

## **Lexus Committed to Sustainable Transportation and Business**

Offering the luxury category's first gasoline/electric hybrid vehicles is perhaps the most visible element of Lexus' comprehensive long-term strategy for reducing environmental impact in all aspects of its business. Lexus is also committed to reducing fuel consumption and carbon emissions from its conventionally powered vehicles. Company production, sales and logistics facilities are actively engaged in programs to reduce energy and water consumption and increase recycling; Lexus actively supports its dealerships in efforts to do the same.

Lexus was the first luxury brand to introduce gasoline/electric hybrid vehicles and currently offers three models, with a fourth hybrid debuting at the 2009 North American International Auto Show: The first Lexus hybrid model was the RX 400h luxury utility vehicle in April 2005, followed by the GS 450h hybrid luxury sport sedan, with the LS 600h L flagship hybrid luxury sedan joining the line up in 2007. Each model utilizes Lexus Hybrid Drive, a system that combines the output of a gasoline engine and electric motors. Lexus hybrid vehicle sales were up six percent through the first half of 2008.

The following report summarizes Lexus' environmental initiatives.

### **Vehicle Engineering, Manufacturing, and Technology**

All gasoline-powered Lexus models except the SC 430 meet the ULEV II emissions standard, while the three Lexus hybrid models meet California's more stringent SULEV standard and the Federal Tier 2/Bin 3 standard, as well. Lexus' gas-powered models were among the first in their respective segments to achieve ULEV status, employing technologies such as Variable Valve Timing with intelligence (VVT-i) across the model line. Recently, Lexus began introducing direct fuel injection, and on some models, unique dual-mode fuel injection (direct fuel injection plus port injectors) to help increase fuel efficiency while reducing emissions.

When designing a new vehicle, Lexus works to increase the use of renewable resources such as kenaf. A highly sustainable grass plant similar to bamboo, kenaf produces three harvestable crops per season and absorbs significantly more CO<sub>2</sub> than timber as it grows. Once bonded with non-petroleum glue, kenaf is formed into compressed panels and used inside the doors and seatbacks. The low-beam headlamps on the LS600h L and the tail lamps of every Lexus hybrid model, and most gas-powered models, use light-emitting diodes (LED) rather than conventional bulbs. Not only does this type of bulb last significantly longer, it also uses less energy and contains no mercury.

Another significant step forward was the introduction of soy oil-based polyurethane foam for passenger seats in the Lexus RX luxury utility vehicles. Lexus worked with suppliers to include five percent of the natural soy material without impacting performance. Using soy in polyurethane seat foam lowers the amount of petroleum used for production and reduces the carbon footprint of each vehicle. Lexus is studying natural-based fabrics for vehicle interiors. One innovative material being considered is PLA, a recyclable plastic made entirely from corn that is currently being used in many disposable goods such as drink cups and food packaging.

Working closely with other companies, Lexus engineers developed a new water-based paint used for undercoating and modified the painting process to shorten the drying time. The result is that Volatile Organic Compounds (VOC) emissions are reduced by nearly 70 percent compared to solvent-based undercoats, and CO<sub>2</sub> emissions are reduced by nearly 15 percent.

### **Recycling and Reducing Waste from Vehicles**

When seat cushions, floor mats and the roof liner are made, the leftover bits and trimmings are used as sound insulation in the doors, roof, floors and chassis. Even with strict efficiency measures in place, a small portion of material waste is inevitable. A specialized incinerator with 85 percent thermal efficiency is used to burn the waste, generating electricity and steam that is redirected back into the manufacturing process.

Company engineers developed a plastic called TSOP that does not deteriorate. Used in the bumpers, interior panels, trim and parts of the dash and console, it can be recycled indefinitely rather than discarded as waste after a single use. It is such a significant breakthrough that the formula has been made available to every car manufacturer.

The batteries in Lexus hybrid models are designed to last for the life of the vehicle. At the end of their life, or in the case of an accident or system malfunction, Lexus offers a bounty to reclaim the battery so it can be recycled or stored in an environmentally sensitive way. Lexus also encourages its dealers to dispose of tires in a safe and environmentally appropriate way. The company introduced a program called “Tire Shark” to help improve scrap tire collection service, and it promotes the use of only authorized and licensed scrap tire haulers to help ensure compliance with environmental requirements. The Tire Shark device compresses a tire and puts four nails into it so that it cannot be resold or reused. “Sharked” tires are then recycled and converted to crumbs for playground surfaces and playing fields, as well as tire-derived aggregate and energy sources.

On a typical vehicle, the transmission fluid needs to be changed and disposed multiple

times over its lifetime. On a Lexus hybrid, the fluid lasts the life of the vehicle, reducing the overall number of potential contaminants introduced into the environment.

### **Marketing and Philanthropy**

Lexus is proactively involving customers and prospective customers in its environmental efforts. Several Lexus marketing initiatives demonstrate ever-increasing opportunities for customers to combine luxury and sustainable living.

Lexus Hybrid Living ([www.lexus.com/hybridliving](http://www.lexus.com/hybridliving)) features a collection of people, products, services and companies that embrace both luxury and sustainability. It offers tours of cities across the country spotlighting Lexus Hybrid Living Partners, as well as focusing on influential people in various industries who are incorporating sustainability in meaningful ways. Lexus Hybrid Living also holds events across the country introducing environmentally aware customers to other facets of sustainability.



Lexus has partnered with The Fairmont to create two Lexus Hybrid Living Suites, designed for eco-savvy customers. Famed eco-designer Kelly LaPlante used sustainable, organic and recycled materials to showcase sustainability at suites in The Fairmont San Francisco and The Fairmont Washington D.C. Travelers who book either of the suites also get the use of an LS 600h L hybrid luxury sedan during their stay.

To inspire the next generation to take action toward improving the environment, Lexus sponsors the \$1 million Lexus Eco Challenge. Last year, more than 3,500 middle and high school students participated and tackled a wide range of issues from recycling, water pollution and vampire electronics to alternative energy, reducing emissions and enhancing forests. The program for the 08/09 school year will award 48 \$10,000 prizes, 14 \$30,000 prizes and 2 \$50,000 grand prizes.



### **Zero-Landfill Status**

Every Lexus manufacturing site maintains near zero-landfill status, meaning that 98 percent of waste resulting from manufacturing is recycled, repurposed or used to generate additional energy. In addition, Toyota Motor Sales, USA, Inc. (TMS) achieved zero landfill status at the U.S. sales headquarters campus for Toyota and Lexus.

In fiscal year 2007, the TMS headquarters campus recycled 64 percent of its waste,

exceeding its target of 60 percent. For example, furniture that has been replaced during remodeling, such as desks and bookshelves, was donated to local schools, churches and other organizations, diverting 104,000 pounds of waste from landfill. As a result of these and other efforts, the campus was able to achieve zero landfill. Waste that was not recycled was sent to the Southeast Resource Recovery Facility (SERRF) in Long Beach to generate electricity. Resulting ash from the process is used as road base material.

TMS' sales headquarters and the parts distribution center in Los Angeles were joint winners of California's 2006 Waste Reduction Awards "Program of the Year" award. This award distinguishes TMS as one of California's top five models for waste management. Together, the two locations were able to divert more than 4.6 million pounds of material from landfills.

Our parts distribution centers use reusable metal shipping containers instead of cardboard and wood pallets. The metal shipping containers can be returned to the nearest parts distribution center and reused. In fiscal year 2007, the entire returnable container program for Toyota and Lexus saved 3.4 million pounds of cardboard and 9.8 million pounds of wood, resulting in a savings of \$5.3 million in packaging costs. Environmental coordinators at our various operations share best practices and coordinate cross-division waste reduction efforts, as well as find recycling vendors for the waste they are unable to prevent.

Our vehicle distribution centers in the U.S. have a target of recycling 90 percent of their waste by fiscal year 2011, nearly achieving it in fiscal year 2007 with 89.9 percent. The vehicle distribution center at Port Newark, N.J., received the Large Business Recycling Award from the New Jersey Department of Environmental Protection. Employees accessorize vehicles and recycle almost every piece of the packaging. Through their efforts, the vehicle distribution center achieved zero waste to landfill and sent less than a pound of waste to a waste-to-energy facility for each vehicle processed.

### **Reducing Energy and Water Usage**

Lexus, as part of parent company Toyota Motor Sales, USA, Inc., is involved in company-wide efforts to reduce energy and water usage in all its operations. By fiscal year 2011, the company plans to reduce energy consumption of U.S. facilities by 18 percent compared to the fiscal year 2001 baseline.

A program that began in 2008 will set a water-usage reduction rate beginning in 2009. In the meantime, at the Portland, Ore., vehicle distribution center, rainwater is being harvested to

flush toilets, and natural rainfall is used for all landscaping rather than relying on a landscape irrigation system. The Portland vehicle distribution center filters storm water draining into the Willamette River and serves as a protected wildlife habitat for eagles, geese, ducks, rabbits and coyotes. It is also one of many environmental innovations that earned this facility gold certification in the Leadership in Energy and Environmental Design (LEED®) rating system by the U.S. Green Building Council.

In water-limited southern California, recycled water is used for landscape irrigation at the Ontario parts center, the Los Angeles regional sales office, and TMS headquarters' South Campus. In addition, the South Campus complex uses recycled water for toilet flushing and building cooling. The West Basin Municipal Water District has described South Campus as the most diverse user of recycled water in Los Angeles County.

### **Working with Lexus Dealers**

Lexus Vision USA Design Team is committed to helping its dealer body develop a greater understanding of sustainable design and to make the most environmentally effective choices. For example, Lexus provides a list of strategies that can help reduce water usage by 30 percent, and it suggests roofing materials that can significantly reduce solar heat gain to reduce the load on air conditioning systems.

Benefits of building a sustainable dealership are realized in the cost savings derived from a reduction in energy, lower water usage, and diverting waste from landfills. There are also lower costs associated with operations and maintenance, and the enhancement of occupant productivity and health associated with indoor air quality. Lexus' facilities department began working with its dealerships in late 2004 to promote greener building practices at Lexus dealerships. We assist in building the business case for applying for LEED® certification, research support and consulting during remodeling or new construction. There are several LEED projects under development at dealerships across the U.S.

While image, comfort and convenience were important features in the design of the Lexus of Westminster dealership in southern California, environmental sustainability was an underlying goal. Tinted insulated glass and solar shading devices reduce the need for air conditioning. The building was designed to utilize natural daylight, and occupancy sensors control additional energy-efficient fluorescent light. Interior materials and finishes were produced from recycled products, and the use of low off-gassing materials and water-based adhesives and paints enhance indoor air quality.

Lexus uses the Web to provide our dealers a number of tools, including the Environmental Assistance Network (EAN) and an online HazMat compliance training course, HazMat U. The EAN provides dealers with up-to-the minute information on regulatory requirements, waste stream management best practices, self-audit tools, and federal and state regulatory agency contacts. The HazMat U training course was developed through a partnership of the North American Automotive HazMat Action Committee (NAAHAC) – of which TMS is a member – and the Coordinating Committee for Automotive Repair<sup>®</sup>. HazMat U helps dealers comply with federal and state regulatory and training requirements. By working with regulatory agencies, a HazMat U training module was developed for airbags, seat belt pretensioners and lithium ion batteries – auto parts subject to new regulation.

### **Electronic Waste Recycling**

The company launched the “Keep IT Green” program in 1999 to recycle all sales and logistics IT electronic equipment throughout the U.S. and Puerto Rico. To date, the Keep IT Green program has diverted over 2.6 million pounds of equipment from landfills. Complementing the Keep IT Green efforts, some Lexus and Toyota locations have organized “E-Waste Roundups” on Earth Day for Toyota employees to bring electronic waste from home to be recycled. Last In fiscal year alone, Toyota and Lexus employees brought more than 40,000 pounds of equipment to be recycled, including computers, consumer electronics, microwaves, monitors, printers and televisions.