SOUNDGRID PARTNERS

Statement of Qualifications

Helping utilities and energy providers embrace solar and energy storage 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 solar and energy storage 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 solar and energy storage as grid-integrated resources. We offer a suite of analysis, engineering, and advisory 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 pactice and move quickly on project opportunities.

Will Fischer, VP of Business Development, Summit Ridge Energy

Our Services

Solar and Storage Program Design

Diverse tools to design and implement solar and energy storage programs including regulatory, techno-economic analysis, engineering, and commercial support.

Procurement Support

Comprehensive supply chain and procurement expertise including capital and operating 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 and sizing of solar and energy storage projects.

Project Implementation & Operations

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

Project Engineering

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

Expert Witness / Consultant

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

> 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

Laura Kraus Lovenshimer, MS

Partner

Caroline Piephoff, BS

Lead Power Systems Engineer

Marley Cross, BA

Lead Power Systems Engineer

Isaac Kretzmer, Ph. D.

Power Systems Engineer

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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 solar and energy storage projects. Below is a summary of key services recently provided to our customers.

Year	Location	Customer	SGP Services
2025	USA-Southwest	Utility	Desktop study including a BCA on implementing CVR on their distribution system and writing a 40+ page report on how CVR could be implemented in a demonstration project.
2025	USA-Southwest	Utility	Research how utilities are engaging with customers interested in microgrids. Create a playbook that can be used to determine if/how they should partner with customers on a microgrid or if the customer should instead have a behind the meter microgrid.
2023	USA-Southwest	Utility	Technical, analytical, and advisory support for Strategic Energy Managers group who liase with large C&I customers focused on solar, storage, and emerging technologies
2023	USA-Southwest	Utility	Analysis of organizational responsibilities for solar and storage resources based on specific utility organizational structure
2023	ERCOT	Developer	Comprehensive analysis of market revenue potential for ESS participating in the ERCOT market. Recommended sizing and estimated project revenues for addition of storage to two specific solar projects.
2023	PJM	Developer	Techno-economic analysis of market revenue potential for standalone storage project located in Ohio, participating in PJM's regulation market and providing peak shaving services.
2023	USA-Southwest	Utility	Analysis comparing value of customer-sited solar and storage to bulk-scale solar and storage based on utility-specific data and grid characteristics.
2023	USA - Montana	Developer	Expert witness for developer filing petition to the Montana Public Service Commission to advance a solar and storage PURPA project
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 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
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

Year	Location	Customer	SGP Services
2021	USA - South	Developer	Optimal sizing and interconnection filing preparation
2021	USA - Southwest	Utility	ESS RFP development support, analysis of respondents, 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
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
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

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

About Dan

Dan Sowder, P.E., is a co-founder and Principal of Sound Grid Partners and is responsible for customer engagements, business development, and business operations. Over the course of his career, he has advanced the deployment and utilization of energy storage and solar technologies across multiple facets of the power system ecosystem while also developing new technologies and building successful business enterprises.

Education

2010
University of North Carolina, Chapel 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

Experience

2018 - Present
Sound Grid Partners, LLC
Co-Founder & Principal (Seattle, WA)
Provide engineering, analytics, procurement, and advisory services to enable better integration of renewable energy to the grid. 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

1. **Battery energy storage system controller systems and methods**
   - A 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.
   - US Patent #10,554,048 issued February 4th, 2020

2. **Managing the outflow of a solar inverter (sole inventor)**
   - 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.
   - US Patent #10,439,401 issued October 8th, 2019

3. **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.
   - US Patent #9,843,189 issued December 12th, 2017

4. **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.
   - US Patent #9,507,364 issued November 29th, 2016

Selected Projects, Technologies, and Experience

Value of Solar and Storage Analysis

Salt River Project, Phoenix, AZ

- Conducted benefit-cost analysis of multiple scales and deployment models for solar and energy storage ranging from residential behind-the-meter to bulk scale transmission-connected resources.
- Modeling included holistic analysis of grid and customers benefits and costs
- Provided analytical insights into the most cost-effective methods to advance de-carbonization efforts.

BESS Project Design and Competitive Procurement

Snohomish Public Utilities District, Everett, WA

- Advised utility on self-build vs contract project structure options.
- Supported competitive procurement and negotiations for a 25 MW / 100 MWh BESS energy storage agreement (ESA) contract.

Critical community facility BESS microgrid design and regulatory support

United Illuminating Company, Orange, Connecticut

- Provided microgrid technical design and BESS sizing analysis for three critical facility microgrids in support of CT PURA docket 23-06-05.
- Provided testimony on project design and benefit-cost analysis resulting in project approval.

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Selected Projects, Technologies, and Experiece (continued)

Utility Operational Readiness for Inverter-based Resources

Salt River Project, Phoenix, AZ

- Developed holistic readiness strategy to deploy and operate the grid with hundreds of MW of new solar and energy storage assets.
- Provide advisory and technical input to support to utility leaders over multi-year program.

Expert Technical Witness for Battery Energy Storage Project Disputes

U.S.-based arbitration and mediation proceedings

- Provided technical analysis, written reports, and live testimony related to BESS. project performance and contracting in support of multiple project disputes involved in arbitration and mediation processes.

BESS Equipment Contracting and Project Portfolio Analysis

Multiple US-based solar and energy storage developers

- Analyzed BESS project portfolios to evaluate revenue estimates (contracted and market revenues), cost estimates, and development risk.
- Advised developer clients on BESS equipment supply including technical sufficiency, optimal guarantees, and contract negotiations.

Analysis of Coal Plant Replacement with a BESS

Consumers Energy, Jackson, MI

- Analyzed siting, market revenue potential, and interconnection process to evaluate replacing a retiring coal plant with a large-scale BESS in the MISO market.
- Provided recommendations on technical and regulatory process to advance project.

Selected Energy Storage Projects

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.

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 and MuellerESS – 1.5 MW / 3.0 MWh Lithium Ion

Austin Energy, Austin, TX

- 1.5 MW / 3.0 MWh LG Chem Li-Ion batteries with Parker-Hannifin PCS.
- 1.5 MW / 3.0 MWh Younicos-integrated battery/PCS units connected to a 12 kV utility substation.

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 the optimization and dispatch of an ESS fleet, including optimization of Bonneville Power Authority market operations.

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Selected Energy Storage Projects (continued)

MESA-1 and MESA-2 BESS fleet deployment

Snohomish Public Utilities District, Everett, WA

- 2.0 MW / 1.0 MWh Litium Ion LG Chem and GS Yuasa batteries.
- 2.2 MW / 8.0 MWh Vanadium Redox Flow battery from UniEnergy Technologies
- Deployed using Modular Energy Storage Architecture (MESA) standard.

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.

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 circuit with solar. Technical Paper.
- Used to develop new grid-supportive control algorithms. Winner of Power Grid Int'l Project of the Year (2013).

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.

Electric Power Research Institute (EPRI) – Energy Storage Integration Council (ESIC)

- Founding member of EPRI's ESIC effort, designed to accelerate the integration of energy storage technologies in the electric grid.
- Awarded 2013 EPRI Technology Transfer Award for efforts in the launch of ESIC.

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Tess Williams, Ph.D.

Co-Founder & Principal

I am an expert in the design and operation of energy storage and solar projects, the integration of such resources into utility operations, and how to characterize their value.

About Tess

Tess Williams, Ph.D., is a co-founder and Principal of Sound Grid Partners and leads project execution and team operations. She is an expert in helping electric utilities and other megawatt scale power producers to evaluate, procure, integrate and optimize energy storage and renewable energy. With extensive experience in utility operations, she has designed control strategies, software architecture, and processes necessary to integrate solar and storage into core utility operations, including Balancing Authority functions and wholesale market interactions. She has performed Benefit/Cost Analysis of solar and storage at the kW to GW level and has led design studies of 1000s of MW of utility-owned and utility-operated projects in multiple regulatory jurisdictions. Tess is also an expert in the changing regulatory environment for solar and storage and has consulted and lectured nationally and internationally on the topic.

Education

2011

Harvard University

Ph.D. Physics

2005

Stanford University

BS Physics

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

1. **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.
   - US Patent Application #14/042 filed September 30th, 2013.
2. **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.
   - US Patent Application #62/057 filed September 30th, 2015.

Selected Projects, Technologies, and Experience

Techno-Economic Analysis:

Value of Solar and Storage Analysis

Salt River Project, Phoenix, AZ

- Conducted benefit-cost analysis of multiple scales and deployment models for solar and energy storage ranging from residential behind-the-meter to bulk scale transmission-connected resources.
- Modeling included holistic analysis of grid and customers benefits and costs
- Provided analytical insights into the most cost-effective methods to advance de-carbonization efforts.

Inverter-Based Resources Value Streams Analysis

Salt River Project, Phoenix, AZ

- Lead a multi-disciplinary team of utility subject matter experts in real-time operations, planning, and market strategy in developing an optimal dispatch strategy for hundreds of MW of solar and storage systems, dispatched by SRP for capacity, energy, and ancillary services under PPA.
- Analyze utility load, solar generation, and storage dispatch data and model future IBR dispatch.
- Develop software architecture roadmap to support dispatch for value, including coordination of EMS, scheduling optimizer, and resource site controllers for standalone, hybrid, and co-located solar and storage.
- Manage engagement of broad array of technical and non-technical stakeholders across the utility in developing consensus around optimal dispatch strategies.

Benefit-Cost Analysis of the Smart Grid Chip

Utilidata, Providence, RI

- Develop strategy for Benefit-Cost Analysis of advanced distribution technology under development by Utilidata. The Smart Grid Chip is a grid-edge source of data and control that has the potential to enhance resiliency, reduce DER integration costs, and make utility operations more efficient and cost-effective.
- Consult on utility operations, value of SGC applications, and utility messaging strategy.

Expert Technical Witness

BESS System Integrator

- Acted as an expert technical witness in a confidential arbitration between a BESS system integrator and BESS owner/operator. The subject of the dispute was the performance of a BESS operated in the PJM Reg D market.
- Analyzed BESS operational data, contract terms, and market performance to characterize BESS performance and calculate liquidated damages.

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Selected Projects, Technologies, and Experience (continued)

Evaluation of Solar and Storage Respondents to All-Source Procurement
Salt River Project, Phoenix, AZ

- Technical and financial analysis of respondents to a utility All-Source Procurement offering solar and storage projects under PPA.
- Advisory services concerning technology risk, value of resources, and modeling of solar and storage for capacity value.

Expert Technical Witness
BESS System Integrator

- Acted as an expert technical witness in a confidential mediation between a BESS system integrator and BESS owner. The subject of the dispute was the performance of a BESS operated in the PJM Reg D market.
- Analyzed BESS operational data, including power, temperature, and market performance data. Characterized BESS performance and contextualized in the era.

Austin SHINES System Levelized Cost of Energy to Serve Load
Austin Energy, Austin, TX

- Detailed economic modeling of distrusted 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.

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.

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.

Solar and Storage Controls and Utility Operations:

Operational Readiness Program
Salt River Project, Phoenix, AZ

- Led comprehensive stakeholder engagement and research effort, carried out gap analysis, and developed strategy for activities that Salt River Project must complete to be operationally ready for the integration and operation of a 10x increase in bulk power system solar and storage resources, to be procured via Power Purchase Agreement (PPA). SRP is a Balancing Authority and participates in the CA Energy Imbalance Market.
- Support SRP's Director of Operational Readiness in overseeing, coordinating, and guiding the completion of twenty projects across bulk power system operations; longterm, mid-term, and day-ahead planning; control software and analysis and visualization software; Inverter-Based Resource (IBR) technical requirements and testing; and PPA contract terms with utility dispatch.

Control Software Architecture and Design for Inverter-Based Resources
Salt River Project, Phoenix, AZ

- Perform a comprehensive functional requirements analysis to identify required capabilities for IBR control and management.
- Develop technical specifications for IBR control in economic optimization day ahead and in the EIM; in real-time operations via Energy Management System; and at the plant control level.
- Coordinate technical specifications and feature development with utility, software vendor, and IBR project supplier to optimization software architecture and ensure complete solution.

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Selected Projects, Technologies, and Experience (continued)

Enhanced Dispatch Flexibility in Power Purchase Agreements for Inverter-Based Resources

Salt River Project, Phoenix, AZ

- Overhaul SRP's form PPA to incorporate utility dispatch of solar and storage systems, including dispatch of storage and curtailment of solar for economic and reliability reasons.
- Survey recent developments in utility dispatch of IBRs procured via PPAs and incorporate into updates.

BESS Valuation Analysis, Concept of Operations, and Market Operations Strategy Development

Consumers Energy, Jackson, MI

- Managed the testing and developing of strategy for an operational pilot-scale BESS providing regulating reserve service to MISO as a fast-ramping resource.
- Worked with MISO and utility engineers to test and commission regulating reserve service as a fast-ramping resource, with this BESS as the first in MISO to offer this service
- Analyzed the revenue potential of market participation in MISO and developed an optimal strategy for offering multiple MISO market services.
- Developed a concept of operations, the who, what, when, how, why of BESS operations, for utility dispatch of BESS for MISO market services.

Advanced Distribution Technology Roadmap

Salt River Project, Phoenix, AZ

- Performed a technical feasibility and Benefit-Cost Analysis of advanced distribution technologies, including Volt/VAR Optimization, microgrid control, FLISR, ADMS-integrated demand response, and utility dispatch of distributed energy resources.
- Developed a roadmap for the study, piloting, and deployment of advanced technologies.

Balancing Authority Strategy and Analysis of Ancillary Services

Black Hills Energy, Rapid City, SD

- Compared multiple strategies for the provision of ancillary services for a utility considering transitioning from participation in a reserve sharing group to becoming a Balancing Authority.
- Performed production cost modeling to characterize the cost difference of the provision of ancillary services.

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.

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.

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.

SOUNDGRID PARTNERS

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Selected Projects, Technologies, and Experience (continued)

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.

Conceptual Design of Energy Storage Systems and Solar plus Storage Systems:

Virtual Power Plant Pilot Design
Kawar Energy, Amman, Jordan
- Lead the technical analysis and design of a pilot Virtual Power Plant (VPP) incorporating distributed solar, energy storage, and responsive load in the country of Jordan.
- Analyze the value of the VPP services within the bulk power system and in providing local grid services.
- Develop a conceptual design for a pilot VPP include asset sizing, siting, control and communication architecture, and operational plan
- Perform a gap analysis of the regulatory elements required to enable the deployment of a VPP and present findings and recommendations to Jordanian regulators and grid-operators in day-long workshop in Amman.
- Project funded by the USTDA, in partnership with Jordanian solar developer and law firm.

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.

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, project in-service.

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).

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.

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.

SOUNDGRID PARTNERS

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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

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

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.

SOUNDGRID PARTNERS

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Selected Projects for Other Distributed Energy Resources

Time Warner Hilo PV – 30kW
Hilo, HI

- Flush roof-mounted commercial PV array

Time Warner Kona PV – 40kW
Kona, HI

- Flush roof-mounted 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).

SOUNDGRID PARTNERS

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Location
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Laura Kraus Lovenshimer, MS

Partner

I am a technical and commercial leader of energy storage and solar projects focused on performance optimization, analytics, and operations. With experience managing nearly 6 GW of operating renewable assets over 7 years, I have developed expertise in asset management, performance modeling and engineering, performance guarantees, operational software, and analysis tool development.

About Laura

Laura Kraus Lovenshimer is an Analytics Partner at Sound Grid Partners where she leads client-facing projects on analytics, performance engineering, and asset/program optimization. Laura brings extensive experience in asset management, performance analysis, performance modeling, software, and operation of utility-scale PV and battery storage assets. From IPPs with large operational portfolios to utilities with growing renewable generation, Laura's priority is helping clients develop assets, analysis tools, and operational practices that optimize the production, reliability, performance, and lifetime value of renewable power generation.

Education

2018

University of Oregon

MS Economics

2012

Belmont University

MAT Mathematics

2010

Saint Louis University

BS Business & Economics

Experience

2024- Present

Sound Grid Partners, LLC

Partner (Seattle, WA)

- Lead client-facing projects in the areas of analytics, optimization, operations, and performance of clean energy projects.

2024

Stem, Inc.

Director, Asset Performance Management Solutions (San Francisco, CA)

- Led product and solutions teams developing PowerTrack Asset Performance Management (APM), an operational and asset management software solution for utility-scale BESS and PV portfolios.

2023 - 2024

Shining Rock Analytics, LLC

Principal Consultant & Founder (Asheville, NC)

- Consultant to IPPs and energy analytics companies on strategic planning, asset management, performance modeling, optimization software, performance guarantees, and contracting.

2022 - 2023

Pine Gate renewables / Blue Ridge Power

Director, Performance & Engineering (Asheville, NC)

Led asset management for PGR's 2 GW operational portfolio and 10+ GW development pipeline

- Developed new operational and technical asset managementgroups focused on performance optimization, data strategy, andoperational analysis
- Organizational SME on performance modeling,performance/capacity guarantees, and O & M

2022 - 2023

Director, Operations & Maintenance

Led O & M across 2 GW operational portfolio

- Led integration and technical due diligence for O & M companyacquisition
- Developed new site onboarding and warranty managementprocesses between EPCs, O & M, owners, OEMs, and utilities

2021 - 2022

Strata Clean Energy

Sr. Manager, Performance Analytics (Durham, NC)

- Drove performance improvement initiative for large utility partnerand IPP portfolios resulting in performance gains of over 10% atindividual sites and portfolio performance gains of 5%.
- Drove organization-wide migration to new Data Acquisition System(DAS) and data warehouse

Experience (continued)

2020 - 2021 Manager, Performance Analytics

- Developed bi-facial module, BESS, and improved PV expected energy and forecasting models used to predict and evaluate performance of 4 GW of power for 9 different ownership groups
- Led team responsible for energy forecasting, PV system performance analysis, operational KPIs, capacity testing, predictive analytics, cost-benefit analysis, and cost-modeling.

2018 - 2020 Performance Data Analyst

- Used data-science methodologies to identify sensor data anomalies
- Acted as internal consultant on analytics and operational performance projects for executives and O&M leadership

Publications and Research

"A TCN-based Spatial-Temporal PV Forecasting Framework with Automated Detector Network Selection."
Lee, Y., Kraus, L., et. al. IEEE Transactions on Sustainable Energy. In submission.

" A Machine Learning Evaluation of Maintenance Records for Common Failure Modes in PV Inverters."
Gunda, T., Hackett, D., Kraus, L., et al. IEEE. 2020.

Production Impacts of UAS-Identified Faults in PV Systems.
NREL PV Reliability Workshop. Poster, 2020.

Industry Research Partner: Renewable Generation Forecasting.
FREEDM Systems Center, North Carolina State University. 2019-2022.

PV O&M Working Group: Inverter Failure Rates.
National Technology & Engineering Solutions of Sandia. 2018-2021 of Sandia. 2018-2021.

Selected Projects, Technologies, and Experience

PV Performance Model &Product Advisory

Performance Engineering Software Start Up, CA

Advisor on operational time-series data, modeling issues, technical product requirements, product/market strategy, and PV performance analysis.

Renewable Data Valuation Study

Renewable Technology Start Up, NC

Evaluated market dynamics for valuation of renewable generation time-series data and contributed to development of whitepaper.

Sunstone Energy - 800 MW AC PV/ 150 MW BESS

Pine gate renewables, Maupin, OR

Early-stage development for interconnected renewables project to meet datacenter load.
Adviser on offtake power purchase and performance contracting, operational planning, production modeling review, OpEx budget, and feasibility study of land management requirements.

SOUNDGRID PARTNERS

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Selected Projects, Technologies, and Experience (continued)

Eastover - 100MW AC PV / 73.6 MWh Zinc-Hybrid DC-Coupled BESS
Pine Gate Renewables, Eastover, SC

EMS software provider negotiation, contracting and commissioning, analytics for capacity and operational testing, set-point logic troubleshooting, new technology training for O & M, utility coordination, dispatch planning, and investor coordination during COD extensions.

Asset Management Software Search and Implementation
Pine Gate renewables

Led internal team to collect areas where software could improve asset management team efficiency, compliance risk reduction, data integrity, and performance improvement for valuation study. Developed technical software requirements list and evaluation metric including internal constraints and implementation timelines. Drove targeted software search and evaluation of 3rd party and internal solutions. Early-stage pricing and negotiations. Developed and staffed process to identify, document, and organize per database hierarchy source-of-truth technical and financial documents and meta data for 102 sites as initial stage of software implementation.

TWE Bowman - 75 MW AC PV
Pine Gate Renewables, Bowman, SC

Drove performance improvement strategy including technical and commercial loss analysis, BCA, investor coordination, and implementation. Resulted in full warranty claim and partial tracker retrofit, large-scale DC-string repair, and drainage repairs.

Beulah Solar - 74.9 MW AC PV
Pine Gate Renewables, Batesburg, SC

Drove planning, development, and implementation of NERC-compliant operational strategies including site access and operational technology trainings for O & M subcontractors prior to COD and initial operational phases.

Pecan Solar - 100 MW AC PV
Dominion Energy, Northhampton, NC

Drove ongoing performance and capacity testing within first year of operation, as well as long-term performance optimization.

Scott Solar + Storage, 48 MWh Lithium Ion BESS AC and DC Coupled
Dominion Energy, Powhatan County, VA

Battery pilot project including three separate BESS systems on the same site. Collaborated with Dominion performance engineering staff on data collection and analysis of battery health, performance, and solar smoothing capability. Developed custom KPIs for unique site design to be used in ongoing monitoring and performance analysis.

O&M Cost Model Development
Strata Clean Energy

Developed, built, and ran scalable and flexible O&M cost model with variability analysis utilized to benchmark current operational costs, forecast internal OpEx and contract revenue, and utilized for business development in RFP responses and bidding new O & M contracts.

Wilkinson Solar - 74 MW AC PV Bifacial
Dominion Energy, Beaufot County, NC

Drove expansion of modeling, forecasting, and reporting tools to accommodate first utility scale bi-facial site on the East Coast. Led ongoing performance and capacity testing, including meteorological station troubleshooting and IR investigations within first year of operation.

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Selected Projects, Technologies, and Experience (continued)

Eastern Shore Solar - 80 MW AC PV
Dominion Energy, Accomack County, VA

Drove weather resource study to evaluate location-based poor forecasting accuracy. Identified root cause and implemented new methodology for irradiance forecasting with higher accuracy for coastal locations.

LiDAR Inter-row Shading Model & Study
PV Project - ~100 MW AC, Southeastern EPC and Measure UAS, Inc.

Worked with aerial intelligence company, Measure UAS, to develop vector-based inter-row shading identification from LiDAR data, expand to annual impact for tracking site, and calculated 8760 analysis for a new site not meeting initial capacity and performance expectations.

Module Degradation Analysis
Strata Clean Energy, PV Project - ~50 MW AC, Southeastern, US

Supported multi-year technical analysis for large scale module failure including quarterly statistical analysis of increased diode failures, EL testing, and IV curve tracing results. Used collected data to conduct study, identify root causes of failures, and support module degradation warranty claim.

PV Performance Analytics Training
Strata Clean Energy- Performance Analytics, Operations & Asset Management; Dominion Energy- Renewable Generation, Performance Engineering

Developed two-week self-guided training program and led in-person multi-day workshops on PV Performance Analytics utilized by both internal and utility-partner staff.

UAS Program Development & IR Inspection Analytics
Strata Clean Energy

Developed UAS program inspecting over 1.4 GW of PV in the first year, increasing Part 107 certified drone pilots from 1 to 22, and reducing annual infrared analysis costs by over 60%.

SOUNDGRID PARTNERS

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Location
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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

Lead 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

2023 - Present

Sound Grid Partners, LLC

Lead Power Systems Engineer (Seattle, WA)

- Manage the schedule, budget, and client relationships for projects that support the integration of solar and energy storage for utilities and developers.
- Complete deliverables for strategic and technical projects for a wide range of topics: commercial contract reviews, organizational strategy and processes, equipment procurement support, and more.

2019 - 2023

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 Integration of Solar and Storage

Organizational Division of Responsibility for Inverter-Based Resources
Phoenix, AZ

- Delivered a comprehensive division of responsibility document including a detailed RACI matrix for a utility client that defined 45 core competencies throughout the lifecycle of a renewable plant.
- Over 30 teams were interviewed to create a division of responsibility document unique to the structure of the specific utility client.

Value of Customer-sited Solar and Storage Analysis
Phoenix, AZ

- Project conducted a Benefit-Cost Analysis for customer-sited solar and energy storage resources for a specific utility, included multiple resource control modes and tariff details to evaluate resources from a host customer, utility, and total system perspective.
- Assisted in a detailed cost analysis for customer resources, bulk-scale resources, and various control program costs as inputs to the BCA

Update of Interconnection Requirements for Inverter-Based Resources
Phoenix, AZ

- Conducted a wholesale review and update of a utility client's transmission interconnection requirements to include updated performance and reliability standards for solar, energy storage, and wind to enable easier integration and improved reliability of renewable resources

Safety Documentation Support for Battery Energy Storage
Arlington, WA

- Created an updated Emergency Response Plan for a 25 MW battery energy storage system and supported the utility client in engaging with the local community members to address safety concerns

Selected Projects for Energy Analysis

Energy Storage Sizing Analysis for a Large Commercial Campus
Phoenix, AZ

- Created an energy storage and solar dispatch model to estimate the percentage of campus load and electric bill savings a large commercial customer could serve with varying sizes of energy storage

Selected Projects for SCADA Commissioning & Operations

Combined Solar + Storage Facility – 7.5 MW / 3039 kWh Lithium Ion
Pueblo, CO

- Site SCADA responsible for monitoring 48 SMA inverters, multiple SEL 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 manage total system (solar output, battery output, college campus load) load during peak demand hours.
- Remote Operations contract for facility; responsible for monitoring solar performance and ESS operation, provide remote support to local technicians for corrective and preventative maintenance.

Tracker Production Analysis – 2 MW
Beloit, KS

- Facility was experiencing slight production losses due to unknown reasons, was experiencing irradiance sensor dips in morning and afternoon indicating possible tracking issue.
- Analysis of engineering documents and tracker settings showed a mismatch of module length information, caused shading with tracking configuration. Tracker software adjusted to match installed equipment and production increased.

SOUNDGRID PARTNERS

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Marley Cross, BA

Lead Power Systems Engineer

I am a lead power systems engineer with a focus in analytics. I have experience in quantitative analysis of solar, energy storage, and energy efficiency projects and programs, including leading integrated modeling efforts. I have strong experience in developing automated tools for evaluating solar operations including performance testing, time-series analysis of production data and commissioning of data acquisition systems (DAS).

About Marley

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

Education

2020

Brown University

BA, Economics and Environmental Studies

Experience

2025 - Present

Sound Grid Partners, LLC

Lead Power Systems Engineer (Seattle, WA)

- Manage integrated modeling processes to deliver technical and market analyses of solar and battery storage projects. Lead day-to-day operations, client communications, and delivery of results.

2024 - 2025

TCO Solar

Maintenance and Development Engineer (Marseille, France)

- Carried out remote monitoring and troubleshooting of distribution-scale solar plants located in France, Germany, and Italy.
- Evaluated available SCADA and monitoring systems in European market for potential replacement of existing systems.
- Conducted site evaluations, landowner negotiations, and initial drawings for development of agrivoltaics solar plant located in France.
- Created excel tool for analysis of operational and financial impacts of curtailment by grid and market operators at German plants.

2022 - 2024

Sound Grid Partners, LLC

Power Systems Engineer (Seattle, WA)

- Provided market analytics, modeling, and engineering services to enable the successful integration of renewable energy resources.
- Built techno-economic models for sizing in conceptual design of solar and battery storage projects.
- Analyzed market revenues and participation models for solar and battery storage projects operating in wholesale electric markets.
- Analyzed operational data from solar and battery storage projects for performance optimization and development of dispatch strategies.

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 troubleshot 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.

Experience (continued)

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, Technologies, and Experience

Techno-Economic Analysis:

Value of Solar and Storage analysis

Salt River Project, Phoenix, AZ

- Conducted benefit-cost analysis of multiple scales and deployment models for solar and energy storage ranging from residential behind-the-meter to bulk scale transmission-connected resources.
- Modeling included holistic analysis of grid and customers benefits and costs.
- Provided analytical insights into the most cost-effective methods to advance decarbonization efforts.

Plant Design:

1.3 MW Ground-Mount and Rooftop Solar Plant

Aix-en-Provence, France

- Initial design drawings for 1MW ground-mount tracking photovoltaic array and 300kW rooftop photovoltaic array.
- Collaborated with structural engineering team to create and adhere to customer specifications for greenhouse structure.
- Evaluated available options for ground-mounted tracking array, with specific focus on technical requirements for use in agrivoltaics.

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

SOUNDGRID PARTNERS

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Selected Projects, Technologies, and Experience (continued)

Analysis Tools:

German Grid Curtailment
Asset Management Tool

- Collected data from grid operators and market operators in Germany regarding grid curtailment of solar plants
- Compared hourly curtailment data as reported by operators to actual plant production data and invoices in excel-based tool
- Reviewed plant contracts to track plant reimbursement according to source and circumstances of curtailment
- Summarized curtailment on a monthly basis to highlight discrepancies and ensure accurate reimbursement

Solar and Storage Dispatch Tool
Techno-Economic Analysis Tool

- Developed hourly annual model of solar and storage dispatch:
  - Tracked energy flows and losses
  - Modeled charge and discharge of storage based on one or multiple dispatch strategies including solar curtailment mitigation, energy price arbitrage, and ancillary services
  - Calculated plant costs and revenues
- Created VBA macros to enable user-friendly use of tool to:
  - Specify plant technical configuration and dispatch preferences
  - Download market energy and ancillary price data directly from market web sources
  - Run analysis over single year or multiple-year project lifetime
- Summarized key technical and financial results of model, including plant production and losses, battery cycling, plant revenues, and costs

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

SOUNDGRID PARTNERS

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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.

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

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.

Selected Projects, Technologies, and Experience

Value of Solar and Storage analysis

Salt River Project, Phoenix, AZ

- Conducted customer dispatch modeling and bill calculations of residential and commercial behind-the-meter solar and storage scenarios for use in benefit-cost analysis
- Provided analytical insights into the most cost-effective methods to advance de-carbonization efforts

Behind-the-Meter Customer Dispatch and Bill Calculation Model

- Developed an Excel and Python-based tool for analyzing BTM scenarios utilizing solar and/or storage resources with:
    - User-configurable Excel template for defining resource specifications, conditions, and time-series profiles
    - Generalized tariff formatting to accommodate a variety of utility rate structures
    - Glass-box Python-based dispatch algorithms for simulating both one or more possible customer dispatch behaviors
    - Customer bill-savings calculations for benefit-cost analysis of customer- sited resources
- Automated to output technical dispatch and bill savings results in an Excel template
- Directly integrates with an Excel-based benefit-cost model to calculate total grid system benefits, avoided costs, and avoided emissions

SOUNDGRID PARTNERS

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