Advanced 3-Dimensional Compact-City Development Strategies for the Seoul Metropolitan Area on Future

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I Future Trend & Seoul, Korea

II Development and Application Analysis of Transport Technology in Future

III Concept and Characteristics of Advanced 3-D Compact City

IV Location Alternatives and Application of Advanced 3-D Compact City in Seoul

V Conclusion and Policy Strategies
Future Trend & Seoul, Korea

1. Seoul and Korea at Present
2. Future Trend on Seoul, Korea and the World
3. Future Trend Summary and Development Prospect
I. Future Trend & Seoul, Korea

1. Seoul Metropolitan Area (SMA) at Present

### SMA Location

- **Seoul MA City**: 25 Districts (Gu)
- **Incheon MA City**: 8 Districts + 2 Counties (Gun)
- **Kyung-gi Province**: 27 Cities (Si) + 4 Counties

### SMA’s Administrative Government Structure
## 1. Seoul and Korea at Present

### Population and Economy

<table>
<thead>
<tr>
<th>MA</th>
<th>Population (Yr 2005)</th>
<th>% Pop. To Entire Korea</th>
<th>No. of Employees in 2008</th>
<th>No. Firms (Yr 2008)</th>
<th>% No. of Employees to Entire Korea</th>
<th>% GRDP to Entire Korea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seoul</td>
<td>9,820,171</td>
<td>20.77%</td>
<td>8,158,554</td>
<td>1,439,374</td>
<td>25.0%</td>
<td>23.6%</td>
</tr>
<tr>
<td>Incheon</td>
<td>2,531,280</td>
<td>5.35%</td>
<td>1,487,299</td>
<td>310,145</td>
<td>4.5%</td>
<td>4.7%</td>
</tr>
<tr>
<td>Kyung-gi</td>
<td>10,415,399</td>
<td>22.03%</td>
<td>6,403,782</td>
<td>1,153,201</td>
<td>19.6%</td>
<td>20.3%</td>
</tr>
<tr>
<td>Total</td>
<td>22,766,850</td>
<td>48.15%</td>
<td>16,049,635</td>
<td>2,902,720</td>
<td>49.3%</td>
<td>48.6%</td>
</tr>
<tr>
<td>Entire Korea</td>
<td>47,278,951</td>
<td>100.0%</td>
<td>32,576,560</td>
<td>6,529,564</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

**Population (%)**

- Seoul
- Incheon
- Kyung-gi
- Total

**GRDP to Entire Korea (%)**

- Others
- Incheon
- Kyung-gi
- Seoul
1. Seoul and Korea at Present

Population and Economy

### Population Density

Legend:
- Rail
- Road

Population Density

- under 3,000 persons/km²
- 3,000~5,000
- 5,000~10,000
- 10,000~20,000
- over 20,000 persons/km²

### Employment Density

Legend:
- Rail
- Road

Employment Density

- under 5,000 persons/km²
- 5,000~10,000
- 10,000~20,000
- 20,000~30,000
- over 30,000 persons/km²
I. Future Trend & Seoul, Korea

1. Seoul Metropolitan Area (SMA) at Present

Road-Oriented Suburbanization

- Road Network at Present
- Expressway (X-way) Investment

Suburbanization and its Direction

New Town Dev. Projects Without-City

- 1971
- 1981
- 1990
- 2000

Urbanized Area
I. Future Trend & Seoul, Korea

1. Seoul Metropolitan Area (SMA) at Present

Traffic Congestion and Costs

* Traffic Congestion Costs (Unit 100M Won) 1 Us $ = 1,110 Won
2. Future Trend in Seoul, Korea and the World

Economic Growth

GDP Estimates in Future (Korea) : Development Demand and Suburbanization ↑

- 4% Annual Increase of GDP on average
- 3% increase of world economy

- *source : 1980~2015 : IMF(International Monetary Fund Home Page)
- *source : 2020, 2030 : vision 2030 (Korea)-함께가는 희망한국-한세대 앞을 내다보는 미래전략보고서

I. Future Trend & Seoul, Korea

2. Future Trend in Seoul, Korea and the World

**Urbanization, Suburbanization and Mega-city Region**

- **Step 1. Urbanization**
- **Step 2. Metropolitanization**
- **Step 3. Mega-regionalization**

* Source: http://www.america2050.org/maps/
I. Future Trend & Seoul, Korea

2. Future Trend in Seoul, Korea and the World

Population Structure and Housing Demand in Korea

Population estimates in future

Estimated Households: Family Nuclearization

Super-Aging Society: Recentralization and Transit Demand
I. Future Trend & Seoul, Korea

2. Future Trend in Seoul, Korea and the World

### Income Distribution and Travel Budget

**Korea**

- Wolfson index
  - 0.23 (1994)
  - 0.25 (1993)
  - 0.020 (1984)
  - 0.018 (1993)

- Esteban & Ray index

**IMF Crisis**

- 0.20 (1994)
- 0.20 (1998)
- 0.28 (2005)
- 0.021 (1999)
- 0.021 (2005)

*Source: CEO Information (2006), SERI*

**World: Income Distribution → Polarization and Transit Demand ↑**

I. Future Trend & Seoul, Korea

2. Future Trend in Seoul, Korea and the World

Car Ownership and Travel Demand

Car-Oriented Mega-city Region?

- No. of Cars registered
- Motorization trend in Asia

Source: Jamie Leather (2009), p.4
I. Future Trend & Seoul, Korea

2. Future Trend in Seoul, Korea and the World

Fuel Price and Vehicle Technology

<table>
<thead>
<tr>
<th>Trend of World Fossil Fuel Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Graph of Fossil Fuel Prices" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fuel efficiency (Liter/100km)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Graph of Fuel Efficiency" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CO² M. Tons per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Graph of CO² Emissions" /></td>
</tr>
</tbody>
</table>

* Source: European Commission (2009) “EU Energy Trend to 2030, p.16

* Source: Shell (2010)
I. Future Trend & Seoul, Korea

2. Future Trend in Seoul, Korea and the World

Architecture and Civil Engineering Technology

Skyscraper in Korea

Skyscraper in the World

No. Floors & Energy consumption

*sources: CTBUH Journal (2009), left; Hammond & Jones (2008), right
## Summary of Future Trend in Seoul

<table>
<thead>
<tr>
<th>Category</th>
<th>Future Trend in 2030</th>
<th>Space and Transport Prospect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Economy</strong></td>
<td>- World Economy: Annual growth 3.53%</td>
<td>- Employment Demand ↑</td>
</tr>
<tr>
<td></td>
<td>- Domestic Economy: Annual growth 4%</td>
<td>- Development needs ↑</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Travel Demand ↑</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Transportation Infrastructure ↑</td>
</tr>
<tr>
<td><strong>Urbanization</strong></td>
<td>- 60% of the world's population living in cities</td>
<td>- Seoul (GDP ranking: 20→17)</td>
</tr>
<tr>
<td></td>
<td>- Growth of metropolitan areas</td>
<td>- Urban sprawl</td>
</tr>
<tr>
<td></td>
<td>- megalopolis</td>
<td>- Travel Demand (between regions) ↑</td>
</tr>
<tr>
<td><strong>Population</strong></td>
<td>- Metropolitan area ↑</td>
<td></td>
</tr>
<tr>
<td>Number</td>
<td>- Seoul ↓</td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td>- post-aged society (24.3%)</td>
<td>- Suburbanization ↑</td>
</tr>
<tr>
<td></td>
<td>- Increasing 1~2 person households (51.8%)</td>
<td>- travel distance ↑</td>
</tr>
<tr>
<td><strong>Commute</strong></td>
<td>- No. of car ↑</td>
<td>- Housing demand (in urban area) ↑</td>
</tr>
<tr>
<td>Car</td>
<td></td>
<td>- Medium/small-sized housing demand ↑</td>
</tr>
<tr>
<td>Oil price</td>
<td>- Oil Price ↑</td>
<td></td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation</td>
<td>- Fuel/Engine Technology ↑</td>
<td>- Travel costs ↓</td>
</tr>
<tr>
<td>Architecture</td>
<td>- High rise / Energy saving Technology ↑</td>
<td>- Personal Vehicles demand ↑</td>
</tr>
<tr>
<td>civil engineering</td>
<td>- Underground Space Technology ↑</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Underground Space Development needs ↑</td>
</tr>
</tbody>
</table>
I. Future Trend & Seoul, Korea

3. Future Trend Summary and Development Prospect

Prospect Scenarios and Climate Change

- Climate Change
- Counter-Measure
- Spatial Structure
- Trend
- Base

Advanced 3-D Compact City-Region

3-D Compact City-Region

Centralized Decentralization

Opportunity ↑

Recentration

Decentralization (Suburbanization)

Risk ↓

Skyscraper Underground

Income polarization
Strong dev. demand
High oil price

Aging society
Nuclear family

Population Growth

Engine & Fuel Efficiency

Strong dev. Demand Motorization

Population

Economy

Technology

Future Transport System + Modes

High oil price

Aging society

Nuclear family

Strong dev. Demand Motorization

Population Growth

Engine & Fuel Efficiency

Strong dev. Demand Motorization

Population Growth

Engine & Fuel Efficiency

Population

Economy

Technology
Development and Application Analysis of Transport Technology in Future

1. Future Prospects of Transport System and Modes
2. Application Analyses for Future
## II. Development and Application Analysis of Transport Technology in Future

### 1. Future Prospects of Transport System and Modes

#### Long-Distance Transport System and Modes

<table>
<thead>
<tr>
<th>Automated Highway System, AH</th>
<th>MAGLEV, magnetic levitation</th>
<th>Transition Flying Car</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Image</strong></td>
<td><img src="image1" alt="Automated Highway System" /></td>
<td><img src="image2" alt="MAGLEV" /></td>
</tr>
<tr>
<td><strong>Concept</strong></td>
<td>using existing roads, underground 9-25 Platoons. Manless driving</td>
<td>high speed magnetic levitation train. Maximum speed 6437km/h (now 581km/h)</td>
</tr>
<tr>
<td><strong>Case</strong></td>
<td>PATH Project(I-15 San Diego 1991)</td>
<td>MAGLEV(Tokyo-Osaka) trial run(2003)</td>
</tr>
<tr>
<td><strong>Benefits</strong></td>
<td>safety and mobility, capacity ↑. energy and time save. Efficiency of road space ↑. Just-In-Time</td>
<td>High speed / Large capacity. minimized vibration. . air Pollutant free</td>
</tr>
<tr>
<td><strong>Dis-advantages</strong></td>
<td>Traffic congestion (slip road). Uncertain environmental and land-use benefits. Possibility of major accidents. social equality ↓</td>
<td>high construction costs(US$34.6M per kilometer)and operating costs. noise</td>
</tr>
</tbody>
</table>
II. Development and Application Analysis of Transport Technology in Future

1. Future Prospects of Transport System and Modes

**Sustainability and Speed: Maglev**

* Source: Morichi(2008)

주) MAGLEV Test Line: Tokyo – Osaka
II. Development and Application Analysis of Transport Technology in Future

1. Future Prospects of Transport System and Modes

<table>
<thead>
<tr>
<th>Short-Distance Transport System and Modes</th>
<th>Automated Public Transit System, APTS</th>
<th>Bike Rapid Transit</th>
<th>Neighborhood Electronic Car</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Image</strong></td>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td><strong>Concept</strong></td>
<td>1~6 person, point-to-point, on-demand operating</td>
<td>overpass/underpass</td>
<td>Battery Electric Vehicles</td>
</tr>
<tr>
<td></td>
<td>Minimize interval</td>
<td>Interchange</td>
<td>low-speed</td>
</tr>
<tr>
<td></td>
<td>Max. 40km/h 3200~4800persons/hour</td>
<td>Speed ↑ Impact of Climate ↓</td>
<td>for two people</td>
</tr>
<tr>
<td></td>
<td>Using electric and hydrogen</td>
<td></td>
<td>Low Pollutant short distance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>under 40km/hr</td>
</tr>
<tr>
<td><strong>case</strong></td>
<td>Morgatown PRT, ULTra, CVS, PRT200 etc.</td>
<td>none</td>
<td>California, US</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US Transglide 2000, Canada Velo-city, Germany Velovent etc.</td>
<td>Zero Emissions Vehicle(rebate $1,500)</td>
</tr>
<tr>
<td><strong>Benefits</strong></td>
<td>Total Automation System</td>
<td>long-distance drive</td>
<td>Low Pollutant short distance vehicle</td>
</tr>
<tr>
<td></td>
<td>Occupy less space</td>
<td>Transportation Safety ↑</td>
<td>minimize parking space</td>
</tr>
<tr>
<td></td>
<td>Traffic congestion ↓</td>
<td>energy saving /Pollutant free</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pollutant free</td>
<td>promotion of health</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Door-to-Door/ minimize land use</td>
<td></td>
</tr>
<tr>
<td><strong>Disadvantages</strong></td>
<td>Not applicable in CBDs</td>
<td>energy consumption ↑ (high-tech systems)</td>
<td>Land consumption</td>
</tr>
<tr>
<td></td>
<td>initial investment ↑</td>
<td>Construction/ operating cost ↑</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Safety</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Potential greenhouse effect</td>
<td></td>
</tr>
</tbody>
</table>
II. Development and Application Analysis of Transport Technology in Future

1. Future Prospects of Transport System and Modes

## Logistics System

<table>
<thead>
<tr>
<th>CARGOCAP</th>
<th>Advanced Multi-modal Freight System</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Image</strong></td>
<td><img src="image_url" alt="Image" /></td>
</tr>
<tr>
<td><strong>Concept</strong></td>
<td>Underground Capsule(48”×32”) Logistics System using Electricity(500V) Intelligent Logistics System Better is high demand for small size of freight Just-in-Time pickup and Delivery</td>
</tr>
<tr>
<td><strong>case</strong></td>
<td>none (Applicable in Yr. 2015)</td>
</tr>
<tr>
<td><strong>Benefits</strong></td>
<td>Traffic congestion ↓ Environment &amp;energy efficiency ↑ Transportation Safety ↑ Land-use efficiency ↑ Freight transport reliability ↑</td>
</tr>
<tr>
<td><strong>Disadvantages</strong></td>
<td>none</td>
</tr>
</tbody>
</table>
II. Development and Application Analysis of Transport Technology in Future

2. Application Analyses for Future Transport

**Evaluation Criteria**

- **Criteria 1: Practicality and Competitiveness**
  - Technology development, Compatibility
  - Spatial hierarchy, Competitiveness
    - Substitutes vs. Complements
    - Innercity vs. Intercity vs. International

- **Criteria 2: Cost and time budget limits**
  - Compared to income levels,
    - Constant travel budget (8~12%)
  - Travel time invariability (per day) (time vs. distance)
    - time and space Convergence
II. Development and Application Analysis of Transport Technology in Future

2. Application Analyses for Future Transport

Evaluation Criteria 1: Application

- **Passenger Transport**
  - Inner City: short
  - Inter City: Medium
  - Inter National: Long

- **Freight Transport**
  - CAEGOCAP
  - Automated Multi Modal Freight System
  - Automated Highway System

- New system and modes are complementary, not competitive, goods
- But, the role of old transport system and modes is becoming shrinking
II. Development and Application Analysis of Transport Technology in Future

2. Application Analyses for Future Transport

Evaluation Criteria

- Criteria 3: Sustainability
  - Economic Efficiency
    (time, construction costs, operating costs)
  - Social Equity
    (quality of life, the mobility Handicapped)
  - Environmental Preservation
    (Pollution, Land consumption)
II. Development and Application Analysis of Transport Technology in Future

2. Application Analyses for Future Transport

Evaluation Criteria 2

- Bike Rapid Transit
- High-Speed Electronic Train
- Super-High Speed Megalev
- Personal Rapid Transit (PRT)
- Automated Highway System (AHS)
- High-Speed Electronic Vehicles (EVs)
- Transiton Flying Car

Travel Distance (Efficiency)
III

Concept and Characteristics of Advanced 3-Dimensional Compact City

1. The Concept and Vision of Advanced 3-D Compact City
2. Advanced 3-D Compact City Development Panning
III. Concept and Characteristics of Advanced 3-D Compact City

1. The Concept and Vision of Advanced 3-D Compact City

Concept and Planning Elements of Advanced 3-D Compact City
III. Concept and Characteristics of Advanced 3-D Compact City

1. The Concept and Vision of Advanced 3-D Compact City

Need of Advanced 3-D Compact City

- Reduction of CO² emissions
- The Correlation between Land-use and Energy consumption

![Graph showing land use policy and energy consumption]

- Land Use Policy
  - Density
    - Urban
    - Outer
    - Inner
  - Land Use Mix
    - Population acceptance of density level
    - Infrastructure investments
    - Attractive public transportation

![Graph showing change in mode choice and trip efficiency]

- Change in Mode Choice
  - Walking/cycling
  - Public transportation
  - Private car

- Trip Efficiency
  - Trip Length
  - Trip Chaining

Energy Consumption


Unit: CO² tons per passenger or freight ton
III. Concept and Characteristics of Advanced 3-D Compact City

1. The Concept and Vision of Advanced 3-D Compact City

Concept and Vision of Advanced 3-D Compact City

All-win (Economy, Society, Environment)
- Public Transportation
- Low speed transit on the ground
- Transportation Demand Management

Convenient and safe city
- Preservation of ground built environment in past and present
- Traffic Calming + Sufficient open space on ground
- Underground use for new transport and transfer system

Enhancement of land use and conservation of land resources
- Global and domestic economic growth
- Transport Hub
- Hierarchy network
- Multi-Dimensional Complex Developments Urban Growth Management

Compact and 24 hours activity
- High-density, high-rise, compact development
- Underground Arterial traffic system
- Automatic Logistics System

Improvement of Accessibility
- Multi-mode transit system
- Diversity
- Smart work center based on Information and Communication Facilities

Accessibility
- Multi-mode
- Dimensional dualistic transport system (Arterial & Feeder)

Sustainability
- Enhancement of land use and conservation of land resources
- Global and domestic economic growth
- Transport Hub
- Hierarchy network
- Multi-Dimensional Complex Developments Urban Growth Management

Activity
- Compact and 24 hours activity
- High-density, high-rise, compact development
- Underground Arterial traffic system
- Automatic Logistics System

Transportation Mode
- Multi-mode
- Dimensional dualistic transport system (Arterial & Feeder)

Space
- Enhancement of land use and conservation of land resources
- Global and domestic economic growth
- Transport Hub
- Hierarchy network
- Multi-Dimensional Complex Developments Urban Growth Management

Time
- Convenient and safe city
- Preservation of ground built environment in past and present
- Traffic Calming + Sufficient open space on ground
- Underground use for new transport and transfer system

Advanced 3-D Compact City
- Compact and 24 hours activity
- High-density, high-rise, compact development
- Underground Arterial traffic system
- Automatic Logistics System

THE KOREA TRANSPORT INSTITUTE
III. Concept and Characteristics of Advanced 3-D Compact City

2. Advanced 3-D Compact City Development Planning

**Transport Planning**
- UAHS: Underground AHS
- UMRT: Underground Metro Rapid Transit
- BRT: Bus Rapid Transit
- HS-EV: High Speed-Electronic Vehicle
- PRT: Personal Rapid Transit
- NEV: Neighborhood Electric Vehicle

**Logistics System**
III. Concept and Characteristics of Advanced 3-D Compact City

2. Advanced 3-D Compact City Development Planning

Land-Use Planning

Vertical Land Use

- Medium-Low density land use
  - Housing, Neighborhood Facilities
  - Floor area ratio: 100~250%

- Medium-High density land use
  - Housing, Education
  - Floor area ratio: 250~400%

- High density mixed housing
  - Housing, Office, Commercial
  - Floor area ratio: 500~600%
  - 500m radius

- High density mixed land use
  - High density housing, Office, Commercial, Transportation Hub
  - Floor area ratio: over 600%
  - 250m radius

* Source: Towards an Urban Renaissance, Urban Task Force, 1999, p62

Horizontal Land use Model _ Urban Center

- Medium-Low density land use
  - Housing, Neighborhood Facilities
  - Floor area ratio: 100~250%

- Medium-High density land use
  - Housing, Education
  - Floor area ratio: 250~400%

- High density mixed housing
  - Housing, Office, Commercial
  - Floor area ratio: 500~600%
  - 500m radius

- High density mixed land use
  - High density housing, Office, Commercial, Transportation Hub
  - Floor area ratio: over 600%
  - 250m radius

Horizontal Land use Model _ Edge city

- Medium-Low density land use
  - Housing, Neighborhood Facilities
  - Floor area ratio: 100~250%

- Medium-High density land use
  - Housing, Education, Neighborhood Facilities
  - Floor area ratio: 250~400%
  - 500m radius

- High density mixed housing
  - Housing, Office, Commercial
  - Transportation Hub
  - Floor area ratio: 500~600%
  - 250m radius

- High-tech industrial complex
  - Industrial complex, R&D, Freight facilities

* Source: Towards an Urban Renaissance, Urban Task Force, 1999, p62
III. Concept and Characteristics of Advanced 3-D Compact City

2. Advanced 3-D Compact City Development Planning

Urban Design Planning

Minimizing the block size → Walking accessibility ↑

* Source: http://neighbors.columbia.edu/pages/manplanning/proposed_plan/gallery.html

* Source: A Study on Appropriate Size of Pedestrians-friendly City Blocks, Su-Min Lee, 2006, p50,52
III. Concept and Characteristics of Advanced 3-D Compact City

2. Advanced 3-D Compact City Development Planning

Architecture Design Planning

- Improve pedestrian environment _ Piloti Structure

- Greening building and sky passageway


- Improve pedestrian environment _ Set-back: Pedestrian-way width ↑

IV Location Alternatives and Application of Advanced 3-Dimensional Compact City in Seoul

1. Location Alternatives in the Seoul Metropolitan
2. Advanced 3-D Compact City Development on the DeaGok Edge City
IV. Location Alternatives and Application of Advanced 3-D Compact City in Seoul

1. Location Alternatives in the Seoul Metropolitan Area

Transport SOC Investment Planning

Legend
- u-Smart Highway
- GTX
- IC
- JCT
- 지하주차장

0 3 6 12 Kilometers

Ongoing
IV. Location Alternatives and Application of Advanced 3-D Compact City in Seoul

1. Location Alternatives in the Seoul Metropolitan Area

<table>
<thead>
<tr>
<th>Classification</th>
<th>Radius 3km</th>
<th>Radius 1km</th>
<th>Radius 500m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>3,595 (36.65%)</td>
<td>406 (67.21%)</td>
<td>45 (80.35%)</td>
</tr>
<tr>
<td>Commercial</td>
<td>619 (6.31%)</td>
<td>23 (3.81%)</td>
<td>3 (5.365%)</td>
</tr>
<tr>
<td>Public Facilities</td>
<td>271 (2.76%)</td>
<td>12 (1.98%)</td>
<td>1 (1.78%)</td>
</tr>
<tr>
<td>Office</td>
<td>94 (2.76%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Leisure</td>
<td>24 (0.24%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Etc. (Religious Facilities, Factory..)</td>
<td>5,208 (53.08%)</td>
<td>163 (26.98%)</td>
<td>7 (12.5%)</td>
</tr>
<tr>
<td>total</td>
<td>9,811 (100%)</td>
<td>604 (100%)</td>
<td>56 (100%)</td>
</tr>
</tbody>
</table>

**Image:** Map of Seoul Metropolitan Area showing location alternatives and development areas.
IV. Location Alternatives and Application of Advanced 3-D Compact City in Seoul

2. Advanced 3-D Compact City Development on the DeaGok Edge City

Location and Transport System in Future

<table>
<thead>
<tr>
<th>Present</th>
<th>Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rail</strong></td>
<td><strong>Rail</strong></td>
</tr>
<tr>
<td>• Subway line3</td>
<td>• GTX(2017),</td>
</tr>
<tr>
<td>• Gyeongui double-track line (step1)</td>
<td>• Sosa~Deagok line(2012)</td>
</tr>
<tr>
<td></td>
<td>• Gyeongui double-track line (step2,2012),</td>
</tr>
<tr>
<td></td>
<td>• Seoul교외선 double-track (구상)</td>
</tr>
<tr>
<td><strong>Road</strong></td>
<td><strong>Road</strong></td>
</tr>
<tr>
<td>• Seoul ring expressway</td>
<td>• 2nd Jayuro (2010)</td>
</tr>
<tr>
<td>• National highway39</td>
<td>• National highway 39 Alternative Road (2011)</td>
</tr>
<tr>
<td>• Jayuro</td>
<td>• 백신도로( 일부 보상 중)</td>
</tr>
<tr>
<td>• Local Road no.74(ilsan~Susa다)</td>
<td>• Seoul~Munsan road(2014)</td>
</tr>
<tr>
<td>• Municipal road no.356</td>
<td></td>
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</tbody>
</table>
Conclusion and Policy Strategies

1. Needs of Advanced 3-D Compact city Development
2. Policy Strategies for its Realization
V. Conclusion and Policy Strategies

1. Needs of Advanced 3-D Compact City Development

Not demand, needs of Advanced 3-D Compact City

- Needs 1: Encouraging opportunities and discouraging risks
  - Strong economy growth
  - Income polarization
  - Aging society + nuclear family
  - High oil price
  - Architecture & civil engineering technology development
  → Climate change countermeasure

- Needs 2: People, utilitarian & advanced technology-oriented approach strategies
  - 3-Dimensional Compact City
    - Underground: Transport + SOC Facilities
    - Ground: People- & Environment-friendly Open Space and Transport
    - Sky: Skyscraper + Walking passageway + Flying car
  - Advanced City
    - Underground automated highway system / Megalev transit system
    - High and low speed EVs, PRT, BRT, E-bike, etc.
    - Advanced congestion pricing system for UAHS
V. Conclusion and Policy Strategies

2. Policy Strategies for its Realization

- Strong Support from Governments & Continuous Economic Growth
  - Change of spatial structure in a region can attained from strong support of gov.
  - A big-money investment and long-term construction project

- A Model City Development in Reality (Ex. Daegok Rail Station Area)
  - Realizing the expected impacts and encouraging the support

- Comprehensive & Integrated Planning and Policies
  - 3-D development ← integrated planning is necessary
  - Safety and disaster prevention planning is prerequisite

- Institutional Support for It
  - A new and advanced development project is achievable through institutional improvement
  - Integrating many related laws makes it easily achieve for future sustainability
Advanced 3-Dimensional Compact-City Development Strategies for the Seoul Metropolitan Area on Future

Thank you