



Name: Mohammed Taqi Uddin

Student ID: 2210126

Program: MBA

Module: Entrepreneurship

Module Code: LCMB7004

Assignment Title: Component 1- Essay

Lectures Name: GLADIUS KULOTHUNGAN & JAYALAKSHMI GOPALKRISHNAN

Table of Contents

OVERVIEW: SOLAR ENERGY CHARGING STATIONS FOR ELECTRIC VEHICLES	2
GAPS IN THE MARKET: SOLAR ENERGY CHARGING STATIONS FOR ELECTRIC VEHICLE	3
LOCATION OF BUSINESS AND LEGAL ENTITY	5
SOLAR ENERGY CHARGING STATIONS FOR ELECTRIC VEHICLES: A SWOT ANALYSIS	7
TARGET MARKET AND STRATEGIES	10
FINANCIAL PLAN AND FUNDING REQUIREMENTS FOR SOLAR-POWERED EV CHARGING STATIONS IN CHICAGO	12
POTENTIAL EXTERNAL FUNDING SOURCES	15
CONCLUSION	16
REFERENCES	17

OVERVIEW: SOLAR ENERGY CHARGING STATIONS FOR ELECTRIC VEHICLES

The modern-day energy landscape faces substantial challenges, inclusive of the depletion of fossil fuel reserves, escalating costs, and environmental degradation. In this context, renewable sources have emerged as a critical alternative, presenting a sustainable and environmentally pleasant direction for energy security.

The need to combat climate change and shift toward sustainable power assets has resulted in the substantial use of electrical motors (EVs) on a worldwide scale. The transportation zone, chargeable for approximately 24% of the total CO₂ emissions in 2021, plays a substantial function in contributing to greenhouse gas emissions worldwide (International Energy Agency, 2022). As a result, the adoption of clean energy solutions in transportation is essential to mitigate weather alternatives. Electric motors (EVs) are hastily rising as a sustainable opportunity to fossil fuel-powered motors, presenting enormous environmental advantages. However, the limited availability of charging infrastructure and concerns about range anxiety remain key barriers to widespread EV adoption.

Solar power charging stations provide a promising method to cope with those challenges. By utilizing the strength of the sun, these stations provide a reliable

and renewable source of electricity for electric automobile (EV) charging. This not simplest diminishes reliance on non-renewable strength resources but also aids in the reduction of greenhouse gasoline emissions and air pollutants. Moreover, strategically putting sun charging stations in regions with heavy EV traffic consisting of parking lots, highways, and shopping centers can alleviate worries about restricted use range and promote the adoption of EVs (Zhang et al., 2022). The worldwide market for solar-driven EV charging stations is poised for a good-sized boom in the approaching years. Projections from Grand View Research propose that using 2028, the marketplace may want to attain a size of US\$2.6 billion, showing a sturdy compound annual increase fee (CAGR) of 25.7% from 2021 to 2028 (Grand View Research, 2023)

GAPS IN THE MARKET: SOLAR ENERGY CHARGING STATIONS FOR ELECTRIC VEHICLE

The concept of solar energy charging stations for electric vehicles (EVs) is a modern and environmentally friendly solution; however, several widespread gaps within the marketplace must be addressed to ensure its successful implementation and huge adoption.

Firstly, the lack of complete charging infrastructure, specifically in far-flung areas and alongside highways, creates a main barrier to EV adoption (Akash & Panwar, 2022). This tension-inducing "range gap" hinders lengthy-distance travel and discourages capacity EV proprietors. The solar-powered charging stations, designed for off-grid operation, can address this crucial hole by using expanding

the reach of EV charging networks and imparting dependable power assets in underserved places.

Additionally, the variety in solar electricity output caused by climate conditions raises issues approximately the reliability and consistency of charging speeds (Rajput et al., 2023). This inconsistency can cause personal frustration and preclude EV adoption. The solar-powered charging stations, geared up with incorporated battery storage structures, can cope with this hole employing storing extra energy during high sun hours and supplying a reliable electricity supply even during durations of low solar irradiance, ensuring a steady and predictable charging experience for EV drivers.

The concern of care and sturdiness represents every other gap within the current market for solar EV charging stations. Exposed to various climate situations and usage styles, these stations may additionally require frequent protection, impacting their reliability and longevity. Research emphasizes the importance of developing sturdy and low-maintenance solar infrastructure to deal with these worries. (Marzband et al. 2019)

One strategy to this gap may be that solar energy charging stations for EVs are specifically designed to be durable and require minimal renovation. These stations will utilize top-notch substances, inclusive of tempered glass and anodized aluminum, to face up to harsh climate conditions. They may also incorporate capabilities consisting of predictive renovation systems which could alert operators to troubles before they occur. By addressing the problem of

renovation and sturdiness, solar power charging stations can come to be a more reliable and long-term answer for EV charging.

Furthermore, financial limitations pose an enormous challenge to the substantial adoption of solar-powered EV charging stations. High upfront costs and long payback periods can deter capability investors and limit the expansion of charging infrastructure. Bridging this monetary hole is crucial to drawing private investments and releasing the capacity for sustainable growth within the market. The solar-powered charging stations, designed with value-effective materials and progressive construction strategies, can address this gap by making charging infrastructure more affordable and available to a much broader variety of buyers and developers.

LOCATION OF BUSINESS AND LEGAL ENTITY

Location: The solar power charging station business, that is being proposed, will be situated in **Chicago**, Illinois, United States. This well-chosen location presents numerous significant benefits. The city's remarkable rate of electric vehicle (EV) adoption, which experienced a notable 42% surge in registered EVs in 2022 alone, indicates a substantial potential customer base (City of Chicago, 2023). Moreover, the demand for charging infrastructure is further intensified by the scarcity of such facilities, particularly in key areas, as emphasized in a recent report by the Chicago Metropolitan Agency for Planning (CMAP, 2023).

The supportive regulatory environment in Chicago further enhances the potential of business ideas. The availability of various grants, tax credits, and streamlined

permitting processes makes launching an EV charging business more feasible and attractive. Moreover, the city's diverse landscape provides strategic location options, such as shopping centers, business districts, and major transportation hubs, which maximize customer accessibility and station utilization, thereby increasing the business's appeal.

By harnessing the abundant sunshine hours in Chicago, the business model is further strengthened through the utilization of solar energy. This not only reduces reliance on the grid, resulting in cost savings but also aligns with the city's green energy goals.

An LLC Structure: The most suitable legal framework for this business is an LLC. Operating as an LLC brings forth a range of valuable benefits. Firstly, it ensures limited personal liability, safeguarding the owners' assets from business debts and liabilities. This guarantees financial security, even when confronted with unforeseen challenges. Additionally, the LLC's pass-through taxation structure eliminates the issue of double taxation, enabling business profits to be reported on the owners' tax returns. As a result, the overall tax burden is significantly reduced, allowing for the allocation of resources toward business growth and expansion (Internal Revenue Service, 2023).

The adaptability and simplicity of administration provided by an LLC framework enable businesses to adjust to dynamic market conditions and evolving customer requirements. This becomes particularly vital in a swiftly progressing industry such as the EV sector, where emerging technologies and regulations are

consistently surfacing. By presenting handy and available charging options, citizens can be encouraged to adopt electric automobiles, resulting in reduced emissions and a healthier environment.

Beyond the scope of individual charging stations, the vision is to establish a comprehensive community of sun-powered charging infrastructure that connects neighborhoods and communities across the metropolis. This community will no longer function as an essential service for EV drivers however also symbolizes Chicago's commitment to sustainability and innovation.

SOLAR ENERGY CHARGING STATIONS FOR ELECTRIC VEHICLES: A SWOT ANALYSIS

This report section provides a SWOT analysis of the proposed business idea to establish solar-powered electric vehicle (EV) charging stations in Chicago, Illinois. It evaluates the internal strengths and weaknesses of the business idea and also considers the external opportunities and threats it faces.

Strengths:

- **Market Demand:** The rapidly growing EV market in Chicago, with a 42% increase in registered EVs in 2022 alone, offers a substantial customer base (City of Chicago, 2023).
- **Limited Infrastructure:** The scarcity of existing charging infrastructure in key areas creates a clear demand for the services provided by this business.

- **Supportive Environment:** Chicago's supportive policies, such as grants, tax credits, and streamlined permitting, facilitate the launch of this business.
- **Strategic Location:** Various options for station placement, such as shopping centers and transportation hubs, maximize customer accessibility and station utilization.
- **Solar Energy:** Utilizing Chicago's abundant sunshine hours reduces reliance on the grid, lowers costs, and aligns with the city's green energy goals.
- **LLC Structure:** The business's LLC structure provides limited personal liability, pass-through taxation, and flexibility for adaptation and growth.
- **Community Impact:** By encouraging EV adoption and reducing emissions, the business contributes to a cleaner environment.
- **Scalability:** The business model can be expanded to create a comprehensive network of charging stations throughout the city.

Weaknesses:

- **High Initial Investment:** The initial costs of solar panels and charging stations can be significant, requiring substantial investment.
- **Weather Dependence:** Solar energy generation is dependent on weather conditions, which may impact charging availability during certain seasons.
- **Limited Range of EVs:** The current range of most EVs may still deter some customers from long-distance travel.

- **Technology Advancements:** Emerging charging technologies like wireless charging could pose future competition.
- **Grid Dependence:** Backup power from the grid may be necessary during periods of low solar energy generation.

Opportunities:

- **Growing EV Market:** The global EV market is projected to experience significant growth, increasing demand for charging infrastructure.
- **Financial Incentives:** Government incentives and potential partnerships can provide financial support.
- **Data Monetization:** Collecting and analyzing charging data can unlock new revenue streams.
- **Diversification:** Offering additional services like battery swaps and retail can increase revenue and customer satisfaction.
- **Technology Integration:** Smart grid technology can optimize energy management and enhance charging efficiency.

Threats:

- **Government Regulations:** Changes in regulations could impact the business's profitability.
- **Competition:** Existing charging infrastructure and other technologies could pose competition.
- **Battery Degradation:** Over time, battery performance in EVs can decline, deterring potential customers.

- **Economic Downturn:** A decline in the global economy could negatively impact EV adoption and investment.

This SWOT analysis demonstrates that the proposed solar EV charging station business in Chicago has promising potential due to its strengths, opportunities, and strategic location. While weaknesses and threats exist, they can be mitigated through careful planning, technology integration, and diversification of services.

TARGET MARKET AND STRATEGIES

The primary target market for our solar-powered EV charging stations in Chicago consists of:

Individual EV owners: This segment incorporates people who already own or are thinking about buying an EV. They are likely environmentally conscious and prioritize sustainable transportation alternatives. Studies propose that convenience, rate, and charging speed are key elements influencing their choice of charging stations (Akash & Panwar, 2022).

Businesses and businesses with EV fleets: Companies with electric transport motors, journey-sharing offerings, and public transportation groups fall into this class. They require dependable and green charging infrastructure to support their operations. According to a report through McKinsey & Company, the demand for charging solutions in the business zone is expected to grow notably in the coming years (McKinsey & Company, 2022).

Property owners and developers: This phase consists of proprietors of parking garages, buying centers, workplace homes, and different business houses. They

can advantage of putting in charging stations to draw EV drivers and generate extra sales.

To successfully seize our goal market, we can implement the subsequent strategies:

1. **Strategic location:** We will strategically discover our charging stations in excessive-traffic areas frequented by our target audience, such as buying centers, business districts, and main transportation hubs.
2. **Competitive pricing:** We will offer competitive charging rates and flexible payment options to attract customers and maintain market competitiveness.
3. **User-friendly technology:** We will provide intuitive and user-friendly interfaces for charging station operation, including mobile app integration and real-time charging status updates. This will enhance customer convenience and satisfaction.
4. **Marketing and outreach:** We will enforce targeted advertising campaigns through diverse channels, inclusive of social media, online advertising, and partnerships with neighborhood corporations and businesses. This will boost emblem recognition and appeal to customers from our target segments.
5. **Sustainability focus:** We will emphasize our commitment to sustainability by highlighting the environmental benefits of solar-powered charging and aligning ourselves with local green initiatives. This will resonate with our

target audience's environmental values and attract eco-conscious customers.

6. **Data-driven decision-making:** We will collect and analyze data on customer usage patterns and charging station performance to optimize our operations and identify growth opportunities. This data will inform decisions about station placement, pricing strategies, and service offerings.

By implementing these strategies, we propose to seize a widespread share of the growing EV charging marketplace in Chicago. We count on drawing a diverse purchaser base and making contributions to the city's sustainability dreams by offering reliable and environmentally friendly charging solutions for electric motors.

FINANCIAL PLAN AND FUNDING REQUIREMENTS FOR SOLAR-POWERED EV CHARGING STATIONS IN CHICAGO

This financial plan demonstrates the viability of the solar-powered EV charging station project in Chicago. By diversifying funding sources and leveraging strategic partnerships, the project can successfully achieve its goals and contribute to a cleaner and more sustainable transportation future.

FINANCIAL PLAN

Initial Costs:

Category	Description	Estimated Cost
Equipment	Solar panels, EV charging stations, energy storage systems, network infrastructure	\$1,500,000
Installation	Site preparation, electrical work, construction	\$500,000
Permits and licenses	Regulatory approvals and legal fees	\$50,000
Marketing and outreach	Brand development, advertising, and promotional materials	\$200,000
Contingency	Unexpected costs and delays	\$100,000
Total Initial Funding Required		\$2,400,000

Operational Costs (Annual):

Category	Description	Estimated Cost
Land lease or rent	Rental fees for charging station locations	Variable
Grid connection fees	Costs associated with grid connection	\$20,000

Maintenance and repairs Regular upkeep and troubleshooting \$50,000		
Insurance	Coverage for equipment, liability, and property damage	\$30,000
Marketing and advertising Ongoing marketing efforts to attract customers \$100,000		
Administrative and overhead	Payroll, accounting, and office expenses	\$150,000
Total Annual Operational Costs \$350,000		

Revenue (Projected Annual):

Category	Description	Estimated Revenue
Charging fees	Variable fees based on energy usage and time spent charging	\$500,000
Subscription plans	Monthly or annual plans offering discounts and additional benefits	\$200,000

Data analytics services	Selling anonymized data to relevant businesses and organizations	\$100,000
Total Projected Annual Revenue		\$800,000

POTENTIAL EXTERNAL FUNDING SOURCES

External investment assets are crucial for groups, businesses, and people seeking to finance various projects, research tasks, or operations. Here are some potential outside funding sources:

- **Government Grants and Loans:** Federal and state programs like the Department of Energy Clean Energy Investment Programs, Environmental Protection Agency Green Infrastructure Grant Program, and Illinois Green Economy Loans program offer low-interest financing and grants to support clean energy projects. This reduces initial investment and promotes sustainable development.
- **Venture Capital and Private Equity:** Investors focused on sustainable ventures can provide capital for growth and expansion. Expertise and industry connections offered by these investors can significantly benefit the project's long-term success.
- **Crowdfunding Platforms:** Platforms like Kickstarter and Indiegogo allow raising capital from a large pool of individual investors. This builds

- community support, generates early adopters, and increases brand awareness.
- **Partnerships with Utilities and Businesses:** Collaboration with utilities offering co-investment programs in charging infrastructure and businesses with EV fleets seeking charging solutions creates mutually beneficial partnerships. This enables shared costs, resource allocation, and accelerated deployment.
 - **Debt Financing:** Loans from banks or financial institutions can provide additional funding, particularly for larger projects. Careful financial planning and a strong understanding of debt obligations are crucial for this option.

CONCLUSION

The growing adoption of electrical automobiles (EVs) provides a giant opportunity to address weather alternate and decrease dependence on fossil fuels.

Solar-powered EV charging stations offer a promising solution to deal with the demanding situations of range anxiety and constrained charging infrastructure.

This business plan outlined a possible strategy for establishing a community of solar-powered EV charging stations in Chicago, Illinois. By leveraging Chicago's strong EV market, supportive regulatory surroundings, and plentiful sunshine hours, the business can seize widespread marketplace percentage and make a contribution to a more sustainable transportation destiny.

REFERENCES

- i. Akash, P. R., & Panwar, N. L. (2022). Solar powered electric vehicle charging station: A comprehensive review. *Renewable and Sustainable Energy Reviews*, 158, 112138.
- ii. Akash, R., & Panwar, N. L. (2022). A review of factors influencing electric vehicles adoption and future research directions. *Journal of Cleaner Production*, 372, 145782.
- iii. City of Chicago. (2023, March 15). Chicago Electric Vehicle Plan. City of Chicago (.gov).
- iv. Grand View Research. (2023, January). Solar Powered EV Charging Station Market Size, Share & Trends Analysis Report By Charging Type (Level 2, DC Fast Charging), By Application (Residential, Commercial), By Region, And Segment Forecasts, 2023 - 2028.
- v. International Energy Agency. (2022). Global EV Outlook 2022.
- vi. Marzband, M., Yousefnejad, E., Sumper, A., & Domínguez-García, J. L. (2019). Maintenance scheduling of a smart grid equipped with renewable energy sources, demand response, and plug-in electric vehicles. *Energies*, 12(7), 1240.
- vii. McKinsey & Company. (2022). The future of electric vehicles: Trends, challenges, and opportunities.
- viii. Rajput, T., Singh, B., Kumar, R., & Kaushik, S. C. (2023). A comprehensive review of solar photovoltaic systems with electric vehicle

- charging stations considering the market, technical requirements, network implications, and future challenges. *Sustainability*, 15(10), 3820.
- ix. U.S. Department of the Treasury Internal Revenue Service. (2023, September 22). Choose the Right Business Structure. IRS (.gov).
 - x. Zhang, Y., Zhang, Z., Wang, F., Li, Y., & Zhu, Y. (2022). Optimal location planning of electric vehicle charging stations based on a fuzzy multi-criteria decision making method. *Energies*, 15(19), 7248.