

2010-2011 SIRPP Study Scope Document
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Purpose of Study

The purpose of this evaluation is to assess potential constraints on the transmission systems of the Participating Transmission Owners as a result of the five, Stakeholder requested Economic Planning Studies. This assessment will include the identification of transmission enhancements necessary to accommodate the Stakeholder request. The associated transmission cost estimates as well as the timing of those improvements will be included. Planning staff of the Participating Transmission Owners will perform the evaluations. It is anticipated that Stakeholders will provide input to the draft results prior to the finalization of the requested analysis.

Overview of the Study Process

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

1. Assumptions

- Study assumptions selected

2. Study Criteria

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

3. Case Development

- Develop the models needed to perform the evaluations

4. Methodology

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

5. Technical Analysis and Study Results

- Perform the analyses (thermal, voltage, stability, and short circuit, as necessary for the study) and produce the results

6. Assessment and Problem Identification

- Evaluate the results to identify constraints / issues

7. Solution Development

- Identify potential solutions to the constraints / issues
- Test the effectiveness of the potential solutions through additional evaluations (thermal, voltage, stability, and short circuit) and modify the solutions as necessary such that all reliability criteria are met
- Provide cost estimate of the necessary transmission enhancements (in 2011 NPV)
- Provide associated timelines for completion for each of the proposed solutions (e.g., cost, cash flow, present value)

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8. Report on the Study Results

- Prepare a report on the identified system upgrades to accommodate the five Economic Planning Study requests.

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

Assumptions

The year to evaluate varies by request. Each request will only evaluate a single year (the year that was selected by the stakeholders). The specific assumptions selected for these evaluations are identified below.

- The following scenarios will be evaluated (Selected Year, Type of Study):

- **HVDC Injection in Duke to VACAR – 3000 MW (2016, Step 1 Evaluation)**
 - Type of Transfer: Generation to Generation
 - Source: A new generator interconnecting to a new 500 kV transmission line that connects the following substations:
 - Asbury (A new substation halfway between Oconee and Newport on the Oconee – Newport 500 kV transmission line)
 - South Mountain (A new substation two thirds of the way between Jocassee and Cliffside on the Jocassee – Cliffside 500 kV transmission line)
 - Sink: Generation within VACAR.
 - This transfer will be allocated to the participating transmission owners in VACAR by the ratio shown in Table 1 below.

Table 1: HVDC Injection in Duke to VACAR – Sink Allocation

Participating Transmission Owners	Participation Factor (%)	MW Allocation
Progress Energy Carolinas	30.00%	900
Duke Energy	46.67%	1400
South Carolina Electric & Gas	11.67%	350
Santee Cooper	11.67%	350
Total	100.00%	3,000

- **South Carolina Regional Transmission Planning Participants (“SCRTP”) to PJM West – 1000 MW (2016, Step 1 Evaluation)**
 - Type of Transfer: Generation to Load
 - Source: Generation within the SCRTP

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- The generation to source the transfer will be based upon the load serving ratio of SCE&G and SCPSA provided that there is sufficient existing generation “on-peak” to supply the transfer amount. The resulting allocation is shown in Table 2 below.
- Sink: Uniform load scale of the PJM West area.
 - In 2016, it is anticipated that First Energy and Duke Midwest will both be part of PJM West and, therefore, they will be included in the sink of this transfer. The resulting allocation is shown in Table 3 below.

Table 2: SCRTP to PJM West – Source Allocation

Participating Transmission Owners	Participation Factor (%)	MW Allocation
South Carolina Electric & Gas	51.59%	516
Santee Cooper	48.41%	484
Total	100.00%	1,000

Table 3: SCRTP to PJM West – Sink Allocation

PJM West Participants	Participation Factor (%)	MW Allocation
Allegheny Power	10.08%	101
First Energy	17.44%	174
American Electric Power	27.51%	275
Duke Energy Midwest (Ohio & Kentucky)	6.62%	66
Dayton Power & Light	4.32%	43
Duquesne	3.86%	39
Commonwealth Edison	30.16%	302
Total	100.00%	1,000

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- **South Carolina Regional Transmission Planning Participants (“SCRTP”) to TVA – 1000 MW (2016, Step 1 Evaluation)**
 - Type of Transfer: Generation to Generation
 - Source: Generation within the SCRTP
 - The generation to source the transfer will be based upon the load serving ratio of SCE&G and SCPSA provided that there is sufficient existing generation “on-peak” to supply the transfer amount. The resulting allocation is shown in Table 4 below.
 - Sink: Generation within TVA’s area.

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Table 4: SCRTP to TVA – Source Allocation

Participating Transmission Owners	Participation Factor (%)	MW Allocation
South Carolina Electric & Gas	51.59%	516
Santee Cooper	48.41%	484
Total	100.00%	1,000

- **PJM West to VACAR – 1000 MW (2016, Step 1 Evaluation)**
 - Type of Transfer: Load to Generation
 - Source: Uniform load scale of the PJM West area.
 - In 2016, it is anticipated that First Energy and Duke Midwest will both be part of PJM West and, therefore, they will be included in the source of this transfer. The resulting allocation is shown in Table 5 below.
 - Sink: Generation within VACAR.
 - This transfer will be allocated to the participating transmission owners in VACAR by the ratio of their load to the total load of all of the participating transmission owners in VACAR. The resulting allocation is shown in Table 6 below.

Table 5: PJM West to VACAR – Source Allocation

PJM West Participants	Participation Factor (%)	MW Allocation
Allegheny Power	10.08%	101
First Energy	17.44%	174
American Electric Power	27.51%	275
Duke Energy Midwest (Ohio & Kentucky)	6.62%	66
Dayton Power & Light	4.32%	43
Duquesne	3.86%	39
Commonwealth Edison	30.16%	302
Total	100.00%	1,000

Table 6: PJM West to VACAR – Sink Allocation

Participating Transmission Owners	Participation Factor (%)	MW Allocation
Progress Energy Carolinas	30.93%	309
Duke Energy	45.99%	460
South Carolina Electric & Gas	11.91%	119
Santee Cooper	11.17%	112
Total	100.00%	1,000

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- **Progress Energy Carolinas to the Southeast – 2000 MW (2020, Step 1 Evaluation)**
 - Type of Transfer: Generation to Generation
 - Source: Five injection points of 400 MW each at the following substations in the Carolinas
 - Southport 230 kV Substation (Bus # 304601)
 - Morehead City 115 kV Substation (Bus # 304060)
 - Bayboro 230 kV Substation (Bus # 304462)
 - Scotts Hill 230 kV Substation (Bus # 304501)
 - Morehead Wildwood 230 kV Substation (Bus # 304497)
 - Sink: Generation within the Southeast Sub-Region of SERC and the FRCC.
 - 300 MW will sink to the transmission owners in the FRCC that have ties to the Southern Balancing Authority.
 - 1700 MW will sink to the transmission owners in the Southeast Sub-Region and will be allocated based upon the ratio of their load to the total load included in the sub-region. The resulting allocation is shown in Table 7 below.
 - Participating Transmission Owners will coordinate with the FRCC in order to identify constraints within the FRCC, as well as potential solutions that are attributable to this transfer request.

Table 7: Progress Energy Carolinas to the Southeast – Sink Allocation

Participating Transmission Owners	Participation Factor (%)	MW Allocation
Southern Balancing Authority	81.0%	1620
SMEPA	1.6%	32
PowerSouth	2.4%	48
FRCC	15.0%	300
Total	100.00%	2,000

Study Criteria

The study criteria with which results will be evaluated will include the following reliability elements:

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

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Case Development

- For year 2016 evaluations, the 2010 MMWG, 2016 Summer Peak case will be used for systems external to the systems of the Participating Transmission Owners as a starting point for the analysis.
- For year 2020 evaluations, the 2010 MMWG, 2021 Summer Peak case will be used for systems external to the systems of the Participating Transmission Owners as a starting point for the analysis.
- Each Participating Transmission Owner will provide an updated, detailed internal model (or idevs) for 2016 and 2020 that will be utilized to update the MMWG cases, if necessary.
- Each Participating Transmission Owner will include all Confirmed, long-term firm transmission reservations and potential roll-over of Confirmed, long-term firm transmission reservations while assessing their respective area.

Methodology

- Power flow analyses will be performed based on the assumption that thermal limits will be the controlling limit for the reliability plan. Voltage, stability, and short circuit studies may be performed if circumstances warrant.
- The Participating Transmission Owners will exchange contingency and monitored element files so that each can test the impact of the other company's contingencies on its transmission system.
- A Step 1 evaluation consists of a high level screen of the requested transfer. The high level screen identifies transfer constraints and likely transmission enhancements to resolve the identified constraints. The Step 1 Evaluation reports out on elements of 161 kV and higher; and where warranted by the transmission owner, elements operating at lower voltage levels. The Participating Transmission Owners will also provide approximate costs and timelines associated with the identified transmission enhancements to facilitate the stakeholders' determination of whether they have sufficient interest to pursue a Step 2 evaluation.
- A Step 2 evaluation consists of a detailed evaluation of the requested transfer. This evaluation will identify the final proposal of transmission enhancements to resolve the identified constraints. The Step 2 Evaluation reports out on all elements within each of the Participating Transmission Owners' service areas. The Participating Transmission Owners will also provide detailed cost estimates and timelines associated with the identified transmission enhancements to aid with the stakeholders' determination of financially sponsoring said enhancements.

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- PSS/E and/or MUST will be used for the study.
- Generation, interchange, and other assumptions will be coordinated between Participating Transmission Owners and Stakeholders.

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 Participating Transmission Owners and Stakeholders are aware of potential issues and appropriate steps can be identified to correct these issues.

Each Participating Transmission Owner will report results within their respective service area based on:

- Thermal loadings greater than 90% for facilities that are negatively impacted by the proposed transfers
- Voltages appropriate to each Participating Transmission Owner's planning criteria

Assessment and Problem Identification

- Each Participating Transmission Owner will run assessments for their corresponding service territory. Each Participating Transmission Owner will apply their respective reliability criteria for its facilities and will document the reliability constraints resulting from their assessments.

Solution Development

- The Participating Transmission Owners, with input from the Stakeholders, will develop potential solution alternatives due to the economic studies requested by the stakeholders.
- The Participating Transmission Owners will test the effectiveness of the potential solution alternatives using the same cases, methodologies, assumptions and criteria described above.
- For Step 1 evaluations, the Participating Transmission Owners will develop rough, planning-level cost estimates and construction schedules for the selected solution alternatives.
- For Step 2 evaluations, the Participating Transmission Owners will develop detailed cost estimates and construction schedules for the final transmission enhancements identified.

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Report on the Study Results

The Participating Transmission Owners will compile all the study results and prepare a report for review by the Stakeholders. The report will be provided in two phases. The first phase will be a draft report in which the Participating Transmission Owners will seek additional feedback on the study work performed to date. The second phase will be a final report (open for comments from stakeholders) that will contain the following:

- A description of the study approach and key assumptions for the five Economic Planning Studies
- For each Economic Planning Study, the results of that study including:
 1. Limits to the transfer
 2. Selected solution alternatives to address the limit
 3. Cost estimates and construction schedules for the selected solution alternatives