



University of Hawai'i at Mānoa

Hawai'i Natural Energy Institute

School of Ocean & Earth Science & Technology

New Opportunities for Alternative Energy Designs

The most important issues facing transportation sustainability and development of future transportation systems are the crucial oil-supply issues we face today on a global scale and the imperative need to reduce greenhouse gas emissions and air pollution. Novel design-based ideas are necessary to promote the vehicle hybridization and perhaps create novel alternative energy devices to support renewable electricity. The plug-in hybrid electric vehicle (PHEV) is discussed as a pivotal player in this new scheme, which can very efficiently utilize supply-limited renewable and conventional electricity via a rechargeable energy storage unit. To increase the acceptance rate of PHEVs, the design and research of an auxiliary drive device are presented. The proposed auxiliary drive device can potentially retrofit all conventional vehicles into a PHEV without any physical change to the vehicle. Supporting the development of new renewable energy technologies for PHEV application is necessary to globally reduce greenhouse gas emissions from transportation. Novel design concepts of renewable energy extraction devices are also presented that can address new PHEV electrical loads.

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