



Statement of Qualifications

Helping utilities and energy providers
embrace distributed energy resources as a
core part of their service

Sound Grid Partners, LLC

info@soundgridpartners.com

212 Broadway Ave. E. #22774, Seattle, WA 98122



Helping utilities and energy providers embrace distributed energy resources as a core part of their service

We do this by providing multi-faceted capabilities and experience developed over years of leading the expansion of DERs in the electric grid. We offer a suite of DER integration services and have earned a reputation for excellence in our support of client goals and objectives.

Sound Grid Partner's (SGP) clients include electric utilities and energy project developers across the United States. We have deep experience in electric grid operations and design, energy storage technology, and techno-economic modeling associated with grid operations.

Together, these skills make SGP the ideal partner for utilities or developers that are seeking to deploy energy storage, microgrid, and other DER projects utilizing the most up-to-date technical and commercial capabilities.



SGP knows the energy storage market. SGP's analytics and procurement support helped us launch our storage practice and move quickly on project opportunities.

Will Fischer, VP of Business
Development, Summit Ridge Energy



Our Services



DER Program Design

Diverse tools to design and implement a DER program including regulatory, techno-economic analysis, engineering, and commercial support.



Procurement Support

Comprehensive DER supply chain and procurement expertise including DER cost analysis, competitive procurements, and contract negotiation support.



Techno-Economic Modeling & Analysis

Suite of advanced analytics and modeling tools and services quantifying economic and technical feasibility and optimal design of DER projects.



DER Project Implementation & Operations

Support throughout the DER project delivery and operations life cycle: project management, contract compliance, asset operations, and maintenance.



Project Engineering

DER engineering services including technical studies, drawings, specifications, and engineering process management.



DER Expert Witness / Consultant

Independent technical expert services supported by highly experienced, credible subject matter experts leveraging evidence-based analysis.



SGP's experience covers just about every aspect needed to build a utility ESS program. They were our go-to resource as we built up our internal energy storage program and capabilities.

Steve Casey, Manager - Strategic Planning
Eversource Energy



Our Team



Dan Sowder, P.E.

Co-Founder & Principal



Tess Williams, Ph.D.

Co-Founder & Principal



Axel Schmidt, BS

Partner



Marley Cross, BA

Senior Power Systems Engineer &
Analytics



Caroline Piephoff, BS

Senior Power Systems Engineer



Isaac Kretzmer, Ph. D.

Power Systems Engineer



Xochitl Menchaca, ME

Senior Power Systems Engineer



Featured Projects

Market Integration and Testing

Client: Consumers Energy / Location: MI and MISO

SGP supported Consumers Energy in deploying the first ESS to act as a fast-ramping resource in the MISO regulating reserve market, including market registration, market integration testing, valuation analysis, performance assessment, and development of optimal bidding and control strategy.

DER Analysis and Procurement Support

Client: Summit Ridge Energy / Location: NY, MA, and ISO-NE

SGP has supported Summit Ridge Energy (SRE) with a suite of services across the full span of the development cycle of a cohort of solar and storage projects. To support the conceptual design process, SGP developed technical and financial analysis tools that enabled SGP and SRE to model expected performance in multiple commercial markets and generate key metrics for use in equipment specifications and project financing documents. To efficiently procure technology, SGP created and facilitated an energy storage Request for Proposals process that enabled SRE to competitively procure ESS deployment partners, supported the technical evaluation and choice of vendors, and acted on SRE's behalf to negotiate competitive solutions and robust contracts. SGP has contributed to interconnection filings, evaluated technology offerings for key fire safety compliance and certification requirements, and acted as SRE's partner in support of each stage of successful development.

Value of Solar and Storage

Client: Salt River Project / Location: AZ

SGP conducted a comprehensive survey of the Value of Solar and Storage at a vertically integrated utility. Working with subject matter experts at the utility, SGP facilitated a study process that efficiently surveyed all potential value streams including energy, capacity, ancillary services, transmission and distribution infrastructure deferral and grid services, and then carried out detailed analysis of high-potential value combinations. The results of the study have been used to inform future testing, procurement, and operations of solar and storage.

Techno-Economic Analysis and Conceptual Design

Client: Solar Developer and Energy Services Provider / Location: Middle East

As the technical experts on an international and cross-functional team, SGP led the valuation analysis, conceptual design, economic and financial analysis, and regulatory analysis for a pilot Virtual Power Plant (VPP) in the Kingdom of Jordan. SGP quantified value streams across all sectors of the power system to inform a pilot VPP design able to create value initially and in an evolving future system. SGP also conducted a gap analysis of regulatory and policy developments required for VPPs to provide maximum potential value in Jordan and briefed key stakeholders.

Independent Expert Services

Client: K&L Gates / Location: North America

SGP provided independent expert analysis and testimony related to technical and commercial energy storage matters in support of K&L Gate's energy storage practice.

Project History

Sound Grid Partners has supported dozens of diverse utility-integrated DER projects. Below is a summary of key services recently provided to our customers.

Year	Location	Customer	SGP services
2023	MISO	Utility	Conceptual design and project management support for a large BESS project to replace a retiring coal plant.
2023	USA-Southwest	Utility	Identification of distribution storage technologies and development of a roadmap for utility R&D activities in support of storage technology readiness
2022	USA-Southwest	Utility	Development of software and dispatch for inverter-based resources technical requirements
2022	USA-Southwest	Utility	Analysis of optimal combination of value streams and dispatch strategy for portfolio of 100+ MW solar + ESS and ESS projects
2022	USA	Grid Controls Technology	Benefit-cost analysis in support of grid-edge control technology product development and regulatory engagements
2022	NY	Developer	Analysis of VDER revenue potential for specific standalone ESS project located in Long Island.
2022	MISO	Developer	Techno-economic analysis of market revenue potential for ESS participating in MISO market services.
2022	USA	Independent Power Producer	Creation of an engineering standards document for ESS for use in contracting
2022	USA	Independent Power Producer	Development of a custom ESS dispatch analysis tool for techno- economic analysis, training, and on-going support for analysis
2022	USA	Independent Power Producer	Support of active transactions including technical due diligence, ESS dispatch and sizing analysis and optimization, market opportunity, technical and strategic advisory
2022	Washington	Landowner	Supported a large landowner in evaluating a proposed renewable energy lease agreement including revenue modeling, market comparables, and strategy advice
2022	ISO-NE	Utility	Conceptual design and regulatory filing support for three standalone ESS located in Connecticut for use in islanding for reliability purposes.
2022	Massachusetts	Utility	Conceptual design, analytics, and procurement advisory in support of ESS regulatory filing

Year	Location	Customer	SGP services
2022	Massachusetts	Utility	Administered competitive RFI for procurement of BESS equipment and services
2022	Massachusetts	Utility	Conceptual design, analytics, and procurement advisory in support of ESS regulatory filing
2022	USA-Southwest	Utility	Detailed technical analysis and updates of solar and storage PPA contracts to increase utility flexibility and dispatch of assets
2022	USA-Southwest	Utility	Identification and specification of R&D lab use cases, control hierarchy, communication protocols, and procedures
2022	USA-Southwest	Utility	Development of techno-economic modeling tools for utility distribution planners to evaluate BESS for distribution infrastructure deferral
2022	ERCOT	Landowner	Administered RFI process and engaged in negotiation of land lease terms with ESS developer
2022	MISO	Utility	Analysis and development of tool for estimating value of MISO market services for ESS deployed for grid services
2022	UT	Developer	Act as Owner's Engineer to evaluate EMS for pilot project
2022	USA-Southwest	Utility	Evaluation and summary of technical standards and features to improve operational flexibility and dispatch language in contract agreements
2022	ERCOT	Developer	Technical, commercial, and operational advisory services for ERCOT registered BESS
2022	USA-Southwest	Utility	Technical, analytic, and contracting advisory services for utility All Source Procurement
2022	USA-Southwest	Utility	Solar and storage operational readiness implementation and planning
2022	USA - Texas	Landowner	Analysis of renewable energy development potential for land in south Texas, including solicitation to interested developers
2022	USA-Southwest	Utility	Specification development and pilot planning for a mapping tool to inform the locational value of increased DER and EV penetration
2022	USA-South	Developer	ESS optimal sizing, PV+ESS controls, and proposal support

Year	Location	Customer	SGP services
2022	USA - Southwest	Utility	Quantify costs and benefits of new ADMS-related distribution technology and create a roadmap for adoption
2021	USA - Southwest	Utility	Analysis of joint value of solar and storage for utility and large industrial customer (steel recycling), development of tool to calculate bill impacts of BTM solar and storage
2021	NYISO	Developer	Techno-economic analysis of wholesale market opportunity, optimal sizing and design, strategic advisory
2021	NY	Developer	RFP administration, contract negotiation/development, strategic advising
2021	ERCOT	ESS Technology	Project management, product development, technical and strategic advising, commissioning/testing support
2021	NY	Developer	Screening analysis and training of NY VDER value drivers
2021	USA	ESS Technology	ESS control software product advisory
2021	NYISO	Developer	Techno-economic analysis of wholesale market opportunity, optimal sizing and design, strategic advisory
2021	MA	Utility	Conceptual design, analytics, and procurement advisory in support of ESS regulatory filing
2021	USA - Texas	Landowner	Negotiation of land lease terms for ESS development
2021	USA - South	Developer	Optimal sizing and interconnection filing preparation
2021	USA - Southwest	Utility	ESS RFP development support, analysis of respondents, procurement strategic advisory
2021	USA - Southwest	Utility	Solar and storage operational readiness assessment and strategic plan development
2021	USA - Southwest	Utility	Techno-economic analysis and tool development of utility-scale solar + storage
2021	USA	Developer	ESS supply chain, procurement process, and strategic advisory
2021	NY	Developer	ESS procurement advisory and contract negotiation

Year	Location	Customer	SGP services
2020	USA - Midwest	Utility	Market integration, testing, and valuation analysis
2020	PJM	Developer	Techno-economic analysis of wholesale market opportunity, optimal sizing and design, strategic advisory
2020	NY	Developer	Techno-economic analysis and ESS project pro forma development
2020	USA - Northeast	Developer	ESS optimal sizing and proposal support
2020	NYISO	Developer	Techno-economic analysis of wholesale market opportunity, optimal sizing and design, strategic advisory
2020	ISO-NE	Developer	ESS optimal sizing and proposal support
2020	MA	Developer	Techno-economic analysis of MA SMART opportunity, optimal sizing and design, strategic advisory
2020	MA	Developer	Development of tools for techno-economic analysis of MA SMART opportunities
2020	ISO-NE	Developer	Techno-economic analysis of wholesale market opportunity, optimal sizing and design, strategic advisory
2020	NYISO	Developer	Wholesale market analysis, procurement advisory, support of interconnection application
2020	USA	BTM Aggregator	Proposal support for BTM aggregation software and services
2020	PJM	ESS Technology / Law Firm	Expert witness and technical analysis in mediation proceedings
2020	USA - Southwest	Utility	Comprehensive study of the value of solar and storage at a vertically integrated utility
2020	USA	ESS Technology	ESS product advisory
2020	USA - Midwest	Utility	ESS market opportunity analysis in support of Integrated Resource Planning
2020	NY	Developer	Market/policy analysis and proposal development support for solar + storage opportunity

Year	Location	Customer	SGP services
2020	USA - West	Utility	Bulk system techno-economic analysis of Balancing Authority ancillary service requirements
2020	Middle East	Developer	Valuation analysis, conceptual design, and regulatory analysis for solar + storage Virtual Power Plant
2020	USA	Utility	Market survey of advanced applications of energy storage inverters
2020	MA	Utility	Conceptual design, analytics, and procurement advisory in support of ESS regulatory filing
2020	USA - West	Developer	Engineering studies for ESS project
2020	USA - Southwest	Utility	Techno-economic modeling and conceptual design of a microgrid to enhance resiliency at a military site
2020	USA - South	Developer	ESS optimal sizing and proposal support
2020	NY	Developer	ESS RFP development and administration; procurement strategic advisory
2020	USA - Southwest	Utility	Owner's Engineer for microgrid-related activities
2020	USA	Developer	Energy storage technology and value training
2019	USA - Midwest	Utility	Techno-economic analysis and optimal sizing of solar + storage for market applications and grid services
2019	PJM	Developer	Techno-economic analysis of wholesale market opportunity, optimal sizing and design, strategic advisory
2019	NY	Developer	Techno-economic analysis and tool development for NY VDER opportunities
2019	PJM	ESS Technology / Law Firm	Expert witness and technical analysis in arbitration proceedings
2019	CA, NY, MA, CO	Energy Services Provider	Techno-economic analysis and tool development for BTM and FTM DER; NY VDER, CA SGIP, MA SMART
2019	USA - Midwest	Utility	Technical advisory for measurement and verification of Volt/VAR Optimization

Year	Location	Customer	SGP services
2019	MA	Utility	Techno-economic analysis and optimal sizing of storage under MA Clean Peaks Program
2019	MA	Utility	ESS procurement advisory and contract negotiation
2019	PJM	Developer	Techno-economic analysis of wholesale market opportunity, optimal sizing and design, strategic advisory
2019	MA	Utility	Techno-economic analysis and conceptual design of resiliency applications of solar + storage projects
2019	USA	Developer	ESS procurement advisory and contract negotiation
2019	USA	Standards Body	Technical expert and advisory services in support of ESS communication standards synthesis



About Dan

Dan Sowder, P.E., is a co-founder and Principal of Sound Grid Partners and leads customer engagement and business operations. Over the course of his career, he has advanced the deployment and utilization of distributed energy resources across multiple facets of the power system ecosystem while also creating new technologies and building successful business enterprises.

Education

2010

University of North Carolina, Chapill Hill

Master of Business Administration

2008

Old Dominion University

Master of Engineering Management

2005

U.S. Navy Nuclear Power Program

Nuclear Engineer Qualification

2001

U.S. Naval Academy

BS, Aerospace Engineering

Dan Sowder, P.E.

Co-Founder & Principal

My engineering, business, and leadership experience has built technologies, businesses, and teams that make new technologies (particularly energy storage) a valuable part of a cleaner electric grid.

Licensed Professional Engineer (Electrical Power Systems)

North Carolina License #039270

Experience

2018-Present

Sound Grid Partners, LLC

Co-Founder & Principal (Seattle, WA)

Provide engineering, analytics, procurement, and advisory services to enable better integration of distributed energy resources. Manage client engagement and business operations.

2016-2018

Doosan Gridtech

Vice President, Power System Integration (Seattle, WA)

Directed project and engineering operations including ESS delivery, engineering, supply chain, and analytics. Account executive and business development lead for all major utility accounts.

- Originated EPC team, expanding team from 6 to 18 and increasing revenue by > 250%.

2014-2016

1Energy Systems

Vice President, Power System Integration (Seattle, WA)

Founded Power System Integration team at early-stage energy storage start-up. Responsible for project delivery, engineering, and customer engagement for all projects. Acquired by Doosan.

- Delivered six utility-integrated ESSs with the development of standards and dispatch controls.

2013-2014

Duke Energy

Business Development Manager, Renewable Generation (Charlotte, NC)

Integrated technical, economic, and policy considerations into business models that supported the deployment of distributed resources with a focus on solar, microgrids, and CHP generation.

2010-2013

Duke Energy

Senior Project Manager, Emerging Technology (Charlotte, NC)

Led the design and integration of numerous distributed energy technologies for utility operations. Designed and installed first-of-a-kind ESS, microgrid, and solar integration projects. Awarded Project of the Year for Grid Integration of Renewable Energy. Two patents awarded.

Experience (continued)

2001-2008

U.S. Navy

Nuclear Submarine Warfare Officer (Various Locations)

Served on U.S. Navy Europe Operations staff and onboard USS Maryland. Directed multi-national operations in Europe and Africa and at-sea operations of \$2 billion/175-person nuclear submarine.

Patents

01. Grid tied system controller including logic coupled to a photovoltaic station and an energy storage system.

- Control algorithm that reduces the negative grid impacts of solar PV output by coupling solar and energy storage system output.
- Issued December 12th, 2017: [US Patent #9,843,189](#)

02. Methods for reducing solar inverter output volatility, and related nodes and solar inverters (sole inventor).

- Methodology and algorithm for a solar inverter to reduce the negative impacts to the electric grid caused by output intermittency. Algorithm designed to increase the grid's solar carrying capacity through better solar integration.
- Issued November 29th, 2016: [US Patent #9,507,364](#)

03. Managing the outflow of a solar inverter.

- Method for managing the outflow of a solar inverter such that a photovoltaic array becomes a more dispatchable source of energy which can be used for grid control schemes such as frequency regulation.
- Issued October 8th, 2019: [US Patent #10,439,401](#)

04. Battery energy storage system controller systems and methods.

- Control methodology that enables an energy storage system to mitigate power and voltage volatility that enables the electric grid to absorb a higher penetration of solar generation.
- Issued February 4th, 2020: [US Patent #10,554,048](#)

Selected Projects for Energy Storage

Beacon BESS – 20 MW / 10 MWh Lithium Ion

Los Angeles Department of Water and Power (LADWP), Mojave Desert

- Deployed in the Mojave Desert with availability guarantee of 99% for 10 years.
- Utilized Samsung Li-Ion batteries and SMA power conversion systems.

Parkview ESS – 1.0 MW / 1.0 MWh Lithium Ion

Consumers Energy, Kalamazoo, MI

- Includes Samsung batteries and Ingeteam PCS integrated into a 12 kV utility substation.



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Selected Projects for Energy Storage (continued)

Distributed Energy Resource Optimizer – BESS Fleet Optimization Software

Austin Energy, Austin, TX

- Designed and installed ESS fleet control software with seven applications that enabled Austin Energy to optimize and dispatch their ESS fleet, including participation in ERCOT markets.

Kingsbery ESS – 1.5 MW / 3.0 MWh Lithium Ion

Austin Energy, Austin, TX

- LG Chem Li-Ion and Parker-Hannifin PCS (containerized system).

Mueller ESS – 1.5 MW / 3.0 MWh Lithium Ion

Austin Energy, Austin, TX

- Consists of seven Yunicos integrated battery/PCS units connected to a 12 kV utility distribution circuit.

Distributed Energy Resource Optimizer – BESS Fleet Optimization Software

Snohomish Public Utilities District, Everett, WA

- Designed and installed ESS fleet control software with four applications that enabled SnoPUD to optimize and dispatch their ESS fleet, including optimization of Bonneville Power Authority market operations.

MESA-1 ESS – 2.0 MW / 1.0 MWh Lithium Ion

Snohomish Public Utilities District, Everett, WA

- Includes LG Chem and GS Yuasa batteries combined using MESA standards

MESA-2 ESS – 2.0 MW / 1.0 MWh Vanadium Redox Flow

Snohomish Public Utilities District, Everett, WA

- VRFB from UniEnergy Technologies.

Glacier ESS – 2.2 MW / 4.4 MWh Lithium Iron Phosphate

Puget Sound Energy, Glacier, WA

- Includes four BYD integrated battery/PCS containers capable of islanding a 12 kV distribution circuit.

Marshall ESS – 1.25 MW / 750 kWh Lithium Polymer

Duke Energy, Sherrills Ford, NC

- Kokam lithium polymer battery with S&C Electric PCS.

Rankin ESS – 402 kW / 282 kWh Sodium Nickel Chloride

Duke Energy, Mount Holly, NC

- FIAMM NaNiCl₂ battery with S&C Electric PCS deployed on 12 kV distribution circuit with solar. Technical Paper.
- Used to develop new grid-supportive control algorithms. Winner of Power Grid Int'l Project of the Year (2013).



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Selected Projects for Energy Storage (continued)

McAlpine Microgrid – 250 kW / 500 kWh Lithium Iron Phosphate

Duke Energy, Charlotte, NC

- Includes BYD batteries coupled with solar and capable of seamlessly islanding a critical 12 kV facility.
- Awarded Electric Power Research Institute (EPRI) Technology Transfer award as a founding member of the Energy Storage Integration Council (2014).

Community Energy Storage (CES) Units (2) – 25 kW / 25 kWh Lithium Ion

Duke Energy, Charlotte, NC

- Installed underground CES units (S&C Electric Company and Kokam) that could automatically island residential transformers and provide grid services.

Selected Projects for Other Distributed Energy Resources

Marshall Solar Smart Inverter Project – 1 MVA solar inverter with 500 kW solar array

Duke Energy, Sherrills Ford, NC

- Designed multiple grid-supportive algorithms that demonstrated innovative ways for a solar inverter to support the grid.

Deployment of Plug-in Electric Vehicle (PEV) Test Fleet and Associated charging infrastructure

- Led the deployment of 15 Chevy Volts (pre-market release) and 35 Level-2 (240V) electric vehicle charging stations as part of a DOE-funded vehicle electrification study. Led power quality and charging behavior analysis.

Grid-integrated smart appliances demand side management pilot

- Led the deployment of 46 Samsung smart appliances including dishwashers, clothes washers, dryers, and refrigerators with four levels of demand response capabilities.
- Led a six-month test to assess the demand response capacity and impacts on the customers of these appliances.



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About Tess

Tess Williams, Ph.D., is a co-founder and Principal of Sound Grid Partners and leads analytics and design services. She is an expert in helping electric utilities and other megawatt scale power producers to evaluate, procure, integrate and optimize energy storage and other distributed energy resources.

Education

2011

Harvard University

Doctorate in Physics

2005

Stanford University

Bachelor's in Physics

Tess Williams, Ph.D.

Co-Founder & Principal

I am an expert in power system modeling and the integration of distributed energy resources (DERs) into the electric grid, committed to advancing the use of DERs through sound engineering.

Experience

2018-Present

Sound Grid Partners, LLC

Co-Founder & Principal (Seattle, WA)

Provide engineering, analytics, procurement, and advisory services to enable better integration of distributed energy resources. Manage power system analytics and DER design services.

2016-2018

Doosan Gridtech

Manager, Power System Integration (Seattle, WA)

Led power system analytics team, responsible for conceptual design studies of energy storage projects and analytics to support DER controls development for utility applications.

- Led energy storage conceptual design studies submitted to state utility regulators and critical for project approval, resulting in multiple rate-based energy storage projects.
- Directed economic modeling of distributed energy resource and traditional utility assets to optimize sizing, location, and DER control algorithm functionality.
- Managed modeling that developed new control applications for utility-integrated, megawattscale energy storage systems.

2012-2016

Pacific Northwest National Laboratory

Smart Grid Engineer (Seattle, WA)

Conducted research and utility projects related to distribution system control and DER integration.

- Power systems analysis including state and parameter estimation, quasi-static time-series simulation, with a focus on distribution system control and renewable integration.
- Developed on-line, minimally-intrusive, efficient new measurement and verification technique to analyze energy savings from volt/var management systems; results used in rate filings.
- Led team of engineers and economists to provide innovative solutions for microgrid design, renewable energy and energy storage integration for US Army Office of Energy Initiatives.

2011-2012

Harvard Center for the Environment

Postdoctoral Research Associate (Cambridge, MA)

Analyzed major U.S. shale extraction activities to characterize trends in shale gas and oil production; advised member of the President's Council of Advisors on Science and Technology.

Patents

01. Electrical Power Grid Monitoring Apparatus, Articles of Manufacture, and Methods of Monitoring Equipment of an Electrical Power Grid.

- Algorithms for applying state and parameter estimation to distribution systems, including incorporation of AMI data, for the purpose of monitoring state of health of distribution system infrastructure.
- Filed September 30th, 2013: [US Patent Application #14/042](#)

02. Development of Method for Evaluating Benefits of Volt VAR Control and Verification.

- Measurement and verification algorithm for energy savings from Volt VAR Control. Previous state of the art required multiple months of testing with interruption of operation; this technique is on-line, minimally intrusive, and enables widespread, on-going verification of benefits.
- Filed September 30th, 2015: [US Patent Application #62/057](#)

Selected Projects for Conceptual Design of Energy Storage

Outer Cape Energy Storage System – 25 MW / 38 MWh Lithium Ion

Eversource Energy, Provincetown, MA

- Primary objective is reliability improvement in geographically challenging and environmentally sensitive area. Energy Storage System (ESS) will island circuit to mitigate impact of outages located in distribution system or transmission system.
- Study filed with MA Department of Public Utilities as part of rate filing, \$40M project budget approved, expected in-service 2020.

Martha's Vineyard Energy Storage System – 5 MW / 20 MWh Lithium Ion

Eversource Energy, Martha's Vineyard, MA

- Primary objective is reliability improvement on island supplied by submarine cables; ESS will contribute to reliability resource that enable retirement of backup diesel generators.
- Secondary use cases include voltage support to enable higher penetration of distributed solar PV generation and peak shaving to manage bulk system capacity charges.
- Study filed with MA Department of Public Utilities as part of rate filing, \$15M project budget approved, expected in-service 2021.

Nabb Energy Storage System – 5 MW / 5 MWh

Duke Energy, Nabb, IN

- Primary objective is reliability improvement of rural circuit; ESS will island distribution circuit when supply lost.
- Secondary use case is participation in MISO frequency regulation market.
- Study filed with Indiana Utility Regulatory Commission as part of rate filing. Two energy storage projects approved (~\$9mm each), expected in-service 2019.

Blair Energy Storage System – 2 MW / 4 MWh

Eversource Energy, Blair, CT

- Primary objective is voltage support to increase circuit hosting capacity of distributed solar PV.
- Secondary use cases are peak shaving demonstration and management of bulk system capacity charges.



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Selected Projects for Conceptual Design of Energy Storage (continued)

New Bedford Energy Storage System – 5 MW / 5 MWh Lithium Ion

Eversource Energy, New Bedford, MA

- Primary objective is voltage support and energy shifting to increase hosting capacity of distributed solar PV on a distribution circuit.
- Multiple scenarios for control of third-party-owned solar and storage and control of utility-integrated storage modeled and compared to inform evolution of DER interconnection and control requirements.

Pittsfield Energy Storage System – not recommended

Eversource Energy, Pittsfield, MA

- Primary objective was deferral of utility substation transformer upgrade.
- Study determined that conventional substation upgrade was better solution than energy storage, so energy storage project was not recommended to proceed.

Chicago O'Shea – 1 MW / 1 MWh Lithium Ion

DTE, Detroit, MI

- Pilot energy storage project designed to demonstrate and enable learning about use cases including voltage support for solar integration, peak shaving, and wholesale market participation.

Selected Projects for Techno-Economic Analysis

Austin SHINES System Levelized Cost of Energy to Serve Load

Austin Energy, Austin, TX

- Detailed economic modeling of distributed energy resources and utility assets to optimize sizing, location, and control algorithms for Department of Energy-funded SHINES project.
- Developed and implemented calculation of System Levelized Cost of Energy to Serve Load, a new metric to characterize impact of DERs to overall system cost, including interactions between all system components under varying control strategies.

Economic Analysis and Tool Development for Remote Alaskan Microgrids

Department of Energy Project, AK

- Developed tools for off-grid Alaskan villages to enable optimal generation asset sizing and model investment requirement and economics over lifetime.

Selected Projects for Other Distributed Energy Resources and Controls

Distributed Energy Resource Optimizer – ESS Fleet Optimization Software

Austin Energy, Austin, TX

- Designed and installed ESS fleet control software with seven applications that enabled Austin Energy to optimize and dispatch their ESS fleet, including participation in ERCOT markets.



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Selected Projects for Other Distributed Energy Resources and Controls (continued)

ESS in Wholesale Market Analysis and Design

Doosan GridTech

- Assessed wholesale market revenue potential for merchant energy storage projects in multiple ISOs, including NYISO, ISO-NE, MISO, and CAISO, for Doosan GridTech sales and project origination team.
- Developed dispatch strategies to maximize value over lifetime, optimizing between revenue and lifetime with consideration of degradation of battery cycling.

NSA Crane Microgrid – Solar, Energy Storage, and Diesel Generator Microgrid

Duke Energy and US Navy, Crane, IN

- Designed a microgrid capable of islanding critical load of NSA Crane in case of loss of supply.
- Critical load identification and modeling, optimal sizing of generation, control and communication specification, operations and workflow design, analysis of power quality and stability, and conceptual budget.

JFTB-Los Alamitos Microgrid – Solar, Energy Storage, and Diesel Generator Microgrid

Army Office of Energy Initiatives, Los Alamitos, CA

- Designed a microgrid capable of islanding Joint Forces Training Base Los Alamitos in case of loss of supply.
- Critical load identification and modeling, load management process, optimal sizing of generation, equipment specification, operations and workflow design, and conceptual budget.

Field Evaluation of Volt VAR Optimization Pilot

American Electric Power, Owasso, OK

- Assessed effectiveness of Volt Var Optimization system in reducing end-use energy consumption in pilot project.
- Developed on-line, minimally-intrusive, efficient new measurement and verification technique to analyze energy savings from Volt VAR management systems.

Loads as a Resource

Department of Energy Research, PNNL, Richland, WA

- Studied effectiveness of distributed, responsive loads in participating in primary frequency response to control frequency, traditionally only managed by generation.
- Evaluated performance of residential water heaters in delivering primary frequency response with modeling and laboratory testing.

Distribution System Asset Monitoring

Department of Energy Research, PNNL, Richland, WA

- Developed algorithms to bring state and parameter estimation techniques to distribution systems with incorporation of AMI data.
- Modeled how algorithms could identify distribution system components in need of repair or replacement.



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About Axel

Axel Schmidt is a consultant at Sound Grid Partners where he leads client-facing project management, engineering, and procurement projects. He has extensive experience with design, deployment and operation of DERs, as well as energy management systems (EMS) and controls. He has designed and deployed dozens of renewable energy and energy storage projects throughout the world.

Education

2009

Western Washington University

BS, Vehicle/Plastics Engineering

Axel Schmidt, BS

Partner

I am an experienced project manager and engineer with an extensive background managing the design and delivery of solar and energy storage projects for utility and developer customers. I have a particular expertise in energy management systems and software controls for DERs.

Experience

2021-Present

Sound Grid Partners, LLC

Partner (Seattle, WA)

Lead client-facing projects related to the technical design, component procurement, grid integration, and project management of distributed energy resource projects.

- Provide subject matter expertise on energy storage software integration including multi-asset projects and market integration.

2019-2021

Doosan Gridtech

Manager, Software Delivery (Seattle, WA)

- Managed Software Delivery team responsible for design and deployment of custom controls for energy storage and renewable energy projects.
- Customer-facing Program Manager for high-profile software projects and clients.

2015-2019

Doosan Gridtech

Senior Engineering Project Manager (Seattle, WA)

- Managed design, construction, testing, and commissioning of utility-scale energy storage systems.
- Led contract negotiations and execution with end customers, subcontractors, and other key project stakeholders.

2013-2016

Alpha Technologies, Alpha Energy

Manager, Renewable Energy Systems (Bellingham, WA)

- Managed team of engineers, project managers, and sales staff to design and deploy renewable energy systems.
- Reviewed and assessed the viability of new technologies and emerging companies.

2009-2013

Alpha Technologies, Alpha Energy

Lead Renewable Energy Systems Engineer (Bellingham, WA)

- Led renewable energy system designs including specification of equipment, system sizing, performance modeling, quoting, and drawing packages.
- Conducted on-site commissioning, testing, and troubleshooting of renewable energy systems.

Selected Projects for Energy Storage

Chisholm ESS Energy Management System – 100 MW / 100 MWh Lithium Ion

Able Grid/Map Energy, Dallas, TX

- ESS participating in ERCOT market services, including Fast Frequency Response
- EMS responsible for interfacing with Samsung batteries, Sun Grow PCS/BSC, substation, QSE interface, cloud data storage server.

Distributed Energy Resource Optimizer – BESS Fleet Optimization Software

Austin Energy, Austin, TX

- Designed and installed ESS fleet control software with seven applications that enabled Austin Energy to optimize and dispatch their ESS fleet, including participation in ERCOT markets.

Kingsbery ESS – 1.5 MW / 3.0 MWh Lithium Ion

Austin Energy, Austin, TX

- LG Chem Li-Ion and Parker-Hannifin PCS (containerized system).

Mueller ESS – 1.5 MW / 3.0 MWh Lithium Ion

Austin Energy, Austin, TX

- Consists of seven Younicos integrated battery/PCS units connected to a 12 kV utility distribution circuit.

Distributed Energy Resource Optimizer – BESS Fleet Optimization Software

Snohomish Public Utilities District, Everett, WA

- Designed and installed ESS fleet control software with four applications that enabled SnoPUD to optimize and dispatch their ESS fleet, including optimization of Bonneville Power Authority market operations.

HBC Microgrid – 60kW PV, 40kW generator, 130kWh ESS

Hummingbird Cay, Bahamas

- Hybrid power system powering all site loads on a remote island, including university research center.

Ft. Bliss Hybrid Power System – 64kW PV, 60kW generator, 768kWh ESS

Motorola, Ft. Bliss, TX

- Hybrid power facility located in active missile range supporting army telecommunications.

Customs and Border Patrol Hybrid Power System – 21 kW PV array, 10 kW generator, 384 kWh ESS

Motorola, Remote location, Maine

- Hybrid power facilities on remote mountain tops supporting CBP and local emergency telecommunications.

Joint Base Lewis-McCord Hybrid Power Skid- 5 kW PV, 5 kW generator, 19.2 kWh ESS

Saab Sensis, JBLM, WA

- Multiple skid-mounted hybrid power systems designed to support radar tower sites.



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Selected Projects for Other Distributed Energy Resources

Time Warner Hilo PV – 30kW

Hilo, HI

- Flush roof-mount commercial PV array.

Time Warner Kona PV – 40kW

Kona, HI

- Flush roof-mount commercial PV array.

SCTE PV – 17kW

Philadelphia, PA

- Ballasted, roof-mount commercial PV array.

Arizona Game and Fish Department PV – 191 kW

Phoenix, AZ

- Ballasted, roof-mount commercial PV array.

Cox Communications PV – 318 kW

Phoenix, AZ

- Elevated commercial PV shade structures (4 sites).



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About Marley

Marley Cross is a power systems engineer in analytics at Sound Grid Partners, where she provides a suite of services in analytics and engineering.

Education

2020

Brown University

BA, Economics and Environmental Studies

Marley Cross, BA

Senior Power Systems Engineer & Analytics

I am a power systems engineer with a focus in analytics. I have experience in quantitative analysis of solar, energy storage, and energy efficiency projects and programs. I have strong experience in distributed-scale solar operations including time-series analysis of production data and commissioning of data acquisition systems (DAS).

Experience

2022-Present

Sound Grid Partners, LLC

Power Systems Engineer & Analytics (Seattle, WA)

Provide market analytics, modeling, and engineering services to enable the successful integration of renewable energy resources.

2020-2022

Nexamp

Associate Solar Performance Analyst (Boston, MA)

- Designed and ran performance analyses of operational solar and storage facilities in Excel and SQL utilizing internal project, outage, and equipment databases.
- Installed, programmed, and troubleshoot modems, weather station equipment, and SCADA systems on-site. Effectively communicated these processes to field technicians over the phone for out-of-state projects. Developed new workflows, communication processes and templates to increase efficiency of project hand-off during commissioning.
- Conducted capacity testing of solar and storage plants based on ASTM (American Society for Testing and Materials) standards to demonstrate the performance of assets to lenders/buyers. Automated this process in R and Python, made broadly accessible with a web interface to decrease calculation time by 50% per test.
- Tracked performance of 300MW+ of solar and storage plants through monitoring software. Reported to third-party customers, responding to requests and questions in a timely and clear manner.

2020-2020

Optimal Energy, INC.

Quantitative Intern (Providence, RI)

- Built a model in R comparing net present values of heat pumps to gas systems under variable interest rates, carbon prices, and decarbonization pathways to feed into potential studies of cost-effective energy efficiency resources for commercial customers and state policy groups.
- Developed a tool in Excel enabling swift comparisons between complex energy savings models to inform statewide energy planning for the Rhode Island Office of Energy Resources, enabling prioritization of energy efficiency programs in the state's Annual Energy Efficiency Program Plan.

Selected Projects for Plant Commissioning

Data Acquisition System Commissioning – 25MW of Distributed Solar and Storage Projects

Massachusetts, New York

- Installation of weather stations and modems.
- Network programming of inverters, remote relays, and revenue-grade meters.
- Configuration of assets in remote monitoring software.
- Troubleshooting of systems in the field.
- On-call troubleshooting support for field crew encountering complex problems.

Capacity Testing – 45MW of Distributed Solar Projects

Massachusetts, New York, Illinois

- Data collection from site and data preparation of energy models.
- Regression analysis, calculation of expected output, and performance comparison.

Selected Projects for Analysis Tools

Capacity Test Automation

Performance Testing Tool

- Automated previously manual capacity test process into Python-based tool with:
 - User-adjustable configuration inputs specifying minimum test irradiance and filter band widths.
 - Data preparation and filtering of measured plant data and modeled 8760 data.
 - Stepwise regression runs to determine expected production based on weather data.
 - Results calculation comparing measured plant performance to modeled plant performance.
- Report printout to excel with relevant data tables, regression results, and final test percentage.
- Made available to performance analysis team via web interface; reduced manual test calculation time by 50% per test.

Optimal Energy

Energy Efficiency Program Analysis Tool

- Processed historical energy efficiency program data and annual plan data.
- Mapped categories of energy efficiency technologies to enable swift comparisons between costs and energy savings.
- Identified and highlighted gaps between program data and state energy savings goals.



Contact Marley Cross

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About Caroline

Caroline Piephoff is a power systems engineer at Sound Grid Partners where she provides a suite of services in analytics and engineering.

Education

2019

Appalachian State University

BS, Applied Physics

Caroline Piephoff, BS

Senior Power Systems Engineer

I am a power systems engineer with experience in performance monitoring and maintenance of DG and Utility scale solar and storage projects. I have strong experience constructing and commissioning facility SCADA systems to allow for improved plant operations.

Experience

20233- Present

Sound Grid Partners, LLC

Power Systems Engineer (Seattle, WA)

Provide market analytics, modeling, and engineering services to enable the successful integration of renewable energy resources.

2019 - 20233

Aderis Energy, LLC

Solutions Fulfillment Manager/Operations Manager (Cornelius, NC)

- Managed production schedule for manufacturing of SCADA and renewable interconnection products sold to third party developers. Effectively supported customers over the phone with remote commissioning and system troubleshooting.
- Delivered monthly performance reports and preventative maintenance paperwork to asset owners for over 100 MW of distributed solar and storage facilities. Responded to any customer concerns or requests in a timely manner.
- Created field technician maintenance schedule for portfolio preventative and corrective services, assisted in troubleshooting performance issues remotely using site SCADA systems. Sourced replacement field parts and created out of scope service proposals for asset owners.
- Led software demonstrations for prospective and current customers, demonstrating how to use the SCADA system to streamline plant operations and maintenance activities.

Selected Projects for SCADA Commissioning & Operations

Combined Solar + Storage Facility - 7.5 MW PV/3039 kWh Storage

Pueblo, CO

- Remotely commissioned site SCADA responsible for monitoring 48 SMA inverters, multiple SEL-735 energy meters, equipment pad cameras, weather sensors, transformer oil health, and integrated EMS
- EMS responsible for interfacing with ConEd batteries and net load meters to limit total system load (solar output, battery output, college campus load) during peak demand hours to carry out demand reduction goals
- Remote Operations contract for facility; responsible for monitoring solar performance and BESS operation, provided remote support to local technicians for corrective and preventative maintenance.

Single-Axis Tracker Production Analysis - 2 MW PV

Beloit, KS

- Facility was experiencing slight production losses after commissioning due to unknown reasons; experiencing dips in irradiance sensor values in morning and afternoon indicating possible tracking issue.
- Analysis of engineering documents and tracker settings showed a mismatch of module length information, causing shading due to tracker configuration. Adjusted tracker software to match installed equipment specifications and production increased.



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About Isaac

Isaac Kretzmer is a power systems engineer at Sound Grid Partners focusing on power systems modeling and analytics.

Education

2023

University of Washington

Doctorate in Chemical Engineering

2018

University of Arizona

BS, Chemical Engineering



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Isaac Kretzmer, Ph.D.

Power Systems Engineer

I am a power systems engineer with a focus on techno-economic modeling of solar and storage systems. I have strong research expertise in developing electrochemical systems, data science, and data visualizations.

Experience

2023 - Present

Sound Grid Partners, LLC

Power Systems Engineer (Seattle, WA)

Provide quantitative modeling and analytics services for solar and energy storage projects to enable better integration of distributed energy resources.

2018 - 2023

University of Washington

Doctoral Research Associate (Seattle, WA)

- Evaluated transition-metal catalysts for their potential in alternative energy storage systems, identifying cost-efficient alloys with improved electro-catalytic properties. Developed novel electrochemical procedures to enhance the performance of transition-metal catalysts for usage as high-capacity battery electrodes.
- Performed finite element analysis of lithium-ion and redox flow batteries resulting in novel cell and flow-field geometries with improved current distributions.
- Conducted large-dataset analysis of U.S. energy production and consumption for determination and visualization of energy-market and energy-environmental trends and correlations.



Xochitl Menchaca, ME

Senior Power Systems Engineer

I am a power systems engineer with a focus in analytics and energy storage design. I have experience in the techno-economic analysis and design of standalone and hybrid energy storage systems including technical design, ISO market analysis, and development process support to help clients make holistic decisions from early-stage development through operation.

Experience

2023 - Present

Sound Grid Partners, LLC

Senior Power Systems Engineer (Seattle, WA)

Provide market analytics, modeling, and engineering services to enable the successful integration of renewable energy resources.

2023 - 2023

Invenergy, LLC

Energy Storage Strategy Analyst (Chicago, IL)

- Completed merchant revenue analyses and dispatch modeling to assist with sizing of standalone and hybrid storage in multiple wholesale markets including ERCOT, SPP, PJM, and Canada.
- Managed project teams to aggregate, interpret, and present information to management on the value of various storage opportunities.
- Interpreted RFPs and understood energy markets domestically and internationally to determine storage use cases to best fit customer needs.
- Evaluated feedback from customers to interpret market needs and craft competitive proposals.
- Streamlined development and bid process through analyses of technology, cost influences, and risks to propose new standard processes.
- Interpreted off-take structures and associated risks to advise on sizing and storage technical requirements.
- Analyzed and utilized third party price and revenue forecasts in various markets.

2021 - 2023

Energy Storage Engineer (Chicago, IL)

- Planned and led a solar + storage design initiative, resulting in a dispatch modeling tool for co-located sizing.
- Visited and supervised project sites to ensure design consistency across all internal and contracted parties.
- Reviewed design documentation and design projects to requested specifications.
- Conducted diligence on equipment specifications and communicated with vendors to ensure products are designed in a safe and efficient manner.
- Evaluated emerging storage technologies and the feasibility of their integration in the field.

About Xochitl

Xochitl Menchaca is a Senior Power Systems Engineer at Sound Grid Partners where she provides a diverse range of expertise to support client needs related to energy storage project design and analysis.

Education

2021

University of Illinois

ME, Energy Engineering

2018

University of Illinois

BS, Chemistry



Contact Xochitl Menchaca

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Selected Projects, Technologies, and Experience

Project Economics:

Financing – 120+ MW of Solar and Energy Storage

Arizona (various)

- Supported financing through documentation of life cycle cost analysis, revenue modeling, and engineering design.
- Defended risk mitigation efforts, revenue, and technical assumptions of projects.

Revenue Forecasting – 500+ MW of Energy Storage

ERCOT, PJM, SPP, IESO, CAISO

- Investigated market participation options for various durations of storage in different regions.
- Evaluated optimal storage sizing and risks based on predicted revenues and impact to grid.

Analysis Tools:

Co-located Energy Storage Dispatch Model

Dispatch Modeling Tool

Created a co-located modeling dispatch tool with dynamic configurations to demonstrate how various systems and sizes can meet customer needs.

- User-adjustable configurations including estimated demand, LMPs, and prioritized hours.
- Iterations for various storage capacities and durations to demonstrate impact on peak demand and site revenues.
- Results and figures demonstrate asset impact of various storage additions, including energy delivered, cost of energy, cash flow, and plant capacity factor.

Engineering Model Process Improvements

Design and Cost Modeling Tool

- Managed processes for efficient communication across teams throughout the early-stage design.
- Streamlined and automated engineering estimates for BESS design in Excel and VBA.



Contact Xochitl Menchaca

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