SOLARCYCLE

Business Plan and Investment Proposal
12.12.2013

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1 EXECUTIVE SUMMARY

1.A COMPANY NAME
The company being proposed is SolarCycle.

1.B PRODUCT SUMMARY
SolarCycle offers a unique, low cost, electric transportation vehicle to provide emission free transport for commuters. This product is designed as a solar charging alternative to the current electric motorcycle available in a limited supply. The product consists of a high speed, of 50mph, electric motorcycle with a sensible commuting range of 25 miles. The product will have the availability of battery charging via a fold-out solar array apparatus for while parked. The solar apparatus will charge the batteries to a reasonable level, of 80%, with a charging time of 8 hours, or one full business day.

1.C MARKET
The primary market for this product will consist of small distance city commuters. This can be implemented for college students, high school students, businessmen, and many others for a low cost, emission free transportation. The product is much more marketable in the Southern United States, providing a higher solar charging capacity as well as a longer season for comfortable motorcycle travel.

1.D STRATEGIES
The primary strategy aims to focus on the low purchase cost as well as the low fuel cost for the life of the vehicle. In addition to cost, the company intends to stress the emission free aspect of the product and the solar powered charging system, differentiating it from all of the available market competition. The government also sponsors a federal tax credit 10% of the purchase cost, up to $2,500, for an electric motorcycle. The company intends to promote this incentive along with the low purchase cost as main marketing strategy. The company intends to put a larger advertising and marketing focus on areas of a warmer yearly climate, such as the Southern and Western United States.

1.E EXPERIENCE
The company consists of 4 Mechanical Engineers with a background in the gasoline to electric vehicle conversion. Because of this experience, the product will be designed very efficiently and with the mechanical drive system in mind.

1.F FINANCIAL REQUEST
Due to the large upfront facility, production, and intellectual/designer costs, a request for $6,000,000 is necessary.
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2 VISION AND MISSION

2.A COMPANY VISION
The company vision aims to help in eliminating the sources of carbon dioxide emissions resulting from both fossil fuel transportation vehicles as well as from the coal-powered electricity producing power plants. The company believes that it is in the best interest of the both the customer and the business to reduce emissions and provide a careful stewardship of the environment.

2.B VALUES AND PRINCIPLES
SolarCycle seeks to live by a very basic set of moral values and principles in both design and customer service. These values include honesty, safety, and environmental stewardship.

SolarCycle aims to embody honesty in all transactions with both customers and suppliers. The goal of the company is to inspire trust between the customer and the company. Not only is this beneficial to the success of the company, but it also fulfills the moral obligation of any company.

Much more than just honesty, safety also embodies one the largest concerns with any design. SolarCycle wishes for a trust also between the company and the community as a whole. For this to be obtained, the level of safety must be the highest with this product.

SolarCycle also aims at the goal of total and complete environmental stewardship. This relates specifically to the contribution of both the company and the customer to the supply of carbon dioxide in the earth’s atmosphere. Because of the solar charging and electric motor, the company aims to reduce this major transportation emission source. It is essential that the company recognize and act in view of the destructive nature of this emission source.
3 INDUSTRY PROFILE AND OVERVIEW

3.A INDUSTRY BACKGROUND AND OVERVIEW
The electric motorcycle began as a concept in 1885, when the first patent for an electric bicycle was filed and approved. Since then, it has grown from a mere concept to a large market with firms such as Yamaha getting involved and new firms being created every year. With the price of oil on the rise, the push to create a vehicle that does not run on gasoline has become stronger than ever, and these firms are experiencing rapid growth.

3.B MAJOR CUSTOMER GROUP
The main customer group is to appeal to the 18 - 30 age group. The company intends to appeal to a young group of low distance everyday commuters who desire a low cost city transportation technique. As well as this target age market, the company also wishes to put a larger geographic emphasis on the Southern and Western areas of the United States. Here the solar charging will be more effective and the season for comfortable motorcycle travel is year round. SolarCycle intends also to focus on the remaining geographic regions of the United States as well, however with less concentrated focus.

3.C REGULATORY RESTRICTIONS
The main regulatory restrictions faced by SolarCycle are the requirements in the state of Michigan for a motorcycle to be considered street legal. Such requirements include functioning brakes on both the front and rear wheels, a working headlight and taillight, brake lights, and at least one rear view mirror. These should be taken into consideration when manufacturing begins.

3.D SIGNIFICANT TRENDS
With the price of oil rising, electric vehicles have become more and more attractive to consumers who both care for the environment and wish to save money on gas. Due to lowering costs of technology, large companies such as Yamaha have begun manufacturing their own versions of electric motorcycles. Navigant Research, a team dedicated to analyzing trends in green markets, estimates that the demand for electric motorcycles and scooters will increase from about 4,000 units in 2012 to almost 36,000 units in 2018, an increase of 9 times in only 5 years.

3.E GROWTH RATE
The electric motorcycle movement is growing every single day. As stated above, the demand for electric motorcycles is estimated to increase from 4,000 units in 2012 to almost 36,000 units in 2018. The team believes that this upcoming boom would be the ideal time to enter the market and provide a lower cost alternative to high cost brands.
3.F  **BARRIERS TO ENTRY/EXIT**

The barriers to entering this market come mostly from cost and technology available. The technology available limits the range and speed of the product, if it is also to be cost friendly to the customer. However, the target market of this product accounts for this reduction of range and speed. In the small distance commuting 18-30 age market, cost becomes a much larger focus than thrill. Especially for a transportation device. SolarCycle’s philosophy of low cost along with environmental stewardship makes this product highly appealing to the market group.

In addition to this entry barrier, a smaller barrier, but not insignificant one, is the role of a company’s reputation. For a primary source of transportation, reliability is key. A new company in this market will have the challenge of gaining a reputation, something that cannot get accomplished until after several years of service. However, the current market for electric motorcycles is small enough that none of the companies have a very high name familiarity. Therefore, this process becomes less significant. This will be solved through the warrantee and guarantees of the product as well as a superior design that will be tested by time.

3.G  **KEY SUCCESS FACTORS**

Since many large companies exist, it would be difficult for a start-up company to compete by offering the exact same product in the exact same way. This is why quality, personal service, and trust are the most important aspects of this project for the SolarCycle team. By offering better personal service and a higher quality product at a lower price point, the team hopes to gain a foothold in the electric motorcycle industry. SolarCycle will also focus on marketing the addition of the solar panels on each bike that allow for charging without having to plug the bike in. This gives SolarCycle an advantage over its competition, since very few companies offer an electric motorcycle with the option of solar charging.

3.H  **OUTLOOK FOR THE FUTURE**

With the demand for electric motorcycles increasing every year, the team is feeling positive that an alternative to existing name brands could meet great success in the future. The team will focus on providing a quality product and a level of personal service that other large manufacturers simply can't accomplish. This will allow the team to better compete against more established brands in the future.
4 BUSINESS STRATEGY

4.A DESIRED IMAGE AND MARKET POSITION
SolarCycle desires an image to appeal to the college and early career market group. For this a chic, stylish design is very important to the marketing strategy. However this must also be balanced by a no-nonsense cost cutting product. SolarCycle desires to be seen as a low cost, reliable product, with no unnecessary add-ons. In this way, SolarCycle will appeal to both stylish and inexpensive categories necessary to this target age group. Similarly, the environmental sustainability aspect of SolarCycle is also very popular to both the desired age group and target location, the South-West United States.

4.B COMPANY GOALS AND OBJECTIVES

4.B.1 Operational
The operations of the product will be designed with the goals of a top speed of 50mph, a range of 25 miles with a sustained speed of 25mph, and a solar charging time of 8 hours. This corresponds to 1 day of work. Similarly, the goals of the product are to eliminate the dependence on oil and the daily emissions of carbon dioxide due to a short distance travel.

4.B.2 Financial
The company seeks the goal of a financially stable business after only 2 years from the beginning of production. This time is required to overcome the initial purchased equipment costs. In addition to this, SolarCycle intends to achieve a profit of 10% with a growth rate of 30% annually. This growth rate will be enacted after the initial product and the quality provided to the consumer.

4.C SWOT ANALYSIS

4.C.1 Internal Strengths
Perhaps the most useful internal strength present is the team’s knowledge of materials and manufacturing processes. This will allow for a frame that is of adequate strength but at the lowest possible cost, and manufacturing knowledge will help design the most efficient process possible so the costs of manufacturing can be cut down. Likewise, the knowledge of drivetrains and mechanical linkage systems will allow for a more efficient drive train system.

4.C.2 Internal Weaknesses
Currently, the SolarCycle team has limited electrical knowledge, so any circuitry and design comes as a large challenge. This will be remedied through the addition of several designers to the SolarCycle team.

4.C.3 External Opportunities
The most apparent external opportunities comes in the form of the federal tax credit on the purchase of an electric vehicle. This rebate will account for 10% of the purchasing cost of the motorcycle, with a maximum limit of $2500. This is a large opportunity for the customer to take advantage of as well as for the company to market.
4.C.4 External Threats
The largest external threats come from the competition of electric vehicles in the market. A large number of automobile suppliers are already beginning to investigate the electric vehicle market and there also exists a small number of electric motorcycle suppliers serving as the primary competition. This market competition is described further in section 7, complete with strategies to market the product.

4.D Competitive Strategy

4.D.1 Cost Leadership
SolarCycle aims to become the market leader primarily through the cost leadership market strategy. Although a lower cost will hinder the product specifications in regards to top speed and distance, a low cost will provide a more attractive feature to the customer. Because the specifications covered are practical for everyday city use, the low cost will provide the advantage to the customer.

4.D.2 Differentiation
The product is differentiated from current electric motorcycles in the solar charging aspect of the design. This differentiates the product from many equivalent products through a complete reduction of emissions, from charging to operating. The only emissions relating to this transportation comes from the manufacturing and production of the design. This is highly attractive from a marketing standpoint and when viewed along with the low cost, the product may easily become a market leader in short distance transportation.

4.D.3 Response
SolarCycle will respond to any direct competition through an increase in advertising and an evaluation of the opponent’s product to the standards of SolarCycle. In addition, cost lowering may be used in order to combat competition, however SolarCycle intends to promote reputation and quality before lowering costs.
5 COMPANY PRODUCTS AND SERVICES

5.A DESCRIPTION

5.A.1 Product or Service Features; Uniqueness
The uniqueness of this product lies in the emission free aspect of both the charging and operating. This is accomplished through an electric motor driving system and a solar-panel charging option. The product is also unique in the speed achievable. Currently the market for electric 2-wheeled vehicles consists mostly of scooters and low speed vehicles.

5.A.2 Customer Benefits
The first major benefit of the purchase of this product comes in the cost benefits. The customer will no doubt benefit from the federal tax benefit provided for electric vehicles, but will also benefit from the reduced cost of fuel. Ideally the cost of fuel will be completely eliminated, but in the event of inclement weather or the need for quick charging, the wall outlet charging will provide very low cost electricity to fuel the bike.

In addition to the cost benefit, the customer will also benefit from the knowledge of environmental stewardship and earth keeping. The customer will not be contributing towards the emission of carbon dioxide from fossil fuel combustion (in the form of transportation) and from coal-combustion (in the form of electricity power plants). This will provide a significant moral and self-satisfied benefit to the customer. Many customers are willing to pay a small premium for the “green” label and the satisfaction that comes with it. SolarCycle intends to capitalize on this premium attributed to the environmental movement.

5.A.3 Warranties and Guarantees
A warranty on this product is highly important to the success of this company. For a product upon which much depends, as is the case with a transportation vehicle, it is essential that the customer feels confident in the reliability of the design. In addition to the necessity of reliability, the customer must also feel that any repairs necessary will be accomplished quickly and correctly. Home repair is far less common for electrical systems, as opposed to gasoline, mechanical systems.

In response to this necessity, SolarCycle intends to guarantee the vehicle for 25,000 miles of service. If the product fails due to manufacturing or design flaws, the product will be replaced or repaired at no cost to the customer. After the 25,000 miles of service, the product will no longer be under a direct warranty but will be designed for a life of 80,000 miles. In addition to warranties and guarantees, the company will also support comprehensive recalls and enhancements to the design if a significant safety concern arises with the product.
5.B Patent or Trademark Protection

The product does not qualify for any patent protection, because this method has already been implemented with a number of motorcycle projects. This design has not been introduced into the marketplace or in large scale manufacturing for sales. The SolarCycle brand name will be investigated for a trademark protection. With the success of the product, it will become very necessary to protect the name and the reputation associated to the SolarCycle name.

5.C Future Product or Service Offering

SolarCycle intends to release future designs after the success of the first product. These designs will use new technology in the form of smaller longer-life batteries, higher efficiency solar panels, and smaller motors as the technology becomes more available and inexpensive. A new design will be released every 2 years to account for technological advances as well as to provide new options and aesthetic designs to the customer. It is essential to the market strategy of SolarCycle to stay up-to-date on the current trends and developments in the graphic design world. Because SolarCycle intends to appeal to a younger generation, this creative up-to-date strategy is essential.
6 MARKETING STRATEGY

6.A TARGET MARKET

6.A.1 Problem to be Solved or Benefit Offered
Commuting is not only a hassle for people, it is destructive to the environment. In many cities, people only commute a short distance, but when tens of thousands of people commute using standard gasoline powered cars, the environmental impact becomes very significant. An emission-free commuter vehicle would go a long way in helping sustain the environment by reducing carbon emissions.

6.A.2 Demographic Profile
The main demographic that the team hopes to appeal to with this product is commuters in cities. These are ideal customers because they usually have shorter commutes, and while electric motorcycles have many benefits, they cannot go as far as a car with a full tank of gas. This is why the team is choosing to target students in university towns, as well as working professionals who have a commute of about 10 miles or less. The team also sees the potential in marketing to many of the southern states, as they have longer warm seasons and they experience more direct sunlight than many of the northern states.

6.A.3 Other Significant Customer Characteristics
The SolarCycle product will most likely appeal to a demographic that doesn’t have much experience with motorcycles. This means the product has to be safe and easy to use for people with no previous motorcycle experience, and it must feature a low enough price point to get them interested in purchasing a SolarCycle.

6.B CUSTOMERS’ MOTIVATION TO BUY
Customers will be more likely to buy a SolarCycle than any of the other large brands because SolarCycle represents the jack-of-all-trades in the electric motorcycle world. Many others have high top speed and good range, but can be priced as high as $10,000. Others have low cost, but are very limited in terms of speed and range. By offering a balance of performance and cost, the team hopes to fill the gap between high performance, high cost motorcycles and low cost, low performance motorcycles. In addition to this, the emission free, no cost solar charging offers a new feature not currently found in the market.

6.C MARKET SIZE AND TRENDS

6.C.1 Size
Based on research by the above mentioned Navigant Research placed the demand for electric motorcycles and scooters in North America at around 4,000 units in the year 2012.

6.C.2 Growth and Speed
While the market for electric motorcycles is currently small, it has been estimated that the demand for electric motorcycles will be approximately 36,000 units in North America alone, with a compound annual
growth rate of more than 50% through the year 2018. This drastic growth will offer SolarCycle an opportunity to become part of a market that will one day be world-wide.

6.D ADVERTISING AND PROMOTION

6.D.1 Message
SolarCycle hopes to convey a message of trust and stewardship to their customers. The team is not as concerned with making money as with providing people with an emission-free commuter vehicle alternative that not only saves the consumer money but also cares for the environment. The team also wants to convey a message of personal attention and care to the customers. By offering personal service to everyone who wishes to buy a SolarCycle, the team hopes that people will recommend the product to friends and family members.

6.D.2 Media
The team believes that the future of marketing lies in the internet, rather than television. Television commercial spots are often expensive, and require a large amount of time and money to film and edit. Having an ad on a website is more much effective, as it is usually comprised of only a single picture and a link to the company website.

6.D.3 Budget
For the preliminary advertising budget, a total advertising cap of $250,000 has been requested. This will correspond to the advertising using both web-based ads and through personal endorsements.

6.D.4 Plans for Generating Publicity
To generate publicity, significant time will be spent advertising in areas with the highest concentration of the target demographic. This would include urban areas, with special focus given to towns with large populations of college-age students in the American South-West.

6.E PRICING

6.E.1 Desired Image in Market
SolarCycle wishes to create an image unlike any other mass manufacturer. By fostering trust and lasting relationships with consumers, SolarCycle hopes that this will give customers incentive to come back or refer friends and family to SolarCycle. SolarCycle also wants to be known at the affordable but still useful alternative to more expensive motorcycles. Most electric motorcycles are either too expensive or lacking the basic requirements that most consumers desire.

6.E.2 Comparison against Competitors’ Prices
Electric motorcycles from competitors can range in price from about $1,700 to over $38,000. This is a huge problem for consumers, since many can’t afford a motorcycle that costs on average about $10,000, but the cheaper bikes simply don’t meet their range or speed requirements. SolarCycle hopes to fill this gap, by providing a bike suitable for the average commuter in terms of speed, range, and price. With
the ability to travel 25 miles at 25 miles per hour with a top speed of about 50 mph and a cost of only $6000, SolarCycle hopes to create a desirable product unlike anything seen today.

6.E.3 Discount Policy
The federal government offers a tax credit of 10% of the purchase price of an electric motorcycle up to $2,500. This will hopefully provide an incentive for people to buy an electric motorcycle.

6.E.4 Gross Profit Margin % Anticipated
The team anticipates that the SolarCycle project will produce a gross profit margin of about 10%.

6.F DISTRIBUTION STRATEGY- CHANNELS OF DISTRIBUTION
SolarCycle motorcycles will be manufactured at various manufacturing facilities and then shipped to either specialized dealerships or existing dealerships that are willing to carry the product.
7 COMPETITIVE ANALYSIS

7.A EXISTING COMPETITORS

7.A.1 Identification
Currently there is a limited market for an electric motorcycle product. These products are being delivered by a number of suppliers and companies found in Table 7-1.

Table 7-1: Identification of Market Competition and the Limiting Factor of each

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<th>Minimum Selling Price</th>
<th>Limiting Factor</th>
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<td>ZERO Motorcycles</td>
<td>ZERO FX</td>
<td>$9,495.00</td>
<td>High Cost</td>
</tr>
<tr>
<td>BRAMMO</td>
<td>Enertia Plus</td>
<td>$10,995.00</td>
<td>High Cost</td>
</tr>
<tr>
<td>iGo</td>
<td>eCity</td>
<td>$1,699.95</td>
<td>Low Range &amp; Speed</td>
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<td>Lightning Motorcycles</td>
<td>SuperBike</td>
<td>$38,888.00</td>
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<td>evlove</td>
<td>zinc</td>
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<td>Honda</td>
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<td>Mission Motorcycles</td>
<td>Mission R</td>
<td>$29,999.00</td>
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</tr>
</tbody>
</table>

7.A.2 Strengths
The current competitors present several strengths because they already have an existing market presence as well as a reputable name. These companies also benefit from the high technological experience and knowledge of the customer base.

7.A.3 Weaknesses
The largest weakness of these competitors lies in the cost of the product. For the most part the products listed here may boast a higher speed, but this increase comes at the expense of a much higher price than SolarCycle.

7.B POTENTIAL COMPETITORS

7.B.1 Identification
Many of the current major motorcycle manufacturers are to be viewed as potential competitors to this product. This list includes Yamaha, Suzuki, Kawasaki, Peugeot and Triumph. In addition to the motorcycle suppliers, another source of possible competitors comes from the current electric car companies who may wish to expand into the motorcycle market. This list may include Tesla, Ford, GM, Toyota, and Volvo.

7.B.2 Impact on Business
These companies currently have no hold on the market. However if any of these companies ventured into this market, they would pose a significant threat to SolarCycle. These large companies have a large market worth and name recognition, therefore providing a large competition to SolarCycle. However, the key to the success of SolarCycle lies in the product differentiation from the solar Charging technique. This no-cost emission free charging is unique to SolarCycle and will be the pioneer of this technology in the market.
8 MANAGEMENT TEAM

8.A KEY MANAGERS AND EMPLOYEES

8.A.1 Background
The key members of this team consist of managers with a background in engineering. This will allow for a more comprehensive understanding of the safety and technological aspects of both the production process and the product design. However, it will also be necessary to search for and add some marketing and public relations experts to the management team. These team members will be essential to the demand and spread of word of the product at its initial stages.

8.A.2 Experience, Skills, and Contribution to Company
The skills necessary to the implementation of the product and the success of the company include: design knowledge, circuit design, frame design, manufacturing design, marketing, public relations, sales, assembly work, welding, electrical wiring, safety analysis, and financial accounting. These skills and labor will be found from both the technicians employed for labor and through the current and future management team. It will also be necessary to add advisors and engineers experienced in automotive design and assembly process after the first phase of product design.

8.B RESUMES OF KEY MANAGERS AND EMPLOYEES
See Appendix D, section 12.D, for a complete portfolio of each key manager and company leader.

8.C FUTURE ADDITIONS TO MANAGEMENT
SolarCycle foresees a very prosperous future for this product and therefore plans to incorporate additional members into the key management positions. After the first two years expansion will be necessary and new designs will be underway, therefore it will be necessary to begin searching for additional company members. A description of the positions needed to fulfill this expansion may be found in Table 8-1, seen below.

Table 8-1: Summary and description of the additional employment necessary prior to expansion

<table>
<thead>
<tr>
<th>Position Title</th>
<th>Position Description</th>
<th>Skills and Experience Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant Manager</td>
<td>Oversee manufacturing and assembly</td>
<td>Manufacturing Management</td>
</tr>
<tr>
<td></td>
<td>5+ years of experience required</td>
<td></td>
</tr>
<tr>
<td>Marketing Director</td>
<td>Oversee advertising and marketing campaign</td>
<td>Advertising</td>
</tr>
<tr>
<td>Electrical Designer</td>
<td>Oversee circuitry design</td>
<td>Electrical Engineering</td>
</tr>
<tr>
<td>Director of Public Relations</td>
<td>Oversee company image to public</td>
<td>Public Relations and Advertising</td>
</tr>
<tr>
<td></td>
<td>5+ years of experience required</td>
<td></td>
</tr>
<tr>
<td>Director of Safety and Licensing</td>
<td>Oversee product certification and testing</td>
<td>Failure Testing</td>
</tr>
<tr>
<td></td>
<td>5+ years of experience required</td>
<td>Product Certification</td>
</tr>
</tbody>
</table>
8.D BOARD OF DIRECTORS AND ADVISERS

The board of directors for SolarCycle will consist of the four primary designers: Mike Houtman, Matt De Young, Tae Lim, and Jack Amick. In addition to these four members, the board will also consist of investors in the company. The investors will hold a primary stake in the proposed company and will function to make decision for the future and stake of SolarCycle.
9 OPERATIONS

9.A LEGAL FORM OF OWNERSHIP AND RATIONALE
The company will be owned in full by the four key management officials with an even percentage of 25%. The company will begin as a private venture and will consider a public venture if the growth is significant. Any initial public offering (IPO) would not be until at a minimum of five years into the future.

9.B COMPANY STRUCTURE
The company will consist of the four key managers at the head, overseeing the operations of the entire company, with the board of trustees and the investors communicating with these managers. Below these members will consist of the senior engineers and advertisers. The key managers will approve of all the decisions made regarding product release and the company finances. The senior employees will be involved in overseeing production, design, and promotion campaigns. It will be the responsibility of these employees to account for technological innovations and key requirements towards the design. Initially, there will be only the required employees for production and minimal design. However, as the company grows and the demand for the product increases, the need for

9.C DECISION MAKING AUTHORITY
Any decisions towards the change in SolarCycle will consist in the requirement of the unanimity of any decisions between the four key management officials: Mike Houtman, Matt De Young, Jack Amick, and Tae Lim. Although each management official pertains to a different role in the organization, all four hold equal representation in the decisions made pertaining to the future of the company and the final release of the design.

9.D SIGNIFICANT COMPENSATION AND BENEFITS PACKAGE
Due to the hazards of the assembly and production work required, workers compensation is a must to consider. In addition to this, salaried employees will be given a complete medical and dental coverage, as well as 2 weeks of paid vacation annually. SolarCycle wishes to promote a very beneficial working environment in order to foster the growth of ideas and the quality of the design.

9.E DESCRIPTION OF PRODUCTION

9.E.1 Raw Materials
For this production and assembly process, the raw materials come in the fabrication of the frame and solar linkage. This will require access to raw, extruded aluminum. The remainder of the components will be purchased from preexisting motorcycle supply companies. A complete breakdown of these costs and labor requirements may be found below in Table 9-1.
9.2 Costs

The costs associated with this process accrue from raw materials, design work, assembly, component costs, and testing costs. A complete breakdown of these costs and labor requirements may be found below in Table 9-1.

<table>
<thead>
<tr>
<th>Design</th>
<th>Hours</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame</td>
<td>50</td>
<td>$5,000</td>
</tr>
<tr>
<td>Drivetrain</td>
<td>50</td>
<td>$5,000</td>
</tr>
<tr>
<td>Battery Mount</td>
<td>25</td>
<td>$2,500</td>
</tr>
<tr>
<td>Solar Mount</td>
<td>25</td>
<td>$2,500</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>$15,000</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Components</th>
<th>Price/Part</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor</td>
<td>$750</td>
</tr>
<tr>
<td>Solar Panels</td>
<td>$350</td>
</tr>
<tr>
<td>Batteries</td>
<td>$400</td>
</tr>
<tr>
<td>Wheels and Steering</td>
<td>$400</td>
</tr>
<tr>
<td>Lights &amp; Electrics</td>
<td>$200</td>
</tr>
<tr>
<td>Controller</td>
<td>$300</td>
</tr>
<tr>
<td>Suspension</td>
<td>$250</td>
</tr>
<tr>
<td>Brakes</td>
<td>$150</td>
</tr>
<tr>
<td><strong>Total/Bike</strong></td>
<td><strong>$2,800</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Materials</th>
<th>Amount/Bike</th>
<th>Cost/Bike</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum (lbs)</td>
<td>200</td>
<td>$160</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Production</th>
<th>Hours</th>
<th>Price/Bike</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame (Form/Weld)</td>
<td>3</td>
<td>$300</td>
</tr>
<tr>
<td>Solar Mount Assembly</td>
<td>2</td>
<td>$200</td>
</tr>
<tr>
<td>Battery Mount Assembly</td>
<td>2</td>
<td>$200</td>
</tr>
<tr>
<td>Drivetrain Assembly</td>
<td>3</td>
<td>$300</td>
</tr>
<tr>
<td>Electrical Wiring</td>
<td>2</td>
<td>$200</td>
</tr>
<tr>
<td>Final Bike Assembly</td>
<td>2</td>
<td>$200</td>
</tr>
<tr>
<td>Paint/Detail</td>
<td>2</td>
<td>$200</td>
</tr>
<tr>
<td><strong>Total/Bike</strong></td>
<td></td>
<td><strong>$1,600.00</strong></td>
</tr>
</tbody>
</table>
9.E.3 Key Supply Chain Components
The key components to the supply aspect of the manufacturing process come in welding and painting. The frame and necessary components must first pass through the welding process to form the frame. The driving components of the product, such as shocks, brakes, wheels, steering, batteries, motor, etc., will then be assembled on an employee assembly line process. Following this the product will move on to painting and aesthetic work before ultimate finalization.

9.F Facilities

9.F.1 Location
The production and design facilities will be tied together at the same location with the testing facility. This will be located in the southwest United States, in order to promote the product with the primary market group. This will also allow for the product to begin where it is marketed and reduce on the transportation costs associated with the first, limited product release.

9.F.2 Layout
The layout of the facility will consist of three main buildings: Design and Financing, Production and Assembly, and Testing with Failure Analysis. These three areas of product production will be included in the one facility location and will for a simple implementation of changes as well as minimized transportation. The production process will primarily consist of an assembly line process complete with technicians and laborers to both assemble components and weld the frame. The process will end with a painting and decal area.

9.F.3 Setup Constraints
The setup constraints of this facility occur from the cost of renting and the limitations in size needed. Because the production will begin with a meager 1000 units per year, the costs and facilities required for this enterprise are minimal.

9.G Capacity Issues and Concerns
Currently there are no issues of capacity or concerns with the proposed facilities. The setup will begin small scale and grow annually as the demand for the product also grows.
10 FINANCIAL FORECASTS

10.A  KEY ASSUMPTIONS
One of the biggest assumptions made during financial analysis is the stability of prices for base materials. Materials such as aluminum, which would be a major component of the frame, have prices which can change rapidly. Similarly, labor and facilities pricing are considered to remain at a constant rate.

10.B  FINANCIAL STATEMENTS

10.B.1 Income Statement
The income statement, seen attached, details the price point and the net income of the company. With an assumed price of $6000 and a first year sales of 1000 units, the statement shows that a net profit may be achieved amounting to $1,200,000 after taxes. This will be used to begin the payment of the initial loan as well as invest in growth and technology.

10.B.2 Balance Sheet
The balance sheet is not included in this analysis because there will be no sales on credit. The company will supply the product to the suppliers through direct contract and this will determine the demand of the product. Similarly the company will sell the product directly to the customer if an interest arises.

10.B.3 Cash Flow Statement
The cash flow statement details the reinvestment of the net income. The income will be partly used to repay the loan and partly used as an investment in the company. This investment will come in the form of additional employment, new technologies, and increased production capability. These specific investments will depend upon the consumer demand, the supplier demand, and the profit from the previous year.

10.C  BREAK-EVEN ANALYSIS
After conducting a break-even analysis, it was determined that at a selling price of $6000, approximately 200 bikes would need to be sold in order to break even. A complete cost analysis of the design may be seen above in Table 9-1.

10.D  RATIO ANALYSIS
A ratio analysis of SolarCycle looks specifically at the debt to equity ratio and the net asset turnover. Solar Cycle aims to achieve an initial profit margin of 10% growing 2% annually, a total debt payoff in 5 years, and an asset turnover of 1.25 in the first year. In this way, SolarCycle will achieve a high demand for a superior product, unique in its design. This desire to quickly pay off the debt will remove much of the risk and fear of profits in the future of SolarCycle and make the company less susceptible to bankruptcy from a fluctuating economy.
11 INVESTMENT PROPOSAL

11.A TOTAL REQUEST
For the implementation of SolarCycle, a total request of $6,000,000 is requested to begin initial operations and development.

11.B PURPOSE AND ALLOCATION OF FUNDS
The primary allocations of this fund will go towards the purchase of equipment, the hiring of employees, and the renting of facilities for the first product line. This funding will also go towards the purchase and production of the materials and time necessary for the first product release. Because SolarCycle wishes to supply distributors with the product, a large number of bikes must be produced for the initial release and therefore the demand must be estimated. This may be seen below in Table 11-1. The remainder of the funds will be used towards the facilities and equipment costs of this product.

Table 11-1: Full description and distribution of funds requested for production implementation

<table>
<thead>
<tr>
<th></th>
<th>Annual Production Cost (Assuming 1000 bikes/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>$ 15,000.00</td>
</tr>
<tr>
<td>Components</td>
<td>$ 2,800,000.00</td>
</tr>
<tr>
<td>Materials</td>
<td>$ 160,000.00</td>
</tr>
<tr>
<td>Production</td>
<td>$ 1,600,000.00</td>
</tr>
<tr>
<td>Shipping</td>
<td>$ 100,000.00</td>
</tr>
<tr>
<td>Marketing</td>
<td>$ 250,000.00</td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td><strong>$ 4,925,000.00</strong></td>
</tr>
<tr>
<td><strong>Cost/Bike</strong></td>
<td><strong>$ 4,925.00</strong></td>
</tr>
<tr>
<td><strong>Selling Price</strong></td>
<td><strong>$ 6,000.00</strong></td>
</tr>
<tr>
<td><strong>Profit per year</strong></td>
<td><strong>$ 1,075,000.00</strong></td>
</tr>
</tbody>
</table>

11.C REPAYMENT SCHEDULE AND EXIT STRATEGY
Looking at the estimated sales numbers and the resulting profit, it is seen that the loan may be repaid after a five year period from the beginning of production. This time will allow for the allocations of profit towards the initial loan, while simultaneously promoting growth and investment of new products after initial demand.

11.D IMPLEMENTATION TIMETABLE AND FORECAST TO LAUNCH
The implementation of production and sales is scheduled for one year after the initial loan has been sourced. This time will allow for the purchase of equipment, the hiring of employees, and the setup of facilities. In addition to this, the implementation time is also necessary in order to properly begin licensing and safety testing of the product from the federal government.
## 12 APPENDICES

### 12.A FINANCIAL STATEMENTS

**Pro-Forma Statement of Income**

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales revenue</td>
<td>8,000,000</td>
<td>10,000,000</td>
<td>12,000,000</td>
</tr>
<tr>
<td>Variable Cost of Goods Sold</td>
<td>4,000,000</td>
<td>4,800,000</td>
<td>5,000,000</td>
</tr>
<tr>
<td>Fixed Cost of Goods Sold</td>
<td>200,000</td>
<td>200,000</td>
<td>200,000</td>
</tr>
<tr>
<td>Depreciation</td>
<td>142,900</td>
<td>259,190</td>
<td>206,535</td>
</tr>
<tr>
<td>Gross Margin</td>
<td>3,657,100</td>
<td>4,740,810</td>
<td>6,593,465</td>
</tr>
<tr>
<td>Variable Operating Costs</td>
<td>1,600,000</td>
<td>1,800,000</td>
<td>2,000,000</td>
</tr>
<tr>
<td>Fixed Operating Costs</td>
<td>50,000</td>
<td>50,000</td>
<td>50,000</td>
</tr>
<tr>
<td>Operating Income</td>
<td>2,007,100</td>
<td>2,890,810</td>
<td>4,543,465</td>
</tr>
<tr>
<td>Interest Expense</td>
<td>1,250</td>
<td>3,750</td>
<td>6,250</td>
</tr>
<tr>
<td>Income Before Tax</td>
<td>2,005,850</td>
<td>2,887,060</td>
<td>4,537,215</td>
</tr>
<tr>
<td>Income tax (40%)</td>
<td>802,340</td>
<td>1,154,824</td>
<td>1,814,886</td>
</tr>
<tr>
<td>Net Income After Tax</td>
<td>1,203,510</td>
<td>1,732,236</td>
<td>2,722,329</td>
</tr>
</tbody>
</table>

**Pro-Forma Statement of Cash Flows**

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning Cash Balance</td>
<td>-</td>
<td>421,410</td>
<td>2,412,836</td>
</tr>
<tr>
<td>Net Income After Tax</td>
<td>1,203,510</td>
<td>1,732,236</td>
<td>2,722,329</td>
</tr>
<tr>
<td>Depreciation expense</td>
<td>142,900</td>
<td>259,190</td>
<td>206,535</td>
</tr>
<tr>
<td>Invested Capital (Equity)</td>
<td>50,000</td>
<td>75,000</td>
<td>100,000</td>
</tr>
<tr>
<td>Increase (decrease) in borrowed funds</td>
<td>25,000</td>
<td>25,000</td>
<td>25,000</td>
</tr>
<tr>
<td>Equipment Purchases</td>
<td>(1,000,000)</td>
<td>(100,000)</td>
<td>(50,000)</td>
</tr>
<tr>
<td>Ending Cash Balance</td>
<td>421,410</td>
<td>2,412,836</td>
<td>5,416,700</td>
</tr>
</tbody>
</table>

*Assume no change in Accounts Receivable, Inventory or other current assets other than cash; Accounts Payable or other current Liabilities other than Notes Payable; Fixed Assets other than equipment; or Equity Accounts other than Retained Earnings*
### Break - Even Analysis

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales revenue</td>
<td>8,000,000</td>
<td>10,000,000</td>
<td>12,000,000</td>
</tr>
<tr>
<td>Less: Variable Costs:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable Cost of Goods Sold</td>
<td>4,000,000</td>
<td>4,800,000</td>
<td>5,000,000</td>
</tr>
<tr>
<td>Variable Operating Costs</td>
<td>1,600,000</td>
<td>1,800,000</td>
<td>2,000,000</td>
</tr>
<tr>
<td>Total Variable Costs</td>
<td>5,600,000</td>
<td>6,600,000</td>
<td>7,000,000</td>
</tr>
<tr>
<td>Contribution Margin</td>
<td>2,400,000</td>
<td>3,400,000</td>
<td>5,000,000</td>
</tr>
<tr>
<td>Less: Fixed Costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed Cost of Goods Sold</td>
<td>200,000</td>
<td>200,000</td>
<td>200,000</td>
</tr>
<tr>
<td>Fixed Operating Costs</td>
<td>50,000</td>
<td>50,000</td>
<td>50,000</td>
</tr>
<tr>
<td>Depreciation</td>
<td>142,900</td>
<td>259,190</td>
<td>206,535</td>
</tr>
<tr>
<td>Interest Expense</td>
<td>1,250</td>
<td>3,750</td>
<td>6,250</td>
</tr>
<tr>
<td>Total Fixed Costs</td>
<td>394,150</td>
<td>512,940</td>
<td>462,785</td>
</tr>
<tr>
<td>Income Before Tax</td>
<td>2,005,850</td>
<td>2,887,060</td>
<td>4,537,215</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Fixed Costs</td>
<td>394,150</td>
<td>512,940</td>
<td>462,785</td>
</tr>
<tr>
<td>Contribution Margin %</td>
<td>30%</td>
<td>34%</td>
<td>42%</td>
</tr>
<tr>
<td>Break Even Sales Volume</td>
<td>1,313,833</td>
<td>1,508,647</td>
<td>1,110,684</td>
</tr>
</tbody>
</table>

### Equipment Purchases

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment Purchases Year 1</td>
<td>1,000,000</td>
<td>142,900</td>
<td>244,900</td>
</tr>
<tr>
<td>Equipment Purchases Year 2</td>
<td>100,000</td>
<td>14,290</td>
<td>24,490</td>
</tr>
<tr>
<td>Equipment Purchases Year 3</td>
<td>50,000</td>
<td>142,900</td>
<td>259,190</td>
</tr>
</tbody>
</table>

### MACRS Rates (7-year recovery period)

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1429</td>
<td>0.2449</td>
<td>0.1749</td>
<td></td>
</tr>
</tbody>
</table>

### Interest Expense:

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual interest rate on debt</td>
<td>10%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average debt balance</td>
<td>12,500</td>
<td>37,500</td>
<td>62,500</td>
</tr>
<tr>
<td>Interest expense</td>
<td>1,250</td>
<td>3,750</td>
<td>6,250</td>
</tr>
</tbody>
</table>
12.B ORGANIZATIONAL STRUCTURE
The organizational structure of SolarCycle will consist in the requirement of the unanimity of any
decisions between the four key management officials: Mike Houtman, Matt De Young, Jack Amick, and
Tae Lim. Although each management official pertains to a different role in the organization, all four hold
equal representation in the decisions made pertaining to the future of the company and the final release
of the design. In addition to these four members, both investors and other key officials will serve on the
board of directors, to foresee many decisions and act as advisors to the four key management members.

12.C MANAGEMENT BACKGROUND
The résumés and experience of the SolarCycle management team may be found in the following pages.
Michael H. Houtman
2643 Colton Ave SE
Grand Rapids, MI 49506
(760) 445-4970
michael.houtman@gmail.com

Objective
To obtain a full-time mechanical engineering position where innovation and meaningful engineering experience will benefit the company.

Education
Calvin College - Grand Rapids, MI
Bachelor of Science in Engineering, International Mechanical Concentration, May 2014
- GPA: 3.46/4.0, Honors Scholar, Dean’s List 2010-2013

Vrije University of Amsterdam - The Netherlands
Coursework leading towards Bachelor of Science in Engineering, January - June 2012
- Studied Engineering and Sustainability in Amsterdam

Calvin Christian High School - Escondido, CA
- Graduated Valedictorian, June 2010

Notable Coursework
- German and Dutch Language Studies
- Acoustics and Vibrations
- Renewable Energy & Bio-Fuels
- Sustainability & Environmental Perspectives

Relevant Experience
Airbus - Bremen, Germany
ECCC3: Engineering Cargo Systems Department Intern, June - August 2013
- Performed research on new cargo loading innovations, organized meetings
- Communicated results in both presentations and formal Airbus Technical Reports
- Worked in Hamburg, Germany on Single Aisle Customization and A380 MAP testing

Engineering Department, Calvin College - Grand Rapids, MI
Engineering Lab Assistant Instructor and Grader, September 2012 - May 2013
- Assisted lecturers and graded assignments for CAD Lab
- Tested materials, graded assignments, and assisted lecturers for Materials Lab

Notable Projects
Engineering Department, Calvin College - Grand Rapids, MI
Engineering Senior Design Project, September 2013 - Present
- Designed and constructed solar-electric motorcycle
- Organized meetings, formulated budget, and prepared marketing reports within a team

CJ Redwood - Escondido, CA
Mill Worker, May - August 2011, 2012
- Operated timber saw, chop saw, rip saw, band saw, miter saw, and moulder
- Graded redwood and cedar for commercial sale

Superior Ready Mix - Escondido, CA
Construction Laborer, July - August 2010
- Drove company trucks and operated construction equipment
- Graded inclines, mixed/loaded concrete, welded, and operated jackhammer

Technical Skills
- Microsoft Office
- Strong Communication Skills
- MathCAD
- Effective Writing Skills
- Autocad Inventor
- C++ Programming
- Engineering Equation Solver (EES)
- Finite Element Analysis (FEA)

References
Magnum Koehler, Airbus, ECCC3 Task Team Leader magnus.koehler@airbus.com +49 (421) 538-7432
Mike Callahan, C.J. Redwood, Lead Sales Representative (760) 741-7033
Rich De Jong, Calvin College, Mechanical Engineering Professor dejong@calvin.edu (616) 526-7086
Jack Amick, E.I.T.
413-770-4663
jackamick@icloud.com
1020 North Main Street
Lanesborough, MA 01237

Objective
To obtain a mechanical engineering position where machine design experiences will contribute positively to the organization.

Education
Calvin College – Grand Rapids, Michigan
Bachelor of Science in Engineering - International Mechanical Concentration GPA: 3.0/4.0; Expected Graduation May 2014
Vrije Universiteit Amsterdam – Amsterdam, Netherlands
Studied engineering, February – May 2012
Technische Universität Berlin – Berlin, Germany
Completed engineering and German language courses – Summer 2011

Courses
Engineering Design
Calculus & Differential Equations
Mechanics of Materials
Chemistry & Materials Science
German, French, Dutch
Physics
Statics & Dynamics
Thermodynamics
Machine Design
Control Systems

Experience
Calvin College Engineering Department – Grand Rapids, MI
Engineering Senior Design Team Member, September 2013 – Present
• Designed and built solar powered motorcycle with three other students
ArtiFlex Manufacturing, LLC – Grand Rapids, MI
Design Engineering Intern, May – September 2013
• Designed and built parts for automated machines and production cells
• Worked successfully while priorities constantly changed
Calvin College Engineering Department – Grand Rapids, MI
Photographer, September 2011 – May 2013
• Photographed school events for use on posters and Calvin website
Christiansen’s Tavern – Lanesborough, MA
Cook, June – September 2012
• Worked efficiently in a fast-paced, high stress environment
Odoa Mexican Grill – Grafton, WI
Line Server, September 2008 – June 2010
• Practiced effective communication skills with customers

Computer Skills
SolidWorks
Autodesk Inventor
Mathcad
AutoCAD
EES
Microsoft Office

Activities
Vice President, Calvin College Photography Club – 2011-2013
• Planned photography related events around Grand Rapids
Eagle Scout, Boy Scout Troop 836 – Cedarburg, WI; 2003-2012

References
Leonard De Rooy
Engineering Department Head
Iderooy@calvin.edu
616-526-6372
Jeremy Deemer
Project Manager, ArtiFlex Mfg.
jeremy.deemer@artiflexmfg.com
616-855-8902
Tae-Hyung Lim
hans2966@gmail.com
2030 Rowland Ave. SE APT103
(616) 334-0583
Grand Rapids, MI 49546

Objective
To obtain a position in product development and engineering consulting where engineering and general leadership skills attained through education and employment will benefit the company.

Experience
ESPEC North America Inc. - Hudsonville, MI
Design Engineer (May 2013 – Present)
- Design refrigeration system for test chambers to meet customers’ special needs
- Release assembly drawings and bill of materials to manufacturing
- Collaborate with other engineers from different departments to successfully design and manufacture large projects involving over $500,000 capital

Calvin College Engineering Department – Grand Rapids, MI
Student Researcher (Summer 2012)
- Built numerous data acquisition systems using LabVIEW and prepared example guidelines to be used as future lab manuals for department
- Submitted periodic progress reports to inform supervisor

Hyundai Motors - Ulsan, South Korea
Production Worker (Summer 2009, Fall 2011)
- Operated press machines at assembly lines

Republic of Korea Army (ROKA) - Seoul, South Korea
Sergeant (2009 – 2011)
- Provided interpretation for video-teleconferences with US Armed Forces in Korea for Joint Chief of Staff
- Served in Special Equipment Battalion to supervise maintenance and operation of counter-artillery RADARs, generators, and high-tension transformers

Education
Calvin College – Grand Rapids, MI
Bachelor of Science in Engineering, Mechanical Concentration – May 2014
Minor in Mathematics; GPA: 3.0/4.0

Senior Design Project
Calvin College Engineering Department – Grand Rapids, MI
Team Member, September 2013 – Present
- Designed and built an electric motorcycle powered by solar panels

Coursework

Activities
- Campus Choir, Calvin College (2006)
- Certified automobile inspector in Korea – Secondary level

Related Skills
- AutoCAD
- Algor
- Excel
- Inventor
- LabVIEW
- MathCAD
- Solidworks
- Syteline ERP
- Welding
- Grinding
- Soldering
- Electrical Wiring

Language
- Fluent in Korean
- Elementary level in Japanese/Spanish
Matthew De Young

Current Address: 1232 Hope St. SE
Grand Rapids, Michigan 49506
(219) 689-7846

Permanent Address: 9445 Calumet St.
Dyer, Indiana 46311
matthewdeyoung726@gmail.com

Objective
Fourth year engineering student seeks to obtain an internship where mechanical engineering skills will contribute to the company.

Education
Calvin College – Grand Rapids, MI
Bachelor of Science in Engineering, Mechanical Concentration
German Minor
Expected Graduation Date: May 2015: GPA: 2.905

Technical University of Berlin - Berlin, Germany
Coursework: German Language and Culture, as well as Statics and Dynamics

Experience
Calvin College Engineering Department - Grand Rapids, MI
Senior Design Project Team Member, September 2013-Present
- Collaborated with three other mechanical engineering students to create a marketable product
- Researched feasibility of electric vehicle for commuters

Research Assistant, June - August 2013
- Constructed hotbox for thermal testing on windows and window inserts
- Built and tested two wind tunnel sections to get better insight into turbulent boundary layers

Student Grader and Class Assistant, September - December 2012
- Helped students learn important concepts in computer drafting
- Graded and returned homework in timely fashion

References
Richard De Jong, Engineering Professor, Calvin College,
dejong@calvin.edu, (616) 526-7086

Ned Nielsen, Engineering Professor, Calvin College,
nnielsen@calvin.edu, (616) 526-6440