



South Carolina Regional Transmission Planning

Stakeholder Meeting

SCE&G Lake Murray Training Center

Columbia, SC

May 16, 2011





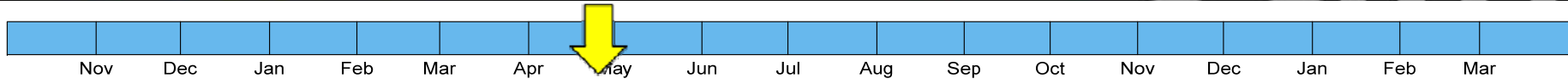
Purposes of Today's Meeting – May 2011

- Review, discuss and receive input from the stakeholder group on the initial findings of requested Economic Transmission Planning Studies
 - Impacted facilities
 - Solution options
 - Cost and time estimates
- Review how to acquire data and study assumptions used to conduct the Economic Transmission Planning Studies

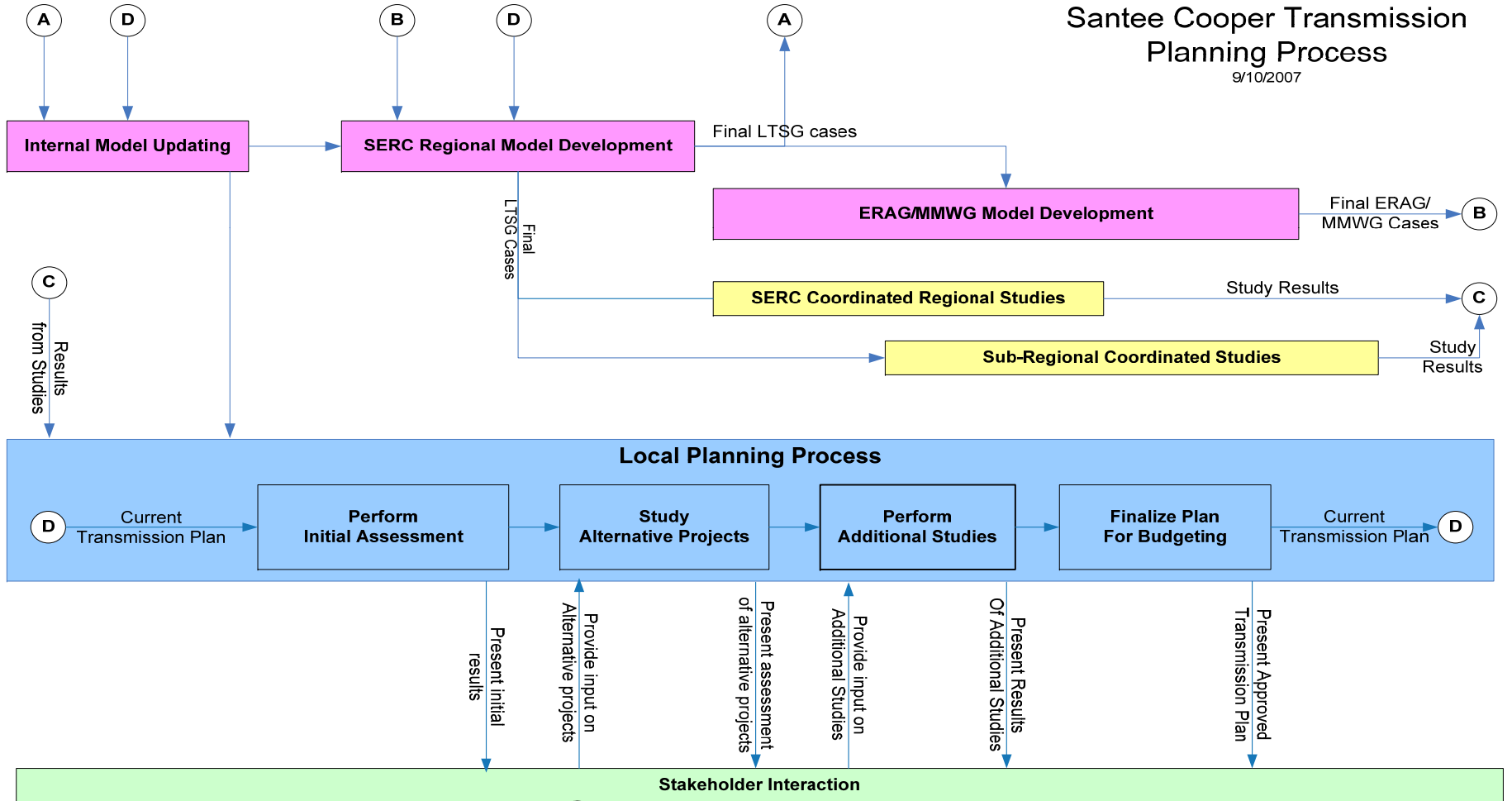


Purposes of Today's Meeting – May 2011

- Elect Sector Voting Members
- Review, discuss and receive input from the stakeholder group on the current transmission expansion plans
- Review, discuss and receive input from the stakeholder group on Key Assumptions and Data for the next Planning Cycle
- Review and discuss Inter-regional assessment studies



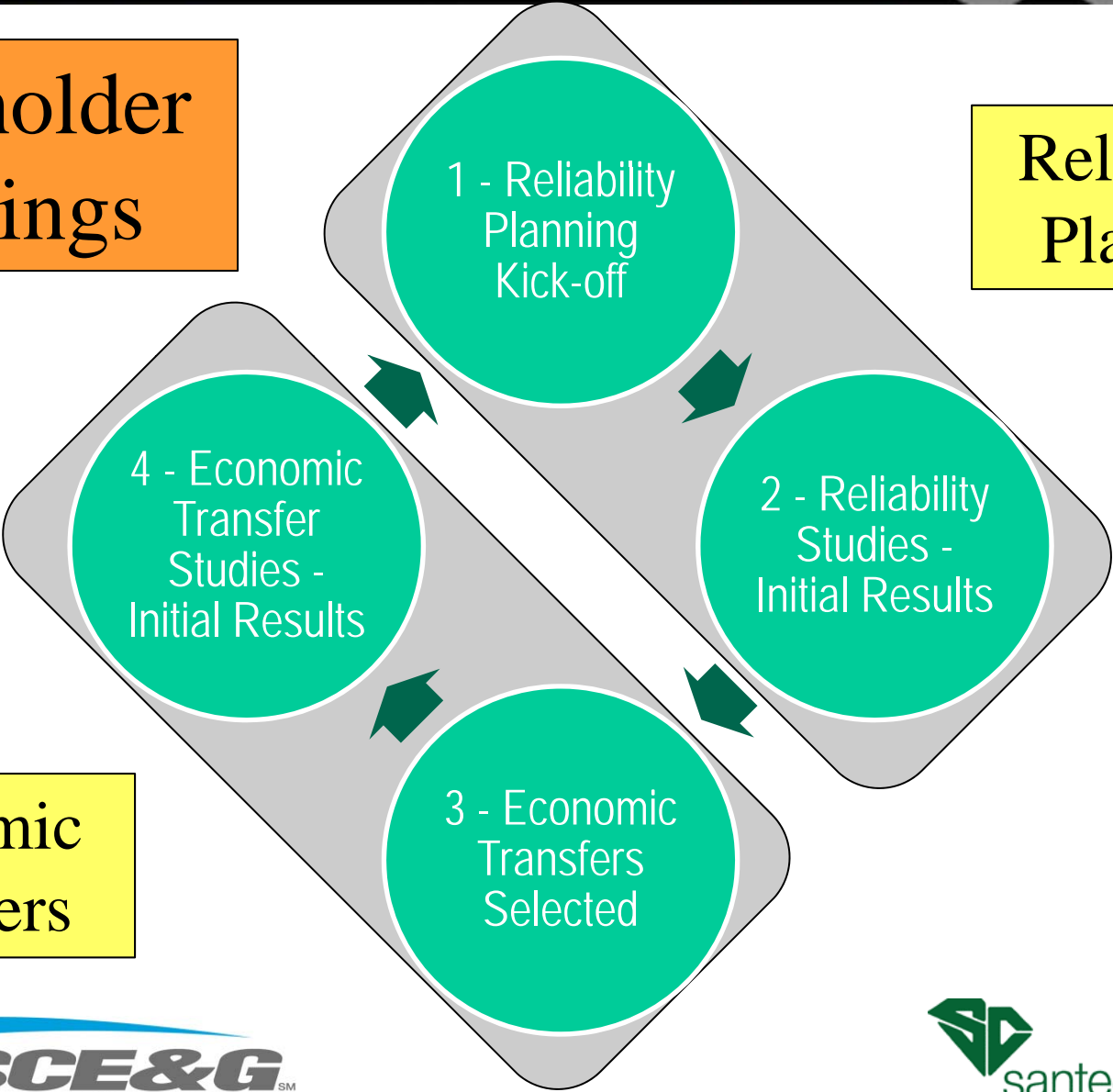
Santee Cooper Transmission Planning Process
 9/10/2007





Stakeholder Meetings

Reliability Planning



Economic Transfers



Economic Transmission Planning Studies Preliminary Results

Kale Ford





Case Development

- The most current MMWG models will be used for the systems external to SCE&G and SCPSA as a starting point for the study case.
- The study case(s) include the detailed internal models for SCE&G and SCPSA and will, also, include new transmission additions currently planned to be in-service for the given year (i.e. in-service by summer 2020 for 2020S case).



Case Development

- SCE&G and SCPSA will coordinate interchange which will include all confirmed long term firm transmission reservations with roll-over rights applicable to the study year.
- The coordinated case will be used to perform transfer analysis.
- An additional transfer case will be created to represent transfer for additional analysis.



Study Methodology

In accordance with the requirements of NERC Standards FAC-012-1 and FAC-013-1, the transfer capability determination in this study is consistent with traditional Transfer Capability Methodologies.

Two types of studies:

- Linear transfer analysis using PTI's MUST Software. Analysis includes single contingencies of SERC while monitoring SCE&G and Santee Cooper Transmission Systems.





Study Methodology

- A Thermal and Voltage analysis using PTI's PSS/E and PowerWorld Simulator Software. This analysis of SCE&G and Santee Coopers internal transmission systems included single contingencies, double contingencies and selected bus outages with and without the simulated transfer in effect. However, this analysis is not a complete testing of NERC TPL standards.



Study Results

- Overloaded facilities that had a low response to the requested transfer were excluded and problems or issues identified that are local area in nature were also excluded.



Stakeholder Selected Studies

Source	Sink	Study Year	Transfer
Santee Cooper	Progress Energy Carolinas	2015 Summer	500 MW
Santee Cooper	Duke Energy Carolinas	2015 Summer	500 MW
Santee Cooper	Southern Company	2015 Summer	200 MW
SCRTD (Coast)	Southern Company and PJM	2020 Summer	500 MW each





Study Assumptions

2015 Summer

- Generation dispatched for each Participant company in the study case to meet the transfer in accordance with their economic dispatch order. Transfers above available generation will be simulated by load scaling in the exporting area.
- Load growth assumptions will be in accordance with each Participant company's practice.
- Generation, interchange, and other assumptions will be coordinated between the Participant companies as needed.
- The 2010 series MMWG case for 2015 Summer and 2020 Summer will be used as the starting points for study case and interchange development.



Study Assumptions

2020 Summer

- 1000 MW simultaneous transfer from SCRTP (Coast) to Southern Company and PJM (500 MW each)
- Four injection points of 250 MW each localized to the South Carolina Coast 230 kV transmission
 - Winyah 230 kV
 - Campfiled 230 kV
 - Church Creek 230 kV
 - Yemassee 230 kV
- Load growth assumptions will be in accordance with each Participant company's practice.
- Generation, interchange, and other assumptions will be coordinated between the Participant companies as needed.
- The 2010 series MMWG case for 2020 Summer will be used as the starting points for study case and interchange development.



Preliminary Result Components

- The following information is preliminary and subject to change pursuant to additional analyses.
- The following 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.
- These potential solutions only address constraints identified within the respective areas that comprise the SCRTP. Balancing Areas external to the SCRTP were not monitored, which could result in additional limitations and required system enhancements.



Preliminary Results

2015 Summer Studies

Scenario	Constrained Facility	%	%	%	Contingency
		Loading	Increase		
SC to CP&LE 500 MW	None	---	---	---	
SC to Duke 500 MW	None	---	---	---	
SC to SOCO 200 MW	None	---	---	---	

* Project Identified





Identified Projects

2015 Summer Study

Item	Proposed Enhancement	Cost (2010 \$)
None	None	---

Total Identified Cost (2010\$) – ---





Preliminary Results

2020 Summer Study

Scenario	Constrained Facility	% Loading	% Increase	Contingency
SCRTP to PJM/ SOCO 1000 MW	Perry Road-Myrtle Beach #1 115 kV	107.2	1.2	Perry Road-Myrtle Beach #2 115 kV
SCRTP to PJM/ SOCO 1000 MW	Arcadia-Garden City #1 115 kV	106.1	4.0	Arcadia Garden City #2 115 kV
SCRTP to PJM/ SOCO 1000 MW	Arcadia-Garden City #1 115 kV	91.5	6.9	Campfield-Bucksville 230 kV
SCRTP to PJM/ SOCO 1000 MW	Arcadia-Garden City #2 115 kV	99.7	5.0	Arcadia-Garden City #1 115 kV
SCRTP to PJM/ SOCO 1000 MW	Campfield 230-115 kV	93.0	40.5	Base Case
SCRTP to PJM/ SOCO 1000 MW	Campfield 230-115 kV	110.3	13.0	Georgetown SS-Campfield 115 kV

* Project Identified





Preliminary Results

2020 Summer Study Continued

Scenario	Constrained Facility	%	%	Contingency
		Loading	Increase	
SCRTP to PJM/ SOCO 1000 MW	Perry Road 230/115 kV #1	93.8	29.5	Base Case
SCRTP to PJM/ SOCO 1000 MW	Perry Road 230/115 kV #1	95.6	3.3	Campfield-Perry Road 230 kV
SCRTP to PJM/ SOCO 1000 MW	Perry Road 230/115 kV #1	97.7	1.1	Campfield 230/115 kV
SCRTP to PJM/ SOCO 1000 MW	Perry Road 230/115 kV #1	114.5	1.6	Perry Road 230/115 kV #2
SCRTP to PJM/ SOCO 1000 MW	Perry Road 230/115 kV #2	94.4	29.7	Base Case
SCRTP to PJM/ SOCO 1000 MW	Perry Road 230/115 kV #2	96.3	3.4	Campfield-Perry Road 230 kV
SCRTP to PJM/ SOCO 1000 MW	Perry Road 230/115 kV #2	98.4	1.2	Campfield 230/115 kV
SCRTP to PJM/ SOCO 1000 MW	Perry Road 230/115 kV #2	114.9	1.6	Perry Road 230/115 kV #1

* Project Identified



Preliminary Results

2020 Summer Study Continued

Scenario	Constrained Facility	% Loading	% Increase	Contingency
SCRTP to PJM/ SOCO 1000 MW	Georgetown SS-Campfield 115 kV	101.5	-1.6	Campfield 230/115 kV
SCRTP to PJM/ SOCO 1000 MW	Georgetown SS-Campfield 115 kV	91.1	-23.2	Winyah-Campfield 230 kV
SCRTP to PJM/ SOCO 1000 MW	*Church Creek 230/115 kV #1	95.4-111.1	4.9-14.2	Single transmission lines and Church Creek 230/115 kV #2
SCRTP to PJM/ SOCO 1000 MW	*Church Creek 230/115 kV #2	98.2-116.4	7.1-17.3	Single transmission line and Church Creek 230/115 kV #1

* Project Identified





Identified Projects

2020 Summer Study

Item	Proposed Enhancement	Cost (2010 \$)
P1	230/115 kV #3 336 MVA autotransformer at Church Creek. 230 kV high side breakers for all three autotransformers and one 115 kV low side breaker for the new #3 autotransformer.	\$5,750,000

Total Identified Cost (2010\$) – \$5,750,000





Stakeholder Input on Preliminary Results

- Study Refinements
- Other Solution Options
- Future Conference Call



Report and Power Flow Case Access

- Draft reports will be provided to stakeholders by June 1, 2011
- Comments sent to kale.ford@scana.com by July 1, 2011
- Power Flow Base Cases available now on secure website



SCRTP Stakeholder Group

Tom Abrams





Key features of the Stakeholder Group

- Stakeholder participants determine their sector affiliation
- Each sector will have two voting members
- One vote per member
- Majority rule
- Voting members determined by the sector members annually at the Fall meeting
- Each company will have no more than one voting member in the SG



Key features of the Stakeholder Group (continued)

- Stakeholder meetings are open to non-stakeholder members
- Stakeholder group will identify and request economic transfers to be studied (if more than five requested, voting stakeholders will select the top five)
- Stakeholder group can change the number and timing of meetings with agreement by SCPSA and SCE&G



2010 Stakeholder Group Voting Members

Cooperatives

John Boyt – Central

Bob Beadle – NCEMC

Marketers

Eddie Folsom – SCE&G

Glenda Horne – Santee Cooper

Municipals

John Bagwell – Orangeburg

Alan Loveless – Georgetown

Generators

Victor Shaw – CEC

ISO/RTO

Network and PTP

J. W. Smith – SEPA

Calvin Daniels – ECG

Transmission Owners

Bob Pierce – Duke





Stakeholder Group Breakout



2011 Stakeholder Group Voting Members

Cooperatives

Marketers

Municipals

Generators

ISO/RTO

Network and PTP

Transmission Owners





Current Transmission Expansion Plan

William Gaither





Transmission Expansion Drivers:

- Criteria Testing
 - NERC Reliability Standards
 - Internal Planning Guidelines
- Customer Needs
 - Distribution & Industrial
 - Wholesale (cooperative & municipal)
 - Network
 - Firm PTP
- Generator Interconnection Needs
- Actual system performance



- The projects described in these presentations represent the current transmission plans within the SCRTP footprint.
- The expansion plan is continuously reviewed and may change due to changes in assumptions and key data.
- This presentation does not represent a commitment to build.



Santee Cooper Transmission Expansion Projects





Transmission Network Completed Projects

- St. George-Varnville/Walterboro Tap 115 kV 05/12/2010
- Burke Road Tap 115 kV Rebuild 05/20/2010
- Lake City 230-69 kV Transformer #2 07/07/2010
- Carnes-Cane Bay Tap Double Circuit 115 kV 11/15/2010



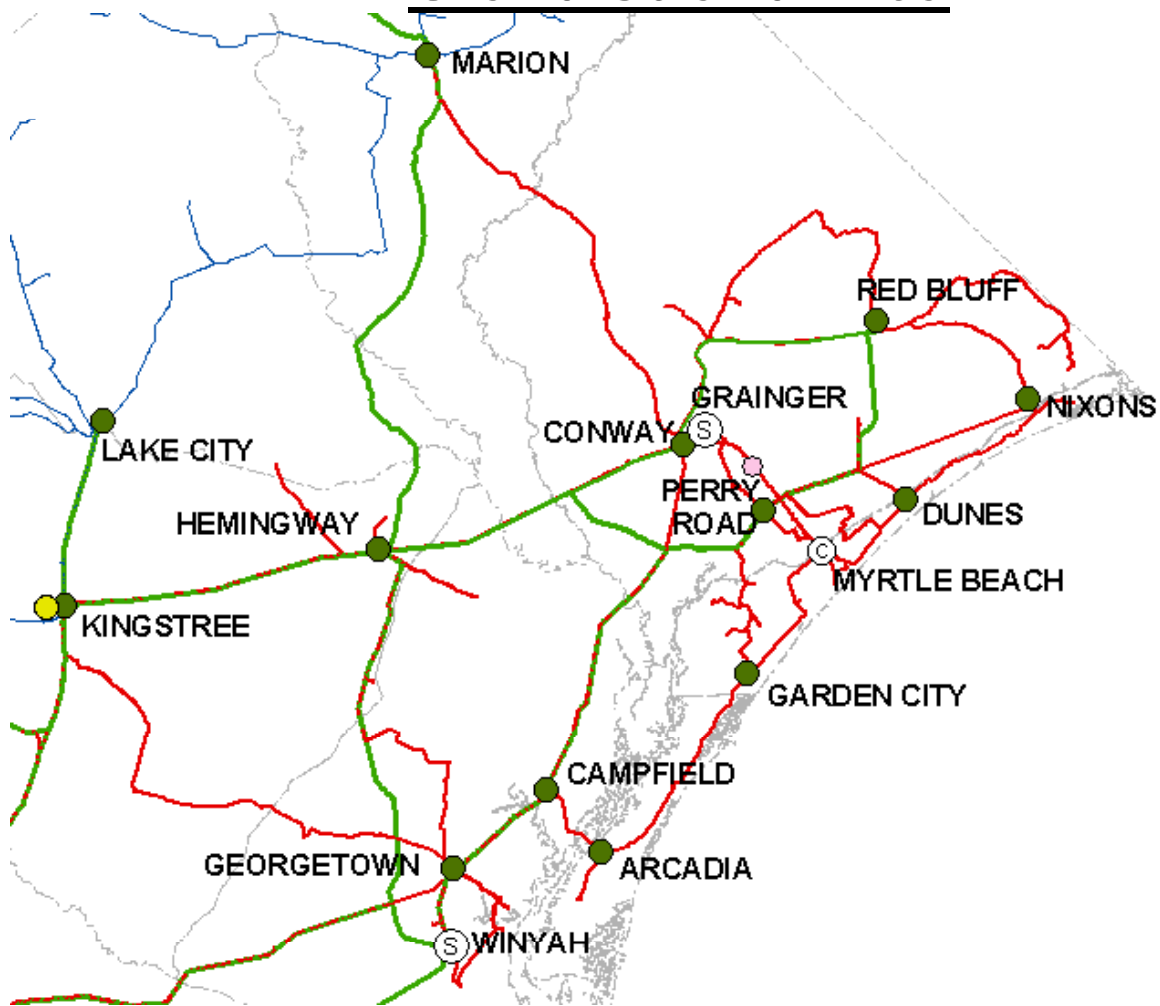
Transmission Network

Active Projects

- Arcadia-Garden City #2 115 kV Line 12/2011
- Carolina Forest 230-115 kV Substation 06/2012
- Carolina Forest-Dunes #2 115 kV Line 06/2012
- Fold Hemingway-Marion 230 kV Line into Lake City 12/2012
- Orangeburg 230-115 kV Substation 12/2012
- Pomaria 230-69 kV Substation 03/2013



Grand Strand Area





Myrtle Beach Area

- Issues:
 - Large load center served from remote resources
 - Tightly-integrated transmission system
 - Numerous contingencies impact “source” lines into the area
 - Line loadings projected to exceed their normal rating

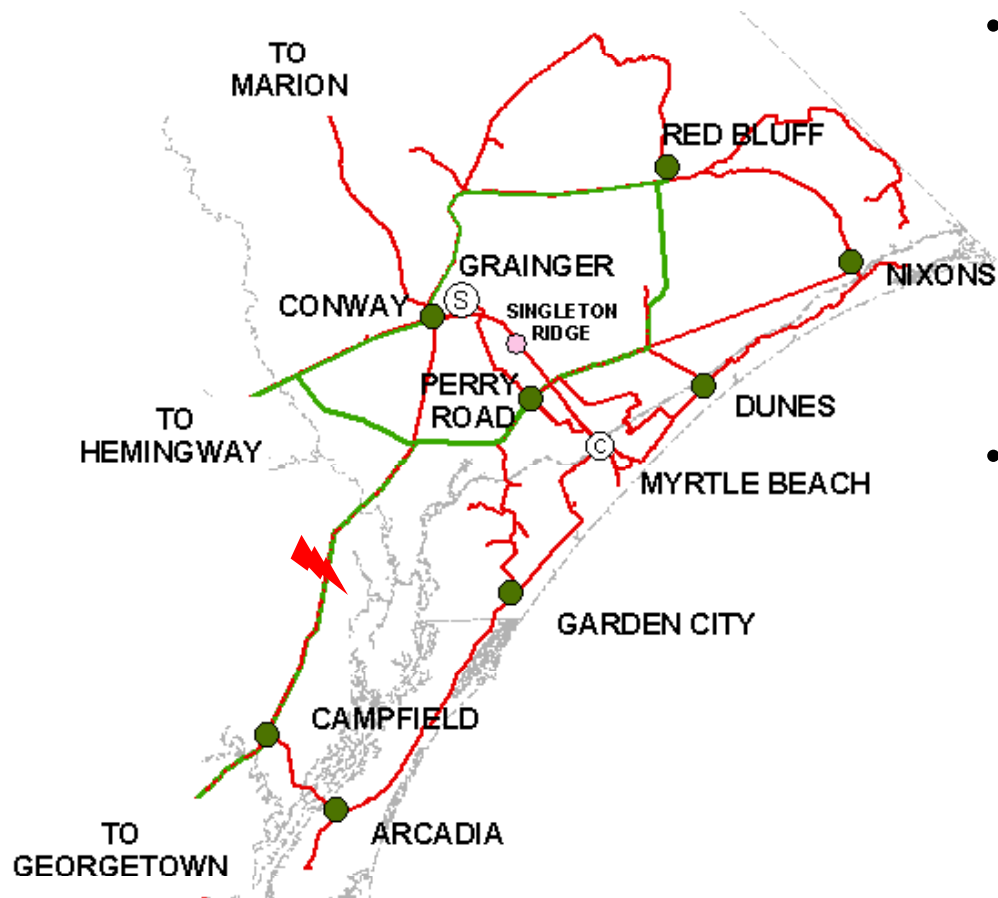


Arcadia-Garden City #2 115 kV Line

- Problem:
 - Contingency:
 - Outage of Campfield-Perry Road 230 kV Line
 - Severe or extreme events in the Myrtle Beach Area
 - Result:
 - Arcadia-Litchfield 115 kV line section may overload
 - Base case loading projected to exceed normal rating in 2012



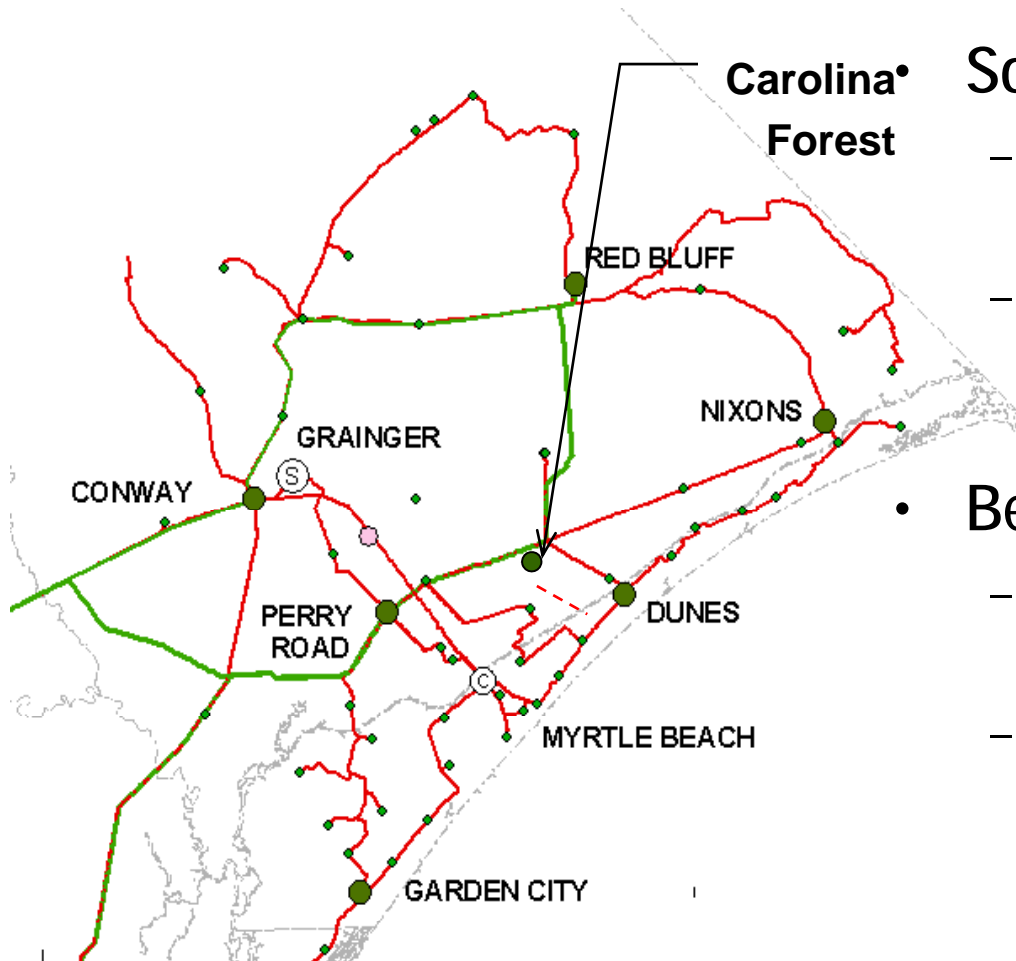
Arcadia-Garden City #2 115 kV Line



- **Solution:**
 - Rebuild the existing Garden City-Arcadia 115 kV Line as a double circuit line
- **Benefit:**
 - Provide another source into southern portion of Myrtle Beach area.



Carolina Forest 230/115 kV Substation



Solution:

- Construct the Carolina Forest 230/115 kV Substation
- Construct 115 kV line from Carolina Forest to Dunes 115-12 kV Substation

Benefits:

- Provide another bulk source into the central part of Myrtle Beach
- Relieve dependency on Perry Road and Myrtle Beach Substations

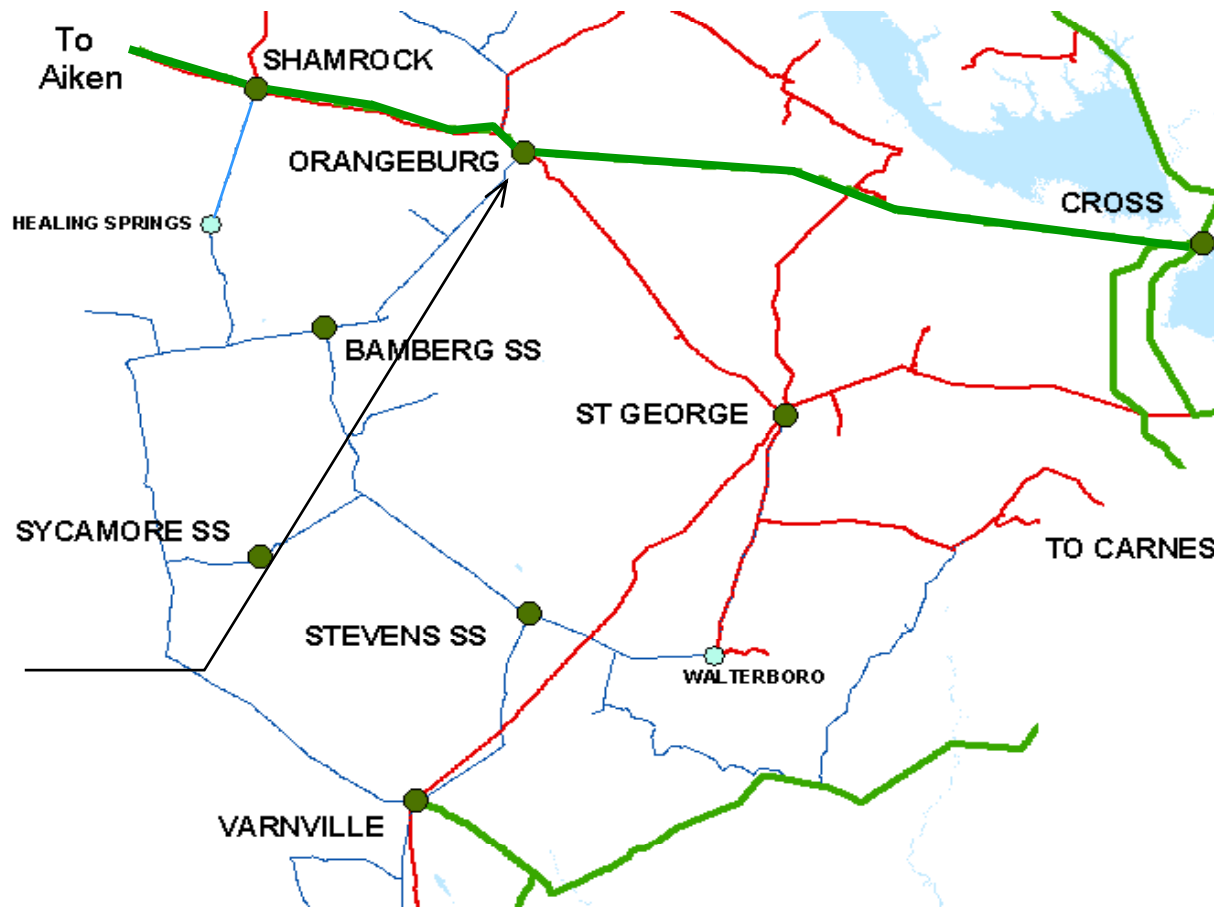


Fold Hemingway-Marion 230 kV into Lake City





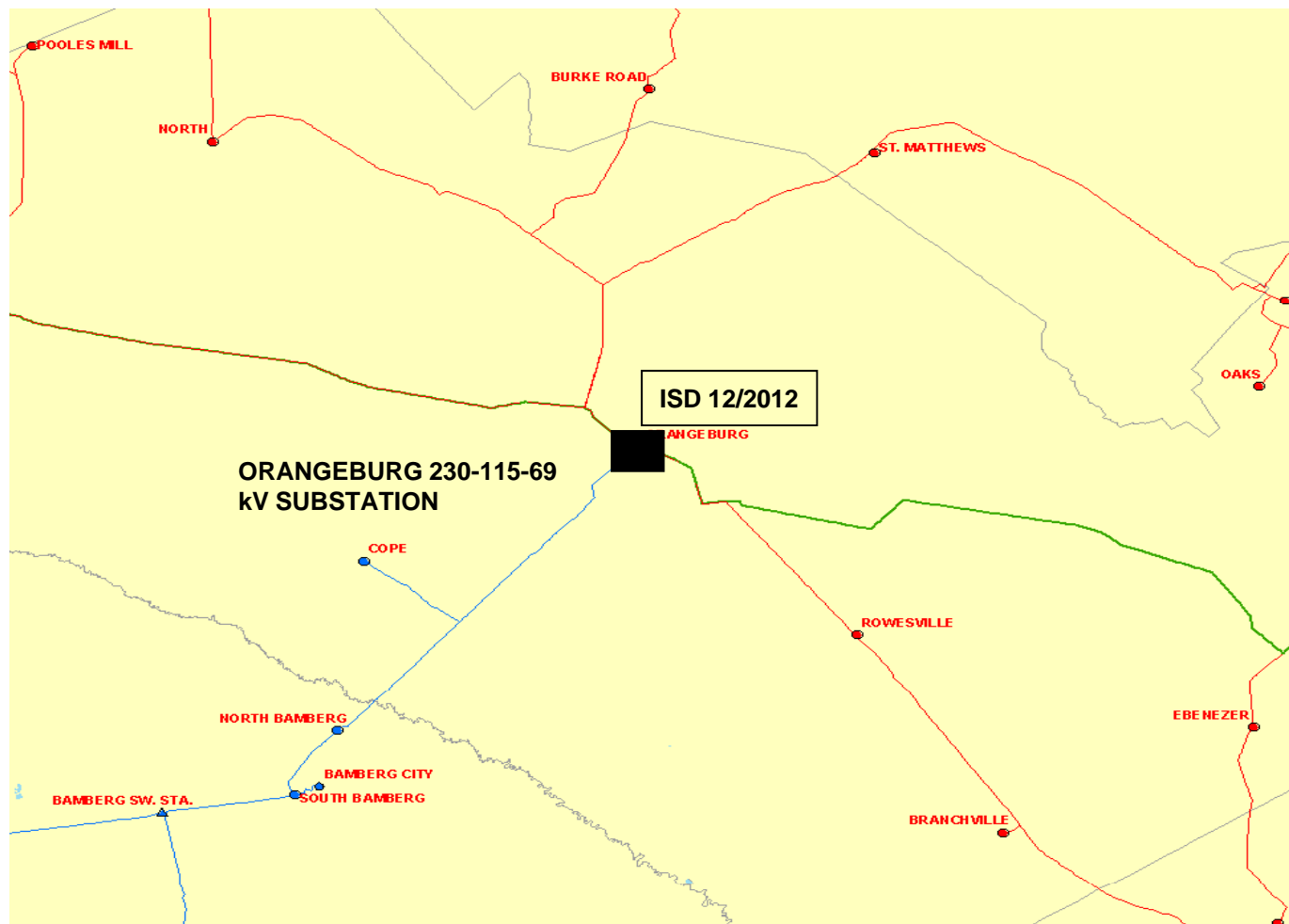
Orangeburg-St. George-Varnville 69 kV System



**Orangeburg
230/115 kV
Sub**

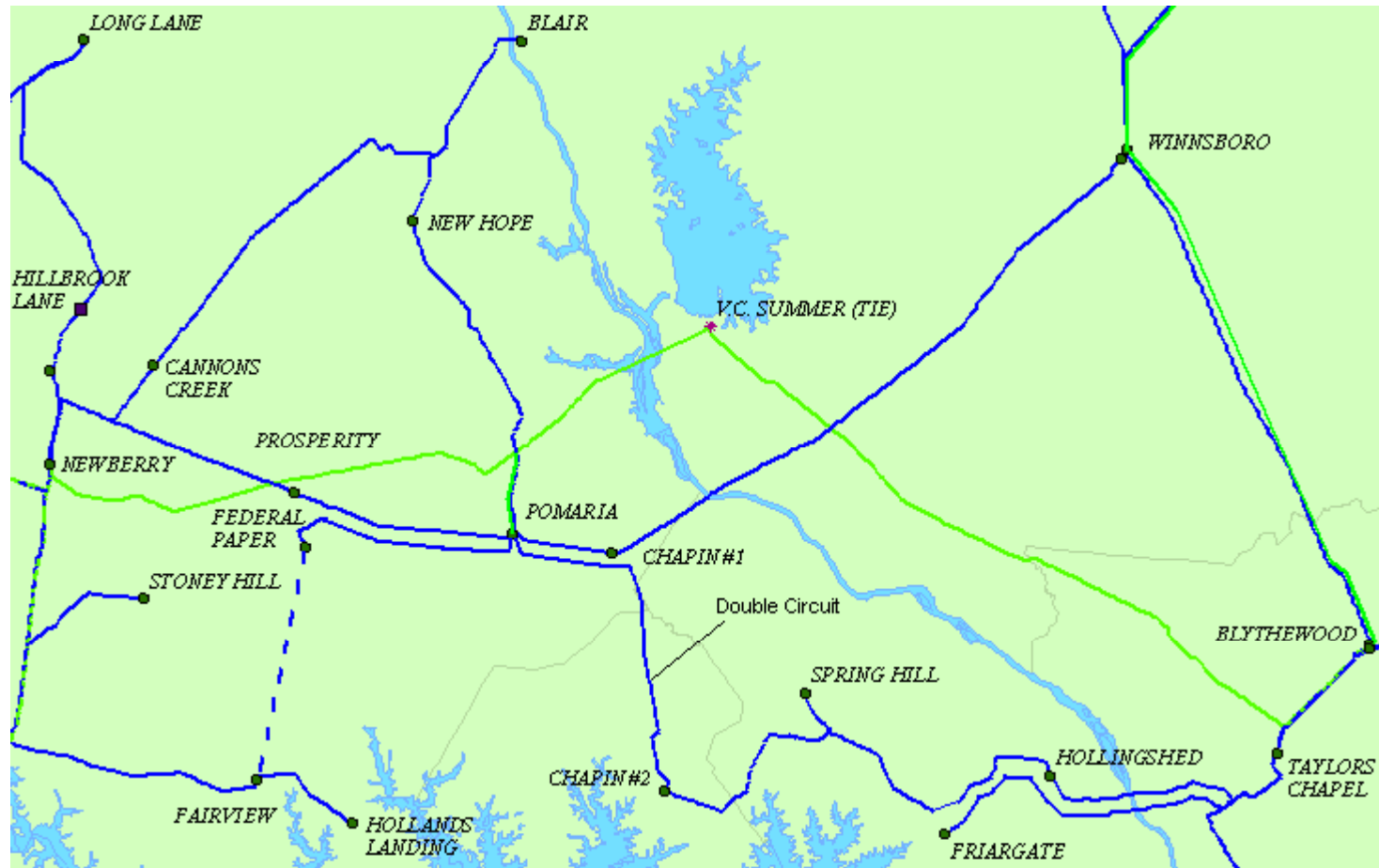


Orangeburg 230-115-69 kV Substation





Pomaria 230-69 kV Substation



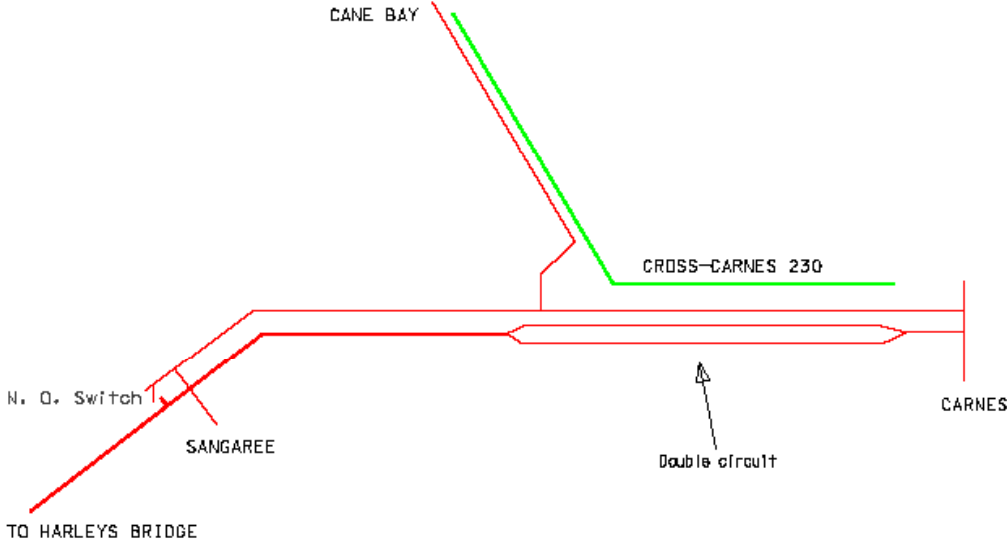


Transmission Network Planned Projects

- Carnes-Sangaree Tap 115 kV 06/2014
- Purrysburg 230-115 kV Substation 11/2014
- Bucksville 230-115 kV Substation 06/2015
- Winyah-Bucksville 230 kV Line 06/2016
- Bucksville-Garden City 115 kV Line 06/2017
- Wassamassaw 230-115 kV Substation 06/2017
- Cross-Wassamassaw #2 230 kV Line 06/2018
- Transmission Plans Associated with VCS #2 (2016) and VCS #3 (2019)



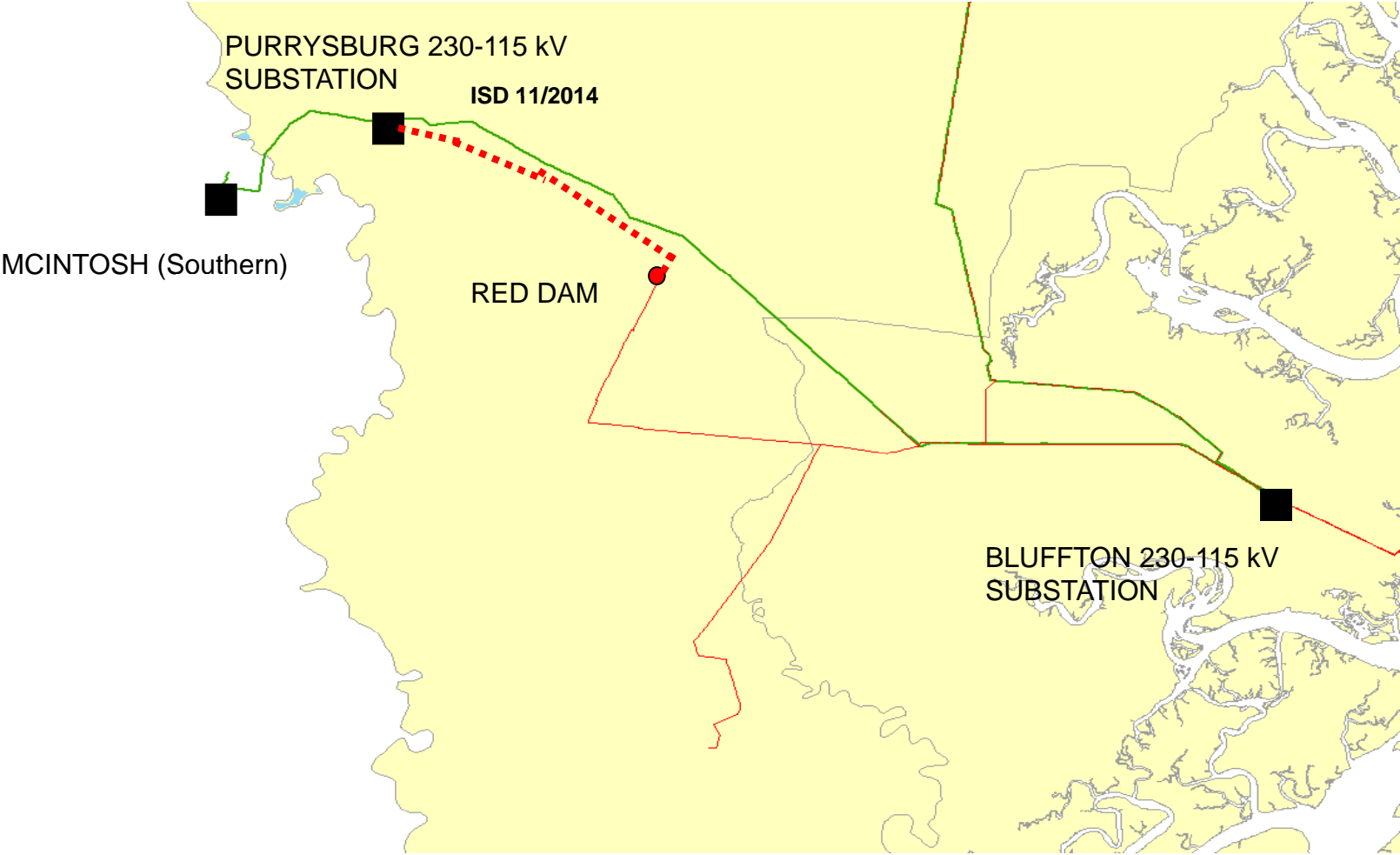
Carnes-Sangaree Tap 115 kV Line



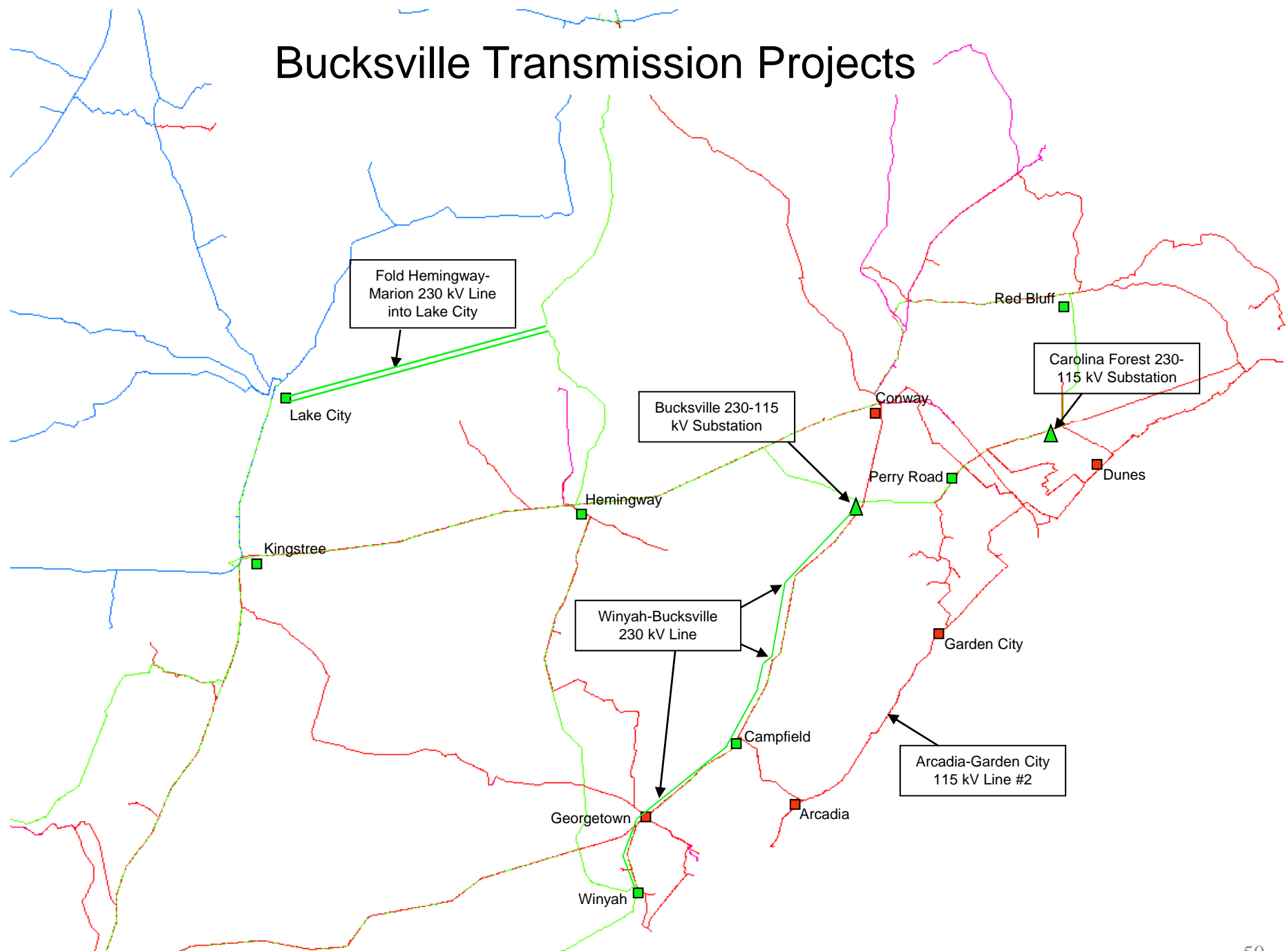
Carnes-Sangaree Tap 115 kV Double Circuit Rebuild
Figure 2



Purrysburg 230-115 kV Substation

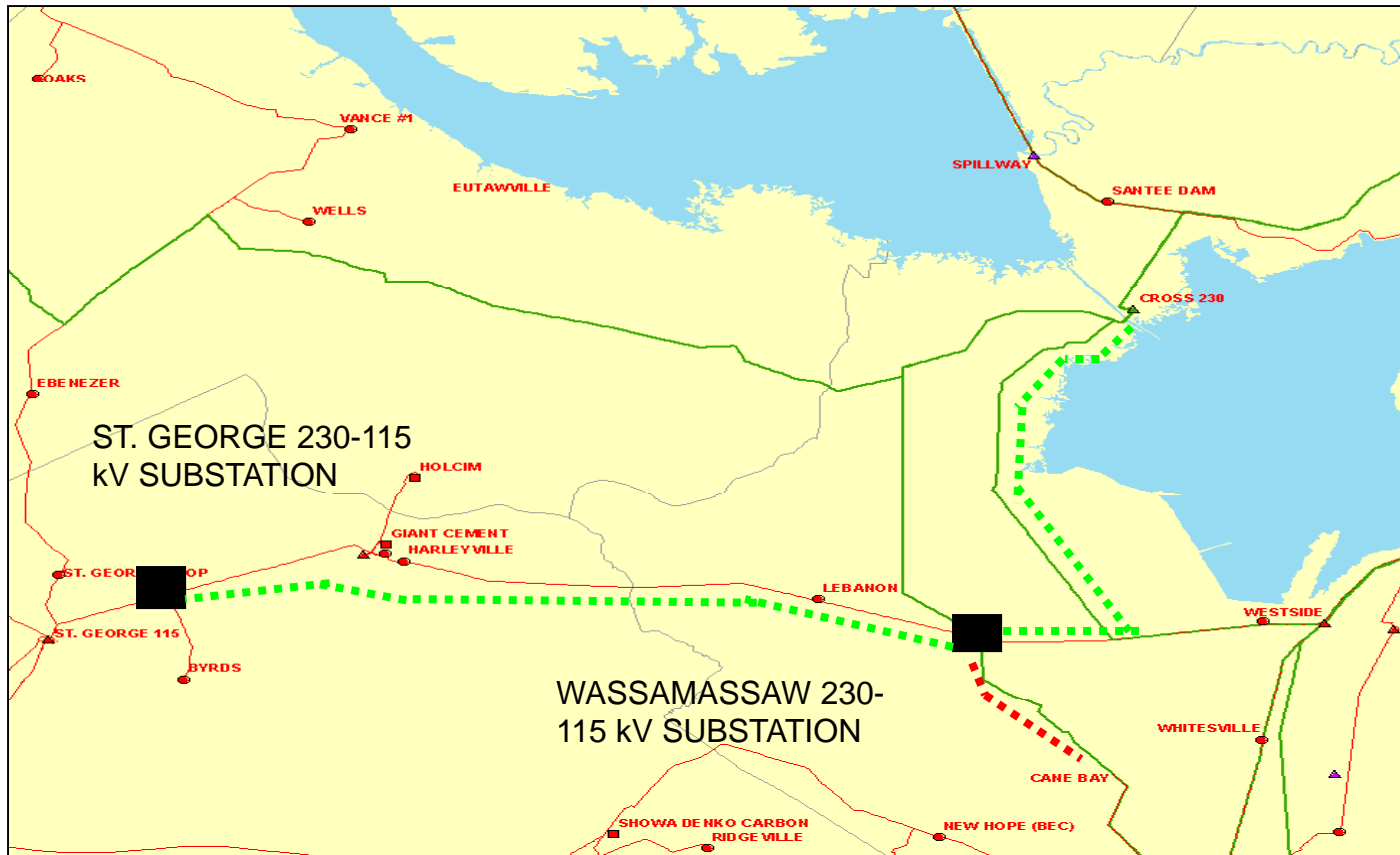


Bucksville Transmission Projects

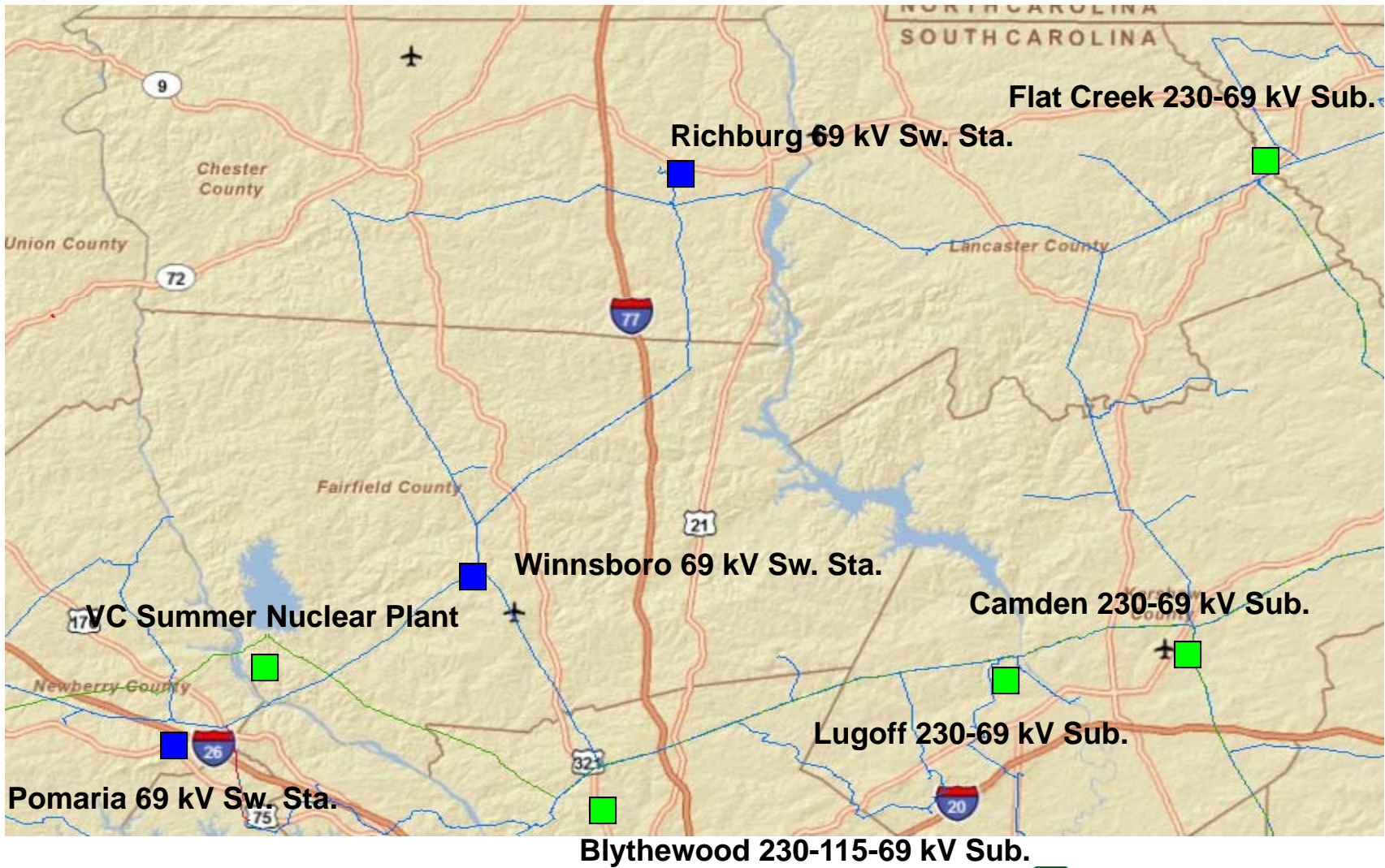




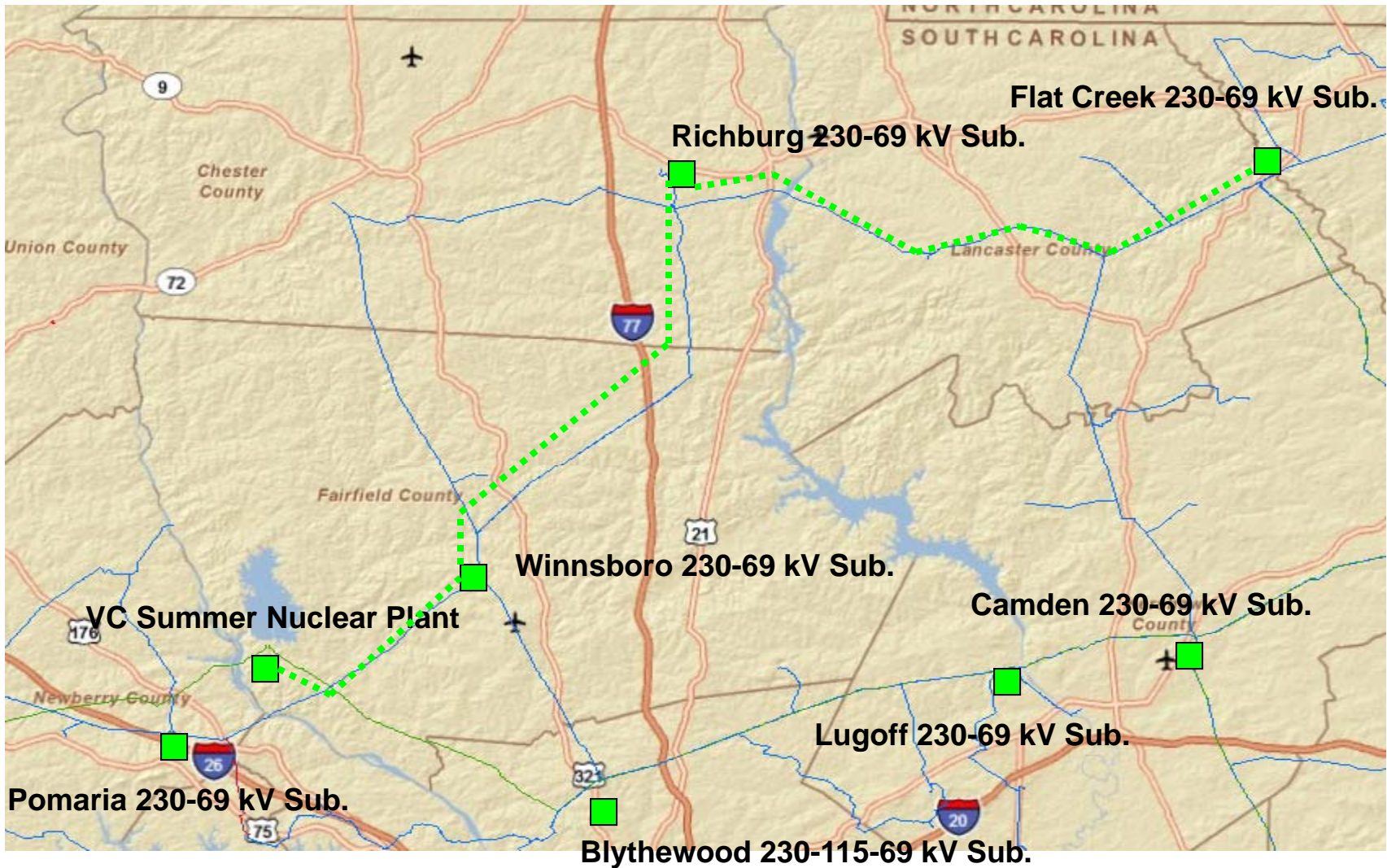
Wassamassaw 230-115 kV Substation ISD 6/2017



VC Summer #2 Transmission Plan (ISD 2016)



VC Summer #2 Transmission Plan (ISD 2016)

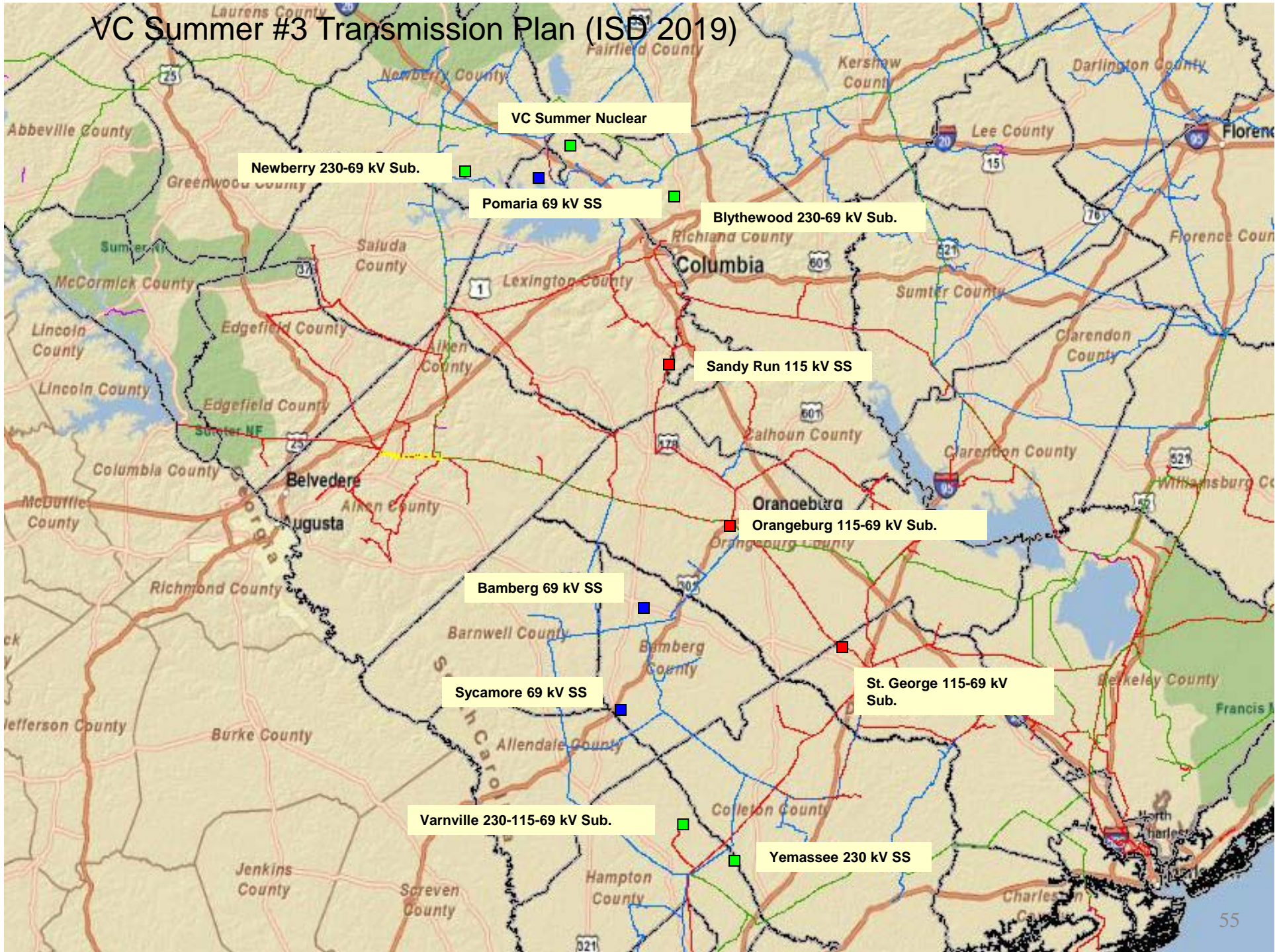




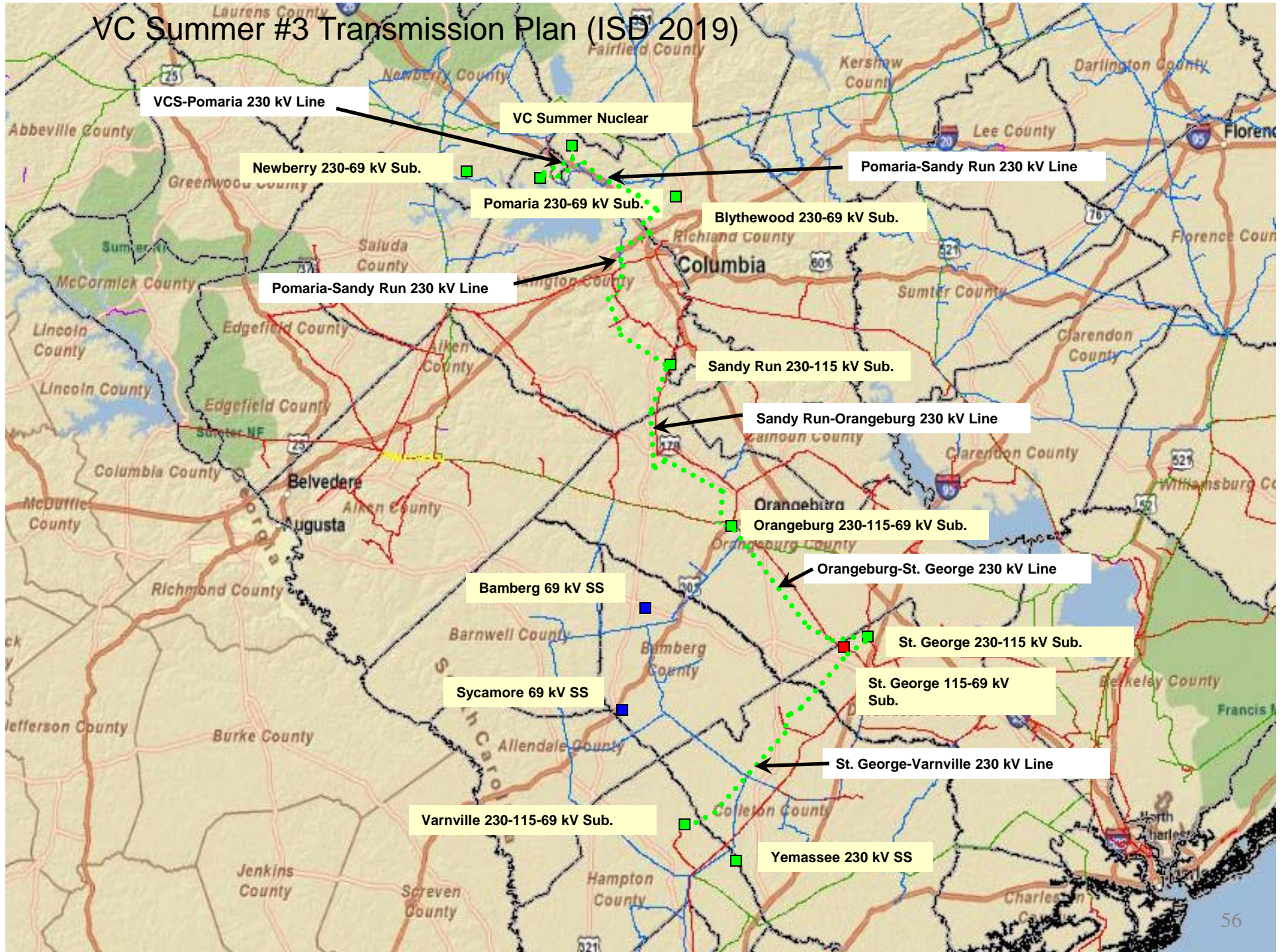
VCS #2 Transmission Projects

- Winnsboro 230-69 kV Substation 09/2013
- VCS-Winnsboro 230 kV Line 11/2013
- Richburg 230-69 kV Substation 06/2014
- Winnsboro-Richburg 230 kV Line 08/2014
- Richburg-Flat Creek 230 kV Line 10/2015

VC Summer #3 Transmission Plan (ISD 2019)



VC Summer #3 Transmission Plan (ISD 2019)





VCS #3 Transmission Projects

- VCS-Pomaria #2 230 kV Line 05/2014
- Sandy Run 230-115 kV Substation 04/2016
- Pomaria-Sandy Run 230 kV Line 05/2016
- Sandy Run-Orangeburg 230 kV Line 05/2017
- St. George 230-115 kV Substation 04/2018
- Orangeburg-St. George 230 kV Line 05/2018
- Varnville 230-115 kV Substation 05/2019
- St. George-Varnville 230 kV Line 06/2019



SCE&G Transmission Expansion Projects

Joe Hood



South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Thomas Island-Cainhoy 115kV Line Construct

Project ID

0147

Project Description

Construct a new normally open 115kV tie line from the Thomas Island substation to the Cainhoy substation with 1272 ACSR conductor. Two planned distribution substations will be tapped from this line (Thomas Island - Jack Primus Section)

Project Need

System load growth requires the addition of these distribution substations and the transmission facilities to connect them.

Project Status

Under Construction

Planned In-Service Date

5/1/2012

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
39,620	1,200,000	3,600,000	0	0	0	4,839,620

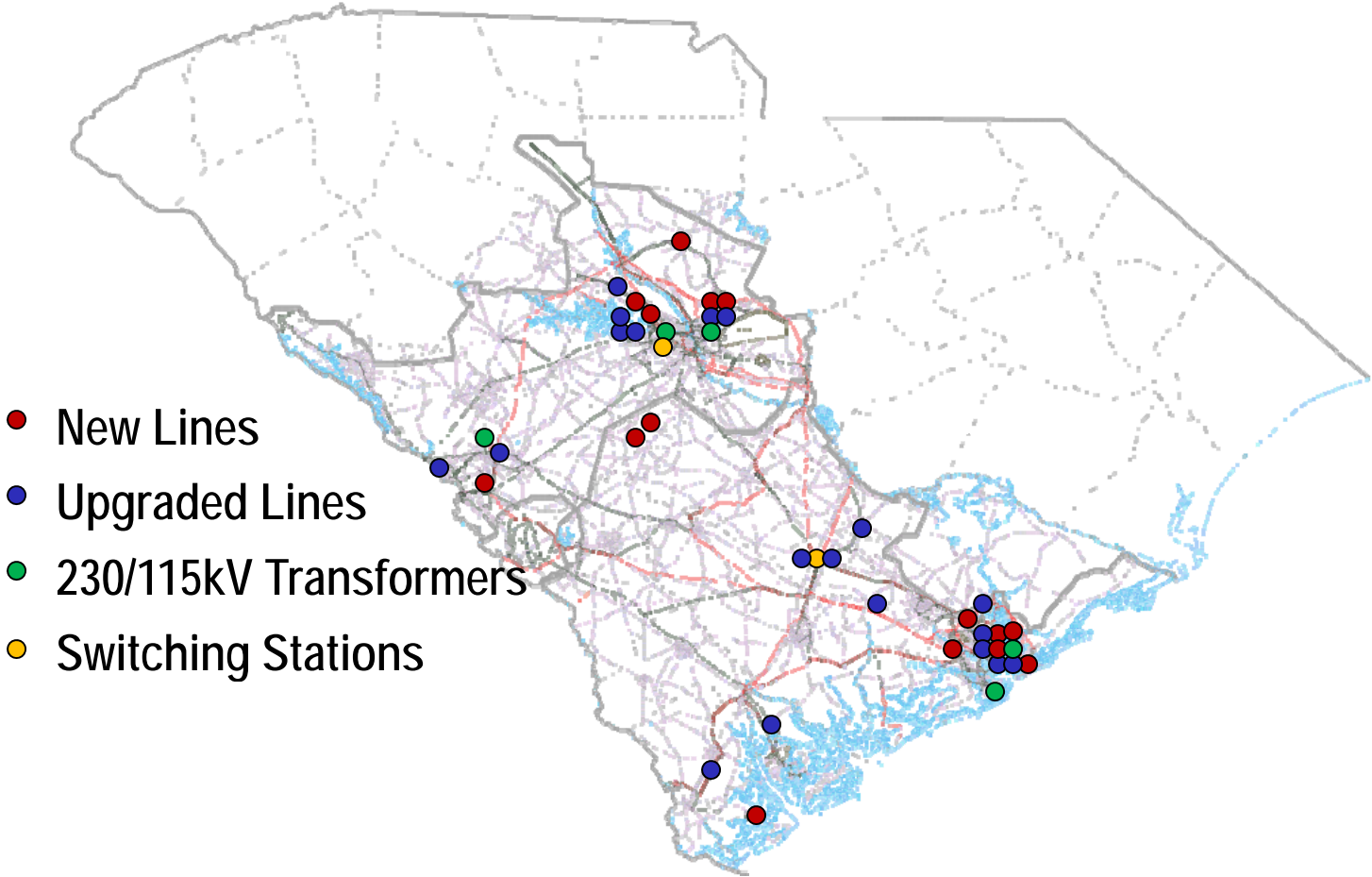


- **SCE&G Recently Completed Transmission Projects**

- ✓ **Yemassee Add 3rd 230/115kV 336MVA Autotransformer**
- ✓ **Ritter 230/115kV Transmission Substation Construct**



SCE&G Planned Projects



- New Lines
- Upgraded Lines
- 230/115kV Transformers
- Switching Stations



SCE&G Planned Projects – Near Term (2011-2015)

Project	Tentative Completion Date	Expenditures as of December 31, 2010	2011	2012	2013	2014	2015	Total
Yemassee Add 3rd 230/115kV 336MVA Autotransformer	Feb-11	\$ 5,126,732	\$ 125,971					\$ 5,252,703
Ritter 230/115 Substation	Mar-11	6,380,034	569,966					6,950,000
VC Summer #1 Switch House	Apr-11	3,466,400	33,600					3,500,000
Denny Terrace - Pineland 230kV Line Construct	May-11	4,604,600	5,045,400					9,650,000
Pepperhill-Robert Bosche 115kV Line	Jun-11	2,793,915	106,085					2,900,000
Bayview Charlotte St Overhead Section	Jun-11	1,560,933	782,067					2,343,000
Thomas Island-Cainhoy 115kV Line Construct	May-12	39,620	1,200,000	3,600,000				4,839,620
Callawassie-Callawassie 46KV - Convert to 115KV	May-12	49,783	480,000	4,560,000				5,089,783
Eutawville Substation 115kV Line	May-12	172,468	600,000	2,700,000				3,472,468
Williams-Faber Place 230kV Line Replace Structures	May-12	1,081		3,600,000				3,601,081
Graniteville #2 Substation Construct	May-12	4,787,848	1,800,000	450,000				7,037,848
Accabee-Hagood-Charlotte St 115kV Line	May-12	1,039,015	720,000	5,436,000				7,195,015
VCS-1 add Back-to-back Bus Tie Breakers	Oct-12	1,200,444		3,627,020				4,827,464
Killian-Blythewood 230kV SPDC	Dec-12		2,400,000	6,750,000				9,150,000
Belvedere-Stevens Ck Dbl Circuit	Dec-12		1,020,000	6,480,000				7,500,000
Urquhart Replace Switch House	Dec-12	776,669	1,440,000	1,680,000				3,896,669
Cainhoy 230/115kV Sub Construct	May-13	16,283	4,200,000	1,200,000	10,050,000			15,466,283
Summerville-Pepperhill 230kV	May-13				8,070,000			8,070,000
Hamlin-Isle of Palms 115kV Underground Cable Construct	Dec-13	542,290	900,000	18,300,000	12,000,000			31,742,290
Yemassee-Burton 115kV #2 Line Rebuild as Double Circuit	May-14	446,309			6,000,000	11,280,000		17,726,309
Saluda River 230/115kV Sub Construct	May-14			720,000		9,180,000		9,900,000
Mt Pleasant-Bayview 115kV Reuild to 1272	Dec-14					3,000,000		3,000,000
McMeekin Replace Switch House	Dec-14				1,200,000	1,800,000		3,000,000
Charlotte St-Bayview 115kV Backup Cable	Dec-14	707,104		360,000	1,200,000	2,580,000		4,847,104
Lyles-Denny Terrace 115kV #1 and #2 Upgrade to B-795	Dec-14					3,000,000		3,000,000
VCS-2 - Lake Murray 230kV Line #2 Construct	Apr-15	298,078	456,276	1,102,781	3,498,242	9,093,479	14,996,749	29,445,605
Denny Terrace - Lyles 230kV Line Upgrade	Apr-15					184,952	2,410,163	2,595,115
Denny Terrace Add 3rd Autotransformer	Apr-15					6,704,514	6,781,463	13,485,977
Canadys-Pepperhill 230kV	May-15				1,500,000	15,960,000	31,620,000	49,080,000
Bluffton-Santee 115kV SCPSA Tie	May-15						3,840,000	3,840,000
Aiken-Aiken Hampton 115kV Line Upgrade	May-15						2,400,000	2,400,000
VCS-Winnsboro-Killian 230kV Line Construct	May-15	729,316	651,823	1,240,630	5,725,703	13,871,408	21,615,413	43,834,293
Stevens Creek Replace Switch House	Dec-15				1,200,000	1,200,000	1,200,000	3,600,000
AM Williams Replace Switch House	Dec-15					1,200,000	1,200,000	2,400,000
		\$ 34,738,922	\$22,531,188	\$ 61,806,431	\$ 50,443,945	\$ 79,054,354	\$ 86,063,788	\$334,638,627

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Yemassee Add 3rd 230/115kV 336MVA Autotransformer

Project ID

0615

Project Description

Add a 3rd 230/115kV 336MVA Autotransformer at the Yemassee Substation

Project Need

System load growth in Yemassee and Burton areas requires an additional 230/115kV Transformation.

Project Status

Complete

Planned In-Service Date

2/1/2011

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
5,126,732	125,971	0	0	0	0	5,252,703

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Ritter 230/115 Substation

Project ID

2053A

Project Description

Establish a new 230/115kV substation at the Ritter 115kV Switching Station site

Project Need

System load growth in the Walterboro and Ritter areas requires an additional 230/115kV source. This project is required to meet NERC TPL standards and SCE&G's Internal Planning Criteria.

Project Status

Complete

Planned In-Service Date

3/15/2011

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
6,380,034	569,966	0	0	0	0	6,950,000

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

VC Summer #1 Switch House

Project ID

0091G

Project Description

Replace the switch house at the VC Summer #1 station

Project Need

Substation Maintenance

Project Status

Complete

Planned In-Service Date

4/15/2011

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
3,466,400	33,600	0	0	0	0	3,500,000

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Denny Terrace - Pineland 230kV Line Construct

Project ID

0202

Project Description

Construct a new 230kV line from Denny Terrace to Pineland with Bundled-1272 conductor

Project Need

System load growth requires an addition 230kV source for the Northeast Columbia area. This project is required to meet NERC TPL standards and SCE&G's Internal Planning Criteria.

Project Status

Under Construction

Planned In-Service Date

5/31/2011

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
4,604,600	5,045,400	0	0	0	0	9,650,000

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Pepperhill-Robert Bosche 115kV Line Upgrade

Project ID

2600H

Project Description

Construct a 115kV line from Pepperhill to Robert Bosche with 1272 ACSR conductor

Project Need

Load growth in the area between Pepperhill and Faber Place requires an upgrade of the existing transmission between these substations

Project Status

Under Construction

Planned In-Service Date

6/1/2011

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
2,793,915	106,085	0	0	0	0	2,900,000

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Bayview-Charlotte St Overhead Section Upgrade

Project ID

1265A

Project Description

Upgrade the overhead portion of the Bayview-Charlotte St 115kV line and under ground cable to 1272 ACSR conductor

Project Need

Load growth in the Mt Pleasant area requires addition transmission capacity from the Charleston Peninsula source

Project Status

Under Construction

Planned In-Service Date

6/1/2011

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
1,560,933	782,067	0	0	0	0	2,343,000

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Thomas Island-Cainhoy 115kV Line Construct

Project ID

0147

Project Description

Construct a new normally open 115kV tie line from the Thomas Island substation to the Cainhoy substation with 1272 ACSR conductor. Two planned distribution substations will be tapped from this line (Thomas Island - Jack Primus Section)

Project Need

System load growth requires the addition of these distribution substations and the transmission facilities to connect them.

Project Status

Under Construction

Planned In-Service Date

5/1/2012

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
39,620	1,200,000	3,600,000	0	0	0	4,839,620

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Callawassie-Callawassie 46KV - Convert to 115KV

Project ID

0704

Project Description

Upgrade the Callawassie 115kV-Callawassie 46kV line to 115kV

Project Need

Callawassie 46kV substation is to be upgraded to 115kV, requiring the Callawassie 46kV line to be upgraded to 115kV

Project Status

Under Construction

Planned In-Service Date

5/1/2012

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
49,783	480,000	4,560,000	0	0	0	5,089,783

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Graniteville #2 Transmission Sub Construct and Reterminate Lines

Project ID

0166

Project Description

Add a second Graniteville 230/115kV substation adjacent to the existing Graniteville 230/115kV substation. Add a 336MVA 230/115kV autotransformer and reterminate several 230kV and 115kV lines.

Project Need

System load growth requires an addition 230/115kV transformation in this area. This project is required to meet NERC TPL standards and SCE&G's Internal Planning Criteria.

Project Status

Under Construction

Planned In-Service Date

5/31/2012

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
4,787,848	1,800,000	450,000	0	0	0	7,037,848

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Eutawville Substation 115kV Line

Project ID

0083

Project Description

Construct a 5 mile line from the St George-Santee 115kV line to the Eutawville Substation

Project Need

System load growth requires an additional distribution substation in this area

Project Status

Under Construction

Planned In-Service Date

5/31/2012

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
172,468	600,000	2,700,000	0	0	0	3,472,468

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Williams-Faber Place 230kV Line Replace Structures

Project ID

4324

Project Description

Replace several structures on the A.M. Williams-Faber Place 230kV line

Project Need

Required to insure that the A.M. Williams-Faber Place 230kV line continues to perform reliability

Project Status

Planned

Planned In-Service Date

5/31/2012

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
1,081	0	3,600,000	0	0	0	3,601,081

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Accabee-Hagood-Charlotte St 115kV Line

Project ID

1264

Project Description

Rebuild a portion of the Accabee-Charlotte St 115kV line as a double circuit with 1272 ACSR conductor, with one circuit folded into Hagood

Project Need

System load growth in the Charleston Peninsula area requires additional 115kV capacity. This project is required to meet NERC TPL standards and SCE&G's Internal Planning Criteria.

Project Status

Under Construction

Planned In-Service Date

5/31/2012

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
1,039,015	720,000	5,436,000	0	0	0	7,195,015

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

VCS-1 add Back-to-back bus tie Breakers at buses 1 and 3

Project ID

0090Y

Project Description

Replace existing bus tie breaker between VCS-1 buses #1 and #3 with 90kA double bus tie breakers

Project Need

NERC TPL Standard requirement.

Project Status

Planned

Planned In-Service Date

10/1/2012

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
0	3,627,020	0	0	0	0	3,627,020

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Killian-Blythewood 230kV SPDC

Project ID

0220

Project Description

Rebuild the Killian-Blythewood 115kV line as a double circuit with both circuits built for 230kV

Project Need

System load growth in the Blythewood area requires additional transmission capacity. This project is required to meet NERC TPL standards and SCE&G's Internal Planning Criteria.

Project Status

Planned

Planned In-Service Date

12/1/2012

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
0	2,400,000	6,750,000	0	0	0	9,150,000

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Urquhart Replace Switch House

Project ID

1060K

Project Description

Replace switch house and relays at the Urquhart substation

Project Need

Substation Maintenance

Project Status

Planned

Planned In-Service Date

12/31/2012

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
776,669	1,440,000	1,680,000	0	0	0	3,896,669

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Belvedere-Stevens Ck Dbl Circuit

Project ID

0710

Project Description

Rebuild the Belvedere-Stevens Creek 115kV line as a double circuit with 1272 ACSR conductor

Project Need

Load growth in the Belvedere and Stevens Creek area requires additional transmission capacity. This project is required to meet NERC TPL standards and SCE&G's Internal Planning Criteria.

Project Status

Under Construction

Planned In-Service Date

12/31/2012

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
0	1,020,000	6,480,000	0	0	0	7,500,000

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Summerville-Pepperhill 230kV

Project ID

2600

Project Description

Construct a new 230kV line from Summerville to Pepperhill with Bundled-1272 ACSR conductor

Project Need

Load growth in the Pepperhill and Summerville load centers requires additional transmission capacity. Constructing a new 230kV line from Summerville to Pepperhill allows both of these areas to support each other under contingencies. This project is required to meet NERC TPL standards and SCE&G's Internal Planning Criteria.

Project Status

Under Construction

Planned In-Service Date

5/1/2013

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
0	0	0	8,070,000	0	0	8,070,000

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Cainhoy 230/115kV Sub Construct

Project ID

2499A

Project Description

Establish a new 230/115kV transmission substation near the Cainhoy distribution substation site, initially with one 230/115kV 336MVA autotransformer

Project Need

Load growth in the Cainhoy, Hamlin, Mt Pleasant, and Thomas Island areas requires an addition 230/115kV transformation near these areas. This project is required to meet NERC TPL standards and SCE&G's Internal Planning Criteria.

Project Status

Planned

Planned In-Service Date

5/1/2013

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
16,283	4,200,000	1,200,000	10,050,000	0	0	15,466,283

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Hamlin-Isle of Palms 115kV UG Cable Construct

Project ID

0011

Project Description

Construct a new 115kV Line from Hamlin to Isle of Palms with 1272 ACSR equivalent capacity. There will be an overhead section and an underground cable section.

Project Need

Hamlin, Isle of Palms, and Osceola substations current only have a one-way feed. This new line will give these heavily-loaded substations a backup source.

Project Status

Under Construction

Planned In-Service Date

12/31/2013

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
542,290	900,000	18,300,000	12,000,000	0	0	31,742,290

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Yemassee-Burton 115kV #2 Line Rebuild as Double Circuit

Project ID

1268

Project Description

Rebuild the Yemassee-Burton 115kV #2 line as a double circuit with 1272 ACSR conductor

Project Need

Load growth in the Burton area requires addition transmission capacity from the Yemassee source.

Project Status

Planned

Planned In-Service Date

5/30/2014

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
446,309	0	0	6,000,000	11,280,000	0	17,726,309

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Saluda River 230/115kV Sub Construct

Project ID

0046

Project Description

Establish a new 230/115kV substation in the West Columbia area along the corridor between Saluda Hydro and Lyles substations. Add a 336MVA autotransformer. Construct a section of the future VCS-St George #1 230kV line between Lake Murray and Saluda River, and fold in 115kV lines

Project Need

The load growth in the Lexington and Columbia areas requires an additional 230/115kV transformation to meet NERC TPL standards and SCE&G's Internal Planning Criteria

Project Status

Planned

Planned In-Service Date

5/31/2014

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
0	0	720,000	0	9,180,000	0	9,900,000

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Mt Pleasant-Bayview 115kV Rebuild to 1272

Project ID

1269

Project Description

Upgrade the overhead portion of the Mt pleasant-Bayview 115kV line to 1272 ACSR conductor

Project Need

Load growth in the Isle of Palms and Hamlin areas requires additional transmission capacity from the Mt Pleasant Source

Project Status

Planned

Planned In-Service Date

12/21/2014

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
0	0	0	0	3,000,000	0	3,000,000

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

McMeekin Replace Switch House

Project ID

1060L

Project Description

Replace switch house and relays at the McMeekin substation

Project Need

Substation Maintenance

Project Status

Planned

Planned In-Service Date

12/31/2014

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
0	0	0	1,200,000	1,800,000	0	3,000,000

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Charlotte St-Bayview 115kV Backup Cable

Project ID

0502

Project Description

Install a backup 115kV under ground cable from Charlotte St to Bayview

Project Need

Because of the long lead times associated with underground cable failure repairs, a second underground cable from Charlotte St-Bayview is needed

Project Status

Planned

Planned In-Service Date

12/31/2014

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
707,104	0	360,000	1,200,000	2,580,000	0	4,847,104

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Lyles-Denny Terrace 115kV Line #1 and Line #2 Upgrade to B-795

Project ID

0205

Project Description

Upgrade both Lyles-Denny Terrace 115kV Lines #1 and #2 to Bundled-795 ACSR conductor

Project Need

VCS Nuclear Unit #2 Interconnection Requirement. Distribute power from generation to load while meeting NERC TPL standards and SCE&G's Internal Planning Criteria.

Project Status

Planned

Planned In-Service Date

12/31/2014

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
0	0	0	0	3,000,000	0	3,000,000

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Denny Terrace - Lyles 230kV Line Upgrade

Project ID

0090L

Project Description

Upgrade the Denny Terrace-Lyles 230kV Line to Bundled-1272 ACSR conductor

Project Need

VCS Nuclear Unit #2 Interconnection Requirement. Distribute power from generation to load while meeting NERC TPL standards and SCE&G's Internal Planning Criteria.

Project Status

Planned

Planned In-Service Date

4/1/2015

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
0	0	0	0	184,952	2,410,163	2,595,115

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Denny Terrace Add 3rd Autotransformer

Project ID

0090P

Project Description

Add a 3rd 336MVA 230/115kV Autotransformer at Denny Terrace

Project Need

VCS Nuclear Unit #2 Interconnection Requirement. Distribute power from generation to load while meeting NERC TPL standards and SCE&G's Internal Planning Criteria.

Project Status

Planned

Planned In-Service Date

4/1/2015

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
0	0	0	0	6,704,514	6,781,463	13,485,977

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

VCS-2 - Lake Murray 230kV Line #2 Construct

Project ID

0090E, 0090G

Project Description

Construct a new 230kV line from VCS-2 - Lake Murray with Bundled-1272 ACSR conductor

Project Need

VCS Nuclear Unit #2 Interconnection Requirement. Distribute power from generation to load while meeting NERC TPL standards and SCE&G's Internal Planning Criteria.

Project Status

Under Construction

Planned In-Service Date

4/1/2015

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
298,078	456,276	1,102,781	3,498,242	9,093,479	14,996,749	29,445,605

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Bluffton-Santee 115kV SCPSA Tie

Project ID

0703

Project Description

Construct a 115kV normally open tie line from Bluffton-Santee Cooper (SCPSA)

Project Need

There is significant Load growth in the area between Okatie and Bluffton. Without constructing this addition backup source from SCPSA, the load in the area would be served from a single source

Project Status

Planned

Planned In-Service Date

5/1/2015

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
0	0	0	0	0	3,840,000	3,840,000

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Canadys-Pepperhill 230kV

Project ID

2602

Project Description

Construct a new 230kV line from Canadys-Pepperhill

Project Need

Load growth in the Charleston area requires additional transmission capacity from the Church Creek source. This project is required to meet NERC TPL standards and SCE&G's Internal Planning Criteria.

Project Status

Planned

Planned In-Service Date

5/1/2015

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
0	0	0	1,500,000	15,960,000	31,620,000	49,080,000

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Aiken-Aiken Hampton 115kV Line Upgrade

Project ID

1272

Project Description

Upgrade the 115kV line between Aiken and Aiken-Hampton substations

Project Need

This line overloads under certain area contingencies and need additional capacity in order to continue to provide reliable power to the Aiken area load. This project is required to meet NERC TPL standards and SCE&G's Internal Planning Criteria.

Project Status

Planned

Planned In-Service Date

5/29/2015

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
0	0	0	0	0	2,400,000	2,400,000

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

VCS-Winnsboro-Killian 230kV Line Construct

Project ID

0090B

Project Description

VC Summer – Winnsboro – Killian 230kV transmission line. Approximately 24 miles. Single pole construction with bundled 1272 ACSR conductor. Rating is 975 MVA.

Project Need

VCS Nuclear Unit #2 Interconnection Requirement. Distribute power from generation to load while meeting NERC TPL standards and SCE&G's Internal Planning Criteria.

Project Status

Under Construction

Planned In-Service Date

5/31/2015

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
729,316	651,823	1,240,630	5,725,703	13,871,408	21,615,413	43,834,293

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

AM Williams Replace Switch House

Project ID

1060i

Project Description

Replace switch house and relays at the AM Williams substation

Project Need

Substation Maintenance

Project Status

Planned

Planned In-Service Date

12/31/2015

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
0	0	0	0	1,200,000	1,200,000	2,400,000

South Carolina Electric and Gas Company
Planned Transmission Project Greater than \$2M Total
5 Year Budget

Stevens Creek Replace Switch House

Project ID

1060F

Project Description

Replace switch house and relays at the Stevens Creek substation

Project Need

Substation Maintenance

Project Status

Planned

Planned In-Service Date

12/31/2015

Estimated Project Cost (\$)

Previous	2011	2012	2013	2014	2015	Total
0	0	0	1,200,000	1,200,000	1,200,000	3,600,000



SCE&G Planned Projects – Long Term (2016-2022)

- **Urquhart-Graniteville 230kV Line #2 Construct** **5/1/2016**
- **Okatie 230/115kV Sub Construct** **12/31/2016**
- **Cainhoy-A.M. Williams 230 #2 Line Construct** **5/1/2017**
- **Cainhoy-A.M. Williams 115 #2 Line Construct** **5/1/2017**
- **Lake Murray-Harbison 115kV Line Construct** **5/1/2019**
- **Queensboro 230/115kV Sub Construct** **5/1/2020**
- **Canadys-Church Ck Rebuild to Dbl Circuit** **5/1/2022**
- **Lexington Junction 115kV Switching Station** **5/1/2022**



• V.C. Summer Unit #2 Related Projects

SCE&G

- Denny Terrace - Lyles 230kV Line Upgrade 12/31/2015
- Lake Murray - McMeekin 115kV Line Upgrade 12/31/2015
- Lake Murray - Saluda 115kV Line Upgrade 12/31/2015
- Saluda - McMeekin 115kV Line Upgrade 12/31/2015
- Denny Terrace – Add 3rd 230/115kV 336MVA 12/31/2015
- VCS2 230kV Switchyard Construct 12/31/2015
- VCS2 - Lake Murray #2 230kV Line Construct 12/31/2015
- VCS2 - Winnsboro - Killian 230kV Line Construct 12/31/2015





• V.C. Summer Unit #3 Related Projects

SCE&G

- Saluda - Duke 115kV Tielines Upgrade 12/31/2018
- St George 230kV Switching Station Construct 12/31/2018
- St George - Canadys 230kV Line Upgrade 12/31/2018
- St George - Summerville 230kV Line Upgrade 12/31/2018
- VCS Sub #2 - St George 230kV Double Circuit 12/31/2018



Stakeholder Comments and Input

Current Transmission Expansion Plans



Santee Cooper

Transmission Planning Key Assumptions and Data

William Gaither





Components

- Demand Forecast
- Transmission Network
- Generation Resources



Demand Forecast

- Santee Cooper produces a Corporate Load Forecast annually and this forecast is provided to Transmission Planning.
- Forecast incorporates updates to econometric models using consultant-based research.
- Forecast utilizes current historical data and economic outlook for Santee Cooper's service area.



Demand Forecast

Load forecast is developed with contributions from:

- Santee Cooper (retail, industrial)
- Central Electric Power Cooperative, Inc. (retail, industrial)
- Cities of Bamberg and Georgetown (municipal)



Demand Forecast

- Transmission Planning uses customer-provided station-level forecasts for modeling and reliability assessments.
- Customer-provided forecasts are compared to the corporate load forecast to ensure consistency.
- Processes for tabulating actual and forecast demands are consistently applied for all study efforts.



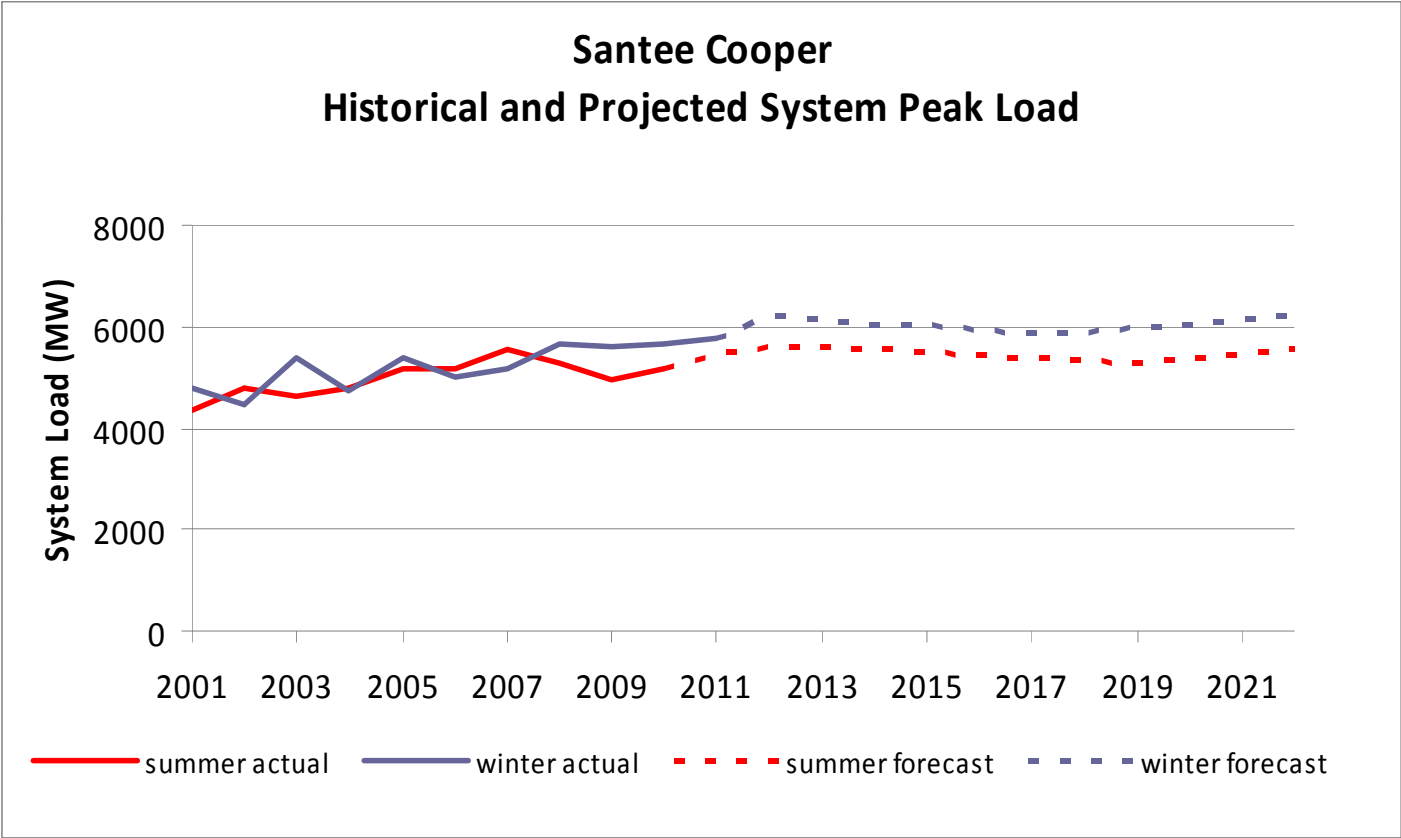
Demand Forecast

Santee Cooper Load Forecast is comprised of four primary categories:

- Authority
- Cooperative
- Industrial
- Municipal



Demand Forecast





Transmission Network

Models include:

- Existing transmission system as well as committed Santee Cooper additions (uncommitted facilities are subject to change in scope or date).
- Neighboring transmission system representations.
- All facilities assumed to be available for service.
- Normal operating status (in-service or OOS) of facilities is represented.



Transmission Network

- Uniform ratings methodology is consistently applied to transmission facilities.
- Base case models are updated annually.
- Study models may be updated prior to any study effort.



Transmission Network

Active Projects Included in Models

- Arcadia-Garden City #2 115 kV Line 12/2011
- Carolina Forest 230-115 kV Substation 06/2012
- Carolina Forest-Dunes #2 115 kV Line 06/2012
- Orangeburg 230-115 kV Substation 06/2012
- Hemingway-Marion Fold-in to Lake City 12/2012



Transmission Network Planned Projects Included in Models

- Pomaria 230-69 kV Substation 12/2012
- Bucksville 230-115 kV Substation 06/2015
- Winyah-Bucksville 230 kV Line 06/2017
- Bucksville-Garden City 115 kV Line 06/2018



Generation Resources

Existing Connected Generation

Cross 1- 4

Grainger 1, 2

Hilton Head Turbines 1- 3

Jefferies 1, 2, 3, 4, 6 (Hydro)

Jefferies 1-4 (Steam)

Myrtle Beach Turbines 1-5

Winyah 1-4

J.S. Rainey Power Block 1

J.S. Rainey 2A, 2B

J.S. Rainey 3-5

Spillway

St. Stephen 1-3

V.C. Summer



Generation Resources Projected Capacity in Models

V. C. Summer #2 (June 2016)

V. C. Summer #3 (January 2019)



SCE&G

Transmission Planning Key Assumptions and Data

Joe Hood





Modeling Assumptions

- **Dispersed Substation Load Forecast**
Summer/Winter Peak, Off-Peak and Seasonal Load Levels
- **Existing Generation**
Input from Generation Maintenance Schedule
- **Generation Additions**
Input from Generation Expansion Plan
- **Transmission Additions**
Input from Transmission Plan
- **Firm Transmission Service**
Input from OASIS, Coordinated with Neighbors
- **Neighboring Transmission Systems Modeled**



Load Forecast Process

- Obtain summer and winter snapshot meter data from most recent seasons and adjust for load switching
- Develop 10 year projected forecast based on:
 - 10 year historical loading
 - Feedback from Distribution Planning, Local Managers, Large Industrial Group and Transmission Services Manager
- Dispersed forecasted load points are integrated into Corporate forecasted load.
- Wholesale loads are modeled as provided by the customer



Generation Expansion Plan

- 1117MW of SCE&G/Santee Cooper Base Load Nuclear Generation planned for 2016 (V. C. Summer)
- 1117MW of SCE&G/Santee Cooper Base Load Nuclear Generation planned for 2019 (V. C. Summer)





Stakeholder Comments and Input

Planning Key Assumptions



Inter-regional Assessment Studies

Jim Peterson

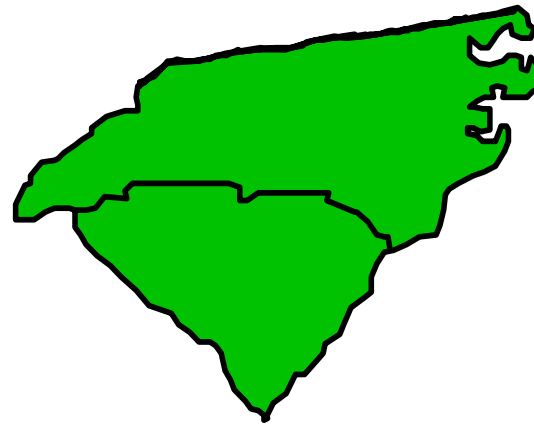


Current Reliability Studies

- CTPCA
- SERC LTSG
- ERAG



Carolinas Transmission Planning Coordination Arrangement (CTPCA)





CTPCA 2014/21 Summer Studies

Purpose

- Assess the existing transmission expansion plans of Duke Energy, Progress Energy, SCE&G, and SCPSA to ensure that the plans are simultaneously feasible.
- Identify any potential joint solutions which would improve the simultaneous feasibility of the Participant companies' transmission expansion plans.
- The Power Flow Study Group ("PFSG") will perform the technical analysis outlined in this study scope under the guidance and direction of the Steering Committee ("SC").



CTPCA 2014/21 Summer Studies

Scope

- NERC Reliability Standards, SERC Requirements, and individual company study criteria.
- Cases are developed with detailed internal models with current transmission expansion plans from each participating company.
- Generation down cases are developed from starting point cases with internal generation redispatch and Transmission Reserve Margin (TRM) import(s) implemented.



CTPCA 2014/21 Summer Studies Scope (continued)

- Study results are obtained by use of PTI's MUST and PSS/E programs.
- Report on thermal loading(s) above 90% and voltage(s) violating individual company criteria
- Study report in Spring 2011



CTPCA Studies

Results of Studies





- 2014s- SCE&G Results

Element	Contingency	Problem	Solution
Pineland – VC Summer Sub 1 Bus 1 230 kV	Parr – Denny Terrace 230 kV	Loading	Pineland-Denny Terrace 230 kV (2016)
McIntosh – Jasper Tap 115 kV (Southern/SCEG)	Jasper – Yemassee 230 kV	Loading	Evaluating
Lyles – Williams St 115 kV	Lyles – Edenwood 230 kV	Loading	Line Upgrade
Georgia Pacific Tap	Saluda – Georgia Pacific Tap 115 kV	High Voltage	Evaluating



- 2021s- SCE&G Results

Element	Contingency	Problem	Solution
McIntosh-Jasper Tap 115 kV (Southern/SCEG)	McIntosh – Purrysburg 230 kV (Southern/SCPSA)	Loading	Evaluating
Summerville 230/115 kV #1	Summerville 230/115 kV #2	Loading	Evaluating
Parr – Winnsboro 115 kV	Pineland – North Point 115 kV	Loading	Evaluating
Georgia Pacific Tap	Saluda – Georgia Pacific Tap 115 kV	High Voltage	Evaluating



- 2014s- SCPSA Results

Element	Contingency	Potential Issue	Solution
Winyah-Campfield 230 kV Line	Brunswick 1 Dn (TRM) Hemingway-Perry Road 230 kV Line	Loading <100%	Bucksville 230-115 kV Sub. (2015) Winyah-Bucksville 230 kV Line (2016) Bucksville-Garden City 115 kV (2017)
Winyah-Campfield 230 kV Line	Brunswick 1 Dn (TRM) Winyah-Hemingway 230 kV Line	Loading <100%	Bucksville 230-115 kV Sub. (2015) Winyah-Bucksville 230 kV Line (2016) Bucksville-Garden City 115 kV (2017)
Arcadia-Parkersville 115 kV Line	Brunswick 2 Dn (TRM) Perry Road-Campfield 230 kV Line	Loading <100%	Bucksville 230-115 kV Sub. (2015) Winyah-Bucksville 230 kV Line (2016) Bucksville-Garden City 115 kV (2017)



- 2014s- SCPSA Results

Element	Contingency	Potential Issue	Solution
Georgetown-Campfield #3 115 kV Line	McGuire 1 Gm Winyah-Campfield 230 kV Line	Loading >100%	Bucksville 230-115 kV Sub. (2015) Winyah-Bucksville 230 kV Line (2016) Bucksville-Garden City 115 kV (2017)
Georgetown-Campfield #3 115 kV Line	Catawba 1 Gm Campfield 230-115 kV Transformer	Loading <100%	Bucksville 230-115 kV Sub. (2015) Winyah-Bucksville 230 kV Line (2016) Bucksville-Garden City 115 kV (2017)
Georgetown-Campfield #3 115 kV Line	Brunswick 1 Dn (TRM) Georgetown-Campfield #2 115 kV Line	Loading >100%	Bucksville 230-115 kV Sub. (2015) Winyah-Bucksville 230 kV Line (2016) Bucksville-Garden City 115 kV (2017)



- 2021s- SCPSA Results

Element	Contingency	Potential Issue	Solution
Winyah-Campfield 230 kV Line	Brunswick 2 Dn (TRM) Georgetown-Campfield #2 115 kV Line	Loading <100%	Evaluating

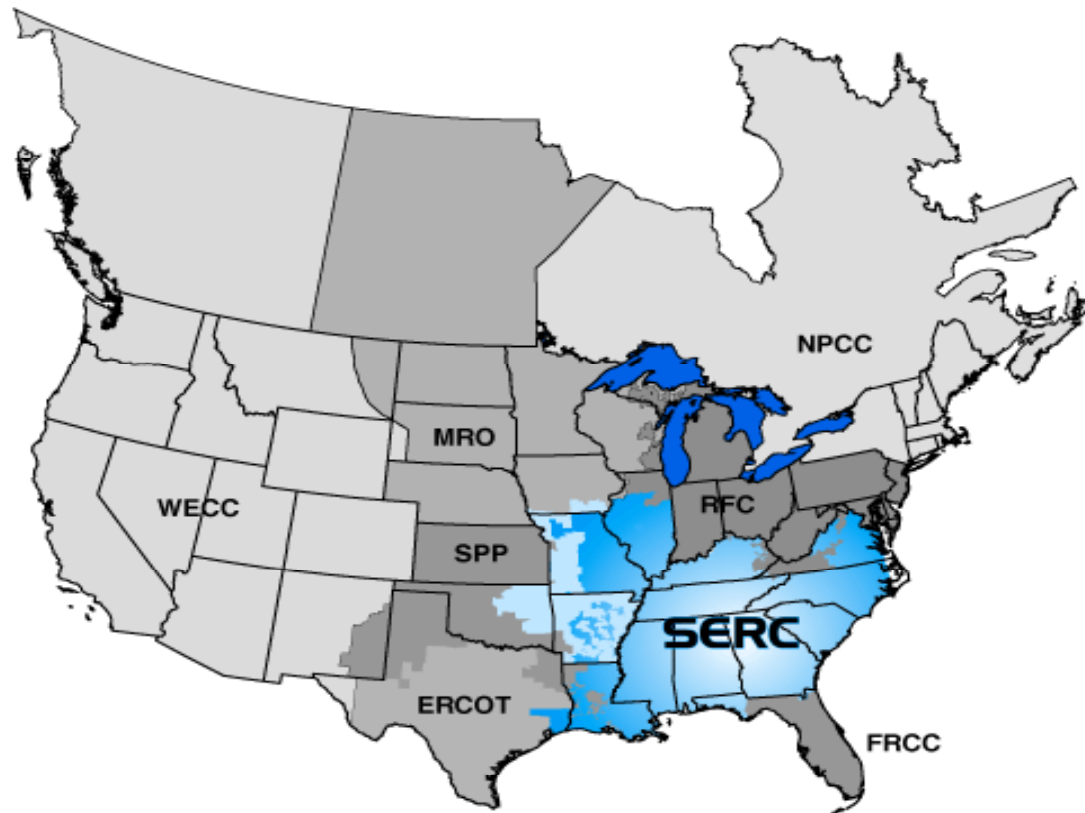


CTPCA Studies

Question ?



SERC Long Term Study Group (LTSG)





SERC LTSG 2016 Summer Study Purpose

- Analysis of the performance of the members' transmission systems that identifies limits to power transfers occurring non-simultaneously among the SERC members.
- Analysis of the performance of the members' transmission systems under normal conditions and loss of a single element.



SERC LTSG 2016 Summer Study Scope

- Assess the strength of the SERC interconnected network by determining its ability to support power transfers.
- NERC Reliability Standards and SERC Requirements.
- Case is developed by the SERC LTSG Modeling Group.



SERC LTSG 2016 Summer Study Scope (continued)

- Study results are obtained by use of PTI's MUST and PSS/E programs.
- Identify Significant Facilities under transfer analysis.
- Study completed December 2010



SERC LTSG 2016 Summer Study Significant Facilities

- If the facility is a hard limit to a transfer
- The level at which it limits a transfer compared to the test level
- The response of the facility to the transfer
- The number of different transfers/companies impacted



SERC LTSG 2016 Summer Study Significant Facilities (continued)

- If the facility requires the use of an operating guide
- If the outage of the facility results in the overload of numerous major transmission elements
- If an actual TLR have been called on the facility



SERC LTSG 2016 Summer Study Variable Factors

- Load forecasts and generation availability
- Anticipated drought conditions in the SERC area
- Geographic distribution of load and generation



SERC LTSG 2016 Summer Study Variable Factors (continued)

- Transmission system configuration
- Simultaneous inter-system power transfers
- Operation based on regional requirements to respect additional contingencies



2016 LTSG Summer Reliability Study Results

Element	Contingency	Potential Issue	Solution
McIntosh-Jasper Tap 115 kV Line (Southern/SCEG)	McIntosh-Purrysburg 115 kV Line (Southern/SCPSA)	FCITC import limit	Evaluating
Lexington-Lyles 115 kV Line (SCPSA/SCEG)	Silver Lake-Lyles 115 kV Line (SCPSA/SCEG)	FCITC import limit	Evaluating

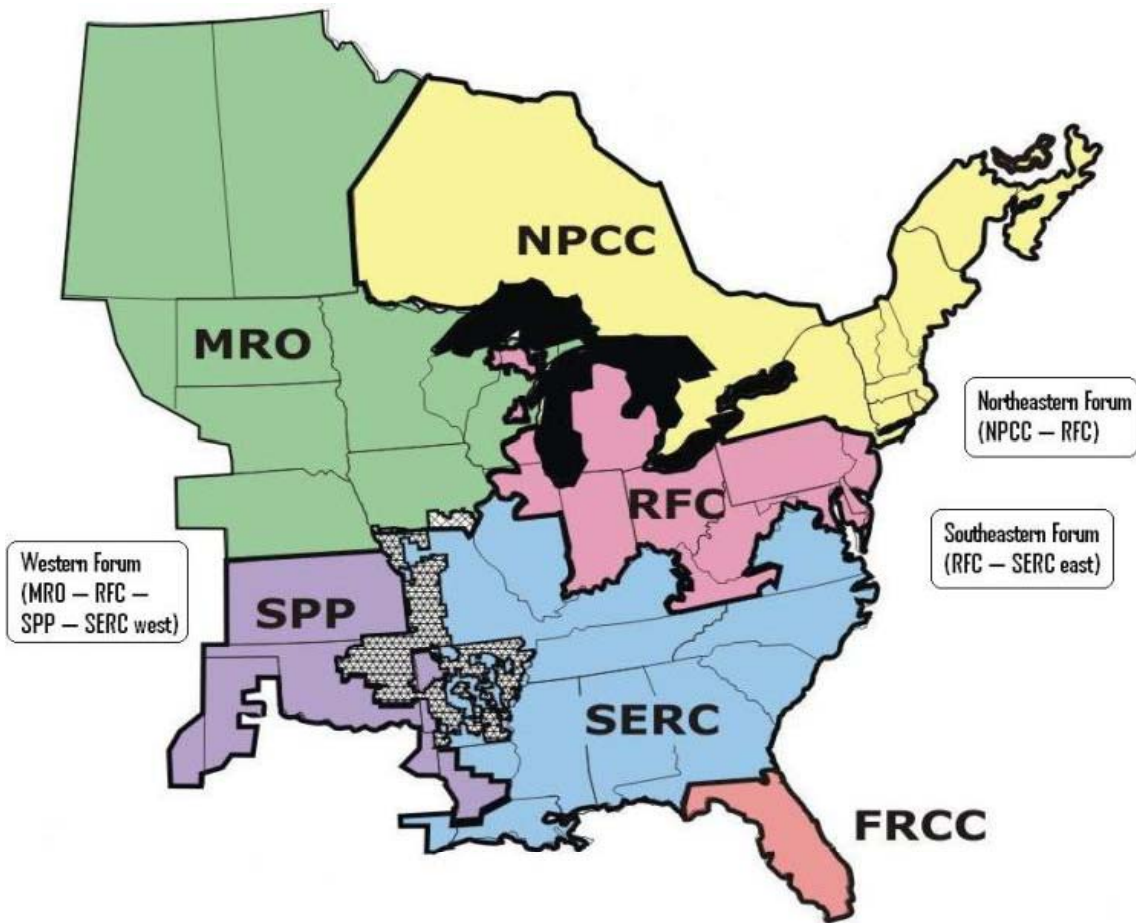


SERC LTSG Study

Questions?



ERAG Future Year Assessments





SERC East-RFC

- SERC East
 - ✓ VACAR (Duke, DVP, PEC, SCE&G, SCPSA)
 - ✓ Central (TVA, EON U.S., EKPC, BREC)
- Reliability First Corporation
 - ✓ PJM (Pennsylvania, New Jersey, Maryland)
 - ✓ MISO (Midwest Independent System Operator)



SERC East-RFC Long-Term Studies

- Analysis of interregional system performance during regional and sub-regional power transfers
- Study of normal and contingency conditions
- Effects of selected multiple outages and simultaneous transfers on system performance



SERC East-RFC Long-Term Studies

- Identify transfer limits from and to each study region
- Transfer limits are not ATC or TTC as required in FERC Orders 888 and 889 and posted on OASIS
- Results are conditional, not absolute or optimal
- Identify facilities having thermal or selected voltage/reactive limits for regional and sub-regional transfers



SERC East-RFC Long-Term Studies

- FCITC - First Contingency Incremental Transfer Capability is the incremental transfer capability above the transfers modeled in the base case
- FCTTC - First Contingency Total Transfer Capability is the algebraic sum of the FCITC and the base case region-to-region transfer



SERC East-RFC Long-Term Studies

- Analysis of FCITCs for simultaneous transfers among, or through study areas
- FCITCs and FCTTCs for non-simultaneous transfers
- Appraisals for PJM, Midwest ISO and SERC East study areas



FCITC values are based on the prediction of many factors that could change in daily operation of the power system



SERC East-RFC Long-Term Studies Reliability Assessment Assumptions

- Load forecasts and generation availability
- Geographic distribution of load and generation
- Transmission system configuration



SERC East-RFC Long-Term Studies Reliability Assessment Assumptions

- Simultaneous inter-system power transfers
- Regional operational requirements for contingencies
- Phase Angle Regulator control settings



SERC East-RFC

2021 Summer Long Term Study

Scope

- Due November 2011
- Develop 2021 summer base case with all scheduled firm capacity backed transactions
- Determine thermal regional and sub-regional FCITCs
- Determine FCTTCs for regional and sub-regional transfers



SERC East-RFC Scope

- Reliability Analysis for selected transfers occurring simultaneously among, or through the SER regions
- Identify Limiting facilities for non-simultaneous emergency transfers among MISO, SERC East, and expanded PJM
- Appraisals for the PJM, MISO and SERC East study areas
- The FCITCs reported in the study are based on simulated system operation



SERC East-RFC Interregional Transmission System Reliability Assessments

Questions?



Next Meeting

- Stakeholders notified by email
- Discuss initial results of reliability studies
- Discuss options to address found constraints
- Stakeholders can provide additional options



South Carolina Regional Transmission Planning

Stakeholder Meeting

SCE&G Lake Murray Training Center

Columbia, SC

May 16, 2011

