

Greg Linder

Energy System SCADA and Telemetry Engineer

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Objective

I have a passionate interest in renewable energy and over 15 years of experience solving varied multidisciplinary engineering problems. I work long hours, invent and implement new solutions, and cooperate vigorously with others. My present objective is to use my skills and knowledge to assist with the integration of renewable energy systems into the control and dispatch networks of the electric utility industry. This objective includes applying my skills towards modernization of transmission and distribution system equipment to make better use of various "smart grid" systems and modern control protocols, including DNP3 and IEC 61850.

Qualifications

- 2 years of experience with substation communications equipment and relay configuration
- 6 years of experience with distributed generating assets, including solar, wind, and reciprocating engine systems, including control systems for these technologies
- 4 years of data remote data radio design and implementation, including wireless mesh, 900MHz line of site, and various WiFi systems
- 10 years experience in embedded system design using multiple types of microcontrollers
- 7 years experience in PLC system programming, design, and panel layout
- 5 years PCB design and layout experience
- Extensive international travel and multicultural collaboration experience
- Highly collaborative and friendly personality
- Avid collector and restorer of computer hardware, with 20 years of experience in machines going back 40 years.
- Working knowledge of many things including solar panel manufacturing, utility metering and protective schemes, substation automation, solar inverter communications protocols and maintenance procedures, machine tool operation, network security, embedded systems programming, SCADA and remote telemetry systems, power electronics design and testing, rigging, circuit board layout, electronics repair and installation, Virtual Private Network (VPN) configuration and deployment, electric machinery and drives, computer networking, pneumatic and hydraulic systems, electrical codes, scuba diving, high vacuum systems, carbon fiber layup and autoclave procedures, swing dancing, battery technologies, commercial and residential wiring standards, singing, control panel design and layout

Education

- MSEE, Clarkson University, May 2009
- BSEE, University of Illinois Urbana-Champaign, May 2005
- Completed coursework required for a BS in Computer Engineering also at University of Illinois
- Extensive study in Photovoltaic Engineering in 2003-2004 from University of New South Wales, Sydney, Australia

Professional Memberships and Certifications

- EIT / FE certification (2005)
- Field service certifications for ETC, Leviton, and Strong lighting equipment suppliers

- IEEE member since 2003, PES (Power & Energy Society) member
- American Solar Energy Society (ASES) member since 2007
- American Society of Agricultural and Biological Engineers (ASABE) member since 2009
- SunSpec Alliance Member
- Amateur Extra radio licensee, call: KC9OPU
- ARRL (American Radio Relay League) member since 2009
- NIST SGIP (Smart Grid Interoperability Panel) participant since 2009

Experience

- **Juwi Solar Inc: SCADA Engineer** (Boulder, Colorado) (2010 – Present)
 - Upgraded existing SCADA system for increased reliability
 - Deployed full plant-wide configurations in Subnet Solutions Substation Server platform for data integration of solar plant assets, including various brands of inverters, weather stations, protective relays, utility meters, and programmable logic controllers
 - Designed and configured SCADA Master, including operator screens, redundant database configuration, web interface, and user management using the Control Microsystems ClearSCADA host platform
 - Designed and implemented VPN solution for secure plant to control center communication using DNP3 over IP.
 - Designed and managed construction of electrical panels for utility-scale solar plant control, including integration of PLCs, temperature rated computers, uninterruptable power systems, radio communications systems, and DC and AC sensing
 - Designed custom shunts and sensing equipment to allow revenue grade measurements on both DC and AC sides of an inverter
 - Wholly responsible for the design, implementation, and commissioning of the Juwi SCADA system, which currently monitors nearly 50 MW of PV generating capacity across five states
- **Linder Engineering Works, LLC: Founder** (Denver, Colorado) (2008 – Present)
 - Provided consulting services and electrical engineering services for numerous industries
 - Integrated emerging data protocols with industrial control protocols, including various solar protocols, such as the SunSpec Alliance, SMA Sunny Data, and the OpenADR demand management protocol
 - Designed and constructed hardware and developed firmware for Microchip PIC-based embedded systems, including a multi-axis motor drive device with wireless mesh data aggregation and precision distance measuring system for pneumatic tools
 - Managed production run of electrical devices, including part sourcing, shipping, assembly, programming, testing, and warranty services
 - Volunteered at Clarkson University as an alumnus for maintenance and repair work on Clarkson University's Anaerobic food digester project
 - Managed the development and deployment of web-based asset monitoring system.
 - Prepared patent drawings and paperwork for several devices
 - Performed mechanical design of assemblies and systems for pneumatic placing tools
 - Prototyped and tested encoderless universal dual-axis solar tracker controller
- **Clarkson University: Research Assistant** (Potsdam, New York) (2007-2009)
 - Designed and constructed SCADA system for Clarkson Anaerobic Manure Digester
 - Designed and built 500 gallon trailer-mounted portable anaerobic digester
 - MS Thesis, “Failure Analysis and Smart Grid Control Protocols for Anaerobic Digesters”
- **SolFocus Inc: Intern** (Mountain View, California) (Summer 2008)

- Assisted with installation and commissioning of SolFocus solar tracking systems
 - Installed and configured equipment for solar telemetry and control systems
 - Advocated the use of utility-standard control protocols and hardware to solar field control
- **Chicago Spotlight: Field Service Technician** (Chicago, Illinois) (2006-2007)
 - Installed and commissioned building-integrated lighting control networks
 - Trained others in the use and installation of dimming and control equipment
 - Worked with electricians in the installation of lighting control systems
 - Repaired numerous theatrical electrical systems, including automated fixtures, follow spots, lighting control consoles, and dimming equipment
- **SmartSpark Energy Systems: Embedded Systems Engineer** (Champaign, Illinois) (2005-2006)
 - Designed and built a large scale PLC based water-immersion battery cycling test system
 - Wrote firmware for family of proprietary PIC-based non-dissipative battery charge balancing systems
 - Designed and built family of MSP430 based low-power floating channel data acquisition systems for battery characterization
- **U of I Future Energy Challenge 2004: Controls Team Leader** (Urbana-Champaign, Illinois) (2004-2005)
 - Controls team leader for the design of experimental high-efficiency 500 watt three phase variable frequency drive with active power factor correction
 - Designed and wrote PIC18 firmware in assembly language
 - Designed and built hand-wired prototype hardware to test code prior to PCB completion
 - Laid out multiple mixed-signal circuit boards containing power inverter, control and isolated communications sections
 - Performed significant characterization, debugging, and testing work using dynamometers and power measuring equipment
- **UNSW Solar Racing Team: Mechanical Team Leader** (Sydney, Australia) (2003-2004)
 - Race Team member competing with the UNSW Sunswift II solar car in the 2003 World Solar Challenge
 - Mechanical Team Leader for the initial design phase of the UNSW Sunswift III
 - Negotiated sponsorship contracts for fiberglass materials supply, mold release agents, and large-scale CNC machining for the initial tooling
 - Directed mechanical design efforts for Sunswift III, including steering systems, suspension, trailer, monocoque chassis, and composite materials
 - Assisted with design and debugging of soft-switched maximum power point tracker
 - Actively sought opportunities to present on high efficiency transportation technologies via radio interviews, NRMA shows and CeBIT Australia
- **George L. Clark X-ray Facility: Student Employee** (Urbana, Illinois) (2000-2005)
 - Designed custom cable support bracket to address design oversights in Kappa-geometry diffractometer
 - Performed maintenance and repair work on x-ray diffraction equipment
- **Fermi National Accelerator Lab: Intern** (Batavia, Illinois) (2001-2003)
 - Designed and constructed semi-automatic RF test stands for wave-guides and particle accelerating structures
 - Performed preliminary design work for a fully automated high-volume RF disk testing and sorting system
 - Assisted with the installation, leak checking, and acceptance procedures of a large vacuum brazing furnace
 - Recovered presumed-lost magnet data and Fortran code from legacy VAX/VMS systems

- **University of Illinois School of Chemical Sciences: Undergraduate Research Assistant** (2001-2002)
 - Designed and built in-situ platinum polishing attachment for a kappa-geometry x-ray diffraction instrument
- **Aberle GmbH & Company: Apprentice** (Gutach, Germany) (2000)
 - Performed shop floor tasks, including manufacturing parts, programming machines, and quality control
 - Assisted ISO 9001 compliance documentation
- **Norris Cultural Arts Center: Crew** (St. Charles, Illinois) (1997-2000)
 - Responsible for maintenance of theatrical systems, including lighting instruments and controls, sound equipment, rigging systems and hydraulics
 - Performed several crew roles, including set construction, lighting and sound design, fly rail operation, and special effects

Presentations and Publications

1. [Pending] Linder, Greg, John Tembrock, Tony Motisi, Electra Lamb, Dave Kubat, Mike Pauly. *AC and DC Restoration for Utility Scale Photovoltaic Generating Assets*. Pending presentation at the 2012 IEEE Power and Energy Society Transmission and Distribution Conference and Exposition. Orlando, Florida.
2. Linder, Greg. *Communications Reliability for Utility Scale Photovoltaic Plants*. Presented at 2011 Subnet Solutions User Group, October, 2011. Austin, Texas.
3. Linder, Greg. *Subnet Solutions' Substation Server Simplifying Solar SCADA*. Presented at 2010 Subnet Solutions User Group, October, 2010. Phoenix, Arizona.
4. Linder, Greg, Stefan Grimberg, Ph. D. *Comparison of Monitoring Systems for Anaerobic Digesters*. Presented at 2010 IEEE Power & Energy Society Conf., New Orleans, Louisiana
5. Linder, Greg, Stefan Grimberg, Ph.D., Eric Thacher, Ph.D. Shaun Jones. *Implementation of a Distributed Standard Anaerobic Digester Control System Based on Observations from Real World Failure Analysis*. Presented at 2009 ASABE Annual International Meeting
6. Linder, Greg. *The Importance of Standard SCADA Protocols to the Reliable Operation of Distributed Farm-Scale Anaerobic Digesters*. Presented at 2009 IEEE PES Power Systems Conference and Exposition, Seattle, Washington
7. Linder, Greg. *Failure Analysis and Smart Grid Control Protocols for Anaerobic Digesters*. [Thesis] Clarkson University, May 2009
8. Romanov, Gennady, Tug Arkan, Harry Carter, Timergali Khabiboulline, Gregory Linder. *Measurements of high order modes in high phase advance damped detuned accelerating structure for the NLC*. Proceedings of LINAC 2004, Lubeck, Germany.