# 2007 NCTPC Study & Preliminary Results

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# Purpose of Study

- **Assess NCTPC transmission system reliability**
  - **Present LSE resource projections**
  - **Resource supply options (hypothetical imports/ generation)**
- **Assess Enhanced Transmission Access Planning Requests from TAG**
  - **Received no ETAP requests in 2007**
- **Update single Collaborative Transmission Plan**

# 2007 Study

- **Study years**
  - **2012 Summer- near term base reliability**
  - **2016 Summer - long term base reliability & resource supply options**

- **Thermal power flow analysis**
  - **Duke & Progress contingencies**
  - **Duke & Progress monitored elements**
    - **Internal lines**
    - **Tie lines**

| 2016 Hypothetical Import Scenarios (RSOs) | | |
|---|---|---|
| Resource From | Sink | Test Level (MW) |
| Duke | Progress East | 600 |
| Duke | Progress East | 1,200 |
| PJM | Progress East | 200 |
| SCPSA | Progress East | 400 |
| SCEG | Progress East | 600 |
| CPLE | Duke | 100 |
| PJM | Duke | 600 |
| SCEG | Duke | 600 |
| SOCO | Duke | 600 |
| TVA | Duke | 600 |

| 2016 Hypothetical Generation Scenarios (RSOs) | | |
|---|---|---|
| Resource in (County) | Sink | Test Level (MW) |
| Scotland | Progress East | 450 |
| Cumberland | Progress East | 450 |
| Wilson | Progress East | 450 |
| Johnston | Progress East | 450 |
| Robeson | Progress East | 600 |
| Guilford | Duke | 150 |
| Davidson | Duke | 150 |
| Union | Duke | 150 |
| Gaston | Duke | 150 |
| Rockingham | Duke | 800 |

# Major Project Status Of 2006 Collaborative Transmission Plan

| Major Project Status of 2006 Plan | | |
|---|---|---|
| Reliability Project | TO | Planned I/S Date |
| Marion-Whiteville 230 kV line | Progress | I/S 6/7/07 |
| Reconductor Lee Sub-Wommack 230 kV South line | Progress | May ’08 |
| Durham 500 kV sub | Progress | June ’08 |
| Rockingham-West End 230 kV line | Progress | June ’09 |
| Clinton-Lee 230 kV line | Progress | June ’10 |
| Richmond 500 kV sub, reactor | Progress | June ’10 |
| Asheville-Enka 230 kV line, Convert 115 kV line; and<br>Asheville-Enka 115 kV, Build new line | Progress | December ’10<br>December ’14 |

| Major Project Status of 2006 Plan (Continued) | | |
|---|---|---|
| Reliability Project | TO | Planned I/S Date |
| Greenville-Kinston Dupont 230 kV line | Progress | June ’11 |
| Henderson-Kerr Dam 115 kV line | Progress | June ’11 |
| Rockingham-West End 230 kV East line | Progress | June ’11 |
| Harris-RTP 230 kV line | Progress | June ’11 |
| Pleasant Garden-Asheboro 230 kV line, replace Asheboro 230 kV xfmrs | Progress/ Duke | June ’11 |
| Replace Antioch 500/230 KV xfmrs | Duke | June ’13 |
| Reconductor London Creek 230 kV lines | Duke | June ’15 |

# 2007
# Preliminary
# 2016 Reliability Results
# Progress

# Preliminary Reliability Results - Progress

- Issues are addressed by planned Progress transmission projects
  - Planned projects now include three *new* projects associated with a confirmed Progress 400 MW transmission service request (Duke-to-Progress)
  - These new projects were identified last year as possible solutions to Duke-to-Progress RSO studies and are *now part of the Progress base reliability plan*
- Continue with limited use of operating procedures

# Preliminary Reliability Results - Progress

- Rockingham-Lilesville 230 kV line
  - Construct approximately 14 miles of new 230 kV line between Lilesville and Rockingham 230 kV Substations
  - Address loadings on existing Rockingham-Lilesville 230 kV lines
  - Planned in-service date - June 1, 2011

# Preliminary Reliability Results - Progress

- Wake #3 500/230 kV Bank
  - Install third 500/230 kV transformer bank at Wake 500 kV Substation
  - Address loadings on existing bank for the loss of a parallel bank
  - Planned in-service date - June 1, 2013

# Preliminary Reliability Results - Progress

- Cape Fear-West End 230 kV West line Reactor
  - Install 230 kV series reactor at the West End 230 kV Substation on the Cape Fear 230 kV terminal
  - Address loadings on Rockingham/West End 230 kV corridor
  - Planned in-service date - June 1, 2016

# 2007
# Preliminary
# 2016 Reliability Results
# Duke

# Preliminary Reliability Results - Duke

- Two projects previously identified continue to be monitored (2011 and beyond) for adjustments to the timing of the projects
- Three new projects were identified by the base reliability study

# Preliminary Reliability Results - Duke

- London Creek 230 kV Line (Riverview – Peach Valley 230 kV Line)
  - Last year's PWG study indicated upgrade will be necessary around 2015. Internal screens indicate that bundling of this line will be required in the 2016 timeframe. The current PWG study indicates upgrade will be necessary around 2020.
  - The timing is impacted by south-to-north flow across the Duke control area.
  - Will continue to monitor timing of upgrade.

# Preliminary Reliability Results - Duke

- Antioch 500/230 kV Transformer Banks (2)
  - Internal screens show need for an upgrade project in 2015 time frame. Operating experience indicates an earlier need for additional capacity.
  - The current PWG study indicates additional transformer capacity needed around 2013.
  - Increased imports from the north accelerates timing, while increased imports from the south delays project.
  - Location of additional generation resources can significantly impact bank loading and timing of upgrade.

# Preliminary Reliability Results - Duke

- Dooley Tie 500/230 kV Station
  - The current PWG study indicates heavy loading of the McGuire Nuclear Station 500/230 kV transformer in 2016. Because of already high fault current on the 230 kV at McGuire, 80 ika breakers are installed. Fault duty on the breakers is close to their rated capability and higher rated breakers are not available. Therefore, installing additional transformer capacity at McGuire is not an option.
  - Internal screens do not show the need for additional capacity at McGuire therefore no upgrades are planned.
  - A new 500/230 kV station at the intersection of the 500 kV Guardian Line (McGuire – Woodleaf) and the 230 kV Dooley Line (Marshall – Winecoff) relieves loading on the McGuire transformer.
  - Location of additional generation resources can significantly impact bank loading and timing of upgrade.

# Preliminary Reliability Results - Duke

- Steelberry 230 kV Line (Allen - Woodlawn 230 kV Line)
  - Internal screens indicate that bundling of this line will be required in the 2016 timeframe.
  - The current PWG study also indicates upgrade will be necessary around 2016.

# Preliminary Reliability Results - Duke

- Fisher 230 kV Line (Central - Shady Grove Tap 230 kV Line)
  - Internal screens indicate that bundling of this line will be required in the 2018 timeframe.
  - The current PWG study indicates upgrade will be necessary around 2016.
  - The timing is impacted by south-to-north flow across the Duke control area.

# 2007
# Preliminary
# 2016 Resource Supply Results

# Preliminary Resource Supply Results - Progress

## Hypothetical Imports

- Duke, PJM, SCPSA or SCE&G
  - No new projects were identified within Progress area to support import resource supply option scenarios studied.

# Preliminary Resource Supply Results - Progress

## Hypothetical Generation

- Wilson & Johnston County scenarios
  - Projects in place to address network loadings
- Scotland, Cumberland & Robeson scenarios
  - New project(s) would be needed to address network loading on facilities in Fayetteville / Raeford / Wagram area

# Preliminary Resource Supply Results - Duke

No new projects were identified within the Duke area to support the resource supply option scenarios studied.

# Preliminary – Major Projects in 2007 Collaborative Transmission Plan

# Update of NCTPC Collaborative Plan

- January 2007
  - Initial NCTPC 2006 Collaborative Plan issued
- March 2007
  - Supplemental Report updated NCTPC 2006 Collaborative Plan
- April 2007
  - New Progress 400 MW import transmission service request from Duke-to-Progress East confirmed
    - Committed to new projects to support request
    - Same projects that were identified in Duke-to-Progress1200 MW RSO analysis from the 2006 Supplemental Report
- June 2007
  - Updated status of Major Projects in NCTPC 2006 Collaborative Plan

| Preliminary – Major Projects in 2007 Plan | | |
|---|---|---|
| Reliability Project | TO | Planned I/S Date |
| Marion-Whiteville 230 kV line | Progress | I/S 6/7/07 |
| Reconductor Lee Sub-Wommack 230 kV South line | Progress | June ’08 |
| Durham 500 kV sub | Progress | June ’08 |
| Durham-Falls 230 kV line | Progress | June ‘08 |
| Rockingham-West End 230 kV line | Progress | June ’09 |
| Clinton-Lee 230 kV line | Progress | June ’10 |
| Richmond 500 kV sub, reactor | Progress | June ’10 |
| Asheville-Enka 230 kV line, Convert 115 kV line; and<br>Asheville-Enka 115 kV, Build new line | Progress | December ’10<br>December ’14 |

| Preliminary – Major Projects in 2007 Plan (Continued) | | |
|---|---|---|
| Reliability Project | TO | Planned I/S Date |
| Greenville-Kinston Dupont 230 kV line | Progress | June ’11 |
| Henderson-Kerr Dam 115 kV line | Progress | June ’11 |
| Rockingham-West End 230 kV East line | Progress | June ’11 |
| Harris-RTP 230 kV line | Progress | June ’11 |
| Pleasant Garden-Asheboro 230 kV line, replace Asheboro 230 kV xfmrs | Progress & Duke | June ’11 |
| Rockingham-Lilesville 230 kV line | Progress | June ’11 |
| Add 3rd Wake 500/230 kV xfmr | Progress | June ’13 |
| Cape Fear-West End 230 kV West line, Install reactor | Progress | June ’16 |

| Preliminary – Major Projects in 2007 Plan (Continued) | | |
|---|---|---|
| Reliability Project | TO | Planned I/S Date |
| Replace Antioch 500/230 KV xfmrs | Duke | June ’13 |
| Dooley Tie | Duke | June ’16 |
| Reconductor Fisher 230 kV lines | Duke | June ’16 |
| Reconductor Steelberry 230 kV lines | Duke | June ’16 |
| Reconductor London Creek 230 kV lines | Duke | June ’20 **(beyond planning horizon)** |

# Remainder of 2007 Work Plan



## Develop Solutions

- Develop potential alternative solutions
- Further testing & evaluation of solutions, as required
- Estimate project costs & solutions

## Select Collaborative Plan Projects

- Compare all alternatives
- Further testing & evaluation of solutions, as required
- Select preferred solutions

## Prepare Study Report

- PWG develops DRAFT Plan
- Publish DRAFT Plan
- TAG review/comment

TAG Meetings

# Questions?
# or
# Comments