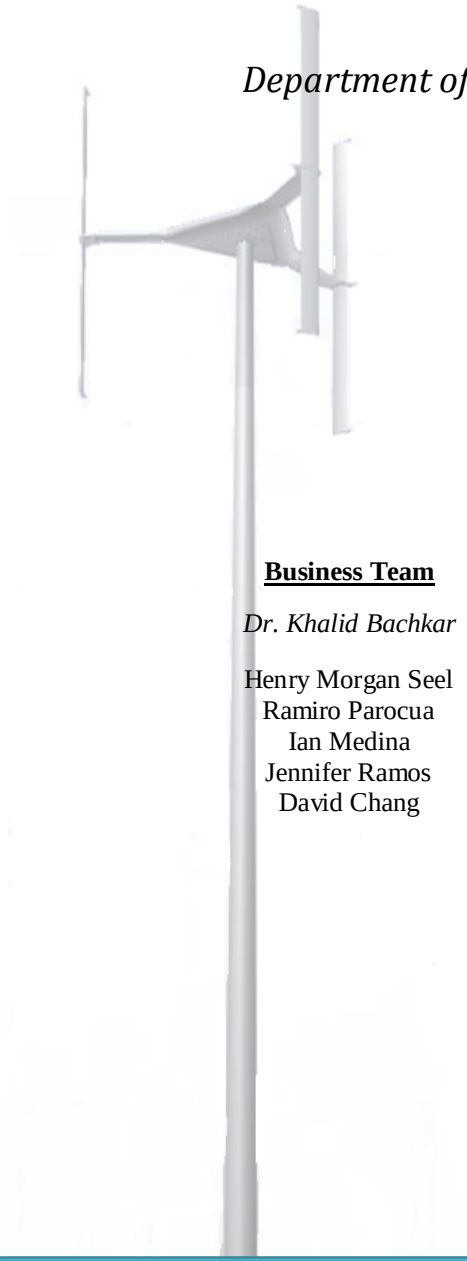
CMA Wind

Department of Energy Collegiate Wind Competition



Business Team

Dr. Khalid Bachkar

Henry Morgan Seel
Ramiro Parocua
Ian Medina
Jennifer Ramos
David Chang

Engineering Team

Dr. Tom Nordenholz

Gerald Spencer
Alec Calder
Glen Fuller
Eric Johnson
Sasha Barnett
Samuel Gray

1. Executive Summary

1.1 Mission Statement

CMAWind is dedicated to bringing quality renewable energy opportunities to those in need around the globe. Customer demographics, in terms of the end-user, targeted by our company would be those individuals who are living off the electrical grid and in remote areas of eastern Africa where power is limited but sorely essential. As a humanitarian effort, the company will utilize strategic marketing and distribution methods through partnerships to best reach and aid the customer.

1.2 Objectives

a. Sell 1500 wind turbine units in year 1.

b. Sell 2100 wind turbine units by year 2.

c. Expand beyond our initial four target countries after three years.

1.3 The Team

The California Maritime Academy has assembled a team of eleven senior year cadets and two project advisors to compete in the National Collegiate Wind Competition and develop this business. Equal parts of the student lead teams will graduate in 2014 with a Bachelor of Science degree in either Mechanical Engineering or International Business and Logistics. Greater details of each student's expertise will be provided under the management team section.

1.4 Product

CMAWind will offer a wind-powered turbine product that is small, compact, robust, and light-weight that possesses a capacity to charge and power various electrical devices such as LED light bulbs or cell phones in the rural areas of Africa.

1.5 **Growth & Future Plans**

Market penetration will begin in South Africa, where English is commonly spoken and there is a solid existing infrastructure. As we reach our first and second year objectives northern expansion, along coastal countries where wind is strongest, will take place.

1.6 **Financial Considerations**

a. Startup funding.
b. Cost of penetrating various new sub-markets within Africa.
c. Potential repair costs.
d. Research and development.
e. Marketing. (Radio, Billboards, etc…)

1.7 **Keys to Success**

a. Provide a compact, robust, and high quality product.
b. Increase the standards of living in the target region.
c. Strategize market entry to a foreign region.
d. Utilize local partnerships to the fullest.

2. **Business Overview**

2.1 **Company Name**

The company will be known as the California Maritime Academy Wind, "CMAWind", a subsidiary of the California Maritime Academy, CSU.

2.2 **Vision**

Our vision at CMAWind is to provide humanitarian aid by way of light-weight, robust, and economically-priced wind turbines in the pursuit of improving standards of living through the supply of clean energy.

2.3 **Value Proposition**

Humanitarian Aid

Partnering with Non-Governmental Organizations (NGOs), CMAWind endeavors to provide power sources to impoverished populations in the eastern African region which have social and economic barriers that make it near impossible to help themselves.

Environmentally Friendly

Encouraging the use of a unique wind power innovation, promoting the utilization of green power in remote off-grid areas that will result in minimal to no waste to the local environment.

Improved Standards of Living

Enhancing the lives of people in eastern Africa by providing them the necessity of electricity for daily life, in the pursuit of improving infrastructure and education rates.

Educational Impact

Allow more time for students to complete their studies during dark hours resulting in boosted education rates and benefits to the country long-term.

Promoting Cell Phone Penetration

Partnering with local cell service companies in the region to increase mobile use. Giving individuals' access to communication to aid incase emergency, or simply to better conduct business and complete everyday tasks.

3. Market Opportunity

3.1 **Design Objectives**

The team's objective is to develop a wind turbine designed and optimized to best utilize moderate wind-speeds that will have the following features: 1) light-weight, 2) durable, 3) reliable in harsh conditions, 4) easy to construct and repair due to modularity.

3.2 **Target Market**

According to the International Energy Agency there are 587 million individuals in Africa without a sustainable, economically viable, electricity source (Table 5). Our wind turbines will, therefore, be designed with the capability to charge portable LED lights and cell phones primarily, but will also have a USB outlet built-in to allow customers to charge other devices as well, given the appropriate stored energy. The countries we are most focused on at this point are South Africa, Zimbabwe, Mozambique, and Madagascar then proceeding to move north along the eastern coast to Tanzania, Kenya, Ethiopia, Somalia, Eritrea and Sudan (Table 1). We have chosen these countries due to the high number of people living with minimal to no electricity and most importantly the moderate annual wind speeds, among other factors (Figure 1).

3.3 **Market Needs**

According to The World Bank over 1.2 billion people live without access to electricity (20% of the world's population) (World Bank, 2014).With this in mind, the market needs we are targeting to fulfill are broken up into the following two areas:

a. Without access to power, many east African people cannot charge their cell phones to quickly respond in case of emergency, or even to communicate and conduct business, thus harming economic productivity.

b. Many of these people have no significant lighting access, thus productivity drops down to nearly zero after sunset. Students cannot complete their studies due to lack of light, which in turn affects education rates (Rutizibwa, 2013). Furthermore, with no other options, many Africans still use candles and kerosene lamps that are expensive, fire hazards, as well as cause health problems (Lam, 2013). Our wind turbine will charge portable LED lights giving cleaner and higher quality lighting.

3.4 **Turbine Design**

The turbine's design will be that of a vertical axis which will perform better than a horizontal axis turbine in non-constant wind directions (Treacy, 2011). The wind turbine will be simple to

assemble and disassemble due to modularized interchangeable parts. With fiberglass airfoils and a small motor-generator, the actual turbine unit itself will be quite light weight. The tower will be made of steel or PVC to allow the turbine to reach the optimal heights between 6 to 24 meters.

3.5 **Turbine Uniqueness**

Unlike other products currently in the wind energy market, the CMAWind turbine will allow for easy setup and repair through modular design. Another product key feature is the light-weight durability in the sum of its parts, making its transportation and reliability in remote areas possible. The product is designed with its intended users in mind at all times to best cater to their location and needs.

3.6 **Competition and Pricing**

Wind Turbine Competitors

Although we differentiate our product from large scale wind turbines, we will still do our best to maintain low prices among our size range. One of our main competitors in the small wind turbine market is Evance Wind Turbines. Evance Wind Turbines is a small wind turbine manufacturer that caters to customers with diverse environments and needs (Business Wire, 2012). Although their target market currently focuses on Asia, if they find success there, they may try to enter into the eastern Africa market in the future. To effectively compete we will not be selling our products directly to the customer, but through strategic partnerships with Humanitarian NGO's, and Cell Phone Companies (Table 2).

Solar Power Competitors

i. Advantages of Solar Energy vs. Wind Energy

The biggest competitor to the development of wind energy is solar power, especially in our targeted African market. Norkero, a solar power company, builds solar powered lamps that can be charged during the day to utilize during the night. Their product

consists of a single, or strand of lights, with small solar cells that are placed on top; this product is sold for $6. (Marcacci, 2013)

IndiGo pay-as-you-go solar by Azuri Technologies is another competitor in the solar market, and has already found success in sub-Saharan Africa. Their pay-as-you-go method of sales through mobile technology has given them a mechanism to penetrate the market by selling directly to the end-user (Leader, 2012).

ii. Disadvantages of Solar Energy vs. Wind Energy

While their product is very inexpensive, a problem that all solar power technologies suffer, including Norkero, is not being able to store energy when the sun is not shining, whether that be in cloudy weather or at night. Our strategy is to provide a product that can charge devices at all times (day and night) even when in operation, while simultaneously conserving excess energy from the wind to be stored in a battery for later use.

Solar-based technology also has the disadvantage of being very difficult to repair in case of breakage. Turbines are simpler in this regard as they use simple motors for generation (Clean Technica, 2013).

4. Management Team

Engineering

- Gerald Spencer
  - Engineering team leader on the wind turbine design with an extensive background of parametric modeling; finite element analysis; multi-axis CNC machine and 3D printer programming.
- Alec Calder
  - Primary focus and specialty of the turbine's aerodynamic capabilities and design utilizing his background in fluid and thermal design to conceptualize the blade design.
- Glenn Fuller

- Specializes in the electrical components of the turbine. He will specifically focus on the turbine's power transfer, transmission and generator.

- Sasha Barnett
  - Specialization in the energy storage and efficiency aspect of the turbine.
- Eric Johnson
  - Specialization in the designing and configuring the electrical control of the turbine and well as aiding in foil shape design.
- Samuel Gray
  - Specialization and extensive background in electrical generation and transfer.

Business and Logistics

- Henry Morgan Seel
  - International Business and Logistics team leader with a background in supply chain management as well as globalization. He will also focus on the market topic opportunities for wind energy.
- Ramiro Parocua
  - Specialization in marketing opportunities aspect of the project specifically being the primary researcher for the potential marketable target countries to enter.
- Jennifer Ramos
  - Specialization in financial analysis and accounting along with product development to minimize and keep costs low, while maintaining quality.
- Ian Medina
  - Specialization in product development and operations along with being the webmaster and public relations liaison.
- David Chang
  - Primary market topic researcher and presenter.

-

5. Product Development and Operations

5.1 Growth Strategy

Our initial target countries include South Africa, Zimbabwe, Mozambique, and Madagascar then expanding north-east to Tanzania, Kenya, Ethiopia, Somalia, Eritrea and Sudan over the course of three to five years once our primary two-year objectives are met. Growth will begin in the form of partnerships with local cell phone and service companies of the region (Table 2) in addition to Humanitarian Non-Governmental Organization (NGO) aid foundations (Table 5). Our target NGO partners are established organizations that have already gained local knowledge on the developing areas of which we aim to market. Partnerships such as these will allow for exploitable opportunities in research and development undertakings, whereby related information has already been acquired and compiled by these entities. Market research and wind resource availability help dictate where our ventures will expand. After testing markets in the field and gauging our sales and success in the initial four countries, CMAWind will utilize existing relationships with NGOs and Cell Service Providers to break into new markets.

5.2 Manufacturing

Procurement of materials will be done through Original Equipment Manufacturer (OEM) subcontractors based on the material variety and quality required. Based in Beijing, Sinovel is the largest wind turbine manufacturer (Zeller, 2010) in China and will serve as our current manufacturing and assembly company for our wind turbine parts (OEM components). Beijing is an ideal venue for this operation due to its proximity to the port of Tianjin. Additionally, Beijing possesses extensive infrastructure that is catered towards manufacturing and is currently one of China's top manufacturing cities (Feng, 2014) As a new company, we must determine the lowest possible labor and manufacturing costs that will provide our company with the most feasible expense levels while delivering good quality for our customers. China also serves as a country that has a growing internal infrastructure as well as stability when it relates to their manufacturing

prowess. China's technology and knowledge relates to their ability to manufacture; this serves as a competitive advantage when comparing with other countries.

5.3 **Durability**

Durability will be a key feature in our product design process. The wind turbine will feature a heavy duty design which is not only limited to: 1) the turbine, 2) housing and 3) mount. All aspects of its design will also be designed to withstand all weather conditions especially the dry, wet, and humid temperate climates of Eastern Africa. The durability of the wind turbine will be one of the main dimensions to be sustainable throughout its lifespan. The housing which is made out of high strength stainless steel can withstand high and low temperatures, wind abrasiveness, water damage, and rust. The key to the wind turbine's robust design derives from extensive product testing in different climate temperatures, the material analysis of the turbine, and reliable service life.

6. **Market Deployment Feasibility**

6.1 **Risk Management**

Our primary risk will be in making sure that the locations we distribute our product possess sufficient levels of wind in order to make our product feasible. See figure 1 and figure 2 to view the optimal wind presence in certain regions in Africa. If our distributed turbines fail to provide enough power to those in need, then we will likely lose our partners. Thus, the wind industry market in our targeted regions will face numerous amounts of risks (Table 4). As an organization, it is advantageous to develop countermeasures to mitigate collateral damage. The risks presented are within the risk envelope catered to our target regions.

6.2 **Distribution**

CMAWind's distribution strategy is to work collaboratively with our partners to best distribute our product to our target areas which possess the greatest opportunity for wind and have the greatest need for off-grid power. Humanitarian NGO's and cell phone companies of interest will serve as intermediaries for our turbines to be distributed from our warehouse in South Africa to

their established areas of operation in our targeted regions by rail and truck. From these partner hub locations, the product will be trucked to the end-user.

6.3 **Original Equipment Manufacturer**

South Africa will serve as our region of interest for our warehousing, distributing and retailing activities. Geographically, South Africa has a strategic location to store and distribute our OEM parts imported from China. Basing our warehouse, distribution and retail activities in South Africa has advantages such as: 1) the shortest route for our supply chain to deliver to the customer, lower lead times, and 2) the infrastructure South Africa possesses to house warehouses for our parts. One of the challenges to any supply chain in the world is to lower transportation costs as most transportation costs can represent over 10% of a commodity's value (Rodrigue, 2014). By locating our warehouses in South Africa, we will provide the shortest route for 3rd party logistic companies to ship our product to customers and simultaneously incur decreased transportation costs.

6.4 **Supply Chain**

Upon studying the industry, we have found our best avenue of action is to ship from China using a twenty foot standard TEU (Twenty-foot equivalent) while optimizing our product size to be integrated within it. With the aid of logistic optimization software, we are able to load 665 turbines (simulated) into one standard TEU (Figure 3) simulating and visualizing the freight loading into one standard TEU. Pallets that are standard for China and South Africa (120cm(47.24") x 100cm(39.37") x 15cm (5.91")) will be utilized to fit transportation regulations in our market countries. By optimizing our containerized cargo into one TEU, we are able to calculate shipping costs of approximately $1,306 - $1,443 (Including Insurance) from the port of Tianjin, China to Durban, South Africa. An optimized supply chain will provide us a standard to track our product throughout the supply chain (POS and RFID technology) and accountability in times of theft.

6.5 **Build-ability Opportunity**

The development of our organization's build-ability process is essential in order to create a smooth construction process. Cost overruns, delays, quality issues, and errors can be dealt with before official manufacturing can take place. Computer Aided Design (CAD) programs will be exploited and serve as a visual aid for blueprinting and manufacturing processes. Visuals will incorporate exact dimensions and aspects that will reflect the product's final desired quality. CAD will also help in de-risking perceived problems with the product by easily pinpointing problem areas.

6.6 **Sales Strategy - Partnerships**

Non-Governmental Organizations (NGO)

NGO's will be our first channel for turbine sales. Our common vision is to increase the standards of living for our target regions. Increasingly, our relationship with NGO's operating in the target region will allow them to purchase our turbines and distribute them to affected areas that lack a dependable power source. A list of NGO's operating in our target region is seen in (table 4). Partnering with the given NGO's will allow our organization to increase our revenues and simultaneously penetrating off-grid areas in our targeted regions to improve the quality of life for our end users.

Cell Phone Providers

Cell Phone Providers/Service Providers will serve as our second channel for sales. The various cell phone companies located throughout our targeted regions provide cell phones and service to approximately 169,456,300 people (Table 2). Partnering with cell phone companies is advantageous for our organization for the fact that many cell phone users are without a reliable power source to charge their mobile devices. To resolve that need, CMAWind will provide our high quality and small scale wind turbines as a complimentary product in conjunction with cell phones which will create a highly viable option for customers to purchase

7. Financial Analysis

7.1 Sales Forecast Projections

In the first year we project the company will sell 1,500 units at $120 each. The second and third year we see a steady increase of sales. We estimate that this increase will continue but then level out on the 5th year (Figure 4).

7.2 Assumptions for Break Even Analysis

As shown on break-even table, our breakeven point will be at 1661 units sold. According to the sales forecast we will not break even the first year. In the second year we assume the company will breakeven (Figure 5).

7.3 Assumptions for Profit and Loss Projections

The Following table includes financial assumptions of profits and loss. The First year we will have a loss of $9660.95. On the second year the company will see its first profits. By the third year the company will begin to see promising profits (Figure 6).

7.4 Assumptions for Cash Flow Analysis

The company will begin with a loan of $100,000 USD (Table 8). After the 1st and 2nd year the company will lose money in hand. Not until the 3rd year will the company observe its cash position grow (Figure 7).

7.5 Assumptions for Balance Sheet

According to the Balance Sheet, the company owners will owe money in the first year after subtracting the liabilities from the assets. This might serve as a red flag for investors, but this is because the company lost some money on the first year from the loan taken out for startup. On the second year the owner's equity is positive and serves as a signal that the company has growth (Table 11).

8. Appendices

Figure 1: Wind Speed vs. Population Density

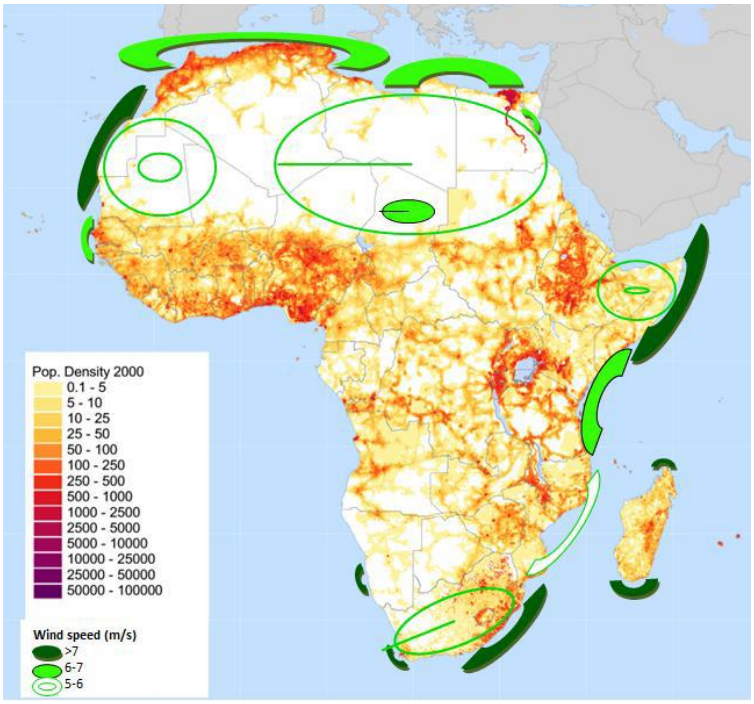


Figure 2: Wind Speed Energy Potential

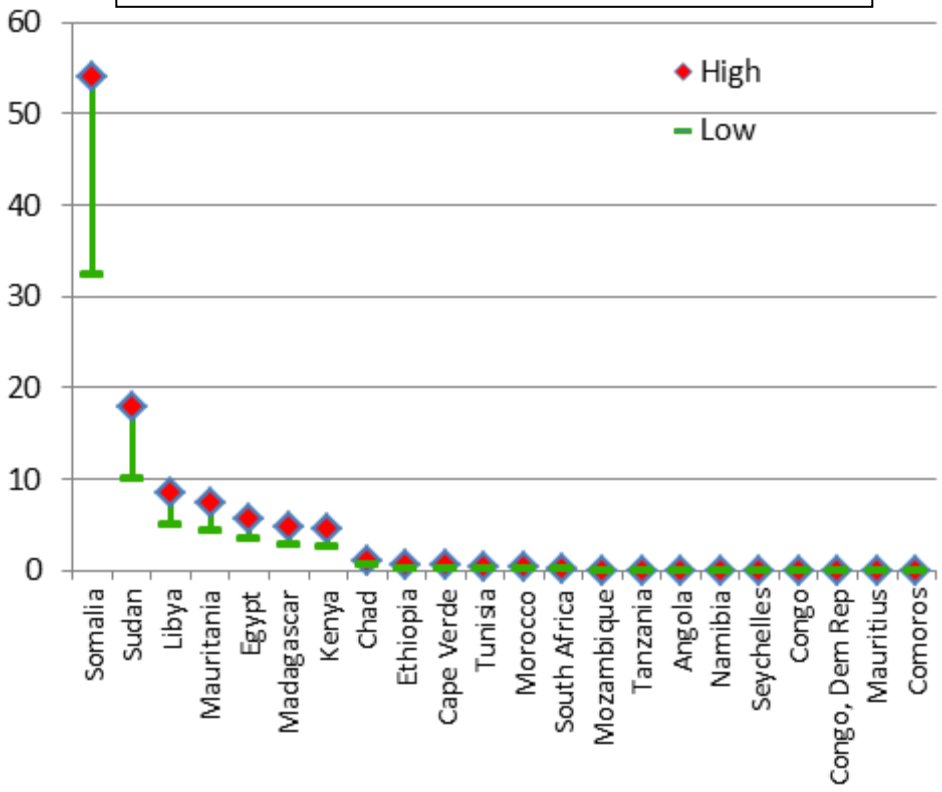


Figure 3: CargoWiz Container Capacity Simulation

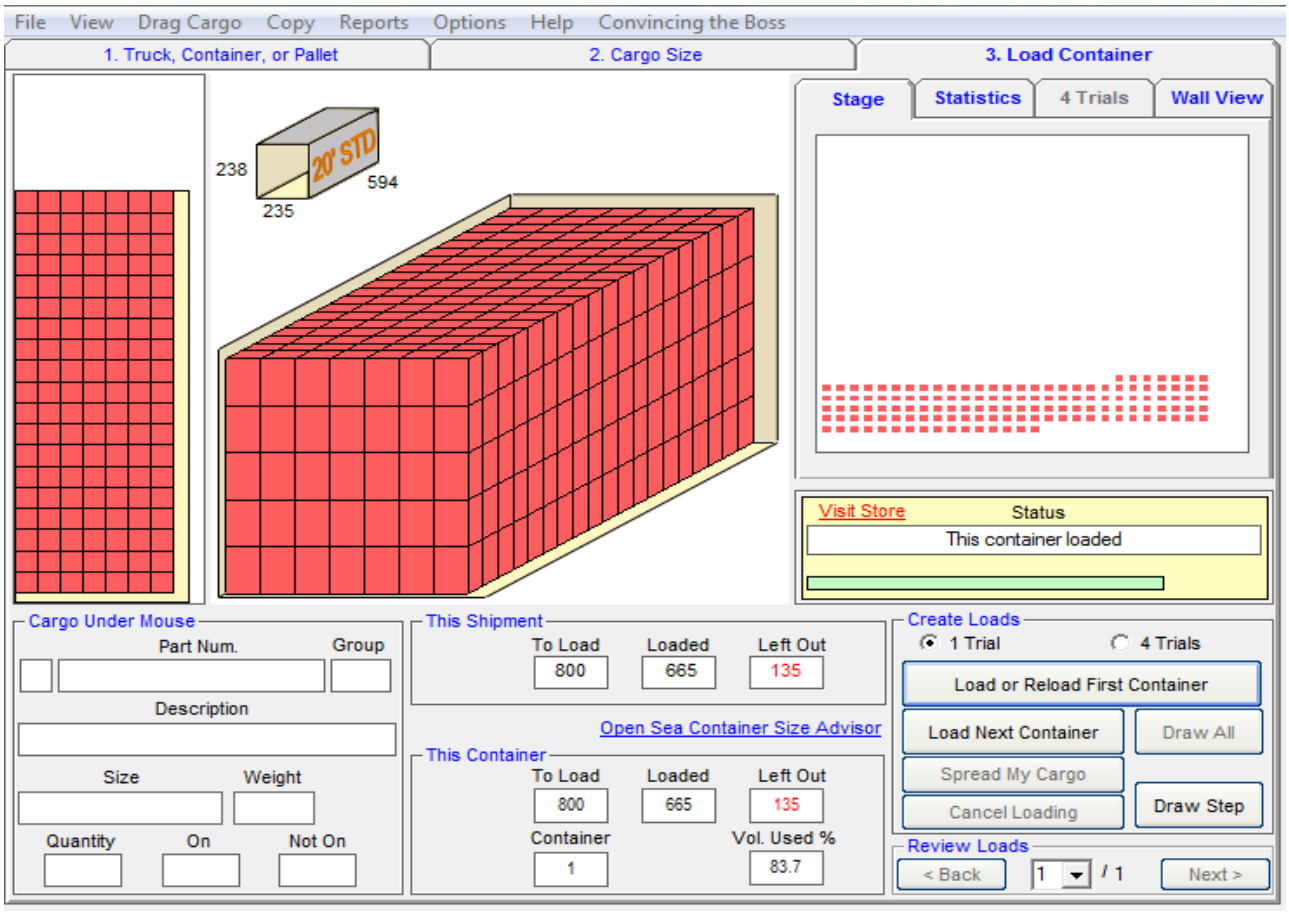


Figure 4: Sales Forecast

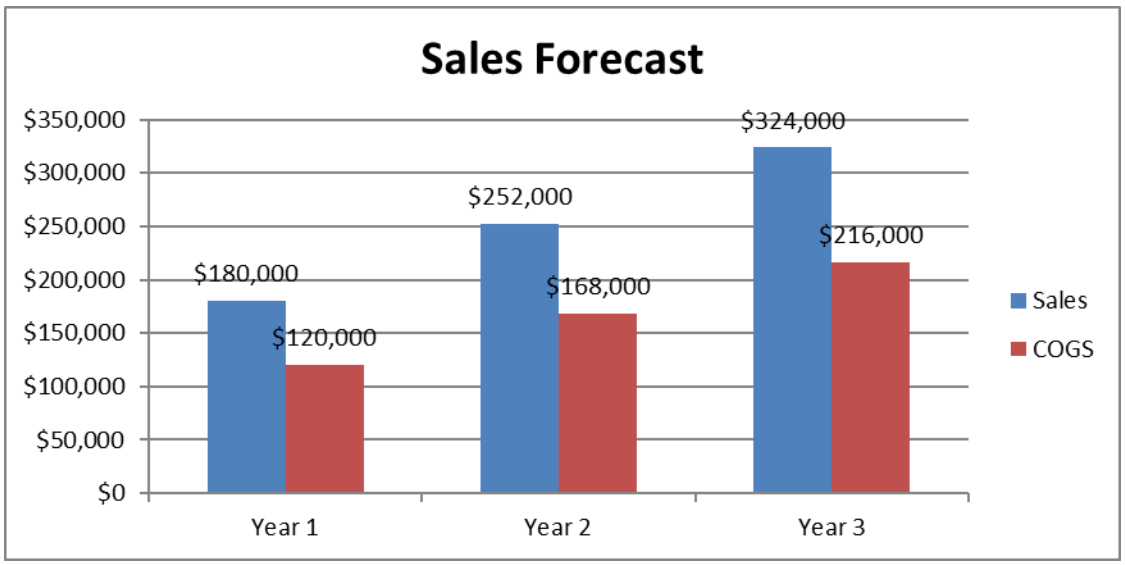


Figure 5: Break-Even Analysis

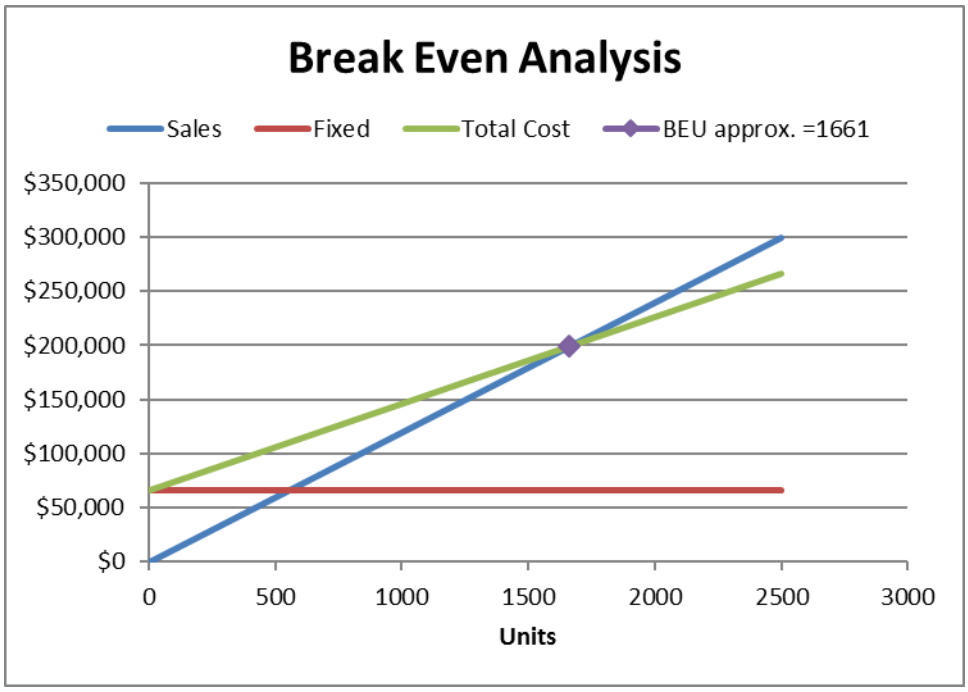


Figure 6: Profit and Loss

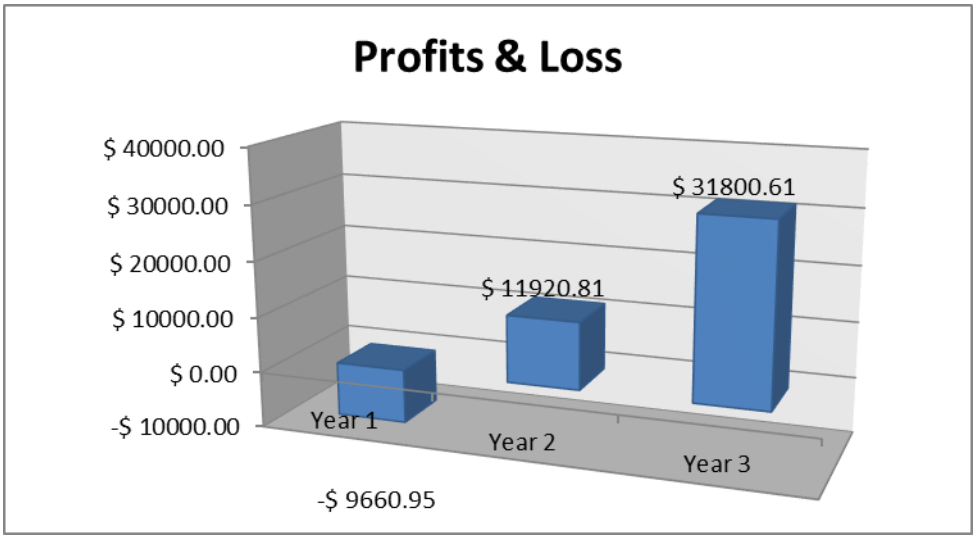


Figure 7: Cash Position

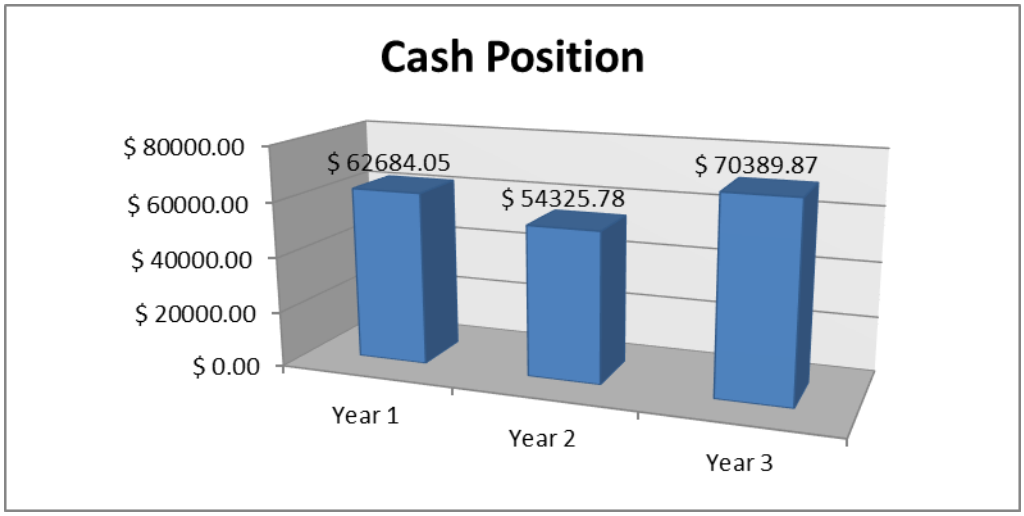


Table 1: Target Countries

Target Countries

Countries	Population	Cell Phone Users	Internet Users	Internet Hosts	Literacy	School Life Expectancy	Electricity availability	GDP (Real Growth Rate)	Pop. Below Poverty Line	Unemployment Rate
Sudan	35,482,233	27.659 million (2012	4.2 million (2008)	99 (2012)	71.9% Age 15 and over	4 years	29.00%	3.90%	46.50%	20.00%
Zimbawe	13,182,908	12.614 million (2012	1.423 million (2009)	30,615 (2012)	83.6% Age 15 and over	9 years	36.90%	4.40%	68.00%	95.00%
Kenya	44,037,656	30.732 million (2012	3.996 million (2009)	71,018 (2012)	87.4% Age 15 and over	11 years	18.10%	4.70%	50%	40%
Eriterea	6,233,682	305,300 (2012)	200,000 (2008)	701 (2012)	68.9% Age 15 and over	5 years	32.00%	7.0%	50%	N/A
Ethiopia	93,877,025	20.524 million (2012	447,300 (2009)	179 (2012)	39% Age 15 and over	9 years	23.00%	7.0%	29.20%	N/A
Somalia	10,428,043	658,000 (2012)	106,000 (2009)	186 (2012)	37.8% Age 15 and over	N/A	N/A	2.60%	N/A	N/A
South Africa	48,375,645	68.4 million (2012)	4.42 million (2009)	4.761 million (2012	93% Age 15 and Over	N/A	84.70%	2.00%	31.3%	51.5%
Mozambique	24,692,144	8.108 million (2012)	613,600 (2009)	89,737 (2012)	56.1% Age 15 and over	10 years	20.20%	7.00%	52.0%	17.0%
Madagascar	23,201,926	8.564 million (2012)	319,900 (2009)	38,392 (2012)	64.5% Age 15 and over	10 years	14.30%	2.60%	50.0%	24.1%
Total	299,511,262	Electricity availability: http://data.worldbank.org/indicator/EG.ELC.ACCS.ZS					CIA.GOV			

Table 2: Cell Phone Companies in Target Countries

Countries	Population	Cell Users	Percentage	Cell Phone Companies
Sudan	35,482,233	27,659,000	0.78	Operators: MTN, Zain
Zimbabwe	13,098,000	12,614,000	0.96	Operators: Econet, Telecel, Net*One
Kenya	43,291,000	30,732,000	0.71	Operators: Safaricom, Airtel, Orange, Yu (Essar Telecom Kenya)
Eritrea	4,980,000	305,300	0.06	Operator: Eritel
Ethiopia	86,614,000	20,524,000	0.24	Operator: ETHMTN
Somalia	10,428,043	658,000	0.06	Operator: Ganni Wireless, Somafone, Somtel
South Africa	52,982,000	68,400,000	1.29	Operators: Vodacom, MTN, Cell C, Telkom, Hello Mobile, Virgin Mobile, Telkom Mobile, Red Bull Mobile
Madagascar	21,852,000	8,564,000	0.39	Operators: Orange, Airtel, Telma Mobile, Life
Total	**268,727,276**	**169,456,300**	0.63	

Table 3: Electricity Access in 2009-Regional Aggregates

Electricity access in 2009 - Regional aggregates

	Population without electricity million	Electrification rate %	Urban electrification rate %	Rural electrification rate %
Africa	**587**	**41.8**	**68.8**	**25.0**
North Africa	2	99.0	99.6	98.4
Sub-Saharan Africa	585	30.5	59.9	14.2
Developing Asia	**675**	**81.0**	**94.0**	**73.2**
China & East Asia	182	90.8	96.4	86.4
South Asia	493	68.5	89.5	59.9
Latin America	31	93.2	98.8	73.6
Middle East	21	89.0	98.5	71.8
Developing countries	**1,314**	**74.7**	**90.6**	**63.2**
World*	**1,317**	**80.5**	**93.7**	**68.0**

Source: *International Energy Agency*

Table 4: Risk Analysis

Risk	Priority	Mitigation Strategy
Financial Risks		
Destruction of Property/ Theft	High	Labeling aids to alert customer of potential risks. Recommend to place product in an area that is observable. Palletizing freight increases accountability.
Unpaid Debt (A/R)	High	Customers will be determined if they possess the ability to pay back.
Credit Risk	Moderate	Financial accounts will be monitored in order to pay liabilities (A/P) on time.
Operational Risk	Low	Supply chain will be carefully be tracked via RFID systems if problems were to occur within 3PLs.
Liquidity Risk	Low	Market studies will be applied to determine if our product's demand.
Technical Risks		
Volatility of Wind	High	Wind and climate maps will be studied to determine the optimal areas for wind energy opportunities.
Component Defectiveness	Moderate	R&D, component, and material limit tests will be studied to insure all components will function reliably in any weather condition.
Cell Phone Compatibility	Low	Components installed will be universally compatible to all cell phone brands in Africa to prevent cell phone damage
Quality Metrics	Low	Statistical Process Control strategies will be implemented for the quality of products manufactured and assembled are to be within design specifications.
Legal Risks		
Litigation Expenses	Moderate	Organization must keep keen to follow laws regarding safety standards, contracts, rights, etc.
Product Lifecycle Risks		
Introductory Stage	High	Gain acceptance within the target market and government by fulfilling all of the customers' needs while simultaneously conforming to regional regulations.
Maturity Stage	Moderate	Continually improving and developing our product will help prevent other competitors and niche markets to arise.

Table 5: Non-Governmental Organizations Operating in Africa

NGO	Area(s) of Operation	Main Objectives
Africa Humanitarian Action	Angola, Burundi, Chad, Congo (DR), Ethiopia, Guinea (Rep.) Liberia, Namibia, Rwanda, Sudan, Uganda and Zambia	Emergency relief services, fights diseases, poverty, and works to develop local capacity and disaster response mechanisms
Zero Emissions Research and Initiatives (ZERI)	Worldwide	Industrial projects, community based initiatives, business related enterprises, government and bilateral and UN aided co-operation
United Nations Children's Fund (UNICEF)	Worldwide	Improve children's lives by providing health care and immunizations,clean water and sanitation, nutrition, education, emergenc y relief and more
Gates Foundation	Worldwide	Work's to uplift hunger and proverty, harness new technologies to save lives, and foster educational atmoshperes for communities
CARE	Worldwide	Private international humanitarian organizations, committed to helping families in poor communities improve their lives and achieve lasting victories over
Relief International	Worldwide	Programs include health, shelter construction, education, community development, agriculture, food, income-generation, and conflict resolution
Oxfam	Worldwide	Works to overcome poverty and injustice

Table 6: Sales Forecast

	Year 1	Year 2	Year 3
Units	1500	2100	2700
Sales	$180,000	$252,000	$324,000
COGS	$120,000	$168,000	$216,000

Table 7: Break-even Assumptions

Time	Units Start	Units Increment	Unit Price	Unit Variable Cost	Total Fixed Cost
Year	0	250	$120.00	$80.00	$66,439.95

Units	Sales	Variable Cost	Contribution Margin	Fixed	Total Cost	Net Income
0	$0	$0	$0	$66,440	$66,440	-$66,440
250	$30,000	$20,000	$10,000	$66,440	$86,440	-$56,440
500	$60,000	$40,000	$20,000	$66,440	$106,440	-$46,440
750	$90,000	$60,000	$30,000	$66,440	$126,440	-$36,440
1000	$120,000	$80,000	$40,000	$66,440	$146,440	-$26,440
1250	$150,000	$100,000	$50,000	$66,440	$166,440	-$16,440
1500	$180,000	$120,000	$60,000	$66,440	$186,440	-$6,440
1750	$210,000	$140,000	$70,000	$66,440	$206,440	$3,560
2000	$240,000	$160,000	$80,000	$66,440	$226,440	$13,560
2250	$270,000	$180,000	$90,000	$66,440	$246,440	$23,560
2500	$300,000	$200,000	$100,000	$66,440	$266,440	$33,560

Break Even X	Break Even Y	Label
1661	$199,320.00	BEU approx. =1661

Table 8: Profit and Loss Assumptions

	Year 1	Year 2	Year 3
Sales	$ 180000.00	$ 252000.00	$ 324000.00
Cost/Goods Sold	$ 120000.00	$ 168000.00	$ 216000.00
GROSS PROFIT	$ 60000.00	$ 84000.00	$ 108000.00
OPERATING EXPENSES			
Salary (Office & Overhead)	$ 41060.00	$ 41060.00	$ 41060.00
Payroll (taxes, Social Security)	$ 1221.00	$ 1221.00	$ 1221.00
Outside Services	$ 500.00	$ 500.00	$ 500.00
Supplies (Office & Operation)	$ 900.00	$ 1000.00	$ 1100.00
Repairs & Maintenance	$ 1500.00	$ 2500.00	$ 3500.00
Advertising	$ 5000.00	$ 5000.00	$ 5000.00
Car, Travel	$ 4000.00	$ 4000.00	$ 4000.00
Accounting & Legal	$ 1500.00	$ 1500.00	$ 1500.00
Rent	$ 4652.00	$ 4652.00	$ 4652.00
Telephone	$ 280.00	$ 280.00	$ 280.00
Utilities	$ 360.00	$ 360.00	$ 360.00
Insurance	$ 1200.00	$ 1200.00	$ 1200.00
Interest	$ 7387.95	$ 5982.27	$ 4459.91
Depreciation	$ 100.00	$ 100.00	$ 100.00
Other expenses			
TOTAL EXPENSES	$ 69660.95	$ 69355.27	$ 68932.91
NET PROFIT (before taxes)	-$ 9660.95	$ 14644.73	$ 39067.09
Income Taxes	-$ 1796.94	$ 2723.92	$ 7266.48
Real Income Tax	$ 0.00	$ 2723.92	$ 7266.48
NET PROFIT (after tax)	-$ 9660.95	$ 11920.81	$ 31800.61
Owner Draw/Dividends	$ 0.00	$ 0.00	$ 0.00
ADJUSTED TO RETAINED	-$ 9660.95	$ 11920.81	$ 31800.61

Table 9: Interest Payment

Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	Year 5 Total
$ 7387.95	$ 5982.27	$ 4459.91	$ 2811.20	$ 1025.65

Table 10: Cash Flow

	Pre Startup EST	Year 1	Year 2	Year 3	Total Item EST
Cash on hand	$ 100000.00	$ 95348.00	$ 62684.05	$ 54325.78	$ 70389.87
CASH RECEIPTS					
Cash Sales		$ 180000.00	$ 252000.00	$ 324000.00	$ 756000.00
Collection from CR Accounts					$ 0.00
TOTAL CASH RECIEPTS	$ 0.00	$ 180000.00	$ 252000.00	$ 324000.00	$ 756000.00
TOTAL CASH AVAILABLE	$ 100000.00	$ 275348.00	$ 314684.05	$ 378325.78	$ 826389.87
CASH PAID OUT					
Purchases (COGS)		$ 120000.00	$ 168000.00	$ 216000.00	$ 504000.00
Gross Wages		$ 41060.00	$ 41060.00	$ 41060.00	$ 123180.00
Outside Services		$ 500.00	$ 500.00	$ 500.00	$ 1500.00
Supplies		$ 900.00	$ 1000.00	$ 1100.00	$ 3000.00
Repair & Maintenance		$ 1500.00	$ 2500.00	$ 3500.00	$ 7500.00
Advertising		$ 5000.00	$ 5000.00	$ 5000.00	$ 15000.00
Car, delivery & travel		$ 4000.00	$ 4000.00	$ 4000.00	$ 12000.00
Accounting & legal		$ 1500.00	$ 1500.00	$ 1500.00	$ 4500.00
Rent	$ 4652.00	$ 4652.00	$ 4652.00	$ 4652.00	$ 18608.00
Telephone		$ 280.00	$ 280.00	$ 280.00	$ 840.00
Utilities		$ 360.00	$ 360.00	$ 360.00	$ 1080.00
Insurance		$ 1200.00	$ 1200.00	$ 1200.00	$ 3600.00
Interest		$ 7387.95	$ 5982.27	$ 4459.91	$ 17830.13
Other expenses		$ 0.00	$ 0.00	$ 0.00	$ 0.00
SUBTOTAL	$ 4652.00	$ 188339.95	$ 236034.27	$ 283611.91	$ 712638.13
Loan principle payment		$ 24324.00	$ 24324.00	$ 24324.00	$ 72972.00
Capital purchase					$ 0.00
Other startup cost					$ 0.00
Reserve and/or Escrow					$ 0.00
Other withdrawal					$ 0.00
TOTAL CASH PAID OUT	$ 4652.00	$ 212663.95	$ 260358.27	$ 307935.91	$ 785610.13
CASH POSITION	$ 95348.00	$ 62684.05	$ 54325.78	$ 70389.87	$ 40779.74

Table 11: Balance Sheet

ASSETS		
CURRENT ASSETS	**Year 1**	**Year 2**
Cash in bank	$ 62684.05	$ 54325.78
Accounts Receivable	$ 0.00	$ 0.00
Inventory	$ 0.00	$ 0.00
Deposits	$ 0.00	$ 0.00
Other current Assets	$ 0.00	$ 0.00
TOTAL CURRENT ASSETS	$ 62684.05	$ 54325.78
FIXED ASSETS		
Machinery & Equipment	$ 10000.00	$ 9800.00
Leaseholder improvements	$ 0.00	$ 0.00
Land & Building	$ 0.00	$ 0.00
Other fixed assets	$ 0.00	$ 0.00
TOTAL FIXED ASSETS	$ 10000.00	$ 9800.00
OTHER ASSETS		
Intangibles (patent)	$ 20000.00	$ 20000.00
Other	$ 0.00	$ 0.00
TOTAL OTHER ASSETS	$ 20000.00	$ 20000.00
TOTAL ASSETS	$ 92684.05	$ 84125.78
LIABILITY AND OWNERS EQUITY		
CURRENT LIABILITIES		
Accounts Payable		
Interest Payable	$ 14279.03	$ 8296.77
Taxes Payable		
TOTAL CURRENT LIABILITIES	$ 14279.03	$ 8296.77
LONG TERM DEBT		
Bank loans payable	$ 81590.71	$ 64722.22
TOTAL LONG-TERM DEBT	$ 81590.71	$ 64722.22
TOTAL LIABILITIES	$ 95869.74	$ 73018.98
OWNERS EQUITY		
OWNERS EQUITY	-$ 3185.69	$ 11106.80
Retained Earnings		
TOTAL OWNERS EQUITY	-$ 3185.69	$ 11106.80
TOTAL LIABILITIES & EQUITY	$ 92684.05	$ 84125.78

9. References

Advantages and Disadvantages of Solar Power. (2013, November 7). CleanTechnica. Retrieved March 17, 2014, from http://cleantechnica.com/2013/10/08/advantages-disadvantages-solar-power/

World Bank. (2014, March 25). Energy Overview. Retrieved April 1, 2014, from http://www.worldbank.org/en/topic/energy/overview

Feng, w. (n.d.). Beijing as a globally fluent city. Retrieved April 7, 2014, from http://www.brookings.edu/~/media/research/files/papers/2013/10/14%20beijing%20as%20a%20globally%20fluent%20city/beijing%20as%20a%20globally%20fluent%20city.pdf

Marcacci, S. (2013, October 16). Solving Energy Poverty With Solar Light Bulbs: Nokero Product Review. *CleanTechnica*. Retrieved January 2, 2014, from http://cleantechnica.com/2013/10/16/solving-energy-poverty-with-solar-light-bulbs-nokero-product-review/#ywt08Kc2uLJH76aE.99

Lam, N., Smith, K., Gauthier, A., & Bates, M. (2013, May 25). . "Kerosene: A Review of Household Uses and Their Hazards in Low- and Middle-Income Countries." Retrieved February 2, 2014, from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3664014/

Leader, J. (2012, March 30). Eight19's IndiGo Solar System Brings Pay-As-You-Go Power To Africa. The Huffington Post. Retrieved February 18, 2014, from http://www.huffingtonpost.com/2012/03/30/eight19-indigo-solar-power-system_n_1383078.htm

Rodrigue, J. (n.d.). Transport Costs.http://people.hofstra.edu/. Retrieved April 8, 2014, from http://people.hofstra.edu/geotrans/eng/ch7en/conc7en/ch7c3en.html

Treacy, M. (2011, July 13). JUL 13. Caltech Study Says Vertical Axis Wind Turbines 10X More Efficient Than Horizontal Axis Turbines. Retrieved March 3, 2014, from http://ecogeek.org/wind-power/3555

Rutizibwa, M. (2013, April 22) (Youth Perspective: Kerosene lamps affect study performance - Sustainability. (n.d.). Sustainability. Retrieved April 18, 2014, from http://sustainability.thomsonreuters.com/2013/04/22/kerosene-lamps-affect-study-performance/

Zeller, T., & Bradsher, K. (2010, December 15). Wind Power for Boston, Made in China. The New York Times. Retrieved April 18, 2014, from http://www.nytimes.com/2010/12/16/business/energy-environment/16windside.html

Zephyr Corporation and Evance Wind Turbines Announce Collaboration. (n.d.).Press release distribution, EDGAR filing, XBRL, regulatory filings. Retrieved April 18, 2014, from http://www.businesswire.com/news/home/20120612005648/en/Zephyr-Corporation-Evance-Wind-Turbines-Announce-Collaboration#.U1CsPLRzWF9