

Expertise

- Renewable Energy

Education

- B.S. Physics, Northwest Missouri State University, 2005
- B.S. Electrical Engineering, University of Missouri, 2006

Registration

- Engineer-in-Training: Missouri
- LEED Accredited Professional

Total Years of Experience

4

Years With Burns & McDonnell

4

Start Date

January 2007

Mr. Bothof serves Burns & McDonnell as an electrical engineer and project manager. He has worked on a broad variety project types including aviation, industrial, and commercial facilities for both international and domestic clients. He has international experience and is familiar with the nuances associated with electrical design in foreign countries. He has been involved in all aspects of project design including concept design, final design, construction specification writing, estimating, and construction supervision. Mr. Bothof has worked on both remodeling/retrofit projects as well as green field projects and is experienced in working on all sizes of jobs from single-drawing projects to multi-contract projects. His responsibilities during construction have included shop drawing review, monitoring of contractor progress, and review of installations for compliance with plans and specifications.

Air National Guard Photovoltaic Feasibility Study *Atlantic City, New Jersey*

Mr. Bothof served as lead engineer to study the feasibility of two 500kW photovoltaic arrays at the Air National Guard Base on the Atlantic City Airport. 500 kilowatts would be roof mounted on multiple structures, and the second was designed to be ground mounted. The project included structural evaluation of existing aircraft shelters, code analysis of array installation, return on investment calculations, and production estimates.

130 kW Roof Mounted Photovoltaic Array *US Air National Guard, Hawaii*

Mr. Bothof designed a roof mounted 130 kW array for a military hanger in Hawaii. The array consists of crystalline modules mounted on a standing seam metal roof. DC power was cabled to two central inverter inside the facility. Mr. Bothof performed full electrical design, specification, and coordination of the 130 kW photovoltaic array. This array is the first photovoltaic array on this base. It has resulted in a current design of multiple larger covered parking arrays.

Ameren Solar Technology Center *St. Louis, Missouri*

Mr. Bothof served as lead engineer to study multiple facilities within Ameren's properties, including their world headquarters, for the feasibility of photovoltaic arrays. The project goals were educating customers, and Ameren, as to best practices, technology types, and construction techniques. Mr. Bothof performed output simulations, return on investment calculations, as well as detailed estimates of cost on over 250kW of varying photovoltaic technologies. Shadow studies were performed in order to maximize the available area. Mr. Bothof was also charged with safety, designing to allow Ameren to walk clients through the array.

Mr. Bothof performed design and construction services on the final installation. The installation consisted of three 30 kilowatt arrays, and two 2.5 kilowatt arrays. Each was a different technology made up of Thin film, Polycrystalline, Mono-crystalline, tracking and bifacial modules. Different technologies were placed in similar areas to allow evaluation of technologies. The arrays were designed for flexibility to allow for new technologies to be added.

Qatar National Convention Centre

Doha, Qatar

Mr. Bothof served as an electrical engineer for the Qatar Exhibition Hall in Doha, Qatar. Mr. Bothof was responsible for electrical design and development a 700kW photovoltaic roof mounted array. The exhibition hall, a nearly 1 million square foot building, is designed to be certified LEED gold. Mr. Bothof executed calculations of predicted output, layout, and coordination of all building integration aspects from inverter interconnection to specific roof penetration. Mr. Bothof's responsibilities also included detail oversight, substation interconnection, BMS integration, and power loss mitigation, along with structural coordination.

The Heart of Doha

Doha, Qatar

Mr. Bothof is served as electrical engineer providing renewable energy solutions for a mixed-use urban redevelopment of retail, housing, office, public space and government office facilities. The facilities include a roof mounted PV system of over 500kW, in which Mr. Bothof performed detailed design efforts and modeling of array output.

Qatar Student Housing Facility, Education City

Doha, Qatar

Mr. Bothof served as an electrical engineer for the Qatar Student Housing Facility in Doha, Qatar. Mr. Bothof was responsible for electrical design and development of the Renewable Energy portfolio for the sites. The student housing facilities are designed to be certified LEED platinum. They will be the first LEED platinum Housing Campus in the world. Mr. Bothof was in charge of ensuring an on site renewable power supply of 7.5% of the total energy consumed. There were two Campuses Male and Female Sites. Each Site Consists of a Community Center, two residence Halls and three Apartments. Future expansion of the sites is also planned. The Student Housing facility was the first form of major photovoltaic installation in Qatar. The total Photovoltaic installation is approximately 1MW of roof mounted Crystalline Photovoltaics. Four 6.5 kW wind turbines were also designed on each site and feed into the Community Center. He was responsible for sizing the Photovoltaic system and planning the balance of systems, along with the electrical design of the system.

100 kW Photovoltaic Array

US Air National Guard, Marana, Arizona

Mr. Bothof designed a ground mounted 100 kW array for a military facility in Arizona. The array consists of crystalline modules mounted across a water drainage area to a central inverter inside the adjacent facility. Structure and foundations for the array are designed with a flexible electrical system allowing for multiple module manufacturers to bid. Mr. Bothof performed full electrical design, specification, and coordination of the 100 kW photovoltaic array.

10 MW Photovoltaic Owner's Engineer

Sempra Energy

Mr. Bothof served as owner's engineer for 10 MW ground mounted photovoltaic installation. The installation consisted of 10MW of CDTe thin film Modules. The interconnection was to a generation facility and ran parallel to the generator system. Mr. Bothof reviewed construction documents, and specifications, supplied recommendations and oversight of designed work. Mr. Bothof was also involved in construction services the duties included overseeing aspects of construction, and contract documents including output guarantee, and cut sheets analysis.

30KW Demonstration Design

Confidential Client

Mr. Bothof is worked directly with a manufacturer on a demonstration installation of their new photovoltaic product. He is developed multiple system metrics, including the inverter characteristics, for a scalable photovoltaic solution. Mr. Bothof is also coordinating with the utility to ensure permitting and proper installation.

Burns & McDonnell Headquarters Renewable Initiative

Kansas City, Missouri

Mr. Bothof is lead electrical engineer and designer for the installation of photovoltaics at Burns & McDonnell's world headquarters. He performed tasks ranging from design to utility permitting. This is a demonstration installation located in a high traffic area at the front of the headquarters. The installation is the first of its type in Kansas City. The system will be a ground mounted array of grid-tied photovoltaics. The mounting system was a unique challenge and was specifically developed with a manufacturer to suit the specific and highly visible location. The system will generate approximately 5kW and be utilized for building loads.