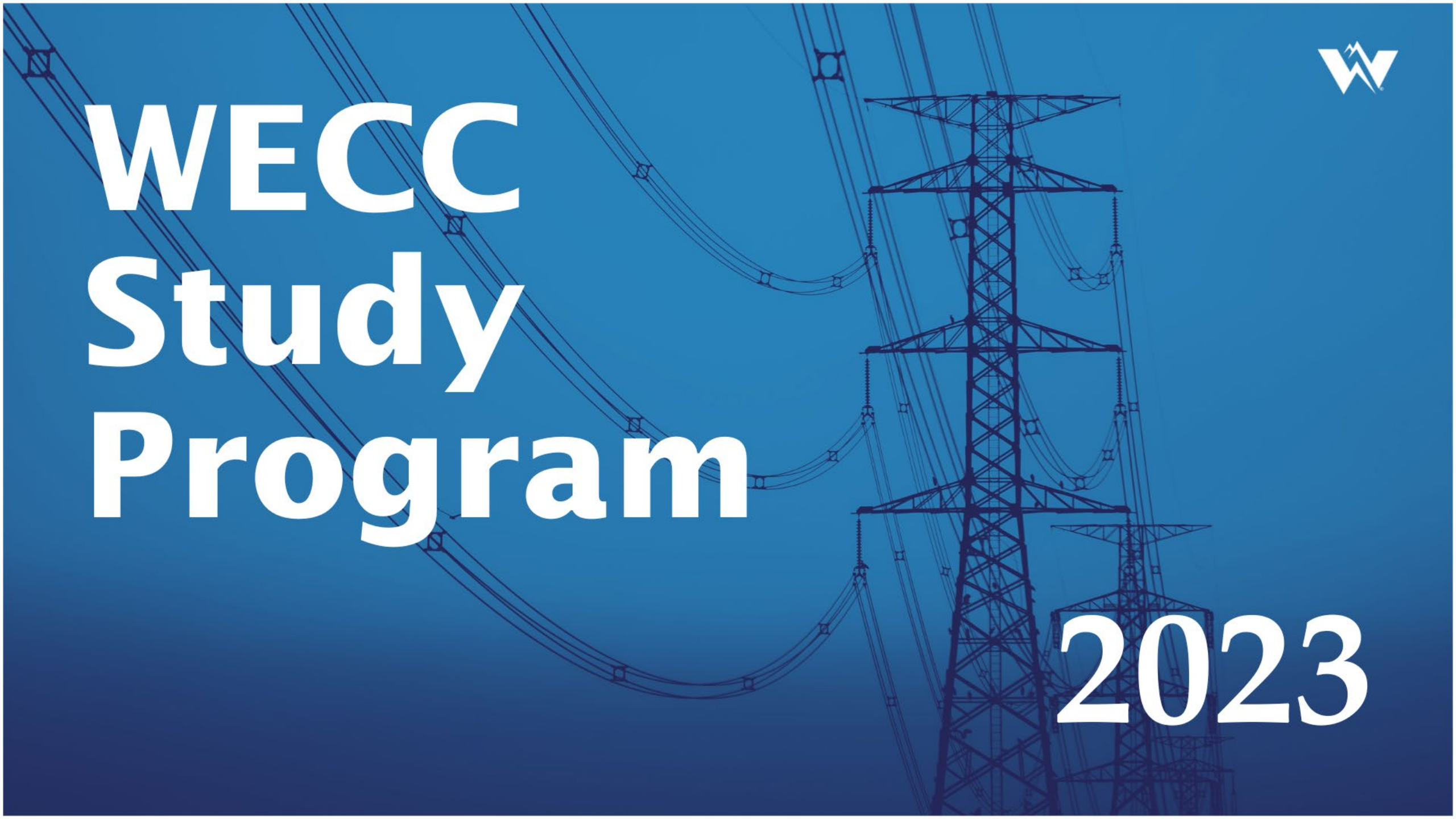
WECC Study Program

2023



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Purpose and Context

WECC 2023 Study Program

October 19, 2022

Saad Malik

Director, Reliability Planning

WECC

Workshop Format

WECC 2023 Study Program

October 19, 2022

Jon Jensen
Engineer, System Adequacy Planning

Katie Rogers
Senior Engineer, System Adequacy Planning

Workshop Goals

- Studies compiled based on:
  - Previous Study Program cycle
  - WECC RRPs
  - RAC groups
- For your consideration:
  - Are these studies on your radar?
  - What is missing?

Workshop Format

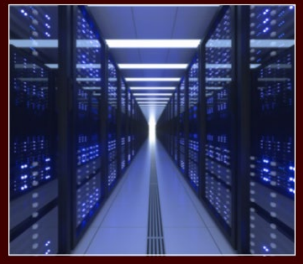
CLEAN ENERGY SCENARIOS

CHANGES IN SYSTEM INERTIA

EXTREME NATURAL EVENTS

VARIABILITY IN LOADS & RESOURCES

IMPACT OF HIGH DISTRIBUTED ENERGY RESOURCES



CYBERSECURITY

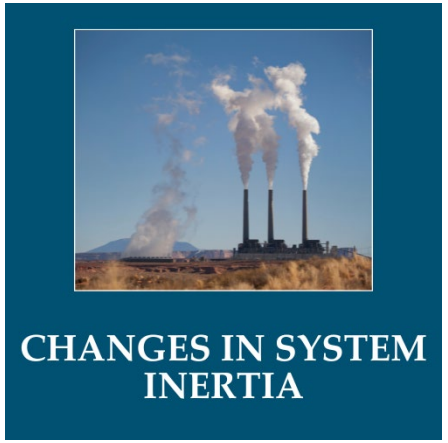
OTHER

Clean Energy Scenarios

- Long Duration Energy Storage—In Progress, BK Ketineni
- Scenario Work Group Proposal—SWG

Changes in System Inertia

- Evaluate changes in generation resource using short circuit ratio (SCR) by comparing 2019 SCR to 2022 SCR using short circuit data—Enoch Davies
- Study impact of grid-forming inverters, apply spring conditions with low inertia—Doug Tucker



Extreme Natural Events

- Extreme cold weather event: Load is higher than normal with reduced gas availability and reduced hydro in the Northwest—Katie Rogers
- High clean energy with extreme natural event: 80–90% clean energy with higher load than normal and reduced hydro in the Northwest—Tyler Butikofer
- Extreme weather with high DER: Load is higher than with high penetration of DER—Tyler Butikofer

Variability in Loads and Resources

- Impact from heat waves with hybrid BESS—Katie Rogers
- High renewable penetration with low renewable performance—Katie Rogers

Impact of High DER

- Does reduction of use of thermal lead to system instability when DER is offline?—Nick Hatton
- Study potential reliability risk/reward with potential inverter capabilities—Nick Hatton
- Research into risk of inverter instability (is it the model or reality?)—Nick Hatton
- Integration of high DER with EV/battery integration—Jon Jensen
- High DER with high loads, e.g., 1-in-20 loads, how much is too much?—Jon Jensen
- High DER case: DG-BTM PV and/or battery storage added to the distribution side to study system reliability—Arkadeep Das

Cybersecurity

- System control equipment (e.g., RC, IBR, DSM aggregations, other) loss due to hack—Doug Tucker

Other

- Electrification Study–Electrification of Industry/Agriculture/Residential/Transportation(2035 ZEV)–No new gas—Jon Jensen
- Virtual Power Plants – (BTM resources paired with batteries and management system) Do these make the system more robust?—Jon Jensen

Next Steps

- Stakeholder survey—Responses due October 28, 2022
- StS meeting November 14–15, 2022
- Advisory group kick-off meetings—Year-end 2022
- Scope studies—January 2023

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Electric Reliability and Security for the West

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