

Power of wind

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Power of Wind Jason A. Jennings Principles of Marketing (BUS 330) Instructor: Debra McCoskey-Reisert January 28, 2012 Power of Wind There is a large sector in the United States that believes wind energy is an excellent alternative resource. There is also a group of people that believe that the wind turbines that are used to generate wind energy is a bad idea because they obstruct the natural view, causes death to birds, and generates noise pollution. They also argue that wind energy is not a dependable source of energy because the wind does not blow continually.

Wind as a viable source of energy will be evaluated from a positive and negative perspective. Wind energy has long history of being used as a power source (Berry, History of Windmills, 2011). Considering the current issues that the global community faces concerning green house gases and pollution alternative energy sources must be evaluated. As of 2010 the United States Energy Information Administration listed Saudi Arabia, Russia, and the United States as being the top three world oil producers (U. S. Department of Energy). The top three oil consumers are the United States, China, and Japan.

As of 2009 the United States Energy Information Administration listed Saudi Arabia, Canada, Iran, Iraq, and Kuwait as having the highest level of proven world oil reserves (U. S. Department of Energy). In 2010 the United States Imported close to forty nine percent of the petroleum products that it consumed in that same year (U. S. Department of Energy). About half of those imports came from nations located in the Western Hemisphere. The world currently faces a shrinking petroleum based energy supply and a

rapidly growing pollution problem as a result of the dependency on petroleum.

Countries around the world increasingly have to compete with each other in order to secure petroleum based energy resources. China and India continue to place a higher demand on the world's petroleum supply because of their rapidly growing economies. High gasoline prices, global warming concerns, and fears that fossil fuel resources are likely hitting peak supply while global demand is surging demands the modern world's undivided attention. Oil producing countries in the Middle East currently hold a forty percent share of the world's oil market.

Wind energy has the ability to market itself. There is a large sector around the world with a belief that wind energy is an excellent alternative resource. Wind farms are also one of the emerging green technologies that are beginning to show their true value. Between the year 2000 and 2010 the wind power capacity of the United States jumped exponentially (see page 6). That is a direct result of the hundreds of new wind farms that came on line in the American power grid. In 2010 global wind installation hit 196, 000 gigawatts.

In a recent study conducted by the United Nations said renewable energy accounted for sixty percent of new electricity generation capacity in Europe and more than half in the United States of America. The human relationship with the wind has been a long one with the use of sailing ships and windmills. For centuries past the wind was used as the main power source for sailing ships. The use of windmills seems to have started with the

Persians for grinding grain (between 500 and 900 A. D.). Windmills started appearing in Europe around the time of the Crusades (1096 -1270).

The European design is very different from the Persian one and there is an ongoing debate whether the Europeans developed the windmill themselves or the Crusaders had taken the idea back to Europe (Berry, History of Windmills, 2011). The earliest windmills found in Europe were a post mill construction. The main structure of the windmill sits on top of a post and could be rotated to face the wind. Human power was needed to rotate the windmill to face the direction of the prevailing winds. The windmill was turned by a long beam that was attached horizontally to the body of the mill.

The mills sat upon a tripod structure that consisted of two crossed beams resting on the ground with four angled beams coming up to support the post in the center. These windmills used a horizontal axis allowing the sails of the windmill to take better advantage of the wind. The power was then transferred to machines by cogs and gears. In 1650 smock mills were developed with just the top part of the windmill being turned to face the wind. This was a huge improvement to the windmill because the sail structure was much lighter and easier to turn.

Permanent structures could be built to house the mill. Brick and stone tower mills were built using the new smock mill method. Smock mills received that name because they resembled a nineteenth century countryman's smock. They were built in a tapered, boarded, Octagonal shaped tower form. The Chinese built their first documented windmill in 1219 A. D. and was used to grind grain. In the late 1300's the Dutch developed a new sail design that

increased efficiency. The sail was constructed with a leading edge that created aerodynamic lift.

Windmill sails were made of cloth stretched over a wooden frame. Some windmill designs incorporated trimmed sails allowing them to take better advantage of the variable wind conditions. The English used a fantail on their windmills that allowed them to be turned by the wind. The large Dutch designed windmills continued to be used all across Europe until the development of the steam engine in the 1880's. The use of steam power caused a decline in the use of large tower windmills. In the United States windmills were used in the west for pumping water to the ranchers live stock.

In the mid 1900's Charles Brush developed a huge wind dynamo that generated electricity and became fascinated with the possibility of producing free energy for the general public. Beginning in the 1930's a group of disgruntled ranchers got together and started the development of wind energy. The ranchers were facing rising prices, power outages and poor customer service. Robert Righter is a historian that has done extensive research on wind energy in the United States. The first wind farms were built in the state of California in the 1980's.

The Altamont Pass, located near the San Francisco Bay area there are still some of the older and much smaller turbines. They only had a rotor diameter of 15 meters and a capacity of tens of kilowatts. The new turbines being manufactured today have a capacity of 1.5 - 2.5 megawatts (MW), rotor diameters as great as 100 meters allowing the blades to sweep an area the size of a football field. Wind power is on the rise in the United States with

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capacity jumping by 45 percent at the end of 2007 and capacity reaching to 17 gigawatts (GW).

Wind power is an attractive alternative to fossil fuels such as coal and oil because it is an energy source that does not produce pollution or climate altering greenhouse gases. When the massive turbines have been installed the only fuel that is needed to run them is the wind. Wind resources found around the world are so massive that they could easily meet the world's current energy needs. A study that was conducted by researchers at Stanford University found that global wind energy potential in the year 2000 was about 72, 000 gigawatts (GW), almost five times the world's total energy demand at that time.

The technology used to tap into the wind energy resources is getting much cheaper. In the early 1980's electricity produced by the wind cost as much as 30 cents per kilowatt hour. In 2007 the cost had fallen to 10 cents per kilowatt hour. There are various incentives in the form of tax credits and feed in tariffs that make electricity generated from the wind cost competitive with electricity generated from natural gas and coal. Maria Sicilia of the International Energy Agency (IEA) has stated that a \$30. 0 dollar tax per ton of carbon dioxide emitted would allow electricity produced on wind farms could compete in most markets without subsidies [(International Energy Agency, 2009)]. Even with no tax being placed on carbon emissions the growth of wind power is very likely to continue. The European Union has set a goal of getting 20% of its energy from renewable resources by 2020, with a large portion of it coming from wind power. The United States Department of

Energy has laid out a plan to get 20% of the energy needed in the United States from wind power by 2030 [(U. S.

Department of Energy, 2008)]. Asia may become the biggest market for new wind installations over the next five years. The wind does not blow all of the time and wind farms cannot be placed in some areas of the United States. For wind to stay on the path of expansion the industry will have to build new transmission lines and improve the integration of electricity produced by the wind into the power grid [(IBM)]. The industry is also vulnerable financially if subsidies are suddenly phased out. Some groups will say that the massive wind turbines cause the needless deaths of birds.

The effect that the wind farms have on the view is one reason that has been cited for saying no to wind power. There have been issues concerning the noise that the turbines create. Wind energy is an excellent and valuable resource that can be used as a replacement for dirty fossil fuels and the dangers of nuclear power. It cannot be the only replacement for those energy sources but it can be used in conjunction with solar power, geothermal, and hydroelectric to fulfill our nation's energy requirements.

The use of coal as an energy source for the generation of electricity can gradually be scaled down. Mankind has had a long relationship with the wind as an energy source and should continue to use it well into the future. Pollution has become a major problem that is affecting the climate and that problem should be resolved on a global scale with all nations working together for the common good. A comparison of year end wind capacity in the United States between 2000 - 2010 (U. S. Department of Energy, 2011) References Berry, M. (2011, May 24). History of Windmills.

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