



University of Hawai'i at Mānoa

Hawai'i Natural Energy Institute

School of Ocean & Earth Science & Technology

Battery pack simulation and diagnostics for transportation or energy storage applications

In today's world, harvesting energy from different sources seems to be a necessary alternative to fossil fuels consumption. Many renewable resources, like solar or wind energy, are dependent on nature in terms of intensity, frequency and duration. Energy storage will be able to efficiently deliver a steady flow of current and mitigate those natural temporal fluctuations. Among all the storage options, electrochemical storage appears to be one of the best alternatives as it allows the direct storage of electricity in batteries with an excellent round-trip efficiency.

A number of different batteries are commercially available, offering a variety of performance and cost features. To assist in assessing if a battery technology is suitable for transportation or energy storage application, we are developing a suite of simulation tools to allow us to model battery behavior under different dynamic conditions. Traditional battery testing could not serve this purpose, due to the sporadic nature of duty cycles involved in the power generation and consumption. Our tools will allow us to assess the complex behavior of a battery pack under dynamic situations and to develop proper strategies for applications in transportation and distributed energy resource storage.

Matthieu Dubarry

Visiting Scholar

Hawai'i Natural Energy Institute

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