

Solis Power, Inc: Technical Proposal

Section 1- Introduction

With electric vehicles becoming more and more popular, drivers are facing a new set of emergencies. Solis Power aims to combat one of these potential emergencies. Imagine you are driving your electric vehicle and you notice you need a charge soon. However, you are in an area that does not have a charging station close enough for you to make it there. The team at Solis Power has created a solar-powered charger that can be mounted to the roof of your electric vehicle. This charger will be able to give you the boost needed to get you to the closest charging station. As the popularity of electric vehicles continues to grow, Solis Power offers a product that could be attached to every electric vehicle across the country. The purpose of this proposal is to provide a detailed description of the solution to this problem as well as discuss the steps to completing this project. The proposal will also lay out the potential risks associated with this idea and how the team will mitigate these risks.

Section 2- State the problem

In the last few years, the focus of the world has been on the rising temperatures of greenhouse gas emissions. One area of concern is the amount of direct CO₂ released from the average internal combustion engine tailpipes throughout the world. In 2021 the U.S. Energy Information Administration (EIA) reported that 1,486 million metric tons of CO₂ from the use of gasoline and diesel-powered vehicles, accounting for 30% of the U.S. energy sector's emissions¹. In response to this, our public and private sectors have pushed to advance many forms of alternative energies such as wind, hydro, and solar. The transportation sector specifically has been implementing more hybrid and fully electric vehicles (EVs) and advancing this technology rapidly. While these pushes will affect the total CO₂ emissions as EVs reduce direct tailpipe emissions by a ratio of 3:1, these EVs are not fully carbon neutral. According to the EIA, the U.S. generated roughly 4.009 kWh of energy in 2020, and only 19.8% or 792 billion kWh came from renewable sources².

The problem with this is that EVs have to charge their batteries from the power grid and still add to the annual carbon footprint. Without a new innovation in this aspect to reduce EVs' reliance on the power grid global warming conditions will still be accelerated. Additionally, a problem with this transition to EVs is the convenience of charging them. Across the U.S. there are only 56,000 charging stations with about 148,000 charging ports³. This lack of stations across the country has led to many people having to take longer trips out of the way to find stations along their route or end up having to be towed as they run out of charge. Without a solution to the

¹ U.S. Energy Information Administration- *How much carbon dioxide is produced from U.S. gasoline and diesel fuel consumption?*

² U.S. Energy Information Administration - *EIA - independent statistics and analysis*

³ USAFacts- *How many electric vehicle charging stations are there in the US?*

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problems of greenhouse gas emissions and charging ability, customers will be wary to invest in owning EVs which hinder future transportation abilities.

Section 3- Propose Solutions

Solis Power's mission is to revolutionize the way EVs are charged, by providing a sustainable and efficient solution. Our first-generation product, the Solis Series Alpha, is a compact, foldable solar panel that can be used to charge EVs on the go. With its ability to harness the sun's energy and provide a clean and renewable source of energy, the Solis Series Alpha is the solution to the problem of carbon emissions produced during the charging of EVs.

The Solis Series Alpha stands out from existing products because it offers a convenient and sustainable solution for charging EVs. Unlike other products that rely on the power grid, the Solis Series Alpha utilizes renewable energy from the sun, reducing the carbon emissions produced during the charging process. Additionally, the Series Alpha's compact and foldable design makes it a more practical solution, as it can be used while on the go and does not require access to a charging station. This level of convenience and sustainability makes the Solis Series Alpha a better solution than existing products.

According to the U.S. Energy Information Administration, only 19.8% of the energy generated in the country in 2020 was from renewable sources. This means that when an EV is charged using the power grid, it still contributes to the production of carbon emissions. The Solis Series Alpha eliminates this issue by providing an alternative source of energy that is not only clean but also convenient. With its ability to be placed on the roof while the vehicle is in motion or taken down and unfolded when parked, the Series Alpha can produce more efficient solar energy and charge the EV battery while on the go. Additionally, the lack of access to charging stations can pose a challenge for EV owners, leaving them in a difficult position if they run out of battery. The Solis Series Alpha offers a solution to this problem by providing a source of energy that can be used anywhere, making it a convenient option for those who are on the go. This means that even if a charging station is not available, the EV can still be charged using the Solis Series Alpha, eliminating the need for it to be towed to a charging station.

In conclusion, the Solis Series Alpha provides a practical and efficient alternative to the traditional way of charging EVs. With its ability to harness renewable energy, reduce carbon emissions, and provide a convenient source of energy, the Solis Series Alpha has the potential to make a large impact in the EV industry. Furthermore, with its compact and foldable design, the Solis Series Alpha is a better solution than existing products that are not as portable and efficient.

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Section 4- Statement of Work

The statement of work will disclose and breakdown all the work structure in defining the tasks, milestones, and deliverables. The project is broken down into five important categories, with each having its own set of tasks and will be the backbone of completing the Solis Power project. The first two phases can be done simultaneously, however, both were given allocated times to be worked on individually for the purpose of scheduling and keeping a deadline. The last three phases are contingent upon the completion of each other.

- **Research and project Requirements:** This phase will focus on getting all the information needed in order to create the product.
 - Design
 - Work on a schematic/chart for how the structure of the product will look like
 - Parts/Components
 - With the completion of the design, we will be able to research for parts to incorporate into the design
 - Outer structure
 - Research and find materials/covers that will go on the surroundings of the wires from the design.
 - Compatibility
 - Ensure dimensions and sizes will be compatible with each other from the picked parts/components and outer structures
- **Funding:** Will go over getting the funds for the company's project to use for purchasing parts, marketing, copyright/patent, and every other expense to complete the project.
 - Reaching out to foundations/departments for funds.
 - Department of Energy
 - National Science Foundation
 - Government grants
 - Private donors
 - Post on public platforms like Facebook, Twitter, and Instagram for donations. (Ensuring to show the benefits of the project only)
 - Reach out to private businesses or individuals who focus on sustainability and clean energy projects for funds.

After funding is secured and underway, purchase the materials needed to create the prototype collected in the first phase. It is essential to place the orders as soon as funding is underway since shipping takes a bit of time.

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- **Establish a prototype:** This phase will be the most sensitive as it will produce a physical prototype, the more precise the work the better the outcome will be.
 - With the material purchased, and the design schematic/chart, we will be able to put together the pieces and finalize the prototype.
- **Testing/Safety:** Testing the prototype is an important assignment in making sure the product is safe for use
 - Undergo tests as if this is the final product
 - Test when the product is in driving mode (Folded out on the EV roof)
 - Slow speeds and fast speeds
 - Watch the sturdiness and any movements during motions of the EV
 - Storms, windy, and foggy conditions
 - Test when the product is in its fixed mode (Tripod position)
 - Storms, windy, and foggy conditions
- **Marketing:** After passing the testing/safety phase, Solis Power will officially be able to market its complete product.
 - Announce a website
 - Announce on public platforms (Facebook, Instagram, Twitter)
 - Sell (Amazon, Etsy, etc)

Section 5- Risk Management Plan

There are several potential risks associated with the Solis Power design. One would be the climate of certain areas of the country. Using solar power as a potential emergency charge would not work in an area that does not have sufficient light or if the product is needed during nighttime. This could cause the product to be less marketable in certain regions, to mitigate the risk the team will focus their marketing efforts in regions that offer more sunlight. Another potential risk is this product relies heavily on the success and popularity of the electric car industry. To mitigate this risk the team will be closely monitoring the success of various electric car companies. The third potential risk is more electric charging stations being opened across the country. With more and more stations opening up, the need for the product will decrease as there will be more access to charge the vehicle.

Section 6- Proposing team

- Loyal Jabakji (CEO) is a Junior pursuing a Bachelors in Electrical engineering at the University of North Carolina - Charlotte. Has completed two associate degrees one in Electrical engineering technology and the other in Computer engineering technology. Loyal has two internship experiences, the first being an intern at BRP, a manufacturing company that specializes in power sports vehicles, and the other experience being an intern at Duke Energy where she focused on the telecommunication side and learned about the different types of power plants and the process

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they follow to get energy. With Layal's background, she will be managing the overall operations of the company and finding other organizations to help fund our project.

- Shivam Patel (COO) is a Computer engineering student who has completed 2 internships in virtualization and programming and is on track to graduate and work for Nutanix, a cloud-based enterprise company that is a leader in virtualization. Have completed many different projects throughout my undergraduate year including experience with Matlab, Python C++, Simulink, PSpice, etc. Additionally, with this experience, Shivam will be able to lead all operations at Solis Power.

- Christopher Myers (CQO) is an Electrical engineering student with 7 years of experience as a Quality Assurance/Nondestructive Inspector in the US Air Force. During his service, he certified the serviceability of various components of the F-16 and F-15 platforms utilizing methods such as X-Ray, ultrasound, spectroscopy, and eddy current inspections. Additionally, he certified all his other inspectors during annual evaluations on all inspection techniques members used to inspect the airframes. Also, he oversaw the daily operations of the 40-member inspection section and controlled the quality of the inspection method through a three-shift operation. Finally, for the last year, he has been working in the USAF electrical power production career, generating and distributing power effectively to the home station and deployed locations. With Chris's background, he will be ensuring the overall quality and safety of the work are met.

- Benjamin Milkins (CMO) is a 4th-year electrical engineering student and veteran of the US Navy. Benjamin has completed an internship with Andritz Hydro working on three multi-year projects with the company. He has also successfully created a code for TTI Floorcare to apply to various upright vacuums to allow them to have an automated edge-cleaning function.

- Karlie Marion (CFO) is a Computer Engineer with a minor in Mathematics. Before coming to Charlotte, she completed her Associates in Science at Surry Community College in Dobson, NC. Karlie has worked with many different programming languages. They are; C++, Matlab, Python, R-script, Java, Autodesk Inventor, and Revit. She plans to get an internship this summer to better herself at programming and get closer to her degree. With her qualities, she will be able to run the bookkeeping, budgeting, and accounting.

Section 7- Schedule and Budget

For the month of February, we will mainly be focusing on our Project Requirements, Technology Research, and Market Research. To make sure we get the correct information for the Solis Project, we will need to start this project ASAP. We will need to spend a week to two weeks of research on these three topics. Once we get these three main goals completed, we can start communicating with other companies to see what they think of how our Solis Series Alpha and

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how it can help their company and other companies. We want to have these two researches and the requirements completed by the middle of March. By March, we want to secure our funding. Knowing how much it will cost us **out of pocket**, how long will it take for the money to come in, etc. Once we get an idea of how much money we can secure for this project, we will start our prototype.

In April, May, and June we will start our prototyping and our design process. As a group, we will all design a prototype and decide which one has the better outcome. We will then come up with a matrix to show what we have done and what our future for the project looks like. Once we get our plan, we will start deciding on what items we need to get that are the right amount for our funding. Once we get to July and August, our group will continue to design but we will also be developing our market and how much we would want to sell it for. **We will also look at our risk mitigation. We want to make sure we will not be harming customers or the environment. If we were to do that, it could be very dangerous for us.**

From September to December, we will be finalizing our product, continue to speak to companies about our product, and start our safety testing to make sure everything is running smoothly. If we run into an error while going through the safe testing, we will see where the test is failing and fix it. Our group will start running tests and the safety test by the end of September or early October to make sure we still have enough time to fix our mistakes and take them to different companies.

From January to February of the next year, our group will be taking our product and we will try to put it up on the market at a decent price. From all the time spent working for this product to be a success, we will probably sell it for at least \$300-\$500 depending on how much we spent to build the product.

Section 8- References

“How Much Carbon Dioxide Is Produced from U.S. Gasoline and Diesel Fuel Consumption?”
FREQUENTLY ASKED QUESTIONS (FAQS)- U.S. Energy Information Administration, 10 May 2022,
<https://www.eia.gov/tools/faqs/faq.php?id=307&t=10#:~:text=The%20U.S.%20Energy%20Information%20Administration,a%20total%20of%20about%201%2C486>.

“U.S. Energy Information Administration - EIA - Independent Statistics and Analysis.”
Renewable Energy Explained - U.S. Energy Information Administration (EIA), US EIA, Apr. 2022, <https://www.eia.gov/energyexplained/renewable-sources/>.

USAFacts. “How Many Electric Vehicle Charging Stations Are There in the US?” USAFacts, USAFacts, 23 Nov. 2022,
usafacts.org/articles/how-many-electric-vehicle-charging-stations-are-there-in-the-us/.