CASE STUDY

Electric School Bus Microgrid: Strengthening Resilience, Reducing Emissions, and Delivering Energy Savings

A CUSTOMER SUCCESS STORY

Project Overview

System Owner | Franklin-McKinley School District

Location | San Jose, California

Introduction

In a pioneering distributed energy initiative, Heila Technologies (Heila) has partnered with Lawrence Berkeley National Laboratory (Berkeley Lab) and Franklin-McKinley Elementary in San Jose, CA. Heila is serving as the integrator, project manager, and technology provider for deploying a solar PV carport and battery energy storage system. The resulting microgrid will provide bidirectional vehicle-to-building charging capacity to power Franklin's new electric school bus (ESB) fleet and serve as a resilience hub.

As microgrid experts with deep energy industry expertise, Heila is uniquely equipped to provide the turnkey solution necessary to facilitate this project from start to success.

Background

The California Energy Commission's (CEC) School Bus Replacement Program provides funding for the state's school districts to transition diesel-powered buses to battery electric buses. Since zero-emission transportation requires charging infrastructure, the CEC's Energy Infrastructure Incentives for Zero-Emission Commercial Vehicles Projects (EnergIIZE) also provides funding for the associated ESB charging infrastructure.

Berkeley and Franklin-McKinley recognized the opportunity in this policy environment to replace Franklin's school bus fleet with an electric fleet using a charging station powered by a microgrid system with renewable energy generation and battery storage. Most of the day, school buses remain unused, sitting and waiting until the end of the school day when needed. **A solar canopy or carport microgrid can charge the buses all day to use them in the afternoon and still deliver backup power for enhanced resilience.**

Key Drivers

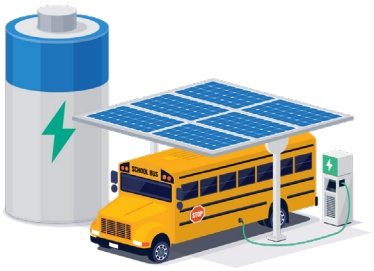
DECARBONIZE ENERGY SYSTEM

DEVELOP A RESILIENCE HUB

DRIVE COST SAVINGS

Decarbonize Energy System

Heila's solution will seamlessly integrate the solar PV carport and battery energy storage into the microgrid, ensuring that a significant portion of the fleet's energy needs come from renewable sources, significantly reducing carbon emissions.



The bidirectional capability further complements the project's clean energy integration efforts. During times of excess renewable energy generation, the ESBs and batteries can store the surplus energy, which would otherwise go to waste. The school can then use the stored energy during peak demand periods or when renewable energy generation is low, reducing reliance on fossil fuels and contributing to a greener and more sustainable energy system.

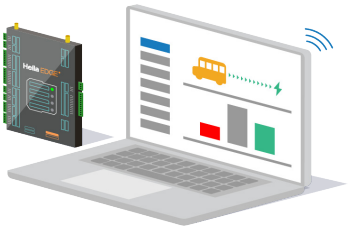
Develop a Resilience Hub

With the increasing vulnerability of the central grid to natural disasters, the project will create a resilience hub that can function as a reliable energy source during emergencies. Heila's microgrid controls will enable the development of an islanded microgrid to maintain power even during grid outages.

The ESBs can serve as mobile energy storage units for emergencies by employing bidirectional vehicle-to-charging capacity in the event of a power outage. The charged buses can supply electricity to critical facilities or even support disaster relief efforts, enhancing community preparedness and response capabilities during unforeseen events.

Drive Energy Savings

The project's primary goal is to optimize energy usage in the ESB's charging process. Heila's EDGE microgrid control platform will ensure a charging system that factors in peak demand periods, load balancing, and time-of-use (TOU) pricing. Implementing smart charging techniques means the project will reduce energy consumption, lower electricity costs, and decrease the overall environmental impact.



Moreover, since Heila's advanced microgrid controls can handle bidirectional charging, the ESBs can draw power from the grid and also feed excess energy back into the grid. This bidirectional capability creates a two-way energy flow, making the ESBs valuable assets that can contribute to the main grid's stability and support balancing efforts.

Initial Challenges

Although EV funding opens the door to more sustainable and resilient energy development, the novel nature of microgrid technology, fleet electrification, and managing complex energy loads requires more than money. Project success requires experts who know how to navigate byzantine layers of bureaucratic red tape, understand a rapidly-evolving technology landscape, and design an accurately sized microgrid solution.

Additionally, a project of this scope involves a range of stakeholders, including the local utility, the CEC and other Authorities Having Jurisdiction (AHJs), EPCs and subcontractors, and the school board, all of whom must act in concert to ensure the project meets its milestones on schedule.

Faced with a very new and niche microgrid sector and a maze of permitting applications and sub-contractor networking, Berkeley Lab contacted Heila after learning about Heila's diverse portfolio of successful microgrid and distributed energy projects.

The Heila Platform: Formulate, Collaborate, and Integrate

The challenges presented center on integrating various technologies into a single, efficient microgrid system capable of achieving energy goals while adhering to strict government operation protocols and coordinating multiple stakeholders.

Heila offers a platform that formulates the plan and design, collaborates closely with all stakeholders, and integrates different Distributed Energy Resources (DERs) into a scalable, flexible, cost-effective microgrid.

Formulate

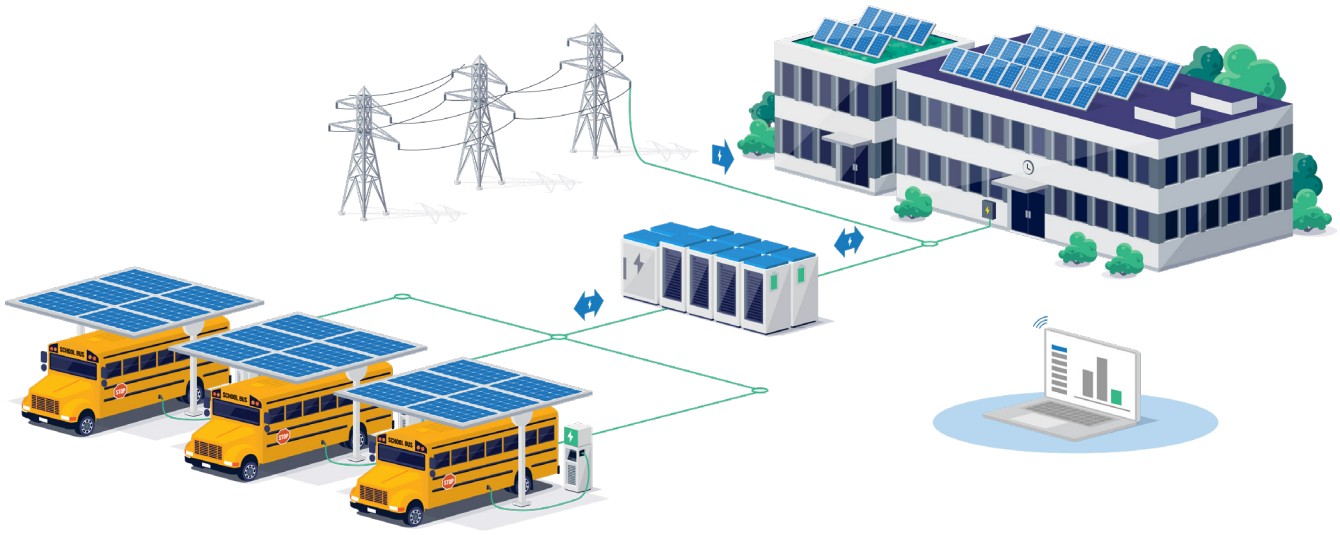
Heila's solution design phase is a comprehensive process that involves careful planning and analysis. After conducting site assessments to determine the optimal locations for charging stations and renewable energy sources, Heila drafted a detailed microgrid design with specifications for controllers, energy storage systems, and smart charging algorithms. The plan considers the specific requirements of the ESB fleet and the charging infrastructure needed to support them, in addition to meeting all of the project objectives.

Collaborate

Heila has an open environment for greater collaboration, from working with AHJs and commissioning bodies to onboarding and training EPCs on how to leverage the vast opportunities microgrids offer. Heila works closely with subcontractors responsible for executing specific project activities to ensure that each task is completed on time and according to the project's quality standards. Heila establishes clear communication channels, provides detailed instructions to subcontractors, and monitors their progress throughout the project.

Integrate

Heila helps procure components and equipment, which may include energy storage systems, solar panels, electric vehicle charging stations, and related hardware. Heila oversees procurement to assess equipment specifications, consider supplier reliability, and adhere to government procurement regulations. Additionally, Heila's EDGE® microgrid control and optimization platform standardizes installations by seamlessly integrating DERs — the solar panels, ESBs, electric loads, etc. — to build intelligent systems with guaranteed performance.



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