

Variability in loads and resources (VLAR)

Assessment Introduction and Purpose:

The purpose of this study is to determine the impact of variability in loads and resources on the western interconnection. This study will model the variability in loads and resources in both the PCM and Power Flow to identify BPS reliability risks related to extreme variability in loads and changing generation portfolio.

Team Lead and WECC staff support:

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Key Reliability Questions:

How might the reliability of the bulk power system be impacted by

1. Covid-19 (Pandemic Impact)
 - a. Project delays associated with Covid-19 and economic recession
 - b. TOU shift in load, and lower projected load.
2. Weather impact on renewable generation
 - a. Generation impact due to changing weather patterns like prolonged solar and wind unavailability.
 - b. NREL energy futures load forecast to study the impact on load forecast.
3. High penetration of Battery Energy Storage (BES),
 - a. BES and renewable integration
 - b. 4-hr BES and 6-hr BES
 - c. Load impact due to charging of this additional BES.

Suggested Scenarios:

Scenario	Generation	Load
Business as usual (Reference Scenario)	ADS PCM	ADS PCM
Covid-19 Impact	Cancellation and delays in project construction, retirement date changes	TOU-shift in load, Lower projected load
Storage	High penetration of BES, Hybrid renewable integration, 4 hr BES. 6 hr BES sensitivity.	ADS PCM + Storage charging impact
Weather impact on renewable generation	Generation impact due to weather pattern, (renewable generation profiles)	NREL load forecast

Reliability Risk Priorities:

The study will address the following Reliability Risk Priorities:

- Changing resource mix
- Load impacts

Assessment Requirements:

(What Tools, Models, Data are required to accomplish this study?)

- **Tools –**
 - **PCM (Gridview)**-Use to simulate an 8,760-hour PCM on the model
 - **Power Flow (PSLF)**-Use to simulate a Power Flow study on model
- **Models**
 - PCM
 - Power Flow
 - Resource planning models
- **Data**
 - 2030 ADS PCM
 - 2030 ADS Power Flow
 - Need Electrification/load forecast data
- **Collaborators**
 - National labs



Study outline:

- Detailed scoping of study – VLAR Team (11/11/2020-12/15/2021)
- Develop and implement loads and resource planning models for Power Flow and PCM – VLAR Team (12/15/2020-3/15/2021)
- Starting with the 2030 ADS PCM/Power Flow - Build a case with VLAR models implemented – VLAR Team (3/15/2021-5/15/2021)
- Run cases PCM – WECC Staff (5/15/2021-5/30/2021)
- Select and export hour from PCM to Power Flow – VLAR Team/WECC Staff (5/30/2021-6/4/2021)
- Solve Power Flow– WECC Staff (6/4/2021-6/18/2021)
- Power Flow Dynamics - WECC Standard Dynamic Contingencies– WECC Staff (6/18/2021-7/2/2021)
- Analysis and Report
 - Analyze the study - VLAR Team (7/2/2021-7/14/2021)
 - Create a study report - VLAR Team (7/14/2021-7/30/2021)

Timeframe of Study:

Year 10

Reporting Metrics:

- Resource Adequacy
 - Unserved energy by BA or Area
 - Transmission congestion
 - Generation unavailability
 - Generation dispatch
- Power Flow
 - Thermal constraints
 - Transient voltage stability
 - cascading outages
 - Amount of load loss
 - Duration of load loss
 - Voltage violations
 - Islanded systems