

# 2009-2010 SIRPP Study Scope Document

## FINAL

### June 2010

## **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 2010 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):
  - Entergy to Georgia Integrated Transmission System (“ITS”) – 2000 MW (2014, Step 2 Evaluation)
    - Type of Transfer: Generation to Generation
    - Source: Same as utilized in the Step 1 evaluation.
      - Generation within Entergy
    - Sink: Same as utilized in the Step 1 evaluation.
      - Generation within the Georgia ITS
  - MISO to TVA – 2000 MW (2015, Step 1 Evaluation)
    - Type of Transfer: Generation to Generation
    - Source: Uniform load scale of the MISO area.
      - In 2015, First Energy will not be a part of MISO and, therefore, is not included in the source of this transfer.
    - Sink: Generation within TVA’s area.
  - Kentucky to Georgia ITS – 1000 MW (2015, Step 1 Evaluation)
    - Type of Transfer: Generation to Generation
    - Source: Three existing substations in Kentucky.
      - Avon 345 kV Substation (Bus # 341036)
      - Paradise 500 kV Substation (Bus # 360042)
      - Wilson 345 kV Substation (Bus # 340561)
    - Sink: Generation within the Georgia ITS.
  - MISO & PJM West (SMART) to SIRPP – 3000 MW (2018, Step 1 Evaluation)
    - Type of Transfer: Load to Generation
    - Source: Each of the following MISO and/or PJM participants’ load will be scaled by 500 MW.
      - Ameren Missouri
      - Ameren Illinois
      - Alliant Energy West
      - Mid-American Energy

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- Commonwealth Edison
- AEP (Ohio Power, IM Power, CS Power Zones only)
- Sink: Generation within the SIRPP. The transfer will be allocated to the Participating Transmission Owners by the ratio of the load to the total load of all of the Participating Transmission Owners. See Table 1 below for the area participation factors and MW allocation for the sink of this transfer.
  
- SPP to SIRPP – 3000 MW via HVDC (2018, Step 1 Evaluation)
  - Type of Transfer: Generation to Generation
  - Source: Two 1500 MW generators interconnecting to the following substations (one per substation).
    - Bowen 500 kV Substation (Bus # 380020)
    - Montgomery 500 kV Substation (Bus # 360044)
  - Sink: Generation within the SIRPP. The transfer will be allocated to the Participating Transmission Owners by the ratio of the load to the total load of all of the Participating Transmission Owners. See Table 1 below for the area participation factors and MW allocation for the sink of this transfer.

**Table 1: 2018 SIRPP Sink Participation Factors and MW allocation**

<b>Participating Transmission Owners</b>	<b>Participation Factor (%)</b>	<b>MW Allocation</b>
Southern Balancing Authority	30.48%	<b>914</b>
PowerSouth	0.55%	<b>17</b>
South Mississippi Electric Power Association	0.57%	<b>17</b>
Duke Energy Carolinas	12.19%	<b>366</b>
Entergy Companies	15.48%	<b>464</b>
Progress Energy Carolinas	8.29%	<b>249</b>
South Carolina Electric & Gas	3.13%	<b>94</b>
Santee Cooper	2.35%	<b>71</b>
Tennessee Valley Authority	22.26%	<b>668</b>
E. ON U.S.	4.70%	<b>141</b>
<b>Total</b>	<b>100.00%</b>	<b>3,000</b>

**Study Criteria**

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

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

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#### Case Development

- For years 2014 and 2015 evaluations, the 2009 MMWG, 2015 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 2018 evaluations, the 2009 MMWG, 2020 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 2014, 2015, and 2018 that will be utilized to update the MMWG cases.
- 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