



# SELF EVALUATION OF LCT-I SYSTEM OF BANDA ACEH CITY

---

**1<sup>st</sup> APEC LCMT SYMPOSIUM**  
Low Carbon Model Town (LCMT) Project Phase 7  
14-15 September 2017  
**Shangrilla Hotel-Jakarta**



By:  
**The City Director** of Banda Aceh City

# **STRUCTURE**

---



**City Profile**



**Carbon Emission in Banda Aceh City**



**Self Evaluation Result**



**Future Plan of Low Carbon Development**



# Banda Aceh



Area:  
**61 km<sup>2</sup>**

Population:  
**254.904**  
Inhabitant

Elevation :  
**0.80 m**  
Above Sea Level

**9** Subdistrict

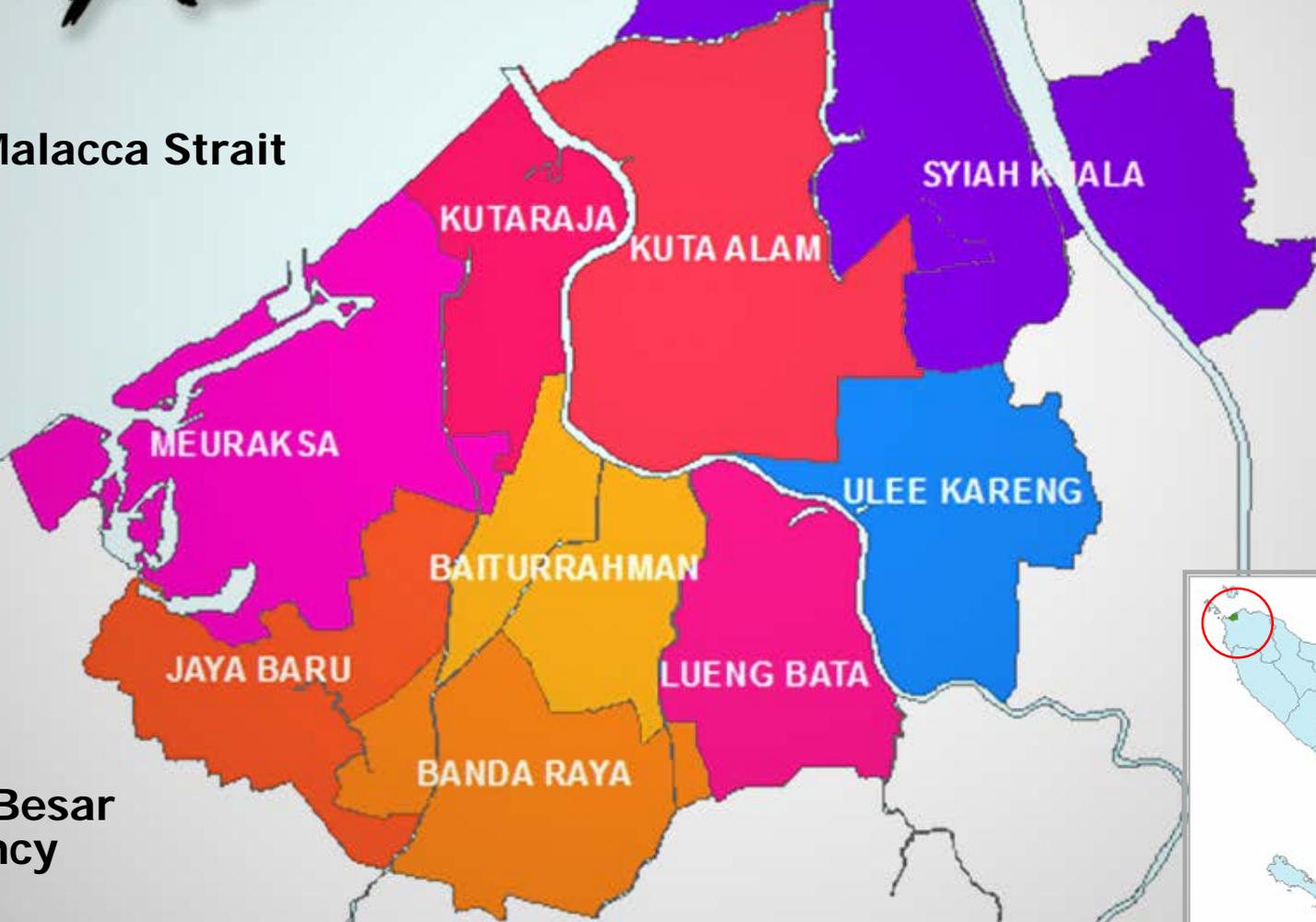
**90** Villages

GDP per Capita:  
**4.712 USD**  
IDR 62 M

# Banda Aceh

Malacca Strait

Aceh Besar  
Regency



Aceh Besar  
Regency

# ECONOMY

Post tsunami Banda Aceh undergoes rapid urban and economic development

PARAMETER	2004	2012	2015
Economic Growth (%)	4.81	6.02	5.01
Inflation (%)	6.97	3.32	1.27
Local Own Revenue (million IDR)	9.561	99.022	209.914
GDP per Capita	IDR 7,6 M	IDR 39,3 M	IDR 58,9 M
Population (person)	239,146	228,562	250,303
Poverty rate (%)	8.89	9.08	7.78
Unemployment rate (%)	10.10	7.17	12.00

# Profile Infrastructure



**86%**

Clean Water  
Coverage



**90%**

Livable Houses



**84%**

Household with Good  
Sanitation



**88%**

Waste Collection  
Service Coverage



**23%**

Green Open Space



# **CARBON EMISSION IN BANDA ACEH CITY**

---

# CARBON EMISSION

---

- Banda Aceh produce 448.171 ton CO<sub>2</sub> eq/ year or 1,8 ton CO<sub>2</sub> eq/ capita/ year
- The main contributor is transportation sector, that contributes 67% of total emission.
- It shows that huge efforts must be taken in transportation sector to reduce carbon emission significantly.
- Target to reduce 12% carbon emission
- The emission reduction is mostly contributed by BRT Transkutaraaja

**To support Green City vision**

# CARBON EMISSION



**LABI-LABI**



**Mostly from transportation sector**

# REGULATION TO SUPPORT ENVIRONMENT FRIENDLY DEVELOPMENT

---

## Banda Aceh's regulation to support LCT :

- Spatial master plan 2014-2034
- Sanitation White Book
- Mayor decree about waste reduction team
- The action plan for greenhouse gasses reduction 2013-2018
- The action plan for greenhouse gasses reduction for Trikarsa Bogor 2015-2020
- The Master plan for Compact and Smart City of Banda Aceh 2016-2021
- Green open space master plan

**To support Green City vision**

# GREEN OPEN SPACE MASTERPLAN 2029



PEMERINTAH KOTA BANDA ACEH

## MASTERPLAN RUANG TERBUKA HIJAU KOTA BANDA ACEH

### PETA POTENSI RUANG TERBUKA HIJAU (RTH)

----- Batas Kecamatan

-  Ruang Terbuka Hijau (RTH) Park
-  Ruang Terbuka Hijau (RTH) River
-  Ruang Terbuka Non Hijau
-  Jalan
-  Sungai/Air



Scale bar and projection information:  
Skala: 1:50,000  
Datum: WGS 1984  
Sistem Koordinat: UTM  
Zona: 48N  
Datum: WGS 1984  
Sistem Koordinat: UTM  
Zona: 48N

#### PETA ORIENTASI



Information regarding the map's preparation and approval:  
Dibuat oleh: Dinas Perencanaan Kota  
Disetujui oleh: Kepala Dinas Perencanaan Kota  
Tanggal: 2023

# **MAIN STRATEGY**

---

## **Banda Aceh's main strategy to achieve low carbon town:**

- Establishing quality public transportation by developing bus rapid transit system Transkutaraaja
- Increasing the use of renewable energy
- Energy use management
- Better waste management and the utilization of methane for green energy
- Extending green space
- Regulation to support green building and green waste management
- Disaster mitigation based planning

**To support low carbon town**



# LCT-I EVALUATION OF BANDA ACEH

---

# **LCTI-I SHEET 1. DEMAND**

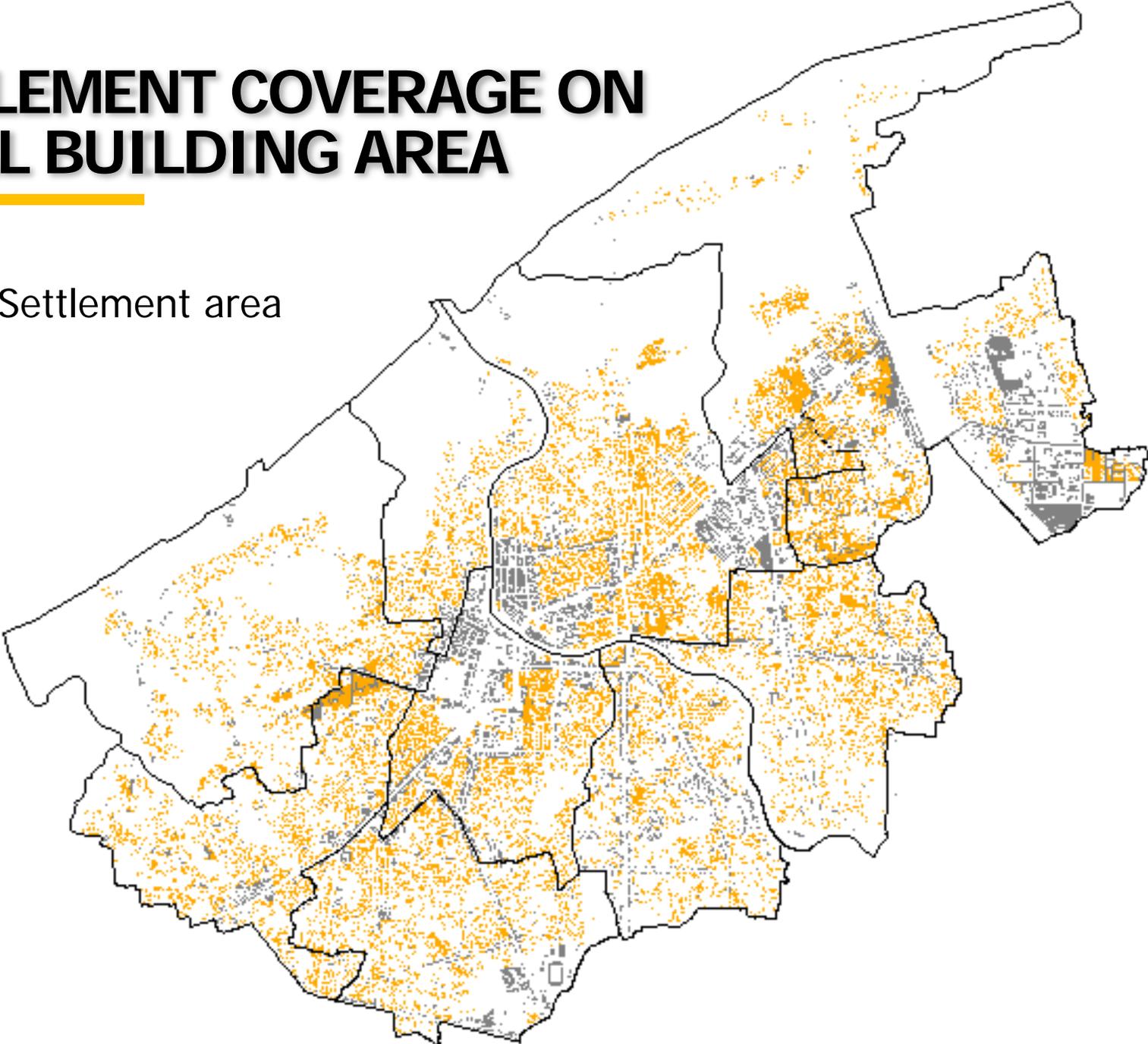
## **1. Town Structure**

- Building covers around 16% of total area
- Residential area covers around more than 60% of total building
- Most building are in used
- Bus rapid transit Transkutaraja has been established. But it has not influenced the land use yet
- BRT is not integrated with vertical development currently

# SETTLEMENT COVERAGE ON TOTAL BUILDING AREA



Settlement area



# **LCTI-I SHEET 1. DEMAND**

---

## **2. Buildings**

- Banda Aceh has not established system or criteria for thermal performance and energy saving equipment performance yet.
- The use of natural energy has not commenced yet. But, the planning for such policy has been introduced in planning document such as Regional Action Plan for Greenhouse Gasses Reduction (RAD GRK) 2013-2018 and Compilation of Action Plan for Greenhouse Gasses Reduction-Trikarsa Bogor, and Master plan for Smart compact City 2016-2021.
- There is already effort to formulate green construction guideline

# **LCTI-I SHEET 1. DEMAND**

## **3. Transportation**

- BRT already operating
- The coverage area of public transportation is limited because only two corridors are operating
- Bicycle lane exists but does not work properly
- The development of new bridge, flyover and underpass
- Banda Aceh has not formulated subsidy system for low carbon vehicle yet
- Eco driving has been implemented but in limited scale
- Traffic congestion in peak hour

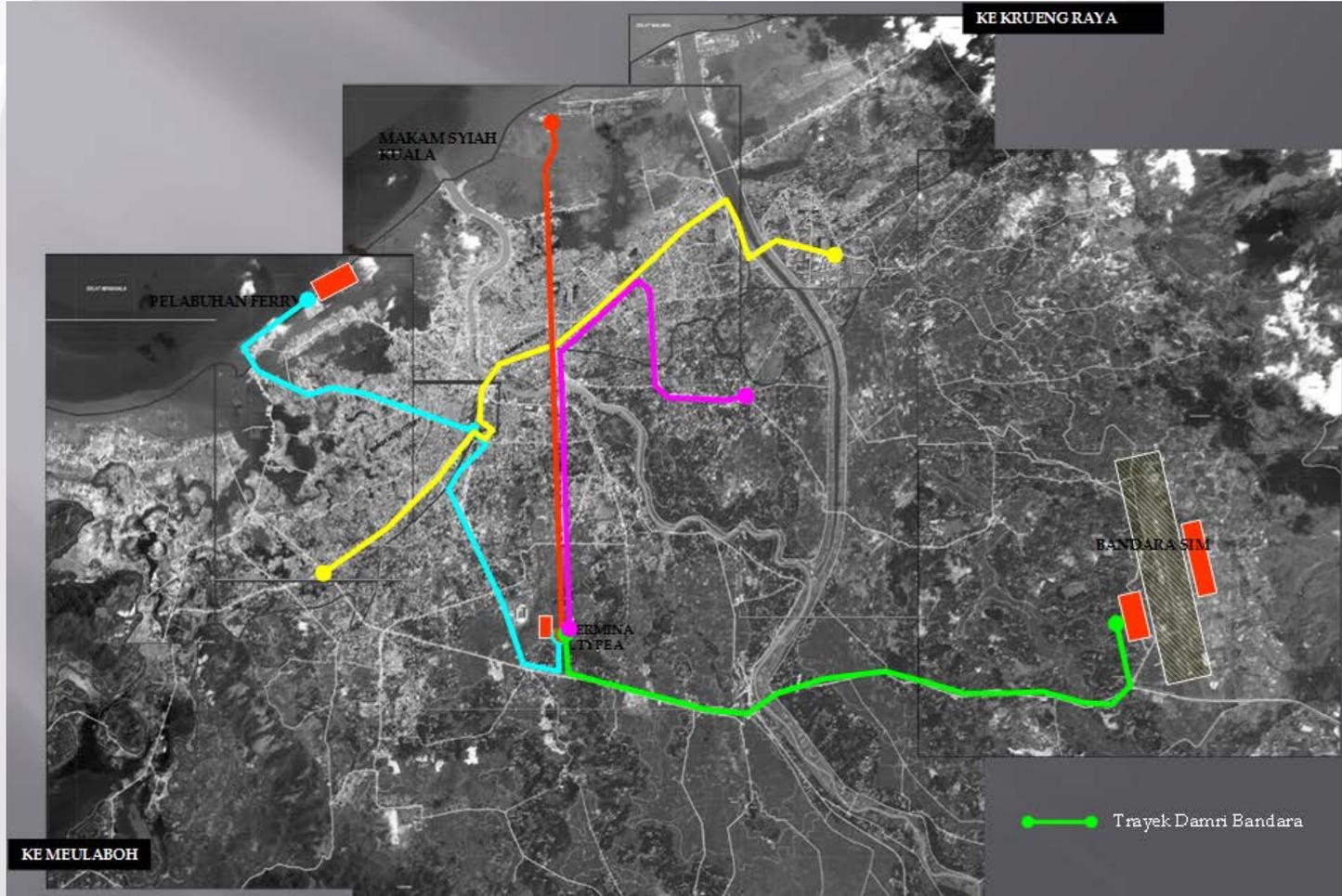
# LCTI-I SHEET 1. DEMAND

## 3. Transportation



# LCTI-I SHEET 1. DEMAND

## 3. Transportation

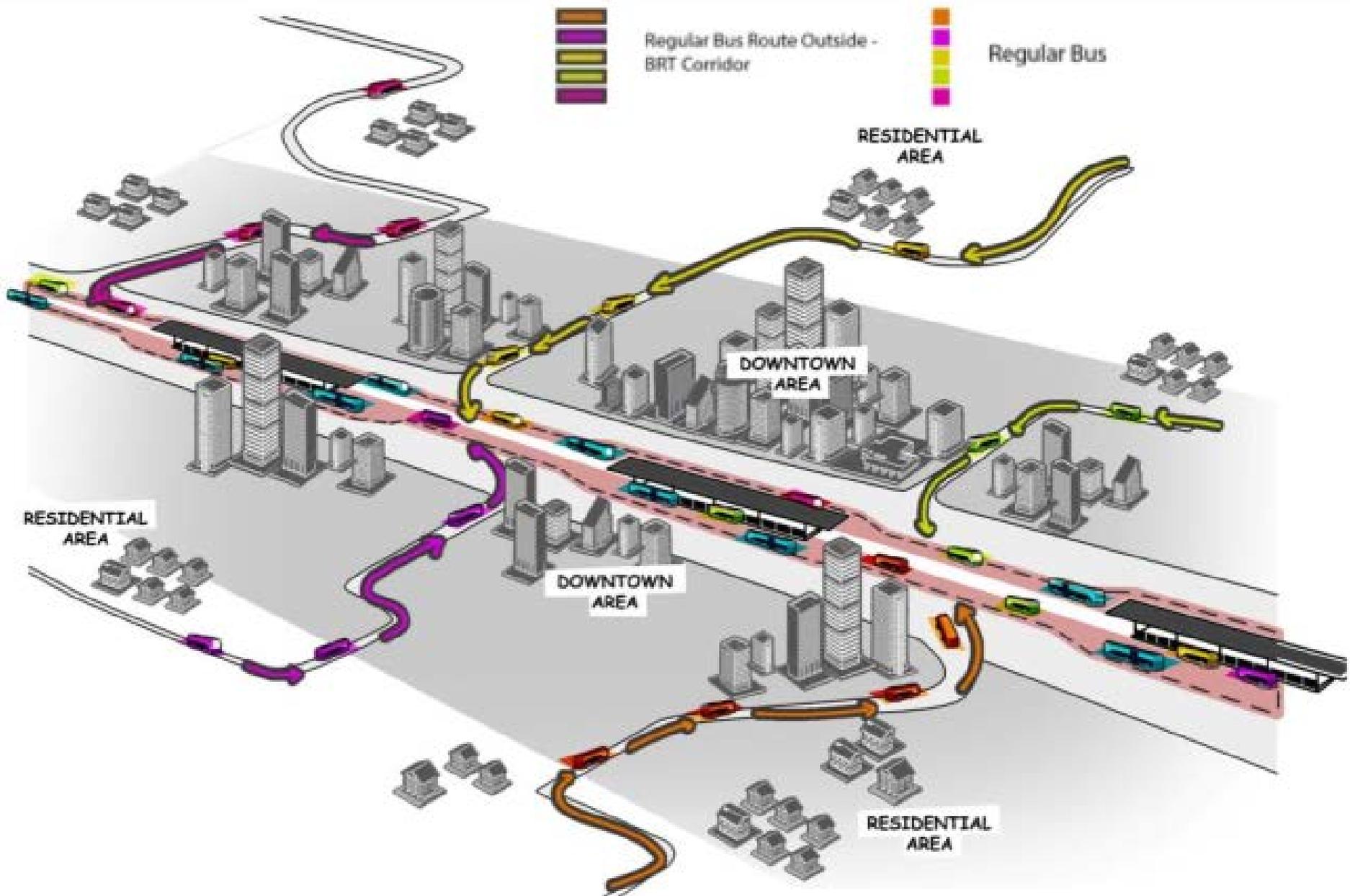


# BRT Transkutaraaja Corridor Plan

# BRT TRANSKUTARAJA IMPROVEMENT PLAN: SEPARATED LANE



# BRT TRANSKUTARAJA IMPROVEMENT RECOMMENDATION: DIRECT SERVICES SYSTEM



# LCTI-I SHEET 1. DEMAND

---

## 3. Transportation



# LCTI-I SHEET 2. SUPPLY

## 4. Area Energy System

- The city has not establish plan for area energy system yet.

## 5. Untapped Energy

- There are several efforts to introduce untapped energy in small scale for example the utilization of methane from black water treatment plant and landfill to produce energy for surrounding households.



**Methane collector pipe**

# **LCTI-I SHEET 2. SUPPLY**

## **6. Renewable Energy**

- The utilization of solar panel and LED lamp for street lighting and in government building to introduce solar energy and LED
- Small proportion of electricity and thermal energy cost has been already covered by renewable energy



## **7. Multi-Energy System**

- The government has not introduced multi-energy system yet

# **LCTI-I SHEET 3. DEMAND & SUPPLY**

## **8. Energy Management System**

- The government still has not introduced energy management of buildings/ area and AEMS (Area energy management system)
- Smart micro grid has not been introduced yet

# LCTI-I SHEET 4. ENVIRONMENT AND RESOURCES

## 9. Greenery

- The green space covers 23% of total area
- 13,2% is public green space
- 20% public green space required
- Urban forest
- Green corridor



## 10. Water Management

- Water usage concept has not been developed yet
- Recycled waste water is used in some facilities
- Recycled waste water from black water treatment plant is used for watering green corridor

# LCTI-I SHEET 4. ENVIRONMENT AND RECOURCES

## 11. Waste Management

- 200 ton solid waste per day
- 0,75 kg/ capita/ day
- Waste reduction target in waste master plan
- Government regulation for waste reduction
- Waste bank at school and other public facilities to separate plastic waste
- Full waste separation has not been implemented yet
- Plastic waste separation by scavenger for waste recycling



# **LCTI-I SHEET 4. ENVIRONMENT AND RECOURCES**

---

## **12. Polution**

- Effort to reduce air pollution has been implemented in small scale by the utilization of emission control facility which control emission from public transportation and freight vehicle
- The city government has established sanitation regulation to reduce soil contamination

# LCTI-I SHEET 4. ENVIRONMENT AND RECOURCES

## 12. Polution

- Reduce water pollution by developing waste water treatment plant. 5 WWTP's are functional currently.
- Ongoing development WWTP in Gp Jawa for 5000 households



# **LCTI-I SHEET 5. GOVERNANCE**

## **13. Policy Framework**

- Efforts towards low carbon town are integrated into planning document. In doing so, the city also establish cooperation with CDIA, UCLG, CityNet etc
- The city government assigns regular budget to extend green space
- The city has not yet established Business/ Life Cycle Plan (B/ LCP)
- DRR is integrated into planning document.
- The conservation of coastal area
- Sanitation master plan as guideline to counter flood and developing drainage infrastructure

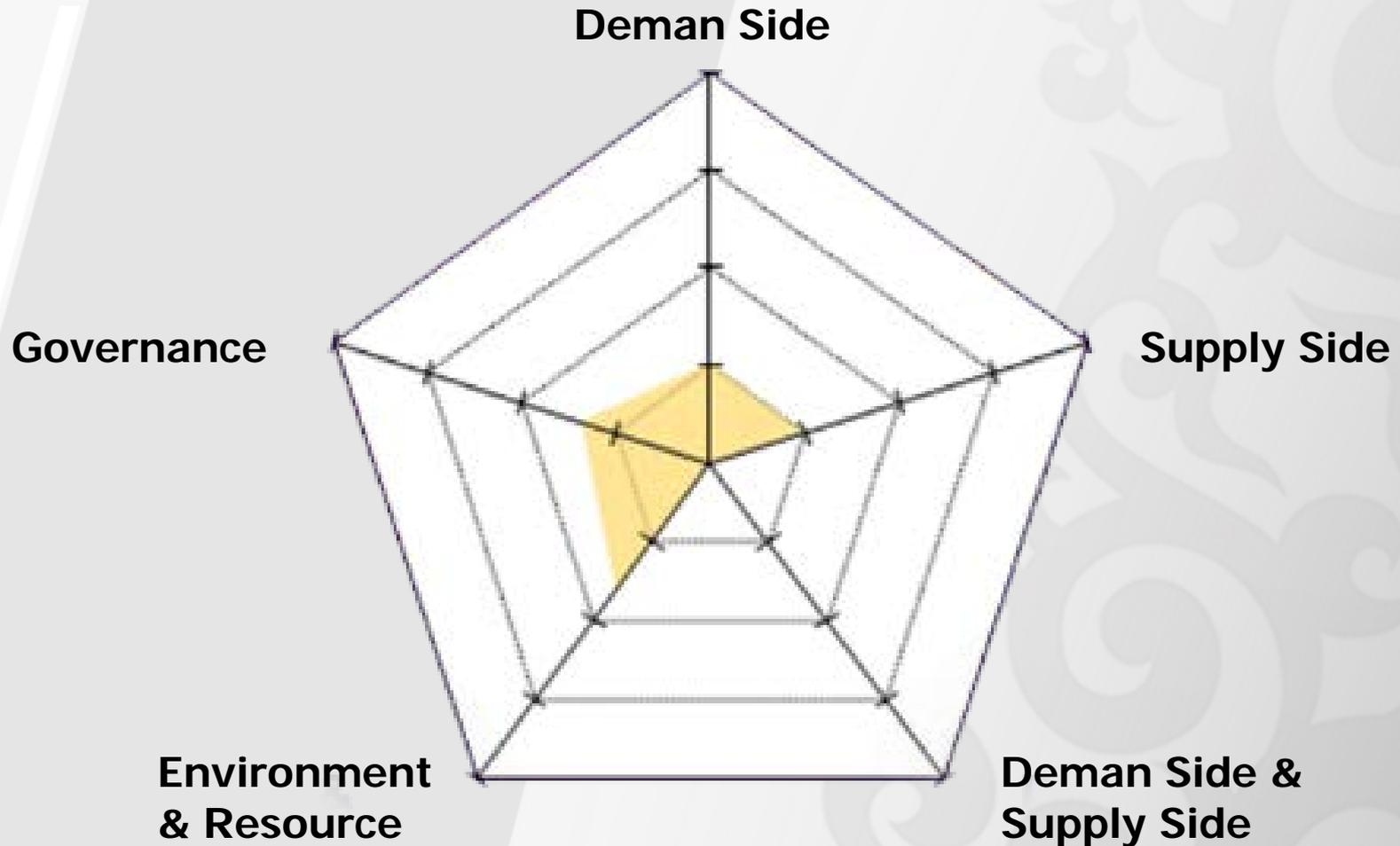
# **LCTI-I SHEET 5. GOVERNANCE**

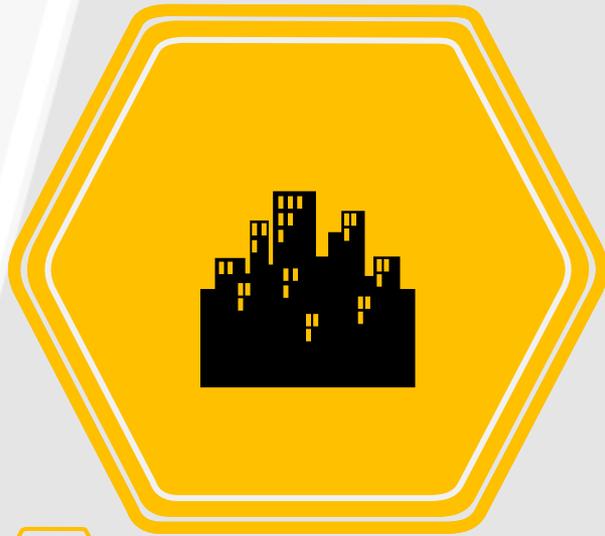
## **14. Education and Management**

- Cooperation with green community
- Community participation program is planned in documents such as Smart-Compact City Masterplan and The Action Plan of Greenhouse Gas Emission Reduction
- Community association for green planning called P2KH (Green City Development Program) consist of city official, green community and academician to support green city. But the community does not function well in the last few year. It is necessary to empower the community.

# LCTI-I SELF EVALUATION RESULT

## Current radar chart





# **FUTURE PLAN OF LOW CARBON DEVELOPMENT**

---

# FUTURE PLAN OF LOW CARBON DEVELOPMENT

---

## Assessment Items

- Bus Rapid Transit Transkutaraja separated lane
- Improving the coverage area of BRT Transkutaraja
- Transit Oriented Development (TOD) along the BRT line
- Establishing system for energy saving construction, including in measuring thermal performance, energy saving equipment performance and natural.
- Establishing green construction guidelines
- Promoting low carbon vehicle and eco driving
- Introducing area energy
- Increasing the utilization of renewable energy

# FUTURE PLAN OF LOW CARBON DEVELOPMENT

---

## Assessment Items

- Introducing multi energy system
- Introducing energy management, area energy management system, and smart micro grid
- Extending greenery
- Improving the effort to reduce water usage and increase water reuse
- Optimizing waste reduction effort
- Increasing waste reuse and recycling
- Improving emission measurement and monitoring facilities
- Regular check of water pollution
- Increasing the effort to reduce soil contamination

# FUTURE PLAN OF LOW CARBON DEVELOPMENT

---

## Assessment Items

- Establishing the goals for low carbon town and carry actual effort
- Secure budget for low carbon town
- Establishing Business /Life Contingency Plan in pilot area
- Implementing development based on spatial master plan
- Carrying education for low carbon town
- Increasing the role of community association

# LCTI-I SELF EVALUATION RESULT

## Future radar chart

