

## **Toyota Strengthens Initiatives for Low Carbon Society**

— Toyota Environmental Forum Held in Tokyo—

Tokyo—TOYOTA MOTOR CORPORATION (TMC) unveiled today an action plan for contributing to the realization of a low carbon society through initiatives in the areas of research and development, manufacturing and social contribution.

“Since its foundation, Toyota has conducted its business based on the guiding principle of contributing to the development of a prosperous society through the manufacture of automobiles”, said TMC President Katsuaki Watanabe, speaking at the Toyota Environmental Forum in Tokyo, where the action plan was unveiled. “Toyota seeks to combine the power of people and technology to help create a society that maintains a balance between corporate activities and environmental preservation.”

Specific TMC plans are described below.

### 1. Research and Development

Some of the environmental and energy issues surrounding automobiles include reducing CO<sub>2</sub> emissions (global warming measures), supporting the use of non-petroleum based sources of energy and improving air quality. TMC aims to help achieve sustainable mobility by using hybrid technology as a core means to reduce oil consumption and promote the adaptation of vehicles to energy diversification.

#### Automobiles

While adapting to energy diversification, TMC will develop vehicles that can simultaneously reduce CO<sub>2</sub> emissions and make the air cleaner. It will commercialize such vehicles in line with the energy trends of each market based on its philosophy of introducing the right vehicle, at the right time, in the right place.

### Packaging

TMC is working on initiatives to reduce vehicle size and weight. The “iQ”, which is planned for launch in 2008, offers revolutionary packaging—seating four people in a body less than three meters long.

### Powertrains

**Average fuel efficiency for new Toyota vehicles sold in Japan rose by approximately 28% in the 10 years from 1997 to 2007.** By the end of 2010 TMC will complete transition to a new series of highly efficient engines and transmissions.

#### *Gasoline Engines*

**TMC will complete revamping its engine lineup, with new 1.3-liter and 2.5-liter engines introduced in 2008. The new 1.3-liter gasoline engine is equipped with the newly developed TOYOTA Stop&Start SYSTEM.**

#### *Diesel Engines*

In 2003, TMC introduced clean diesel engines featuring the Diesel Particulate-NOx Reduction system, and, in the fall of 2007, it introduced a new 4.5-liter V8 engine. Cumulative production of diesel engines passed the 20 million mark in February 2008.

#### *Transmissions*

While advancing multi-stage automatic transmissions and continuously variable transmissions, **TMC will introduce a highly efficient compact six-speed manual transmission in the fall of 2008.**

### Hybrid Vehicles

Hybrid systems are a core Toyota technology that can contribute to cleaner emissions, lower CO<sub>2</sub> emissions and increased fuel efficiency. TMC is actively working to popularize these systems by increasing the number of hybrid models among its vehicle series.

Worldwide cumulative sales of the Prius reached 1 million units this past April and global cumulative sales of hybrid vehicles reached 1.5 million in June 2008. According to TMC's calculations, use of these vehicles has contributed to approximately 7 million fewer tons of CO<sub>2</sub> emissions than would have otherwise been

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generated and has reduced gasoline consumption by approximately 2.7 million kiloliters<sup>\*1</sup>.

- TMC's aim is to achieve hybrid vehicle sales of 1 million vehicles annually as early in the 2010s as possible and to strive for further popularization.
- TMC is working to further reduce the size, weight and cost of motors, inverters, batteries and other hybrid system components.
- In addition to already producing hybrid vehicles in China and the United States, TMC recently decided to produce hybrid vehicles in Thailand and Australia. We intend to continue to expand our overseas hybrid vehicle production efforts.

<sup>\*1</sup>Based on TMC calculations

### Alternative Fuel Vehicles

#### *Flexible Fuel Vehicles<sup>\*2</sup>*

##### *Bio-fuel Flexible Fuel Vehicles*

In 2006, TMC adapted all of its vehicles sold worldwide to E10 fuel and in May 2007 introduced flexible-fuel "Corolla" models in Brazil that can run on E100.

TMC will introduce the E85-compatible flexible-fuel Tundra and Sequoia in North America in 2008.

<sup>\*2</sup>Vehicles that are specially designed to run on either gasoline alone or on a blend of gasoline and ethanol

#### *Electricity (Plug-in Hybrid Vehicles/Electric Vehicles)*

Verification tests are currently being conducted in Japan, the United States and Europe, as plug-in hybrid vehicles—which can be used as electric vehicles for short trips and as conventional hybrid vehicles for traveling longer distances—represent the most promising approach.

- By 2010, TMC will introduce a plug-in hybrid vehicle equipped with a lithium-ion battery, geared toward fleet customers in Japan, United States and Europe.
- TMC plans to accelerate development of small electric vehicles for mass production.

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### *Battery R&D and Production*

- **TMC will establish in late June 2008 a battery research department to advance the development of an innovative next-generation battery that can outperform a lithium-ion battery.**
- **Panasonic EV Energy Co., Ltd.**, a joint venture TMC established with the Matsushita Group that is conducting joint research on batteries for use in automobiles, **will commence limited production of lithium-ion batteries in 2009, moving into full-scale production in 2010.**

### *Hydrogen (Fuel Cell Hybrid Vehicle or FCHV)*

TMC has developed the “TOYOTA FCHV-adv”, which features a newly designed high-performance Toyota FC Stack fuel cell. The TOYOTA FCHV-adv received vehicle-type certification from Japan’s Ministry of Land, Infrastructure and Transport on June 3.

The TOYOTA FCHV-adv features a 25% improvement in fuel efficiency, and, through the use of TMC-developed 70Mpa high-pressure hydrogen storage tanks, has a single-fill-up cruising range of approximately 830 km (in the 10-15 Japan test cycle; 760 km in the JC08 test cycle; as measured by TMC), which is more than twice the cruising range of its predecessor, the TOYOTA FCHV.

The TOYOTA FCHV-adv can be started and operated at –30 degrees Celsius, greatly improving its cold weather performance. TMC is steadily overcoming the technological hurdles associated with fuel cell vehicles and will focus next on solving problems related to maintaining reliability and reducing costs.

### *Alternative Fuel Supplies*

TMC’s involvement in alternative fuel utilization includes a variety of initiatives aimed at ensuring fuel supplies.

- TMC is reinforcing its structure of survey-based global energy analysis by establishing energy research organizations in Japan and the United States.
- TMC is conducting research on a cellulosic ethanol that can both avert competition with food supplies and ensure a stable supply. The distinctive feature of TMC’s research is the focus on using technologies that involve yeast.
- TMC is conducting joint research with Nippon Oil Corporation on high-concentration bio hydrofined diesel (also known as “BHD”) as a bio-fuel

alternative to petroleum-based diesel. So far, the research has led to vast improvement in the oxidative stability of BHD, enabling the fuel to perform on par with conventional diesel.

- **TMC is conducting research on biomass-to-liquid (also known as “BTL”), which is derived from synthesizing gas made from all types of biomass, including cellulose.**

### *Infrastructure and Driver Support*

Solving global warming and energy-related issues cannot be accomplished solely through automotive technology; it is essential to address issues throughout society, taking into consideration the actions of drivers and the state of the transport infrastructure. As an automaker, TMC is supporting activities in these areas.

In terms of infrastructural development in Japan, TMC is working with various government ministries to improve traffic flow by reducing traffic congestion. One potential method for accomplishing this is to find practical applications for the Probe Communication Traffic Information System<sup>\*3</sup>.

As one way to support environmentally considerate driving, TMC will increase the number of vehicle series equipped with the Eco Driving Indicator, which lights up when the vehicle is being operated in a fuel-efficient manner, and with the Eco Driving Mode Switch, which puts the vehicle in an energy conserving mode by monitoring and controlling such functions as gear-shift timing and air conditioner settings.

<sup>\*3</sup>Gathers traffic information and provides drivers with specifically tailored driving information.

## 2. Manufacturing

TMC is continuing to actively seek greater environmental responsiveness in its production and logistics through greater reduction of CO<sub>2</sub> and further consolidation of environmental management. In addition to existing initiatives, TMC is also strengthening the global implementation of “sustainable plant” initiatives as another means of reducing CO<sub>2</sub> emissions.

## CO<sub>2</sub> Emission Reduction Results and Targets for TMC Production

TMC is reducing CO<sub>2</sub> emissions from its production activities, based on its “Fourth Toyota Environmental Action Plan” (2006 to 2010<sup>\*4</sup>). Because TMC has already achieved its original 2010 targets, it has set new targets and strengthened its approach.

<sup>\*4</sup>Unless otherwise noted, the years mentioned are from April 1 to March 31.

### 2010 CO<sub>2</sub> Emission Reduction Targets, Results and New Targets

Region	Emissions	2010 Target	2007 Results	New 2010 Target
Worldwide <sup>*5</sup>	Volume per sales unit	20% reduction from 2001	32% reduction from 2001	35% reduction from 2001
TMC (Japan)	Volume per sales unit	35% reduction from 1990	55% reduction from 1990	60% reduction from 1990
TMC (Japan)	Volume	20% reduction from 1990	25% reduction from 1990	30% reduction from 1990

<sup>\*5</sup>The roughly 120 Toyota Group companies both in Japan and overseas subject to consolidated environmental management

### “Sustainable Plant” Activities

“Sustainable plant” activities were begun in July 2007 with the aim of emphasizing the role of nature through the creation of production sites that are in harmony with their natural surroundings. TMC is implementing its “sustainable plant” activities with the following in mind:

- 1) Energy reduction through development and implementation of low carbon production technologies and through daily *kaizen* (improvement) activities
- 2) Energy conversion using photovoltaic and other renewable energy sources
- 3) Tree planting for fostering exchanges with local communities and protecting ecosystems

### Model Plant Initiatives

#### *Japan*

##### Takaoka Plant

In August 2007, Line No. 1 started production after the introduction of innovative production technology.

##### Tsutsumi Plant

- A photovoltaic generation system was introduced in March 2008 that has a rated output of 2,000kW, making it one of the largest photovoltaic power generation systems in use among automobile plants worldwide (as surveyed by TMC).

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- Also, a project to paint the assembly plant's exterior walls with a photo-catalytic paint is planned for completion by around the summer of 2008.
- On May 18, volunteers from the local community and from TMC took part in Japan's largest tree-planting event (as surveyed by TMC), with approximately 50,000 trees planted.

### *Overseas*

#### United States

Toyota Motor Manufacturing, Mississippi, Inc. (TMMMS) is expected to begin production—with an innovative production line—in around 2010. TMMMS is also actively promoting tree-planting activities as part of its effort to achieve a harmonious balance between the local community and the environment.

#### Europe

Toyota Motor Manufacturing (UK) Ltd. (TMUK) and Toyota Motor Manufacturing France S.A.S. (TMMF) serve as model plants.

#### Asia

Ban Pho Plant of Toyota Motor Thailand Co., Ltd. in Thailand is Asia's model plant. In addition to its cogeneration system and solar panels, the plant recycles wastewater, employs waterborne metallic paint at vehicle body paint lines and has maintained zero landfill waste since the beginning of its operations. This year in August, as part of its plant "greening" activities, Toyota plans to conduct one of the largest-ever tree-planting events in Thailand, with 10,000 people planting 100,000 trees.

### 3. Social Contribution

TMC promotes programs for the development of forestry, human resources and the local community in countries and regions throughout the world, believing that community-based initiatives are just as necessary for a sustainable level of environmental preservation as initiatives on the national or international level. TMC will continue to strengthen and enhance its contribution to environmental preservation by sharing the knowledge and experience gained with society at large so that the initiatives can be more widely implemented.

## Examples of Key Initiatives

- In 1992 the “Forest of Toyota” initiative was launched in Toyota City, Aichi Prefecture. This initiative includes a number of activities, such as a hands-on nature experience program, forest improvement and maintenance, and research on *satoyama* (forests and wetlands near populated areas).
- In the year ending March 2001, TMC launched the Toyota Environmental Activities Grant Program, a subsidy program that supports the environmental activities of non-profit private groups and other organizations. The core theme of the program is environmental technology and human resource development that contribute to environmental revitalization and conservation. As of the end of the 2007 fiscal year (in March 2008), TMC granted funding to a total of 140 grant projects, both in Japan and overseas.
- In 2001, desertification prevention projects were begun as part of afforestation efforts in China, in areas affected by overgrazing and excessive cutting down of trees. In addition, TMC launched afforestation programs in 2007 to rejuvenate tropical forests in the Philippines, where forest degradation is a serious issue.
- In 2005, TMC supported the establishment of the Center of Industrial Development and Environmental Governance within the School of Public Policy and Management at Tsinghua University in China.
- The Toyota Shirakawa-Go Eco-Institute in Shirakawa, Gifu Prefecture, which was established in 2005, offers hands-on programs so that people can experience and learn about nature and projects for conserving forests.
- In addition, Toyota foundations and overseas affiliates throughout the world conduct initiatives in a number of areas, centered on providing grants.