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### PV SysCo: Solar energy system comparison and evaluation

Lisa B Bosman<sup>1</sup>, Seth Darling<sup>2</sup> and Wilkistar Otieno<sup>3</sup>

<sup>1</sup>College of Menominee Nation, USA

<sup>2</sup>Argonne National Laboratory, USA

<sup>3</sup>University of Wisconsin-Milwaukee, USA

According to the U.S. Energy Information Administration (U.S. EIA), renewable energy consumption made up about 13% of the nation's energy supply in 2013, of which only about 2% was contributed by solar energy. This contribution (by solar) is expected to increase to 20% by 2040. In 2010, the U.S. Department of Energy announced the SunShot Initiative, which aims to reduce the total installation cost of solar technologies by 75% between 2010 and 2020. This implies that solar energy is a top priority in the U.S. and many other countries. The purpose of this research is to design and implement a customer decision support system to determine the appropriate solar PV technology to install depending on the customer, technological and geographical location attributes. This research develops a solar decision support system that incorporates: Multiple comparison of six different commercially available PV solar technologies (e.g., crystalline, amorphous and thin film), a variety of system configurations (e.g., battery based PV systems), a variable monthly derate factor (e.g., snow only during winter), annual degradation by component (e.g., panels and inverter), module configurations (e.g., flat-plate, cylindrical panel), temperature coefficient modifications and albedo coefficient and inverter selection (e.g., microinverters). PV SysCo, which overcomes these deficiencies, is introduced as an alternative method to better estimate the performance and reliability of PV energy systems over time. Practically speaking, PV SysCo provides consumers with the ability to make educated choices for optimizing solar energy investment returns and it allows insurance underwriters and home appraisers the ability to accurately assess actual cash value of used PV systems. This model is conceptually similar to the Kelley Blue Book, which allows consumers to estimate the value of a used car. This "Solar Energy Blue Book", a solar energy system evaluation tool, will allow consumers to estimate the value of a used solar energy system, taking into consideration many factors, such as latitude (which determines the quantity of incoming sunlight) and zip code (which determines the approximate cost of electricity). PV SysCo allows potential solar energy system consumers the opportunity to understand the return on investment for new and in particular, used solar energy systems.

### Biography

Lisa B Bosman holds PhD in Industrial Engineering from the University of Wisconsin-Milwaukee. She is currently an Assistant Professor at the College of Menominee Nation, where she serves as the Director of the Solar Energy Research Institute. Her research interests include solar energy performance modeling, entrepreneurial minded learning and STEM education.

lbosman@menominee.edu

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