INTRODUCTION
UC Riverside has embarked on an innovative project called "The New Grid: Integrating Photovoltaics, Energy Storage, and a Local Utility for Electric Transportation", supported by the South Coast Air Quality Management District in response to their program "Deployment of Five Megawatts or More of In-Basin Renewable Distributed Electricity Generation and Storage to Support Electric Transportation Technologies within the South Coast Air Quality Management District". UC's effort is being led by the College of Engineering-Center for Environmental Research and Technology (CE-CERT) with the coordinated support of: Winston Chung Global Energy Center (WCGEC), Southern California Research Initiative for Solar Energy (SC-RISE), Riverside Public Utilities (RPU), the City of Riverside, UCR Physical Plant, UCR Transportation and Parking Services (TAPS), and UCR Capital and Physical Planning, Boums Electronics, SolarMax, and the Riverside Transit Agency (RTA). These key participants will help integrate four primary project components:
• Four Megawatts (MW) of UCR integrated solar photovoltaics (PV);
• Two Megawatt-hours of battery energy storage;
• Several Level II electric vehicle charging stations and one Level III fast charging station;
• An electric trolley route servicing the general UCR region.

Support Electric Vehicle Charging with PV Generation and Energy Storage
Photovoltaic energy generation on the UC Riverside campus will be utilized to offset electrical energy utilized throughout the region for Plug-in electric vehicle (PEV) charging events. The PV generation will be linked with stationary battery storage to manage energy needs during periods of insufficient PV generation. Energy management will be coordinated with Riverside Public Utilities to optimally reduce peak loads on the electrical distribution network and local power feeders.

Electric Transit
A UCR owned and RTA operated Trolley Bus will be converted from diesel combustion to battery electric operation. Energy use will be continuously monitored. Grid impacts resulting from fast DC charging of the trolley will be offset with PV generation and battery storage.

Stationary Battery Energy Storage
2.16 MWh of stationary battery storage will be integrated with the campus facilities and distribution feeders to offset on-site power demand. Batteries will store excess energy during evenings and deliver power during peak events.

Photovoltaic Generation
500 kW of photovoltaic power generation is being implemented on the CE-CERT research campus and integrated with energy storage and smart grid monitoring and control. Solar generation will be optimized to reduce peak demand on the local distribution feeder. Facility power usage, monitoring, and control will implement energy optimization strategies for daily power demand.

Smart Grid Energy Monitoring Management and Control
Energy use will be continuously monitored within the research facilities in conjunction with the distribution feeder and the overall utility grid. Smart Grid management decisions will be implemented and utilized to maximize grid stability, reliability, and efficiency. Strategies, protocols, and methods will be explored and documented relative to emissions reductions, cost, and effectiveness while supporting EV charging events.

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