PREVALON
A Mitsubishi Power Americas and EES Joint Venture

400 International Parkway, Suite 200
Heathrow, FL 32746
PrevalonEnergy.com

Lead Engineer, Power Electronics Controls and Modeling

Location: On-site - Heathrow, FL / Hybrid / Remote

About Prevalon

Prevalon Energy LLC (Prevalon), a Mitsubishi Power Americas and EES joint venture, is a leading global energy storage technology and services company that is empowering companies to deploy flexible energy solutions and accelerate a more sustainable energy future.

With 10 years of global battery energy storage experience and over 4 GWh of utility-scale battery energy storage projects deployed, Prevalon develops an end-to-end integrated battery energy storage solution that delivers throughout the entire lifecycle of your project and ensures performance.

Working with our customers to develop a solution to meet the demands of their energy system today and into the future, we are grounded by the principles of commitment, reliability and expertise to guide our decision making, design philosophy, and relationship building.

Our Culture and Values

Responsibility
Safety is at the core of everything we do. From the well-being and health of people to the quality of the products we develop and implement, sustainability is the foundation of our operations. Our expertise guides our decision-making and design development, and lives at the core of our mission.

Community
People are the focus and heartbeat of what we do. We prioritize the well-being of our customers, employees, and communities we work with. Through teamwork, collaboration, and open communication, we work together to continuously innovate.

Innovation
We value and encourage creativity in the ways we work and are always forward thinking. We embrace diversity of thought and adapt to emerging trends and technologies. We recognize the importance of respecting traditions but not beholden by them.

Accountability
We are focused on taking responsibility and ownership for our actions and decisions. We deliver on promises in a transparent and reliable manner. We are accountable in our commitment to sustainable practices and products.

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Job Summary

The Power Electronics Controls & Modeling Engineer is a hands-on technical role focused on the analysis, simulation, and validation of Prevalon's next-generation Modular Multilevel Converter (MMC) platform. Reporting to the Power Electronics and Modeling Manager, this engineer will be responsible for building and maintaining high-fidelity simulation models to verify system performance, stability, and grid code compliance.

This role is ideal for a deeply analytical engineer who lives in MATLAB/Simulink and PSCAD. You will support the development of advanced control algorithms (Grid Forming & Grid Following) and serve as the primary validation resource, running complex scenarios to ensure our external design partners meet our rigorous technical requirements.

Essential Duties & Responsibilities

Essential duties and responsibilities include, but are not limited to the following:

- **Modeling & Simulation**
    - Model Development: Develop and maintain detailed simulation models (Average and Switching models) in MATLAB/Simulink, and PSCAD for the BESS Power Conversion System.
    - Grid Study Execution: Perform electromagnetic transient (EMT) studies to simulate grid events—including Low/High Voltage Ride Through (L/HVRT), frequency excursions, and weak grid operation (low SCR).
    - MMC Dynamics: Simulate specific MMC behaviors, including capacitor voltage balancing, circulating current suppression, and protection coordination.
- **Control Algorithm Support**
    - Algorithm Design: Assist in the design and tuning of control loops for Grid Following (GFL) and Grid Forming (GFM) modes, including Virtual Synchronous Machine (VSM) and droop control strategies.
    - Stability Analysis: Conduct frequency-domain analysis (impedance-based stability, Bode plots) to predict and mitigate potential resonance or instability issues when connecting to the grid.
    - Code Implementation: Support the translation of control block diagrams into C/C++ code for DSP/FPGA implementation, ensuring the logic is optimized for real-time execution.
- **Validation & Vendor Support**

- Hardware-in-the-Loop (HIL): Support HIL testing activities (Typhoon, Opal-RT, or RTDS) to validate control code before it touches real high-voltage hardware.
- Data Analysis: Analyze test data from SPCS supplier and field pilots, comparing real-world results against simulation baselines to identify discrepancies.
- Documentation: Create detailed engineering reports, simulation logs, and requirement traceability documents to support product certification.

Knowledge, Skills, & Abilities

To perform this job successfully, an individual must be able to perform each essential duty satisfactorily. The requirements listed below are representative of the knowledge, skill, and/or ability required. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

- Inverter Controls: Proven experience developing or managing the development of vector control, droop control, and virtual synchronous machine (VSM) algorithms.
- Simulation Mastery: Advanced proficiency in MATLAB/Simulink is required. Proficiency in PSCAD or PLECS is highly preferred.
- Control Theory: Solid understanding of classical control theory (PID tuning, Bode/Nyquist stability, Phase Locked Loops - PLL).
- Power Electronics: Fundamental understanding of voltage source converters (VSC), with specific exposure to Modular Multilevel Converters (MMC) being a strong plus.
- Grid Forming: Conceptual understanding of GFM vs. GFL behaviors and the challenges of integrating inverter-based resources (IBR) into the grid.
- Coding: Familiarity with C/C++ or Python for data scripting and automated testing.
- Analytical Rigor: A personality that enjoys "debugging" physics—digging into why a simulation crashed or why a waveform looks wrong.
- Curiosity: A willingness to learn new standards (IEEE 2800) and topologies quickly under the mentorship of the Lead.
- Exceptional communication skills particularly conveying complex technical concepts or issues.

Education & Experience

- Education: Master's Degree in Electrical Engineering with a focus on Power Electronics, Control Systems, or Power Systems. (A PhD is valuable but not required if practical experience is strong).
- Experience: 2–5 years of relevant industry or academic research experience.
- Domain: Experience with renewable energy systems (Solar/Wind/Battery), motor drives, or FACTS devices is highly desirable.

Physical Requirements & Work Environment

The physical demands and work environment characteristics described herein are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

- Regularly required to stand and walk, with frequent lifting or moving of up to 25 pounds and occasional lifting of up to 50 pounds.
- The noise level in the work environment is usually moderate to loud. Hearing protection may be recommended and/or required in some work locations.
- Domestic and international travel may be required.