TOYOTA PRIUS PLUG-IN HYBRID VEHICLE FLEET

OVERVIEW

The Advanced Power and Energy Program (AEP) maintains a fleet of 18 Toyota Prius Plug-In Hybrid vehicles (PHVs). These pre-production models were deployed to AEP from Toyota Motor Sales, USA, Inc. in 2011 in advance of the vehicle’s commercial introduction.

The majority of the fleet has been deployed to households participating in the Irvine Smart Grid Demonstration project (ISGD), a joint collaboration between AEP, Southern California Edison and other partners to evaluate energy reliability and efficiency technologies on a smart power grid. Daily use of the vehicles tests the impact of multiple households charging electric vehicles on a single electric circuit. The vehicles have logged more than 220,000 miles of travel and thousands of charging hours.

In addition to the ISGD program, fleet Prius PHEVs are used in sustainable transportation exhibits at various campus and community events.

GOALS

• Analyze the impact of vehicle charging on the power grid
• Provide vehicle use and performance data to Toyota
• Build public awareness of sustainable transportation options

VEHICLE INFORMATION

The Prius Plug-in Hybrid (PHV) is based on the third-generation Prius. The vehicle represents a significant enhancement of Toyota’s Hybrid Synergy Drive® (HSD) system. It combines high-output lithium-ion batteries with HSD technology to offer an expanded fully electric driving mode. The Prius Plug-in Hybrid can be recharged in approximately three hours from a standard 110V electrical outlet or one and a half hours with a 220V connection.

The Prius Plug-in Hybrid's lithium-ion battery pack ensures strong, seamless acceleration up to highway speeds of more than 60mph on electric-only power. With a fully charged battery, it can travel a maximum of approximately 13 miles in EV mode. Once the EV-mode charge is depleted, the vehicle defaults to normal, full-hybrid mode and operates like a regular Prius.

ENGINE SPECIFICATIONS

Engine
Displacement (cm³): 1798
Max. Output (hp/kW) / rpm: 98 (73) / 5200
Max. Torque (Nm / rpm): 142 / 4000

Motor
Motor Type: Permanent magnet synchronous motor
Max. Output (hp / kW): 80 / 60
Max. Torque (Nm): 207

HV Battery
Battery Type: Lithium-ion
Maximum EV Cruising Range: Approximately 13 miles

HV Battery
Recharging Time: 1½ hours @ 220V or 3 hours @ 110V

RECENT PUBLICATIONS/PAPERS


PERSONNEL

Graduate Students: Renee Cinar, Li Zhang
Staff: Brendan Schaffer, Jean Grigg
Principal Investigator: Scott Samuelsen