Creating sustainable mobility

Piet Steel
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www.brdo-co2nference.net
Creating Sustainable Mobility

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Vice-President
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Toyota Motor Europe

Climate Change: An Opportunity for Growth
Brdo
16 November 2007
Agenda

1. Sustainability challenges & Toyota’s response

2. Innovation for the environment
Toyota - In Europe

- Began selling cars in 1963
- Over €6 billion invested since 1990 in manufacturing, sales, parts and logistics networks as well as R&D, Design and Formula One.
- Over €5 billion/year spent with European suppliers each year
- 1,124,000 vehicles sold in 2006
- 2007 expected to be 11th consecutive year of sales growth
European Production: “Operating at full capacity”

“Around 70% of Toyotas sold in Europe are made in Europe by Europeans”
Sustainability challenges

- **Environment**: Emissions, waste, biodiversity
- **Energy**: Consumption
- **Safety**: Accidents, injuries
- **Mobility**: Congestion, equal access
- **Quality of life**: Employees, customers and communities
Sustainability challenges

Environment
- Emissions, waste, biodiversity

Energy
- Consumption

Safety
- Accidents, injuries

Mobility
- Congestion, Equal Access

Quality of life
- Employees, customers and communities
Global Increase in Vehicles

1.2 billion by 2020!

Source: Handbook of automotive industry 1999

+71%
CO₂ Emissions Increase

Reducing CO₂ is essential for our sustainable growth

Source: IPCC95 annual report
Future automotive fuels

Primary energy

Automotive fuels

Current Mainstream

Mobile use

Stationary use

Automotive energy sources will diversify into liquid, gas and electricity

Fossil Fuel
- Oil
- Natural gas
- Coal
- Other Sources
- Biomass
- Solar, wind, hydro, nuclear

Automotive fuels
- Gasoline, diesel
- Synthetic fuels (FT synthetic diesel, etc.)
- Biofuels
- Gaseous fuels (CNG, LPG)
- Hydrogen
- Electricity

Manufacturing
Residential

TOYOTA MOTOR EUROPE
Agenda

1. Sustainability challenges & Toyota’s response

2. Innovation for the environment
Petrol & diesel engine performance is being improved with new technologies.
Transmission technology evolution

… and so is transmission performance …
Body technology evolution

- High tension steel
- Tailored blanks
- Ultra light
- Alternative material structure
- Carbon fibre technology
- New concept

… whilst body weight can also be reduced in the same way
Support for eco-driving

Gear Shift Indicator
(manual transmission)

Indicates gear shift point for good fuel economy drive

Eco Drive Indicator
(Automatic transmission, CVT)

Indicates good fuel economy condition

Momentary FE 11.4km/L
Indicates momentary fuel economy value

Driver education program

TOYOTA MOTOR EUROPE
Biofuels – Toyota’s stance

- Allow for 10% ethanol and 5% bio-diesel blending
- Need for clear consumer information and awareness to avoid confusion at the pump & possible problems
- Need for fuel quality standards on alternative fuels
- Flex Fuel Vehicles in certain markets (Brasil, USA)
- Preference is 2\textsuperscript{nd} Generation: better overall CO\textsubscript{2} reduction
Hybrid technology

- Contributes to high fuel efficiency
- Usable for all types of powertrain
Hybrid technology

- Fuel efficiency
- Low emissions
- Driving performance
- Quietness

Internal combustion engine
Battery
Electric motor

- Regenerative braking
- Engine stop
- Motor-assist
- EV Drive

HYBRID SYNERGY DRIVE

TOYOTA MOTOR EUROPE
Ten years of hybrid sales

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<th>World-wide</th>
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Aiming to reach one million per year early in the 2010s decade

1m sold May 2007

Toyota 26.2% Lexus 9.3%
Hybrid technology evolution

Toyota Hybrid System (THS)

1997
The first mass production hybrid

1997
The first mass production hybrid

2003
Result:
Cost: -70%

2003
Result:
Cost: -70%

20XX
Target:
Cost: -50%
Size: -50%
Weight: -50%
Plug-in hybrid vehicle

A petrol or diesel hybrid vehicle with an external recharger
Challenges for fuel cell vehicles

Performance in very cold conditions

- Achieve starting & driving under –30°C
- Range now proven at 560km on one tank
Toyota’s point of view:

- As a **responsible company** we have the culture & technology to simultaneously increase sustainable mobility and reduce the environmental impact of our activities.

- As a **company with long-term prospectives** we invest in R&D and work simultaneously on many technology options.

- By **strengthening co-operation** amongst stakeholders and the **right mind-set** can we overcome the challenges of climate change.
Ultimate Eco-Car

Energy diversity | CO2 reduction | Air quality

Hybrid Technology

Gasoline, Diesel
Gaseous Fuels
Biofuels
Synthetic Fuels
Hydrogen
Electricity

the Right Car
the Right Place
the Right Time
Thank you
Podnebne spremembe: priložnost za razvoj
Climate change: an opportunity for growth