

1. Project Title:

Reed Road Solar Microgrid Project

2. Project Background:

WPI LLC is undertaking the Hudson, MA Solar Microgrid Project to install a solar-powered energy system at 75-77 Reed Road. The project will integrate solar panels with Hudson Light & Power's grid, supported by battery storage and a backup generator for reliability. This initiative is designed to reduce the community's reliance on fossil fuels, lower electricity costs, and improve energy resilience. Expected benefits include cleaner energy, reduced greenhouse gas emissions, and a more sustainable future for the local community.

3. Project Objectives:

- 1) Develop a Solar Microgrid at 75-77 Reed Road, Hudson, MA, integrating with Hudson Light & Power's grid to provide sustainable energy to the local community.
- 2) Optimize Solar Panel Placement to maximize energy production and efficiency while minimizing land use.
- 3) Incorporate Backup Systems, including battery storage and a gasoline generator, to ensure uninterrupted power supply during grid outages or low solar generation.
- 4) Collaborate with Hudson Light & Power to define the exact system configuration and ensure seamless integration with the existing power infrastructure.
- 5) Engage with the Local Community to gain acceptance and promote the benefits of clean energy, reduce fossil fuel reliance, and lower electricity costs.
- 6) Reduce Greenhouse Gas Emissions by offsetting oil-based energy production with renewable solar power, contributing to environmental sustainability.

4. Project Scope:

The Hudson, MA Solar Microgrid Project focuses on establishing a sustainable energy solution for the local community at 75-77 Reed Road. This initiative aims to integrate solar technology while providing a reliable power source for 800 homes.

Boundaries:

- 1) **Location:** The project will be located at 75-77 Reed Road in Hudson, MA, serving the immediate community.
- 2) **Technology:** The microgrid will utilize solar energy solutions, including photovoltaic panels and associated systems, without incorporating any non-renewable energy sources.

Deliverables:

- 1) **Solar Panel Installation:** A fully operational solar panel array designed to meet the community's energy needs.
- 2) **Microgrid Control System:** A comprehensive system to manage energy distribution, monitor performance, and optimize efficiency.
- 3) **Battery Storage:** A reliable battery system for storing excess energy generated by solar panels to ensure consistent power availability.
- 4) **Backup Generator:** A gasoline backup generator to provide additional power security during periods of low solar generation.
- 5) **Connection to Local Grid:** A seamless integration with Hudson Light & Power's existing grid to enhance energy reliability.

Features:

- 1) **Energy Monitoring:** A system to monitor energy production and consumption in real-time, allowing for transparency and informed decision-making.
- 2) **User Interface:** An intuitive platform for residents to track their energy usage and savings.
- 3) **Community Education:** Programs aimed at informing residents about the benefits of renewable energy and energy conservation practices.

Functions:

- 1) **Clean Energy Generation:** Produce renewable energy to power local homes, reducing the community's dependence on fossil fuels.
- 2) **Efficient Energy Storage:** Store surplus energy for later use, helping to balance supply and demand.
- 3) **Power Continuity:** Ensure reliable electricity supply even during outages or periods of low solar activity.

- 4) **Environmental Benefits:** Decrease greenhouse gas emissions by substituting traditional power sources with solar energy, contributing to broader sustainability goals.

This project aims to create a resilient solar microgrid that supports the Hudson community's energy needs while promoting environmental sustainability and reducing overall reliance on fossil fuels.

5. Project Stakeholders:

Sponsors:

- 1) **Worcester Polytechnic Innovations LLC (WPI LLC):** The main sponsor responsible for funding and overseeing the project's execution.
- 2) **Hudson Light & Power:** The local utility provider that will collaborate on integrating the microgrid into the existing power grid and may offer additional resources.

Project Team Members:

- 1) **Project Manager:** Coordinates the overall project, manages resources, and facilitates communication among stakeholders.
- 2) **Technical Engineers:** Specialists in solar technology and microgrid systems who will design and implement the solar panels and control systems.
- 3) **Consulting Systems Engineer:** Provides technical guidance during the feasibility analysis and implementation phases of the project.
- 4) **Community Engagement Specialist:** Works with local residents to address concerns, promote the benefits of the project, and ensure community support.

Customers:

- 1) **Local Residents:** Approximately 800 homes that will benefit from the renewable energy, reduced costs, and enhanced energy reliability.
- 2) **Local Businesses:** Potential customers who may also gain from lower energy expenses and a more reliable power supply.

Regulatory Bodies:

- 1) **State and Local Government Agencies:** Responsible for approving project permits and ensuring compliance with regulations related to renewable energy.

Financiers:

- 1) **Investors and Financial Institutions:** Entities that may provide funding or financial support to meet the project's capital requirements and operational expenses.

Environmental Groups:

- 1) **Local Environmental Organizations:** Stakeholders interested in the project's sustainability impact, who may advocate for or support the initiative.

6. Project Resources:

To effectively carry out the Hudson, MA Solar Microgrid Project, a variety of resources will be necessary:

Personnel:

- 1) **Project Manager:** Responsible for overall project oversight, including planning and coordination with stakeholders.
- 2) **Technical Engineers:** Experts in solar energy systems who will design and implement microgrids.
- 3) **Consulting Systems Engineer:** Offers technical advice throughout the project to ensure optimal system performance.
- 4) **Community Engagement Specialist:** Works to communicate with residents and build support for the project.
- 5) **Construction Crew:** Skilled workers tasked with installing solar panels and electrical infrastructure.
- 6) **Electricians:** Licensed professionals to connect the solar system to the existing grid safely.
- 7) **Environmental Consultant:** Evaluates the environmental impact and ensures compliance with regulations.

Materials:

- 1) **Solar Panels:** High-efficiency photovoltaic panels to convert sunlight into electricity.
- 2) **Microgrid Control System:** The technology required to monitor and manage energy distribution within the microgrid.
- 3) **Battery Storage Systems:** Batteries that store excess energy for use during low solar generation periods.

- 4) **Backup Generator:** A gasoline generator to provide additional power when solar energy is insufficient.
- 5) **Electrical Components:** Essential items like wiring, inverters, switches, and connectors for system integration.
- 6) **Mounting Structures:** Racks or frameworks for securely installing solar panels.

Equipment:

- 1) **Installation Tools:** Equipment such as drills, saws, and lifts for the installation process.
- 2) **Testing Instruments:** Tools to evaluate solar panel efficiency and system performance.
- 3) **Monitoring Technology:** Systems for tracking energy generation and consumption in real-time.
- 4) **Safety Equipment:** Personal protective gear for workers, including helmets and harnesses.

Financial Resources:

- 1) **Budget for Materials and Equipment:** Funds allocated for purchasing all necessary components for the project.
- 2) **Labor Costs:** Compensation for all personnel involved in various aspects of the project.
- 3) **Contingency Fund:** A reserve to cover any unexpected costs that may arise during implementation.

7. Project Risks and Assumptions:

- 1) **Regulatory Delays:** Delays in obtaining necessary permits could impact the project timeline.
- 2) **Cost Overruns:** Unforeseen increases in material or labor costs may exceed the budget.
- 3) **Technical Integration Issues:** Challenges in integrating solar panels, batteries, and control systems could affect performance.
- 4) **Community Opposition:** Local resistance could hinder acceptance and progress.
- 5) **Supply Chain Disruptions:** Delays in material delivery may stall construction.
- 6) **Weather-Related Delays:** Adverse weather conditions could slow down the construction phase.
- 7) **Operational Challenges:** Potential equipment malfunctions or maintenance issues post-deployment.

Assumptions:

- 1) **Community Support:** Residents will support the project and its benefits.
- 2) **Resource Availability:** Required materials and skilled labor will be accessible on schedule.
- 3) **Regulatory Compliance:** All necessary approvals will be obtained without significant obstacles.
- 4) **Technology Reliability:** Solar technology will perform as expected.
- 5) **Stable Funding:** Financial resources will remain secure throughout the project.
- 6) **Operational Efficiency:** The microgrid will function effectively for post-installation.
- 7) **Environmental Benefits:** The project will successfully reduce greenhouse gas emissions and reliance on fossil fuels.

8. Summary

The Project Charter for the Hudson, MA Solar Microgrid Project establishes a clear framework for the initiative, detailing its purpose, goals, and scope. The project aims to develop a solar microgrid that will supply renewable energy to a community of 800 homes, thereby reducing dependence on fossil fuels and lowering energy costs. Key stakeholders include Worcester Polytechnic Innovations LLC as the primary sponsor, Hudson Light & Power as the local utility partner, and community residents who will benefit directly from the project. The charter outlines deliverables such as the installation of solar panels, battery storage systems, and a microgrid control system. It also addresses potential risks and assumptions related to regulatory approvals, community acceptance, and resource availability. By defining the project's objectives and boundaries, the charter serves as an essential guide for all participants, promoting alignment and clarity throughout the project's development.