JAYHAWK WINDUSTRIES

BUSINESS PLAN

1 Executive Summary

Historically, central plants have represented a fundamental part of the electric grid. Most often, these large generating facilities have been located specifically either close to resources or otherwise far from populated centers. These were developed when the costs of transportation of fuel and integrating generating technologies into populated areas far exceeded the cost of developing traditional transmission and distribution (T&D) facilities and tariffs. However, by the start of the 21st century, Central Plants could hardly continue to deliver competitively cheap and reliable electricity to remote customers through the grid as this had become the main driver of remote customer's power costs and power quality problems. Efficiency gains no longer come from generating capacity, but from smaller units located closer to sites of demand.

Diesel generators have been increasingly used for their portability, reliability and relative affordability by non-governmental organizations (NGOs), governments and municipalities, and individual customers to suffice the electric energy need in remote areas and emergency situations. On the other hand, these have also shown to require frequent refueling at possibly inconvenient costs of fuel given the upward trending, produce heavy carbon emissions affecting the environment, health and safety of users, require frequent maintenance, and have a lower efficiency at their total load capacity.

Jayhawk Windustries is proud to present to the Inaugural Collegiate Wind Competition hosted by the DOE and NREL, its portable and environmentally friendly wind turbine; a product developed targeting high efficiency and performance. The small-scale 400 W wind turbine rated at 12 m/s is portable, durable, and reliable, providing an energy offset to diesel generators and the expense associated with acquiring, refueling and repairing these. Jayhawk Windustries provides a singular but scalable turbine solution with broad applications for NGOs and with high emphasis on user safety that was developed as a result of the combined expertise and efforts of students of the School of Engineering and School of Business at the University of Kansas.

2 Business Overview

2.1 Mission

Jayhawk Windustries seeks to develop innovative solutions to the challenges of small-scale wind energy by cultivating a diverse and multi-disciplinary team of forward thinking, aspiring student engineers in the belief that we, as the next generation of engineers will, through education and application, develop into the technical leaders who will solve the greatest challenges of the future.

2.2 The Existing Problem

- High costs of central plant generation (complexity, regulatory oversight, and others)
- Increasing age, deterioration, and capacity upon T&D for bulk power
- Increasing relative economy of mass production of smaller appliances over heavy manufacturing of larger units and on-site construction
- Unpredictable and upward trending cost of diesel fuel
- High emissions of greenhouse gasses by diesel generators
- Endanger of health by production of carbon monoxide by diesel generators
- Safety concerns with flammability of fuel
- Noise disturbances caused by diesel generators
- Decreased lower power capacity at generator's total load capacity
- High potential for damage and maintenance if not stored and handled properly (diesel generators)

2.3 The Solution

Jayhawk Windustries provides *affordable, portable, and easily deployable* green energy to non-governmental organizations (NGOs) operating across the globe in the form of a self-contained 400 W wind turbine generator. In combination with a *durable rechargeable battery*, the generated energy can

be *used to power various life-saving instruments*. By providing electricity through these turbines, NGOs have access to much needed electricity in a more *environmentally friendly* manner than diesel powered generators most commonly used today. With rising fuel prices, Jayhawk Windustries' turbines can provide electricity at a *reduced cost* in modest to high-wind environments. Jayhawk Windustries delivers a *one-size-fits-all* solution by providing a modular system in which *additional turbines can be combined to fit any power requirement*.

3 Market Opportunity

Jayhawk Windustries's focus is on meeting the demand of electric energy in emergency situations, and in remote areas and communities in need throughout the world. Today, citizens of developing countries are rightly and increasingly demanding access to modern amenities that are taken for granted in developed nations and urban populations. In response, non-governmental organizations (NGOs) direct their efforts to meet people's needs, provide better health, family planning, and education services, support the community development, and maximize involvement of beneficiaries.

Jayhawk Windustries then identifies the need for a stand-alone power system that expands the electricity access by optimizing the utilization of renewable energy. The company's relationships with NGOs and other organizations focused on the development and improvement of societies will serve as a solid foundation for the growth of the business. The company estimates that about 3 % proprietorship of the available market will be achieved within the first year after start-up. It is estimated that the market share will grow approximately 3% annually for each of the first three years.

3.1 Target Market

The total market was identified as shown in the following Table 3.1 after performing exhaustive and comprehensive research (Ref. Appendix E).

Table 3.1: Small-Scale Wind Turbine Addressable Market (Ref. Appendix E)

Total NGOs Operating Budget for 1 year	$96 B
Total Investments of Development Projects and the like	$18 B
Distributed Energy Percent Share of Market	1.75 %
Distributed Energy Market Size	$318 M
Estimated Competitive Price of Turbine with $ 100 of profit	$750

The addressable target market is equal to 1.75% of the global NGO-energy market defined by the applicable portion of the NGOs operating budget for the acquisition of distributed energy devices, and represents $318 M annually. This market is defined for the portion of the NGOs annual operating budget that is used for energy generation and for various projects such as the ones listed below.

- Livelihood/Economic development
- Climate and Environmental Programs
- Emergency, Health, and Sanitation
- Education
- Science, Technology, and Innovation
- Organizations' Daily Operational Activities

NGOs projects and power needs vary significantly. Therefore, Jayhawk Windustries provides a flexible, portable, and repairable one-size-fit-solution. Jayhawk Windustries is projected to achieve 3% share of this market by the 1st year ($9 M), % 6 in the 2nd year ($19 M) and 10 % in the 3rd year ($31M).

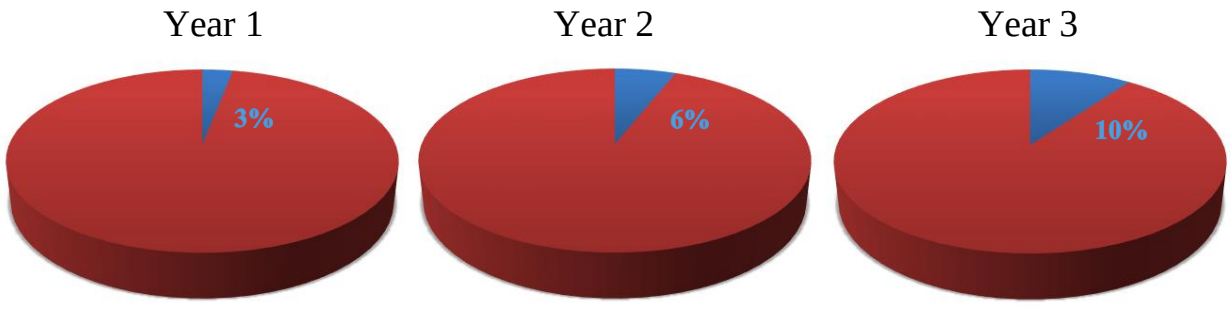

Figure 3.1: Jayhawk Windustries Market Share Years 1-3

Jayhawk Windustries' wind turbines supplement the current local energy needs of global communities. Based on the NGOs activity in the world, the company offers a 10 year product life cycle based on standard Class III wind regions (average wind speed of 7.5 m/s) as shown in Appendix D. This class III assumption applies to approximately 18% of all NGO operations.

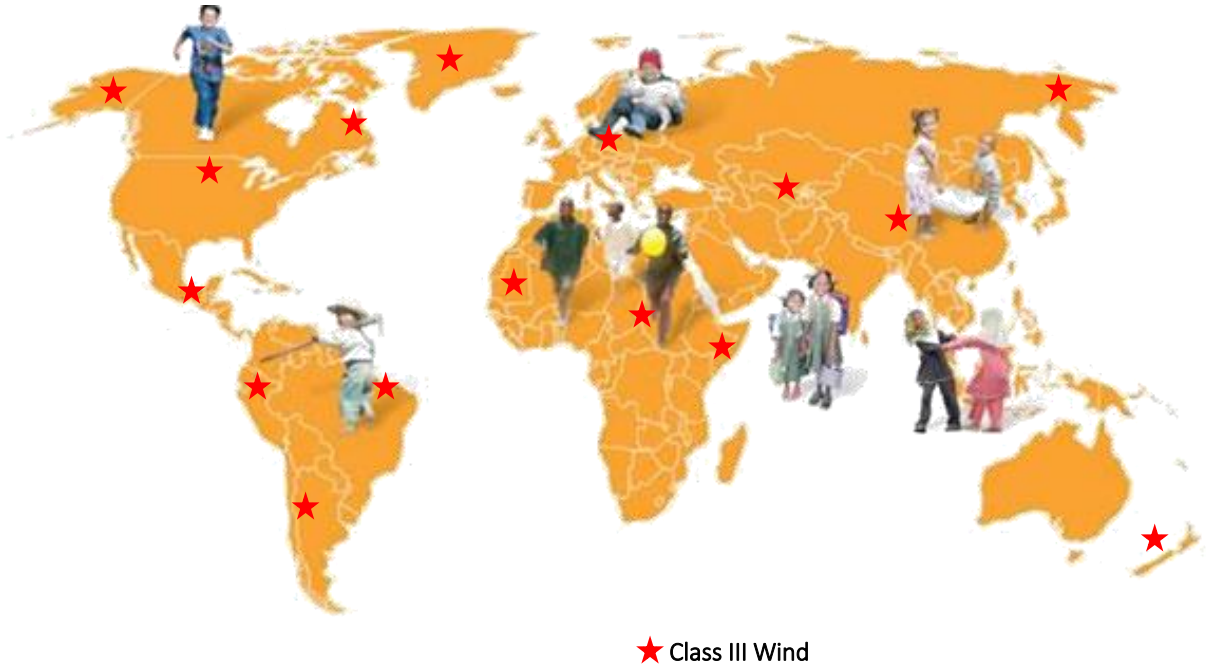

Figure 3.2: World NGO Activity and Class III Wind Regions

NGOs' projects most commonly have a life span of 3-5 years. For this, energy requirements, and portability issues that NGOs' encounter are directly addressed by the value proposition of the 10 year life cycle wind turbine developed by Jayhawk Windustries. Greater energy demands are satisfied with the investment on more turbines.

4 Management Team

Jayhawk Windustries is a start-up business formed by a multidisciplinary group of students from the School of Business and School of Engineering at the University of Kansas. The following presents the executive team. For full description of roles and responsibilities see Appendix A.

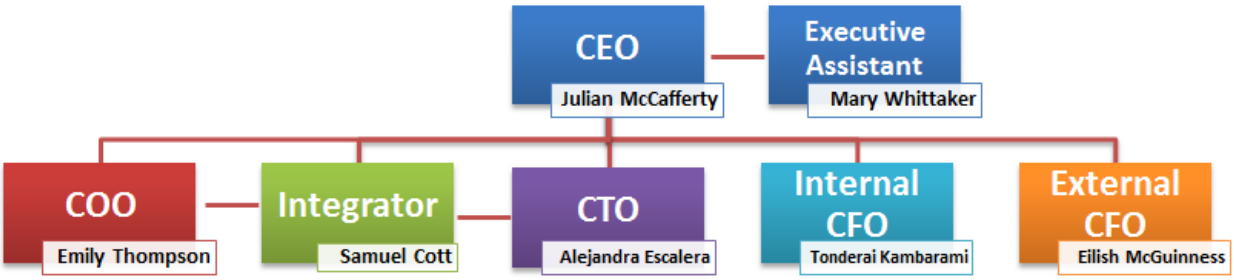

Figure 4.1: Executive Team Structure

This is formed as a Limited Liability Corporation to protect the interest of our partners and future investors.

5 Product Development and Operations

Jayhawk Windustries will succeed by offering its customers high-quality and reliable products. Each satisfied customer is a potential to three new referrals so the quality of our workmanship and product support are key to allow the growth of the business. The following merit criteria was developed to determine the design approach, materials, and processes required for the wind turbine with a respective weighting for its influence on the design.

Table 5.1: Merit Criteria

Weighting System	Percentage
Safety	25%
Performance	20%
Maintainability	20%
Procurement Cost	15%
Life Cycle Cost	10%
Portability	10%
TOTAL	100%

Safety entails labor safety, structural margins, and most importantly reduction of risk of injury to the customer. Performance is defined by the competitive power delivered that meets the needs of the customer. Maintainability is demarcated by the repairability, ease of access, and simplicity of design. Minimizing the procurement cost requires appropriate and efficient manufacturing, processing, and

facilities. Lessening the life cycle cost entails providing durable and lasting components with simple and low cost parts replacement. Finally, portability affects parts count, weight, size, breakdown and assembly, and is considered as a necessary feature for NGOs and other customers with operating sites that move at least once per year.

This wind turbine is differentiated from the market by featuring a shrouded rotor for safety and added performance, a hub-less rotor for low parts count, and a collapsible design to maximize portability.

5.1 Barriers to Entry

Barriers to entry and Jayhawk Windustries' plans to address include the following:

Table 5.2: Barriers to Market Entry

Barrier to Entry	Plan to Address
Large upfront investment to set up manufacturing operation	Hire contractor for manufacturing of wind turbines
Difficulties associated with selling to NGO's	Gift-in-kind (GIK) donations Partnership with NGO's for execution of programs. Initially targeting lower income markets, strengthen social CSR, and aim to a safe, durable, reliable and portable product
Dispersed market with many customers	Sales force-driven marketing plan with local offices in different areas of the USA

5.2 Competitive Analysis

The competitive advantage of the proposed wind turbine is evaluated based on how much the turbine offsets the amount of kWh per year used in fuel and coal burning, required to produce the same amount of power.

For one year, and operation of four hours per day, existing and off-the-shelf diesel generators are evaluated over their acquisition cost, and over the number of gallons of fuel used to produce 400 W. For each unit sold, Jayhawk Windustries offsets 47,647 kWh of non-renewable energy use, and 423 gallons of fuel burned in relation to 1200 W power generators. This can be achieved given that the wind turbine

does not require extra resources, such as fuel, coal, or diesel, to operate. If more power is required, the purchase of each turbine allows for a total annual savings of $ 1,210 which can later be used for the acquisition of more turbines. This in turn allows access to a greater amount of environmentally friendly produced energy.

Table 5.3: Competitive Advantage of Wind Turbine over Average 1,200 W Gasoline Generator (Champion Power Model No. 42436)

	Gasoline Generator	Jayhawk Windustries
Power (w)	*1200*	*400*
Average Fuel Consumption (gallons/hr)	*0.29*	*0*
Average Cost	$ 199.99	$ 750.00
Assuming they operate 4 hr a day:		
No. Gallons Consumed in 1 yr	$ 423.40	$ -
Total cost of diesel	$ 3,260.18	$ -
1 year operating cost	$ 3,460.17	$ 750.00
Cost/kWh	*0.0254*	*0.0165*
Annual Savings	$ -	$ 1210.17

Finally, as a startup company, recognize the economic advantages of the larger, existing companies marketing traditional generator solutions. However, as our product is introduced to the market, companies that produce diesel generators would not be in a position where they would find it economically viable to compete against wind turbines unless their product cost/kWh is equal to or less than the cost/kWh of the wind turbine. Such drastic price cuts in the generator market are not projected to be feasible while remaining profitable.

5.3 Business Model Canvas

The Jayhawk Windustries business model describes the company's value proposition, aligns the company's activities, and potential trade-offs. Due to the restrictions of this report, Jayhawk Windustries has chosen to begin selling to NGOs', with high potential of expansion to other customer segments.

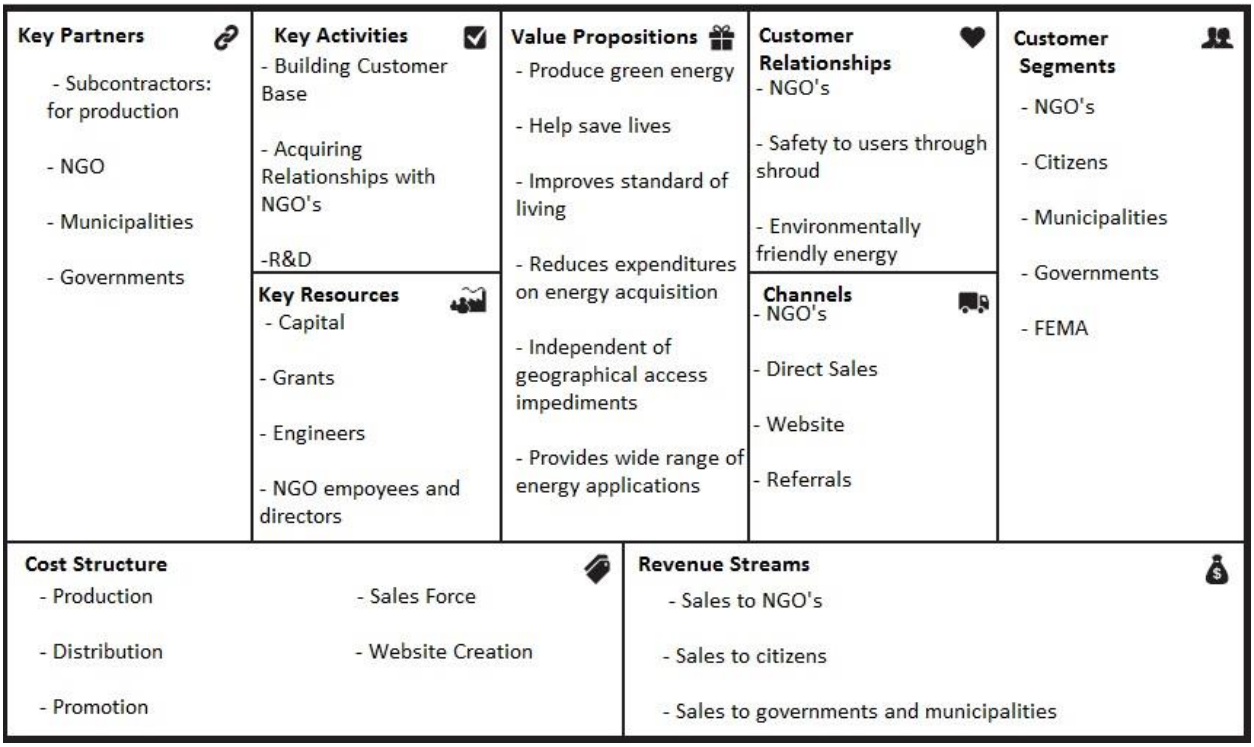

Figure 5.1: Business Model Canvas

5.4 Product Development and Manufacturing Strategies

Jayhawk Windustries' plan to manufacture the wind turbines involves molding the blades from an RTP 2289 HM plastic using an injection molding process. The cost of manufacturing each blade is a function of the number of blades produced. The remainder of the components will be constructed from commercial off-the-shelf electronics and materials. These components will then be combined in a factory owned by Jayhawk Windustries. The complete development process is outlined in the Technical Report also presented to the conference.

5.5 Marketing Plan and Operations

Jayhawk Windustries allocates $300,000 to the marketing budget in year 1, declining to $200,000 in continuing years, which will be allocated as follows:

Table 5.4: Jayhawk Windustries Marketing Plan

Media	Target	Reason	Frequency	Effectiveness	Costs
Conventions & Trade Shows	NGO's/Individuals	Create awareness & display product	Quarterly	Moderate/High	$70K
Trade Magazine Advertisements	NGO's/Governments/Municipalities/Individuals	Increase credibility create awareness	Monthly	Moderate	$20K
NGO's Influencer	NGO's	Efficiently form relationships with municipalities	As needed	High	$95K
Social Media	Individuals	Create awareness for citizens about product	Monthly	Low	$5K
Direct Sales Force	NGO's/Governments/Municipalities/Individuals	Acquire new customers to generate sales	All Year	High	$110K
				TOTAL	$300K

6 Financial Analysis

Jayhawk Windustries will be selling an initial run of 350 wind turbines to NGOs during a pre-launch phase period. Results from this pre-launch phase will be used to forecast national expansion over the next three years. Following the infusion of two rounds of capital totaling $1 million, the firm is expected to be profitable after year 2. Jayhawk Windustries is expected to break even and start producing positive cash flows early in year 2. The table below illustrates the revenue and profit over the first three years. A more detailed breakdown of these values can be found in Appendix C.

Table 6.1: Revenue and Profit Estimations (in Millions of Dollars)

	Pre-Launch	Year 1	Year 2	Year 3
Revenue	$ 0.26	$ 9.56	$ 19.13	$ 31.88
Profit	$ (0.74)	$ 0.46	$ 3.02	$ 7.63

6.1 Pricing:

A full scale production of over 30000 units in a year yields a production cost of $450, and production run of 350 for the pre-launch will yield a production cost of $1000. By setting a gross profit margin of 27.5% for the first year, a market price of $750 is determined. The cost to manufacture a turbine is dependent on the scale of production.

6.2 Financial Plan

Venture financial projections can be summarized as follows:

Table 6.2: Financial Projections

	Pre-Launch	Year 1	Year 2	Year 3
Units Sold	350	12,750	25,500	42,500
Sales	$ 262,500.00	$ 9,562,500.00	$ 19,125,000.00	$ 31,875,000.00
COGS	$ 340,711.97	$ 6,938,264.22	$ 11,766,103.22	$ 17,017,987.40
GM	$ (78,211.97)	$ 2,624,235.78	$ 7,358,896.78	$ 14,857,012.60
GM %		27%	38%	47%
Expenses	$ 659,500.00	$ 2,167,500.00	$ 4,335,000.00	$ 7,225,000.00
Net Profit	$ (737,711.97)	$ 456,735.78	$ 3,023,896.78	$ 7,632,012.60
Cumulative	$ (737,711.97)	$ (280,976.19)	$ 2,742,920.59	$ 10,374,933.18

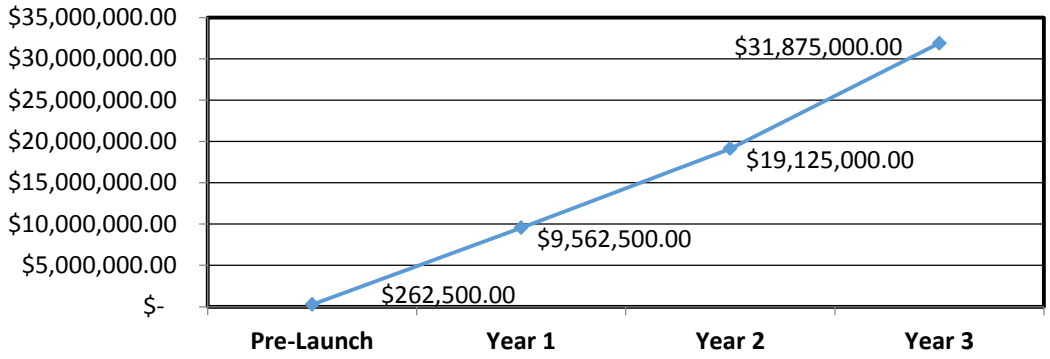

Figure 6.1: Yearly Sales

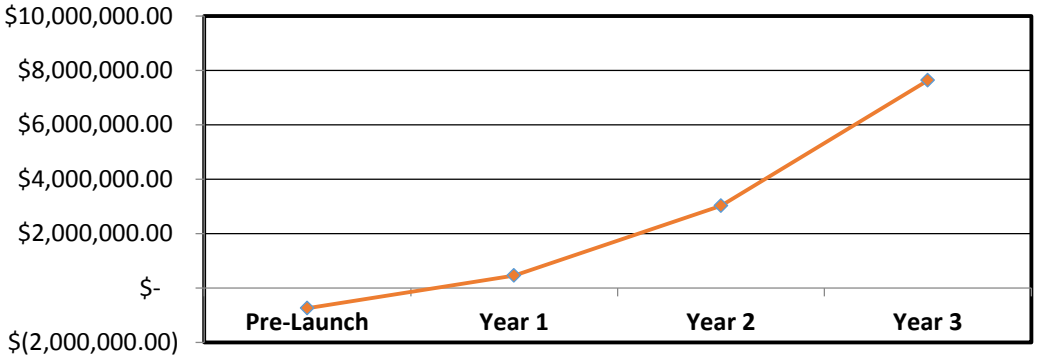

Figure 6.2: Yearly Net Profit

Table 6.3: Yearly Cash Flow

	Pre-Launch	Year 1	Year 2	Year 3
Beginning Cash Position	$ 1,000,000	$ 262,288	$ 719,024	$ 3,742,921
Cash Inflow	$ 262,500	$ 9,562,500	$ 19,125,000	$ 31,875,000
Cash Outflow	$ 1,000,212	$ 9,105,764	$ 16,101,103	$ 24,242,987
Net Cash Flow	$ 262,288	$ 719,024	$ 3,742,921	$ 11,374,933

Table 6.4: Monthly Cash Flow

	Year 1												Year 2			
	Pre-Launch	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Cash Balance	$ (1,000)	$(1,262)	$(1,224)	$(1,186)	$(1,148)	$(1,110)	$(1,072)	$(1,034)	$(996)	$(958)	$(920)	$(882)	$(844)	$ (806)	$ (554)	$ (302)	$ (50)
Cash Inflow	$ 263	$ 797	$ 797	$ 797	$ 797	$ 797	$ 797	$ 797	$ 797	$ 797	$ 797	$ 797	$ 797	$1,594	$1,594	$1,594	$1,594
Cash Outflow	$ 1,000	$ 759	$ 759	$ 759	$ 759	$ 759	$ 759	$ 759	$ 759	$ 759	$ 759	$ 759	$ 759	$1,342	$1,342	$1,342	$1,342
New Cashflow	$ (1,738)	$(1,224)	$(1,186)	$(1,148)	$(1,110)	$(1,072)	$(1,034)	$ (996)	$(958)	$(920)	$(882)	$(844)	$(806)	$ (554)	$ (302)	$ (50)	$ 202

6.3 Deal Terms

Venture capital required and equity deal terms can be summarized as the following:

Table 6.6: Sample Term Sheet

Jayhawk Windustries	
Term Sheet	
Preferred Stock Financing	
Issuer	Jayhawk Windustries
Max Investment	$ 900,000
Min. Investment	$ 200,000
Investment Increments	
Year 1	$ 600,000
Year 2	$ 300,000
Price per Share	$ 1
Max Number of Shares	900000
Pre-Money Valuations	$ 2,079,168
Post-Money Valuation	$ 2,979,168
Year 3 Valuation	$ 10,374,933
Prjected Return	$ 3,134,244
Projected ROI	3.48

Table 6.5: Usage of Stock Finance

Sources		Uses	Year 1	Year 2
Personal	$ 137,712	Marketing	300000	200000
Equity	$ 900,000	R&D	75000	50000
		Personal	200000	500000
		Other Expenses	162712	0
Total Funds Needed	$1,037,712	Total Funds Used	737712	300000

Table 6.7: Capitalization Table

Class	Shares	%
Existing Common Stockholders	2079168	69.79%
Investor Preferred Stock	900000	30.21%
Total	2979168	100.0%

Appendix A: Management Team Description

Julian McCafferty, Chief Executive Officer

The Chief Executive Officer (CEO) is responsible for all employees, deadlines, and objectives of the company. The CEO is the final authority in all significant decisions affecting the company and design of the product. This person delegates tasks and responsibilities to his or her executives to be handled at the lowest appropriate level. The CEO ultimately provides direction and leads the employees to towards the goals of the company set forth in its vision.

Alejandra Escalera, Chief Technical Officer

The Chief Technical Officer (CTO) is responsible for high-level review of the wind turbine design team. They facilitate communication between the manufacturing department and design department to ensure full compatibility between the teams. The CTO is responsible for overseeing the design process and acts as a technical advisor to the design team.

Emily Thompson, Chief Operating Officer

The Chief Operating Officer (COO) is responsible for the manufacturing of the prototype wind turbine in accordance with the determined design. This person will ensure that the manufacturing process remains on schedule and remain aware of any design adjustments while the prototype is being built. The COO will be accountable for quality control of the product and maintaining a safe work environment for employees during manufacturing.

Eilish McGuinness-Barnhart, Tonderai Kambarami, Chief Financial Officers


The Chief Financial Officer (CFO) role is split into two executive officers. The first executive is the Internal CFO who is responsible for employee wages, human relations, employee work hours, and cost projections for the project. The second executive is the External CFO and is responsible for marketing analysis and funding for the project. This person is the liaison with the business students and will work with them in determining a market for the project. They will also be investigating external resources for additional funding and will collaborate with Internal CFO and CEO with hard dollar budgeting for the project.

Samuel Cott, Integrator

The Integrator position was created facilitate communication between the design and manufacturing teams with the mechanical team. He was in charge of the assimilation of information between the teams and ensuring mechanical components were designed and manufactured on time and within specifications.

Mary Pat Whittaker, Executive Assistant

Formerly titled "Scribe," the Executive Assistant was responsible for minutes at all meetings and presentations, facilitation of communication between the other Executive board members, as well as being a general aid if an Officer needed assistance. She also was in charge of all reports, submission materials, release forms, and took the lead on travel arrangements for the team's trip to the competition.

Appendix B: Start-Up Expenditures

Operating Expenditures	
Pre-Opening Salaries and Wages	$259,500.00
Payroll Taxes	$ 40,000.00
Insurance	$ 15,000.00
Legal and Accounting Fees	$ 6,000.00
Rent Deposits	$ 3,500.00
Utility Deposits	$ 3,000.00
Supplies	$ 5,000.00
R&D	$ 12,500.00
Website	$ 8,000.00
Pre-Launch Advertising & Promotion	$300,000.00
Unanticipated Expenses	$ 3,000.00
Other Start-Up Costs	$ 4,000.00
Total Operating Expenditures	$659,500.00

Appendix C: Income Statement

Item	Pre-Launch	Year 1	Year 2	Year 3
Net Sales	$ 262,500.00	$ 9,562,500.00	$ 19,125,000.00	$ 31,875,000.00
Cost of Goods Sold	$ 340,711.97	$ 6,938,264.22	$ 11,766,103.22	$ 17,017,987.40
Gross Margin ($)	$ (78,211.97)	$ 2,624,235.78	$ 7,358,896.78	$ 14,857,012.60
Gross Margin (%)	-30%	27%	38%	47%
Operating Expenses:				
Advertising	$ 164,875.00	$ 528,121.83	$ 1,056,243.66	$ 1,760,406.10
Promotion	$ 131,900.00	$ 594,136.57	$ 1,188,273.14	$ 1,980,455.24
Other Marketing	$ 32,975.00	$ 88,020.44	$ 176,040.87	$ 293,401.45
R&D	$ 137,395.83	$ 44,009.83	$ 88,019.65	$ 146,699.42
Insurance	$ 16,487.50	$ 55,012.67	$ 110,025.35	$ 183,375.58
Miscellaneous	$ 3,297.50	$ 11,002.85	$ 22,005.69	$ 36,676.16
Office Expense	$ 5,495.83	$ 28,606.62	$ 57,213.24	$ 95,355.41
Payroll Expenses	$ 219,833.33	$ 506,116.92	$ 1,012,233.84	$ 1,687,056.39
Payroll Tax	$ 43,966.67	$ 143,033.11	$ 286,066.22	$ 476,777.03
Professional Fees	$ 6,595.00	$ 22,004.91	$ 44,009.83	$ 73,349.71
Rent	$ 3,847.08	$ 33,007.76	$ 66,015.52	$ 110,025.87
Website Development	$ 8,793.33	$ 33,007.76	$ 66,015.52	$ 110,025.87
Travel	$ -	$ 26,406.05	$ 52,812.11	$ 88,020.18
Utilities	$ 3,297.50	$ 22,004.91	$ 44,009.83	$ 73,349.71
Other Expenses	$ 4,396.67	$ 33,007.76	$ 66,015.52	$ 110,025.87
Total Operating Expenses	$ 659,500.00	$ 2,167,500.00	$ 4,335,000.00	$ 7,225,000.00
Operating Income	$ (737,711.97)	$ 456,735.78	$ 3,023,896.78	$ 7,632,012.60
Income Before Taxes	$ (737,711.97)	$ 456,735.78	$ 3,023,896.78	$ 7,632,012.60
Taxes (30% Rate)	$ -	$ 137,020.73	$ 907,169.03	$ 2,289,603.78
Net Income After Taxes	$ (737,711.97)	$ 319,715.05	$ 2,116,727.75	$ 5,342,408.82

Appendix D: Class III Wind Rayleigh Distribution of Probability of Wind Speeds

For a 1 m rotor diameter and Class III $V_{average}$ = 7.5 m/s:

Wind Speed	Power Output	Rayleigh Distribution	Energy Capture
m/s	Watts	%	kW-Hrs / Year
<2.5	0	11.89%	0.0
3.0	6	8.21%	4.3
4.0	15	9.44%	12.4
5.0	29	10.04%	25.5
6.0	49	10.04%	43.1
7.0	78	9.53%	65.1
8.0	117	8.65%	88.6
9.0	167	7.52%	110.0
10.0	229	6.29%	126.2
11.0	304	5.07%	135.0
12.0	395	3.95%	136.5
13.0	400	2.97%	103.9
14.0	400	2.16%	75.6
15.0	400	1.52%	53.2
16.0	400	1.03%	36.3
17.0	400	0.68%	24.0
>18	400	1.00%	35.0
	TOTAL	100%	1074.8

Appendix E: References

1. Anon., "2012 CARE Annual Report," *Cooperative for Assistance and Relief Everywhere (CARE)*, http://care-international.org/ [retrieved March 2014].
2. Anon., "2012 Financial Annual Report," *Caritas Internationalis*, http://www.caritas.org/who-we-are/finance [retrieved March 2014].
3. Anon., "2012 Financial Annual Report," *Catholic Relief Services (CRS-USCC)*, http://crs.org/financial-reports [retrieved March 2014].
4. Anon., "2012 Financial Annual Report," *InterAction*, http://www.interaction.org/resources/annual-report [retrieved March 2014].
5. Anon., "2012 Financial and Funding Information Overview," *International Committee of the Red Cross (ICRC)*, http://www.icrc.org/eng/who-we-are/finances/index.jsp [retrieved March 2014].
6. Anon., "2012 Financial Annual Report," *Relief International*, http://www.ri.org/newsroom/reports-and-policies.php [retrieved March 2014].
7. Anon., "2012 Financial Annual Report," *United Nations Children's Fund (UNICEF)*, http://www.unicef.org/ [retrieved March 2014].