



*The National Science Foundation &
Center for Renewable Energy Advanced
Technological Education*

Energy International Faculty Consortium



**Grant #'s
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Energy Storage Project

Center for Renewable Energy Advanced Technological Education (CREATE)

The goal of the CREATE Energy Storage Project is to advance the field of renewable energy by supporting the integration of energy storage technology into existing two-year college programs, creating high school pathways and partnerships.

This goal will be accomplished through four objectives:

1. Examining existing model energy storage education efforts already pioneered in European countries.
2. Conducting a Job Task Analysis and Curriculum Gap Analysis to identify critical knowledge and skills for technicians working with energy storage systems.
3. Implementing pilot energy storage courses in a model teaching laboratory.
4. Providing professional development in energy storage for two-year college instructors through digital webinars, presentations, and workshops.

The CREATE Energy Storage Project (CREATE-ESP) builds on several years of United States and international cooperation to improve the quality of community college energy education. The project employs a proven, evidence-based, international collaboration model, which will gather global knowledge and expertise to produce an energy storage job task analysis, industry validated curriculum, and instructional materials. The project will equip a model teaching laboratory, integrating energy storage technology with solar photovoltaic systems and electric vehicle charging stations. This lab will serve as a platform for testing new curriculum with college students, and will also be used to educate faculty from across the country through professional development workshops to increase the impact of the project and strengthen energy education across the nation.

The CREATE Energy Storage Project will prepare a new generation of energy instructors and technicians to realize this transformation. The ultimate results will be greater deployment of clean renewable energy, a more strategically designed and economical distributed power infrastructure, greater resilience of our energy systems in the event of emergency or natural disaster, and a more cooperative role for the United States in the global development of energy storage technology.





Overview

Center for Renewable Energy Advanced Technological Education (CREATE)

Over the past decade, renewable energy has grown at a pace that is much faster than most other industry sectors. This growth is accelerating as a result of recent technological advances, manufacturing cost reductions, and government policy and regulatory initiatives. Although many two-year colleges in the United States now offer coursework in renewable energy, the vast majority of these programs are in their infancy, and most of the instructors are still in the early stages of their teaching careers. Thus, the educational sector is challenged to catch up to the renewable energy industry. There is a strong need to support new renewable energy programs, to help faculty to develop as professionals, and to provide them with high quality instructional materials.

CREATE serves high school educators and two-year college instructors, helping to create bridges to higher education. CREATE draws new institutions to the National Science Foundation (NSF) community, including business and industry partners, to help identify and strengthen renewable energy career paths.

In our previous renewable energy projects, the overwhelming majority of the faculty and schools served by CREATE had no prior exposure to NSF. Nevertheless, 80% were considering applying for an NSF grant in the near future, indicating a great opportunity to grow the Advanced Technological Education (ATE) community, while also underscoring a pressing need for mentoring support. Several Hispanic Serving Institutions, Tribal Colleges, and Historically Black Colleges and Universities were included amongst these schools. CREATE continues to serve as an advocate and model for female leadership in renewable energy, and promotes the advancement of women in STEM careers. Perhaps most importantly, by advancing the field of renewable energy, CREATE will have far reaching environmental and economic benefits as it helps to transform America's energy infrastructure.

CREATE's goal is to advance the field of renewable energy by championing exemplary renewable energy educational programs. This goal is accomplished through five key objectives:

1. Providing support and mentoring for faculty that wish to start or improve educational programs in renewable energy technology.
2. Establishing and supporting renewable energy industry, business and academic partnerships.
3. Promoting technician careers, visibility and the public image of renewable energy.
4. Addressing technician knowledge, skills, and competencies needed for the evolving, converging, and emerging renewable energy technical workplace.
5. Screening, validating, updating, and broadly distributing exemplary renewable energy materials, curricula, and pedagogical practices adapted or designed by ATE centers, projects and other sources.





Leadership Bios



Dr. Kenneth Walz, Principal Investigator
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Dr. Walz is the Director and Principal Investigator for the Center for Renewable Energy Advanced Technological Education (CREATE). Dr. Walz earned his B.S. degree in Science Education, and Ph.D. in Environmental Chemistry and Technology at the University of Wisconsin. He completed his dissertation working on advanced lithium-ion batteries with Rayovac and Argonne National Laboratory. He also worked as a visiting scientist with the University of Rochester Center for Photoinduced Charge Transfer. Since 2003, he has taught chemistry, engineering, and renewable energy at Madison College in Madison, Wisconsin. Dr. Walz is an alumnus of the Department of Energy Academies Creating Teacher Scientists (DOE ACTS) Program at the National Renewable Energy Laboratory (NREL). He is also an adjunct professor with the Department of Civil and Environmental Engineering at the University of Wisconsin. He serves as Secretary for the Wisconsin Distributed Resources Collaborative and as an advisory board member for the Wisconsin K-12 Energy Education Program (KEEP). Dr. Walz has been recognized as Professor of the Year by the Carnegie Foundation and the Council for Advancement and Support of Education, and as the Energy Educator of the Year by the Wisconsin Association for Environmental Education.



Dr. Kathleen Alfano, Co-Principal Investigator
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Dr. Alfano has a Ph.D. from UCLA in Higher Education with a cognate in administration and evaluation. Her B.S. is in chemistry and she worked as an analytical chemist in industry before returning for her M.S. and pursuing a career in education. She served as founder and Director of CREATE, based at College of the Canyons, from 1996 to 2016. At College of the Canyons she is a Faculty Emeritus and was a Dean of Professional Programs and Academic Computing from 1996-2000. She currently acts as Co-PI for the CREATE NSF ATE Support Center, Co-PI of two NSF mentoring projects and as a mentor with the AACC/NSF MentorLinks project. Dr. Alfano served as a Program Director at the National Science Foundation and Co-lead of the ATE program in 2007-2008. Dr. Alfano was the only community college representative on the National Academy of Sciences Committee on Workforce Trends in the U.S. Energy and Mining Industries which released their report in March 2013.



Joel Shoemaker, Co-Principal Investigator
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Joel Shoemaker is a Wisconsin state-certified Master Electrician with over 12 years of experience with photovoltaic systems. He has been a Co-PI for Madison College's NSF ATE grants since 2009. He has been a past instructor for the PV trainer programs offered by Madison College and Solar Energy International, and led the creation of the Madison College PV Institute for High School Teachers. In 2011, the Wisconsin Bureau of Apprenticeship Standards and the Wisconsin Apprenticeship Advisory Council recognized Shoemaker as a Centennial Educator.





Leadership Bios



Gabrielle Temple, Co-Principal Investigator
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Ms. Temple is the Project Manager for the National Science Foundation Center for Renewable Energy Advanced Technological Education (CREATE) and the Co-PI on the National Science Foundation Energy Storage Project (ESP) at Madison Area Technical College in Wisconsin. She has spent the last seven years as the Project Manager for the National Science Foundation CREATE Center at College of the Canyons in California, and has more than twelve years' experience working on

NSF grants. During her time as Project Manager for CREATE, Ms. Temple coordinated two successful international projects funded through NSF to explore the renewable energy achievements in Australia and Germany. Ms. Temple started her career in the private sector in accounting and finance before coming to College of the Canyons. Ms. Temple earned her B.A. in Communications with an emphasis in Public Relations at California State University Bakersfield and a M.A. in Strategic Communications from National University. In addition to her grant administration duties, Ms. Temple is an Adjunct Instructor in Communication Studies at College of the Canyons in California and a higher education consultant specializing in grant administration.



Ted Petith, Consultant
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Receiving his B.A. in Modern German Studies from the University of Illinois at Urbana-Champaign in 1989, Ted Markus Petith brings a decidedly German focus to issues surrounding sustainable city planning. Having travelled and worked extensively in Germany, Ted has cultivated many sustainability-related connections, especially in Madison, Wisconsin's Sister City of Freiburg, Germany. A globally-recognized leader in the implementation of Green technologies and sustainable city planning, Freiburg, Germany offers valuable insight into many 'best practices'

for sustainable infrastructure growth. He works closely with Freiburg's Green City Office, part of the City's Department for International Contacts. Mr. Petith is the owner of GreenLink Projects LLC and an Associate Lecturer in the College of Agricultural and Life Sciences at the University of Wisconsin-Madison. He has served as a consultant for the US DOE Solar America Cities MadiSUN Program, the City of Madison, Gebhardt Development LLC and many other entities.



Wilson Rickerson, Consultant
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Wilson Rickerson is a Principal at Converge Strategies, LLC, where he focuses on advanced energy technology and resilience. He previously served as CEO of Meister Consultants Group where he advised governments across all 50 states and 25 countries on new energy strategies. He currently serves on the National Visiting Committee for the Center for Renewable Energy Advanced Technological Education and previously supported clean energy workforce programs at the Center for Sustainable Energy at Bronx Community College. Wilson began his career

in energy working with the German Wind Energy Association as part of a Congressionally-sponsored professional exchange in Berlin. He holds a Masters in Energy and Environmental Policy from the University of Delaware and a B.A. in International Relations from the College of William and Mary.





Leadership Bios



Dr. Mary Slowinski, Learning Coordinator Consultant

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Dr. Slowinski is an educator and consultant specializing in collaborative learning design and workforce education research. She is Co-PI for Working Partners, a National Science Foundation research grant studying industry/education partnerships, development lead for a bio-tech education community of practice, and tenured faculty at Bellevue College with an emphasis on educational technology and online learning. Dr. Slowinski has also served as learning coordinator for two prior CREATE international faculty learning projects and has facilitated the development of curricula and course materials across disciplines. Mary received her Ph.D. in Learning Science/Educational Psychology from the University of Washington, Seattle.



Dr. Jean Sando, Evaluator

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Dr. Sando serves as the external evaluator for the project. She has a Ph.D in Curriculum and Instruction from Indiana State University. She is the former Associate Vice President for Academic Affairs and as Assistant Vice President for Assessment at Minnesota State University Moorhead. She has acted as a review panel member for the U.S. Department of Education's Strengthening Institutions program and has been an external evaluator for one national and two regional NSF/ATE centers. Dr. Sando is the co-author of, "Stepping Ahead: An Assessment Plan Development Guide" with Gloria Rogers, Ph.D. which has been distributed to over 10,000 faculty members throughout the country. She has also worked in a variety of areas in higher education including corporate, foundation and government development and grant management. Currently she is teaching and researching in a local high school in reading development.





Faculty Team Bios



Andrew McMahan
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Andrew McMahan is the Chair for the Department of Sustainability at Central Carolina

Community College in Pittsboro (CCCC), North Carolina. Andrew has been involved in renewable energy education in North Carolina since 2004; first as an instructor, then as the program coordinator for CCCC's biofuels program. From 2010-12 Andrew worked as the Energy Sector Director for the Code Green Super CIP, a statewide initiative tasked with integrating renewable energy training and workforce development into existing vocational programs at all 58 community colleges across North Carolina. He has also written and managed multiple grants to support the growth of renewable energy education and workforce development in North Carolina. Andrew is a graduate of Appalachian State University with a degree in Environmental Policy & Planning.



Christopher Miller
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Mr. Miller is a Professor and Program Coordinator at Heartland Community College.

Chris is most proud of three achievements: First, helping a lot of students over the last eighteen years get great careers in the technical field. Second, the creation of the Renewable Energy degree program at Heartland in 2009. Third, helping author the Illinois Commerce Commission's Distributed Energy Installer Program and establishing the criteria necessary to become an installer. His input recognized and developed multiple pathways for Illinois citizens to gain employment in the growing distributed energy workforce. Mr. Miller has designed and built technical lab trainers, developed a partnership to increase student electronic technology certification in China, and leads a

sustainability and renewable energy study abroad course in Belize.



Dr. Deb Hall
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Dr. Hall is the Principal Investigator of the Broadening Education, Access, and Momentum in Energy

Management and Controls Technology project, funded by the National Science Foundation. Since January of 2001, she has had the honor of teaching at Valencia College where she is currently Valencia College's Energy Management and Controls Technology Program Chair and Professor of Electronics Engineering Technology. Prior to Valencia College, she worked as an electrical engineer for seven years with theme park ride and show control, electric vehicle battery testing, and solar power feasibility studies. Dr. Hall earned both her M.S. in Electrical Engineering and her B.S. in Electrical Engineering from the University of Central Florida and earned her Doctor of Education in Higher Education Leadership from Nova Southeastern University. She serves within the Central Florida community as the 2018 IEEE Orlando Section Executive Committee Chair and is involved in many hands-on engineering outreach programs to encourage young female students in grades 4-12 to pursue STEM related careers.



Dr. Lisa Bosman
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Dr. Lisa Bosman is an Assistant Professor in the Purdue Polytechnic Institute (formerly the College of Engineering

Technology) at Purdue University. She earned her B.S. degree in Industrial Engineering from the Milwaukee School of Engineering, M.S. degree in Management Information Systems, a second M.S. degree in Industrial Engineering from Clemson University, and her Ph.D. in Industrial Engineering





Faculty Team Bios

(Dr. Lisa Bosman Continued)

from the University of Wisconsin System. Dr. Bosman's dissertation, titled "A Decision Support System to Analyze, Predict, and Evaluate Solar Energy System Performance" focused on better understanding and assessing the factors influencing the performance and reliability of PV solar energy systems. Her current research interests include STEM Education and the Impacts of Technology on Society. Within the realm of STEM Education, she has done a variety of work in areas including teaching the entrepreneurial mindset, competency-based learning, self-regulated learning, transdisciplinary education, integrating the humanities into engineering education, workforce development and faculty professional development. As for the Impacts of Technology on Society, her technology-optimization focused research includes solar energy and digital manufacturing. In 2018, Dr. Bosman was an award finalist for the C3E Award for Mid-Career Women's Leadership and Achievement in Clean Energy.



Jenny Brinker
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Jenny Brinker, has conducted hundreds of commercial energy audits since beginning a career in energy management in 2005. Ms. Brinker has developed and managed contracts for energy management programs, electric and gas utilities, government entities and non-profit organizations. Her work also involved training energy auditors, which led to her current role as a sustainability and energy management instructor at Northeast Wisconsin Technical College, and adjunct instructor for the Wisconsin K-12 Energy Education Program. She also serves as Co-PI for the Manufacturing, Engineering Technology, and Energy Ready Scholars (METER) project funded by the National Science Foundation. Ms.

Brinker's teaching emphasizes learning from real-life projects. She recognizes and teaches the importance of saving energy, money and the environment, along with meeting customer comfort and production needs. She holds a Master's Degree in Land Resources and Energy Analysis and Policy from UW-Madison and is an Association of Energy Engineers Certified Energy Manager.



Louise Petruzzella
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Louise Petruzzella is Lead Faculty and Director of the Clean Energy Technology (CET) and Entrepreneurship program at Shoreline Community College. Her current focus is on developing a sustainable relationship between the CET program and regional employers. Partnering with regional business and community leaders in designing a robust curriculum ensures that CET graduates meet industry demands for a highly skilled workforce. In addition, Ms. Petruzzella is the PI for the Clean Tech ATE: Advancing Technician Training in Clean Energy Technology project funded by the National Science Foundation. She has 20 years of professional experience as an educator and business liaison, as well as experience in leading and mentoring others. With deep experience in community outreach and mobilization linking students and faculty with local companies for internships, externships and job placements, she brings a strong collaborative philosophy to her work environments. Having earned a Certificate in Sustainable Business Leadership, Ms. Petruzzella is adept at identifying and fostering sustainable business practices. She is a graduate of the Clean Energy Technology program and received her Masters in Theological Studies and Philosophy from Emory University.





Faculty Team Bios



Richard Lawrence
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Mr. Lawrence is a Program Director at The Solar Foundation, whose mission is to accelerate adoption of the world's most abundant energy source. He leads Solar Ready Vets 2.0, a Department of Energy sponsored initiative that connects veterans and transitioning service members to training, certifications, apprenticeships, and jobs in the solar industry. He also coordinates the Solar Automated Permitting Process (Solar APP), an industry initiative to streamline the permitting and inspection process for installations. And he co-chairs the Solar Energy Industries Association's Quality Assurance Working Group, which creates best practices for the finance and installation of PV systems. Mr. Lawrence earned a B.S. degree in Science Education from Florida State University, and a M.S. degree in Environmental Education from Lesley University through the Audubon Expedition Institute, where he spent semesters studying in Alberta, the Sonoran Desert, Maine, and Cape Cod. Since 2002, he has focused his career on renewable energy education, training, workforce development, credentialing, advocacy, and quality assurance. He has worked for several non-profit and academic institutions including Self-Reliance, Clean Power Now, Cape Cod Community College, Hudson Valley Community College, the North American Board of Certified Energy Practitioners (NABCEP), and the Institute for Building Technology and Safety (IBTS) in positions ranging from Adjunct Instructor to Executive Director. He has solar on his house in upstate NY, which did cover 100% of his family's annual electrical load prior to their purchase of two plug-in hybrid vehicles.



Roger Ebbage
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Mr. Ebbage is the Director of the Northwest Water and Energy Education Institute (NWEI) at Lane Community College. Ebbage

is currently the Principal Investigator (PI) on two National Science Foundation Advanced Technology Education (NSF-ATE) project grants and a Co-PI on the NSF-ATE CREATE-SC grant. His NSF ATE project grants involve taking career/technical programs fully online where students interact with "Field-work Mentors" to satisfy "hands-on" course requirements instead of periodically traveling to the Lane campus for a lab experience. Mr. Ebbage has taught energy related workshops throughout the United States and internationally, has mentored community college faculty through the American Association of Community Colleges (AACC) NSF funded MentorLinks project, and through an NSF ATE project grant (2009-2013), and has served on many regional and national boards and committees. Mr. Ebbage recently received the Western U.S. Regional Energy Professional Development Award from the Association of Energy Engineers.



Scott Liddicoat
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Mr. Liddicoat has taught high school science for 34 years. In recent years he has specialized in teaching high school courses on energy conservation and renewable energy for college credit. Mr. Liddicoat is also an instructor for the Center for Renewable Energy Advanced Technological Education (CREATE) and the Wisconsin K-12 Energy Education Program (KEEP). In addition, Mr. Liddicoat is the Renewable Energy Education Coordinator for the Wisconsin Public Service SolarWise for Schools program. In these capacities, he has been responsible for the instruction and training of hundreds of teachers. He has authored over 40 classroom lessons, bringing energy topics to life for teachers and their students across Wisconsin. Mr. Liddicoat completed his undergraduate studies at the University of Wisconsin—Madison, and his Masters degree at Viterbo University. During his career, Mr. Liddicoat has won the Aldo Leopold Teaching Award ('89), Herb Kohl Fellowship Award ('02), and Wisconsin Energy Educator of the Year ('13).

