Innovation in Transport Systems for Green Growth

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I. Green Growth and Transport

- The Goal of Green Growth
- GHG Emissions in Transport
- Reduction Measures : ASI
- Prioritization of Measures

The Goal of Green Growth

- Promoting economic growth and environmental conservation
- Creating new growth engines:
  Green technologies and industries
- Contributing to global GHG reduction efforts
GHG Emissions in Transport

Car Ownership Trends

Co2 Emission / Person

Transport
Other Sector

Developed Countries
Developing Countries

Business as usual
Expected trend

Source: WCTRS, 2010

Reduction Measures: ASI

Avoid
Shift
Improve

Congestion pricing
Remote working
Car sharing
Walking & cycle
Improved public transport
Modal Shift
Fuel efficiency/Green Car
Bio fuels
Eco-driving
ITS

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Prioritization of Measures

- Technology assisted measures -> high compliance

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<th>Public Compliance</th>
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<td>Eco-driving</td>
<td>ITS</td>
<td>Improving fuel-efficiency</td>
<td>Biofuels</td>
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<td>Promoting green vehicles</td>
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<td>Pay-as-you-drive insurance</td>
<td>Encourage walking &amp; cycling</td>
<td>Modal shift</td>
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<td>Congestion pricing</td>
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II. Future Trend

- Technology Evolution
- Major changes that lead to the future
Technology Evolution

- Rapid evolution of technology post-Industrial Revolution
  - 50-year cycles
  - What modes and technologies of transport for the future?

![Chart showing evolution of transport modes with different cycles and historical events.

Major changes that lead to the Future

- **Energy system: Energy crisis and climate change**
  - Use of renewable energy sources, efficient energy utilization
  - Climate change and GHG reduction

- **Urban structure: High-density land use**
  - Rapid urbanization
  - High density urban redevelopment

- **Convergence: IT-Vehicle-SOC**
  - Smart mobility with smart vehicles and telematics
  - Remodeling existing road network with ICT
  - Innovative traffic demand management
III. Innovative Technologies

- KOTT’s Research Initiatives for Green Transport

1. BRT with Online Electric Vehicle
2. Bike Rapid Transit
3. Cloud Transport System
4. Intermodal Connectivity Center
5. Technology driven Eco Driving
6. Expressway Reservation System
7. Automated Container Transport
1. BRT with Online Electric Vehicle

- Online Electric Vehicles (OLEV) with underground power supply lines
  - Powered from underground power line
  - Charges at start and end sections (20%) of BRT route

2. Bike Rapid Transit (BIRT)

- Elevated structure
- Non-stop Bikeways
- Faster than bus in peak-hour
- Travel mid to long distance with low energy (Gradient is not critical)
- Unaffected by temperature and rainfall

Green transport system where bikes move faster on elevated structure without stopping
3. Cloud Transport System

- Sharing transport modes
  - EV, Bicycle, Public transport, etc
- Creating new business model for EV

CTS
Own Less Share More

- Intermodal journey planner and reservation service
- User customized service

Benefits

- Reduction of GHG emissions
- Reduction of user cost
- Mitigation of traffic congestion

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4. Intermodal Connectivity Center

- Upgrading Intermodal Connectivity System
  - Remodeling layout of transfer facilities
  - Smartphone based travel information
  - Efficient management of transfer facilities

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5. Technology driven Eco Driving

Driving Patterns
- Quick start & acceleration
- Quick stop & deceleration
- Lane-change, quick right & left turns

Eco-Indicators
- Eco-driving saves 63% of additional fuel compared to quick start & acceleration
- Eco-driving saves 13% (fuel, CO₂) compared to usual driving

Eco-Navigators
- Smart-sensor equipped
- Collecting driving patterns

Tolling fee discount
- Eco-Driving Analysis using driving patterns

6. Expressway Reservation System

- Tackling extraordinary peak traffic demand for roads with limited capacity
- Introduces pre-reservation system as with public transport
- Maximized traffic throughput and reduced congestion
- Combine with flexible road tolling policy
7. Automated Container Transport (AutoCon®)

- Container flow on Seoul–Busan: approx. 9,000 TEU/day
- Conveyor system using Linear Induction Motor (LIM)
- AutoCon infrastructure cost is 1/3 of railway
- High efficiency non-stop system
- Unmanned automated cargo handling system

(Fuel saving) US$ 200 million/yr
(GHG Saving) 1.1% of roads, 11.2% of railways
Discussion

• Innovative combined technology measures contribute to CO₂ reduction
  - To account for more than 50% of target reduction (in Korea)
  - Eco-driving to be evaluated as high compliance, low cost and high efficiency measure

• Improve investment through innovation in transport
  - Promoting operational efficiency with intermodal and ICT technology
  - Expanding BRT network which is low cost and high efficiency compared to railway investment

• Convergence of technology and policy
  - Understanding users’ behavioral patterns
  - Better public acceptance and co-operation

• Creating new technologies and policies beyond transport border
  - Convergence with ICT, energy and psychology
Thank you