



# North Carolina Transmission Planning Collaborative

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## 2020 NCTPC Study Scope Document

### Purpose of Study

The purpose of this study is to assess the Duke Energy Carolinas (“DEC”) and Duke Energy Progress (“DEP”) transmission systems’ reliability and develop a single collaborative transmission plan for the DEC and DEP transmission systems that ensures reliability of service in accordance with NERC, SERC, DEC, and DEP requirements. In addition, the study will also assess Local Economic Study option scenarios and / or Public Policy Study requests provided by the Transmission Advisory Group (“TAG”) and approved for study by the Oversight Steering Committee (“OSC”). The Planning Working Group (“PWG”) will perform the technical analysis outlined in this study scope under the guidance and direction of the OSC.

This year the NCTPC will perform analysis to evaluate Local Economic Studies / Public Planning Studies. The Local Economic Study will assess the rapid high load growth for the Union / Cabarrus County load area. The Public Policy Study will assess off-shore wind development and the impact on the NC transmission system.

The TAG members will have the opportunity to provide input on all the study scope elements of the Reliability Planning Process as the study activities progress. This will include input on the following: study assumptions; study criteria; study methodology; case development and technical analysis; problem identification; assessment and development of solutions (including proposing alternative solutions for evaluation); comparison and selection of the preferred transmission plan; and the transmission plan study results report.

### Overview of the Study Process Scope

The scope of the proposed study process will include the following steps:

#### 1. Study Assumptions

- Study assumptions selected

#### 2. Study Criteria

- Establish the criteria by which the study results will be measured

#### 3. Case Development

- Develop the models needed to perform the study
- Determine the different resource supply scenarios to evaluate



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## **4. Methodology**

- Determine the methodologies that will be used to carry out the study

## **5. Technical Analysis and Study Results**

- Perform the study analysis and produce the results. Initially, power flow analyses will be performed based on the assumption that thermal limits will be the controlling limit for the reliability plan. Voltage, stability, short circuit and phase angle studies may be performed if circumstances warrant.

## **6. Assessment and Problem Identification**

- Evaluate the results to identify problems / issues

## **7. Solution Development**

- Identify potential solutions to the problems / issues
- Test the effectiveness of the potential solutions through additional studies and modify the solutions as necessary such that all reliability criteria are met.
- Perform a financial analysis and rough scheduling estimate for each of the proposed solutions (e.g., cost, cash flow, present value)

## **8. Selection of a Recommended Collaborative Transmission Plan**

- Compare alternatives and select the preferred solution alternatives – balancing cost / benefit / risk
- Select a preferred set of transmission improvements that provide a reliable transmission system to customers most cost effectively while prudently managing the associated risks

## **9. Report on the Study Results**

- Prepare a report on the recommended Collaborative Transmission Plan

Each of these study steps is described in more specific detail below.

## **Study Assumptions**

The specific assumptions selected for the 2020 Study are:

- The years to be studied (study year) will be 2025 Summer and 2025/2026 Winter for a near term reliability analysis and 2030 Summer for a longer-term reliability analysis. Each Load Serving Entity (“LSE”) will provide a list of resource supply assumptions and



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include the resource dispatch order for each of its Designated Network Resources in the DEC and DEP control areas. Generation will be dispatched for each LSE in the cases to meet that LSE’s peak load in accordance with the designated dispatch order. LSEs will also include generation down scenarios for their resources, if applicable (e.g., generation outage with description of how generation will be replaced, such as by that LSE’s dispatch orders).

- PSS/E and/or TARA will be used for the study.
- Load growth assumptions will be in accordance with each LSE’s practice.
- Generation, interchange and other assumptions will be coordinated between Participants as needed.
- The tables below list the major generation facility additions and retirements included in the 2025 Summer, 2025/2026 Winter and 2030 Summer study models.

## Major Generation<sup>1</sup> Facility Additions in 2020 Study Models

Company	Generation Facility	2025S	2025/ 2026W	2030S
DEC	Lincoln County CT (525 MW)	Included	Included	Included
DEC	Apex PV (30 MW)	Included	Included	Included
DEC	Broad River PV (50 MW)	Included	Included	Included
DEC	Cool Springs PV (80 MW)	Included	Included	Included
DEC	Gaston PV (25 MW)	Included	Included	Included
DEC	High Shoals PV (16 MW)	Included	Included	Included
DEC	Lancaster PV (10 MW)	Included	Included	Included
DEC	Lick Creek PV (50 MW)	Included	Included	Included
DEC	Maiden Creek PV (69.3 MW)	Included	Included	Included
DEC	Oakboro PV (40 MW)	Included	Included	Included
DEC	Partin PV (50 MW)	Included	Included	Included

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<sup>1</sup> Major Generation Threshold is considered to be 10 MW or greater and connected to the transmission system



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Company	Generation Facility	2025S	2025/ 2026W	2030S
DEC	Pelham PV (32 MW)	Included	Included	Included
DEC	Pinson PV (20 MW)	Included	Included	Included
DEC	Ruff PV (22 MW)	Included	Included	Included
DEC	Speedway PV (22.6 MW)	Included	Included	Included
DEC	Stanly PV (50 MW)	Included	Included	Included
DEC	Stony Knoll PV (22.6 MW)	Included	Included	Included
DEC	Sugar PV (60 MW)	Included	Included	Included
DEC	Thinking Tree (35 MW)	Included	Included	Included
DEC	Two Hearted PV (22 MW)	Included	Included	Included
DEC	West River PV (40 MW)	Included	Included	Included
DEC	Westminster PV (75 MW)	Included	Included	Included
DEP	Asheville CC (560 MW)	Included	Included	Included
DEP	Crooked Run Solar (70.1 MW)	Included	Included	Included
DEP	Bay Tree Solar (70.1 MW)	Included	Included	Included



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## Major Generation<sup>2</sup> Facility Retirements in 2020 Study Models

Company	Generation Facility	2025S	2025/ 2026W	2030S
DEC	Allen 1-3 (617 MW)	Retired	Retired	Retired
DEC	Allen 4-5 (564 MW)	Not retired	Not retired	Retired
DEP	Asheville 1-2 (384 MW)	Retired	Retired	Retired
DEP	Darlington Co 1,2,3,4,6,7,8,10 (514 MW)	Retired	Retired	Retired
DEP	Blewett CTs 1-4 and Weatherspoon CTs 1-4 (232 MW)	Retired	Retired	Retired
DEP	Roxboro Units 1-2 (1053 MW)	Not retired	Not retired	Retired

- For a variety of reasons (such as load growth, generation retirements, or power purchase agreements expiring), some LSEs may wish to evaluate other resource supply options to meet future load demand. These resource supply options can be either in the form of transactions or some “hypothetical” generators which are added to meet the resource adequacy requirements for this study.
- The Local Economic Study will assess the impact of the assumption that rapid high load growth occurs in the Union and Cabarrus County areas of North Carolina. The study will analyze the effect of a high load growth case (5-6% growth) on the transmission system in the 2025 and 2030 summer models (winter peaks are lower due to the availability of natural gas in the area). For this analysis the renewable generation in the models will include sites already interconnected with the DEC system and sites with an executed Interconnection Agreement in DEC.
- The Public Policy Study assessment of the off-shore wind development and the impact on the NC transmission system will analyze the following:
  - the potential for 2,400 MW of wind generation injecting into Dominion’s Landstown 230 kV area to be wheeled into DEC/DEP (60/40 ratio); and
  - separately, determine 3 least-cost injection points somewhere along the NC coast and determine the transmission cost breakpoints for varying amounts of generation injection at those sites up to 5000 MW. The status of the off-shore wind study will

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<sup>2</sup> Major Generation Threshold is considered to be 10 MW or greater and connected to the transmission system



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be provided in the annual report but the study's schedule will be determined by the OSC and may include modifications to the study scope as the analysis progresses.

- The PWG will analyze the Local Economic Study and Public Policy Study scenarios to determine if any reliability criteria violations are created. Based on this analysis, the PWG will provide feedback to the Participants on the results of these studies. The results of this analysis will be included in the 2020 Collaborative Transmission Plan Report.

## Study Criteria

The study criteria used will promote consistency in the planning criteria used across the systems of the Participants, while recognizing differences between individual systems. The study criteria will include the following reliability elements:

- NERC Reliability Standards
- SERC requirements
- Individual company criteria (voltage, thermal, stability, short circuit and phase angle)

## Case Development

- The most current MMWG system models will be used for the systems external to DEC and DEP as a starting point for the Base Case.
- The Base Case will include the detailed internal models for DEC and DEP and will include current transmission additions planned to be in-service for the given year (i.e. in-service by summer 2025 for 2025S cases and in-service by the winter for 2025/2026W cases as well as in-service by the summer of 2030 for 2030S cases).
- 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).
- DEC and DEP will each create their respective generation down cases from the common Base Case and share the relevant cases with each other.
- Additional 2025S and 2030S cases will be developed to evaluate the Local Economic Study and Public Policy Study scenarios as required to analyze the scenarios previously identified under the Study Assumptions section.



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## Study Methodology

DEC and DEP will exchange contingency and monitored element files so that each can test the impact of the other company's contingencies on its transmission system. Initially, power flow analyses will be performed based on the assumption that thermal limits will be the controlling limit for the reliability plan. Voltage, stability, short circuit and phase angle studies may be performed if circumstances warrant.

## Technical Analysis and Study Results

The technical analysis will be performed in accordance with the study methodology. Results from the technical analysis will be reported throughout the study area to identify transmission elements approaching their limits such that all Participants are aware of potential issues and appropriate steps can be identified to correct these issues, including the potential of identifying previously undetected problems.

DEC and DEP will report results throughout the study area based on:

- Thermal loadings greater than 90%.
- Voltages less than 100% for 500 kV and less than 95% for 230 kV, 161 kV, 115 kV, and 100 kV buses; pre- to post-contingency voltage drops of 5% or more.

## Assessment and Problem Identification

- Each utility will utilize its own reliability criteria for its own transmission facilities. Each utility will document the reliability problems resulting from its assessments. These results will be reviewed and discussed with the TAG for feedback.

## Solution Development

- The PWG will develop potential solution alternatives to the identified reliability problems.
- The TAG will have the opportunity to propose solution alternatives to the identified reliability problems.
- DEC and DEP will test the effectiveness of the potential solution alternatives using the same cases, methodologies, assumptions and criteria described above.
- DEC and DEP will develop rough, planning-level cost estimates and construction schedules for the solution alternatives.



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## **Selection of a Recommended Collaborative Transmission Plan**

- The PWG will compare alternatives and select the preferred solution alternatives, balancing cost / benefit / risk.
- The PWG will select a preferred set of transmission improvements that provides a reliable and cost effective transmission solution to meet customers' needs while prudently managing the associated risks.
- The preferred set of transmission improvements developed by the PWG will be reviewed and discussed with the TAG for feedback.

## **Report on the Study Results**

The PWG will compile all the study results and prepare a recommended collaborative plan for OSC review and approval. Prior to the OSC's final review and approval, the final draft of the study report will be reviewed and discussed with the TAG members to solicit their input on the recommended collaborative plan. The final report will include a comprehensive summary of all the study activities as well as the recommended transmission improvements including estimates of costs and construction schedules.