

Transformers – BMFITT 2021 Team Social Entrepreneurship Business Plan

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Transformers

*Bright Minds, Fresh Ideas Think Tank Summer Internship, Powered by FPP*

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## **Executive Summary**

Non-renewable sources such as coal, gasoline, and natural gas are all finite sources of energy expected to run out in the next 30 years. Humanity's constant usage of non-renewables as energy sources for centuries has raised the level of harmful pollutants released in our environment that affect peoples' lives every day. Renewable energy sources like solar, wind, hydropower, and geothermal are all infinite sources of energy. Although they are generally unpredictable and can be unreliable. Technology to harvest renewable energy sources are being used today through to development in solar panels, wind turbines, hydropower dams and geothermal power plants. However, this technology is mostly used by large corporations and are commonly too expensive for the average homeowner to afford.

With the Sunerator, you will be able to access clean energy that is not harmful to humans nor to mother nature. The Sunerator is a unique kind of solar generator. It comes with built-in solar panels that consume and convert solar energy to electricity. Direct current (DC) and alternating current (AC) electricity will both be available through the charge inverter and various electrical ports installed on the generator. Our product is the best solution in case of a malfunction in your homes' power lines. Although it is not made to power the entire home, the Sunerator will be able to generate enough power for essentials like a mini-refrigerator, cellphones, computers, T.V.s, microwaves, air conditioners and even Wi-Fi routers. The Sunerator is designed to be a suitcase-like, portable generator that can be used on the go for daily use or emergencies.

The main target audience for our solar generator are people that need emergency backup power, people that conduct outdoor events, people who enjoy

camping, people who live in remote areas and people that work in construction sites. We plan to market our product through image ads on magazines and social media platforms so that we reach a variety of age groups. The main companies people frequently shop at to buy generators are Home Depot, Lowe's Home Improvement, Ace Hardware, Walmart, Amazon, Target, Outdoor World, and Camping World.

Our product, the Sunerator, is different from our competitors because one of the main issues with solar generators currently in the market is the solar panels being sold separate from the actual generator. The Sunerator will have attached solar panels that can be opened for charging and closed for transportation. It has no motor and as such will make little to no noise when in use. Our product will have four 360-degree suitcase wheels on the bottom for easier mobility. The retractable suitcase handle on the top allows someone to grab it and push it around without needing to pick it up. To top it off, the design is appealing and eye-catching.

## **Business Case**

Every day as we progress into the future, our technology evolves and with it, our ability to change. A major concern making itself largely apparent in the twenty first century is the rising level of pollution being dispersed into our environment. "Since 1970, CO2 emissions have increased by about 90%, with emissions from fossil fuel combustion and industrial processes contributing about 78% of the total greenhouse gas emissions increase from 1970 to 2011" (EPA, 2021). As a result, natural disasters are becoming more and more unpredictable. In addition, temperatures are drastically rising and lowering in parts of the world, all because of these harmful emissions from non-renewable sources.

One natural disaster in particular, hurricanes or commonly also known as cyclones, are known to hit tropical areas along the coastline of the Atlantic and Pacific oceans. Those who live in those areas are ordinarily used to their occurrence, but weather is not like it was more than 30 years ago. "We conclude that since 1975 there has been a substantial and observable regional and global increase in the proportion of Cat 4-5 hurricanes of 25-30 percent per °C of anthropogenic global warming" (Holland & Bruyere, 2013). When a natural disaster occurs typically lots of damage and destruction is caused. It may also take years for the areas affected to recover.

According to the Inter-American Development Bank (2019) when Hurricane Dorian hit the Bahamas, the damage caused was estimated to be "\$3.4 billion" and that "the number of confirmed deaths caused by Hurricane Dorian is 67, with 282 persons still missing as of 18 October 2019. An additional 29,472 persons were affected by the

hurricane by damages to their homes and assets.” Florida was lucky enough to have been spared from Dorian’s destruction as it had unexpectedly shifted east off its predicted course through Florida, however it did not spare the locals from strong tropical storms. Imagine how the people living in the Bahamas felt in the aftermath of Hurricane Dorian. Their homes destroyed and being separated from their loved ones whom they may never see again. To make matters worse, many of them may not be able to afford repairs, making the process of getting back to a normal life one that could take years to accomplish. It happened to them, who is to say it would not happen to you? This does not only apply to hurricanes, but it also includes other natural disasters such as tornadoes, floods, volcanic eruptions, earthquakes, sinkholes, and even sandstorms or snowstorms in certain areas that have made more frequent due to climate change that was a result of the frequent use of fossil fuels and natural gas.

Increased amounts of carbon dioxide also create health problems not only for our environment, but for people as well. In urban areas where there are high levels of toxic emissions, these pollutants can create a thick cloud of smog which affects the health of many who live in the area. “Air pollution has caused an estimated 49,000 deaths and \$23 billion in economic losses in the cities of Beijing and Shanghai alone since Jan. 1” (TheJapanTimes, 2020). Not only in China are people suffering from air pollution, but so are people in the United States. “Researchers found that 1,341 people in the LA area die annually due to air pollution that exceeds levels recommended by the American Thoracic Society (ATS)” (CBS Los Angeles, 2016). Imagine those horrible conditions that people in Beijing, Shanghai, and Los Angeles had to endure. Everyday activities like going to the store are made difficult when the air is toxic. People thought wearing

masks because of Covid-19 was bad, but having to wear masks because you could get serious, life devastating health problems if you did not wear it? It is especially important for people to see just how serious this problem has gotten.

Humanity is always consuming power, but at the cost of our environment. That is why people today and future generations must stress on ways to use renewable energy sources. Unlike non-renewable energy sources, “renewable energy sources often referred to as clean energy, comes from natural sources or processes that are constantly replenished” (Shinn, 2018). They also produce little to nonnatural gas emissions while functioning.

In the world, there are six known renewable energy sources on the planet: solar, wind, hydropower, biomass, geothermal, and oceanic currents. Every renewable energy source has its positives and its negatives in propelling humanity into a possible future of switching from a non-renewable energy dependent reality to a renewable energy dependent reality.

Solar energy is a commonly known renewable energy source as it is being used every day directly and indirectly. The developed technology of solar panels has contributed greatly to harvesting and collecting solar energy into electricity. “Solar, or photovoltaic (PV), cells are made from silicon or other materials that transform sunlight directly into electricity” (Shinn, 2018). However, solar panels are not able to collect solar energy 24/7 as it is not nearly available at night or during cloudy days to the extent that it is during a clear, sunny day. The cost to create and invest in solar panels is also high. They need acres of land to power something as large as a town or city. Like solar

panels, wind turbines that collect wind energy through rotating blades, also contribute to harvesting renewable energy “with the largest wind turbine capable of generating enough energy to power 1,400 homes” (AZoCleanTech, 2007). Although, they too cannot collect energy 24/7 because wind patterns are unpredictable and uncontrollable. All renewable energy sources cannot be controlled completely by humans so their use may not always be reliable. “Solar panels typically have an efficiency between 15% and 20%, coal has an efficiency of up to 40% and natural gas efficiency levels reach up to 60%” (Parkman, 2021). Renewable energy sources may have its challenges, but it does have potential for a main future role in humanity’s energy consumerism. Especially if we want to have a future for humanity on Earth.

Options we considered for a product are a solar-powered and solar-storing drone that chases the sun, a solar-powered laptop, a solar-collecting blimp, a solar-powered electric motorboat, and a solar-powered generator.

Like all things dealing with energy consumption, renewable energy sources have their benefits and drawbacks. “Generating energy that produces no greenhouse gas emissions from fossil fuels and reduces some types of air pollution” (EPA, 2021). This is beneficial because air pollution, such as carbon monoxide, lead, nitrogen oxides, soot, and sulfur dioxide to name a few, is still a big problem that still needs to be addressed. Solar energy technology like solar panels is actually a good way for consumers to address this problem. Thus, we propose our brand of solar-powered generators! Regular gas generators contribute to air pollution with the use of burning gasoline or natural gas as an energy source. Solar panels by themselves produce zero amount of air pollution and have the least amount of concern to the environment than any other

type of energy source. “In fact, they [US Office of Energy Efficiency & Renewable Energy] estimate that we could save more than 25,000 lives. That is because with cleaner air comes cleaner lungs” (Vivint Solar, 2021). Meaning our solar generator would not contribute to pollution as well as be free of the strong gasoline smell that gas generators commonly have while functioning. Another thing about our solar generators is that they are particularly quiet. Depending on the load, gasoline and natural gas generators are noisy and loud. Most customers tend to not buy generators in general for this sole, annoying reason which is why people looking to buy a generator would be more willing to pay more for a quiet generator. Yes, quiet generators do exist, but solar generators are always quiet no matter their size. Perhaps there may be a soft buzzing sound if it is producing more energy, but that is nothing compared to the loud growl of a large gas generator.

Our focus is to have smaller, more portable generators as large solar generators already exist. We would also like to attach foldable solar panels to the generator to reduce the amount of time needed to set it up. Of course, when it comes to any product relating to renewable energy sources, typically the upfront cost will almost always get the customer to think twice about it. It can be difficult to purchase some of the advanced technology at a lower price without sacrificing the quality of renewable energy source technology like solar panels. Like just to buy solar panels for your home “for a 10-kilowatt (kW) installation in the U.S. ranges from \$17,760 to \$23,828 after the federal solar tax credit, and the average price per watt for solar panels ranges from \$2.40 to \$3.22” (Matasci, 2021). For a customer who may not generate a lot of revenue, it may be costly, however the solar energy helps them gain back the money they spent in the

long run. In addition, gasoline and natural gas needed for gas generators add to a gas generator's maintenance cost. Meanwhile, people do not need to pay to access solar energy when they can just step outside.

The Business Case will be worked on for 7 days.

Market Analysis will be worked on for 5 days.

The Product will be worked on for 5 days.

The Management will be worked on for 3 days.

The Financial Goals will be determined within 2 days.

Company Description will be worked on for 2 days.

The Executive Summary will be worked on for 3 days.

Review and Preparation will be done within 3 days.

The Symposium will be presented for 1 day.

Thank You Emails will be completed within 2 days.

Renewable Energy Sources are generally expensive due to the more advanced technology used in their creation but in the long run, it can save people a lot of money.

Getting a solar panel is expensive depending on the area. Solar panels cost ranges from 11,144 to 14,696 for average sized homes. "If you need a few panels for a small DIY project, expect to pay around \$200 to \$250 per panel" (Parkman, 2021). The average cost to install solar panels in the United States is about \$12,000 after federal tax incentives. A geothermal plant in the US is roughly \$2500 per installed kW.

Conventional Hydro (impoundment) \$1,000-\$5,000 a mature technology, conventional hydro falls at the lower end of the range of installed costs, particularly for upgrade projects at existing sites. New dams and greenfield sites are more expensive. One

hundred percent “clean energy would save Americans as much as \$321 billion in energy costs” (Renewable Energy World, 2020).

Every single one of renewable energy sources has its risks. Many of them are unpredictable, though not unpreparable. Solar panels are designed in such a way to be safe and securable, however that does not mean safety when handling them can be taken lightly. Some common risks of handling solar panels can be electrocution and fire hazards. “A typical size solar panel around 300W could have open circuit voltage values close to 40 V and current values that could be between 7 A and 9 A. When you realize that 1 A could easily kill you, then you realize what could happen to you if you put your hands in the terminal outputs of a solar panel” (Carlos, 2021). Although the risk of getting electrocuted is low, it is always good to know where the terminal outputs are on a solar panel and make sure to avoid those areas as well as knowing what part of the solar panel is safe to touch. It does not help that solar panels do not have an off switch and will always be activated so long as there is sunlight so engineers must be extra careful when handling solar panels during the day. Fire hazards are also a concern when dealing with solar panels due to the batteries stored within them. “These solar power storage batteries contain lead and sulfuric acid, which are hazardous materials. Also, lead batteries can explode when they get wet” (Lee, 2021). Good thing these batteries are usually protected when it rains and are rarely a problem, but still a good fact to note.

Wind turbines, as good as they are for the air quality, have environmental risks as well such as interrupting migration or flight patterns of birds and in some cases bats. “From a distance, the blades seem to move slowly but the tip speed on these turbines

can approach 200 miles per hour, creating deadly obstacles for birds” (Looper, 2012). Another thing to note about wind turbines is that they also are hazards to any neighboring homes or buildings. Though their design has improved, there is a small chance that a blade or pieces of ice in colder areas could break free and be sent flying as a dangerous projectile. The noise can also be a risk for anyone nearby because it “is believed to cause maladies ranging from headaches and sleeplessness to dizziness and even depression. And visually, the flicker effect of spinning turbines can cause vertigo and even seizures” (Looper, 2012). So, people should consent to these risks when having wind turbines around.

Like wind turbines, hydropower dams and reservoirs also have a risk of impacting on the environment. “In some cases, hydroelectricity can cause changes in reservoir and stream water quality. Operating a hydroelectric power plant may alter the water temperature and the river’s flow. These changes may harm native plants and animals in the river and on land” (Jensen, 2018). However, that is generally one of the few concerns of using hydropower other than its expensiveness to construct and maintain.

The most concerning of the renewable energy sources would be biomass energy. Biomass is made up of plant material, waste, sewage, and anything that has been thrown away. “Burning biomass also releases carbon monoxide, leading to headaches, nausea, dizziness, and in high concentrations, premature death. What is more, burning biomass for electricity also produces nitrogen oxides (like nitrogen dioxide) and nasty cancer-causing chemicals, including benzene and formaldehyde” (American Lung Association, 2016). This shows that while there is always a source of

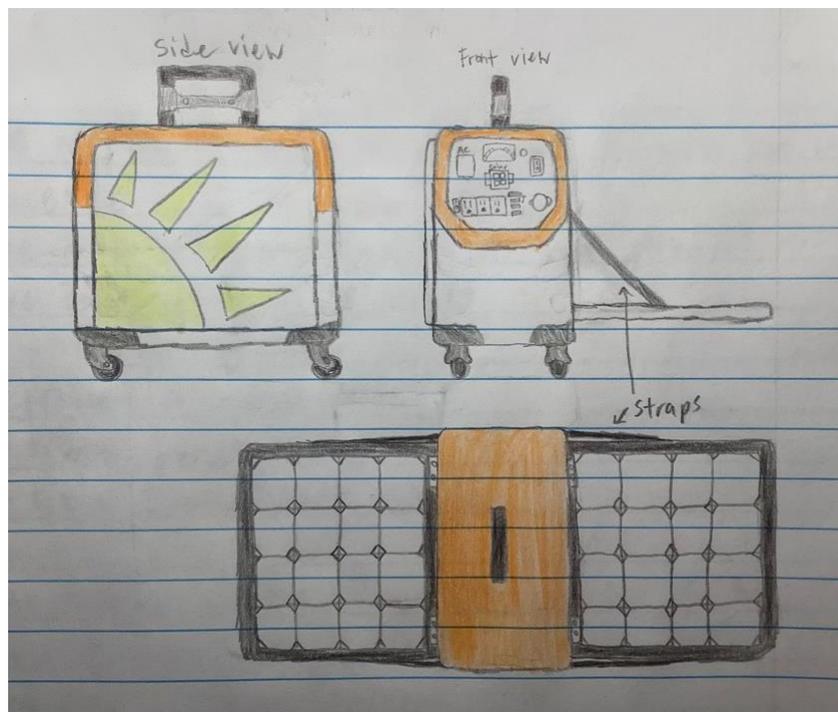
biomass being made to get energy from, it is still pollution. Thus, it can have harmful effects on people working with them so they should be sure to be in a contained environment and using protective gear.

Geothermal energy has a variety of risk factors when handling it. "Geothermal power plants generate small amounts of sulfur dioxide and silica emissions. The reservoirs can also contain traces of toxic heavy metals including mercury, arsenic, and boron" (SolarReviews, 2020). This is mainly because there are numerous reserves of carbon dioxide and natural gas pockets within the Earth's crust, however the portion of these gases being released by geothermal power plants is minimal compared to the amount of these gases being released by coal and oil factories. A true main concern of using geothermal energy is the increased risk of earthquakes. Earthquakes are caused by movements in the fault lines of Earth's tectonic plates. "Whenever you drill miles into the Earth and remove material, whether it's steam, water or hot rock, you release pressure that causes the ground above the geothermal pocket to shift and subside. Even worse, the most abundant geothermal energy sources are located in areas of high seismic activity. In fact, some experts actually believe that drilling into the rocks around a fault line could trigger quakes" (Roos, 2012). This puts any neighboring communities or buildings at risk of experiencing strong earthquakes, which leads to a risk of buildings collapsing and a lot of property damage so it is important to be careful where geothermal energy can be harvested from.

## Company Description

We are a retail company partnering with Florida Prosperity Partnership to produce a portable, solar-powered generator we call the Sunerator. The Sunerator is a suitcase-like solar generator that comes with attached solar panels that fold out when in use. It comes complete with four 360-degree rotating suitcase wheels, a retractable handle in the center, and various electrical ports such as USB ports and AC ports.

The Sunerator is a new way to look at consumption of renewable sources for the public. Due to the fact it gets its energy from the sun, it saves consumers money they would spend for gasoline or propane required for a gas generator. The upfront cost of it will be at a high price due to the advanced technology and good quality, however one generator will last customers a while. The generator is expected to be usable for 10 to 20 years after the consumer starts using it. The Sunerator is mainly good for any kind of remote camping trips or as an emergency backup power in case power lines go down. It is easy to use as all consumers need to do to charge it is to open the solar panels and leave it outside somewhere sunny. The Sunerator is also equipped with rotating wheels and a retractable handle in the center for easier transportation.



**Project Team**

Avril Elmer - Team Member, Co-worker

Ana Delgado-Rivera - Team Member, Co-worker

Nahum Flerzile - Team Member, Co-worker

Barry Altland - Director at FPP, Supervisor

Julia Jamieson - Cohort Lead

Bill Daniel - Project Mentor

Edward McKelvey - Senior Vice President at South State, Project Mentor

**Mission Statement**

Our goal is to sell quality, portable, solar-powered generators that encourage consumers to use more renewable energy sources.

## Market Analysis

Generators are usually bought by how much power they can emit for certain functions. “Small gensets of power rating up to 20 kVA can be classified into stationary and portable generator types” (Report Buyer, 2017). Generators are used all over the world. Mostly the conventional portable generator which is to be used for job site backup power for homes, outdoor programs or emergency backup portable generators are usually run-on gasoline or propane. “Generators generate about 3,000 to 10,000 watts of energy” (Grainger, 2017). These serve as handy accessories in residential applications, “where they can provide energy for lighting, sump pumps, specific essential appliances like refrigerators and air conditioners, and vital medical equipment. They also find use at construction sites, farms, motor homes, and recreation vehicles, and during camping trips” (Generator Source, 2017). Our target customers would most likely be people who use generators for backup power for their houses, outdoor events, camping trips, motorhomes, farms, and construction sites. Consumers are estimated to range from the ages of 20 to late 40s.

Some of the main places people can get generators are Home Depot, Lowe’s Home Improvement, Ace Hardware, Walmart, Amazon, Target, Outdoor World, and Camping World. Our target customers may go to places like Home Depot, Lowe's, or Amazon to purchase our generator for construction, small businesses, or at home use. They might go to Walmart or Target to purchase our generator as a backup power for fans or to recharge a device. If our target customers like camping, they can buy our generator from Outdoor World or Camping World. Since more people shop online

nowadays, they may purchase our generator from Amazon because of the convenience of getting it shipped to their house.

The idea for solar-powered generators do exist in the current market. It is our job to identify what we will be up against in the marketing world. A direct competitor we will have is a brand-named Nature's Generator who sells portable, solar-powered generators through Home Depot and their own website. Some other brands who also sell solar generators are Jackery, SolarSynthesis, ExpertPower, SereneLife, Goal Zero, and Kohler. Some indirect competitors that sell portable generators or generators in general are Honda Power Equipment, Westinghouse, Generac, Briggs & Stratton, Energizer, Winco, DuroMax, DuroStar, ATIMA, Caterpillar (CAT), Champion Power Equipment, Firman Power Equipment, Sportsman, Powerhorse, Earthquake, Powermate, Predator, and Ford Generators.

To compete with our direct competitors, we will attach the solar panels to the generator itself instead of having them separate. Most solar generator companies typically sell their generators separate from their solar panels. Customers typically like buying things that have them doing less work to set the product up for function. These attached solar panels would fold outwards when being used and would fold inwards when not being used. For easier transportation, four 360-degree rotating wheels on the bottom and a handle will be attached to the generator's case. As for our indirect competitors, we will highlight to our customers how much money they are saving by not using gasoline or natural gas as well as show them how much a gas generator emits in air pollution. By using recycled material to create our product, we will also add that in our advertisement.

## Product Analysis

“Solar panels consist of a number of layers, typically glass, then a protection layer and a front contact layer covering individual solar cells switched in series. Beneath those, there are metal back contacts which conduct the electricity and are laminated to waterproof the cells and insulate it from excess heat. Finally, there is a protective back layer of glass, metal or plastic” (Danyleko, 2018). The layers make sure that they are not dangerous to handle when installing.

Solar panels can be made of 4 different types of metal used in photovoltaic technology: crystalline silicon, amorphous silicon, organometallics, and gallium arsenide. Crystalline silicon is the most used and most efficient metal in solar energy collection. “The lifespan of crystalline silicon cells is more than 25 years without deterioration, making it ideal for industrial solar power generation” (Danyleko, 2018). This means the solar panels would last some time before the metal needed to be replaced. “Solar cells are made with crystalline silicon that is melted and mixed with gallium or boron to form wafers called silicon ingots. Phosphorus is then added to the silicon, and along with the gallium or boron, these substances give silicon its electrical capability” (Almerini, 2021). This compound of metals is melted and crafted into solar cells, creating the solar cell layer of a solar panel. The metal components will most likely be the trickiest part of building the solar panels for our generator. Luckily, the other components of a solar panel such as aluminum frame and glass layers can be recycled from any old solar panels or reusable materials which can save our production costs on them. We just must make sure the glass we are reusing is true low iron glass so that it transfers the most energy.

As for types of solar panels, there are three: monocrystalline, polycrystalline, and thin film. Monocrystalline would be the best option for our solar panels since they have the highest efficiency rate and take up less area. “Monocrystalline panel efficiencies can range from 17% to 22%” (Sendy, 2021). They do cost more than the other types of solar panels and are more difficult to produce, however their efficiency when using smaller versions of them will work in our favor as we want to have the solar panels attached to our generator foldable.

For the generator itself, we will need “a battery pack, charge controller, and an inverter into a compact system to turn solar energy into an electrical current. Each component is designed to match the electricity rating of the device that is receiving power. Standard voltage ratings for solar generators are 12, 24, and 48 volts” (GoingSolar, 2019). Solar panels typically generate direct current (DC) electricity. “The consistent and constant voltage of DC power supplies electronics that use a battery, such as your mobile device or smartphone” (Mr. Electric, 2021). While that is good for charging phones, the generator will need an inverter that converts DC electricity to alternating current (AC) electricity, in which we would need an off-grid inverter. “Your home or office receives electricity in the form of wave-like AC current, which is capable of changing direction and voltage from higher to lower current with the aid of transformers” (Mr. Electric, 2021). AC electricity is typically used to power air conditioners, TVs, and even dishwashers. In some cases, things like lightbulbs use both DC and AC electricity so it is important the generator supports both.

The battery in the generator stores the energy being produced by the solar panel and is crucial if the customer wants to access energy for the generator on a cloudy day

or during the night. “A lithium-ion battery is the most commonly used for its long lifespan and affordability” (GoingSolar, 2019). Lastly, a charge controller will be needed to conduct the flow of electricity and avoid overloading the battery.

Some more minor things we will also need in the making of our generator is the plastic cover, negative and positive charge wires, folding hinges, straps, and paint.

Building a solar generator will be tricky if not expensive. The solar panels we are looking for, which are around 100W solar panels, cost around two hundred (200) to four hundred (400) dollars. The price for a pair of durable suitcase wheels is thirty (30) dollars. We will need two pairs of wheels so that will total at sixty (60) dollars. The price of a retractable suitcase handle is twenty-six (26) dollars. The price of the charge inverter we plan to get is about one hundred (100) dollars. The price of the lithium-ion battery we plan to use is about six hundred & ninety (690) dollars. The price of a charge controller is around twenty-one (21) dollars. The price of steel hinges is around five (5) to twenty (20) dollars for one. We will need four to six hinges in total. The price of durable straps is five (5) to twenty (20) dollars. The price of connecting wires is about ten (10) to thirty (30) dollars. The price of recycled raw plastic material is around twenty (20) to seventy (70) dollars. The price of paint is around eleven (11) to thirty (30) dollars.

Due to climate change, our everyday weather is changing faster than we know it. Natural disasters that used to be an uncommon occurrence are now appearing more frequently with every passing year. Take Hurricane Florence, a Category 4 hurricane that struck Wilmington, North Carolina in 2018 for example. According to research by Betsy et al. (2020), “Florence made landfall near Wrightsville Beach, North Carolina, on September 14, 2018. With at least 51 deaths and flooding that broke 28 different

records, Florence is one of the deadliest and costliest hurricanes to ever impact the Carolinas.” Hurricane Florence had also caused an estimated \$24 billion dollars’ worth in total damages. Hurricanes with this kind of power commonly leave many people without power. Shah reported in 2018 that “for the first time in a week since before Hurricane Florence took the town apart, the sun came out in Wilmington and brought a new set of problems. It’s now boiling hot and many people here in this stricken North Carolina city don’t have air conditioning or enough gas for the generators to turn on fans.” These types of agonizing situations for the survivors makes solar-powered generators come in handy.

Solar-powered generators, or solar generators, are built like normal gas-powered generators in the aspect that it is a giant battery. However solar generators do not need gasoline and instead use solar energy provided by portable solar panels to turn into an emergency source of electricity. Imagine how useful solar generators would have been during the aftermath of Hurricane Florence. Their homes were destroyed, their water/food reserves depleted, and to top it off the power was out alongside a severe shortage of gasoline. “Next to a 200-car line for gas, Michael Horner sat helplessly at a closed gas station. He can’t idle or start and stop his car for four hours because his tank is on empty” (Shah, 2018). Normal gas generators would be useless as there would be no gasoline available to power them. Thus, the survivors had to endure days of the scorching hot sun with shade as the only source of protection from the sun’s heat. Solar generators, which are not dependent on gasoline, can utilize the sun’s heat and turn into electricity for people to power their air-conditioning. People would be able to access

stored solar energy throughout the day and would have probably made waiting for supplies more bearable during the aftermath of natural disasters.

## **Management**

In our business, we would need around 20-200 employees for a small manufacturing company. The three main managers and creators of this product will be Avril Elmer, Ana Delgado-Rivera, and Nahum Flerzile. The company Transformers works in part with the Florida Prosperity Program and Bright Minds Fresh Ideas Think Tank under supervisors Barry Altland and Julia Jamieson.

Plant managers supervise the operations of producing factories. They manage workers, monitor processes, and perform internal control. They additionally rent workers, produce schedules, and maintain bound quotas. Internal control inspectors monitor operations to make sure merchandise is being made in step with standards. They review specifications, supervise processes, and determine defects in merchandise and materials. Some internal control inspectors create suggestions to boost the potency and accuracy of machines and operations. Machinists and tool-and-die manufacturers found, maintain, and operate computers and mechanically operated machines that produce components for the production method. Warehouse staff are to blame for numerous tasks, together with making ready and inserting orders, shipping merchandise, and finishing deliveries. It is additionally their job to trace and unload the assorted merchandise housed at intervals in their warehouse.

## Financial Projections

Materials	Prices
Suitcase Wheels	\$30
Detachable Suitcase Handle	\$26
Charge Inverter	\$100
Lithium Ion	\$690
Charge Control	\$21
Steel Hinges	\$5 - \$20
Durable Strap	\$5 - \$20
Connecting Wires	\$10 - \$30
Recycled Raw Plastic	\$20 - \$70
Paint	\$11 - \$30
Solar panels	\$200 - \$400
<b>Total Manufacturer Price:</b>	<b>\$1,118 - \$1,425</b>

We will be able to sell our product for the lowest cost seven hundred and twelve (712) dollars to the highest, buyable cost of two thousand (2,000) dollars. Since the manufacturing process of one is a high cost, we cannot go under \$1,425 each if we want to gain any income. So, we decided \$1,599.99 or about \$1,600 is a good price. If

we sold about 100,000 generators a year each for \$1,599.99 each then our yearly income would be \$17,499,000 minus the manufacturing cost and not including tax. This left-over income will be put into buying a patent and shipping costs.

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