

# Allegheny and Acutec

## *Case study of a strategic partnership*

Economics 427, Spring 2007

By Don Goldstein

*This case study describes a real partnership between three classes at Allegheny College and Acutec, Inc., to explore the feasibility of wind power generation at the company's facility in Saegertown, PA. Initiated during the summer of 2006 by Rob Smith, Acutec's owner and CEO, the project brings together company personnel with Allegheny classes Environmental Science 210 (Environmental Research Methods, taught by Rich Bowden and Eric Pallant), and Economics 421 and 427 (Strategic Environmental Management and Corporate Finance, respectively, both taught by Don Goldstein).*

### **Background**

Rob Smith was worried. Not by the current state of his business: Acutec, the northwestern Pennsylvania company he had founded and still ran, was profitable and expanding. (See [www.acutecprecision.com/](http://www.acutecprecision.com/).) A maker of precision-machined parts, primarily for the aerospace industry, Acutec had recently opened a second facility not far from its original one on a hilltop outside the town of Saegertown. Orders were strong from customers both domestic and foreign, and the major constraint on the immediate horizon was finding enough skilled workers for the highly demanding work.

What bothered Smith that summer day in 2006 was his electric bill. Despite all the efficiencies available from state of the art air compressors and other best practices, Acutec's power needs were rising and so were electricity rates. And it was impossible to miss the signals—in the news, the trade journals that he read, and conversations with colleagues—that eventually, at the state and/or federal levels, the regulatory response to climate change would add significantly to the cost of conventionally produced electricity.

In fact, it wasn't just the likely cost to his company that worried Smith about global warming. A self-styled "hard-headed businessman," he did not describe himself as an environmentalist. But he cared about the world that would be inherited by his two grown daughters and generations to come. Everything he was hearing about greenhouse gasses, including those emitted by coal-fired power plants, made him wonder what that world would look like.

As Smith leaned back in his chair and gazed out the window while these thoughts crossed his mind, his eye was caught by the flag whipping against the pole in front of the plant. It seemed the wind was always blowing at Acutec's hilltop site. Smith had wondered on and off whether one or more wind turbines on the property might significantly reduce the company's exposure to future electricity cost increases. Whether or not in the short term wind power would produce big savings, if at least it didn't cost him much perhaps it would be worthwhile, just for the satisfaction of doing a little something about climate change. But with all the possible technologies out there, and all the complexities of connecting a turbine to the plant's power supply and possibly the utility grid, it seemed there were a thousand questions that needed to be addressed.

Smith had an idea. For several years he had been a Trustee at his alma mater, nearby Allegheny College. Allegheny featured innovative programs in Environmental Science and Managerial Economics, with particular expertise in getting students involved in tackling real world problems outside the classroom. Smith knew several professors who he thought might be interested in helping find answers to his questions. He flipped through the phone book, picked up the receiver, and dialed.

### **The partnership**

On January 10, 2007, a memorandum of understanding formalized a plan that had been hammered out over several weeks of discussions involving Rob Smith for Acutec and Allegheny professors Rich Bowden, Eric Pallant (both of Environmental Science) and Don Goldstein (of Managerial Economics). The memo covered the task sequence and allocation of costs involved in the following plan for Spring semester and summer of 2007:

- Early in the semester, Bowden and Pallant's Environmental Research Methods students (ES 210), would study the wind conditions at the main Acutec facility.
- In mid-semester, Goldstein's Strategic Environmental Management students (Econ 421) would take the preliminary data and questions generated by ES 210, and research the economic issues—especially available technologies and relevant electric company policies—around wind turbine installation and use at the plant.
- Later in the semester, Goldstein's Corporate Finance students (Econ 427) would use all this data to conduct a preliminary capital budgeting exercise on the project.
- Over the summer, a College intern would work with Acutec personnel and the Allegheny professors to pull together and extend the prior semester's work into a feasibility study on wind power at Acutec.

It was an ambitious plan. It required extra work and outside-the-box thinking by all the planners, and would challenge the students in the classes involved to take on complex, messy questions that did not neatly fit the concepts and tools that seemed so straightforward in their course texts. As the project began, each group in sequence turned its attention to its assigned tasks.

### **ES 210 – The wind study**

The initial problem here was taking wind readings high enough off the ground to be relevant to a wind turbine; even smaller models could stand 100 feet or more in height. Smith had solved this by getting permission for wind sensors to be mounted at intervals on a cellular telephone tower standing next to the Acutec property. Bowden had located and ordered appropriate equipment, and Acutec engineer Tracy Porter had designed and arranged for the fabrication of arms for attaching the sensors to the tower.

All this was the easy part. The students had to work in the dead of winter, at a frigid location that certainly seemed always to be windy, to obtain the necessary readings to begin creating a record of the site's wind characteristics: speed, height, direction, and time pattern. They worked hard to provide the next group with a report that would point toward the relevant technological possibilities. Along the way, they also generated a list of related questions that were passed on to the next team as well.

### **Econ 421 – The technology study**

This class had been reading about efforts by a growing number of companies to incorporate environmental impact-reduction at or near the center of their strategic planning. Many of these efforts were now revolving around mitigating climate change, as responses by consumers, regulators, and other businesses were rapidly changing the competitive terrain for many companies. The students had learned that both researchers and practitioners were finding that cutting environmental impacts could generate cost reductions in production processes and revenue enhancements from more environmentally friendly products. Wind power at Acutec seemed clearly to be in the former category—if it worked.

But what were the issues that needed to be addressed? This class had the task of taking the wind and related data from ES 210, identifying all the factors that Econ 427 would have to consider in estimating the financial viability of the project, and gathering the critical information on all of these factors. Goldstein asked the students to brainstorm and prioritize a list of questions, and to propose a set of teams for researching each major issue or set of issues. They came up with the following issues and teams (their final reports are attached as Exhibits 1-6):

- Wind turbine technologies
- Electric utility issues
- Carbon risk
- Company (Acutec)-specific issues
- Stakeholder considerations
- Subsidies for windmills

### **Econ 427 – The financial study**

The Corporate Finance students had studied the standard textbook models of capital budgeting: how to estimate the economic viability of proposed capital projects. They soon discovered that modeling the uncertainties surrounding this project, typical in many ways of any real capital budgeting exercise, was the heart of the matter.

Clearly, the wind turbine study would require detailed information on projected cash flows over the life of the project. The Econ 421 reports offered a wealth of information that would be relevant. In addition, they would need to estimate Acutec's cost of capital. For that, company financial data would be a necessary starting point. Rob Smith reported that Acutec's borrowing costs averaged around 8%; he also provided Professor Goldstein with recent financial information on a similar company, attached as Exhibit 7. Goldstein suggested that students look at publicly held companies in Yahoo Finance, for financial data on firms that are comparable and relevant to this case. But, he wondered, would that be in the [Aerospace/Defense Products & Services](#) industry sector, where Acutec itself would probably be located?

The Finance students had already worked together in teams, so they were able to get organized quickly. Time was of the essence, because their reports were due back to Goldstein at 11:00 AM, Monday, April 16.

# EXHIBIT 1 -- Wind Technologies

Don Lippert, Matt Spriegel, Travis Skinner, Steve Horvath, Nicole Sisk, and  
Katie Murphy

The rate at which the cost of electricity is rising makes any alternative energy sources a viable option in the near future. Wind seems to be to be a very popular choice for many businesses around the world and its “exponential growth reflects the nation’s increasing demand for clean, safe and domestic energy, and continues to attract both private and public sources of capital” (Real de). This paper is focused on finding the best possible technology available based on the site-specific information of Acutec Inc.

Based on the average wind speeds from an anemometer study at the Acutec site and from comparing regional studies, we found a base for estimating the average monthly wind speeds, which revealed some critical information. In the winter months the wind blows on average between 10 to 12 miles per hour, and in the summer months the wind speeds average between 7 to 8 miles per hour. The American Wind Energy Association webpage revealed, “There will be very little energy available to be harvested at wind speeds less than 9 miles per hour.” However, the anemometer study conducted at Acutec was only at 30 ft, and wind speeds increase significantly on a cubic basis when increasing in elevation. The Environmental Science class has recently attached anemometers at various height increments to the cell phone tower located on the property. The information that will be made available from these wind indicators will reveal more relevant information about wind speeds that the wind generator would be receiving. Based on the information that is currently available from the studies we deduced the best available generator (Winter).

The companies that we found had generators that were the best fit for Acutec’s specific needs were Nordex, Enertech, and Lorax Energy Systems. We will give a basic overview of each company and their policies regarding wind technologies and then delve further into the specific generator information and evaluation in the body of the paper. Nordex was created in 1985 in Denmark and since has spread to 33 countries across the world. They “attach importance to reliability” by completing a rigorous safety analysis before releasing any equipment. The specifics of their turnkey project are given in Chart 1.1 and demonstrate the dedication to the design, construction, and continued maintenance of their products. “Using micrositing methods, we support our customers on a comprehensive and individual basis in determining suitable wind energy turbines and their precise positioning” (“Products and Services”). Once someone has decided to go with Nordex turbines, the company works together with the client to make the best possible decisions based on the site information.

Enertech was involved in the wind turbine industry in the 1970’s and 1980’s when wind farms began popping up all over California. There was a significant decrease in demand which caused the Vermont based company to go out of business, until they were reintroduced into the market in 2003 due to their knowledge and expertise of the manufacturing of the product (“Enertech Breezes”). They have a wide range of turbine sizes, which makes them versatile to different wind speed scenarios, but there was no information about the any “turnkey” style projects on their webpage.

Lorax Energy Systems is a North American company that distributes wind turbines for the German company Fuhrländer AG (“Services.”). They have very similar features of a turnkey project, as elaborated on in Chart 1.2. Fuhrländer AG also has a FLAGServ-system, which...“provides permanent, extensive communication between the FL turbines, our service centre and the customers to safeguard smooth operation of the reliable turbine technology for many years. The results are above average technical availabilities of our turbines. In combination with service packages, you are provided with maximum investment security” (Fuhrländer). This set of functions that Lorax-Energy and Fuhrländer AG provide help to make the purchase and operation of the turbines easy and all inclusive, which make this a viable option for Acutec’s wind turbine project.

Lorax provides a couple different options of possible turbines. The FL250 design is the best option for the Acutec because it is designed for a medium village or small area. In addition, this design is the optimal option for lowering high cost utility power at facilities. The design has a turbine size of 0.25 MW and the diameter of each rotor is 97ft. Also, the height of the tower being installed will be around 190 to 256 ft and will consist of a tubular design. FL 250 will generate approximately 350,000 to 700,00 kWh/yr. Each model has three blades that have cut in speeds of 2.5 m/s and cut out speeds of 25 m/s. The generator of the FL 250 consists of an asynchronous, 3 stage process, operating at speeds around 900 to 1200 rpm and All FL 250 designs have control systems that include speed regulation, electric yaw motor, main and tip brake, second brake system, disc brake, grid connection and remote data and control. Also, each turbine produces a sound level around 98dB and has no pulsation.

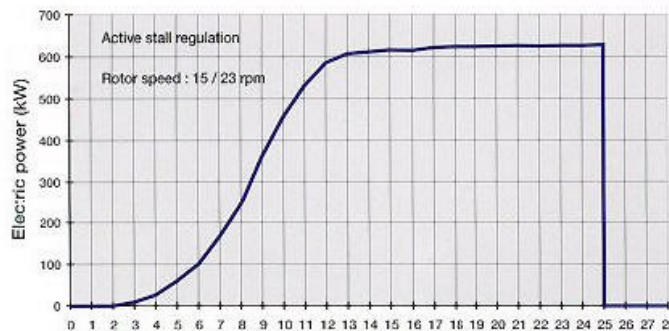
Furthermore, Lorax Energy Systems will provide a complete project management. The firm will help each customer decide what turbine is best and will help to integrate the entire design system. Lorax Energy Systems will acquire the appropriate local planning, zoning and building permits. Also, they will do a complete on site construction of the foundation, tower and wind turbines as well as guaranteeing long-term maintenance of the wind turbine system. Finally, the firm will provide wind and wind turbine measurements for their customers. The estimated price for the FL 250 can be around \$490,000.

Enertech offers a similar product called E48, which is a viable 600kw wind turbine option that allows for optimum production at a smaller size. The E48 has a 48m (157ft) rotor that is ideal for placement in crowded areas. The height of the tower that would support the rotor would range from 164 to 213 feet. Enertech recommends purchasing two E48's to maximize power production and a major advantage to this approach is eliminating any down time for necessary repairs. Due to the smaller size of the E48 it is much easier to install than other larger models. This model is made using welded steel. The cost per unit is approximately \$900,000.

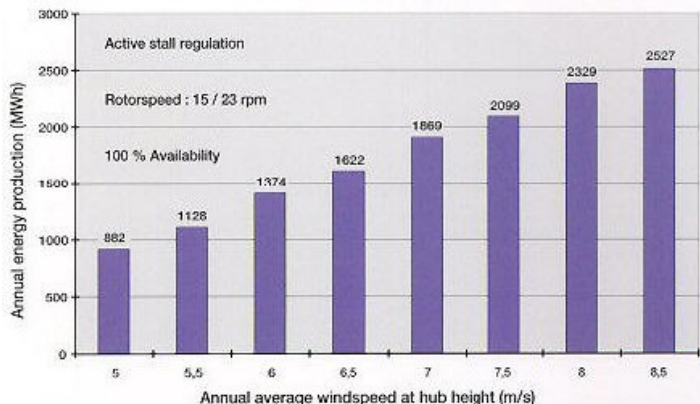
The E48 is equipped with an Active Stall Control (ASC) system, which ensures maximum output in all environmental conditions and is also responsible for bringing the blades back to idle speed in the occurrence of a grid failure. The E48 also includes a safety feature that will cause "cut-out" at winds higher than 26m/s (56mph). The entire windmill can withstand winds up to 60 m/s (134mph). This system will become operational beginning with winds of 7m/s (3mph). In this situation a 120kw generator will turn on to ensure high performance in light winds. When wind speeds exceed 7m/s the 600kw generator takes over.

The E48 is assembled in Kansas. This can greatly reduce shipping costs and enable a much faster delivery times and allow for smaller quantities of turbines to be purchased. The E48 has a life span of at least 20-25 years and comes with the option of remote control and monitoring via a modem link.

Enertech has been in operation since 1998 and has over 70 units in operation. They are also fully certified by various international organizations and the E48 is built to ISO 9001 quality standards.



## Enertech E48



Another model that fits the basic needs of Acutec is The S77 from Nordex. The S77 was developed partly from existing technology in its predecessor, the S70, as well as new advances additions. The S77 is an ideal turbine for areas that yield minimal to medium wind generation. The model compensates for the average wind speeds through the use of a larger rotor diameter and pitch technology. The Danish manufacturer claims its distinction in 'combining consistent engineering with technologically high-quality components in an efficient system'.

The pitch and rotor speed controls operate together to keep the wind turbine balance between minimum and maximum yields. Depending on the variation in wind speed, the turbine will employ specific systems for operation. The turbine will be active with cut in wind speeds of 3 m/s and be cut out with wind speeds between 20 to 25 m/s depending on the structure. For instance, at low speeds the control blade pitch will be used, and at high speeds the rotor controls and pitch. Nordex utilizes the vacuum injection method in blade manufacturing in order to increase resin absorption and provide durable blades on a consistent basis. Nordex has also has made use of a new coating process which has proved to be effective in weather-resistance. The model can also be constructed upon either on either a tubular or tower. This option can be attractive to consumers who can tailor the turbine to meet their needs. ("Products and Services.")

Chart 1.1

<b>Nordex Worldwide Turnkey-Project</b>
Planning and project management
Drawing up the layout of the wind park and micrositing
Road access
Foundation works
Cable installation
Installation of a transmission station or substation (medium voltage or high voltage)
Grid connection
Installation of turbines
Commissioning of wind turbines
Control and monitoring of turbines and the wind farm via Nordex Windpark Control and Management System (WPCMS)
Maintenance, service and technical operation

Chart 1.2

<b>Lorax Energy's Complete Project Management</b>
Wind turbine selection and integration of the overall system design.
Wind turbine procurement and coordination of equipment delivery to site.
Acquisition of local Planning, Zoning and Building permits
Utility interconnection design, utility approvals, balance of plant installation.
Foundation, tower, and wind turbine construction and erection.
Component testing and wind system startup and commissioning.
Wind and wind turbine power measurements and data logging.
Long-term wind turbine operation and maintenance.

The main priority for Acutec is the production precision-machined parts for high-level machinery. With this in mind, the integration of a windmill could lead to some challenges in regards to turbine installation and maintenance. The best way for Acutec to avoid interrupting the current production process is to purchase wind turbine equipment from a company that will virtually cover all aspects of

turbine installation and maintenance. In terms of wind turbine capabilities and wind production, Acutec could use Enertech, Nordex and Lorax for wind energy production as they all have a wide range of wind speed usage. Enertech produces what seems to be a quality product and they are well established and reputable. Their wind turbines are smaller making them easy to install and ideal for crowded areas. The downside is that the company lacks service packages for maintaining the wind turbines in the long-run. This is a big problem because Acutec has limited knowledge in the field of wind energy. Nordex had been considered a potential supplier for Acutec's wind energy project as they offer wind turbines that are customizable for individual customer needs. In addition, Nordex claims a high quality product with efficiency. Nordex wind turbines have a special finish, making them extra durable for inclement weather. Although Nordex and Enertech present some very quality products with features that fit Acutec's agenda, Lorax turbine systems are the most applicable to Acutec's needs and goals. Lorax turbines offer a number of great features, which include everything from speed regulators to grid connections. They also offer complete project management, which means Acutec will have little concern in undertaking such a huge project. Lorax will provide wind and energy measurements as a way of tracking the long-term investment. Above and beyond Lorax even takes care of the local zoning and building permits prior to turbine installation. Their wind turbines have so many great features and the all around planning, installation and long-term up keep of their wind turbines. This proves to be more than sufficient in providing results with minimal distraction to existing systems at Acutec. Overall the Lorax model is the best fit for Rob Smith because he gave us the impression that he wants to help keep the environment sustainable while making a sound financial investment, but with limited knowledge a major concern was the project maintenance. With Lorax Rob Smith will be provided with the proper tools and resources so that his investment becomes profitable and worthwhile.

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## EXHIBIT 2 – Electric Utility

Andrew Sunday, Sean Hanlon, Patrick Malie, Tony Taormina, and Philip Badger  
Econ 421: Strategic Environmental Management March 16, 2007

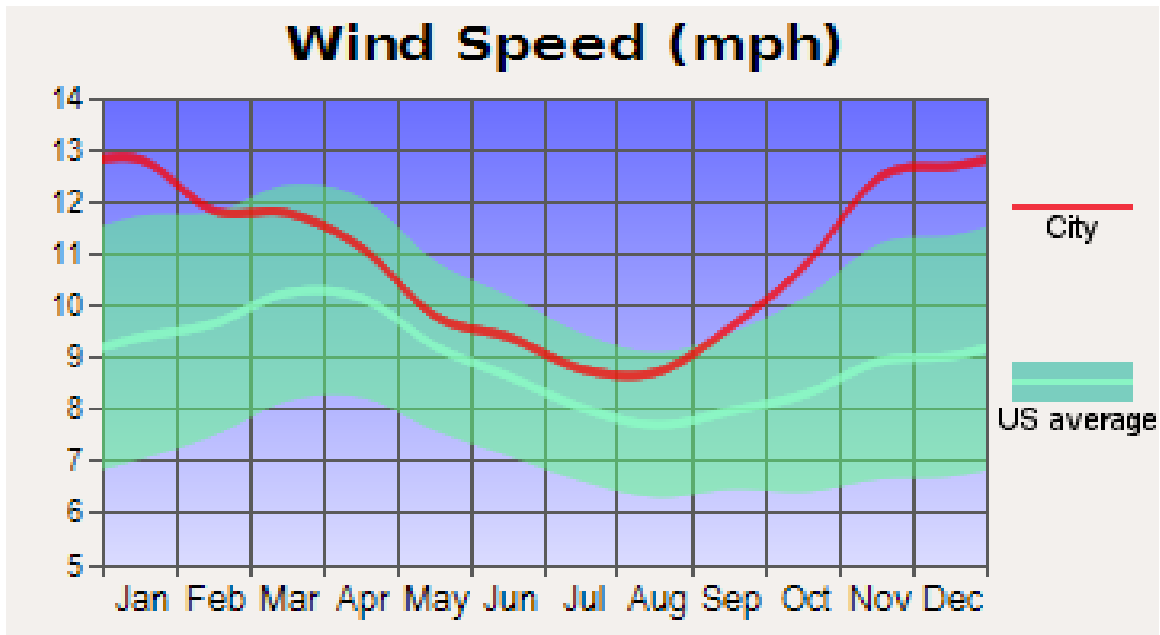
The project presented towards our team was to look at the electric utility usage at Acutec and to offer suggestions as to what the company should pursue with putting in a wind turbine to alleviate the electricity costs for the company. There will be a rise in the electric bill for Acutec as the cap on the electric companies will be raised and as Rob Smith stated, his bill most likely will rise to three hundred thousand dollars a year. As was stated in the ES 210 presentation, Acutec did not want the tallest wind turbine that they could find. These students suggested that Acutec look at the wind turbines that the company Nordex produces and specifically looking at the S77 model. In order to produce a cost benefit analysis comparing the electric use and the possibility of adding one or more wind turbines, we had to first analyze Acutec's bill and look at the average wind speeds for Saegertown, PA. We also had to find out about the grid hookups for the turbine, the possibility of storing excess energy, and also seeing if the company could sell its unneeded electricity back to the grid, or if it would be beneficial for the company to even do so. Our group also had to evaluate and figure in any grants or tax breaks that Acutec may receive for using green technology.

Our major source came from Acutec's electric bill from Penelec. This showed us the amount of kilowatt hours and the amount of kilowatts that Acutec uses per year. This is important in establishing the peak usage months for Acutec, a key determinant when factoring these numbers against the average wind speeds in Saegertown, PA which was found on city-data.com. The wind speed data was also presented by the ES 210 students and they also cited the city-data.com website for their findings. We also used a couple of handouts that were provided from this presentation for our report. Since the class suggested the Nordex S77, we went on Nordex's site to find out everything about this wind turbine. We also got in contact with Acutec's contact Jim Wimer at Penelec Energy Company and asked specific questions about the grid hookup and sell back which were used in this report.

The use of the windmill would defiantly beneficial in Acutec's case. Just judging from the electric bill alone Acutec would save about two hundred thousand dollars a year. But in light of the rate cap coming off of the electric market in Pennsylvania in January 2008 they would save even more money over the years. Another Factor that brings its self up during the process of this analysis is that Acutec's Electricity usage goes up 10% to 15% which at 15 % is an increase of 396,345 kWh for the year of 2007. The fifteen percent increase in usage results in another \$17,835 in electric cost at the current price level of 4.5 cents per kWh. At the new uncapped rate of 7.5 cents per kWh the cost increase would be \$29,725. These factors do not even include the transmission costs that it would take to get the power to the facility.

When comparing the figure on wind speed with the figure on monthly peak load, there appears to be an inverse relationship between average wind speed in Saegertown and monthly peak load at Acutec. The monthly load in kilowatts peaks during the summer months while the average wind speed peaks during the winter months. Likewise, the monthly load plummets during the winter months while the average wind speed plummets during the summer months. This relationship suggests that multiple turbines could be advantageous during the summer months when the average wind speed can be under nine mph. The ES 210 class has noted that the Nordex S77 model turbine that Acutec is considering will produce anywhere from 200-400 kilowatts per month during the summer months. In 2006, Acutec used approximately 1,800 kW during the months of May, June and July. At this rate, multiple turbines could be effective in completely eliminating Acutec's electric bill during the summer months, as it takes 26 mph wind speeds for the turbine to even operate at full capacity. If storage were available, multiple turbines could make the project a profitable venture as Acutec would be able to sell the surplus energy independently, while taking care of their own bills.

Figure (wind speed)



One economic advantage of wind power is a subsidy offered by the US government in the form of a tax credit. During the first 10 years of installation and usage, companies using wind turbines to power their plants can receive a tax credit of 1.9 cents per kilowatt hour of energy generated (windaction). This rate is also adjusted yearly with inflation. An average sized, 2,000 kilowatt turbine can be expected to generate tax cuts of about \$100,000 a year (windaction). After 10 years of tax cuts for one turbine, one third of the initial total turbine costs can be paid for. Pennsylvania also recently passed a tax law, Senate Bill 514, mandating that wind turbines be considered tax exempt company equipment, and that only the land they are installed on will calculate into property taxes (windaction). Another advantage of wind power generation is accelerated depreciation. Accelerated depreciation allows companies to depreciate wind turbines up to five times faster than normal company equipment, allowing for a turbine to be written off in as little as five years. No physical money is actually saved with accelerated depreciation, as the higher write offs now will take away from future write offs, but money is always preferred now by businesses than in the future.

With the provided information comparing different wind turbines from the ES 210 presentation, we were able to find a specific wind generator that seems to fit the job. The Nordex S77 is a mid-range priced wind turbine at approximately \$1 million. It stands 202 – 295 feet with a rotor diameter of 253 feet and is easily capable of 250+ kW per hour. This turbine fits within Acutec's preferred height range. With a cut-in wind speed of only 6.71 mph, this turbine is workable even in the lowest wind-speed months of the year in Acutec's location. Wind in the area dips just below 8.7 mph and peaks at about 13 mph. With this range of wind speeds, the Nordex S77 offers an adjustable governor to change the resistance of the turbine to ease blade rotation in low speed wind times, and increase resistance in high speed wind in order to generate more electricity.

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## EXHIBIT 3 – Acutec’s Carbon Risk

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Laura Nagel, Jonathan Weinberg

March 16, 2007

### Background

The world’s scientists strongly agree that global climate change is happening and furthermore that human activity has contributed to it. The effects of climate change will be far-reaching and catastrophic. Global climate change will lead to more extreme weather events such as severe hurricanes and droughts. Increasing temperatures will melt polar glaciers resulting in rising sea levels. Scientists also believe that a continuing temperature rise will lead to the spread of disease and an increase in human illnesses and deaths (Mendelsohn 2001). All of these impacts will have economic implications. Among them are expensive clean-up operations after storms and floods, billions of dollars in property damage from rising sea levels, and loss of productivity from human illness. It has been forecasted that climate change will cost the global economy US\$300 billion per year by 2050 (Smith and Pears 2005).

Since the beginning of the industrial revolution, atmospheric concentrations of carbon dioxide have increased nearly 30%, methane concentrations have more than doubled, and nitrous oxide concentrations have risen by about 15% (*EPA Climate 2000*). These increases have enhanced the heat-trapping capability of the earth’s atmosphere. The United States, the world’s largest emitter of greenhouse gases, is a major contributor to this problem. Global climate change is largely due to our massive consumption of fossil fuels and the depletion of the world forests, primarily tropical rain forests (Uzawa 2003). The leading forces behind these human activities are economic, and any policy or institutional measures to prevent the process of global warming successfully will have to take into account the economic, social and political implications (Uzawa 2003).

Our economic system has largely contributed to the global warming crisis. Atmosphere and greenhouse gases are global public goods, or externalities. Global public goods are goods whose influences are felt around the world rather than in one nation, town, or family (Nordhaus and Danish, 2003). Public goods are commodities for which the cost of extending the service to an additional person is zero and for which it is impossible or expensive to exclude individuals from enjoying. Traditional economics has been almost exclusively concerned with those scarce resources that are privately appropriated and whose ownership rights are traded on the market (Nordhaus 2001). While the marketplace is the most efficient way of producing private goods, it fails to allocate public goods effectively. For individual actors or firms, it is often the best and most rational strategy to emit greenhouse gases because, as of right now, the action is essentially free. However, the costs of emissions are being externalized on society. From a societal standpoint the action is not a good or rational one. Because of their characteristics, public goods frequently need to be provided by nonmarket or modified market mechanisms (Heal 2000). As regulations are passed and firms address their carbon emissions these externalities will begin to be internalized.

While some broad economic sectors, such as transportation or electricity, are more obvious emitters of greenhouse gases, the contribution of private businesses, such as individual manufacturers, have remained relatively out of blame’s limelight. However, with the ever-increasing acceptance of the fact that anthropogenic emissions are indeed collectively affecting global climate, businesses of all sizes and levels of production are being pressured to make serious changes in their production and management practices. Acutec in Saegertown, PA is one

business that is facing such pressures. Acutec manufactures aerospace parts and this production requires energy, which is currently drawn from a traditional energy grid. Therefore, Acutec is indirectly contributing to the rise in atmospheric carbon. However, if business continues as usual, Acutec will inevitably face carbon risks. In an effort to circumvent economic pressures, Acutec hopes to be proactive and incorporate the use of wind power into its production.

With the debate over the reality of global climate change over, many have come to the realization that regulation of carbon emissions will be inevitable in the future. Recent action by corporate leaders and politicians confirm the fear of looming carbon regulations. In a recent survey of 31 major U.S. companies, 90% believed that regulation by the government would come soon and 67% believed that it would be between 2010 and 2015 (Hoffman 2006). With the United States lagging behind on a comprehensive plan for regulation compared to other countries around the globe, many corporate leaders faced with prolonged uncertainty have begun to take their own initiatives in order to ensure long-term financial stability of their firms (Hoffman, 2007). Recently, 10 industry leading corporations including major energy firms banded together with environmental groups to push for government regulation (Barringer 2007). The Global Roundtable on Climate Change formed in 2004 to investigate the shaping of corporate policy to preserve the environment. Large corporations like General Electric and Volvo are members of the roundtable and call for prompt and decisive action on climate change (*Corporate Push for Action Against Warming* 2007). These corporations are also spending huge sums of money on research and development of new technologies that would be less dependent on fossil fuels. Likewise, 375 mayors from across the nation signed an agreement, which urged the federal government to establish nationwide legislation (Hoffman 2007). These leaders and others believe that regulation is inevitable. In signing the initiative, they are paving the way for the regulation of carbon so that they will be able to plan better for their futures while those who do not will be left in their wake. Currently, there are several bills that would regulate carbon emissions pending before the U.S. congress such as the Climate Stewardship Act. Although the current administration does not plan to regulate greenhouse gasses, future administrations will have to address the problem.

There are several mechanisms that can be used to align private and public interests in the global warming case. The first is command-and-control regulations. The EPA or some global organization could set maximum emissions rates, or "performance standards" that industries must follow. If a firm were unable to meet these new reductions in greenhouse gases they would be subject to penalties, such as a fine (Smith 2004). Being forced to quickly change its practices (i.e., limit its fossil fuel usage) could certainly inhibit Acutec's production for a time, thus creating a potential profit loss. The pressure to quickly respond to new governmental standards is one type of risk Acutec currently faces.

Another way to align private and social interests is through taxation and subsidies. Pigou suggested this technique in 1932. With taxation you can alter the private cost of an activity until it equals the social cost. A corrective tax could be added to oil or coal in order to bring private costs in line with social costs. The tax would reveal the true price of nonrenewable energy, including its costs on society. Taxes provide polluters with an incentive to find the most cost-efficient means of limiting their pollution (Smith 2004). Depending on the tax rate, a carbon tax could substantially reduce the use of commercial carbon fuels and create price-incentives for transition to sustainable energy sources, such as wind, solar and geo-thermal power (Paul and Wahlber 2002). Facing the potential of a future carbon tax is another way in which Acutec is subject to carbon risks.

Tradable carbon permits could also be assigned to address the global warming problem and businesses' role in the issue. Another name for this type of market is cap-and-trade. A group of emitters (or countries) have a limit placed on their collective emissions over a set period of time. The cap is usually fixed, an absolute amount of tons of carbon is set at the beginning, but it could also apply where there is an indexed variable, such as carbon tons per GDP (Ward 2005). Once the cap is set, the second step is allocating the cap in the form of tradable emission permits or allowances among the group of emitters. The trading feature of the cap-and-trade program authorizes anyone to buy, sell, or hold allowance; very similar to investing in the stock market. In a well-functioning trading market, permits will end up being distributed among firms that find the cost of abatement (cost of reducing emissions) higher than the cost of purchasing the permits. Firms will sell permits if their abatement costs are lower than the permit price (Ward 2005). This feature of the cap-and-trade system allows for a least-cost outcome. Each firm meets the demands of the cap by adopting its lowest-cost means of abatement.

This last method of encouraging businesses to adopt methods to curtail emissions has already been enforced elsewhere around the world. In December 1997, 175 nations agreed to the Kyoto Protocol (Ward 2005). The protocol sets a legally binding agreement for 39 developed countries to reduce their greenhouse gas emissions by 5.2 percent between 2008 and 2012 (Ward 2005). In order to implement the Kyoto Protocol, the European Union and other countries have set up a cap-and-trade system for carbon emissions. The European Union Emission Trading Scheme is the largest multi-national, greenhouse gas emissions trading scheme in the world. It commenced operation in January 2005 and all 25-members of the European Union are participating. In its first year, 362 million tons of CO<sub>2</sub> were traded on the market for a total of twelve billion dollars (Ward 2005). The success of Europe's system creates harsh competition for the U.S. economy. When corporations are faced with the option of investing in new, more efficient technology they have the choice of installing it in the U.S. or abroad. Under the Kyoto Protocol, the corporation will be able to receive valuable credits for making those efficiency gains, and be able to reduce its greenhouse gas emissions. Those credits will be worth cash abroad because of the European Union Emission Trading Market. It is clear that in the coming years, the United States will need to address global warming in order to remain competitive, and a cap-and-trade system may be the solution (Ward 2005).

If the government were to set an emission cap, one possibility is that companies could buy offsets so that they would not have to implement carbon-reducing measures. A carbon offset is a service that tries to reduce the net carbon emissions of individuals or organizations indirectly, through proxies who reduce their emissions and/or increase their absorption of greenhouse gases. Carbon credits certify the removal of carbon dioxide from the air. Each carbon credit is associated with the removal of a single ton of carbon dioxide from the Earth's atmosphere (Nordhaus 2006). A wide variety of offset actions are available; tree planting is the most common. Acutec could buy the credits from forests, grasslands, wetlands or other ecosystems that sequester carbon. Renewable energy and energy conservation offsets are also popular, including emissions trading credits.

### Analysis

In 2006, Acutec used 2,642,304 kWh of electricity. The production of this electricity caused 6,077,299.2 tons of carbon to be emitted into the atmosphere (*Preliminary Energy and Utility Saving Assessment* 2006). In order to sequester that amount of CO<sub>2</sub> from the atmosphere 320 acres of forested land would be needed every year (*Preliminary Energy and Utility Saving Assessment* 2006).<sup>1</sup> This amount of carbon is a huge risk for Acutec in the future and it does not even take into account the amount of carbon emitted from shipping products long distances.

To put into perspective the potential costs of emitting carbon we will look at current carbon prices. One popular site CarbonCounter.com offers a carbon sequestration service to individuals and firms. They charge \$10 per ton of carbon (*Buy Carbon Offsets* 2007). If Acutec wanted to buy credits for the amount of carbon it emitted last year it would cost \$26,423,040. Within the European Union, carbon is currently traded at US \$26.7 per ton of carbon (Shah 2006). At the European price it would cost \$162,263,883 to offset the firm's carbon emissions in one year. The World Bank recognizes carbon at US\$5 (Shah 2006). Even at this relatively cheap price, it would cost Acutec \$13,211,520. It is true that it is very unlikely that a firm would have to pay for all its carbon emissions in a year, yet this example shows that even having to account for 10% of emissions will be costly.

As far as the future is concerned, the price of carbon is not set, nor is it easily projected. In October 1998, after the Kyoto Protocol was signed, EIA (Energy Information Administration) published an article in which it made carbon reduction and price predictions. EIA analysis of the cost of various carbon reduction scenarios shows a wide range of results, from \$67 per ton of carbon to \$348 per ton, well above the current European price (Wiser and Bolinger 2004).

Even though the EIA has projected a wide range of price predictions, several utility companies, in an effort to factor in the risk of future carbon regulations, have attempted to pin down a slightly more specific price within this range. PacificCorp modeled a variety of scenarios of possible future cap and trade regulations. The first models carbon starting at \$8 per ton by 2008, another had carbon at \$25 a ton by 2013 (Wiser and Bolinger 2004). Idaho Power's long-term plan used the following estimates of a 30% probability of zero carbon tax, a 50% probability of a \$12.30 per ton tax and a 20% probability of a

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<sup>1</sup> The conversion factor (tons c/kwh) is what the DEP uses to do its calculations. Every kWh generates 2.3lbs of CO<sub>2</sub> and one acre of forest can remove and store 19,000lbs of CO<sub>2</sub>.

\$49.21 tax by 2015 (Wiser and Bolinger 2004). A 2004 study by the California Public Utilities Commission has proposed the following probabilities for carbon regulation: zero percent until 2008, 10 percent in 2008, increasing every four years to 50 percent in 2024. According to the studying, through 2015, offset costs range from zero to \$15 per ton. After 2015, this increases to \$30 per ton (Wiser and Bolinger 2004).

### **Concluding Remarks**

With the installation of windmills before the enforcement of the potential regulations mentioned above, Acutec would be at an advantageous position in the market. If Acutec proactively switches to alternative energy before such taxes and restrictions are enforced, it would not have to worry about making a quick, and therefore potentially costly, production transitions. Acutec would also benefit from a more secure and reliable relationship with its energy provider. If a tax were to be levied on utility companies, there would inevitably be an extra cost imposed on its customers. With wind power generating some electricity, Acutec would not have to be as vulnerable to these rising utility costs. Not only would Acutec be able to avoid potential costs, but it could also actually generate an extra source of revenue. For example, if a cap and trade system were to be implemented, Acutec would be able to sell unused credits provided by the windmill to other companies for a profit.

We conclude that a wide range of carbon regulation scenarios are possible. Reports are projecting carbon regulations to begin as early as 2008, however the majority suggest that regulatory measures will be adopted by 2020. While, there is still great uncertainty as to when there will be carbon regulations in the U.S., the type of government regulation, and the price of carbon, there is little uncertainty that global warming is already a serious problem and that we are at a pivotal time. Therefore, it is in Acutec's best interest to begin to protect itself against the potential risk of carbon.

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## **EXHIBIT 4 – Company Issues**

Whitt Fiscus, John Mangini, Ranhee Pyo, Mateo Villa, Josh Whitside

### **Introduction**

The purpose of this paper is to examine company specific issues that Acutec will encounter in their implementation of wind power. Common empirical questions are generated as a company researches a new source of energy. Brainstorming and interviewing Acutec personnel such as Rob Smith, Dan Bras, and Tracy Porter, led to the answers of some of these questions. However, there still some questions that need to be considered and researched. In the sections that follow, four categories of company issues are reviewed. First, the relationship between external and internal stakeholders is examined. Secondly, financial issues revolving around the expected rate of return and potential business structures are viewed to find which is most apt for a small period for recovery cost. Thirdly, a section is devoted to the costs and hurdles associated with the expected windmill site are offered to describe the issues regarding actual implementation. Finally, is a research based section regarding the company's past electricity consumption is considered to find a strategy to reduce costs using a newly implemented windmill.

### **Stakeholder Relations**

Stakeholder relations are vital to Acutec's growth and success. The positive reputation surrounding "green" energy may influence external stakeholders such as major industrial corporations, neighboring companies and the community in their relationship with Acutec. Large corporations such as GE and Lord have an interest in environmental issues such as "green" energy. On each of these two company's web pages, they express their devotion to the environment. Certainly, one of the reasons for doing so is to solidify their reputation as a responsible company, as well as to be viewed as innovative and able to implement environmentally friendly tactics. Therefore, Acutec is achieving the same type of reputation, which they should be willing to advertise within their business. Because these clients are major stakeholders and provide Acutec with a large portion of business, by aligning environmental concerns with that of their clients only positive repercussions can occur. If Acutec were to gain more business from being "green", it would help defray the costs of implementing the windmill(s).

One specific neighboring company that is a stakeholder providing incentives to Acutec is Crown Communications, a company that owns a cellular tower adjacent to the probable windmill site. During our interview with Tracy Porter, he reported that Crown was willing to allow sensors to be attached to their tower to gather data about wind speeds. This would be cost free research to Acutec for their windmill project, allowing them to determine the electricity that a windmill would be able to produce. Because "green" energy is thought to be the future, Crown has an interest in a wind study to later sell wind data for the region. Surely, by Acutec being the first to investigate this new source of energy, their reputation for being innovative will be reassured and the perks of this reputation are already being reaped by the offer from Crown Communications.

The community is also a major stakeholder that has an interest in environmentally friendly business practices. By building their reputation within the community as environmentalists, Acutec achieves two goals. They open themselves to possible low interest loans and grants for being an innovative, trend-setter within the state. Secondly, as we heard from Tracy in speaking with him, the Saegertown area has a negative attitude toward those who seek environmentally friendly goals due to lack of information. By being an established part of the community, investing in the environment may bring a fresh positive attitude to the area, and allow more environmental regulation to take place.

### **Financial Issues**

The windmill power project will pose many different financial hurdles for Acutec. The first hurdle is the cost of the windmills themselves. After talking to the Acutec administration, Tracy Porter in particular, it seems that Acutec is willing to pay for windmills up that cost anywhere from \$100,000 to \$500,000 as long as it is possible for them to recover their own cost within their lifetime. Based on talking with Acutec representatives, it seems that turning a large financial profit is not a primary concern, thus it is not crucial to buy cheaper windmills that would recover their costs in a shorter period of time. However, since Rob Smith is looking for a turn-key operation, implementation of the windmills will likely cost more than average due to landscaping, tree removal, and other such set up costs.

Other financial issues are the long term financial costs. One such long term cost is the employment of one or more persons to maintain and oversee the windmill(s). Considering the case that

Acutec will have to employ a company to maintain the windmill and oversee operations, this cost could have a significant impact on the overall profitability of the project. Another long term cost is replacement parts for the windmill. Replacement parts can be quite costly on large scale windmills, especially blades and turbines. Also, smaller moving parts on the windmill are likely to require more frequent replacement.

On the positive side, the goal is for the windmills to be a source of positive revenue, or rather decreased electricity costs. One scenario is selling excess electricity back to the power grid for profit to offset some of the electric bill. If it turns out that this is a real opportunity, Rob Smith mentioned the possibility of creating an entirely new limited liability corporation to maximize profits. A more likely source of financial benefit is taking advantage of a "green" Acutec via tax breaks and subsidies. A more environmental Acutec is also likely to attract customers who are interested in such corporations without losing potential customers who aren't.

### **Land Constraints**

Acutec owns a total of 11.96 acres at the Saegertown facility (Map 1). The highest point on the property is an approximately 2 acre area immediately east of the Acutec building. This hilltop is the proposed location for the base of the wind turbine. The production facility does not cover the remainder of the acreage but parking lots, the cell tower, and underground components of the company's septic system make the initially proposed site the only feasible one.

The site is easily accessible for initial construction as well as routine maintenance and repairs. The successful construction and upkeep of the 300 ft cell phone tower adjacent to the site lays to rest any concerns about problems relating to accessibility. In addition to the existing access road to the cell phone tower, the site is located on the corner of State Route 198 and Interstate 79 making the delivery of heavy machinery and large component pieces feasible.

The opportunity costs of using the proposed site for the construction of a wind turbine appear to be relatively low. Further expansion of the firm's production facilities are limited by several factors. Owner Rob Smith has emphasized that he wants to build additional production capabilities at other locations in an attempt to maintain the advantages of having a small, tight knit facility. According to engineer Tracy Porter, growth is additionally limited by the septic system. The facility is close to its full size potential with respect to waste management capabilities. The only other option mentioned by Acutec personnel for use of some of the available land was a pavilion for company functions and public relations. The pavilion project does not seem to be a priority and is not necessarily ruled out by the construction of the windmill.

Depending on the desired size of windmill, limited acreage could be a constraint. The elevated area is composed of relatively new topsoil. The reason the area is the highest point on the property is that topsoil and fill from construction on the property was placed there. The stability of this soil must be investigated prior to construction.

In addition to the stability of the soil, exact measurements of the available space must be made. Distances between roads, buildings, the cell tower and the proposed location for the base of the windmill need to be determined. Zoning laws will be important as well.

### **Electricity Concerns**

Acutec's electricity is going up by about 15% per year on average. We can analyze that Acutec's electricity bill and kW are very high in the summer (Jul. \$20,085 - Aug. \$20,003) because of cooling system in the working place (See "Electric Utility" graphics). They have to keep a cool temperature during hot summer days with 2 shifts.

Total Kw Hours as well as total electricity costs have been steadily increasing over the last year. Acutec's billing structure is such that they are charged for their peak usage at any given point during the month. Implementing wind power as well as pursuing measures to spread out electricity use at peak times could significantly reduce energy costs.

In electricity storage issues, Acutec only maintains limited storage opportunities. For example, a few portable lights, tools and forklifts run on batteries. Other than that, all main production, lighting, heating, cooling are run off grid power. Now, people are looking for "green energy" that helps the company to achieve strong stakeholder relationships and obtain lower or more stable operating costs with reducing emissions. In this atmosphere, they are concerned about the wind power. If Acutec has battery storage for the excess wind power, they could save a big portion of the electricity bill for summer usage. They may want to look into investing in more battery powered machinery.

### **Conclusion**

There are extensive considerations to be made by Acutec before the construction of their wind turbine, including stakeholder relations, financial issues, land constraints, and electricity concerns.

Without careful consideration of the entirety of these topics it would be impossible to make this project practical or profitable. It is still essential to continue the brainstorming process to think of more company specific issues that could pose potential barriers. However, if properly planned and executed it is more than likely that this project will be beneficial for both Acutec and the environment.

## **EXHIBIT 5 – Governmental Subsidy Options**

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### **Intent of Study**

The purpose of this study is to determine the current viability of government subsidy options, in the case of a wind turbine proposal for Acutec Precision Machining, Inc. If it is determined that government subsidy programs are a viable source of income for Acutec's proposed wind turbine program, the potential exists for Acutec to save significant funds, should their management choose to proceed with this program. As such, the result of this study will be of significant value to the end result of the proposed Acutec wind turbine program.

### **Form of Subsidies**

Subsidies, in their purest definition, are monetary grants given by government to lower the price faced by producers or consumers of a good, generally because that good is considered to be in the public interest. In other scenarios, the term subsidy can also refer to assistance granted by others, such as individuals or non-government institutions. These alternate sources of subsidy are not being addressed by this study.

Subsidies are generally given in two forms: grants and low interest loans. In these two forms, there are many different kinds of subsidies given, such as direct, indirect, labor, tax, production, regulatory, infrastructure, trade, export, procurement, and consumption incentives and disincentives. The main subsidies that may apply to the windmill project are production subsidies, tax incentives, and low-interest loans.

### **Production Subsidies**

There have been many programs implemented by Governor Ed Rendell to bring alternative energy sources to Pennsylvania. He is working to provide companies that are using all types of alternative energy with some financial aid. In Rendell's words, "Pennsylvania is home to one of the nation's most progressive alternative energy portfolio standards, ensuring that 18 percent of all generated energy comes from clean, efficient sources by 2020." (PSATS Conference) Under Governor Rendell, there have been grants and loans made totaling \$15 million and there will be another \$200 million provided by private investors. Funds have also been provided by The Small Business Advantage Grant Program.

An additional Rendell program is the Pennsylvania Energy Harvest. "This round of Energy Harvest grants will fund projects that promote and build markets for advanced or renewable energy technologies. The intent is to provide a stimulus for opportunities that better manage our energy resources in a way that also improves our environment, supports economic development and enhances our quality of life." (EnergyHarvest) Each year, Governor Rendell issues almost \$6 million to the year's recipients of the grant.

In addition to the current projects in affect, there are also programs, which were recently in affect and have a likelihood of being renewed in the near future. For example, there was a grant made available in 2006 by the PA Energy Development Authority, where each company was given about \$1 million dollars, on average, for environmentally friendly programs. This program supported all forms of alternative energy research and projects. Though it was available in 2006, it has a strong chance of becoming available for 2007.

Additionally, as part of Governor Rendell's plan to promote alternative energy in Pennsylvania, the Pennsylvania Energy Development Authority and Southwest Windpower worked together to give 15 small wind turbines to school districts, municipalities, and public authorities throughout the state. The turbines, which are about big enough to power a typical house, are manufactured by Gamesa Corp., a Spanish company that now has a headquarters in Philadelphia. Although the deadline to apply for this program was in last May, there will likely be another application period in which businesses can apply to either receive wind turbines or grants for alternative energy use.

### **Production Subsidy Distribution**

It is important to note that any subsidies given for the windmill project will likely come from the Energy Commission. The way that the Energy commission distributes the subsidies are based on electricity produced per kilowatt-hour by the wind turbine. If subsidies are used for the production of these alternative energy sources, the production will be regulated by the energy Commission in such a manner that will only allow a certain amount of energy to be used per quarter. This means that there will be times where energy will have met production requirements for the quarter, and as such will the wind turbine will have to be shut down the remaining time left in the quarter. On the other hand, in quarters where production has not met the maximize production level it is allotted, the wind turbine will be allowed to make up for the remaining energy balance in the upcoming quarters. This level of restriction should not be a problem for Acutec, due to its desire to only use its wind turbine to produce energy for its respective plant. The only foreseeable time where this issue could affect Acutec would be if the company branched out and began a new company, which would produce energy for neighboring industries, as was suggested as a potential future project by Mr. Smith from Acutec. In that case, this governmental oversight could possibly be viewed as a disincentive to use governmental subsidies in the execution of the Acutec wind turbine program.

### **Tax Incentives**

In addition to state subsidies, there are several state and federal tax incentives made available to companies, which are taking steps towards the utilization of alternative energy sources.

Firstly, under the Modified Accelerated Cost-Recovery System (MACRS), commercial and industrial businesses can recover investments in property through depreciation deductions. The MACRS establishes a set of "class lives" for various types of property, ranging from three to fifty years, over which the property may be depreciated. The current MACRS property class for wind property placed in service after 1986 is five years. Information and instructions for IRS Form 4562: Depreciation and Amortization, which is utilized in this tax incentive, can be found at the IRS web site (IRS, DSIRE 2007).

Secondly, in November 2006, Pennsylvania enacted legislation (Act 167 of 2006) excluding wind turbines and related equipment, including towers and foundations, from real estate taxes. In order to qualify for this exemption, each county's assessor (in the Acutec case, the Crawford County assessor) must develop an assessment valuation for real property used for wind energy generation, by using the income capitalization approach (IREC 2007).

As a third example, there is the Wind Energy Production Tax Credit (PTC), a per kilowatt-hour (kWh), corporate tax credit for wind-generated electricity. The PTC provides a 1.9 cent per kWh tax credit for electricity generated with wind turbines over the first ten years of a project's operations. Enacted as part of the Energy Policy Act of 1992, the credit has gone through several cycles of expiration and renewal. In December 2006, the credit was extended through December 31, 2008 by Section 207 of the Tax Relief and Health Care Act of 2006 (DSIRE 2007).

Finally, there is Pennsylvania's Alternative Energy Investment Act, referred to the Committee on Finance on March 9, 2007, which intends to "encourage the development of and support to businesses that are engaged in the production of ... alternative energy [fuels and equipment]." Under this tax incentive, qualified businesses receive a tax credit in the amount of 15% of the qualified expense of the project. If the business cannot use the entire amount of the credit, the excess may be carried over to succeeding taxable years and used as a credit against any tax of the business under Article III, IV, or VI of the Tax Reform Code of 1971. The total amount of the tax credit cannot exceed \$15,000,000 in one fiscal year. This act is set to be implemented in May 2007 (PA General Assembly 2007).

### **Low-Interest Loans**

Beyond governmental subsidies and tax incentives, low-interest loans are also a very viable source of additional income for the funding of the proposed Acutec wind turbine program, as well as other similar business ventures. Concerning these loans, there are loans available at the local and state level across Pennsylvania. No loans distributed at the federal level have been found for the type of energy production Acutec wishes to utilize. Only two loans appear appropriate for Acutec, one granted at the local level and one granted through the state. The terms of both loans vary according to the type of project to be implemented.

Firstly, the Penelec Sustainable Energy Fund of the Community Foundation for the Alleghenies Loan Program provides loans at the local level for interests within the Penelec energy service area of western Pennsylvania. It is based in Johnstown, Pennsylvania. As of April, 2006, the fund had \$9.1 million for loan and grant making, but typical loans do not exceed \$500,000. The loan is under a business investment program for businesses like Acutec that wish to develop renewable energy generation for their operations. Financial assistance for wind energy generation is available from the fund in the form of commercial loans, subordinated debt, royalty financing, and equity financing.

The Pennsylvania Energy Development Authority (PEDA), a subdivision of the Pennsylvania Department of Environmental Protection, provides state issued loans up to \$1 million, with a maximum guarantee on each loan of \$500,000. PEDA offers these loans as part of a partnership with the Pennsylvania Department of Community and Economic Development. The program budget is \$10 million. Though PEDA's most recent loan solicitation period has ended this past summer, notification of the next available solicitation (application) period is available on PEDA's website. Interest rate on these loans is 50% of the prime interest rate, but not under 3.25%. This program is not currently accepting applications, but will probably be doing so in the future.

### **Concluding Remarks**

Through the previously noted analysis of governmental subsidy options, it can be concluded that governmental subsidies have been, are, and will likely continue to be available to Acutec Precision Machining, Inc, should its management choose to proceed with its proposed wind turbine program. In pursuit of this program, various forms of subsidies should be available to Acutec, including government production subsidies, tax incentives, and low-interest loans.

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## EXHIBIT 6 – Acutec Stakeholder Relations

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In 1994, Rob Smith became president of Acutec Precision Machinery with a strategic plan of increasing customer diversification while maintaining relationships with historic partners. Just twelve years later, Acutec experienced a rapid expansion of customer base and grew to a thirty-one million dollar company with this exact strategic vision. Presently, Acutec is keeping up in the market by continuously investing in current equipment and by having hands on approach to business. Recently, Acutec and Rob Smith have expressed interest in the investment of a wind turbine. The majority of the support for the wind turbine stems from the monetary benefits that would result from lower energy costs. However; there are other potential benefits of perusing innovation in field of renewable energy. Other “benefits appear to have monetary value that may be more difficult or even impossible to quantify” (Greenpower Market Dvlp. Group). Converting to another source for energy can enhance a company’s overall public profile and stakeholder relationships. Businesses that are venturing into the realm of renewable energy have recently been viewed as corporate leaders. Acutec’s and Rob Smith’s demand driven and proactive approach sets the company up to be put right into the position as corporate leader in the precision machinery field. Acutec’s support of new technologies that provide broad social benefits is a time-honored way of demonstrating corporate leadership and stimulating good connections with their key stakeholders.

Acutec’s conversion to wind or “green” power can be attractive to certain consumers. As consumers become more and more conscious of corporate environmental performance, green power purchases provide an opportunity for businesses to acquire trust in the public eye while differentiating themselves from their competitors. A purchase of a wind turbine could also potentially strengthen relations with local communities. Acutec will establish the title of a good community actor and, the community could be a direct beneficiary of the avoided pollution; enjoying cleaner air because of the company's action. A connection between Acutec and community could also be made if the surplus power becomes available for purchase by local businesses and consumers. An environmentally concerned company can also increase good relations with state and federal regulators. “By taking a proactive approach to addressing environmental issues, companies that use green power will be positioned better to engage environmental decision-makers and will be viewed with more credibility when meeting with legislators and regulators.”(Greenpower Market Development Group). One of Acutec’s main concerns is constantly trying to attract new and skilled employees. Green power purchases can improve relations with employees. By investing in the wind turbine, Acutec signals its concern for a broader set of issues that include more than just making a profit. These actions can improve employee morale and aid in attracting high quality employees.

Having strong stakeholder relations is very important for the success of Acutec because it is these stakeholders that keep the business strong and competitive in a growing market. Acutec is privately owned company that depends greatly on its smart investments in regards to expanding their customer base and maintaining strong ties to the surrounding community. The investment of a wind turbine is a proactive approach to combating price increases of future uncapped utility bills. This project is not only attractive to Acutec but also attractive to environmentally concerned potential customers as well. This could lead to a broader customer base and raise in future profits. Rob Smith, owner of Acutec, feels that there is too strong of a dependence on one of their customers, Lord Industries. This poses a risk for Acutec because Lord Industries may decide to change their suppliers at anytime. Reducing reliance on this particular customer, while continuing to have a superior relationship with that corporation, may

be aided by the addition of Acutec's wind turbine. Switching to a renewable energy source may spark the interest of other buyers in the precision machining market with "green" initiatives.

With the installation of a wind turbine Acutec is leading the way in Northwestern Pennsylvania as an innovator in the use of green renewable energy making it both profitable for the company and beneficial for the community. Green power purchases can strengthen relations with the local community. Certain benefits include reduced amounts of fossil fuels being burned to produce electricity. In some cases, where Acutec's green power purchase displaces existing or prospective conventional energy generation in the local area, the community could be a direct beneficiary of the avoided pollution and a potential drop in utility bills. Enjoying cleaner air because of Acutec will undoubtedly not only make them look better but the community and surrounding area as well. Acutec, along with most of the Northwestern Pennsylvania area, are part of a "HUBzone". A HUBzone is a distressed and under-utilized business area. As Acutec becomes more attractive, due to their new wind turbine, to customers and potential buyers around the world they are also building up the entire area, letting buyers look at other surrounding businesses as well. This attention and growth will lead to job opportunities, attract private investment, and empower the community as a whole.

The employees of a company may be overlooked when the management considers aggregate yearly data, but are an integral stakeholder in corporate decisions. Rob Smith discussed the fact that skilled machinists are in high demand, and Acutec does all it can to keep its workers satisfied. While machinists will be more concerned with paychecks, benefits, and time off, there is still very much an element of 'company pride' to be experienced as an employee of Acutec. The wind turbine may instill a greater sense of social responsibility and pride on the part of the corporation's workers. The Meadville area economy is far from strong, but Acutec may easily become a paramount industry whose employees feel that they are a part of an organization that gives back to the community in which their families reside. Such renewal in a HUBzone will surely grant Acutec a local reputation as an industry to which Meadville is thankful. The addition of a wind turbine brings undertones of responsible ethics that increases a company's reputation with workers as well as regulators, and in many cases, following progressive regulation will have similar motivational effect on local figureheads.

In the precision machining industry, Acutec undergoes many inspections for the quality of their products, the conditions of their machinery and the safety of their workers as well as the environmental impact of their facility. The addition of a wind turbine to Acutec's facility would enhance the relationship of the company with its environmental regulators, namely the DEP. Despite purely economic reasons for adding a renewable source of energy for Acutec, adding a wind turbine may create a good reputation with local environmental policy figureheads. Taking a positive and active role, the company is far better positioned for future energy regulation, such as a mandatory percentage of renewable energy per year, etc. Building trust and a leadership role in the area with proactive environmental action, especially with an economic drive, may put Acutec at the forefront for subsidies and tax credits in the future. Transparency and honesty with the environmental regulators and community environmental organizations increases the trust of these stakeholders. While this particular group of stakeholders may not be identified as key, they are still included in the list of those who are affected by, and may affect Acutec Precision Machining, Inc.

A large benefit of wind turbines as a renewable energy source is that in some instances, more energy is being created than is used and this surplus may be "sold" back to the local energy utility. Whether or not Acutec's wind turbines will generate enough energy for these net sales, Penelec is currently the main electric utility provider for the facility, and any energy issues faced with combining the two sources of energy will deal with this corporation. Regulation may change over time to require conservation efforts on the part of energy consumers, but also on the

implementation of renewable energy from power companies. Penelec is a part of a public benefit clean energy fund, along with five other Pennsylvania power distributors. This fund is directed toward growing businesses that install, design and manufacture technologies used for renewable energy and conservation of energy. Loans, grants and other financial assistance are provided to help with the fixed costs of these investments that not only benefit the corporation, but the rest of the community as well. Currently, Pennsylvania does not offer tax credit, but in the last few years, congress has developed credit systems for solar, and in the near future develop similar systems for small-scale wind turbine use (AWEA).

Acquiring a wind turbine will undoubtedly be a smart investment for Acutec to embark upon. With a current strong local and federal emphasis on environmental protection and improvement Acutec will become a more attractive investment for potential buyers and customers. Acutec is a privately owned business, which means it has to keep all of its stakeholders on good terms with the companies plans. There is no such thing as an insignificant stakeholder when it comes to a company such as Acutec. The purchasing of a wind turbine will generate renewable energy for the company and in turn will help decrease pollution due to the burning of fossil fuels. From a stakeholder's perspective, investing in a wind turbine is a smart business move and the company will profit in the long run.

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## EXHIBIT 7

### Company A, Un-audited Balance Sheet

(March 2007)

in \$ 000

#### Assets

Total Current Assets	7,883
Long Term Assets	11,696
Other Assets	83
Total Assets	<u>\$ 19,662</u>

#### Liabilities and Equity Capital

Current Liabilities	2,311
Long Term Liabilities	8,426
Total Liabilities	<u>10,737</u>
Equity Capital	8,925
Total Liabilities and Equity	<u>\$ 19,662</u>

### Company A, Income Statement

(Year ending March 2007)

in \$ 000

Sales (Note 1)	33000
Costs, interest, depreciation & overhead	29700
Pre-tax earnings	3300
Taxes (Note 2)	1320
Earnings	<u>\$ 1,980</u>

#### NOTE

1. Sales have grown 25% annually for the past 5 years.
2. Tax rate is 40%.