HS 250h Demonstrates Lexus' Hybrid Commitment as the World's First Hybrid-Only Luxury Vehicle

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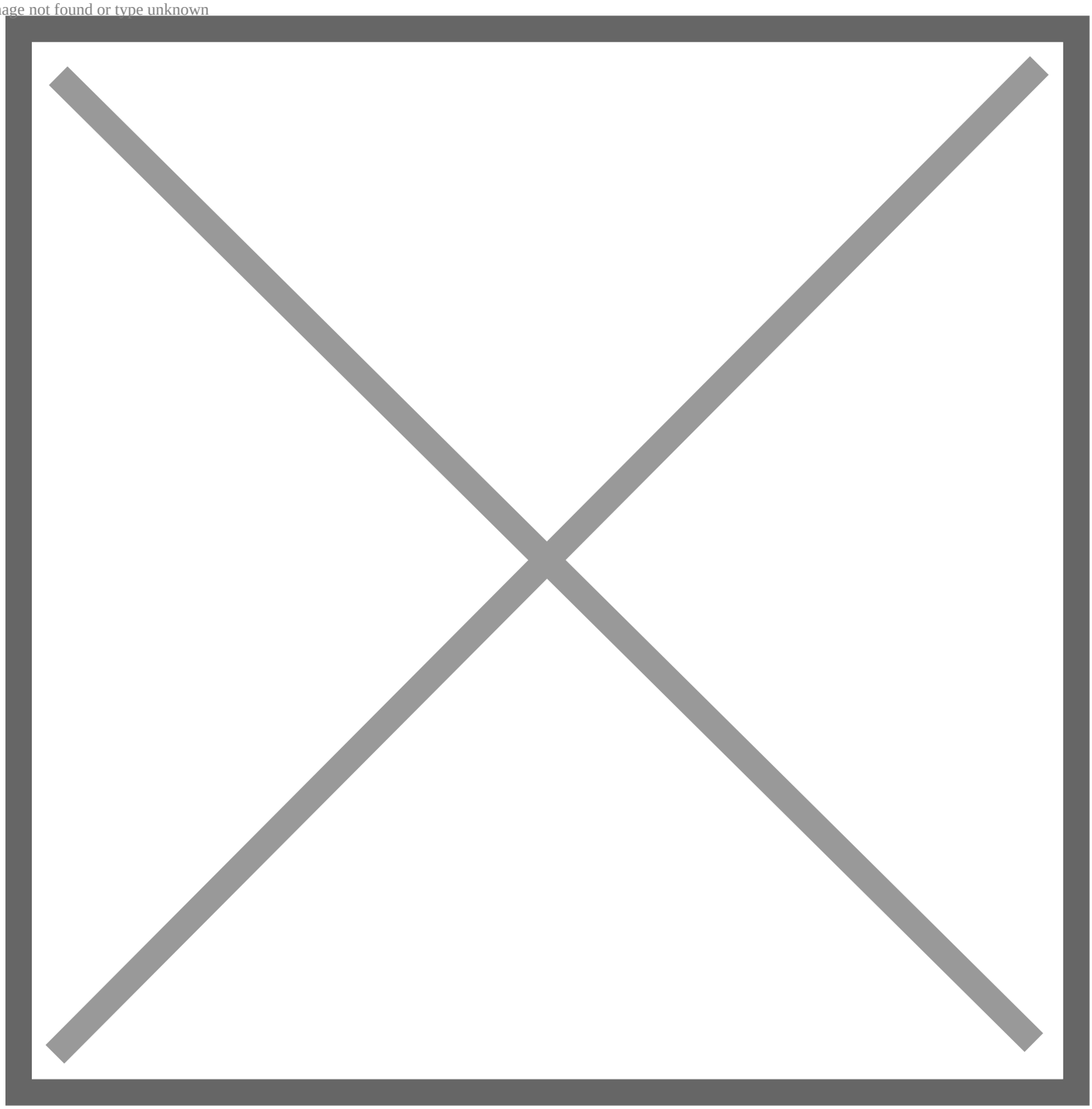

2011 Lexus HS 250h 001

• EPA-Estimated Rating of 35 MPG Combined Using 87-Octane Fuel
• Innovative Driver-Inspired Cabin
• Ecological Plastics Illustrate Sustainable Luxury

Lexus brought the promise of sustainable luxury to the forefront of the auto industry when the world's first dedicated luxury hybrid, the HS 250h, went on sale in August 2009. The HS 250h demonstrates innovative engineering and intelligent, driver-inspired design while offering excellent roominess and nimble maneuverability. Lexus' first dedicated hybrid model cruises into the 2011 model year with several exterior color changes.

The luxurious color palette receives several modifications for 2011 as Satin Cashmere Metallic replaces Golden Almond Metallic, Deep Sea Mica replaces Black Sapphire Pearl, and Aurora White Pearl is discontinued.

Designers and engineers took the opportunity to create a truly unique luxury car that maximizes fuel economy while further shrinking its impact on the planet by using ecologically advanced materials, cleverly packaging people and components, and eradicating waste wherever possible. Outstanding fuel economy is the inevitable result.
Available in standard and Premium models, the HS 250h has a combined EPA-estimated fuel economy rating of 35 mpg combined, 35 mpg city and 34 mpg on the highway utilizing regular 87-octane gasoline – a 74 percent better city mpg rating compared to the average near-luxury sedan.

Engine and Hybrid System
The HS 250h features the brand's first four-cylinder gas engine paired with Lexus Hybrid Drive. Utilizing the most recent generation hybrid system, HS 250h takes advantage of the company's continuous engineering advances to maximize fuel economy, minimize emissions and deliver driving pleasure. A highly efficient engine design, an exhaust heat recovery system, major efforts to reduce parasitic losses, an evaporative emissions system and driver-selectable driving modes all make notable contributions. Significant efforts were also made to minimize engine noise.

An Atkinson-cycle engine design was chosen for its high efficiency and compatibility with hybrid operation in the HS 250h. The twin-cam engine uses four valves per cylinder and Variable Valve Timing with Intelligence (VVT-i) on the intake side. The engine is undersquare, with an 3.48-in. bore diameter and 3.78-in. stroke, and has a relatively high compression ratio of 12.5:1. Peak output equals 147 horsepower and in combination with the hybrid drive motor, the HS 250h generates 187 total system horsepower.

It also meets the California SULEV and federal Tier 2 Bin 3 exhaust emission standards, emitting 70 percent fewer smog-forming emissions than the average new near luxury car; it is also augmented by a system that reduces evaporative emissions to near zero.

Careful design of the intake system reduces engine pumping losses and its twin resonators minimize intake noise. The cooling system uses a modular construction that combines an aluminum engine radiator, hybrid system radiator, A/C condenser and fan into a single assembly for minimal weight. Plus, the electric fan speed is controlled via Pulse Width Modulation to reduce energy consumption and noise. Careful ducting of the cooling system helps prevent hot engine air recirculation that tends to occur at low speeds and while idling, further enhancing efficiency.

One of the keys to lower fuel consumption involves heat. Similar to the Lexus RX 450h luxury utility vehicle, the HS employs an Exhaust Heat Recovery System that captures the heat of spent exhaust gases to speed engine coolant warm-up and allow the hybrid system to stop the engine earlier and more often in the driving cycle when it's not needed, for example in low power demand conditions in city driving. Overall, the system can improve fuel efficiency by as much as seven percent in low ambient temperatures.

Using a two-motor hybrid system, the HS 250h uses a 141 hp drive motor that combines with the gas engine. (Note that the sum of the engine and motor power are not equal to the total system power as the operation of the engine and motor cannot be maximized in the same operation range). A second motor in the hybrid system serves as both engine starter and generator to charge the hybrid battery pack.

The efficient two-motor system also uses an Electronically-Controlled Continuously Variable Transmission (ECVT) that is a model of efficiency, simplicity and compact size with extremely smooth and quiet operation. A motor speed-reduction planetary gear unit helps provide high power output in this small package.

An electric transmission oil pump eliminates another source of parasitic loss to further increase efficiency. Electronic operation allows a control strategy that invokes the oil pump only when needed, and since the oil also flows over the drive motor, overall efficiency of the motor and transmission are improved.

The HS 250h also incorporates drive-mode buttons that allow the driver to select between four modes: Normal, Power, Eco and EV. Each mode changes the rate of throttle opening for a given throttle-pedal angle. Normal mode has an essentially linear throttle response that gives naturally progressive power. Power mode can be selected for a more responsive feel when desired. In Eco mode, air conditioning settings are adjusted and the throttle response is reduced relative to the pedal angle to emphasize fuel economy. Under certain circumstances, the EV mode can allow the vehicle to be driven short distances using only the electric motors.

Acceleration from 0-to-60 mph is rated at 8.4 seconds. Responsive passing acceleration that benefits from the instant torque of the electric motor and the ECVT's ability to quickly find the optimal gear ratio enhance the driving experience.

Chassis/Body/Suspension/Tires/Brakes

Nimble handling, excellent body control, and smooth ride in the HS 250h begin with a stiff body structure. The HS body is designed with superior stiffness overall with added focus in strategically-located areas that have the greatest effect on ride, handling and noise.

A rigid and compact MacPherson strut front suspension employs a .94-in. diameter stabilizer bar plus large diameter pistons and rebound springs in the shock absorbers to help provide superior ride control. The steering rack is directly mounted (no rubber bushings) to create an unfiltered connection between it and the suspension members to help accurately communicate to the driver what is happening where the rubber meets the road.

The compact double-wishbone rear suspension design uses low-mount coil springs that help improve cargo space. As in the front suspension, rebound springs are used to aid both handling and ride, while all mountings and bushings are optimized to help provide an excellent combination of ride, handling and low noise.

A comprehensive approach was taken with particular efforts directed at engine and booming noise as well as wind noise. Component solutions include acoustic windshield glass and an extensive package of optimally positioned sound insulation materials. Dynamic dampers for the engine mounts, dual intake resonators and optimized muffler capacity were employed to achieve a smooth, linear sound quality with natural peaks and valleys.

Aerodynamic work was conducted with both computational fluid dynamic (CFD) analysis and wind tunnel evaluation to identify noise sources, assist designers to create appropriate design elements and prove countermeasures. Strategically placed seals, barriers and insulation material are used to eliminate noise paths and insulate passengers from noise sources.

The HS 250h utilizes Lexus' experience with Electric Power Steering (EPS). The vehicle-speed sensitive steering has been optimized to provide ideal steering feel at any speed. Inertia compensation control, friction feedback and recovery control assist in tailoring the steering feel and effort. The EPS system also helps improves fuel economy by reducing parasitic losses.

Like all Lexus vehicles, the HS 250h braking system is comprehensive, and as a Lexus hybrid it is augmented by regenerative braking which also helps recharge the hybrid battery pack and improve fuel economy. The electronic controlled brake (ECB) system actuator is managed by the ECB computer and acts on the system's hydraulic brake components. The ECB computer also controls the interaction between the four-wheel disc friction brakes and the regenerative brake system.

Standard 17-inch aluminum alloy wheels on the HS 250h are shod with P215/55 R17 all-season tires. Available 18-inch aluminum alloy wheels are equipped with larger P225/45 R18 all-season tires. All wheels feature the direct-type Tire Pressure Monitor System (TPMS).

Safety

As it is with ride, handling, noise and vibration, the body structure plays a key role in the fundamental safety characteristics of the HS 250h. To help protect the driver and passengers, the body is designed to be strong but strategically resilient to help absorb and distribute energy in the event of a crash. High strength steel components are carefully located in the body structure, doors and other areas to help ensure strength in key areas.

The HS 250h incorporates a standard 10-airbag Supplemental Restraint System (SRS) with dual-stage airbags and knee airbags for driver and front passenger, side curtain airbags, and both front and rear seat-mounted side airbags to help protect front and rear outboard passengers in certain types of severe frontal or side collisions. The front passenger is equipped with a twin-chamber airbag that further helps provide occupant protection. Additionally, front and outer rear seatbelts incorporate pretensioners with force-limiters to help protect occupants in the event of certain severe frontal collisions. Active front headrests are also standard.

An optional Pre-Collision System (PCS) with Dynamic Radar Cruise Control and Driver Monitor can help reduce collision damage. Dynamic Radar Cruise Control uses millimeter-wave radar to measure and help maintain a pre-set following distance from a vehicle traveling ahead. The radar sensor is designed to detect certain obstacles in front of the car, and a PCS computer with vehicle speed, steering angle and yaw-rate inputs, helps to determine whether a collision is highly possible. In such a situation, PCS alerts the driver with audible and visual warnings, preemptively retracts front seat belts and pre-initializes Brake Assist (BA) so that increased braking will be applied the instant the driver depresses the pedal.

Luxury/Comfort/Convenience

The HS 250h conveys comfort with its standard leather-trimmed seating, 10-way power-adjustable driver's seat with power lumbar and eight-way power-adjustable front passenger seat. The HS 250h Premium model receives heated and ventilated 10-way power front seats trimmed in semi-aniline leather.

When more than one driver uses the HS 250h, an available memory system allows individual driver settings to be recalled automatically by individual keys, saving the drivers the trouble of recalling their particular setting. The system memorizes the steering-wheel position, seat position, exterior mirror positions and air conditioning

settings associated with each key, translating to shorter preparation time prior to driving.

The high-visibility, electro-luminescent instrument cluster offers fresh methods of keeping track of the various systems in the car and helps the driver to conserve fuel. A hybrid system indicator displays the hybrid system output and regenerative charging status, simultaneously indicating the efficiency of the system related to driving style. An auxiliary Eco Drive Indicator light further assists the driver in maintaining the most economical use of system power.

A multi-information display situated in the instrument cluster keeps the driver informed of the numerous actions controlled by the steering wheel-mounted switches. It uses high-contrast organic light-emitting diode (OLED) technology for maximum visibility and indicates various conditions such as fuel consumption, ambient temperature and cruising range. Additionally, several vehicle functions can be customized through use of the display with the steering-wheel mounted multi-information switch.

Climate control is designed to provide comfort and clean air for all passengers. A dual temperature control system is used for front seat occupants and a dedicated rear blower mounted in the center console promotes quick cool down for the rear passengers. A Plasmacluster ion generator, A/C clean air filter and a pollen removal mode help clean air inside the cabin.

The cabin climate gets a little extra help from the windshield, which has infrared-ray reduction properties that help keep the interior cool, allowing a smaller size air conditioning system than would otherwise be required. In addition, the side glass has a water-repellant coating that improves wet weather visibility and aids defrosting performance.

A standard 10-speaker, 137-watt Lexus Premium audio system featuring a six-disc CD changer, a subwoofer and center speaker uses two-way woofer and tweeter systems in both front and rear for rich, clear sound quality. It also offers Bluetooth® wireless connectivity, an integrated XM Radio receiver (includes complimentary 90-day trial subscription) and USB/iPod® connectivity. When an iPod® is attached via the USB port it can be operated via steering wheel controls or from the display screen while information such as names for the artist, track and album is displayed on the headunit or available navigation screen.

Luxury Options

From the driver's perspective, several important developments inside the HS 250h transform the driving experience, making it easier and more enjoyable while also helping to enhance the driver's attention to the road ahead.

The optional navigation system features Bluetooth hands free phone, phone book download capabilities, and Lexus' exclusive Remote Touch controller with user-adjustable haptic feedback. The innovative controller, similar to a computer mouse, eliminates the need for touch screen controls, allowing the pop-up navigation system screen to be mounted further up the center stack and away from the driver. The driver benefits with a clear, high-resolution screen, improved site lines and reduced eye movement. These advances combined with the physical feedback provided by the controller make the system extremely easy to use.

A back-up camera and voice command, a casual-language-based voice recognition feature, are standard on navigation-equipped vehicles. Voice command technology allows the driver to give fewer and more flexible, conversational commands in a specific order for easier access to audio, climate, and navigation system functions to help drivers focus more on the road ahead.

Another driver-inspired development is an optional Heads-Up Display (HUD). The system projects a miniature display on a small portion of the windshield in front of the driver, significantly reducing eye movement to see

frequently viewed information such as vehicle speed. The display has been developed for maximum visibility, with crisp, high-contrast white lighting that makes it possible to see even in difficult lighting conditions such as driving on snow-covered roads.

In addition to speed, the system also displays turn-by-turn navigation arrows and driver-assist warnings, as well as audio information and Touch Tracer (sensors on steering-wheel switches will show an image of switch layout in the HUD), both of which can be turned off separately from the rest of the display.

An available Wide-view Front Camera helps enhance the driver's ability to see in the traditionally blind areas around the front of the vehicle. The front grille-mounted camera has a maximum 190-degree lateral field of view and allows the driver to see as close as approximately 24 inches in front of the car within an 83-degree vertical field of view.

Images from the two cameras feed into the available park assist ECU. The ECU processes and sends the images to the navigation system display at separate times depending on whether the vehicle is moving forward or backward. The front camera operates in either of two modes. Normal mode allows the driver to manually operate the camera with a switch on the lower left dash area. In auto mode, images from the front camera automatically display when the vehicle slows to about six mph or less and automatically shuts off when speed rises above approximately 7.5 mph. The driver can also toggle the front camera on or off while in the auto mode.

The HS 250h offers an optional Lane Keep Assist (LKA) feature that is designed to help drivers stay within their chosen lane and uses Dynamic Radar Cruise Control and the lane-departure warning (LDW) function. LKA and LDW depend on the detection of lane markers by an on-board camera, and are intended for use primarily on well-developed roads and highways. LDW alerts the driver of unintentional lane departure by sounding a warning buzzer and displaying an alert. LKA works in conjunction with LDW and the Dynamic Radar Cruise Control to help the vehicle stay in the center of its lane. It helps ease the burden on the driver by smoothly increasing steering torque a small amount to assist in maintaining course. It does not steer the vehicle independently and it requires the driver to maintain active steering control. The system shuts off automatically when it detects driver input through the steering, brake pedal or turn signal operation. To engage LDW only, the driver must depress the LKA button. To activate LKA, the driver must engage cruise control and depress the LKA button.

Audiophiles will appreciate the optional Mark Levinson® 5.1-channel Premium Surround Sound system. Power is rated at 330 watts at only 0.1 percent total harmonic distortion from 20-20, 000 Hz, and the system uses 15 strategically placed speakers for outstanding audio performance and sound quality.

The Lexus HS 250h also offers a telematics system, Lexus Enform® with Safety Connect®, available by subscription. Complimentary one-year trial subscriptions are included on all purchases of new Lexus vehicles equipped with these features. Safety Connect is standard on all vehicles while Lexus Enform with Safety Connect is on all vehicles equipped with the optional Navigation system. The Lexus Enform and the Safety Connect response centers operate 24 hours a day, 7 days a week—every day of the year. Lexus Enform vehicles are factory ready for subscriptions to a variety of innovative XM services including XM NavTraffic®, XM NavWeather™ and XM Sports and Stocks services. XM services require separate XM subscriptions. The XM Sports and Stocks service is included with an XM Radio subscription. All XM services offer complimentary 90-day trial subscriptions.

Exterior Design

Body designers looked to the Lexus L-Finesse design language to create a new shape for their first dedicated hybrid. The silhouette displays a smoothly flowing line from front to rear; the C-pillar has a unique arrowhead

shape; the grille is set low in the front with no openings to facilitate smooth airflow over the hood; there is an air inlet directly below the grille to cool the hybrid system and a larger one lower in the fascia to cool the engine and radiator. The standard projector-beam headlamps provide a focused look, while innovative, efficient LED headlamps are available. LED taillamps with a clear blue-accented frame intentionally signal "hybrid."

Striving to create a sleek and aerodynamic shape with a roomy cabin while containing the physical footprint of the car and packaging the hybrid system components, HS 250h designers had their work cut out for them. To accomplish their goals, they used a somewhat taller profile and more forward A-pillar location than used in conventional sedans.

Ambitious goals were set requiring designers to work closely with aerodynamicists from the outset to create a low-drag form in an attractive, spacious, yet compact package. Their work yielded a coefficient of drag (Cd) among the best, 0.27, which makes a considerable contribution to fuel economy, especially at highway speeds.

The low nose encourages airflow while also helping enhance vehicle dynamics. Smooth transitions along the front fender and A-pillars avoid disturbance of the airflow. Subtle front- and rear-bumper spoilers and an available rear-lip spoiler contribute to low drag and minimize lift. The body sides taper from the center pillar to the rear where they meet the slightly kicked-out tail lamps, helping reduce drag-inducing wake turbulence.

Several measures were also taken under the car to promote airflow and reduce drag. Airflow resistance in the engine compartment was improved by optimizing the duct profiles around the radiator. Careful positioning of numerous underfloor covers plus added diffuser fins on the rear covers further reduce drag while enhancing straight-line control.

Interior Design

The HS 250h interior was designed to communicate the high level of innovation inherent in the car with the craftsmanship expected from Lexus products. The center stack sweeps rearward to the Remote Touch which naturally meets the driver's hand atop a "floating" form over the center console. Switches and displays are neatly arranged for ease of operation and free of visual complexity, courtesy of Remote Touch.

Standard leather-trimmed and special soft touch stitched details on the center stack and instrument hood provide an extra premium touch in the cabin. Interior trim colors include Black leather, Light Gray leather, Parchment leather, and for the optional Touring Package, a distinctive Black/Light Gray two-tone leather trim. A high-finish dark gray trim is featured on the standard model while the Premium model has brown walnut wood trim. Front door trim that mirrors the shape of the center stack and armrest provide a comfortable symmetry. The steering wheel center pad appears to float on the wheel, surrounded by control switches that mimic the design and color of those on the center stack.

A tall profile and more forward A-pillar location allows for a higher seating position for both front and rear passengers, improved passenger vision, easier egress/ingress, and a better location for the batteries. The battery components, including the high-voltage battery pack, auxiliary battery and battery-connected devices, were carefully packaged to take advantage of this layout, resulting in a spacious cabin and surprisingly large trunk space.

Underlying the HS 250h's forward-thinking interior design is the implementation of bioplastic material. Known more formally as ecological plastic, the bioplastic uses plant sources as raw material and is used for parts of the interior upholstery in the HS 250h.

Ecological plastics are used in a number of injection-molded, foam and board components throughout the car, including trunk compartment trim, cowl side trim, door scuff plates, seat cushions and the package tray. Overall, approximately 30 percent of the combined interior and trunk are covered in ecological plastic.

Warranty

All new Lexus vehicles come with a 48-month/50,000-mile basic limited warranty with roadside assistance for 48-months/unlimited miles. Powertrain and restraint system coverage is provided for 72 months/70,000 miles. Corrosion perforation protection is covered for 72 months, regardless of mileage. The hybrid-related components, including the HV battery, battery-control module, hybrid control module and inverter with converter, are covered for eight years/100,000 miles.

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