



The Impact of Double-use Storage on a Grid Connected House with Photovoltaics

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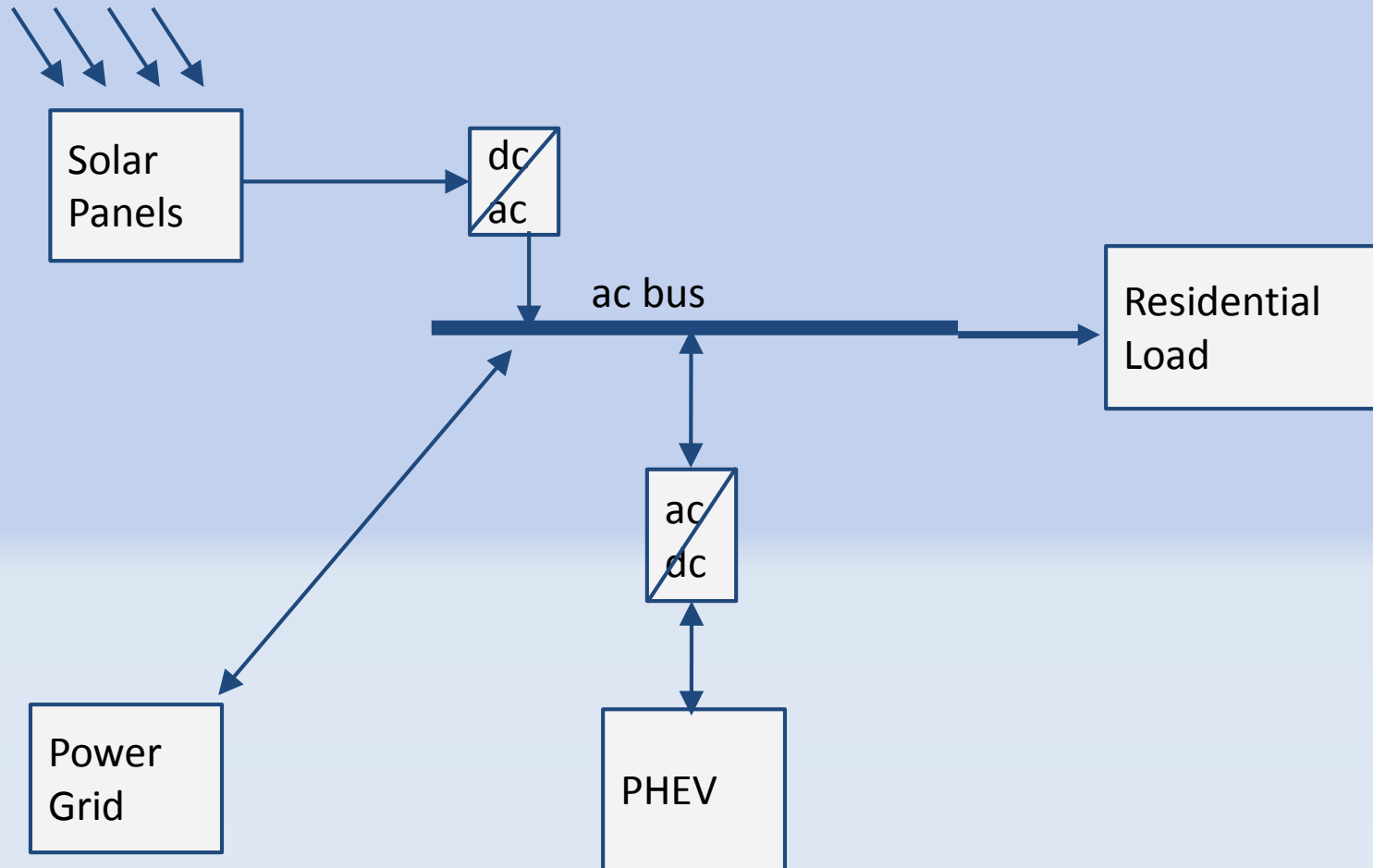


Objectives/Overview

- Analyze the impact of double-use storage on a grid connected house with photovoltaics (PV) in Tallahassee, Florida.
- Increase efficiency, flexibility and reduce grid usage for a PV grid-connected system.
- Employ a plug in electric vehicle (PEV), as double-use storage, to provide battery storage for an average-sized residential house with PV.
- The grid and PV system are connected to a residential load, and a PEV is connected to the system sometimes.
- Modes of operation based on the PV production, the PEV (presence/absence/SOC), and the load requirement are developed.
- A control system, the power energy management system (PEM), controls the distribution and flow of energy.
- Cost and benefits of this system are analyzed.

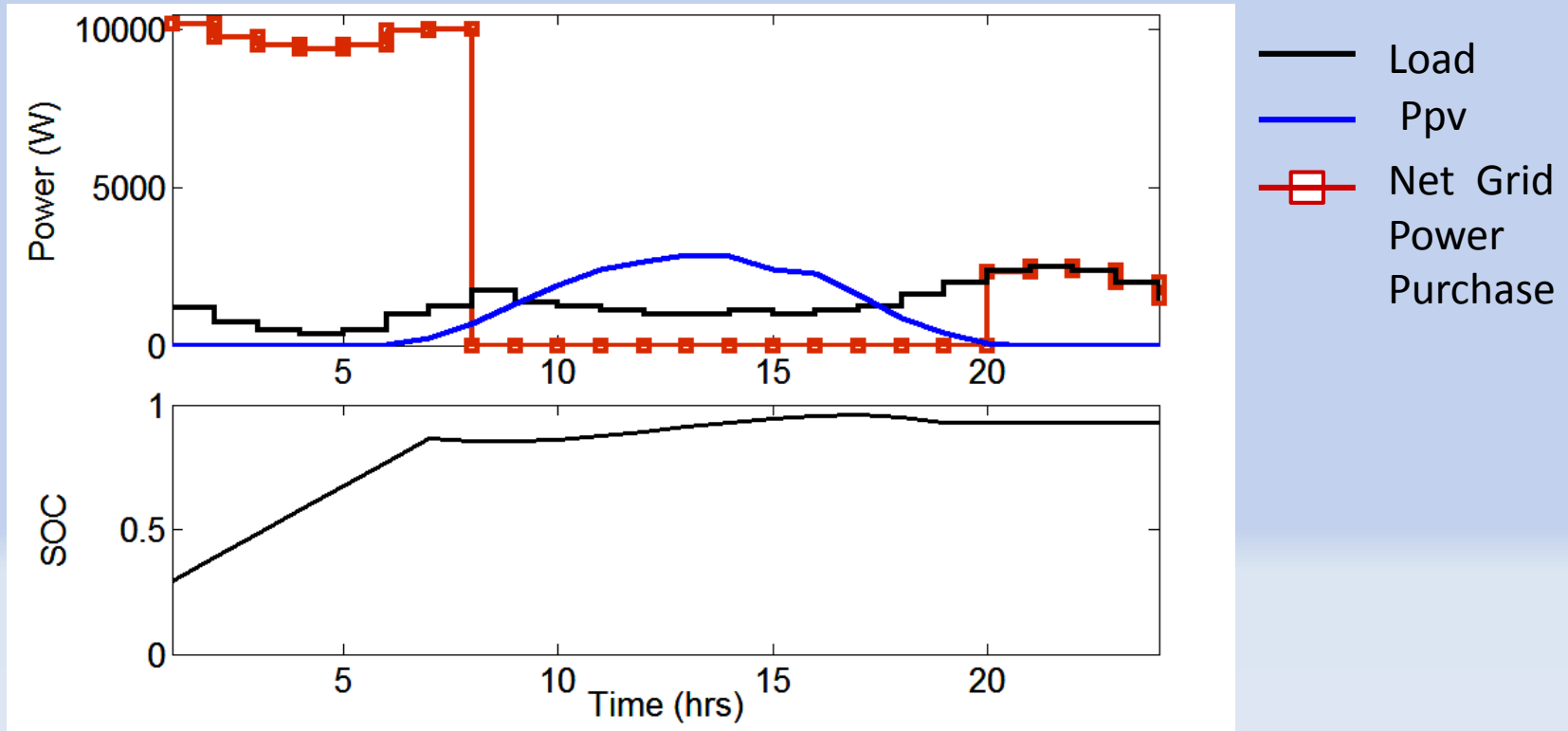


System Block Diagram





Results: Case 1 of 5



PEV discharges only over on-peak times and charges over off-peak times



Summary

- The PEV's battery is the only local energy storage system connected to the residence when available.
- The PV provides the renewable energy, the grid is used to provide power to the house and charge the car when the PV is not providing enough energy.
- Grid relief is provided by the PV when the car is charged and the load requirements are met.
- The system employs net-metering, excess PV production during peak hours is sent to the grid for credit to offset overall grid cost.
- The results show that the cost of purchasing power from the grid can be reduced with the use of a PV and PEV integration.
- The PEV can be used as an uninterruptible power supply (UPS) to power the load in the absence of the grid and the PV.