smarter grid solutions

MITSUBISHI ELECTRIC | MITSUBISHI ELECTRIC POWER PRODUCTS, INC.

CONSULTANCY & ANALYSIS

SERVICES FOR UTILITIES & DEVELOPERS

WWW.MEPPI.COM

OUR MISSION

We are dedicated to optimizing DER integration by providing expertise in the study and implementation of DERMS for efficient operations. Our goal is to de-risk investments and unlock the full value of DERs, driving a smarter and more sustainable energy future.

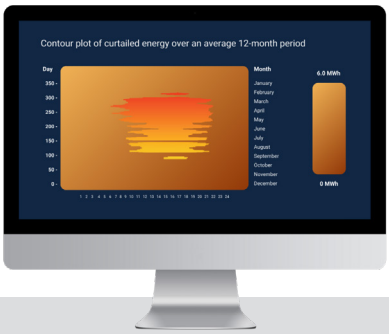
CUSTOMERS

- Distribution Utilities
- Independent System Operators
- DER Developers
- Virtual Power Plants
- Smart EV Charging Owners
- Government Bodies
- Regulators

SOUTHERN CALIFORNIA EDISON®

nationalgrid

AVANGRID



As a DERMS vendor in the industry for over15 years, we bring extensive expertise in solving complex DER-related challenges and optimizing grid operations. We offer customizable solutions and utilize specialized tools to meet the unique needs of our customers. Our proven track record ensures seamless integration, informed financial decision making and operational efficiency, helping our customers stay ahead in the evolving energy landscape.

Consulting Services

UTILITY SERVICES

Pre-DERMS Services

- DERMS Use Case Identification
- DERMS Value/Benefit Case Analysis
- DERMS Capacity/Headroom Release Study
- Grid Modernization Related Analysis
- Vehicle – to – Grid (V2G) Analysis
- Net-Zero Carbon Goals Road Mapping

During DERMS Implementation

- Requirement Elicitation, High Level Design and Architecture
- Constraint/Curtailment Analysis
- System Configuration Study
- Process/Procedure Development
- Requirements and Policy Review

Post DERMS Support

- System Performance Evaluation And Optimization
- DER Curtailment Analysis
- System Expansion And Configuration
- Defining New DERMS Functions And Value Case Assessment

DEVELOPER SERVICES

Pre-Interconnection

- Network capacity/headroom screening study
- DER flexible interconnection analysis and value case assessment
- Generator interconnection assessments
- Probabilistic outage assessment (estimating generation site curtailment due to direct transfer trip)

During Interconnection

- Connection Time Mitigation
- Constraint Mitigation Analysis
- Flexible Interconnection study
- Business objectives mapping to DERMS implementation
- Battery Storage Coordination and Constraint Off-setting Studies
- BESS Optimization Study

After Interconnection

- DERMS or Flexible Interconnection configuration setting
- DERMS Operational Reporting
- DERMS configuration optimization and constraint/curtailment minimization
- Project Re-evaluation (technology change, network config change, or others)

Utility Case Studies

AVANGRID: CLCPA

In 2020, SGS played an essential role in supporting Avangrid's response to the "Implement Transmission Planning Pursuant to the Accelerated Renewable Energy Growth and Community Benefit Act," an order issued by the State of New York Public Service Commission. In the Avangrid Climate Leadership and Community Protection Act (CLCPA) project, SGS supported to complete the "Utility Study" report to submit to The New York Public Service Commission.

The objective of the "Utility Study" was to address the increasing demand for DER in Avangrid's service territories within NYSEG and RG&E. This growth was expected to create substantial capacity requirements and expensive system upgrades. Through this study, SGS identified the locations where DER growth will trigger capacity restrictions and studied the smart solutions that can defer, avoid, or complement these upgrades through strategic investments, ultimately reducing costs and enhancing cost-effectiveness.

This Study employed a top-down, econometric-driven assessment methodology that combined technology cost and performance, power system costs and constraints, and DER deployment drivers and barriers to arrive at the overall cost / benefits from investments to stakeholders – utility, ratepayers, and DER developers.

In this project, SGS built the study model to identify the trends and key impact areas (i.e. "Hot Spots") with respect to DER interconnection across the utility service territories. These Hot Spot areas were then modelled with a set of DER deployment scenarios to assess system impact when applying various utility investments – including conventional upgrades (e.g. transformer upsize, line re-conductor, adding regulation equipment) and smart solutions (e.g. DER flexible interconnection, BESS for grid support, smart inverter controls).

The project's results presented a comprehensive mapping of utility investments categorized by DER capacity, system location, and their associated impacts. SGS employed this methodology across the utility service territory to pinpoint opportunities for expanding DER hosting capacity, assess the feasibility of various technologies, and determine their cost-effectiveness. As a result, SGS was able to formulate recommendations that align with Avangrid's asset investment strategy, addressing the mandates outlined in the PSC Order.

SPEN: CONSTRAINT ANALYSIS TOOL

The evolving energy landscape in the UK is undergoing significant transformation due to the rollout of Active Network Management (ANM), the outcomes of Ofgem's Access and Forward-Looking Charges Significant Code Review (Access SCR), and the transmission technical limits process within ongoing transmission reforms. These regulatory and technical changes are reshaping how networks manage flexibility, curtailment and new connections, establishing the need for a more efficient approach to constraint analysis.

To address these challenges, SGS has delivered a Constraint Identification and Curtailment Assessment Tool to SP Energy Networks, where the tool delivers the following functions:
1. Perform Automated Power Flow Analysis: perform automated studies to identify relevant distribution network constraints for all SP Energy Networks' network areas.

2. Principles of Access Build-in: to manage multiple, interactive connection requests at the same time: Last in First Out (LIFO) is the default principle of access. The tool is also capable of integrating smarter options (e.g., shared, technical best, market-led) to minimize curtailment for all connections.
3. Customized Analysis: calculate the likely level of MWh curtailment and hourly curtailment limits for a new connection and integrate this communication to customers within SP Energy Networks' connection offers, under the outcomes of the Access SCR and/or GSP Technical Limits. Furthermore, this information can be used by SP Energy Networks alongside an Advanced Curtailment Estimate to produce a "Second Opinion" on curtailment outside the proscribed regulated methodologies.

4. Produce Curtailment Report: the tool processes and outputs will be accessible by Design Engineers by auto-generating comprehensive reports based on the curtailment assessment data.

This constraint identification and curtailment assessment tool with automated power flow analysis streamlines the study process, minimize manual effort, and ensures accuracy. This tool supports SP Energy Networks' goal for a more efficient way to perform analysis, aligning with future grid flexibility needs and regulatory reequipments.

Developer Case Studies

SCENARIO-BASED CURTAILMENT ANALYSIS FOR GENERATION SITES

Our consultancy specializes in scenario-based curtailment analysis, helping developers access and mitigate grid constraints, gain more knowledge in flexible interconnection solutions to support strategic generation site investments. The curtailment analysis involves a comprehensive assessment of how energy assets can affect the grid headroom. By modeling various grid conditions and simulating different scenarios of DER operations, we provide insights into potential curtailment risks, project site impact analysis, and optimization strategies to maximize energy output and financial returns.

PROBABILISTIC OUTAGE ANALYSIS FOR RISK MITIGATION ON GENERATION PROJECTS

The probabilistic outage analysis evaluates the impact of direct-trip outages on a generation project's export capabilities (or both import and export for BESS), with curtailment defined as limitations on the site's import or export capacity. Using a time-series approach, we model outage behavior based on historical outage data for specific equipment that may affect the project site. We analyze the occurrence, frequency, and duration of direct-trip events, incorporating future reinforcement plans to assess potential long-term impacts. We run Monte Carlo Simulations to derive sample-based approximations of outages, providing a robust probabilistic assessment where we can extract P10, P50, P90 results for project risk assessment.

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