Challenges for Sustainable Mobility

Information Meeting
Challenges to Deliver Mobility for a Sustainable Society

Zeronize
- CO2 reduction
- Effective utilization of alternative fuels
- Cleaner emissions
- Safety

Maximize
- Development of appealing products
Advanced Gasoline Engine Technology

Major Technologies

- Direct Injection System
- Variable Valve Drive System - VVT-iE - Valvematic
- Low Friction
- Downsizing/Weight Reduction
- Turbo Charger
- Lean Burn System

Realize high output and better fuel economy by technology development and expansion into additional models

Advantage

- Fuel economy improvement
- High output
Diesel Engine Lineup

- 1.4 litre
- 1.6 litre class: To be introduced
- 2.0-2.2 litre
- 2.5-3.0 litre
- V8 4.5 litre

Wide array of diesel engines and increased production

CO₂ Reduction
Cleaner Emissions

Reached 1 million units per year
Advanced Clean Diesel Technology

Toyota D-CAT System

Advantage

- Low Compression Ratio
  - Ceramic Glow Plug
- Common Rail System
  - Piezo Injector
- High Pressure Injection
  - 180MPa~
- Variable Nozzle Turbo Charger
- DPNR (Diesel Particulate – NOx Reduction System)

Early introduction of advanced diesel engine

CO₂ Reduction
Cleaner Emissions
Clean Emission Technology

**History of Toyota’s after-treatment technology**

- 1992 NSR: application for patent
- 1994 Start production of NSR catalyst for gasoline engine
- 2003 Start production of DPNR catalyst for diesel engine

We have been offering licensing of NSR to multiple car manufacturers, and this seems likely to continue.

**Cleaner emissions by introduction of new engine**

- NSR: NOx Storage Reduction Catalyst
- DPNR: Diesel Particulate – NOx Reduction System

Promotion of emission treatment (original technology and production)
Environmental Superiority of Hybrid Vehicles

**CO2 Reduction**

HV contributes to CO2 reduction

**HV**

- PRIUS
- CAMRY HV
- GS450h
- RX400h
- LS600h

**Gasoline**

- PRIUS
- GS450h
- RX400h
- LS600h

**Diesel**

- PRIUS
- GS450h
- RX400h
- LS600h

**CO2**

- (g/km)

**Mass**

**EC mode**
Annual Sales Volume of Hybrid Vehicles

Cumulative sales of 1 million worldwide

Further evolution of HV and plan of expansion to more models

CO2 Reduction

Cost reduction, Downsizing, Battery development

1 million units per year

Further evolution of HV and plan of expansion to more models
Efforts to Utilize Alternative Fuel

Bio-fuel
- Flex Fuel Vehicle
- Advanced bio research
- Quality improvement of conventional bio-fuel

Hydrogen
- Fuel Cell Hybrid Vehicle

Electric
- Plug-in Hybrid Vehicle

CO₂ Reduction
Promotion of alternative fuels
Plug-in Hybrid Vehicle

Charge battery from external charging, and expand EV driving range by motor

- PHV runs by motor charged by electricity for short range
- PHV runs by engine and motor for longer distances, high speed, and hill-climbing

A practical way to use electricity
Superiority of Toyota PHV

Toyota selected HV-based PHV considering driving range, battery size, charge time, etc.
Safety Technology Development/ Equipment Diffusion

Evolution

New Technology Development

Pre-crash Safety System

Curtain Shield/ Side Airbag
Active headrest, VSC etc.

Expansion of safety equipment to more models
Advancement of the System (Pre-crash Safety)

2003 Harrier (Japan)
- Front Stereo Camera
- Rear Millimeter-wave Radar

2004 Crown Majesta (Japan)
- Front Camera

2006 GS450h
- Driver Monitor Camera

2006 LS460
- Front Stereo Camera
- Rear Millimeter-wave Radar

2007 LS600h

Detection of pedestrian
Evolution to higher level omni-directional detection

TOYOTA
Three Aspects for Better Safety

People

Traffic Environment

Vehicle

Evolution

New Technology Development

Diffusion

Safety Technology

Expansion of safety equipment to more models

Pre-crash Safety System

Curtain Shield/ Side Airbag Active headrest, VSC etc.

Road-to-vehicle communication

People-to-vehicle communication

Toyota City Transportation Safety Project
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**Maximize**
- Development of appealing products
Toward Development of Appealing Products

- Package Revolution
- Provide with Low Cost
- Fun to Drive

Improve product competitiveness by development of appealing products and cost reduction technology.
Partner Robot Development

Promote robot development in four areas that assist people:
- Housework assistance
- Personal transfer assistance
- Nursing care/medical assistance
- Manufacture assistance

TPR-ROBINA

smartness

kindness

High Level

TOYOTA
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