Toward the Realization of Sustainable Mobility

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Senior Technical Executive

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**CO₂ Emission from Transportation Sector**

**Distribution by Sector**
(Japan, 2005)

- Industries (38.6%)
- Offices/other (19.4%)
- Residential (14.5%)
- Transportation (21.3%)
- Energy Conversion (6.1%)

**CO₂ Emission from Transportation Sector and reduction efforts**

Source: Ministry of the Environment

Source: Japan Automobile Manufacturers Association

**Reduction Target by 2010**

- Business As Usual (BAU)
  - Vehicle: 21.0 Mt
  - Traffic: 28.3 Mt
  - Other: 5.6 Mt

- 54.9 million ton
- Help maintain ecological balance
- Narrow the mobility divide
- Contribute to economic growth
Mobility 2030: Seven Goals

1. Reduction of conventional pollutants
2. Limit transport related GHG emissions to sustainable levels
3. Reduce the total number of road vehicle-related deaths and serious injuries
4. Reduce transport-related noise
5. Mitigate congestion
6. Narrow the “mobility opportunity divides”
7. Enhance mobility opportunities for the general population
Economic Growth and Mobility Demand

Passenger Travel and GDP by Region: 1950-1997

- North America
- Western Europe
- Eastern Europe
- Pacific OECD
- Former Soviet Union
- Centrally Planned Asia
- South Asia
- Latin America
- Middle East & North Africa
- Sub-Saharan Africa
- Other Pacific Asia
- World

$1 = ¥250 (1985)$

★ Japan (2000)
Improvement of Fuel Efficiency (Gasoline)

Average Mileage (Brand new cars sold in Japan)

Km / litter

Source: Japan Automobile Manufacturers Association
Plug-in Hybrid Vehicle: Hybrid vehicle with charging function from external electric power sources
Driving Speed vs Emission

Source: Japan Automobile Research Institute
Mobility Performance: Reality

- Single-passenger Corolla in Tokyo
  - Performance figure: 1.0

- Single-passenger Tundra in LA
  - Performance figure: 0.86
Energy consumption ratio (per passenger) (KJ / sec-person)

Performance figure: 1.0

Single-passenger Corolla in Tokyo

Single-passenger Tundra in LA

Performance figure: 0.86

Suburban driving
Corolla, 2-4 passengers, IW = 1,200kg

City driving
Single-passenger vehicle, IW = 300kg

Mobility Performance: Improvement

Performance figure: 7

Average speed (km/h)

Energy consumption ratio (per passenger)
**Mobility Performance: Realization**

**Optimal combination of diverse transport modes**

- **Ubiquitous Technology**
  - Automated parking

- **Combining urban transit innovation with urban development**
  - Upgrading the urban and road infrastructure
  - Introduction of ITS
  - Transportation demand management (TDM)

**Reduction of energy consumption**

**Innovation of Mobile Units and Energy Conversion**

- Reducing size and weight, automated driving, and automated platoon operation
- Plug-in hybrid vehicles, electric vehicles, fuel-cell vehicles
Transport Demand Management

[Behavioral Change of People]
- Modal shift
  (2,000 cars to public transport)
- Flexible working hours
- Park and ride

[Upgrade of Road Infrastructure]
- Additional lanes
- Dedicated lanes for turning

[New Technologies of ITS]
- Traffic Simulation
- Traffic Management System
  (MODERATO)
Free shuttle bus service for Commuters
CO$_2$ emission is reduced by higher travel speed although traffic volume has increased.

**Modal Shift Effect**
- Travel time: ↓ 30%
- CO$_2$ emission: ↓ 14%

+ **Road Upgrade Effect**
- Travel time: ↓ 60%
- CO$_2$ emission: ↓ 17%

**Travel time from Toyota I.C. to Toyota-cho (4km)**

- 45min. => 6km/h
- 32min. => 8km/h
- 19min. => 13km/h

**Graph:**
- **Original**
- **TDM**
- **Road upgrade**
Road Infrastructure

- Underpass
- Station Plaza
- Inner Ring Road
- Central District
- Industrial Center
- Underground Parking
Traffic became smooth due to park & ride, despite population growth and increasing dependence on automobile.
Cutting congestion and CO\textsubscript{2} emission by half
Reducing traffic fatality to zero

Goals: Rebirth of urban traffic systems
without congestion, CO\textsubscript{2} emission and accidents

New generation logistic systems
for timely delivery at competitive cost

Actions: Concurrent efforts from diverse perspectives
1) Effective deployment of transportation infrastructure
2) Active application of advanced IT and ITS technologies
3) Market penetration of new generation vehicles
4) Awareness and participation by citizens and industries
5) Strategic policy decision and its implementation
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<td>3) Fatality</td>
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<td>Deployment and penetration (Confirmed at FOT, operation spreads)</td>
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Plan: “The Project of Accelerating Reduction to the Society” aims to visualize for the citizen the outcome of large demonstration projects at a model city/line in a selected district, and to accelerate the application of successful practice on other areas. The special committee for new transportation & logistics in ITS Japan is taking initiatives in collaboration with industry, committed for realization with government.

**General Science & Technology Conference**
- Project of accelerating reduction to the society
- Road Transport System (ITS) Task Force
  - Policy-making, budget allocation, project promotion

**Leader:** Councilor Mr. Okumura
**Member:** Cabinet secretary, Police Agency, Ministry of Internal Affairs and Communication, Ministry of Economy, Trade, and Industry, Ministry of Land, Infrastructure, Transport and Tourism
**Specialist:** Intellectuals, ITS Japan

**Academia**

**Transport & Logistics Renaissance Project**
- Make a proposal
- Launch the organization
- Support promotion
- Follow up outcome

**ITS Japan**
- The special committee for new transport & logistics
  - Project proposal & promotion

**Town revival WG**
- Auto manufacturers
- Electronic manufacturers
- City developer
- Model city/local district etc.

**Advanced logistics WG**
- Auto manufacturers
- Electronic manufacturers
- Transport company
- Highway company
- Railway company etc.
City Planning with Innovative Transportation
City Planning with Innovative Transportation

- Address global warming
- Protect safety
- Vitalize a city/region
- Raise QOL of the citizen
- Enable response to disasters
Next Generation Logistics
Next Generation Logistics

- Address global warming
- Protect safety
- Improving international competitiveness for the cost of transport
- Provide reliability