



2023 Study Program Changes to Grid Strength

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CIGS Scope

- This proposed study will be using short-circuit ratio (SCR) as a metric to represent voltage stiffness of a grid.
- A bus that has low SCR may exhibit or contribute to unacceptable system performance characterized by degraded voltage and frequency response and increased likelihood of system instability.

Key Reliability Questions

- What are the impacts with an increase of IBR's in the system in regard to SCR?
- What are the potential consequences of low SCR in certain buses of the system?

Approach

- Starting with four entities (Northwest, PAC, SCE, Tri-State) 2023 Operating Short Circuit model
- Replacing 20% of the synchronous generation with IBRs in ASPEN OneLiner
- As time permits, replacing 40%, 60%, 80% of the synchronous generation with IBRs
- Review and analysis results

Generation

Area	Total amount of generation (MW)	Amount being replaced (MW)
SCE	3,057	611
Northwest	5,099	1,020
Tri-State	1,485	297
PAC	8,775	1,755

Unanticipated Issues

- Power flow to short-circuit model
- Impedance vs. MW/MVAR
- Calculating generation
- Retirements, what is in which case?
- Modeling IBRs

Process

Generator Data

At bus 4868 CRAIG G1 22.kV

Unit ' 1' On-Line	Edit
Unit ' 2' On-Line	On/Off-Line
Unit ' 3' On-Line	New
Unit ' 4' On-Line	Delete
Unit ' 5' On-Line	

Internal V-Source

p.u.= Ref. angle=

Current Limits (A)

A: B:

Power Flow Regulation

☒ Regulates voltage ☐ Fixed P+jQ output

Hold V= pu at

Memo:

Tags=None

Done Help

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