

PUBLIC DISCLOSURE

2023 Solar Sensitivity Continued Study Scope

Background

As solar generation continues to spread throughout Southern Balancing Authority Area (SBAA), the transmission system will continue to experience thermal constraints as certain levels of solar penetration are achieved.

This study continues the 2022 Solar Sensitivity Studies which utilized linear transfer analysis, and AC Contingency Analysis. This continued study will be based on the results and recommendations from the 2022 Solar Sensitivity Study to verify system impact of proposed strategic projects and develop additional system upgrades with specific assumptions of future solar generation expansion locations. By running phased analyses, this study will examine multiple strategic projects to test the effectiveness of resolving system constraints by potential solar generation expansion.

Purpose

Analyze and develop strategic projects that support expansion of solar resources in south/central Georgia. This study utilizes PSS/E software to conduct AC contingency analysis, simulating the impact of multiple strategic projects with growth of renewable resources in zones 213, 214, 215, 216, 218, 219; collectively.

Based 2022 Solar Sensitivity Study results several strategic projects are proposed, and given projects location and land availability the 2023 Solar Sensitivity Continued Study will evaluate the effectiveness of projects in the following phases, which each phase will include the projects listed in previous phase:

Phase 1: Hatch – Wadley Primary 500 kV project

Phase 2: McGrau Ford – Middle Fork 500 kV, Douglas – Pine Grove Primary 230 kV, South Bainbridge – Climax – Hopeful – Raccoon Creek 230 kV, Thomasville – East Moultrie 230 kV projects

Phase 3: Bonaire – North Tifton 500 kV, Raccoon Creek – Tazewell 230 kV, Talbot County – Scherer 500 kV, Scherer – Wadley 500 kV projects

Since Phase 1 project will be included in all phases of the study, it will be examined with all compliance load level cases with unit outs and area maxes, but no solar generation expansion. Hatch – Wadley 500 kV project will be a part of the base cases studied in the next phases.

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Year(s):	2028 through 2033
Load levels:	Summer Peak (S), Dusk Shoulder (H) Daylight (D) Off Peak (O) Southern Balancing Authority Area (SBAA) Power Flow Models
Base case origination:	2023 version 2 Series
Generation dispatch:	Base Case, area maxes and unit outs
Monitored Areas:	Georgia; 115 kV and above (plus ties)
Solar Generation Expansion:	0 GW
Contingencies:	N-1: Georgia; 115 kV and above plus ties 115 kV and above

Phase 2 & Phase 3 Study Parameters

Year(s):	2028 through 2033 (Phase 2) 2029 through 2033 (Phase 3)
Load levels:	Summer Peak (S), Daylight (D) Off Peak (O) Southern Balancing Authority Area (SBAA) Power Flow Models
Base case origination:	2023 version 2 Series
Generation dispatch:	Base Case, non-unit out
Monitored Areas:	Georgia; 115 kV and above (plus ties)
Solar Generation Expansion:	REDACTED
Contingencies:	N-1: Georgia; 115 kV and above plus ties 115 kV and above

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Study Case Phase 1 Assumptions

Hatch – Wadley Primary 500 kV line:

Hatch to Wadley Primary 500 kV line will be modeled with 100C triple 1113 ACSR, and with a length of 65 miles proximately.

Thermal Constraint Identification Methodology:

AC contingency analysis with unit outs and area maxes will be performed to identify potential impact of Hatch – Wadley Primary 500 kV line. There will be no additional solar generation in the base cases.

Study Case Assumptions (Phase 2 & Phase 3)

McGrau Ford – Middle Fork 500 kV

McGrau Ford to Middle Fork 500 kV line will be modeled with 100C triple 1113 ACSR, and with a length of 64 miles proximately.

Douglas – Pine Grove Primary 230 kV

Douglas to Pine Grove 230 kV line will be modeled with 170C ACSS 1351.5, and with a length of 65 miles proximately.

South Bainbridge – Climax – Hopeful – Raccoon Creek 230 kV

South Bainbridge to Climax to Hopeful to Raccoon Creek 230 kV line will be modeled with 170C ACSS 1351.5, and with a length of 48 miles proximately.

Thomasville – East Moultrie 230 kV

Thomasville to East Moultrie 230 kV line will be modeled with 170C ACSS 1351.5, and with a length of 30 miles proximately.

Bonaire – North Tifton 500 kV

Bonaire to North Tifton 500 kV line will be modeled with 100C triple 1113 ACSR, and with a length of 75 miles proximately.

Raccoon Creek – Tazewell 230 kV

Raccoon Creek to Tazewell 230 kV line will be modeled with 170C ACSS 1351.5, and with a length of 70 miles proximately.

Talbot County – Scherer 500 kV

Talbot County – Scherer 500 kV line will be modeled with 100C triple 1113 ACSR, and with a length of 67 miles proximately.

Scherer – Wadley 500 kV

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Scherer – Wadley 500 kV line will be modeled with 100C triple 1113 ACSR, and with a length of 82 miles proximately.

Thermal Constraint Identification Methodology:

AC contingency analysis will be performed to identify potential impact of future solar generation expansion. The existing solar generation in resources in zones 213, 214, 215, 216, 218, 219 are identified below based on the latest PSS/E model of years 2028 -2033,

Sites from the 2022 Generation Interconnection queue will be selected based on location and assigned with the amount of MVA ratings that are proportion to the number of requests they receive. The selected sites will be modeled for future solar expansion, and these sites are compiled from Generation Interconnection queues from GPC, GTC, and MEAG.



Possible expansion
sites (version 1).xlsx

The generators at the stations identified above will be uniformly increased so the total solar generation in zones 213, 214, 215, 216, 218, 219 will reach the following amounts below,

- 2028: REDACTED
- 2029: REDACTED
- 2030: REDACTED
- 2031: REDACTED
- 2032: REDACTED
- 2033: REDACTED

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Study Criteria

1. Transmission line and transformer bank loadings are not to exceed normal rating (Rate B) under non-contingency conditions.
2. Transmission line and transformer bank loadings are not to exceed normal rating (Rate B) under contingency conditions
3. Future planned projects will be considered during the analysis. Topology will be consistent with latest approved SBAA expansion plan.

Study Methodology

- Analysis to be performed in accordance with the planning events and system performance criteria in TPL-001 Table 1.
 - Normal (P0) and single contingency (P1, P2.1, P2.3 EHV) conditions will be examined for each case with the generation dispatch unchanged from the base cases.
- AC Contingency analysis will be performed to identify thermal or voltages issues resulting from additional solar generation and sinking to SBAA load.