Toyota Industries' Technologies and Products Based on 3Es

Toyota Industries' environmental technologies play a dynamic role in society and daily life. We remain close to you and provide support for a comfortable society and enriched lifestyles.

Based on the keywords of 3Es (energy, environmental protection and ecological thinking), Toyota Industries promotes the development of technologies that contribute to energy savings, electrification and lighter weight. We are applying these technologies to our products in diverse business domains, including automobiles and materials handling equipment, and in turn contribute to the realization of a society with less environmental impact.

Diesel-Powered Internal-Combustion Hybrid Lift Truck
Offers excellent environmental performance combined with economic efficiency

DC-AC Inverter
Enables home electric appliances to be used in a car

PCU Direct-Cooling Device
Contributes to reducing the size of motor drive units of HVs

Variable-Displacement Type Compressor
Contributes to precise control of car air conditioner's cooling capability and greater fuel economy

Electric Compressor
Fitted in HVs, PHVs and electric vehicles (EVs)

Automatic Guided Vehicles (AGVs) for Freight Containers
Adopts a diesel-electric system equipped with a proprietary energy-saving mode

Onboard Charger
Converts home-use power sources to charge plug-in hybrid vehicles (PHVs)

Electric Lift Truck
Boasts power and longer operating period

DC-DC Converter
Converts the high voltage of hybrid vehicle (HV) batteries to run such devices as lights and wipers

Towing Tractor
Electric model that is environmentally friendly and widely used in airports

Air-Jet Loom
Inserts weft yarn using air

Smart Charging System
Efficiently charges multiple PHVs and EVs

Diesel Engine
Clean with less CO_2 emissions

Plastic Glazing
Contributes to reducing vehicle body weight

Leading the World in Energy-Saving, Electrification and Lighter-Weight Technologies

With a focus on 3Es, Toyota Industries pursues technological innovation to offer the most advanced energy-saving, electrification and lighter-weight technologies matched to growing needs in the global market for greater environmental performance. This special feature presents a few examples of our 3E-based technologies in respective fields.

Energy Savings | Variable-Displacement Type Compressors

Toyota Industries' car air-conditioning compressors boast the world's highest-level quality and performance in the areas of compactness, weight reduction, fuel economy, reliability during high-speed operation and quietness. Rising global environmental awareness has generated greater demand for higher energy-saving performance. In response, we developed the world's first internally controlled variable-displacement type compressor in 1995 and externally controlled variable-displacement type compressor in 1997, and have continued to pursue greater performance in these products.

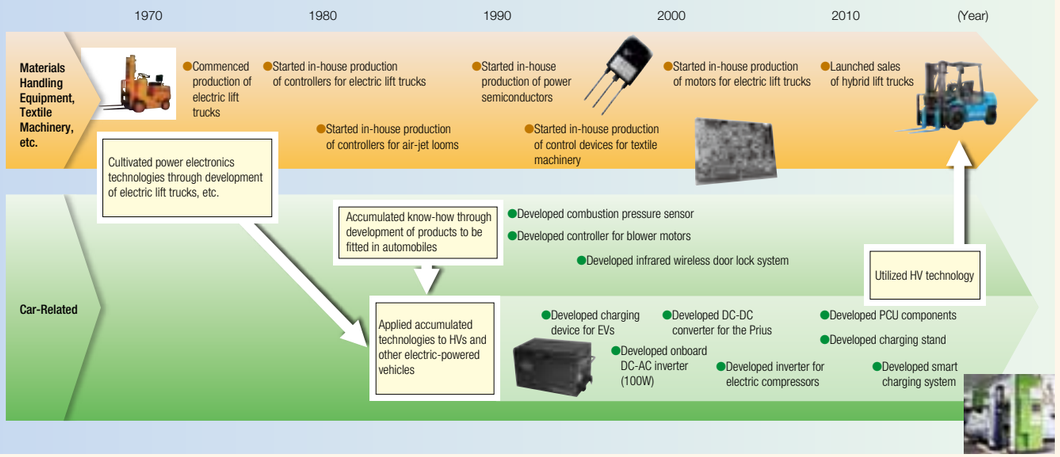
Our externally controlled variable-displacement type compressors automatically and optimally control the air conditioner's cooling capability in accordance with the temperatures in and outside a vehicle as well as the status of engine operation. Receiving high acclaim for their outstanding performance, they are widely adopted by major automakers in and outside Japan.

By changing the angle of the swash plate to adjust the piston stroke, the compressor automatically controls the cooling capability.

Electrification | Generating Technological Synergies in Electrification between Materials Handling Equipment and Automobile Fields

Since commencing production of electric lift trucks in 1967, Toyota Industries has cultivated power electronics technologies and know-how through the development and in-house production of electronic components fitted in lift trucks and textile machinery.

During the 1990s, we applied accumulated electrification technologies to the automobile field. We now develop and produce car electronics products for HVs and other electric-powered vehicles.



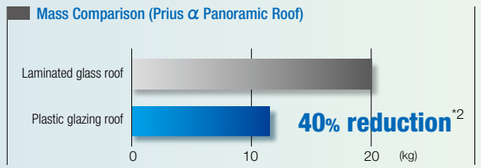
Lighter Weight | Plastic Glazing

Recently, there has been growing demand for reducing vehicle body weight, which directly leads to improved fuel economy of an automobile. The weight of glass accounts for more than 30 kg even in a compact car, and expectations for plastic glazing have become progressively greater as a lighter-weight substitute for glass.

Drawing on our experience in developing plastic glazing, we successfully realized the previously challenging task of developing a technology to create a larger-size plastic glazing. The resulting plastic glazing panoramic roof, the largest of its kind in the world*1, is used in the Prius α (Prius v in North America and Prius + in Europe) released by Toyota Motor Corporation in May 2011.

We have been receiving a number of inquiries from automakers in and outside Japan. We will further enhance the appeal of our plastic glazing products to increase the number of vehicle models fitted with our products and expand the scope of applications to include other vehicle components.

*1: As of March 31, 2012. Survey by Toyota Industries Corporation
*2: Survey by Toyota Industries Corporation



Latest Technological Trend: Electric Commercial Van "e-Porter"

Toyota Industries developed a new electric commercial van, "e-Porter," which contributes to greater logistics efficiency in a smart mobility society and less CO_2 emissions. The e-Porter is a new concept vehicle that combines energy-saving, electrification and lighter-weight technologies with the keywords of 3Es.

The e-Porter brings together Toyota Industries' comprehensive technological capabilities including a technology to create a special vehicle that combines its accumulated automotive body design technology with logistics know-how; power electronics technology cultivated in developing electric lift trucks and onboard devices for automobiles; and development strengths in electric drive systems.

For this concept vehicle, we developed a new, dedicated platform with a suitable structure for EVs. Specifically, we reduced the number of parts used to successfully achieve both weight reduction and lower costs. The e-Porter is also fitted with our newly developed powertrain unit*3 for EVs, an onboard charger, DC-DC converter and electric compressor, all of which contribute to reducing environmental impact.

Toyota Industries displayed the e-Porter concept model at the 42nd Tokyo Motor Show held in December 2011 and presented the direction we envision for next-generation commercial vans.

*3: See page 36 for details.

On display at the 42nd Tokyo Motor Show 2011