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ANTAGONISMS AND PROTAGONISMS OF ALTERNATIVE ENERGY SOURCES AND THEIR EFFECTS ON RANCHERS

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BACKGROUND

Over the past 20 years, the United States' use of power has increased about 25 percent. Couple this with the fact that Americans are looking for more clean energy choices, and it is easy to see the incentive for energy generation and use from alternative energy sources. Agriculture can provide the potential for clean, alternative energy sources.

Renewable Portfolio Standards (RPS) require that affected electricity providers include a specified amount of renewable energy as part of their portfolio of generating fuels. There are many varieties of RPS; of the twenty-six states that adopted RPS, no two states have enacted exactly the same provisions. Out of the four states included in the collaborative efforts to present the Range Beef Cow Symposium, Colorado is the only one that has adopted such standards.

There are several sources that are considered alternative energy. As reported by the Energy Information Administration, the 2006 profile of renewable energy sources includes biomass, geothermal energy, hydroelectric conventional, solar/pv energy, and wind energy. Preliminary data from the report shows that total wind generation increased by 45 percent from 2005 to 2006.[1]

Wind Energy – Natural Resource: Where Does It Fit?

The total wind energy used has increased 800 percent from 1989 to 2005 with a 260 percent increase seen from 2001 to 2005, placing wind power as the largest increaser in renewable energy generation.[2] By the end of 2006, wind net summer capacity stood at 11,119 megawatts or about 2 _ times the 2002 level. Texas, with 2,698 megawatts of capacity in 2006, overtook California as the Nation's leader in wind capacity. Colorado was one of fifteen states reporting net increases in wind capacity in 2006.[3] For 2007, the American Wind Energy Association reported the industry was on track to install over 3,000 megawatts of wind capacity.[2]

With wind power generation increasing faster than any of the other alternative energy sources, the focus of my presentation is exploring the antagonisms and protagonisms of utility-scale wind energy generation.

EXPLORING THE OPTIONS

There are six major components that play a role in wind energy development: wind energy resources; market for wind energy; transmission access and capacity; environmental impact and location factors; landowner and community support; and power company considerations. Concerns from ranchers and the public often include: a change in landscape, impact on the viewsheds, surface damage, production loss, loss of wildlife habitat, bird mortality, and attorneys & contracts. I will go into more detail about each of these factors, whether they are an antagonism or protagonism and the impact of each one.

Wind energy resources
The potential for wind energy development must be determined before evaluating the value of the resource. Factors that are considered when evaluating potential include sustained wind speeds, the right kind of wind, topography, and open areas with room for the development. Landowners will have more bargaining power if this process is done in advance of a wind lease agreement.

The Department of Energy's Wind Program and the National Renewable Energy Laboratory (NREL) published new wind resource maps for Colorado, Nebraska, South Dakota, and Wyoming as well as many other states. These maps show the wind speed estimates at 50 meters above the ground and represent the resource that could be used for utility-scale wind development. Wind as a renewable resource is rated by wind power classes, which are based on typical wind speeds. The classes range from Class 1 (lowest) to Class 7 (highest). Class 4 and above are considered good wind resources and have the potential for large generator wind development.

These resource maps estimate that many areas of this four-state region have a tremendous potential for wind energy development. The NREL maps may be viewed at http://www.eere.energy.gov/windandhydro/windpoweringamerica/wind_maps.asp. Colorado's map shows that there are significant contiguous areas of good resource in the eastern quarter and an area of excellent-to-outstanding wind resource north of Fort Collins along the Wyoming border. Exposed ridge crests in several parts of the state also have good-to-outstanding wind resource. Major areas of good wind resource are found throughout much of Nebraska except the extreme eastern portion. Typically, the best wind is located on elevated terrain features. South Dakota has good-to-excellent wind resource areas located throughout the state. In Wyoming, there are areas of excellent-to-superb wind resource in the southeastern part of the state, outstanding resource areas in the south-central part of the state and additional good-to-excellent resource in the northeast and on ridge crests throughout the state. It is important to note that the wind resource can vary significantly at the micro environment level so it is crucial that landowners have their individual resource professionally evaluated.

The University of Wyoming Renewable Resources Department has an anemometer loan program that allows for the documenting of wind energy potential in an area. Other states have similar programs. There are a limited number of anemometers and there is usually a waiting list. With the use of this tool, a landowner will have data to show "what he has" to lease. If good wind for energy development exists, this will shorten the marketing time and increase the demand for the area recorded by the anemometer.

It pays a landowner to know what he has before he goes to market it. Would a rancher sell or buy calves at a given price if he had no idea whether they weighed 300 pounds or 600 pounds? No!

The same marketing strategy applies to wind energy development. Companies will pay bottom dollar to lease land that doesn't have a wind potential study history in comparison to land that has documented studies showing a good wind energy development potential.

Market for wind energy
After determining the wind resource, there are several ways for a landowner to proceed with marketing his land for potential wind energy development.

One option is for an individual landowner to work with a wind developer to negotiate a wind energy development lease agreement. In this case, negotiations are on an individual basis and if wind development occurs on the leased land, the individual gets the determined portion negotiated for all the wind energy generated on the land. This has potential if the landowner is a good negotiator, know the going rate for good wind leases and has a significant block of land to lease.

The principle of "economies of scale" can be a limiting factor if a landowner decides to do it "on his own". Usually the best chance of realizing development on wind energy leased land comes when there is at least 60,000 acres in the leased block. Wind "speculators" may lease smaller blocks of ground. This can create a checkerboard pattern of leasing. Potential for wind energy development in this situation is unlikely. This has the potential to pit one neighbor against the other if development occurs in this checkerboard pattern where some landowners get payments and others do not.

Another option for marketing the wind resource is to create a "wind association". To create an association, first a block of land with good wind potential is identified and then through an informative and educational process, producers form an association. After the formation of the association, bids are taken from wind developers.

Currently, three blocks of land in Southeast Wyoming have been identified and are in different stages of formation for wind associations. The Southeast Wyoming Resource & Conservation Development (RC&D) office is serving as the facilitator for this process. These associations are finding strength in numbers and an increase in their collective bargaining power.

At this time, at least one association that has outstanding-to-superb wind potential has received bids from four major companies and the bids are coming in higher than expected. If there is a wind development project on any land within the boundaries of the association, every member of the association will get a slice of the pie – not just those who have wind turbines on their property.

Transmission access and capacity
Interest from wind energy speculators is encouraging because of the wind strength and availability, but the wind energy development potential is only realized if in close proximity to existing transmission facilities. Possibly the largest single factor currently limiting development of wind energy in many rural areas is the lack of available high voltage interstate transmission lines to carry the generated electricity to the large load centers. The current transmission lines on the grid are running near capacity now. Transmission line development has declined over the past twenty years and hindered the support for large scale wind development.

New transmission lines and facilities are required to fully utilize this alternative energy source. Wind energy proponents are developing plans that look at the evaluation of the current system and the areas where wind potential is the greatest to implement projects that

will expand the transmission line capacity. This development is very costly and is not expected to be in operation for at least two to five years.

Environmental impact and location factors
The most serious environmental drawbacks to wind machines may be their negative effect on wild bird populations and the visual impact on the landscape. To some, the glistening blades of windmills on the horizon are an eyesore; to others, they're a beautiful alternative to conventional power plants.

Wind is a free, renewable and clean fuel source. Wind is an attractive energy source because it produces electricity with no air or water pollution since no fuel is burned. Wind energy provides yet another advantage over conventional fuels: conservation of our precious water resources. No water is used with wind energy production.

Department of Interior officials recognize the benefits of wind energy development while at the same time being sensitive to the adverse impacts of wind energy facilities to wildlife, especially birds and bats, and their habitats. After evaluating and researching the impacts, they wrote "Service Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines". This document is intended to provide guidance to industry in the future design and development of wind energy projects in an attempt to minimize these impacts.

Many people have been led to believe or assume that wind turbines are a major avian hazard. There have been numerous research studies on this topic; it is estimated from these studies that wind turbines contribute to 1.83 avian fatalities per turbine per year or an estimated 28,500 total per year. This sounds like a lot of birds! But to put this in perspective, this represents approximately 0.01 to 0.02 percent of all the birds killed by collisions with man-made structures and activities in the U.S.[4] For comparison, collisions with automobiles and trucks results in the death of from 60 to 80 million birds annually; tall buildings and house windows cause between 100 million and 1 billion deaths per year; estimates for birds killed by cats is 100 million; and the list goes on with power lines, lighted communication towers, pesticides, and airplanes. While we must be cognizant of the potential adverse impacts, society must also weigh the clean energy facts surrounding wind energy.

Wind energy offers rural landowners a new cash crop that is "homegrown". Impacts to forage production and amount of surface disturbance can be minimized through the negotiation process with the wind energy development company. The "footprint" of the operation—the turbine base plus the service roads—occupies only 5 percent of the land area. That makes wind power a perfect partner with open-space operations like farming and ranching. Since the turbines have a small footprint, most land at the project site will remain in production for existing grazing and wildlife habitat purposes. Sizable wind projects can be constructed in a short time so that reclamation can begin on the area of surface disturbance in less than one year. Significant traffic and human activity is of short duration in contrast to natural gas or oil field development. The life of wind projects is projected to be 20 to 30 years.

For a dense wind turbine configuration, the spacing between turbines is 500 to 900 feet and the spacing between rows of turbines is one half mile. The average wind farm requires 17 acres of land to produce one megawatt of electricity, about enough electricity for 750 to 1,000 homes.[5] The spacing of wind turbines is dependent upon the size of the wind turbines used at the site.

Landowner and community support
Good wind = good potential for positive economic impact and provides the opportunity to increase the diversity of income from agriculture land without taking the land totally out of

production. I personally would rather see cows or wildlife grazing under a wind turbine dotted landscape than a landscape dotted with houses in subdivisions.

Wind energy projects provide new jobs, a new source of revenue for farmers and ranchers through agriculture diversification, and an increased local tax base for rural communities. Leasing arrangements vary widely, as do the size of the turbines and the rating of the wind, so it is hard to calculate an estimated economic benefit to the landowner. It is estimated that a 100 megawatt facility will contribute $500,000 to $1,000,000 per year in county revenues. This may also have an indirect effect on ranchers. If the wind energy development can increase the county revenues, tax increases are less likely. In addition, it is estimated that two to six permanent jobs are created for a 50 to 100 megawatt installation.

Power Company considerations

Diversifying energy portfolios with wind energy also makes good economic sense for power companies. Early on, wind energy cost about 40 cents per kilowatt-hour. In 2004, the cost per kilowatt-hour dropped to less than 5 cents, making wind energy a competitive contender for electricity generation.[5] Although the cost for wind energy has decreased substantially, the cost for construction materials and the increased demand for turbine components caused price increases the last two years. Wind energy offers a viable, economical alternative to conventional power plants in many areas of the country.

One drawback to wind energy for those managing power is that electricity generated from wind power can be highly variable. This lack of consistency presents challenges to incorporating large amounts of wind power into a grid system. Management of supply and demand has economic implications for suppliers, consumers and grid operators. This problem is already a reality with the use of other power sources, but wind energy adds yet another set of challenges to this balancing act.

SUMMARY

Agriculture can benefit from alternative energy sources as well as provide a benefit to the Nation and the World through alternative energy development on agriculture land. Implementation of renewable energy resources, whether on a small scale such as solar energy to heat our homes or wind turbines to generate electricity for cities and towns, can help provide cleaner air, a more secure energy resource base, and a sustainable future for everyone. Wind energy development especially in the four state region of the conference, offers amazing potential to ranchers and our nation for the foreseeable future.

For more info on Wind Energy:

http://www.coopext.colostate.edu/WR/windbooklet.pdf - Wind Energy in Colorado, A Practical Guide for Farmers and Ranchers, About producing energy from wind, Colorado State University, University Cooperative Extension

http://eere.energy.gov/windandhydro/windpoweringamerica - U.S. Department of Energy, Wind Energy Program, Washington, DC - learn about the economic benefits of wind energy projects to your community by accessing the Job and Economic Development Impact (JEDI) model.

www.nrel.gov/wind - National Renewable Energy Laboratory, Golden, CO 303-384-6979

www.awea.org – American Wind Energy Association, Washington, DC 202-383-2500

www.windustry.com – Windustry, Minneapolis, MN 800-946-3640

www.uwig.org – Utility Wind Interest Group, Springfield, VA 703-644-5492

www.nationalwind.org – National Wind Coordinating Committee, Washington, DC 888-764-WIND

NOTES

[1] Renewable Energy Consumption and Electricity Preliminary 2006 Statistics, released August 2007 by the Energy Information Administration; Office of Coal, Nuclear, Electric and Alternate Fuels; U.S. Department of Energy, Washington, DC 20585

[2] Energy Information Administration / Renewable Energy Trends in Consumption and Electricity, 2005. Released July 2007. Compiled from Energy Information Administration, Form EIA-906, "Power Plant Report," and Form EIA-902, "Combined Heat and Power Plant Report."

[3] American Wind Energy Association, "U.S. Wind Industry to Install Over 3,000 Megawatts of Wind Power in 2007: First Quarter Market Report," see website: http://www.awea.org/newsroom/releases/AWEA_First_Quarter_Market_report_2007.html

[4] National Wind Coordinating Committee Avian Collisions with Wind Turbines: A Summary of Existing Studies and Comparisons to Other Sources of Avian Collision Mortality in the United States (NWCC)

[5] The Energy Story, California Energy Commission, 2002, www.energyquest.ca.gov/story/