E2.03 – Texas State Sunbeams

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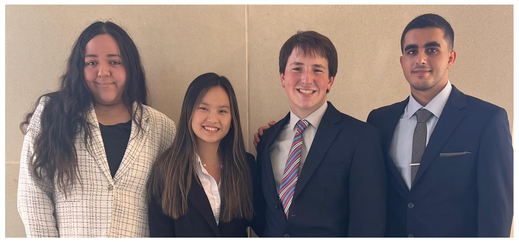
Sponsor: TRC

Power Impact Study of Solar Generator Integration Onto Existing 24kV Distribution System

Meet the Team



Sarah Ortiz | Anna Collingwood | Nick Merritt | Musa Khalaf (PM)

Project Background

- TRC and the Ingram School of Engineering have collaborated to conduct a system impact study that analyzes how a proposed 5MW solar farm could affect an existing 24kV power distribution system.
- The implementation of solar generation within a distribution system reduces carbon emissions and creates a cleaner way for power distribution.

Subsystems Overview

- **Pre-Power Flow Analysis**

Analyze system before solar farm installation

- **Solar PV Creation/Integration**

Creation and addition of solar farm at the five candidate connectivity points. Ensure full functionality of solar farm

- **Short Circuit Analysis**

Collects pre & post fault data at interconnection point, Analyzes protection devices, Suggests upgrades

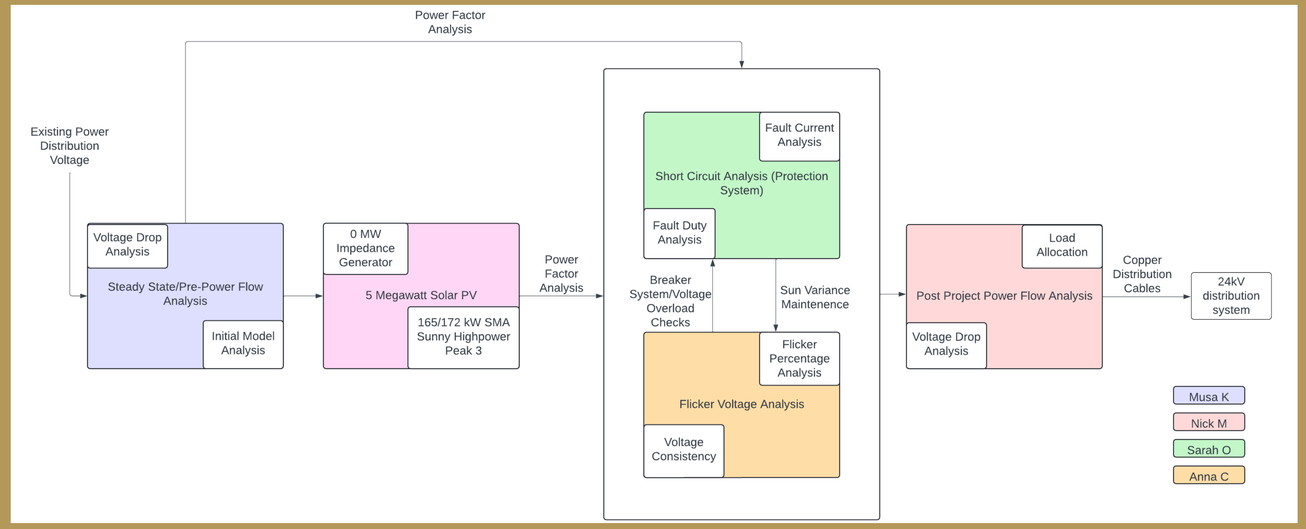
- **Flicker Voltage Analysis**

Collect pre and post flicker data at point of interconnection and throughout the system

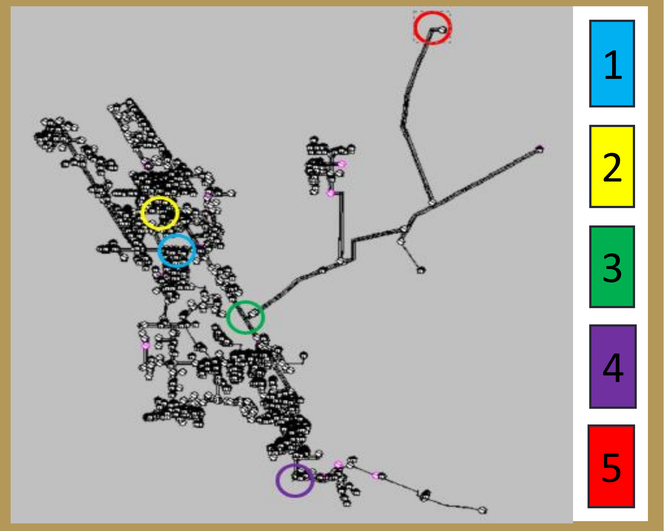
- **Post-Power Flow Analysis**

Analyze system after solar farm installation

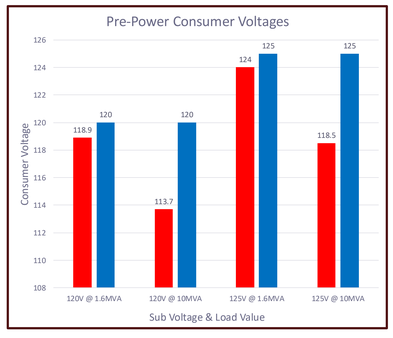
Subsystem Analysis Block Diagram



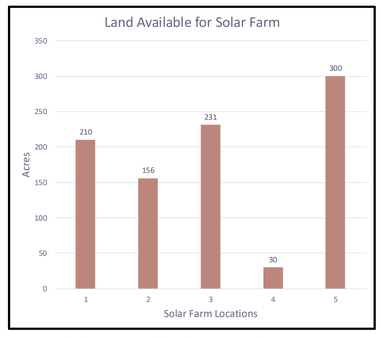
Base Model With Locations



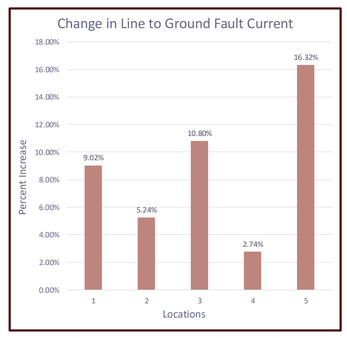
Location Data



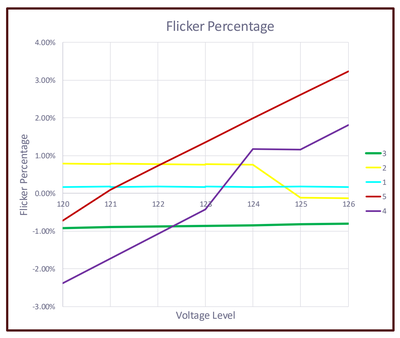
Consumer voltage must stay between 118 V – 126 V



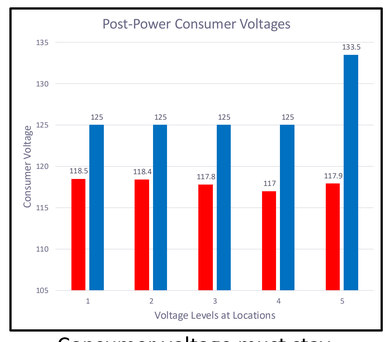
A minimum of 50 Acres is necessary for Solar Farm Construction



The increase in available fault current should be less than 10%



A positive flicker voltage below 5% is desired



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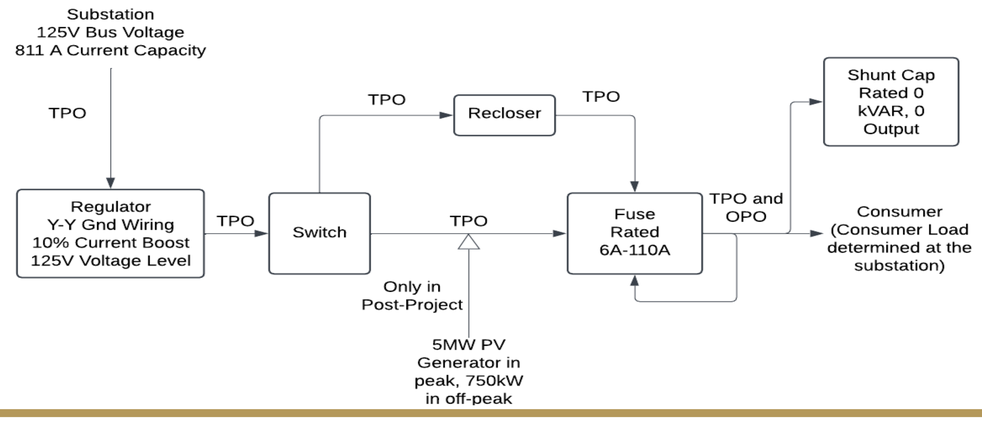
Power Distribution System Block Diagram



Final Decision

Location 1

- Land acreage available is more than 50 acres
- Available fault current increased by 9.02%
- Flicker percentage is positive and closest to zero, meaning less flicker
- Post Power voltage stays between 118V – 126V

Acknowledgements

Sponsor: TRC

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Course Instructor: Mr. Stevens