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Final Report for
Renewable Energy for Rural Economic Development (RERED) Project
July 2005 to June 2013

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Executive Summary

When Renewable Energy for Rural Economic Development (RERED) began in 2005, Utah had no commercial wind power projects in operation. Today, the state hosts two commercial wind power plants, the Spanish Fork Wind Project and the Milford Wind Corridor Project, totaling 324 megawatts (MW) of wind capacity. Another project in San Juan County is expected to break ground very soon, and two others, also in San Juan County, are in the approval process. RERED has played a direct role in advancing wind power (and other renewable energy and clean technology innovations) in Utah through its education outreach and research/publication initiatives. RERED has also witnessed and studied some of the persistent barriers facing wind power development in communities across Utah and the West, and its research expanded to examine the diffusion of other energy efficiency and clean technology innovations. RERED leaves a legacy of publications, government reports, and documentary films and educational videos (archived at www.cleantech.usu.edu) to provide important insights for entrepreneurs, policymakers, students, and citizens about the road ahead for transitioning society onto a cleaner, more sustainable future.

As stated in the 2005 Congressional Funding Request, RERED's overarching goals were to develop an informational resource on wind energy issues in Utah, accompanied by a roadmap for facilitating wind development in the state's rural communities. In 2007, RERED's objectives were expanded to support wind power and other related high-performance, clean technology innovations (commonly known as "cleantech"). Accordingly, in 2008, the Center for the Market Diffusion of Renewable Energy and Clean Technology was established to increase RERED's visibility and disseminate the project's research and publications throughout Utah and the West. Through the Center, RERED has produced publications (including peer-reviewed journal articles, government and university wind development economic impact reports, and articles for the popular business press and news media), documentaries, and educational videos as key outreach vehicles. RERED has also organized and contributed to conferences and outreach events. Finally, RERED has offered presentations and documentary screenings across Utah and the country to initiate discussions about wind energy, renewable energy and cleantech opportunities and the challenges facing their development.

RERED has worked as a collaborative leader with government entities, industry groups, non-government organizations, universities, and citizens in three arenas – (1) the electricity market, (2) the political/regulatory environment, and (3) in rural Utah communities to achieve its stated education and outreach goals. As some of the founding members of the Utah Wind Working Group, we have served on the Utah State Wind Outreach Team, the American Wind Energy Association's Public Affairs Committee, and Utah State University's Sustainability Council. RERED has also partnered with Utah Clean Energy, the City of Spanish Fork, Park City, and other groups to engage in and help organize events for education outreach on wind energy.

RERED has published economic impact reports about wind development in rural Utah counties using the National Renewable Energy Laboratory's Jobs and Economic Development Impact (JEDI) model. These analyses were used in testimony before policymakers to encourage Utah policies conducive to wind development. RERED also advised wind developers about how to address critical barriers, and it engaged communities about the implications of nearby wind development.

One of RERED's most significant initiatives was the in-depth documentation and analysis on the four-year struggle to establish Utah's first wind project at the mouth of Spanish Fork Canyon, resulting in articles and reports, a 30-minute documentary entitled *Wind Uprising*, and educational videos that have been used across the country to educate policymakers, entrepreneurs, citizens, and students about the challenges facing wind development and America's transition toward a cleaner, more sustainable future. RERED has sponsored over 70 screenings of *Wind Uprising* (including post-screening question-and-answer sessions with audiences) in Utah and across the country in a variety of forums, including at policy and energy conferences, universities, film festivals, and in rural communities. Others have adopted *Wind Uprising* as an education outreach tool across the country. RERED's second 30-minute documentary, *Wind Unlimited* (forthcoming), overviews the U.S. Department of Energy's *20 Percent Wind Energy by 2030* report and highlights how policy and transmission expansion may realize this important national objective. Expected to be released in November 2013, the purpose of *Wind Unlimited* is to help educate policymakers and citizens about wind energy's economic and energy security opportunities while also depicting the policy and transmission challenges that must be hurdled to realize those opportunities.



Cathy Hartman and Edwin Stafford are recognized with the "Yes in My Backyard Award" for their documentary, Wind Uprising, from Windustry at the "Community Wind Across America" Conference, University Park, Pennsylvania, 2011.

Collectively, RERED's initiatives have resulted in practical insights about the entrepreneurship and diffusion processes of renewable energy and clean technology that we've incorporated into an emerging conceptual framework for the "sustainable entrepreneurship" process. Drawing from our research and observations about wind power development in Utah, along with other research on cleantech, our framework suggests that sustainable entrepreneurship entails three principal steps: **(1) recognition of environmental problems and their solutions; (2) evaluation of the market feasibility of those environmental solutions and self-assessment of one's acumen to implement them as a viable businesses; and (3) actual implementation of the business and**

environmental solution. Moving through this process requires that entrepreneurs engage in four interrelated subtasks or roles, including (1) as **business entrepreneurs** to craft a viable business model for the sustainable innovation; (2) **policy entrepreneurs** to influence laws and regulations to facilitate the sustainable innovation's acceptance; (3) **social entrepreneurs** to build community support and acceptance for the sustainable innovation; and (4) **collaborative entrepreneurs** to tap the necessary networks to procure the expertise, support, and resources to overcome entrenched political, market, and social barriers facing novel, sustainable innovations. Our framework is intended to help entrepreneurs, policymakers, students, and citizens understand how to encourage society's transition onto a cleaner, more sustainable path.

This report details RERED's key accomplishments, findings and lessons learned for developing and diffusing renewable energy and cleantech innovations, and recommendations for future research and engagement.

Introduction

In the beginning, the Renewable Energy for Rural Economic Development (RERED) Project focused on the development of research, policy, and education outreach initiatives for wind power development in Utah. From 2005 to 2006, the activities of RERED investigated the policy, market, and community barriers that needed to be overcome to develop the first commercial wind project in the state of Utah. In 2007, with the establishment of the Center for the Market Diffusion of Renewable Energy and Cleaner Technology, the focus of RERED was expanded to include research on clean technology innovations and green marketing (e.g., ozone and climate safe refrigerants). While wind energy would be RERED's principal focus, the intent was to consider how insights about wind/renewable energy development could apply to other cleantech innovations and vice versa to lead to more generalized insights (e.g., green marketing, framing of messages to appeal to citizens indifferent to environmental problems, strategies for influencing markets, etc.).

The RERED project addressed four principal initiatives to facilitate the development process of wind energy and clean technology in Utah. The first initiative focused on the development of public educational and outreach materials including documentary films, peer-reviewed research publications, fact sheets, presentations, academic cases and classes, newspaper and other mass media publications, and business conference presentations.

The second initiative involved research on Utah policymakers' perceptions of the potential for wind development and implementation of renewable energy policy mechanisms for the study. The results of this study led to the development of a strategic roadmap for overcoming the market, policy, and community barriers and encouraging the implementation of state policies supportive of wind/renewable energy development for Utah.

The third initiative involved the application of the Jobs and Economic Development Impact (JEDI) model to potential wind locations in rural counties in Utah. Studies were completed for Beaver, Box Elder, Cache, Millard, San Juan, Summit, Tooele, and Wayne counties and findings disseminated to relevant stakeholders (e.g., Utah legislators, county and city elected officials, wind developers, academics, and citizens).

The fourth initiative encompassed research on how different development factors (e.g., level of investment, state tax incentives and policies, and capacity factors) impacted costs from the development and integration of Utah's wind resources with the goal of achieving 20 percent wind generation by 2020. The findings of this study were disseminated to groups (e.g., Utah legislators and public service commissioners, wind developers and advocates, and citizens) to support policy and market analyses of wind development in Utah.

Background

The principal investigators of RERED, Cathy L. Hartman and Edwin R. Stafford, are both marketing professors in the Jon M. Huntsman School of Business at Utah State University in Logan, Utah. In 1995, we formed a research partnership to address environmental issues in marketing. Our first study focused on the formation and implementation of “green alliances” – multi-sector partnerships between companies and environmental groups (e.g., McDonald’s and the Environmental Defense Fund) to solve environmental problems (Stafford and Hartman 1996). Green alliances were a novel form of partnership at this time. We investigated the relationship and management issues of these multi-sector collaborations and how they influenced business practices, marketing strategies and the diffusion of green innovations such as cost-saving waste management initiatives, ozone- and climate-safe (natural) refrigerants, sustainable farming, and the greening of the Olympic Games preparations. This research background gave us an understanding of the cross-sector relationships and collaborative processes often necessary for the broad adoption of environmental initiatives.

In 2003, we developed a framework to guide the diffusion of cleantech innovations that highlighted the importance of government policy, multi-sector collaboration, and education to jumpstart markets for cleantech innovations (Stafford, Hartman, and Liang 2003). Briefly, our framework proposed that the diffusion of cleantech innovations was contingent upon a variety of macroenvironment, industry structure, supply side, and adopter variables and forces. Various action levers, such as working to change government policy in the macroenvironment or appeal to consumer needs in the adopter sector, could help encourage clean technology diffusion (see Stafford, Hartman, and Liang 2003).

We extended the framework to wind energy development in Utah and presented it to the Utah Wind Working Group where we served as the education outreach coordinators. Our application of this framework resulted in our designing a buzz marketing campaign, which included car decals, press releases, and news commentaries to encourage discussion about wind energy across the state (see Hartman and Stafford 2010). Part of the campaign included a set of billboards depicting children running through a wind farm featuring the slogan, “Wind Power Can Fund Schools,” along the Interstate-15 corridor (see picture below). The billboards and slogan were successful in driving significant traffic to our Web site that explained how wind power could fund schools, resulting in news media coverage and encouraging the Utah State Legislature to pass a sales tax incentive for wind power and other renewable energy resources in 2004.

The success of the slogan can be attributed to the effective alignment of wind energy’s benefits to the core values of Utah legislators and citizens – the supporting of children and schools. Specifically, Utah ranked last in the nation for per-capita funding for school children, but increasing taxes was an unpopular option. The framing of wind energy’s benefits – the increased property tax revenues generated by wind power projects and paid by wind developers that primarily go to support local school districts – positioned wind power as a potential solution to school funding without raising taxes among citizens. Our billboard and slogan were eventually adopted by the U.S. Department of Energy’s Wind Powering America (WPA) program in 2004. We presented our

outreach campaign at WPA's All-States Summit in Chicago in 2004 to help other state wind working groups design effective buzz marketing messages in their states (see Hartman and Stafford 2010).



Edwin Stafford and his daughter Victoria (featured in the 2003-4 billboard campaign, "Wind Power Can Fund Schools") pose at the installation of one of the billboards along Interstate-15 near Willard, Utah.

This outreach effort brought us to the attention of Utah Senator Robert Bennett who sponsored our 2005 application for the Congressionally-directed RERED grant. Our framework ultimately became the basis for our crafting of compelling messages and education outreach of wind power development in Utah. We extended our green message framing insights and proposed an applied framework for aligning messages and product attributes with target audience's values to improve the effectiveness of environmental marketing and the desirability of green products (Ottman, Stafford and Hartman 2006). The article received significant media attention and was re-published in a variety of business and environmental anthologies.

Our research indicated that at the heart of effective green messaging is the need to understand the perceptions and motivational values of target audiences to craft compelling educational and persuasive messages. Upon funding of the Renewable Energy for Rural Economic Development project, we initiated a research project to in-depth interview key energy stakeholders in Utah to uncover their perceptions about Utah's potential for wind energy and their motivational values (details discussed below under "Results and Discussion").

Our research on message framing and the diffusion of renewable energy and other clean technology innovations has been published in business, environmental policy and sustainability journals. Our research and expertise has been featured in a variety of local, regional, and national newspapers and magazines, and also we've written numerous news commentaries and articles for the business press on renewable energy policies, green marketing strategies, and consumer concerns.

Results and Discussion

In 2005, the first year of the RERED project, very limited information or research was available to provide background for the development of education/outreach initiatives appropriate to jumpstarting the wind energy industry in Utah. The only available information was a 2003 50-meter Utah Wind Resources Map prepared by the National Renewable Energy Laboratory, and the Utah Energy Office was attempting to validate the best potential sites by installing wind anemometers in locations across the state. Frustratingly, many of the locations were not ‘proving out.’ Aside from a sales tax incentive, the state did not have significant policies in place to facilitate wind development such as wind ordinances or methods for pricing wind. Finally, research had not been conducted with respect to attitudes toward wind development held by Utah policymakers, regulators, or citizens. Consequently, the first research undertaken by RERED was an exploratory study to gain preliminary understanding of the opportunities and threats facing commercial wind development in the state of Utah.

Depth interviews of energy stakeholders. Upon funding of RERED, we initiated a research project to depth interview key energy stakeholders in Utah to uncover their perceptions about Utah’s potential for wind energy. These stakeholders included members of the Governor’s Energy Advisory Board, executives of Utah’s major utilities, Utah State legislators, and other clean energy and health advocates. We interviewed 33 individuals in total, and their interviews were tape recorded, transcribed, and content analyzed. The questions we asked included their perceptions about barriers facing wind development in Utah, the state’s current and future energy market situations, and consumer attitudes toward wind power development. The interviews uncovered a rich understanding of core beliefs about energy and the values underlying those beliefs, providing a basis for launching our research and education outreach. Specifically, we discovered that Utah policymakers were concerned about the viability of wind energy as a practical and economically-feasible energy source, how wind turbines would impact the beauty of Utah’s landscape, and how wind would affect Utah’s coal industry. Our insights about key stakeholder beliefs (e.g., how if the wind stops blowing, lights would go off) and values (e.g., protection of coal miner jobs) became the basis for RERED education outreach initiatives (see Hartman and Stafford 2007).

The findings revealed that market, policy, and community barriers had to be overcome for wind energy development. The over-arching theme suggested by the decision makers was that Utah was “at an energy crossroads.” This stemmed from several developments in the energy market. The varying estimates for the years left of economically-accessible coal supplies in Utah (ranging from 12 to 40 years). Because Utah was a net-exporter of electricity to California, that state’s adoption of a Renewable Energy Standard of 33 percent renewable by 2020 threatened the continued sale of Utah’s coal-generated power to that state. Air quality issues were also raising concern where Utah was suffering from inversions that brought the state out of compliance of standards set by the U.S. Department of Environmental Protection (see Hartman and Stafford 2010).

Additionally, with respect to the potential for wind energy, a dominant theme was that Utah was the ‘hole-in-the donut’ – the state was surrounded by other states with higher wind regimes (e.g., Idaho, Wyoming, Colorado) and that Utah’s winds were not economically competitive. Many policymakers expressed the belief that we should “let the market decide” – if wind power was truly

viable, Utah's entrepreneurial culture would bring about wind development. This suggested to us that policymakers were not well-informed of the importance of policy for encouraging innovation in a regulated utility market. Finally, most believed that Utah would follow energy paths set in surrounding states such as Wyoming (but not California). Additionally, Utah Public Service Commissioners were concerned with short-term economic benefits for rate payers to maintain low-cost power offered by coal-generated electricity in the state and that the addition of wind energy could adversely impact those rates. Finally, our interviews uncovered a perception that the public was generally uninformed and uninterested in the electricity market or the need for wind energy. Many perceived Utah had sufficient coal supplies, climate change was not an issue, and that state didn't need wind energy (Hartman and Stafford 2007). These results were presented to the Utah Wind Working Group to inform development of education outreach, and some of these results were published in a 2007 government report entitled, "Utah Perspectives from the Second Annual Harvesting Energy Summit: Outcomes from the 'Dialogue Diner' and Stakeholder Panel Sessions" (See Hartman and Stafford 2007).

The second major study that commenced over a four-year period was a case analysis of the development of the Spanish Fork Wind Project. This entailed monitoring daily news developments of the project and our video-taped interviews of key players involved in the project, which resulted in several articles, government reports and a 30-minute award-winning documentary, *Wind Uprising*. The documentary became the centerpiece of our education outreach, resulting in RERED sponsoring over 70 screenings and audience question-and-answer sessions from April 2010 to August 2013. We also conducted several Jobs and Economic Development Impact studies for various rural Utah counties contemplating wind energy, along with several other studies and outreach initiatives on wind and related clean technology innovations. These are detailed in the Accomplishments section that follows.



Edwin Stafford and Cathy Hartman at the Spanish Fork Wind Project, 2009.

Accomplishments

RERED had five principal objectives set out in the “Statement of Project Objectives: Revision – September 7, 2007.” They are as follows:

1. Maintain the research/education center established for RERED (known as the Center for the Market Diffusion of Renewable Energy and Clean Technology). This involved (1) maintenance of a website (access at www.cleantech.usu.edu); (2) developing and participating in workshops, conference and seminars that focus on continuing the commercial development of wind power in Utah; and (3) publishing and disseminating research reports via mass media channels and website.
2. Conduct research on the diffusion of wind energy and related clean technology.
3. Serve as advisors to groups interested in wind energy and related clean technology, such as entrepreneurs and businesses, utility executives, policymakers, educators and non-government organizations.
4. Develop and deliver educational and outreach programs on wind energy and related clean technology for critical constituent groups, including wind developers, public educators, policymakers, the news media, and the general public.
5. Provide support and resources to organizations that will assist in educational outreach programs throughout Utah.

RERED’s activities resulted in a broad array of accomplishments, including (1) the establishment of the Center for the Market Diffusion of Renewable Energy and Clean Technology in the Jon M. Huntsman School of Business at Utah State University; (2) numerous publications (including peer-reviewed academic journal articles, government reports, and publications targeted for businesses [e.g. *Marketing News*, *Utah CEO Magazine*], rural communities [e.g., *Rural Connections*, *Utah State University Extension Fact Sheet*], and citizens [e.g., *Salt Lake Tribune*]), (3) the production of two documentaries to illustrate the barriers and opportunity of wind energy development and related educational video cases (for university student education in social responsibility), (4) the organizing of two renewable energy/clean technology conferences at Utah State University and contributing to several other conferences and outreach events; (5) the delivery of numerous presentations and documentary film screenings (at academic, policy, and energy conferences; for policymakers, community groups, and universities/schools); (6) several miscellaneous outcomes, including mentoring of students in doctoral dissertations, masters theses, and field study projects and engaging with the news media and public; and (7) the partnering with and providing of financial support to Utah Clean Energy to deliver education outreach and serve as project managers for economic studies related to RERED’s objectives.

In addition to partnering with Utah Clean Energy, many of RERED’s initiatives involved the collaboration with others, including energy entrepreneurs, policymakers, the energy trade associations, the U.S. Department of Energy’s Wind Powering America (WPA), WPA’s All-State Summits, the National Renewable Energy Laboratory, the American Wind Energy Association, Windustry, non-government organizations, universities, citizens, and students. RERED’s most important accomplishments are summarized as follows:

Center for the Market Diffusion of Renewable Energy and Clean Technology

Establishment of the Center met RERED's objectives 1, 4, and 5.

The Center has provided online resources for policymakers, students, and citizens, including RERED's publications, reports, news, and documentation of activities and portals to other Utah-based resources (e.g., Utah Clean Energy; Giving Voice to Values). Utah State University will maintain the Web site as a legacy for RERED's accomplishments and update it with ongoing initiatives started under RERED (e.g., forthcoming publications, documentary, etc.). www.cleantech.usu.edu.

Publications

RERED's broad array of publications met objectives 1, 2, and 5.

Peer-reviewed journal articles on the barriers and opportunities of wind energy development in Utah

RERED published three case studies in peer-reviewed journals documenting different aspects of the development Utah's first wind power project at Spanish Fork Canyon. The case studies parallel RERED's documentary, Wind Uprising, but provide greater details and insights about (1) wind education outreach, (2) the wind development process, and (3) the community engagement challenges that faced the Spanish Fork project and how they were resolved. These articles have circulated widely among members of the American Wind Energy Association and have been distributed via Wind Powering America's newsletters and online database. The purpose of these case studies was to educate developers, policymakers, business leaders, and citizens about key barriers facing wind energy development and strategies leveraged in Utah to overcome those barriers successfully.

- Stafford, Edwin R. and Cathy L. Hartman (2012), "Resolving Community Concerns over Local Wind Development in Utah," *Sustainability: The Journal of Record*, 5 (February), 38-43. <http://online.liebertpub.com/doi/abs/10.1089/SUS.2012.9990>.
- Hartman, Cathy L., Edwin R. Stafford, and Sandra Reategui (2011), "Harvesting Utah's Urban Winds," *Solutions Journal*, 2 (May-June), 42-50. <http://www.thesolutionsjournal.com/node/930>.
- Hartman, Cathy L. and Edwin R. Stafford (2010), "Sell the Wind," *Stanford Social Innovation Review*, 8 (Winter), 25-6. http://www.energy.utah.gov/government/strategic_plan/docs/publiccomments/se llthewind.pdf.

Peer-reviewed journal articles on related environmental and clean technology marketing

While wind energy development research and outreach were central to RERED's mission, several articles on topics related to supporting wind energy efforts were also published as part of RERED's broader sustainability education goals, such as on green marketing and message framing, community/stakeholder collaboration, and energy efficiency/cleantech innovations.

- Stafford, Edwin R. and Cathy L. Hartman (2013), "Saving the Environment and More! Lessons in Green Marketing," *Solutions Journal*, 4 (May-June), 27-32.
<http://www.thesolutionsjournal.com/node/23441>.
- Stafford, Edwin R. and Cathy L. Hartman (2012), "Making Green More Macho," *Solutions Journal*, 3 (July-August), 25-29.
<http://www.thesolutionsjournal.com/node/1128>.
- Livesey, Sharon M., Cathy L. Hartman, Edwin R. Stafford, and Molly Shearer (2009), "Performing Sustainable Development through Eco-Collaboration: The Ricelands Habitat Partnership," *Journal of Business Communication*, 46 (October), 423-454.
<http://jib.sagepub.com/content/46/4/423.short>.
- Stafford, Edwin R. and Cathy L. Hartman (2007), "Improving the Sustainability of Green Marketing," *Business Strategy and the Environment*, 16 (September), 456-7.
- Hartman, Cathy L. and Edwin R. Stafford (2006), "Case Study: Chilling with Greenpeace, From the Inside Out," *Stanford Social Innovation Review*, 4 (Summer), 54-59.
http://www.ssireview.org/articles/entry/chilling_with_greenpeace_from_the_inside_out.
- Ottman, Jacquelyn A., Edwin R. Stafford, and Cathy L. Hartman (2006), "Avoiding Green Marketing Myopia: Ways to Improve Consumer Appeal for Environmentally Preferable Products," *Environment*, 48 (June), 22-36.
<http://www.greenmarketing.com/files/Stafford-MyopiaJune06.pdf>.

Peer-reviewed wind power development economic impact studies (government and university reports)

RERED engaged both graduate and undergraduate students at Utah State University and Utah wind developers to prepare economic impact analyses for wind power development for a variety of Utah counties using the Jobs and Economic Development Impact (JEDI) model developed by the National Renewable Energy Laboratory (NREL). In addition to creating opportunities for mentoring students to procure employment in the renewable energy sector, several of the JEDI analyses were used in the approval process for wind projects in Utah County (at Spanish Fork) and San Juan Counties (now underway). One RERED student, Sandra Reategui, secured a position at NREL as an economist, based on her experience with the JEDI model. Another student, Austin Coover, went on to work for Seattle Power, and more recently, Jeffrey Parker presented his JEDI analyses at the Clinton Global Initiative Conference in Washington, D.C., in 2012. Mentoring business students on renewable energy development has been an important activity for RERED.

- Parker, Jeffrey, Edwin R. Stafford, and Cathy L. Hartman (2013), "An Analysis of State-Level Economic Impacts from the Development of Wind Power Plants in Wayne County, Utah," Center for the Market Diffusion of Renewable Energy and Clean Technology, Utah State University, June.
http://huntsman.usu.edu/cleantech/files/uploads/Wind_Economic_Study_for_Wayne_County_June_2013.pdf.

- Parker, Jeffrey, Cathy L. Hartman and Edwin R. Stafford (2013), “An Analysis of State-Level Economic Impacts from the Development of Wind Power Plants in Box Elder County, Utah,” Center for the Market Diffusion of Renewable Energy and Clean Technology, Utah State University, June.
http://huntsman.usu.edu/cleantech/files/uploads/Wind_Economic_Study_for_Box_Elder_County_June_2013.pdf.
- Coover, Austin, Edwin R. Stafford, and Cathy L. Hartman (2013), “An Analysis of State-Level Economic Impacts from the Development of Wind Power Plants in Cache County, Utah,” Center for the Market Diffusion of Renewable Energy and Clean Technology, Utah State University, June.
http://huntsman.usu.edu/cleantech/files/uploads/Wind_Economic_Study_for_Cache_County_June_2013.pdf.
- Ratliff, David J., Cathy L. Hartman and Edwin R. Stafford (2010), “An Analysis of State-Level Economic Impacts from the Development of Wind Power Plants in San Juan County, Utah,” U.S. Department of Energy, Energy Efficiency and Renewable Energy, March, Report No. DOE/GO-102010-3005.
http://www.windpoweringamerica.gov/pdfs/economic_development/2010/ut_san_juan.pdf.
- Ratliff, David J., Cathy L. Hartman and Edwin R. Stafford (2009), “An Analysis of State-Level Economic Impacts from the Development of Wind Power Plants in Summit County, Utah,” U.S. Department of Energy, Energy Efficiency and Renewable Energy, October, Report No. DOE/GO-102009-2918.
http://www.windpoweringamerica.gov/pdfs/economic_development/2009/ut_summit_county.pdf.
- Reategui, Sandra, Edwin R. Stafford, and Cathy L. Hartman (2009), “Generating Economic Development from a Wind Power Project in Spanish Fork Canyon, Utah: A Case Study and Analysis of State-Level Economic Impacts,” U.S. Department of Energy, Energy Efficiency and Renewable Energy, January, Report No. DOE/GO-102009-2760.
http://www.windpoweringamerica.gov/pdfs/economic_development/2009/ut_spanish_fork.pdf.
- Mongha, Nikhil, Edwin R. Stafford, and Cathy L. Hartman (2006), “An Analysis of the Economic Impact on Tooele County, Utah, from the Development of Wind Power Plants,” U.S. Department of Energy, Energy Efficiency and Renewable Energy, August, Report No. DOE/GO-102006-2353.
http://www.windpoweringamerica.gov/pdfs/wpa/ut_tooele_county.pdf.
- Mongha, Nikhil, Edwin R. Stafford, and Cathy L. Hartman (2006), “An Analysis of the Economic Impact on Box Elder County, Utah, from the Development of Wind Power Plants,” U.S. Department of Energy, Energy Efficiency and Renewable Energy, August, Report No. DOE/GO-102006-2350.
http://www.windpoweringamerica.gov/pdfs/wpa/ut_box_elder_county.pdf.
- Mongha, Nikhil, Edwin R. Stafford, and Cathy L. Hartman (2006), “An Analysis of the Economic Impact on Utah County, Utah, from the Development of Wind Power

Plants,” U.S. Department of Energy, Energy Efficiency and Renewable Energy, May, Report No. DE-FG48-05R810736.

http://www.windpoweringamerica.gov/pdfs/wpa/econ_dev_jedi.pdf.

Peer-reviewed government report

As part of RERED’s policy research, the following report incorporated input from key Utah policymakers and stakeholders concerning critical barriers facing wind/renewable energy development in the state who were part of two panels we organized for the 2007 Harvesting Energy Summit in Salt Lake City.

- Hartman, Cathy L. and Edwin R. Stafford (2007), “Utah Perspectives from the Second Annual Harvesting Energy Summit (2007): Outcomes from the ‘Dialogue Diner’ and Stakeholder Panel Sessions,” U.S. Department of Energy, Energy Efficiency and Renewable Energy, April, Report No. DOE/GO-102007-2422.
http://www.windpoweringamerica.gov/pdfs/wpa/ut_harvesting_energy_summit.pdf.

Peer-reviewed Utah State University Extension Fact Sheet

As part of RERED’s engagement with students, RERED partnered with Utah State University Extension beginning in 2013 to prepare peer-reviewed fact sheets for educating Utah’s rural communities about wind, renewable energy, and sustainability. This is the first of several Extension fact sheets in preparation, including one on green building and energy efficiency.

- May, Whitney, Roslynn Brain, and Edwin Stafford (2013), “Wind Power in Utah,” Utah State University Extension Sustainability Fact Sheet, July,
http://extension.usu.edu/files/publications/publication/Sustainability_2012-16pr.pdf.

State-of-the-Art Book chapter

As part of RERED’s broader sustainability objective, research on the diffusion of ozone- and climate-safe refrigerants has resulted in the following forthcoming book chapter for Routledge. Research on wind energy development is referenced throughout this chapter to develop a framework on “sustainable entrepreneurship.”

- Stafford, Edwin R. and Cathy L. Hartman, (2013), “NGO-Initiated Sustainable Entrepreneurship and Social Partnerships: Greenpeace’s “Solutions” Campaign for Natural Refrigerants in North America,” in *Social Partnerships & Responsible Business: A Research Handbook*, M. May Seitanidi and Andrew Crane, editors, Oxford, Routledge, forthcoming.

Non-refereed articles and news commentaries

To better reach citizens, business decision-makers, rural communities, and broader audiences, RERED also produced news commentaries and popular press articles about wind, renewable energy, green marketing, and sustainability issues. Sometimes the articles paralleled presentations at local conferences or in the community.

- Stafford, Edwin R. and Todd Stevens (2013), "How Utah Can Catch Boom in Clean Energy," *Salt Lake Tribune*, July 7, 06.
<http://www.sltrib.com/sltrib/opinion/56548858-82/energy-clean-utah-price.html.csp>.
- Stafford, Edwin and Cathy Hartman (2013), "Wind Development as Sustainable Entrepreneurship," *Rural Connections*, June, 23-28.
http://wrwc.usu.edu/files/publications/publication/pub_4011976.pdf.
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- Stafford, Edwin R. (2005), "'Green' Cars, Buildings Good for Environment – and Consumers," *Deseret Morning News*, July 3, AA2.

Documentaries and educational videos

RERED's documentary and educational videos were designed to meet objectives 2 and 4.

As part of its outreach objective, RERED partnered with GreenTech Films to produce two 30-minute, high-definition documentaries to screen and initiate dialogue among policymakers and citizens in communities about wind development. The documentaries' production and screenings became RERED's primary focus, beginning in October 2007. The documentaries were peer-reviewed/fact checked by representatives of the U.S. Department of Energy, Wind

Powering America, and the American Wind Energy Association. Some footage was integrated into teaching video cases for the Giving Voice to Values curriculum, based at Babson College.

Documentaries

- ***Wind Unlimited*** (2013) Michelle Nunez (Producer/Director), Edwin Stafford and Cathy Hartman (Producers/Writers). 30-minute short about how America may achieve 20 percent of its electricity from wind power through policy and transmission development with footage and interviews with **President George W. Bush, Utah Senator Bob Bennett, Iowa Governor Terry Branstad, Montana Governor Brian Schweitzer**, NREL analysts, and other policymakers and stakeholders. *Expected national roll-out in November 2013.* Copies will be provided to Wind Powering America for education outreach purposes.
- ***Wind Uprising*** (2010) Michelle Nunez (Producer/Director), Cathy Hartman and Edwin Stafford (Producers/Writers). 30-minute short tracing the four-year struggle to establish the first wind project in Utah at the mouth of Spanish Fork Canyon through interviews with the wind developers, **Senator Bob Bennett**, various policymakers, advocates, and citizens involved in that process. The film was narrated by **Senator Jake Garn**. DVD released July 2011. Ten copies were provided to Wind Powering America for distribution to its regional partners for education outreach. See www.winduprisingmovie.com.



Cathy Hartman interviews Spanish Fork City Council member, Matt Barber, for the documentary, Wind Uprising, Spanish Fork, Utah, 2008.

Teaching video cases and teaching notes (for university classroom use)

- Hartman, Cathy L., Edwin R. Stafford, and Mary C. Gentile (2012), “Social Responsibility or Insanity: the Entrepreneurial Struggle to Build Utah’s First Wind Project,” and teaching notes available at www.GivingVoiceToValues.org.
- Hartman, Cathy L., Edwin R. Stafford, and Mary C. Gentile (2012), Segment I, Parts 1 & 2, “Livingston’s Quest for “A Way to Give Back,” video case, available at <http://huntsman.usu.edu/cleantech/htm/cases>.
- Hartman, Cathy L., Edwin R. Stafford, and Mary C. Gentile (2012), Segment II, Parts 1 & 2, “Livingston Faces Transmission, Pricing, and Utility Conflicts,” video case, available at <http://huntsman.usu.edu/cleantech/htm/cases>.
- Hartman, Cathy L., Edwin R. Stafford, and Mary C. Gentile (2012), Segment III, Parts 1 & 2, “Livingston Faces Community Conflict,” video case, available at <http://huntsman.usu.edu/cleantech/htm/cases>.

Awards

- “Yes in My Backyard Award” for documentary, *Wind Uprising*, at Windustry’s “Community Wind Across America Conference (February 8, 2011)
- “Silver Sierra Award” for documentary, *Wind Uprising*, at the Yosemite Film Festival (October 2010)
- Seven Summits Award” for documentary, *Wind Uprising*, at the Mountain Film Festival for “Best Environmental Film” category (February 2010)

Organization of conferences and other outreach events

RERED’s sponsorship and organization of conferences and other events met objectives 1 and 4.

RERED sponsored and organized two renewable energy/cleantech conferences at Utah State University to engage Utah policymakers, energy entrepreneurs, business and utility managers, and citizens.

- **“Renewable Energy, Cleantech, and Sustainable Business,”** Partners in Business Seminar, Jon M. Huntsman School of Business, Utah State University, Logan, Utah, April 8, 2010. *The conference featured speakers on a variety of renewable energy, energy efficiency, and green building topics, including a keynote address by **Senator Orrin Hatch** and the premiere of RERED’s documentary, **Wind Uprising**, featuring the developer and mayor of Spanish Fork in a follow-up panel discussion. Attendees included business and utility managers, policymakers, and students.*



Students attend USU's Renewable Energy, Clean Technology, and Sustainability Partners in Business Seminar and documentary premiere of "Wind Uprising," 2010.

- **"Sustainable Energy Research and Climate Initiatives Conference,"** Jon M. Huntsman School of Business, Utah State University, Logan, Utah, February 29, 2008. *The conference featured several Utah State University faculty engaged in renewable energy initiatives for a group of business and government leaders from Summit County, Utah, including **Park City Mayor Dana Williams**.*



Sandra Reategui, former graduate student, presents her wind development economic analysis at USU's Sustainable Energy Research and Climate Initiatives Conference, 2008.

In addition to Utah State University conferences, RERED also helped organize, facilitate, and sponsor several other outreach conferences, summits, and events.

- Utah State University "Earth Week," April 8-12, 2013; organized panel including a local wind developer to engage students.
- Utah State University "Earth Week," April 9-13, 2012; organized tour of new USU College of Agriculture LEED Gold building.
- Presentation by Mr. Torben Bonde, Chief Information Officer, Vestas Wind Systems, at Jon M. Huntsman School of Business, Utah State University, Logan, Utah, November 4, 2011.

- Spanish Fork Sky Spectacular, Wind Project's Opening Dedication Ceremony, September 5-6, 2008; helped organize and sponsor event; donated 1000 Wind Powering America wind pins.
- Harvesting Energy Summit, "Rural Prosperity Through Renewable Energy," Salt Lake City, Utah, February 28, 2008; served on steering committee and provided financial sponsorship.



Edwin Stafford and Cathy Hartman congratulate Spanish Fork Mayor Joe Thomas at the "Sky Spectacular" opening ceremony for the Spanish Fork Wind Project, Spanish Fork, Utah, September 2008.

Presentations

RERED engaged in numerous presentations to meet objective 4.

Testimony to Policy Makers

RERED formally testified before the Utah State Legislature and the San Juan County Commissioners regarding economic impacts on wind power development. RERED also submitted written testimony to Governor Gary Herbert's Commission for a "10-Year Energy Plan."

- Governor Gary Herbert's Commission for a "10-Year Energy Plan," September 14, 2010. Provided written testimony about the economic development opportunities of wind energy for the state of Utah as input for the Governor's proposed "10-Year Energy Plan."
http://www.energy.utah.gov/government/strategic_plan/docs/publiccomments/edwinstaffordcathyhartman09142010.pdf.

- San Juan County Commissioners, April 16, 2007. Testified about county- and state-level economic impacts of wind development for San Juan County, with Sandra Reategui. <http://www.sanjuancounty.org/archives/Minutes/20070416.TXT>.
- Utah State Legislature, Public Utilities and Technology Interim Committee, November 15, 2006. Testified about the state-level economic impacts of wind development of the proposed Spanish Fork wind project.
- Utah State Legislature, Public Utilities and Technology Interim Committee, July 19, 2006. Testified about economic impacts of wind development in rural counties.



Cathy Hartman and graduate student, Sandra Reategui, meet with San Juan County economic development officers about rural wind development and job opportunities, Monticello, Utah, 2007.

Documentary screenings with panel or audience engagement

As noted above, screening Wind Uprising became a central RERED activity, beginning in 2010. The listing below reflects only those sponsored by RERED. Numerous other screenings have taken place, led by other groups and universities across the country.

- Incoming Freshmen “Connections,” Utah State University, Logan, August 20, 2013.
- NSF EPSCoR Climate Change Seminar Series, University of Nevada, Las Vegas, May 9, 2013.
- MGT 4590, Marketing Audit (section 1), Jon M. Huntsman School of Business, Utah State University, Logan, Utah, April 25, 2013.
- MGT 4590, Marketing Audit (section 2), Jon M. Huntsman School of Business, Utah State University, Logan, Utah, April 25, 2013.
- “Earth Week,” Utah State University, Logan, Utah, April 8, 2013.
- GEOPHYS 3150 Energy in the 21st Century, Ludger Scherliess, instructor, College of Science, Utah State University, Logan, Utah, April 4, 2013.
- Provost’s Office of Global Engagement, Utah State University (for a delegation of visiting Korean professors from Far East University), Logan, Utah, February 4, 2013.
- MGT 4590 Marketing Audit, Jon M. Huntsman School of Business (section 1), Utah State University, Logan, Utah, December 6, 2012.
- MGT 4590 Marketing Audit, Jon M. Huntsman School of Business (section 2), Utah State University, Logan, Utah, December 6, 2012.
- Friends of the Merrill-Cazier Library, Utah State University, Logan, Utah, October 25, 2012.

- Senior University, Utah State University, Logan, Utah, September 26, 2012.
- Our Energy Future Conference, Salt Lake City, Utah, September 25, 2012.
- MGT 4590 Global Marketing Strategy, Jon M. Huntsman School of Business (section 1), Logan, Utah, April 26, 2012.
- MGT 4590 Global Marketing Strategy, Jon M. Huntsman School of Business (section 2), Logan, Utah, April 26, 2012.
- Logan Film Festival, Logan, UT, April 21, 2012.
- ENVS 5570 Sustainable Living, Roslynn Brain, instructor, College of Natural Resources, Utah State University, Logan, UT, April 20, 2012.
- Utah Council for Citizen Diplomacy (delegation of Russian economic development representatives), Logan, Utah, April 13, 2012.
- Senior University, Utah State University, Logan, Utah, March 21, 2012.
- Intermountain Sustainability Summit, Weber State University, Ogden, UT, March 7, 2012.
- Diversified Agriculture Conference, Davis Conference Center, Layton, UT, February 23, 2012.
- The Leonardo Museum, Salt Lake City, UT, February 17, 2012.
- Landscape Architecture and Environmental Planning Speaker Series, Department of Agriculture, Utah State University, Logan, UT, February 10, 2012.
- MGT 4590 (section 1), Global Marketing Strategy, Jon M. Huntsman School of Business, Utah State University, Logan, UT, December 8, 2011.
- MGT 4590 (section 2), Global Marketing Strategy, Jon M. Huntsman School of Business, Utah State University, Logan, UT, December 8, 2011.
- Sustainability Week, Utah State University, Logan, UT, November 9, 2011.
- Energy Dynamics Laboratory and USU Research Foundation, Innovation Campus, Logan, UT, October 19, 2011.
- Asia Pacific Clean Energy Summit, Honolulu, HI, September 15, 2011.
- “Building Competency in English Language and Natural Resource,” USU Office of Global Engagement, Utah State University, Logan, UT, June 15, 2011.
- Giving Voice to Values Conference on Teaching and Learning and Research, Babson College, Wellesley, MA, June 13, 2011. (excerpts)
- Wind Powering America State Summit, Anaheim, CA, May 26, 2011. (excerpts)
- “Communicators Summit,” Wind Power 2011, Anaheim, CA, May 25, 2011. (excerpts)
- “Public Relations: Understanding and leveraging Wind Energy’s Broad Support” panel, Wind Power 2011, Anaheim, CA, May 24, 2011. (excerpts)
- “Science Unwrapped,” College of Science, Utah State University, Logan, UT, April 29, 2011.
- MGT 4590 Global Marketing Strategy, Jon M. Huntsman School of Business, Utah State University, Logan, UT, April 26, 2011.
- Cliffside Ward, Church of Jesus Christ of Latter-Day Saints, Logan, UT, April 18, 2011.
- MGT 4800 Special Topics Social Entrepreneurship, Christopher Reutzel, instructor, Jon M. Huntsman School of Business, Utah State University, Logan, UT, April 12, 2011.



Cathy Hartman and Edwin Stafford with Wayne County officials after a screening of Wind Uprising at the Wayne Theater, Bicknell, Utah, 2010.

- Brigham Young University, Provo, UT, March 30, 2011.
- Stokes Nature Center, Cache County Multipurpose Room, Logan, UT, March 17, 2011.
- Green Building and Energy Code Conference, Bridgerland Applied Technology College, Logan, UT, February 11, 2011.
- Windustry's "Community Wind Across America Conference," Penn State University, State College, PA, February 8, 2011.
- "Energy and the Environment" seminar, Stephanie Hughes, instructor, Santa Clara University, Santa Clara, CA, January 21, 2011.
- Sustainability Project, San Jose State University, San Jose, CA, January 21, 2011.
- American Wind Energy Association's "Small and Community Wind Conference and Expo," Portland, OR, December 9, 2010.
- Renewable Energy course, Jack Greene (instructor), Bridgerland Applied Technology College, Logan, UT, December 1, 2010.
- MGT 4590 Global Marketing Strategy courses (two sections), Jon M. Huntsman School of Business, Utah State University, Logan, UT, December 1, 2010 (two screenings).
- Bioneers Conference, Utah State University, Logan, UT, November 6, 2010.
- University of Utah, Bill E. Daniels Ethics Initiative, Salt Lake City, UT, November 4, 2010.
- Windustry's "Community Wind Across America Conference," Denver, CO, October 26, 2010.
- Nora Eccles Harrison Museum of Art, Utah State University, Logan, UT, October 9, 2010.
- Nora Eccles Harrison Museum of Art, Utah State University, Logan, UT, October 5, 2010.
- Utah State University – Tooele Campus, Tooele, UT, September 24, 2010 (two screenings).

- Utah Interfaith Power & Light, St. Mark's Cathedral, Salt Lake City, UT, September 23, 2010.
- Marketing Doctoral Seminar, Debbie Scammon, instructor, University of Utah, Salt Lake City, UT, September 23, 2010.



Edwin Stafford and Cathy Hartman serve on a panel discussion after a screening of Wind Uprising with the developer Mr. Tracy Livingston and other energy stakeholders at the Swaner Eco-Center, Park City, Utah, 2010.

- Utah League of Cities and Towns Conference, Salt Lake City, UT, September 17, 2010 (three screenings).
- Jon M. Huntsman School of Business, Utah State University, Logan, UT, September 16, 2010.
- St. John's Episcopal Church, Logan, UT, August 24, 2010.
- Summer Citizens Series, D's Bridgerland Apartments Club House, Logan, UT, August 3, 2010.
- Summer Citizens Series, Lundstrom Student Center, Logan, UT, July 7, 2010.
- Western Governors' Association meeting, Whitefish, MT, June 27, 2010.
- MGT 3500, Principles of Marketing, Lynne Pettit (instructor), Jon M. Huntsman School of Business, Utah State University, May 19, 2010.
- BUS 2100, Business Science Global Society, David Clark (instructor), Jon M. Huntsman School of Business, Utah State University, May 13, 2010.
- Swaner Eco-Center, Park City, Utah, May 1, 2010.
- Wayne Theater, Bicknell, Utah April 30, 2010.
- 2nd Milford Renewable Energy Fair, Milford High School, Milford, Utah, April 29, 2010.
- Earth Day Celebration, Jon M. Huntsman School of Business, Utah State University, Logan, Utah, April 22, 2010.
- "Renewable Energy, Cleantech, and Sustainable Business" Partners in Business Seminar, Jon M. Huntsman School of Business, Utah State University, Logan, Utah, April 8, 2010. (Premiere)
- Renewable Energy and Energy Efficiency course, Jack Greene (instructor), Bridgerland Applied Technology College, Logan, Utah, February 25, 2010. (rough cut)

- Physics Colloquium, College of Science, Utah State University, Logan, Utah, February 9, 2010. (rough cut)
- JCOM 1130, Beginning News Writing, Jane Koerner (instructor), Utah State University, Logan, Utah, November 2, 2009. (rough cut)
- Regional Wind Energy Institute – West Meeting, Salt Lake City, Utah, October 15, 2009.
- Huntsman Scholars Program, Stacey Hills, instructor, Huntsman School of Business, Utah State University, Logan, Utah, September 25, 2009.

Known screenings of ‘Wind Uprising’ not sponsored by RERED

Wind Uprising has been screened at film festivals and by other organizations and universities without RERED’s direct sponsorship. Some of the known screenings are listed below.

- Westminster College, Salt Lake City, Utah, March 17, 2013.
- University of Colorado, Boulder, CO, November 15, 2012.
- Craftsbury Public Library, Craftsbury Commons, Vermont, February 4, 2012.
- Clean Energy Film Festival, Columbia Gorge Community College, The Dalles, OR, October 29, 2011.
- Utah Renewable Energy Conference, Salt Lake City, Utah, April 19, 2011.
- Mountaintop Film Festival, Vermont, January 19-20, 2011 (double-feature with *Windfall*).
- Colorado Environmental Film Festival, November 5, 2010.
- New Orleans Film Festival, New Orleans, Louisiana, October 17, 21, 2010.
- Yosemite Film Festival, Yosemite, California, September 2010.
- Indie Spirit Film Festival, Colorado Springs, Colorado, April 2010.

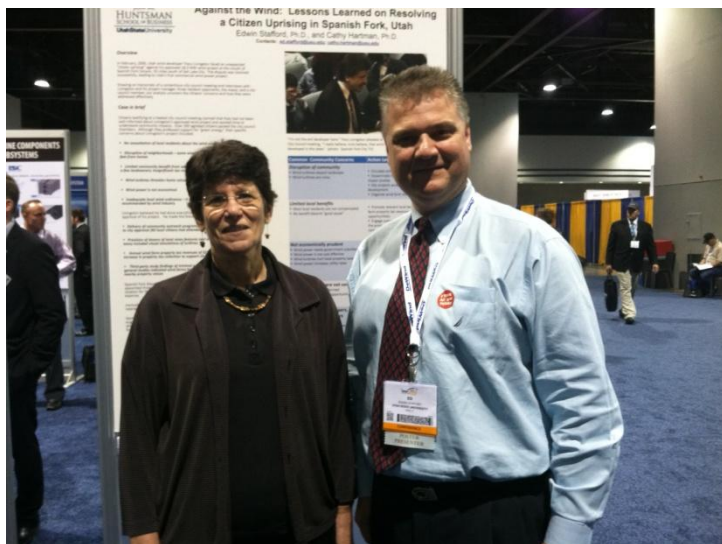


Cathy Hartman speaking at Wind Power 2011, Anaheim, California

Non-documentary conference presentations

RERED presented at several energy, policy, and sustainability conferences across Utah and the country.

- Stafford, Edwin R. and Cathy L. Hartman (2012), “Against the Wind: Lessons Learned on Resolving a Citizen Uprising in Spanish Fork, Utah,” Poster, Wind Power 2012 (June 3-6), Atlanta, GA.
- Hartman, Cathy L. and Edwin R. Stafford (2012), “, “Social Responsibility or Insanity: The Entrepreneurial Struggle to Build Utah’s First Wind Project,” Western Casewriters Conference, La Jolla, CA, March 22.
- Reategui, Sandra, Edwin R. Stafford, and Cathy L. Hartman (2007), “2007 JEDI Report for Utah County Spanish Fork,” Second Annual Intermountain Harvesting Energy Summit (February 28), Salt Lake City, Utah.
- Hartman, Cathy L. and Edwin R. Stafford (2006), “County Level Economic Impacts from Commercial Wind Park Development Using the JEDI Model,” Uinta Headwaters Resource Conservation and Development Council Renewable Energy Conference, (November 10), Park City, Utah.
- Hartman, Cathy L. and Edwin R. Stafford (2006), “The Three Cs for Avoiding ‘Green Marketing Myopia,’” Utah Bioneers 3rd Annual Conference, Edwin R. Stafford, moderator (October 21), Logan, Utah.
- Hartman, Cathy L., and Edwin R. Stafford (2006), “Renewable Energy for Rural Economic Development – Peer Review,” National Renewable Energy Laboratory Peer-Review Conference, (May 11), Golden, CO.
- Stafford, Edwin R. and Cathy L. Hartman (2006), “How to Avoid Green Marketing Myopia,” EnvironDesign10 Conference, (April 27), Toronto, Canada.
- Stafford, Edwin R. and Cathy L. Hartman (2005), “Winds of Opportunity for Utah and the West,” Utah Bioneers 2nd Annual Conference, Catherine Logan, moderator, (October 14), Logan, Utah.
- Stafford, Edwin R. and Cathy L. Hartman (2005), “Energy in the West: A Discussion of the Politics, Economics, and Science of Energy and Energy Efficiency in the Western States,” Roundtable presentation, Bill Dinklage, moderator, Shaping the American West Conference, (June 11), Snowbird, Utah.



Cathy Hartman and Edwin Stafford present a poster at Wind Power 2012, Atlanta, Georgia.

Non-documentary Invited education outreach presentations

- “Marketing Renewable Energy,” NSF EPSCoR Climate Change Seminar Series, University of Nevada, Las Vegas, May 9, 2013.
- “Making Green More Macho” and “Avoiding Green Marketing Myopia” for ENVS 5570 Sustainable Living, Roslynn Brain, instructor, College of Natural Resources, Utah State University, Logan, UT, March 22, 2013.
- “Making Green More Macho,” Senior University, Utah State University, Logan, Utah, January 30, 2013.
- “Making Green More Macho,” Sustainability Student Office, Utah State University, Logan, Utah, January 28, 2013.
- “Making Green More Macho,” Luncheon Keynote for USU Alumni Association, Zions Bank Building, Salt Lake City, Utah, November 14, 2012.
- “Wind Power,” Girl Scouts Troop 1, St. John’s Episcopal Church, Logan, Utah, October 3, 2012.
- “Making Green More Macho,” Utah American Marketing Association, Zions Bank Building, Salt Lake City, UT, April 25, 2012.
- “Agricultural Science Green Building Tour,” with Jordy Guth, John Fitch, and Tom Peterson, Utah State University, Logan, UT, April 11, 2012.
- “Diffusion of Alternative Vehicles,” Agricultural Systems Technology & Education (ASTE) 7500 Diffusion of Innovations, Brian Warnick and Gary Straquadine, instructors, Extension, Utah State University, Logan, UT, April 9, 2012.
- “Making Green More Macho,” ENVS 5570 Sustainable Living, Roslynn Brain, instructor, College of Natural Resources, Utah State University, Logan, UT, March 9, 2012.
- “Wind Power,” River Heights Elementary School, Green Team, Jan Parent, faculty advisor, River Heights, UT, February 8, 2012.
- “Making Green More Macho,” Utah American Marketing Association Luncheon, Riverwoods Conference Center, Logan, Utah, January 4, 2012.
- “Making Green More Macho,” Logan Rotary Club, Copper Mill Conference Center, Logan, UT, December 15, 2011.

- “Wind Power in Utah,” for First Grade Class, Mrs. Peterson (instructor), Wilson Elementary School, Logan, Utah, November 12, 2009.
- “Wind Power,” with Victoria Stafford, for Fourth Grade Class, Mrs. Blair, Wilson Elementary School, Logan, Utah, May 4, 2009.
- “Building a ‘Near Zero Energy’ Home: Our Continuing Journey,” for Sustainability Inside & Out Conference, Landscape Architecture and Environmental Design Department, Utah State University, Logan, Utah, April 9, 2009.
- “Harnessing the Winds at Spanish Fork Canyon: Four-Year Struggle and Economic Analysis,” Western Extension Directors Conference, Thanksgiving Point, Utah, April 1, 2009.
- “Wind Energy/Renewable Energy Development on LDS Church Properties,” Presentation to officials of the Church of Jesus Christ of Latter-Day Saints, Salt Lake City, Utah, December 2009.
- “Reflections on Building a Near-Zero Energy House,” for Meet the Faculty Seminar, Sean Michael, instructor, Landscape Architecture and Environmental Planning, Utah State University, December 3, 2008.
- “Reflections and Connections,” Inaugural Lecture, President Stan Albrecht, Utah State University, November 19, 2008.
- “Green Marketing and Policy: How Can Clean go Mainstream?” for Summer Citizens Lecture Series, Utah State University, Logan, Utah, June 13, 2008.
- “Building Green: From High Performance to Zero-Energy Homes,” Summer Citizens Lecture Series, Utah State University, Logan, Utah, June 12, 2008.
- “Your Next Car – Plug Ins Anyone?” Summer Citizens Lecture Series, Utah State University, Logan, Utah, June 11, 2008.
- “Renewable Energy Sources that Work Now! And Those on the Horizon,” Summer Citizens Lecture Series, Utah State University, Logan, Utah, June 10, 2008.
- “Anatomy of America’s Energy Crisis,” for USU Conference Services Summer Citizens Lecture Series, Utah State University, Logan, Utah, June 9, 2008.
- “How to Avoid Green Marketing Myopia: Positioning Green to Become Mainstream,” for Huntsman Scholars Program, Junior Year Experience 2007-08, Stacey Hills, instructor, Huntsman School of Business, Utah State University, Logan, Utah, April 14, 2008.
- “How to Avoid Green Marketing Myopia: Positioning Green to Become Mainstream,” for Utah Advertising Federation, Keynote Luncheon Address, Marriott City Center Hotel, Salt Lake City, April 8, 2008.
- “Energy in Utah: Dispelling the Myths about Wind,” for Logan Kiwanis Club, Keynote Luncheon Address, Copper Mill Restaurant, Logan, February 6, 2008.
- “Market and Policy Factors Driving Wind Energy Development in Utah,” panel presentation for Focusing Cache/Focusing the Nation Conference, Business and Agriculture panel, Utah State University, January 31, 2008.
- “Energy in Utah: Dispelling the Myths about Wind,” with for Applied Science, Sharon Atwood, instructor, Thomas Edison Charter School, January 16, 2008.
- “Wind Energy in Utah: Dispelling the Myths,” for JCOM 1130 Beginning News Writing class, Jay Wamsley, instructor, Journalism and Communication Department, Utah State University, November 20, 2007.
- “Wind Energy in Utah: Dispelling the Myths,” for JCOM 1130 Beginning News Writing class, Jay Wamsley, instructor, Journalism and Communication Department, Utah State University, November 19, 2007.

- “Wind Energy in Utah: Opportunities and Market Barriers,” for Science class, JaDean Frehner, InTech Colligate High School, Logan, October 29, 2007.
- “Wind Energy in Utah: Opportunities and Market Barriers,” for Science class, JaDean Frehner, InTech Colligate High School, Logan, March 30, 2007.
- “2007 JEDI Report for Utah County Spanish Fork,” with Sandra Reategui, for Utah Wind Working Group, Utah Department of Natural Resources, Salt Lake City, March 22, 2007.
- “The Three C’s for Avoiding ‘Green Marketing Myopia,’” for Honors 2100 Inquiry Seminar, Clifford Skousen, instructor, Utah State University, March 5, 2007.
- “Wind Energy in the West: Opportunities and Market Barriers,” for Honors 2100 Inquiry Seminar, Clifford Skousen, instructor, Utah State University, March 6, 2006.
- “Alternative Fuel Vehicles: Opportunities and Challenges,” for Mt. Logan Middle School Debate Team, Gail Buxtum, advisor, February 7, 2006.
- “Wind Energy in the West: Opportunities and Market Barriers,” for visitors from Schlumberger, Utah State University, January 2006.
- “Anatomy of ‘Buzz’ Marketing,” Cache Chamber of Commerce Business Expo 2006, Logan, Utah, January 11, 2006.
- “Marketing in the New Age of ‘CleanTech’ – How to Avoid ‘Green Marketing Myopia’ to Deliver Consumer Value,” 15th Annual Customer Service & Marketing Seminar, Partners in Business, Utah State University, November 9, 2005. (presented twice)

Miscellaneous Outreach

RERED has engaged with a variety of constituents through industry/community/university committees and work groups, student mentoring, media interviews, etc., to meet objectives 2, 3, and 5.

Industry/Community/University Committees

As part of RERED’s advisory mission, we’ve served on various work groups and committees.

- Utah Wind Working Groups (founding members, 2003 – 2011; group disbanded in 2011)
- Utah State Wind Outreach Team (SWOT) (2008 to 2010; group disbanded in 2010)
- American Wind Energy Association, Public Affairs Committee (2011 to the present)
- Utah State University Sustainability Council (2011 to present)



Edwin Stafford with members of Utah Wind Working Group, awarded “Outstanding State Wind Working Group” by Wind Powering America, Dallas, Texas, 2010.

Doctoral dissertation/masters thesis committees

In addition to working with students on JEDI model reports and Utah State University Extension facts sheets noted above, RERED has also worked with students on research for renewable energy-related doctoral dissertations and master theses, three of which are ongoing.

- Peter Robertson (doctoral dissertation), Sociology Department, College of Humanities and Social Sciences, Fall 2014 (expected). Committee member with Richard Krannich (chair), Helen Berry, Mark Brunson, and Douglas Jackson-Smith.
- Blake Thomas (masters thesis), Environment and Society Department, College of Natural Resources, Fall 2013 (expected). Committee member with Roslynn Brain (chair) and Joseph Tainter.
- Betsy Byrne (masters thesis), Landscape Architecture and Environmental Planning, College of Agriculture, Fall 2013 (expected). Committee member with Carlos Licon (chair) and Keith Christensen.
- Neal Barth (masters thesis), “Connecting Wind Energy Development with Visual Resource Management,” Landscape Architecture and Environmental Planning, College of Agriculture, Defended April 27, 2012. Committee member with Carlos Licon (chair) and Keith Christensen.

Field Studies for Jon M. Huntsman School of Business

RERED engaged in two business student team projects with Utah organizations related to wind energy development. These semester-long projects resulted in formal reports and presentations to those organizations’ managers.

- Utah State University Facilities, “Feasibility Study of a Wind Turbine – Community Perceptions.” Spring 2009.
- Mountain Crane, “Feasibility Study for Purchase of Crane for Erecting Wind Turbines.” Fall 2008.

Education Outreach – Radio Interviews/News Features

As part of RERED’s media engagement objective, we participated in nine radio interviews about Utah’s wind development and related marketing communication issues.

- KUSU 89.5 FM (Logan, Utah), Access Utah, Tom Williams, host, April 27, 2011 (discussed “Wind Uprising” documentary).
- KVNU 610 AM (Logan, Utah), Cross Talk with Jennie Christensen, March 16, 2011 (discussed “Wind Uprising” documentary).
- KCPW (Park City, Utah), Mountain Money with Ann Johnson, April 8, 2010 (report about “Wind Uprising” documentary and Seven Summits Award)
<http://kpcw.org/mountain-money>
- KVNU 610 AM (Logan, Utah), News with Craig Hislop, March 30, 2010 (discussed “Wind Uprising” documentary and Seven Summits Award)
- KVNU 610 AM (Logan, Utah), Cross Talk with Jennie Christensen, February 11, 2009 (discussed Spanish Fork wind project’s economic impacts, hurdles to development)
- KVNU 610 AM (Logan, Utah), Cross Talk with Jennie Christensen, September 16, 2008 (discussed green building)
- CKLW 800 AM (Windsor, Ontario, Canada), Windsor Now, Leah Hansen, host, May 1, 2007 (discussed green marketing strategy)
- KUSU 89.5 FM (Logan, Utah), Access Utah, Lee Austin, host, October 4, 2006 (to discuss “Wind Power Development in Utah”)
- KUSU 89.5 FM (Logan, Utah), Access Utah, Tom Williams, host, May 25, 2005 (with Christine Watson Mikell to discuss “Wind Development in Utah”)

Education Outreach – Television Interviews/News Features

As part of RERED’s media engagement objective, our research on wind energy and cleantech has been featured in four television news stories.

- KSL Channel 5 Eye Witness News (Salt Lake City, Utah), “Wind Project Generates Economic Windfall for Utah,” Sam Penrod, reporter, January 27, 2009,
<http://www.ksl.com/?nid=148&sid=5436853>.
- Aggie TV (Logan, Utah), “Near Zero Energy Home,” Kenny Reid, reporter, September 25, 2008. <http://www.usu.edu/atvnews/>
- KSL Channel 5 Eye Witness News (Salt Lake City, Utah), “Geothermal Pioneer Builds Green House,” Jed Boal, reporter, September 22, 2008,
<http://www.ksl.com/index.php?nid=148&sid=4331802>.

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Grant proposals for educational programs

RERED drafted two proposals for education outreach initiatives. Neither was funded.

- Vestas Scholars Program (Fall 2011); proposal to establish an elite renewable energy education program for Utah State University students to be funded by Vestas. Unfunded.
- Integrative Graduate Education Research Traineeship Project (Winter 2010); joint proposal with Colleges of Engineering, Humanities, and Natural Resources to establish multi-disciplinary graduate education program via the National Science Foundation. Unfunded.

Training and Personal Development

RERED facilitated our personal educational development and training on renewable energy issues and communications via conferences and seminars to enhance our personal knowledge and education outreach effectiveness. Our participation in such training was designed to meet objective 1.

- Giving Voice to Values Conference, Babson College, Babson, MA, June 2013.
- Wind Power 2012, Atlanta, Georgia.
- Giving Voice to Values Conference, Babson College, Babson, MA, June 2011.
- Wind Powering America's All-States Summit, 2011, Anaheim, CA.
- Wind Power 2011, Anaheim, CA.
- Biomimicry Seminar, Monterey Aquarium, CA, July 2010.
- Wind Powering America's All-States Summit 2010, Dallas, Texas
- Wind Power 2010, Dallas, Texas
- New Wind Agenda for Wind Energy Works!, American Wind Energy Association webinar, December 12, 2008.
- Association to Advance Collegiate Schools of Business (AACSB) Sustainable conference, Salt Lake City, UT, July 2008. Participated in conference to consider sustainability curriculum development for the Jon M. Huntsman School of Business.
- Wind Powering America's All-States Summit, Houston, Texas, 2008.
- Wind Power 2008, Houston, Texas.
- Connecting Points Webinar, Andy Goodman, March 2008.
- Alternative Energy: Seeking Climate Change Solutions, Utah State University, Logan, Utah, March 2008.
- Wind Powering America's All-States Summit, 2007, Los Angeles, CA.
- Wind Power 2007, Los Angeles, CA.

- The Essentials of Communicating with Diplomacy and Professionalism, Skillpath Seminars, June 2006.
- Wind Powering America's All-States Summit, 2005, Denver, CO.
- Wind Power 2005, Denver, CO.

Utah Clean Energy

Between 2007 and 2010, RERED provided financial sponsorship for Utah Clean Energy to assist with delivering education outreach presentations, project management of a Utah Rate Impact Study and Economic Development Studies, and other initiatives to meet objectives 3, 4, and 5. The following overviews some of Utah Clean Energy's initiatives supported by RERED:

Utah Rate Impact and Economic Development Studies

- Coordination with Dr. Terry Glover, Economics and Finance Department, Utah State University and representatives from the National Renewable Energy Laboratory, Lawrence Berkley Laboratory, Utah State government, Rocky Mountain Power, and renewable industry representatives to gather data and information for how renewable energy may impact energy rates in Utah.
- Preparation and publication of study, "Building the Clean Energy Economy: A Study of Jobs and Economic Development of Clean Energy in Utah."
http://www.utahcleanenergy.org/utah_economic_development_study#.UizTQyfnYdU.
- Peer review of RERED's Jobs and Economic Development Impact analyses and documentaries.

Outreach and Presentations

*In conjunction with RERED, Utah Clean Energy engaged in dozens of renewable energy and energy efficiency presentations and outreach across Utah. Some of the most important were with **Utah's agricultural communities**, including the Utah Department of Agriculture and Food, USDA Rural Development Employee Training, and the Utah Farm Bureau. Representatives of Utah Clean Energy often served as panelists after screenings of Wind Uprising across the state.*

Coordination of Events and Conferences

Utah Clean Energy helped to coordinate numerous renewable energy events and conferences across the state, both with RERED and independently, including the Spanish Fork Sky Spectacular Wind Project's Opening Dedication Ceremony and the Intermountain Harvesting Energy Summit.

Utah Wind for Schools Project

Utah Clean Energy coordinated with the Utah State Office of Education, Wind Powering America's Wind for Schools Program, the Utah State Energy Program, and Rocky Mountain Power to establish the Utah Wind for Schools Project. The initiative connected Utah schools

with resources to develop wind power projects, integrate renewable energy into the curriculum, and foster a new generation of renewable energy technicians and experts. The project resulted in the installation of wind turbines at Milford Elementary School (Milford, Utah), Milford High School (Milford, Utah), Three Peaks Elementary (Enoch, Utah), and Cyprus High School (Magna, Utah).

Utah State Wind Outreach Team (SWOT)/Utah Wind Pioneers

*Utah Clean Energy spearheaded efforts to coordinate and develop a strategic state wind outreach plan, which involved ongoing teleconferences among various wind stakeholders, including RERED, Interwest Energy Alliances, and Wind Powering America. One key outcome of SWOT was the training of **Utah Wind Pioneers**, a broad cross-section of professionals and citizens interested in wind energy who were willing to engage in outreach about wind energy in their local communities. RERED participated in the training of some Wind Pioneers.*

Conclusions

Prior to RERED, our research centered on understanding multi-stakeholder collaboration and green marketing. We were interested in applying our knowledge to help kick-start a new sustainable technology and encourage its diffusion into the marketplace and society to make a difference in the world. Wind energy in Utah presented itself as the arena for us to apply our expertise, and we began that journey by helping to found the Utah Wind Working Group in 2003. We volunteered to serve as the education outreach coordinators and initiated the “Winds of Opportunity for Utah” campaign to educate Utah policymakers and citizens about the economic and environmental benefits posed by developing Utah’s winds for electricity. This culminated with the successful billboard campaign, “Wind Power Can Fund Schools,” which was later adopted by the Utah Trust Lands and the U.S. Department of Energy’s Wind Powering America. This gave us momentum to begin RERED with an understanding of the energy market in Utah (and the West) and the key market, social, and policy barriers facing wind development.

Through our eight years working on RERED, we supported the beginnings of wind energy development in Utah and witnessed its incremental growth and persistent roadblocks as new communities contemplated the still very novel prospect of local wind development. Through conducting economic impact analyses for counties considering wind development, filming a developer’s four-year struggle to establish Utah’s first wind power project, and interviewing citizens opposed to nearby wind development to understand their concerns and how those concerns could be ameliorated, we’ve accumulated a comprehensive understanding of the difficult entrepreneurship process for renewable energy and clean technology and the challenges that lay ahead in society’s transition toward a cleaner, more sustainable future.

Some specific insights and “lessons learned” with regard to research and engagement of Utah’s wind power development include:

- **Decisions about wind development are local.** Much of the public discourse about energy often centers on federal government policies and their impact on economic development, land use, and protecting the environment. The issues are complex and often are subject to divisive politics and gridlock (e.g., the extension of the Production Tax Credit). While federal policies are important, one of our central conclusions about wind development is that make-or-break decisions for actual projects are made ultimately at the local community level in the chambers of city councils and town hall meetings by local officials, administrators, and citizens (Hartman, Stafford, and Reategui 2011). Because of the novelty of wind projects, decision makers are often strained by a lack of knowledge and resources. Our publications and documentary, *Wind Uprising*, about the Spanish Fork Wind Project illuminates the entrepreneurial process and local barriers that are common in local wind development and have been designed to aid local policymakers.
- **Wind developers need to engage local communities early and often throughout the approval and development process.** The Spanish Fork Wind Project was almost derailed when an unexpected uprising of local citizens approached the Spanish Fork City Council to enact a moratorium on the project months after it has been approved (Stafford and Hartman 2012). The citizens claimed that they had not been advised about the wind

project's proximity to their homes and it benefit to the community. While the developer perceived that he had engaged the community sufficiently, many citizens disagreed and the demands for a moratorium delayed the project, forcing the project to be relocated and requiring the re-tracing of several steps in the development process. Our research indicates that proactive community input in the siting and approval process of local wind projects can help foster community trust and support for local wind development. Central to the resolution of the Spanish Fork case was the creation of a resident committee to meet with the developer and Mayor to resolve their concerns.

- **Education outreach messages about local wind development (and clean technology) must align with the values of constituent groups.** Our research found that wind developers often tout economic development and jobs as primary “selling points” for local wind development. The problem is such opportunities may not readily benefit or be valued by local constituents in host communities. Consequently, wind developers need to understand local citizens and constituents and identify ways that a wind project can meet their needs and values. Connecting how increased property tax revenues can benefit local schools or the library or expand government rural services in a tangible way may be critical for winning over local support.

Sustainable Entrepreneurship Process Framework

Our latest work strives to synthesize our research and experiences through the development of a comprehensive conceptual framework for understanding the ‘sustainable entrepreneurship’ process and implications for action, which will be published in a forthcoming book chapter by Routledge in November (Stafford and Hartman 2013a). Drawing on our analysis of the Spanish Fork Wind Project, we developed the framework in the context of wind energy (Stafford and Hartman 2013b) and are extending it to other cleantech innovation contexts.

Sustainable entrepreneurship is defined as the exploitation of business opportunities to create goods and service that sustain the natural environment and provide economic and social gains for others (Patzelt and Shepherd 2011). The task of sustainable entrepreneurs is to determine “what needs to be sustained” (e.g., preservation of nature, sources of life support, and communities) and “what needs to be developed” (e.g., innovations and business models that provide economic and social gains to other groups in society) (Shepherd and Patzelt 2011). Whereas traditional entrepreneurship uses finance and business acumen to transform innovations into economic goods (such as new products or technologies) for business gains, by contrast, sustainable entrepreneurship leverages those business skills to transform environmentally-protective innovations (such as wind power) into economic and social gains for the entrepreneur and other relevant groups, such as local communities hosting wind power plants.

Briefly, our framework asserts that entrepreneurs engage in three principal steps to evaluate and initiate sustainable business opportunities, such as wind projects:

(1) Recognition of environmental problems and their solutions. In the context of Utah, coal was the primary source of the state’s electricity generation in the early 2000s, and

analysts asserted that the state's economically-feasible coal reserves were dwindling. Further, coal use could be subject to a carbon tax or restrictions in the future should policies to combat climate change take effect nationally or regionally (see Hartman, Safford, and Reategui 2011). Utah entrepreneur Mr. Tracy Livingston recognized wind energy as a potential clean substitute for coal-fired electricity to help address that problem.

(2) Evaluation of the market feasibility of environmental solutions and self-assessment of one's acumen to implement those solutions as a viable business.

Livingston believed his engineering background and previous experience with starting other businesses gave him sufficient expertise to make Utah's first wind power project financially feasible (Hartman, Stafford, and Reategui 2011).

(3) Implementation of the business and environmental solution. As depicted in our documentary, *Wind Uprising*, Livingston engaged in a four-year struggle to establish Utah's first wind power project at the mouth of Spanish Fork Canyon, where he had to overcome a variety of policy, market, and social barriers. It was our direct observation of how Livingston overcame these critical barriers that resulted in our further development of our framework on sustainable entrepreneurship.

Our framework identifies four critical entrepreneurial activities or roles that individuals must pursue proactively to establish their sustainable enterprises. These include:

Business entrepreneur: As business entrepreneur, Livingston had to identify locations conducive for a wind project, attract investors, acquire wind turbines, and procure a power purchase agreement with the local utility monopoly.

Policy entrepreneur: A policy entrepreneur is defined as an individual or organization that operates from outside the formal positions of government and draws on expertise, persistence, and skill to achieve certain policy or institutional changes that they favor (e.g. Weissert 1991). Livingston discovered that the state of Utah's method for implementing the 1978 Public Utility Regulatory Policies Act dictated a regulated selling price for his wind power well below prevailing current market prices for energy (including new fossil fuel resources) and would have made his proposed wind project uneconomical. Before the Utah Public Service Commission, Livingston and his associates argued successfully for an alternative "market proxy" pricing method based on a previously accepted competitively-procured price that the utility was already paying for wind energy from another project in an adjoining state (i.e., Idaho). The episode demonstrated the need for sustainable entrepreneurs to evaluate how laws and regulations may be affecting the feasibility and market acceptance of sustainable innovations. Sustainable entrepreneurs need to work proactively in the policy arena (Stafford and Hartman 2013a, 2013b).

Social entrepreneur: A social entrepreneur is an individual or organization that seeks to discover, define, and exploit opportunities in order to enhance social wealth and benefits (Zahra et al. 2009). An unexpected citizen uprising of resistance to Livingston's proposed wind project nearly derailed it (Stafford and Hartman 2012). Demanding a moratorium on

the project's construction in a heated Spanish Fork City Council meeting, citizens claimed that they had not been informed about the wind project and its proximity to nearby homes. In addition to local concerns about how the project would impact their homes and property values, citizens wanted to know, "What was in it for Spanish Fork?" In a compromise with the community, Livingston agreed to move his project, but he also recognized the need to explain the social and community benefits of his proposed wind project (e.g., how increased property tax revenues would support local city services and schools). The episode indicated that entrepreneurs need to be cognizant of how a proposed wind project's local benefits are understood and disseminated throughout the host community. Long-term social initiatives may need to be incorporated into the wind farm's overall business (Stafford and Hartman 2013b).

Collaborative entrepreneur: Collaborative entrepreneurs are individuals or organizations that seize opportunities of creative value through the construction of social networks and jointly-generated ideas that emerge from the sharing of information, knowledge, and resources (Ribeiro-Soriano and Urbano 2009). Much of the success behind the Spanish Fork Wind Project centered on the collaborative relationships Livingston forged throughout the project. For example, when facing the Utah Public Service Commission regarding the pricing of renewable energy, Livingston enlisted the help of an economist and Utah Clean Energy to help him craft a more equitable pricing method for renewable energy and to make his case before the commission. Another critical ally was the local school district. When Livingston requested his project be designated as a "community re-development area" to procure a temporary property tax reduction to cover the additional expenses incurred from the delays and relocation of the project, school officials were in favor of it as they recognized the wind farm's long-term property tax revenue stream would benefit the school district's future (Stafford and Hartman 2013b). In sum, proactive coalition-building is critical in the renewable energy process.

Our research and observations suggests that forging collaborative relationships is at the center of sustainable entrepreneurship because tapping the necessary resources, expertise, and support of others is critical to navigate successfully the nexus of policy, market, and social issues inherent in the encouraging sustainable enterprises and market/social acceptance of sustainable goods and services. Collectively, we believe the framework can provide insights to policymakers, entrepreneurs, and citizens about kick-starting sustainable industries. We have applied the framework in the context of the diffusion of natural refrigerants in North America in a forthcoming book chapter (see Stafford and Hartman 2013a), and we intend to continue developing this framework as we apply it in studying additional cleantech contexts in the near future.

Recommendations

Throughout this report about RERED's research and education outreach initiatives, we've described a variety of key "lessons learned" and insights about the wind power/renewable energy development process and related issues, such as effective green message framing, community engagement, and multi-sector collaboration. Our observations about wind energy and renewable energy development identifies three major emerging trends warranting further investigation for encouraging renewable energy/cleantech entrepreneurship and diffusion. They are as follows:

Effective handling of disinformation/anti-renewable energy campaigns. As renewable energy grows in market share across the nation, it is perceived to be a increasing threat to traditional fossil fuel- and nuclear-based electricity generation. In our work in RERED, we have encountered vitriolic rhetoric against renewable energy, typically in the form of organized disinformation campaigns in the news media, on the web, and on billboards (e.g., "sWINDled" billboards in Idaho). The intent of these disinformation campaigns is to sway policymakers and enrage citizens to oppose renewable energy's continued development. As members of the American Wind Energy Association's Public Affairs Committee, we have witnessed firsthand how the industry is addressing the growing disinformation about wind energy; on a daily basis, a "war room" of designated commentary writers and bloggers scan the media for negative stories and commentary about wind energy to write rebuttals and corrections in the comment sections of online stories. Interestingly, little research has investigated the impact of disinformation in the renewable energy/cleantech arena, how it affects public opinion, and effective strategies for addressing it. We recommend that academics and industry researchers study the motivations behind disinformation and how the industry and wind developers may manage it in their outreach and community engagement.

Hurdling legal challenges to wind development. Another issue that has emerged is the use of the court system to delay the approval and development of wind energy. We've witnessed several wind projects, including one in Utah and two in Wyoming, stymied through opponents' savvy use of the court system to delay approved projects, draining the developers' resources and ability to procure investors and power purchase agreements. We recommend that the wind industry, lawyers, and developers become more knowledgeable about addressing legal tactics used by wind energy opponents and identify strategies for either preventing or managing this significant barrier.

Engaging local policymakers in the wind development approval process. Much of the public discourse about energy often centers on the merits and challenges of federal and state government policies (such as the Production Tax Credit and state-level renewable energy standards). While important, our findings suggest that make-or-break decisions about wind/renewable energy development take place ultimately in the chambers of city councils and county commissions. Surprisingly, little research has examined how local policymakers, who serve their city/county governments on a part-time basis and are resource- and time-constrained, attempt to evaluate the implications of proposed wind projects in their communities. Part of the challenge that faced the Spanish Fork Wind Project resulting in a citizen uprising demanding a moratorium on the project's construction was that citizens were displeased with wind siting ordinance that the Spanish Fork City Council had approved to govern local wind power development. The ordinance allowed turbines to be sited 600 feet away from homes, and citizens perceived this was too close given their

size and potential impact on their property values (see Hartman, Stafford and Reategui 2011; Stafford and Hartman 2012). Research is needed to provide a richer understanding of how city and county policymakers approve local wind power development to derive guidelines for facilitating more equitable and effective decision making and community engagement.

Forming collaborative international partnerships. Our research and experience suggests that there are a constellation of forces that wind entrepreneurs must harness to be successful. In particular, we have noted how they must work not only in the market, but also in the policy arena and local community. More recently, we have seen how the ‘timing’ of resolving issues and overcoming barriers is critical. For example, the realization of wind development in Montana hinged on the building of additional transmission that crossed the U.S.-Canadian border. At first the transmission developer a Canadian energy company, Enbridge, Inc., did not consider local history and cultural values in acquiring right-of-way. This resulted in opposition from local farmers concerned about the impact on their farming practices as well as the disregard for their input into the process. Successful resolution came about when local county officials organized community meetings between land owners, residents and Enbridge company representatives to work through differences. We recommend that researchers investigate the hurdles and implications of cross-national renewable energy and infrastructure development.

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