



# Hawaii Natural Energy Institute Research Highlights

## Electrochemical Power Systems

### Data Collection & Analysis to Support HCATT Electric & Hybrid Vehicle Program

**OBJECTIVE AND SIGNIFICANCE:** Development of a sophisticated database and graphical user interface (GUI) to allow data collection and fuzzy logic based analysis of a fleet of electric vehicles during operation.

**BACKGROUND:** The Hawaii Center of Advanced Transportation Technologies (HCATT) worked with the Air Force Advanced Power Technology Office (APTO) to launch an electric and hybrid ground vehicle demonstrations at the Hickam Air Force Base (HAFB) between 2000 and 2004. This program has established the National Demonstration Center for Alternative Fuel Vehicles at the HAFB to facilitate demonstration and validation of the latest fuel efficient and environmentally compliant technologies for use in ground vehicles and support equipment. HNEI has been working with HCATT in this program to assist the data collection and analysis of the vehicle performance.

HNEI has developed a sophisticated database and graphical user interface (GUI) to allow data collection and analysis of the drivetrain and the power source systems deployed to the fleet operation and vehicle demonstration. Data collection and analysis to derive useful information from drive systems and vehicle performance in the field operation is very challenging and technically difficult.

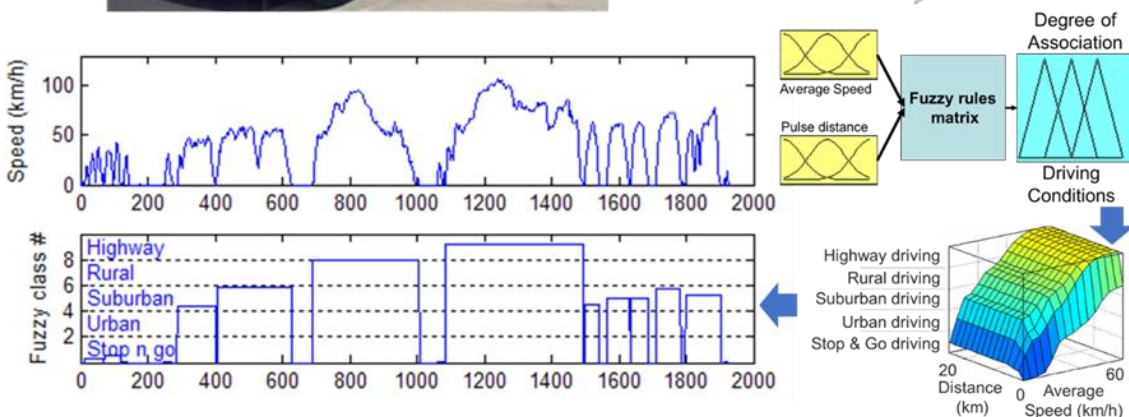
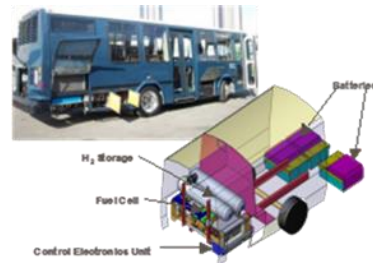
HNEI was involved in the collection of data from 15 Hyundai Santa Fe electric SUVs from July 2001 to June 2003 and conducted vehicle driving cycle, usage, and performance analyses successfully. Most importantly, HNEI have developed a viable and comprehensive analysis approach to allow us systematically analyze driving cycles from the trip data collected in the field, which provides a tremendous amount of information about vehicle usage and fleet operation. This approach brought considerable values subsequently to the HCATT program, and the results have been documented in archival journals. The most useful contribution of this approach is the ability to deriving fleet operation and vehicle usage from the same set of data collected in the field and to correlating them with the vehicle and drive system performance.

**PROJECT STATUS/RESULTS:** Project completed. GUI fully developed. This work led to 3 publications.

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## **ADDITIONAL PROJECT RELATED LINKS**

### **PAPERS AND PROCEEDINGS:**

1. 2007, B.Y. Liaw, M. Dubarry, [From driving cycle analysis to understanding battery performance in real-life electric hybrid vehicle operation](#), Journal of Power Sources, Vol. 174, Issue 1, pp. 76-88.
2. 2007, M. Dubarry, N. Vuillaume, B.Y. Liaw, T. Quinn, [Vehicle Evaluation, Battery Modeling, and Fleet-Testing Experiences in Hawaii: A Roadmap to Understanding Evaluation Data and Simulation](#), Journal of Asian Electric Vehicles, Vol. 5, Issue 2, pp. 1033-1042. (Open [PDF](#))
3. 2005, M. Dubarry, M. Bonnet, B. Dailliez, A. Teeters, B.Y. Liaw, [Analysis of Electric Vehicle Usage of a Hyundai Santa Fe Fleet in Hawaii](#), Journal of Asian Electric Vehicles, Vol. 3, Issue 1, pp. 657-663. (Open [PDF](#))

**LABORATORY:** [PAKALI BATTERY LABORATORY](#)