

Toyota Unveils Advanced Technologies in All-New Prius

October 13, 2015

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TORRANCE, Calif., Oct. 13, 2015 – – In its fourth generation, the Toyota Prius is set to take on new markets with groundbreaking environmental performance, a stylish new design, and a fun-to-drive spirit. Today, Toyota is proud to unveil the technological advances that enable its hybrid flagship to break the mold while still remaining true to form.

Toyota has made significant improvements in its new generation full hybrid powertrain, reducing losses, redesigning and relocating key components and reducing weight. Extensive changes to the transaxle, engine and combined hybrid system, generate an expected 10 percent improvement in EPA estimated MPG on core models, with an Eco model that will achieve an even greater improvement.

Engine with Unprecedented Thermal Efficiency

The new Prius retains the established 1.8-liter VVT-i gasoline engine, however, the engine has been completely re-engineered, with remarkable results in terms of performance, fuel economy, and reductions to size and weight.

The new engine achieves a ground-breaking maximum thermal efficiency of 40 percent. This improvement was enabled in part through the use of a large-volume exhaust gas recirculation (EGR) system and improvements in combustion efficiency. Additionally, a redesigned air intake port improves airflow inside the combustion chamber, while the coolant passages have been redesigned to optimize internal engine temperature. The friction created by the piston skirts, rotating parts and the oil pump has been reduced, while the use of low-viscosity oil reduces friction between sliding engine components.

Fuel efficiency is also boosted by improvements to heating performance. An active grille shutter has been added to open and close the grille as necessary in response to outside temperatures. The exhaust heat recirculation system has also been improved and made more compact. This recycles exhaust heat from the engine into the coolant to be reused in the heaters and to warm the engine. Cold weather fuel efficiency has also been improved by introducing an engine coolant selector valve and adding a new system which accelerates engine heating.

Transaxle and Electric Motor

The transaxle and motor have been redesigned, delivering a reduction in their combined weight. The motor itself is considerably more compact and gains a better power-to-weight ratio. Notably there is a 20 percent reduction in mechanical losses through friction compared to the previous model. The planetary gear arrangement in the reduction gear has been replaced with parallel gears, which further helps loss reduction.

Power Control Unit

The use of a loss-reduction device in the power control unit cuts losses by about 20 percent. With a more compact design, the unit can now be positioned directly above the transaxle.

New Lithium-Ion or Nickel-Metal Hydride Hybrid Batteries

The new Prius will be available with either a new lithium-ion or a new nickel-metal hydride hybrid battery. While the batteries use established technology, Toyota has succeeded in increasing their energy density, which means more power can be obtained from a smaller unit. This in turn has allowed the battery to be relocated beneath the rear seat, increasing cargo space.

A Hybrid that Handles

The TNGA concept delivers an increase of more than 60 percent in body torsional rigidity, compared to the previous model, by using Laser Screw Welding (with a greater number of weld points), structural adhesives and uniquely shaped frame structures. In addition, the amount of high-tensile strength steel has increased from 3 percent to an impressive 19 percent. Combine these enhancements with its new double wishbone rear suspension and a lower center of gravity, and the result is a hybrid with a sporty ride.

New updates to the hybrid system software improve the feel of acceleration, giving a smooth and direct response in a lower rpm range. To improve brake feel and reduce noise, the all-new Prius utilizes a newly-developed active hydraulic booster for its regenerative brakes.

Functional Beauty

The new Prius displays cutting-edge styling that's been designed to evoke a stronger emotional response. The TNGA chassis allows for lower lines, while retaining the Prius's signature triangular silhouette.

The body height has been reduced by 20mm and the high point of the roof has been moved 170mm forward, ensuring plenty of headroom for front seat passengers while also contributing to excellent aerodynamics and an impressive 0.24 coefficient of drag (Cd). The lower center of gravity has also allowed the nose height to be brought down by 70mm and the rearmost section of the hood by 62mm, improving the driver's forward view.

Standard bi-LED headlamps are fitted, which use a single lens for both high and low beam operation. They have a striking appearance that adds character and emphasis to the front of the car.

The rear of the Prius features strong lines that extend from the rear spoiler through the combination lamps to meet the edges of the bumper. The result is both distinctive and functionally aerodynamic.

Interior Designed to Please the Senses

Staying true to the core concepts of the Prius, Toyota has produced an occupant-friendly interior that focuses on ease of use, with a design that aims to evoke the car's advanced capabilities while remaining warm and welcoming.

The new instrument panel has a slim, sculpted form, with optimum positioning of the gauges, displays and controls. White accents on the steering wheel and front console tray add to the impact and advanced quality of the design.

New seats have been created to provide more comfort and support and to help ease the strain of long journeys. Innovations in the materials and thicknesses used for the cushion pads help take the strain off the hips and create a more comfortable feel for passengers.

Improvements have also been made to the cushioning of the rear seats in order to match the higher comfort levels achieved in the front seats. Although the car's height has been reduced, this is not at the cost of space; in fact an innovative ceiling design has increased headroom compared to previous models.

New Features for On-board Information and Comfort

Toyota has improved the look and performance of the multi-information display in the driver's instrument panel. Data and images are now presented in full color with high resolution graphics on dual, 4.2-inch multi-information display screens. The right-hand section presents speed, fuel level and other basic data and the left-hand section is a multi-display where the driver can select preferred content using a switch on the steering wheel.

There is also a new color head-up display, which projects essential vehicle data and alerts on to the lower section of the windscreen, making information instantly and easily readable without the driver having to take their eyes off the road ahead.

The Smart-flow (S-FLOW) air conditioning system improves efficiency. It detects whether the front and rear passenger seats are occupied and adjusts ventilation and heating performance accordingly, minimizing air flow

around any empty seats. This results in making the cabin environment more comfortable and also helps improve fuel efficiency.

Available Advanced Technologies Worthy of the Prius Name

The new Prius will make a significant advance in active and preventive safety measures with the available Toyota Safety Sense P package that includes a Pre-collision System with Pedestrian Detection. The system uses a millimeter-wave radar and a single-lens camera with integrated control to detect both cars and pedestrians. The package also comes with Full-speed Dynamic Radar Cruise Control.

Drivers can also receive parking assistance with the Intelligent Parking Assist, which uses ultrasonic sensors to detect surrounding objects and identify parking spaces. The driver stops the car before the open parking space and by pushing a single button, the system guides drivers to the right position for reverse parking and assists drivers in backing into the space.

Setting the Stage for the Future of Mobility

It started in 1992 with a vision for the future – mobility in harmony with society. Prius, which means “to go before” changed the way we move about the world, and changed the automotive industry forever. More than two decades and over 8 million Toyota hybrid sales later, the all-new, no compromises 2016 Prius stands side by side with its sibling, the hydrogen powered Mirai, poised to change the game yet again. The new Prius will arrive in dealerships early next year.