"Working our way towards better solutions"

An Analysis of Cache Valley Public Opinion Regarding Wind Energy

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Introduction

Across the nation, discussion of renewable energy is becoming more commonplace. Among those participating in this discussion are universities that are seeing the importance of adopting renewable energy sources. As a land grant university, Utah State University (USU) has the responsibility of preserving our natural resources and educating citizens about the use of these resources. USU, along with other state universities, is facing growing budget cuts and uncertain state funding. One way for USU to address this uncertainty is to investigate ways to reduce expenses and stabilize its budget. Last year, USU used 62,736,735 KWh on the main campus. If all of this power had been purchased, instead of some on campus production, it would have cost $3,328,886.84 (Berrett, 2009). By finding ways to produce its own energy from renewable energy sources, USU can hedge rising energy costs.

This report sets out to discuss wind energy and its applicability to USU. The report will investigate perceptions of key constituent groups (e.g., campus administrators, community leaders) with regard to USU building and maintaining its own wind turbine. Current national, state, local and university policies concerning renewable energy are also addressed in this paper.

Background

The U.S. is now the world leader in wind electricity generation. As of December 31, 2008 the United States had 25,170 Megawatts (MW) of wind power capacity and another 4,451 MW is under construction (AWEA, U.S. Wind Energy Projects, 2008). Renewable energy production has become significantly more feasible with the recent signing of the American Recovery and Reinvestment Act of 2009 signed into law by President Obama. The current stimulus package as well as financial incentives are offered to those working on renewable energy projects in order to address the economic downturn. At the same time, energy companies must consider the potential impact of concerns surrounding energy-related greenhouse gas (GHG) emissions. The investment community is beginning to push energy companies to shift their investments towards technologies that emit fewer GHGs (EIA, 2008).

The U.S. Environmental Protection Agency (EPA) declared on April 17, 2009 that carbon dioxide and five other industrial emissions threaten the planet. This turning point in federal policy lays the foundation for US government to cap carbon emissions. Such a decision will affect the daily life of every U.S. citizen, changing the type of cars they drive, the way they build their homes, and the types of energy they may consumer. In order for the EPA to enforce such regulations, the agency could require businesses to conserve energy, utilize emissions reduction technology, and rely on more renewable

energy resources. The EPA could mandate increasing use of wind, solar, or other clean energies (Weisman, 2009).

If wind is to be implemented, it is important to consider the advantages and disadvantages. One advantage is wind power is an affordable and unlimited energy resource to the economy. Wind power does not only provide clean and sustainable energy, but it also provides jobs and new sources of income and revenues, particularly in rural communities. The cost of electricity from utility-scale wind powered systems has declined by more than 80% in the last 20 years (AWEA, 2009). Improved turbine technology allows for power to be generated for a much lower cost and at much lower wind speeds than in the past. Thus, wind power is becoming more competitive with traditional resources of energy such as coal or gas-fired power plants. Impending risks of carbon taxes and/or restrictions on carbon emissions are likely to increase the costs of traditional fossil fuels, making the economics of wind power increasingly more attractive. The noise that was once associated with wind turbines has also been nearly eliminated with improved engineering (AWEA, 2009)

As with all tall structures, birds and bats can possibly collide with wind turbines. Overall the impact on birds from wind energy development is very low compared with other human-related sources of bird mortality, such as buildings, windows, and cars (AWEA, 2009).

Wind energy systems do not generate air or water emissions or hazardous wastes as some other energy sources do. Even with federal policies such as the Clean Air Act, other energy sources continue to emit increasing amount of pollutants that cause things such as acid rain, smog, inversions, as well as greatly impacting human health (AWEA, 2009). Increasing growth of wind power can reduce these health risks.

Policy

Growing public acceptance of the science of climate change is encouraging political and economic initiatives to support renewable energy production such as wind. The following paragraphs present a summary of the current policies within the federal, state and local governments respectively.

Federal

President Bush expressed his concern for the U.S. energy sources in the 2006 State of the Union address when he stated, “Keeping America competitive requires affordable energy. Here we have a serious problem: America is addicted to oil, which is often imported from unstable parts of the world” (Bush, 2006). To provide a solution for the stated problem, President Bush called for 20% of America’s

energy consumption to be provided through wind generation by 2030. This call for change resulted in the U.S. Department of Energy investigating the feasibility of and strategies for achieving that objective. This resulted in the publication of *20% Wind Energy by 2030* (U.S. Department of Energy, 2008).

20% Wind Energy by 2030 carries the Department of Energy's findings of technical feasibility, costs, major impacts, and challenges associated with the implementation of 20% wind energy. The information presented in this report provides pertinent information that the University can use in the adoption and implementation of wind energy. According to this report, 46 of the 50 states would need significant wind development to achieve the 20 percent wind energy goal by 2030 (20% Wind Energy by 2030, 2008). Utah State University is in a position to help contribute in reaching this goal.

Cost. The cost of the 2030 wind scenario will only be 2% above the no-new-wind scenario. Initial higher capital costs would be incurred; however, these costs are offset by $155 billion in lower fuel expenditures. The same potential would apply to a wind turbine in Cache Valley. There would be higher initial cost, but the cost would be offset by savings in energy costs.

Funding. The U.S. Government will be investing $790 billion to aid the economy and stimulate growth in the renewable energy industry. A significant part of the stimulus package includes tax and spending provisions for the renewable energy industry. This has been met with enthusiasm by investors in the renewable energy industry. The CEO of Pax World, a leading company in sustainable investing stated, "The stimulus package is the first significant investment in green energy infrastructure that has ever been attempted in the U.S. (Kropp, 2009)."

Timeframe. The stimulus package includes grants, guaranteed loans, and tax incentives for the production of biofuels. The grant program in place by the federal government reimburses a percentage of the investments put into renewable energy projects during 2009 and 2010 or projects for which construction began in 2009 or 2010. These grants will cover up to 30 percent of the cost of projects with wind, solar, geothermal, and biomass applications. There is also an extension of the Production Tax Credit (PTC) as well as an expansion of the Investment Tax Credit (ITC) on renewable facility expenditures. This is a rare window of opportunity for our University to reap the benefits of wind energy at a lower capital cost (Kropp, 2009).

Making the change. The report concludes, "the 20% Wind Scenario is not likely to be ealized in a business-as-usual future" (20% Wind Energy by 2030, 2008). Achieving this scenario would involve nationwide commitment to clean, available energy sources with minimal harmful emissions and other

environmental pollutants. The federal government is doing its part to make these projects feasible, and Utah State University can lead Cache Valley's efforts to meet this objective.

State of Utah

Governor Jon M. Huntsman, Jr., stated his priorities about Utah's energy future when he said, "Utah should position itself as a leader in renewable energy technologies and not lose opportunities to other western states like New Mexico and Colorado who are pursuing this area aggressively" (Renewable Energy, 2008).

Utah, however, has a long ways to go to become a 'leader in renewable energy technologies.' Currently, Utah produces the majority of its electrical needs from the burning of fossil fuels, with coal the most significant resource being consumed. In 2007, coal fueled 85.3% of all electricity generated in Utah, which was substantially more than the U.S. average of 48.6%. This figure has decreased since 2005 when coal accounted for 94.2% of all electric generation in Utah. The decline in coal use has come through an increased use of natural gas for electric generation. In 2007, natural gas fueled 12.7% of electricity produced in Utah, compared to only 2.4% in 2005. Despite the decrease in coal's overall share of Utah's electric generation portfolio, demand for Utah coal at power plants around the world remains steady as electricity consumption continues to grow (Vanden Berg, 2007).

Supply and Demand. Utah's energy consumption rose 5.2% in 2007 and is expected to rise in the future based on current population growth rates. Additionally, the increased use of air conditioning; construction of larger-sized homes; and adoption of more electronic devices, such as cell phones and flat-screen televisions will also increase consumption. This increase in demand for electricity will put a strain on Utah's utility companies, as well as the consumer. Estimates show that if no new electricity sources are developed, Rocky Mountain Power would be faced with a deficit of 750 MW in 2010, and a 3,000 MW by 2016 (Bauman 2008). . In order to accommodate increasing demand for electricity, Utah will have to increase its production of electricity (Reategui, Stafford, & Hartman, 2009).

A key risk facing Utah is its dependency on coal-fired electricity, and there has been increasing debate regarding the longevity of Utah's coal reserves. "Whether it is 12 years or 40 years, there's an end in sight," said Jim Kohler, chief of the federal Bureau of Land Management's minerals section in Utah (Gorrell, 2007). Additionally, because Utah is using more natural gas for electricity production, rate payers are further exposed to the risk of price volatility inherent in natural gas prices. By using

other forms of energy resources, Utah could preserve some of its coal reserves and mitigate the price volatility of natural gas. Wind energy in particular is a viable alternative to coal and gas. Specifically, wind energy is price stable, and increasing use of it can ease the price pressure on fossil fuels resources.

Making the change. The state of Utah is currently facing a turning point in energy production and consumption. As the United States grows increasingly conscious of its energy needs, so has Utah in its efforts to combat higher energy costs and climate change. Governor Jon M. Huntsman, Jr., stated that, "Energy is a critical component in sustaining Utah's vibrant economic growth and preserving our unparalleled quality of life. With just the right blend of ambition, brain power and diverse natural resources, Utah stands ready to lead the charge in energy efficiency, renewable and alternative energy development, and new and innovative technologies" (Mission of the Energy Policy, 2008).

Governor Huntsman supports the development of both nonrenewable and renewable energy sources. Governor Huntsman has organized the Utah Renewable Energy Zone Task Force, which is made up of twenty members representing utilities; renewable energy generation developers; environmental organizations; federal, state and local government representatives; and energy advocate representatives. The primary purpose of this task force is to promote the development of renewable energy resources to meet the goal of 20% of Utah's electricity by 2025 (Utah Renewable Energy Zone Task Force, 2008). Also, in 2007, Utah became a member of the Western Climate Initiative, which is a cap-and-trade program involving six other U.S. states and four Canadian provinces. Their goal is to reduce climate-changing greenhouse gas emissions, spur growth in new green technologies, help build a strong clean-energy economy and reduce dependence on foreign oil (Release, 2008).

In February 2009, Utah's House of Representatives adopted a resolution to withdraw from the Western Climate Initiative. Critics of the resolution asserted that withdrawal would be detrimental because Utah would lose its voice in regional energy decisions and policies. Duane Cardell, who wrote an editorial on the subject, stated that, "It is better to be a key player in regional efforts to develop a strategy, than merely assuming the role of observer while waiting for others to make the decisions" (Cardell, 2009).

Although the state legislature may not support the Western Climate Initiative, renewable energy projects are moving forward across the state. An elementary school in Cedar City recently installed a wind turbine to support its power demands while it collects heat for the building from geothermal sources (Henetz, 2009). At the same time, an eight-turbine wind farm in Spanish Fork is now

operational. As renewable energy projects progress across the state, the climate for USU to implement a wind turbine is generally more favorable than it has been in the past.

Cache Valley

There is a diverse and passionate understanding of energy uses and the importance of conservation within Cache Valley (The Salt Lake Tribune, 2006). The Cache Valley Community has supported conservation efforts by sponsoring local public transportation ridership programs such as "The Annual Dump The Pump Day," a day that is dedicated to enlightening community members of the benefits that come from riding public transportation, both in terms of cleaner air and energy savings (Cache Valley Transit District, 2009). They also have supported efforts to lower car emissions and conserve energy. The implementation of a wind turbine would become a great symbol of residents concern about air quality and the environment in general.

City of Logan

Energy purchases and usage became a broad citywide debate for Logan in 2007. This was due to a decision made by the City Council to refrain from purchasing energy from a new proposed coal-fired energy plant to be built in central Utah. At the time, the basis of this decision was somewhat controversial as it assumed that the price of coal would increase in the future as well as the possible implementation of a cap and trade policy on carbon dioxide emissions further raising the cost of power. The Council hoped that newer, cleaner, and cheaper sources of energy not subject to carbon taxes or restrictions would become available to support the growing needs of the City of Logan.

Further efforts to reduce the city's environmental impact include the organization of a Renewable Energy & Energy Conservation Advisory Board. The board meets monthly to discuss issues related to renewable energy, energy conservation, and how these issues are affecting Utah and Cache Valley. Logan City currently endorses many energy conservation programs that are available to the community, and provides money rebates to residents who invest in approved energy efficient home materials and energy efficient electrical appliances.

Logan City Light and Power (LCL&P) supports renewable energy projects. Currently, LCL&P is offering a Solar Power incentive program to encourage and facilitate the installation of photovoltaic (Solar) systems in Logan City. This incentive is intended to encourage residential and commercial customers to install "grid-tied" solar panels and associated equipment in order to supply a portion of the customer's own electricity that would otherwise be purchased from LCL&P. In addition to this, LCL&P

maintains two different hydroelectric plants located in Logan Canyon. Together, these plants generate about 10% of Logan's electricity at a cost of less than 1 cent per kWh (Logan City, 2009). Logan has also participated in the purchase of energy produced by wind turbines from St. George, Utah, and Uinta County, Wyoming, to add to its energy portfolio, and meet city resident's needs (Wheeler, 2008).

In order for Logan City to continue aligning its policies with federal and state initiatives, local action must be taken in sanctioning renewable energy projects. While renewable energy is being promoted on federal and state levels, implementation of renewable energy projects are ultimately decided on a local/city level. University energy policies contribute to that development.

Renewable Energy and Utah State University

Utah State University is committed to following the national and state trend in investigating and improving alternative energy production. University President, Stan Albrecht, has signed the "American College and University Presidents Climate Commitment." In so doing, he has committed that within two years, USU will move toward greater climate neutrality.

Taking Action. Utah State University has taken many actions, and will continue to take action in implementing "green" technologies to help conserve energy. An example is that 85% of the campus florescent lights have been replaced with electronic ballast and T-8 tubes, which provide better lighting and use less energy. New construction and renovation projects on campus are designed using energy saving materials, and the energy efficient electrical units. In 1999 the USU Aggie Shuttle purchased its first natural gas powered shuttles to be used on campus. This effort lowered University fuel costs and helped nearly eliminate carbon dioxide emissions from the shuttles (Blue Goes Green, 2008). Along with this, in 2002, USU brought online a gas fired heating plant, and the next year included a central chilled water system with highly efficient chillers which could be used for evaporative cooling in the off season. A 5 MW gas turbine cogeneration system is used to generate electricity for the campus and recovers waste energy to heat the buildings. The University has invested over $3.5 million in energy conservation projects, which has created savings for the University of $2 million per year (USU, 2007).

Education. USU is focused on conservation, providing educational opportunities, and being a leader in innovation of alternative energy for the citizens of Utah (Utah State Energy Lab, 2008). As a research institution

USU is deeply committed to research alternative energy sources. The USU energy lab (**e**lab) prides itself on being a leader in innovative thinking and research. They are involved in several concurrent projects that include:

- Algae based biofuels
- Adaptive solar systems
- Advanced fusion regimes
- Intuitive buildings
- Automated electric transportation

In additional to these renewable energy projects, a wind turbine located set up by USU would provide educational training for students in the growing area of wind power.

Utah State University Wind Power and Data Analysis Final Report

The Utah State University Wind Power and Data Analysis Final Report is the result of a study conducted by Chevron Energy Solutions regarding the future possibility of generating wind energy for Utah State University. Chevron Energy Solutions subcontracted Idaho National Laboratory, which studied the potential effectiveness of a wind turbine at a site at the base of Logan Canyon. The study found that the site offers sufficient wind for development, and a wind turbine would be beneficial in producing energy for the university. Also, according to Ben Berrett, Director of Facilities at USU, a wind turbine at the site would cover 7% of the university's energy consumption, which would meet almost half of the USU President Stan Albrecht goal of 15% alternative energy consumption use (Berrett, 2009).

Other Universities Are Pursuing Wind

Other universities across the country have adopted wind energy and renewable energy initiatives. Thus, USU would be following a precedent. Essentially, there are three approaches that schools have taken in procuring renewable energy – purchasing green energy, installing small-scale projects, and partnering with a utility company to install a large-scale project. USU has joined, along with several other American colleges and universities, a commitment to achieve climate neutrality and promote renewable energies on campus (Signed Committment, 2007).

Purchasing green energy is the most prominent method of procuring renewable energy for schools because it does not require the investment of capital. The University of Pennsylvania, for example, leads this category purchasing 46 percent of its energy consumption from wind sources. New

York University is the second highest consumer of renewable energy 100 percent of their energy consumption from wind sources last quarter (EPA, 2009).

Students at the University of Utah initiated a green power purchase program in 2005. The funds were generated by a fee increase paid by students that allows the university to purchase 10 percent of its energy from wind-generated sources. The program has recently been expanded to accept donations from outside sources as well as faculty, increasing the purchasing capabilities of the university.

There are many universities that have purchased wind energy credit through their utility provider. USU is at a disadvantage with other schools, however, as its utility provider, Logan City Light and Power, does not offer the opportunity to purchase renewable energy credits. Thus, USU cannot pursue this option.

Small-scale projects have been used to show commitment to sustainable practices and to provide educational opportunities. Small-scale projects, however, do not contribute a significant amount of electricity with regard to the total amount of consumption.

Harvard University recently entered into the renewable energy movement in the beginning 2009. Harvard's Real Estate Services Associate Vice President said, "Having wind turbines on Harvard's flagship office building is a major statement about Harvard's commitment to renewable energy." These six wind turbines produce on average, enough energy to power 30 computers a day (Ireland, 2009).

Utilizing a vertical type windmill that doubles as sculpture, Quinnipiac University in Hamden, Connecticut will supplement .84 MW of campus energy during the year. University President John L. Lahey sees the Windspires as an opportunity to engage students in environmental responsibility and challenge them to become part of the solution (Lomardi, 2008).

The University of Vermont uses its 10 kW wind turbine as an educational tool that has the benefit of supplementing the school's power consumption. The turbine is being incorporated into three courses at UV, two in the department of Community Development and Applied Economics and one in the School of Environment and Natural Resources (Wakefield, 2005).

Large-scale projects not only provide education opportunities but carry real economic and energy production benefits as well. Carleton College found a wind project as "the opportunity to invest funds for a comparable rate of return while contributing to a healthier environment" (Carleton, 2009). Likewise, St. Olaf appreciated the symbolism of a campus-based wind turbine to their commitment "to having as little impact on the environment as possible" (Gonnerman, 2006).

Most remarkable is Colorado State University's move to convert its Fort Collins campus to use 100 percent wind power. A private energy company, Wind Holding LLC, will build up to 25 turbines on land owned by the University. The power they produce will supply the University's peak load of 16 MW with the excess energy being sold back into the grid.

Summary

USU's consideration for generating its own wind power is aligned with growing recognition for the need to develop renewable energy at the federal, state, and community levels. Given that other universities have already initiated wind and renewable energy purchases and projects across the country, USU will be following an important progressive precedent. Wind power can benefit USU by providing the following opportunities: healthy, stable, efficient means of producing necessary energy; educational opportunities for students and the community; and leadership in the state toward developing renewable energy sources.

Elite Community Member Study

USU desires to work collaboratively with the local communityto act in the best interest of Logan City and Cache Valley residents. Community support is central in implementing a USU wind turbine. In order to measure public support and/or opposition, exploratory and depth interviews of 11 community members, policy members, and university faculty were administered. Throughout these interviews, key themes in public opinions were uncovered, highlighting specific issues regarding wind power product at USU. These themes are discussed below in detail. For a complete interview protocol, see Appendix, Figure 1. For an indication of the number of policy makers, community members and university faculty involved in our study, refer to Appendix, Figure 2.

Public Opinions

By analyzing the interviews conducted, we identified four overarching themes. These key themes are: (1) Community Outlook on Renewable Energy Initiatives; (2) Financing and Transparency; (3) Site Selection; and (4) Local Environmental Concerns. We believe these themes will serve to direct education efforts and guide future discussions on renewable energy at Utah State University.

Community Outlook on Renewable Energy Initiatives

The majority of respondents viewed renewable energy favorably and as a necessary step into the future. They believed it is important that USU become a leader in renewable energies. In addition, they viewed wind power to be the most feasible source of renewable energy. This sentiment was exemplified in the statement of a policy maker, "I think we are working our way towards better solutions." However, even though most respondents were in favor of USU pursing renewable energy, they were concerned with the speed of implementation and the necessary infrastructure impacts that may be required in pursuing such a project.

Leadership

As a premier research institution, Utah State University has the opportunity to become a leader in Cache Valley and throughout Utah in developing renewable energy. For example, a campus administrator said: "It's critical. We must go there and it would be great if we could get USU actively engaged in research and development and then the Utah community would buy in." Additionally, many interviewees were aware of the electrical power budget deficit that USU is experiencing and agreed that the university would be wise to invest in some form of autonomous production. One community member interviewed said that alternative energy "is the direction that we're headed in." Additionally a policy maker expressed "I'm really pleased that Utah State is taking the lead in the Valley in actually implementing renewable power sources." Therefore, it would be good for USU to take the lead in moving towards that future.

Feasibility

Various interviewees noted that wind energy is viable because of how well developed the technology is compared with other forms of alternative energy, such as solar. They also realized that wind energy technology is more readily available. However, one interviewee was concerned that the technology will advance in the near future and decrease in overall cost. Thus, it may be wise to be patient in the adoption of new energy sources. Another concern was the availability of infrastructure to support a non-continuous power source. A faculty member stated: "Whether we could ever replace coal or oil with wind is a big question in my mind. It seems to me we ought to reduce consumption first rather try to necessarily replace it all. I'm not sure we can with wind. Whether there is the capacity with wind, the consistency, etc." Specifically, they were concerned over transmission lines and substations needed to support the additional power sources (e.g., need for backup). Thus, USU needs to

communicate the rationale for pursuing wind development and how it intends to overcome cost perceptions and potential variability of the resource.

Energy Future: "Change is always hard"

Many respondents agreed that USU should seriously be looking into renewable energy options to produce its own energy, in order to secure its future energy stability. However, there were some concerns expressed over the speed at which the transition to cleaner energy takes place. For example, referring to the adoption of renewable energy sources one community member stated that society must "ease into it," and that we "can't sell everything we've got at one time." As another interviewee stated, "it's great to go green, but not all at once." There were also concerns brought up about Utah's abundance of coal, and the fact that "we would be in trouble" and "experience major blackouts" if we were to abandon this form of energy production right away. Along these same lines, other respondents were concerned with the ability of alternative energy to completely replace our existing dependence on fossil fuels. However, one community member put the issue in perspective by noting, "we need power the best possible way and the least polluting." In short, USU needs to educate the public that its adoption of wind power is a partial solution to the energy situation facing the community and nation and reassure the community that its adoption of wind energy should not impact energy reliability or mean an immediate abandonment of existing power sources.

Financing and Transparency

Those interviewed were concerned about where the sources of funding would come from to implement a renewable energy project on campus. In addition, they wanted to be reassured that the funding was transparent and made available to the public.

Funding Sources

Respondents were aware of the initial investment required to install a wind turbine. Therefore, concerns were expressed about the sources of funding, and whether USU's budget would allow for the initial costs of construction and implementation, especially in this time of economic downturn. One interviewee commented on the possible trade-offs that would be necessary in order to acquire money to fund renewable energy projects. "We are building to be LEED certified, but it costs a lot more. Do we give up space that we desperately need for research, so that we could make the building more efficient?" They were worried that funding may come from increased tuition or through the loss of

educational programs. On the other hand, one respondent suggested seeking help from government grants and other investors to fund the initial cost of a project.

Transparency

It was suggested that the funding of a wind project needed to be completely transparent. This would be useful in assuring students and university faculty that funding for the turbine was not taken from educational funds, or if it were, they would be aware of it. In addition, others respondents recognized that wind power could act as a hedge against the annual inflation of energy prices, and thus would be a wise investment in the long run. Therefore, research would need to be conducted, so that these costs and benefits could be presented clearly and with transparency.

Site Selection

The site selection of a wind turbine was another major topic. Many interviewees were concerned at the location of a wind turbine, especially at the mouth of Logan Canyon, and how it would affect the aesthetics of the landscape. A policy maker explained, "Where they go in is always the question because the Canyon is such scenic and lovely location. I grew up close to Logan Canyon and it would be sad to see big turbines there, but by the same token it would certainly be nice to be using renewable power."

Recreation Values

Many participants voiced opinions about choosing an appropriate site for a wind turbine. One university administrator thought that the site could potentially conflict with recreational and other values of Cache Valley residents. Some people had heard about a possible site at the mouth of Logan Canyon, and suggested that this location could potentially generate opposition from the surrounding residential communities. Thus, additional research should be conducted to find opinions of residents, and how to mitigate the potential opposition.

Aesthetics

Some people were concerned with the aesthetics of a turbine contrasting the landscape. However, as one community member remarked, wind turbines "have to go somewhere." Another person said that wind turbines could be an "eyesore, but once you get it in there people will let it go, it's like power lines, they're not the prettiest things in the world but they're a necessity." One university

faculty member said that the public would get used to seeing wind turbines just as we have adjusted to the sight of "big box stores and grain elevators." One respondent saw turbines as a positive addition to the landscape stating: "I was thinking, where would they put these turbines? I was looking at the landscape and I could see them there. They would be symbolic of change." In sum, USU will need to launch educational outreach and encourage community discussion of the tradeoffs of the aesthetics of a wind turbine vis-à-vis the community benefits of clean energy generation.

Local Environmental Concerns

The most significant environmental concern was of Cache Valley's air quality, and how a wind turbine could help mitigate some of the air pollution. In addition, it was mentioned that a wind turbine could be a threat to birds and produce noise pollution.

Air Quality

Every interviewee agreed that Cache Valley's air quality is a major problem that needs to be addressed. For example, one respondent admitted: "We moved here about a year and a half ago and that is probably the only thing we don't like here." One administrator said that the pollution is detrimental to the university's image for prospective students and faculty. "Unfortunately we interview candidates for positions at that time [January, February]. They come here and all they see is that inversion in the air. It's terrible." Another respondent suggested that promoting renewable energy would be an effective tool for addressing emission issues, while creating a positive image or symbol for the university and its commitment to clean air in Cache Valley. Another campus administrator suggested that renewable energy choices would not only act as a symbol, but also as an opportunity for education, they stated: "What I would love to see is a wind turbine or a bunch of solar panels, and then in the student center a wall that's got the usage of power with what fraction is coming from our solar panels or wind turbine. Something where we can take the investment we put in and turn it into a learning opportunity." Consequently, it may be important for USU to continue educating the public about the benefits of the wind turbine, even after its installation. The campus and broader community may need ongoing visible evidence of the turbine's contribution to air quality, energy savings, and other benefits to the community.

Birds/Noise Pollution

One respondent was concerned about the potential threat a wind turbine could have on the local wildlife, specifically birds. The respondent stated that, "You start walking around these wind farms and see all these dead birds, everywhere. Not just one or two but a lot of them." This same respondent also stated that the noise pollution could be a problem, and added, "But they have a noise, all of them, I mean you can hear them." These may be viewed as myths or misconceptions; however, they are concerns and should be addressed through proper education.

Appendix

Figure 1.

Utah State University Renewable Energy Development Study
Interview Protocol
Spring 2009

1. What do you think about renewable energy sources?
2. What do you know about wind energy?
3. What do you know about solar energy?
4. What do you know about power and energy resou rces in Utah?
5. Do you know what challenges USU is facing in its energy production?
6. Are you aware of the University's use of renewable resources to generate power and electricity?
7. What do you think makes this an important issue?
8. Are you concerned about the air quality in Logan?
    a. What concerns you?
9. How would you feel about USU putting in wind turbines?
10. How would you feel about USU putting in solar panels?
11. Do you know of anyone else that would be willing to participate in this interview?
12. Do you have any concl uding remarks that you would like to share?

Figure 2.

Policy Maker	GV1
Policy Maker	GV2
Community Member	CM1
Community Member	CM2
Community Member	CM3
Community Member	CM4
Faculty Member	FC1
Faculty Member	FC2
Faculty Member	FC3
Faculty Member	FC4
Faculty Member	FC5

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