Veterans to Energy Initiative

Ben Finkelor, Kurt Kornbluth, Katherine Bannor

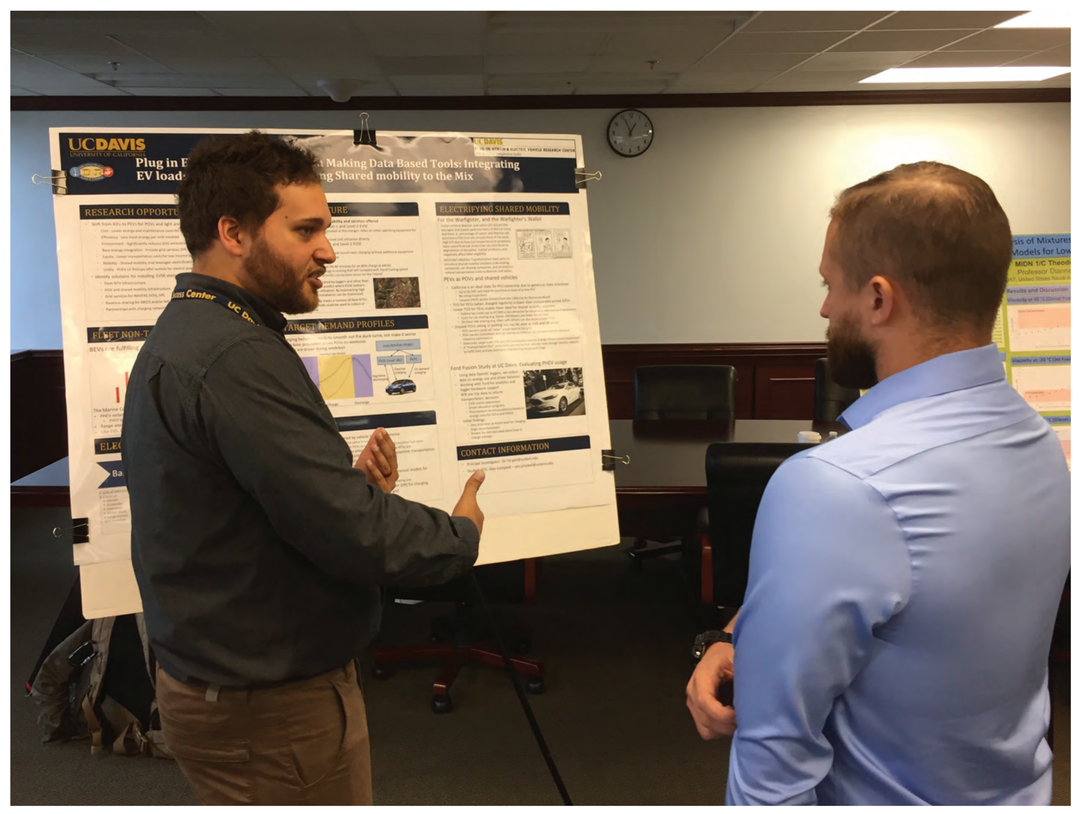
California is home to over 1.7 million former service members and close to 1 million workers in the energy industry. Careers in the energy industry are typically stable and well-paying, and many California utilities are preparing for increased retirements in the next 5-10 years.

Purpose

The Energy and Efficiency Institute (EEI) initiated its **Veterans to Energy Initiative** in 2017 as a part of its collaboration with the Office of Naval Research to foster a partnership among three critical sectors—the military, higher education institutions, and the energy industry in California—in order to facilitate the transition of service members into rewarding careers in the energy sector.

Progress

- A working group met twice in 2017 to draft a framework for the Initiative and determine priorities for the future.
- The EEI, in conjunction with PG&E, is developing a 2-day Fast Track to Energy Careers training program to be held in September for local student veterans.



Next Steps

- Work with utilities and military bases to finalize an on-base Skill Bridge program that will train separating service members for in-demand utility company careers.
- Launch the AvenueM program at UC Davis to provide additional support services and professional development opportunities to student veterans transferring from two-year degree programs.

Sponsors/Collaborators

Pacific Gas & Electric
California State University San Marcos
Engage! Strategies

UC DAVIS
Energy and Efficiency Institute

Modular Solar-Battery Microgrid using 2nd Life Electric Vehicle Batteries

Joseph Lacap, Vivian Tran, Sean Marsh, Brandon Schroder, Alex Chew, Hengbing Zhao, Jae Wan Park, Andrew Burke

As military bases adopt an increasing number of electric vehicles, charging infrastructure and the effect on the base's electrical system become important considerations. We propose using retired EV batteries to support the base's electrical grid for charging electric vehicles. Our project's goal is to develop a controller for a modular EV charging microgrid system that can be integrated into a military base's existing power distribution system.

System Architecture

The system being developed consists of an inverter that connects to a PV array, the second-life battery, and EV charger. The system's controller predicts PV generation, EV charging demand, and optimizes the charging of the battery to reduce grid demand by charging from PV and using PV and battery energy to charge EVs.

The controller also connects to the base's primary power control system to determine the load and generation mix currently supplying the base. This information is used to perform peak shaving and peak shifting which increases the efficiency and quality of the power distribution system at the base.

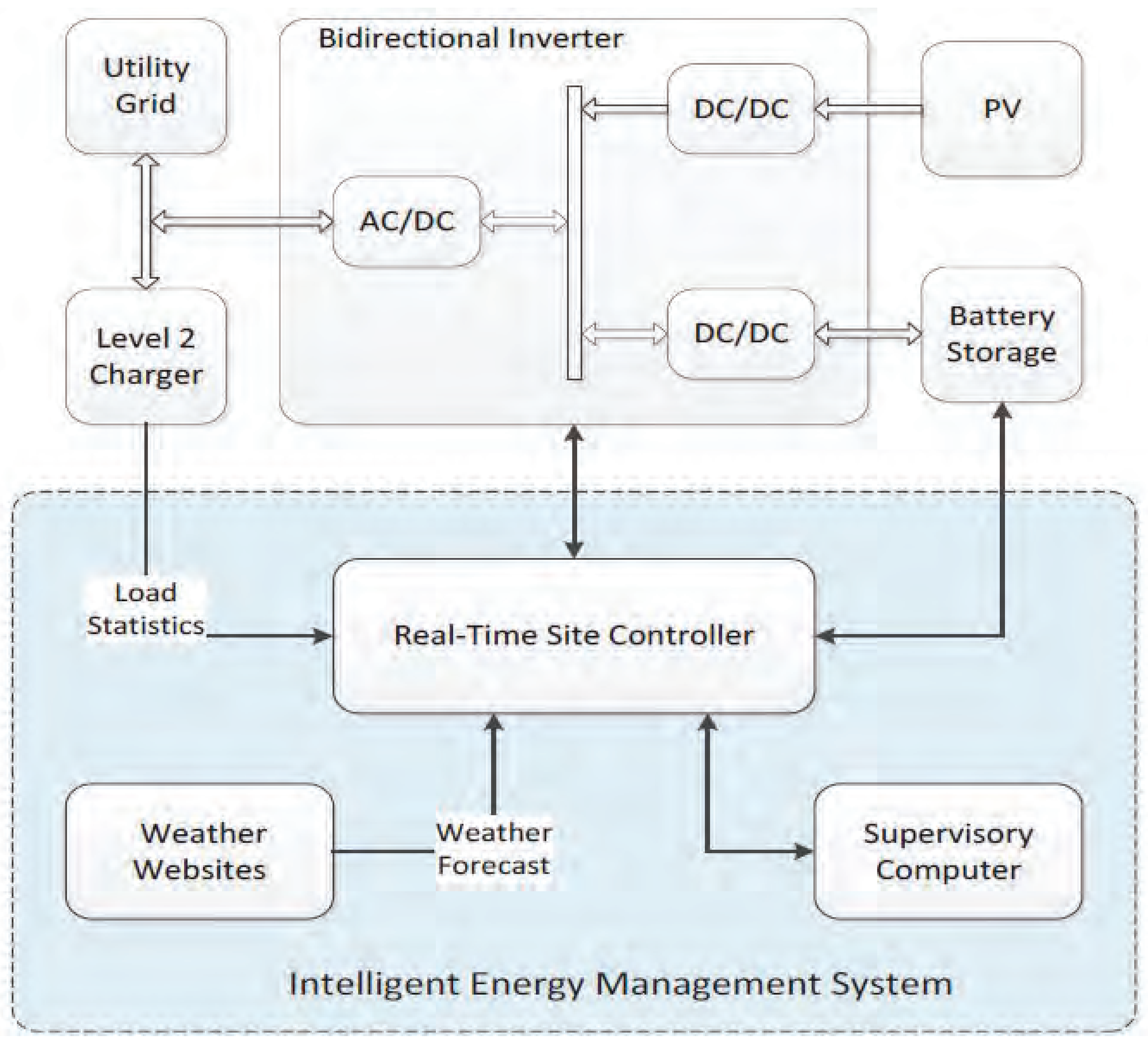
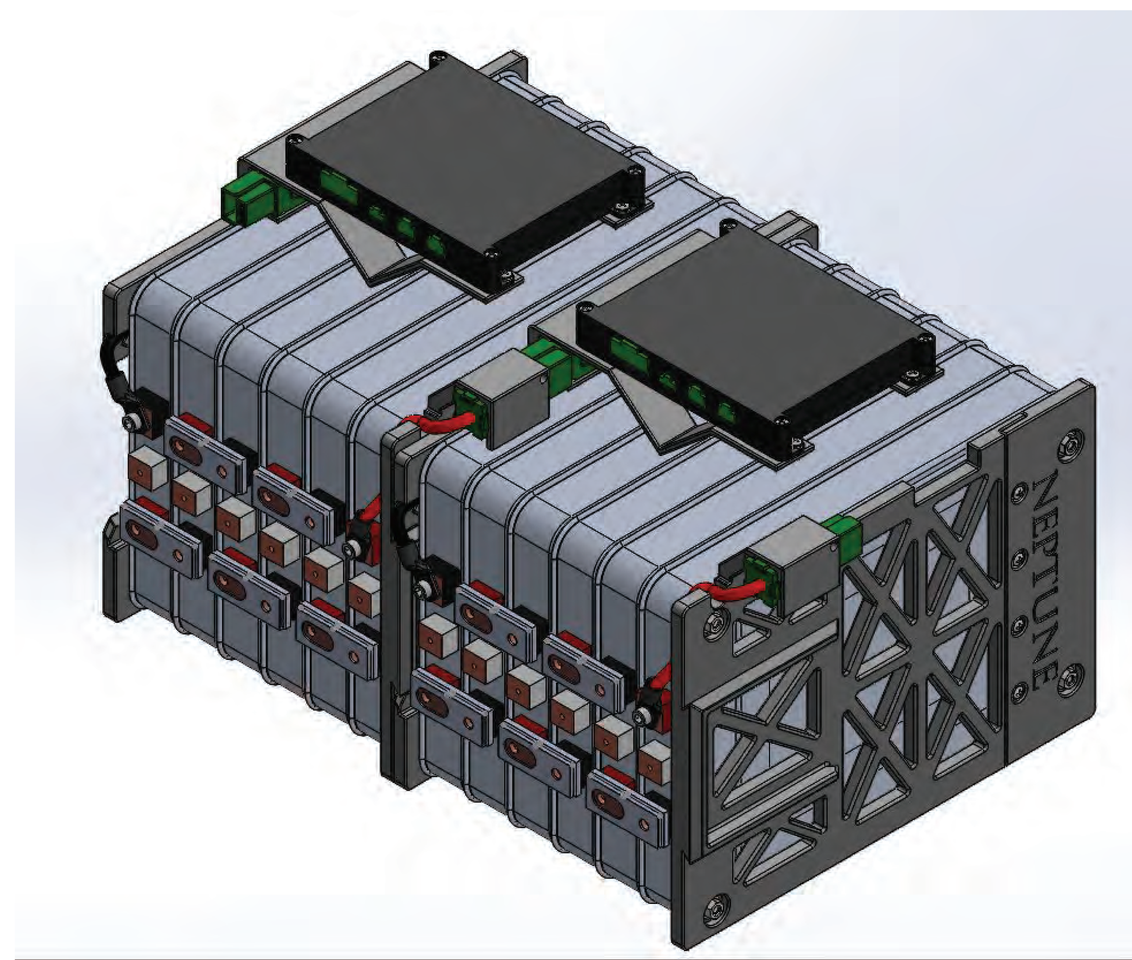


Diagram of microgrid system

Second-life Batteries

Rather than treat second-life batteries from EVs as waste, our project is developing a simple, modular way to re-purpose these batteries to increase the reliability of the electrical system. Several key considerations were used to develop the modular battery packs (e.g. modularity, end plate design, and manufacturability) and a Battery Management System was integrated into the battery packs.



Model of battery pack design

Next Steps

- Finalize the design of the battery pack 3D printing models
- Assemble the battery pack
- Integrate the controller with the battery management system
- Refine and expand the controller

Collaborator: PM Grow

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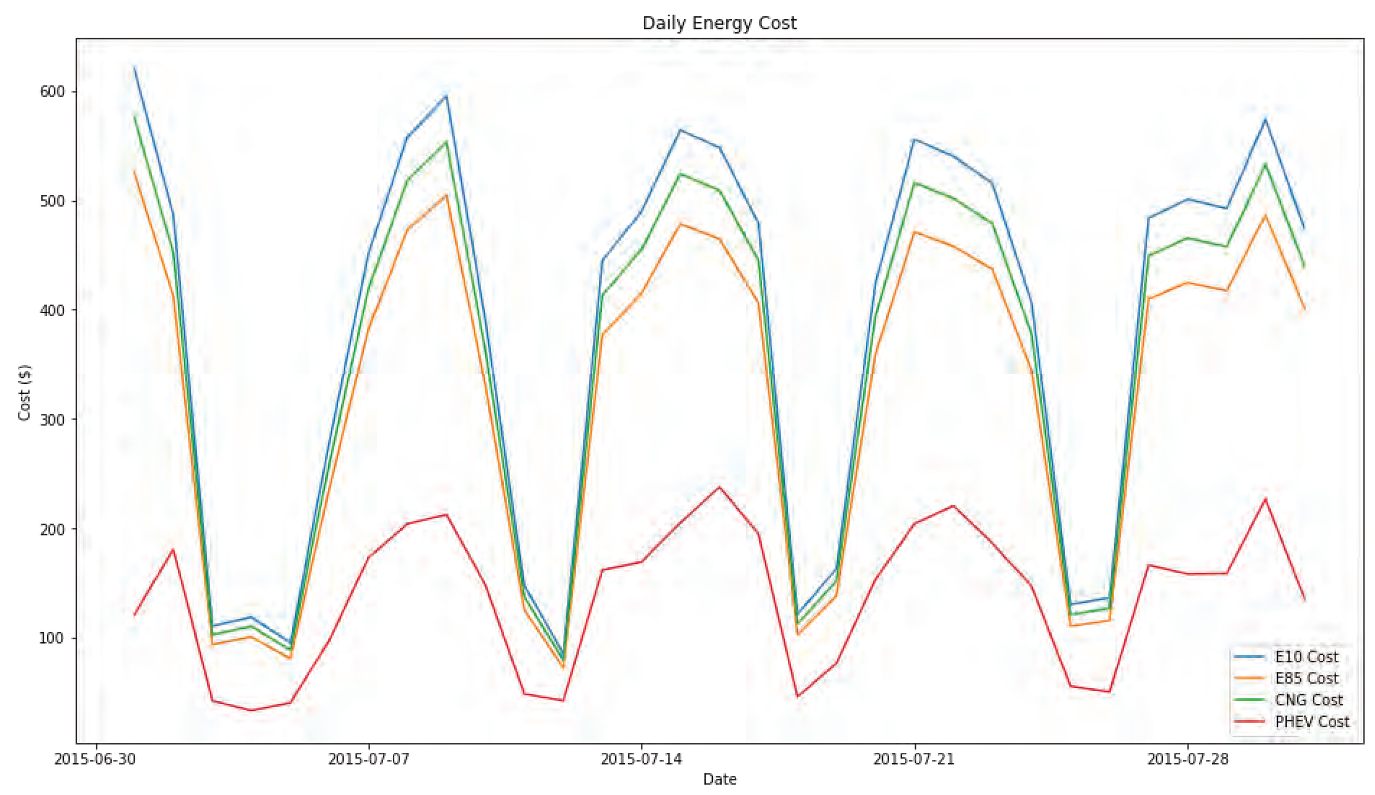
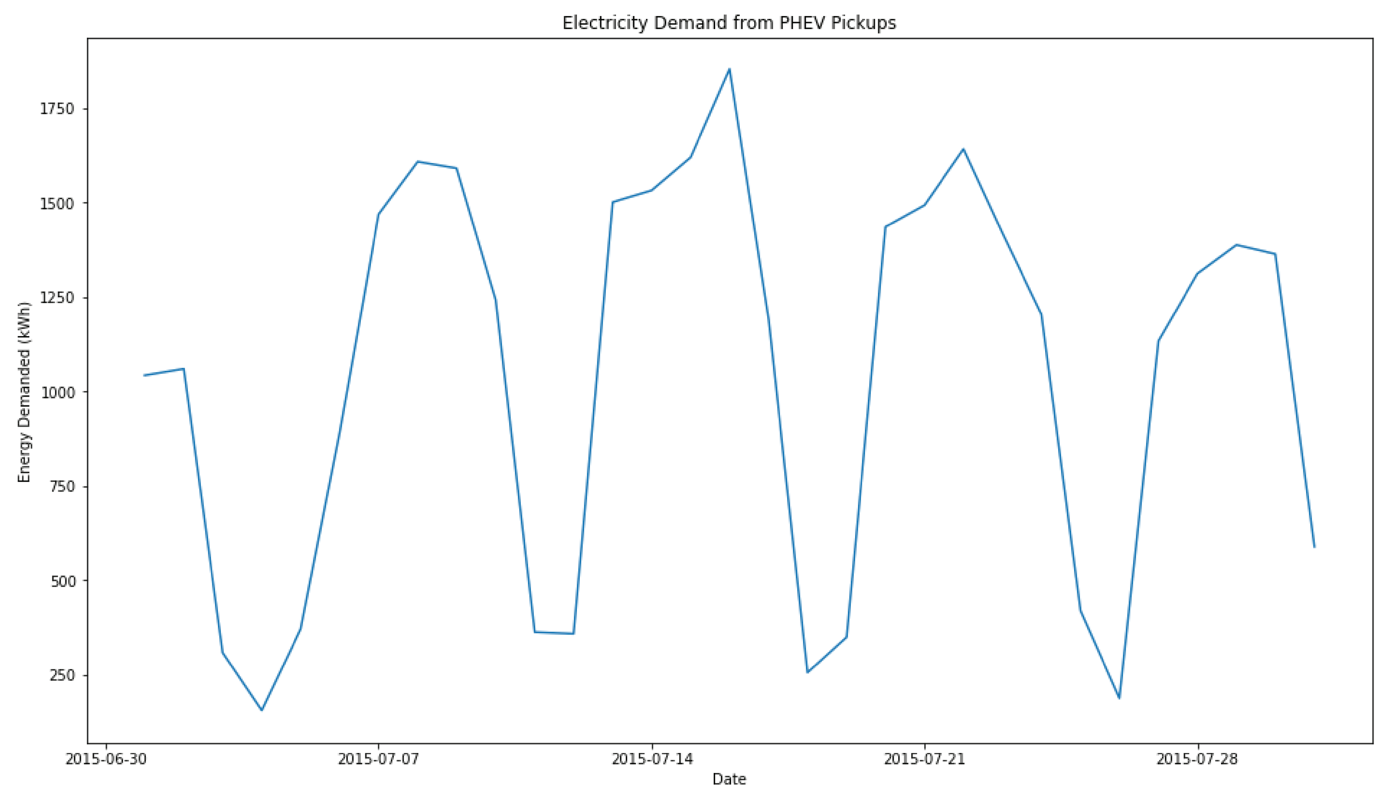
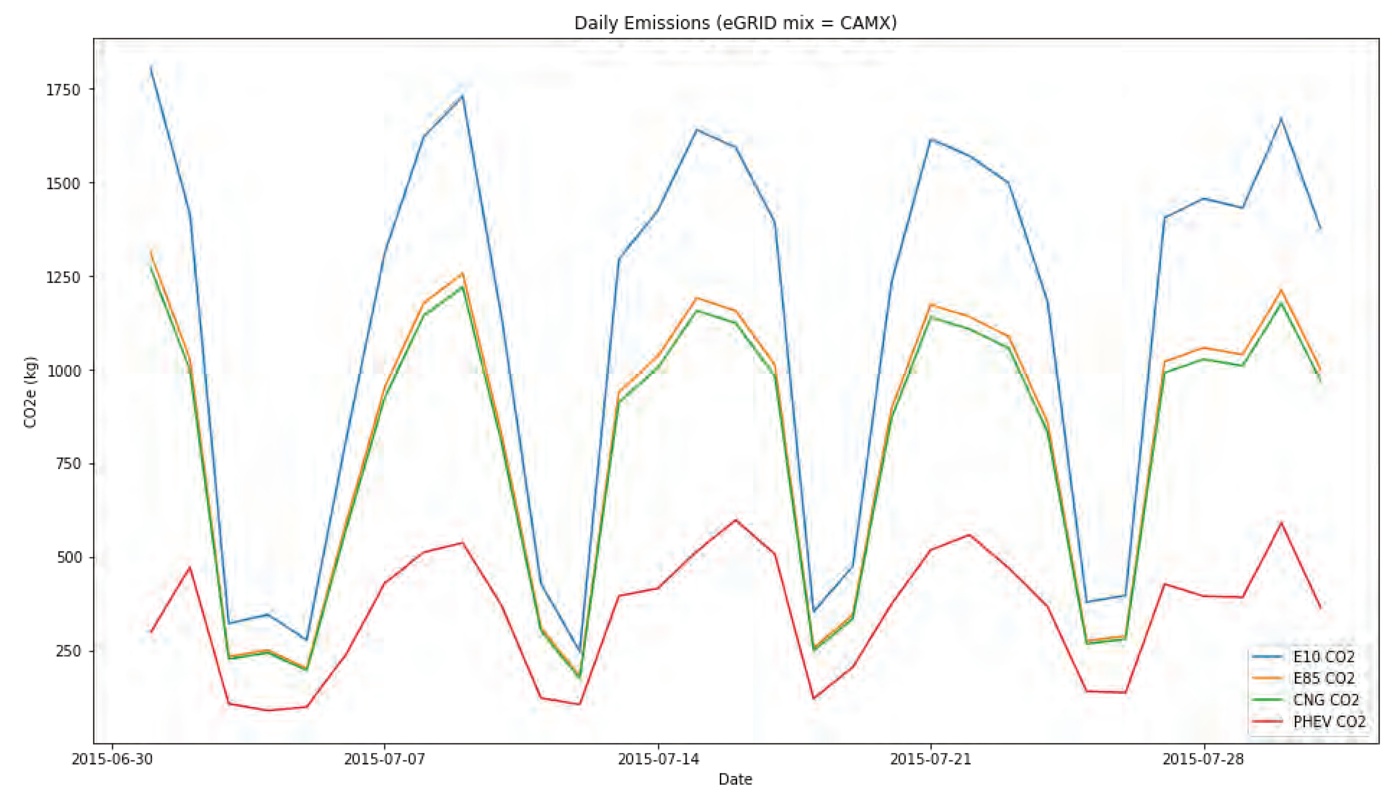
Electrifying Mobility for the Marine Corps

Gil Tal, Alex Campbell







Plug-In Electric Vehicles (PEVs)

Unlike traditional hybrid electric vehicles (HEVs) like the Toyota Prius, plug-in electric vehicles (PEVs) can connect to an external electricity source to fill their energy reserves.

PEVs are broken into two main categories:

- Plug-in Hybrid Electric Vehicles (PHEVs): Most PHEVs run on electric power supplied by the onboard battery, but can use a gasoline generator when the battery is depleted
- Battery electric Vehicles (BEVs): BEVs only run on energy from the battery and do not have a gasoline reserve

Purpose

PEVS provide cost-effective solutions for light-duty, non-tactical applications. In order to reduce energy demands for the Marine Corps and Navy, our work focuses on:

- Finding where current-generation PEVs fit into the Marine Corps' non-tactical fleet
- Electrified shared mobility solutions to reduce transportation costs for off-duty Marines and sailors
- Energy requirements and management solutions

Progress

Using data sets from 2105, the PH&EV Research Center has been analyzing energy demands of Marine Corps fleet non-tactical vehicles for California installations.

Next Steps

We are currently communicating with a Marine Corps working group on mobility transformation at Marine Corps Installations Command West (MCI-W).

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