<Fourth EST Forum in Seoul>

Environmentally Sustainable Transport Policies in Korea

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Overview

I. Transportation Condition and Strategies in Korea
II. Transportation Demand Management Measures
III. Non-Motorized Transport Measures
IV. Transport and Land-use Coordination Measures
I. Transportation Condition and Strategies in Korea

1. Basic Statistics
2. Energy Consumption
3. Transport Strategies

**Population**
- About 50 mil. and Annual Increase of 0.53%
- 0.08% Annual Increase in 7 Big Cities

**Number of Vehicles**
- About 17 mil. and Annual Increase of 13.0%
- 42.7% of Total in 7 Big Cities, 57.3% in Other Area
2. Energy Consumption in Korea

Energy Consumption Trend

- Average Increasing rate: 6.3%
- Transportation: 21% of total energy Consumption

Energy Consumption in Transport Sector

- Industry, 6%
- Domestic/Commercial, 21%
- Transport, 21%
- Public, etc, 2%
3. Transport Strategies in Korea

Vision: “Transportation System for Human & Environment


- Balanced investment for road & rail
- Vitalizing public & green transportation
- Improvement of facilities for the vulnerable
- Enhancement of traffic safety

Travel Demand Management Measures
Non-Motovised Transport Measures
Transport & Land-use Coordination Measures

Source: PCSD (Presidential Commission on Sustainable Development, Republic of Korea)
II. Transportation Demand Management Measures

1. Definition and Potential Effects
2. TDM Measures in Korea
3. Public Transit Reform in Seoul
4. Bus Rapid Transit in Seoul MA
TDM Measure – Policies to Promote Changes in Travel Pattern

Past: Predict–Provide
→ Present: Predict-Manage

More Realistic to Manage Traffic Demand by Prediction

Travel Pattern Changes in Automobile Ridership

- Trip Generation Decrease,
- Modal Shift,
- Time Redistribution,
- Trip Route Shift, etc.

Personal Opportunity Cost Increase,
Fuel Use and Emission Decrease
2. TDM Measures in Korea

- BRT
- Exclusive Median Bus Lane
- Urban Bus Reform
- Transit Facility Expansion
- BIS/BMS
- Business Taxi
- Bicycle Revitalization
- Pedestrian Priority Zone
- Parking Cap
- Parking Fare Policy
- Resident Priority Parking
- Weekly No Driving Day Program
- TDM in Private Sector
- Congestion Fee

Supply Policies

Restriction Policies
II. Transportation Demand Management Measures

2. TDM Measures in Korea

Congestion Toll Charge in Seoul (Namsan Tunnel)

<table>
<thead>
<tr>
<th>Year</th>
<th>1st Tunnel</th>
<th>3rd Tunnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>21.6 km/h</td>
<td>17.8 km/h</td>
</tr>
<tr>
<td></td>
<td>25.3 km/h</td>
<td>39.5 km/h</td>
</tr>
<tr>
<td></td>
<td>35.6 km/h</td>
<td>39.5 km/h</td>
</tr>
<tr>
<td>2000</td>
<td>After 4 yr.</td>
<td>After 6 yr.</td>
</tr>
<tr>
<td></td>
<td>37.6 km/h</td>
<td>48.9 km/h</td>
</tr>
<tr>
<td></td>
<td>49.3 km/h</td>
<td>48.6 km/h</td>
</tr>
<tr>
<td>2002</td>
<td>After 8 yr.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>51.0 km/h</td>
<td></td>
</tr>
<tr>
<td></td>
<td>56.5 km/h</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>46.4 km/h</td>
<td></td>
</tr>
</tbody>
</table>
3. Public Transit Reform in Seoul

Problems Before the Reform

- Expansion of commuting area to Seoul
  - Traffic volume passing across Seoul boundary

- Increase of traffic congestion
  - Average speed of cars in downtown
    - 20.04 km/h (1994) → 16.3 km/h (2002)

- Decrease of bus passengers
  - Number of passengers per bus per day
3. Public Transit Reform in Seoul

Operation of 4-types of Buses

- Regional connection between suburbs and downtown area
- Ensuring operation speed and punctuality

- Feeder to trunk lines and subways
- Meeting local traffic demand

- Local lines within downtown area
- Serving for business and shopping trips

- Express connection between satellite cities and downtown area
- Absorbing passenger car commuters
Restructuring Fare System

**Distance Based Fare**
- Subway single trips
  : Fare according to distance-traveled (basic fare: 900 won up to 12 km; extra fare of 100 won for every additional 6 km)
- Bus single trips: single fare of 1,000 won

**Free of Charge for Transfers**
- For transferring trips
  : accumulated distance-based fare system
    → basic fare up to 10km; extra fare for every additional 5 km
3. Public Transit Reform in Seoul

New Smart Card System

- **Bus Rider Data Collection System**
  - Line Number
  - Stop Location
  - Boarding Time
  - Type of Riders

- **Fare Settlement Center**

- **Subway Rider Data Collection System**

- **Boarding a BUS**
  - Stop Location
  - Time
  - Distance Traveled
  - Tentative Fares

- **Getting off the BUS**

- **Transfer to Subway**
  - Station Location
  - Time

- **Finishing the Trip**
  - Station Location
  - Time, Total Distance
  - Final Fares
II. Transportation Demand Management Measures

3. Public Transit Reform in Seoul

Exclusive Median Bus lanes

Expansion Plan (13 lines/192 km)

- Status of Existing Bus Lanes (2005)
  - Exclusive median bus lanes: 7 lines/84 km
  - Curbside bus lanes: 293.6 km
3. Public Transit Reform in Seoul

Evaluation 1yr before and after Seoul bus reform

### Ridership

Before: the 4th quarter of 2004
After: the 4th quarter of 2005

### Speed

### Punctuality

<table>
<thead>
<tr>
<th>Line</th>
<th>Dist (km)</th>
<th>T-time (min)</th>
<th>Deviation from Schedule (Bus_min)</th>
<th>Deviation from Schedule (Car_min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dobong-Mia</td>
<td>15.2</td>
<td>44.3</td>
<td>2.7</td>
<td>15.3</td>
</tr>
<tr>
<td>Susack-Sungsan</td>
<td>6.8</td>
<td>18.1</td>
<td>1.2</td>
<td>15.6</td>
</tr>
<tr>
<td>Kangnam</td>
<td>4.8</td>
<td>16.7</td>
<td>1.3</td>
<td>4.6</td>
</tr>
</tbody>
</table>

### Safety

- **Number of Traffic Accident**
  - Before: 7,966
  - After: 5,971 (25% decreased)
- **Number of Deaths**
  - Before: 60
  - After: 41 (31.7% decreased)

II. Transportation Demand Management Measures
4. Bus Rapid Transit in Seoul MA

Total 22 regional BRT Lines (540km) Planned in 2004

<table>
<thead>
<tr>
<th>Projects in Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chungra BRT</td>
</tr>
<tr>
<td>Chunho BRT</td>
</tr>
<tr>
<td>Nangok BRT</td>
</tr>
<tr>
<td>Const. Period</td>
</tr>
<tr>
<td>2007 ~2012</td>
</tr>
<tr>
<td>2006 ~2010</td>
</tr>
<tr>
<td>2005 ~2009</td>
</tr>
<tr>
<td>Length</td>
</tr>
<tr>
<td>18.2</td>
</tr>
<tr>
<td>10.5</td>
</tr>
<tr>
<td>3.1</td>
</tr>
<tr>
<td>Total Cost (B KWR)</td>
</tr>
<tr>
<td>125.5 (73.5)</td>
</tr>
<tr>
<td>62.3 (24.9)</td>
</tr>
<tr>
<td>25.3 (17.1)</td>
</tr>
<tr>
<td>Development</td>
</tr>
<tr>
<td>SMTA</td>
</tr>
<tr>
<td>SMTA</td>
</tr>
<tr>
<td>Seoul City</td>
</tr>
</tbody>
</table>
4. Bus Rapid Transit in Seoul MA

Kyoungbu Expressway BRT

- Opening in Oct. 2008
- Total Length = 44.8 km
- Operating from 7am to 9 pm
- Trips per day
  190,000 → 250,000

II. Transportation Demand Management Measures
III. NMT Measures in Korea

1. Pedestrian Priority Zone
2. Public Bike System
1. Pedestrian Priority Zone

**Characteristics of Walking Activity**

- Most Fundamental Transport
- Supporting Mode to Use Different Mode
- For Leisure and Exercise

**Walking as Transport**

- Commuting, Shopping, Business, Leisure
  (Less than 15 minutes or 1km)
- Principle of the Shortest Path
- Speed: 1.2m/sec ~ 1.5m/sec
- Distribution: More than 20% of Total Trip Generated
1. Pedestrian Priority Zone

Road Width & Traffic Safety for Pedestrians

Death by Road Width

• 75.2% of Death in Traffic Accident occur on the road under 13m width

Road Types for Walking

<table>
<thead>
<tr>
<th>Width</th>
<th>Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 13m</td>
<td>4,634</td>
</tr>
<tr>
<td>Over 13m</td>
<td>1,532</td>
</tr>
</tbody>
</table>
1. Pedestrian Priority Zone

Guideline of Pedestrian Priority Zone

By Facility Installation (Physical)

- Pedestrian Facilities by ‘Act on Convenience Increase of Mobility Handicapped Person’ in Pedestrian Priority Zone

   - Speed Reduction Facility
   - Road Crossing Facility
   - Traffic Information Facility (BIS)
   - Transport Signal for Pedestrian Priority
   - Safety Fence for Pedestrian Path
   - Bollard
1. Pedestrian Priority Zone

Example of Pedestrian Facilities within the Zone
## 2. Public Bike System

### Bicycle Model Split

<table>
<thead>
<tr>
<th>Country</th>
<th>Modal Split (%)</th>
<th>Highest Modal Split (%)</th>
<th>Country</th>
<th>Modal Split (%)</th>
<th>Highest Modal Split (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Netherland</td>
<td>26</td>
<td>35-40</td>
<td>Groningen</td>
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<td></td>
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<tr>
<td>Denmark</td>
<td>20</td>
<td>20</td>
<td>Odense</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>10</td>
<td>20 30</td>
<td>Munster, Freiburg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belgium</td>
<td>8</td>
<td>15 20</td>
<td>Ghent, Bruges</td>
<td></td>
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</tr>
<tr>
<td>Ireland</td>
<td>3-4</td>
<td>5</td>
<td>Dublin</td>
<td></td>
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</tr>
<tr>
<td>Austria</td>
<td>9</td>
<td>14 19</td>
<td>Graz, Salzburg</td>
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<tr>
<td>Italy</td>
<td>5</td>
<td>15 20 30</td>
<td>Po Plains, Florence, Ferrara</td>
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<tr>
<td>France</td>
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<td>2</td>
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<tr>
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<td>10</td>
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<td>Switzerland</td>
<td>10</td>
<td>15 17 20</td>
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<td>Switzerland</td>
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<td></td>
<td>Lund and Malmo, Vasteras</td>
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<td></td>
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<tr>
<td>Austria</td>
<td>9</td>
<td></td>
<td>Korea</td>
<td>1.2</td>
<td>18.6</td>
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<tr>
<td>Italy</td>
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<td></td>
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</tr>
<tr>
<td>Japan</td>
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<td>Sang-ju</td>
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<td>Italy</td>
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</tbody>
</table>
2. Public Bike System

Public Bike System in Changwon City

NUBIJA : Nearby Useful Bike Interesting Joyful Attraction

- Feature: GPS (Real time tracking), Distance/Speed, RFID membership card, etc.

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
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</thead>
<tbody>
<tr>
<td>Supply</td>
<td>5,000</td>
<td>500</td>
<td>2,000</td>
<td>1,000</td>
<td>1,000</td>
<td>500</td>
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<tr>
<td>Budget (Mil. Won)</td>
<td>12,700</td>
<td>1,200</td>
<td>5,000</td>
<td>2,500</td>
<td>2,500</td>
<td>1,500</td>
</tr>
</tbody>
</table>
IV. Transport & Land-Use Coordination Measures
(Transit-Oriented Development)

1. Definition and Potential Impacts
2. TOD Strategy in New Town Development
IV. Transport & Land-Use Coordination Measures

1. TOD Definition & Impacts

Integration of Transportation and Land Use in Neighborhood and Regional Area

Planning Factor

- Transit Hub
- Density
- Diversity
- Design

Effect on Transportation

- Modal Choice
- Trip Distance
- Trip Generation Frequency
- NMT ↑
- VKT ↓
- Trip Chaining ↑

Easy to approach
High Density
Mixed-Land use
Pedestrian-friendly Network
2. TOD Strategy in New Town Development

- **New Town Development (A)**
  - Accommodation Increasing / Population Concentrating
  - Active Reaction on Urban sprawl

- **TOD (B)**
  - Automobile Ridership Control by Supplying Public Transport
  - Increase of Non-Motorized Transport
  - Social Equity among Commuters

- **TOD in New Town Development (A+B)**
  - Development in Suburban Area
  - Preservation of Farmland and Green Area
  - Increase of Public Transport and NMT

**TOD in New Town = Sustainable Transport and Urban Development**
IV. Transport & Land-Use Coordination Measures

2. TOD Strategy in New Town Development

Case Study: Unjeong New Town TOD Project

- **Developer**: Korea National Housing Corporation + Paju City
- **Location**
- **Area**: 9,407,766 ㎡
- **Population**: 124,898 persons (46,256 households)
- **Density**: 133 persons/ha
- **Land Use Plan Area Ratio**
  - Total: 9,407,766 ㎡ (100.0%)
  - Residential: 3,248,327 ㎡ (34.6%)
  - Park & Green: 2,851,160 ㎡ (30.3%)
  - Road: 1,446,830 ㎡ (15.3%)
  - School: 488,002 ㎡ (5.2%)
  - Commercial: 411,502 ㎡ (4.4%)
  - Others: 1,264,274 ㎡ (13.4%)

Source: Kim (2006)
IV. Transport & Land-Use Coordination Measures

2. TOD Strategy in New Town Development

Regional Transport System Plan
- High-Speed Kyungui Railway
- Regional BRT on Urban Expressway
- New Rail Station and Transit Center

BRT Route Plan within the New Town

- **BRT-A**: CBD(Unjeong St.) ↔ ⑤ ↔ ④ ↔ Expressway ↔ Susack St., 33.0km
- **BRT-B**: CBD(Unjeong St.) ↔ New Rail St. ↔ ③ ↔ Expressway ↔ Susack St., 33.6km
- **BRT-C**: Kyumcheon ↔ ⑥ ↔ CBD(Unjeong St.) ↔ ④ ↔ Expressway ↔ Susack St., 34.8km
IV. Transport & Land-Use Coordination Measures

2. TOD Strategy in New Town Development

Unjeong St. Transit Center

Location of Unjeong St. Transit Center

Transit Center

Bus & Ride
Park & Ride
Q&A