Welcome

SERTP 2010

"Annual Transmission Planning Summit & Assumptions Input Meeting"

10:00 AM – 5:00 PM

Southeastern Regional TRANSMISSION PLANNING

2010 SERTP

Purposes & Goals of the Meeting

- 2010 Final Economic Planning Study Results
- Southern / FRCC Interface Update
- SIRPP Update
- 10 Year Transmission Expansion Plan
  - East Region
  - West Region
- Preliminary 2011 Base Case Assumptions
- Stakeholder Feedback / Input
- Projected 2011 SERTP Process
- Next Meeting's Activities

Southeastern Regional TRANSMISSION PLANNING

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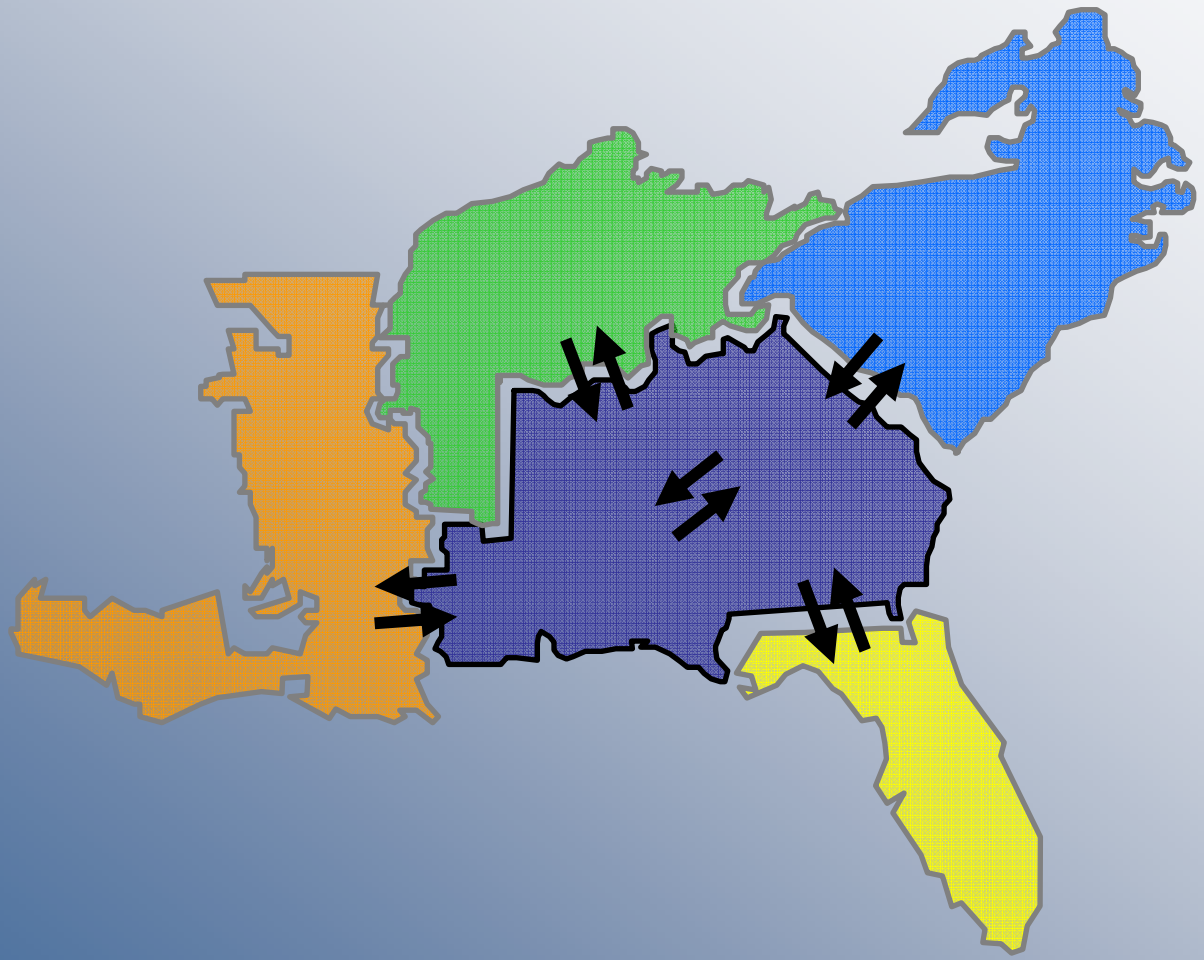
Economic Planning Studies



PowerSouth Energy Cooperative

Dalton Utilities

GeorgiaTransmission

MEAG POWER

South Mississippi Electric Power Association

Southern Company — Energy to Serve Your World℠

Southeastern Regional TRANSMISSION PLANNING

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Five Economic Planning Studies

- Birmingham, AL to Georgia ITS
  - 1000 MW
- TVA Border to Southern Balancing Authority
  - 1500 MW
- SCPSA Border to Southern Balancing Authority
  - 200 MW
- Duke Border to Southern Balancing Authority
  - 2000 MW
- North Georgia to Mississippi
  - 600 MW

Power Flow Cases Utilized

- Study year: 2016
- Load Flow Cases:
  - 2010 Series Version 2C
    - Summer Peak
    - Shoulder

2010 SERTP

Five Economic Planning Studies

- Final Report Components:
  - Thermal Analysis
    - Contingency Analysis to identify constrained elements/contingency pairs
  - Interface Transfer Capability Impacts
  - Stability Impacts
  - Potential Solutions
    - Transmission Enhancements and Cost Estimates

Southeastern Regional
TRANSMISSION PLANNING

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- 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 date of 2016.

- These potential solutions only address constraints identified within the Southern Balancing Area that are associated with the proposed transfers. Other Balancing Areas were not monitored which could result in additional limitations and required system enhancements.

Southeastern Regional
TRANSMISSION PLANNING

Birmingham, AL

to

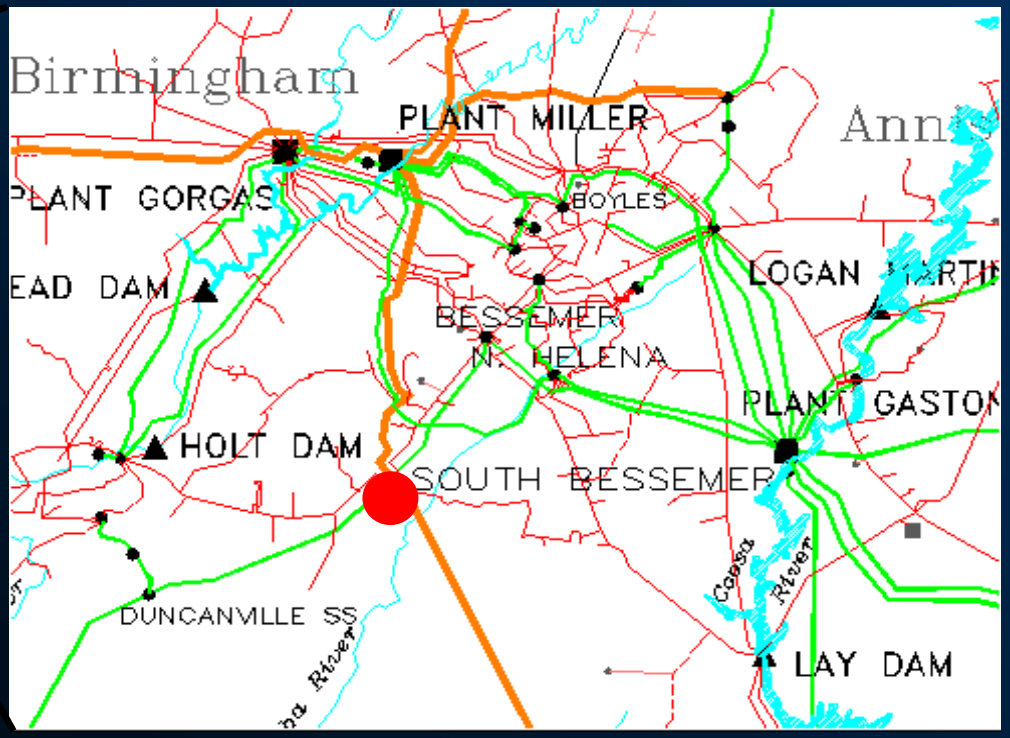
Georgia ITS

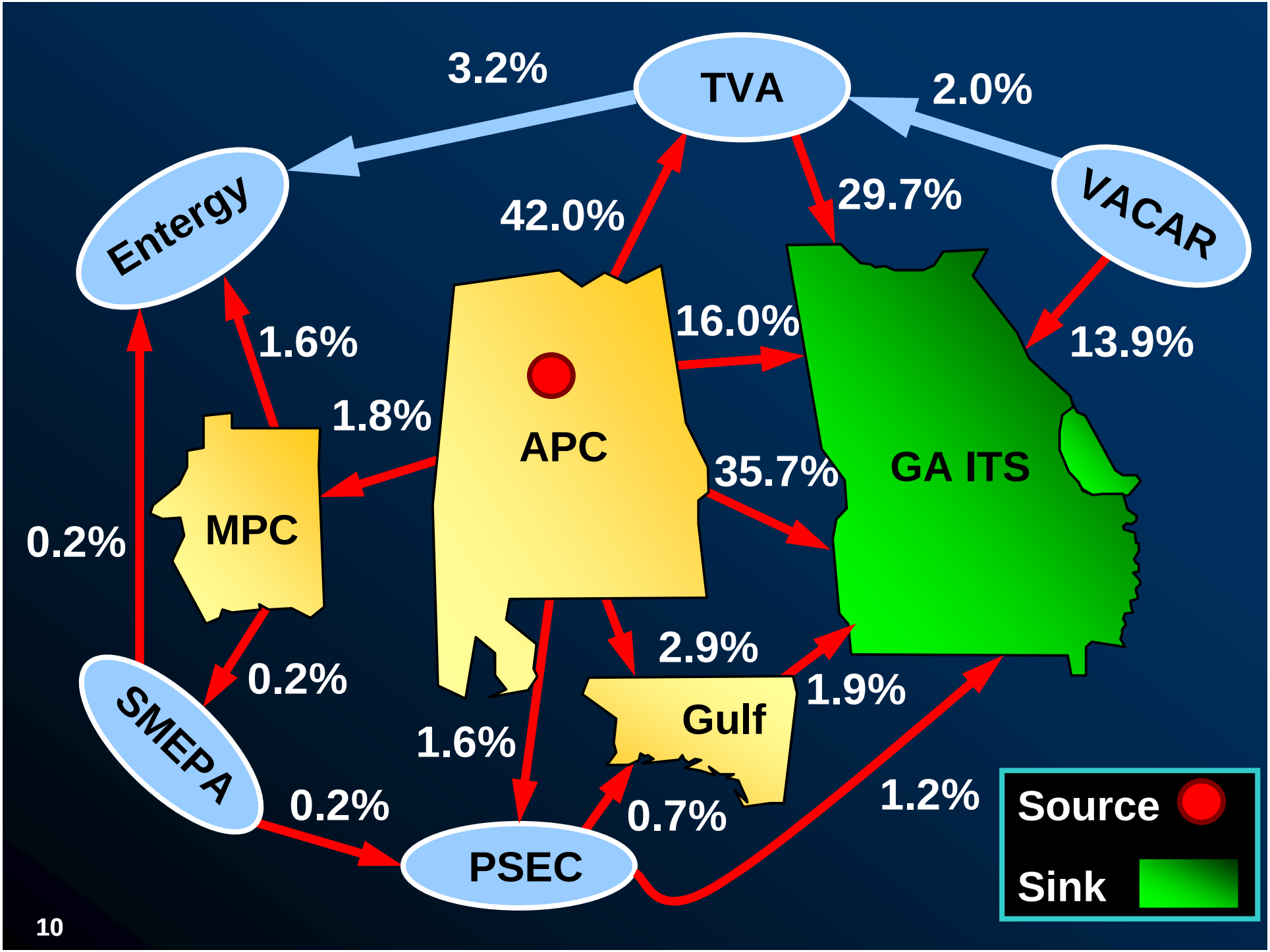
1000 MW

Southeastern Regional TRANSMISSION PLANNING

Birmingham, AL to Georgia ITS 1000 MW

- Transfer Type: Generation to Generation
- Source: South Bessemer 500 kV
- Sink: Generation within the Georgia ITS

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VACAR
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29.7%
1.6%
16.0%
13.9%
1.8%
APC
MPC
35.7%
GA ITS
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2.9%
0.2%
1.9%
SMEPA
Gulf
1.6%
0.2%
0.7%
1.2%
PSEC
Source
Sink

Birmingham, AL to Georgia ITS 1000 MW

Transmission System Impacts

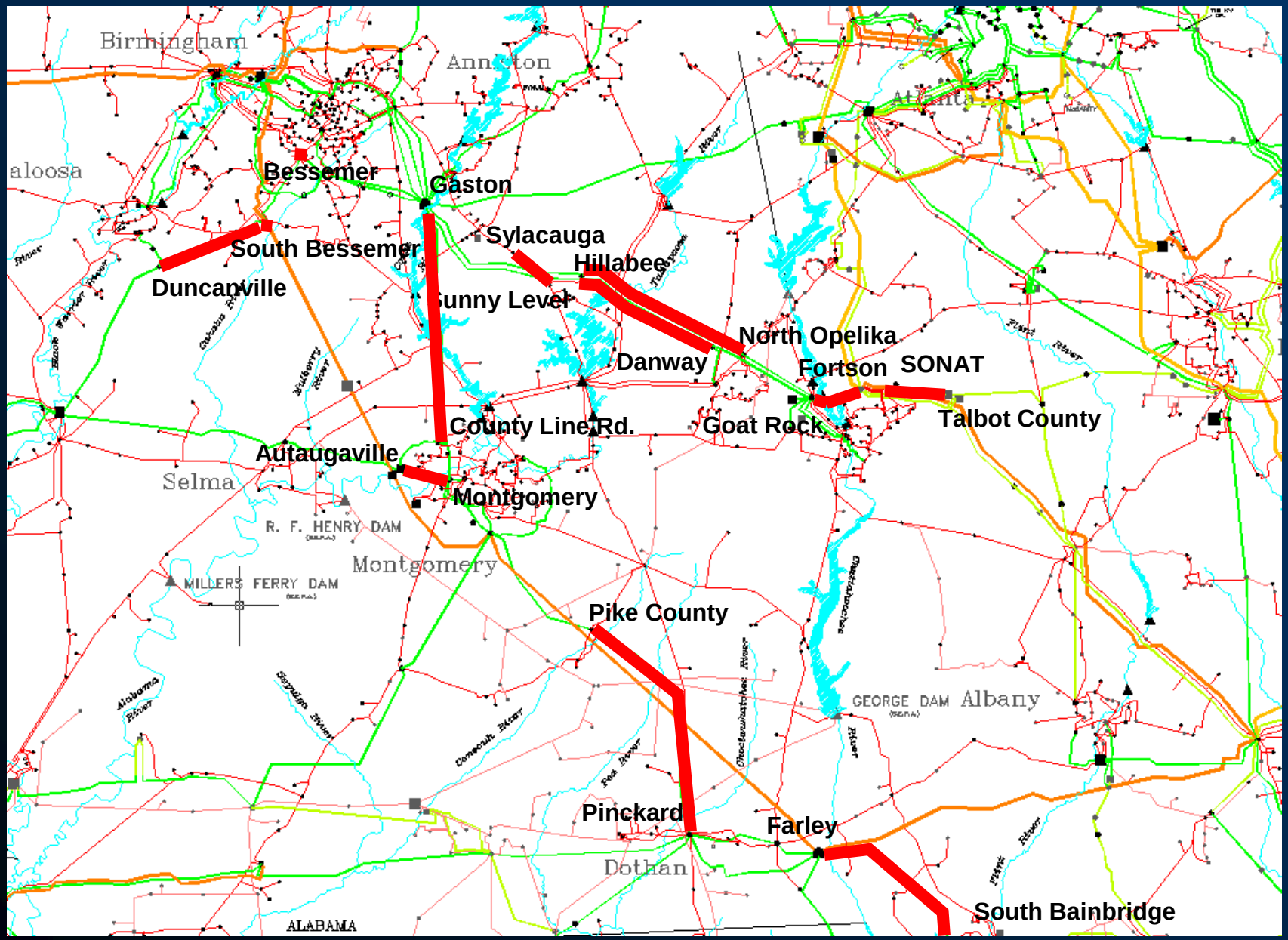
- Thermal Constraints Identified:
  - Ten (10) 230 kV Lines
  - Four (4) 230 / 115 kV Transformers
  - Fourteen (14) 115 kV Lines

Birmingham, AL to Georgia ITS 1000 MW

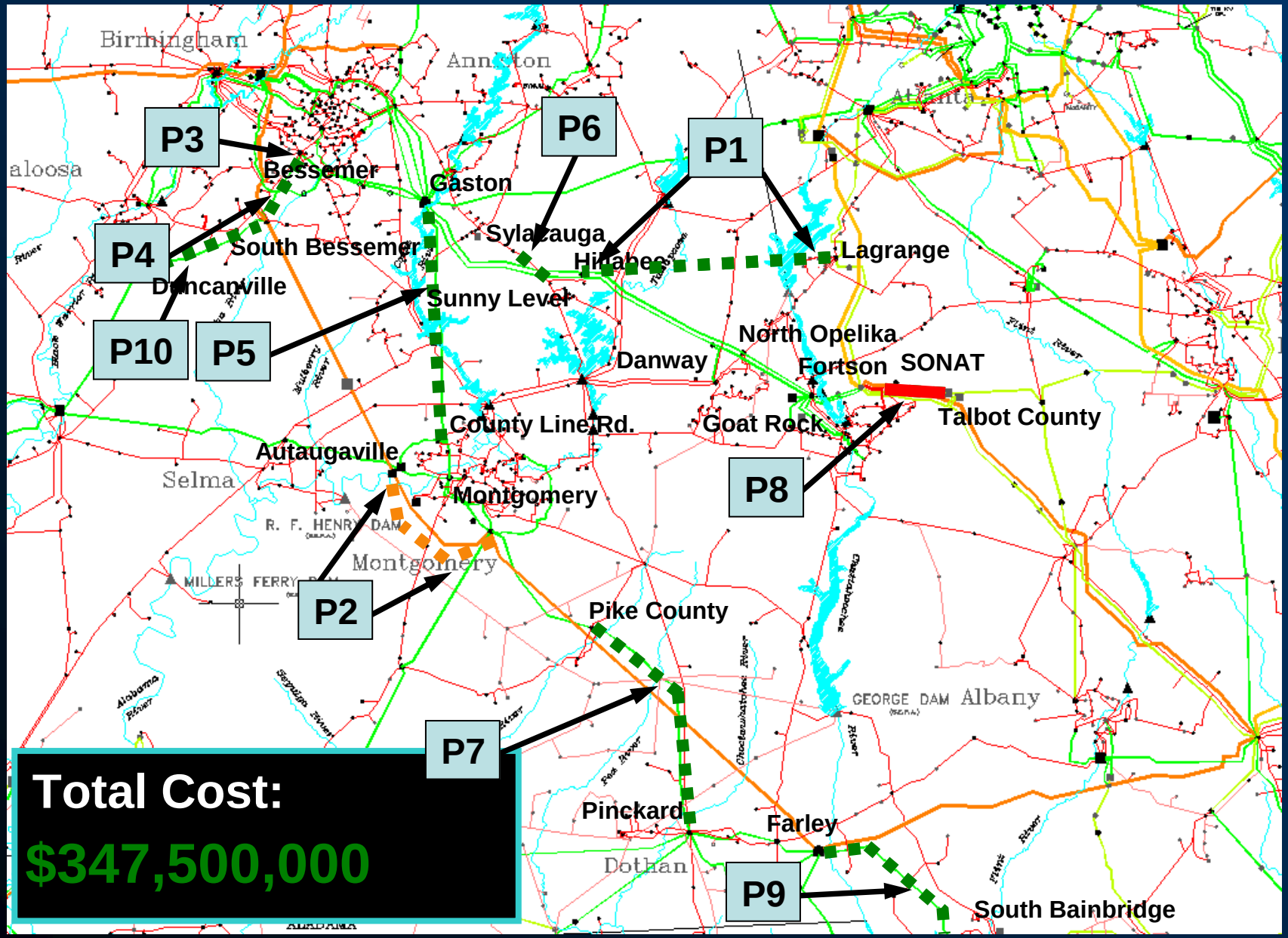
Significant Constraints – PASS 0

Limiting Elements	Rating (MVA)	Thermal Loading (%)	
		Without Request	With Request
Bessemer 230/115 kV XFMR	392	89.1	110.2
Montgomery – Autaugaville 230 kV TL	1243	98.2	109.8
Fortson – Goat Rock 230 kV TL	1192	99.3	107.1
Danway – Hillabee 230 kV TL	602	94.2	104.7
South Bainbridge – Farley 230 kV TL	693	95.5	104.1
North Opelika – Hillabee 230 kV TL	602	91.1	101.6
Goat Rock – Camp McKenzie 230 kV TL	1204	93.5	100.8
North Selma 230/115 kV XFMR	302	96.3	100.5
Pinckard – Pike County 230 kV TL	478	87.6	100.3
Fortson – Camp McKenzie 230 kV TL	1192	92.8	100.2
South Bessemer 230/115 kV XFMR	480	86.2	100.0

Overloaded Elements



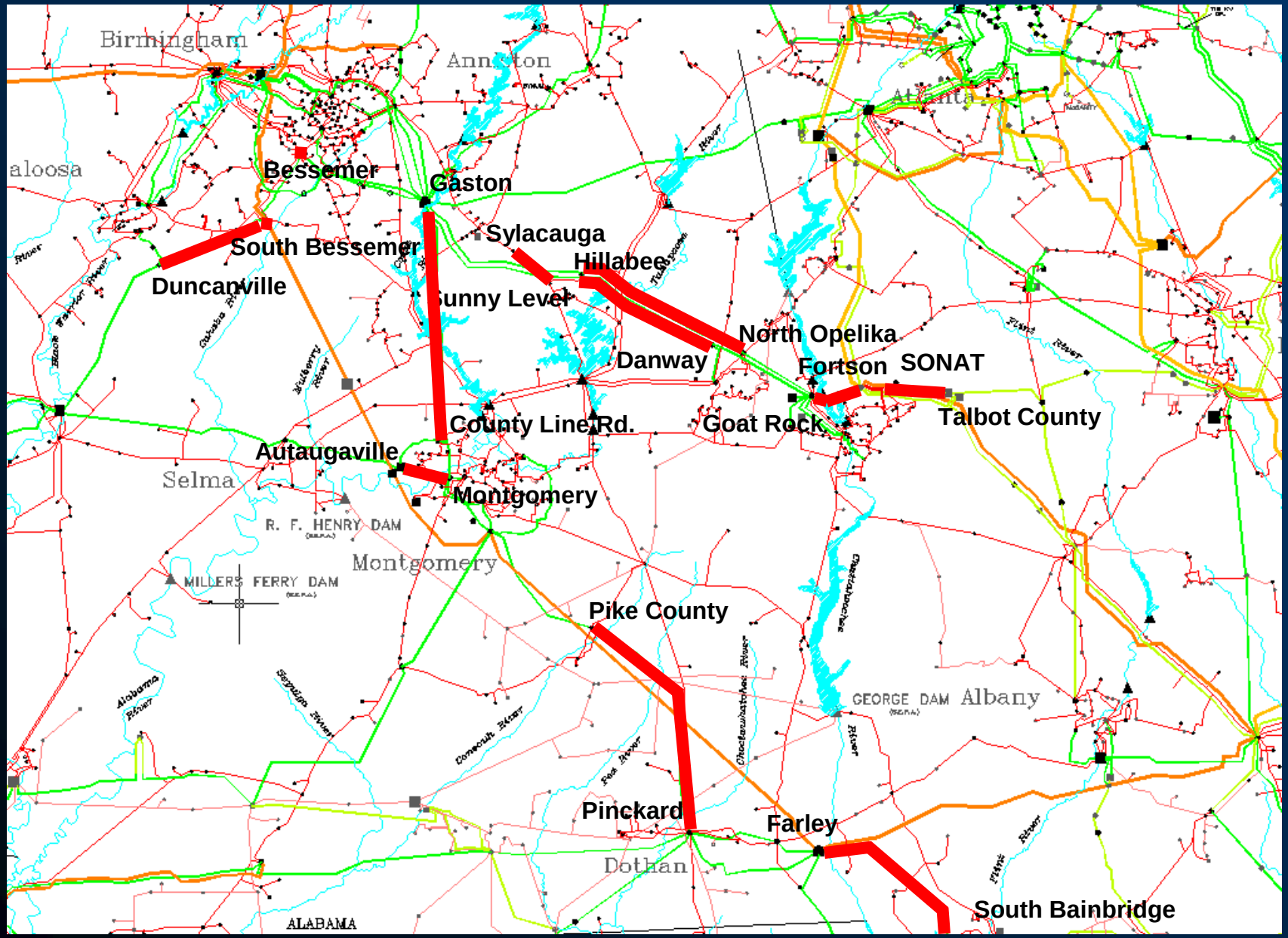
Potential Enhancements - Option 1



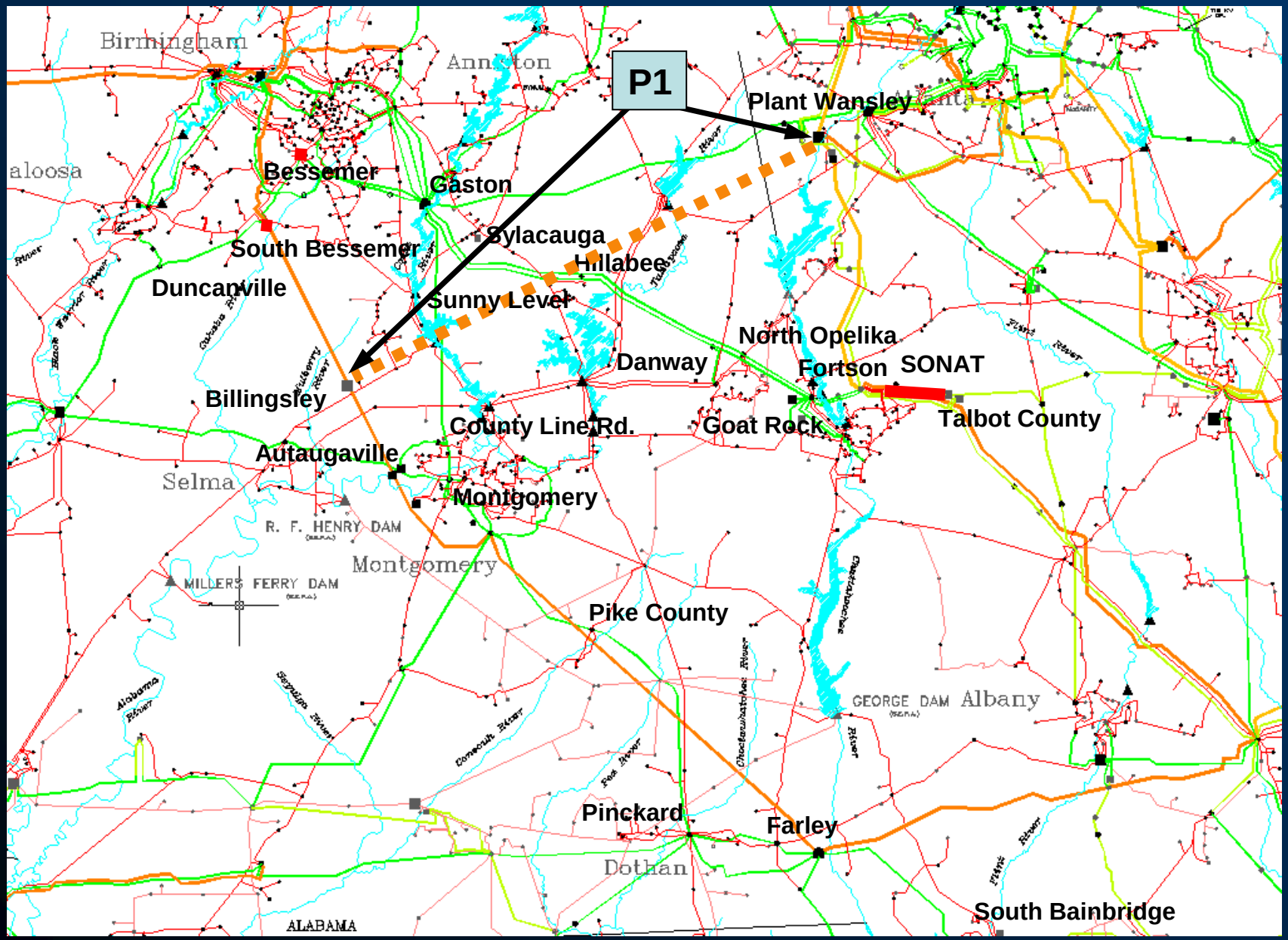
Total Cost:

$347,500,000

Overloaded Elements



Potential Enhancements - Option 2

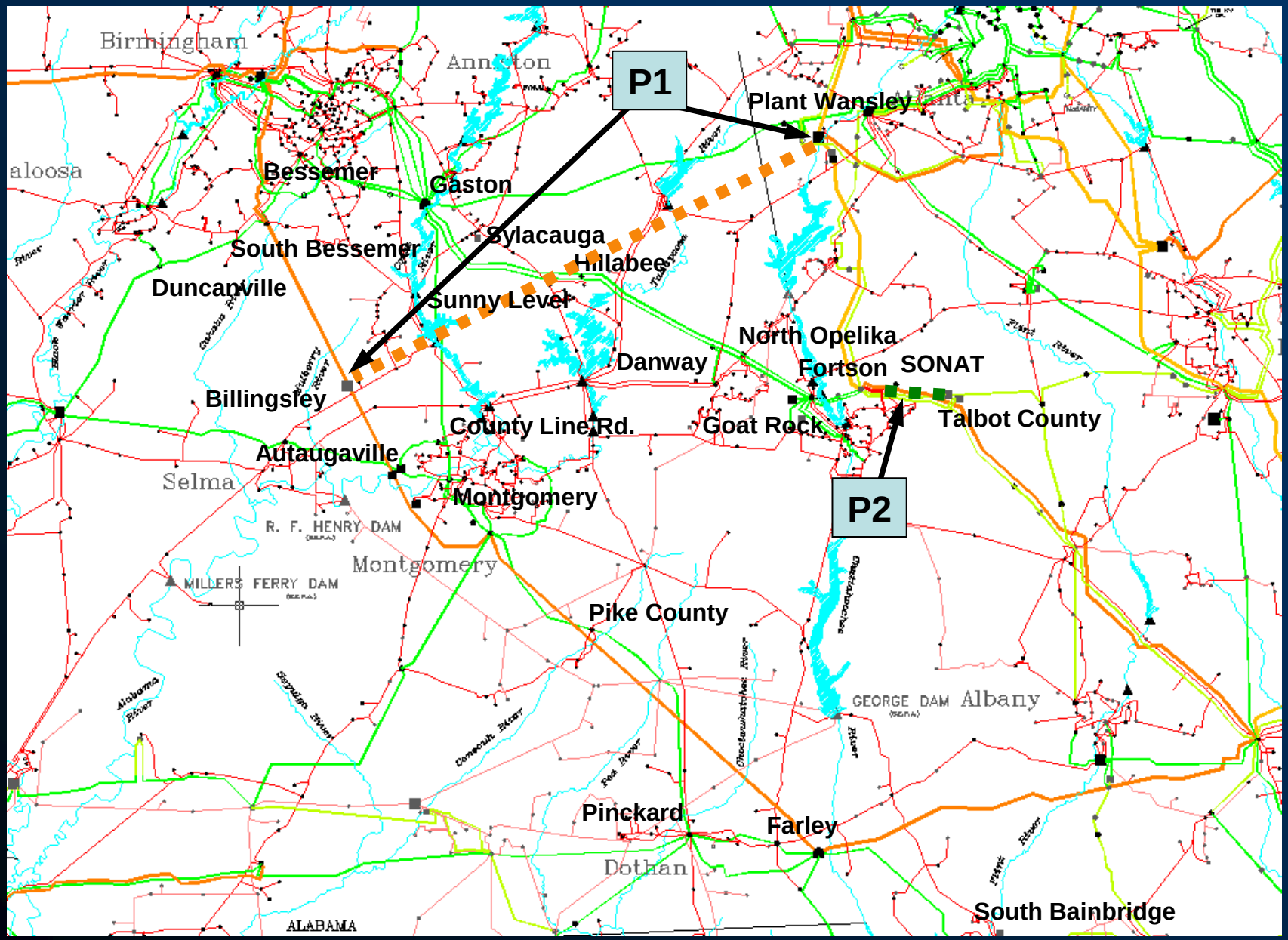


Birmingham, AL to Georgia ITS 1000 MW

Significant Constraints – PASS 1

Limiting Elements	Rating (MVA)	Thermal Loading (%)	
		Without Request	With Request
Southern Natural Gas Tap – Talbot 230 kV TL	433	95.1	104.7

Potential Enhancements - Option 2



Southeastern Regional TRANSMISSION PLANNING

Birmingham, AL to Georgia ITS 1000 MW

Projects Identified

Item	Proposed Enhancements	Cost ($)
P1	Billingsley – Wansley 500 kV TL	$286,000,000
P2	Waynesboro 230/115 kV XFMR	$6,300,000
P3	Jackson Lake – South Covington 115 kV TL	$1,100,000
P4	Gulf State Steel – Morgans Crossroads 115 kV TL	$500,000
P5	Southern Natural Gas – Talbot 230 kV TL	$7,500,000
P6	Halla Climate Control – GKN Westland Aerospace 115 kV TL	$1,100,000
P7	Willingham Drive – East Point 115 kV TL	$2,400,000
P8	Bent Brook – Airport Lane 115 kV TL	$300,000

Total Cost (2016$) = $305,200,000

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Additional Study Aspects

- Estimate of transfer level that could result in a voltage instability event
- Evaluated in 100 MW incremental increases of generation at South Bessemer 500 kV substation
  - **2400 MW** without any thermal enhancements
  - **3000 MW** with the thermal enhancements identified for transferring 1000 MW from South Bessemer to the GA ITS

Questions on the Birmingham, AL to Georgia ITS Transfer?

TVA Border

to

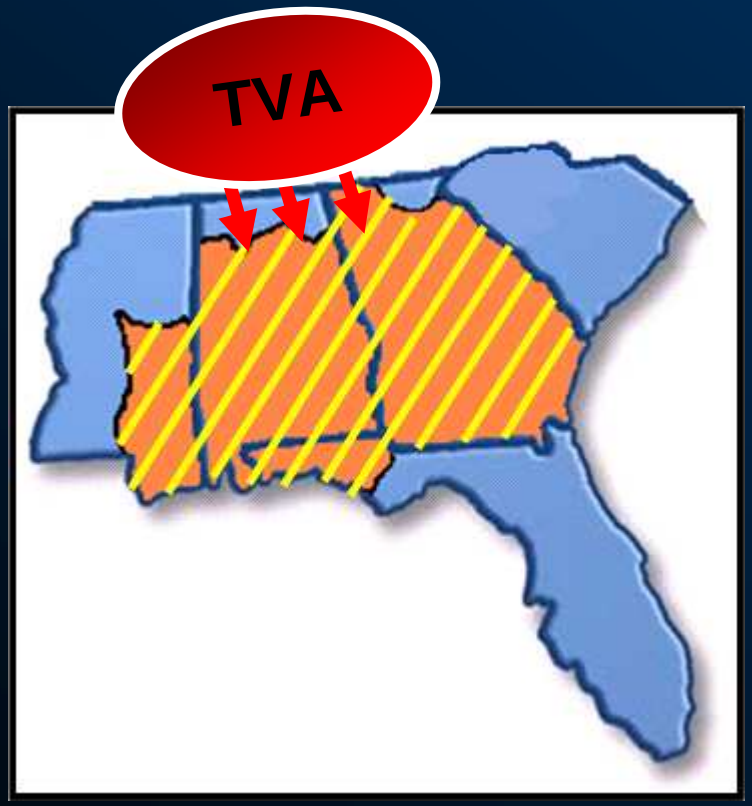
SBA

1500 MW

Southeastern Regional TRANSMISSION PLANNING

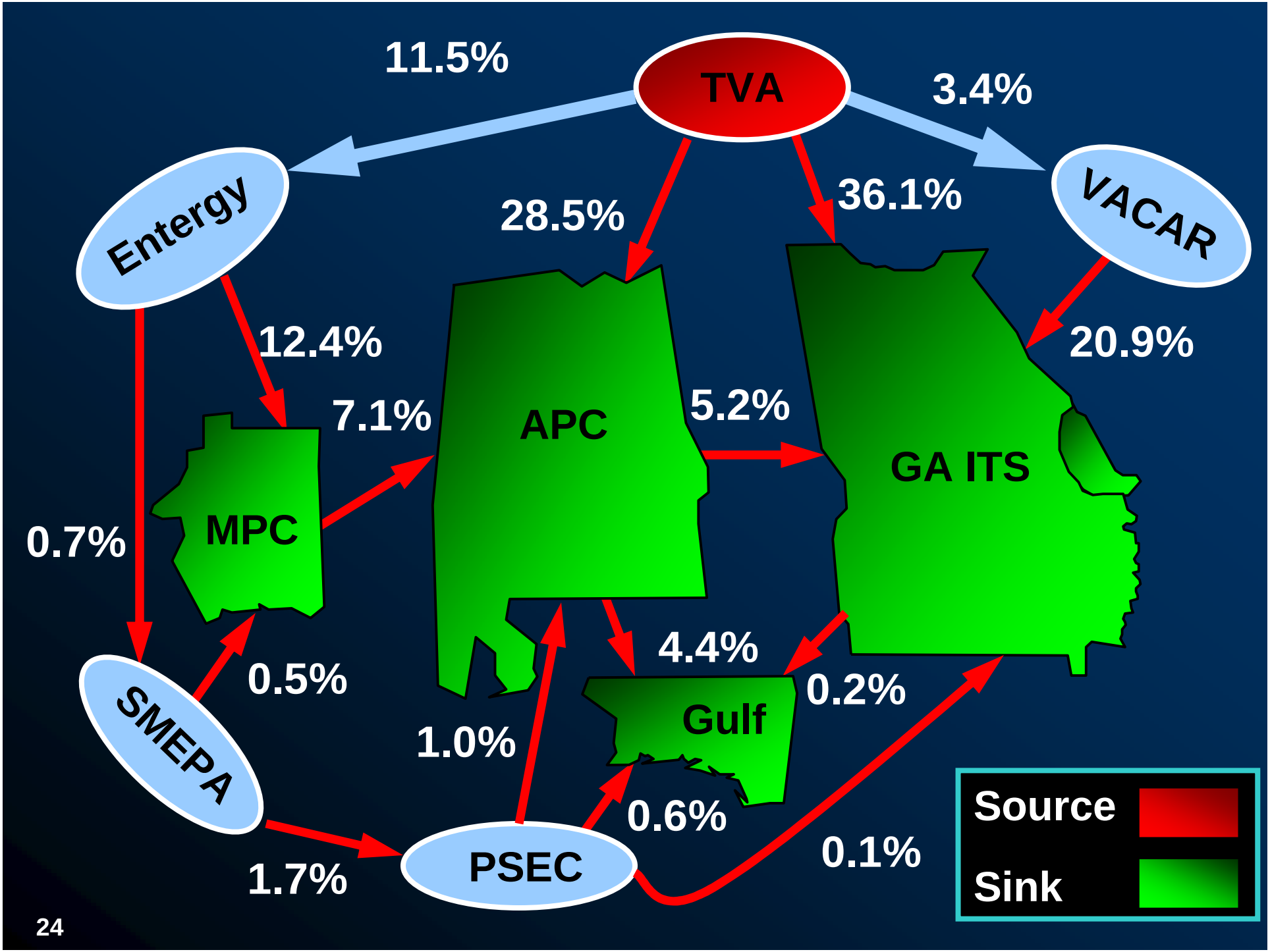
TVA Border to SBA 1500 MW

- Transfer Type: Load to Generation
- Source: Uniform Load Reduction in TVA
- Sink: Generation within the SBA



Source

Sink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TVA
3.4%
Entergy
28.5%
36.1%
VACAR
12.4%
20.9%
7.1%
APC
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4.4%
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PSEC
0.1%
1.7%
Source
Sink

Southeastern Regional TRANSMISSION PLANNING

TVA Border to SBA 1500 MW

Transmission System Impacts

- Thermal Constraints Identified:
  - One (1) 500 kV Line(1)
  - Seven (7) 230 kV Lines
  - Two (2) 161 / 115 kV Transformers
  - One (1) 161 kV Line
  - Seven (7) 115 kV Lines

(1) The limiting element is within TVA

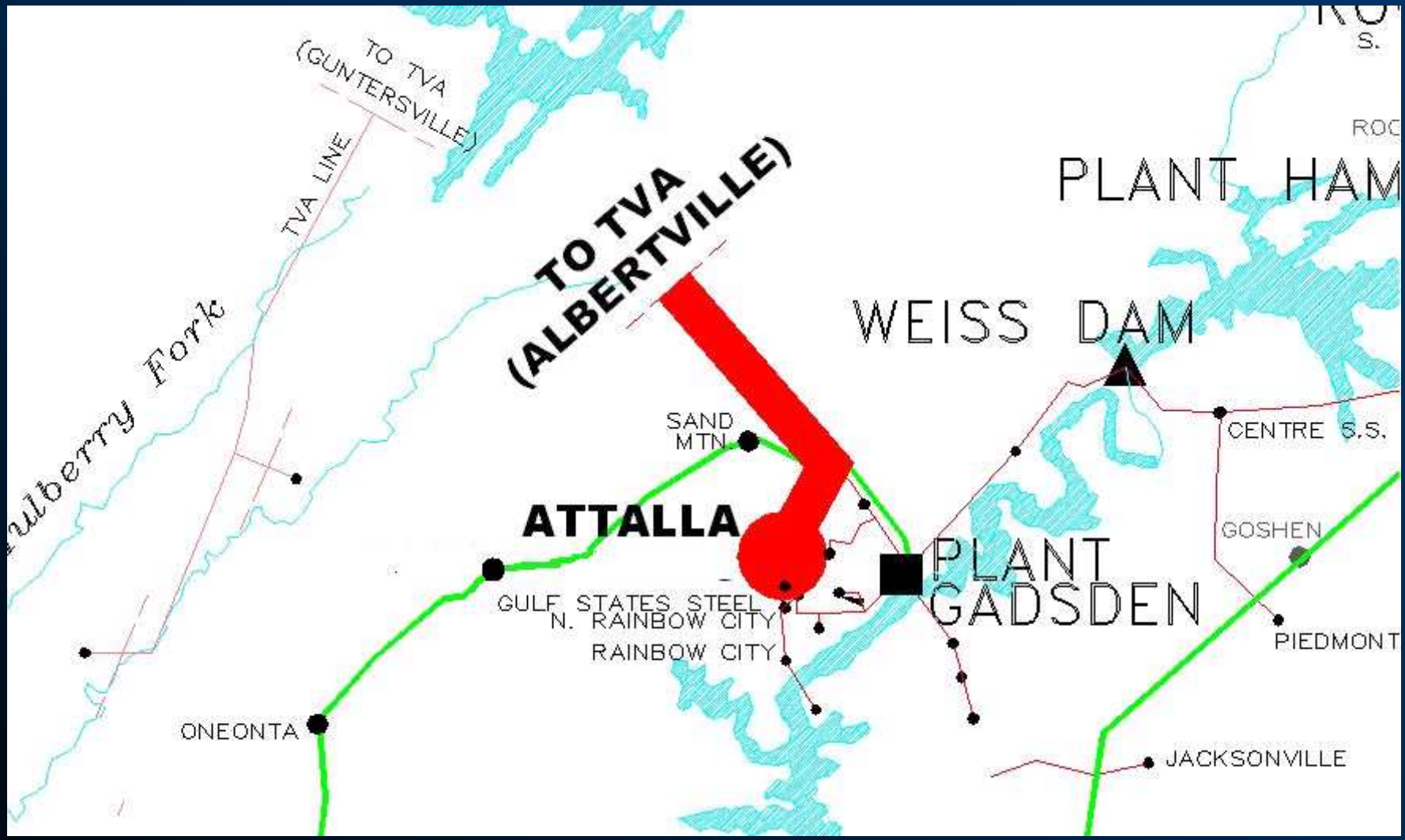
Southeastern Regional TRANSMISSION PLANNING

TVA Border to SBA 1500 MW

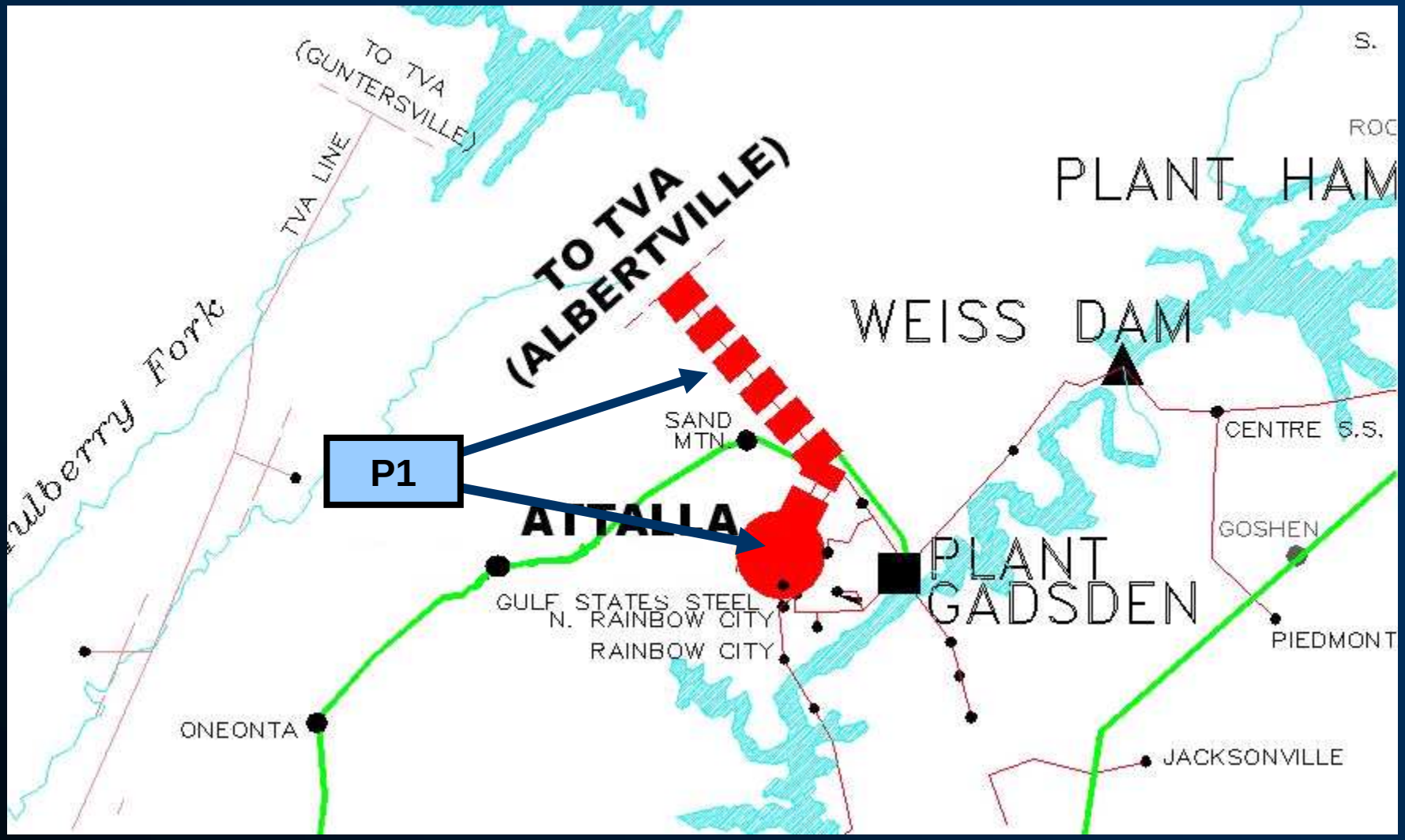
Significant Constraints – PASS 0

Limiting Elements	Rating (MVA)	Thermal Loading (%)	
		Without Request	With Request
Attalla – Albertville 161 kV TL	193	82.7	124.8
Attalla 161 / 115 kV XFMR CKT 1	99	63	121.2
Attalla 161 / 115 kV XFMR CKT 2	111	75.5	114.0
Russell – Lexington 230 kV TL	596	94.9	108.9
South Hall – Candler 230 kV TL	509	91.4	102.7
Hillabee – Danway SS 230 kV TL	602	99.4	105.4
Hillabee – North Opelika 230 kV TL	602	96.3	102.2

Overloaded Elements



Potential Enhancements



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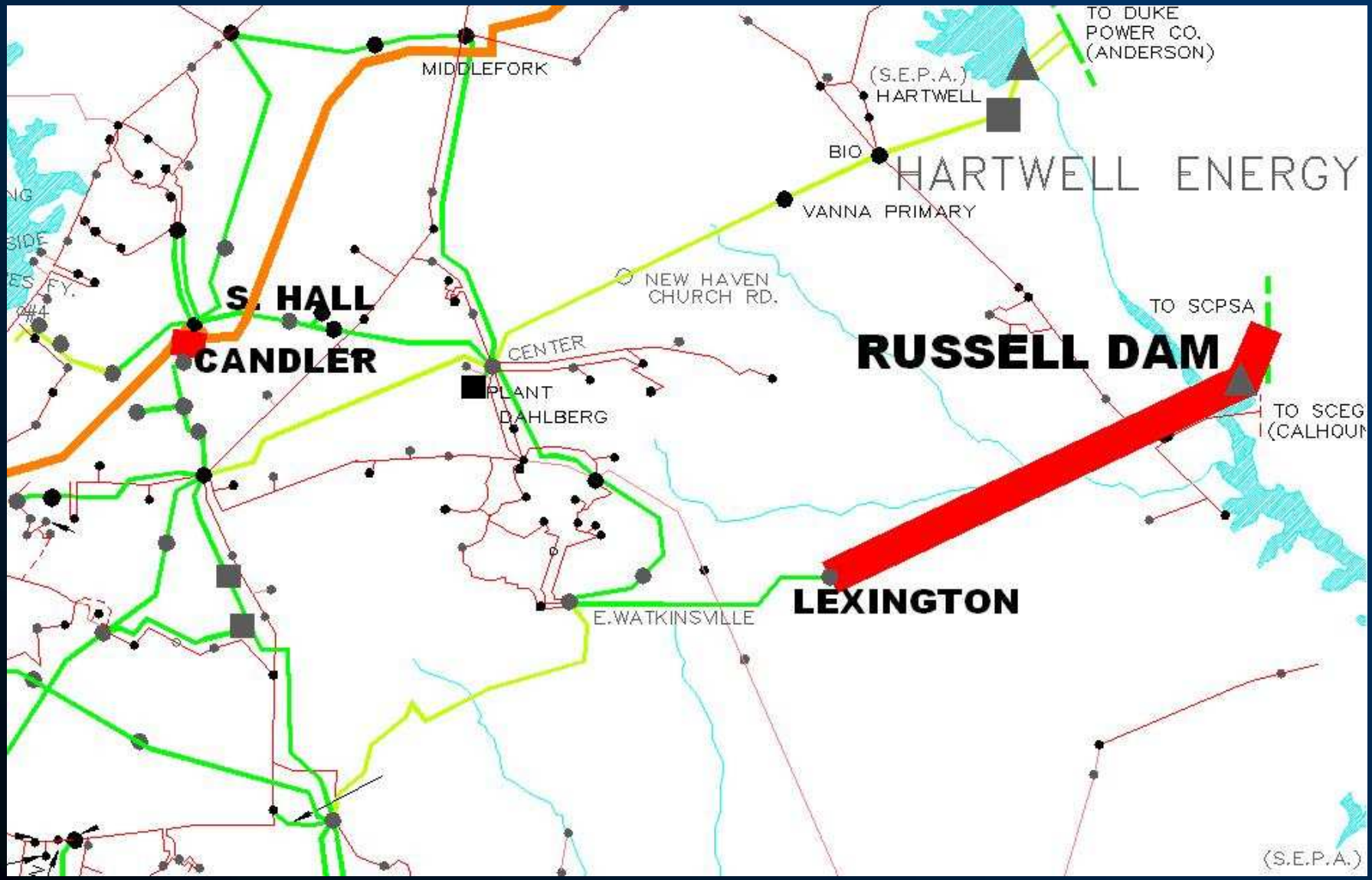

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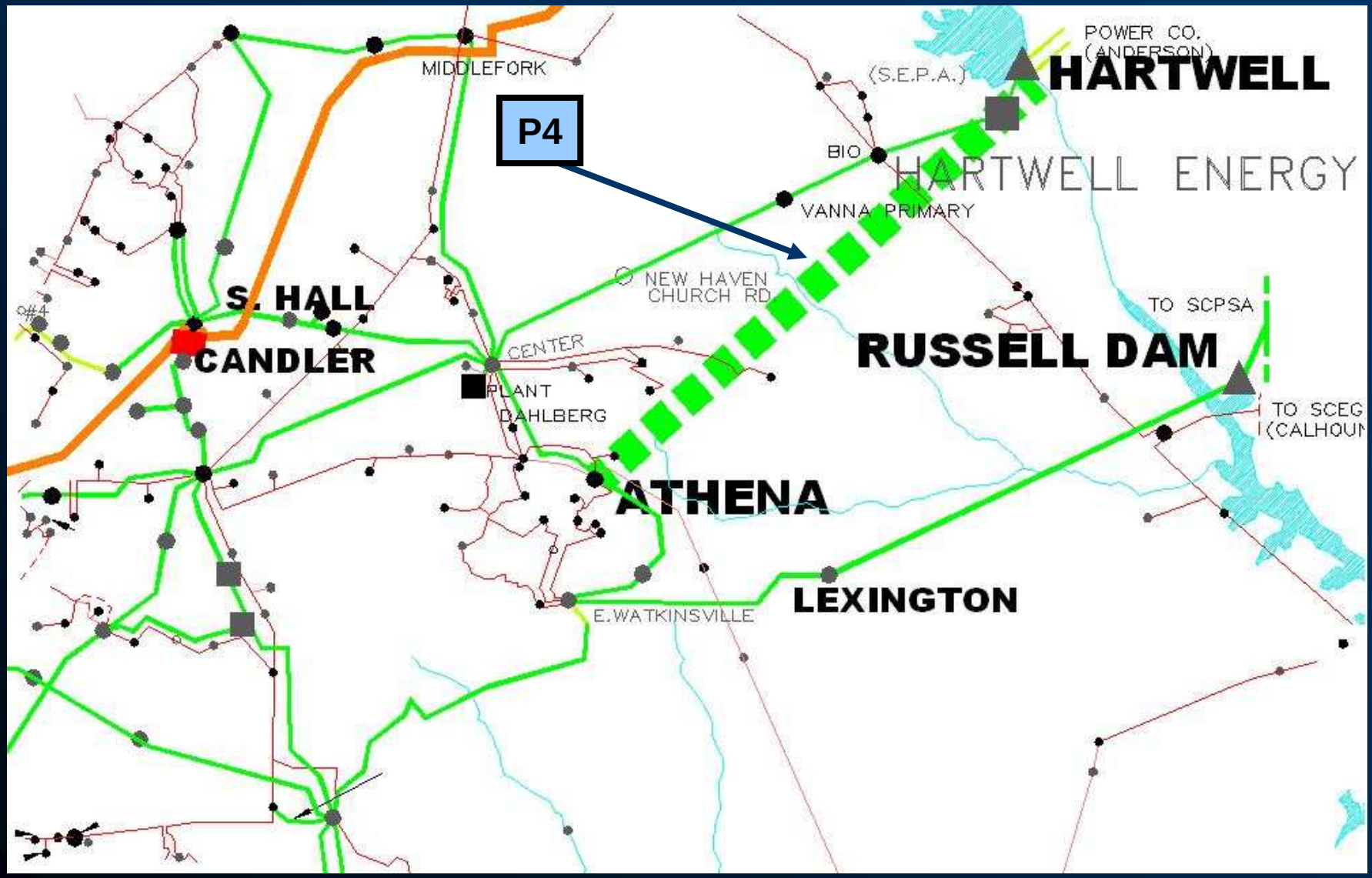

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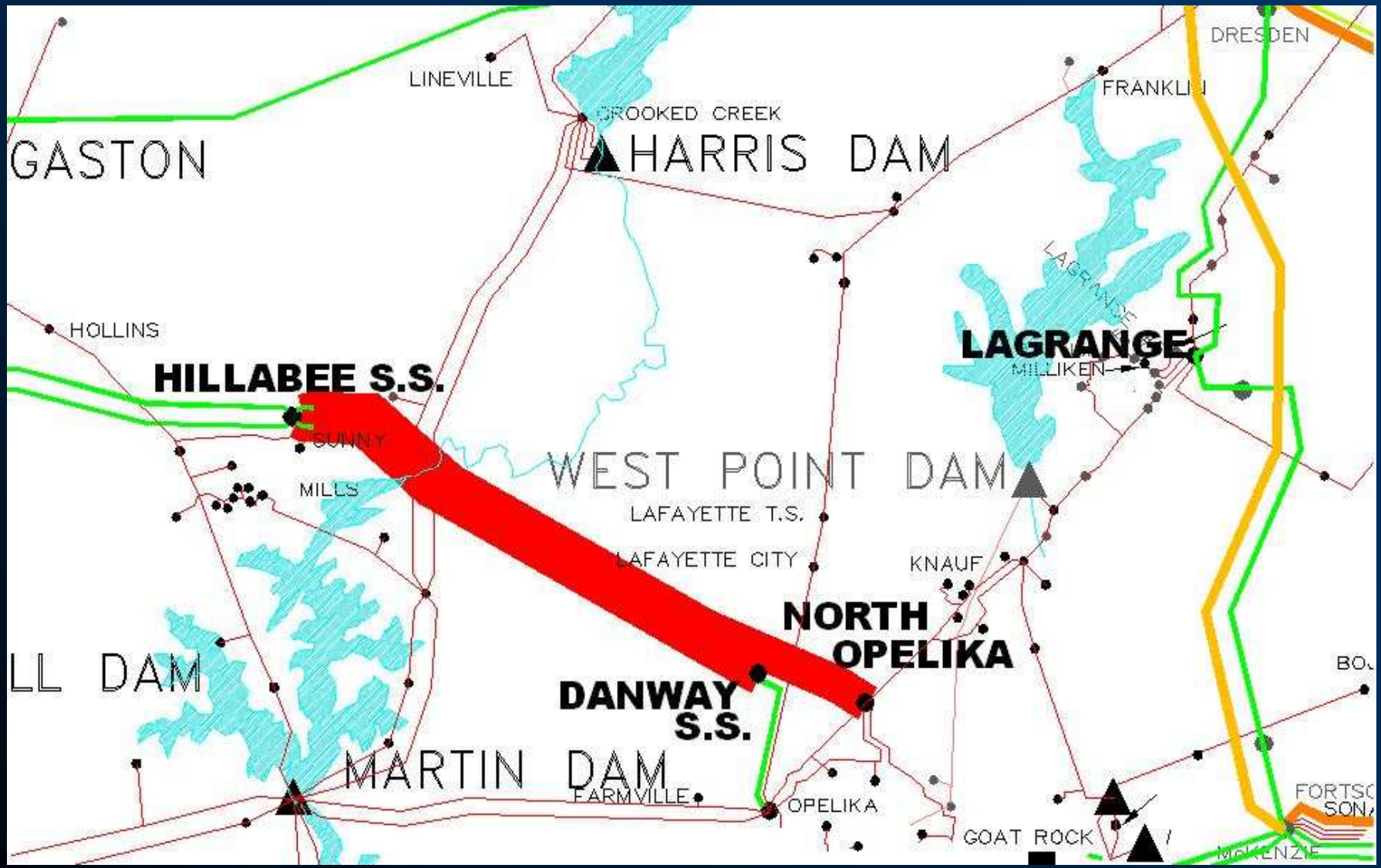

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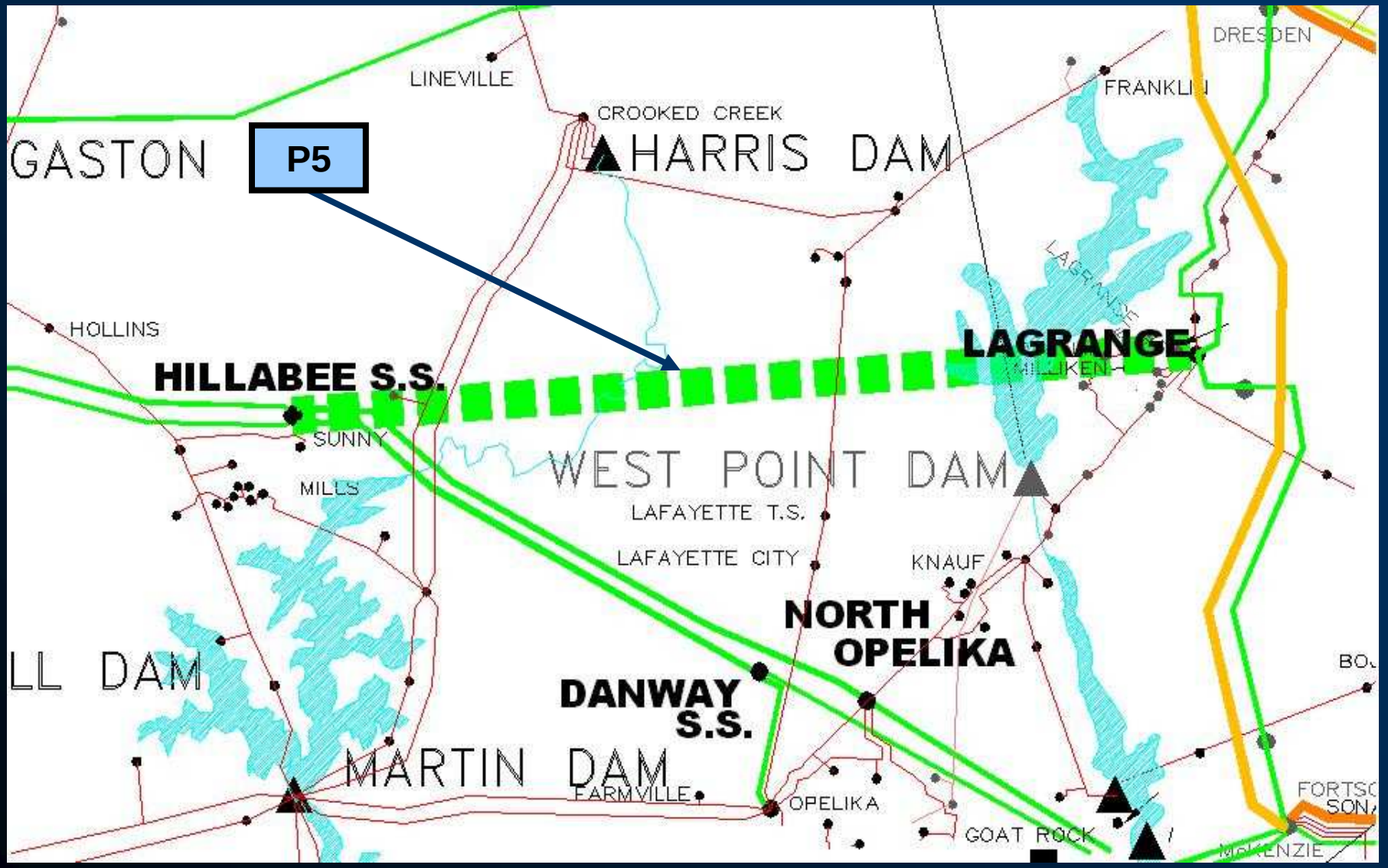


Southeastern Regional TRANSMISSION PLANNING

TVA Border to SBA 1500 MW

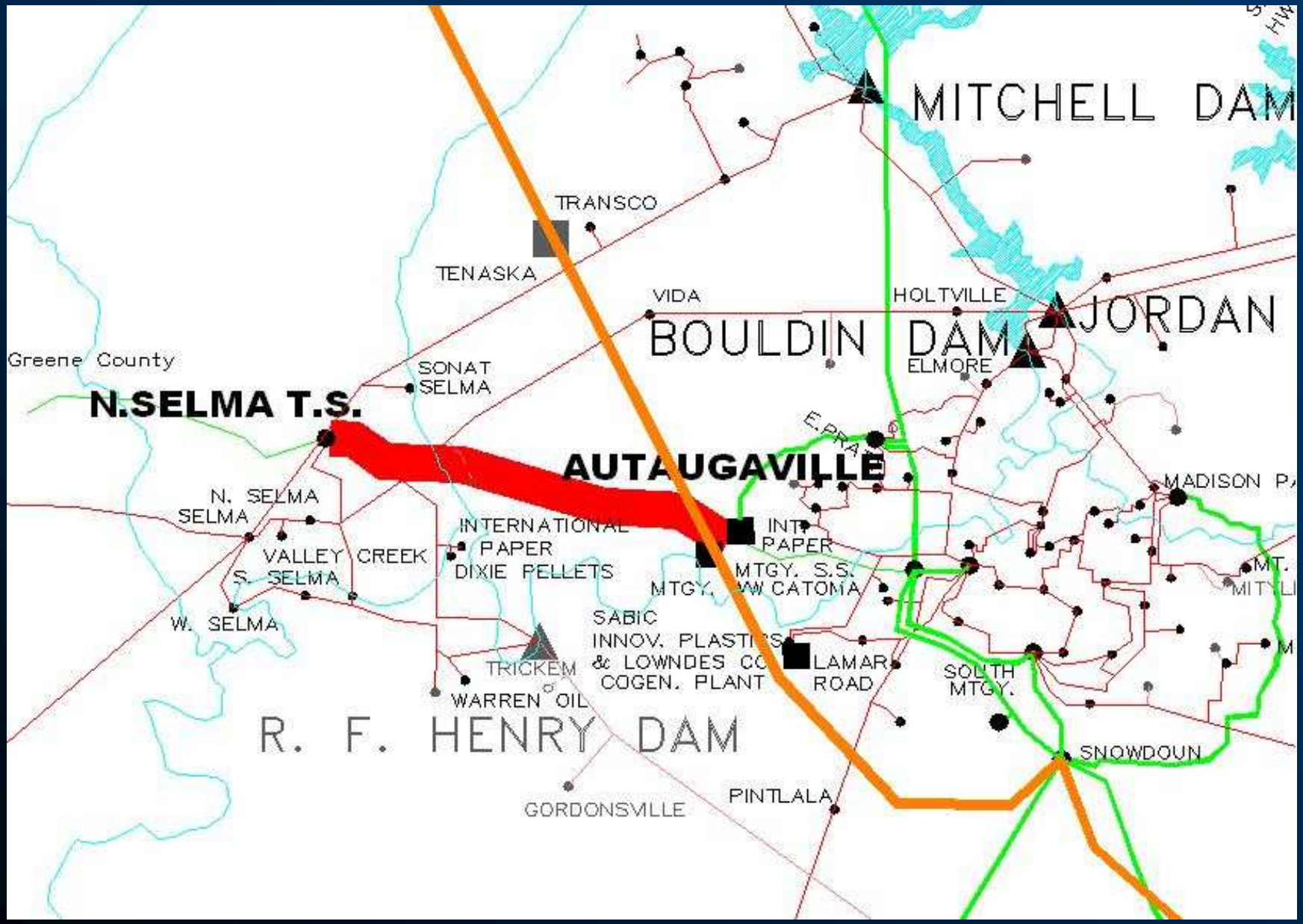
Significant Constraints – PASS 1

Limiting Elements	Rating (MVA)	Thermal Loading (%)	
		Without Request	With Request
Attalla – Gulf States Steel 115 kV TL	138	50.7	107.5
Gulf States Steel – N. Rainbow City 115 kV TL	112	57.4	123.6
N. Rainbow City – Keystone Tap 115 kV TL	112	43.3	110.0
Rainbow City – Keystone Tap 115 kV TL	112	37.5	104.5
North Selma – Autaugaville 230 kV TL	404	78.2	101.1

Overloaded Elements

Potential Enhancements

Overloaded Elements



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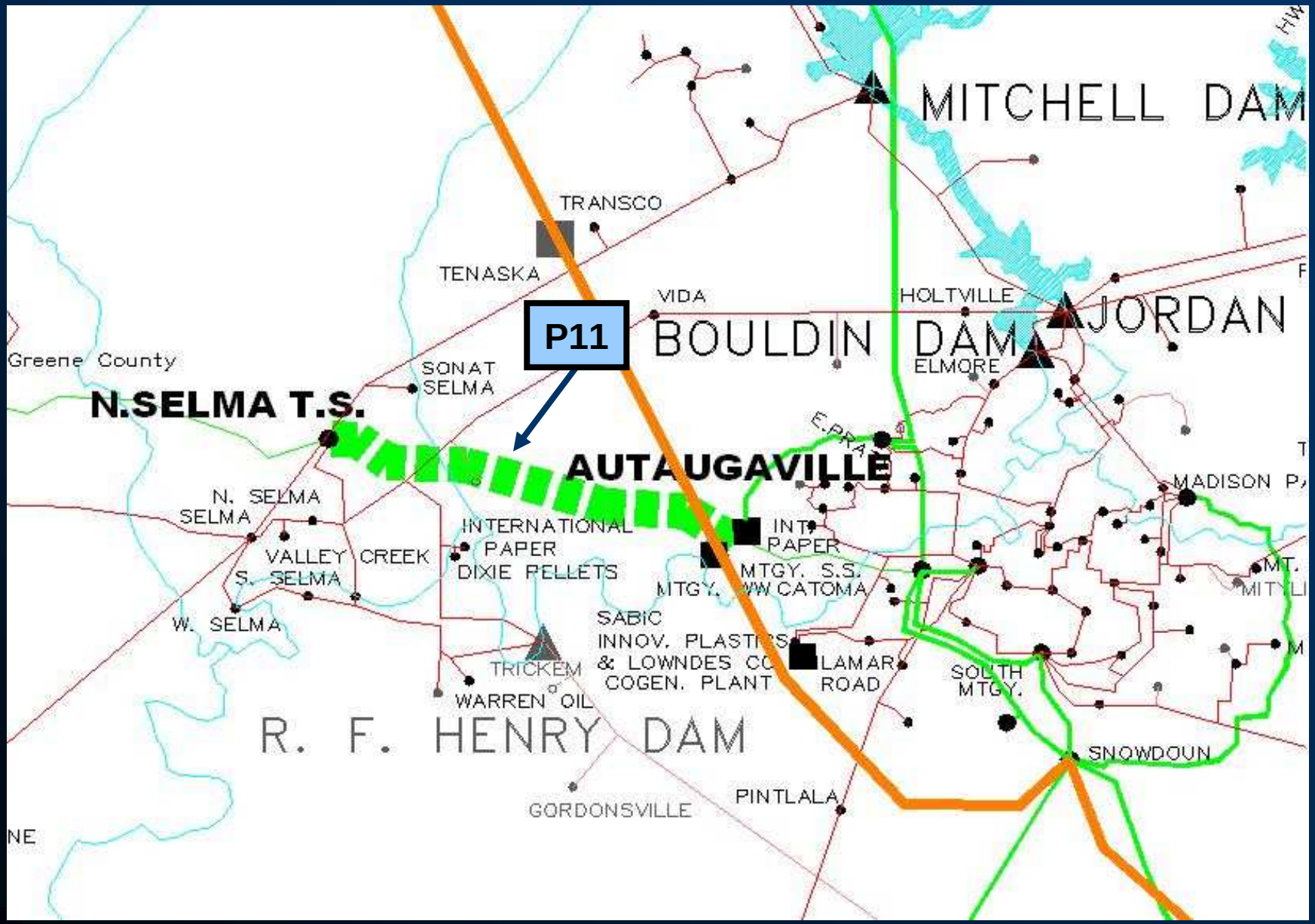


Southeastern Regional TRANSMISSION PLANNING

TVA Border to SBA 1500 MW

Projects Identified

Item	Proposed Enhancements	Cost ($)
P1	Attalla 161 / 115 kV XFMR Attalla – Albertville 161 kV TL	$6,600,000(1)
P2	Celanese – Metal Container 115 kV TL	$765,000
P3	Friendship – Lineville 115 kV TL	$3,971,000
P4	Athena – Hartwell 230 kV TL	$46,762,000(1)
P5	Hillabee – LaGrange 230 kV TL	$51,766,000
P6	Sunny Level Tap – Kellyton 115 kV TL	$255,000
P7	Woodstock – Ragsdale 230 kV TL	$200,000
P8	Sonat Ell Jct. – Talbot County 115 kV TL	$5,422,000
P9	Attalla – Gulf States Steel 115 kV TL	$1,015,000
-	- Continued -	-

(1) Cost provided is for the portion of the solution located within the participating Transmission Owners' territory

TVA Border to SBA 1500 MW

Projects Identified

Item	Proposed Enhancements	Cost ($)
-	- Continued -	-
P10	Gulf States Steel – Rainbow City 115 kV TL	$2,208,000
P11	North Selma – Autaugaville 230kV TL	$6,847,000

Total Cost (2016$) = $125,811,000

Questions on the TVA Border to SBA Transfer?

SCPSA Border

to

SBA

200 MW

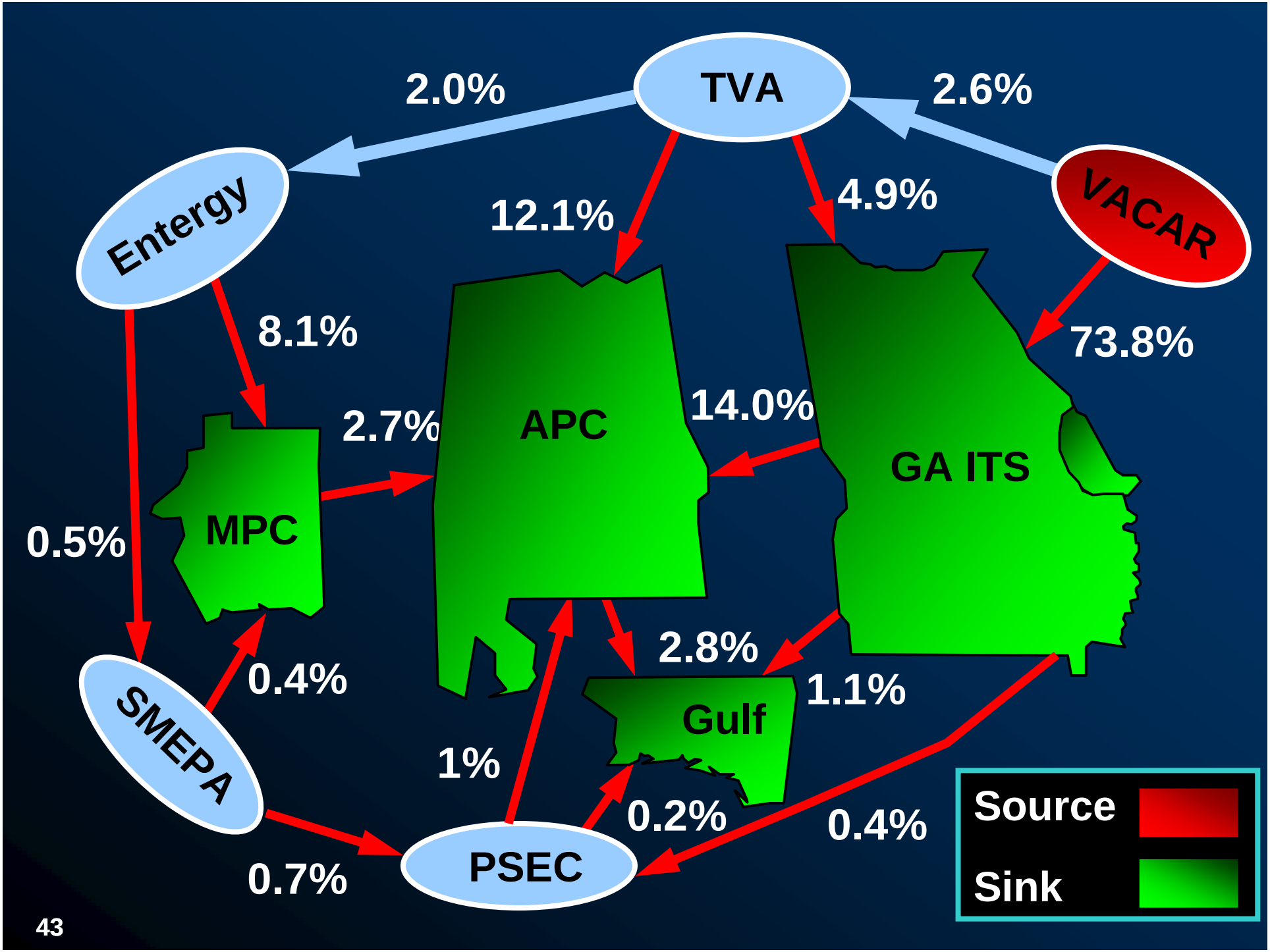
Southeastern Regional TRANSMISSION PLANNING

SCPSA Border to SBA 200 MW

- Transfer Type: Load to Generation
- Source: Uniform Load Reduction in SCPSA
- Sink: Generation within the SBA

Source

Sink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PSEC
Source
Sink

SCPSA Border to SBA
200 MW

Transmission System Impacts

- Thermal Constraints Identified:
  - None

Questions on the SCPSA Border to SBA Transfer?

Duke Border

to

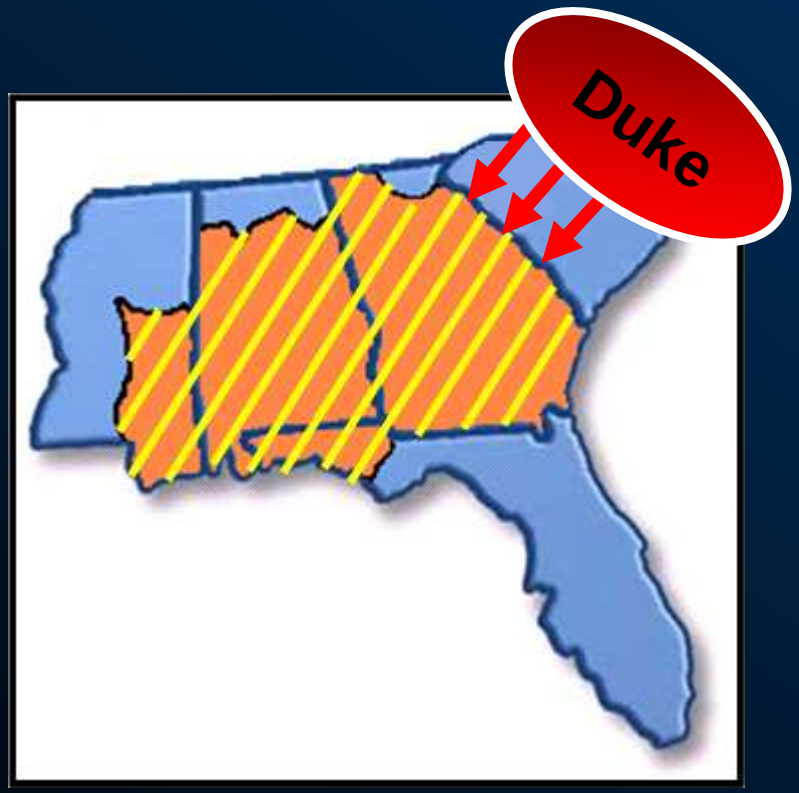
SBA

2000 MW

Southeastern Regional TRANSMISSION PLANNING

Duke Border to SBA 2000 MW

- Transfer Type: Load to Generation
- Source: Uniform Load Reduction in Duke
- Sink: Generation within the SBA



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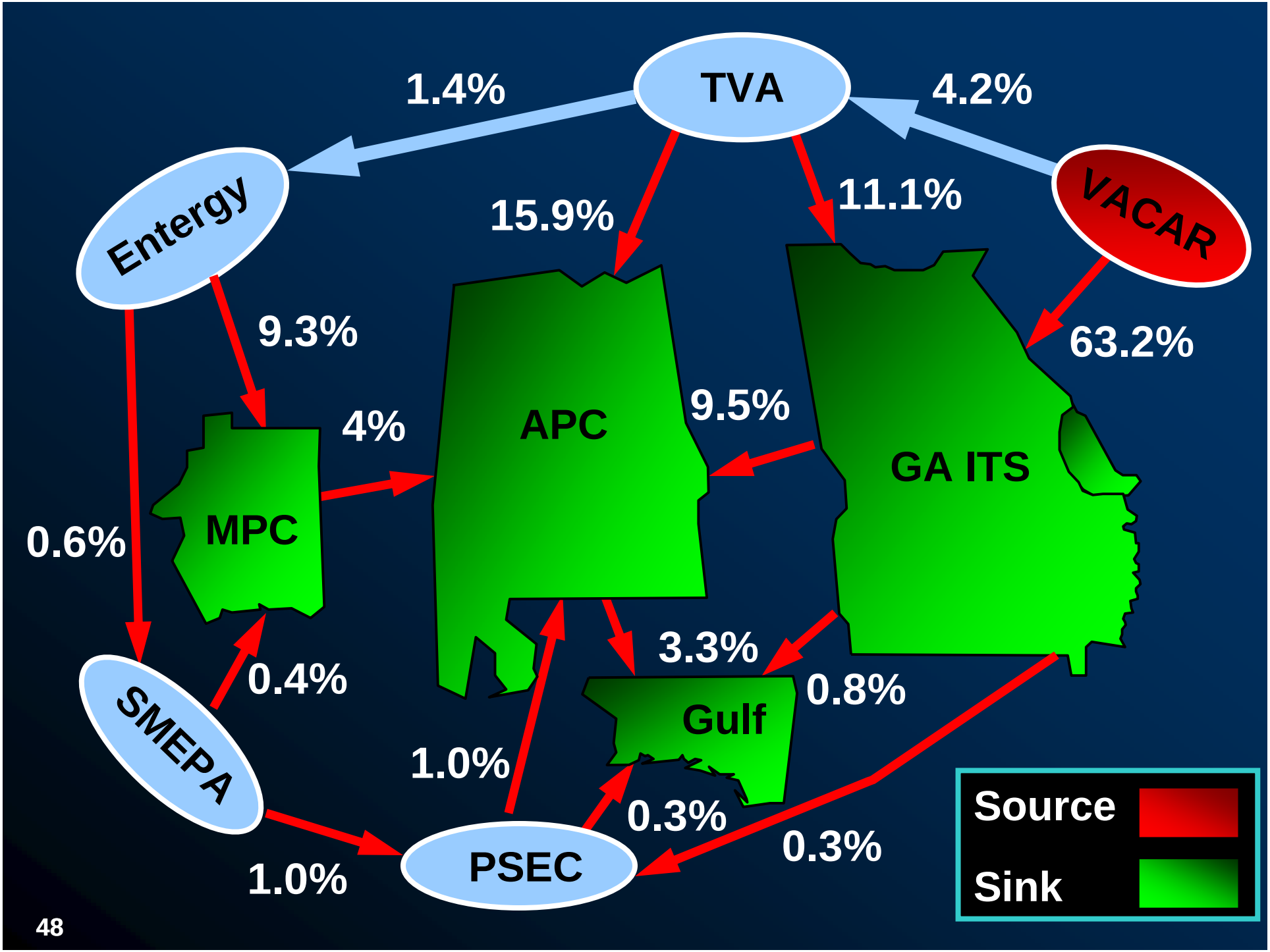
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PSEC
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Source
Sink

Southeastern Regional TRANSMISSION PLANNING

Duke Border to SBA 2000 MW

Transmission System Impacts

- Thermal Constraints Identified:
  - Two (2) 500 kV Lines(1)
  - One (1) 500 / 230 kV Transformer
  - Two (2) 230 / 115 kV Transformers
  - Twelve (12) 230 kV Lines
  - Two (2) 161 / 115 kV Transformers
  - One (1) 161 kV Line
  - Five (5) 115 kV Lines

(1) The limiting elements for these 500 kV Lines are not within the SBA

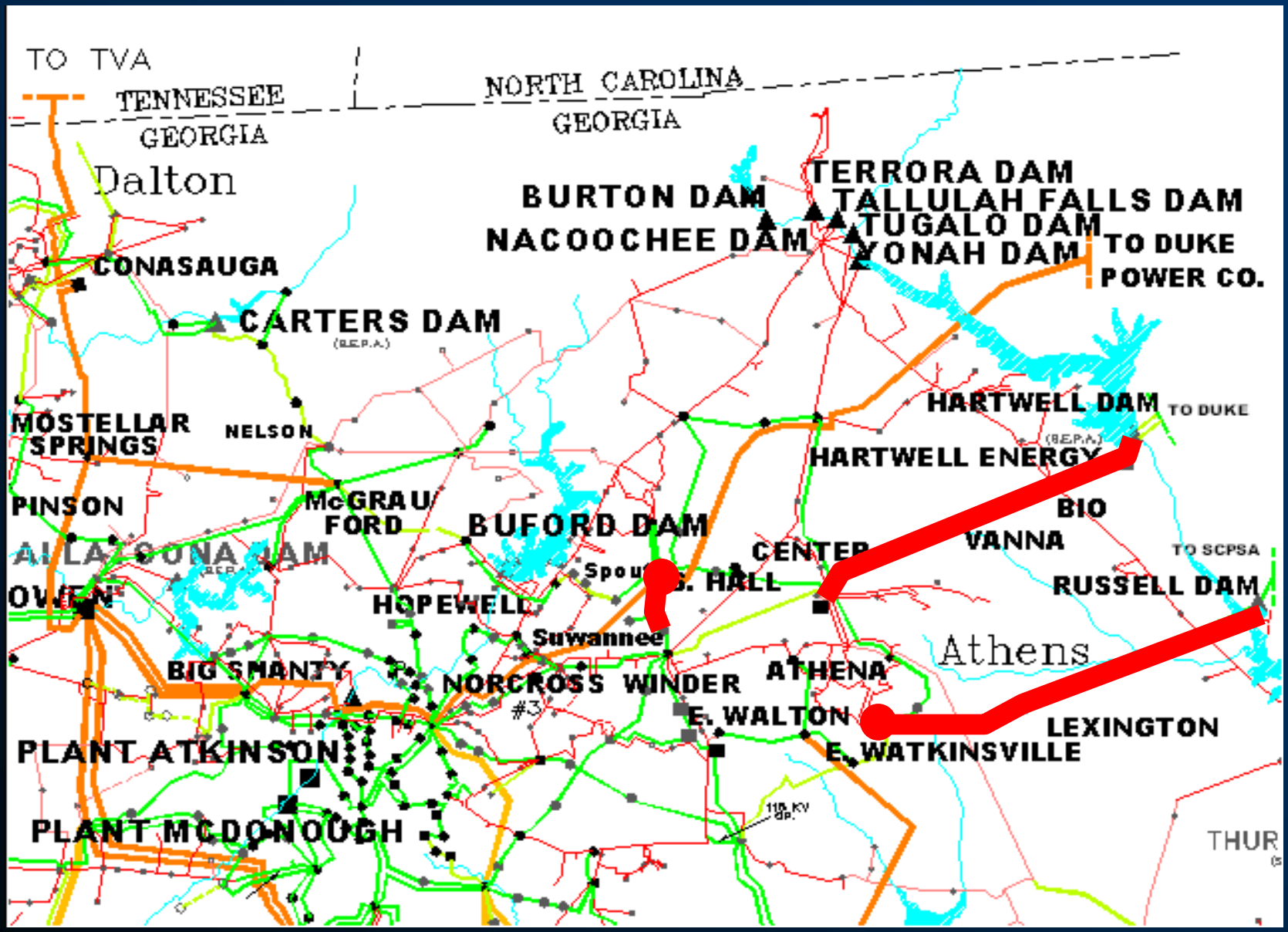
Duke Border to SBA 2000 MW

Significant Constraints – PASS 0

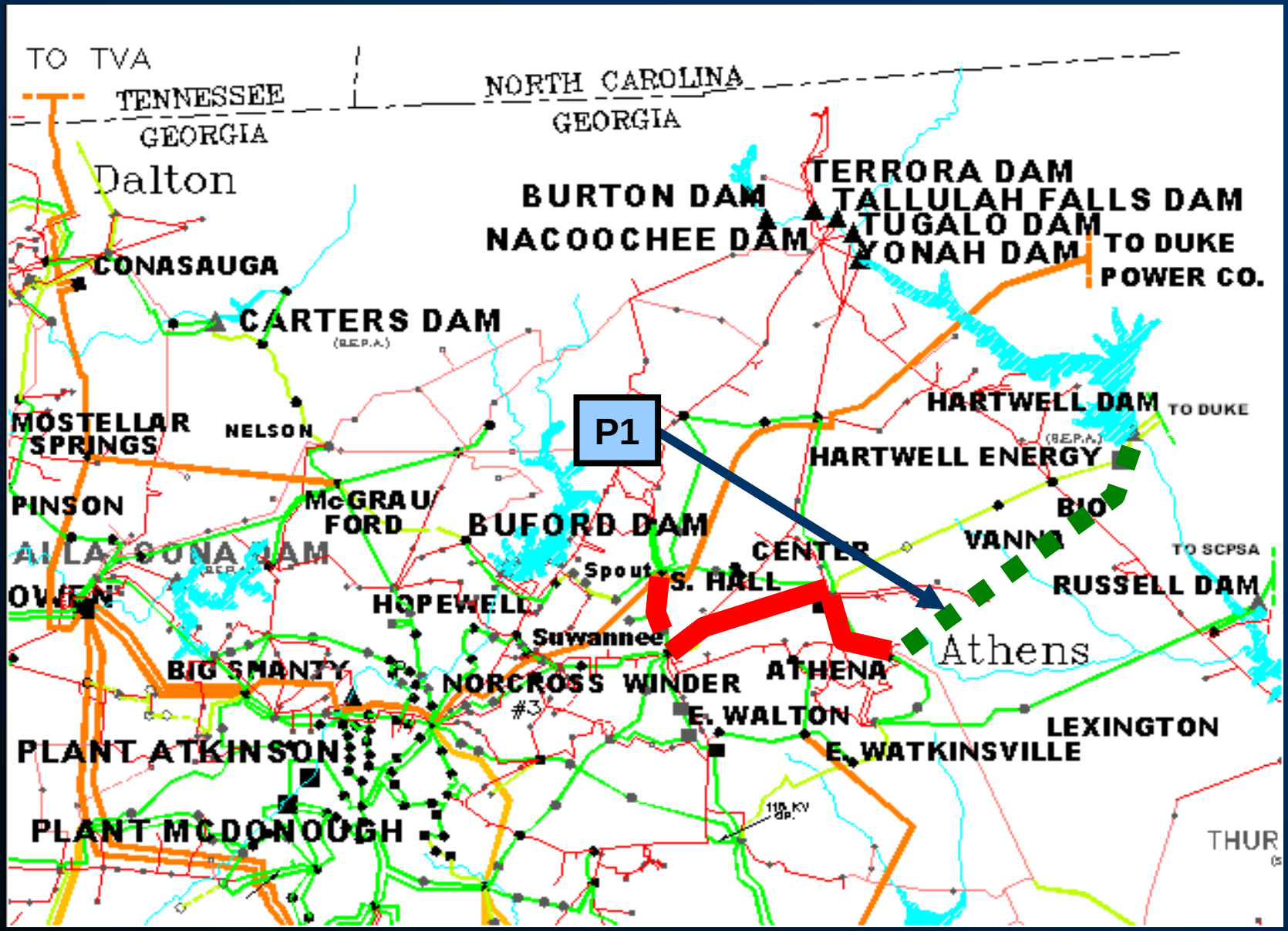
Limiting Elements	Rating (MVA)	Thermal Loading (%)	
		Without Request	With Request
South Hall 500 / 230 kV XFMR	2016	76.9	102.5
Lexington – Russell 230 kV TL	596	94.5	125.6
Lexington – East Watkinsville 230 kV TL	602	90.3	121.0
East Watkinsville 230 / 115 kV XFMR	332	86.6	107.9
Bio – Vanna 230 kV TL	433	92.9	117.2
South Hall – Oconee 500 kV TL(1)	2598	84.2	112.6
Conasauga – Bradley 500 kV TL(2)	2598	92.6	106.7

(1) The limiting element is within DUKE
(2) The limiting element is within TVA

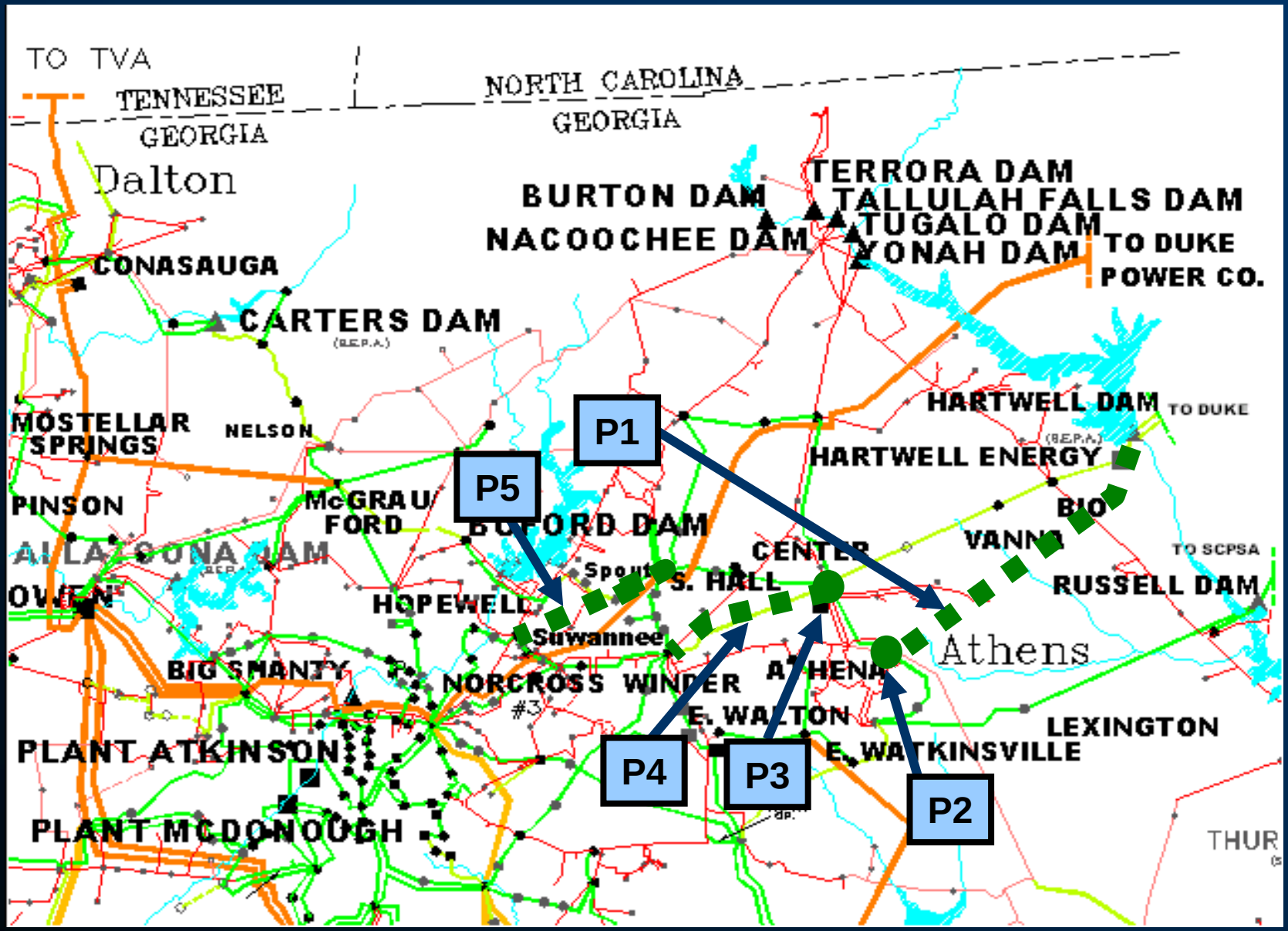
Overloaded Elements



Potential Enhancements



Potential Enhancements

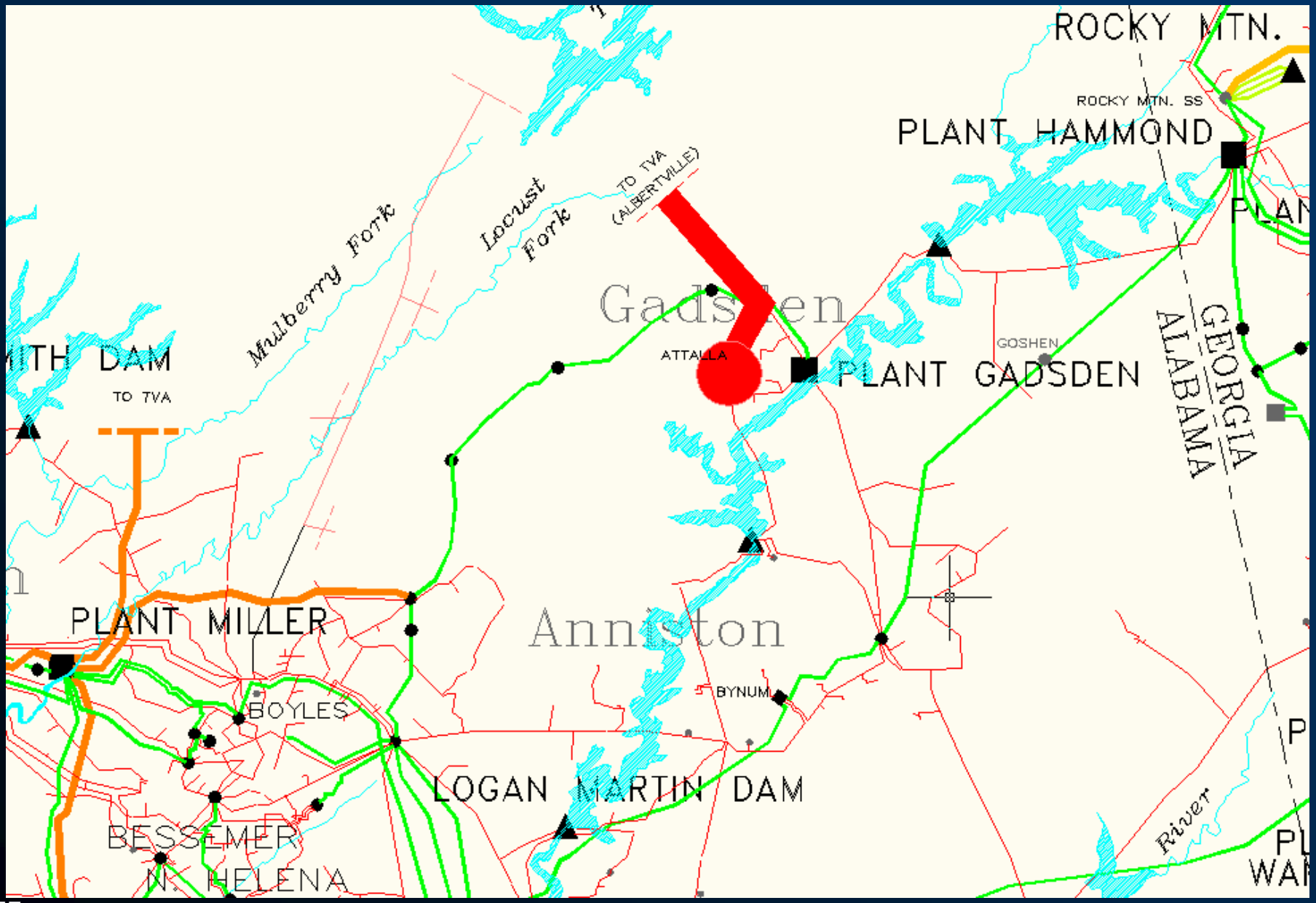


Duke Border to SBA 2000 MW

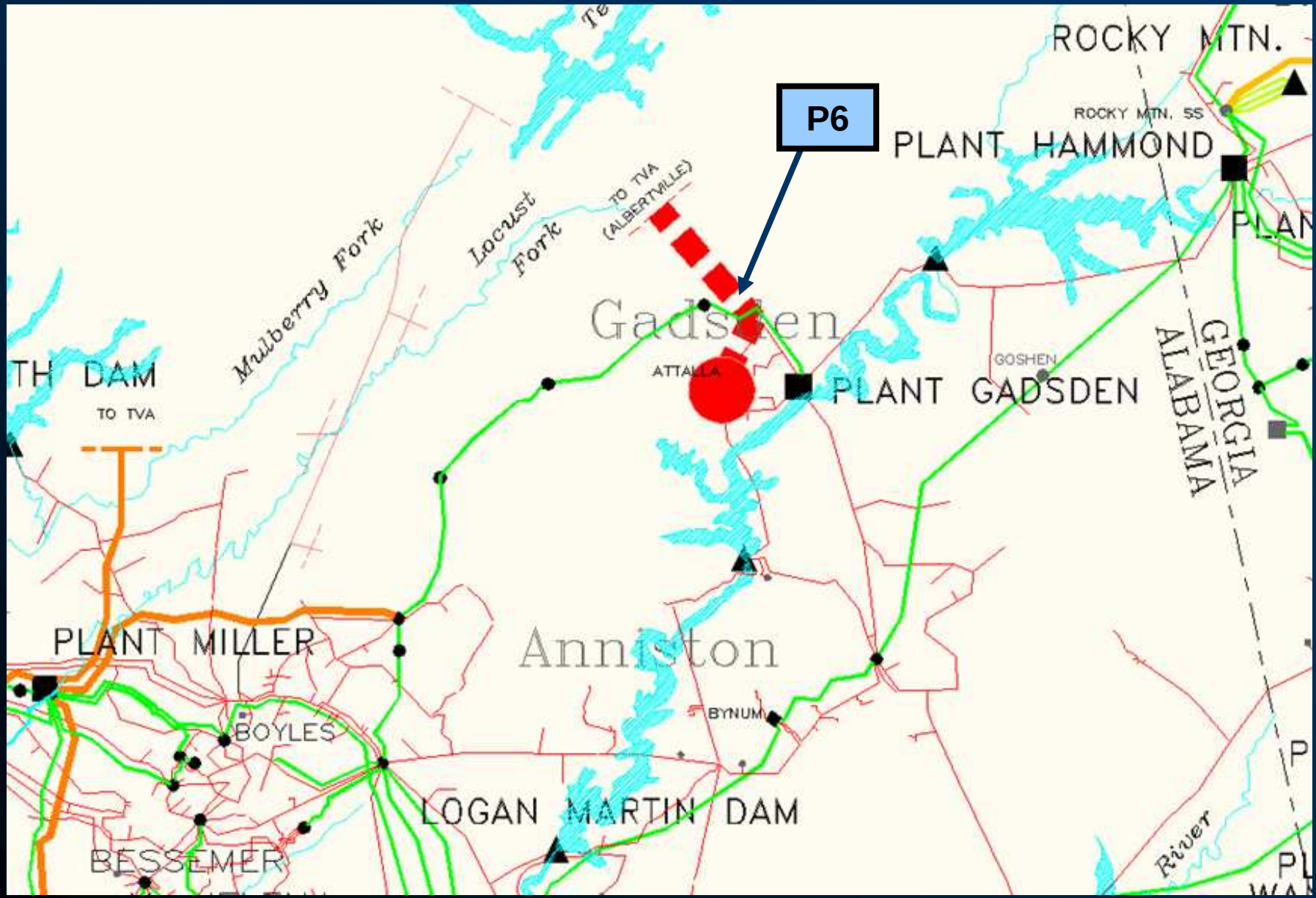
Significant Constraints – PASS 1

Limiting Elements	Rating (MVA)	Thermal Loading (%)	
		Without Request	With Request
Attalla – Albertville 161 kV TL	193	73.4	125.7
Attalla 161 / 115 kV XFMR	99	63.1	119.4
Attalla 161 / 115 kV XFMR	111	75.5	114.9

Overloaded Elements



Potential Enhancements

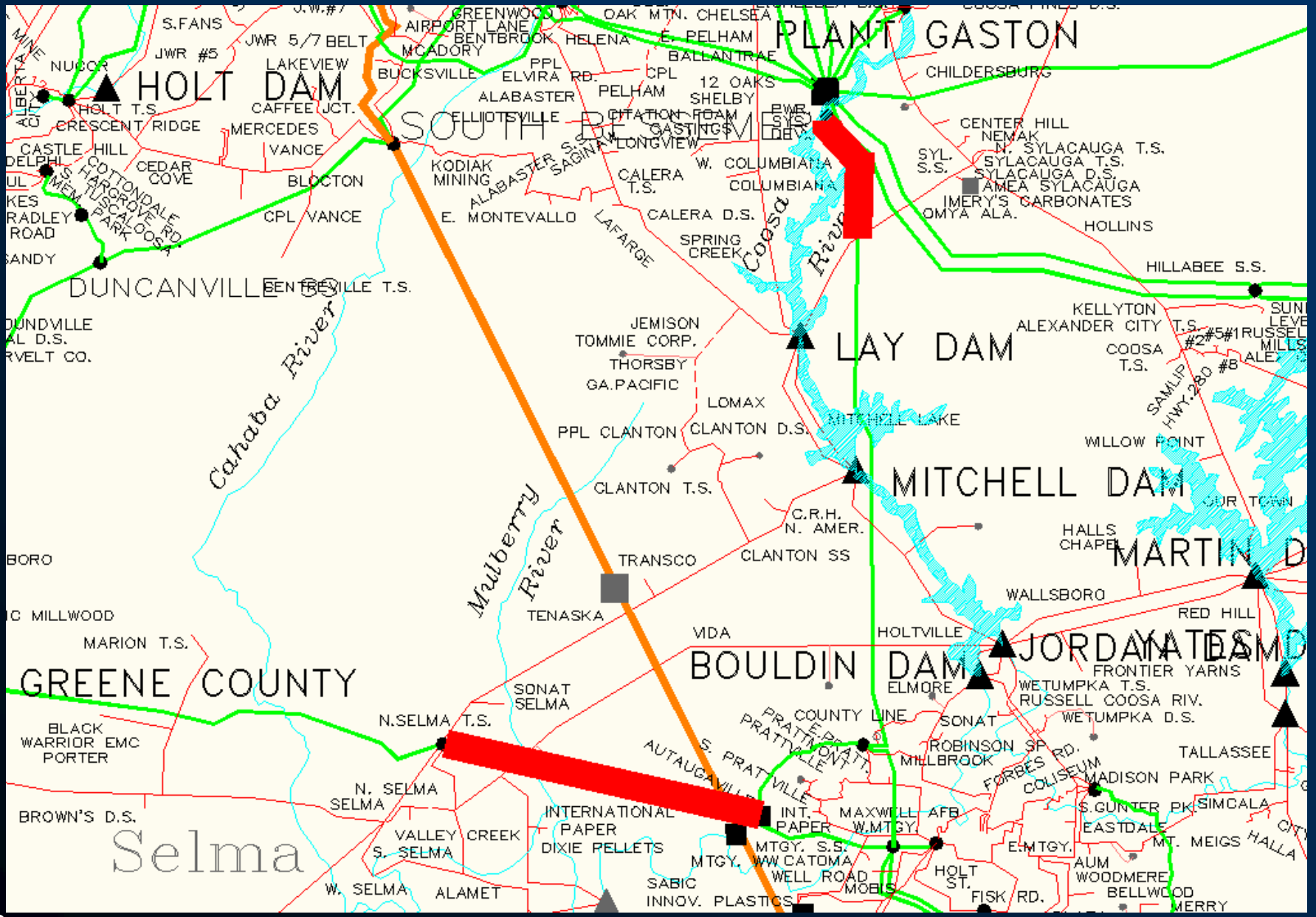


Duke Border to SBA 2000 MW

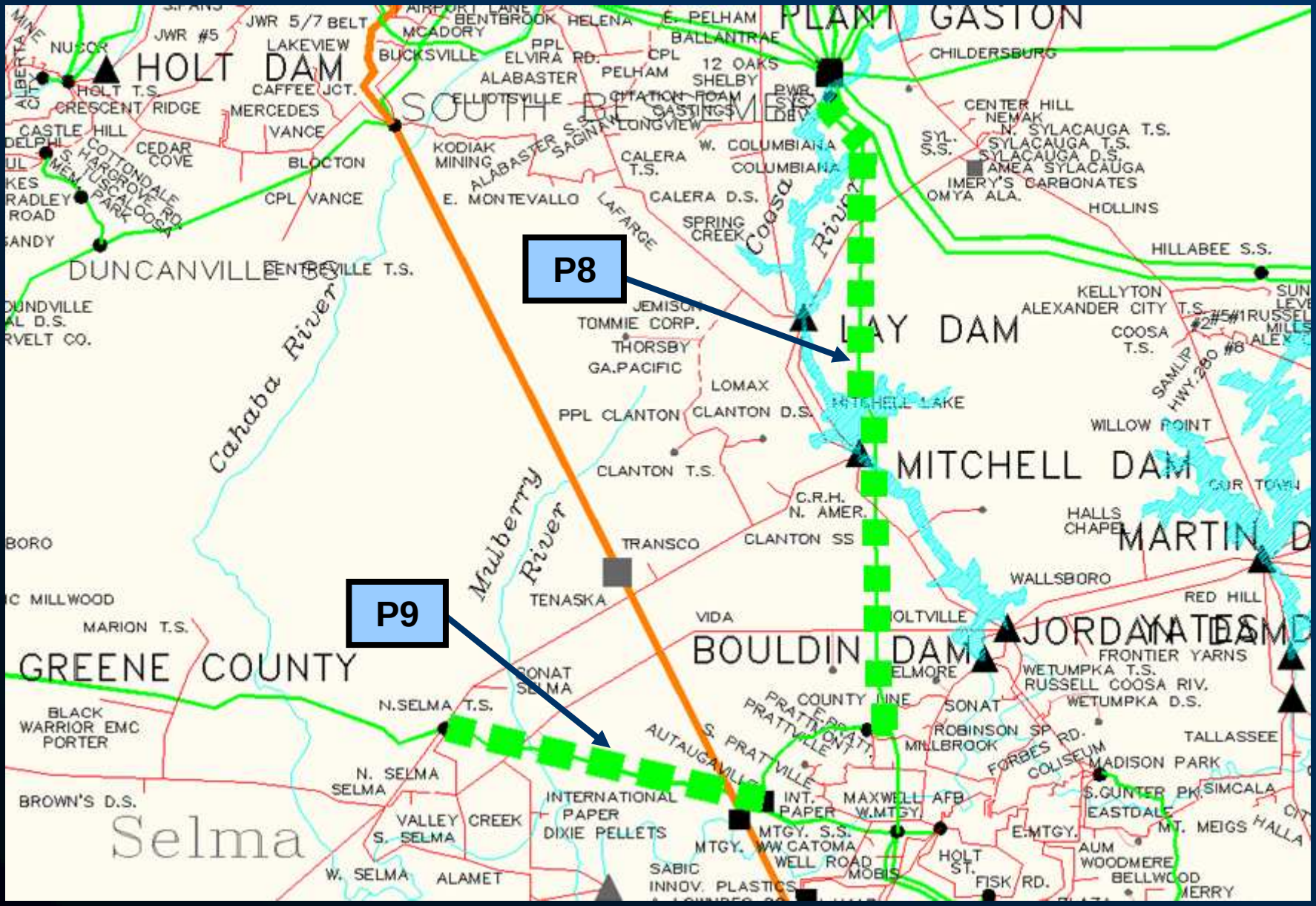
Significant Constraints – PASS 2

Limiting Elements	Rating (MVA)	Thermal Loading (%)	
		Without Request	With Request
North Selma – Autaugaville 230 kV TL	404	78.2	101.5
Power Systems – Fayetteville 230 kV TL	502	96.3	101.4

Overloaded Elements



Potential Enhancements



Southeastern Regional TRANSMISSION PLANNING

Duke Border to SBA 2000 MW

Projects Identified

Item	Proposed Enhancements	Cost ($)
P1	Hartwell Dam – Athena 230 kV TL	$50,128,000(1)
P2	Athena – Center Primary 230 kV TL	$165,000
P3	Center Primary – Clarksboro 230 kV TL	$51,000
P4	Winder Primary – Clarksboro 230 kV TL	$8,930,000
P5	South Hall – Spout 230 kV TL Suwanee – Spout 230 kV TL	$20,113,000
P6	Attalla 161 / 115 kV XFMRs Attalla – Albertville 161 kV TL	$6,600,000(1)
P7	West Brunswick – Thalmann 230 kV TL	$4,337,000
P8	Power Systems – County Line Road 230 kV TL	$37,400,000
-	- Continued -	-

(1) Cost provided is for the portion of the solution located within the participating Transmission Owners' territory

Southeastern Regional TRANSMISSION PLANNING

Duke Border to SBA 2000 MW

Projects Identified

Item	Proposed Enhancements	Cost ($)
-	- Continued -	-
P9	North Selma – Autaugaville 230 kV TL	$6,847,000
P10	Gulf States Steel – Keystone Tap 115 kV TL	$1,486,000
P11	Lawrenceville – Moon Road 115 kV TL	$1,382,000
P12	Celanese – Metal Container 115 kV TL	$765,000

Total Cost (2016$) = $138,204,000

Questions on the Duke Border to SBA Transfer?

Southeastern Regional
TRANSMISSION PLANNING

North Georgia to Mississippi 600 MW

Southeastern Regional TRANSMISSION PLANNING

North Georgia to Mississippi 600 MW

- Transfer Type: Generation to Generation
- Source: Murray County 500 kV
- Sink: Generation within Mississippi
  - SMEPA – 126 MW, MPC – 474 MW

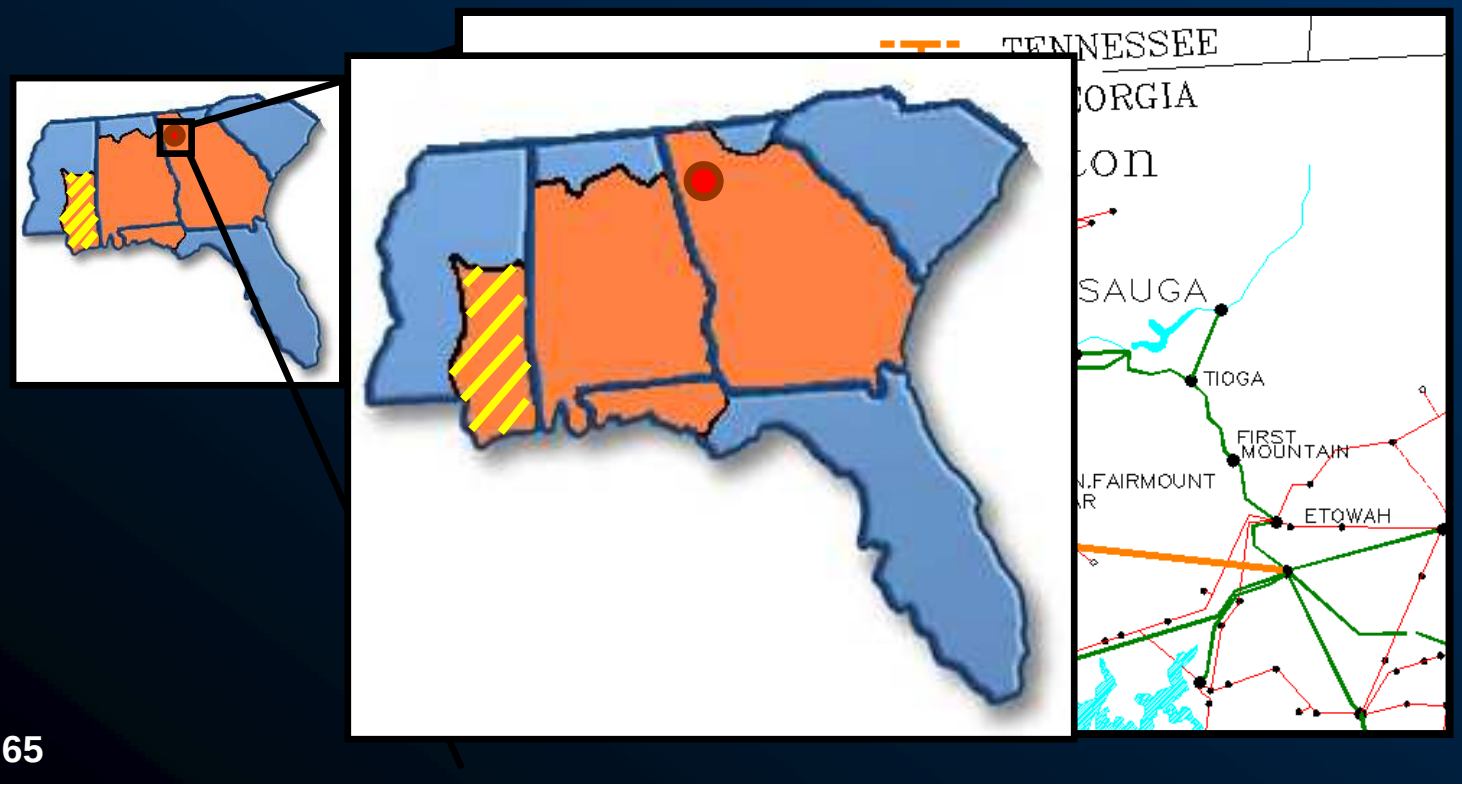
Source

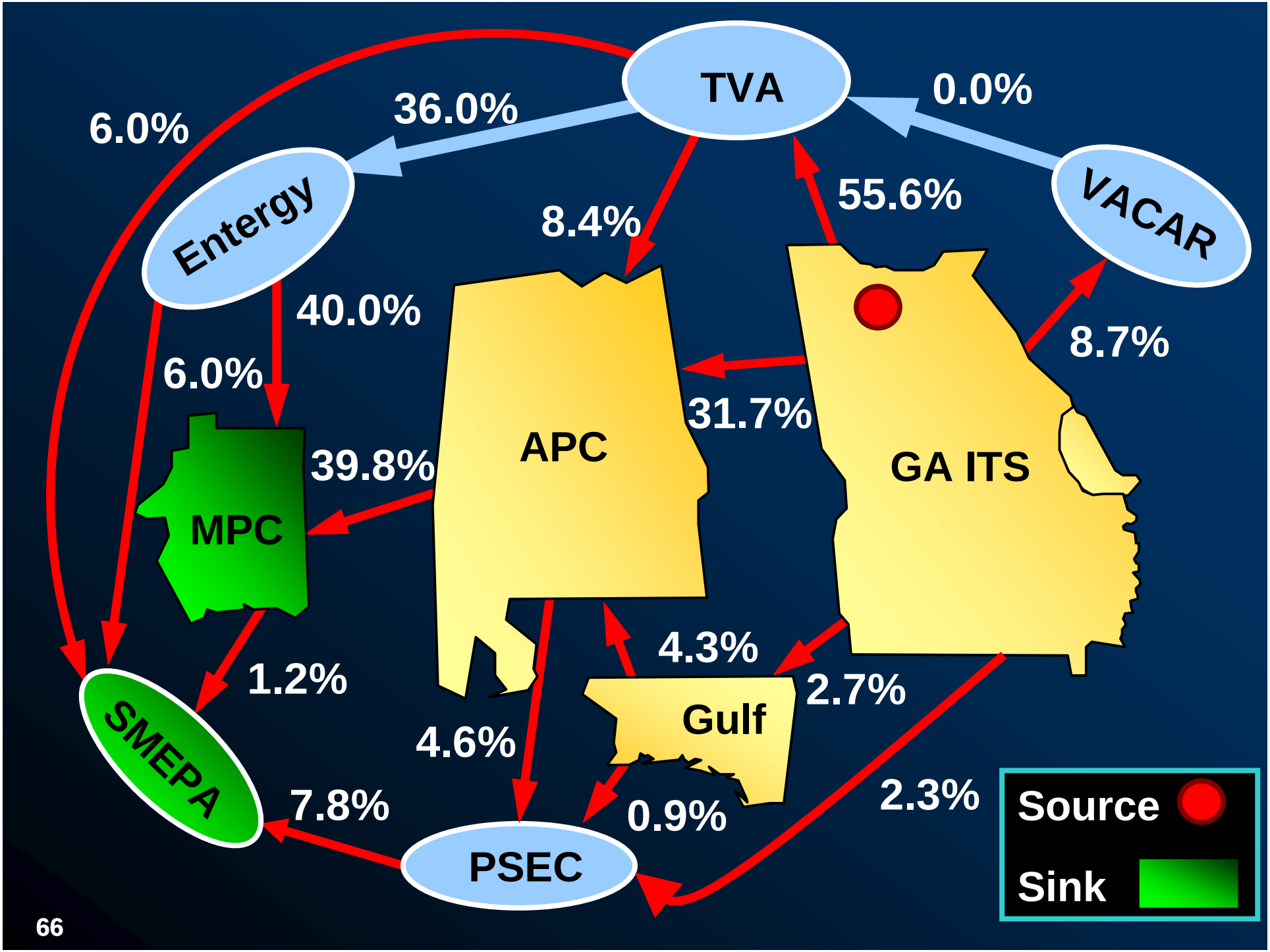
Sink

Southeastern Regional TRANSMISSION PLANNING

North Georgia to Mississippi 600 MW

- Transfer Type: Generation to Generation
- Source: Murray County 500 kV
- Sink: Generation within Mississippi
  - SMEPA – 126 MW, MPC – 474 MW



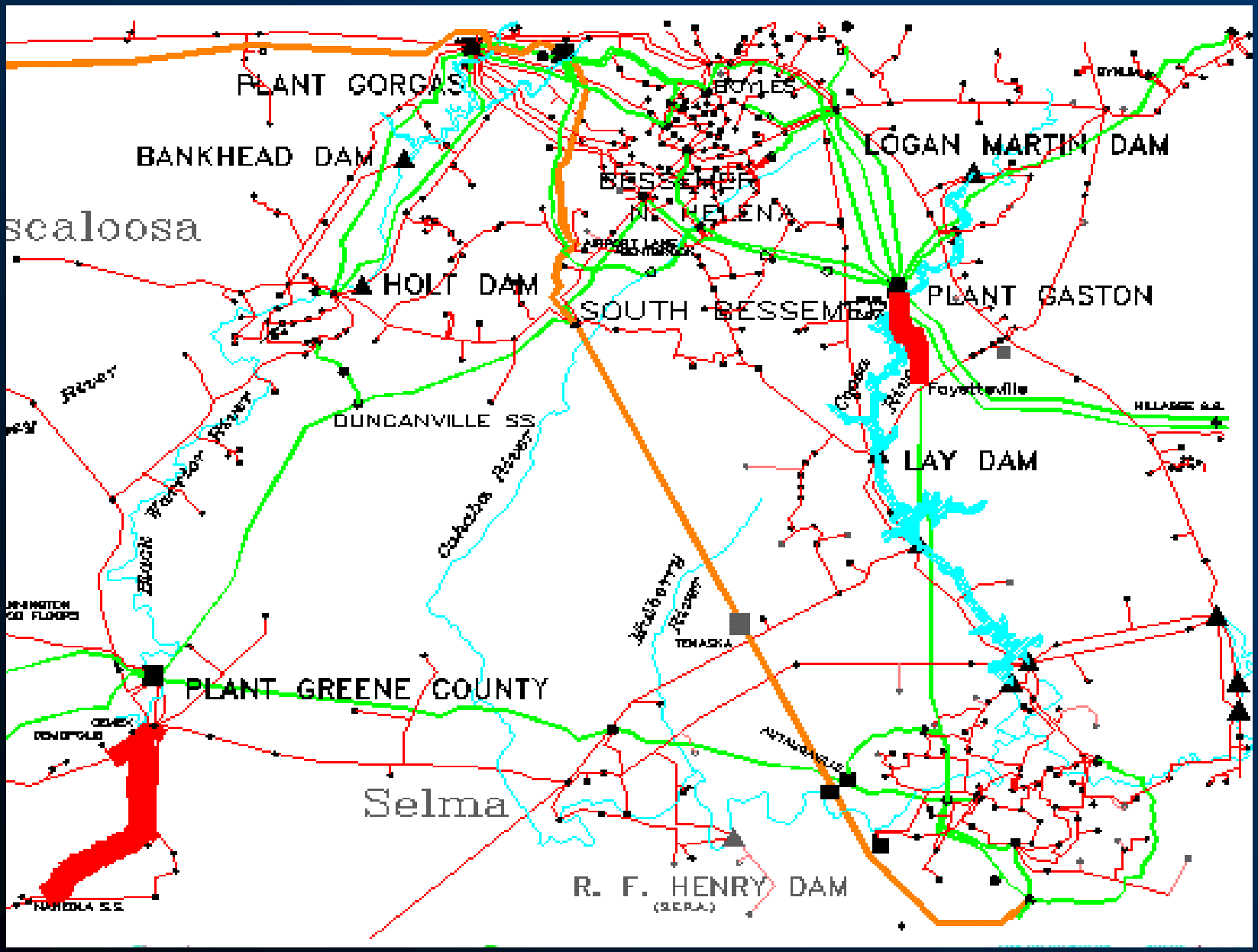

TVA
Entergy
VACAR
APC
GA ITS
MPC
SMEPA
Gulf
PSEC
6.0%
36.0%
0.0%
8.4%
55.6%
40.0%
8.7%
6.0%
31.7%
39.8%
1.2%
4.3%
2.7%
4.6%
7.8%
0.9%
2.3%
Source
Sink

North Georgia to Mississippi 600 MW

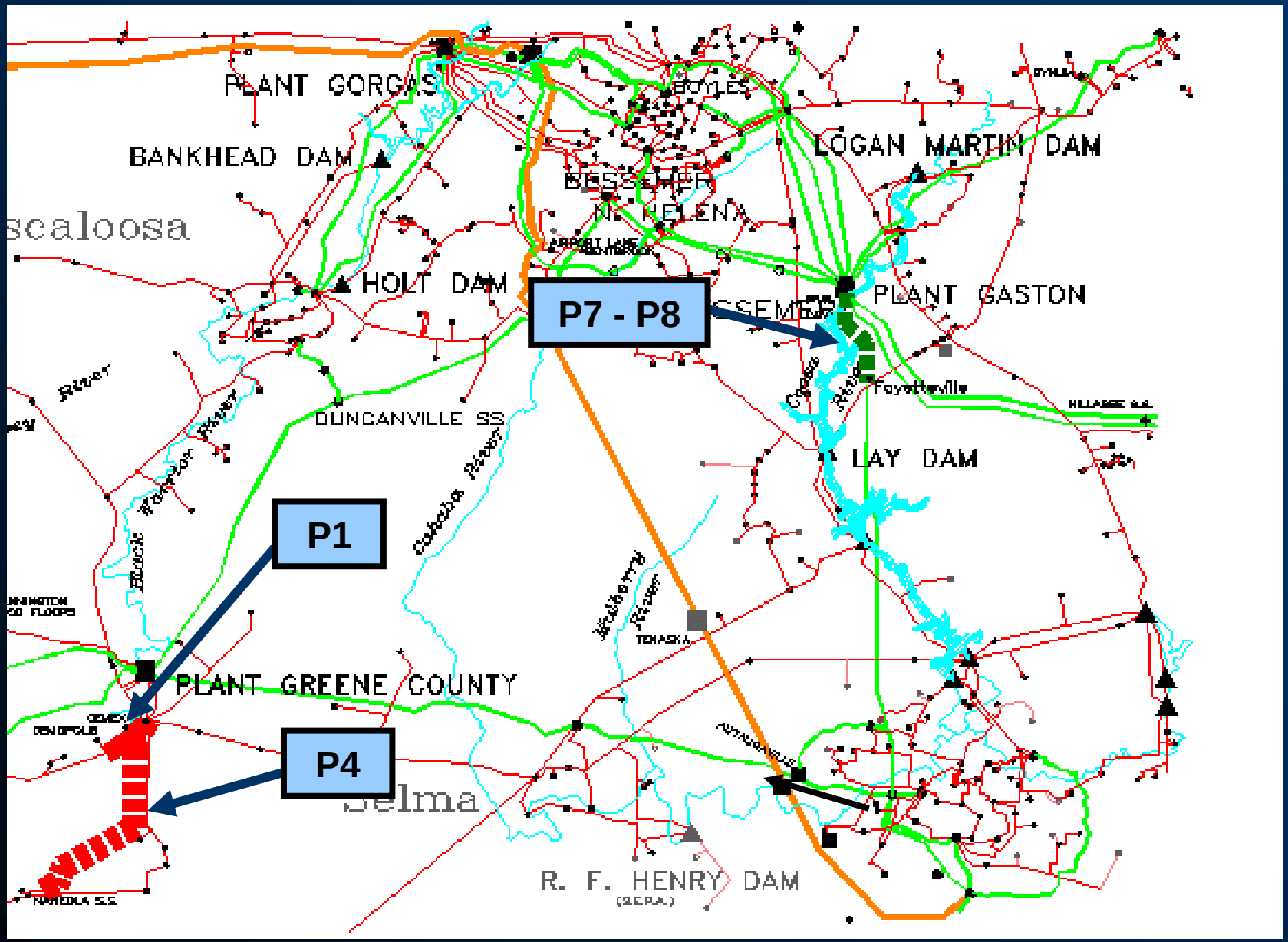
Significant Constraints – PASS 0

Limiting Elements	Rating (MVA)	Thermal Loading (%)	
		Without Request	With Request
Gaston – Power Systems 230 kV TL	497	97.8	102.6
Power Systems – Fayetteville 230 kV TL	502	96.6	101.1
Demopolis – Naheola SS 115 kV TL	112	92.0	100.3

Overloaded Elements



Potential Enhancements



Southeastern Regional TRANSMISSION PLANNING

North Georgia to Mississippi 600 MW

Projects Identified

Item	Proposed Enhancements	Cost ($)
P1	Demopolis – CEMEX 115 kV TL	$304,000
P2	Livingston – Mannington 115 kV TL	$2,366,000
P3	Willingham Drive – East Point 115 kV TL	$2,400,000
P4	Demopolis TS – Naheola SS 115 kV TL	$6,564,000
P5	Airport Lane – Bentbrook Tap 115 kV TL	$148,000
P6	North Brewton TS – North Brewton DS 115 kV TL	$6,409,000
P7	Power Systems – Fayetteville 230 kV TL	$9,278,000
P8	Gaston – Power Systems 230 kV TL	$300,000
P9	GKN Westland Aerospace – Halla Climate Control 115 kV TL	$1,100,000

Total Cost (2016$) = $28,869,000

Questions on the North Georgia to Mississippi Transfer?

Questions?

Southern / FRCC Interface Update

❖Southern / FRCC Interface

- Total Transfer Capability

TTC (MW)				
Season	SoCo to FL	Change (MW)	FL to SoCo	Change (MW)
2011 Summer	3700	+ 100	900	- 100
2011 / 2012 Winter	3800	0	1900	+ 100

2009 – 2010 SIRPP Economic Studies Update

Southeastern Regional TRANSMISSION PLANNING

2009 – 2010 SIRPP

Five Economic Planning Studies

- Entergy to Georgia ITS (2000 MW)
  - Study Year: 2014
  - Step 2 Evaluation

  Total Cost: $330,246,000
- MISO to TVA (2000 MW)
  - Study Year: 2015

  Total Cost: $53,720,000
- Kentucky to Georgia ITS (1000 MW)
  - Study Year: 2015

  Total Cost: $18,700,000
- SPP to SIRPP via HVDC (3000 MW)
  - Study Year: 2018

  Total Cost: $124,906,000
- MISO & PJM West (SMART) to SIRPP (3000 MW)
  - Study Year: 2018

  Total Cost: $252,904,000

Southeastern Regional TRANSMISSION PLANNING

2009 – 2010 SIRPP Update

- More detailed information concerning these studies is available on the Southeast Inter-Regional Participation Process website at the following link:
  - http://www.southeastirpp.com/

2010 – 2011 SIRPP Update

1st Stakeholder Meeting

- October 25th, 2010 in Charlotte, NC
- Five Economic Planning Studies
  - HVDC Injection in Duke to VACAR (2016)
    - 3000 MW
  - SCRTP to PJM West (2016)
    - 1000 MW
  - SCRTP to TVA (2016)
    - 1000 MW
  - PJM West to VACAR (2016)
    - 1000 MW
  - Progress Energy Carolinas to the Southeast (2020)
    - 2000 MW

Upcoming 2011 SERTP Process

- 1st "RPSG" Meeting
  - March 2011
  - Select Five Economic Planning Studies
- Preliminary Expansion Plan Meeting
  - June 2011
  - Preliminary 10 Year Expansion Plan
- 2nd "RPSG" Meeting
  - September 2011
  - Preliminary Economic Planning Study Results
- Annual Transmission Planning Summit
  - December 2011
  - Final 10 Year Expansion Plan
  - Final Economic Planning Study Results

Southeastern Regional TRANSMISSION PLANNING

Upcoming 2011 SERTP

- Next Meeting Activities
  - 2011 SERTP 1st Quarter Meeting
    - Location: TBD
    - Date: March 2011
    - Purpose:
      - Form the "RPSG"
      - Interactive training on development of 10 year expansion plan
      - Select five economic planning studies

Questions?