

Edward C. Kern, Jr., Ph.D.

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Dr. Kern has over four decades experience designing and building solar photovoltaic power systems. He is a director of Irradiance, Inc. a firm designing and manufacturing instruments for solar resource measurement. Dr. Kern consults on renewable energy technology development, infrastructure, and utility power system integration through KRNL PWR LLC and consults and serves as an expert witness in areas pertaining to photovoltaic panel and array structural products and system design concepts.

He is a founder, past president and director of the Solar Energy Business Association of New England. From 2002 through 2004, Dr. Kern lectured in wind and solar energy technology as part of MIT's subject 10.319j "Sustainable Energy". He was Director of Engineering for Schott Applied Power Corporation until 2002 when he formed Irradiance, Inc. and focused his activities on technology consulting and instrumentation design and manufacturing. Since 2015 he has devoted pro bono efforts within his community of Lincoln, Massachusetts and his alma mater Dartmouth College advocating for and providing design guidance toward their initial investments in solar power generation.

Dr. Kern has participated in solar power system research, development, and engineering projects across the United States and internationally since the mid-1970s. After leaving Schott, he worked with an electric utility in the Philippines and the International Finance Corporation to design and build the first megawatt-scale solar photovoltaic system to support clean electric power development in developing countries. He has worked with the United Nations Environment Program and electric utilities in Mexico, El Salvador, Costa Rica, Peru, India, Thailand and the Philippines on planning megawatt-scale PV installations. He worked with the Tata Power Company in Mumbai developing a megawatt-scale PV installation in collaboration with the U.S. Department of State's Asian-Pacific Partnership on Clean Development and Climate. He has served as a consultant to the International Finance Corporation, World Bank Group, in the area of renewable energy and infrastructure.

Dr. Kern has been active in the field of solar energy resources assessment, solar power system design, and power system performance modeling throughout his renewable energy career which started in 1977. Irradiance manufactures a rotating shadowband radiometer (RSR), a field survey instrument for measuring and recording global, direct and diffuse solar irradiance that Dr. Kern invented in the early 1990s. Since 2005 over one thousand RSR instruments have been installed in the United States, Australia, Bahrain, Brazil, Canada, China, Chile, Costa Rica, Ethiopia, Ghana, Greece, India, Indonesia, Israel, Italy, Jordan, Libya, Mexico, Morocco, Pakistan, Peru, the Philippines, Qatar, Russia, Saudi Arabia, South Africa, Spain, Switzerland, Tunisia, Turkey, and

Uruguay. Irradiance and the National Renewable Energy Laboratory's Solar Radiation Research Laboratory worked collaboratively for many years to characterize and improve rotating shadowband radiometers. A third generation of RSR instruments has been developed by [Irradiance, Inc.](#) under his son Chris Kern's leadership.

As founder and president of Ascension Technology (1987-1999) Dr. Kern oversaw the design and installation of over 200 grid-connected photovoltaic systems, in over 20 U.S. states from Hawaii to Massachusetts and internationally, totaling over two megawatts. These seminal grid-tie projects ranged in size from a 300-watt "AC-Module" to 100-kW systems installed within a wind farm in Tamil Nadu State, India and at the Pentagon in Washington, DC. The earliest of these projects were co-funded by the EPA, EPRI and electric utilities across the United States to demonstrate the feasibility of grid-connected solar photovoltaic systems and to determine the air emission offsets derived from clean PV power displacing fossil fuel fired generation. In these and many subsequent projects, system performance-monitoring and solar energy resource measurement equipment was developed under the supervision of Dr. Kern and used in these projects.

Before founding Ascension Technology in 1987, Dr. Kern was a member of the Massachusetts Institute of Technology faculty and research staff. He joined the MIT Lincoln Laboratory Photovoltaic Field-Test and Applications Project in 1977 and was promoted to Assistant Group Leader in 1980. In 1979 he planned and then managed the U.S. Department of Energy's Residential Rooftop Photovoltaic Systems Project. From 1982 until 1987 he continued this photovoltaic systems development activity at the MIT Energy Laboratory.

Before entering the solar photovoltaic power field in 1977, Dr. Kern's professional activities were in the field of hydrodynamics, particularly studying the dynamics of floating ocean structures for the control of oil spills. During the mid-1970s he was an Assistant Professor at MIT's Department of Ocean Engineering.

A Senior Member of the IEEE, Dr. Kern served as a member of the IEEE Standards Coordinating Committee on Dispersed Storage and Generation. During the early 1980s this committee developed the *IEEE Guide for Interfacing Dispersed Storage and Generation with Utility Systems*. He has consulted to the Electric Power Research Institute on photovoltaic applications, has served on the Science and Technology Review Committee for the National Renewable Energy Laboratory's Solar Radiation Resource Assessment Project and has served as a Peer Reviewer for the U.S. Department of Energy's Solar Program for Evaluation, Validation and Analysis.

Dr. Kern earned an A.B. in Engineering Sciences from Dartmouth College, a B.Eng. from Dartmouth's Thayer School of Engineering and a Ph.D. in the field of hydrodynamics from the Massachusetts Institute of Technology. He is a Fellow of the American Solar Energy Society.

A handwritten signature in blue ink, appearing to read "Edward", is displayed on a light blue background.

Projects, Reports, Teaching and Presentations	Year Start	Year End	Type of Activity	Client	Sponsors	Country
DOE Field Tests and Applications Program	1977	1982	PV System R&D		US DOE	USA
DOE PV Program Project Integration Meetings	1977	1982	PV System Field Test and Evaluation		US DOE	USA
IEEE PVSC	1977	2000	PV System R&D		US DOE	USA
DOE Residential PV Roof Top PV Program	1979	1986	PV System R&D		US DOE	USA
IEEE PES Relay and Protection Committee	1983	1986	Codes and Standards Development		US DOE	USA
EPRI Appliance Signature (NIALMS)	1984	1986	Power monitoring instrumentation		EPRI	USA
Gardner MA Model PV Community Project	1984	1990	PV System Field Test and Evaluation	New England Electric System	EPRI	USA

Massachusetts PV Utilization Program	1987	1988	PV System Field Test and Evaluation	Massachusetts Dept of Energy Resources		USA
Florida Power and Light Substation	1987	1988	Power monitoring instrumentation	Florida Power and Light		USA
EPRI Early PV Applications for Electric Power Industry	1987	1990	Training (Utility)		EPRI	USA
Early PV Applications Seminars	1988	1990	Training (Utility)		EPRI	USA
Nantucket Electric PV School	1988	1999	PV System Demonstration	Massachusetts Dept of Energy Resources		USA
EPRI CRIEPI Planning Meetings	1990	1994	Consulting		EPRI	USA
NREL Pakistan	1992	1992	Solar radiometry instrumentation		SERI	Pakistan
NYPA RSR	1992	1995	Solar radiometry instrumentation	New York Power Authority		USA

New England Power RSR	1992	1998	Solar Resource Monitoring	New England Electric System		USA
Northeast Utilities RSR	1992	1998	Solar Resource Monitoring	Northeast Utilities		USA
EPA PV Utility Air Emission Offset Studies 1	1993	1995	PV System Field Test and Evaluation		US EPA	USA
NREL AC Module Development	1993	1999	Power Electronics Development			USA
EPRI RSR	1994	1997	Solar radiometry instrumentation		EPRI	USA
Isla Mona PV	1995	1996	PV System Field Test and Evaluation	Amoco Enron Solar		USA
NEPC Micon Wind/PV integration	1995	1996	PV System Field Test and Evaluation			India
NREL Flat Roof Mounting Design	1995	1996	PV System R&D		NREL	USA
NREL White House	1995	1998	PV System Demonstration		NREL	USA

ISES World Conferences	1995	2000	PV System Field Test and Evaluation		US EPA	Multiple
Bayer Mexico City	1996	1996	PV System Demonstration	Bayer Pharma		Mexico
EPA PV Utility Air Emission Offset Studies 2	1996	1999	PV System Field Test and Evaluation		US EPA	USA
Utility Photovoltaic Group Projects	1996	2000	PV System Field Test and Evaluation		UPVG	USA
NREL Pentagon 1	1997	1997	PV System Field Test and Evaluation	NREL	NREL	USA
NREL Pentagon 2	1998	1998	PV System Field Test and Evaluation	NREL	NREL	USA
Brazil Remote Village Power	1998	1999	Power monitoring instrumentation		NREL	
Applied Power Corporation Management	1998	2000	Consulting			USA
Massachusetts Deregulation	1998	2000	Consulting		US DOE	

Solar Energy Business Association of New England	1999	2002	Consulting			USA
Schott Glass Management	2000	2001	Consulting			USA
MIT Sustainable Energy Subject	2001	2004	Teaching (University)			USA
NYCT Stillwell	2001	2005	PV System Procurement Consulting	New York City Transit Authority		USA
IFC Cagayan de Oro	2002	2005	PV System Procurement Consulting	Cagayan Electric Power and Light Company	WB/IFC	Philippines
NREL Proposal Review Committees	2003	2006	Consulting		NREL	USA
IFC World Outreach	2004	2008	Training (Utility)		WB/IFC	USA
US DOS India	2005	2008	PV System Procurement Consulting		US DOS	India
NREL SRRL Utility Solar Resource Collaboration	2005	2010	Solar radiometry instrumentation		NREL	USA

Tata Power Mulsi 2 MW	2008	2008	PV System Procurement Consulting	Tata Power Company	US DOS	India
Saudi RSR Network	2008	2013	Solar radiometry instrumentation	King Abdullah Center for Renewable & Atomic Energy		Saudi Arabia
Chile - Atacama Resource	2009	2014	Solar radiometry instrumentation			Chile
Egypt Nile Delta PV Irrigation	2010	2010	Consulting		WB/IFC	Egypt
World Bank/Int Fin Corp PV Technology Seminar	2010	2010	Training (Utility)		WB/IFC	USA
Solar PACES Annual Meeting	2010	2010	Solar radiometry instrumentation			France
China Light and Power	2010	2012	Solar Resource Monitoring	China Light and Power		Australia
World Bank South India 5 MW	2010	2012	PV System Procurement Consulting		WB/IFC	India
CH2M Hill Rajasthan/West Bengal	2010	2012	Solar Resource Monitoring	CH2M Hill Consultants	US DOS	India

Tata PowerSolar Resource Studies	2010	2014	Solar radiometry instrumentation	Tata Power Company		India
World Bank/IIInt Fin Corp PV Technology Seminar	2011	2011	Training (Utility)		WB/IFC	India
Solar PACES Annual Meeting	2011	2011	Solar radiometry instrumentation			Spain
Qutar Energy Agency	2012	2012	Solar radiometry instrumentation			Qatar
Solar PACES Annual Meeting	2012	2012	Solar radiometry instrumentation			USA
Saudi Electric Company	2012	2013	Solar Resource Monitoring	Saudi Electric Company		Saudi Arabia
Swiss Sensor Trials	2012	2013	Solar radiometry instrumentation			Switzerland