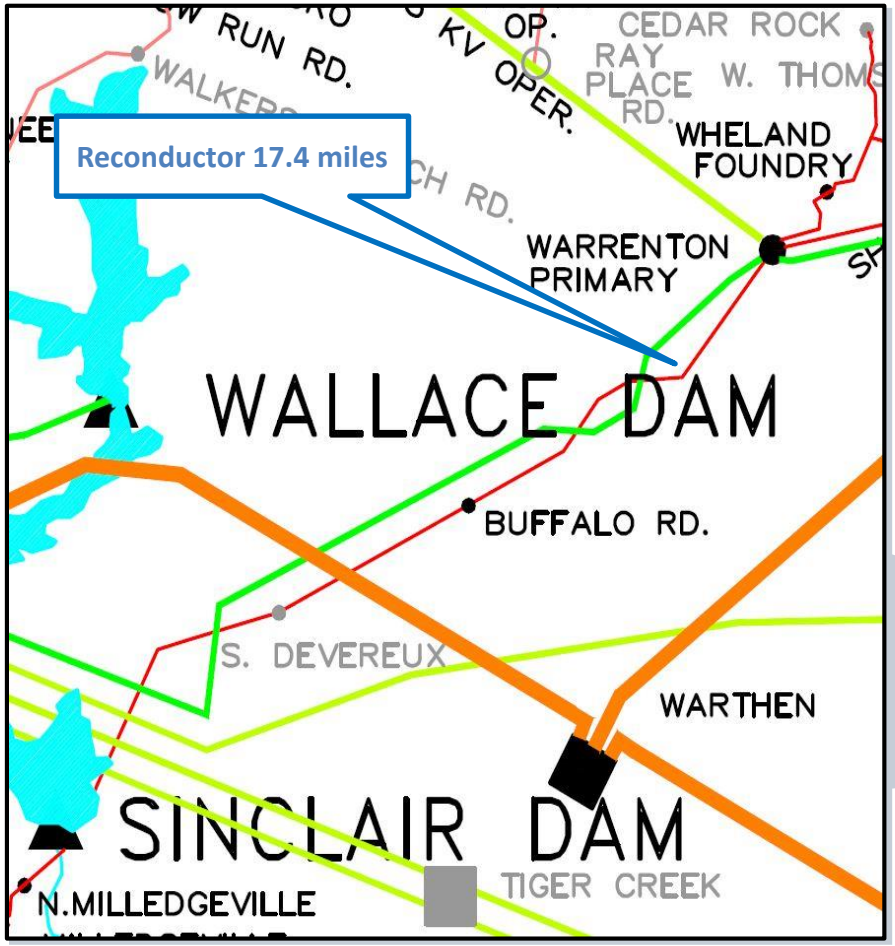
SUPPORTING STATEMENT:

The Klondike – Morrow 230 kV transmission line overloads under contingency.



SOUTHERN – 9E 2027

SINCLAIR DAM – WARRENTON PRIMARY 115 KV T.L.

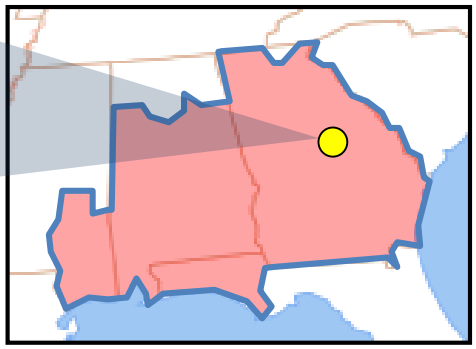


DESCRIPTION:

Reconductor approximately 17.4 miles of 115 kV transmission line along the Sinclair Dam – Warrenton Primary 115 kV transmission line with 795 ACSR at 100°C.

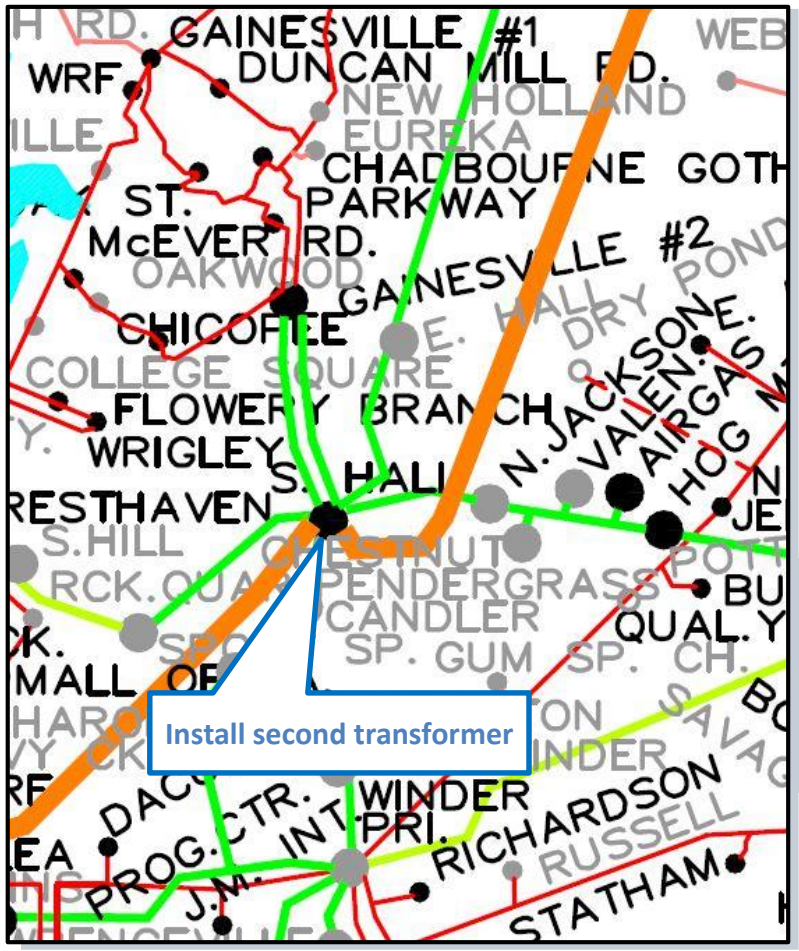
SUPPORTING STATEMENT:

The Sinclair Dam – Warrenton Primary 115 kV transmission line overloads under contingency.



SOUTHERN – 10E 2027

SOUTH HALL 500/230 KV SUBSTATION

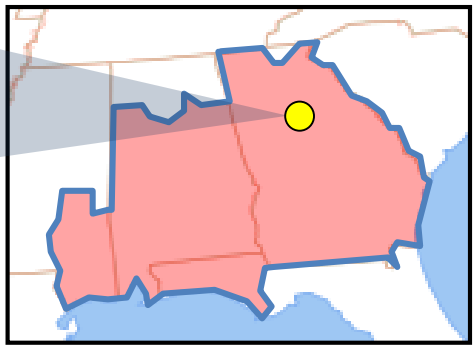


DESCRIPTION:

Install a second 500/230 kV, 2016 MVA transformer at the South Hall 500/230 kV substation.

SUPPORTING STATEMENT:

The Cumming - McGrau Ford 230 kV transmission line and the Lawrenceville - Norcross 230 kV transmission line overload under contingency.

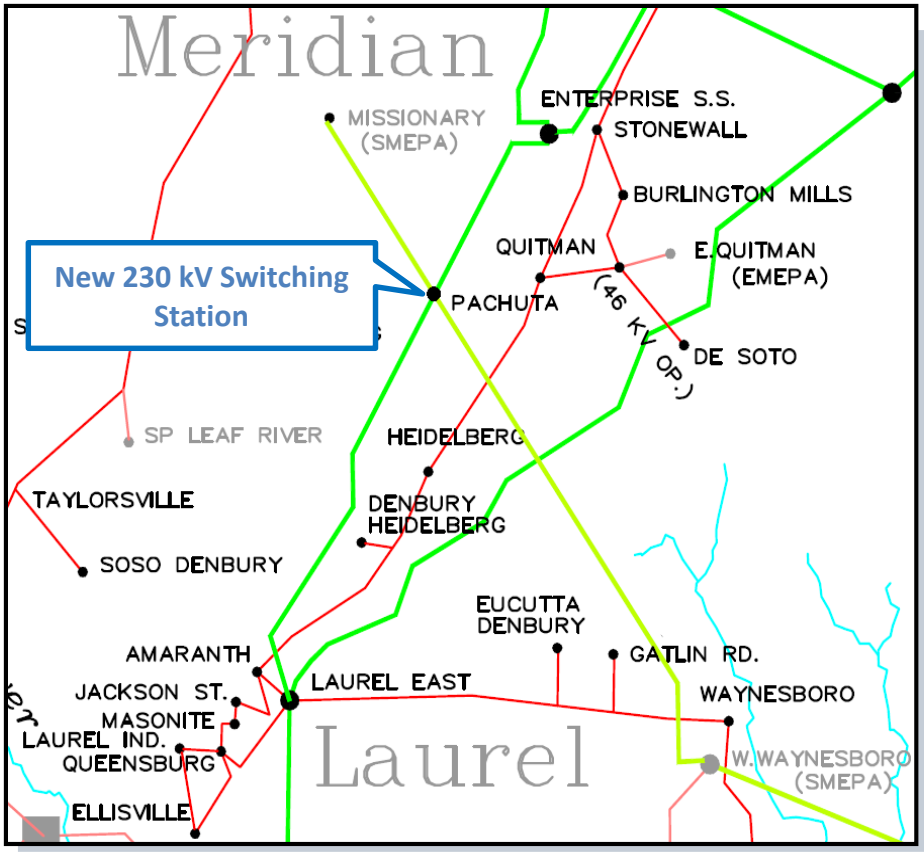


SOUTHERN (WEST) Balancing Authority

SERTP Regional Transmission Expansion Plan

SOUTHERN – 1W 2018

JASPER EAST – MISSIONARY (SMEPA) 230 KV T.L.

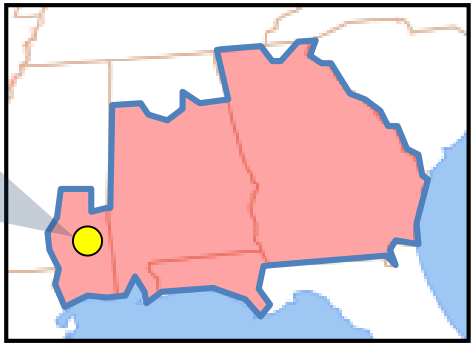


DESCRIPTION:

Tap the Missionary – Waynesboro 161 kV transmission line at the intersection of the Enterprise – Laurel East 230 kV transmission line. Construct a four (4) breaker 230 kV ring bus in Jasper County, MS.

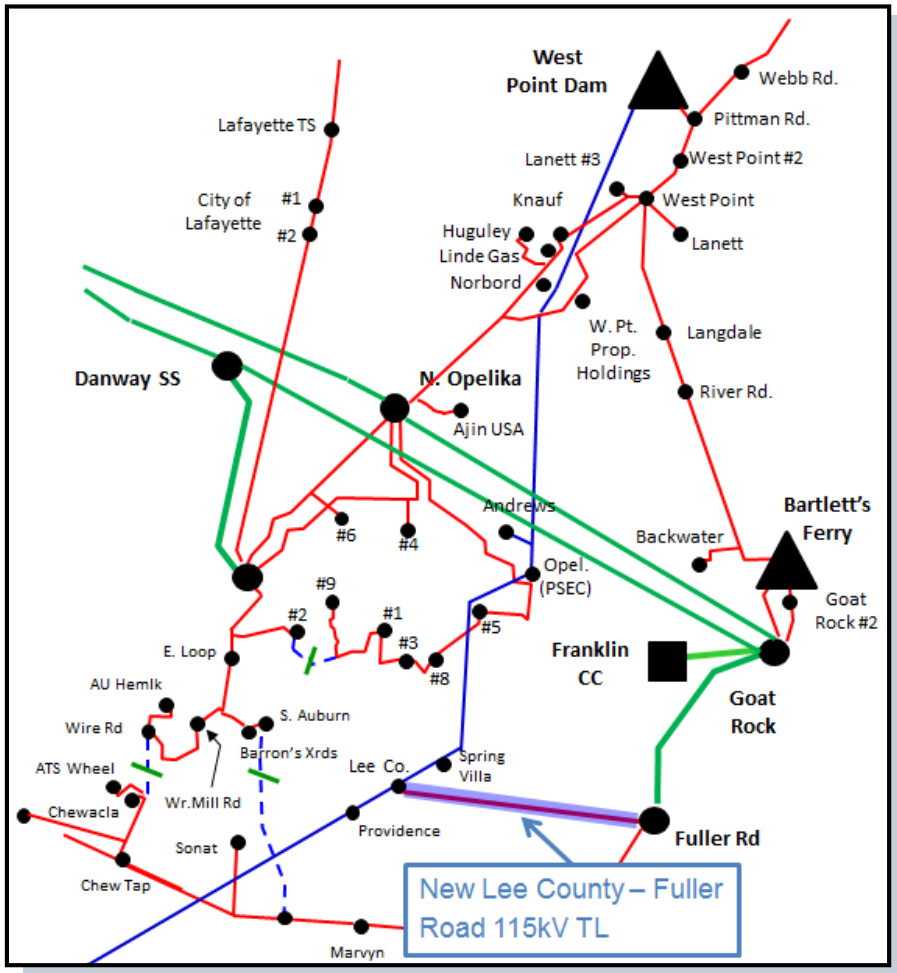
SUPPORTING STATEMENT:

Additional voltage support is needed in the area.



SOUTHERN – 2W 2018

FULLER ROAD – LEE COUNTY (POWER SOUTH) 115 KV T.L.

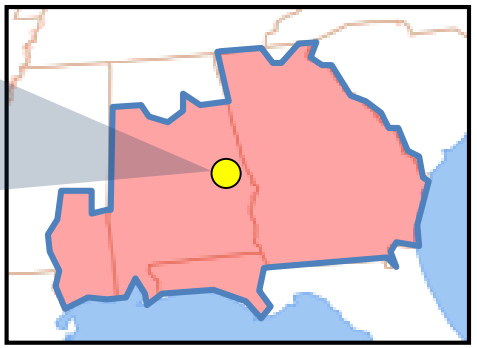


DESCRIPTION:

Construct approximately 13 miles of new 795 ACSR at 100°C 115 kV transmission line from Fuller Road (APC) to Lee County (PowerSouth).

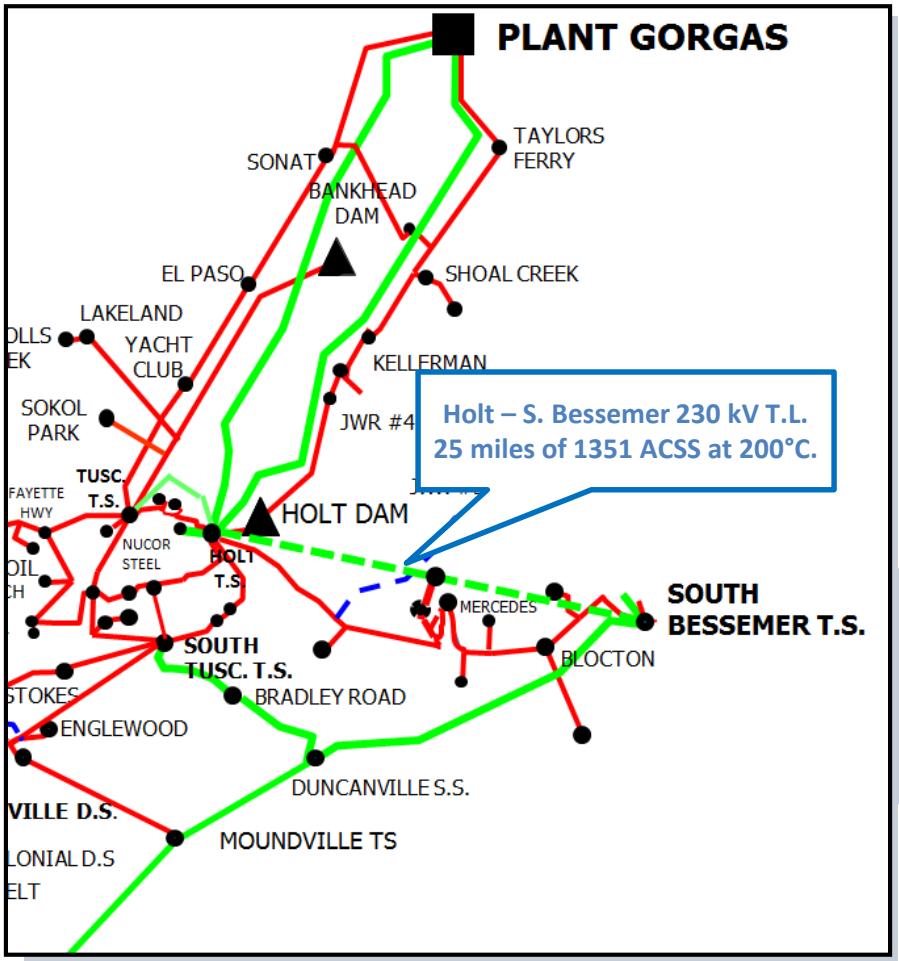
SUPPORTING STATEMENT:

The new Fuller Road – Lee County 115 kV transmission line will provide greater maintenance flexibility on the N. Opelika TS – Lanett DS 115 kV corridor and reduces high loadings on the Knauff Fiberglass – N. Opelika 115 kV transmission line.



SOUTHERN – 3W 2018

HOLT – SOUTH BESSEMER 230 KV T.L.

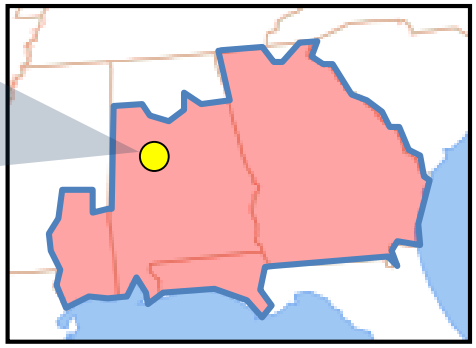


DESCRIPTION:

- Construct approximately 25 miles of 1351 ACSS 230 kV transmission line at 200°C from Holt to South Bessemer.
- Install a **230/115 kV, 400 MVA** transformer and connect to existing Daimler DS.
- Install new 115 kV switching station around Daimler DS.

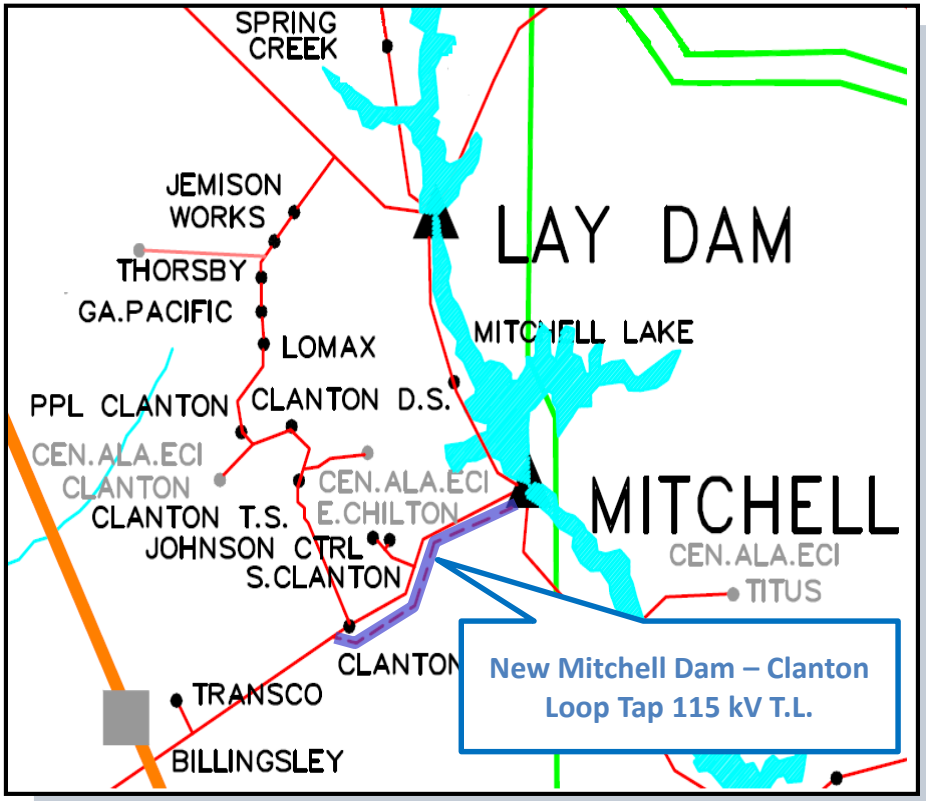
SUPPORTING STATEMENT:

The Holt – Mercedes 115 kV transmission line overloads under contingency. This project also provides increased reliability and maintenance flexibility for the Tuscaloosa Area.



SOUTHERN – 4W 2018

MITCHELL DAM – CLANTON LOOP TAP 115 KV T.L.

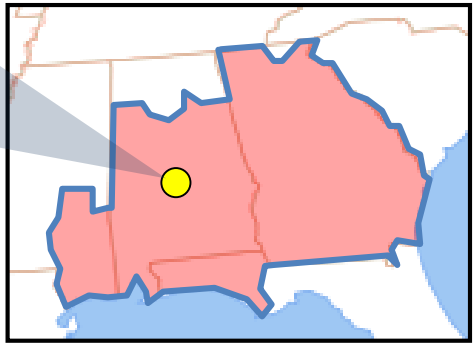


DESCRIPTION:

Construct approximately 10.3 miles of 115 kV transmission line from Mitchell Dam to Clanton Loop Tap with 795 ACSS at 200°C.

SUPPORTING STATEMENT:

The Mitchell Dam – CRH Tap – Clanton Tap 115 kV transmission line overloads under contingency.



SOUTHERN – 5W 2019

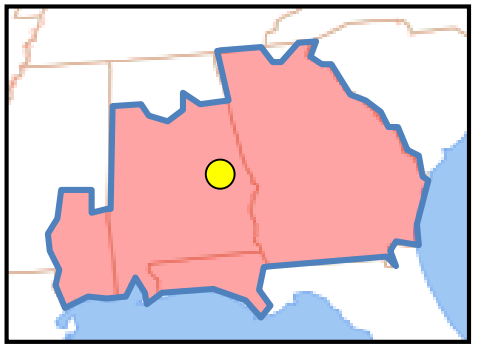
AUBURN – OPELIKA 115 KV T.L. NETWORKING

DESCRIPTION:

- Add four new 115 kV switching stations:
  a) Near East Loop DS (East Loop SS)
  b) West of North Auburn (Pear Tree SS)
  c) Near the Chewacla Tap (Pin Oaks SS)
  d) West of Marvyn DS intersecting the Fuller Rd – Notasulga and South Auburn 115 kV T.L.'s (Sanford SS).
- Construct approximately 4 miles of 115 kV T.L. from Pear Tree SS to Wire Road.
- Reconductor approximately 1.8 miles of 115 kV T.L. line between Opelika #1 and Opelika #3 with 795 ACSR at 100°C.
- Reconductor approximately 14.5 miles of 115 kV T.L. between Sanford SS – Sonat Tap – Pin Oaks – Beehive Tap – Chewacla with 397 ACSS at 200°C.
- Reconductor approximately 6 miles of 115 kV T.L. line between North Auburn – Pear Tree SS with 795 ACSS @ 200°C.

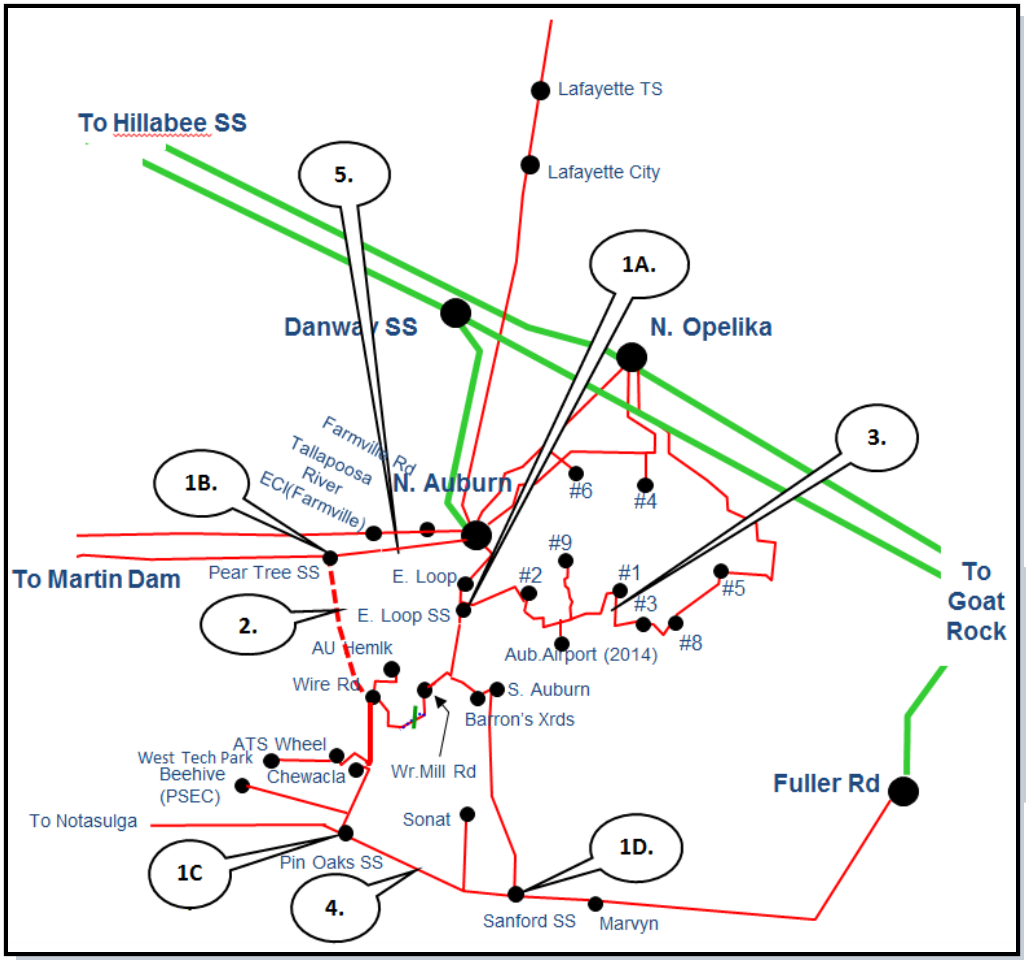
SUPPORTING STATEMENT:

The project provides additional reliability and maintenance flexibility.

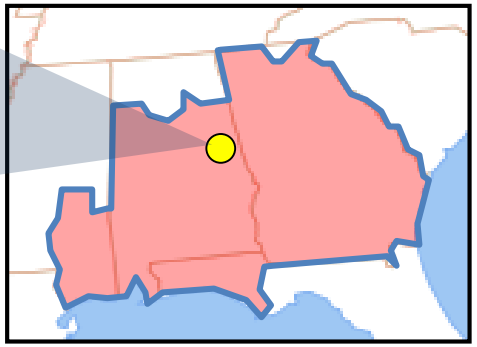


SOUTHERN – 5W 2019

AUBURN – OPELIKA 115 KV T.L. NETWORKING



1. Add four new 115 kV switching stations.
2. Construct approx. 4 miles of 115 kV T.L. from Pear Tree SS to Wire Road.
3. Reconductor approx. 1.8 miles of 115 kV T.L. between Opelika #1 and Opelika #3 with 795 ACSR at 100°C.
4. Reconductor approx. 14.5 miles of 115 kV T.L. between Sanford SS – Sonat Tap – Pin Oaks – Beehive Tap – Chewacla with 397 ACSS at 200°C.
5. Reconductor approx. 6 miles of 115 kV T.L. between North Auburn – Pear Tree SS with 795 ACSS at 200°C.



SOUTHERN – 6W 2019

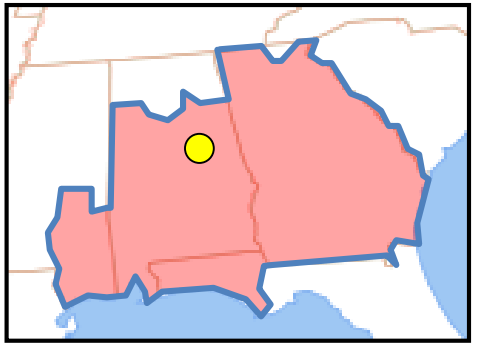
EASTERN AL AREA 115 KV PROJECT

DESCRIPTION:

- Reconductor approximately 5.3 miles of 115 kV transmission line between Gulf States Steel and Rainbow City SS with 795 ACSS at 200°C.
- Install new 115 kV switching station around Rainbow City.
- Install new 115kV terminal at Clay TS and upgrade the existing 230/115 kV transformer at Clay TS to 477 MVA.
- Construct approximately 34 miles of 115 kV transmission line between Clay TS and the new Rainbow City SS with 795 ACSS at 200°C

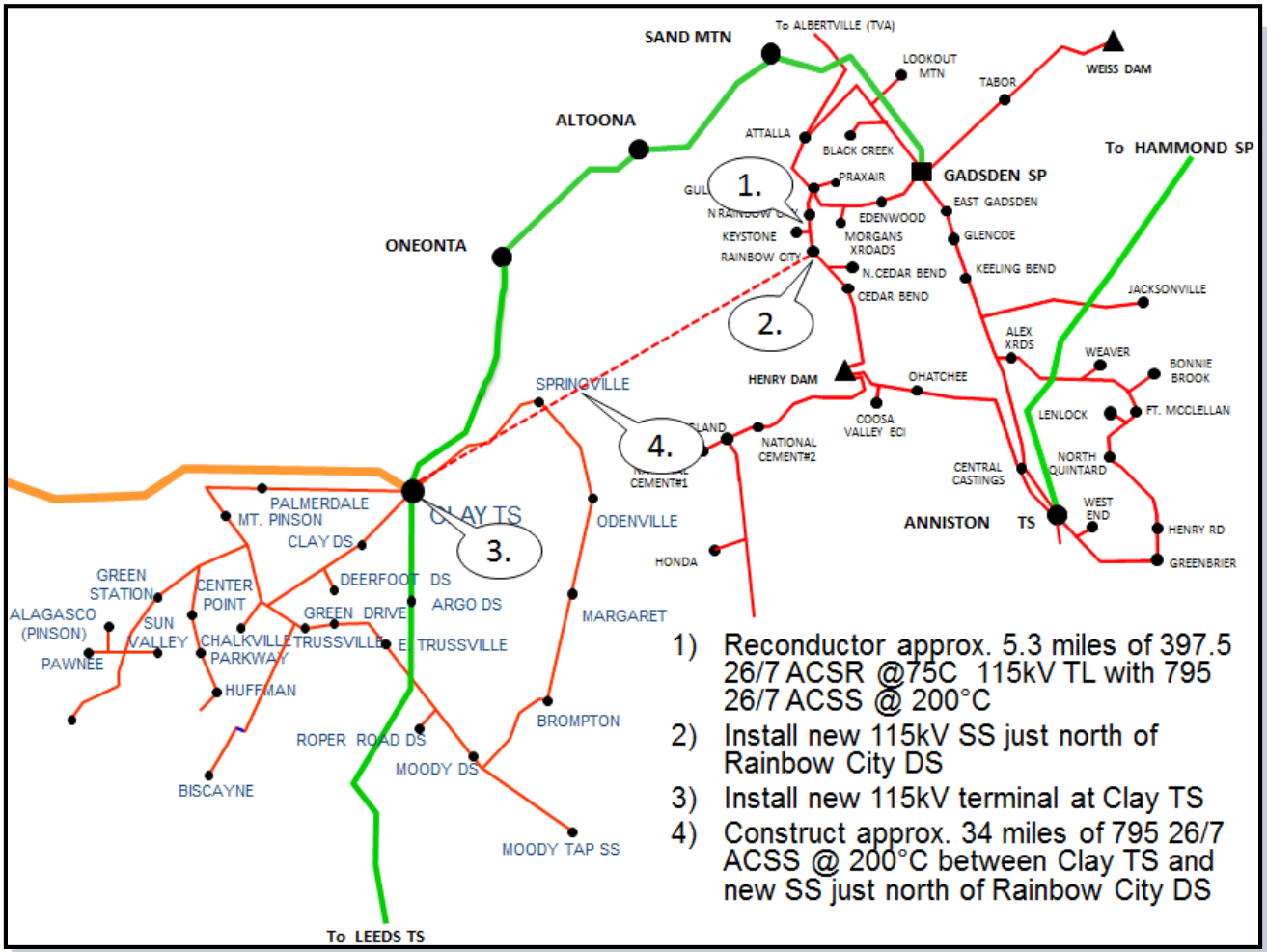
SUPPORTING STATEMENT:

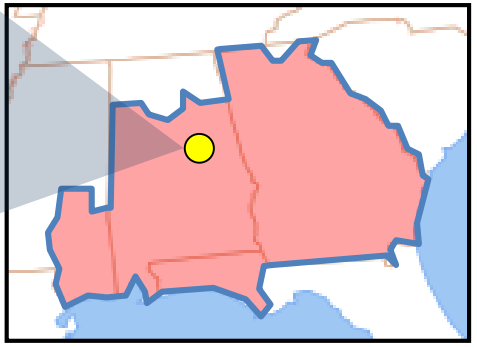
A contingency causes high loadings and hinders maintenance abilities on several 115 kV transmission lines in the Gadsden area.



SOUTHERN – 6W 2019

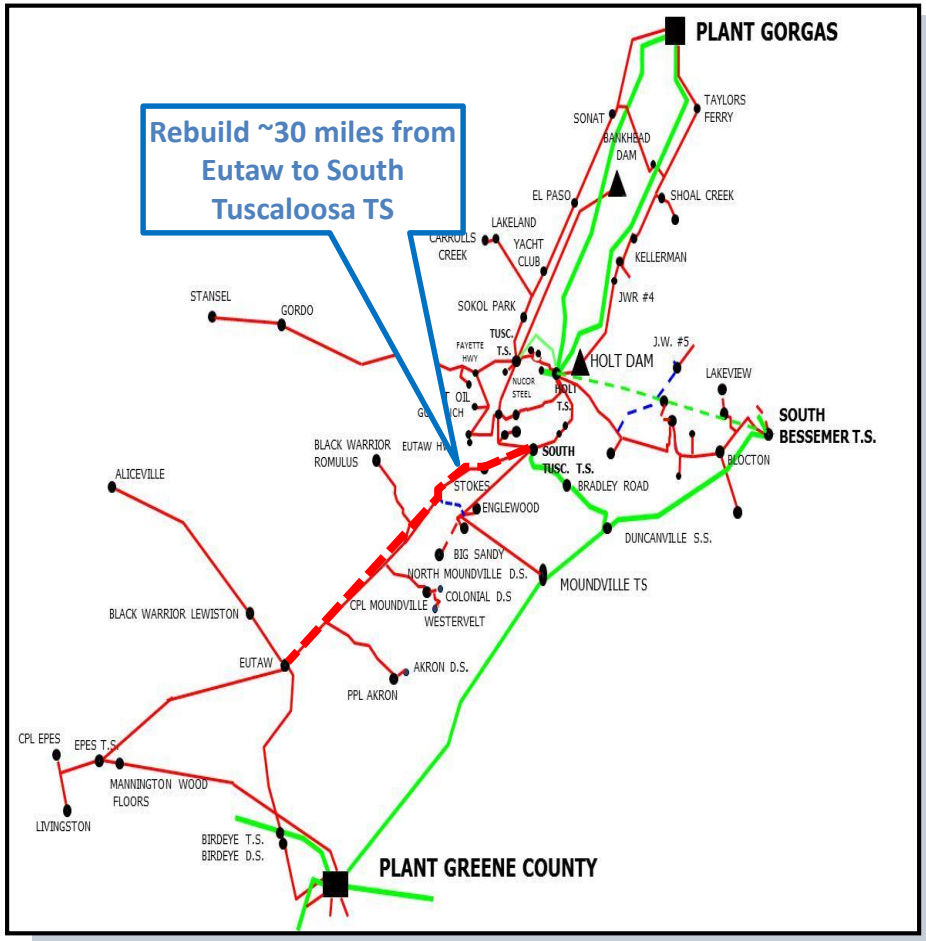
EASTERN AL AREA 115 KV PROJECT





SOUTHERN – 7W 2019

EUTAW – SOUTH TUSCALOOSA 115 KV T.L.

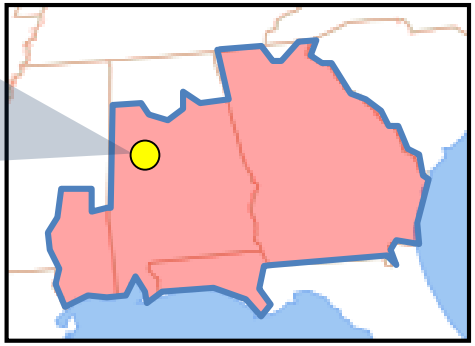


DESCRIPTION:

Rebuild approximately 30 miles of 397 ACSR 115 kV T.L. from Eutaw to South Tuscaloosa TS with 1033 ACSR at 100° C.

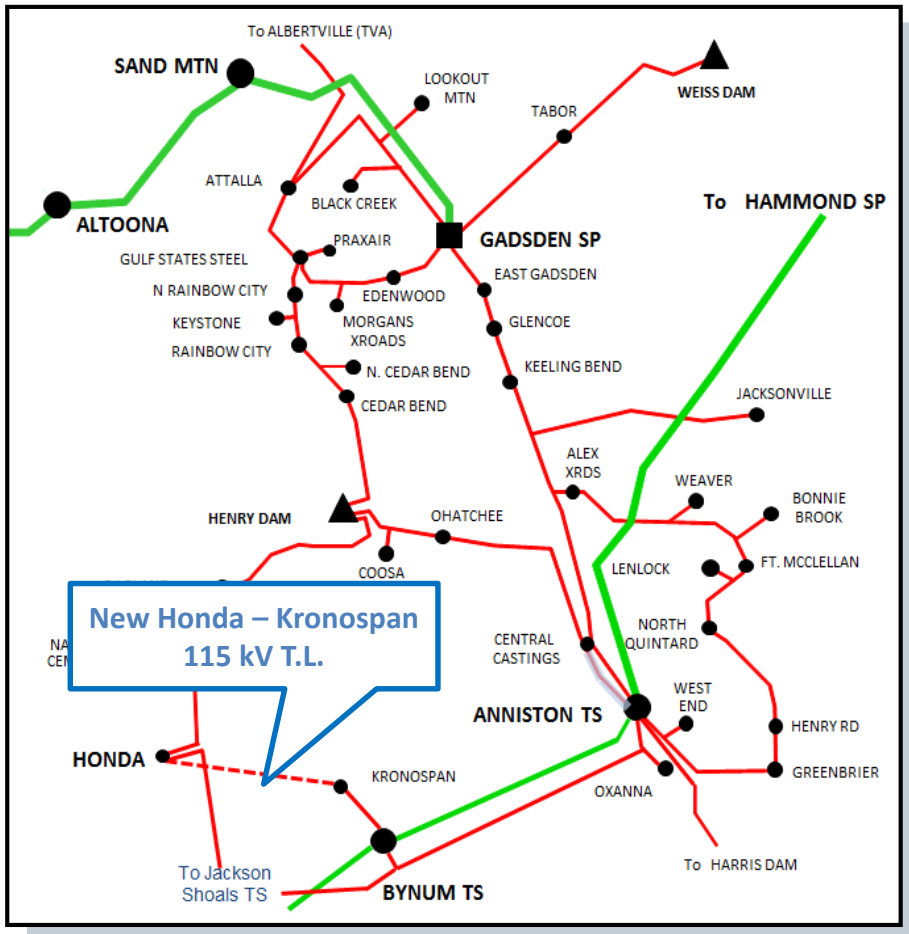
SUPPORTING STATEMENT:

The Eutaw – South Tuscaloosa TS 115 kV T.L. becomes highly loaded under contingency. This project also provides increased operational flexibility in the area.



SOUTHERN – 8W 2019

HONDA – KRONOSPAN 115 KV T.L.

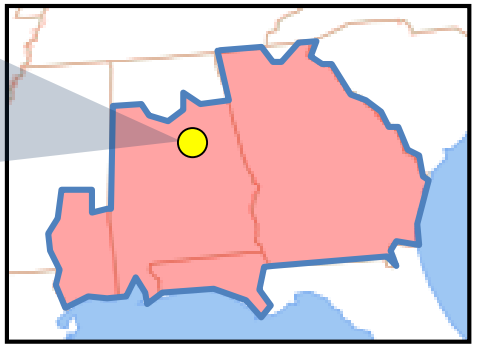


DESCRIPTION:

Construct approximately 10.3 miles of 795 ACSR 115 kV transmission line at 100°C from Honda to Kronospan.

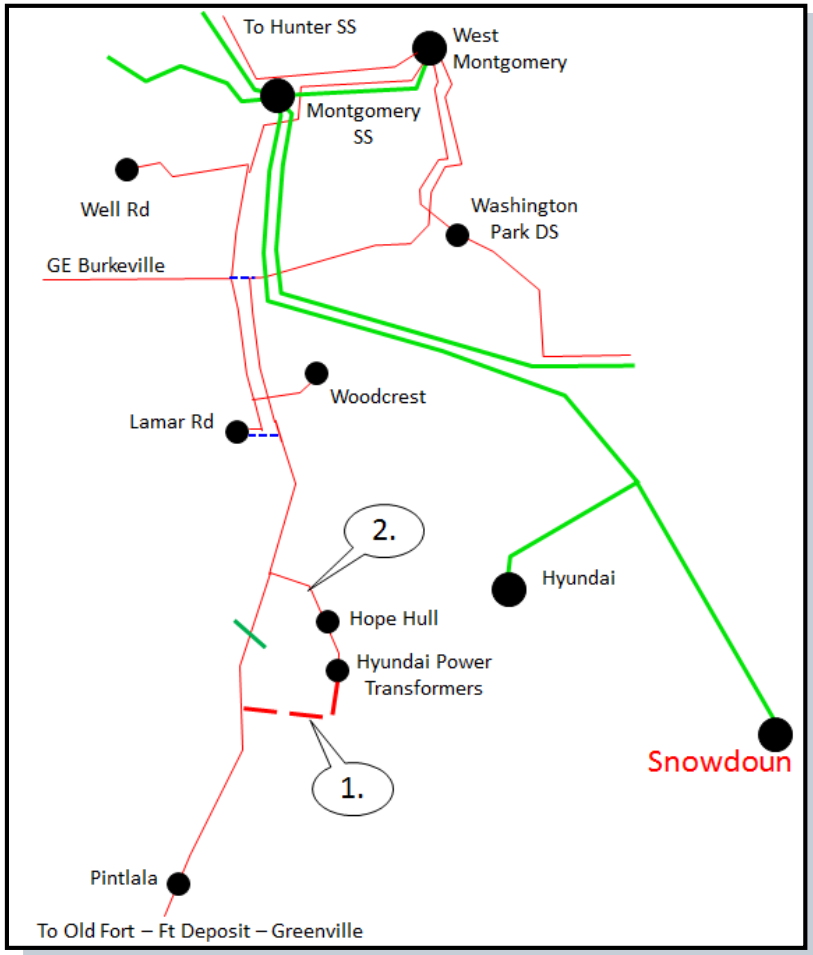
SUPPORTING STATEMENT:

This project provides increased reliability, additional voltage support, and maintenance flexibility in the area.



SOUTHERN – 9W 2019

HOPE HULL AREA SOLUTION

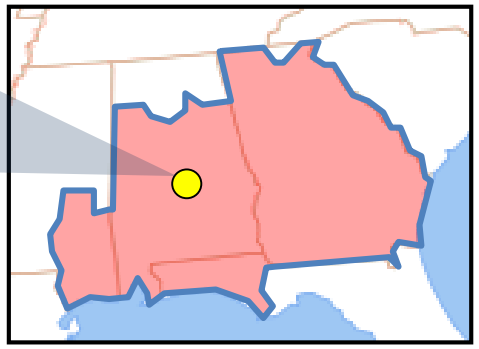


DESCRIPTION:

1. Construct approximately 1.8 miles of 795 ACSR 115 kV T.L. from Hyundai P.T. to the West Montgomery – Greenville 115 kV T.L.
2. Reconductor 2.7 miles of the Hope Hull Tap – Hyundai Power Transformers 115 kV T.L. with 795 ACSR.

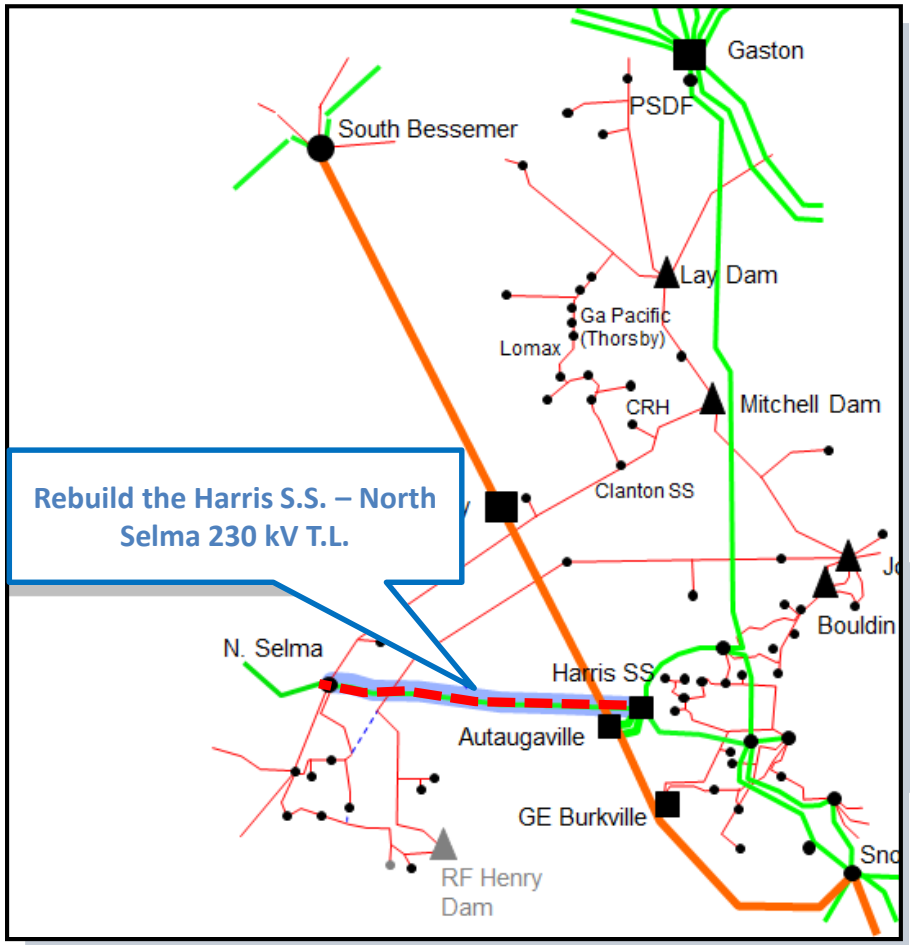
SUPPORTING STATEMENT:

Provides increased reliability and additional maintenance flexibility.



SOUTHERN – 10W 2021

HARRIS – NORTH SELMA 230 KV T.L.

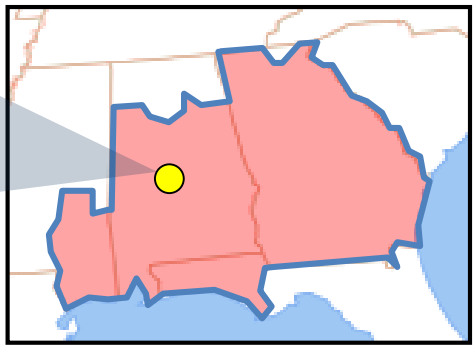


DESCRIPTION:

Rebuild approximately 26 miles of the Autaugaville (Harris SS) – North Selma 230 kV transmission line with 1033 ACCR at 200°C.

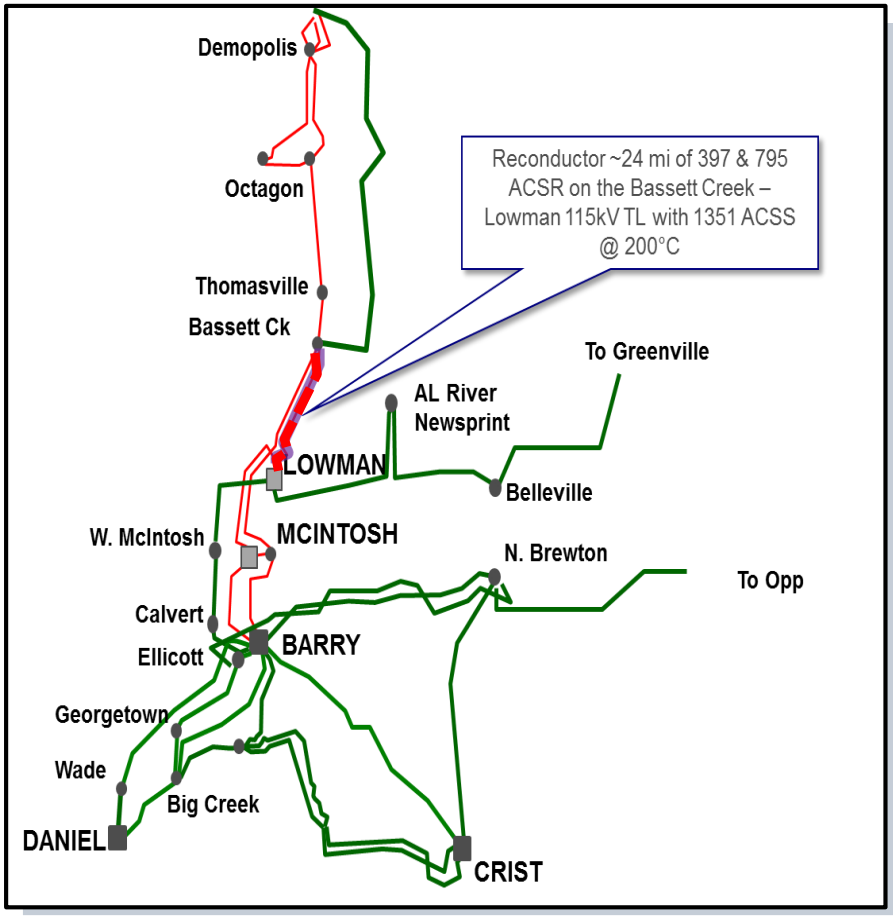
SUPPORTING STATEMENT:

The Harris – North Selma 230 kV transmission line overloads under contingency.



SOUTHERN – 11W 2022

BASSETT CREEK – LOWMAN 115 KV T.L.

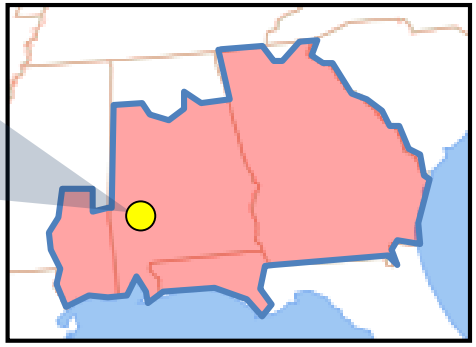


DESCRIPTION:

Reconductor approximately 24 miles of 115 kV transmission line from Bassett Creek to Lowman with 1351 ACSS at 200°C.

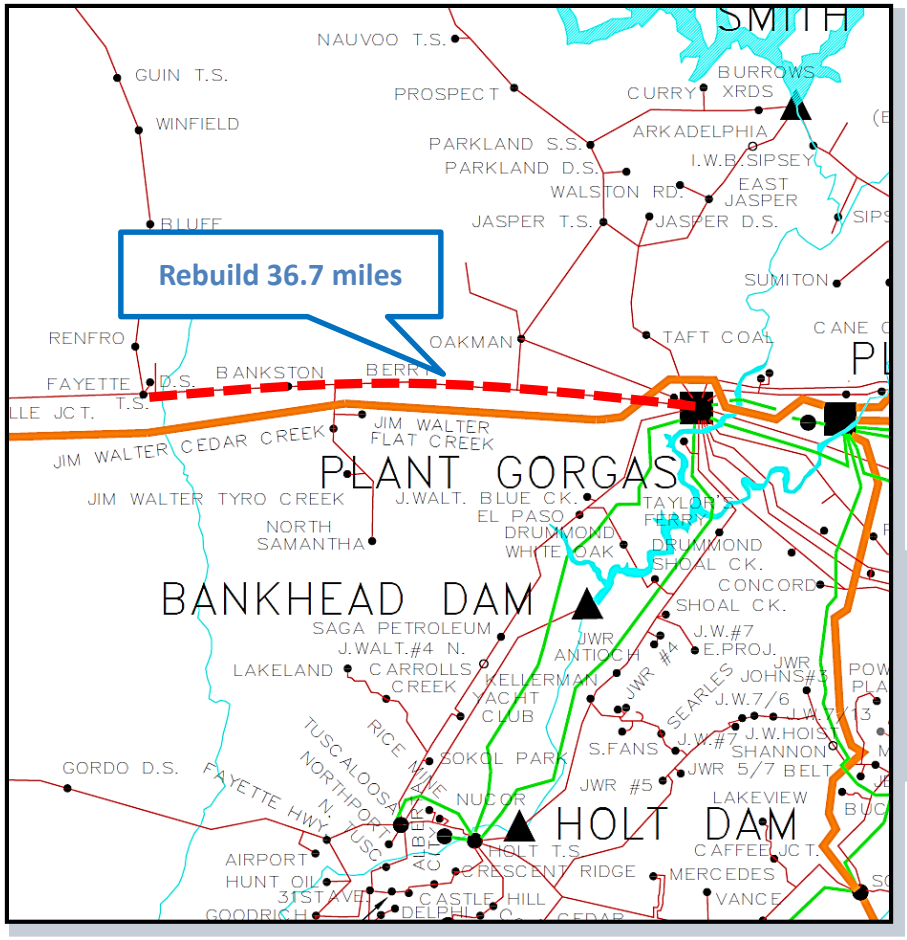
SUPPORTING STATEMENT:

This project creates additional maintenance and operational flexibility along the Bassett Creek to Barry corridor.



SOUTHERN – 12W 2024

FAYETTE – GORGAS 161 KV T.L.

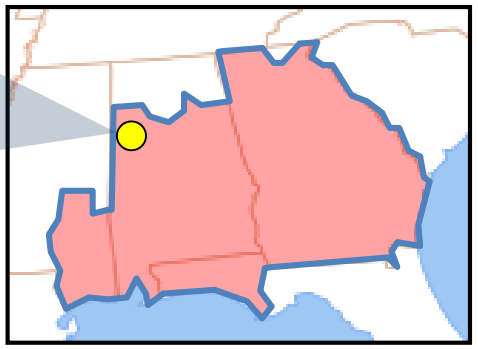


DESCRIPTION:

Rebuild approximately 36.7 miles along the Fayette – Gorgas 161 kV transmission line with 795 ACSS at 160°C.

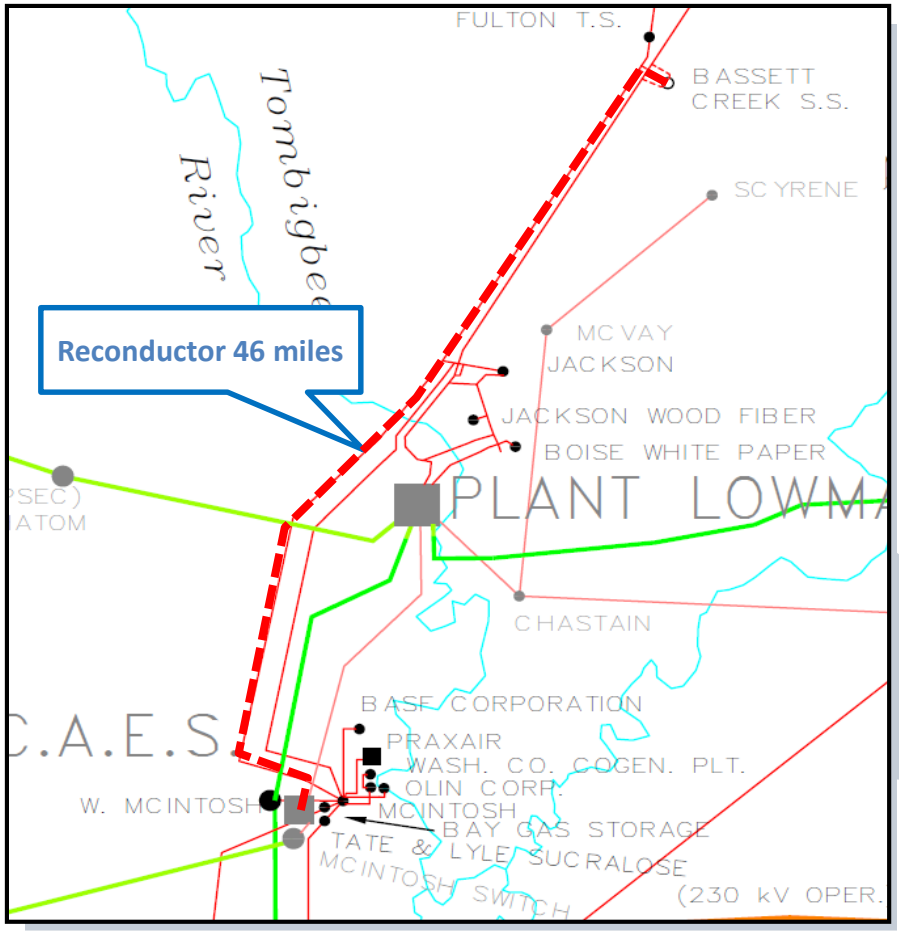
SUPPORTING STATEMENT:

The Fayette – Gorgas 161 kV transmission line overloads under contingency.



SOUTHERN – 13W 2026

BASSETT CREEK – MCINTOSH 115 KV T.L.

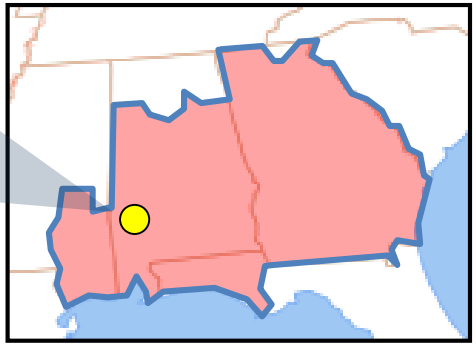


DESCRIPTION:

Reconductor approximately 46 miles along the Bassett Creek – McIntosh 115 kV transmission line with 1351 ACSS at 200°C.

SUPPORTING STATEMENT:

This project creates additional maintenance and operational flexibility along the Bassett Creek to Barry corridor.

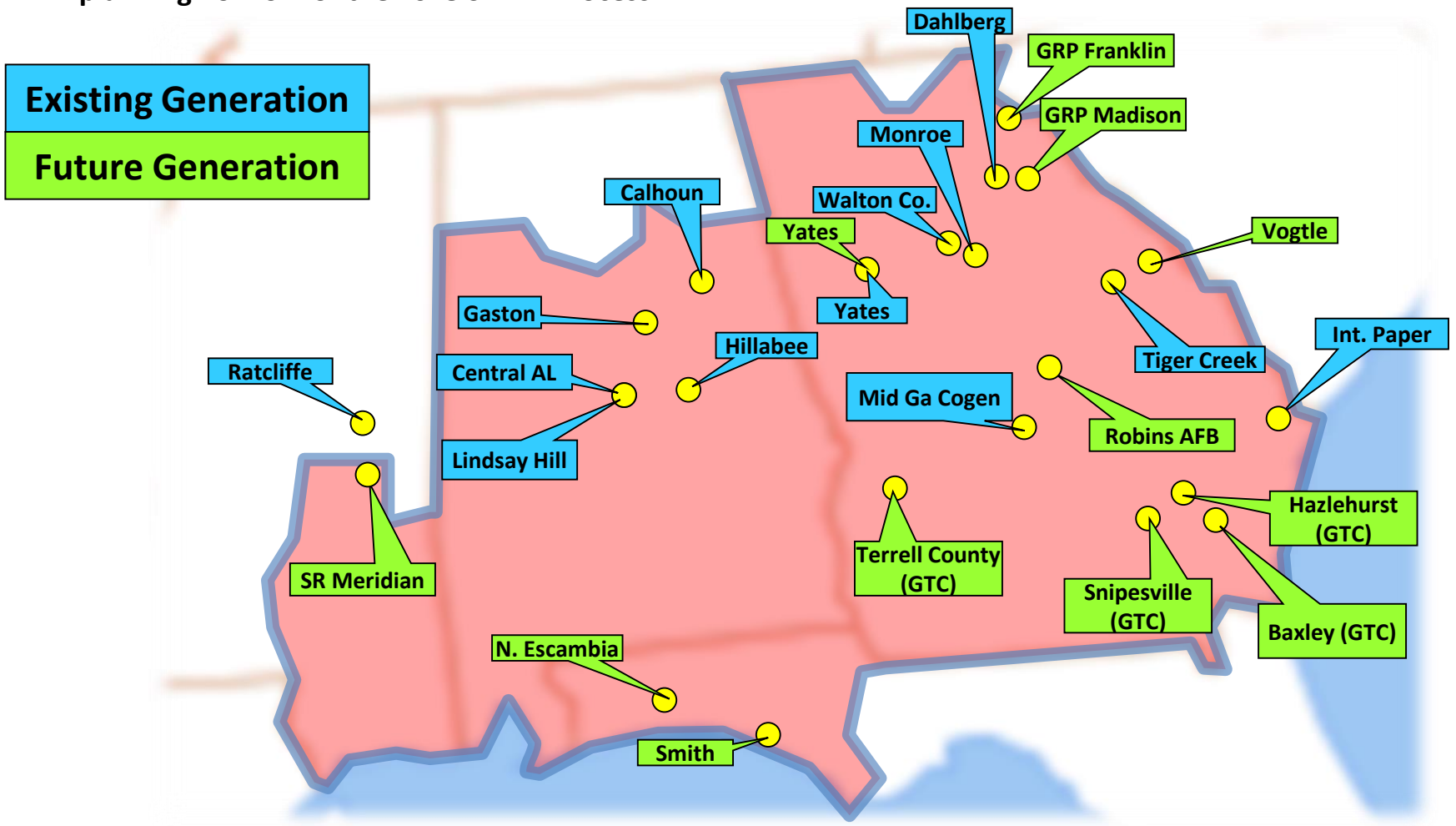


SOUTHERN Balancing Authority

Upcoming 2018 Generation Assumptions

SOUTHERN – Generation Assumptions

The following diagram depicts the location of generation assumptions <u>that change</u> throughout the ten year planning horizon for the 2018 SERTP Process.



Southern Company – Generation Assumptions

The following table depicts the generation assumptions <u>that change</u> throughout the ten year planning horizon for the 2018 SERTP Process. The years shown represent Summer Peak conditions.

SITE	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
CALHOUN 1-4	632	632	632	632	0	--	--	--	--	--
CENTRAL ALABAMA	885	885	885	885	0	--	--	--	--	--
DAHLBERG 2, 6, 8, 10	298	298	298	298	298	298	0	--	--	--
GASTON 1-4	465	465	465	465	465	515	515	515	515	515
GRP FRANKLIN	58	58	58	58	58	58	58	58	58	58
GRP MADISON	58	58	58	58	58	58	58	58	58	58
INT. PAPER - PW BIOMASS	20	20	20	20	20	20	20	20	0	--
MID GA COGEN	300	300	300	300	300	300	300	300	300	0
MONROE POWER	309	309	309	309	309	0	--	--	--	--

Southern Company – Generation Assumptions (Cont.)

The following table depicts the generation assumptions <u>that change</u> throughout the ten year planning horizon for the 2018 SERTP Process. The years shown represent Summer Peak conditions.

SITE	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
RATCLIFFE CC	696	696	696	696	696	696	696	696	696	696
ROBINS AFB	139	139	139	139	139	139	139	139	139	139
SR MERIDIAN III	--	52	52	52	52	52	52	52	52	52
TIGER CREEK 1&4	313	313	313	313	313	0	--	--	--	--
VOGTLE 3	--	--	--	504	504	504	504	504	504	504
VOGTLE 4	--	--	--	--	504	504	504	504	504	504
WALTON COUNTY	465	465	465	465	465	0	--	--	--	--
YATES 6-7	649	649	649	649	649	714	714	714	714	714

Southern Company – Generation Assumptions

The following table depicts future generation assumptions <u>that change</u> throughout the ten year planning horizon for the 2018 SERTP Process. The years shown represent Summer Peak conditions.

SITE	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
LANSING SMITH [1]	--	--	--	--	230	230	230	230	230	230
NORTH ESCAMBIA [1]	--	--	--	--	460	460	460	460	460	460
YATES[1]	--	--	--	--	--	--	1200	1200	1200	1200

(1) This assumption may be modified as resource decisions are made by the corresponding LSEs pursuant to applicable regulatory processes.

Southern Company – Generation Assumptions (Point-to-Point)

The following table depicts generation assumptions based upon expected long-term firm point-to-point commitments. The years shown represent Summer Peak conditions.

SITE	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
BOWEN	159	159	159	159	159	159	159	159	159	159
DAHLBERG	494	494	494	494	494	494	494	494	494	494
FRANKLIN	424	424	424	424	424	424	424	424	424	424
HAMMOND	10	10	10	10	10	10	10	10	10	10
HILLABEE	350	350	350	350	350	350	350	350	350	350
LINDSAY HILL	300	300	300	300	300	300	300	300	300	300
SCHERER	911	911	911	911	911	911	911	911	911	911
VOGTLE	206	206	206	206	206	206	206	206	206	206

GTC – Generation Assumptions

The following table depicts the generation assumptions that change throughout the ten year planning horizon for the 2018 SERTP Process. The years shown represent Summer Peak conditions.

SITE	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
BAXLEY	--	24	24	24	24	24	24	24	24	24
SNIPESVILLE	--	60	60	60	60	60	60	60	60	60
SR HAZELHURST 3	--	42	42	42	42	42	42	42	42	42
TERRELL COUNTY	--	74	74	74	74	74	74	74	74	74
VOGTLE 3	--	--	--	330	330	330	330	330	330	330
VOGTLE 4	--	--	--	--	330	330	330	330	330	330

MEAG – Generation Assumptions

The following table depicts the generation assumptions <u>that change</u> throughout the ten year planning horizon for the 2018 SERTP Process. The years shown represent Summer Peak conditions.

SITE	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
VOGTLE 3	--	--	--	250	250	250	250	250	250	250
VOGTLE 4	--	--	--	--	250	250	250	250	250	250

DALTON – Generation Assumptions

The following table depicts the generation assumptions that change throughout the ten year planning horizon for the 2018 SERTP Process. The years shown represent Summer Peak conditions.

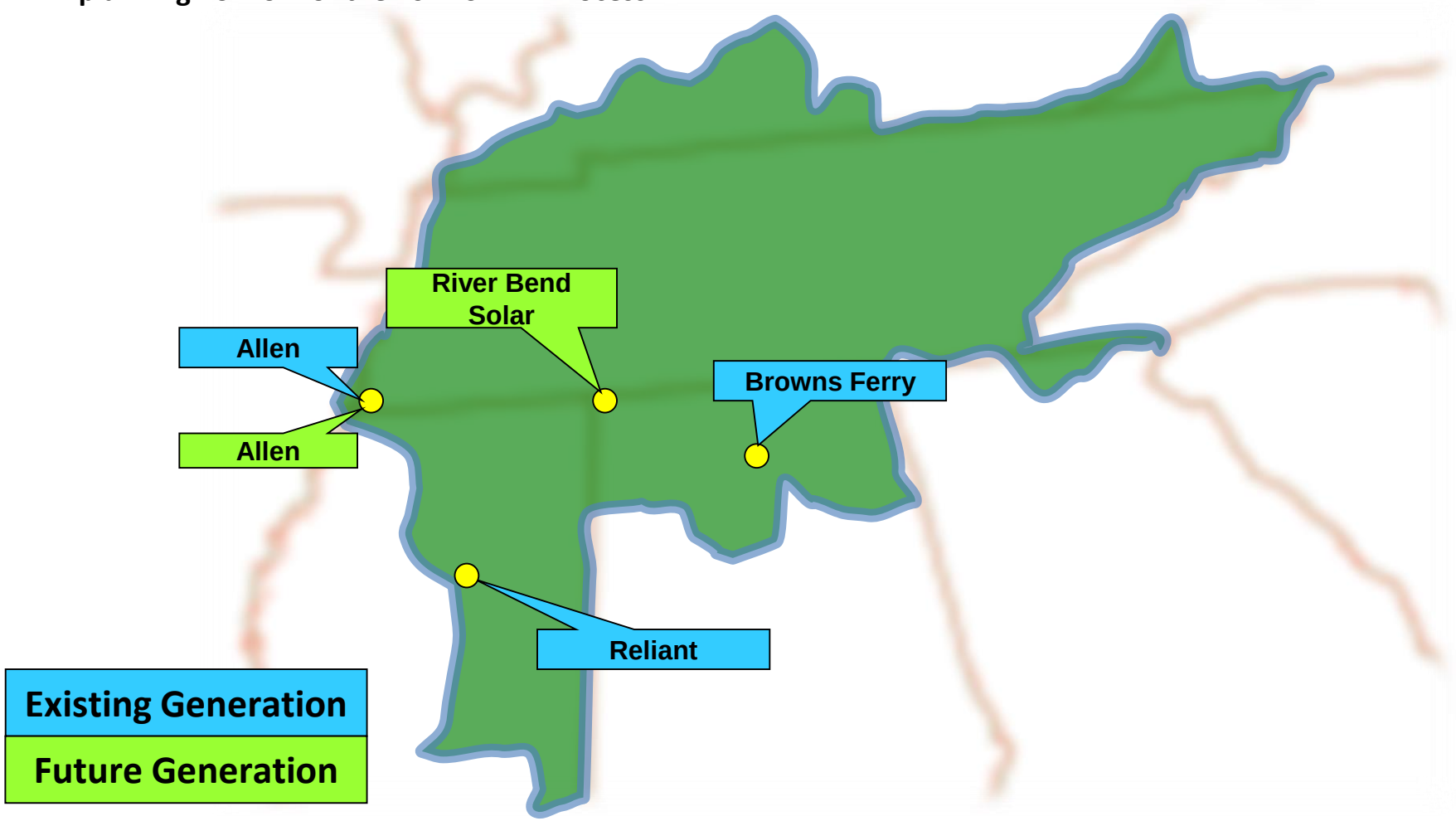
SITE	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
VOGTLE 3	--	--	--	19	19	19	19	19	19	19
VOGTLE 4	--	--	--	--	19	19	19	19	19	19

TVA Balancing Authority

2017 Generation Assumptions

TVA – Generation Assumptions

The following diagram depicts the location of generation assumptions <u>that change</u> throughout the ten year planning horizon for the 2017 SERTP Process.



TVA – Generation Assumptions

The following table depicts the generation assumptions that change throughout the ten year planning horizon for the 2017 SERTP Process. The years shown represent Summer Peak conditions.

SITE	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
ALLEN 1-3	0	--	--	--	--	--	--	--	--	--
ALLEN CC	1082	1082	1082	1082	1082	1082	1082	1082	1082	1082
BROWNS FERRY UNIT 1	1103	1237	1237	1237	1237	1237	1237	1237	1237	1237
BROWNS FERRY UNIT 2	1108	1242	1242	1242	1242	1242	1242	1242	1242	1242
BROWNS FERRY UNIT 3	1242	1242	1242	1242	1242	1242	1242	1242	1242	1242
RIVER BEND SOLAR	75	75	75	75	75	75	75	75	75	75

TVA– Generation Assumptions (Point-to-Point)

The following table depicts generation assumptions based upon expected long-term firm point-to-point commitments. The years shown represent Summer Peak conditions.

SITE	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
RELIANT	800	800	800	800	800	800	800	800	800	800

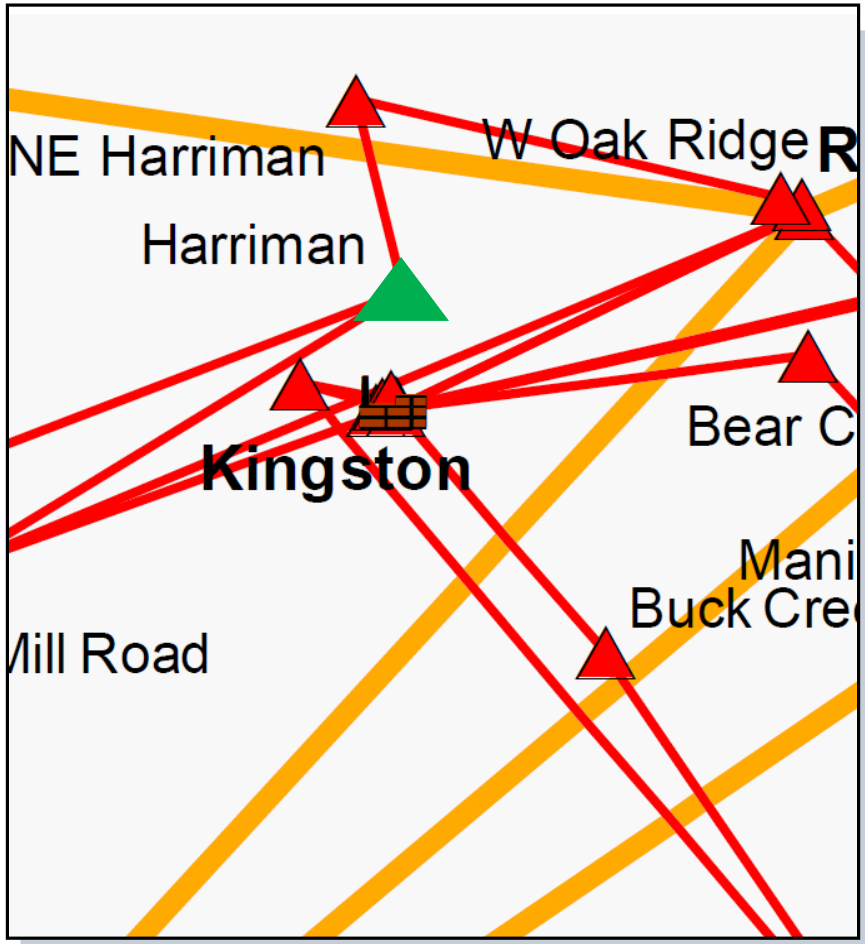
TVA Balancing Authority

SERTP Regional Transmission Expansion Plan

TVA Balancing Authority

TVA – 1 2018

HARRIMAN, TN 161 KV SUBSTATION

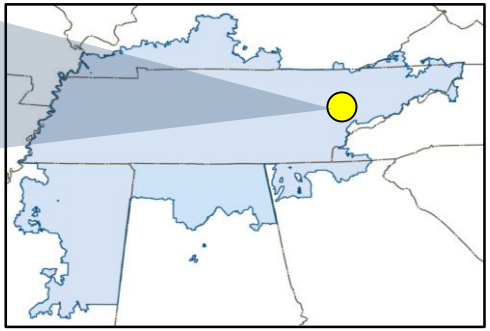


DESCRIPTION:

Reconfigure the Harriman, TN 161 kV substation by looping an additional 161 kV transmission line into the substation and installing 3, 161 kV breakers.

SUPPORTING STATEMENT:

Additional voltage support is needed in the Harriman, TN area under contingency.



TVA – 2

2018

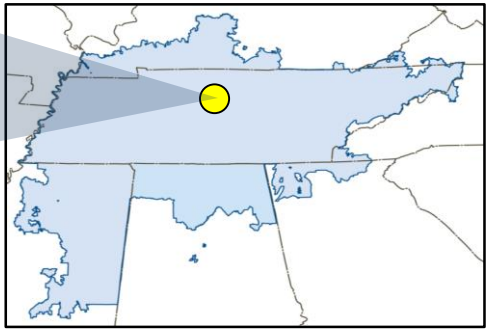
NASHVILLE AREA IMPROVEMENT PLAN

DESCRIPTION:

Install an additional 1344 MVA, 500/161 kV transformer at the Pin Hook 500 kV substation. Reconductor the Nolensville Road – Elysian Fields 161 kV T.L. with 636 ACSS at 150°C. Reconductor the Murfreesboro Road – Airport 161 kV T.L. with 636 ACSS at 150°C. Reconductor the Blackman Tap – Smyrna 161 kV T.L. with 636 ACSS at 150°C. Construct the Montgomery – Clarksville #3 161 kV T.L. with 1590 ACSS at 150°C.

SUPPORTING STATEMENT:

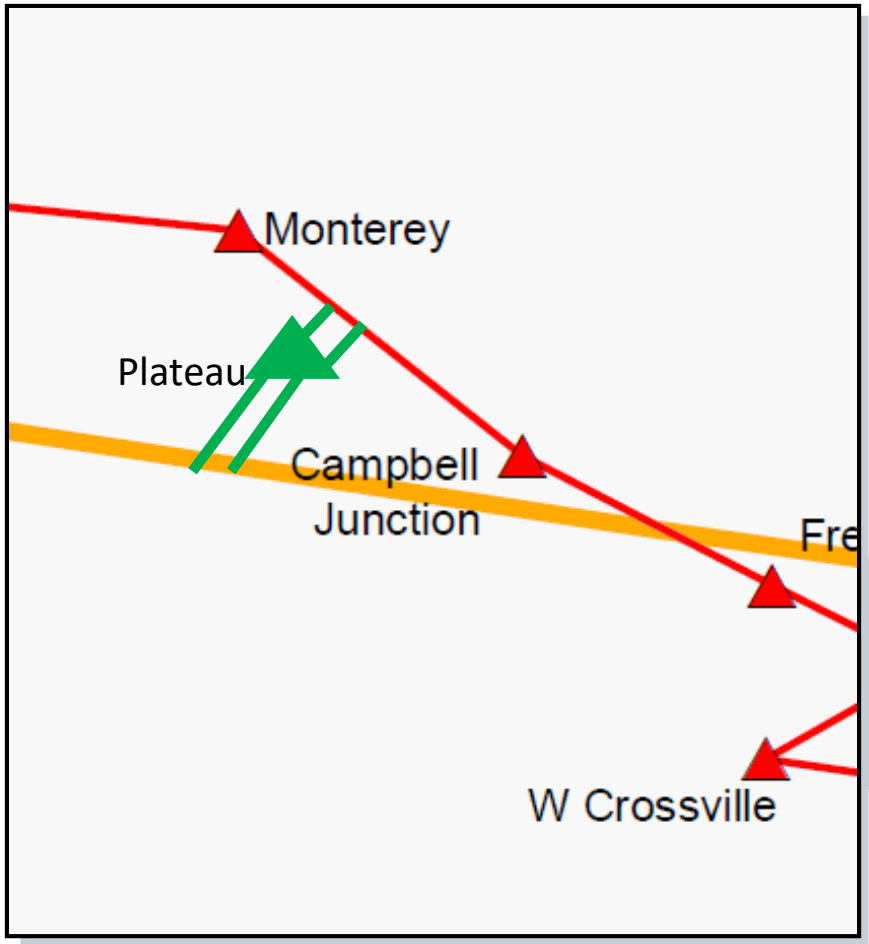
Thermal overloads and the need for additional voltage support is needed in the Nashville area under contingency.



TVA – 3

2018

PLATEAU 500 KV SUBSTATION

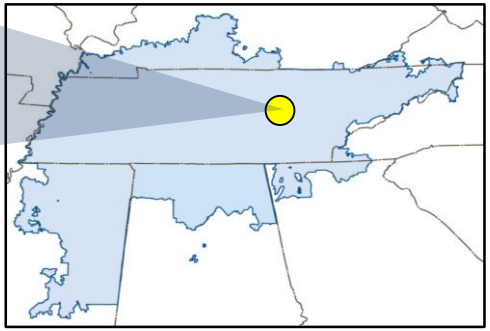


DESCRIPTION:

Construct the Plateau 500 kV substation by looping in the Wilson – Roane 500 kV and West Cookeville – Rockwood 161 kV transmission lines.

SUPPORTING STATEMENT:

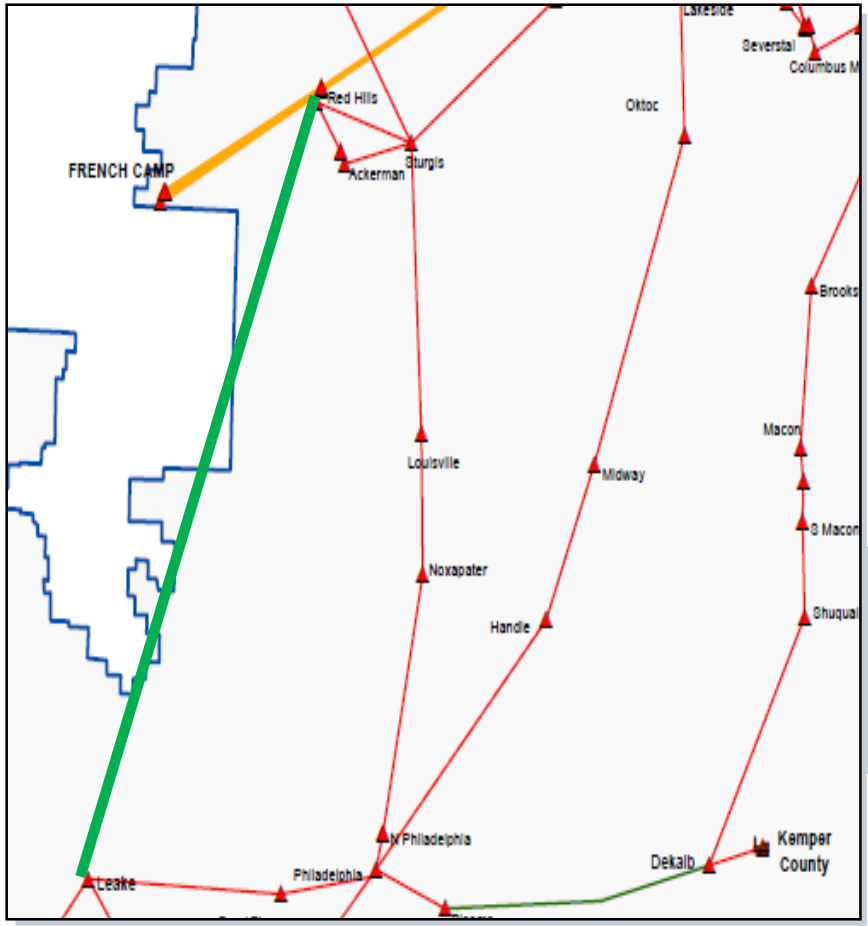
Thermal overloads and need for additional voltage support in the Murfreesboro, TN and Knoxville, TN areas under contingency.



TVA – 4

2019

RED HILLS – LEAKE 161 KV T.L.

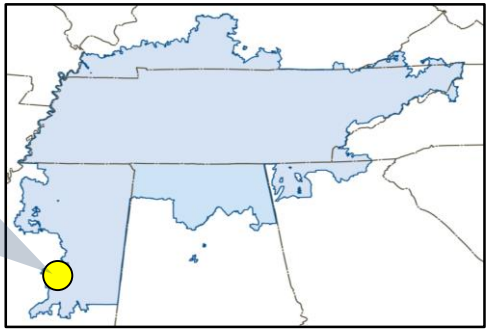


DESCRIPTION:

Construct approximately 60 miles of 161 kV transmission line from Red Hills to Leake with 954 ACSR at 100°C.

SUPPORTING STATEMENT:

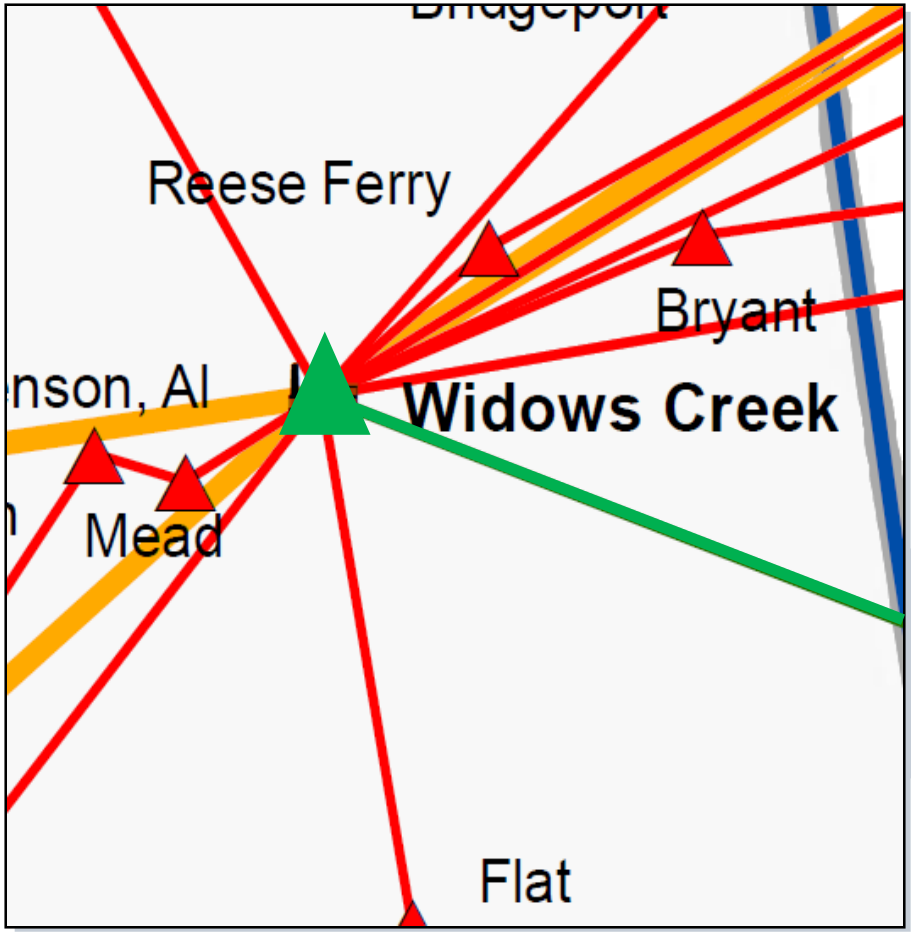
Multiple 161 kV transmission lines in the lower MS area overload under contingency and additional voltage support is needed in the lower MS area under contingency.



TVA – 5

2019

WIDOWS CREEK FP SUBSTATION

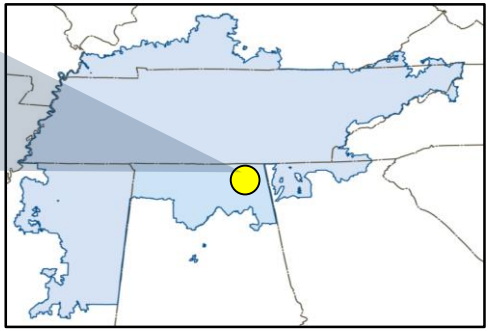


DESCRIPTION:

Install a second 500/161 kV transformer at the Widows Creek Fossil Plant Substation.

SUPPORTING STATEMENT:

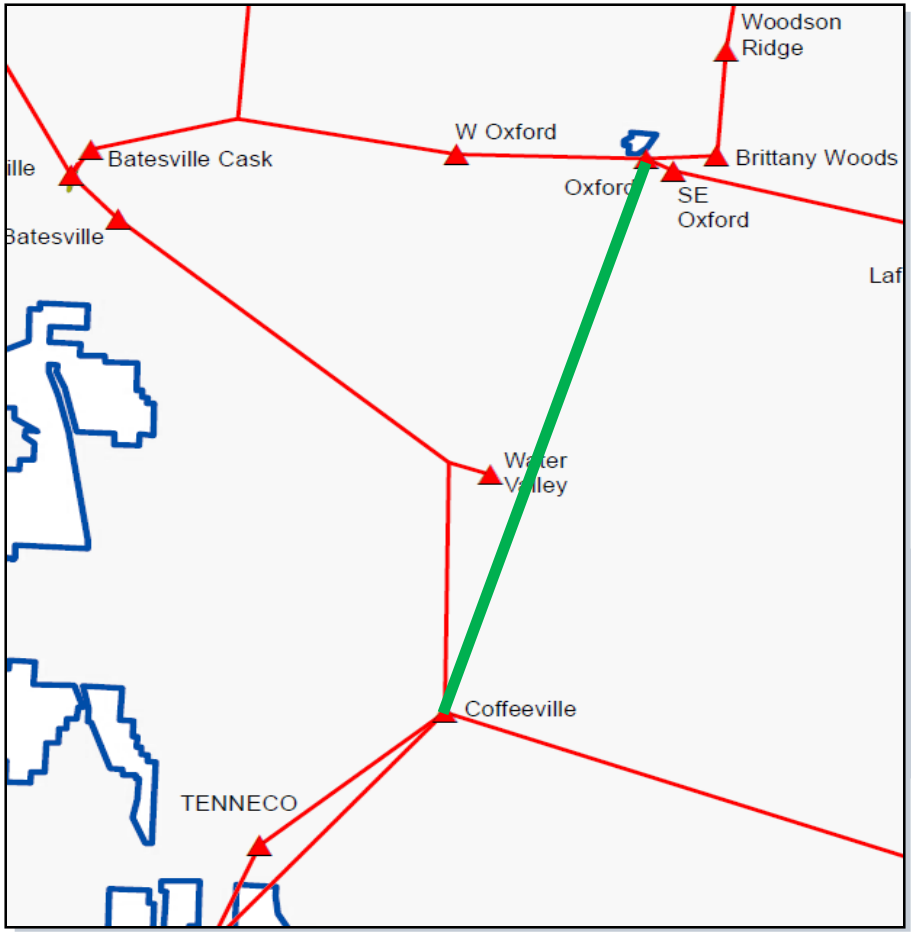
Multiple transmission lines overload and additional voltage support needed in the Huntsville, AL area under contingency.



TVA – 6

2019

OXFORD – COFFEEVILLE 161 KV T.L.

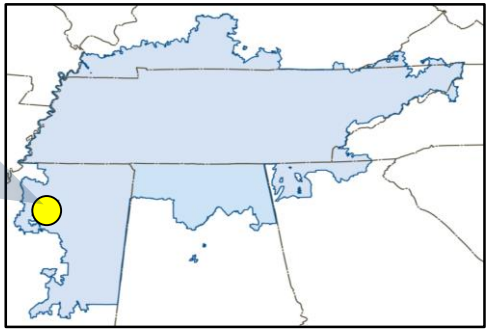


DESCRIPTION:

Construct approximately 30 miles of the new Oxford – Coffeeville 161 kV transmission line with 954 ACSR at 100°C.

SUPPORTING STATEMENT:

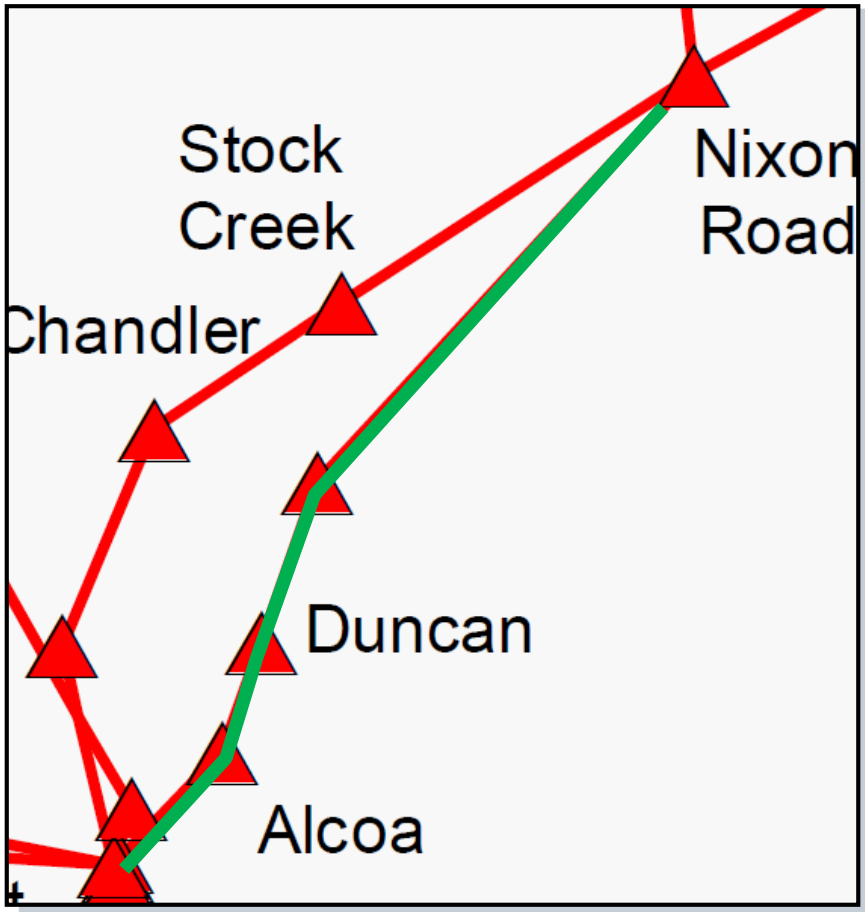
Additional voltage support is needed in the Mississippi area under contingency.



TVA – 7

2020

ALCOA SS – NIXON ROAD 161 KV T.L.

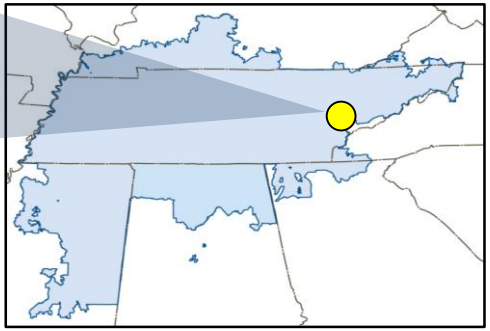


DESCRIPTION:

Rebuild approximately 12 miles of the Alcoa North – Nixon Road 161 kV transmission line with 1590 ACSR at 100°C and construct approximately 2.0 miles of new transmission line to create the Alcoa SS – Nixon Rd 161 kV #2 transmission line.

SUPPORTING STATEMENT:

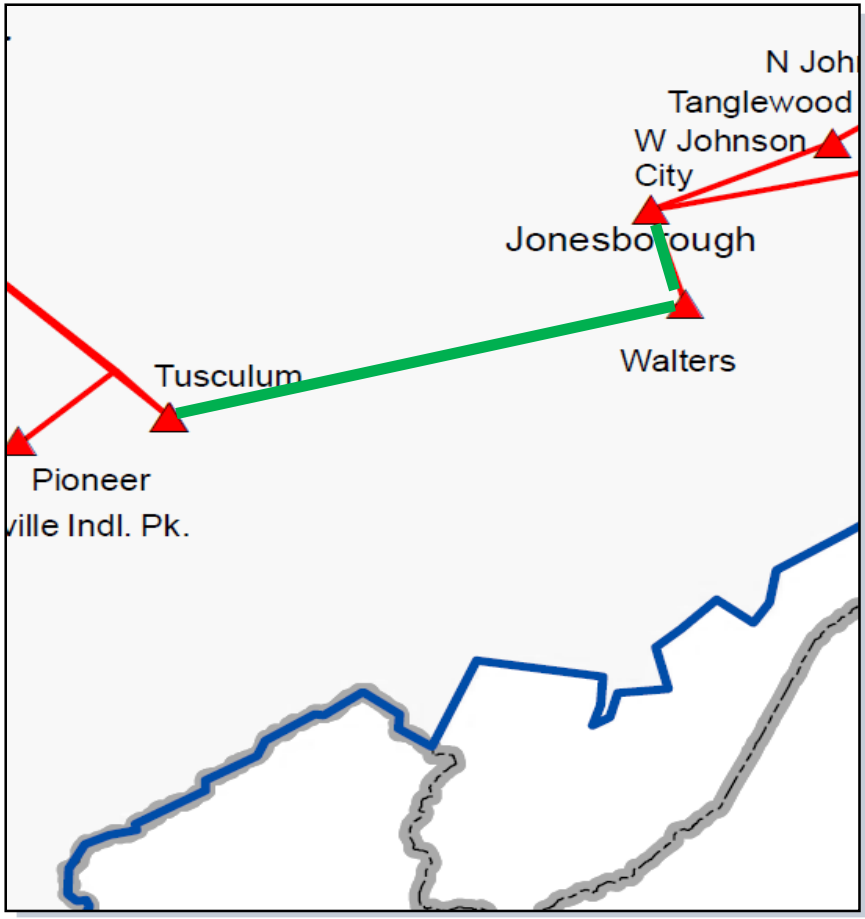
The existing Alcoa Switching Station – Nixon Road 161 kV transmission line overloads under contingency.



TVA – 8

2020

TUSCULUM – JONESBOROUGH 161 KV T.L.

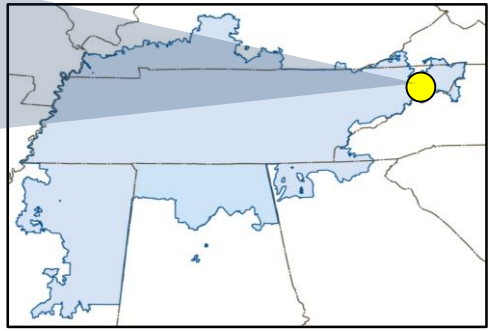


DESCRIPTION:

Double circuit approximately 17 miles of the Tusculum - Jonesborough 161 kV transmission line with 954 ACSR at 100°C.

SUPPORTING STATEMENT:

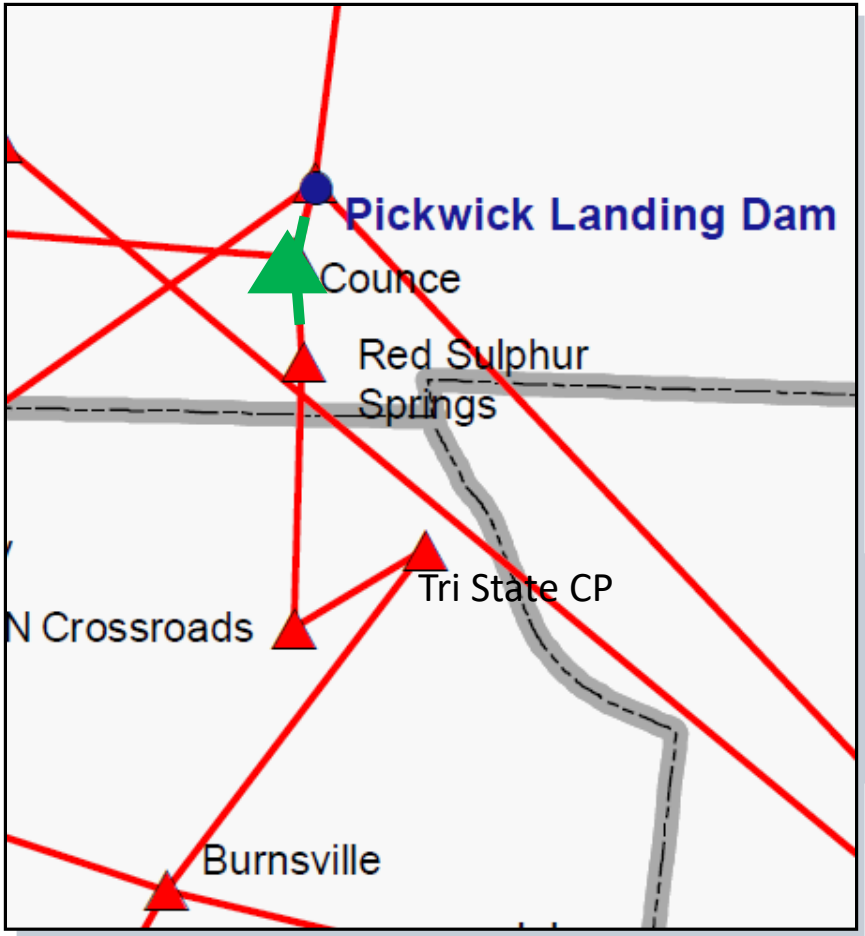
The Tusculum - Jonesborough 161 kV transmission line overloads under contingency.



TVA – 9

2021

COUNCE, TN 161 KV SUBSTATION

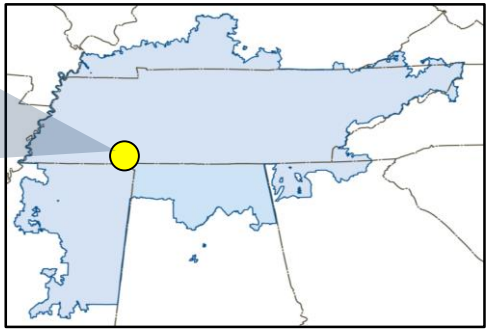


DESCRIPTION:

Convert Counce 161 kV switchyard to a double breaker arrangement. Loop the existing Pickwick - Tri State Commerce Park 161 kV transmission line into the Counce 161 kV station.

SUPPORTING STATEMENT:

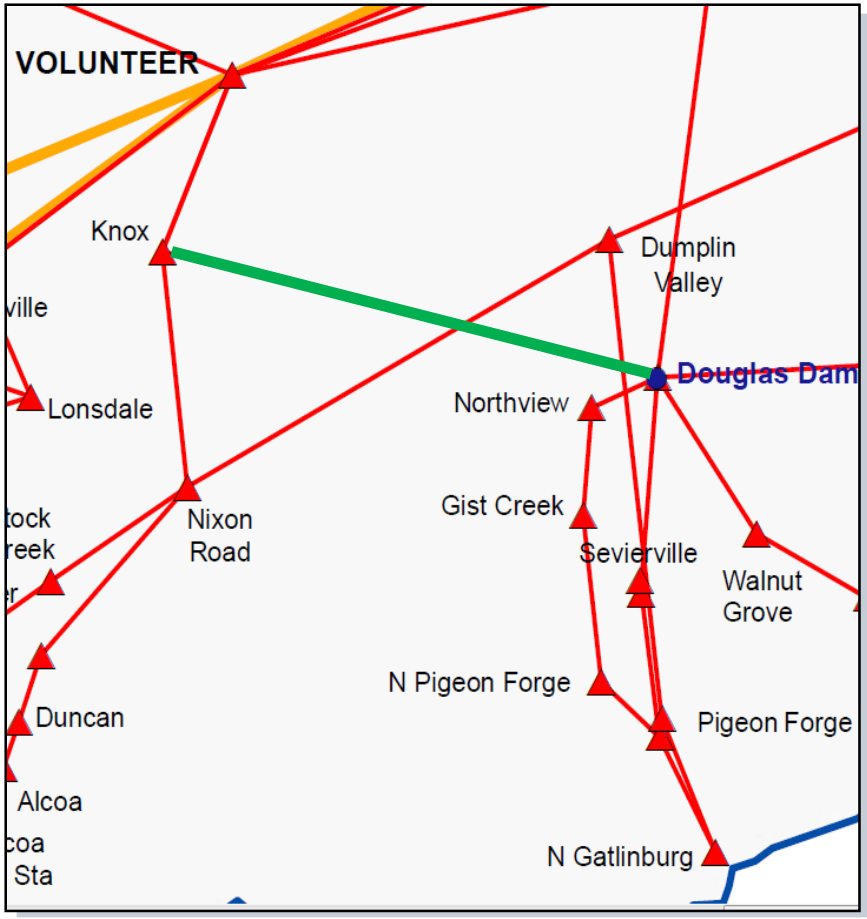
Additional voltage support is needed in the Counce, TN area under contingency.



TVA – 10

2021

KNOX – DOUGLAS 161 KV T.L.

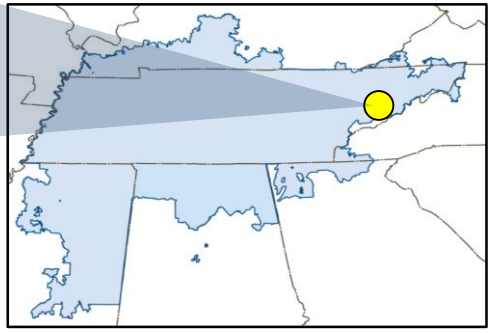


DESCRIPTION:

Rebuild approximately 15 miles of the Knox - Douglas 161 kV transmission line with 954 ACSS at 125°C.

SUPPORTING STATEMENT:

The Knox - Douglas 161 kV transmission line overloads under contingency.

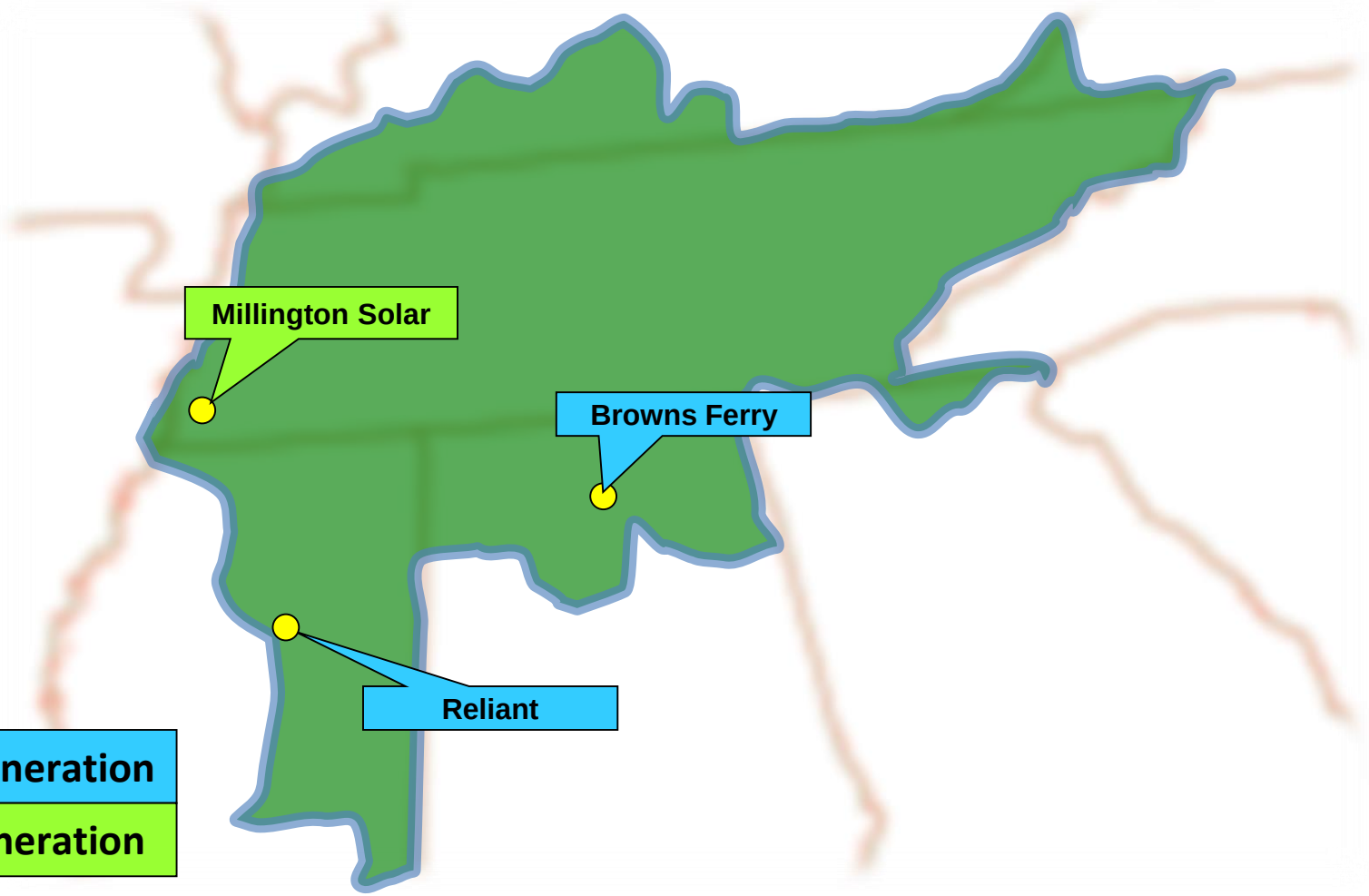


TVA Balancing Authority

Upcoming 2018 Generation Assumptions

TVA – Generation Assumptions

The following diagram depicts the location of generation assumptions that change throughout the ten year planning horizon for the 2018 SERTP Process.



TVA – Generation Assumptions

The following table depicts the generation assumptions that change throughout the ten year planning horizon for the 2018 SERTP Process. The years shown represent Summer Peak conditions.

SITE	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
BROWNS FERRY UNIT 1	1262	1262	1262	1262	1262	1262	1262	1262	1262	1262
BROWNS FERRY UNIT 2	1266	1266	1266	1266	1266	1266	1266	1266	1266	1266
MILLINGTON SOLAR	53	53	53	53	53	53	53	53	53	53

TVA Balancing Authority

TVA– Generation Assumptions (Point-to-Point)

The following table depicts generation assumptions based upon expected long-term firm point-to-point commitments. The years shown represent Summer Peak conditions.

SITE	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
RELIANT	800	800	800	800	800	800	800	800	800	800

SERTP

Regional Transmission Analyses Overview

Regional Transmission Analyses Overview

- Assess if the then current regional transmission plan addresses the Transmission Provider's transmission needs

- Assess whether there may be more efficient or cost effective transmission projects to address transmission needs

Regional Transmission Analyses

Assessment of Current Regional Plan

- **SERTP Sponsors developed 12 coordinated regional models***
- **Models include latest transmission planning model information within the SERTP region**
- **Contingency analysis was performed to identify potential constraints that may result from the regional coordination of latest input assumptions**

*Available on the secure area of the SERTP website upon satisfying access requirements

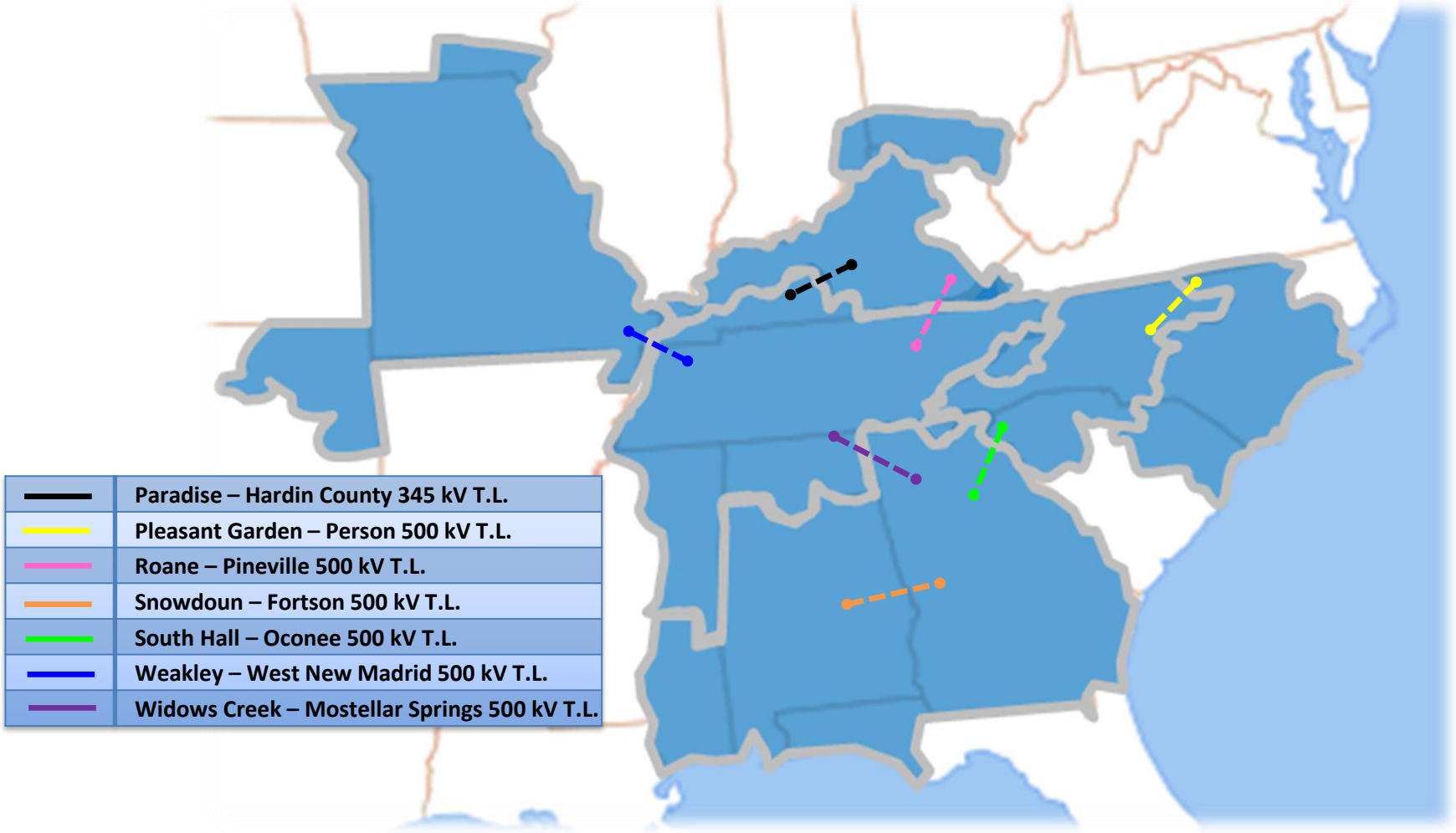
No.	Season	Year
1	SUMMER	2018
2		2020
3		2022
4		2023
5		2025
6		2027
7	SHOULDER	2020
8		2022
9		2025
10		2027
11	WINTER	2022
12		2027

2017 Regional Transmission Analyses

Assessment of 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 500 kV 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.	105	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)

Assessment of Alternative Regional Transmission Projects



Regional Transmission Analyses Overview

- **No significantly constrained transmission facilities were identified in the assessment of the current regional transmission plan.**

- **No evaluated transmission project alternatives were found to be more efficient or cost effective.**
  - Estimated cost of transmission project alternatives significantly outweighed potential benefits.

- **The regional transmission analyses summary is posted on the SERTP website.**

SERTP

Miscellaneous Updates

Regional Planning Updates

- Version 3 SERTP Regional Models available on SERTP Website

- Exchanged the latest transmission models for the ten year planning horizon with FRCC
  - FRCC models will be incorporated into subsequent regional power flow models

Upcoming 2018 SERTP Process

- **SERTP 1st Quarter – *1st RPSG Meeting & Interactive Training Session***

  March 2018

  – Form Regional Planning Stakeholder Group "RPSG"
  – Select Economic Planning Studies
    - RPSG Economic Study Request Form
  – Interactive Training Session

- **SERTP 2nd Quarter – *Preliminary Expansion Plan Meeting***

  June 2018

  – Review Modeling Assumptions
  – Preliminary 10 Year Expansion Plan
  – Stakeholder Input & Feedback Regarding the Plan

Upcoming 2018 SERTP Process

- **SERTP 3rd Quarter – *2nd RPSG Meeting***

  September 2018
  - Preliminary Results of the Economic Studies
  - Stakeholder Input & Feedback Regarding the Study Results
  - Discuss Previous Stakeholder Input on the Expansion Plan

- **SERTP 4th Quarter – *Annual Transmission Planning Summit & Input Assumptions***

  December 2018
  - Final Results of the Economic Studies
  - Regional Transmission Plan
  - Regional Analyses
  - Stakeholder Input on the 2019 Transmission Model Input Assumptions

Questions?

www.southeasternrtp.com