TAG Meeting
December 10, 2012

ElectriCities Office

Raleigh, NC

TAG Meeting Agenda

1. Administrative Items – Rich Wodyka
2. FERC Order 1000 Report – Sam Waters
3. NCTPC Study Overview – Orvane Piper
4. 2012 – 2022 Collaborative Plan DRAFT Report Study Results – Orvane Piper and Mark Byrd
5. 2013 Study Scope – Denise Roeder
6. Regional Studies Update – Bob Pierce
7. 2012 and 2013 TAG Work Plans – Rich Wodyka
8. TAG Open Forum – Rich Wodyka

FERC Order No. 1000 Rule on Transmission Planning and Cost Allocation Compliance Update

Sam Waters – Duke Energy

on behalf of the North Carolina Transmission Planning Collaborative

Regional Compliance Update

- Duke Energy Carolinas and Progress Energy Carolinas submitted the regional compliance filing on October 11, 2012.
- Comments/Protests have been received from the following:
  - NCUC and Public Staff
  - NCEMC
  - LS Power
- Submitted motion to FERC to allow 45 days to submit responses to comments (extend to January 10, 2013)

Regional Compliance Update

Salient points in regional filing:

- Public policy driven by IRP, with stakeholder process to add potential drivers
- Regional project defined (230 kV, $10 million, multiple service providers, materially different, eligible for cost allocation)
- Regional project developer qualifications identified (financial strength, construction, operating and legal/regulatory experience)
- Screening process and planning timeline
- Merchant transmission developer entry into the planning process identified
- Cost allocation based on avoided transmission costs with 1.25 benefit/cost ratio

Interregional Compliance Update

- Compliance filing due on April 11, 2013
- Interregional discussions have been initiated
- Initial thoughts on inter-regional compliance follow

Straw Proposal – Interregional Coordination

- Planning coordination occurs through joint working groups.
- Stakeholder input via existing regional stakeholder groups (no new stakeholder groups).
- Interregional processes established in transmission tariffs or joint agreements.
- Commonality among multiple seams, to the extent possible.

Straw Proposal – Interregional Data Exchange

- Integrated with existing planning cycles to the extent possible.
  - Make data available to other regions on same cycle as available to stakeholders.

- Need to determine which data must be “pushed” to neighboring region versus made available on request to ensure compliance.

Straw Proposal – Interregional Joint Evaluation

- Need clear definition of interregional projects.
- Need process for coordination of review of interregional projects such that they can be considered by affected regions in their processes.

Straw Proposal – Interregional Cost Allocation

- Cost allocation between regions based on avoided transmission cost (benefits).
- Region may allocate its share of project costs as appropriate to its own methodology.

Questions ?

NCTPC 2012 Study Overview

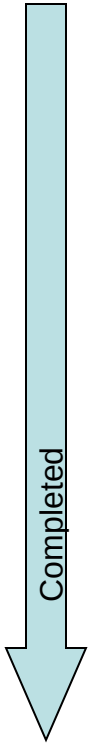
Orvane Piper

Duke Energy

Purpose of Study

- **Assess Duke and Progress transmission systems' reliability and develop a single Collaborative Transmission Plan**

Steps and Status of the Study Process



1. Assumptions Selected
2. Study Criteria Established
3. Study Methodologies Selected
4. Models and Cases Developed
5. Technical Analysis Performed
6. Problems Identified and Solutions Developed
7. Collaborative Plan Projects Selected
8. Study Report Prepared

Study Assumptions Selected

- **Study Years for reliability analyses:**
  - **Near-term: 2017 Summer, 2017/2018 Winter**
  - **Longer-term: 2022 Summer**
- **LSEs provided:**
  - **Input for load forecasts and resource supply assumptions**
  - **Dispatch order for their resources**
- **Interchange coordinated between Participants and neighboring systems**

Study Criteria Established

- **NERC Reliability Standards**
  - **Current standards for base study screening**
  - **Current SERC Requirements**
- **Individual company criteria**

Study Methodologies Selected

- **Thermal Power Flow Analysis**
- **Each system (Duke and Progress) will be tested for impact of other system's contingencies**

Base Case Models Developed

- Started with 2011 series MMWG cases
- Detailed models for Duke and Progress systems
- Adjustments were made based on additional coordination with neighboring transmission systems (i.e. updated PJM dispatch)
- Planned transmission additions from updated 2011 Plan and merger projects were included in models

Resource Supply Options Selected

- **Hypothetical new base load generation**
- **Off-shore wind**

Hypothetical New Generation

- **Davidson County**
- **500 MW Base Load**
- **Sink/Source in Duke**

Offshore Wind Study Scenarios

Location	Scenario #1	Scenario #2	Scenario #3
	MWs by Injection Point		
PJM / Dominion Landstown	1,000	2,000	4,500
NCTPC / Morehead City	1,000	1,500	3,500
NCTPC / Southport	1,000	1,500	2,000
TOTAL MWs Injected	**3,000**	**5,000**	**10,000**
	MWs by Sink Location		
PJM	0	2,000	6,000
NCTPC (40% PEC / 60% Duke)	3,000	3,000	4,000

These MW levels are assumed to occur during the off-peak period.
On-peak MW assumptions are approximately 40% of these values.

Technical Analysis

- Conduct thermal screenings of the 2017 and 2022 base cases
- Conduct thermal screenings of the 2022 Hypothetical New Generation Scenarios
- Conduct thermal screenings of the 2027 Offshore Wind Study

Problems Identified and Solutions Developed

- Identify limitations and develop potential alternative solutions for further testing and evaluation
- Estimate project costs and schedule

Collaborative Plan Projects Selected

- Compare all alternatives and select preferred solutions

Study Report Prepared

- Prepare draft report and distribute to TAG for review and comment

Questions ?

2012-2022 Collaborative Plan Draft Report Study Results

Orvane Piper

Duke Energy

Base Case Results – Duke Energy

- **No new issues identified in Duke Energy Carolinas**

Base Case Results – Progress Energy

2017 and 2022 Summer

- **Contingency overload issue was found on the Weatherspoon - Raeford 115 kV Line in 2018**

- **An alternate solution to the Arabia 2020 project was identified in the Raeford 2018 replacement project that mitigates both the above line and original transformer overload issues**

Base Case Results – Progress Energy

2017-18 Winter

- No new Issues identified in Progress Energy Western Area

Major Projects in 2012 Plan		
Reliability Project	**TO**	**Planned I/S Date**
Asheville-Enka 230 kV line, Convert 115 kV line; & Asheville-Enka 115 kV, Build new line	Progress	In-Service In-Service
Brunswick 1-Castle Hayne 230kV Line, Construct New Cape Fear River Crossing	Progress	December 2012
Jacksonville Static VAR Compensator	Progress	June 2013
Folkstone 230/115kV Substation	Progress	December 2012
Harris-RTP 230 kV line	Progress	June 2014

Major Projects in 2012 Plan (Continued)		
Reliability Project	**TO**	**Planned I/S Date**
Brunswick 1 - Jacksonville 230 kV Line Loop - in to Folkstone 230 kV substation	Progress	June 2020
Greenville-Kinston Dupont 230 kV line	Progress	June 2014
Arabia 230 kV substation	Progress	**Removed**
Raeford 230 kV substation, Loop-In Richmond – Ft Bragg Woodruff St 230 kV Line and replace banks	Progress	**June 2018**
Durham-RTP 230kV Line, Reconductor	Progress	June 2022

Major Projects in 2012 Plan (Continued)		
Reliability Project	**TO**	**Planned I/S Date**
Reconductor Caesar 230 kV Lines (Pisgah Tie-Shiloh Switching Station)	Duke	December 2013
Reconductor London Creek 230 kV Lines (Peach Valley Tie-Riverview Switching Station)	Duke	June 2017

Comparison to Previous Collaborative Transmission Plan

	2011 Plan	2012 Plan
Number of projects with an estimated cost of $10 million or more each	11	11
Total estimated cost of Plan	$296 M	$318 M

TAG Input Request

- **TAG is requested to provide input to the OSC on the 2012 – 2022 Collaborative Plan DRAFT Report, as well as to propose alternative solutions to those study results identified**
- **Provide input by January 4, 2013 to Rich Wodyka - ITP (rawodyka@aol.com)**

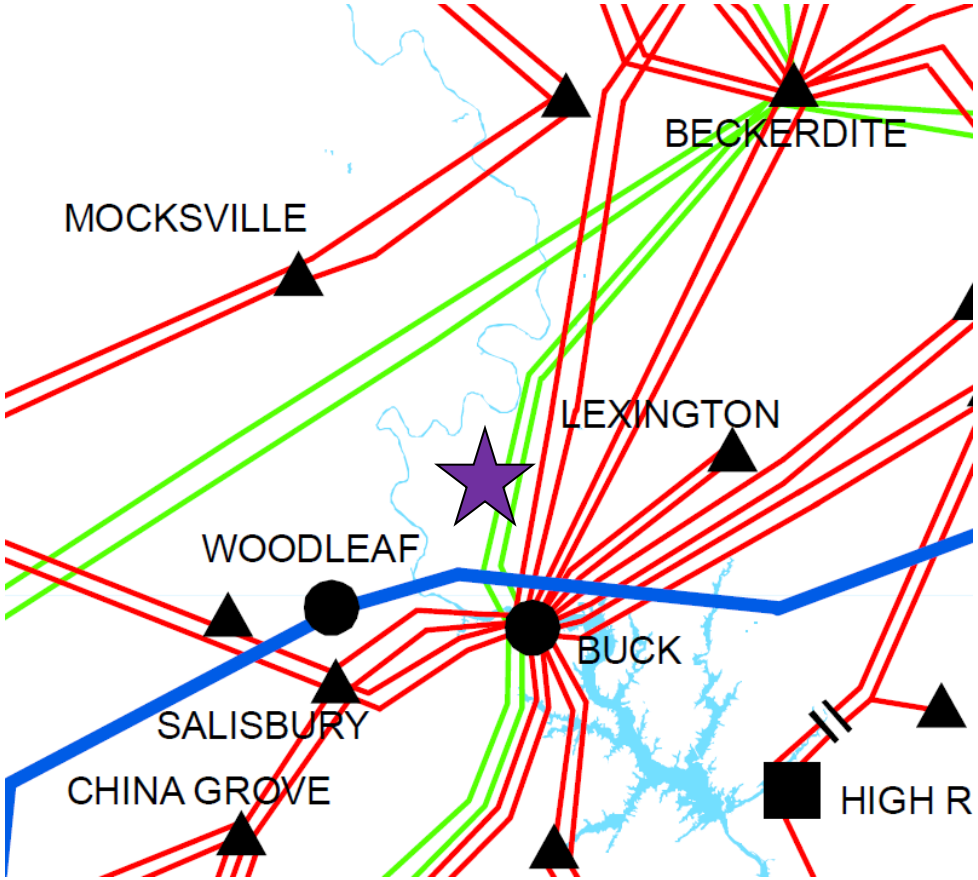
Questions ?

Hypothetical New Generation Scenario – Davidson County Results Review

Orvane Piper

Duke Energy

Davidson County 500 MW Resource



- **Hypothetical New Generation in 2022**
- **5 miles north of Buck Steam Station**
- **Sink/Source in Duke**

Davidson County 500 MW Resource

- **Progress**
  - No previously unidentified issues
- **Duke**
  - Rebuild two (2) 100 kV bus lines between Buck Steam and Buck Tie, 2022
  - Two (2) Additional 230/100 kV transformers at Buck, 2022

Questions ?

Hypothetical New Generation Scenario - NC Offshore Wind Results Review

Mark Byrd

Progress Energy

Scope of 2012 Joint Wind Study

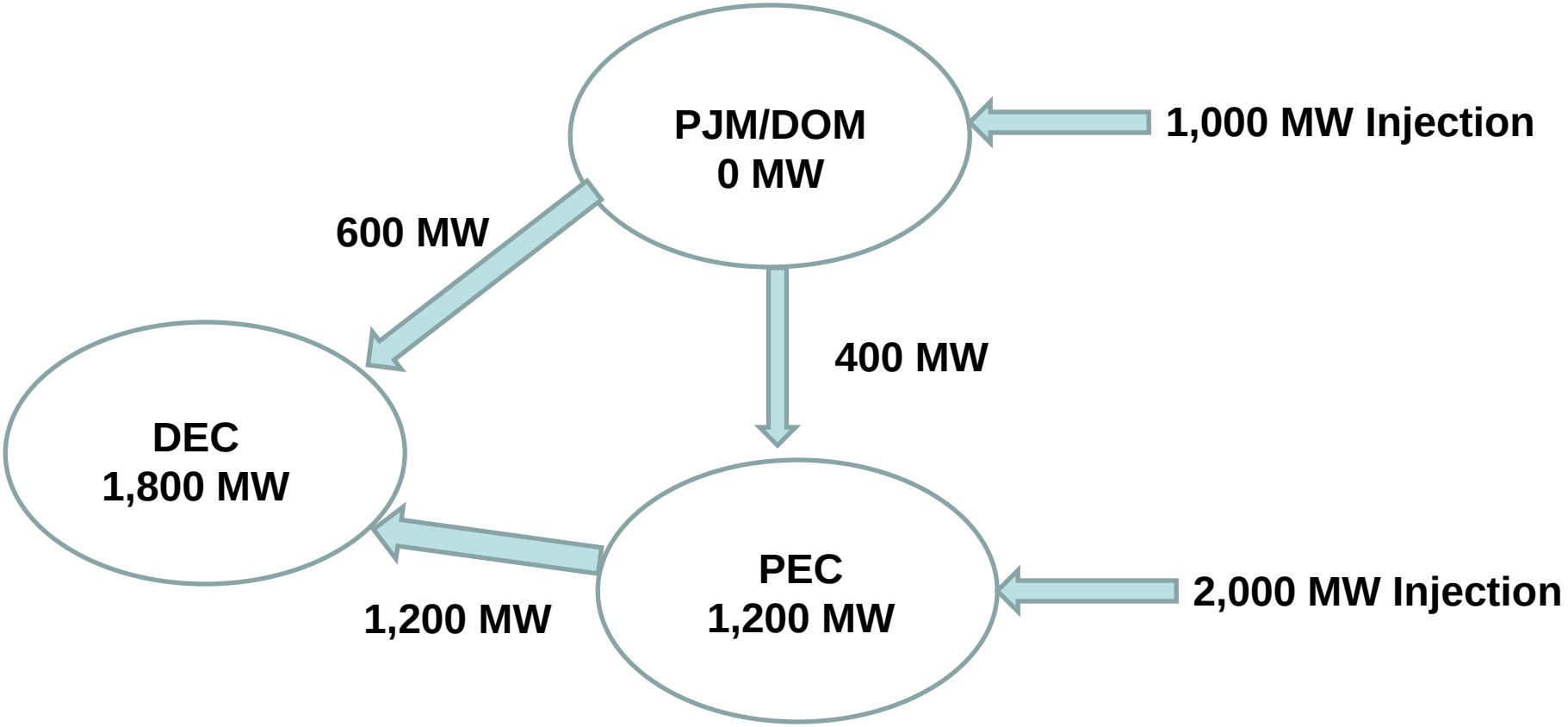
- Year 2027 summer cases used for the Wind Generation Scenarios located off the North Carolina / Virginia coast
- Three off-shore injection points studied
  - Dominion's Landstown 230 kV Substation
  - PEC's Morehead City area
  - PEC's Southport area
- The load level of each study area was set to 60% of 2027 summer forecasted peak levels

Wind Study Methodology

- The 2027 off-peak case was screened for base thermal overloads and voltage violations
- The PEC system included transmission upgrades from prior NCTPC wind studies already incorporated
- A thermal N-1 analysis was conducted to test the post-contingency reliability of the network
- Solutions were determined, modeled in the scenario case, and then verified to ensure the solutions were effective

2027 Summer
60% of Peak Case

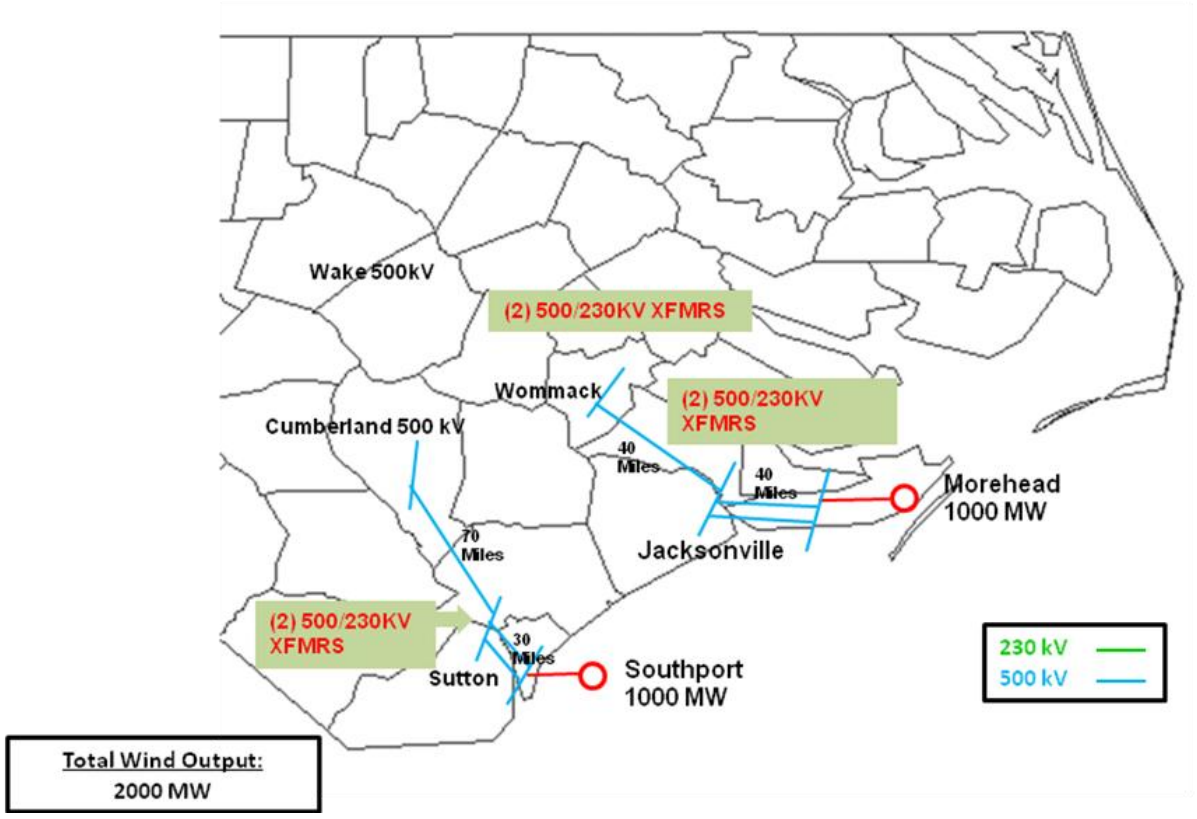
Scenario #1



Summary of Scenario 1 Wind Injection and Area Transfers

Scenario 1 – Wind Generation	PJM – Load Sink	DEC – Load Sink	PEC – Load Sink
PJM – 1,000 MW injection at Landstown	0 MW 0%	600 MW 60%	400 MW 40%
NCTPC – 1,000 MW injection at Morehead City	0 MW 0%	600 MW 60%	400 MW 40%
NCTPC –1,000 MW injection at Southport	0 MW 0%	600 MW 60%	400 MW 40%
Total	0 MW	1,800 MW	1,200 MW

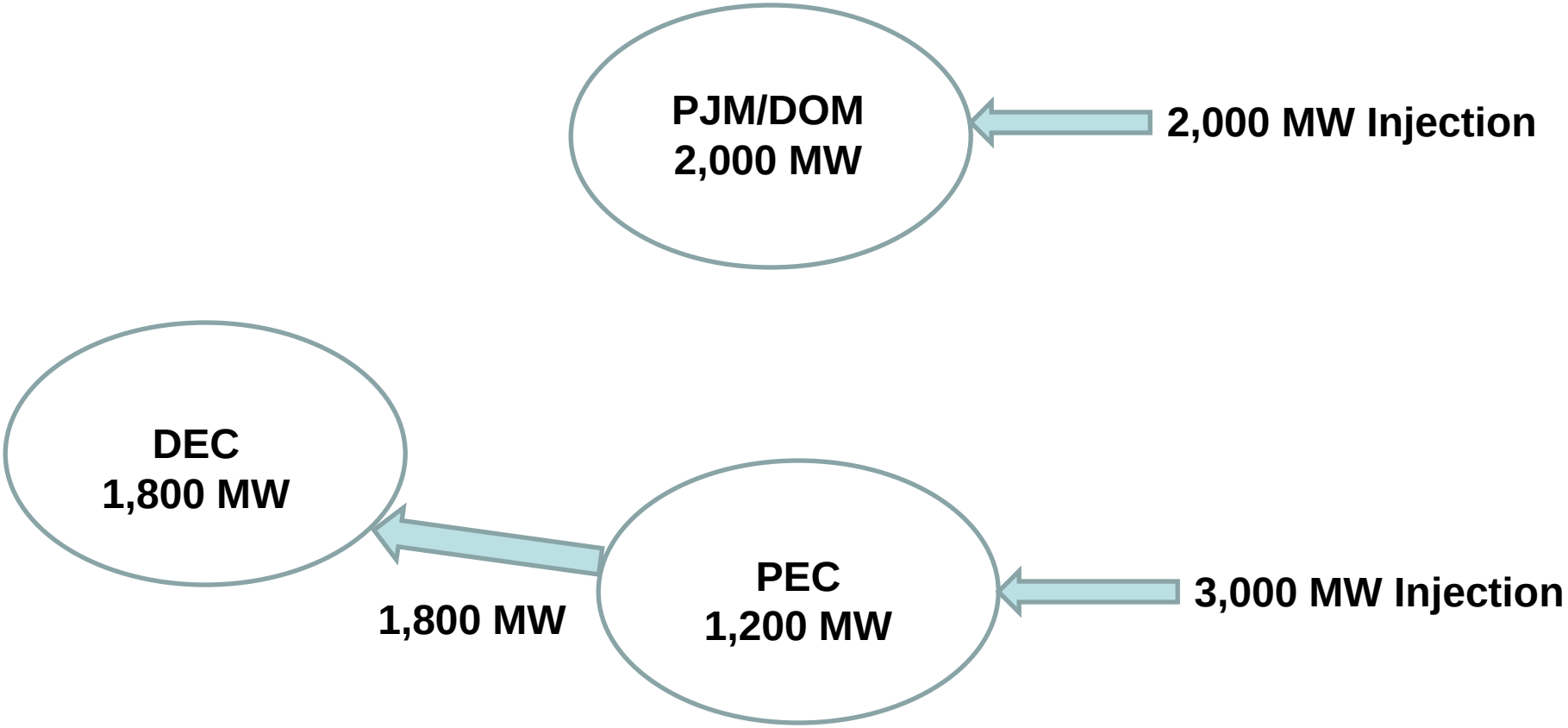
NCTPC/PJM Wind Scenario #1 (PEC Upgrades)



Scenario #1 PEC Upgrades Line/Equipment Name	Voltage (kV)	Estimated Mileage (Miles)	Estimated Cost (M)
Morehead 500 kV Switching Station	500		$30
Jacksonville 500 kV Substation	500		$60
Jacksonville - Morehead Switching Station 500 kV Lines	500	80	$200
Wommack 500 kV Substation	500		$60
Jacksonville - Wommack 500 kV Line	500	40	$120
Southport 500 kV Switching Station	500		$30
Sutton North 500 kV Substation (including 230 kV work)	500		$70
Southport - Sutton North 500 kV Lines	500	60	$150
Cumberland - Sutton North 500 kV Line	500	70	$210
Cumberland 500 kV Substation - Add terminals	500		$2
Totals		**250 Miles**	**$932 M**

2027 Summer
60% of Peak Case

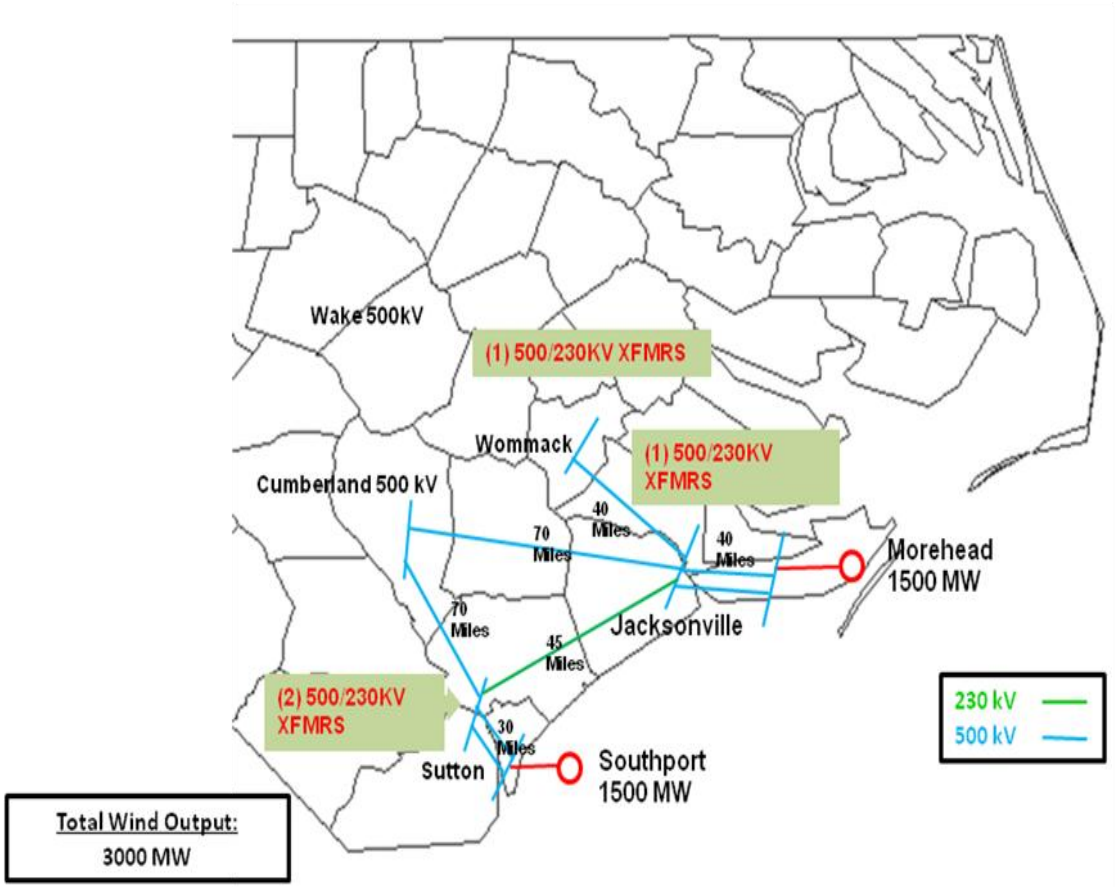
Scenario #2



Summary of Scenario 2 Wind Injection and Area Transfers

Scenario 2 – Wind Generation	PJM – Load Sink	DEC – Load Sink	PEC – Load Sink
PJM – 2,000 MW injection at Landstown	2,000 MW 100%	0 MW 0%	0 MW 0%
NCTPC – 1,500 MW injection at Morehead City	0 MW 0%	900 MW 60%	600 MW 40%
NCTPC – 1,500 MW injection at Southport	0 MW 0%	900 MW 60%	600 MW 40%
Total	2,000 MW	1,800 MW	1,200 MW

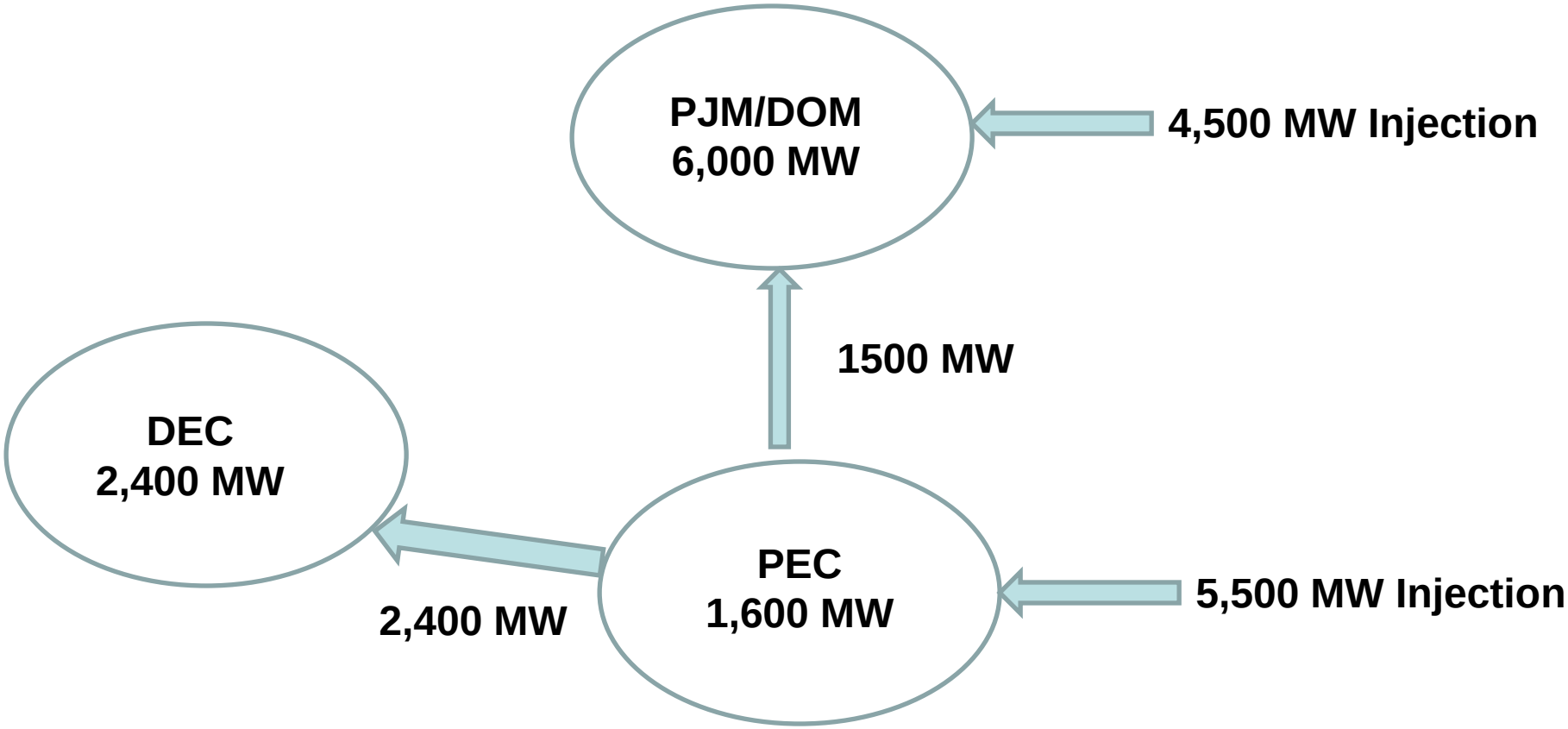
NCTPC/PJM Wind Scenario #2 (PEC Upgrades)



Scenario #2 PEC Upgrades Line/Equipment Name	Voltage (kV)	Estimated Mileage (Miles)	Estimated Cost (M)
Morehead 500 kV Switching Station	500		$30
Jacksonville 500 kV Substation	500		$30
Jacksonville - Morehead Switching Station 500 kV Lines	500	80	$200
Wommack 500 kV Substation	500		$30
Jacksonville - Wommack 500 kV Line	500	40	$120
Cumberland - Jacksonville 500 kV Line	500	70	$210
Jacksonville - Sutton North 230 kV Line	500	45	$90
Southport 500 kV Switching Station	500		$30
Sutton North 500 kV Substation (including 230 kV work)	500		$70
Southport - Sutton North 500 kV Lines	500	60	$150
Cumberland - Sutton North 500 kV Line	500	70	$210
Cumberland 500 kV Substation - Add terminals	500		$4
SVC at Sutton North	500		$40
Totals		**365 Miles**	**$1,214 M**

2027 Summer
60% of Peak Case

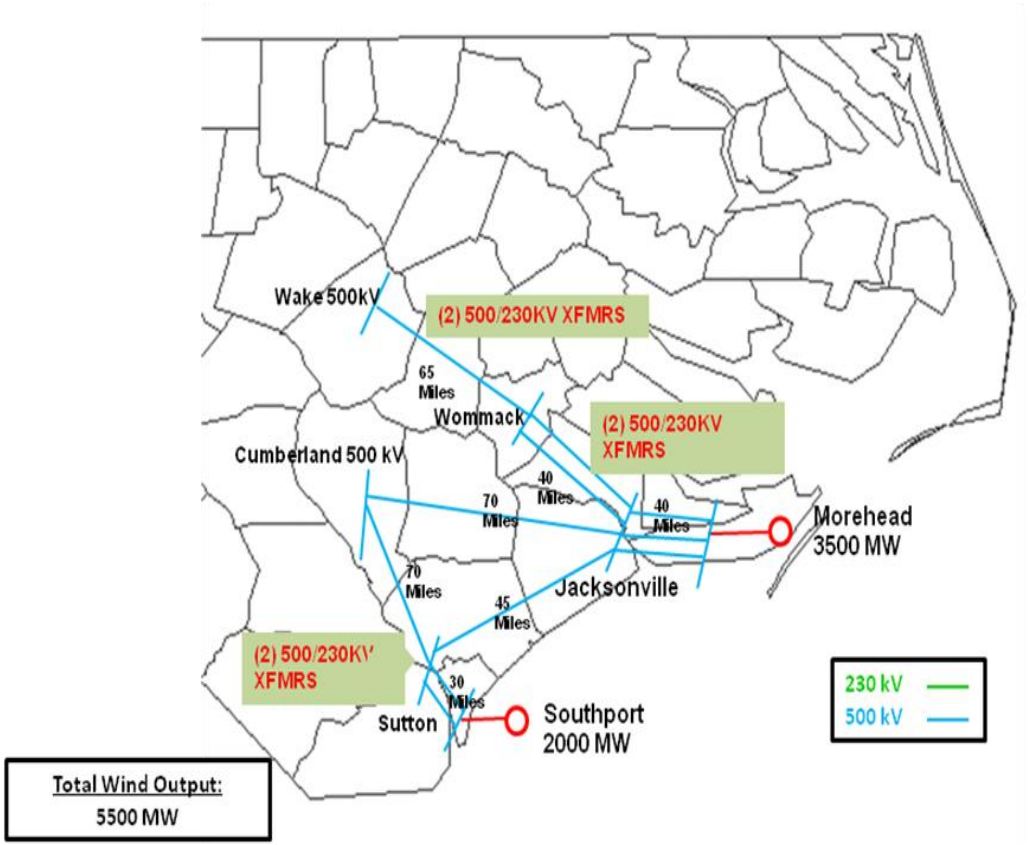
Scenario #3



Summary of Scenario 3 Wind Injection and Area Transfers

Scenario 3 – Wind Generation	PJM – Load Sink	DEC – Load Sink	PEC – Load Sink
PJM – 4,500 MW injection at Landstown	4,500 MW 100%	0 MW 0%	0 MW 0%
NCTPC – 3,500 MW injection at Morehead City	955 MW 27.3%	1,527 MW 43.6%	1,018 MW 29.1%
NCTPC – 2,000 MW injection at Southport	545 MW 27.3%	873 MW 43.6%	582 MW 29.1%
Total	6,000 MW	2,400 MW	1,600 MW

NCTPC/PJM Wind Scenario #3 (PEC Upgrades)



Scenario #3 PEC Upgrades Line/Equipment Name	Voltage (kV)	Estimated Mileage (Miles)	Estimated Cost (M)
Morehead 500 kV Switching Station	500		$30
Jacksonville 500 kV Substation	500		$60
Jacksonville - Morehead Switching Station 500 kV Lines	500	120	$300
Wommack 500 kV Substation	500		$60
Jacksonville - Wommack 500 kV Lines	500	80	$200
Cumberland - Jacksonville 500 kV Line	500	70	$210
Jacksonville - Sutton North 500 kV Line	500	45	$135
Wake - Wommack 500 kV Line	500	65	$195
Wake 500 kV Sub - Add terminals	500		$2
Southport 500 kV Switching Station	500		$30
Sutton North 500 kV Substation (including 230 kV work)	500		$70
Southport - Sutton North 500 kV Lines	500	60	$150
Cumberland - Sutton North 500 kV Line	500	70	$210
Cumberland 500 kV Substation- Add terminals	500		$4
SVC at Sutton North	500		$40
SVC at Wommack	500		$40
Totals		**510 Miles**	**$1,736 M**

Status of Joint Wind Study

- At this time the Joint NCTPC-PJM Inter-Regional report is not complete
- The required upgrades and cost estimates for the PEC transmission system upgrades are provided
- The DEC transmission system does not have any upgrades with an estimated cost greater than $10 million
- Upgrades and cost estimates for the PJM system will be provided in the final joint report
- The final joint report is expected to be released around January 18, 2013

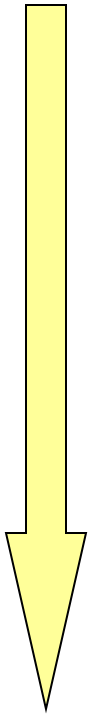
Questions ?

2013 NCTPC Study Scope

Denise Roeder

ElectriCities

Study Process Steps



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Collaborative Study Assumptions

- **Study years**
  - **Short term (5 yr) and long term (10 yr) base reliability analysis**
  - **Alternate model scenarios**
- **Thermal power flow analysis**
  - **Duke & Progress contingencies**
  - **Duke & Progress monitored elements**
    - **Internal lines**
    - **Tie lines**

Study Inputs

- **LSEs provide:**
  - **Inputs for load forecasts and resource supply assumptions**
  - **Dispatch order for their resources**
- **Area interchange coordinated between Participants and neighboring systems**

Enhanced Transmission Access Requests

- TAG request to be distributed in early February, 2013
- Requests can include in, out and through transmission service

2013 Study

- **Base reliability case analysis – 2018 summer and winter and 2023 summer**
  - **An "All Firm Transmission" Case(s) will be developed which will include all confirmed long term firm transmission reservations with roll-over rights applicable to the study year(s)**
  - **Duke and Progress generation down cases will be created from the common Base Case**

- **Alternate scenarios/sensitivities – 2023 summer**

Past Studies' Alternate Scenarios

- **Hypothetical Imports/Exports re-evaluated every other year**
- **Hypothetical NC Generation**
  - **Traditional Fuel**
  - **Wind Energy**
    - **On-shore**
    - **Off-shore – NCTPC only and NCTPC-PJM Joint Study**
- **Retirement of Coal Units**
- **Impact of NERC Reliability Standards**

2013 Alternate Scenarios

- **Hypothetical Imports/Exports?**
  - **Transfers to/from neighboring control areas (Southern, SCEG, SCPSA, PJM, TVA)**
  - **Limited value to examining 600 MW transfers → examine larger MW (1,000 MW?) transfers**
- **Other suggestions?**

TAG Input Request

- **TAG is requested to provide any additional input to the OSC on the proposed 2013 Study Scope and any additional suggested study scenarios**
- **Provide input by January 4, 2013 to Rich Wodyka – ITP (rawodyka@aol.com)**

Questions?

Regional Studies Reports

Bob Pierce

Duke Energy

Eastern Interconnection Planning Collaborative (EIPC)

EIPC background

- EIPC Objectives
  1. Integration (“roll-up”) and analysis of approved regional plans
  2. Development of possible interregional expansion scenarios to be studied
  3. Development of interregional transmission expansion options

EIPC Structure

Eastern Interconnection Planning Collaborative (EIPC)
(Open Collaborative Process)

EIPC Analysis Team
Principal Investigators
Planning Authorities

Steering Committee

Stakeholder Work Groups

Executive Leadership

Technical Leadership & Support Group

Stake-holder Groups

States

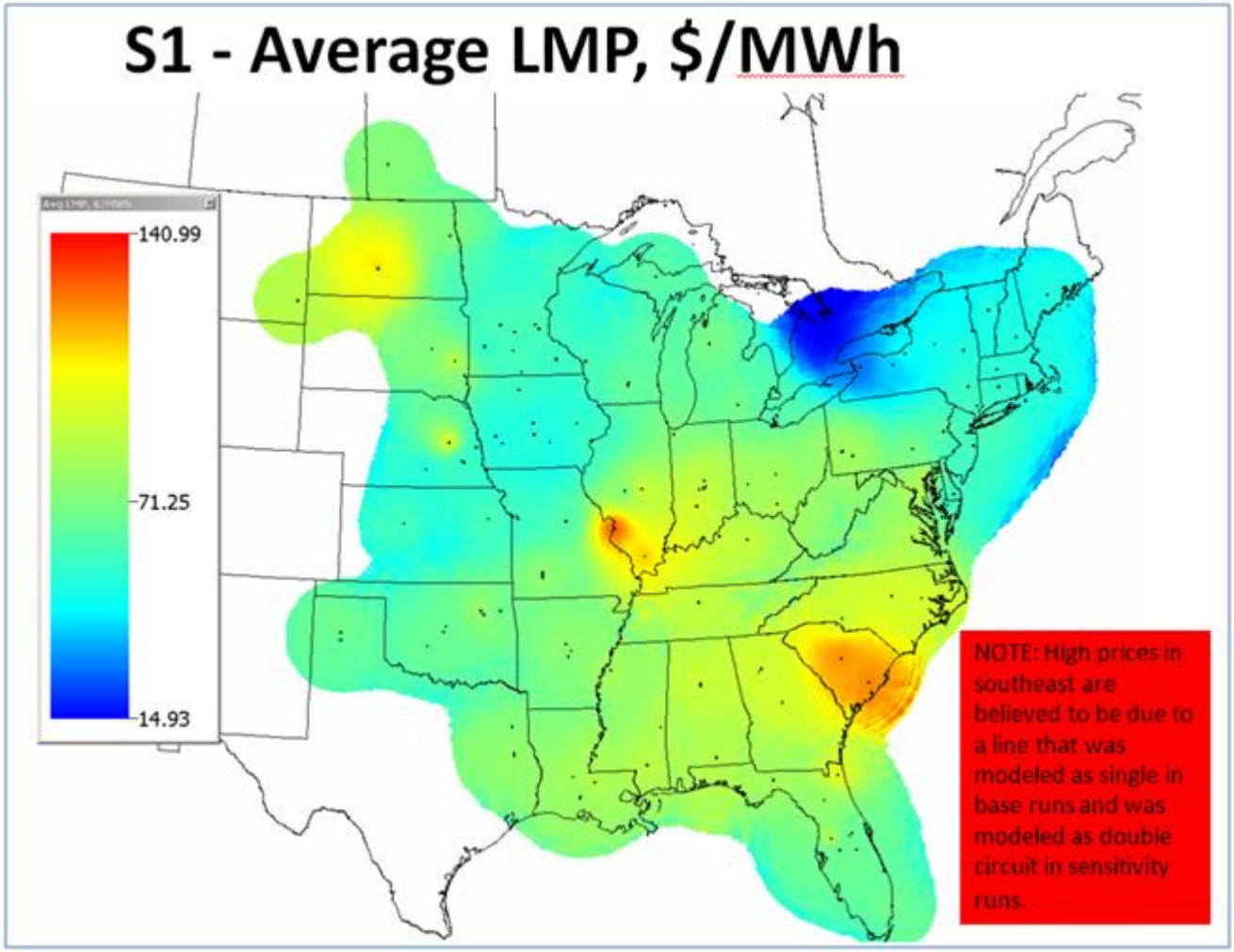
Provinces

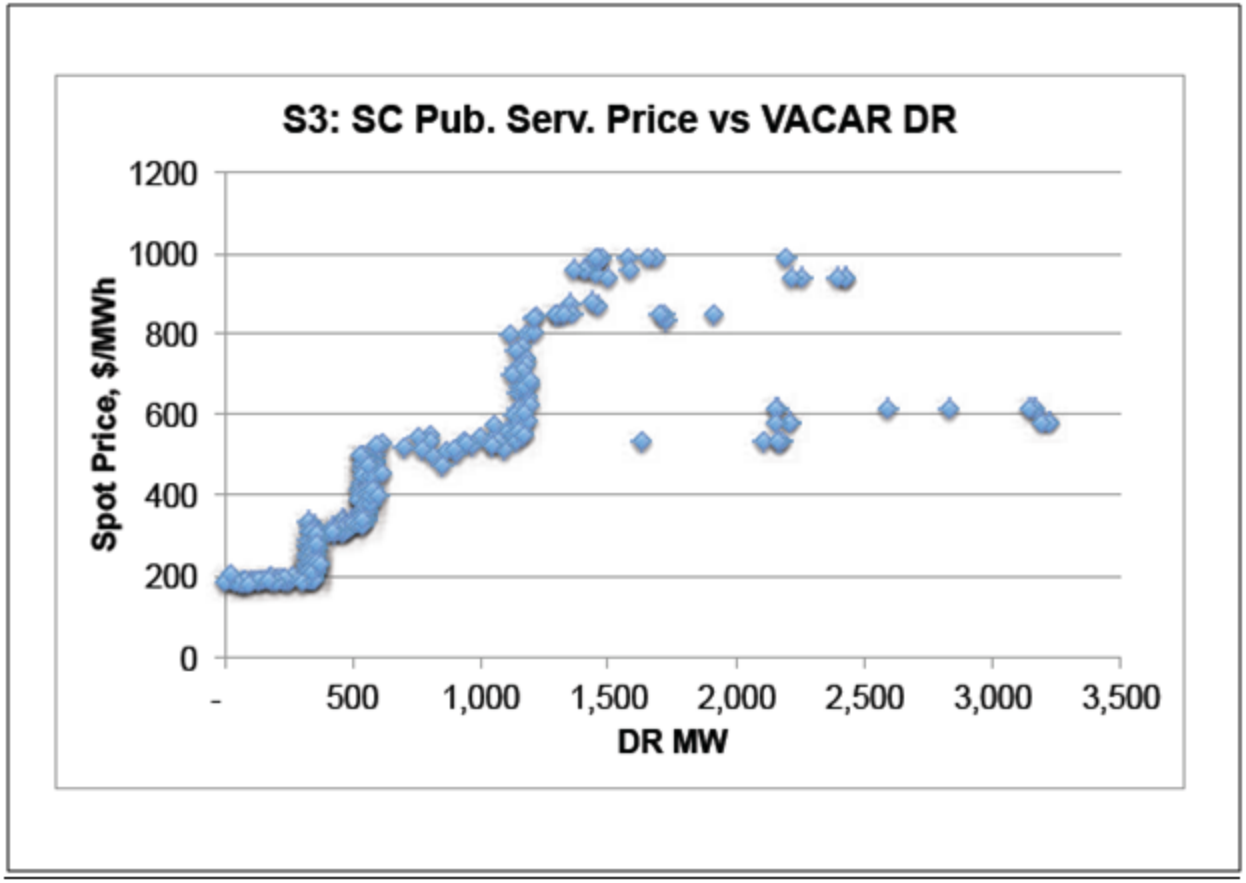
Federal

Owners Operators Users

Phase II

- Develop transmission expansion options, along with associated costs, for agreed on expansion scenarios
- Perform production cost sensitivity analysis
- Final report due at end of year


S1 - Average LMP, $/MWh
140.99
71.25
14.93
NOTE: High prices in southeast are believed to be due to a line that was modeled as single in base runs and was modeled as double circuit in sensitivity runs.



Graph 5 shows significant increases in the amount of DR called upon as the spot prices increase. At $200/MWh, 500 MWs of DR is called upon in the VACAR region while at $1000/MWh 1,500-2,500 MWs of DR is called upon. This dispatch pattern is consistent with the step function deployed in Task 9 for modeling DR dispatch.

EIPC's future

- Phase 3 Gas-Electric Interface Analyses
- EIPC Scope of Activities (non-grant)
- EIPC Work Plan 2013-2014 (non-grant)

Phase 3 Gas-Electric Interface

- Proposed scope – Analysis of the interface between natural gas and electric transmission infrastructures
- Principal Investigators from EIPC – PJM as the project recipient, New England ISO, the Independent Electricity System Operator (IESO) Ontario, Canada, New York ISO, Midwest ISO, and TVA
- Timeline – January 2013 to December 2014
- Technical analysis to be performed by a new contractor as a result of an RFP (Spring 2013)

EIPC Scope of Activities (non-grant)

- Key changes for 2013
  - Recognize the end of Phase 2 of the DOE funded interconnection studies project
  - Continue to recognize the importance of obtaining stakeholder input to the work of the EIPC by providing a forum for the EIPC to receive input on the activities of the EIPC, in particular ensuring a role for federal, state and provincial officials

EIPC Scope of Activities (non-grant)

- Develop and analyze a defined number of sensitivities around the EIPC Roll-Up in order to analyze the efficiencies, responsiveness and robustness of the EIPC Roll-Up to identifiable near-term changes - potential impact of queued generation projects and the potential impact of implementation of public policies embodied in state or federal laws or regulations to the extent such policies drive transmission needs. Results of such analyses shall be made available for consideration in regional and inter-regional planning processes.

EIPC Scope of Activities (non-grant)

- In response to specific requests and consistent with budget and resource limitations, serve as a resource to provide relevant policy makers and regulators with current, complete and technically sound interconnection-wide information relating to potential transmission impacts associated with specific state, provincial, and national energy initiatives.

EIPC Work Plan 2013-2014 (non-grant)

- 2013-Model roll-up and evaluation (contingency analysis and/or transfer analysis)
  - Select model years (for example a 10 year case and the option of a 5 year case) and build rolled-up models
  - Perform model evaluation (contingency and transfer) analysis
  - Identify any gaps or inconsistencies and develop enhancements to roll-up model to address those gaps
  - Publish results
  - Provide feedback to regional planning processes

EIPC Work Plan 2013-2014 (non-grant)

- Develop an open stakeholder process for implementation beginning in last half of 2013 by working with states (EISPC) and other stakeholders
  - Q1-Develop strawman process for state and stakeholder comments
  - Q2-Poll states and other stakeholders for input
  - Q3-Finalize and implement new stakeholder process
    - Hold initial open stakeholder meeting
  - Q4-Hold stakeholder meeting(s) to present roll-up results and receive input on scenarios of interest

EIPC Work Plan 2013-2014 (non-grant)

- Late 2013 through 2014
  - With stakeholder input, develop resource expansion scenarios to be studied in 2014 on 2013 roll-up models
  - Perform inter-regional transmission analysis to support selected scenarios
  - Provide cost estimate for incremental transmission improvements and build-out required to support selected scenarios
  - Discuss interim results with Stakeholders and receive feedback
  - Revise analysis as appropriate
  - Hold Stakeholder meeting(s) to present final results of analysis
  - Publish results
  - In 2014, develop a new work plan for 2015 and beyond

http://www.eipconline.com/

SERC Long Term Study Group Update

SERC Long Term Study Group

- 2016 Summer Study Report final draft soon
- ERAG MMWG stability models are being worked on
- Start model building process for 2013 in first quarter
- Working on 2016 MATS implementation impact study

COWICS Study Update

- Wind resource evaluation complete
- Transmission Analysis beginning – complete 1/13
- Approval for Phase II needed

NERC Update

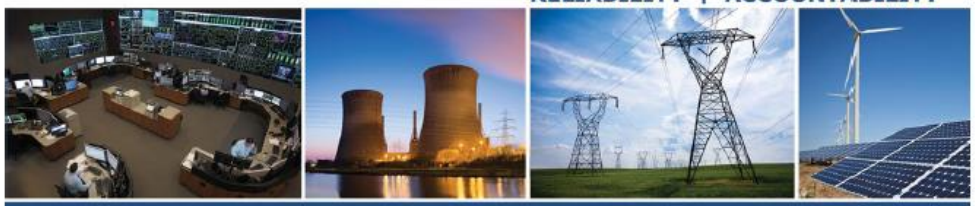
- TPL “footnote b” remand
- TPL - 003/4 – Stuck breaker and/or PS failure
- BES definition guidance document
- Southwest outage – SERC and NATF follow-up

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Bulk Electric System Definition Guidance Document

October 3, 2012

RELIABILITY | ACCOUNTABILITY



3353 Peachtree Road NE
Suite 600, North Tower
Atlanta, GA 30326
404-446-2560 | www.nerc.com

Figure E3-3 depicts an excluded local network with reactive resources (BES & Non-BES) connected through various methods.

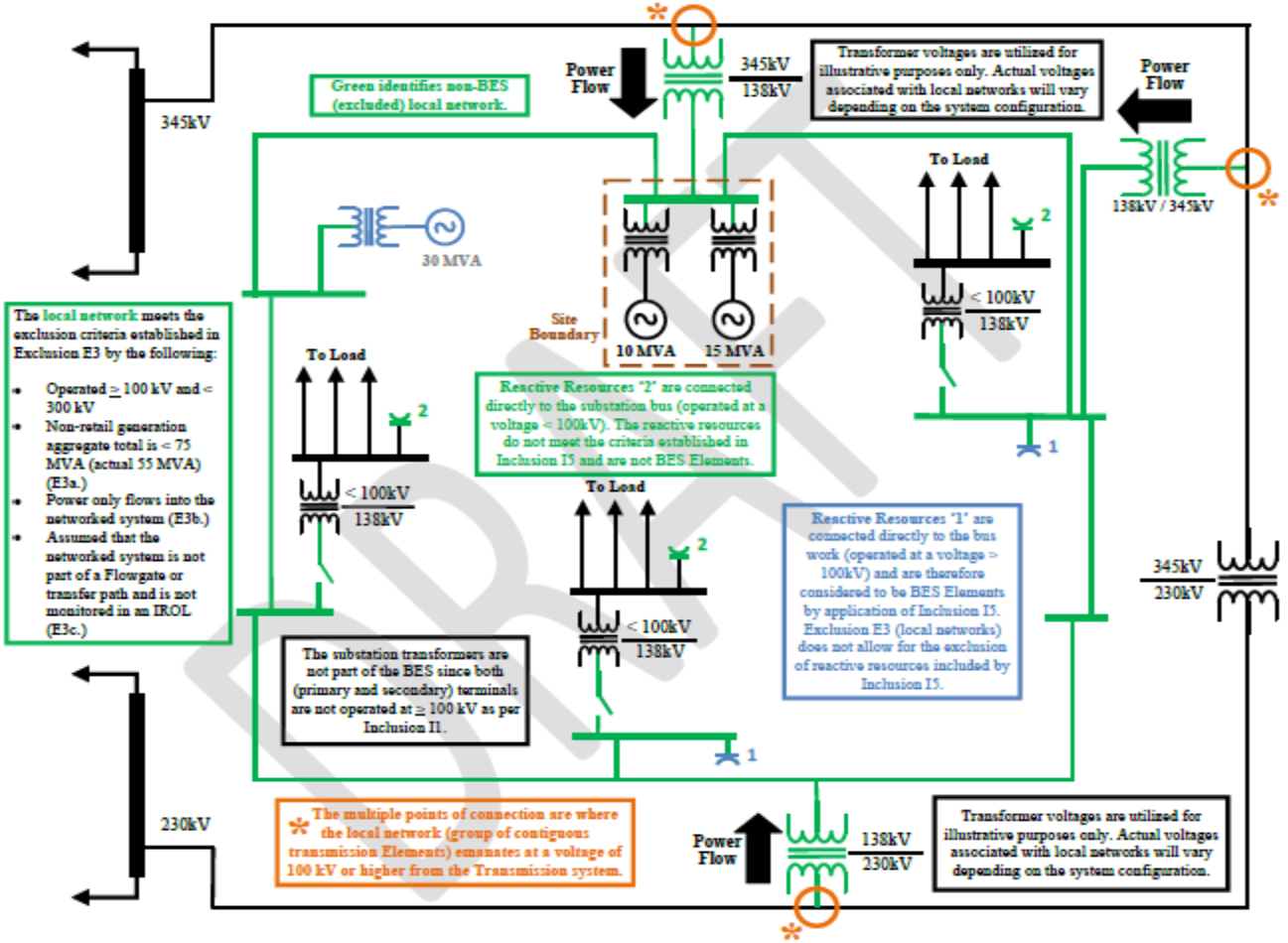
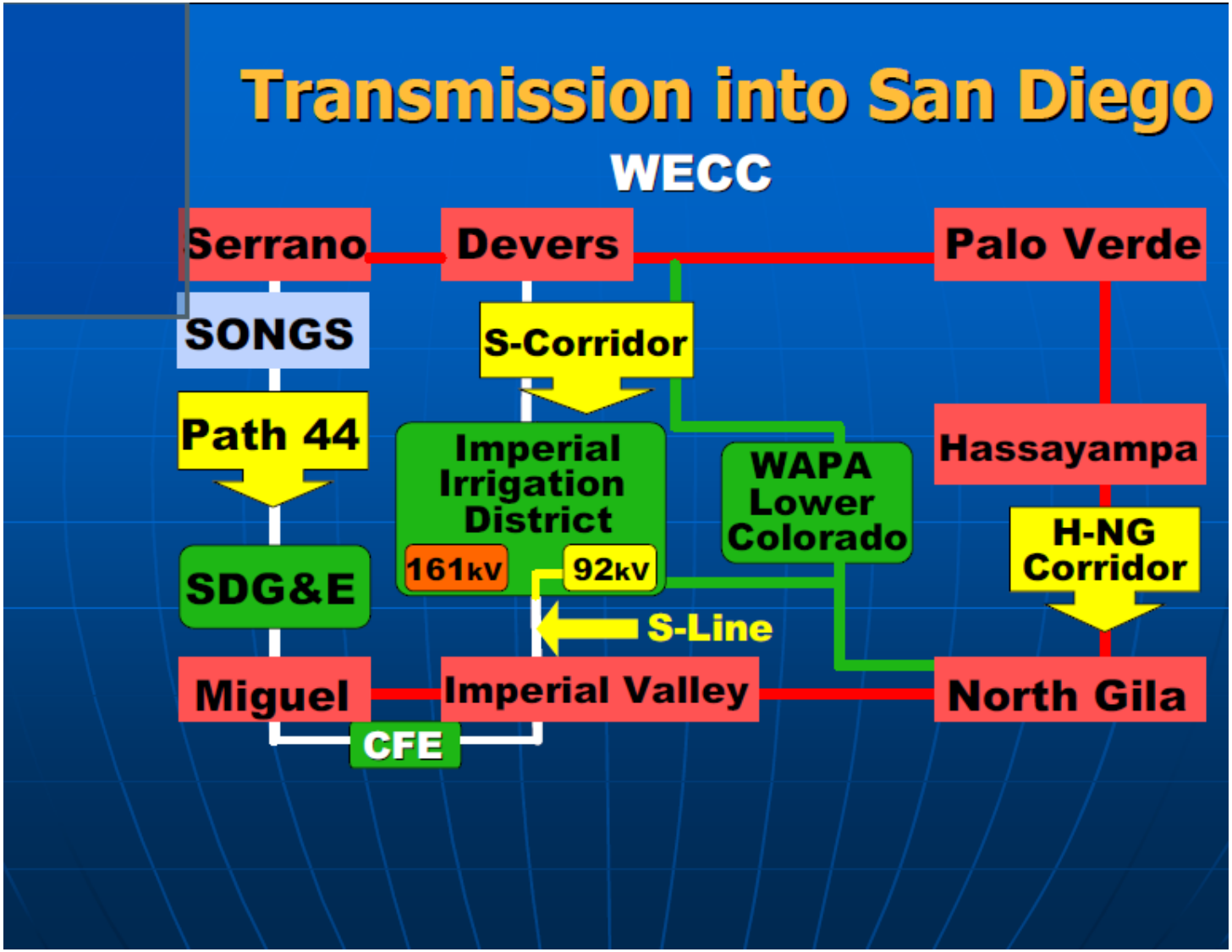


Figure E3-3 Local Network (non-BES) with Reactive Resources (BES & non-BES)


Transmission into San Diego
WECC
Serrano
Devers
Palo Verde
SONGS
S-Corridor
Path 44
Imperial Irrigation District
161kV
92kV
WAPA Lower Colorado
Hassayampa
H-NG Corridor
SDG&E
S-Line
Miguel
Imperial Valley
North Gila
CFE

Carolinas Transmission Coordination Arrangement (CTCA)

CTCA

STUDY PURPOSE:

- Assess the existing transmission expansion plans of DEC, PEC, SCEG, and SCPSA to ensure that the plans are simultaneously feasible.

- Evaluate any potential joint alternatives identified by the Steering Committee representatives which might improve the simultaneous feasibility of the participants' transmission expansion plans.

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STUDY ASSUMPTIONS

- 2012 Series LTSG model for 2016S used for external systems
- Models updated to include the detailed internal models for DEC, PEC, SCEG, and SCPSA
- Models include transmission additions planned to be in-service for the given year

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STUDY ASSUMPTIONS

- Interchange was coordinated to include all confirmed long term firm transmission reservations with roll-over rights applicable to the study year(s).

- Contingency and monitored element files were exchanged so that the impact of the other systems' contingencies on each transmission system was evaluated.

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STUDY ASSUMPTIONS

- Evaluated multiple generation down cases in each area

Duke: Belews Creek 1, Catawba 1, Cliffside 5 & 6, Dan River CC, McGuire 1, McGuire 2, Oconee 1, Oconee 3 replaced with internal generation redispatch

Progress: Brunswick 1, Robinson 2, Harris replaced with TRM import

SCEG\SCPSA: VC Summer 1, Cope (2016S) replaced with internal generation redispatch and import

SCPSA: Rainey CC, Cross 3 replaced with internal generation redispatch and import

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STUDY ASSUMPTIONS

- Evaluated shoulder case assuming low gas price dispatch where CC's and/or CT's are being dispatched before coal units

- Shoulder case is defined as 70-80% of summer peak conditions

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STUDY RESULTS

PROGRESS ENERGY CAROLINAS
SUMMARY OF POTENTIAL RELIABILITY ISSUES
2016 SUMMER PEAK

Element	Contingency	Potential Issue	Potential Solution
Rockingham-Wadesboro Tap2 230 kV Line 1 (Rockingham-West End East)	Harris Gd (TRM) Rockingham-West End 230 kV Line 1	Loading (98.9 %)	Existing Operating Procedure to Open West End Terminal
Marion-Dillon Tap 115 kV Line 1 (Marion-Weatherspoon)	Brunswick 1 Gd (TRM) Latta SS-Dillon MP Tap 230 kV Line 1	Loading (93.1 %)	Existing Operating Procedure to Open Weatherspoon Terminal
Chestnut Hills-Milburnie 115 kV Line 1	Harris Gd (TRM) Durham-Falls 230 kV and Falls-Method 115 kV Lines	Loading (92.3 %)	Relocate Neuse 115 kV Substation to Falls-Method 115 kV Line [2022]

DUKE ENERGY CAROLINAS
SUMMARY OF POTENTIAL RELIABILITY ISSUES
2016 SUMMER PEAK

Element	Contingency	Potential Issue	Potential Solution
North Winston Retail-Wake Forest 100 kV Line 1 (Whitaker)	Buck CC Gm Beckerdite 230/100/44 kV Transformer 1	Loading (110.5 %)	2.29 miles 477 ACSR Reconductor [2016]
Parkwood 500/230 kV Transformer 5	Harris Gd (TRM) Parkwood 500/230 kV Transformer 6	Loading (112.3 %)	New Operating Procedure [2019] Trips Parallel Bank
Lakewood 230/100 kV Transformer	Catawba 1 Gm Lakewood 230/100 kV Transformer and Lakewood-Riverbend 230 kV Line 2 (Pinoca)	Loading (103.0 %)	New Lakewood Transformer Capacity [2016]
Glen Raven-Burlington Tap Black 100 kV Line 1 (Alamance)	Harris Gd (TRM) Glen Raven-Mebane White 100 kV Line 1 (Alamance)	Loading (97.5 %)	3.15 miles 2-477 ACSR Reconductor [2018]

DUKE ENERGY CAROLINAS
SUMMARY OF POTENTIAL RELIABILITY ISSUES
2016 SUMMER PEAK

Element	Contingency	Potential Issue	Potential Solution
Riverbend-Lakewood White 100 kV Line 2 (Long Creek)	Buck CC Gm Riverbend-Lakewood Black 100 kV Line 2 (Riverbend)	Loading (100.9 %)	10.64 miles 336 ACSR Reconductor [2016]
Sadler-Ernest Sw Sta B/W 230 kV Line 1/2 (Sadler)	Dan River CC Gm Sadler-Ernest Sw Sta W/B 230 kV Line 2/1 (Sadler)	Loading (104.0 %)	12.61 miles 1272 ACSR Reconductor [2016]
Pleasant Garden-Vandalia White 100 kV Line 1 (Glen Raven)	Dan River CC Gm Pleasant Garden-Glen Raven Black 100 kV Line 1 (Glen Raven)	Loading (92.2 %)	6.74 miles 795 ACSR Reconductor [2021]
Mitchell River-Surry Yadkin Delivery 7 White 100 kV Line 1 (Bannertown)	Belews 1 Gm Mitchell River-Bannertown Black 100 kV Line 1 (Bannertown)	Loading (95.2 %)	6.46 miles 336 ACSR Reconductor [2019]

DUKE ENERGY CAROLINAS
SUMMARY OF POTENTIAL RELIABILITY ISSUES
2016 SUMMER PEAK

Element	Contingency	Potential Issue	Potential Solution
Winecoff 230/100/44 kV Transformer 2	Mountain Island Gm Winecoff 230/100/44 kV Transformer 4	Loading (105.1 %)	New Winecoff Transformer Capacity [2022]
Cliffside 230/100/44 kV Transformer A2	Cherokee Gm Cliffside 230/100/44 kV Transformer A1	Loading (99.7 %)	New Cliffside Transformer Capacity [2017]
Mini Ranch-Lancaster-Red Rose White 100 kV Line 1 (Monroe)	McGuire 1 Gm Morning Star 230/100 kV Transformer and Morning Star-Newport 230 kV Line 1 (Sandy Ridge)	Loading (95.3 %)	8.94 miles 2/0 Cu Reconductor [2019]
Hodges-Mulberry Creek Retail Black 100 kV Line 1 (Cokesbury)	VC Summer 1 Gd Hodges-Coronaca White 100 kV Line 1 (Cokesbury)	Loading (98.1 %)	2.30 miles 477 ACSR Reconductor [2018]

DUKE ENERGY CAROLINAS
SUMMARY OF POTENTIAL RELIABILITY ISSUES
2016 SUMMER PEAK

Element	Contingency	Potential Issue	Potential Solution
North Charlotte-Elizabeth Black North 100 kV Line 1 (Elizabeth)	Buck CC Gm Woodlawn-Elizabeth Black South 100 kV Line 1 (Elizabeth)	Loading (96.6 %)	2.20 miles 477 ACSR Reconductor [2019]
Beckerdite-Willow Creek Retail Black 100 kV Line 1 (Linden Street)	Harris Gd (TRM) Beckerdite-High Point City 4 White 100 kV Line 1 (Linden Street)	Loading (103.6 %)	9.74 miles 477 ACSR Reconductor [2016]
Morning Star-Union EMC 9 B/W 100 kV Line 1 (Indian Trail)	Robinson 2 Gd (TRM) Monroe-Monroe City 4 W/B 100 kV Line 1 (Indian Trail)	Loading (103.6 %)	5.40 miles 2-366 ACSR Reconductor [2020]
Newport-Wylie Hydro White 100 kV Line 1 (Hook)	Allen 5 Gm Wylie Hydro-Rock Hill City 7 Black 100 kV Line 2 (Hook)	Loading (103.7 %)	7.47 miles 795 ACSR Reconductor [2018]

DUKE ENERGY CAROLINAS
SUMMARY OF POTENTIAL RELIABILITY ISSUES
2016 SUMMER PEAK

Element	Contingency	Potential Issue	Potential Solution
Wylie Hydro-Rock Hill City 7 Black 100 kV Line 2 (Hook)	Allen 5 Gm Newport-Wylie Hydro White 100 kV Line 1 (Hook)	Loading (91.8 %)	2.48 miles 795 ACSR Reconductor [2022]
Harrisburg-Hickory Grove Retail W/B 100 kV Line 1 (Crab Orchard)	Catawba 1 Gm Harrisburg-Amity Sw Sta B/W 100 kV Line 1 (Crab Orchard)	Loading (92.3 %)	6.43 miles 477 ACSR Reconductor [2022]
Daniels Retail-Blue Ridge EC 25 Black 100 kV Line 1 (Davidson River)	Belews 1 Gm Pisgah-Shiloh 230 kV Lines Commontower Loss (Caesar)	Loading (109.4 %)	4.66 miles 250 Cu Reconductor [2016]
Peach Valley-Enola Retail Black 100 kV Line 1 (Cherokee)	Cliffside 5 Gm Cliffside 230/100/44 kV Transformer A2	Loading (97.3 %)	Relocate Load or 1.26 miles 2/0 Cu Reconductor [2018]

DUKE ENERGY CAROLINAS
SUMMARY OF POTENTIAL RELIABILITY ISSUES
2016 SUMMER PEAK

Element	Contingency	Potential Issue	Potential Solution
Newport-Rock Hill City 7 Black 100 kV Line 2 (Hook)	Allen 5 Gm Newport-Wylie Hydro White 100 kV Line 1 (Hook)	Loading (107.4 %)	4.99 miles 795 ACSR Reconductor [2016]
Allen 230/100 kV Transformer 2B	Allen 5 Gm Allen 230/100 kV Transformer 6	Loading (119.0 %)	New Allen Transformer Capacity [2017]
Parkwood 230/100 kV Transformer 1/2	Dan River CC Gm Parkwood 230/100 kV Transformer 2/1	Loading (129.5 %)	New Parkwood Transformer Capacity [2016]
Stamey 230/100 kV Transformer 2	Oxford Gm Stamey 230/100 kV Transformer 1	Loading (130.2 %)	New Stamey Transformer Capacity [2016]

DUKE ENERGY CAROLINAS
SUMMARY OF POTENTIAL RELIABILITY ISSUES
2016 SUMMER PEAK

Element	Contingency	Potential Issue	Potential Solution
Allen-Woodlawn B/W 230 kV Line 1/2 (Steelberry)	Allen 5 Gm Allen-Woodlawn W/B 230 kV Line 2/1 (Steelberry)	Loading (144.7 %)	8.44 miles 2156 ACSR Reconductor [2023]

DUKE ENERGY CAROLINAS
SUMMARY OF POTENTIAL RELIABILITY ISSUES
2016 SHOULDER (with Low Gas Price Dispatch)

Element	Contingency	Potential Issue	Potential Solution
Parkwood 500/230 kV Transformer 5	Harris Gd (TRM) Parkwood 500/230 kV Transformer 6	Loading (111.0 %)	New Operating Procedure [2020] Trips Parallel Bank
Glen Raven-Burlington Tap Black 100 kV Line 1 (Alamance)	Harris Gd (TRM) Glen Raven-Mebane White 100 kV Line 1 (Alamance)	Loading (97.4 %)	3.15 miles 2-477 ACSR Reconductor [2018]
Peach Valley-Enola Retail Black 100 kV Line 1 (Cherokee)	Cherokee Gm Cliffside 230/100/44 kV Transformer A2	Loading (92.5 %)	Relocate Load or 1.26 miles 2/0 Cu Reconductor [2021]

SOUTH CAROLINA ELECTRIC AND GAS
SUMMARY OF POTENTIAL RELIABILITY ISSUES
2016 SUMMER PEAK

Element	Contingency	Potential Issue	Potential Solution
Aiken 2 Tap-Urquhart 115 kV Line	Graniteville-Aiken 3 Tap 115 kV and Graniteville-Stiefeltown 115 kV Lines	Loading (92.5%)	19.33 miles 477 ACSR Reconductor [2023]

SOUTH CAROLINA PUBLIC SERVICE AUTHORITY
SUMMARY OF POTENTIAL RELIABILITY ISSUES
2016 SUMMER PEAK

Element	Contingency	Potential Issue	Potential Solution
Perry Road-Myrtle Beach 115 kV Line 1	Belews 1 Gm Perry Road-Myrtle Beach 115 kV Line 2	Loading (97.1%)	5.40 miles 556 ACSR Reconductor [2018]
Georgetown-Campfield 115 kV Line	Belews 1 Gm Winyah-Campfield 230 kV Line	Loading (90.3%)	Existing Operating Procedure Open Winyah 230/115 kV Transformer

The map on this page was removed from the public posting per CEII requirements.

CTCA

STUDY RESULTS

- Study results indicate the Participants' current transmission expansion plans are simultaneously feasible.

- The Steering Committee did not identify the need to assess any potential joint alternatives based on the study results and a review of the Participants' current transmission expansion plans.

Questions ?

2012 TAG Work Plan

Rich Wodyka

ITP

2012 NCTPC Overview Schedule

Reliability Planning Process

- Evaluate current reliability problems and transmission upgrade plans
- Perform analysis, identify problems, and develop solutions
- Review Reliability Study Results

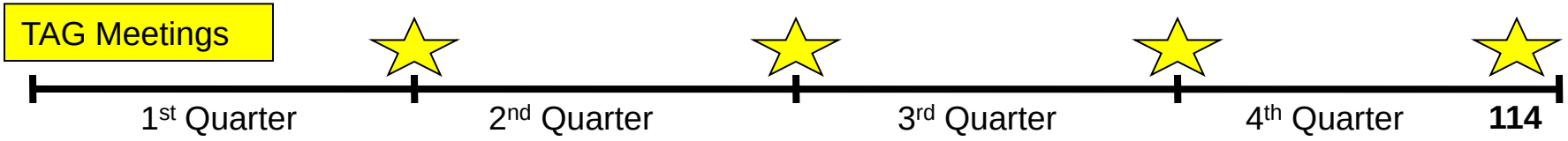
Enhanced Access Planning Process

- *No requests were received for 2012*

Coordinated Plan Development

- Combine Reliability and Enhanced Results
- OSC publishes DRAFT Plan
- TAG review and comment

FERC Order 1000 Updates



2012 TAG Work Plan

January – February

- **2012 Study – Finalize Study Scope of Work**
  - ✓ **Receive final 2012 Reliability Study Scope for comment**
  - ✓ **Review and provide comments to the OSC on the final 2012 Study Scope**
  - ✓ **Receive request from OSC to provide input on proposed Enhanced Transmission Access scenarios and interfaces for study**
  - ✓ **Provide input to the OSC on proposed Enhanced Transmission Access scenarios and interfaces for study - *No requests were received for 2012***

March

TAG Meeting

- **2012 Study Update**
  - ✓ **Receive a progress report on the Reliability Planning study activities**
- **Order 1000 Update**
  - ✓ **Receive report on the direction that the NCTPC is heading on the Order 1000 regional compliance**
  - ✓ **Receive an updated overall Compliance Timeline highlighting when continued stakeholder involvement in the process will occur**

April - May - June

- **2012 Study - Technical Analysis, Problem Identification, and Solution Development**
  - ✓ **TAG will be requested to provide input to the OSC and PWG on the technical analysis performed, the problems identified as well as proposing alternative solutions to the problems identified**
  - ✓ **TAG will be requested to provide input to the OSC and PWG on any proposed alternative solutions to the problems identified through the technical analysis**
- **Order 1000**
  - ✓ **NCTPC will release Draft #1 of regional compliance documents to TAG for comment**

June

TAG Meeting – Tuesday - June 19th

- **2012 Study Update**
  - ✓ **Receive a progress report on the Reliability Planning study activities and preliminary results**
- **Order 1000 Update**
  - ✓ **Receive an update on the Order 1000 regional compliance work**
  - ✓ **Receive an updated overall Compliance Timeline highlighting when continued stakeholder involvement in the process will occur**

July - August - September

- **2012 Study - Technical Analysis, Problem Identification, and Solution Development**
  - ✓ **TAG will be requested to provide input to the OSC and PWG on the technical analysis performed, the problems identified as well as proposing alternative solutions to the problems identified**
  - ✓ **TAG will be requested to provide input to the OSC and PWG on any proposed alternative solutions to the problems identified through the technical analysis**
- **2012 Study Update**
  - ✓ **Receive a progress report on the Reliability Planning study activities and preliminary results**
  - ✓ **Receive update status of the upgrades in the 2011 Collaborative Plan**

July – August - September

- **2012 Selection of Solutions**
  - ✓ **TAG will receive feedback from the OSC on any alternative solutions that were proposed by TAG members**
- **Order 1000 Update**
  - ✓ **NCTPC will release Draft #2 of regional compliance documents to TAG for comment**
  - ✓ **Receive an updated overall Compliance Timeline highlighting when continued stakeholder involvement in the process will occur**

July - August - September

TAG Meeting – September 10, 2012

- **2012 Study Update**
  - ✓ **Receive a progress report on the Reliability Planning study activities and preliminary results**
- **Order 1000 Update**
  - ✓ **Receive an update on the Order 1000 regional compliance work and the changes that will be coming in Draft #2 of the regional compliance documents**
  - ✓ **Receive an updated overall Compliance Timeline highlighting when continued stakeholder involvement in the process will occur**

October - November - December

- **2012 Study Update**
  - ✓ **Receive and comment on final draft of the 2012 Collaborative Transmission Plan report**

TAG Meeting

- **2012 Study Update**
  - ✓ **Receive presentation on the draft report of 2012 Collaborative Transmission Plan**

- **Order 1000 Update**
  - ✓ **Receive update on the Order 1000 interregional compliance concepts and provide updated interregional Compliance Timeline highlighting when stakeholder involvement in the process will occur**

December

TAG Meeting – December 10th

- ✓ Receive presentation on the draft report of 2012 Collaborative Transmission Plan
- ➢ Provide feedback to the OSC on the 2012 – 2022 Collaborative Plan DRAFT Report, as well as to propose alternative solutions to those study results by **January 4, 2013**
- ➢ Provide feedback to the OSC on ideas for the 2013 Study Scope by **January 4, 2013**
- ➢ Review and comment on the proposed 2013 TAG Work Plan Schedule by **January 4, 2013**

2013 TAG Work Plan

Rich Wodyka

ITP

2013 NCTPC Overview Schedule

Reliability Planning Process

- Evaluate current reliability problems and transmission upgrade plans
- Perform analysis, identify problems, and develop solutions
- Review Reliability Study Results

Enhanced Access Planning Process

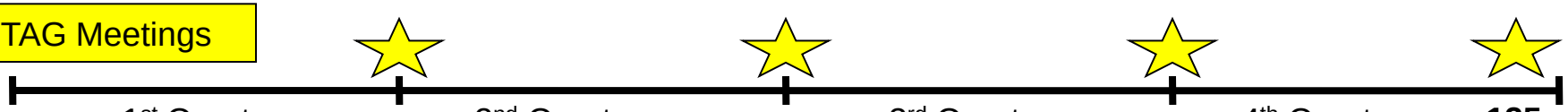
- Propose and select enhanced access scenarios and interface
- Perform analysis, identify problems, and develop solutions
- Review Enhanced Access Study Results

Coordinated Plan Development

- Combine Reliability and Enhanced Results
- OSC publishes DRAFT Plan
- TAG review and comment

FERC Order 1000 Updates

TAG Meetings



2013 TAG Work Plan

January – February

- **2013 Study – Finalize Study Scope of Work**
  - **Receive final 2013 Reliability Study Scope for comment**
  - **Review and provide comments to the OSC on the final 2013 Study Scope**
  - **Receive request from OSC to provide input on proposed Enhanced Transmission Access scenarios and interfaces for study**
  - **Provide input to the OSC on proposed Enhanced Transmission Access scenarios and interfaces for study**

March

TAG Meeting

- **2013 Study Update**
  - **Receive a progress report on the Reliability Planning study activities and preliminary results**
- **Order 1000 Update**
  - **Receive report on the direction that the NCTPC is heading on the Order 1000 regional compliance**
  - **Receive an update on the overall Compliance Timeline highlighting when continued stakeholder involvement in the process will occur**

April - May - June

- **2013 Study - Technical Analysis, Problem Identification, and Solution Development**
  - **TAG will be requested to provide input to the OSC and PWG on the technical analysis performed, the problems identified as well as proposing alternative solutions to the problems identified**
  - **TAG will be requested to provide input to the OSC and PWG on any proposed alternative solutions to the problems identified through the technical analysis**

April - May - June

TAG Meeting

- **2013 Study Update**
  - **Receive a progress report on the Reliability Planning study activities and preliminary results**
  - **Receive update status of the upgrades in the 2012 Collaborative Plan**
- **Order 1000 Update**
  - **Receive an update on the Order 1000 regional compliance work and the discuss changes that will be coming in the regional compliance documents**
  - **Receive an update on the overall Compliance Timeline highlighting when continued stakeholder involvement in the process will occur**

July - August - September

- **2013 Study Update**
  - **Receive a progress report on the Reliability Planning study activities and preliminary results**
- **2013 Selection of Solutions**
  - **TAG will receive feedback from the OSC on any alternative solutions that were proposed by TAG members**

July - August - September

TAG Meeting

- **2013 Study Update**
  - **Receive a progress report on the Reliability Planning study activities and preliminary results**
- **Order 1000 Update**
  - **Receive an update on the Order 1000 regional compliance work and discuss the proposed changes that will be coming in the regional compliance documents**
  - **Receive an update on the overall Compliance Timeline highlighting when continued stakeholder involvement in the process will occur**

October - November - December

- **2013 Study Update**
  - **Receive and comment on final draft of the 2013 Collaborative Transmission Plan report**
  - **Discuss potential study scope for 2014 studies**

October - November - December

TAG Meeting

- **2013 Study Update**
  - **Receive presentation on the draft report of 2013 Collaborative Transmission Plan**
  - **Discuss potential study scope for 2014 studies**
- **Order 1000 Update**
  - **Receive an update on the Order 1000 regional compliance work**

Questions ?

TAG
Open Forum Discussion

Comments or Questions ?