



The U.S. Clean Energy Education & Empowerment Program

celebrating five years of progress: 2012 through 2016

Dear Colleagues,

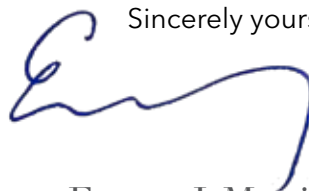
Transforming domestic and global energy systems will require innovation, intellect, and commitment across a broad range of clean energy disciplines and interests. To enable and accelerate this transformation, the U.S. Department of Energy supports Clean Energy Education & Empowerment—C3E—a program designed to inspire more women to enter leadership roles across the clean energy spectrum: from laboratories, legislatures, investment companies, and businesses to think tanks, schools, NGOs, and law firms.

During the past five years, the U.S. C3E program has successfully enlisted respected advocates and role models, sponsored annual symposiums, and provided valuable networking opportunities for clean energy professionals. The U.S. C3E program also recognizes the exceptional achievements of mid-career women whose work in clean energy solves challenges across the globe. Winners of the C3E Award are announced at the annual U.S. C3E Women in Clean Energy Symposium, and the awards are provided by the Massachusetts Institute of Technology Energy Initiative and the Stanford Precourt Institute for Energy. In addition, each year the U.S. C3E program recognizes the lifetime achievements of one woman with an exemplary career in clean energy.

This book celebrates the U.S. C3E program's five-year anniversary, shares the stories of C3E Awardees, and provides insights from its cadre of Ambassadors—senior-level women and men who mentor young professionals and select the Awardees. The stories from the C3E Awardees provide a glimpse of the courage, innovation, and determination displayed by these extraordinary women in clean energy and the value of diversity in transforming global energy systems.

I am sure you will agree that these narratives are inspiring. Please join me in applauding these outstanding women and their many contributions to clean energy.

Sincerely yours,



Ernest J. Moniz
U.S. Secretary of Energy



May 2016

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The U.S. C3E Program

The U.S. Clean Energy Education & Empowerment (C3E) program at the U.S. Department of Energy (DOE) inspires women to pursue careers and leadership roles in clean energy by recognizing achievements and providing professional networks for mentoring and information sharing.

About C3E

Transforming the world's energy systems requires the talent, innovation, and commitment of all members of society. Women make up substantially less than half of the workforce in clean energy and in science, technology, engineering, and math (STEM) fields. The key goals of the U.S. C3E program are closing this gender gap and increasing women's participation and leadership across the clean energy sector. This program is led by the U.S. Department of Energy in collaboration with the Massachusetts Institute of Technology Energy Initiative (MITEI) and the Stanford Precourt Institute for Energy.

Origins

The 2009 United Nations Climate Change Conference in Copenhagen stimulated broad interest in sharing clean energy policies and programs among countries to enhance country-specific efforts to mitigate emissions. To drive progress, DOE convened energy ministers from 24 governments at the first Clean Energy Ministerial (CEM) meeting in 2010. The participating governments shared novel policies, programs,

and partnerships—signing on to specific initiatives for accelerating the transition to clean energy.

The United States used the CEM platform to propose several initiatives, including C3E, which quickly attracted the interest of several CEM partner countries. The energy ministers recognized the need to harness all talent and human capital to effect progress. The C3E initiative was launched to:

- Attract more women to rewarding clean energy careers and support their advancement into leadership positions.
- Provide recognition, role models, and advocates for women in clean energy.
- Create networks for women in clean energy to share relevant ideas, views, events, resources, and opportunities.

Greater gender diversity in the clean energy sector will enrich the talent pool and help shape a robust and sustainable clean energy future.



The U.S. C3E Program

DOE began detailed planning for the U.S. C3E program in 2011. Distinguished women leaders in clean energy gathered at a workshop to identify the challenges faced by women in clean energy fields and recommend specific actions to overcome those challenges. These efforts culminated in the 2012 launch of the U.S. C3E program.

Since 2012, DOE has led C3E with strong collaborative support from MITEI. In December 2015, DOE and MITEI welcomed the Stanford Precourt Institute for Energy to the collaboration supporting C3E.

Four Strategic Pillars

By raising the visibility of role models for women in clean energy, the U.S. C3E program is helping to attract more women to the field—catalyzing innovation, fostering new business models, and expediting global progress toward a clean energy economy. C3E's four-part strategy, described on the following pages, has created a team of established leaders, prestigious awards for mid-career women, recognition for lifetime achievement, and opportunities to energize interaction and networking.

Benefits of Gender Diversity

Companies in the top quartile for gender diversity are 15% more likely to have financial returns above their respective national industry medians.

McKinsey, Diversity Matters, February 2015

A gender-diverse workforce brings different talents, attributes, and skills to the table to help businesses develop, adapt, innovate, and progress.

The Advocate Group, 5 Real Benefits of Gender Diversity in the Workplace, 2015

Men and women have different viewpoints, ideas, and market insights, which enables better problem solving, leading to superior performance.

Gallup Business Journal, Business Benefits of Gender Diversity, by Sangeeta Baharadwaj Badal, January 2014

Gender diversity helps companies attract and retain talented women. Companies cannot afford to ignore 50% of the potential workforce and expect to be competitive in the global economy.

The Advocate Group, 5 Real Benefits of Gender Diversity in the Workplace, 2015

Photos above: C3E symposium participants connect with one another at informal networking sessions, graduate student poster presentations, and undergraduate presentations of current research. (Photos: Justin Knight)



Ambassadors

The U.S. C3E program has assembled a cadre of distinguished senior executives, academics, and thought leaders who serve as role models and advocates for women in clean energy. These C3E Ambassadors voluntarily devote time and resources to support the program, mentor younger women, promote the program at conferences, and select new C3E Award winners at a retreat each year.

Many of these Ambassadors faced formidable obstacles as pioneers in their fields and they now work to strengthen the recruitment, retention, and advancement of other highly qualified women in the clean energy sector. The U.S. C3E Ambassadors form a powerful network of knowledgeable and supportive leaders. With their counterparts named by CEM partner governments, they also serve as members of the International C3E Ambassador Corps, which met in the United Arab Emirates last year. Ambassador insights are presented at the end of this book.

Awards

C3E Awards are presented to eight mid-career women each year to recognize their outstanding leadership and achievements. Winners of these respected awards also actively mentor or support other women in the field. A winner is selected in each of the following broad categories:

- Advocacy
- Business
- Education
- Entrepreneurship
- Government
- International
- Law & Finance
- Research

Nominations are solicited nationwide, then carefully vetted by the C3E Ambassadors. Winners are announced at the annual C3E Women in Clean Energy Symposium, where they receive high-level recognition and cash prizes provided by the MIT Energy Initiative and the Stanford Precourt Institute for Energy. A Lifetime Achievement Honoree is also announced at the annual symposium. This book highlights the stories of the women who have received these awards.

Photo above: 2016 U.S. C3E Ambassadors gathered at the National Renewable Energy Laboratory in Golden, CO for their fifth annual retreat (Photo: Dennis Schroeder)



Symposiums

The annual C3E Women in Clean Energy Symposium showcases the technical accomplishments of women in clean energy. This premier event also promotes networking among professional women in all aspects of clean energy and at all career stages. Participants share recent findings, exchange ideas, celebrate achievements, and inspire others to pursue ambitious energy goals.

Symposium programs include thought-provoking keynote speakers, panel discussions, poster competitions, speed networking sessions, informal dinners, and global webcasts. Graduate and undergraduate students present their research in three-minute lightning rounds or poster sessions.

Attendees describe the symposiums as informative, inspiring and invigorating. At the four C3E symposiums hosted by MITEL from 2012 to 2015, participants enjoyed exploring such topics as natural gas impacts on renewable energy, the energy-water nexus, and clean energy technology frontiers.

C3Enet.org for Professional Networking

C3Enet.org, the online community forum, enables women working on clean energy around the world to share information, insight, inspiration, and opportunities. C3E also actively fosters networking among women working in the field of clean energy through social media such as LinkedIn and Twitter, and through regional meet-ups.

How can you get involved in the C3E community?

- Join C3Enet.org.
- Connect with us on LinkedIn [linkedin.com/in/c3ewomen](https://www.linkedin.com/in/c3ewomen).
- Follow us on Twitter @C3E_EnergyWomen and use the hashtag #C3EWomen.

Connections with peers and mentors provide a vital resource to women pursuing clean energy careers—encouraging them to achieve their goals and create a cleaner world.

C3E Awardees Advance

Past awardees report that the recognition has enhanced their opportunities and visibility in the clean energy community or helped to attract funding for their work. Highlights of follow-up successes include the following:

- Judy Dorsey used her prize money to start a C3E program in Colorado.
- Laura Stachel was voted a Top 10 Hero by CNN.
- President Obama recognized Erica Mackie's GRID Alternatives organization as an innovative approach to helping low-income families, developing the workforce, and improving the environment.
- Mildred Dresselhaus, a C3E Lifetime Achievement Honoree, received the Presidential Medal of Freedom for her contributions to scientific breakthroughs in nanotubes and modern electronics.

Building on Success

C3E efforts to advance women's leadership in clean energy have generated excitement and momentum. U.S. C3E Ambassadors are strengthening their network and engaging the growing number of International C3E Ambassadors around the globe. Awardees find that C3E recognition is opening doors and leading to new opportunities. Women at all career stages are leveraging C3E tools to gain essential information for career development.

C3E is enriching the talent pool and accelerating progress in clean energy. Everyone can contribute.

- Network and support others
- Share opportunities
- Find inspiration
- Pursue your interests in clean energy

You make a difference!



Women around the world are connecting through C3E's online forums. This map shows where C3Enet.org participants live.



Participants taking in a panel discussion at the 2015 C3E Symposium
(Photo: Justin Knight)



Panelists at the 2015 C3E Symposium bring diverse viewpoints to bear on emerging issues
(Photo: Justin Knight)

Narratives from C3E Award Winners

Recipients of the C3E Award from 2012 through 2016 are extraordinary mid-career professionals making significant impacts as leaders across clean energy fields. Each excels within her discipline and beyond—many having received top honors from industry, academia, government, and non-government organizations. Learn about their backgrounds, innovations, professional successes, and other accomplishments at c3eawards.org/winners/.

The narratives presented in this section contain personal stories and perspectives written by our C3E Award winners. They describe the influences or passions that drive their work, turning points in their careers, challenges converted into opportunities, and their

continuing search for new approaches and solutions. All of the Awardees share an avid interest in mentoring students and women and in accelerating progress toward a clean energy economy.

The narratives are arranged in the following five sections:

- Creating Breakthroughs in Science and Technology
- Forging Pathways to Shape Demand
- Increasing Energy Access in Underserved Communities
- Building and Expanding Markets
- Preparing the Workforce for Today and Tomorrow

Creating Breakthroughs in Science and Technology

Lisa Dyson

CHIEF EXECUTIVE OFFICER, KIVERDI, INC.

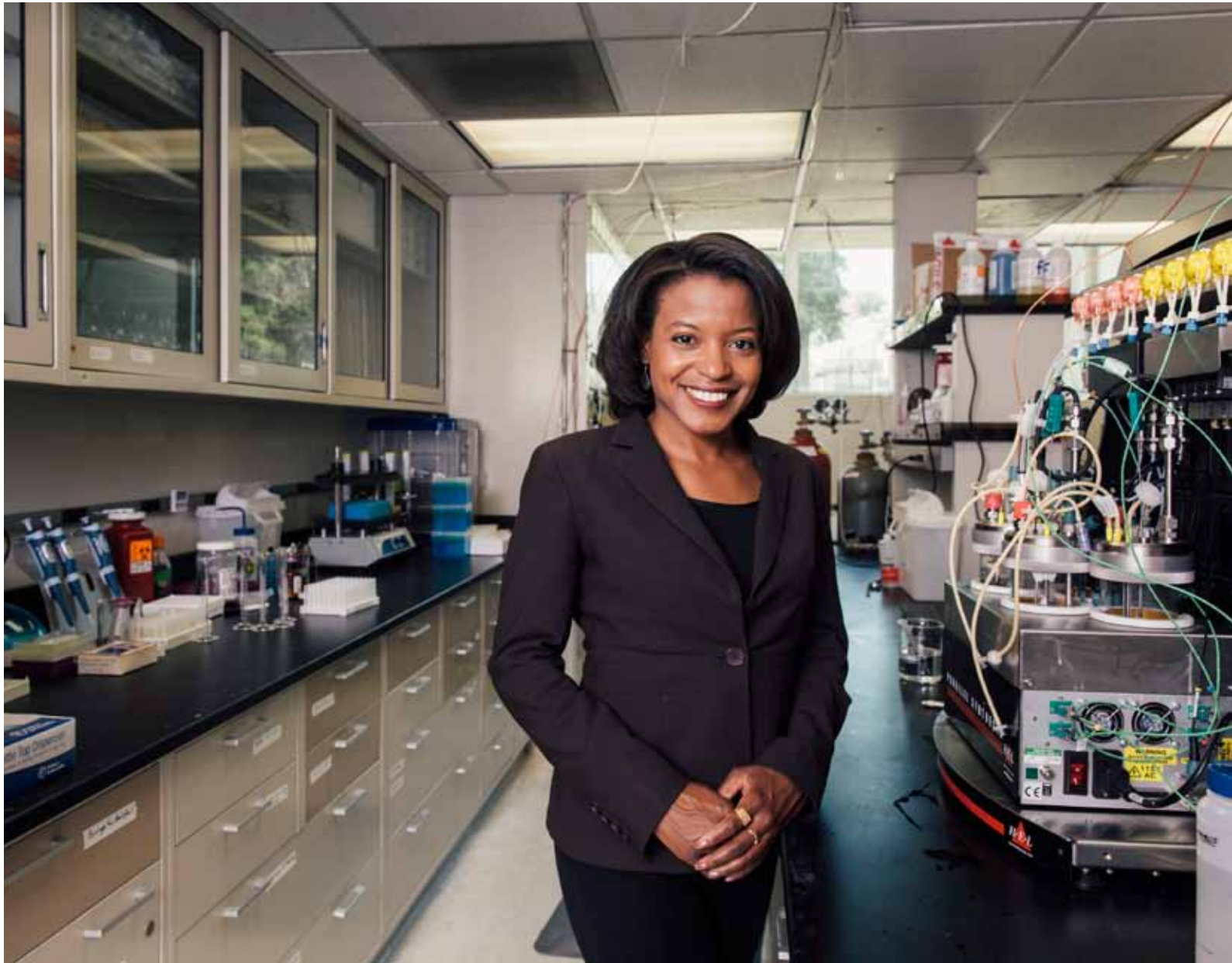
PhD, Physics, Massachusetts Institute of Technology
MS, Physics, University of London
BS, Physics and Mathematics, Brandeis University

While reviewing old research from the NASA Space Program, my colleague Dr. John Reed and I came across some interesting ideas for using microbes to recycle carbon aboard a spacecraft. The concept sparked an intriguing question. Could we pair these ideas from the past with modern technology to recycle carbon? Happily, we can.

Viewing ideas that were before their time through the lens of today's technology can deliver dividends for clean energy.

Today, our company Kiverdi is on a path to produce the agricultural products that will feed and fuel the world of tomorrow. Our innovative technology uses microbes to convert carbon dioxide into high-value oils and proteins for numerous applications.

Our passion for sustainability brought this idea of carbon recycling to fruition. Kiverdi now provides a platform for companies to not only do something good for the planet, but to do so profitably.



Lisa Dyson in the laboratory where Kiverdi's proprietary microbes convert gasified waste and waste carbon into sustainable oils at a fraction of the cost of chemical catalysts (Photo: Hanh Nguyen)

Jessica Granderson

RESEARCH SCIENTIST AND DEPUTY DIRECTOR, BUILDING TECHNOLOGIES,
LAWRENCE BERKELEY NATIONAL LABORATORY

PhD, Mechanical Engineering, University of California, Berkeley
AB, Mechanical Engineering, Harvard University

When I began my graduate training at UC Berkeley in the late 1990s, I could not have predicted that I would establish a career in clean energy—with a focus on energy efficiency in the built environment. Although I was aware of the importance of climate and energy, the disciplines that truly inspired me were user-centered design and design theory and methodology. The concept of using human-focused problem solving to develop technology tailored to people’s needs was just fascinating, and far different from the more theoretical technical training that I received as an undergraduate. Somewhat accidentally, I discovered the field of building energy efficiency and was immediately drawn in by the challenges that it presented. Here was a terrifically complicated space that offered the opportunity to apply a user-centered design approach for tremendous impact, both globally and domestically.

Clean energy and energy efficiency go hand in hand and now provide the foundation of my career in applied research

and development. As a Scientist at the Lawrence Berkeley National Laboratory, my work leverages advances in sensing, analytics, information technologies, and computation to realize the smart buildings of tomorrow. These advances are enabling efficient, dynamic buildings that can integrate with the low-carbon, renewable-powered grid of the future. It is an especially exciting time for our industry.

In addition to energy efficiency and design, I am committed to the development of the next generation of scientists and engineers. I am particularly motivated to support women and people of color in pursuing careers in science, technology, engineering, and mathematics. My professional experiences have been exceptionally rewarding, and I strive to facilitate awareness of the field and opportunities for others by serving as a mentor and student research advisor.



Jessica Granderson

Jessica Granderson conducts research at DOE's FLEXLAB™, the world's most advanced building efficiency testbed. (Photo: Lawrence Berkeley National Laboratory)



Tracey Holloway

PROFESSOR, UNIVERSITY OF WISCONSIN, MADISON

PhD, Atmospheric and Oceanic Sciences, Princeton University
BS Honors, Applied Mathematics, Brown University



Tracey Holloway delivers a TED^x talk at University of Wisconsin, Madison in November 2015. (Photo: Shots by HP)

Winning the C3E Award in 2012 was a real turning point in my career. At the time, I was a tenured professor at the University of Wisconsin-Madison and was considering options for the road ahead. Of all the questions I could tackle, which would be the most important? Where could I really make a difference in my research and career? You might think I would have answered those questions already, but the frantic pace of publishing and teaching did not allow much time for self-reflection. Add in a young child and new administrative duties, and the years whizzed by without a clear personal mission.

In particular, I felt torn between the different hats I wore around energy. I was hired at UW-Madison as part of an Energy Faculty Cluster, so energy had shaped my career for years. I knew that my work in biofuels and electric grids would count as “energy,” but I suspected that many of my interests and passions were too broad to fit an energy mold. I wanted to know how weather patterns affected atmospheric chemistry, how we could make science more inclusive to

diverse groups, and how satellite data could be better used to support policymaking. I assumed these topics fell outside of my “energy” work.

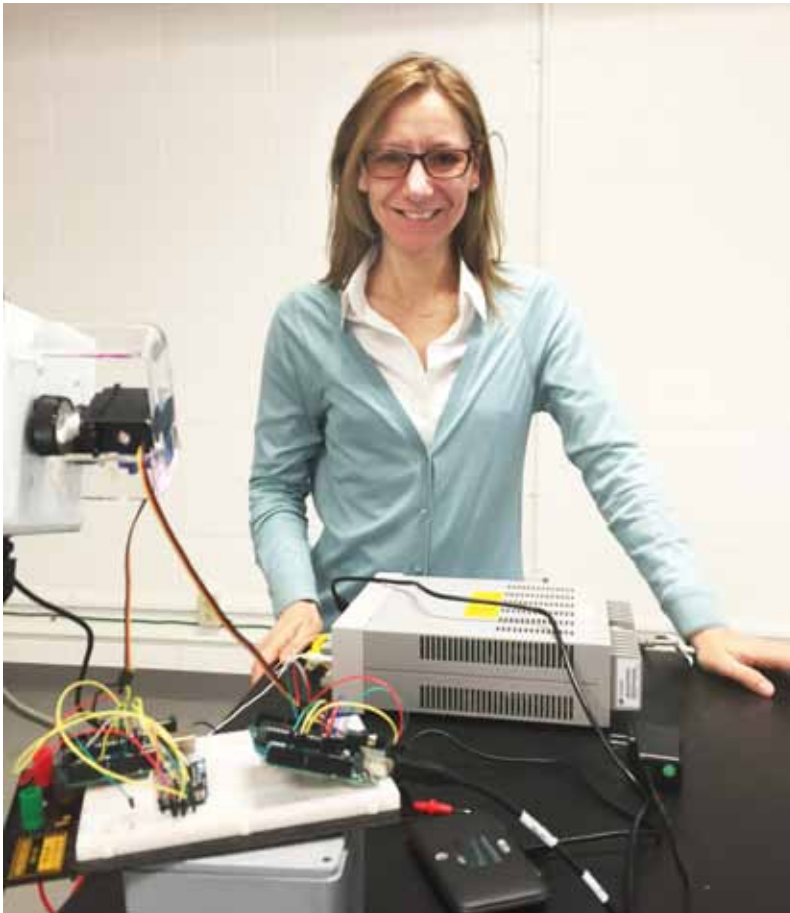
Then came C3E. Frances Beinecke, then President of the Natural Resources Defense Council, presented my award. In her talk, she reflected on my work in air pollution, and especially my efforts to support women in science through the Earth Science Women’s Network. She did not even mention biofuels or power plants! It was inspiring to consider the wider view of “energy” advanced by C3E: an umbrella that includes the human and environmental issues along with the technological and economic. In fact, under the C3E perspective of energy, all of my interests and passions fit together.

I hope to advance understanding of energy and environmental issues and to inspire students to pursue energy as one of the most important challenges of our time. This challenge demands all types of minds and people.

Sila Kiliccote

STAFF SCIENTIST, LEADER OF SMART GRID RESEARCH,
SLAC NATIONAL ACCELERATOR LABORATORY

MBA, Tepper School of Business, Carnegie Mellon University
MS, Building Science, Carnegie Mellon University
BS, Electrical Engineering, University of New Hampshire



Sila Kiliccote and her team developed an open-source system to manage behind-the-meter energy consumption and storage as a function of price. An ARPA-E project will build on this technology in 2016. (Photo: SLAC Lab)

At an Institute of Electrical and Electronics Engineers meeting in San Francisco in 2004, I listened to a speaker describe an elegant solution to a complex problem. At the time, I was a stay-at-home mom with two small boys. I scheduled a meeting with the speaker the next day and told her, with resume in hand, that I wanted to work with her. Mary Ann Piette at Lawrence Berkeley National Laboratory hired and mentored me, and our research collaboration led to the development of a large body of work in demand response and automated demand response over the next decade.

Together with a team of researchers and industry partners, we developed Open Automated Demand Response (OpenADR), which became an international standard and is currently deployed in many countries. What I learned from the experience was priceless: research in the field of clean energy technology must be innovative and widely

applicable, but those traits alone do not guarantee impact. Innovative research, by definition, is ahead of its time. To reach its full potential, innovative research requires the creation of an entire supporting ecosystem, engaging industry, markets, and regulatory bodies in technology education and demonstration. A woman leader—someone who listens, acts on the feedback she receives, focuses on the long-term vision, and consistently demonstrates short-term wins—is in a perfect position to deliver impactful research.

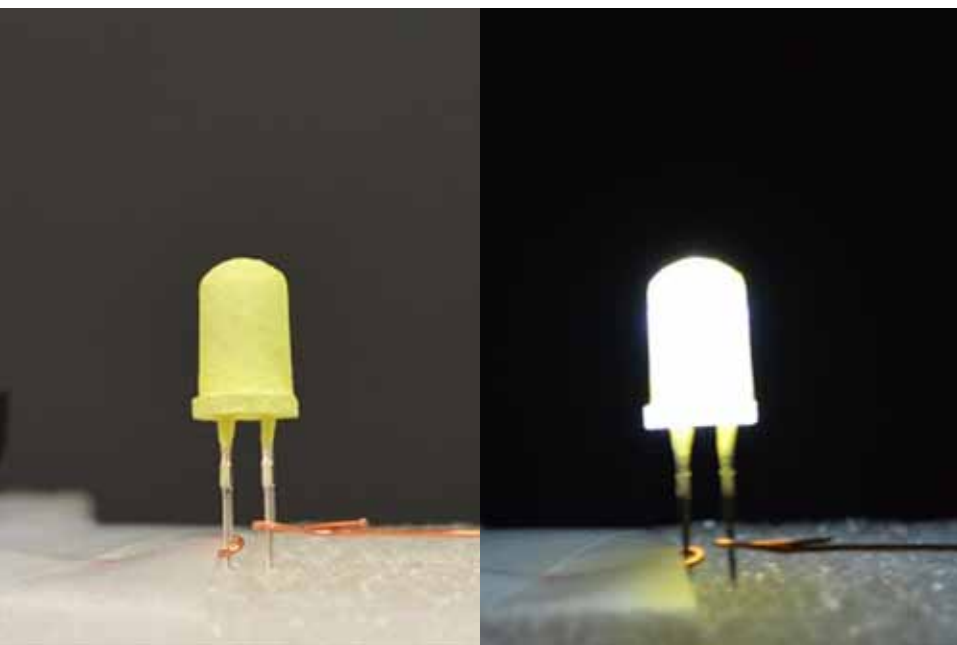
I believe in empowering women with knowledge and skills through training programs and opportunities to stretch their capabilities. In this way, they can continue building confidence throughout their careers and stay relevant in their field. Having a mentor to provide guidance and encouragement can make a world of difference.

In every situation, try to create
a win-win solution.

Jing Li

DISTINGUISHED PROFESSOR, DEPARTMENT OF CHEMISTRY AND
CHEMICAL BIOLOGY, RUTGERS UNIVERSITY

PhD, Inorganic Chemistry, Cornell University
MS, Theoretical Chemistry, State University of New York at Albany



To avoid use of rare earth elements, Jing Li's team developed a family of inorganic-organic hybrid phosphors. An energy-efficient LED coated with one of these alternative "phosphors" (shown turned off at left) provides a warm white light (shown on at right). (Photo: Jing Li Team)



Jing Li (Photo: Chris Pedota)

I emigrated from China more than 30 years ago. Over the past two decades, I have visited China nearly every year. While I have witnessed the country's rapid growth and development, I have also observed the severe consequences of pollution and environmental degradation on both the nation and its people. The most striking impact has been on the color of the sky. Though material belongings were scarce throughout the tumult of the Cultural Revolution, some of my happiest childhood memories—those I hold deep in my heart—are from that time. In particular, I remember being outdoors with playmates beneath a beautiful blue sky.

Sadly, a grey sky now hangs over every part of China that I visit. China accounts for about 97% of the world's supply of rare-earth elements (REEs), and the production of these elements contributes significantly to pollution and health hazards. Several years ago, I read an article divulging the

effects of rare-earth mining in Baotou, China, on human health and the environment. The news was shocking and deeply disturbing.

At around the same time, the U.S. Department of Energy (DOE) released a report on its *Critical Materials Strategy*, in which REEs topped the list of the most critical elements of our time. Several of these critical elements (e.g., Europium, Terbium, and Yttrium) are essential ingredients of the phosphors used in general lighting, including energy-efficient light-emitting diodes (LEDs). Following the DOE call, I initiated a new research program to develop inorganic-organic hybrid materials as alternative lighting phosphors that are completely free of REEs. Four years have passed, and my team has made remarkable progress in this area of research toward our goal—making LEDs far more efficient, affordable, and sustainable.

Debora Rodrigues

ASSOCIATE PROFESSOR, UNIVERSITY OF HOUSTON

PhD, Microbiology and Molecular Genetics, Michigan State University

MS, Microbiology, University of São Paulo, Brazil

BS, Biology and Biology Education, University of São Paulo, Brazil

In 1995, a poor community in Brazil experienced typical symptoms of water-related disease—a scenario that remains all too common in developing countries today. At that time, however, one of my professors heard about the pain and suffering in that community and decided to do something about it. He took a group of his undergraduate students to the community to learn about water quality and how our work at the university could impact the lives of others. As one of those students, I still remember his impassioned speech about the elderly put at risk and heartbroken parents who had lost their children to diseases that could easily have been prevented. We went door-to-door collecting water samples and showing the residents how to make the water safe. After spending a week in that community, I was astounded by how this small effort transformed lives. I had found my true calling! I wanted to be a researcher and educator—bringing the world new ways to improve the lives of people.

From this initial experience, my passion and curiosity about microorganisms grew stronger. I was perplexed by the extent to which small organisms can cause such severe damage. After spending many years on the study of diverse microorganisms,

I went to work for Professor Menachem Elimelech at Yale University. He was an inspiration and role model for me. In his research group, I expanded my knowledge of water treatment technologies and innovative water treatment methods. More importantly, I learned that most of the technologies that are effective at removing chemicals and microorganisms also tend to consume a lot of energy, putting them economically out of reach for developing countries. This insight led me to start looking for new or alternative water treatment technologies that would be more cost-effective and less energy-intensive.

Over the past few years, I have been investigating and developing several technologies to remove microorganisms and chemicals from water simultaneously. My approach to water quality issues involves both nanotechnologies and biotechnologies. I have also successfully engaged students with similar passions for water quality. A group of these students even started a company, called WAVVE Stream, Inc., by licensing my patents. It is rewarding to see that my research is not only benefiting society but is also inspiring younger generations to follow a similar path.



Debora Rodrigues' work on more cost-effective and energy-efficient water treatment technology will benefit members of the Maseno community in Kenya (shown), among the many other communities that face severe issues with water quality. (Photo: Isis Mejias)

Debora Rodrigues shows the difference between two water samples with and without treatment. (Photo: Carlos Landa)



Forging Pathways to Shape Demand

Dorothy Barnett

EXECUTIVE DIRECTOR, CLIMATE + ENERGY PROJECT

BA, Organizational Management, Friends University



Dorothy Barnett (Photo: Dorothy Barnett)

Wind turbines in Kansas now generate nearly 4,000 MW of energy. (Photo: iStock #42014838)

I came to my career in clean energy through a non-traditional pathway. In 2007, I was managing a small non-profit focused on growing the population of my rural Kansas community, when I first heard Kansas referred to as the “Saudi Arabia of wind.” When I met the executive director of the Climate + Energy Project, a newly formed non-profit, Kansas had less than 300 MW of wind energy. After that meeting, I began to envision a Kansas that harnesses the second-best wind resource in the nation to generate: robust economic development, payments to counties hosting wind farms, and income from land leases for farmers and ranchers.

I spent more than a year learning more about wind energy. I then convened a local task force to explore my community’s interest in and support for wind energy and hosted a 200-person wind conference. In 2008, I realized wind energy intersected with my passion for revitalizing rural Kansas, and I joined the Climate + Energy Project as the Director of Energy and Transmission.

Kansas now has nearly 4,000 MW of wind energy, and state utilities produce 20% of their power from clean wind energy—but this

progress did not come easily. Despite overwhelming support for clean energy among Kansans, groups funded by a private interest group had long been waging attacks against renewable energy in the Kansas legislature. Outspent by more than 10 to 1, the Climate + Energy Project led the charge each year as thousands of Kansans sent emails, made phone calls, and paid visits to the statehouse to preserve clean energy policies.

Like the majority of Kansans ten years ago, I saw wind energy as a way to revitalize rural Kansas. Climate change and greenhouse gas emissions meant little to me. Clean energy has taken on a new meaning, however, as our state and the nation continue to experience more intense weather events, drought, floods, higher temperatures, and declining aquifers. Our ability to work across factions and find common support for clean energy has opened a dialogue on climate change and the type of energy future we want for upcoming generations. I’m proud of my role in working toward a clean energy economy.

Maggie Downey

ADMINISTRATOR, CAPE LIGHT COMPACT, BARNSTABLE COUNTY, MA

MA, University of Washington
BA, Johnson State College

I have always had a passion for protecting the environment. Growing up in an urban area meant that I saw evidence of environmental degradation and pollution every day. I knew early on that I wanted to be a force for positive change and protect the environment, so I studied Environmental Policy in college and graduate school. My first job after graduate school was reviewing environmental projects in a small town in Washington State. I was fortunate to have a supervisor who was visionary. She encouraged me to think outside of the box and stand up for what I believed in. She also taught me the importance of coupling my passion with data and facts to achieve results.

It was not until I moved back to the East Coast that I was introduced to energy challenges. I was assigned the task of creating a regional collaborative of 21 towns and 2 counties to work on energy issues—because no other manager wanted to, and I was the newest hire! That was over 20 years ago, and I have never looked back.

Working on local energy issues over the past 20 years has provided many opportunities to work on diverse projects and energy sources.

I think this is rare; people who work in the energy field tend to be specialists. I am definitely more of a generalist. My communications, public speaking, and listening skills enable me to facilitate projects and conversations with individuals who may have opposing points of view. Constantly communicating with stakeholders is the key to negotiating power supply contracts for all-electric customers, administering comprehensive energy efficiency programs, and facilitating the development of more than 27 MW of photovoltaic installations on Cape Cod and Martha's Vineyard.

To date I have had a rewarding and challenging career in the public sector energy arena. I would not have been able to do this had I not been encouraged and supported by local elected officials, supervisors, and extremely talented staff. Women of all abilities can flourish and succeed in the energy field. A passion for this subject matter and hard work will lead to many opportunities.



Maggie Downey announced the launch of Cape Light Compact's \$128 Million Energy Efficiency Program during a press conference on February 2, 2016. (Photo: Cape Light Compact)

Dawn Lippert

MANAGING DIRECTOR, ENERGY EXCELERATOR

MEM, Environmental Management, Yale School of Forestry and Environmental Studies
BA, Environmental Studies, Yale University

When I was a little kid, I was an entrepreneur. I sold greeting cards for 50 cents and stationery for a dime. I was also obsessed with conserving resources. When I was six years old, I made a coin jar and asked my family members to donate a quarter if they left a light on. I did not know then that 20 years later I would be able to combine these two passions.

When I first started funding energy innovation companies in Hawaii in 2009, we didn't have the formula quite right.

We were deploying grant funding for new technology startups, but the funds were not fueling success. For six months, my team and I interviewed entrepreneurs about what they really needed. From their input, we launched the "beta" version of Energy Excelerator in 2013. We still didn't have a perfect playbook, but we figured we could learn and adapt along the way.

Innovation means coming up with a new way to solve a problem, then working like crazy to make it happen.

Our Energy Excelerator model borrows elements from traditional tech accelerators, investors, and government programs—and mashes them together in a way customized for energy startups. Teams of entrepreneurs join Energy Excelerator as a cohort. We train them to listen to what their customers need, and we help them develop a business model

before awarding them up to \$1 million in grant funding to scale up. Companies give back by mentoring newer entrepreneurs and donating a slice of equity. In three years,

we became the largest clean energy accelerator in the United States; so far, our non-profit has funded more than 40 clean energy startups.

We have learned a lot, and we are still learning. Our most successful entrepreneurs all do the following:

- Listen well. This is a critical skill when creating new products or markets. We look for coachable entrepreneurs, who know that there is always more to learn.
- Build healthy teams. Exceptional entrepreneurs motivate their teams to be creative, collaborative, and highly productive—and they share the credit for accomplishments.
- Find motivation in the mission. Solving climate change gets them up in the morning. Where others see massive challenges, great entrepreneurs spot huge opportunities.

What does the energy sector need to innovate its way to a cleaner future over the next 30 years? More talent and more diversity in our entrepreneurs! If you are passionate about energy and our planet, ask yourself whether you are also an entrepreneur. We need you.



Dawn Lippert facilitates a peer-to-peer sharing session with a new cohort of Energy Excelerator entrepreneurs in November 2015. (Photo: Energy Excelerator)

Rebecca Pearl-Martinez

RESEARCH FELLOW AND HEAD OF THE RENEWABLE EQUITY PROJECT,
CENTER FOR INTERNATIONAL ENVIRONMENT AND RESOURCE POLICY

MA, Sustainable International Development, Brandeis University
BA, Political Economy and Environmental Science, Evergreen College



*Rebecca Pearl-Martinez presenting on the Renewable Equity Project
(Photo: Alonso Nichols, Tufts University)*

*Rebecca Pearl-Martinez leads a roundtable on gender and clean
energy (Photo: David Gilmore, Tufts University)*

When I was 13 years old, my father took me out of school and drove me to the State House in Boston to testify in favor of new legislation that was important to me. Although I was confident of my position, I suddenly became afraid that others did not share my vision, and I broke into tears when it was my turn at the microphone. I was disappointed in myself, but my father said, “Your passion for the environment is valuable, and these are new ideas—but if you make your case, people will listen.”

This passion steered me to many years in the international policy trenches working at the intersection of climate change, sustainable development,

and gender equality. I found success working with multilateral organizations and governments in support of lead roles for women in addressing climate change impacts. When it came to the critical role for women in slowing climate change, however, few people accepted the idea. I searched for global data and research on women’s participation in the clean energy sector and climate change mitigation, but I found a startling lack of information. Women were narrowly characterized as victims of natural disasters or dirty cook stoves, and they were virtually invisible in the energy workforce due to lack of data. It then

Fixing the gender imbalances in the clean energy workforce could help solve the climate crisis.

occurred to me: to support women’s advancement in this industry, someone needs to obtain better information—and that person might as well be me.

Last year, championed by advisor Barbara “Bobbi” Kates-Garnick, encouraged by other C3E Ambassadors and colleagues, and supported by the Center for International Environment and Resource Policy, I founded the Renewable Equity Project at The

Fletcher School of Law and Diplomacy at Tufts University. This project is driven by the idea that women’s advancement in the clean energy workforce is a climate-smart innovation and that the

energy transition must not leave half of the world’s population behind. Building on the evidence of women’s transformative roles in the economy, gender imbalances in the energy industry, and the shortage of skilled workers, we are working to show that diversifying the energy workforce could be a watershed for our energy future—here in the United States and globally. Through research, advocacy, and education, we are making our case, demonstrating that we can expand the clean energy economy, build energy security, and decarbonize our world by putting women’s leadership front and center.

Carla Peterman

COMMISSIONER, CALIFORNIA PUBLIC UTILITIES COMMISSION

MBA, Oxford University
MS, Environmental Change and Management, Oxford University
BA, History, Howard University

When I was appointed to the California Public Utilities Commission in January 2013, I was excited to be assigned the energy storage rulemaking. Given my previous work on renewable energy, I was already interested in the potential of energy storage technology as a low-carbon solution for holding excess renewable power and integrating greater amounts onto the grid. However, because of high costs and the lack of operational experience, energy storage was underdeveloped, and it was viewed as the “holy grail” of the electricity sector.

In 2010, landmark California legislation (Assembly Bill 2514) had tasked my Commission with determining appropriate targets, if any, for each utility to procure viable and cost-effective energy storage. Commission staff and stakeholders had spent several years analyzing the possible use cases for, and cost effectiveness of, energy storage. When I arrived in 2013, I had to decide whether we were comfortable enough with the study results to move forward with procurement targets. I decided that we knew enough to take the next step.

In June 2013, I issued a ruling that proposed a first-in-the-nation utility procurement framework for energy storage. This proposal was controversial, given stakeholders’ legitimate concerns and

disparate views regarding technology readiness, cost, and value. To be both ambitious and responsible, we crafted a flexible framework that introduced higher targets gradually and also protected ratepayers from uneconomic investments. Our inclusive decision-making process resulted in a robust decision that received unanimous Commission support.

Nearly three years later, California’s energy storage program and market are flourishing. We have successfully completed two energy storage solicitations and updated the program rules to facilitate new market opportunities. The U.S. energy storage market grew by more than 240% in 2015, and energy storage prices are dropping rapidly. Several other U.S. states are now pursuing energy storage.

As regulators, it remains essential for us to take informed yet bold steps on behalf of ratepayers to ensure that we are investing in the energy system we want to see. I knew that policy alone would not make energy storage a reality, but I also knew that the pressure of a policy and procurement framework incentivizes utilities, energy storage providers, and regulators to collaborate and see what is possible. A lot of work remains, but we now know that energy storage is not a holy grail—but a viable opportunity.



Carla Peterman receives calls of congratulations after being sworn in as Commissioner of the California Public Utilities Commission. (Photo: CPUC)

Among other duties, Carla Peterman leads implementation of California's 50% Renewable Portfolio Standard. The intermittent nature of renewable energy presents the need for energy storage. (Photo: Jacqueline McBride/LLNL)



Rebecca Stanfield

VICE PRESIDENT, POLICY AND ELECTRICITY MARKETS, SOLARCITY

University of Oregon School of Law
University of Illinois



Rebecca Stanfield (Photo: SolarCity)



Increasing numbers of solar panels installed on residential rooftops, like the one pictured above, are helping to reduce dependence on fossil fuels. (Photo: SolarCity)

I first learned about global warming as a freshman at the University of Illinois in Urbana-Champaign, and addressing it immediately became a life mission. Although far less was known about the changing climate 30 years ago, the issue kept me awake at night for two reasons: (1) the magnitude of the potential impacts and (2) the extent to which it called into question the efficacy of our democracy. For the first time, I questioned whether I could rely upon our leaders in industry and government to act responsibly to protect citizens. The realization that our leaders were not acting to meet such a profound global threat motivated me to spend my career working toward the de-carbonization of our electric grid.

For 21 years, I worked with environmental organizations at the state and federal level to encourage electric utilities to integrate clean energy solutions into their resource plans.

Throughout that time, I hoped that clean energy businesses would join the effort, and over the past few years that wish has come true. That is why I eagerly accepted the offer last year to join SolarCity as a Vice President for Policy and Electricity Markets and become part of the growing chorus of clean energy businesses that are building the clean, distributed energy future. It has been an adventure and a learning opportunity for which I am very grateful.

I am inspired by the brilliant innovators who have enabled the dramatic expansion of solar deployment over the past few years and by the people who go up on rooftops every day to build the new electricity grid that will serve us for the coming decades. I have come to measure my success by the number of people who will be able to have careers that advance their own hopes for a safe and sustainable planet.

Suzanne Tegen

MANAGER OF WIND AND WATER POWER DEPLOYMENT,
NATIONAL RENEWABLE ENERGY LABORATORY

PhD, Energy Policy, University of Colorado, Boulder
MS, Environmental Studies, University of Colorado, Boulder
BA, German Literature, University of Wisconsin, Madison

In 1989, my host family and I were glued to the television as we heard the story unfolding—the Berlin Wall was coming down. To me, this was hugely significant. I had family separated by the wall. There was so much excitement when my host sister and I found out that her parents were going to make the four-hour trip to the Wall to experience this historic moment. When we got there, people were full of joy, hammering away at the cement wall and the symbolic divide that had kept families and nations apart.

Suddenly, I could see through to the other side. There was East Berlin. It looked so different from the Germany I knew. Buildings were blackened from pollution, and the crumbling infrastructure looked like it had been neglected for many years. I was shocked. When I asked how things could be so different there, I was told that they did not have the air quality standards we had in the West. I had not considered this before. People so close by were living with coal furnaces inside their houses—something the West had done away with before I was born. I thought about the cousins I had not met yet. I thought

about the grandmothers and the toddlers who suffered from breathing in the soot, and right then, I made a pact with myself that I would do something about it. I promised myself I would help prevent what seemed like senseless pollution and work toward cleaner air for those who need it.

As years went by, I held on to my promise. I worked in Antarctica, where climate change is depressingly visible, and where I voluntarily started their first reuse program so that people in McMurdo and the South Pole could communicate about supplies they needed or had in excess. We would waste less fuel getting the supplies to and from the United States if we could reuse. The authorities were stubborn, and the program took two years to execute. I was the only woman in the room with my bosses and Navy representatives, arguing for something that would save money, time, and resources. At meetings, I was told which chair to sit in and when I could speak. Those were two long years, but they taught me patience and to persevere until I was successful. Good ideas can take a long time, but making strides toward cleaner air is worth it.



*Suzanne Tegen at the National Wind Technology Center in Boulder, Colorado
(Photo: John Clasby)*



*Suzanne Tegen scoops clean snow and delivers it for water use at the Quonset huts at the South Pole in 1996.
(Photo: Claire Carrier)*

Kathryn Zyla

DEPUTY DIRECTOR, GEORGETOWN CLIMATE CENTER

JD, Georgetown Law
MEM, Yale School of Forestry and Environmental Studies
BS, Engineering, Swarthmore College



Kathryn Zyla (Photo: Bill Petros, Georgetown Climate Center)



Kathryn Zyla discusses the future of the electric power sector and EPA's Clean Power Plan with industry representatives, regulators, policy experts, and government officials. (Photo: Bill Petros, Georgetown Climate Center)

As a girl in suburban Detroit, I liked technology, energy, and cars—and the environment. My solution for fitting those interests together was clean energy—how else to justify wanting to drive a vintage Chevy BelAir while caring about air pollution? However, I had no idea how to pursue that professionally. My grandfather had been an automotive engineer (and I had never heard of policy or thought twice about law), so I decided to become an engineer.

I considered studying “environmental engineering,” but it turned out to be about cleaning up pollution. I wanted to stop the polluting. Ultimately, I chose electrical engineering but had no clear path through the field, or any idea how to figure one out. For several years, I worked in unrelated fields, until the Internet made it easier to research careers, scholarships, and academic programs. I was considering a PhD when an eminent professor of engineering finally explained to me that I did not actually want to be an engineer. “I need people who are passionate about membranes,” he said to me. “Are you passionate about membranes?”

I answered honestly, “No, I’m passionate about whatever technology solves the problem.” He pointed me toward policy

and environmental management, which I resisted, thinking, “I’m a math and science person!”—but he was right.

A few years later, armed with a master’s degree and a better understanding of professional opportunities, I started working on clean energy technologies and the policy tools to enable them. As Congress struggled to deal with climate change and policymakers turned to existing legal authorities, I realized how much I still did not know. When I took a position based at a law school, I found an opportunity to add energy law to my clean energy toolbox (and from a working mom perspective, becoming a student helped get my one-year-old into campus daycare).

I now work as a lawyer, not an engineer. Despite not knowing how to get where I wanted to go, I have found my way there. Twenty years after graduating college, fifteen years after being told I did not want to pursue the discipline I had studied, and five years after my son and I started law school, I get to work every day on whatever technologies solve the problem. I still do not have a zero-emission BelAir.

Increasing Energy Access in Underserved Communities

Anya Cherneff

EXECUTIVE DIRECTOR AND CO-FOUNDER, EMPOWER GENERATION

MA, International Human Rights, University of Denver
BA, Anthropology, Columbia University

During the weeks after the Nepal earthquakes in early 2015, most aid organizations were unable to get relief supplies in. Fortunately, I was able to leverage our local, women-led distribution networks to immediately deliver more than 10,000 solar lights and chargers to displaced families and aid workers, who used them for night rescues.

Kala, a 47-year-old woman living less than 40 miles from the quake's epicenter, lost her modest home and had to move into a tent with 35

others. Just six weeks earlier, she had completed the solar entrepreneurship program at Empower Generation and launched her own solar company. She immediately donated all the solar lights she had in stock to her community. When my team reached Kala with more solar aid, we were the first responders to arrive—and the situation was unimaginable. Every home in her village was destroyed, the power was out, and dead livestock had contaminated the water supply.

Recognize that running a startup is like a roller coaster; you will experience the highest of highs and the lowest of lows all in a day's work.

Despite her desperate situation, Kala convinced her community that another, more remote village needed this relief even more. This was a village of "untouchables," people from Nepal's most marginalized caste. Kala organized her village to carry the aid that was intended for them on their backs for four hours into the hills to reach this other village. When

they got there, Kala broke all societal taboos to distribute lanterns to people she was not supposed to touch. Being a savvy entrepreneur, she also took the opportunity to recruit

sales agents to represent her business there and to service the products she had donated.

Empower Generation does not create empowered women; we just give them a platform to increase their impact. Reaching the billions in need of clean energy is one of the greatest challenges of our time, and we believe that local women like Kala hold the key to unlocking this massive opportunity.

After working in anti-human trafficking non-profits for many years, I realized that for every human trafficking victim rescued, there are millions more waiting to take her place. The issue not being addressed is the underlying poverty that forces women to take such incredible risks for a job. I seek opportunities for women to provide much needed energy services to their communities. In the process, these women open their own businesses and earn social capital and respect.



*Top left: Anya Cherneff
Top right: A girl studies at night by solar light.
Bottom: Solar CEO, Runa (in green) and her sales team of village-level sales agents
(Photos: Empower Generation)*

Katherine Lucey

FOUNDER AND CEO, SOLAR SISTER

MBA, Georgia State University
BA, Journalism, University of Georgia



*Florence Ayella distributes a solar light.
(Photo: Brit Liggett for Show the Good and Solar Sister)*



*Top: Katherine Lucey explains the solar light technology. (Photo: Solar Sister)
Bottom: Two students study by solar light. (Photo: Solar Sister)*

Several years ago, I was traveling in an area of Uganda where up to 80% of the population has no access to electricity. There, I met a woman named Rebecca, who had the opportunity to get a three-light solar panel for her home. Rebecca's husband said, "OK, we will put the lights in our rooms." Rebecca said, "No—we want one light over the door so I can come home safely from chores in the dark; one light in the front room, so you can meet with people in the evenings; and one light in the chicken coop, because chickens only lay eggs when they can see." Once she installed the lights, Rebecca's chickens laid more eggs, which she sold at the market. She used the extra money to buy more chickens, then more seeds, then more animals, then extra help to manage it all, until she had a growing and thriving farm. She even started a school with her earnings. Rebecca's story showed me that clean solar light—combined with a woman's ingenuity—can transform lives.

I started my career in investment banking with a focus on the energy sector, where I learned to think critically and to love problem solving. After 20 years, I was ready to transfer my skills in finance, management, marketing, and business development to the non-profit sector. Rebecca's story was a catalyst for me. In Uganda, I saw that women are the ones truly dealing with the day-to-day realities of energy poverty—and they are the ones with the most innovative ideas for solutions. That is how we created the Solar Sister model: women entrepreneurs who sell small, affordable solar energy and clean cookstoves to their communities. That is how we bring energy access to the off-grid communities that need it most. My problem solving and critical thinking skills are essential in my work at Solar Sister, because there is no roadmap for our business model. And that is the best part about working as a pioneer—everyday, I get to come into work and try something totally new.

Erica Mackey

COO, CO-FOUNDER, OFF GRID ELECTRIC LTD.

MBA, University of Oxford

BS, Ecology, Behavior and Evolution, University of California, Los Angeles

When the sun sets tonight, one out of two Africans will not flip on a light switch. Instead, they will light a wick, combusting kerosene (jet fuel) to create a dim, smoky light. According to the World Bank, a single kerosene lamp lit in a room produces the same health impact as smoking two packs of cigarettes a day. The world's poorest people are paying more than anyone for unhealthy and inefficient energy while poisoning themselves and our planet.

The continent of Africa is one of the sunniest places on Earth, so I knew that if I could find a way to make solar technology accessible to the millions of households living off the grid there, then we might have a functional business. My team and I spoke to families around Tanzania, and we learned that the biggest obstacle to adopting solar technology was risk. It is insanely risky for a family to swap a kerosene lamp for a solar panel, given that the cost to purchase and install it could take their entire savings.

In a place where things often break, we had to find an environment-proof solution. What we needed was a rugged, off-road version of a solar power business model. Our "Aha!"

moment came as we looked at an industry that had already figured out an environment-proof solution to deliver modern communication and banking to the same gigantic population we were looking to serve: the cell phone business. People do everything on their cell phones in Tanzania. It is easier to pay a bill in the middle of nowhere in Tanzania on a \$20 cell phone than it is to check your bank balance on a \$600 smart phone in the middle of New York City.

We came up with the following model: instead of buying a kerosene lamp, a customer could pay an equivalent amount to an agent to install our solar equipment in his home. Then, instead of going to the local shop to buy kerosene daily, they could top-up the solar system's pre-pay meter with credit from their mobile phone. If the equipment breaks, we come and fix it. With this service, East Africans get 50 times more energy services for less money and, importantly, at reduced risk.

There is no such thing as a limited resource environment. Overcoming perceived limitations is just a matter of innovation and logistics.



*A Maasai child examines an M-POWER security light on his home
(Photo: Brit Liggett for Show the Good and Solar Sister)*



*Top: Erica Mackey installing an outdoor light with an M-POWER agent
Bottom: A woman shops for vegetables after dark by the solar light of M-POWER.
(Photos: Brit Liggett for Show the Good and Solar Sister)*

Erica Mackie

CEO AND CO-FOUNDER, GRID ALTERNATIVES

BS, Mechanical Engineering and Physics, Southern Illinois University

I think of myself as a social worker, turned engineer, turned back to something in between. My path to clean energy included work with survivors of domestic violence, at-risk youth, women's studies, outdoor education, math, and physics. I am an entrepreneur because the only way to have the job (and impact) I dreamed of having was to create it. In 2001, I was working as a professional engineer implementing large-scale renewable energy and energy efficiency projects for the private sector. It was at this job that Tim Sears and I met and hatched the idea for GRID Alternatives. It took us a few years to actually quit our jobs and take the leap of faith into the non-profit sector. Looking back, I think that the time we spent creating a joint vision and establishing a collaborative leadership style has been critical to our success today.

GRID has grown a lot over the years—from two solar electric systems installed in the San Francisco Bay Area in 2004 to over 1,000 projects installed each year across the country and in Nicaragua—yet our motivation remains the same. We want

to make solar energy technology and its benefits available to low-income communities, which need the savings and jobs the most but have the least access. Every project generates “triple bottom line” results: measurable, long-term financial benefits for low-income families struggling to keep up with monthly expenses; real-world, hands-on experience for local workers in the growing field of solar installation; and environmental benefits from eliminating greenhouse gas emissions and increasing support for solar power as a practical solution for all of our communities.

We think a lot about what it means to work toward our vision of a clean energy future that includes everyone. Our scale and policy work have allowed us to expand access to solar power to communities that are typically left out. Inspired by my C3E Award, we are helping to build a more inclusive solar industry workforce; our growing workforce development program includes women, people of color, veterans, and Native Americans.



Erica Mackie speaking at the launch of the GRID Alternatives office in Washington, D.C. in 2014. She shares the stage with White House officials, homeowners, volunteers, and job trainees. (Photo: Matthieu Young)

Laura Stachel

FOUNDER AND MEDICAL DIRECTOR, WE CARE SOLAR

MPH, University of California, Berkeley
MD, University of California, San Francisco
BA, Oberlin College

I never imagined, as an obstetrician, that I would one day be leading a non-profit devoted to clean energy access for health care. But my interest in international public health, and in reducing the tragic loss of life associated with pregnancy complications, brought me to a hospital in Northern Nigeria in 2008. I knew that rural African healthcare would not mirror Western medicine, but it had not occurred to me that a hospital conducting 150 deliveries a month could be without electricity for at least 12 hours a day. I watched as midwives struggled to deliver babies by kerosene lanterns, physicians tried to conduct C-sections before the sun set, and critically ill patients were turned away from the hospital when the power was down.

That experience changed my life and set me on a journey to bring essential power to front-line health workers. My husband, a solar electricity educator, designed a solar electric system for the Nigerian maternity ward, blood bank, and operating theatre. Obstetric care was transformed. In response to requests to bring solar electricity to surrounding clinics, we developed a rugged, compact, pre-wired solar electric kit that I could carry in my suitcase. I began distributing these “Solar Suitcases” to Nigerian off-grid health centers to the delight

of midwives and patients. With the Solar Suitcase, midwives no longer feared night duty, and more patients could access nighttime care. Demand for our Solar Suitcases spread to other countries, and we learned that hundreds of thousands of primary health centers are without reliable power.

In response, we assembled a core team, created an organization, and collaborated with a broad network of partners to bring this solution to scale. We developed training programs to build local capacity to train health workers and install and service the Solar Suitcases. We created a Women’s Solar Ambassador program to promote women trainers and installers. And we began advocating for clean energy for maternal and child health care—working with agencies such as the United Nations Foundation and World Health Organization to bring international attention to the issue. To date, we have reached more than 1,500 health centers and are trying to catalyze a movement, driven by three beliefs:

- Women have the right to safe childbirth.
- Every health center is entitled to life-saving electricity.
- Clean energy technologies provide safe, reliable, and affordable solutions for this global challenge.



Laura Stachel with a Tanzanian health worker (Photo: We Care Solar)



Health care workers and community members in Tanzania with a new Solar Suitcase (Photo: We Care Solar)

Jodie Wu

FOUNDER AND CEO, GLOBAL CYCLE SOLUTIONS (GCS TANZANIA LIMITED),
ARUSHA, TANZANIA

BS, Mechanical Engineering, Massachusetts Institute of Technology



Jodie Wu (Photo: Global Cycle Solutions)

GCS sales agents Meckitilda Petro and Stephano Nyanda show off the Sun King Home, a smart solar-paneled lamp and USB charging system, from Greenlight Planet. (Photo: DFID-UK Department for International Development)

When I purchased my first solar lantern in 2011, I felt a pang of guilt for buying what I considered a luxury item. Until then, I had lived as the Tanzanians did. When the power went out, I would light my room with a candle. When the power came back, I would join in the cheers and dash off to charge my phone. I knew this solar light would change my daily life. I did not know that it would change the course of my career once I ventured into rural Tanzania, where 97% of households are without electricity.

At that time, Global Cycle Solutions (GCS) was a research and development company that aspired to improve village life through bicycle-powered agricultural devices. One day, we were still out in the field for product testing when the sun began to set. I hung my solar lantern on a clothesline so we could continue collecting user feedback. All attention suddenly shifted to the light.

“How much is that?”

“It’s too expensive. You wouldn’t want it. It’s \$50.”

“That’s it? That’s cheap! Can I buy it?”

That evening, all I could think was, “Here I am in a village where most people live on less than \$2 a day, and they are telling me that a \$50 lantern is cheap?” I started digging deeper and learned

that households were spending \$5–\$10 each month on kerosene alone. In Tanzania, energy was an economic crisis. People were weighed down by the sheer cost of fuel for everyday necessities: kerosene for lighting, gasoline for charging phones, and biomass for cooking.

People could not get their hands on the products they needed. The gap in the market was one of access, not of technology. I realized that bridging that gap would have a real impact. That year, GCS pivoted to last-mile distribution, building a village entrepreneur network to set a global community standard: every household should have access to quality products, unparalleled customer service, and above all, the opportunity for a better life.

From human-powered tools to solar lanterns and chargers, and now clean cookstoves, GCS has sold 75,000 products across 1,000 villages in Tanzania. However, we have barely scraped the surface—around the globe, over two billion people live without electricity, clean cooking facilities, or safe drinking water. We look forward to bringing the world’s next innovations to the developing world.

Building and Expanding Markets

Judy Dorsey

PRESIDENT AND PRINCIPAL ENGINEER, BRENDLE GROUP

MEng, Mechanical Engineering, Colorado State University
BE, Mechanical Engineering, Northwestern University

Pivotal moments challenge you to take charge of your life. Four such moments have molded my career and fueled my passion. My first pivotal moment came at age 17. A guest speaker at my all-girls' high school asked if anyone was interested in an engineering career. Only two other girls raised their hands. Our courage earned us an invitation to tour a brewery and learn about engineering careers. The tour got me hooked on engineering in a fun and welcoming atmosphere.

My second pivotal moment came during my last quarter of undergraduate school, when I happened to enroll in an Environmental Literacy class. Though the sustainability field was just emerging, this course made me aware that I could use my Mechanical Engineering degree to exert either a positive or negative impact on the environment. My newly raised environmental consciousness informed all of my career choices thereafter.

Pivotal moment number three occurred after graduate school. As an emerging young professional, wife, and soon-to-be mother, I was faced with the cultural myth that I could not be both a successful engineer and a good mother. I challenged this notion by starting my own sustainability engineering and planning firm in 1996. The

firm, Brendle Group, is rooted in demonstrating the principles of work/life balance. It is named after my mother, Eileen Brendle, who was a leading-edge architect promoting green building techniques as early as the 1950s. Over the last 20 years, Brendle Group has engineered more than 300 projects incorporating robust sustainability principles. Women make up 40% of our engineering force.

Throughout my career, I have repeatedly faced hurdles as a woman engineer. It is not easy to enter and stay in a field in which your gender is underrepresented. The National Science Board reports that women account for a mere 8% of mechanical engineers in the workforce. Empowering women became a passion of mine and led to pivotal moment number four: my selection to receive the U.S. C3E Women in Clean Energy Award. As an entrepreneur, I knew just what to do—use the cash prize as seed funding to start Colorado C3E, and drive revolutionary growth of the Colorado clean energy economy by educating, mentoring, and empowering women and girls. Its first three initiatives focus on a mentorship program for girls in STEM, workforce placement for returning women veterans, and active business networking for women in clean energy.



Judy Dorsey (Photo: Brendle Group)



Judy Dorsey facilitates a discussion for the Utah Climate Action Network. (Photo: Salt Lake City Corporation)

Shelee Kimura

VICE PRESIDENT, CORPORATE PLANNING AND BUSINESS DEVELOPMENT,
HAWAIIAN ELECTRIC COMPANY

BBA, University of Hawai'i



Top: Shelee Kimura speaks about Hawaiian Electric's strategic transformation plan at a company-wide leadership meeting in 2015. (Photo: Hawaiian Electric Company)

Left: At a site visit to one of Hawaiian Electric's independent power producers, Shelee Kimura takes in the view at the top of a wind turbine. (Photo: Hawaiian Electric Company)

I was born and raised in Hawai'i, the most geographically isolated island population on earth. While it was not apparent to me growing up, I have learned over the years that island people tend to view the natural world and their communities through a unique lens. Our finite resources and the delicate interdependence of all things—people, communities, ecosystems, and economies—are far more evident and cannot be ignored in an island context. Hawai'i's extreme geographic isolation strengthens that mindset, and it underlies our local culture. Like many in our state, I was raised with a sense of responsibility and stewardship for this special place, and an awareness of the reciprocal responsibilities of each person and community to others.

This is the backdrop to Hawai'i's focus on clean energy and my passion to be a part of the solution. The state has set a goal to become energy independent using our abundant renewable resources—reducing and eventually eliminating our dependence on imported oil. Achieving this goal will yield benefits for our environment, local economy, and energy security. Hawai'i has also established a renewable portfolio standard (RPS) of 100% by 2045. We now face the difficult yet exciting task of solving for the 100% RPS in a way that does all of the following:

- Keeps customers at the forefront, as their participation and support are essential
- Delivers reliability and resiliency for our island grids
- Ensures that the cost of this energy transformation is fair and cost-effective for all customers and communities
- Supports the long-term health of our economy
- Attracts the investments needed to transform the grid

As Hawai'i covers new ground in integrating intermittent renewable and distributed energy resources, we are tackling new challenges and have been called a "postcard from the future" by the industry. I believe it is more important than ever that all players in the evolving energy landscape recognize that we are part of an interdependent system, and we must work in a concerted manner to achieve such ambitious goals.

If we all take a giant step back and look at our planet from a distance, earth is our collective island. It too has finite resources and relies on a delicate interdependence among all things. While Hawai'i is my focus, I hope our state can be an example to the world of what is possible for clean energy if, collectively, we can get it right.

Maria Kingery

CHIEF VISIONARY OFFICER, SOUTHERN ENERGY MANAGEMENT
PROFESSIONAL EOS IMPLEMENTER, KINGERY & COMPANY

BA, English, North Carolina State University

I have been called crazy more times than I can remember, and I take it as a compliment. When my husband and I started our business 15 years ago, lots of people called us crazy. At that time, there really was not much of a clean energy industry. Ten years later, they began calling us visionaries.

We started our company in 2001 with the idea of selling solar systems to homeowners, but we quickly realized that few people were willing to make the investment, given the low cost of power in our state. Only the true believers and hardcore environmentalists would even consider it, and sadly, few of them could afford it. Our first clean energy business idea was a bust.

Rather than give up, we did what we have done so many times since then: we looked for a way to add value to the marketplace. We came across the Energy Star® for Homes program and

decided it could help builders build a better product—and our energy efficiency line of business was born.

Today we have worked with hundreds of builders, homeowners, developers, and business owners to implement a variety of energy efficiency and solar solutions. We have reinvented our business many times, and we will keep reinventing it, as long as we can find new ways to help improve the way people make and use energy.

I believe the clean energy industry is just getting started. We have made tremendous progress, but within our industry and within the people who do this work, there is so much potential still waiting to be unleashed. I want to help unleash that potential, so I intend to keep seeking out “crazy” ideas and helping them along for as long as I am able.

When they call you crazy, it often means
you're doing something important.



*Maria Kingery at the Habitat for Humanity 2015 CEO Build
(Photo: Southern Energy Management)*



*Southern Energy Management All Team Meeting
(Photo: Southern Energy Management)*

Ashley Murray Muspratt

FOUNDER AND CEO, WASTE ENTERPRISERS HOLDING/PIVOT LTD

PhD, Energy and Resources Group, University of California, Berkeley
MS, Civil and Environmental Engineering, University of California, Berkeley
BS, Bates College

After my freshman year in college, I took a year off from school and taught high school science in a village in Ghana. It was in Ghana that I was first exposed to the human health and environmental impacts of poor sanitation. In the capital city of Accra, 100 ten-ton trucks would arrive every day to dump human fecal waste at a local beach—the same beach where people swam and caught fish. On the spot, I made a commitment to help solve such dangerous waste management issues. This new focus combined my existing interests in science, travel, and environmental protection.

According to the United Nations Environmental Programme, more than 90% of human waste worldwide is dumped into the environment without treatment. Waste treatment in the United States and Europe is a capital-intensive process, and these high costs put responsible waste treatment out of reach for cities in many parts of the world. Direct discharges of untreated waste into open drains, rivers and oceans put waterborne diseases among the top causes of illness, and contribute to the rapid, irreversible degradation of freshwater and marine ecosystems.

Through my PhD dissertation work in China and extensive travels across Asia and sub-Saharan Africa, I became convinced

that the high cost of building and operating conventional treatment plants was the key bottleneck to expanding waste treatment. I set out to reinvent the economics of sanitation by relying on resource recovery and reuse to convert sanitation from a cost sink to a profitable venture.

My company is a dual sanitation and renewable fuel company. We aim to provide cities with the world's lowest-cost reliable sewage treatment while producing energy-dense, burnable fuel for industry. Our factories receive fecal sludge as raw material and convert it into a solid fuel, called Pivot Fuel, delivering sanitation as a byproduct of our manufacturing process. Pivot Fuel is an energy-dense product that is suitable for use in any industry that uses a biomass- or coal-fired kiln or boiler. We sell Pivot Fuel as a fine powder that is safe and sanitary for handling.

Saying that I run poop factories often raises eyebrows, but I love what I do. I love that I get to set to work every day tackling one of the world's greatest environmental and public health challenges. It's the potential impact and global application of our solution that drives me.



Above: Pivot fuel is shipped to various industries in the region. (Photo: Ashley Murray Muspratt)



Top right: Ashley Murray Muspratt discusses Pivot Fuel logistics with her team. (Photo: Matthew Muspratt)



Bottom right: A technician takes water samples during production (Photo: Matthew Muspratt)

Grace Overlander

MANAGER, NEW PRODUCT INTRODUCTION, TESLA MOTORS

MBA, Massachusetts Institute of Technology

MS, Mechanical Engineering, Massachusetts Institute of Technology

BS, Mechanical Engineering, University of Michigan



Grace Overlander launched the new battery products that are at the heart of Tesla's Model S, shown charging at a Gilroy, California, DC rapid-charging station. (Photo: Steve Jurvetson)



Grace Overlander speaking at the C3E Women in Clean Energy Symposium, November 2015. (Photo: Justin Knight)

I started working at General Motors to get real, on-the-ground manufacturing experience, and I was lucky enough to be a part of the Volt Extended-Range Electric Vehicle Program. Not only did I get to work on a groundbreaking product, I was responsible for setting up and running the Repair and Root Cause Center for any battery that was returned from the field. It was this experience that led me to fall in love with the energy industry and all of the many ways we can use batteries for clean energy—powering anything from cars and trucks to homes and major industrial facilities.

When I had the chance to move up at General Motors, I instead took a lateral move to Tesla, so I could stay in the energy space—building batteries for the Model S, Model X, and Tesla Energy

brands. I found that carefully choosing a path that I found truly interesting led me to a job I love: launching powertrains and energy storage at Tesla.

I also continue to involve myself in mentoring and coaching young women in this cross-section of the automotive, energy, and technology industries, which can really benefit from women leaders. Creating a pipeline of young students who love math and science is important, but giving young professionals the tools to succeed and continue to thrive is vital for the future of the industry. I am proud to say that my group at Tesla is half female. I am passionate about encouraging women to join, grow, and become leaders in this space.

Phuong Phillips

VICE PRESIDENT, DEPUTY GENERAL COUNSEL AND HEAD OF CORPORATE/SECURITIES, SOLARCITY CORPORATION

JD, University of California, Los Angeles School of Law
BA, Communication Studies, University of California, Los Angeles

My story is not necessarily new, but it is becoming more common—and that provides me with so much hope for my daughters and for the future of women in this country. I was born in Vietnam to economic refugees from China and immigrated to the United States at a young age. My parents focused on our education and values at great personal expense to themselves. They taught me hope, discipline, and the belief that our dreams are always within our reach.

At the turn of the century, when my law school classmates and I talked about changing the world, many of us hoped to do so through industries driving vast technological change in Silicon Valley. Instead, I joined SolarCity more than five years ago, and since that time we have installed over 200,000 solar energy systems on homes, schools, and businesses across the United States. It is an impact that continually inspires me. Every day on my drive to work, I pass homes with solar systems, and I hope to see millions more in the future.

As a Vice President at SolarCity, I am most proud to have helped sponsor and support the company's "Women in

Power" initiative. I love mentoring, coaching, and supporting the next generation of women leaders and innovators in our company and beyond, and I am invigorated by their prospects for the future. My career success has been encouraged and influenced by so many people. I am thankful for the opportunity to offer the same promise, support, and influence to the next generation of women, as I hope this generation will for my daughters.

2015 concluded with some key milestones for climate change, including the Paris climate conference and the U.S. Investment Tax Credit extension. We also saw volatility in capital markets, concerns over reduced fuel prices, and continued skepticism about the urgency of adopting sustainable energy solutions. Whenever I feel disheartened, I remind myself that we are working to inspire promising future leaders and that we are in the earliest days of solving global climate change. The advancement of women's participation in the clean energy revolution requires forward-thinking companies like mine and organizations like C3E.



Phuong Phillips (Photo: SolarCity)



Technician installs rooftop solar system to boost residential energy efficiency. (Photo: SolarCity)

Alina Zagaytova

ASSISTANT GENERAL COUNSEL, FIRST SOLAR

JD, Harvard Law School
BA, University of California, Berkeley

What I find most rewarding about my work is that I am helping communities in both mature and emerging markets improve their access to clean, renewable energy. Having worked on a broad range of projects, from building some of the world's largest utility-scale solar power plants in the United States to providing access to electricity in remote villages of Kenya, I know that my legal expertise makes a difference.

My ten years of work experience at the World Bank, the U.S. Senate Foreign Relations Committee, the law firms of Hogan Lovells and Cleary Gottlieb, and now at First Solar have culminated in the value I bring to my work today in renewable energy. Through my diverse career, I have acquired skills in understanding business metrics, leading difficult negotiations, becoming a successful and agile entrepreneur in an emerging industry, and navigating the complexities of local and international legal requirements. At First

Solar, I am constantly reminded that resolving challenging legal issues and structuring and executing investment and financing transactions are critical tools for enabling the construction of solar projects, that reduce carbon emissions around the world.

Remarkable advancements in solar panel technology and global project development help bring the promise of solar power to life as a sustainable, affordable energy source for homes and businesses. I continue to be inspired by the contribution of my 6,000 First Solar colleagues, united in our mission to enable a world powered by clean, renewable solar energy. From our advances in module conversion efficiency and commercial production techniques to the partnerships we are forming with leading utilities, independent power providers, and commercial and industrial companies, I know we are making meaningful contributions to a healthier world.



Alina Zagaytova visiting First Solar's manufacturing facility in Ohio (Photo: First Solar)

Preparing the Workforce for Today and Tomorrow

Ghita Levenstein Carroll

SUSTAINABILITY COORDINATOR, BOULDER VALLEY SCHOOL DISTRICT

PhD, University of Colorado, Boulder
MS, University of Colorado, Boulder
BS, University of Wisconsin, Madison

I am deeply passionate about the fields of sustainability and education. Currently I am the Sustainability Coordinator of the Boulder Valley School District, and over the past two decades, I've had the opportunity to work with tens of thousands of students. Their enthusiasm and understanding of the importance of living more sustainably keeps me motivated.

Two experiences shaped and cemented my career in sustainability. In 2000, I had the honor of working with renowned wind power advocate Rudd Mayer through my job at the University of Colorado (CU) Boulder Environmental Center. Rudd, who was an amazing leader and mentor, created an inflection point for my career and sparked my passion for combining the fields of education and sustainability. Together, we spearheaded a campaign that made CU the first U.S. university to support wind power by raising student fees.

After completing my PhD work in Environmental Studies with a focus on renewable energy policy in 2008, I started work as the Sustainability Coordinator for the Boulder Valley School District. This was an incredible opportunity to put sustainability into action and create real change. As a mother of two young

children, it is hard to ask for a better situation than combining my two passions within our local schools.

My work has given me the opportunity to significantly expand renewable technologies in educational settings, offset many thousands of tons of carbon dioxide, and provide many millions of kilowatt hours of renewable energy to educational facilities. However, the true value is the opportunity to work with students and provide learning opportunities connected to sustainable and renewable energy at their schools.

When I see children biking to school, patiently waiting to dispose lunch items into the proper bins (reusable, recyclable, and compostable), working in gardens, and eagerly raising their hands to share what they know about solar power and how renewable energy is powering their school, I am encouraged and inspired. When we have a generation of children who feel a connection to nature and understand the impact that we have on the environment, our quality of life will improve. I hope to continue on a career path through which I help implement real change toward a more sustainable future.



Ghita Levenstein Carroll speaks at the Colorado State Board of Education

Ghita Levenstein Carroll with several students from Nederland Middle/High School on the day the school's wind turbine was installed in October 2011 (Photo: Boulder Valley School District)



Kristen Graf

EXECUTIVE DIRECTOR, WOMEN OF WIND ENERGY (WOWE)

BS, Engineering, Cornell University



WoWE Executive Director Kristen Graf (right) with other WoWE leaders Mallory Lindgren (middle) and Katy Briggs (left) (Photo: WoWE)

I recently had the opportunity to speak on the Women in Sustainability panel at the annual conference of the Society of Women Engineers. The room was packed—standing room only—and students made up the majority of those in attendance. After the panel concluded, the lines to ask questions stretched across the room, and I heard the same story over and over. These students were studying engineering and wanted to work in renewable energy and sustainability, but they were not sure where or how to get connected to career opportunities. This was yet another signal, among the many I see regularly, that young women are enthusiastic about technology and the environment. We need them more than ever, so it is essential to reach them early and clear the path for leadership in renewable energy careers.

The conversations around women in the workplace and climate change have both gained momentum over the last few

years. We now have data from MIT, Credit Suisse, McKinsey, and more showing us that diversity matters in group decision-making and leadership. We also know that global warming is one of the biggest puzzles and most complex challenges of our time—requiring innovation in technology, markets, policy, and behavior. To tackle it head on and build a clean energy future, we are going to need all of the talent, great minds, ideas, and different perspectives we can find.

We need to establish more visible role models, connect young women to resources for launching clean energy careers, and create more opportunities for leadership. We still have a lot of work to do—as individuals forging careers, as companies and organizations advancing and retaining capable women,

I'm thrilled to be part of WoWE, an organization that is lifting the voices of women and charting their actions to make our clean energy future a reality.

and as a society breaking down norms and obstacles that no longer serve us.

At Women of Wind Energy (WoWE), I get to work with women and men all over the country who are passionate about recruiting, retaining, and advancing women and lifting their voices at every opportunity. I see more and more wind businesses interested in how to grow talent and support a diverse

workforce. I'm ecstatic to be able to leverage WoWE's expertise and resources to help all of them—not only because it is the right thing to do, but because I fundamentally believe it is what we must do to successfully transition to the clean energy future we all want and so desperately need.

DaNel Hogan

DIRECTOR, THE STEMazing PROJECT, OFFICE OF THE PIMA COUNTY SCHOOL SUPERINTENDENT, TUCSON, ARIZONA

MAT, Southern Oregon University
BA, Physics, Coe College

As a high school and middle school physics teacher, I have always tried to impress upon students the critical role of energy and the impacts of our energy choices. After fortuitous encounters with folks at the Idaho National Laboratory (INL) and the National Energy Education Development (NEED) Project, I decided to concentrate my efforts on helping teachers better engage students in energy learning. Initially, I participated in and then began facilitating hands-on activities related to nuclear energy at the INL Physics Teachers Workshops. Once I joined the Teacher Advisory Board of the NEED Project, I was able to greatly expand the breadth of energy topics I teach.

My two years as an Einstein Fellow working on the Energy Literacy Initiative at the U.S. Department of Energy strengthened my passion and ability to deliver energy-focused professional development for Pre-K through 12th-grade teachers. Challenges I faced as an educator attempting to teach energy topics included gaps in my background

knowledge, my understanding of the complexity of the energy system, and limited access to the equipment and supplies I needed to engage students. The work I continue today addresses these challenges by educating current classroom teachers on a variety of science, technology, engineering, and mathematics (STEM) topics and engagement strategies. Influencing the way a teacher engages his or her own students is incredibly powerful. I can ultimately impact thousands of students throughout the career of each teacher, and I have the pleasure of working with hundreds of teachers each year.

The next challenge I am tackling within the STEM education space is to implement a program that develops and empowers master classroom educators, so they can share their expertise and practices with their peers. Not only does this professionalize the endeavor of teaching, it shows our most valuable resources—the educators working with our students every day—just how much we value their hard work and dedication to this challenging profession.



Above: DaNel Hogan 90 meters underground at the Compact Muon Solenoid (CMS) detector at the Large Hadron Collider in France, the largest machine ever built to study physics (Photo: DaNel Hogan)

Right: DaNel Hogan inside a Hoberman sphere at a teacher workshop (Photo: Brooke Meyer)



Nicky Phear

PROGRAM DIRECTOR, CLIMATE CHANGE STUDIES, UNIVERSITY OF MONTANA

PhD, Sustainability Education, Prescott College
MS, Environmental Studies, University of Montana
BA, Psychology, University of Pennsylvania

I was reading Elizabeth Kolbert's book, *Field Notes from a Catastrophe*, when I decided to dedicate my life's work to climate change education and empowerment. Kolbert stresses how profoundly humans are altering the planet—and how scientists are far more alarmed about it than the public. At the time, I was part of a faculty group developing a new interdisciplinary degree program in climate change. Kolbert's sense of alarm was not new to me—I had been an environmental educator for 15 years—but it was a new challenge to create a climate change curriculum that would draw from the sciences and humanities, involve practical experience, and inspire students to work on solutions.

I developed a course to take students by bicycle across Montana to learn about energy and climate change. We cycled through coal country; across the state touring wind, solar, biofuel, and geothermal sites; and then up the Rocky Mountain Front to visit bark beetle-killed forests, ranchers struggling with drought, and shrinking glaciers in Glacier National Park. This course provided the framework for future programs—combining student education with hands-on application. I went on to develop an internship program that empowers students to work on clean energy solutions,

stimulate conversations on climate to generate campus and community action, and lead international field studies of climate change responses in Vietnam and Bhutan.

What motivates me is finding ways to build students' sense of agency, or self-power. We know that if people believe they can effect change, they are more likely to commit to causes they care about and to persevere through challenges. Climate change—and the massive work required to transition to a clean energy economy—can be daunting. Creating opportunities for meaningful engagement can help to counteract the potential for despair that many feel.

My work with students is inspired by the words of Kathleen Dean Moore: "If you are looking for your calling, you will find it at the place where your greatest joy intersects with the world's deepest needs." I love to mentor students so they can connect their passions—whether in art, policy, science, or education—to address sustainability challenges. I cannot think of a more worthy endeavor than creating educational opportunities so students make connections and act on our climate and energy needs in creative ways.



Nicky Phear (Photo: Tom Robertson)

Nicky Phear (in foreground holding papers) teaching a class on McDonald Lake in Glacier National Park at the conclusion of her Cycle the Rockies: Energy and Climate Change in Montana course, which included cycling 600 miles across the state. (Photo: Dave Morris)



Liz Porter

PROGRAM DIRECTOR, INFORMATION TECHNOLOGY, LOCKHEED MARTIN

MBA, University of Colorado
BS, Electrical Engineering, Villanova University



Liz Porter (Photo: Liz Porter)

I gravitated toward math and science from a young age, and my parents were always supportive. They told my sisters and me that we could accomplish anything as long as we were willing to put our minds to it. Support like that is invaluable—whether from family, peers, colleagues, mentors, or spouses. Many people start their careers with a can-do attitude, determined to make a difference. But maintaining that attitude can be difficult. That is when you need a good support system. Never listen to anyone who says, “It can’t be done.”

As a young electrical engineering student in the early 1990s, I had very few women role models. As a result, I now actively mentor early-career women and men in STEM fields, and I emphasize the roles of engineering and technology in solving energy challenges. We need to create a diverse culture that stimulates new ways of thinking, and I encourage my staff to bring their ideas forward. Every idea is important, and anything is possible.

After years of working in technical fields, I became interested in the broader perspective: the financial and business side of implementing technologies and running programs. This led me to acquire an MBA, which now allows me to bridge both areas. My dual background helps me interact with the engineering staff to fully understand complex technical challenges and then present cost-effective engineering solutions to senior executive clients. I use engineering and math to step through an issue, assess solutions, and figure out how to make the numbers work.

My advice to those entering the clean energy field is to set your priorities consciously and be aware that they are likely to change over time. Moreover, it is fine to fail. As you progress in your career, you will face disappointments and failures. Step back and consider how you could have done it differently. Share your lessons learned with others. These so-called setbacks teach you to speak up and act sooner.

Finally, follow your passion and the rest will come. If you really like what you are doing, you will find fulfillment, even though the work is hard. I am passionate about clean energy and its potential to alleviate global problems.

Debra Rowe

PROFESSOR, OAKLAND COMMUNITY COLLEGE

PhD, University of Michigan
MBA, University of Michigan
BA, Yale University

When I first met people living in the United States who were forced to choose between heating and eating, I knew our energy future had to change. I first installed solar energy systems more than thirty years ago, and I saw that they work, that the savings cover the costs, and that they produce positive cash flows and quality jobs. I became motivated by these proven precedents and by additional opportunities to produce healthy-wage jobs in the fields of energy efficiency and renewable energy.

I am also highly motivated by the need to act—and to act now—on climate change. I am dismayed by the needless suffering occurring in the United States and globally due to the present impacts of climate change, and I am extremely concerned about future impacts. I know we need to reduce the combustion of fossil fuels and move to clean energy globally much faster than we are currently. We have the technology, but now we face critical state-level policy struggles to spur effective energy and utility planning and investment that will

support a clean energy future made up of renewable energies and energy efficiency.

To speed up the transition to clean energy, I continue to help colleges and universities across the United States start or grow their sustainable energy education offerings. I also continue to work on systemic change through the Higher Education Associations Sustainability Consortium; the Green Gigawatt initiative; the science, technology, engineering, and mathematics (STEM) disciplines' Sustainability Improves Student Learning initiative; and the Sustainability Education and Economic Development initiative of the American Association of Community Colleges. In addition, I have been part of the U.S. delegation to an international conference on sustainable development and have worked with international networks to empower women (and others) across the globe. All of these efforts generate opportunities for engagement to foster systemic change at local to global levels and create a more sustainable future for all.



Debra Rowe (Photo: Debra Rowe)

To engage a broad range of audiences, Debra Rowe uses a trailer equipped to demonstrate clean energy technologies. (Photo: Donna Napolitano)



Kathy Swartz

EXECUTIVE DIRECTOR, SOLAR ENERGY INTERNATIONAL

BA, Psychology and Sociology, West Virginia Wesleyan College



Kathy Swartz at Solar Energy International's campus (Photo: SEI)

The Solar Energy International team is passionate about solar training and advancing the solar industry. (Photo: SEI)

I have the honor of serving as the Executive Director at Solar Energy International (SEI), a non-profit educational organization. Our mission is to provide industry-leading technical training in renewable energy to empower people, communities, and businesses worldwide. Since 1991, we have trained more than 45,000 people from around the world to design, install, and maintain renewable energy systems. Since I became Executive Director, we have expanded our outreach to train veterans for work in the solar industry, developed Programa Hispano, expanded our scholarship program to ensure that tuition is never a barrier, and spun off two for-profit consulting companies that now support our non-profit mission.

Even with our global reach, the most transformative work we do is in our hometown of Paonia, Colorado. SEI is based in a community that once mined over 1.5% of the nation's coal and employed more than 1,000 people in well-paying jobs. As our coal mines closed and local families were forced to pursue employment elsewhere, our community began to suffer. As an organization, we asked ourselves, "What can we do to drive economic development through solar?" The North Fork Valley has always been an

energy-producing community, and with the help of our local economic development organization, rural-electric co-op, and AmeriCorps volunteers, SEI is driving local economic development through renewable energy. Given a skilled local workforce, one begins to see how renewable energy can be a true game changer for our communities.

Reaching SEI's vision of a world fully powered by renewable energy still has a long road ahead, but we are beginning locally. I am most excited by the possibility that our community can serve as a model for energy resilience. Though I can only imagine what the next 25 years hold for SEI, I know we will continue to hold true to our mission, because there is too much at stake—in the lives we are improving, the businesses we are expanding, and our impacts to the world.

Our vision of what we can achieve permeates our daily operations, from emails to budgets. If you keep taking small steps forward, you have the momentum when you are ready to dive in.

Narratives from C3E Lifetime Achievement Honorees

C3E has formally recognized the lifetime achievements of five exceptional women—one each year since the program’s inception. This prestigious C3E honor is reserved for those women who, on the strength of their keen intellects and hard work, broke new ground and overcame major obstacles as they pursued their academic and professional passions or careers. All have excelled in their work for many decades and are widely acclaimed for their significant

contributions to clean energy. Learn about their illustrious and ongoing careers at c3eawards.org/winners/lifetime/. Our Lifetime Achievement Honorees understand the value of diverse talent pools in generating future clean energy innovations and delivering them to global markets. They actively mentor and support women who are following in their footsteps or forging their own paths. Reflections and advice from our Honorees are presented on the following pages.

Mildred Dresselhaus

PROFESSOR OF PHYSICS AND ELECTRICAL ENGINEERING, EMERITA;
INSTITUTE PROFESSOR, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

PhD, Physics, University of Chicago
MS, Physics, Radcliffe College
BS, Physics, Hunter College



*Mildred Dresselhaus reviews experimental results in the lab.
(Photo: MIT)*

Mildred Dresselhaus was awarded the Medal of Freedom by President Obama in November 2014 for her contributions to major advances in electronics and materials research. (Photo: White House)

Our energy sources and technologies for generating and converting energy evolve over time—but energy demand continues to rise. I remember as a young person that the soot and smoke from open coal furnaces made it hard to breathe and even see in the streets of London. Today, of course, it is Beijing and other places that face serious air quality issues. The good news is that now we can better generate energy from the sun and other clean renewable sources. The faster we transition to clean energy, the sooner we can improve air quality around the globe to protect human health and reduce some of the most severe climate impacts.

As a scientist, I am interested in many topics. When given a choice of topics to study, I like to ask myself three questions:

- What is the real problem to be solved?
- Given my unique mix of skills and resources, where can I make the greatest impact?
- How can I contribute?

For me, science stays fun and fresh because there are always new topics to study, new tools to use, great people to work

with, and lots to learn. Science is endless. For example, our chip-based devices have become steadily smaller, more powerful, and cheaper for several decades, but now Moore's Law appears to be ending. What will be next? I don't have the answer, but we will need a whole new level of innovation—and I am excited at the prospect of working on the topic.

I believe women can offer a slightly different perspective on scientific inquiry—with the potential to spark innovative approaches. When I first arrived at MIT, women made up only 4% of students and an even smaller percentage of faculty. In 1968, I became the first woman to receive tenure in electrical engineering at MIT. Since then, the gender balance of the student body has improved significantly (now about 50%). I have also observed that once one woman joined the faculty of a particular discipline, other women were more likely to join them. I see a clear need for an organization like C3E, and I genuinely enjoy mentoring other women scientists. There is so much left to do in science, and we need diverse ideas to make progress more quickly.

Sarah Kurtz

RELIABILITY GROUP MANAGER, PV PROGRAM LEAD, NCPV CO-DIRECTOR
RESEARCH FELLOW, NATIONAL RENEWABLE ENERGY LABORATORY

PhD, Chemical Physics, Harvard University
BA, Chemistry and Physics, Manchester College



Sarah Kurtz explains performance differences among various types of photovoltaic modules at the National Renewable Energy Laboratory. (Photo: Dennis Schroeder, NREL)

As one person in a world of billions of people, I am like a minnow trying to change the direction of a big ship. How much change can a minnow bring about?

When I was in college and some of my ideas were rudely dismissed, I learned that I could *choose* to become angry or I could *choose* to respond graciously. Responding graciously was more difficult, but when I succeeded in tapping into that power within me, the results were often far better.

While many in our world focus on gaining *authority*, I have found that the more effective goal is being *persuasive*. As a manager,

I strive to never pull rank and lay down directives. I suggest a direction to a researcher, but if I cannot convince him or her, then I drop it. Researchers who are intent on pursuing an idea can be very difficult to dissuade, so this approach has forced me to develop clear reasoning skills.

Without authority, how might we persuade others to go in a better direction today? I think back to 2004, when Colorado passed Amendment 37—the first U.S. renewable energy portfolio standard passed by a direct vote of the people.

Soon afterward, I joined an implementation meeting at which the discussion centered on how to get more people to put solar panels on their rooftops. I asked, “Why not have the utility do it?”

They responded, “The utility is the enemy! We don’t want them to get a penny of our incentive program!” This attitude is still common today among solar energy advocates, and the utilities have responded in kind. Nevertheless, solar energy’s

biggest challenge ultimately is delivering power when the sun is not shining, and utilities are well-positioned to address this challenge—since they are typically responsible for ensuring a reliable electricity supply. If the utilities were to help turn variable solar resources into reliable electricity, they would help solar grow. Hence, a partnership with the utilities could logically hasten the growth of clean energy. If each clean energy proponent convinces one other person that the utilities should be our partners in transforming the grid, such partnerships might form. The utilities could then show the strength of a whale—changing the direction of the ship faster than the minnows alone.

No one of us will bring about the energy transformation alone, but, working together, we can change the world!

Mary Nichols

CHAIR, CALIFORNIA AIR RESOURCES BOARD

JD, Yale Law School
BA, Russian Literature, Cornell University

I moved to Los Angeles in 1971 when the smog was terrible in California. I quickly became depressed, and then angry, about the thick yellowish gray morning sky, the fluorescent orange sunset and the metallic taste and eye-stinging character of the air. So I resolved to do something about it and as a young public interest lawyer brought one of the first successful lawsuits under the Clean Air Act against US EPA.

I was then appointed to the California Air Resources Board by Governor Jerry Brown at age 29 and given a mandate to set strong standards for vehicles and fuels. I worked with electric utilities, vehicle manufacturers, fuel providers and others to develop effective approaches to clean the air. Over the years we've learned to use regulations combined with incentives to motivate a transition to a cleaner economy. Today, we need to significantly cut greenhouse gas emissions. Our successes give us confidence that technological advancements can help us achieve this goal—while also growing the economy and preserving our quality of life.

If you have an interest or desire for public service, you need to be willing to go after it and seize opportunities even if you don't

feel completely prepared. At this point in my career, I have had the honor to serve as a political appointee five times. Of course, political appointments do come to an end, so my career path has had several detours. During some of these detours I tried private law practice and non-profit work but was always drawn back to public policy.

What makes this work so gratifying is that I get to work with an array of talented scientists and engineers to craft decisions that promote a more sustainable future. To find solutions, we gather input from people with diverse viewpoints, backgrounds, and skills—all in a public setting. We listen to what everyone has to say and advocate for the interests of those who are not yet at the table but who are affected by the decision. Despite conflicting positions, we build trust with the community by identifying diverse objectives or constraints and finding common ground for solutions. We strive to make decisions that are balanced, durable, and acceptable to all. Ultimately, the public fills out our report card, so we need to clarify costs and benefits. The battles along the way are challenging but it is where we end up that counts. My advice to other women on this path is support one another, share lessons and opportunities and celebrate each other's successes.



Mary Nichols speaks at the California Road to Paris Summit 2014. (Photo: The USC Schwarzenegger Institute)

Maxine Savitz

VICE-CHAIR, PRESIDENT'S COUNCIL OF ADVISORS ON SCIENCE AND TECHNOLOGY (PCAST)

PhD, Chemistry, Massachusetts Institute of Technology
BA, Chemistry, Bryn Mawr College

Looking back over my career, I'm struck by how much has changed. Advanced degrees in science and technology have become more accepted aspirations for female students, and universities offer entire programs specifically in sustainable energy technology, policy, and economics. Women are better represented on scientific faculties, and today's wider workforce includes many women leaders who serve as role models. Some stellar technical women are leading key government clean energy programs. Women have also taken the helm at a few major energy companies and in small business startups, universities, non-profit organizations, and financial institutions. We always need more of these examples, of course, and I'm well aware that certain fields or subareas are noticeably lagging.

It's all about networking. Learn about each other. Together we can create opportunities, leverage success, and open doors to advance women and clean energy.

Some challenges associated with advancement, however, have remained the same. Women entering the clean energy field today still need to acquire strong basic skills and plug into effective networks. By basic skills, I mean they need a sound knowledge and understanding of the science, technology, or other areas they want to pursue. My advice to them is to find a school with a rigorous program and strive to excel. In addition to acquiring the technical knowledge, you'll learn to think logically and to solve problems—skills you can use anywhere. Learning to write well can also give your career a tremendous boost. Acquiring these skills should also provide you another key to success: unshakable confidence in yourself.

Skills and confidence alone are not enough. Women still need information on opportunities in the clean energy field. They need to hear about potential job openings, studies, committees, funding sources, and a myriad of other possibilities. That's where networking comes in.

C3E networking is our answer to the old boy network. We connect, form relationships, and learn about one another's qualifications, roles, needs, and resources. These connections let us become eyes and ears for each other. We learn whom to contact for certain information and whom to recommend for various positions. The C3E Ambassadors have forged connections among leaders across the spectrum of clean energy, and the Symposia bring everyone together: Ambassadors, mid-career women, and graduate students. The C3E.net.org platform links women around the world and further expands our networking options and opportunities. The future of our planet depends on our success in clean energy.



Maxine Savitz (Photo: Maxine Savitz)

Susan Tierney

SENIOR ADVISOR, ANALYSIS GROUP

PhD, Regional Planning, Cornell University
MS, City and Regional Planning, Cornell University
BA, Art History, Scripps College



Susan Tierney (Photo: John Tierney)

My interest in clean energy started when I was in my teens, growing up in Southern California. The smog was just terrible; elderly folks and kids were advised not to go outside, and on countless days we could not even see the 12,000-foot mountains close to my hometown of Redlands. I remember a 1967 *Time* magazine cover showing thick air pollution hovering over Los Angeles. It made me want to understand why and how this situation had happened, and to try to do something about it. That started me on my career in clean energy, which now spans several decades.

Wonderful progress has been made in the United States and elsewhere to clean up motor vehicle emissions and make cars much more fuel efficient. I have been amazed to see the technological innovation and cost reductions in wind- and solar-energy projects. It is heartening to look at the collective impact of the many investments to make buildings, appliances, production processes, and power systems more energy efficient. Since my years as a teenager, the United States has made many gains in energy

productivity, tripling our economic output while cutting total energy demand in half. My own small contributions to addressing these issues have focused on finding innovative, market-based incentives to increase efficiencies and reduce the environmental impacts of energy production and use—and designing public policies to produce those outcomes when market failures stand in the way.

Today, I spend most of my time on carbon-related issues associated with energy production, delivery, and use. Although we have been able to make meaningful progress on traditional smog and other air (and water) pollution issues, carbon pollution urgently requires much more work. As a mother of two grown sons starting families, I worry about the global threats that accompany climate change and how they will affect their lives. My sons' generation understands these risks. My generation needs to do everything it can to help hand off a cleaner energy system. I am so appreciative of the work that C3E is doing to advance that goal in the United States and in so many other parts of the world.

Quotes from U.S. C3E Ambassadors

Thirty-eight distinguished senior leaders currently volunteer as Ambassadors to help implement the U.S. C3E program. These eminent decision makers and thought leaders serve as energetic advocates and role models for women in clean energy. The C3E Ambassadors are also instrumental in selecting the exceptional mid-career women who receive the C3E Award—in recognition of their leadership and accomplishments toward clean energy goals.

C3E Ambassadors represent the broad range of clean energy fields, including science and technology, policy, law, business, and finance. Individually and collectively, they promote the C3E program and enrich its varied networking opportunities to address the gender gap and drive advancements across clean energy sectors. C3E is deeply

grateful for their guidance and support. Learn more about their careers at c3eawards.org/about-c3e/c3e-ambassadors/.

The following pages provide a list of the current U.S. C3E Ambassadors and a series of quotes collected from individual Ambassadors, reflecting their insights and experiences as clean energy leaders and shepherds of the C3E program. These quotes are presented in the following sections:

- Ambassador Advice for Women Pursuing Careers in Clean Energy
- Experiences at the C3E Symposiums and Forums
- Serving as a C3E Ambassador
- Value of the U.S. C3E Program

U.S. C3E Ambassadors in 2016



Sally Benson
*Co-Director, Precourt Institute for Energy, and Director,
Global Climate and Energy Project, Stanford University*



Martha Broad
*Executive Director,
MIT Energy Initiative*



Marilyn Brown
*Professor, School of Public Policy,
Georgia Institute of Technology*



Kateri Callahan
*President,
Alliance to Save Energy*



Amy Chiang
*Vice President, Energy and the Environment,
Global Government Relations, Honeywell*



Karen Conover
*Vice President and Senior Technical Advisor,
DNV GL*



Karina Edmonds
*Executive Director for Corporate Partnerships,
California Institute of Technology*



Christine Ervin
*Principal,
Christine Ervin/Company*



Amy Francetic
*Senior Vice President, New Ventures
and Corporate Affairs, Invenergy*



Lisa Frantzis
*Senior Vice President, Strategy and Corporate
Development, Advanced Energy Economy*



Deb Frodl
*Global Executive Director,
Ecomagination, General Electric*



Bobi A. Garrett
*Chief Operating Officer, National
Renewable Energy Laboratory*



Dian M. Grueneich
*Senior Research Scholar, Precourt Energy
Efficiency Center, Stanford University*



Katherine Hamilton
*Co-Founder and Principal,
38 North Solutions*



Colette Honorable
*Commissioner, Federal Energy
Regulatory Commission*



Britt Ide
*President,
Ide Energy & Strategy*



Kristina Johnson
*Founder and Chief Executive Officer,
Cube Hydro Partners, LLC*



Barbara Kates-Garnick
*Professor of Practice, Center for International
Environment and Resource Policy, Fletcher, Tufts*



Melanie Kenderdine
Energy Counselor to the Secretary and Director, Office of Energy Policy and Systems Analysis, U.S. Department of Energy



Nancy Kete
Independent Consultant, Resilience, Adaptation, and Transformation



Constance Lau
President and Chief Executive Officer, Hawaiian Electric Industries, Inc.



Robert Marlay
Director, Office of International Science & Technology Collaboration, U.S. Department of Energy



Rose McKinney-James
Managing Principal, Energy Works; McKinney-James & Associates



Sydney McNiff Johnson
Senior Advisor, Global Energy Practice, Dentons



Ellen Morris
Energy and Environment Faculty, Columbia University, and President, Sustainable Energy Solutions



Susan Petty
President and Chief Technology Officer, AltaRock Energy, Inc.



Nancy Pfund
Founder and Managing Partner, DBL Partners



Maxine Savitz
Vice-Chair, President's Council of Advisors on Science and Technology



Kim Saylor-Laster
Executive Vice President and Chief Procurement Officer, Black Bear Energy, Inc.



Christine Eibs Singer
Senior Advisor, Sustainable Energy for All Initiative, United Nations



Mary Anne Sullivan
Partner, Energy Regulatory Practice, Hogan Lovells US LLP



Dymphna van der Lans
Chief Executive Officer, Clinton Climate Initiative



Richenda Van Leeuwen
Former Head of Energy Access, UN Foundation



Carter Wall
Managing Director, Franklin Beach Energy



Alla Weinstein
Co-Founder, Trident Winds LLC



Seth Weissman
Executive Vice President, General Counsel, and Secretary, SolarCity Corporation



Maja Wessels
Executive Vice President, Global Public Affairs, First Solar



Joan Wills
Chief Engineer and Program Leader, Cummins, Inc.

Ambassador Advice for Women Pursuing Careers in Clean Energy

Set your professional goals as you envision. Before college, Justice Sonia Sotomeyer decided to be a judge, and then she focused on achieving her dream. Network as much as you can. Women (and men) everywhere are willing to be mentors. Never hesitate to ask for advice, introductions, and feedback.

DIAN GRUENEICH

You have to be in the room to make a difference. That is true at all levels of the company. For women and minorities, the value of a seat at the table cannot be underestimated.

ROSE MCKINNEY-JAMES

Don't overthink your career path.
You need to be open to opportunities that will land
in your lap—and shape your career and life.

ELLEN MORRIS

Focus on the organization you join rather than a specific job. If the organization is high performing and has an inclusive culture, you can always upgrade your specific job as you demonstrate your talent and commitment.

NANCY PFUND

The clean energy field provides numerous opportunities for women. Seek out a position you love and the sky is the limit.

KIM SAYLORS-LASTER

A successful career is not a straight path—
detours can be great life experiences.

CHRISTINE EIBS SINGER

There is no such thing as “it can't be done.”
The improbable will take extra effort.

ALLA WEINSTEIN

Lean into uncertainty. The positive impacts from your leadership will come from accepting risk, taking on meaningful work challenges, and constantly listening to and integrating relevant input from disparate sources.

JOAN WILLS

During a speed networking session at the 2014 C3E Women in Clean Energy Symposium, participants have multiple opportunities to connect and share ideas. (Photo: Justin Knight)



Experiences at the C3E Symposiums and Forums

With energy demand projected to double by 2050, the world needs clean, affordable, and plentiful energy sources that meet global needs while curbing climate change. C3E has created a valuable network of professional women, at all stages of careers, working on energy and climate solutions.

MARTHA BROAD

It is inspirational to be among so many amazing women leaders. They are bright, passionate, and confident. Together, they are leading change for a better tomorrow.

DEB FRODL

It is not an exaggeration to say that C3E kept me in the energy field. Working in a male-dominated, conservative region is challenging. Meeting all the amazing women in C3E gave me the support and inspiration to continue.

BRITT IDE

C3E showcases the depth and breadth of often unheralded, but truly amazing talent and accomplishment. It is more than uniquely inspiring—it is paradigm-shifting. It causes one to act—to recruit, retain and advance more women in this field.

ROBERT MARLAY

As one of two men in the Ambassador cohort, I have had a unique opportunity to be with a group of extremely accomplished women—affording some perspective on what it might be like to be the sole woman in a room full of men. This has opened my eyes, and I have a new appreciation for the workplace dynamics that many women encounter.

SETH WEISSMAN

Participants at all career stages converse during a break at the 2014 Symposium hosted at MIT. In the back, participants review student posters and select their top choices for special recognition. (Photo: Justin Knight)



Serving as a C3E Ambassador

As a founding C3E Ambassador, I am proud to see the program's growth and impacts through mentoring and recognizing the achievements of women working in the clean energy field. C3E is a catalyst for attracting the "best and brightest" young women—from many disciplines—into this exciting and innovative sector.

KATERI CALLAHAN

As a C3E Ambassador, I've had invaluable opportunities to work with amazing professionals who are focused on communicating the value of women in the global advancement of clean energy deployment. C3E provides a forum to help identify and nurture future clean energy leaders.

AMY CHIANG

Clean energy is one of those frontiers that requires intrepid mentors and leaders. C3E Ambassadors have the joy of playing a role in lifting up other women and helping them see that each and every one of them has the power to change the world.

KATHERINE HAMILTON

The camaraderie of the C3E Ambassador cohort has been one of my greatest experiences. We have met inspiring and intelligent students with phenomenal projects as well as the fantastic winners of the C3E Awards. Reading all the nominations is awe inspiring.

SYDNEY MCNIFF JOHNSON

One of the things I most enjoy about serving as a C3E Ambassador is the engaging and thought-provoking dialogues we have on clean energy solutions and recruiting more talent to clean energy disciplines. It is a privilege working with this cohort to select C3E Award winners and help incentivize solutions and leadership for a sustainable future.

MELANIE KENDERDINE

Reviewing the nominations for the C3E Awards is the most inspiring part of participating in C3E. I learn about the innovative and exciting things women are doing to advance clean energy—and I get to see how many mentors and supporters those up-and-coming women have in their careers.

MARY ANNE SULLIVAN

C3E Ambassadors assembled at MIT's Endicott House in July 2015 for their fourth annual retreat. (Photo: DOE)



Value of the U.S. C3E Program

Our common future depends on solving the global climate and energy problem for everyone, everywhere—beginning now.

SALLY BENSON

C3E provides a valuable opportunity for women to network and learn from other women who are active in the clean energy sector. I continue to be impressed by the achievements of mid-career women working in diverse areas and by everyone's dedication to helping other women succeed. We are playing an important role in clean energy development.

LISA FRANTZIS

Women are the key to our clean energy future. We need to promote the education, professional development, and advancement of women to achieve a strong, diversified workforce and support a robust renewable energy economy.

KAREN CONOVER

We need to ensure that all people have access to energy that is clean and, ultimately, end the life-threatening conditions associated with energy poverty. C3E reinforces my belief that women have the ability to lead in this effort and make a compelling difference locally and globally.

BOBI GARRETT

Clean energy is one of the largest economic opportunities of this century, and we need leaders who bring diversity to the cause—diversity of ideas, opinions, backgrounds, gender, and ethnicity. Our future health and prosperity depend on innovation and leadership in the field.

AMY FRANCTIC

C3E provides a timely opportunity to influence our country's clean energy future by identifying an extraordinary talent pool of women in diverse disciplines who are already drivers on the path to leading the energy transformation.

BARBARA KATES-GARNICK

In the five years since C3E began, clean energy has become more affordable and accessible, and demand has increased as buildings, cities and companies have become more insistent on using clean energy. C3E highlights the prominent role women have played in many of these advancements and the career opportunities for young women in these growing fields.

CONNIE LAU

We can't wait for the future to start deploying innovative clean energy solutions. Right now, we need to transition and invest in clean renewable energy including geothermal. We can save jobs and strengthen communities. The women involved in C3E are making this happen.

SUSAN PETTY

C3E increases support for the next generation of women leaders in this rapidly growing industry. We must all change the way we produce and use energy. Women's voices and leadership are therefore central in our move to embrace a low-carbon future.

RICHENDA VAN LEEUWEN

C3E shines a light on the contributions women are making in clean energy and the benefits communities receive. In a virtuous circle, this recognition furthers their ability to achieve even more.

MAJA WESSELS



C3E participants discuss diverse ideas and experiences in small groups at the 2015 Symposium (Photo: Justin Knight)

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