City with Sustainable Development Goals

Incheon Metropolitan City

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Agenda

Introduction

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Incheon Metropolitan City

Challenges of Climate Change

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What is Climate Change?

Climate change is a change in the statistical distribution of weather patterns when that change lasts for an extended period of time (i.e., decades to millions of years).

Why urban action play an important role for Climate Change?

Human activities are the causes of climate change. There are two domain in human activity. First is direct forcing such as green house gas(GHGs) . Second is indirect forcing such as land-use(urbanization, deforestation, agricultural intensification).

“Cities consume 2/3 of the world energy and create over 70 percent of the global CO2 emissions.”

Land-use, urban transportation and environment?

Hypotheses

Raising urban densities is expected to lead to a decrease in energy consumption and consequently enables a reduction in pollutant emission.

Understanding the connection between land-use and transportation can be promoted by analyzing the urban spatial structure. Spatial structure have changed with introduction of private cars: an outward expansion of the metropolitan boundary, a density decline in all forms of land.

The United Nations(1993) focused on means to reduce CO2 emissions by reducing the vehicle-miles traveled (VMT). Most recommended methods were based on the often implicit, hypothesis that levels of urban transportation energy consumption are negatively correlated with urban density. (See Fig1)
Literature Review 2/4

Kenworthy's Cities and Automobile Dependence (1989).
Land-Use Policy as a demand management tool

1. The logic of Density
Planning for high density has two main goals in the context of transport energy consumption:

1) Reducing trip length and total mobility by concentrating residential, employment and services areas (Cervero, 1988).
2) Changing the modal split to reduce the share of the private car use in relation to public transportation, walking and cycling

2. The Logic of Mixed Land

A second major policy initiative is planning for higher density in conjunction with planning for mixed land-use (Black, 1996). Numerous hypotheses which suggest that mixed land-use is likely to reduce trip length, and change the distribution of trips during the day, have been proposed. A major behavioral change in modal split, diverting trips from the private car to public...
3. Priority to public transportation

The purpose of giving priority to public transportation, whether rail or bus, is to shift passengers from private cars to more environmentally friendly travel modes.

This shift is supposed to be achieved by creating an attractive and competitive public transportation system (Feitelson et al., 1998).

4. Priority to non-motorized modes of transport

The underlying goal of providing priority to non-motorized modes such as walking and cycling is to reduce energy consumption (Plane, 1995). Policy makers propose this course to support the fast growing, yet small, demand for these modes which replace the private car in dense urban areas.
The social factors:
(1) The willingness of the population to accept high levels of density
(2) The social-economic status of the population. The target is to influence non-captive users of transportation,
(3) Compatibility of employment supply

The policy factors:
(1) land-use policy regarding mix patterns and density and the location in which it is applied.
(2) Infrastructure and public transportation investments
Incheon Metropolitan City 1/2

- **Historical Marine City**
  - Trade point for 1,000s years
  - 168 Treasure Islands

- **International Logistic Hub**
  - Largest port in the west coast
  - Incheon International airport, the Hub of Northeast Asia

- **The Heart of Economic Capital (IFEZ)**

- **Center of Green Growth in Korea**
  - 10 UN organizations
  - 4 international organizations
  - Secretariat of Green Climate Fund (GCF)
Incheon Metropolitan City 2/2

**Seoul**
- Population: 9.8 million
- Area: 605 km²
- GRDP: 357,080 billion KRW
- Major industry: service (87.0%), construction (7.2%)

**Incheon**
- Population: 2.9 million
- Area: 1,063 km²
- GRDP: 80,862 billion KRW
- Major industry: service (69.5%), manufacturing (24.6%)

**Ulsan**
- Population: 1.2 million
- Area: 1,061 km²
- GRDP: 71,236 billion KRW
- Major industry: service (58.5%), manufacturing (33.9%)

**Daegu**
- Population: 2.5 million
- Area: 884 km²
- GRDP: 49,673 billion KRW
- Major industry: service (74.0%), manufacturing (19.2%)

**Daejeon**
- Population: 1.5 million
- Area: 539 km²
- GRDP: 35,922 billion KRW
- Major industry: service (82.7%), manufacturing (10.1%)

**Busan**
- Population: 3.4 million
- Area: 770 km²
- GRDP: 81,198 billion KRW
- Major industry: service (76.9%), manufacturing (15.4%)
Main Challenges of Climate Change 1/1

Severe Drought, “Farmers using wastewater in farmland”

Gangwhado - Drought(2015.10)

Threats of Fine Dust, China is not the only victim

Songdo - Fine Dust(2017.3)

Flood Risk, Citizens were unprepared

Namgu - Flooding(2018.4)

Heat Wave Death, 70 years old man dies

Gangwha - Heat Wave(2016.8)
Incheon Metropolitan City has worked hard to take responsibility for creating “sustainable development.”

Incheon sustainability report has been published to extrapolate on Incheon city’s sustainability policies, from economic, social, and environmental and policy and administrative perspectives.

Its purpose is to lay the groundwork for sustainable development by bringing to light administrative policies and how they have performed economically, socially, and environmentally.
Sustainable Development Goals 2/4

Sustainable Development

Goal

Economic
Environment
Social
Policy & Administration

Index

Economic Growth  2
Economic Inequality  1
Employment High Quality Job  4
Social Economy  1
Sustainable economy  2
Environmental Disaster  1
Industrial Disaster  1
Transportation Safety  1
R&D  1
Old Market Place  1
Urban renewal  1
Total  16

Water Resource  3
River and Wildlife  3
Energy  2
Climate Change  1
Air  1
Soil and Undergroundwater  2
Sustainable Transportation  2
Recycle & Waste  5
Aquatic ecosystem  4
Land ecosystem & Greenspace  3
Total  26

Social Welfare  2
Poverty  2
Food & Wellbeing  2
Health  4
Social Education  2
Culture  2
Lifetime Education  2
Safety for Women  1
Gender Equality  3
Multiculture  1
Housing  1
Security  2
Disabled people  1
Community  1
Total  26

Transparency  1
Government Service  1
Open Government  2
Civil complaint  1
Budget  1
Citizen Participation  2
Operation of Government  2
Total  10
### Make Cities more Inclusive Safe, Resilient Sustainable

#### Incheon Sustainable Development Index

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<td>Share of public transportation</td>
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<tr>
<td>Distance of bike route</td>
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<tr>
<td>Percentage of vacant residential houses remodeled</td>
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<td>Car accident dearth rate</td>
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#### Related Index

- Percent of green space
- Green space area per capita
- Healthiness of stream ecosystem
- Number of crime per 1,000 people
- Damage of disasters (number of victims, estimated damage in money terms)
- Average concentration of PM2.5, PM10
### SDG13 Take urgent action to combat climate change and its impacts 4/4

#### Incheon Sustainable Development Index

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<td>• GHG Emission per capita</td>
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<td>• Number of disasters, number of victims, scale of the damage</td>
<td>• Energy consumption per capita</td>
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<td>• Proportion of renewable energy among primary energy supply</td>
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Land use - Coastline expansion

From 1985 to 2015, Incheon urban density decreased from 7,459/km² to 2,736km².

The main reason is coastline expansion for urbanization. The Coastline expansion lowered urban densities as the city grown, negatively affecting the sustainability of urban development - increase in energy consumption and consequently increases emission.

Policy makers should understand the that land-policy can change the level of energy consumption.
Transportation: Bike routes

Policy makers in Incheon proposed attractive bike lane in new city like Songdo, which is to replace private car. The total length of bike road in Songdo is 20km, and was constructed near 6 subway station in 2009.

There is almost 120 citywide bike rental system in Incheon where people can rent public bike and return at the public bike station nearby.

Non-motorized mode such as walking and cycling reduce energy consumption (Plane, 1995).
Case Study 3/6

**IFEZ Smart City : Disaster Monitoring System**

Disaster can occur any time either it is natural or human made. To make city safe and resilient from urban crime and disaster, IFEZ introduced **Cloud technology** in the public sector.

**Big data-Cloud technology** : traffic, environment, crime, communication, 3D spatial data technology

If a crime occurs. IFEZ CCTV will detect the location and report emergencies to the nearest police station.
Case Study 4/6

**Sewage heat recovery system**

**Songdo** Sewage heat recovery system, a heat pump used to capture the warmth of wastewater and transfer it district heat.

Heat recovery system produces 7.7(Gcal/h) and the IFEZ will benefit over 1.15 million dollars annually.

Incheon is also planned roadmap to increase **renewable energy share** at 11% by 2035.
Zero Energy Building

To avoid the worst effects of climate change we need to drastically cut back on the emissions associated with the operation of new buildings.

In Incheon, 28 Buildings including Northeast Asia Trade Tower, Songdo Convensia was built Eco-friendly Building certified by LEED-NC (Leadership in Energy and Environment Design, LEED)
Incheon City is a leader in lowering greenhouse gas emissions through 2015-2016.

According to Ministry of Environment Korea

Incheon was awarded 1<sup>st</sup> place for Public Sector GHG & Energy Goal Management Excellence Award Ceremony

The city reduced GHG to 42.6% (reduction of 12,959 tons of CO2-eq) compared to the standard emission of 33,422 tons of CO2-eq. It was recognized the highest reduction rate among 243 local governments (17 wide-area and 226 basic).

The city focused on improving facilities such as renewable power generation facility, operation of LED lighting equipment, improvement and replacement of high-efficiency facilities to reduce greenhouse gas emissions.
Conclusion

Cities are key actors in efforts to respond to climate change

Incheon Metropolitan City government has put effort to take responsibility for creating Sustainable development.

Government cannot address those issue alone. Wide range of actors: central government, civil society, private sector and international community should work together,
Thank You!

For more information visit, http://climate.idi.re.kr/

Continue the conversation with us online, follow:

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