

This press pack accompanied the media launch of the third generation Prius in June 2009. Changes to the model during its time on sale can be tracked using the timeline feature on the Prius archive web page. More information about the Prius range can be obtained from the Toyota press office.

THE THIRD GENERATION TOYOTA PRIUS

Key Points

- The only full hybrid powertrain in the mass-mobility market
- D segment sized vehicle with 2,700mm wheelbase (same as Avensis)
- Power increased by 24 per cent to 134bhp
- Fuel economy improved by 10 per cent to 72.4mpg
- Tax-efficient CO₂ emissions of 89g/km, down 14 per cent
- Ninety per cent component redesign for a lighter, more compact and efficient full hybrid system
- New 1.8-litre VVT-i Atkinson cycle petrol engine
- EV, ECO and POWER on-demand drive modes
- Advanced safety features and seven airbags as standard
- World first solar powered ventilation and remote air conditioning systems
- Head-up display for line-of-sight vehicle information
- Whole-life improvements in CO₂ emissions, from design, production and driving through to recycling
- On-the-road prices from £18,370 - unchanged for T3 and T Spirit models in spite of all-round performance gains and higher equipment specifications

Heritage, sales and the future

- Third generation Prius: the outcome of more than 30 years of hybrid drive development

- In three generations Hybrid Synergy Drive system power increased by 35 per cent, yet fuel consumption reduced by 23 per cent and CO₂ emissions cut by 25 per cent
- Global Prius sales exceed 1.2 million units, European sales more than 130,000
- Sales of more than 1.7 million Toyota hybrid models contributes to a nine million-tonne reduction in CO₂ emissions
- All Toyota models to offer a Hybrid Synergy Drive powertrain derivative by 2020
- "Future Proof" Hybrid Synergy Drive readily adaptable for use in both full-electric and hydrogen fuel cell vehicles

"In order that automobiles can continue to progress in the 21st century, I was determined to provide a solid solution to one of the key, negative attributes of the car. I set my mind to providing a solution to the issues of the environment and fuel consumption with Prius as I undertook its development programme."

Takeshi Uchiyamada, Chief Engineer, First Generation Prius, and Executive Vice President

Heritage

For several decades the automobile industry has faced three important environmental challenges: ambient air quality, climate change and energy supply and demand. In order to save energy resources and prevent global warming, there is a growing need to improve vehicle fuel consumption, thereby reducing CO₂ and particulate emissions.

In response, the 1992 Toyota Earth Charter stated that: "Toyota's aim is to build clean, safe automobiles, while working for affluent societies and a green earth." In February 1993 this core policy was combined with a set of action guidelines to create the Toyota Environmental Action Plan. Together these initiatives instigated a path for technological development that the company continues to follow in the quest for sustainable mobility through the creation of the ultimate eco-car.

Basing its approach on the concept of "the right car, at the right place, at the right time," Toyota believes it is important to follow more than one path towards this goal. Yet, continuing to improve the efficiency of petrol and diesel engine vehicles using biofuels and diverse power sources, it remains convinced that hybrid drive is the core technology for the 21st century.

Hybrid drive is not an alternative to petrol or diesel, but an addition that raises the efficiency of existing powertrains. Hybrid vehicles produce lower emissions than petrol-powered vehicles and less CO₂ than diesels.

Toyota has been researching and developing hybrid drive systems for more than 30 years. In the 1970s it unveiled hybrid versions of the S800 and Century models which used a combination of gas turbine engines and electric motors. Research into electric vehicles began at the same time and an in-house electric motor development programme was initiated in the 1980s.

In the 1990s CO₂ was identified as a significant cause of global warming and the reduction of CO₂ in exhaust gas became an issue of world importance. Toyota was aware of the inherent weight and packaging problems associated with using batteries as a major powertrain component and so looked at the possibilities offered by different types of hybrid systems. It focused its research and development efforts on designing mass-production hybrid vehicles that could be made widely available.

Twelve years on from the launch of Prius more than 1.7 million Toyota hybrids have been sold around the world. Toyota accounts for 80 per cent of global hybrid sales, which, to date, has contributed to a reduction in automotive CO₂ emissions of around nine million tonnes.

The Prius project

In 1994 Toyota initiated the G21 project with the aim of creating a "green and environmentally friendly car" for the 21st century, which, despite having impeccable environmental credentials, offered all the convenience and driving pleasure of a conventional vehicle. Initial development goals targeted a powertrain that would be 1.5 times more efficient than that of conventional petrol or diesel cars. However, with

the use of hybrid drive technology in mind, that target was raised to double the efficiency.

With electronics no longer ancillary to the engine, the function of every electrical and mechanical component in a mass-produced hybrid vehicle becomes critical. Needing to accumulate first-hand development know-how in all the key areas of this new technology, Toyota decided to design, develop and produce every component in its hybrid drive system in-house, studying more than 100 hybrid system variants in the preparation of its own Toyota Hybrid System (THS).

The first generation Prius was launched as the world's first mass-produced full hybrid vehicle in Japan in 1997, and in Europe in 2000. The name Prius, "to go before" in Latin, quickly became symbolic of a car that came to market before environmental awareness became a mainstream social issue.

The car's unique Toyota Hybrid System established a major industry milestone in the vehicle powertrain development and sustainable mobility. It combined a 1.5-litre petrol engine and a powerful electric motor with continuously variable transmission to develop maximum power output of 100bhp (101 DIN hp), yet return fuel economy of 55.4mpg and CO₂ emissions of just 120g/km.

Within three years Toyota implemented significant improvements to the system's battery, electric motor and inverter. The 2003 Prius's THS II powertrain adopted a boost converter to further improve system efficiency. The second generation model developed 112bhp (113DIN hp), while simultaneously reducing fuel consumption to 65.7mpg and CO₂ emissions to 104g/km.

Today the new Toyota Prius's next generation Hybrid Synergy Drive system features comprehensive improvements with 90 per cent of the hybrid drive components redesigned to create a lighter, more compact system with a focus on increasing power, improving cold weather operation, further gains in real-life fuel efficiency and unprecedented reductions in CO₂ emissions.

A new, lightweight 1.8-litre petrol engine replaces the 1.5-litre of the current Prius. Total system power output has been increased to 134bhp (136 DIN hp), yet fuel

consumption has been further reduced to 72.4mpg and CO₂ emissions brought down to 89g/km, a figure unmatched by any other family car on the market.

Toyota series/parallel full Hybrid Synergy Drive system is a unique fusion of high technology and ecological responsibility in powertrain design and has been fundamental to Prius's global success. Three generations of the car have seen significant improvements to successive evolutions of the full hybrid powertrain, with system power increasing by 30 per cent, fuel consumption falling by more than 23 per cent and CO₂ emissions being reduced by almost 26 per cent.

Prius was named 2005 Car of the Year by European motoring journalists and its Hybrid Synergy Drive powertrain was the 2004 International Engine of the Year, going on to win the award for best fuel economy every year for the last five years.

The third generation Prius should not be regarded as a niche model that should only be judged against specialised criteria. In spite of recording CO₂ levels below A and B-segment cars, its on-road performance and dynamic abilities bear comparison with any D-segment competitor. Prius's continuing customer approval is witnessed in its top ranking in J.D. Power and Associates customer satisfaction surveys in the UK, France and Germany during the past two years.

Sales

A recent, pronounced acceleration in sales highlights a growing acceptance of Toyota's full hybrid system in the mainstream car market. Worldwide sales of the second generation Prius more than doubled between 2004 and 2008 to more than 285,000 units. In Europe, in spite of increased competition, sales grew more than five-fold to almost 42,000 units a year during the same period.

As Prius enters its third generation, sales figures continue to reflect its status as the world's most technologically and environmentally advanced mass-mobility car. By the end of 2008 cumulative worldwide sales exceeded 1.2 million units. Total sales in Europe were almost 130,000, with the UK contributing 28,034 to that figure.

Toyota's objective is for 60,000 sales of new Prius in Europe in 2009, which will make significant contribution to its target of one million Hybrid Synergy Drive vehicle sales

worldwide by the early 2010s. By the early 2020s the company aims to offer all its models with a Hybrid Synergy Drive powertrain derivative.

Toyota already builds hybrid vehicles in China and the USA and it intends expanding production outside Japan to include Thailand and Australia. It plans to sell new Prius in 80 countries worldwide, almost double the existing 44-country market.

The future

Toyota is committed to further reducing the size, weight and cost of key hybrid system components, such as the electric motor, inverter and batteries. Hybrid Synergy Drive will serve as a core technology, applicable to all future Toyota models, reflecting Toyota's environmental leadership in the drive towards sustainable mobility. The system has been designed to be "future proof" and is readily adaptable for use in both full-electric and hydrogen fuel cell vehicles.

Verification tests are under way in Japan, the USA and Europe for a Toyota Plug-in Hybrid Vehicle (PHV) that functions as an electric vehicle on short trips and as a conventional hybrid when travelling longer distances. As with Prius, it runs on both a petrol-powered internal combustion engine and an electric motor. What sets it apart from current hybrids is a larger battery capacity that enables longer electric-only cruising over a range of about 10 kilometres, and a battery charging function that lets users fully recharge their vehicle from an external source, such as an ordinary domestic electricity supply, in less than two hours.

The PHV's enhanced EV mode offers significant benefits: compared to Prius, it can run more frequently in electric-only mode, further reducing CO₂ emissions.

Toyota began work on Fuel Cell Hybrid Vehicles (FCHVs) in 1992, with in-house development of fuel cells and high-pressure hydrogen storage tanks. The company applies its own hybrid drive technology to FCHV development, replacing petrol engines with fuel cells; its FC stack is a performance leader in fuel cell technology. In 2002 the Toyota FCHV became the world's first production fuel cell vehicle and in 2005 it received type certification.

Toyota's next-generation fuel cell hybrid, FCHV-adv, achieves a 25 per cent improvement in fuel efficiency and, by using Toyota-developed 70MPa high pressure hydrogen storage tanks, has a cruising range of about 515 miles – more than twice the range of its predecessor. FCHV-adv also has better cold weather performance, operating in temperatures as low as -30°C.

Through the development of its RAV4-EV, Toyota has also gained an unprecedented depth of knowledge and capability in the field of electric vehicles.

The demand for short-distance commuter vehicles is expected to increase in the coming years and the new FT-EV concept is a fully electric vehicle based on the Toyota iQ's highly compact platform. Its powerful electric motor generates 45kW and 160Nm of torque at 2,690rpm. It has a top speed of 68mph, a range of 50 miles before recharging, and a zero emissions rating.

NEW Hybrid Synergy Drive : DYNAMIC PERFORMANCE WITH IMPROVED FUEL ECONOMY

- Full hybrid, series/parallel system – the only full hybrid powertrain in the mass-mobility market
- 90 per cent component redesign for a lighter, more compact and efficient system
- Power increased by 24 per cent to 134bhp (136 DIN hp)
- Fuel economy improved by 10 per cent to 72.4mpg*, matching the performance of a small city car
- Tax-efficient CO₂ emissions of 89g/km*, down 14 per cent
- New 1.8-litre VVT-i Atkinson cycle petrol engine with cooled Exhaust Gas Recirculation (EGR)
- Increase in battery output

* Figure refers to models fitted with 15in wheels

New Prius's next-generation Hybrid Synergy Drive system features comprehensive improvements with 90 per cent of the hybrid drive components redesigned to create a lighter, more compact system with a focus on delivering more power, better cold

weather operation, further improvements in real-life fuel efficiency and unprecedented reductions in CO₂ emissions.

Total system power output has been increased by 24 per cent, from 112 to 134bhp (113 to 136 DIN hp). Performance matches a conventional 2.0-litre family car, with seamless acceleration from nought to 62mph in 10.4 seconds, half a second quicker than current Prius. Top speed is 112mph.

At the same time, overall fuel economy has been improved by 10 per cent. Adopting a larger, 1.8-litre engine in place of the 1.5-litre unit reduces rpm in high speed driving to improve long-haul cruising fuel efficiency by about 10 per cent. In standard driving mode new Prius returns 72.4mpg in the European homologation combined cycle.

The full hybrid Prius is the only family car to combine the fuel consumption levels of a small city car with a cruising range of almost 715 miles, which is 93 miles more than the current model, in spite of having the same size fuel tank.

New Prius meets Euro 5 emissions standards and is expected to meet the Euro 6 requirements, too. Its CO₂ emissions are a best-on-the-market 89g/km, a figure unmatched by any other family car, earning Prius significant tax incentives in the UK and other European countries.

Moreover, when switched to EV (electric vehicle) running, Prius gives zero emissions performance for up to two kilometres at speeds up to 31mph.

Hybrid Synergy Drive system architecture

As a full hybrid, new Prius offers all the benefits of series/parallel powertrain architecture. Rival, mild hybrid models currently only use a parallel system configuration.

A parallel hybrid uses supplementary electric motor power purely to boost petrol engine performance under acceleration. The engine and electric motor always operate in parallel and are unable to drive the wheels independently of each other. Although this requires a smaller, lighter battery than a full hybrid vehicle, a parallel

hybrid cannot realise the benefits a full hybrid can provide when running under electric motor power alone, namely high fuel efficiency, zero emissions and near-silent performance.

Series hybrid vehicles are also available, which rely on the electric motor alone to drive the wheels. The petrol engine runs independently and serves only to charge the battery when required. Although series hybrids minimise emissions, they need larger, heavier batteries and cannot match the high-performance, high-speed cruising abilities of a full hybrid vehicle.

New Prius's full hybrid system is capable of operating in petrol and electric modes alone, as well as in a combination of both, and so gives the energy-saving benefits of a series hybrid combined with the performance benefits of a parallel hybrid. It gives the car strong, seamless acceleration and remarkably quiet operation, while still returning class-leading fuel efficiency and exceptionally low emissions.

The system comprises a 1.8-litre petrol engine, a powerful electric motor, a generator, high performance battery, power control unit (PCU) and a power split device that uses a planetary gear set to combine and

reallocate power from the engine, electric motor and generator according to operational requirements. The electric motor, generator and power split device have been successfully housed in a single, lightweight, highly compact transmission casing that is roughly the same size as a conventional gearbox. The new driveshafts are smaller and lighter than that in current Prius, and reduces energy losses by between 10 and 20 per cent. This clever packaging has been key to Hybrid Synergy Drive's successful installation in the front-engine Prius platform.

During deceleration and under braking, the electric motor acts as a high-output generator to effect regenerative braking, optimising energy management in the Hybrid Synergy Drive system by recovering kinetic energy (normally wasted as heat) as electrical energy for storage in the high-performance battery.

1.8-litre Atkinson cycle engine

A new, lightweight and highly compact four-cylinder 1,798cc Atkinson cycle petrol engine replaces the 1.5-litre unit featured in the current Prius. As a result, both maximum power and torque are greater by 27 and 23 per cent respectively.

Using a larger, more powerful engine in a full hybrid system designed to minimise fuel consumption may seem counter-productive, but the larger capacity of the new engine actually allows it to achieve better fuel efficiency at cruising speeds.

The new engine generates 98bhp (99 DIN hp) at 5,200rpm and more torque at lower engine speeds, with a maximum 142Nm at 4,200rpm. At 75mph it combines quieter running with a 10 per cent improvement in long distance cruising fuel economy.

Combined with a new cooled Exhaust Gas Recirculation (EGR) system, the Atkinson cycle offers significant gains in fuel efficiency and reduced emissions. In conventional four-cycle petrol engines, fuel enrichment is sometimes necessary to cool the exhaust gases and prevent degradation of or damage to the catalytic converters. In an Atkinson cycle engine, compression and expansion are not symmetrical and the valves close late, delaying compression. This creates a high expansion ratio for less compression, reducing intake and exhaust energy losses and converting combustion energy to engine power more effectively. As a result, the exhaust temperature is lower than that of conventional engines.

EGR reintroduces precise amounts of exhaust gas, cooled from 880°C to 150°C, into the intake system. This further reduces engine operating temperatures, while also reducing engine pumping losses through a reduction in intake vacuum pressure.

Together these technologies work to minimise the situations where fuel enrichment is necessary to protect the catalytic converter from overheating damage, thereby improving fuel economy and lowering emissions.

A new engine heat management system improves cold weather fuel economy and cabin comfort, combining a heat recovery system with an electric water pump. To reduce mechanical losses, an electric system has replaced the water pump drive belt. Using an electric water pump not only controls the coolant flow rate more

precisely, it also allows the air conditioning and heating to be used without the engine running, all of which contributes to greater fuel efficiency.

An exhaust heat recovery system redirects exhaust gases to heat up the engine coolant at start-up, via a valve in the exhaust assembly. As well as helping heat the cabin quicker and more effectively, this improves hybrid system efficiency and fuel economy by significantly reducing engine warm-up times. This means the engine can be shut off earlier for longer electric motor-only driving, particularly in cold weather.

The new 1.8-litre engine has numerous features to improve performance and minimise fuel consumption and emissions. VVT-i (Variable Valve Timing – intelligent) technology helps boost response levels across the entire rev range by varying the air-fuel intake valve timing to suit the conditions at any given time. As well as improving torque at low and medium engine speeds, the system also reduces emissions and raises fuel efficiency.

The new engine has roller rocker arm valvetrain control, a resin intake manifold with an optimised port configuration, and 12-hole, atomising long-nozzle injectors. Thin, long-reach sparkplugs contribute to better anti-knock performance. Lower tension piston rings, reduced piston friction and a standing oil jet for piston cooling all help raise engine efficiency. Together these advanced technologies help improve power output with reductions in fuel consumption and emissions.

Ultra-low NVH performance is key attribute of Hybrid Synergy Drive and in new Prius attention has been paid to minimising engine noise and vibration. The rigidity of engine parts, including the cylinder block and crankcase, has been optimised through CAE analysis. A highly rigid, ribbed aluminium cylinder head cover combines light weight with reduced NVH.

The engine is mounted on a four-point suspension system with the rubber used for the mounts optimised for suppressing noise and vibration. A two-step dynamic damper is integrated in the engine mount to further cut NVH, as well as to reduce engine start/stop shock.

Hybrid transaxle

60kW electric motor

The high-performance, permanent magnet, synchronous 60kW electric motor works in tandem with the petrol engine to boost acceleration; it also works alone to power the front, driven wheels when Prius is operating in EV mode. During regenerative braking, the motor acts as a high-output generator, recovering kinetic energy as electrical energy to charge the system battery.

The motor generates a maximum 207Nm of torque between zero and 13,000rpm and, despite being lighter than that in current Prius, realises a 20 per cent increase in power. It is also more powerful than the electric motors used in mild hybrid systems. This has been achieved by more than doubling the motor's maximum rpm and boosting available torque through a new reduction gear device within the transaxle.

The motor is now air-cooled, and maximum drive voltage amplification has been increased from 500 to 650V. Under ordinary driving conditions, unless maximum output is required, the motor is driven at unamplified voltage whenever possible, to enhance fuel efficiency.

Generator

Like the electric motor, the 42kW generator is an AC synchronous type. Because the system has no starter motor, the generator is used to start the petrol engine. In normal driving conditions, engine output is divided according to system requirements both to drive the wheels and power the generator, which, via the PCU, drives the electric motors and simultaneously charges the high-voltage battery. Moreover, to optimise engine speed control for full hybrid system efficiency, the generator also controls engine speed.

The generator stops the engine when it is not required by the hybrid drive system. However, if the vehicle runs on electric motor power alone for such a distance that the battery needs charging, the generator will start the engine, which then provides the power for the generator to recharge the battery.

High-output battery

The 202V battery uses proven and reliable nickel-metalhydride (NiMH) technology and allows new Prius to run in EV mode, using electric motor power only. Battery output has been increased by 2kW to a maximum 27kW, improving motor smoothness at start up.

The battery pack is located beneath the rear loadspace floor and has been further reduced in size so there is less impact on cabin accommodation. Increased fan capacity has improved the battery cooling system's efficiency, in line with the increase in battery power.

Power Control Unit (PCU)

The Hybrid Synergy Drive PCU, now similar in size to a 12V battery, consists of:

- A voltage boost converter, which boosts electric motor, generator and battery voltage to increase hybrid system power output.
- An inverter, which converts DC power from the battery into AC power for driving the motor and generator.
- A DC/DC converter, which reduces the high voltage of the 202V battery pack to 14V, supplying power to the accessory systems and charging the auxiliary battery.

The new 13-litre inverter is 36 per cent lighter at 13.5kg and 37 per cent more compact than its predecessor. Its faster switching improves efficiency and it converts the battery's direct current into a higher, 650V alternating current to drive the electric motor and, occasionally, the generator, giving a significant improvement in PCU performance.

Hybrid Synergy Drive in operation

Over the course of any journey, the Hybrid Synergy Drive system will operate in different modes to maximise Prius's overall efficiency. At rest, the engine stops automatically to conserve fuel. In low engine efficiency conditions, such as at start-up and low to mid-range speeds, the vehicle runs on the electric motor alone, eliminating CO₂ and NO_x emissions.

Under normal driving conditions, power allocation is constantly adjusted between the engine and electric motor to gain optimum performance with maximum fuel efficiency. The new Electronically Controlled Braking (ECB) system helps optimise Prius's energy management through a regenerative braking function, as detailed above.

Battery power level is constantly managed via an engine-driven generator, so the system does not have to be recharged from an external source.

QUIET, SMOOTH DRIVING WITH IMPROVED DYNAMICS

- New MacPherson strut style front suspension and torsion beam rear suspension for improved handling and ride comfort
- Improved NVH levels give a comfortable, quiet driving experience
- EV, ECO and POWER on-demand drive modes for improved performance, efficiency and fuel economy
- Eco Drive Monitor promotes more fuel-efficient driving
- Intelligent Park Assist

In brief

New Prius is built on Toyota's new mid-sized platform, which features extensive revisions to the MacPherson strut front and torsion beam rear suspension geometries to gain greater agility and ride comfort.

New speed-sensitive power steering uses less energy and so aids fuel economy, and the EV, ECO and POWER on-demand driving modes increase the full hybrid powertrain's capabilities in different driving conditions. An Eco Drive Monitor helps drivers tailor their driving style to make the most of the fuel efficiency available from the Hybrid Synergy Drive system.

Revised suspension

Improvements to the MacPherson strut front suspension include increased torsional stiffness and caster angle to give a more natural steering feel, and an input force-dividing upper support which allows for coil spring input to be transmitted directly to the body without passing through the upper support, for better ride comfort.

A number of new measures reduce system weight and so contribute to better fuel economy, including:

- Minimum-weight components, such as an aluminium knuckle and anti-roll bar link and a thin, hollow anti-roll bar
- Optimised hub bearing size
- Optimised lower arm board thickness and cross-section height

The rear, pipe-mould torsion beam suspension positions the coil spring and shock absorber separately to minimise intrusion into the loadspace. A trailing arm bush, positioned diagonally and with a lightweight resin bulge, combines with optimised spring and damper rates and low friction sealing to give excellent steering stability and ride comfort.

Together these revisions have significantly enhanced new Prius's driving dynamics with marked improvements in agility, stability and comfort.

Comprehensive NVH measures

Although Hybrid Synergy Drive is inherently quiet in its operation, Toyota has focused on further NVH measures to ensure a calm, quieter cabin environment.

Bodyshell rigidity has been supported by comprehensive structural bracing and panel resonance tuning, ensuring minimal transmission of vibrations. Road and engine noise are suppressed by high-performance soundproofing materials used through the engine and passenger compartments.

The back edge of the bonnet has a flip-up design which minimises airflow over the windscreen wipers and even the screen washer jet nozzles have been located beneath the line of the bonnet for aerodynamic efficiency. The steps between the head of the windscreen and the roof panel, and the windscreen and A-pillars have been reduced to curb wind noise.

Three on-demand drive modes

Prius's transmission is supplemented by three "on-demand" drive modes the driver can select to increase efficiency, performance and fuel economy.

From start-up and at speeds less than 44mph, Prius automatically operates in EV mode, using electric motor power alone. The petrol engine is only introduced under hard acceleration to boost system power.

The driver can also use a switch to activate EV mode manually. This is a function unique to the full hybrid technology of Toyota's Hybrid Synergy Drive and is not available in mild hybrid vehicles. In EV mode, Prius owners can drive around town with minimal noise, zero CO₂ and NO_x emissions, and at speeds of up to 31mph, for up to two kilometres, according to the level of battery charge. Because the petrol engine is switched off, EV mode contributes to a significant reduction in overall fuel consumption.

In ECO mode, throttle response to aggressive accelerator pedal input is reduced and air conditioning control is adjusted to support better fuel economy. According to driving conditions and the ambient temperature, ECO mode can help driver reduce fuel consumption by 10 to 15 per cent, when used in conjunction with the ECO Drive Monitor (see below).

POWER mode modifies response to throttle inputs by up to 25 per cent, boosting power to improve acceleration and increase driving pleasure. Under a 50 per cent throttle, Prius acceleration time from 31 to 50mph (50 to 80km/h) is improved by 1.7 seconds to 4.11 seconds.

Eco Drive Monitor

The Eco Drive Monitor is designed to help drivers make the most of Hybrid Synergy Drive 's fuel efficiency, using a range of four status displays on the dashboard.

The Energy Monitor shows the current operating conditions of the engine and the flow of electric power. Working in real time, it helps the driver understand the basic energy flow through the Hybrid Synergy Drive system.

The Hybrid System Indicator shows real-time accelerator use, helping the driver modify inputs and driving style to achieve maximum fuel efficiency.

A new Consumption Monitor displays fuel consumption and energy recovery levels at one and five-minute intervals, so drivers have instant feedback on the fuel efficiency of their driving style.

A new Past Record Monitor presents trip computer mileage and average fuel consumption records.

Intelligent Park Assist

New Prius has an improved version of Intelligent Park Assist, which is easier to use and significantly quicker.

The system uses a rear camera and ultrasonic sensors on the front side-bumper to identify viable parking spaces. It will then automatically apply the correct steering angle for the parking manoeuvre into the target space; all the driver has to do is control the vehicle's speed.

ADVANCED SAFETY FEATURES

- Electronically Controlled Braking regeneration system, with Brake Assist, Traction Control and steering-assist Vehicle Stability Control
- Seven airbags as standard
- New active headrests to protect against whiplash
- Improved pedestrian impact safety performance

New Prius has been engineered to achieve the top five-star rating in the more stringent Euro NCAP safety test introduced this year. It is equipped with upgraded active, passive and pedestrian safety features and is built with a highly rigid, impact absorbing bodyshell that contains a higher proportion of high tensile steel.

Standard features include seven airbags and active headrests. The Electronically Controlled Braking (ECB) regeneration system incorporates Brake Assist (BA), Traction Control (TRC), and steering-assist Vehicle Stability Control (VSC+).

Electronically Controlled Braking regeneration system

Prius has a newly developed ECB regeneration system, which co-ordinates control of the hydraulic and regenerative braking systems, maximising regeneration of energy by the electric motor during deceleration and under braking. It is 18 per cent lighter and 31 per cent more compact than conventional systems.

Larger, 255mm ventilated front discs are fitted, with new 259mm solid discs at the rear, improving braking efficiency.

At speeds greater than 34mph, if the ECB determines that emergency braking is taking place, an Emergency Brake Signal system automatically flashes Prius's stop lights to warn following vehicles.

Additional active safety features

Prius is fitted with seven airbags as standard: driver and front passenger front and side airbags; driver's knee airbag; and curtain airbags. The front passenger front airbag can be deactivated, its status shown by a light on the dashboard. When the airbag is switched off, the seatbelt pretensioner remains active, but a rear-facing baby seat can be safely fitted.

All seats feature three point seatbelts with Emergency Locking Retractor (ELR), pretensioner and force limiter. The ELR is designed to lock up the seatbelt when load exceeds a pre-set value. During a collision, the force limiter fractionally reduces seatbelt tension to reduce impact forces on the wearer's chest. Prius's front seats are equipped with cable-operated anti-whiplash headrests to protect occupants in a rear-end collision.

Pedestrian impact safety

Extensive measures have been taken in the design of new Prius's front end to reduce pedestrian injury in an impact. The bumper structure is designed to minimise the risk of leg injury, with impact absorbing materials inside the front bumper and beneath the radiator to help prevent a pedestrian's legs sliding under the vehicle.

The front wings feature an impact absorbing bracket to reduce the chances of head injury, the bonnet catch is located well down from the upper bonnet surface and the bonnet structure itself has an impact absorbing cavity to maximise the impact stroke. In addition, the cowl area has an easily crushable structure to reduce the impact if struck from above.

SPACE, STYLE AND TECHNOLOGY

- D segment sized car with 2,700mm wheel base (same as Avensis)
- Faithful interpretation of the ECO-ICON design concept
- Ultra-low drag coefficient, Cd 0.25
- Improved front and rear visibility with raised roofline for better rear headroom
- "Outside Minimum, Inside Maximum" compact packaging concept
- Ergonomic cockpit with "display" and "command" zones
- New, more comfortable front seats
- Extensive storage and increased boot space

The new Toyota Prius further reinforces its status as the world's most advanced expression of mass-mobility with improved aerodynamics, a higher level of environmental performance, innovative human-centric technologies, higher quality and a more refined image.

Applying these design principles has resulted in a dramatic evolution of Prius: while it maintains a focus on exceptional environmental performance, the third generation of Toyota's full hybrid family car will attract new customers who place a greater emphasis on performance, practicality, driving pleasure and style.

New Prius combines a compact, highly aerodynamic exterior design that gives improved handling stability and quietness with an innovative and surprisingly spacious interior. This significantly increases the fundamental appeal of a car that has already dominated global customer satisfaction surveys over the past two years.

Aerodynamic exterior design

The third generation Prius is instantly recognisable from its characteristic, sweeping monobox profile, and draws strongly on the styling cues of Toyota's ECO-ICON design concept.

To gain the full benefit of its lightweight, high tensile steel and aluminium construction and its Hybrid Synergy Drive powertrain, the exterior design focuses on maximising aerodynamic efficiency, further improving handling stability, quietness and fuel economy.

From the start of the development process, designers and aerodynamicists collaborated closely to ensure that no late aerodynamic add-on elements could spoil the smooth homogeneity of Prius's classic wedge shaped bodyshell. The result is the world's most aerodynamic hatchback, improving Prius's already excellent coefficient of drag from Cd 0.26 to Cd 0.25. The importance of this figure from an environmental perspective is reflected in the combination of low rolling resistance tyres and improved aerodynamic efficiency in helping new Prius achieve a remarkable 14 per cent reduction in CO₂ emissions.

The design of the front end is fundamental to the car's overall aerodynamics. The opening in the upper grille has been kept as small as possible to help maintain a smooth airflow over the upper half of the body. In contrast, the lower grille has been enlarged to reduce airflow resistance and provide engine cooling efficiency.

The flat, vertical surface of the bumper corner houses a new indicator and foglamp configuration and serves not only to reinforce the car's broad stance and greater driving stability, but also corrects the airflow as it passes over the front wheels to minimise turbulence in the wheelarches.

Seen in profile, Prius displays a rising character line that runs through the doors to anchor the rear lamp clusters. Another dynamic touch is the positioning the A-pillar further forward, increasing the rake of the windscreen. This gives a larger front quarterlight, improving visibility, while the view rearwards is helped by the extended rear roofline.

At the rear the Prius keeps its distinctive rear window and spoiler configuration, framed by new, larger LED lamp clusters, with detailed revisions that improve aerodynamic performance. As at the front, a vertical surface on the bumper corner corrects airflow and reduces turbulence in the wheelarches.

Particular attention was paid to minimising panel gaps, giving the door and glazing seals a smooth profile, and achieving aerodynamic efficiency from the door mirrors, doorhandles, lamp clusters and rear spoiler.

Optimising underbody airflow is crucial in minimising drag and maximising high-speed stability. To this end, Prius features numerous aerodynamic parts to smooth and control the passage of air beneath the car. Spats are fitted at the front of each wheelarch to suppress airflow changes around the tyres, improving straight-line stability and steering performance.

Comprehensive use of underbody covers for the engine, front suspension members, cabin floor, fuel tank and loadspace floor, allied to the aerodynamic profiling of the front and rear spoilers and side rocker mouldings, contributes significantly to Prius's outstanding aerodynamic efficiency.

The presence of Hybrid Synergy Drive is denoted by hybrid blue Toyota badging and headlamp accents. Three new hybrid-specific colours are available – White Pearl, Abyss Grey and Orion Blue – taking the full choice to seven exterior shades.

Both the 15-inch and 17-inch wheels have been designed for maximum aerodynamic performance, with integrated wheelcaps and low roll-resistance tyres.

Compact packaging, roomier interior

Following the design maxim "Outside Minimum, Inside Maximum," Toyota has made significant improvements to Prius's proportions and packaging. Although the bodysell easily meets increasingly tough collision and pedestrian impact criteria, it has only been slightly increased in size.

Overall length has been increased by 10mm to 4,460mm, all of which accounted for by the longer front overhang. The wheelbase length remains 2,700mm (same as on

the new Toyota Avensis), while the overall width has grown by 20mm to 1,745mm, helping improve stability and giving the car a more robust, dynamic stance. To maintain aerodynamic efficiency, the overall height has been kept at 1,490mm, but the highest point of the roof has been moved 100mm further back, helping improve rear passenger headroom by 15mm.

The new dashboard design increases cabin length by 10mm, and a 30mm reduction in the front seatback structure has improved rear seat kneeroom by 20mm, even though there is a 15mm reduction in the front-to-rear seat couple distance. The combination of a revised seat design and more efficient packaging of the battery cooling unit has yielded a 10mm increase in loadspace length and a 55mm increase in width, increasing luggage capacity by 30 litres to 445 litres with the rear seats in position. With the seats folded down there is a flat load floor and 1,120 litres of space available – room enough to carry three golf bags.

Innovative interior design

The dominant feature of the interior is the new dual-zone dashboard, designed to minimise driver eye movement when viewing essential vehicle information, and to provide ergonomically superb functionality of all controls and switchgear.

The key features of the upper "display zone" are a new head-up display and a central meter cluster positioned at an ideal distance for at-a-glance viewing of vehicle status information. In addition to vehicle speed and other conventional information, the LED meter also incorporates the Eco Drive Monitor.

The lower "command zone" has an asymmetric bridge construction that places the shift-by-wire transmission lever close to the driver's hand, and also creates a generous lower storage compartment. The lower zone includes the full-colour multi-information display screen, placing control of the air conditioning, audio and satellite navigation systems within easy reach for the driver.

The steering wheel has a new design, with a lower section that has its radius reduced by 10mm to improve knee space. The steering wheel, transmission level, centre console bridge and door pockets have sleek detailing, with a high-quality silver paint finish.

Tahara and Murana (with Orion Blue only) interior trims are available on T3 models and Galena and Kalbarri (with Orion Blue only) on T4 and T Spirit versions. The surface grain of the upper instrument panel and the centre sections of the seat upholstery are finished in a new leaf vein pattern exclusive to Prius, reflecting its environmental credentials.

The new-design front seats are more comfortable and offer a greater degree of adjustment: base sliding has been increased by 20mm to 260mm and is controlled by a new side lever designed for easier operation; and height adjustment is up 15mm to 60mm. Although the front seats offer better lumbar support, the seatback structure is 30mm thinner to give more rear passenger kneeroom. The front seats are also fitted with new active headrests for added whiplash protection.

The 60:40 split-folding rear seats have gained new integrated headrests that further improve the driver's rearward vision.

HIGH TECHNOLOGY INNOVATIONS

- World first solar powered ventilation and remote air conditioning systems —
Head-up display for line-of-sight vehicle information
- Touch Tracer switches
- Extensive use of LED technology

The third generation Toyota Prius introduces numerous high technology features, in addition to its advance Hybrid Synergy Drive powertrain.

They include a world-first combination of a solar powered ventilation system, which prevents cabin temperature from becoming too hot when the car is parked, and a remote control function that allows the air conditioning system to be activated before getting into the vehicle.

A new head-up display projects key vehicle information on to the base of the windscreen, including vehicle speed, the Eco Drive Monitor and turn-by-turn navigation information.

New Touch Tracer switches on the steering wheel let the driver control the audio system, air conditioning and the Eco Drive Monitor without having to look down or take his or her hands off the wheel.

New Prius also gains an upgraded Intelligent Park Assist system.

Solar powered ventilation system

A new solar powered ventilation system reinforces new Prius's environmental profile, using solar energy to prevent the cabin temperature becoming too hot when the car is parked.

The system uses solar panels that are neatly integrated into a sliding glass sunroof to power an electric air circulation fan, with no need for the car's engine to be running. It has the capacity to reduce cabin temperature from 80 to 45°C and can significantly cut the cool-down time needed when the driver returns to the car, so reducing the need for the air conditioning to be used during vehicle start-up.

The system can be activated as the driver leaves the car. One minute after the ignition is turned off, the air intake mode switches to Outside Air Ventilation and blower mode switches to "Face" to increase ventilation efficiency. To avoid previously cooled air in the cabin being vented straight away, the system starts operating after 10 minutes and once started, will continue until it is switched off, or the ignition is turned on.

Remote Air Conditioning

Toyota's Remote Air Conditioning is a world first. Thanks to the power available from Prius's large capacity hybrid battery (such a system could not be supported by a conventional 12V battery), it can run for up to three minutes before the car is occupied.

Activated by pressing the A/C button on the key fob for one second, it can further lower cabin temperature for a more comfortable interior environment at the start of a journey.

Head-up display

A new head-up display is fitted as standard to all new Prius models. This projects key vehicle information on to the base of the windscreen, where the driver can read it without taking his or her eyes off the road ahead. The data presented include vehicle speed, the Eco Drive Monitor and turn-by-turn navigation signals.

The system can be turned on or off using a switch to the side of the centre console and the display can be adjusted for height to match the driver's seat position. Brightness is automatically adjusted according to ambient light levels, but can also be changed manually.

Touch Tracer Switches

The new Touch Tracer switches are touch-sensitive controls mounted on the steering wheel that let the driver operate a number of on-board features without having to look down or take his or hands off the wheel. The switches can be used to select and control the audio system, air conditioning and Eco Drive Monitor.

As the driver touches the top of the switch, a control function map is automatically illuminated on the centre meter cluster. An amber highlight moves in line with the driver's fingertip to the desired function, which can then be selected by pressing the switch.

LOW COST OF OWNERSHIP

- Lowest CO₂ taxation and fuel costs
- Lower servicing costs with outstanding component longevity
- Proven Toyota quality with competitive insurance costs and high residual values

The only car on the market that offers the benefits of full, series/parallel hybrid drive technology, new Prius represents outstanding value for money.

Best-in-market petrol CO₂ emissions of 89g/km and combined cycle fuel economy of 72.4mpg offer customers significant, pan-European tax incentives, inner city congestion charge exemption and exceptionally low running costs.

Prius's next-generation Hybrid Synergy Drive system has been designed for low maintenance and durability. The warranty history of current Prius reinforces the car's reputation for reliability, showing it has the lowest warranty cost per unit among all Toyota models. New Prius is protected by a three-year/60,000-mile warranty, extended to five years/60,000 miles for hybrid system components.

Proven Toyota quality and continued customer approval are witnessed by Prius's top "Lowest Problems" ranking in J.D. Power and Associates' UK, French and German customer satisfaction surveys for the last two years and its top ranking as best model overall in the UK in 2008.

Low CO₂ taxation and fuel costs

New Prius fulfils Euro 5 emissions standards and is expected to meet those of Euro 6, too. Producing best-in-market petrol CO₂ emissions of 89g/km – a figure unmatched by any other family car – the full hybrid offers customers significant tax incentives in several European countries; for instance, up to €3,500 in Italy, €4,350 in Belgium and €6,400 in The Netherlands. In the UK it falls into the lowest band – 10 per cent – for Benefit-in-Kind company car taxation and a 100 per cent capital allowance write down in the first year, equivalent to a saving of around £3,000.

There is a further benefit from new Prius's 10 per cent improvement in fuel economy, even though it uses a larger, 1.8-litre engine. And thanks to its ability to run at lower rpm during high-speed driving, there is a gain of around 10 per cent in long-haul cruising fuel efficiency. New Prius is the only family car to combine the fuel consumption performance of a small city car with a cruising range of more than 700 miles, 93 miles more than the current model, in spite of having the same size fuel tank.

Prius running costs are likely to fall further with the likely future introduction of congestion charging in major European cities. In London, for instance, Prius's hybrid vehicle status gains it exemption from the statutory charge when entering the central Congestion Zone, representing a considerable annual cost saving for city residents and people who regularly travel into the city centre on business.

Lower servicing costs with long-life components

Prius's 10,000-mile service intervals maximise component lifetime efficiency, and its next-generation Hybrid Synergy Drive system is designed for low maintenance and outstanding durability.

The full hybrid powertrain does not need a conventional starter motor or alternator. The engine uses a maintenance-free timing chain, an element oil filter, miniaturised spark plugs (realising savings of 45 and 23 per cent respectively) and, in a world first, has no drive belts, giving both excellent reliability and further cost savings.

Thanks to the efficiency of the Electronically Controlled Braking (ECB) regeneration system, the brake pads have a life expectancy of more than 60,000 miles. Of 130,000 first and second-generation Prius models sold in Europe, only 8.7 per cent – 9,400 – have thus far required new brake pads.

With a proven reliability record established over 60 billion kilometres of driving worldwide, Prius's battery is designed to last the entire life of the car. Rigorously assessed for performance and durability, it is covered by a five-year/60,000-mile warranty.

Exhaust system life expectancy is more than five years due to its high stainless steel content. Standard size tyres not only cost less, but their high running pressure results in less wear, giving them a life expectancy of more than 30,000 miles.

Prius's outstanding reliability is supported by its warranty history, with the lowest warranty cost per unit of all Toyota models. Over three years, Prius warranty cost per unit is only 36 per cent of that of Corolla and Avensis, and of that figure, only 1.3 per cent relates to the car's hybrid components.

New Prius is protected by a three-year/60,000-mile warranty, extended to five years/60,000 miles for the hybrid system components.

Proven Toyota quality with competitive insurance costs and high residual values

Proven Toyota quality and continued customer approval is demonstrated by the top ranking achieved in the "Lowest Problems" category of the J.D. Power and Associates' customer satisfaction surveys in the UK, France and Germany during the past two years.

Prius's bodyshell is designed to resist corrosion throughout the life of the vehicle, with galvanised steel sheets used on most of the body components. An underbody undercoating further prevents corrosion damage as a result of paint chipping.

New Prius also benefits from Toyota's established record for low repair costs. Many components are designed to be easily and cheaply repaired, and the body structure itself is designed for lower repair costs in the event of minor damage.

For example, a crash box integrated in the bumper reinforcement absorbs collision energy, helping to reduce body structure damage. The bumper reinforcement and front side member, radiator support and front side member, and rear bumper crash box and rear side member all have bolt-fastening structures for reduced repair costs. And the radiator support has a retracting mechanism to minimise the risk of damage to the cooling unit in the event of a minor collision.

New Prius residual values are expected to be in line with vehicles at the top of the D-segment. In the case of the UK market, a residual value target of 49 per cent after 36 months/60,000 miles (similar to that of the current model) is anticipated.

OVERALL ENVIRONMENTAL PERFORMANCE

- Whole-life improvements in CO₂ emissions, from design, production and driving through to recycling
- New Prius manufactured at Toyota's Tsutsumi eco-factory
- Use of world's first Ecological Plastic, derived from plants for reduced product cycle CO₂ emissions
- Comprehensive battery recycling process

In brief

In its commitment to minimising the environmental impact of new Prius, Toyota has applied Life Cycle Thinking and Life Cycle Assessment to every stage of the car's development.

The two processes take into account all the resources used and environmental and health impacts associated with the whole life cycle of the product, from its design, through production and use to final recycling, to identify where environmental benefits can be gained and areas where improvements can be made.

New Prius is built at Toyota's Tsutsumi eco-factory, where comprehensive and on-going environmental initiatives have already seen CO₂ emissions from the entire plant reduced by 51 per cent between 1990 and 2006. For the vehicle unit the achievement is even greater, at 65 per cent.

New initiatives include using renewable energy sources with solar panels generating 2,000kW, meeting 50 per cent of the factory's electricity requirements. Tsutsumi has already eliminated waste to landfill and the amount of incinerated waste was cut by 82 per cent in the 10 years to 2006, to just 730 tonnes. Comprehensive water recycling has led to the amount of water discharged into the local river system being reduced by half.

Targeting reduced product cycle CO₂ emissions, Toyota engineers have developed the world's first injection moulded material derived from plants. Called Ecological Plastic, it is already in use in new Prius.

An innovative, near-zero emissions recycling process ensures that 95 per cent of Prius's high voltage battery components can be successfully recovered for re-use.

Life Cycle Assessment for improvements in whole-life CO₂ emissions

To minimise new Prius's environmental impact, Toyota has applied Life Cycle Thinking and Life Cycle Assessment to every stage of the car's development.

Life Cycle Thinking takes into account all the resources consumed and the environmental and health issues associated with a vehicle's entire life cycle, from design, through production and driving to end-of-life recycling.

Life Cycle Assessment is the methodology used to support this process, firstly by quantifying the data produced and secondly by assessing the environmental and health impact of a product to identify where benefits can be gained and areas where improvements can be made.

At the design stage, every detail was analysed to ensure the lowest possible environmental impact through new Prius's lifespan. This meticulous approach has led to an array of innovative features, each of which contributes to the car's overall environmental efficiency.

Using carbon-neutral ecological plastics reduces overall lifetime CO₂ emissions, and extensive use of aluminium and a 20 per cent reduction in the weight of the Hybrid Synergy Drive system improve fuel economy. Toyota's own recyclable plastic, Toyota Super Olefin Polymer (TSOP), has been developed for better recyclability than any conventional reinforced composite polypropylene. Furthermore, new Prius incorporates 5.7kg of recycled plastic material, including soundproofing products.

The fuel efficiency and low emissions benefits of Hybrid Synergy Drive are fully discussed in chapter two of this press pack, but it is relevant to note here that, because Prius's production phase CO₂ emissions are similar to those of a conventionally powered vehicle, the hybrid's CO₂ advantage begins with the first mile driven. After 150,000km (approx. 93,200 miles), the CO₂ advantage is already 37 per cent. Prius's NO_x emissions are also far lower than those of even the cleanest diesel vehicle, just 0.0006g/km against the latter's 0.081g/km.

The Toyota Recycling Vision establishes long term goals for end-of-life vehicle recycling. In response to a European Union directive that by 2015 95 per cent of a vehicle should be re-used or recovered, 95 per cent of new Prius is recoverable and 85 per cent is recyclable. In addition, an innovative near-zero emission recycling process allows 95 per cent of the car's high voltage battery components to be recovered for re-use.

Environmentally efficient production at Tsutsumi

New Prius is built at the Tsutsumi plant, one of Toyota's groundbreaking Eco-Factories that has held the ISO 14001 "green standard" for environmental management since 1996. Between 2003 and 2007 it achieved a 21 per cent reduction in waste, a 48 per cent reduction in the use of volatile organic compounds (VOCs), a 14 per cent reduction in water use, and a 36 per cent reduction in CO₂ emissions.

In a joint venture with Panasonic, Prius's hybrid battery is also built in an ISO 14001-certificated factory.

Toyota's manufacturing plants are among the most environmentally advanced in the world, often heated and cooled using solar power, surrounded by native tree planting and committed to "zero landfill" operations. As an eco-factory, Tsutsumi is committed to working in harmony with both the local community and its surrounding environment, and to an operational lifespan of 100 years.

Comprehensive and on-going environmental initiatives have already yielded a 51 per cent reduction in CO₂ emissions from the facility as a whole, and by 65 per cent for the vehicle unit, between 1990 and 2006. This saving of 138,000 tonnes is equal to the annual CO₂ emissions from 15,000 homes.

Measures taken thus far include the installation of a gas engine-type co-generation system; use of a smaller plant boiler; a change to energy saving lighting; energy saving patrols; and significant power saving when the plant is non-operational.

New initiatives include the installation of solar panels which generate 2,000kW, meeting half the factory's electricity requirements. An energy control system further cuts electricity use when the plant is non-operational, while sunlight ducts have been installed to provide natural light, notably in windowless buildings.

Tsutsumi has already eliminated waste sent to landfill and the amount of incinerated waste was cut by 82 per cent between 1999 and 2006, to just 730 tonnes, with a future goal of reducing that figure to zero.

Comprehensive water recycling has led to the level of water discharged into local rivers being reduced by half, while the water that is discharged is cleaner than that already in the waterways.

Photocatalytic paint covers 22,000m² of the assembly plant building, which will have the same environmental effect as planting around 2,000 trees. A 5,000-strong team of employees and people from the local community have joined in a planting scheme, introducing 50,000 new trees across the factory site.

World's first Ecological Plastic

Toyota has developed the world's first injection moulded material to be derived from plants and it intends increasing the use of this carbon neutral plastic – called Ecological Plastic – in future vehicles. This process has been started with new Prius.

There are two types of Ecological Plastic: those produced completely from plant stuffs; and those manufactured from a combination of plant and petroleum-based materials. Because plant matter makes up a percentage of both types, Ecological Plastic as a whole emits 20 per cent less CO₂ during a product's lifecycle, as most of the CO₂ emitted at the point of disposal is balanced by that which was captured through photosynthesis while the plant was growing.

Plant-based foam and injection-moulded parts are use throughout new Prius, including the scuff plates, deck trim and seat cushions.

Comprehensive battery recycling process

A new recycling process that creates near-zero emissions has been designed so that 95 per cent of Prius's high voltage battery components can be recovered for re-use. The batteries are removed from the vehicle at an authorised Prius service centre and waste management companies have been appointed in each country where the model is sold to transport to them to one of three European Final Treatment Companies (FTCs): SNAP, Accurec and Umicore.

The battery case is removed and can be re-used in steel manufacturing. All the wires and electronic parts are sent to a specialist recovery company and the power cells themselves are recycled using an induction-based, vacuum thermal system.

This is an evolution of the traditional waste heat treatment process, but consumes less energy, is almost emissions-free and is highly secure. The power cells are put in a sealed container from which all air is removed to significantly reduce internal pressure; the container is then heated to 800°C. All materials are isolated through an evaporation process at differing temperatures, then condensed in separate areas through various cooling processes.

When the temperature reaches 400°C, all organic materials break down into a mixture of oil and water. This is then sent to a licensed water treatment company for processing. The power cells are exposed to hydrogen, which helps break the oxides down into metals.

What remains after the vacuum thermal recycling process is a highly concentrated nickel alloy, which is reused as a raw material in new battery production. All other recovered metallic elements, such as cobalt and rare earth metals, are incorporated in the manufacture of stainless or other specialist steels.

NEW PRIUS AND THE UK MARKET

- Available in three grades – T3, T4 and T Spirit
- On-the-road prices unchanged for T3 and T Spirit models in spite of all-round performance gains and higher equipment specifications
- Head-up display, Touch Tracer switches, seven airbags, automatic air conditioning, front fog lamps and Smart Entry & Start standard on all models
- On sale from August

New Prius will retain its established three-grade range structure in the UK, but with significant improvements in equipment specifications at every level.

At the same time, prices have been pegged at the same level as current Prius for T3 and T Spirit versions. This represents exceptional customer value, given the significant increase in Hybrid Synergy Drive performance and higher equipment

specifications including the standard provision on T3 grade of a head-up display, the new Touch Tracer switches, Smart Entry & Start (driver's door), driver's knee airbag heated electrically adjustable door mirrors and front fog lamps.

Likewise T Spirit owners will get much more for their money, with the same additional features as T3 models plus a full Smart Entry & Start system (all doors), HDD navigation and music storage, improved Intelligent Park Assist, rain-sensing wipers and 17-inch alloy wheels.

Sales

Toyota expects new Prius to achieve a high proportion of conquest sales, thanks to the combination of three key areas of customer benefit: total economy, space and style, and effortless drive. The significant advances Toyota has achieved in the new car's powertrain, technology and packaging will also strengthen its market position.

Toyota aims to sell around 4,500 new Prius in 2009 and 7,200 in 2010, its first full year of sales, taking a 5.9 per cent share of the UK D-segment.

Grade structure

Key features of the new T3 model include the head-up display, Touch Tracer switches, seven airbags, automatic air conditioning, Smart Entry (driver's door) & Start, 15-inch alloy wheels, front fog lamps and a six-speaker sound system.

The T4 grade provides 17-inch wheels, Smart Entry (all doors) & Start, cruise control, automatic wipers, Bluetooth and an eight-speaker audio package.

At the top of the range, T Spirit models come with a Navigation Pack that includes a Hard Disc Drive satellite navigation system that also provides an on-board music library system. Intelligent Park Assist and rear camera are also part of the package.

Options

Owners of T Spirit models can take advantage of the optional Solar Pack. Featuring a sunroof with integrated solar panels, this allows automatic cooling of the interior while the car is parked. It requires the fitting of 15-inch alloy wheels.

Pricing, VED and insurance

On-the-road prices for new Prius start at £18,370 for the T3 model – the same price as the current model. Likewise, the price of the T Spirit model is unchanged. Thanks to CO₂ emissions below 100g/km, the entire range falls within Band A for Vehicle Excise Duty, with no annual road tax charge. Insurance groups are yet to be announced.

TOYOTA PRIUS EQUIPMENT LIST

SAFETY	T₃	T₄	T Spirit
Driver and passenger front airbags	✓	✓	✓
Front side airbags	✓	✓	✓
Driver's knee airbag	✓	✓	✓
Front and rear curtain airbags	✓	✓	✓
ABS with EBD and Brake Assist	✓	✓	✓
Traction Control (TRC)	✓	✓	✓
Steering-assist Vehicle Stability Control (VSC+)	✓	✓	✓
Front seatbelt pretensioners	✓	✓	✓
Three three-point rear seatbelts	✓	✓	✓
Driver and front passenger seatbelt warning light and buzzer	✓	✓	✓
Rear seatbelt indicator light	✓	✓	✓
Active front headrests	✓	✓	✓
Anti theft system (immobiliser and alarm)	✓	✓	✓
Passenger airbag cut-off switch	✓	✓	✓
ISOFIX child seat restraint system	✓	✓	✓
Child-proof rear door locks	✓	✓	✓
Emergency braking signal	✓	✓	✓
INSTRUMENTS AND CONTROLS			
7in Electronic Multi-Vision (EMV) Display	✓	✓	✓
Touch Tracer switches	✓	✓	✓
Head-up display	✓	✓	✓
EV, ECO and POWER drive modes	✓	✓	✓
Multi-function trip computer and Eco Drive Monitor	✓	✓	✓
Push button start	✓	✓	✓
Foot release parking brake	✓	✓	✓
COMFORT & CONVENIENCE			
Front and rear electric windows	✓	✓	✓
Driver's window with 'one-touch down' and anti-trap functions	✓	✓	✓
Electrically adjustable heated door mirrors	✓	✓	✓
Electric power steering	✓	✓	✓
Tilt and telescopic-adjustable steering wheel	✓	✓	✓
Manual headlight levelling	✓	✓	x
Automatic headlight levelling	x	x	✓
Remote fuel filler release	✓	✓	✓
Cruise control	x	✓	✓
Intelligent Park Assist (IPA) and rear parking monitor (included in Navigation Pack)	x	x	✓
Smart Entry & Start (driver's door)	✓	x	x
Smart Entry & Start (all doors)	x	✓	✓
Rain sensing front wipers	x	✓	✓
12V power sockets (front and rear)	✓	✓	✓
AUDIO, NAVIGATION AND COMMUNICATIONS			

Six-speaker audio with single CD player	✓	✘	✘
Eight-speaker audio with single CD player and Bluetooth	✘	✓	✘
Navigation Pack, including HDD-based navigation, HDD music library, Bluetooth, rear parking monitor and Intelligent Park Assist)	✘	✘	✓
VENTILATION			
Automatic air conditioning	✓	✓	✓
Solar pack (solar powered ventilation, with 15in wheels and tyre repair kit)	✘	✘	Opt
Remote air conditioning system	✘	✘	Opt
SECURITY			
Immobiliser with alarm system	✓	✓	✓
Remote central door locking	✓	✓	✓
SEATING & UPHOLSTERY			
Cloth upholstery	✓	✓	✓
Leather upholstery	Opt	Opt	Opt
60:40 split folding rear seats	✓	✓	✓
Height adjustable front seats	✓	✓	✓
Electric front seat lumbar adjustment	✓	✓	✓
Adjustable front headrests	✓	✓	✓
Three adjustable rear integrated headrests	✓	✓	✓
EXTERIOR & BODY			
15in alloy wheels with full wheelcaps	✓	✘	✘
17in alloy wheels with full wheelcaps	✘	✓	✓
Space saver spare wheel	✓	✓	✓
Colour keyed door mirrors	✓	✓	✓
Colour keyed door handles	✓	✓	✓
Colour keyed bumpers	✓	✓	✓
Integrated tailgate spoiler	✓	✓	✓
Front fog lamps	✓	✓	✓
Metallic paint	Opt	Opt	Opt

TOYOTA PRIUS TECHNICAL SPECIFICATIONS

ENGINE			
Engine type	2ZR-FXE (Atkinson cycle)		
No. of cylinders	Four in-line		
Valve mechanism	16-valve DOHC with VVT-i		
Bore x stroke (mm)	80.5 x 88.3		
Displacement (cc)	1,798		
Compression ratio	13.0:1		
Fuel system	EFI		
Octane No.	95 or greater		
Max. power (bhp/DIN hp @ rpm)	98/99 @ 5,200		
Max. torque (Nm @ rpm)	142 @ 4,000		
Emissions level	Euro 5		
ELECTRIC MOTOR			
Motor type	Permanent magnet, synchronous		
Max. voltage (CD V)	650		
Max. power (bhp/DIN hp)	80/82		
Max. torque (Nm)	207		
HIGH-VOLTAGE BATTERY			
Battery type	Nickel-metal hydride		
Nominal voltage (SC V)	201.6 (168 x 1.2V cells)		
No. of battery modules	28		
Battery capacity (Ah)	6.5		
System voltage (V)	650		
Max. power (bhp/DIN hp)	27/27		
TRANSMISSION			
Transmission type	Electric CVT		
Gear ratios	Forward	2.683	
	Reverse	2.683	
Differential gear ratio	3.267		
PERFORMANCE			
Max. speed (mph)	112		
Full system power* (bhp/DIN hp)	134/136		
0-62mph acceleration (sec)	10.4		
FUEL CONSUMPTION		15in wheel	17in wheel
Combined		72.4	70.6
Extra urban (mpg)		76.4	74.3
Urban (mpg)		72.4	70.6
Fuel tank capacity (l)		45	
EXHAUST EMISSIONS		15in wheel	17in wheel
CO ₂ (g/km)	Combined	89	92
	Extra urban	86	97
	Urban	90	93
CO (mg/km)		258	
Total hydrocarbons (THC, mg/km)		58.4	

Non-methane hydrocarbons (NMHC, mg/km)	53.7	
NOx (mg/km)	5.8	
PM (mg/km)	0	
SUSPENSION		
Front	MacPherson strut with anti-roll bar, coil springs and dampers	
Rear	Torsion beam with coil springs and dampers	
BRAKES		
Front	Ventilated discs, hydraulic with power assist	
Rear	Solid discs, hydraulic with power assist	
Disc size (diameter x width, mm)	Front	255 x 25
	Rear	259 x 9
Parking brake	Pedal-type	
STEERING		
	15in wheel	17in wheel
Steering type	Electric power-assisted rack and pinion	
Steering ratio (16in/17in wheel)	17.6:1	14.6:1
Turns lock-to-lock (16in/17in wheel)	3.7	2.8
Turning radius (16in/17in wheel, m)	Tyre	5.2
	Body	5.9
EXTERIOR DIMENSIONS		
	15in wheel	17in wheel
Overall length (mm)	4,460	
Overall width (mm)	1,745	
Overall height (mm)	1,490 (1,505 with Solar Pack)	
Wheelbase (mm)	2,700	
Front track (16in/17in wheel, mm)	1,525	1,515
Rear track (16in/17in wheel, mm)	1,520	1,510
Front overhang (mm)	905	
Rear overhang (mm)	855	
Ground clearance (mm)	140	
Drag coefficient (Cd)	0.25	
INTERIOR DIMENSIONS		
Length (mm)	1,905	
Width (mm)	1,470	
Height (mm)	1,225	
Front hip-point height (mm)	460	
Front-rear couple distance (mm)	930	
LUGGAGE COMPARTMENT		
VDA capacity, rear seats up (l)	445	
Luggage floor to ground (mm)	658	
Length (rear seats up/down, mm)	880/1,830	
Max. width (mm)	1,555	
Height	1,225	
WEIGHTS		

Kerb weight (kg)	1,370 – 1,420
Gross vehicle weight (kg)	1,805