



## Business Plan

### Northern Arizona University (NAU)

#### U. S. Department of Energy Collegiate Wind Competition

##### TEAM ORGANIZATION:

PI: Dr. Tom Acker, Director, NAU Institute for Sustainable Energy Solutions and Professor College of Engineering, Forestry, and Natural Sciences

Co-PI: Karin Wadsack, Project Director, NAU Institute for Sustainable Energy Solutions

Co-PI: David Willy, NAU Engineering Instructor and Member of the NAU Institute for Sustainable Energy Solutions

Co-PI: Dr. Frank Spitznogle, Entrepreneur in Residence and Assistant Professor, NAU Franke College of Business

##### ***Student Leads:***

Engineering: Melissa Head

Engineering: Andrew Hoffman

Engineering: Nathan Croswell

Engineering: Devon Martindale

Total Engineering Students: 22

Business: Torey Schreiner

Business: Lukas Loehr

Business: Samantha Stansbery

Business: Caitlin Cullen

Total Business Students: 32

Market Issues: Kelsey Morales

Market Issues: Candice Griffin

Total Market Issues: 2

##### **TOTAL INVOLVEMENT:**

Students 54

Faculty: 4

## EXECUTIVE SUMMARY

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### DESCRIPTION OF PROJECT

This project is a collaboration between Northern Arizona University's W.A. Franke College of Business and the College of Engineering, Forestry, and Natural Sciences. The respective teams are tasked with product and market development, financing, and engineering, in pursuit of creating a successful business venture in the micro-wind industry. SPIN<sub>ENERGY</sub> Wind Solutions has created an easy-to-assemble and durable micro-wind turbine. The product, SPIN, is designed to power small communication devices, which are vital during disaster relief. The micro-turbine is designed for short-term use and has the capacity for longer use during disaster relief situations.

### PROJECT SUMMARY

The company will compete in the small-wind industry. Currently, there are few established companies that manufacture micro-wind turbines to provide an electrical source during disaster situations. This open market provides SPIN<sub>ENERGY</sub> Wind Solutions an opportunity for entry and growth. SPIN<sub>ENERGY</sub> Wind Solutions will target major disaster relief agencies and first responders. Access to communication is one of the largest constraints following a disaster and immediate access to power is vital for relief agencies to operate. In disaster situations, people rely on their cell phones and tablets to communicate with family members and first responders. Without a power supply, these devices eventually become useless to victims in need of communication. This need provides an opportunity for SPIN<sub>ENERGY</sub> Wind Solutions.

The SPIN product is specifically designed for convenience and portability to provide power in time-sensitive situations. The SPIN micro-turbine will produce approximately 65 watts at maximum output. The turbine will have a downwind design, which will create a lighter weight turbine. The tower will be

available in 6-foot increments from 12ft to 48ft in order to reach the height with the most optimal wind speed. The base package will include the SPIN micro-wind turbine, battery, and electrical components including a 12V port. Additional options that can be included will be a 65 watt solar panel, a 6ft sectioned tower with guy wires, and port convertors.

To begin operations, SPINERGY Wind Solutions will require approximately \$500,000. This will cover the initial three month: rent, utilities, beginning startup, salaries, advertising, and travel and promotion expenses. The company has utilized a break-even analysis to determine how many units the company must sell to cover all expenses. SPINERGY Wind Solutions projects that the sale of about 120 units is required to break-even, at year 1 costs. Actual break-even is forecast to occur in year 4 at 167 units. It is also important to consider possible risks that may occur, such as recession and cost variability. The product cost includes all essential parts to operate the SPIN micro-turbine. The target turbine cost is approximately \$900. The cost to the consumer will be based on a 65% mark up, equaling a target price of about \$1,500. SPINERGY Wind Solutions will seek partnership agreements with our suppliers to help control costs.

Through the use of creative design, functionality, and originality, SPINERGY Wind Solutions will provide an effective energy solution for disaster relief organizations.

## **BUSINESS OVERVIEW**

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Natural disasters wipe out sizeable portions of cities each year, oftentimes leaving most disaster victims without electricity (“Charging stations,” 2012). Loss of electricity poses many problems, especially for communication. In disaster situations, people rely on their cell phones and tablets to communicate with family members and first responders. This communication is vital to receive help, notify first responders, find family members, and reach out to other loved ones. Without a power supply, these devices eventually become useless to victims in need of communication. SPINERGY Wind Solutions will provide an easy-to-assemble and durable power source during disaster situations where communication with family members and first responders is vital.

SPINERGY Wind Solutions will operate in a business-to-business model. SPINERGY Wind Solutions will sell the SPIN micro-turbine to disaster relief agencies and first responder groups that will deploy the SPIN turbines during relief efforts. SPINERGY Wind Solutions will be located in Flagstaff, Arizona due to its location near major interstate highways. Flagstaff is also where most of the management team currently resides, allowing for a close working group and access to information. SPINERGY Wind Solutions will be structured as a SubS-corporation. This organizational form features a formal corporate governance structure, offers limited liability protection to shareholders, and provides the flexibility to change to a C-corporation as SPINERGY Wind Solutions grows. The initial Board of Directors will be tasked with finalizing the organizational form to maximize the financial and tax benefits for the shareholders.

## **VISION**

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SPINERGY Wind Solutions will provide a supplemental power solution intended for charging electronic communication devices to help disaster relief organizations and those affected by natural disasters.

## **MISSION**

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SPINERGY Wind Solutions aims to help people affected by disasters, by providing a green solution for powering communication devices.

## **BUSINESS AND MANUFACTURING MODEL**

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SPINERGY Wind Solutions will sell micro-wind turbines directly to disaster relief organizations by operating in a business-to-business model. SPINERGY will utilize an external manufacturing company to produce all the necessary components for the SPIN micro-turbine. The SPIN micro-turbine will then be shipped to disaster relief organizations as orders are received. (See Appendix A1 for Business Model). SPINERGY Wind Solutions will have a small amount of inventory on-hand to provide immediate response to customers responding to a disaster situation and to handle returns or complaints.

## **VALUE PROPOSITION**

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The SPIN micro-wind turbine will be designed specifically for the disaster relief market, generating value through the functionality, originality, and flexibility of the product design. Offering a functionally easy-to-assemble and durable system. The SPINERGY micro-wind turbine provides the flexibility off-grid, renewable power for communication devices during disaster relief efforts. The SPIN micro-wind turbine will create originality through its innovative blade design, portability and transferability, as well as the circuitry to provide power for the user.

## **MARKET OPPORTUNITY**

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### **MARKET GAP**

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As the forecast for more frequent and extreme weather events arise due to climate change, agencies are in search of affordable, carbon-neutral, and quick-access power. In the face of growing public awareness and concern for global warming, the challenge of post-disaster recovery and affordable energy has been intensified with a growing interest in sustainability and green practices (Hayles, 2010). The Small Wind Report of 2012 states, “increasing fossil fuel prices, global warming and the ever-growing electricity demand will be the three long-term drivers of the small wind industry.” (Small Wind Conference, 2012)

During recent disaster situations such as the 2012 Hurricane Sandy on the U.S. East Coast and the 2013

Typhoon Haiyan in Tacloban, Philippines, access to communication posed a major issue (refer to Appendix A15 for pictures). Generator-powered charging stations are often installed to provide power for disaster victims. These power stations are crowded, dangerous, and often not user-friendly. People wait in line for hours to charge their cellular devices, often being exposed to threat of electrical shock when the stations are makeshift. Since these stations are run on gasoline generators, if gasoline runs out or becomes inaccessible, these charging stations are useless.

Major disaster relief agencies also rely heavily on gasoline generators when working in permanent and temporary off-grid areas (Building Knowledge, 2013). When available, generators can be adequate for multiple days if enough fuel is available. However, with floods, hurricanes, tornados and other disasters, adequate quantities of fuel are unreliable and delivery of fuel can pose a major issue. These generators also require daily maintenance, pose electrical safety hazards and emit hazardous pollutants.

In such situations, a wind-turbine that is easily delivered and takes no independent fuel source is a viable option. The market currently lacks an alternative energy solution that provides off-grid power.

### MARKET OPPORTUNITY FORECAST

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SPINERGY Wind Solutions will compete in the small-wind industry, focusing on supplemental electrical support during disaster relief efforts. The number of installed micro-wind turbines has doubled during the last three years. It is expected that micro-wind installations will quadruple by 2015 (AWEA, 2013). However, the work stated above focuses on the entire small-wind industry, not specific to electrical support for disaster relief.

### PRIMARY CUSTOMER MARKET

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SPINERGY Wind Solutions will primarily target disaster relief agencies in the United States. These agencies assist in providing rescue, food, shelter, power, and medical supplies. SPINERGY Wind Solutions will target The National Emergency Response Team, State National Guard, Federal Emergency Management Association (FEMA), Relief International, National Guard, police, and firefighters.

## SECONDARY CUSTOMER MARKET

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SPINERGY Wind Solutions' secondary target markets are homeowners in disaster-prone areas. These consumers are aware of possible natural disasters that could occur near their home, and proactively seek resources, specifically ones that provide power, that can be stored and used in the event of a disaster. The most common resource that is stored in case of emergency is a gasoline generator (Henry, 2013). However, in certain disaster situations generators are not a viable option due to the lack or unavailability of gasoline to power the generator. In these situations, the SPIN micro-wind turbine can be used to power small electronics such as cell devices, allowing consumers to communicate during and after disaster situations.

SPINERGY Wind Solutions will also target the "prepper" market. Preppers are people that are dedicated to preparing for survival during difficult times. Preppers do not focus on one specific event, but are ready for any type of disaster they might face; anywhere from natural disasters to zombie apocalypses. Preppers find joy in finding new gadgets that can be used in emergency situations. Due to the nature of the prepper market's interests, the SPIN micro-turbine will appeal to their needs.

## CUSTOMER VALUE PROPOSITION ANALYSIS

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The SPIN micro-turbine allows for immediate deployment in time-sensitive situations, such as natural disasters. Communication during and immediately after a disaster situation is an essential component of emergency response and recovery. It connects affected people, families, and communities with first responders, support systems, and other family members ("Charging stations," 2012). The SPIN micro-turbine will serve as an easy-to-set-up charging station for communication devices, allowing affected people to reach out to family members and support systems.

## MARKET PRICING STRATEGY

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The pricing of the SPIN micro-turbine will be based on the selected components. The parts included in the base package are the turbine, blades, and the battery. The optional parts that will be offered and bought at the customer's discretion include the tower, an assistive solar panel, and a 12-volt converter.

SPINERGY Wind Solutions expects the turbine to sell for \$1,500, with costs of approximately \$900. This price was calculated by using price estimates for currently identified parts, labor, and related costs.

SPINERGY Wind Solutions will price the product based off the cost of bulk purchases. The optional package including all of the options will be priced at \$2,400. This gives SPINERGY Wind Solutions a profit percentage on the turbine and optional features of about 42%.

## **MANAGEMENT TEAM**

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### **OVERVIEW**

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Initially, SPINERGY Wind Solutions will utilize the Chief Executive Officer (CEO) and a sales representative to run the daily operation of the business. With the assistance of a board of directors, SPINERGY Wind Solutions will operate under a hierarchical system. The CEO will be the driving force behind SPINERGY Wind Solutions. The CEO will have overarching responsibility to make sure the entire company runs smoothly. The sales representative will be required to carry out day-to-day marketing strategies and sales processes. Over time as administrative budgets increase, SPINERGY Wind Solutions hopes to add a Chief Financial Officer (CFO), a Chief Marketing Officer (CMO), and a Production Manager. (See Appendix B2 for list of Management Team). In turn, the Officers will manage each individual department and report to the CEO. The CFO's main role is to seek and arrange funding, while also managing the firm's own funds and other assets. The CMO will be tasked with generating strategies to market the SPIN micro-turbine to existing and potential customers. It is vital that he/she have both marketing and industry experience. Beneath the CMO will be Sales Representatives who will be required to carry out day-to-day marketing strategies and sales processes. The Production Manager will be in charge of research & development and must also have specific industry knowledge and experience. (Refer to Appendix B1 for Management Position Descriptions.)

### **COMPENSATION**

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The management team will be given salaries and stock options; the CEO will be given significantly higher



options of approximately 10% of the company, and 7% each for other executive positions. Remaining stock will be sold over time to investors and will be used to support employee stock options as additional employees are hired.

## EXECUTIVE TEAM

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(Refer to Appendix B3 for Description of Executive Team Members.)

## BOARD OF DIRECTORS

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The Board of Directors will be comprised of 5 members, with the CEO as Chairman of the Board. The others on the board will include 4 outside individuals. The Board of Directors will have the final say in business decisions. SPINERGY Wind Solutions will seek experienced individuals in fields such as engineering, wind turbines, wind energy, and business start-ups. (Refer to Appendix B3 for Description of possible Board of Directors candidates.)

## PRODUCT DEVELOPMENT AND OPERATIONS

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### PRODUCT FEATURES

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The wind turbine will create 65 watts of power in optimal conditions. The turbine battery will have one 12-volt port. The optional product package will include a variety of different converters, such as a converted USB, converted SmallUSB, and converted North American NEMA Style Outlet. These converters can be used to charge an array of items such as a cell phone, tablets, flashlight, or any type of small battery-powered emergency tool. SPINERGY Wind Solutions will also offer an optional guy-wired telescoping tower that will be used to lift the wind turbine to the adequate distance in the air to reach optimal wind speeds. (See appendix A13 for turbine, tower, and guy wires.) The SPIN product will require 3-4 people to transport, and will require one hour to fully erect and make functional. As another add-on for the product, SPINERGY Wind Solutions will offer a 65 watt solar panel for instances of no wind. This solar panel will be included with a clamp that will attach to the tower, or any other standing object. (Refer to SPINERGY Wind Solutions Design Report.)

## SYSTEM SPECIFICATIONS

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At optimal speeds, the wind turbine will produce 65 watts. The turbine will extend by 6-foot intervals from 12 feet to 48 feet on top of the tower. The diameter of the rotation of the blades being used for the wind turbines application will be 44 centimeters with each blade being 19 centimeters. (See appendix A6 through A10 for blade design.) The product will detach into three pieces. The first piece will include the batteries, control panel, and electrical outlets, weighing approximately 8 lbs. The second piece will include the tower that will collapse into 6 feet sections. The micro-turbine will weigh 6lbs to 7lbs and the tower will weigh 28lbs. The optional solar panel will weigh approximately 5lbs and produce 65 watts of output, and will be used in times of no wind or very low wind speeds. (Refer to SPINERGY Wind Solutions Design Report)

## DESIGN OBJECTIVES

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SPIN's design objectives include portability and early deployment. The design will allow SPIN to be transported, set up or moved by 3-4 people. SPIN's packaging will include the turbine but can be augmented with certain added options. The SPIN micro-turbine can be set up and provide electricity within one hour if the device has been properly maintained, as well as previously charged. (See appendix A11 through A14 for SPIN micro-turbine.)

## LAUNCH STRATEGY

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The rollout will begin with completion of product development, development of marketing and sales support items, creation of product assembly instructions, and website design. Product testing will immediately follow at which time prototyping, regulatory compliance, and supplier collaboration will be conducted. With the completion of prototyping, disaster agency relations will be initiated to begin identifying customer prospects. SPINERGY Wind Solutions will launch the online website, attend national trade shows, and engage in newspaper and media press releases. At this time, SPINERGY will have access to full manufacturing capabilities to enter the market. After the conclusion of the rollout launch strategy, a post-launch review will be analyzed and SPINERGY Wind Solutions will respond accordingly.

## DEVELOPMENT AND MANUFACTURING

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Research and Development will be accomplished in house and conducted through the R&D department. Using customer feedback, industry trends, and competition research, SPINERGY Wind Solutions will adjust and modify the SPIN product. SPINERGY Wind Solutions will produce and assemble the SPIN product through an outside manufacturer. The finished product will be delivered directly to customers.

## SOCIAL IMPACT

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SPINERGY Wind Solutions has incorporated the triple-bottom line of economic, environmental, and social elements in the creation of this business venture. SPINERGY Wind Solutions provides environmental benefit by supporting organizations and practices that pursue long-term environmental protection. SPINERGY Wind Solutions operates in the micro-wind industry, which is dedicated to reducing humans' carbon footprint. SPINERGY is committed to the increased profitability of the business through its sound practices and high returns for the current shareholders. SPINERGY positively impacts by operating with a clean supply chain that treats and pays workers fairly. The product SPIN also positively impacts people by providing a power source for communication devices in disaster situations.

## FINANCIAL ANALYSIS

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### ASSUMPTIONS

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There will be multiple assumptions for the pro forma financial sheets. The sales price for the wind turbine will have an operating margin of 42%. It is assumed that an inflation rate of 1.5% will occur each year. The SPIN product will initially gain 100% of the market, although this will decrease as competitors emerge.

### FINANCING NEEDED

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For the start-up of SPINERGY Wind Solutions, the company will need an initial investment of approximately \$50,000. This will cover all of the payroll, inventory, development of prototype, contacts with suppliers/manufacturers, and office equipment. This amount will cover the three months before

the business opens. \$500,000 will be required for future operations. All funding will be raised by the sale of stock in this new Sub-S Corporation. It is anticipated that the stock will be sold to companies and individuals already active in the small wind industry.

### BREAK-EVEN ANALYSIS

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With the operating costs for the company totaling \$154,000 for year 1, \$232,000 for year 2, \$213,000 for year 3, \$281,000 for year 4, and \$420,000 for year 5, SPINERGY Wind Solutions will exceed break-even in year 4, selling 167 turbines. This will come to a total amount of approximately \$325,000 in revenues. (See appendix C6: Breakeven Analysis and appendix D2 for Breakeven in Units graph.)

### RISK ANALYSIS

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SPINERGY Wind Solutions has assessed and evaluated several risks associated with the startup of a business venture in the micro-wind turbine industry. SPINERGY Wind Solutions has considered financial risk of correctly managing and maintaining financial balances, as having money is vital to running the business venture. Market risk has been considered. Due to the quickly evolving technology industry and the volatility of wind energy, it is possible that the market will develop differently than expected. It is vital that SPINERGY Wind Solutions captures a strong customer base early in the business life-cycle in order to gain market share. Competitive risk is also considered. Although SPINERGY Wind Solutions has not identified any key players that produce micro-turbines to provide power for communication devices during disaster situations, there is risk that another company may come in and steal market share. To mitigate this risk, SPINERGY Wind Solutions must continuously innovate and perform market analysis in order to stay current with market trends.

### EXIT STRATEGY FOR INVESTORS

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Our exit strategy has three options that are described in Appendix C8: Buyout, Selling the Company, or Going Public.

## FORECASTING GROWTH AND FINANCIAL STATEMENT SUMMARY

The following financial statements summarize first year performance. Year 1 through 5 can be found in Appendix C.

<b>Income Statement Year 1</b>		<b>Cash Flows - Year 1 Total</b>	
Turbines Sold (in Units)	46	Beginning Balance	
Turbines and Towers Sold (in Units)	16	Cash Receipts	106,000
		Cash Available	640,000
<b>Revenue - \$</b>		<b>Cash Payments</b>	
Turbine	68,000	Cost of Goods Sold	62,000
Turbine and Tower	38,000	Employees, Commissions, and Payroll	
Total Revenue	106,000	Taxes	69,000
		Office Rent	15,000
<b>Expenses - \$</b>		Office Utilities	10,000
Cost of Goods Sold	62,000	Website, Advertising, and Promotional	11,000
Employees, Commissions, and Payroll		Total Payments	167,000
Taxes	69,000		
Office Rent	15,000		
Office Utilities	10,000		
Website, Advertising, and Promotional	11,000		
Refund	-12,000		
Total Expenses	155,000		
<b>Net Income - \$</b>	<b>-49,000</b>	<b>Ending Balance</b>	<b>473,000</b>
<b>Balance Sheet Year 1</b>			
<b>Assets:</b>			
Cash	473,000		
Long Term Lease Investment	12,000		
Total Assets	485,000		
<b>Equity:</b>			
Equity Investments	552,000		
Retained Earnings	-67,000		
Total Equity	485,000		
<b>Total Liability and Owners Equity</b>	<b>485,000</b>		

## REFERENCES

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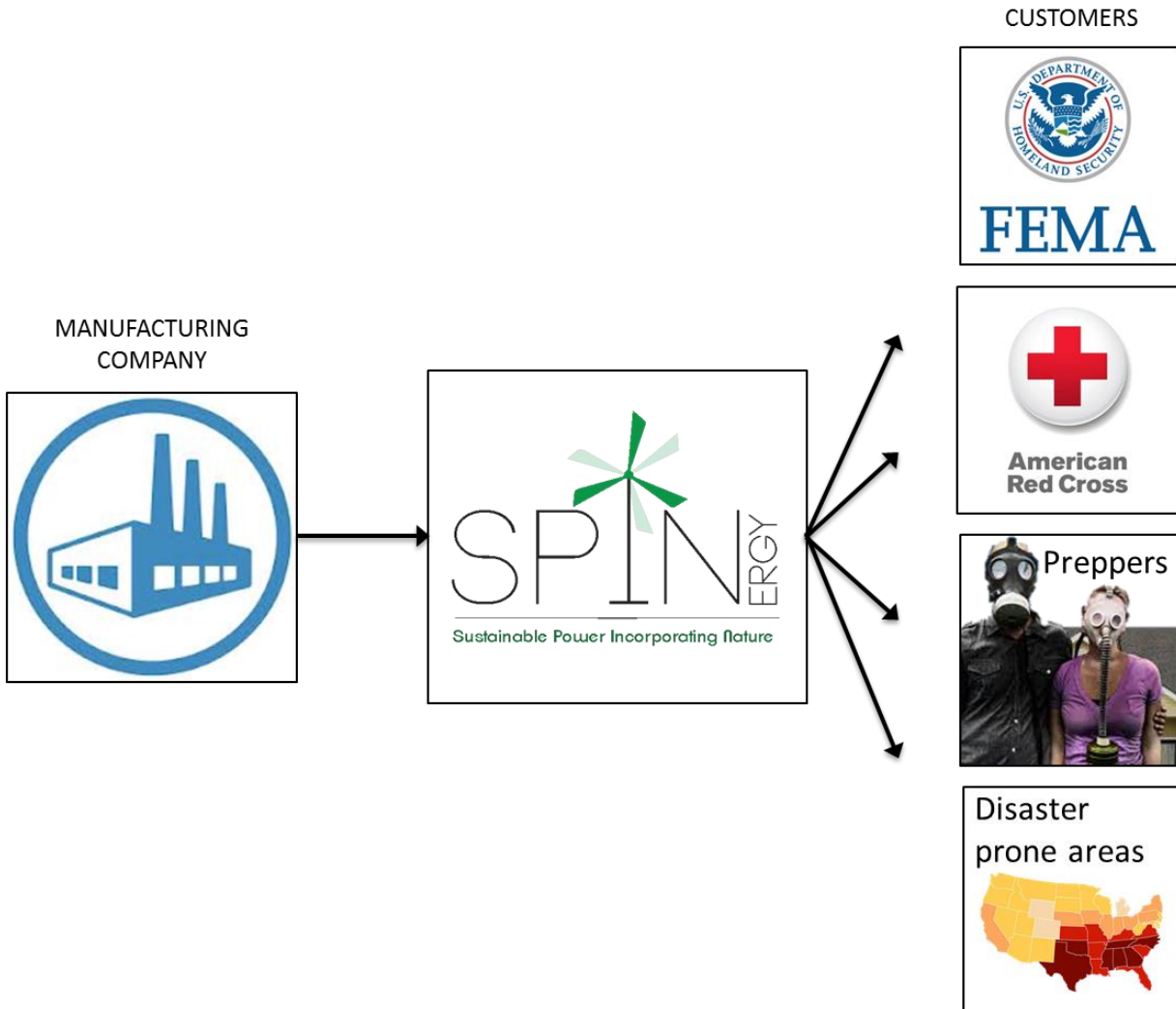
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# APPENDICES

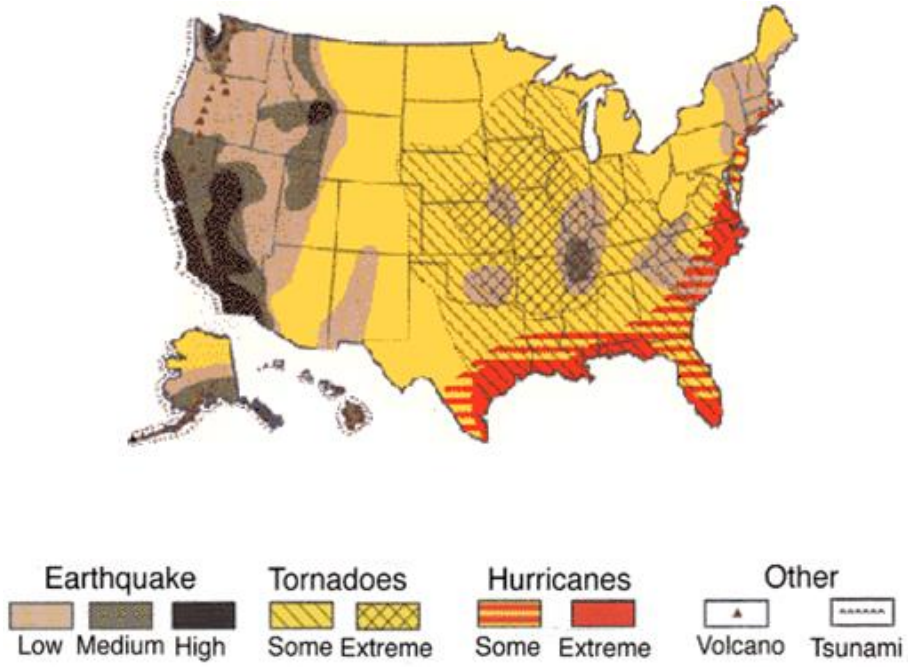
## Appendix A: Images, Graphs, Charts

### A1: Business Model

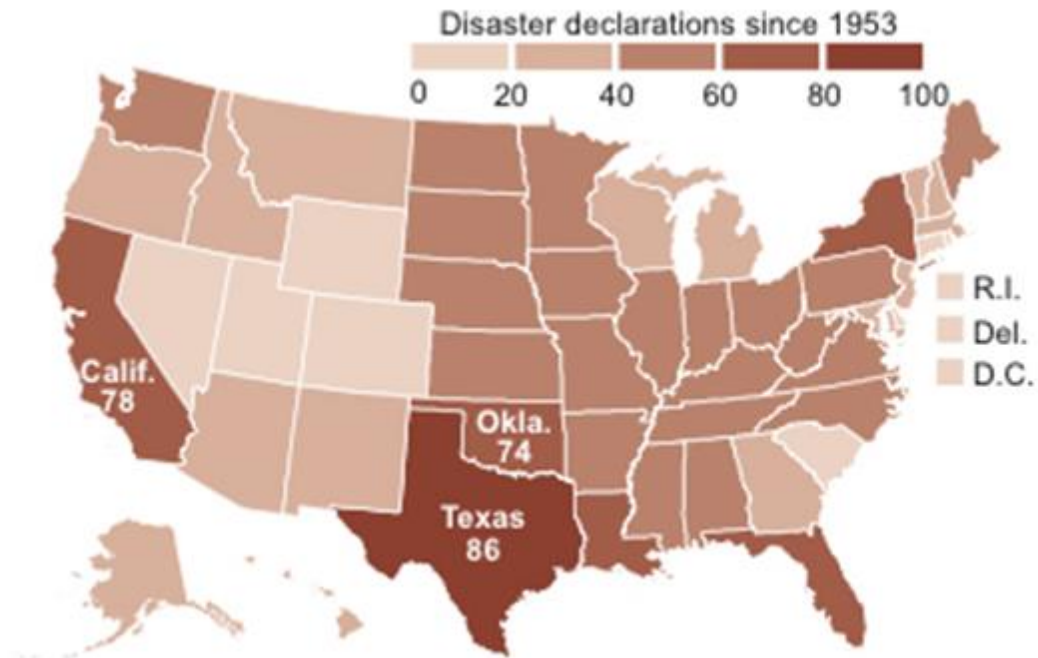




**A2: U.S. Disaster Map Intensity**

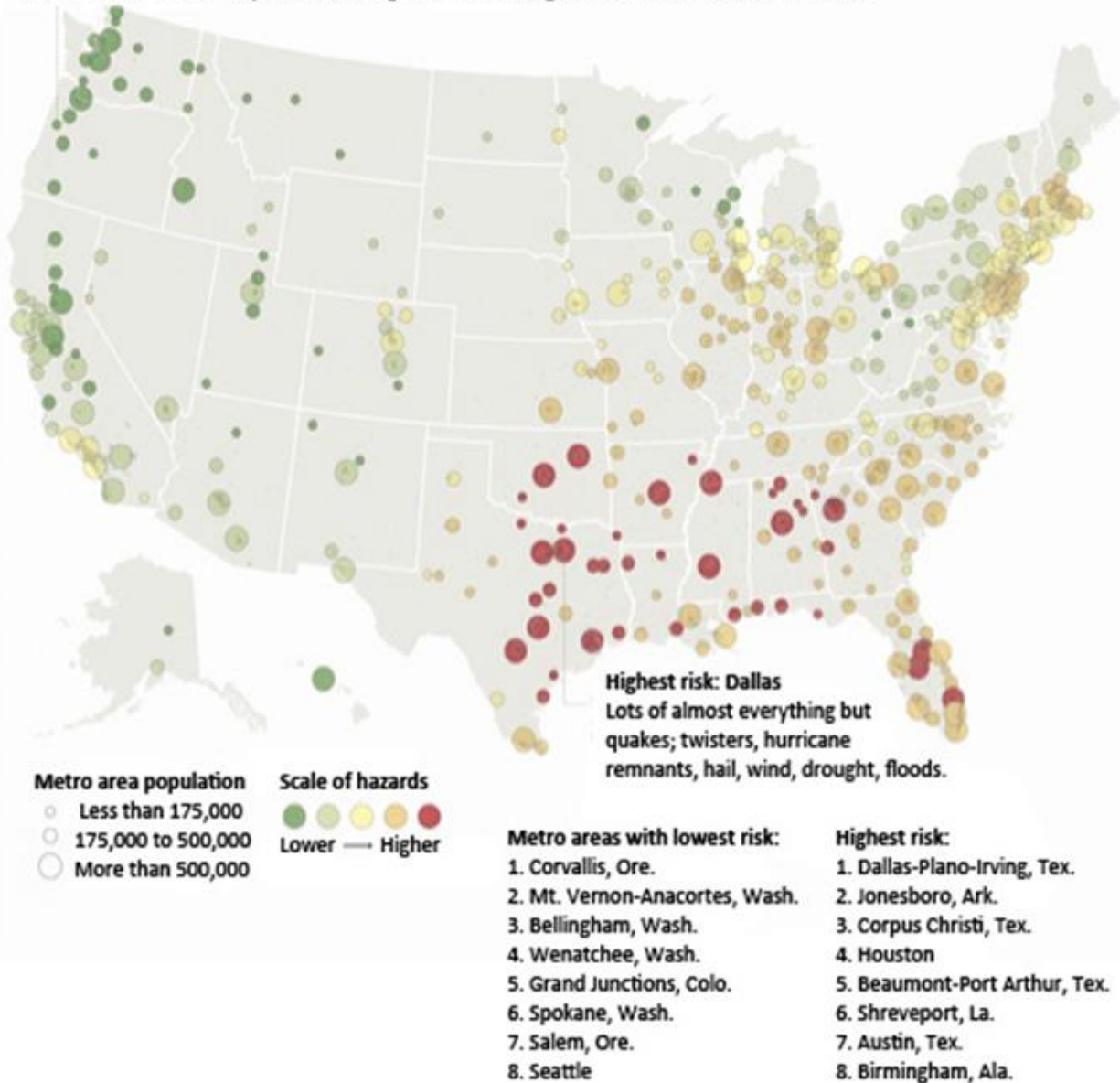


**A3: U.S. Major Disaster Zone Map**

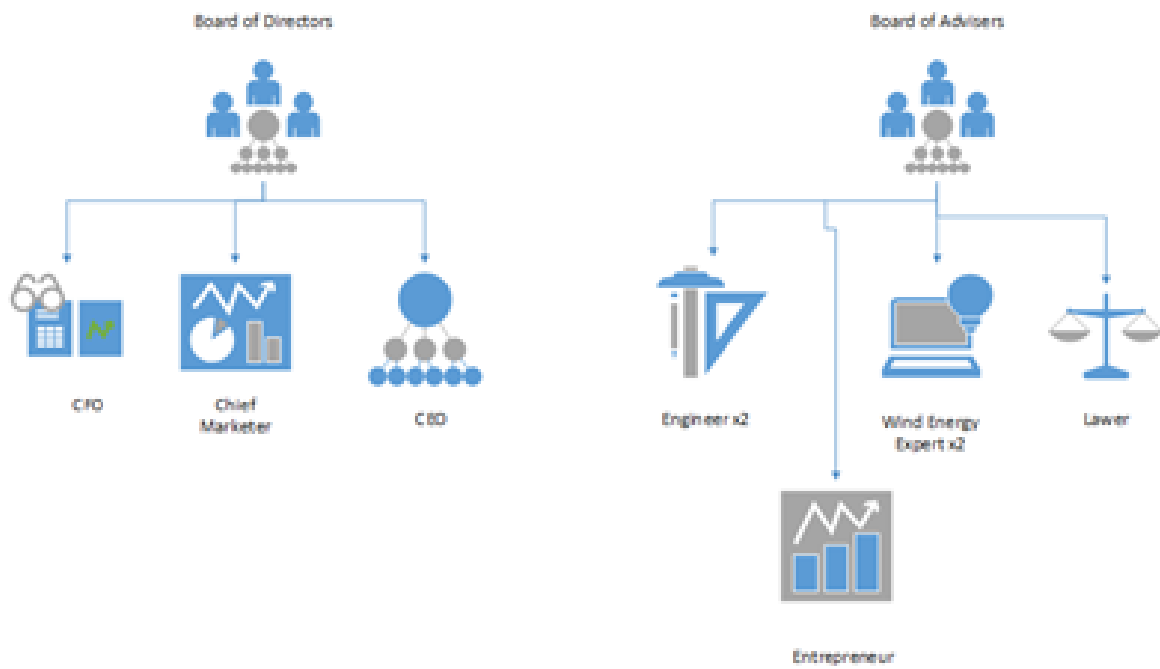


## A4: U.S. Lowest and Highest Risk Disaster Populations

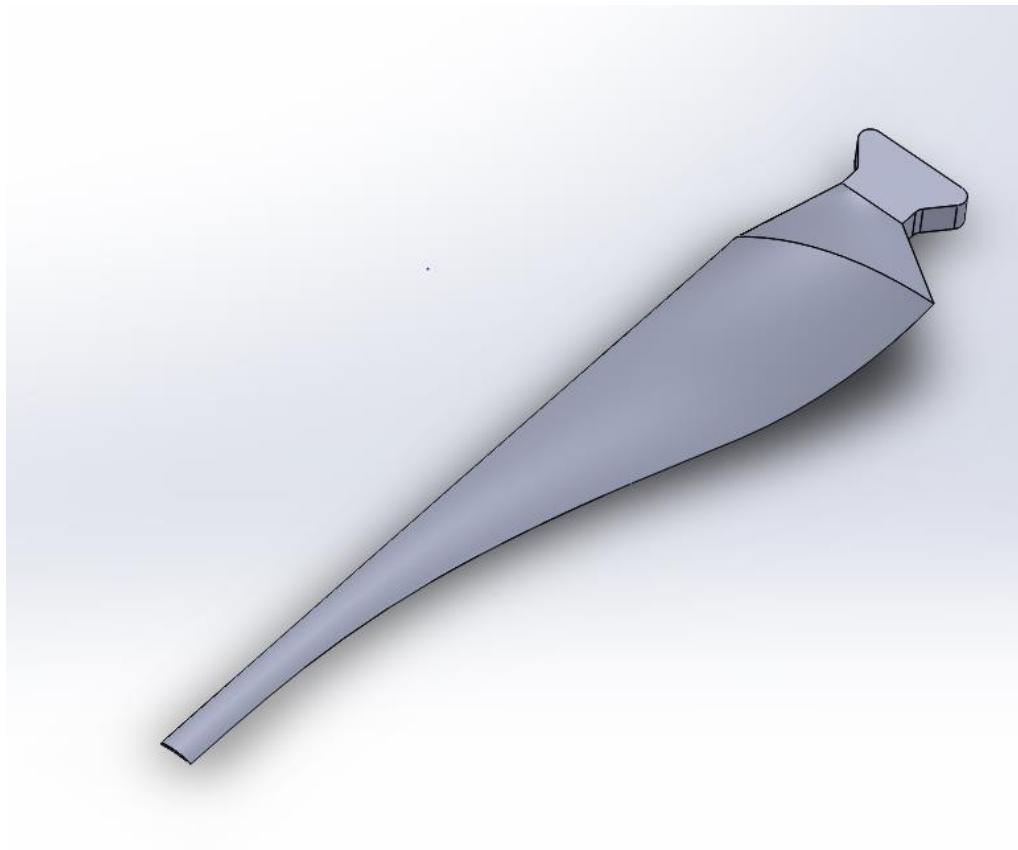
**Lowest risk: Corvallis, Ore. Small quake and drought risk; little extreme weather.**



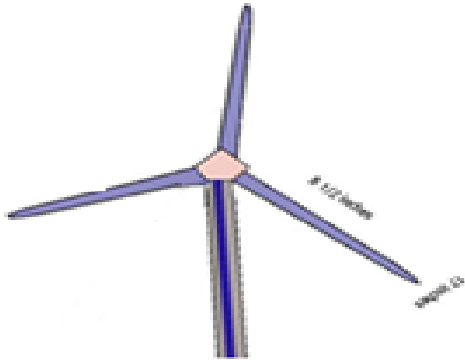
## A5: Management structure



## A6: Wind Turbine Blade Design

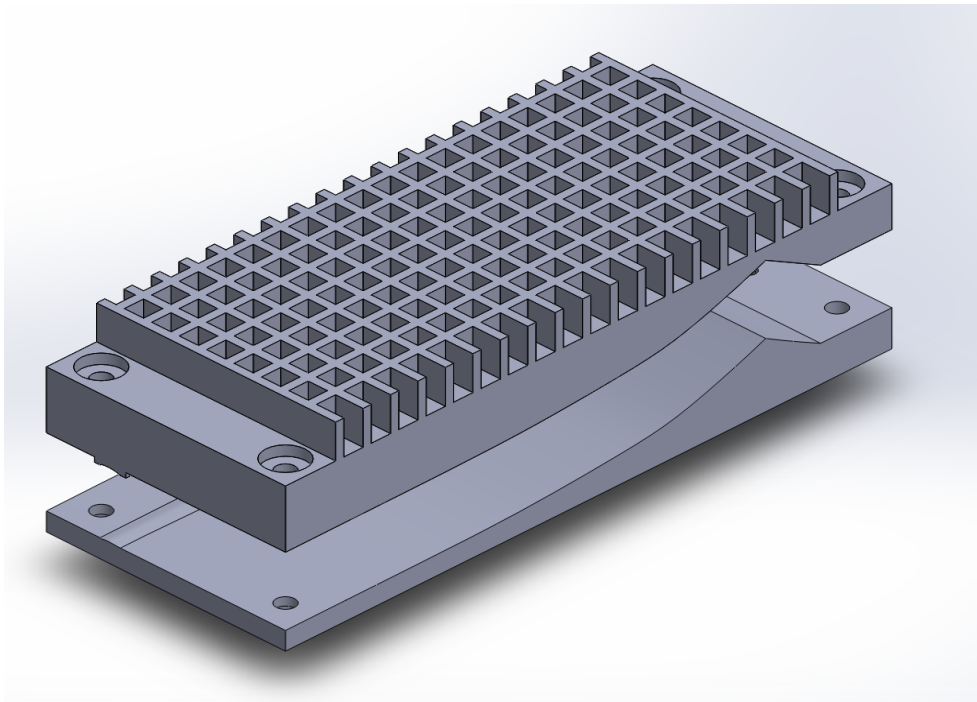


## A7: Wind Turbine Blade Length

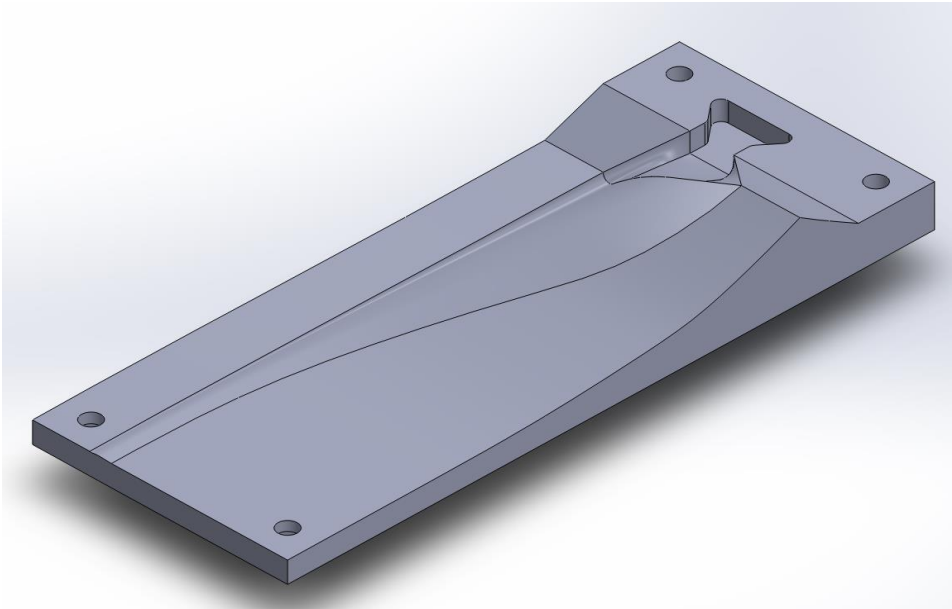


Turbine Specifications  
Downwind  
3 Blade Design (8 1/2 inches in size)  
Blades are 17 inches in diameter  
2 External Lithium Ion Batteries  
Wind Cut In Speed  
65 mph Maximum Wind Velocity  
Weight of turbine: 5-15

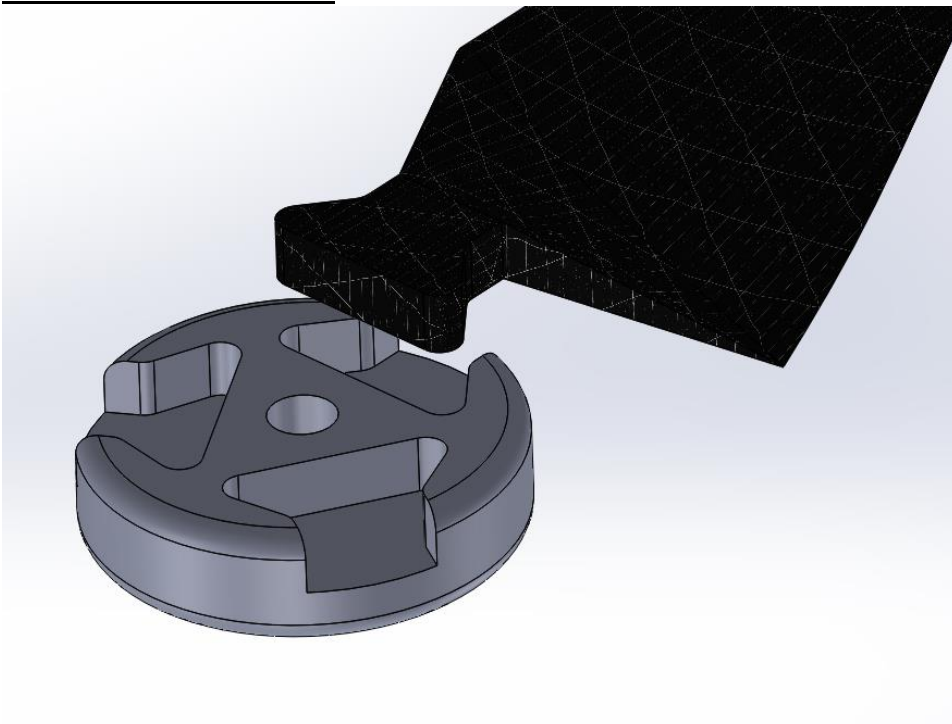
## A8: Turbine Blades Molds



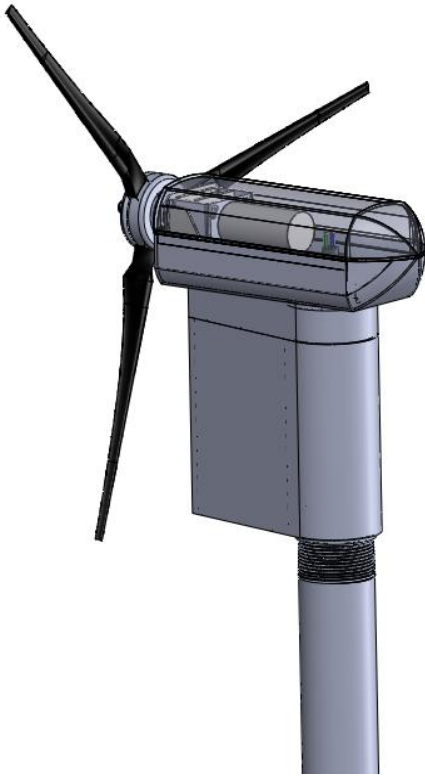
**A9: Bottom Half of the blade mold**



**A10: Blade Root and Hub**



**A11: Transparent Turbine design**



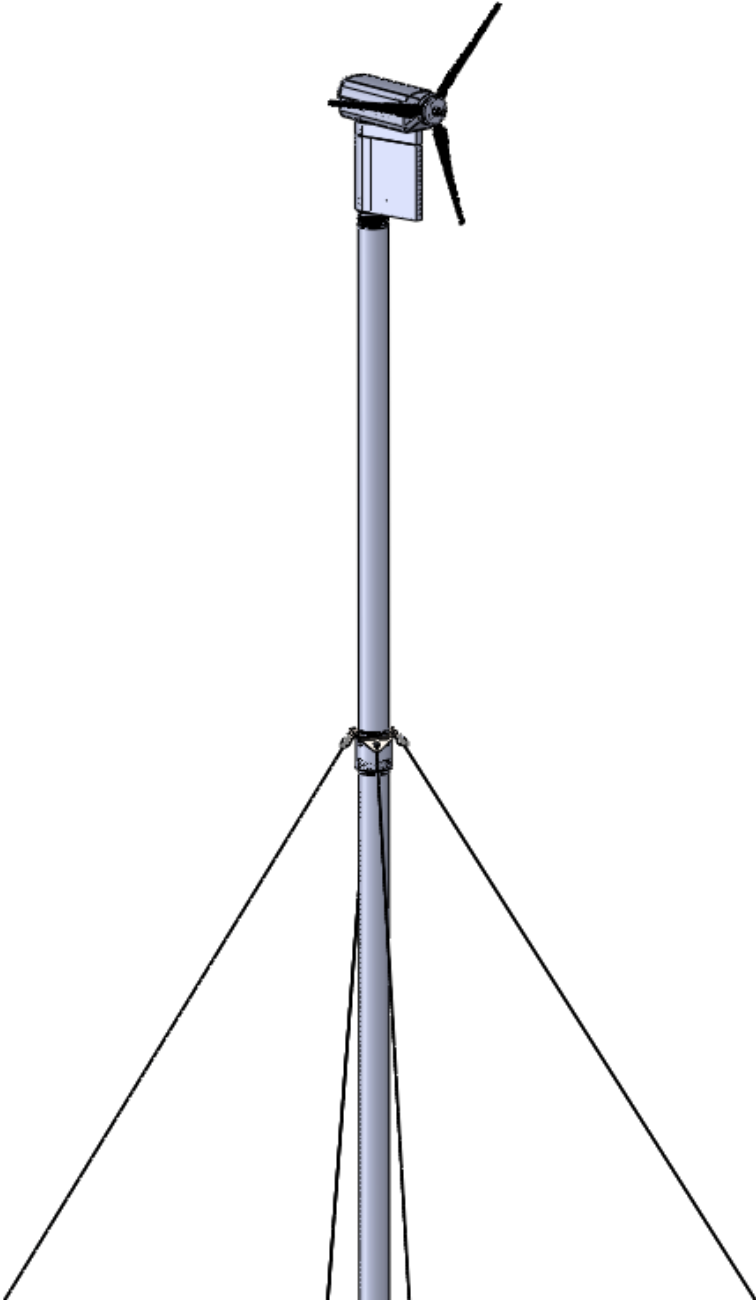
**A12: Turbine design**



**A13: Tower, Base, and Turbine**



**A14: Tower, and Turbine structure**





## **Appendix A15: Photos of charging stations and other events after recent disasters**

### **Photo 1:**

2012 Hurricane Sandy in New York and New Jersey, USA. A woman leaves a gas station that is out of gas.



Source: <http://www.huffingtonpost.com> Photo by: Brendan Smialowski

### **Photo 2:**

2012 Hurricane Sandy in New York and New Jersey, USA. People charge their phones and computers at a gasoline-powered charging station.



Source: <http://www.huffingtonpost.com> Photo by Scott Eells

**Photo 3:**

2013 Typhoon Haiyan in Tacloban, Philippines: Typhoon survivors crowd around charging stations to get power for communication



Source: [www.npr.org](http://www.npr.org) Photo by: Dita Alangkara

**Photo 4:**

2013 Typhoon Haiyan in Tacloban, Philippines: A Filipino family tries to use a ceiling fan to generate electricity, in hopes of charging mobile phones to search for family and friends



Source: [www.youthareawesome.com](http://www.youthareawesome.com) Photo by: Jay Rommel Labra

## Appendix B: Business Definitions, Compare and Contrast Tables, and Business Structure

### B1: Positions in the Company, Job Responsibilities, and Estimated Pay

Position	Description	Estimated Pay
<b>CEO</b>	Manage communications between divisions and board of directors. Responsible for the overall management of the organization. Additional responsibilities will be set by the board of directors.	Stock Options Minimal Salary
<b>CFO (future)</b>	Maintains financial records, manages and minimizes financial risks, and is responsible for capital generation. Additional responsibilities include budget creation and control. The CFO will report to the CEO.	Stock Options Minimal Salary
<b>CMO (future)</b>	Manages the sales team, market research, and deals with marketing communications. Responsibilities are all marketing activities internally and externally in the company. The CMO reports to the CEO.	Stock Options Minimal Salary
<b>Sales Representative</b>	Responsibilities include day-to-day sales, promotion of the product, and acquiring new customers. The sales representatives will report to the CMO.	Base Salary Commission
<b>Product Manager (future)</b>	Organizes product research, design, development, manufacturing processes, and maintaining strong relationships among contractors. The product manager will report to the CEO.	Base Salary Stock Options

### B2: SPIN<sub>ENERGY</sub> Positions Affiliated with Upper Management and Qualifications

Position and Individual	Qualifications
Chief Executive Officer; Lukas Loehr	Lukas is currently pursuing a degree in Business Management from The W.A. Franke College of Business at Northern Arizona University. His attention to sustainability, efficiency, and the future brings a great leader into our corporation.
Chief Financial Officer; Samantha Stansbery	Samantha is currently pursuing a degree in Business Management from The W.A. Franke College of Business at Northern Arizona University. Working among financials in a professional and simulated version through the building of business plans has her skills valuable towards budgeting and keeping up to date on financial records.
Chief Marketing Officer; Torey Schreiner	Torey is currently pursuing a degree in Business Management from The W.A. Franke College of Business at Northern Arizona University. With her

	interests in creativity and sustainability, Torey will effectively market our product towards disaster situations.
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**B3: SPINERGY's Board of Directors**

<b>Advisor</b>	<b>Qualifications</b>
Thomas Acker	Dr. Thomas Acker has worked at NAU since 1996. He is currently the director of Northern Arizona University's Institute for Sustainable Energy Solutions. He has worked at the National Wind Technology Center of the National Renewable Energy Laboratory (NREL) and on behalf of the NREL, he was the "Operating Agent" in charge of leading an international effort to study wind and hydropower integration for the international energy agency.
Frank Spitznogle	Frank is an entrepreneur in residence for the Franke College of Business at Northern Arizona University, and has extensive experience in starting new businesses. Although he has minimal experience when it come to a wind turbine specifically his vast knowledge of business in general is an expertise that we are looking for. He will be able to help us in areas such as marketing, distribution, and management.
Karin Wadsack	Karin is project director at Northern Arizona University's Institute for Sustainable Energy Solutions. To add to her expertise in sustainable energy she also was in charge of implementing a wind energy initiative for schools that was supported by the US Department of Energy. We will be able to consult her on a variety of information on wind turbines and wind energy.
David Willy	David is an engineering instructor and well as a member of the Institute for Sustainable Energy Solutions at Northern Arizona University. He is also a former design engineer for a small wind turbine company. His engineering expertise will give our business and engineer managers a resource for advanced technical consultation. To go along with engineering expertise he will be able to apply his engineering with his expertise on sustainable.
Andy Kruse	Andy is the VP of Business Development at Endurance Wind Power Inc., which is a wind

	<p>power company. Andy has been working in the wind energy field for years developing new ways to use and apply wind energy in the world. The ideas he has and the expertise on current and future products in this industry will be extremely helpful in almost all situations we may run into. Since Andy has several decades of experience running small wind energy companies, we will be able to learn from his past experiences.</p>
<p>Jared Holland</p>	<p>Jared is an attorney located in Flagstaff, Arizona. He attended Arizona State University for Law and is a professor at Northern Arizona University.</p>

## Appendix C: Financial Documentation

### C1: Income Statement

#### Year 1

Income Statement Year 1					
	7	11	13	15	45
Turbines Sold (In Units)					
Turbines and Towers Sold (In Units)	2	5	4	5	16
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year 1 Total
<b>Revenue</b>					
Turbine	\$10,125	\$16,200	\$18,900	\$22,275	\$67,500
Turbine and Tower	\$5,400	\$11,160	\$10,080	\$11,880	\$38,520
<b>Total Revenue</b>	<b>\$15,525</b>	<b>\$27,360</b>	<b>\$28,980</b>	<b>\$34,155</b>	<b>\$106,020</b>
<b>Expenses</b>					
Cost of Goods Sold	\$9,289	\$14,862	\$17,340	\$20,436	\$61,927
CEO, Sale Employee, Commission, and Payroll Taxes	\$16,003	\$16,003	\$16,003	\$20,503	\$68,513
Office Rent	\$3,849	\$3,849	\$3,849	\$3,849	\$15,396
Office Utilities	\$2,774	\$2,606	\$2,522	\$2,522	\$10,424
Website, Advertising, and Promotional Materials	\$2,969	\$2,766	\$2,664	\$2,664	\$11,062
Refund	\$0	\$0	\$0	(\$12,410)	(\$12,410)
<b>Total Expenses</b>	<b>\$34,884</b>	<b>\$40,086</b>	<b>\$42,378</b>	<b>\$37,564</b>	<b>\$154,911</b>
<b>Income (Loss)</b>	<b>(\$19,359)</b>	<b>(\$12,726)</b>	<b>(\$13,398)</b>	<b>(\$3,409)</b>	<b>(\$48,891)</b>

**Year 2**

Income Statement Year 2					
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year 2 Total
Turbines Sold (In Units)	8	13	15	18	54
Turbines and Towers Sold (In Units)	3	4	5	6	18
<b>Revenue</b>					
Turbine	\$12,150	\$19,440	\$22,680	\$26,730	\$81,000
Turbine and Tower	\$6,480	\$10,368	\$12,096	\$14,256	\$43,200
<b>Total Revenue</b>	<b>\$18,630</b>	<b>\$29,808</b>	<b>\$34,776</b>	<b>\$40,986</b>	<b>\$124,200</b>
<b>Expenses</b>					
Cost of Goods Sold	\$18,818	\$30,109	\$35,127	\$41,399	\$125,452
CEO, Sale Employee, Commission, and Payroll Taxes	\$16,127	\$16,127	\$16,127	\$20,717	\$69,100
Office Rent	\$3,926	\$3,926	\$3,926	\$3,926	\$15,704
Office Utilities	\$2,829	\$2,658	\$2,572	\$2,572	\$10,632
Website, Advertising, and Promotional Materials	\$3,028	\$2,821	\$2,717	\$2,717	\$11,283
<b>Total Expenses</b>	<b>\$44,729</b>	<b>\$55,641</b>	<b>\$60,470</b>	<b>\$71,332</b>	<b>\$232,171</b>
<b>Income (Loss)</b>	<b>(\$26,099)</b>	<b>(\$25,833)</b>	<b>(\$25,694)</b>	<b>(\$30,346)</b>	<b>(\$107,971)</b>

**Year 3**

Income Statement Year 3					
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year 3 Total
Turbines Sold (In Units)	12	19	22	26	78
Turbines and Towers Sold (In Units)	4	8	7	9	28
<b>Revenue</b>					
Turbine	\$19,379	\$31,007	\$36,175	\$42,634	\$129,195
Turbine and Tower	\$10,336	\$21,360	\$19,293	\$22,738	\$73,727
<b>Total Revenue</b>	<b>\$29,715</b>	<b>\$52,367</b>	<b>\$55,468</b>	<b>\$65,373</b>	<b>\$202,922</b>
<b>Expenses</b>					
Cost of Goods Sold	\$15,678	\$25,085	\$29,266	\$34,492	\$104,520
CEO, Sale Employee, Commission, and Payroll Taxes	\$16,450	\$16,450	\$16,450	\$21,132	\$70,482
Office Rent	\$4,004	\$4,004	\$4,004	\$4,004	\$16,018
Office Utilities	\$2,886	\$2,711	\$2,624	\$2,624	\$10,845
Website, Advertising, and Promotional Materials	\$3,088	\$2,877	\$2,772	\$2,772	\$11,509
<b>Total Expenses</b>	<b>\$42,107</b>	<b>\$51,128</b>	<b>\$55,116</b>	<b>\$65,023</b>	<b>\$213,374</b>
<b>Income (Loss)</b>	<b>(\$12,392)</b>	<b>\$1,239</b>	<b>\$352</b>	<b>\$349</b>	<b>(\$10,451)</b>

#### Year 4

Income Statement Year 4					
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year 4 Total
Turbines Sold (In Units)	19	30	35	41	125
Turbines and Towers Sold (In Units)	6	13	12	14	45
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year 4 Total
<b>Revenue</b>					
Turbine	\$31,007	\$49,611	\$57,879	\$68,215	\$206,712
Turbine and Tower	\$16,537	\$34,176	\$30,869	\$36,381	\$117,964
<b>Total Revenue</b>	<b>\$47,544</b>	<b>\$83,787</b>	<b>\$88,748</b>	<b>\$104,596</b>	<b>\$324,676</b>
<b>Expenses</b>					
Cost of Goods Sold	\$25,085	\$40,136	\$46,825	\$55,187	\$167,232
CEO, Sale Employee, Commission, and Payroll Taxes	\$16,450	\$16,450	\$16,450	\$26,001	\$75,351
Office Rent	\$4,085	\$4,085	\$4,085	\$4,085	\$16,338
Office Utilities	\$2,886	\$2,711	\$2,624	\$2,624	\$10,845
Website, Advertising, and Promotional Materials	\$2,979	\$2,776	\$2,675	\$2,675	\$11,105
<b>Total Expenses</b>	<b>\$51,485</b>	<b>\$66,158</b>	<b>\$72,658</b>	<b>\$90,571</b>	<b>\$280,871</b>
<b>Income (Loss)</b>	<b>(\$3,941)</b>	<b>\$17,630</b>	<b>\$16,090</b>	<b>\$14,026</b>	<b>\$43,804</b>

#### Year 5

Income Statement Year 5					
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year 5 Total
Turbines Sold (In Units)	33	52	61	72	217
Turbines and Towers Sold (In Units)	11	22	20	24	77
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year 5 Total
<b>Revenue</b>					
Turbine	\$53,719	\$85,951	\$100,276	\$118,182	\$ 358,129
Turbine and Tower	\$28,650	\$59,211	\$53,481	\$63,031	\$ 204,372
<b>Total Revenue</b>	<b>\$82,370</b>	<b>\$145,161</b>	<b>\$153,757</b>	<b>\$181,213</b>	<b>\$ 562,501</b>
<b>Expenses</b>					
Cost of Goods Sold	\$41,390	\$66,224	\$77,261	\$91,058	\$275,933
CEO, Sale Employee, Commission, and Payroll Taxes	\$23,843	\$23,843	\$23,843	\$33,584	\$105,112
Office Rent	\$4,166	\$4,166	\$4,166	\$4,166	\$16,665
Office Utilities	\$3,003	\$2,821	\$2,730	\$2,730	\$11,283
Website, Advertising, and Promotional Materials	\$2,986	\$2,783	\$2,681	\$2,681	\$11,130
<b>Total Expenses</b>	<b>\$75,387</b>	<b>\$99,836</b>	<b>\$110,681</b>	<b>\$134,219</b>	<b>\$420,124</b>
<b>Income (Loss)</b>	<b>\$6,982</b>	<b>\$45,325</b>	<b>\$43,076</b>	<b>\$46,994</b>	<b>\$ 142,377</b>



**Year Total**

Income Statement Year Ending	Year 1	Year 2	Year 3	Year 4	Year 5
<b>Revenue</b>					
Turbine	\$67,500	\$81,000	\$ 129,195	\$206,712	\$ 358,129
Turbine and Tower	\$38,520	\$43,200	\$ 73,727	\$117,964	\$ 204,372
<b>Total Revenue</b>	<b>\$106,020</b>	<b>\$124,200</b>	<b>\$202,922</b>	<b>\$324,676</b>	<b>\$562,501</b>
<b>Expenses</b>					
Cost of Goods Sold	\$61,927	\$125,452	\$ 104,520	\$167,232	\$275,933
CEO, Sale Employee, Commission, and Payroll Taxes	\$68,513	\$69,100	\$ 70,482	\$75,351	\$105,112
Office Rent	\$15,396	\$15,704	\$ 16,018	\$16,338	\$16,665
Office Utilities	\$10,424	\$10,632	\$ 10,845	\$10,845	\$11,283
Website, Advertising, and Promotional Materials	\$11,062	\$11,283	\$ 11,509	\$11,105	\$11,130
Refund	(\$12,410)	\$0	\$0	\$0	\$0
<b>Total Expenses</b>	<b>\$154,911</b>	<b>\$232,171</b>	<b>\$213,374</b>	<b>\$280,871</b>	<b>\$420,124</b>
<b>Income (Loss)</b>	<b>(\$48,891)</b>	<b>(\$107,971)</b>	<b>(\$10,451)</b>	<b>\$43,804</b>	<b>\$142,377</b>

#### **C4: Balance Sheet**

Balance Sheet	End of Year One	End of Year Two	End of Year Three	End of Year Four	End of Year Five
<b>Assets:</b>					
Cash	\$472,942	\$364,970	\$354,519	\$398,323	\$513,915
Long Term Lease Investment	\$12,410	\$12,410	\$12,410	\$12,410	\$12,410
<b>Long Term Assets Total</b>	<b>\$12,410</b>	<b>\$12,410</b>	<b>\$12,410</b>	<b>\$12,410</b>	<b>\$12,410</b>
<b>Net Long-term Assets</b>	<b>\$12,410</b>	<b>\$12,410</b>	<b>\$12,410</b>	<b>\$12,410</b>	<b>\$12,410</b>
<b>Total Assets</b>	<b>\$485,352</b>	<b>\$377,380</b>	<b>\$366,929</b>	<b>\$410,733</b>	<b>\$526,325</b>
<b>Equity:</b>					
Equity Investments	\$552,410	\$552,410	\$552,410	\$552,410	\$552,410
Retained Earnings	(\$67,058)	(\$175,030)	(\$185,481)	(\$141,677)	(\$26,085)
<b>Total Equity</b>	<b>\$485,352</b>	<b>\$377,380</b>	<b>\$366,929</b>	<b>\$410,733</b>	<b>\$526,325</b>
<b>Total Liability and Owners Equity</b>	<b>\$485,352</b>	<b>\$377,380</b>	<b>\$366,929</b>	<b>\$410,733</b>	<b>\$526,325</b>

#### **C5: Cash Flows**

##### **Year 1**

Cash Flows Year 1	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year 1 Total
Beginning Balance	\$534,243	\$514,884	\$ 502,158	\$ 488,761	\$534,243
Cash Receipts	\$15,525	\$27,360	\$28,980	\$34,155	\$106,020
<b>Cash Available</b>	<b>\$549,768</b>	<b>\$542,244</b>	<b>\$531,138</b>	<b>\$522,916</b>	<b>\$640,263</b>
<b>Cash Payments</b>					
Cost of Goods Sold	\$9,289	\$14,862	\$17,340	\$20,436	\$61,927
CEO, Sales Employees, Commision, Payroll Taxes	\$16,003	\$16,003	\$16,003	\$20,503	\$68,513
Office Rent	\$3,849	\$3,849	\$3,849	\$3,849	\$15,396
Office Utilities	\$2,774	\$2,606	\$2,522	\$2,522	\$10,424
Website, Advertising, and Promotional Materials	\$2,969	\$2,766	\$2,664	\$2,664	\$11,062
<b>Total Payments</b>	<b>\$34,884</b>	<b>\$40,086</b>	<b>\$42,378</b>	<b>\$49,974</b>	<b>\$167,321</b>
<b>Ending Balance</b>	<b>\$514,884</b>	<b>\$502,158</b>	<b>\$488,761</b>	<b>\$472,942</b>	<b>\$472,942</b>

**Year 2**

Cash Flows Year 2	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year 2 Total
Beginning Balance	\$472,942	\$446,843	\$421,010	\$395,317	\$472,942
Cash Receipts	\$18,630	\$29,808	\$34,776	\$40,986	\$124,200
Cash Available	\$491,572	\$476,651	\$455,786	\$436,303	\$597,142
<b>Cash Payments</b>					
Cost of Goods Sold	\$18,818	\$30,109	\$35,127	\$41,399	\$125,452
CEO, Sales Employees, Commision, Payroll Taxes	\$16,127	\$16,127	\$16,127	\$20,717	\$69,100
Office Rent	\$3,926	\$3,926	\$3,926	\$3,926	\$15,704
Office Utilities	\$2,829	\$2,658	\$2,572	\$2,572	\$10,632
Website, Advertising, and Promotional Materials	\$3,028	\$2,821	\$2,717	\$2,717	\$11,283
Total Payments	\$44,729	\$55,641	\$60,470	\$71,332	\$232,171
Ending Balance	\$446,843	\$421,010	\$395,317	\$364,970	\$364,970

**Year 3**

Cash Flows Year 3	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year 3 Total
Beginning Balance	\$364,970	\$352,578	\$353,818	\$354,170	\$364,970
Cash Receipts	\$29,715	\$52,367	\$55,468	\$65,373	\$202,922
Cash Available	\$394,685	\$404,945	\$409,285	\$419,542	\$567,893
<b>Cash Payments</b>					
Cost of Goods Sold	\$15,678	\$25,085	\$29,266	\$34,492	\$104,520
CEO, Sales Employees, Commision, Payroll Taxes	\$16,450	\$16,450	\$16,450	\$21,132	\$70,482
Office Rent	\$4,004	\$4,004	\$4,004	\$4,004	\$16,018
Office Utilities	\$2,886	\$2,711	\$2,624	\$2,624	\$10,845
Website, Advertising, and Promotional Materials	\$3,088	\$2,877	\$2,772	\$2,772	\$11,509
Total Payments	\$42,107	\$51,128	\$55,116	\$65,023	\$213,374
Ending Balance	\$352,578	\$353,818	\$354,170	\$354,519	\$354,519

**Year 4**

Cash Flows Year 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year 4 Total
Beginning Balance	\$354,519	\$350,578	\$368,207	\$384,298	\$354,519
Cash Receipts	\$47,544	\$83,787	\$88,748	\$104,596	\$324,676
Cash Available	\$402,063	\$434,365	\$456,956	\$488,894	\$679,195
Cash Payments					
Cost of Goods Sold	\$25,085	\$40,136	\$46,825	\$55,187	\$167,232
CEO, Sales Employees, Commission, Payroll Taxes	\$16,450	\$16,450	\$16,450	\$26,001	\$75,351
Office Rent	\$4,085	\$4,085	\$4,085	\$4,085	\$16,338
Office Utilities	\$2,886	\$2,711	\$2,624	\$2,624	\$10,845
Website, Advertising, and Promotional Materials	\$2,979	\$2,776	\$2,675	\$2,675	\$11,105
Total Payments	\$51,485	\$66,158	\$72,658	\$90,571	\$280,871
Ending Balance	\$350,578	\$368,207	\$384,298	\$398,323	\$398,323

**Year 5**

Cash Flows Year 5	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Year 5 Total
Beginning Balance	\$398,323	\$405,306	\$450,631	\$493,707	\$398,323
Cash Receipts	\$82,370	\$145,161	\$153,757	\$181,213	\$562,501
Cash Available	\$480,693	\$550,467	\$604,388	\$674,920	\$960,824
Cash Payments					
Cost of Goods Sold	\$41,390	\$66,224	\$77,261	\$91,058	\$275,933
CEO, Sales Employees, Commission, Payroll Taxes	\$23,843	\$23,843	\$23,843	\$33,584	\$105,112
Office Rent	\$4,166	\$4,166	\$4,166	\$4,166	\$16,665
Office Utilities	\$3,003	\$2,821	\$2,730	\$2,730	\$11,283
Website, Advertising, and Promotional Materials	\$2,986	\$2,783	\$2,681	\$2,681	\$11,130
Total Payments	\$75,387	\$99,836	\$110,681	\$134,219	\$420,124
Ending Balance	\$405,306	\$450,631	\$493,707	\$540,700	\$540,700

**Year Total**

Cash Flows Years 1-5	Year 1	Year 2	Year 3	Year 4	Year 5
Beginning Balance	\$534,243	\$472,942	\$364,970	\$354,519	\$398,323
Cash Receipts	\$106,020	\$124,200	\$202,922	\$324,676	\$562,501
Cash Available	\$640,263	\$597,142	\$567,893	\$679,195	\$960,824
Cash Payments					
Cost of Goods Sold	\$61,927	\$125,452	\$104,520	\$167,232	\$275,933
CEO, Sales Employees, Commission, Payroll Taxes	\$68,513	\$69,100	\$70,482	\$75,351	\$105,112
Office Rent	\$15,396	\$15,704	\$16,018	\$16,338	\$16,665
Office Utilities	\$10,424	\$10,632	\$10,845	\$10,845	\$11,283
Website, Advertising, and Promotional Materials	\$11,062	\$11,283	\$11,509	\$11,105	\$11,130
Total Payments	\$167,321	\$232,171	\$213,374	\$280,871	\$420,124
Ending Balance	\$472,942	\$364,970	\$354,519	\$398,323	\$540,700

**C6: Break-Even Analysis**

Break Even Analysis	Year 1	Year 2	Year 3	Year 4	Year 5
Turbine (75% of Sales)	\$ 1,500	\$ 1,500	\$ 1,650	\$ 1,650	\$ 1,733
Turbine Cost	\$ 903	\$ 903	\$ 876	\$ 876	\$ 876
Turbine margin	\$ 597	\$ 597	\$ 774	\$ 774	\$ 857
Turbine and Tower (25% of Sales)	\$ 2,400	\$ 2,400	\$ 2,640	\$ 2,640	\$ 2,640
Turbine and Tower Cost	\$ 1,421	\$ 1,421	\$ 1,378	\$ 1,378	\$ 1,378
Turbine and Tower Margin	\$ 979	\$ 979	\$ 1,262	\$ 1,262	\$ 1,262
Operating Expenses	\$92,984	\$106,719	\$ 108,854	\$113,639	\$144,191
Total number of Turbines	117	134	105	110	126
total number of Turbine and Tower	24	27	22	23	29

**C7: Company Valuation**

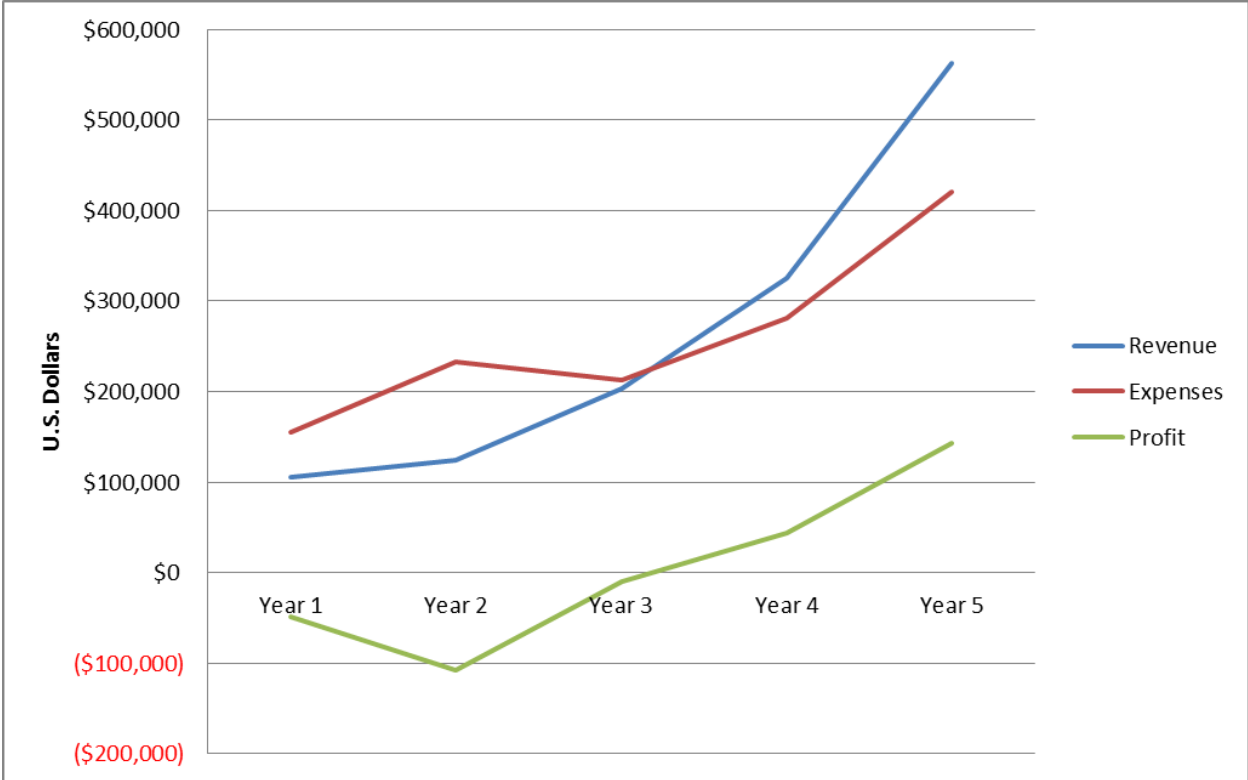
Company Valuation	Year One	Year Two	Year Three	Year Four	Year Five
Cash available	\$472,942	\$364,970	\$354,519	\$398,323	\$513,915
EBITDA	3.56	3.56	3.56	3.56	3.56
Company Value at Year End	\$1,683,673	\$1,299,295	\$1,262,088	\$1,418,031	\$1,829,536

## C8: Exit Strategy for Investors

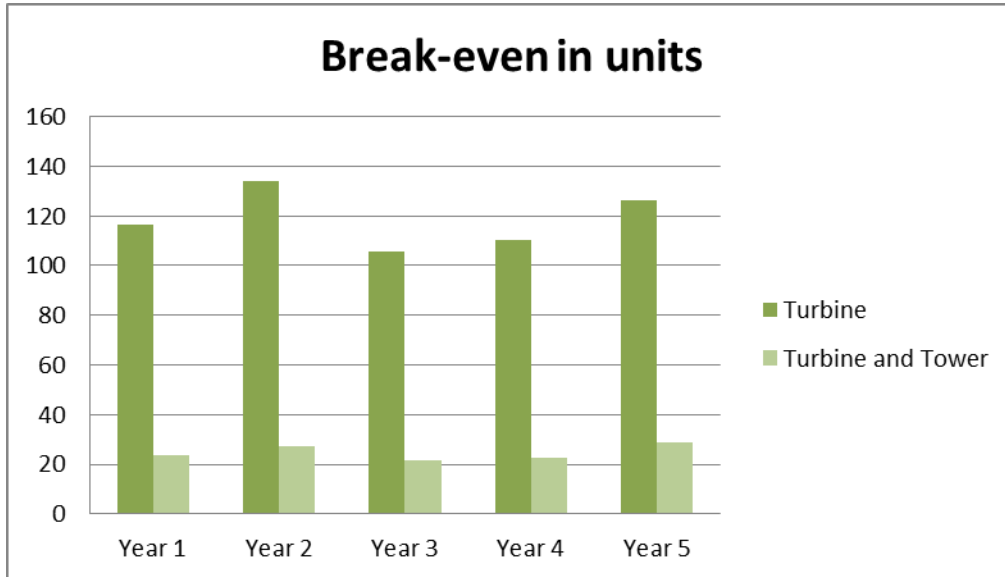
<b>Exit Strategy Options</b>	<b>Advantages</b>	<b>Disadvantages</b>
<b>Buyout</b>	<ul style="list-style-type: none"><li>• Keep original company goal</li><li>• More profits kept to founders</li></ul>	<ul style="list-style-type: none"><li>• Less financial backing</li><li>• Financing new projects can be more difficult</li></ul>
<b>Selling the Company</b>	<ul style="list-style-type: none"><li>• Can lead to increased sales and can open new markets for business</li><li>• Can become more efficient with acquirers management</li></ul>	<ul style="list-style-type: none"><li>• Lose control of the business</li><li>• Company cultures could clash</li><li>• Management styles could differ causing conflict</li></ul>
<b>Going Public</b>	<ul style="list-style-type: none"><li>• Quick funding for the company</li><li>• Can gain more recognition in market</li></ul>	<ul style="list-style-type: none"><li>• More public scrutiny</li><li>• Stricter operating requirements</li><li>• Differing plans for the future by shareholders</li><li>• Higher accounting</li></ul>

# Appendix D: Financial Graphs

## D1: Revenues, Expenses, Profit



**D2: Break-Even in Units**



**D3: Company Valuation**

