Sustainable Urban Development in Jabodetabek

Minister of National Development Planning/
Head of the National Development Planning Agency

The 6th International Conference of Jabodetabek Study Forum: “Urban-rural and Upland-Coastal Connectivity in Managing Sustainable Urbanizing World”

Bogor, 29th August 2018
Urbanization in Indonesia
Indonesia’s Population Projection 2015-2045

- In 2045, Indonesia will experience a substantial population growth— an increase of 63.4 million or 24.7 percent. About 67.1 percent of population will live in urban areas.

- Numbers of working age population will continue to increase, but the share of younger groups (aged 15-29) will decline. It is likely as the result of the extension of average years of schooling.

- The labor force is projected to grow over the next 30 years at an annual rate of 1.84 percent. By 2045, the labor force is projected to reach 206 million.

Source: *Indonesia Population Projection Revision 2015-2045 (latest estimates)
Advanced Urbanization in Java

Island | Population (000) | Proportion to national (%) | Population density (/km²)
---|---|---|---
Sumatera | 51,697,225 | 39.1% / 60.9% Rural | 106 / 151
Java | 138,311,286 | 58.6% / 41.1% Rural | 137 / 204
Kalimantan | 14,105,730 | 42.2% / 57.8% Rural | 25 / 41
Sulawesi | 17,663,879 | 33.6% / 66.4% Rural | 92 / 127
Bali and Nusa Tenggara | 13,327,280 | 39.2% / 60.8% Rural | 13 / 21
Maluku and Papua | 11,972,106 | 29.4% / 70.6% Rural | 2

Spreading Growth through Urban Development

**Legend:**
- Main roads
- Rails
- National Activity Centers
- Regional Activity Centers
- Port cities
- Aerotropolis
- Dam
- PLTN
- Airports
- Palapa Ring Lane

**Key Areas:**
- **Mebidangro** = Medan-Binjai-Deli Serdang-Karo
- **Patungrayaagung** = Palembang-Betung-Indralaya-Kaysugung
- **Banjarbakula**
- **Jabodetabekjur** = Jakarta-Bogor-Depok-Tangerang-Bekasi-Cianjur
- **Kedungsepur** = Kendal-Demak-Ungaran-Salatiga-Semarang-Purwodadi
- **Sarbagita** = Denpasar-Badung-Gianyar-Tabanan
- **Banjarbakula** = Banjarmasin-Banjarbaru-Banjar-Barito Kuala-Tanah Laut
- **Mamminasata** = Makassar-Maros-Sungguminasa-Takalar

- **Manado-Minahasa-Bitung**
- **Bandung Basin**
- **Gerbangkertosusilo** = Gresik-Bangkalan-Mojokerto-Surabaya-Sidoarjo-Lamongan

**Locations:**
- **Ambon**
- **Jayapura**
- **Sorong**
Urbanization Without Growth

- 1% increased in Indonesia’s urbanization contributes to 4% increased in GDP per capita

- The better leveraged is urbanization, the more it will benefit national economic growth

- But if badly managed, there is a risk of “urbanization without growth”

Source: World Bank, 2017 (based on WDI data 2016)
Urban Condition in Jabodetabek
Transportation

<table>
<thead>
<tr>
<th>Parameter 2015</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>POPULATION</strong></td>
<td>10.1 Million</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ECONOMIC (GRDP)</strong></td>
<td>1,924 Trillion</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TRANSPORT (MODE SHARE)</strong></td>
<td>Car 38%</td>
</tr>
<tr>
<td></td>
<td>Motorbike 49%</td>
</tr>
<tr>
<td></td>
<td>Public 13%</td>
</tr>
<tr>
<td><strong>MOTORIZATION</strong></td>
<td>3.4 M car</td>
</tr>
<tr>
<td></td>
<td>13.9 M motorbike</td>
</tr>
<tr>
<td><strong>MOBILITY (SPEED)</strong></td>
<td>5-10 km/hour</td>
</tr>
</tbody>
</table>

**Housing Condition**

**Sub-standard Housing (%)**

“Housing that does not fulfill one of the standard condition of physical, living area, access to drinking water, and access to sanitation indicator”

![Graph showing sub-standard housing (%) for different years and provinces]

<table>
<thead>
<tr>
<th>Indicator</th>
<th>National</th>
<th>Jakarta Province</th>
<th>West Java Province</th>
<th>Banten Province</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Physical condition (Inadequate Roof/wall/floor condition)</td>
<td>21.57</td>
<td>25.64</td>
<td>57.60</td>
<td>50.76</td>
</tr>
<tr>
<td>2. Living area (living area per capita &lt; 7.2 m²)</td>
<td>9.30</td>
<td>8.45</td>
<td>29.43</td>
<td>24.67</td>
</tr>
<tr>
<td>3. Access to Drinking Water</td>
<td>38.88</td>
<td>40.93</td>
<td>34.49</td>
<td>39.13</td>
</tr>
</tbody>
</table>

Source: Susenas

- Percentage of sub-standard housing in 3 provinces higher than national percentage.
- In 2017, the highest percentage of sub-standard housing is 74.55% (Banten Province)

- Nationally, the **indicator that has the highest sub-standard condition** is access to drinking water.
- The indicator that has the **highest sub-standard condition in Jakarta Province** is physical condition.
- The indicator that has the **highest sub-standard condition in West Java and Banten Province** is access to drinking water.
Drinking Water Access and Wastewater Management

Water Supply

Pipeline Network Access

Jabodetabek

19.15%

Source: BPPSPAM (2017)

Access to Improved Drinking Water (in %)

<table>
<thead>
<tr>
<th>Year</th>
<th>Improved Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>78,063</td>
</tr>
<tr>
<td>2017</td>
<td>78,023</td>
</tr>
</tbody>
</table>

Source: Susenas BPS (2017)

Sanitation Access

Source: Susenas BPS (2017)

79.15%  Improved Access
3.57%   Practicing Open Defecation
8.92%   Unimproved Access
12.9%   Safely Managed (Part of Improved Access)

Pipeline Network Water Supply

Source: SIMSPAM, PU (2017)

Idle Capacity: 8.233 L/sec
Land and Water

02 Raw Water Limitation
- Raw water needs in 2017 reached 28 m³/sec, but can only be fulfilled by 18 m³/sec.
- The projection of Jakarta City's raw water supply needs in 2030 is 41.6 m³/sec.

03 River and Jakarta Bay Pollution
- River water from upstream to downstream is in poor condition, both physical quality, chemical quality and biological quality.
- Non-optimal urban waste management system causes wastewater entering the river flow.

04 Land Limitation
- Jakarta needs new space or land for settlements, offices, industry, agriculture, infrastructure and other business activities.

01 Flood
- Causes: Catchment Area degradation, Land Subsidence, Sea Level Rises, poor conditions of urban drainage.
- In 2050, it is predicted that 35.61% of Jakarta's land will be submerged in sea water.

The Jakarta Bay coastline has changed due to the reclamation process.
Land Subsidence in residential areas is greater than the port area.

Source: Diolah dari Heri Andreas (Geodesi ITB) dan Perpustakaan Nasional
Development of built-up area (besides happening in DKI Jakarta) occurs in the Bodetabekpunjur area, especially in areas bordering DKI Jakarta.

These developments indicate the growth of urban areas in the Jabodetabekpunjur region which are functionally related to one another.

Source: Kementerian ATR, 2016
Land Subsidence in North Coast Java
Sustainable Development
Banten-DKI Jakarta-West Java
Issues in Capital City

**WATER RESILIENCE**
- Current bulk water supply is 18 m³/s while the demand is 28 m³/s (deficit 10 m³/s)
- The demand is predicted to rise up to 38 m³/s in 2030
- In bigger scale, bulk water demand of Megapolitan Banten-DKI Jakarta-West Java is predicted at 103 m³/s

**GARBAGE AND SANITATION**
- Low quality of existing on-site treatment system (septic tank)
- Low progress of Waste Water Treatment Plant (WWTP) construction due to limited space and house connection problem. Hence, the progress is not able to catch up the escalation of pollution at riverbank and also at Jakarta Bay
- WWTP does not treat industrial and solid waste at riverbank, only domestic waste

**FLOODS**
- Obstructed drainage, river shallowing and flow blockage at the estuary cause Jakarta become susceptible to urban flood
- Land subsidence at the coast leads to rob flood. In addition, sea level rise magnifies the impact

**TRANSPORT INFRASTRUCTURE**
- Missing link which connects Tangerang and Bekasi burdens the capital particularly northern route Jabodetabek (over capacity of existing road)
- High dwelling time of Tj. Priok Port (3-4 days)
- Low space of Tj. Priok Port Container Terminal
- Soekarno-Hatta Airport is the busiest airport in ASEAN with 1,200 airplane/day (Singapore 1,000/day). High usage of runway decrease the aviation safety

**LAND SCARCITY**
- Jabodetabekpjunjur has been developing rapidly and surpassed prediction. Therefore, the demand of space is significant.
- Agricultural land has turned into commercial district, industrial district, housing and infrastructures without proper attention to food security
Regional Development Vision of Jakarta Bay

**Belt Road Initiative**

**Kra Canal**

**Main Line of Sea Toll Road (Tol Laut)**

**Indonesian Archipelagic Sea Lanes/Alur Laut Kepulauan Indonesia (ALKI)**

**Proposed Route**

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**INDONESIA** is located between **TPP** (Trans-Pacific Partnership) and **BRI** (Belt Road Initiative).

**SUNDA STRAIT** has Traffic Separation Scheme (TSS) to manage shipping line. The depth and width of the strait is **100 m and 24 km** respectively.

**JAKARTA BECOME GLOBAL LOGISTIC HUB** by developing Tj. Priok Port to depth of -20 m and utilizing Sunda Strait potential on ALKI 1.

**JAKARTA BECOME THE CENTER OF GROWTH OF NATIONAL ECONOMY** by providing space of 8000 Ha at the north of Jakarta.

**JAKARTA BECOME WATER SELF-CONTAINED-CITY** by constructing offshore DAM which holds 2.44 billion m³ of bulk water at the north of Jakarta.

**JAKARTA BECOME GREEN CITY** by using renewable energy (wind, solar and water). The renewable energy infrastructure will be built on the offshore DAM and on offshore sea wall.

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Member countries of TPP
Indonesia has issued Presidential Decree No. 59/2017 regarding achieving Sustainable Development Goals (SDGs)

169 SDGs Indicators have been integrated into National Medium Term Development Plan (RPJMN) 2020-2024

The solution of problems in Megapolitan Banten-DKI Jakarta-West Java has to be harmonized with the implementation of SDGs

The issues are closely related to SDGs number 6, 9, 11, 13, 14 and 15
**Offshore Dam Concept at Jakarta Bay**

**FLOOD SOLUTION WITH POLDER SYSTEM**
- Offshore Sea Wall construction (68.81 km) at depth of 0 to -20 m
- Transversal Waterway construction which acts as long storage with capacity of ±56.7 million m³
- Retention lake with area of ±8,300 Ha and volume of ±831.5 million m³
- The required pump capacity is 190 m³/s

**SOLUTION FOR WATER SUPPLY AND WATER QUALITY**
- Offshore DAM provides reservoir of bulk water up to 1.6 billion m³
- Downstream waste water treatment by means of trash rack, sediment trap, artificial wetland, and WWTP construction on new land
- Provide space of 400 Ha for final/temporary processing place to treat waste (cut tipping fee)

**PUBLIC INFRASTRUCTURE DEVELOPMENT**
- Utilize new land for runway or additional airport terminal
- Support Tj. Priok Port development to become deep sea port (draft -20 m) without dredging to accommodate mother vessel
- Land transport development (toll and rail road) on offshore sea wall

**SELF-SUSTAINED ASSET (RENEWABLE ENERGY)**
- Installation of Solar cell on the surface of retention lake
- Installation of medium wind turbine along the offshore sea wall
- Micro-Hydro Power plant operation by means of elevation difference as the consequence of lowering water surface on offshore DAM

**CONSERVATION AND EXTENSION OF VEGETATION ECOSYSTEM**
- Conservation of existing mangrove (± 376 Ha)
- New mangrove along offshore sea wall and canal (± 352 Ha)

**FISHERMAN AND MARITIME INDUSTRY DEVELOPMENT**
- Fisherman still has direct access to open sea through the canal
- National Fisheries Center (NFC) development (200 Ha)
- Acquire new land (±8,000 ha) as the result of lowering water surface

**TOTAL COST OF ALL OFFSHORE DAM COMPONENT:**
± RP 170 TRILLION → ± RP 2.1 MILLION/m²
Concept Development

Updated Master Plan NCICD 2016

1. Phase M (2019-2025) consists of several component:
   a) Integration of 17 islands
   b) Extended Polder System
   c) Integrated treatment at downstream, midstream, and upstream
   d) Construction of Offshore Sea Wall and River Dike
   e) Build retention lake between 17 islands and mainland
   f) Continuation of bulk water supply and clean water network distribution improvement
   g) Construction of toll road on offshore sea wall
   h) Continuation of water quality and sanitation program
   i) Mangrove extension
   j) Coastal revitalization with relocation of affected locals

2. Phase O (2030-2040) consists of several component:
   a) Construction of Offshore Sea Wall
   b) Integrated treatment at downstream, midstream, and upstream
   c) Construction of Offshore DAM
   d) Offshore pump installation
   e) Construction of toll road on offshore sea wall
   f) Deep sea port development

Offshore DAM Concept

- Combination of Phase M (extended folder) and Phase O (offshore sea dike) from Updated Master Plan 2016
- Regional development basis
- Covers Megapolitan Banten – DKI Jakarta – Jawa Barat
# Stages of Construction

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>1. Preparation</strong></td>
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</tbody>
</table>
- Pre-Feasibility Study  
- Feasibility Study  
- Detail Engineering Design (DED) by using non-conventional dike to reduce cost and the technology is eco-friendly  
- Public Private Partnership (PPP) preparation |
| **2. Transversal Waterway** |  
- Construction of transversal waterway by using non-conventional dike  
- Transversal waterway acts as coastal dike  
- Increase the river dike elevation to contain the maximum flood discharge |
| **3. Offshore DAM Compartment** |  
- Construction of sea wall per segment by considering:  
  - Segment for clean water  
  - Fisherman’s access to open sea and fishing port  
  - Tj. Priok Port Development  
  - Toll and rail road alignment |
| **4. Supporting Facilities** |  
- Water gate installation as part of flood mitigation system  
- Utilization of canal for sorting out subsea pipeline and cable at Jakarta bay  
- Implementation of downstream waste water treatment  
- Installation of renewable energy facilities (solar, wind and water) |
| **5. Land Expansion** |  
- Water surface lowering at offshore DAM up to -5m resulting to new land along the coast  
- Application of urban inspiring design on the new land to attract investor |
Offshore Dam as Role Model for Development of Northern Coast of Java

Development of Northern Java Coast:

New land: ± 176,071 Ha
Area of Offshore DAM: ± 652,686 Ha
Water Volume Offshore DAM: ± 48.96 Billion m³
Discussion and Progress

MEETING AND DISCUSSION WITH MINISTRIES

- MINISTRY OF TRANSPORTATION
- MINISTRY OF ENVIRONMENT AND FORESTRY
- MINISTRY OF AGRARIAN AFFAIRS AND SPATIAL PLANNING
- MINISTRY OF MARINE AFFAIRS AND FISHERIES
- MINISTRY OF PUBLIC WORKS AND HOUSING
- PELINDO
- COORDINATING MINISTRY OF ECONOMIC AFFAIRS

MEETING AND DISCUSSION WITH UNIVERSITIES

- INSTITUT TEKNOLOGI BANDUNG
- INSITUT PERTANIAN BOGOR
- UNIVERSITAS GAJAH MADA
- UNIVERSITAS INDONESIA
- UNIVERSITAS HASANUDDIN

MINISTERIAL DECREES:

1. Establishment of an integrated planning team of the northern coast of Java development.
2. Establishment of an expert panel consisting of experts, practitioners, and academics from 5 universities.
3. Expert panel assesses 7 aspects:
   - Technical
   - Social
   - Environment
   - Technology
   - Financial
   - Spatial planning
   - Law
Sustainable Urban Planning and Development
Integrating SDGs and NUA in Indonesia

**SDGs:**
Universal; Integration; No One Left Behind

**NUA:**
Equality – Leave No One Behind: Sustainable and Inclusive; Environmental Sustainability
Vision for Urban Development in Indonesia

Liveable

Competitive

Green and Resilient

Local urban identity

Instruments:

- Long term vision for each city
- Integrated planning-budgeting-financing system
- Institutional arrangement for multidistrict urban areas
- Transparent, accountable and responsive governance
- Information technology for efficient urban management
Elements for Integrated Development

Planning

Capital Investment & Financial Plan

Development Facilitation & Financing

Urban Management Monev & Control

Source: World Bank, 2017
Defining a Metropolitan Statistical Area
...Functional Urban Areas: a City and its Commuting Zone

Definition of a city

Urban centre
(duster of high-density cells with population >50,000 inhabitants per km²)

Commute
> 50% of its population in an urban centre

High-density cell
(>1,500 inhabitants per km²)

Identification of a commuting zone

City
Commute area
Commute area after including enclaves and dropping exclaves

City
Commute

Commute with > 15% of its employed population commuting to the city

Source: Eurostat, accessed 2018
THANK YOU
APPENDIX
Components of Sustainable Urban Development and Management

National Urban System (SPN)
- a. City’s Function
- b. Interrelation between cities

Environment
- a. Open Public Spaces
- b. Waste management strategies
- c. Clean energy

Governance
- a. Government
- b. Government control
- c. Effective public policies

Urban and Urban Areas Development

Social
- a. Sport facilities
- b. Education
- c. Place of worship
- d. Healthcare

Infrastructure
- a. Drinking water
- b. Sanitation
- c. Housing
- d. Electricity
- e. Telecommunication
- f. Roads

Economy
- a. Trading
- b. Opportunities for investment
- c. Funding resources
- d. Goods and people movement (logistics)
Solutions for Infrastructure Development

1. Dike or embankment construction on river and shore as short term solution
   - Pumping station construction and installation
   - Improvement on the upstream area
   - Completion of spatial document (DKI Jakarta)
   - Offshore dike construction as long term solution

2. Rain water harvesting and recycle water as alternative resources for clean water
   - Construction of raw/bulk water treatment installation
   - Provision of clean water and raw/bulk water transmission network and distribution

3. Construction of centralized, communal, and community based sanitation system

4. Development of monitoring method on land subsidence data and data sharing mechanism including installation of monitoring tools (extensometer)
   - Formulation of mitigation actions against land subsidence accompanied with application of those mitigation actions on the selected/prioritized location
   - Formulation of adaptation actions against land subsidence
   - Formulation of implementation and planning control framework on land subsidence including action plan
Elements for Integrated Development

Planning

Capital Investment & Financial Plan

Development Facilitation & Financing

Urban Management Monev & Control

Source: World Bank, 2017
## Avoid Shift Improve Strategy: Urban Transportation Development

“Development of urban transportation is needed to be integrated with the support of mass public transportation and Transit Oriented Development (TOD) facility as well as technology improvement.”

<table>
<thead>
<tr>
<th>AVOID</th>
<th>SHIFT</th>
<th>IMPROVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reducing the need to travel and avoid unnecessary trip</td>
<td>Promote Shifting to Public Transport with Inclusive Design</td>
<td>Increasing the energy efficiency of vehicles, fuels and transport operations</td>
</tr>
<tr>
<td>• Travel management with urban planning and mixed use concept</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Development of Transit Oriented Development (TOD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Benefit: travel time reduction, air quality improvement, health, safety, and more</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Increase the use of Public Transport, Pedestrian, and Bicycles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Development of Public Transport</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Benefit: congestion reduction and equitable access, pollution and safety reduction.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Energy-saving technologies (fuel)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Intelligent Transportation Systems (ITS) Development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Benefit: Increase the use of renewable energy, productivity, and affordability.</td>
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</tbody>
</table>
Transportation and spatial planning are interrelated with each other. Urban sprawling needs to be stopped with the development of integrated Transit Oriented Development (TOD) and mass urban transport infrastructure.

**CURRENT CONDITION**

**Urban Sprawling**

- Urban sprawling condition where the lower middle class is increasingly marginalized due to the inability to access the occupancy caused by the high price of land in the middle of the city.
- The lower middle classes are increasingly bear the burden of the cost of transportation resulting from staying away from the center of activity in the middle of the city.

**IDEAL CONDITION**

**Concept of Vertical Development with TOD**

- Vertical consolidation needs to be encouraged because it is very efficient in the utilization of land that remains relatively fixed with the need for increasing occupancy.
- The development should be allocated to the locations that are well connected with public transport and economic activity centers.

**Adjustment of Basic Building Coefficient (KDB) and Building Floor Coefficient (KLB)**

- Stations /Public Transportation Terminals

Source: Kementerian Koordinator Bidang Ekonomi, 2017
Best Practice: Synergy of Planning and Funding of Transit Oriented Development and Mass Transportation in Hong Kong

HONGKONG MRT DEVELOPMENT SCHEME

- The business model used is the construction of Railway Plus Property (R + P) with revenue share from the property for the development of the rail network.

RAILWAY HONGKONG COMPANY REVENUES

66% of Hong Kong Railway's revenues are derived from the development and rental of residential and commercial properties as part of TOD.

Share Revenue from MRT Hongkong

38% 34% 15% 13%

The Development of TOD + MRT Facilities in Hong Kong Since 1980

Local Governments with immediate needs for infrastructure investments, and have expressed their interest in issuing Regional Bonds (8/93)

Source: World Bank, 2017
Investment needs exceeds financing capacity

Investment need gap  
Borrowing capacity  
Revenue (excl. Salary, earmarked and contingency fund)

Investment needs, borrowing capacity, and total revenue for 14 qualified subnational governments, USD Millions

Urban Financing

- Transfer from Central Government
- Bank and institutional loans
- Non-government investment (PPP, KPBU, PINA, BUMN, etc)
- Zakat
- Long term municipal bonds

Projects for sustainable cities
Different sources of financing to answer Local Government’s different infrastructure investment needs

Addressed by creative financing such as Regional Infrastructure Development Fund (RIDF), KPBU, PINA, etc
Why RIDF?

**Before RIDF**
Top-down approach, limited LG access to financing, inadequate project preparation & appraisal, weak loan monitoring led to defaults & distressed projects

**RIDF**
Demand-based, increase access to financing, rigorous appraisal, thorough monitoring including safeguards standards to ensure low default & good quality infrastructures

<table>
<thead>
<tr>
<th>Eligible sectors</th>
<th>Eligible sub-projects (examples)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water &amp; sanitation</td>
<td>WTP, pumping stat</td>
</tr>
<tr>
<td>Environmental infrastructure</td>
<td>Sanitary landfill, waste processing fac</td>
</tr>
<tr>
<td>Low income housing and slum upgrading</td>
<td>Public housing, integrated urban upgrading</td>
</tr>
<tr>
<td>Productive and logistic infrastructure</td>
<td>Road construction, flyovers</td>
</tr>
<tr>
<td>Social infrastructure</td>
<td>School rehab</td>
</tr>
</tbody>
</table>
Issues in Urban Financing in Tackling Inadequate Urban Infrastructure

- Cities are not self reliant – revenue is not enough to cover expenses
- Absence of financial investment plans
- Lack of financial viability – weak creditworthiness
- Low recognition for private investment’s to support the mission toward liveable cities’ – **high recognition for competitiveness**