

Toyota Introduces 2012 Prius Plug-in Hybrid

December 05, 2011

Image not found or type unknown



Toyota, the world leader in hybrid passenger cars and SUVs, introduced the Prius Plug-in Hybrid at the annual Green Drive Expo here today, as the newest member of the Prius Family.

Joining the popular third-generation Prius Liftback and the new Prius v, the new Prius Plug-in combines the benefits of the standard Prius model's hybrid vehicle operation with extended electric vehicle (EV) driving and more affordable pricing than pure electric or range-extender type vehicles. The 2012 Prius Plug-in Hybrid, which offers seating for five, is expected to achieve a manufacturer-estimated 87 MPGe (miles per gallon equivalent) in combined driving and 49 MPG in hybrid mode.

Toyota has sold more than one million Prius models in the United States since the first-generation model was introduced for model-year 2001. The recent introduction of the larger Prius v and now the Prius Plug-in Hybrid brings this eco-focused model range to four distinct vehicles, including the Prius c, which will debut in 2012.

The 2012 Toyota Prius Plug-in Hybrid will allow true EV operation and performance for up to 15 miles at speeds up to 62 mph, along with quick home charging using a standard AC outlet and 15-amp dedicated circuit. Operating in EV mode, the Prius Plug-in Hybrid provides the quick, smooth quiet driving of a pure electric vehicle. The Prius Plug-in Hybrid offers the same five-passenger seating and luggage space as the standard Prius model.

The 2012 Prius Plug-in Hybrid retains the Hybrid Synergy Drive of the standard Prius model and will seamlessly switch into hybrid operation at a pre-determined state of battery charge. A newly developed 4.4 kWh lithium-ion (Li-ion) battery pack replaces the standard Prius model's nickel metal hydride (NiMH) battery and fits under the rear cargo floor, and the vehicle adds an easy-to-use external charging cable.

A full charge using an external AC outlet takes approximately 2.5 to 3.0 hours using a 120v household outlet or 1.5 hours using a 240v outlet. The included 120v charging cable connects to the charging port inlet located on the right-rear fender.

In addition to offering Entune™, Toyota's new multimedia system, available smartphone applications developed for the Prius Plug-in Hybrid include Charge Management, Remote Air Conditioning System, Charging Station Map, Vehicle Finder and Eco Dashboard.

Introduction of the 2012 Prius Plug-in Hybrid follows an extensive test-fleet program involving 125 early prototypes in the United States. Toyota applied experience from that test phase, along with input from participants, to finalize engineering and improve features for the production model.

Performance and Economy

Even with the addition of the new onboard battery charging system and larger 176-lb. Li-ion battery pack, the 2012 Prius Plug-in Hybrid weighs just 123 lbs. more than the standard Prius Liftback, thanks to weight-savings techniques applied elsewhere. As a result, driving performance for the 2012 Prius Plug-in Hybrid will be similar to the standard Prius.

Running in EV mode, the system switches to full hybrid mode under full acceleration, which splits engine power between the drive wheels and the generator, keeping the battery charged – just as in the standard Prius model.

Even when not running in the driver-selectable EV mode, the Prius Plug-in Hybrid will rely more on its electric-only capability in situations where it is more efficient than running the gasoline engine, especially in urban and suburban driving and during shorter trips when drivers will enjoy the smoothness and quiet of EV operation. The overall fuel economy rating for the Prius Plug-in Hybrid increases to a manufacturer-expected 87 MPGe, with the car achieving an estimated 49 MPG when operating in hybrid mode. Drivers who use the vehicle for frequent short trips and local driving will realize the biggest reduction in gasoline usage.

EV and Hybrid Operation

The Prius Plug-in operates much the same way as the standard Prius model while offering extended EV range

and plug-in charging. Current Prius owners will feel instantly familiar with the new model while enjoying more benefits of EV driving.

The Plug-in Hybrid system consists of a large-capacity Li-ion battery and an external battery-charging port connected to the standard Prius Hybrid Synergy Drive system.

Toyota developed the new compact, lightweight, high-output battery specifically for the Prius Plug-in Hybrid. The 4.4 kWh battery pack includes a battery charger located under battery that features an internal cooling fan. The hybrid system's inverter and has been optimized for the new, higher-capacity battery. In addition, the hybrid cooling system uses a larger heat exchanger and higher-capacity fan motor.

As in the standard Prius Hybrid model, the Prius Plug-in Hybrid shuts down the gasoline engine at a stop and accelerates away with the hybrid battery providing electricity to the front motor; the Prius Plug-in Hybrid can rely on battery power alone for longer distances and higher speeds than the standard Prius. It features a new battery state-of-charge gauge, and a standard multi-information display panel monitors fuel and energy consumption to help encourage economical driving habits.

New multi-information display additions have been included in the Prius Plug-in. A new EV Drive Ratio display records the ratio of driving distance covered by EV power, and the Hybrid System Indicator shows possible EV driving range when in EV mode. An Eco Savings Record screen, new to both the 2012 updated Prius and the Prius Plug-in, allows drivers to measure their savings over a customizable pre-set comparison vehicle. The pre-set areas include fuel cost for a gallon of gas and miles-per-gallon average.

Charging the Prius Plug-in Hybrid

The external charging system is designed to be easy and safe to use. Approximately 24 feet in length, the battery charger cable weighs just 3.75 lbs. and conveniently fits its own compartment in the trunk area.

The port is located behind a spring-loaded push-open door on the right-rear fender. A full charge using an external AC outlet takes approximately 2.5-3.0 hours using a 120V household outlet with a dedicated 15-amp circuit, or 1.5 hours using a 240V outlet. The charge port provides LED (Light Emitting Diode) illumination for convenient nighttime charging. A timer allows charging to take place during off-peak hours and can be set for both start and end times.

In the event of a malfunction, the CCID (Charging Circuit Interrupter Device) in the cable will stop the flow of electricity for safety, and the indicator lamp will flash. There is also a self-test button, similar to that used on household kitchen and bathroom electrical outlets. A special rubber stopper prevents the charging port door from snapping shut when closing.

Leviton Level 2 (240V) Home Charging Stations

Leviton, an approved provider of Level 2 (240V) home charging stations, has developed a residential program exclusively tailored for Prius Plug-in customers. The program will include a one-stop solution for home charging stations, installation services for 120V and 240V applications, and dedicated support for Toyota customers. The program will also offer Level 2 (240V) 16-amp and 30-amp home charging stations designed exclusively for the Prius Plug-in (UL-certified, compact design, easy-to-use, and made in the U.S.A.), industry-leading pricing for Level 2 (240V) with basic packages and a Toyota-dedicated e-commerce web portal (leviton.com/Toyota) with product information, order tracking, and other features. Prius Plug-in customers will be able take advantage of Leviton's special pricing starting early October.

Packaging and Weight Optimization

A key goal for development of the Prius Plug-in was to deliver the optimal balance of performance, range, economy, packaging and affordable price. The new model delivers extended EV range without sacrificing

roominess for passengers or for luggage.

The compact high-output Li-ion battery pack is installed under the rear luggage area. Width, height and length of the luggage space remain the same as the Liftback. There is no reduction in rear seat passenger room from the standard Prius model, with seating for three and 36.0 inches of legroom that is on par with midsize sedans.

Significantly, the biggest change in packaging from the Prius Plug-in Hybrid test-fleet model is the smaller, more efficient battery pack in the production model. The new battery pack is approximately one-half the weight of the demonstration-phase vehicle, yet provides about 15-percent more range.

The 2012 Toyota Prius Plug-in has a weight of 3,165 lbs. versus 3,042 lbs. for the Prius Liftback and 3,373 lbs. for the Plug-in test-fleet model. Suspension tuning has been altered in accordance with the change in weight distribution from the standard Prius model.

The Prius Plug-in reduced vehicle weight in other areas as well. In place of a spare tire, the Prius Plug-in carries a tire-sealing kit and inflator. The trunk floor panel features a reinforced honeycomb design and is about half the weight of the standard model's floor panel, while the charging cable stores in a compartment at the rear edge of the trunk floor.

As on the standard Prius model, weight was saved through use of aluminum in the hood, rear hatch, front stabilizer bar and brake calipers and by using super high-tensile strength steel in the inner rocker panel, center pillar and roof reinforcement.

All Prius models are built using processes that reduce emissions in every stage of the vehicle lifecycle, from production and driving, through eventual disposal and dismantling years down the road. Toyota uses plant-derived, carbon-neutral plastics in Prius models. Known as "ecological plastic," the material is used in the seat cushion foam, cowl side trim, inner and outer scuff plates, and deck trim cover. Ecological plastic emits less CO₂ during the production process than conventional plastic, and it also helps reduce petroleum use.

Exclusive Trim Levels

Externally, the Prius Plug-in inherits the standard model's exceptionally low coefficient of drag at 0.25 Cd. The current Prius had received more wind tunnel hours of testing than any other Toyota in history, resulting in one of the cleanest aerodynamic profiles of any mass-produced vehicle in the world.

The 2012 Prius Plug-in is distinguished from the standard Prius model by exclusive exterior trim, including chrome-like finish for the door handles, front grille, rear license plate garnish and the battery charging door. Unique badges, blue-accent headlamps and LED taillight clusters also identify the new model. It is available in five exterior colors, including the new Clearwater Blue.

The new Prius Plug-in will be offered in two trim levels, standard and Advanced. The standard trim level provides all of the features of the Prius Two Liftback grade, plus some features from the upscale Prius Three and Prius Four grades. The Prius Plug-in Hybrid also makes standard a new touch-screen Display Audio and navigation system with rear backup camera and Toyota's new Entune™ multimedia services.

The Prius Plug-in comes standard with unique wheels, LED Daytime Running Lights, new driver-feedback screens, heated front seats, Smart Key System on three doors with push-button start and remote illuminated entry, and the Touch Tracer Display. The latter features touch sensors on the steering wheel switches that are designed to reduce driver eye movement for better concentration on the road. When the driver touches the audio or info switch located on the steering wheel, a duplicate image is displayed on the instrument panel, directly in front of the driver.

The Advanced trim level adds Head-Up Display, LED headlamps, SofTex interior seat trim, eight-way adjustable power driver seat, a JBL® premium audio and HDD navigation system and exclusive Entune Plug-in Hybrid Applications for smartphones. Additional safety features in the Advanced level include the Pre-Collision System with Dynamic Radar Cruise Control and Safety Connect system. The latter can access a call center with a live operator who can dispatch police and emergency vehicles. The system combines automatic collision notification and a stolen vehicle locator feature, which can track the location of the stolen vehicle via GPS and help guide police to recover it.

Hybrid Synergy Drive

The Hybrid Synergy Drive system in the Prius Plug-in Hybrid is essentially the same as in the current third-generation Prius and new Prius v models. The system uses two high-output electric motors, one 60kw (80 hp) unit that mainly works to power the compact, lightweight transaxle, and another smaller motor that works as the electric power source for battery regeneration and as a starter for the gas engine. Maximum motor-drive voltage is 650 volts DC.

Hybrid Synergy Drive is a series-parallel hybrid system that can provide power either from the engine alone, or the electric motor/generator alone, or any mix of both. A hybrid control computer manages the system so that optimum power is delivered according to driver demand. A start/stop system and regenerative braking also help to conserve fuel, the latter recharging the battery upon deceleration.

Hybrid Synergy Drive is built around a specially adapted, efficient 98-horsepower 1.8-liter four-cylinder engine that runs on the Atkinson cycle and contributes to a maximum 134 total system horsepower. Key components include an electric water pump that requires no belts, and an Exhaust Gas Recirculation (EGR) system that helps warm the engine quickly, reducing fuel consumption when the engine is cold.

The compact and lightweight gasoline engine produces low noise and vibration. Sophisticated valve control, injector design, and other technologies help reduce emissions to allow the Prius Plug-in to qualify for an enhanced ATPZEV emissions rating. A new low-pressure fuel-vapor containment tank system releases pressure in the tank for the engine to consume the generated vapor.

Remote Climate Control Operation for Comfort and Conservation

The Prius Plug-in features a standard automatic climate control system. The remote air conditioning feature can be activated by the key fob while the vehicle is being charged to cool the interior. This feature can help enhance fuel consumption by using the external AC power source to provide comfortable cabin temperature before entering the car. As in the standard Prius, an ECO switch operates to prioritize fuel economy when the air conditioning is running. On the Advanced model a Smartphone can be used to start cooling the cabin.

For quick interior heating in cold climates, the Prius Plug-in Hybrid features standard two-position front seat heaters and a supplementary electric heater.

Safety

Like all Toyota models, the Prius Plug-in Hybrid will feature as standard Toyota's Star Safety System™, which includes Enhanced Vehicle Stability Control (VSC), Traction Control (TRAC), Anti-lock Braking System (ABS), Electronic Brake-force Distribution (EBD), Brake Assist, and the Smart Stop Technology brake-override system. An available Pre-Collision System (PCS), paired with Dynamic Radar Cruise Control, retracts seatbelts and applies the brakes in certain conditions when a frontal crash is determined to be unavoidable. The Prius Plug-in will also come standard with seven airbags. Also available is Safety Connect, which includes automatic collision notification, stolen vehicle locator, emergency assistance button (SOS) and roadside assistance (three-year complimentary subscription included).

Entune Multimedia System

The 2012 Prius Plug-in is among a number of Toyota models that offer the new Entune multimedia system. This innovative new system leverages mobile smartphones to provide a richer in-vehicle experience with fully integrated access to navigation, entertainment and information services.

Toyota Entune debuts the first-ever support for engaging mobile apps, such as Bing™, OpenTable®, and MovieTickets.com, along with accessing useful travel-related services, such as live weather, traffic, fuel information (location and price), stocks, and sports. Toyota Entune brings the largest selection of music options available to a vehicle, including iHeartRadio's 750+ stations, and the Pandora® personalized music service.

Access to Entune services (and Plug-in Hybrid Applications in the Advanced trim level) is complimentary for three years. The audio systems combined with Entune feature a best-in-class, advanced conversational voice recognition system that helps the driver to stay focused on the road by eliminating the need to memorize thousands of voice commands.

Peace of Mind Warranty Protection

Toyota's 36-month/36,000 mile basic new-vehicle warranty applies to all components other than normal wear and maintenance items. Additional 60-month warranties cover the powertrain for 60,000 miles and against corrosion with no mileage limitation. The hybrid-related components, including the battery control module, hybrid control module, inverter with converter, and the charge control computer, are covered for eight years/100,000 miles (15 years/150,000 miles for CARB states). The cable/connector is covered for three years/36,000 miles. The HV battery is covered for eight years/ 100,miles (10 years/150,000 miles for CARB states).

The Prius Plug-in Hybrid will also come standard with Toyota Care, a complimentary plan covering normal factory-scheduled maintenance and 24-hour roadside assistance for three years or 25,000 miles, whichever comes first.

###