Seoul Transport Reform and Information Technology for Public Transportation System
Contents

- About Seoul
- Review on Transport Policy Measures in Seoul
- Problems before STR
- Seoul Transport Reform
- Conclusion
About Seoul

Geography

- Area: 605.4 km²
- Population: 10.3 Million

North latitude

126°59'

East longitude

37°34'
### Figures of economic growth

<table>
<thead>
<tr>
<th></th>
<th>1970</th>
<th>2005</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>5,433,198</td>
<td>10,297,004</td>
<td>2 times</td>
</tr>
<tr>
<td>Vehicles</td>
<td>60,442</td>
<td>2,877,000</td>
<td>48 times</td>
</tr>
<tr>
<td>GNI / p</td>
<td>$254</td>
<td>$16,500</td>
<td>56 times</td>
</tr>
<tr>
<td>Houses</td>
<td>584,000</td>
<td>2,278,000</td>
<td>4 times</td>
</tr>
</tbody>
</table>

- **1950** First 2 cars imported
- **1970** First 2 cars imported
- **1970** Population : 30,000
- **1971** First tram : 8km, 9 veh
- **1971** First railway : 21.8Km
- **1980** Population : 5 Mil
- **1980** Outbreak of Korean War
- **1980** First subway line
- **1980** Five-year economic development plan started
- **1984** National Financial Crisis
- **1988** 10 Mil 88 Seoul Olympic
- **1990** 10.6M 1 Mil veh.
- **1995** 2 Mil veh.
- **1997** Korea-Japan Worldcup
- **2002** Serious problems in traffic and transport condition
- **2004** Seoul Transport Reform

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**About Seoul**

- Became the capital of Chosun dynasty
- Population : 30,000

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3/68
<table>
<thead>
<tr>
<th>History of Transportation</th>
<th>About Seoul</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1960’s</strong></td>
<td></td>
</tr>
<tr>
<td><strong>1970’s</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Subway started to operate (1974)</strong></td>
<td><strong>New 5 satellite towns (1990-94)</strong></td>
</tr>
<tr>
<td><strong>1980’s</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Urbanization</strong></td>
<td><strong>Increase of cars caused traffic problem</strong></td>
</tr>
<tr>
<td><strong>City development planning focused on residence</strong></td>
<td><strong>Increase traffic and environment problem</strong></td>
</tr>
<tr>
<td><strong>1990’s</strong></td>
<td></td>
</tr>
</tbody>
</table>
History of Transportation:
Buses in 60-70’s

200 passengers on a bus (60~70 limit)
# Current Statistics of Transportation About Seoul

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Buses</strong></td>
<td>No. of Buses: 10,000</td>
</tr>
<tr>
<td></td>
<td>No. of Routes: 765 under 150 Operators</td>
</tr>
<tr>
<td></td>
<td>No. Passengers: 5 million per day</td>
</tr>
<tr>
<td><strong>Subway</strong></td>
<td>Total length: 350km</td>
</tr>
<tr>
<td></td>
<td>No. of Lines: 9 under Four Operators (Public)</td>
</tr>
<tr>
<td></td>
<td>No. of Rolling stocks: 3,500</td>
</tr>
<tr>
<td></td>
<td>No. of Passengers: 4.5 million passengers per day</td>
</tr>
<tr>
<td><strong>Taxi</strong></td>
<td>No. of Vehicles: 75,000</td>
</tr>
<tr>
<td><strong>Private Passenger car</strong></td>
<td>No. of Vehicles : 2,8 million</td>
</tr>
<tr>
<td></td>
<td>16km/h average speed in downtown</td>
</tr>
</tbody>
</table>
To facilitate commuting demand to CBD, radial trunk roads had been expanded that eventually built up high density road infrastructure around City Center.

“Cheong-gae” stream was covered and an upheaved road was built in 1969 even if Seoul had only 50,000 cars.
Not much attention to “how to use” the infra. With obsolete bus system and extended commuting distance due to area expansion, more people of better income chose passenger cars for commuting mode. Eventually, it led serious traffic congestion in Seoul.

Han river bridge construction in 60’s to 70’s

Gangnam (south-of-river) development in 70’s to 80’s
Seoul has constructed a subway network of 287km.

- **Period 1**
  - Lines: 1/2/3/4
  - Lengths: 135km

- **Period 2**
  - Lines: 5/6/7/8
  - Lengths: 152km
- Overestimated demand and increasing deficit

- Demand below expectation: for line 5,
  23,000 passenger/km expected → 11,000/km realized
- Take 10 years for completion for line 5
- Operation cost for each trip of subway and bus:
  $1.148 vs. $0.7

- Major stress on municipal financial status
  - 93% of total debt, caused by subway
  - Construction and operation cost/km = 100 Mil. USD
  - Pressure on fare increasing
Population growth and Area Expansion
Rapid growth in travel demand crossing the city boundary

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

Decreasing Ridership
Number of passengers per bus per day
1,069 passengers (1983) → 504 passengers (2003)

Expansion of subway network
Business Environment of Bus Industry (1)

Problems before STR

Modal Split

Subsidy

Bus Fare

(Billion won, iUSD = 1,000 Won)
Bus Industry before STR

Problems before STR

- Increasing vehicles
  - Lack of bus priority policies (bus lane & subsidies)
    - Poor punctuality
    - Poor reliability
    - Slow speed
  - Inefficient bus management system
    - Worsen bus operating conditions
      - stress on driver from traffic congestion
      - unfriendly to passenger, and causing accident
  - Limited road capacity → congestion
    - abolition of route,
      → reduced operation,
    - periodic increase of fare
    - labor dispute
      → inconvenience for citizen
    - no other options except periodic fare raising

- Decrease of bus users
- Abolition of bus service
- Bankrupt of bus company
Vicious Circle in Public Transport System

Problems before STR

- Increase in # of passenger cars
  - Traffic congestion
  - Traffic Volume: 2.7M cars/day (96) → 3.2M cars/day (03)
  - Occupation rate of passenger veh.: 72%
  - Car Speed: 20.0km/h (94) → 16.3km/h (02)
  - Subway: 146km (95) → 287km (02)

- Subsidy increase
- No increase in subway ridership

- Bus ridership decrease
  - Mode Share of Bus: 30% (96) → 26% (03)
  - Decrease in bus revenue

- Poor bus service quality

- Increase in income and extended commuting distance

- No. of Bus Co.: 103 (97) → 57 (03)
Philosophy of Seoul Transport Reform

Paradigm Shift on Transport Policy

- Quantity (Volume)-oriented
- Vehicle-oriented
- Transport infra construction
- Development-oriented

Seoul Public Transport Reform

- Quality service-oriented
- Passenger-oriented
- Environment-friendly and humanitarian
- Integration and efficient operation & mgmt.
Measures of Seoul Transport Reform

Integration of Public Transport Network
1. Unified Fare System & Free Transfer
2. Trunk-feeder system
3. Transfer Facilities

Technological Innovation
4. New Smart Card System
5. BMS / BIS
6. TOPIS

Improvement of Mgmt.
7. Scientific Administration
8. Quasi-Public Operation

Enhancement of Environment for Bus Operation and Pedestrians
9. Axial Bus Lane
10. Road Channelization
11. Premium Bus & Shelter
12. Policy of "More for Pedestrian"
Adoption of distance-based unified fare system irrespective of transport mode
Unified Fare System

Unified Fare Structure

“Transaction Unit”

- A chain of sequential ride records comprising a trip from an origin to a final destination.
- Each ride record should be completed by its alighting-record.
- No more-than-30-minute intervals do not exit between an alighting and the next boarding.
- No more than 4 transfer rides are allowed in a transaction unit.

Fare Structure

- **Subway (single ride)**: Basic Fare W800 for 12 Km
  - Distance-based Fare W100 for 6Km up to 42Km and for 12Km beyond
- **Bus [single ride]**: Flat Fare W800 (Trunk), W500 or W300 (Feeder)
- **Transaction Unit**: a single combined system is applied.

  The basic fare (for 10Km) for a transaction unit is the highest one in the chain.
  Beyond 10Km, the distance-based fare (currently, 100 Won for 5km) is added.

  However, if the combined fare of the unified fare system for a transaction unit is higher than the sum of independent fares in the transaction unit, the latter is collected.
Operators collect fares not for itself, instead but for the whole system

Collections are made at boardings and alightings
Collections are made for the maximum fare of certainty up to the moment

At a boarding, the maximum basic fare up to this ride within the chain and the amount of penalty, if any, are determined.
If the basic fare of this boarding is less than the previous maximum basic fare, then no fare is charged for this ride.
Else, the difference between the current basic fare and the previous maximum basic fare is collected.

At an alighting, the fare for the chain up to this alighting is determined and the difference between the newly determined fare and the total collected fare for the chain before this alighting is collected.
If tagging is made at alighting, fare collection is completed up to the alighting.

Penalty: If tagging is not made at an alighting, the transfer before the alighting is not a valid transfer.
The fare for the ride of the alighting should be recalculated at the next ride.
The diff.(new-old) should be collected as a penalty for not tagging at an alighting.
Fare Settlement Scheme

**Scheme 1**

The part of distance-based fare, collected by transits, belongs to the transit operators.

**Scheme 2**

The rest is shared by the operators in the transaction unit.

**Scheme 3**

The distribution rate for an operator is the proportion of its basic fare to the sum of the basic fares of all ride records in the chain.
### Application of unified fare system on a chain

#### Collection

<table>
<thead>
<tr>
<th>Subway(BF:W800)</th>
<th>44Km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boarding</td>
<td>Alighting</td>
</tr>
<tr>
<td>W800</td>
<td>W600</td>
</tr>
</tbody>
</table>

**Fare Structure of Subway**
- Basic Fare W800 for 12 Km
- Distance-based Fare W100 for 6 Km up to 42 Km and for 12 Km beyond
- Ind. Fare W1400

<table>
<thead>
<tr>
<th>Subway(BF:W800)</th>
<th>14Km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boarding</td>
<td>Alighting</td>
</tr>
<tr>
<td>0</td>
<td>W500</td>
</tr>
</tbody>
</table>

**Fare Structure of Bus**
- Flat Fare W800
- Ind. Fare W900

**Sum of Ind. Fares:** W3,100

#### Settlement

- Distance-based Fare of Subway (1) for 32 Km, W600, to Subway(1)
- Distance-based Fare of Subway(2) for 2 Km, W100, to Subway(2)
- The rest, W1,500, distributed to Subway(1), Bus, and Subway(2) by the ratio 8:8:8

**Total Length:** 77 Km

**Unified Fare:** W2,200

| Sub(1): 500+600=1,100 |
| Bus : 500 |
| Sub(2): 500+100=600 |
**Unified Fare System**

**Seoul Transport Reform**

**Penalty Case**

**Collection**

- **Feeder Bus (W500)**
  - 9Km
  - Boarding: 500
  - Alighting: 0

- **Bus (W800)**
  - ?Km
  - Boarding: 300
  - Alighting: No Tag

**Settlement**

- Feeder 500 + Bus 300 + 500 (Penalty)
- Collected Fare: 1,300

- Distribution Rate: Feeder:Bus = 5:8
- Collected Fare: 1,000 = 500 + 500

**Feeder: 500**

**Bus: 800**
Bus route reorganization and Function change

Before
- Suburban: Irregular headways, Decreasing ridership
- Inner City: Fierce competition among buses or with metro, Reckless driving

After
- Suburban: Regular headways, Increasing ridership
- Inner City: Reduced traffic, Reduced competition, Reduced operation cost

System Reform by Demand Responsive
- Trunk lines
- Feeder lines
- Circular lines
- Wide area lines

Operation of 4 types of Bus

Transfer facilities
All routes were passing through CBD before the reform
### Classification of 4-types of Buses by colors:

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

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

- **Circular Lines**
  - Local lines within the downtown area
  - Serving for business and shopping trips

- **Wide Area Lines**
  - Express connection between satellite cities and downtown area
  - Absorbing passenger car commuters

<table>
<thead>
<tr>
<th>Type</th>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trunk Lines</td>
<td>Blue</td>
<td>Regional connection between suburbs and downtown area, ensuring speed and punctuality</td>
</tr>
<tr>
<td>Feeder Lines</td>
<td>Green</td>
<td>Feeder to trunk lines and subways, meeting local traffic demand</td>
</tr>
<tr>
<td>Circular Lines</td>
<td>Yellow</td>
<td>Local lines within downtown area, serving business and shopping trips</td>
</tr>
<tr>
<td>Wide Area Lines</td>
<td>Red</td>
<td>Express connection between satellite cities and downtown area, absorbing commuters</td>
</tr>
</tbody>
</table>
Building transfer terminals at node between trunk line and feeder line connected with bus and metro

Transfer Terminal for Downtown and Suburban

Cheongnyangni Transfer Terminal

Yeoido Transfer Terminal

: (Secondary) city center  ▲: Boundary  ▼: Suburb
New Smart Card System

- Adopt T-Money, new smart card system for integrated fare collection

**Characteristics**

- **Flexible to various fare policy**
  - unified distance-based and time difference fare system

- **Provides multi-functional services**
  - Transport, shopping and civil service, etc

- **Adopted International standards**
  - Type A / B

- **Enhances security**
  - adopt EMV
Bus operation information collecting at control center through GPS
- Supporting on-the-spot traffic control using real-time traffic data

- Data Gathering
  - Speed Data
  - Image Data
  - Traffic Volume Data

- Monitoring & Management
  - Monitoring real-time traffic status
  - Providing congestion information
  - Analyzing accumulated data and improvement

**Seoul TOPIS**
Policy making based on scientific analysis through smart card & BMS

Data
- T-money Card Data
  - Individual Trip Chains
  - # of Pax per Stop per Hours
  - % of Transfer

- BMS Data
  - Link Travel Time/Speed
  - Headways

Analysis
- Demand Pattern
  - Variation on Time
  - Variation on Location

- Min LOS
  - Maximize Headway
  - Maximize Ridership / Veh.

- Optimization
  - # of Vehicles / Line
  - Optimize Schedule
  - Optimize Manpower

Example of Analysis
- Demand
  - Plot for Ridership / Trip
  - Ridership Contour
  - O-D Matrix

- Operation Plan
  - Optimize Dispatch
  - Optimize Fleet Size
  - Optimize Manpower Allocation
The Old Bus Network

- long and winding routes
- covering locations of major trip demand
- unreasonable amount of time to complete a trip to its destination
- many common long stretches of competing routes on trip-demand belts
- but almost no bus service outside of those belts
- putting the bus industry on the competing position against the transit system instead of complementary one
- no organized effort to integrate transit and bus network into one cooperative network

Restructuring the whole bus route network
Renovating the quality of bus services

- Establishment of “trunk-feeder” system
- Straightening up the old winding routes
- Keeping the operation cost under control
- Strict control over bus operations and driving practices

Quasi-public Operation System with Bus Management System/“Revenue Pool”

- private bus firms run their bus operation on the assigned routes and schedules, determined by the city government
- reimbursed for the operational cost with guaranteed business profit rate by the revenue pool committee
First priority to bus in road share

- Lack of dwelling area due to street facilities
- Interruption / outer lane stop
- Bus speed increase
- Securing punctuality
- Convenience improvement
- Exclusive lane for bus
- Separated dwelling area for bus passengers
Expansion Plan (13 lines/192)

Status of Existing Bus Lanes (2005)

Exclusive median bus lanes: 7 lines/ 84
Curbside bus lanes: 293.6
Trunk routes with Axial Bus Lanes
Road Channelization and introduction of high technology system

**Road Channelization**

- **Bus-Stop Red Zone**
  - 428 red zone stops at the end of 2005
  - Stopping order establishment through smooth in and out

- **Curbside Bus Lane**
  - 183.3Km at 2005
  - Differentiation through colored pavement
  - Prevention of illegal parking/stopping at curbside lane

**Surveillance on Illegal Parking**

- 117 CCTV installation in 2004 to 2005
- Control illegal operation/parking/stopping at bus only lane

Surveillance site
- Remote Monitoring
- Warning via Road-side Speaker
- Send message
- On-site control

Control center
Introduce premium buses for high quality service and replacing shelters for walking environment improvement at bus stops.
### Principle of Operation by Service Types

<table>
<thead>
<tr>
<th>Service Type</th>
<th>Buses Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trunk lines</td>
<td>Articulated buses, Low-floor buses, CNG buses</td>
</tr>
<tr>
<td>Major lines</td>
<td>Low-floor buses, CNG buses</td>
</tr>
<tr>
<td>Aux. Trunk lines</td>
<td></td>
</tr>
<tr>
<td>Feeder lines</td>
<td>Medium-size buses</td>
</tr>
<tr>
<td>Circular lines</td>
<td>Medium-size buses</td>
</tr>
</tbody>
</table>
Establish humanitarian transport culture with environmental concern
Policy of “More for Pedestrians” 2/2

Seoul Transport Reform

- Reduce Space for Private Passenger Veh.
  - Demolition Elevated Motorway
  - Create Seoul Plaza

- Improve Ped. Facility
  - Improving Sidewalk Network
  - Expand Pedestrian Crossings

- Congestion Pricing
  - Expand Pricing Spots
  - Automated Surveillance on Illegal Parking
Restoration of Cheonggyecheon

Decrease of car-traffic volume : 125,000 veh/day

Before

After (Sep. 2005)
Chunggyecheon Restoration Project: history

Early 20C

Place for washing in Cheonggye Stream

Bridge on Cheonggye Stream (Ogansumun)
Chunggyecheon Restoration Project : History

After War: Urban Squatter until 1970’s

After the construction of the overpass

Road Building above Cheonggye
Chunggyecheon Restoration Project

- Process of Demolition

- Step 1
- Step 2
- Step 3

- Step 4
- Step 5
Waterway Opened
Wall Painting
Night View Cheong Gye Cheon
Reform of Seoul Plaza

2004. 5. 1 Open → Restrain Traffic Flow → Ped. Square

Before

After (May 2004)
Reducing car-oriented space, Create Pedestrian-crossing
Conversion to oneway, expanding pedestrian crossing from 3 m width to 6 m.
Rebuild pedestrian crossings

Before (May 2004)

After (May 2004)

Seoul Transport Reform
Rebuild pedestrian crossings

Seoul Transport Reform

Before

Plan (2006)
Achievements of Reform 1/2

Increase in Passengers

- (Thousand Persons per day)
- Before STR ('04.1~6)
- Beginning ('04.7~12)
- Transition ('05.1~6)
- Stability ('05.7~11)

- Subway: 3,827 → 4,463
- Bus: 2,577 → 2,784

Increase in Fare Revenue

- (Thousand USD per day)
- Before STR ('04.1~6)
- Beginning ('04.7~12)
- Transition ('05.1~6)
- Stability ('05.7~11)

- Subway: 2,577 → 2,784
- Bus: 2,577 → 2,784

Increase in Speed

- (Km/hour)
- Before Jun 2004
- After Dec 2004
- Difference

<table>
<thead>
<tr>
<th>Road</th>
<th>Mode</th>
<th>Before</th>
<th>After</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dobong-Mia</td>
<td>Bus</td>
<td>11.0</td>
<td>22.0</td>
<td>11.0†</td>
</tr>
<tr>
<td>Road</td>
<td>Car</td>
<td>18.5</td>
<td>21.6</td>
<td>3.1†</td>
</tr>
<tr>
<td>Susaek-Seongsan</td>
<td>Bus</td>
<td>13.1</td>
<td>21.5</td>
<td>8.4†</td>
</tr>
<tr>
<td>Road</td>
<td>Car</td>
<td>20.3</td>
<td>22.3</td>
<td>2.0†</td>
</tr>
<tr>
<td>Kangnam</td>
<td>Bus</td>
<td>13.0</td>
<td>17.3</td>
<td>4.3†</td>
</tr>
<tr>
<td>Road</td>
<td>Car</td>
<td>18.0</td>
<td>18.6</td>
<td>0.6†</td>
</tr>
</tbody>
</table>

On-time Operation

- Before
  - Headway: 5 ~ 15 Min
  - Punctuality: 0.537
- After
  - Headway: 5 ~ 15 Min
  - Punctuality: 0.493
## Achievements of Reform 2/2

### Air Pollution

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO(Ton)</td>
<td>748.3</td>
<td>623.8</td>
<td>488.0</td>
</tr>
<tr>
<td>NO(_x)(Ton)</td>
<td>2,074.6</td>
<td>1,799.7</td>
<td>1,694.1</td>
</tr>
<tr>
<td>HC(Ton)</td>
<td>356.6</td>
<td>358.6</td>
<td>332.4</td>
</tr>
<tr>
<td>PM(Ton)</td>
<td>45.1</td>
<td>36.2</td>
<td>27.3</td>
</tr>
</tbody>
</table>

### Fuel Consumption

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diesel Usage(1,000ℓ)</td>
<td>148,059</td>
<td>126,485</td>
<td>118,783</td>
</tr>
<tr>
<td>CNG Usage(1,000)</td>
<td>33,955</td>
<td>41,7310</td>
<td>44,671</td>
</tr>
<tr>
<td>Total Fuel Cost (KRW M)</td>
<td>64,816</td>
<td>58,685</td>
<td>56,033</td>
</tr>
<tr>
<td>Difference of Cost(%)</td>
<td>-</td>
<td>9.5</td>
<td>4.5</td>
</tr>
</tbody>
</table>

### Citizen’ Satisfaction

<table>
<thead>
<tr>
<th></th>
<th>7/1</th>
<th>7/2</th>
<th>7/5</th>
<th>7/8</th>
<th>7/15</th>
<th>7/22</th>
<th>7/29</th>
<th>9/23</th>
<th>10/28</th>
</tr>
</thead>
<tbody>
<tr>
<td>not satisfied</td>
<td>47.2</td>
<td>51.8</td>
<td>54.7</td>
<td>56.0</td>
<td>54.2</td>
<td>49.2</td>
<td>43.6</td>
<td>44.9</td>
<td>37.0</td>
</tr>
<tr>
<td>fare</td>
<td>37.4</td>
<td>35.2</td>
<td>34.4</td>
<td>33.0</td>
<td>30.5</td>
<td>35.8</td>
<td>38.6</td>
<td>22.2</td>
<td>23.8</td>
</tr>
<tr>
<td>satisfied</td>
<td>15.4</td>
<td>13.0</td>
<td>10.9</td>
<td>11.0</td>
<td>15.3</td>
<td>15.0</td>
<td>17.8</td>
<td>22.2</td>
<td>13.2</td>
</tr>
</tbody>
</table>

### Traffic Accidents

- **before ('04.1~6)**
- **Early in Reform ('04.7~12)**
- **Transition ('05.1~6)**
- **Stabilized ('05.7~11)**

### Total Fuel Cost:

- Diesel
- CNG
- Total

- Difference of Cost:
  - Percentage

- Casualties:
  - No. of Accidents
  - No. of Casualties
Axial Bus Lane

Increase of speed for both bus and p-car
- 10 km/h to over 20 km/h

More carriage of passenger
- 6 times more passengers than other lanes

Less travel time variation
- 5 times less than other bus lanes
The number of Public Transport users in July and October increases 11.0% from last year.
Citizens are getting more satisfied from the public transportation system after reform.
### Air Pollution

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>Ratio ('03 -&gt; '05)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO(Ton)</td>
<td>748.3</td>
<td>623.8</td>
<td>488.0</td>
<td>▼ 34.8%</td>
</tr>
<tr>
<td>NOx(Ton)</td>
<td>2,074.6</td>
<td>1,799.7</td>
<td>1,694.1</td>
<td>▼ 18.3%</td>
</tr>
<tr>
<td>HC(Ton)</td>
<td>356.6</td>
<td>358.6</td>
<td>332.4</td>
<td>▼ 6.8%</td>
</tr>
<tr>
<td>PM(Ton)</td>
<td>45.1</td>
<td>36.2</td>
<td>27.3</td>
<td>▼ 39.5%</td>
</tr>
</tbody>
</table>
## Fuel Consumption

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diesel Usage(1,000ℓ)</td>
<td>148,059</td>
<td>126,485</td>
<td>118,783</td>
</tr>
<tr>
<td>CNG Usage(1,000 ℓ)</td>
<td>33,955</td>
<td>41,7310</td>
<td>44,671</td>
</tr>
<tr>
<td>Total Fuel Cost (KRW M)</td>
<td>64,816</td>
<td>58,685</td>
<td>56,033</td>
</tr>
<tr>
<td>Difference of Cost(%)</td>
<td>-</td>
<td>▼ 9.5</td>
<td>▼ 4.5</td>
</tr>
</tbody>
</table>
The number of accidents in July, 2004 decreased 26.9% than the July of 2003

142 accidents per month has been decreased

2003: 658
2004: 516

(Number of Accidents)
Contents

- About Seoul
- Review of Transport Policy Measures in Seoul
- Seoul Transport Reform
- Conclusion
1. Successfully Done in mega-city using the existing resources
   - Not in a new town or a planned city
   - Done in a large scale with ten thousand residents
     - Daily public transport passengers: 10 M
     - Daily smart card transactions: 20 M
   - No major addition of infrastructure

2. Integrated by information technology and new management
   - Loosely coupled and controlled existing resources were integrated into one seamless system by IT and adoption of new management scheme
Seoul is ready to work and share its experience with other cities.

- Planning for transport renovation
- Integration design for seamless transport network
- Project financing

- Efficient transport operation & management system
- Smart transportation card system
- Real-time traffic management system
- Real-time large scale traffic simulation system
- U-city architecture

- Axial bus lane and BRT design
- Transfer facility design
Thank You!!

Contact Us

- Bus Reform : gckim@sdi.re.kr
- IT System : parky@t-money.co.kr