



# Analysis Low Carbon Transport Actions and Projects in Indonesian Cities

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Workshop: Deep Transition and Integration of Power and Transport Systems(APEC project EWG 10 2018A)

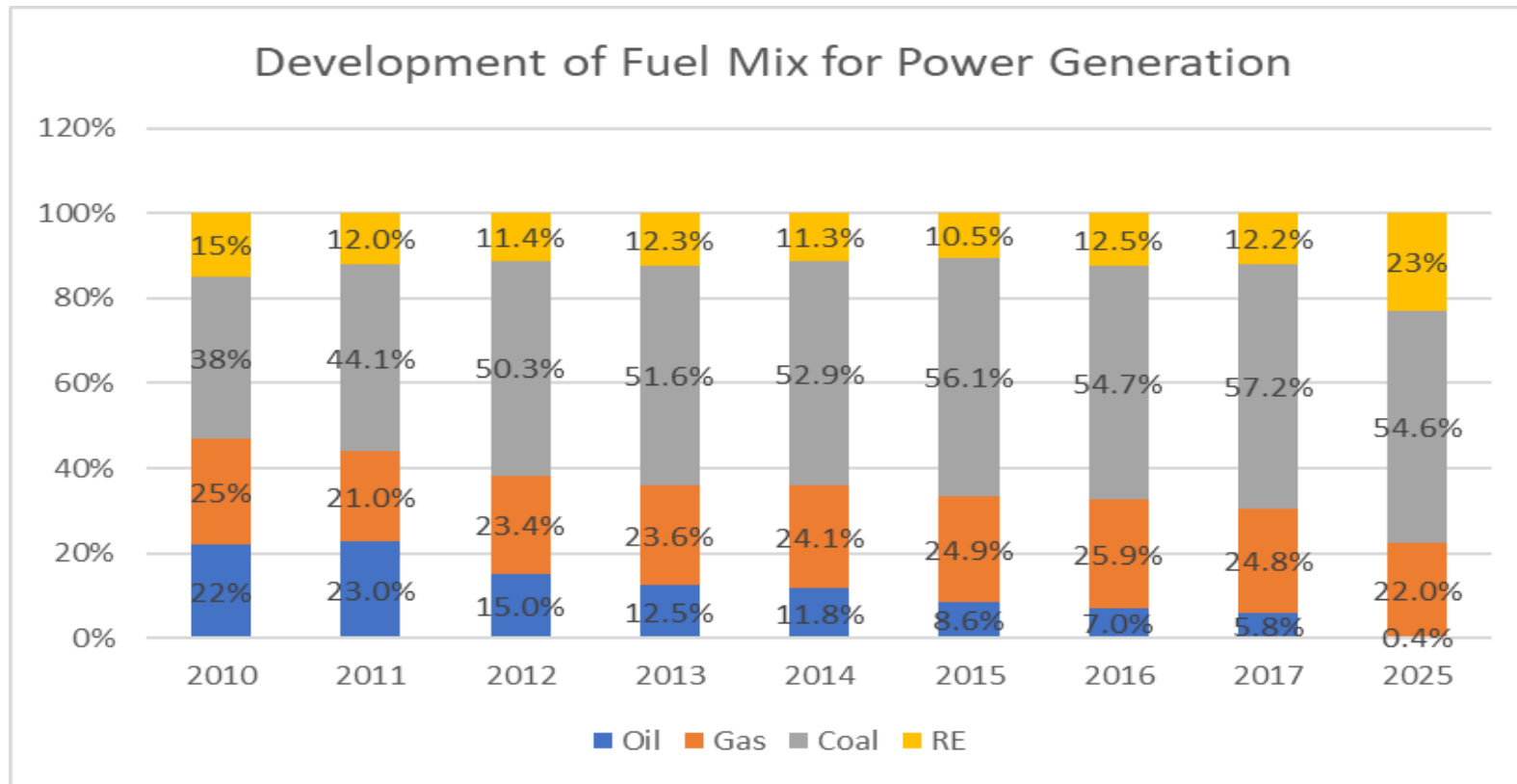
NREL Office, Washington DC, 14-15 January 2020



# Indonesia's Nationally Determined

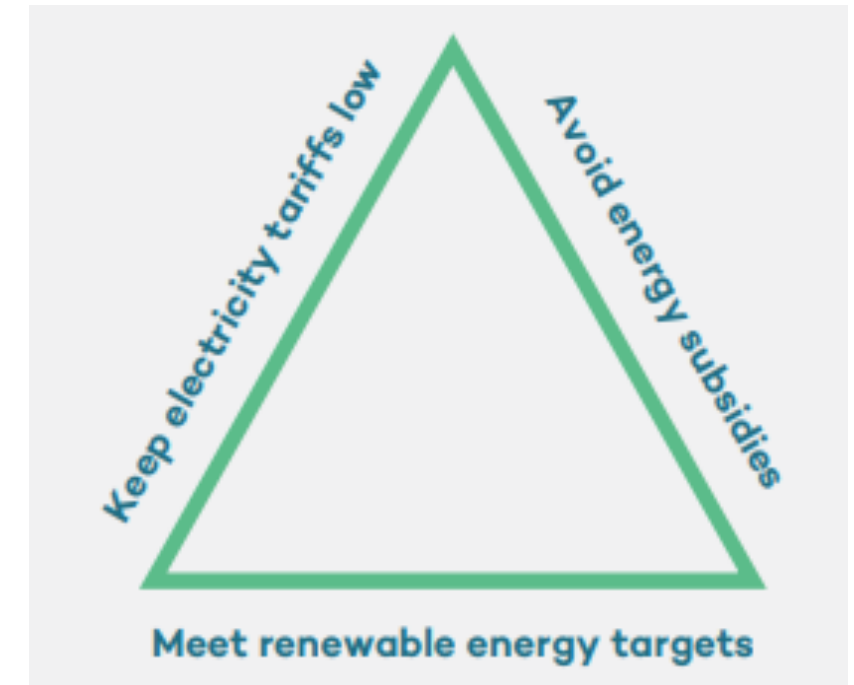
- ## Contribution
1. Unconditional 29% target; 41% conditional against 2030 BAU (2,881 GT by 2030)
  2. Transport is included in energy sector (19% of emissions in 2005); renewables to account for 23% of energy mix by 2030
  3. Takes into account the SDGs, The UN 2030 Agenda for Sustainable Development (SDGs) stresses importance of targeting sustainable energy (goal7) and air quality (goal 11).
  4. Describes enhancing MRV and transparency framework
  5. Underlines synergy and coherence across policies—reference to Indonesia environmental protection and management law
  6. Notes that non-state actors (i.e cities) to play important role

# The energy trends and challenges in Indonesia



Source: (PricewaterhouseCoopers, 2018), (PLN, 2019)

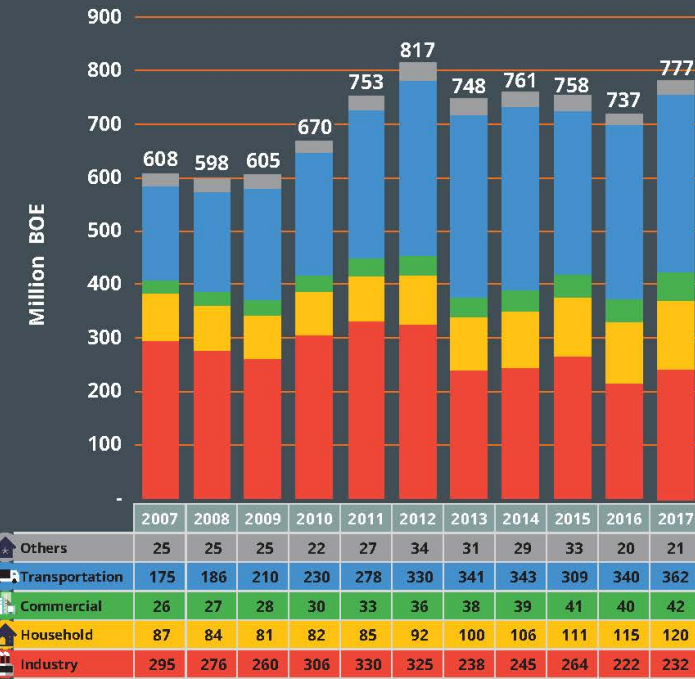
## Indonesia's Energy Trilemma



Source: IISD, 2019

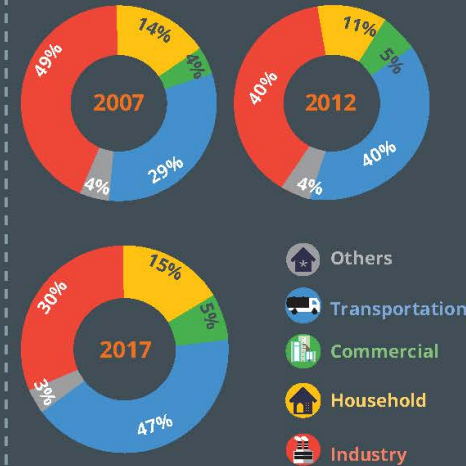
# The energy consumption and energy conservation on Transport Sector in Indonesia

## FINAL ENERGY CONSUMPTION



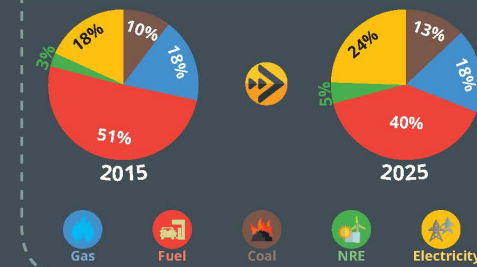
Annotation : ● Excluding Biomass  
● Others consist of agricultural, construction, and mining sector  
Source : Handbook of Energy & Economic Statistics of Indonesia 2018, MEMR

Final Energy Consumption Mix by Sector

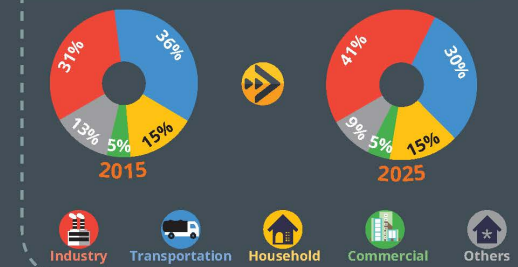


## ENERGY CONSERVATION TARGET AND STRATEGY

Final Energy Consumption Mix by Energy Types



Final Energy Consumption Mix by Sector



Final Energy 2015 - 2050



Annotation : ● Excluding Biomass  
● Others consist of agricultural, construction, and mining sector  
Source : Handbook of Energy & Economic Statistics of Indonesia 2018 Final Edition, MEMR

Strategies for Energy Conservation Implementation

1. Implementing Energy Management mandatory for energy users  $\geq 6,000$  TOE
2. Applying Energy Efficiency Standard and Label for appliances
3. Performing energy conservation within the Ministry/Institution
4. Stimulating private investments in energy the field of energy conservation
5. Developing awareness of energy conservation for energy users
6. Increasing human resources capacity and technology mastery
7. Implementing monitoring, evaluation, and supervision system in the field of energy conservation

2025 TARGET

- Reducing energy intensity by 1% per annum up to 2025
- Achieving energy elasticity less than 1 (one) by 2025
- Reducing final energy consumption by 17% from BaU by 2025



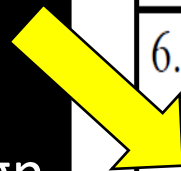
Source: Data & Information on Energy Conservation 2018, Ministry of Energy and Mineral Resources (MEMR)

# Key components of Sustainable Transport

Box 2: Indonesia's NAMAs as submitted to UNFCCC (Jan 2010)

The Transport Section in Indonesia's Nationally Appropriate Mitigation Action (NAMA) drew heavily on:

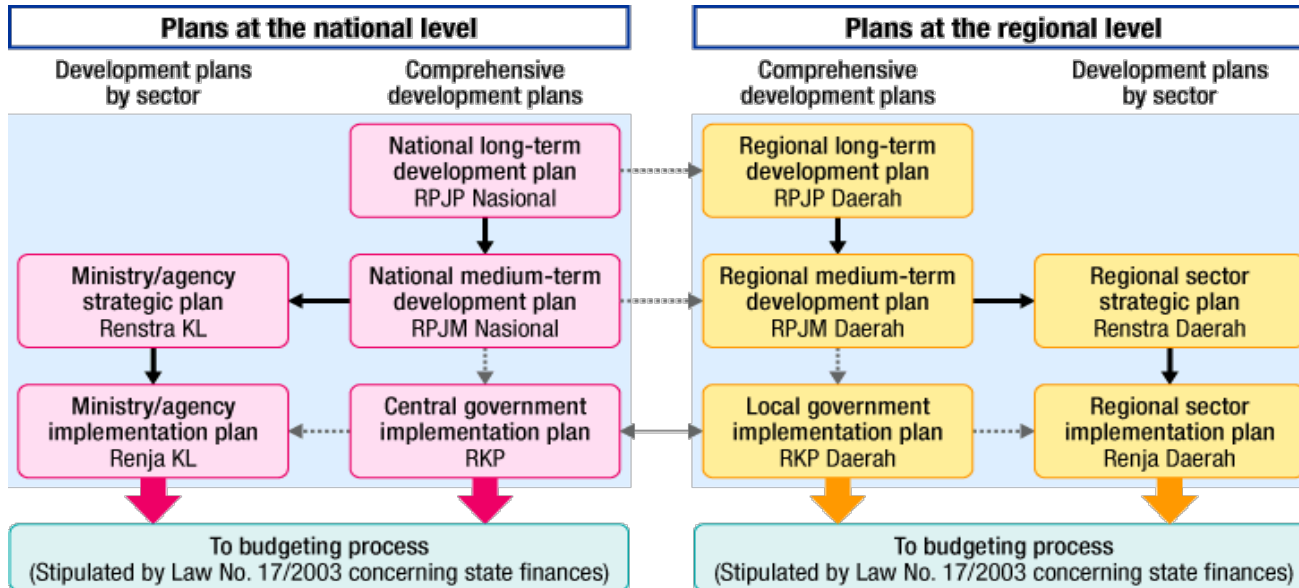
1. AVOID unnecessary travel
2. SHIFT to more efficient modes
3. IMPROVE vehicle design and technologies



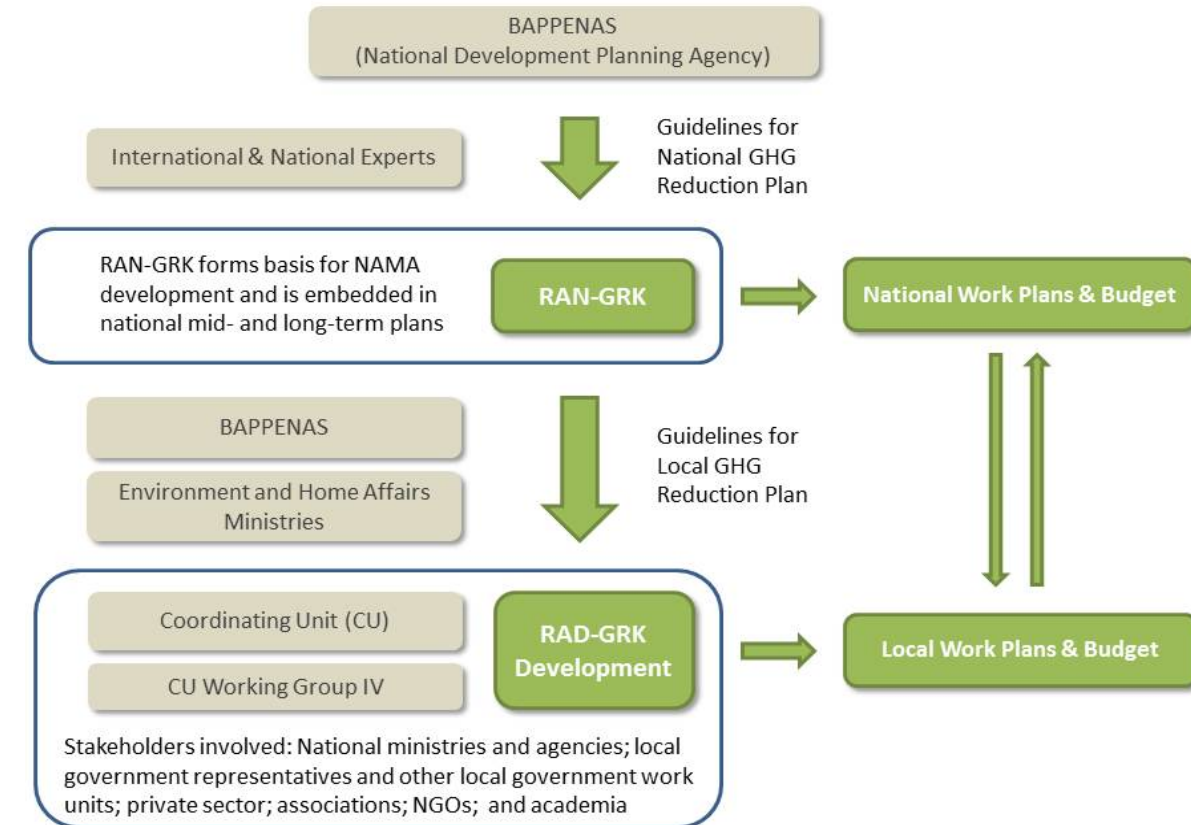
- |                                                                             |
|-----------------------------------------------------------------------------|
| 1. Sustainable Peat Land Management                                         |
| 2. Reduction in Rate of Deforestation and Land Degradation                  |
| 3. Development of Carbon Sequestration Projects in Forestry and Agriculture |
| 4. Promotion of Energy Efficiency                                           |
| 5. Development of Alternative and Renewable Energy Sources                  |
| 6. Reduction in Solid and Liquid Waste                                      |
| 7. Shifting to Low-Emission Transportation Mode                             |

# Challenge: The link between national and regional

## (a) National and Regional plan

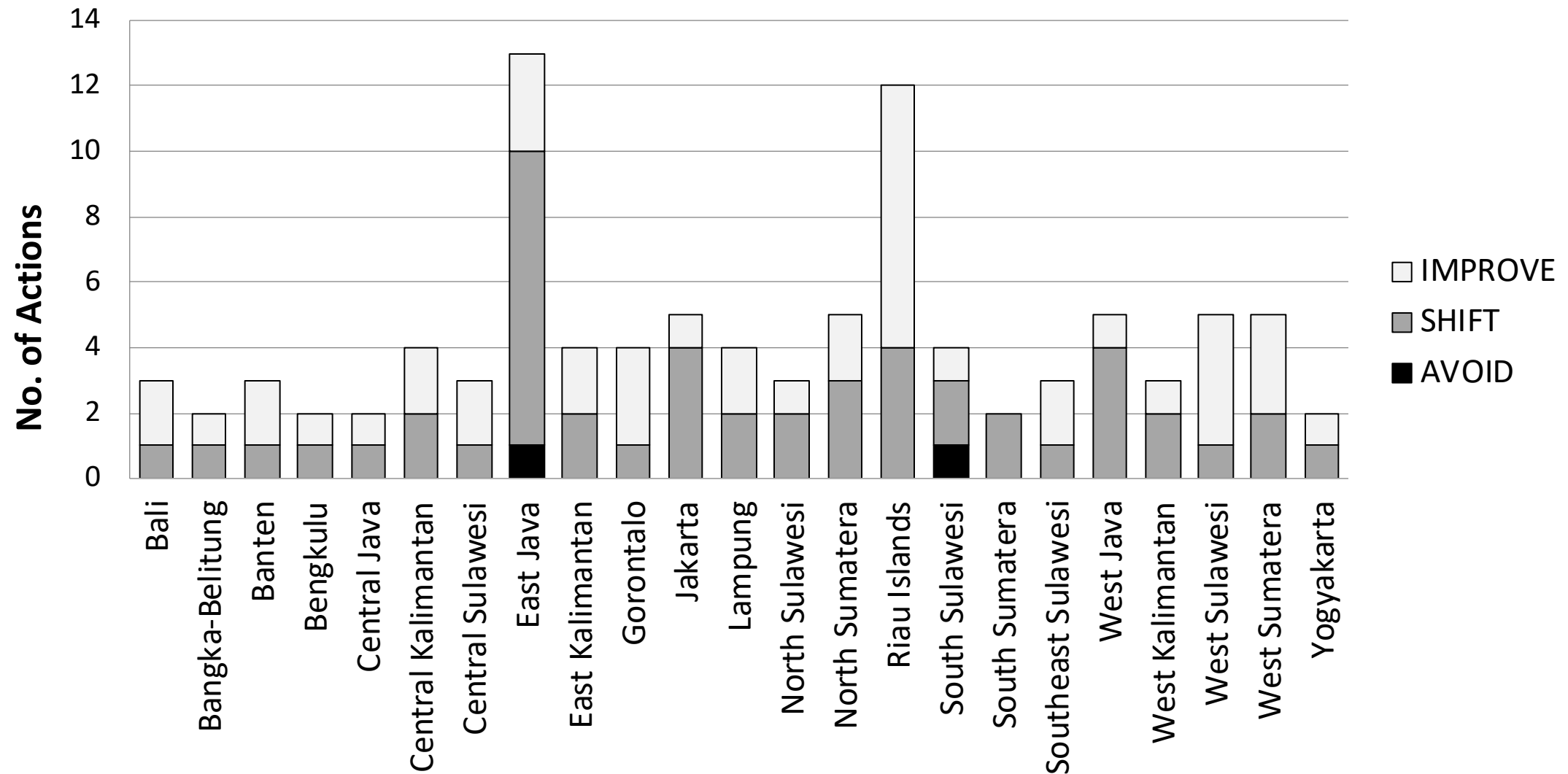


## (b) National and Regional Action Plans on GHG Mitigation

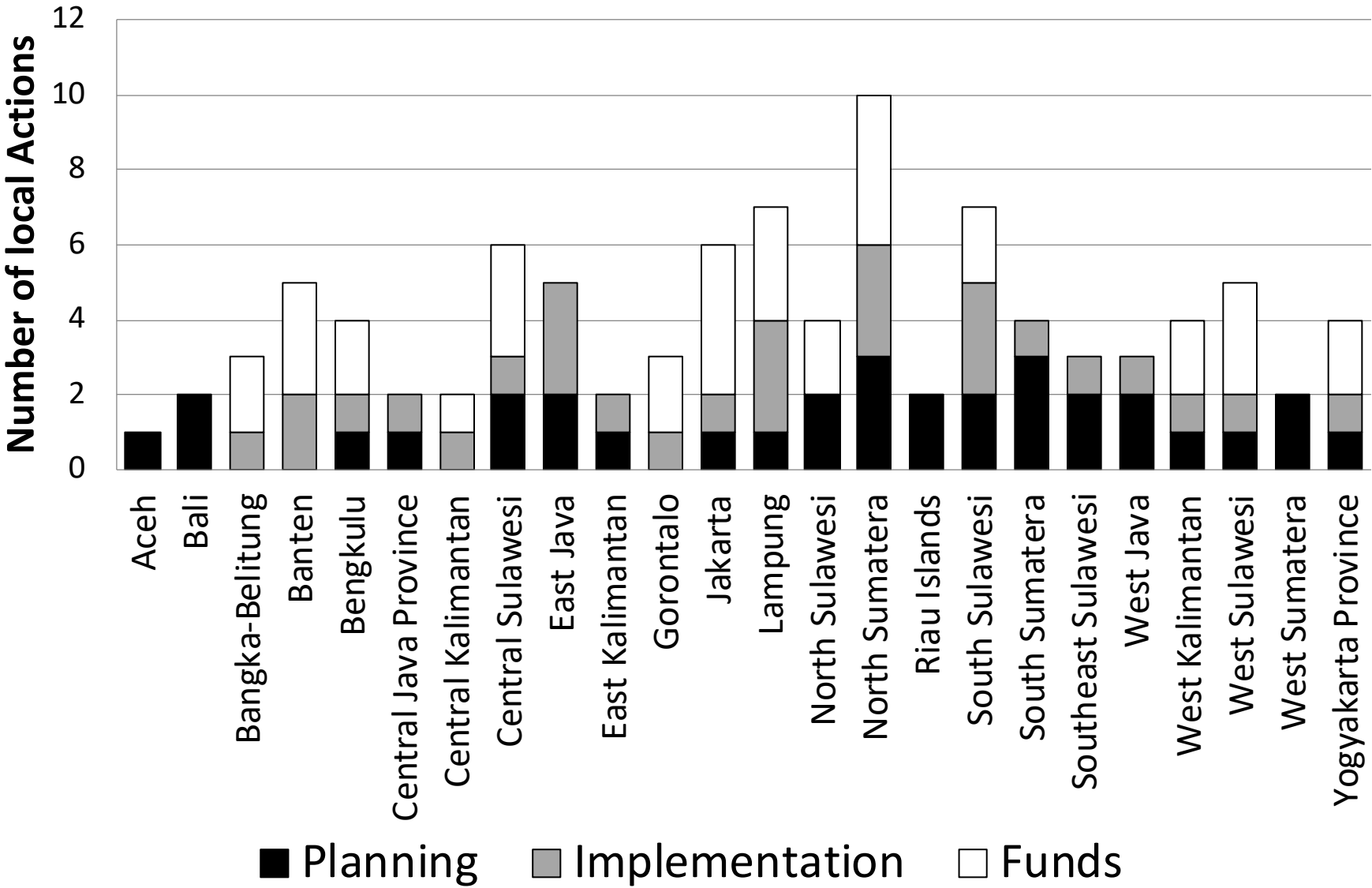




# Vision of Local Governments: Comparison Local Actions (province level) according to the A-S-I Paradigm



# Commitment of Local Governments: Comparison Local Actions (province level) according to the A-S-I Paradigm





# The cases: (a) Pedestrianisation and (b) EV Bus



## Green Infrastructure: Pedestrian

- Bandung City – Capital of West Java Province
- Bogor City : 60 km from Jakarta (Capital City)



## EV Bus

- Jakarta – BRT Trans Jakarta



# ***(A) Investment on Green Infrastructure: Pedestrian Improvement Program***

## **“Panca Trotoar” - Bandung City**



Bandung’s pedestrian improvement program focuses on: 1) Revitalize sidewalks; 2) develop new pedestrian walkways; 3) increase pedestrian safety; and 4) improve the visual appeal of sidewalks.

“Panca Trotoar” means all sidewalks should have 5 components:

- (i) Bench for resting
- (ii) Stone ball to prevent traffic on sidewalk
- (iii) Flower pot for decoration
- (iv) Garbage bin for cleanliness
- (v) Public lighting for security

## **‘Dialogue between space’ for walkable Bogor City**



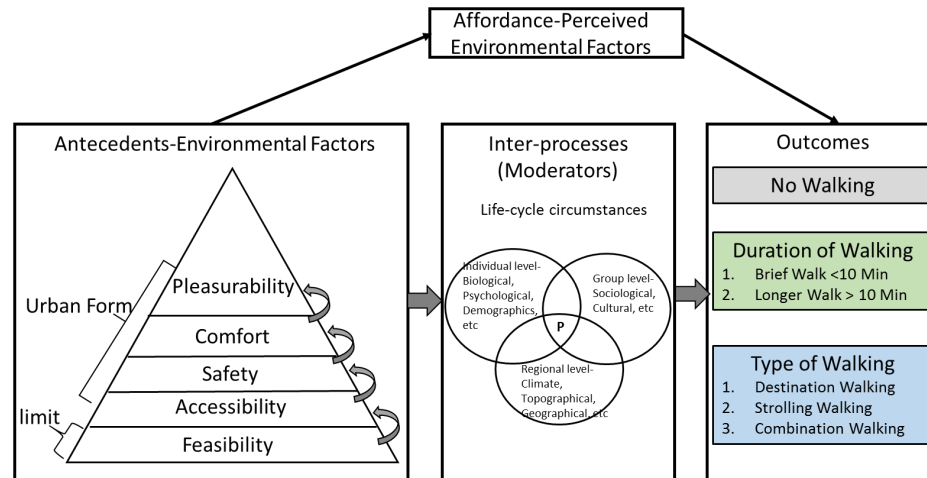
To achieve ***Walkable Bogor City***, pedestrian facilities don’t only support mobility but also tourism

Pedestrian revitalization program along the **Botanical Garden** use the main concept of ***“Dialogue between spaces”*** which combine three major components:

- 1) Green Building/Urban Heritage (Summer Palace, National heritage buildings, etc);
- 2) Urban Green Space (Botanical Garden, Parks and others); and
- 3) Green Transportation.

# Measuring the Impact of Pedestrianisation Program

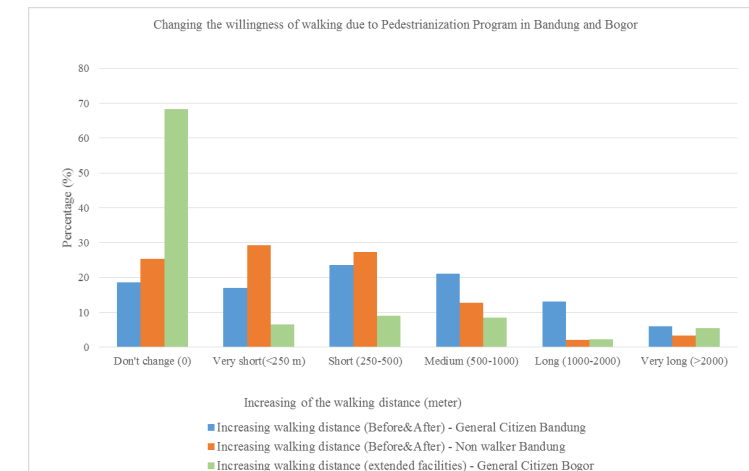
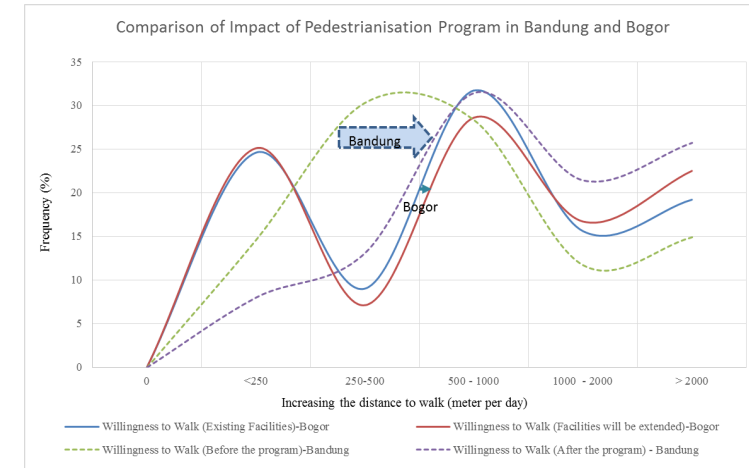
Hierarchy of Walking Need in a social-psychological framework (Alfonzo, 2005)



No	Components	Bandung*	Bogor**
1	Pleasure	0.09	2.13
2	Accessibility	0.13	1.61
3	Feasibility	0.14	1.68
4	Comfort	0.16	1.79
5	<b>Security</b>	<b>0.21</b>	<b>1.51</b>
6	<b>Safety</b>	<b>0.21</b>	<b>1.58</b>

Note: \*: relative weight ;

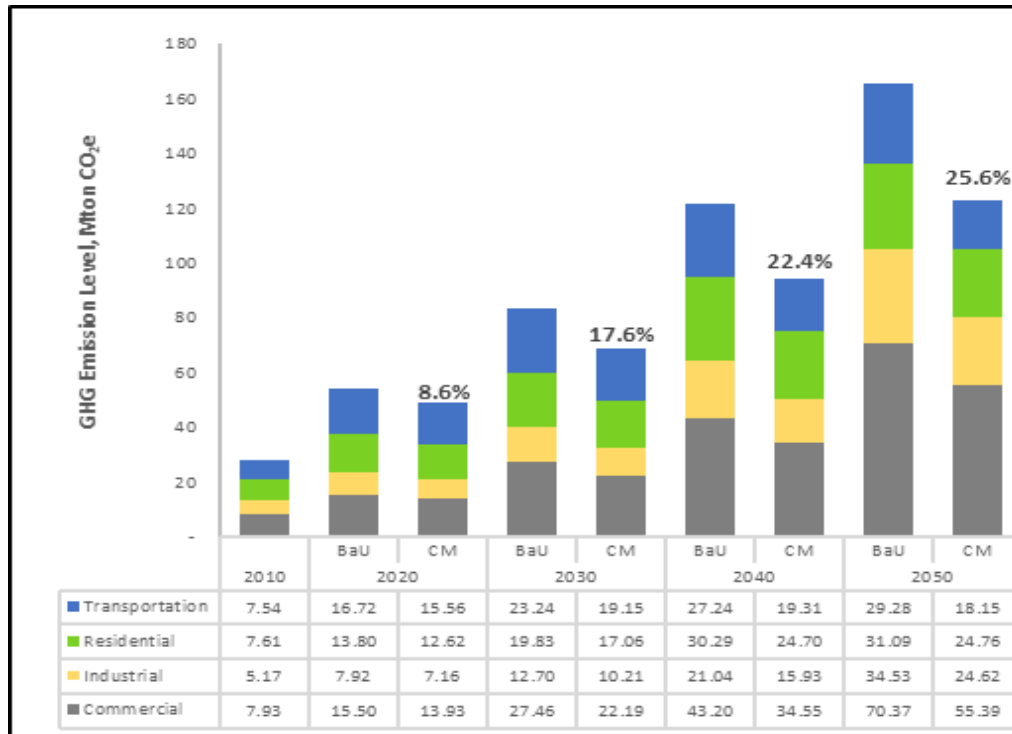
\*\* : Ranks : 1-5 (1 is most important – 5 less important)



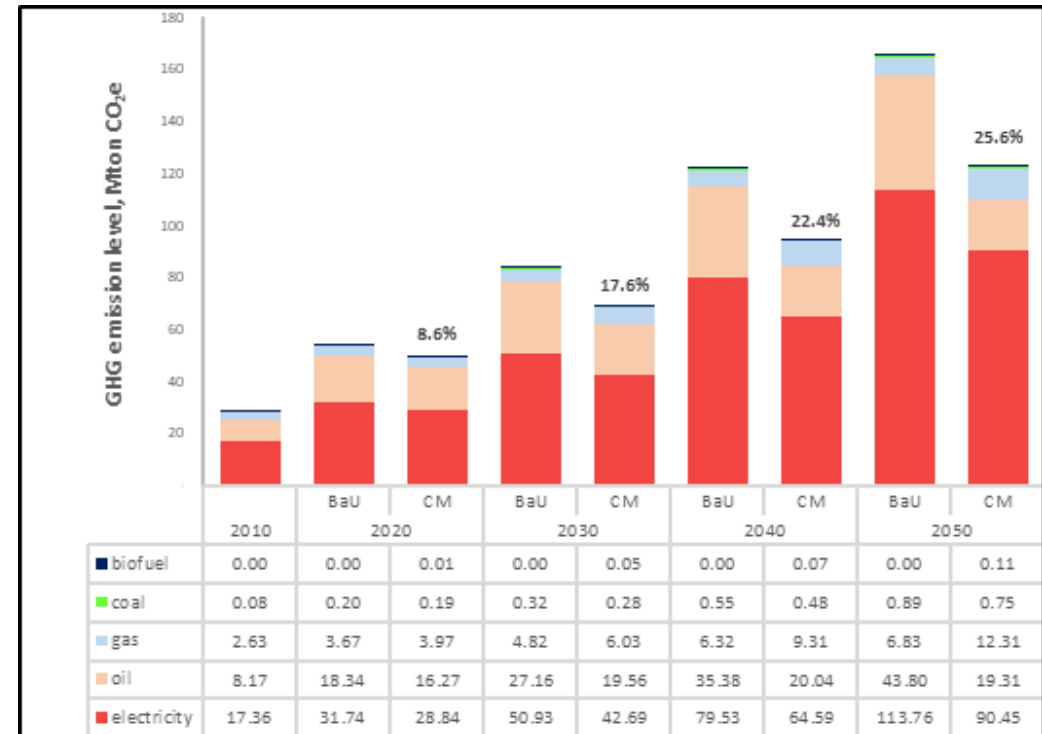
Emission	Daily Emission Reduction (Million Gram)	Emission reduction (%)
CO	1.82	1.20
VOC	0.23	1.76
NOx	0.18	0.95
PM	0.01	1.10

## ***(B) Shifting from Diesel & CNG to EV Bus – Trans Jakarta***

- Government of Jakarta Special Province set ambitious target to reduce 30% of GHG Emission by 2050
- Transport Sector is one of major contributor of CO<sub>2</sub> emission in the city
- New administrative governor is spear-heading the policy to gradually move into electric mobility as a leapfrog from fossil-fueled mobility in Jakarta and the electric bus system is a quick win program



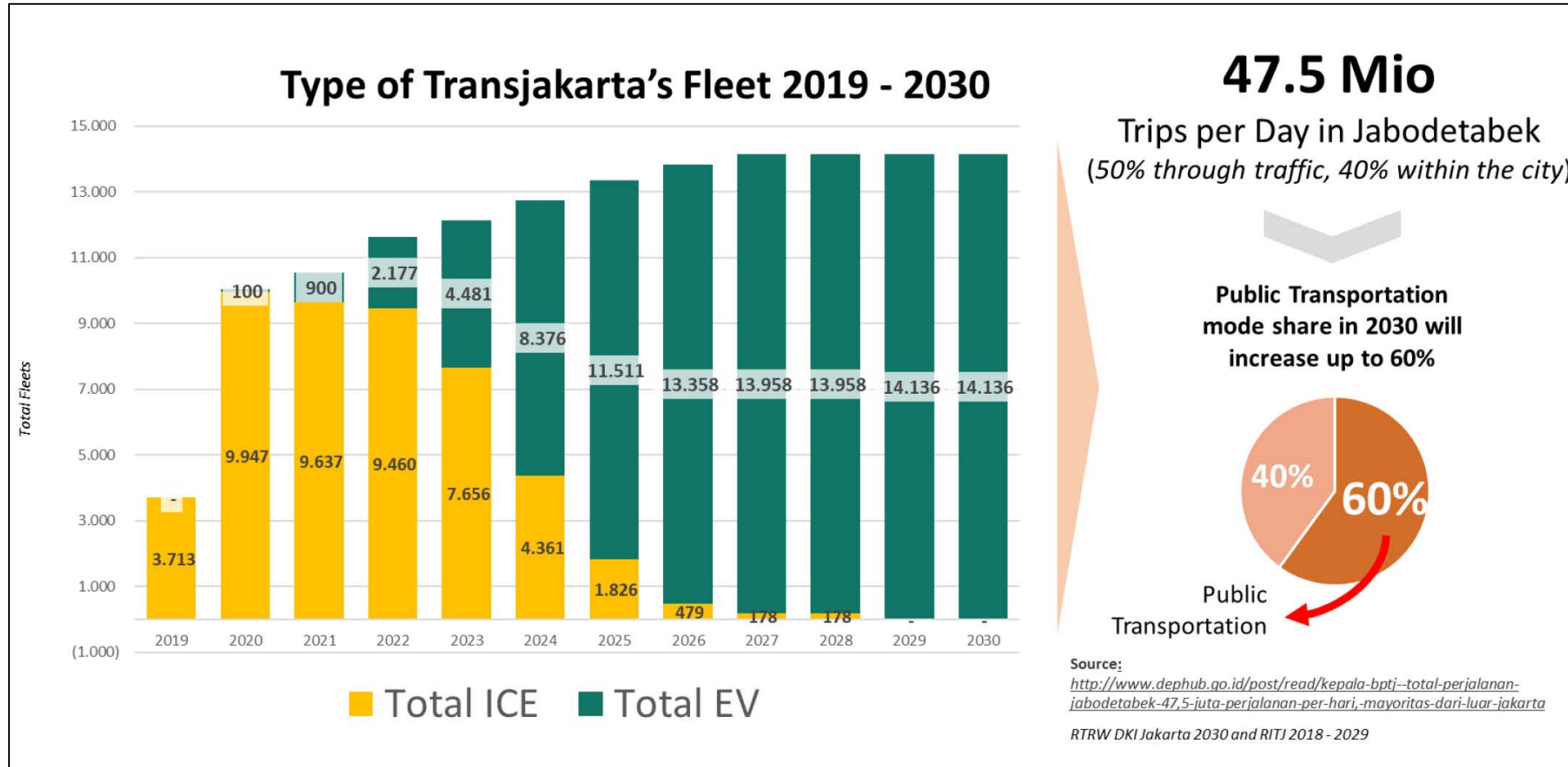
GHG emissions of Jakarta City



CO<sub>2</sub> emissions of DKI Jakarta by type of energy

# Schedule of Implementation

- Pre-trial of 2 EV Bus: Mid January 2020 – June 2020
- June 2020 – 2021: Pilot Test ( 40 – 100 units)
- Gradual Shift the Fleet to EV Bus : 2022 – 2030
- 100% EV buses in 2030

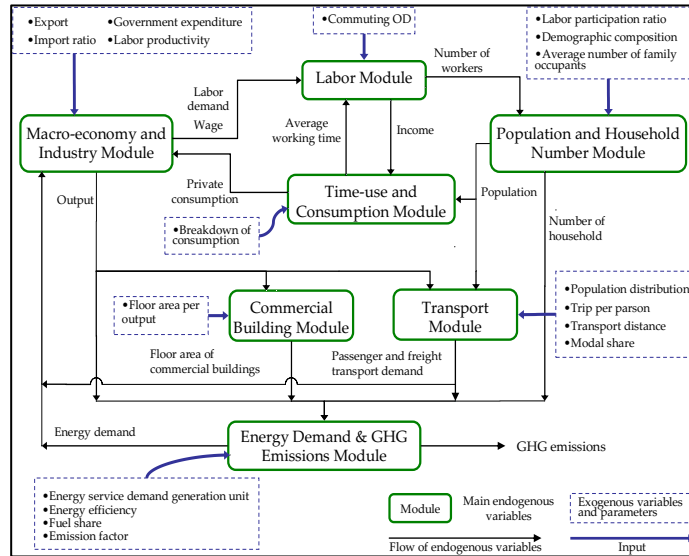


Source: Trans Jakarta, 2019

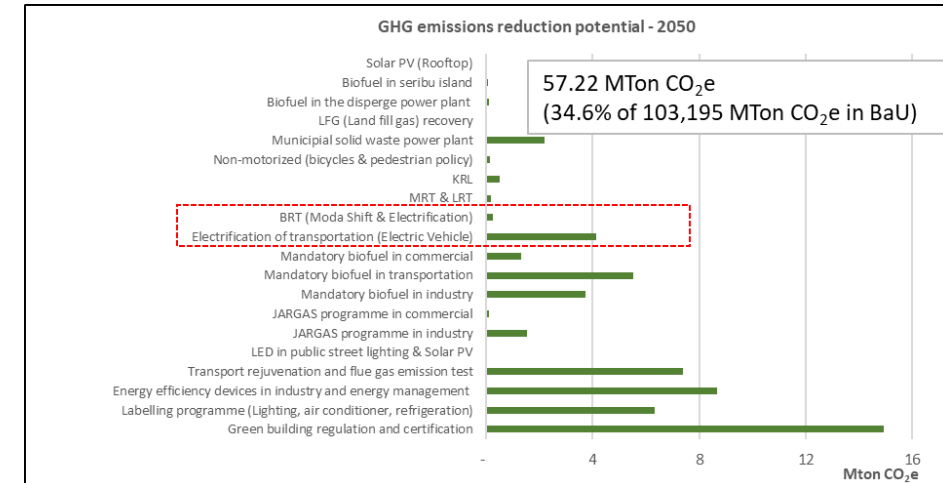
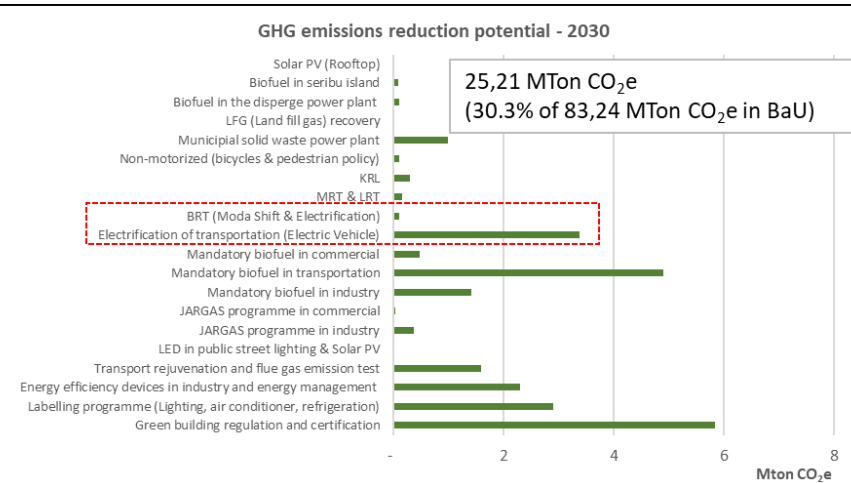
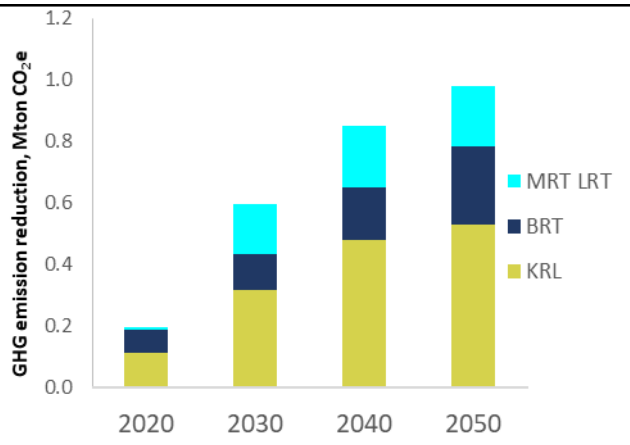


# Impacts on GHG Emissions

## Use Asia-Pacific Intergrated Model (AIM)



Actions	2020		2030		2040		2050	
	GHG Reduction ,Mton CO <sub>2</sub> e	% reduction	GHG Reduction ,Mton CO <sub>2</sub> e	% reduction	GHG Reduction ,Mton CO <sub>2</sub> e	% reduction	GHG Reduction ,Mton CO <sub>2</sub> e	% reduction
Energy efficiency	3.73	6.9%	10.91	13.1%	21.16	17.4%	33.31	20.2%
Fuel switch	0.11	0.2%	0.38	0.5%	0.87	0.7%	1.54	0.9%
Green mobility	0.19	0.4%	0.60	0.7%	0.85	0.7%	0.98	0.6%
Solar PV-rooftop	0.01	0.0%	0.02	0.0%	0.00	0.0%	0.04	0.0%
Biofuel	0.62	1.1%	2.73	3.3%	4.38	3.6%	6.47	3.9%
<b>Total</b>	<b>4.66</b>	<b>8.6%</b>	<b>14.63</b>	<b>17.6%</b>	<b>27.26</b>	<b>22.4%</b>	<b>42.34</b>	<b>25.6%</b>



# Discussions

No	Components	Case Studies
1	<b>Leadership of Local Leader</b>	<p>(a) Visions &amp; Leadership of Local Leaders : Bandung, Bogor and Jakarta.</p> <p>(b) Political Situation: Clientelism and Political Cycle → low hanging fruit, eye catching projects</p> <p>(c) The collaborative support and mainstreaming issue from National Government on electrification in Jakarta City</p>
2	<b>Benefit</b>	<p>(a) Matching Demand and Need Assessments for Green Infrastructures project in Bandung and Bogor. <i>How Bandung and Bogor are meeting the needs of residents on pedestrianisation program which promise to encourage non-motorized transport (NMT).</i></p> <p>(b) Co-Benefit to support local business (Shopping &amp; Culinary in Bandung &amp; Eco Tourism in Bogor)</p> <p>(c) Collaborative support from National Government on Transport Sector in Jakarta</p>
3	<b>Barrier and Overcome Solution</b>	<p>Barrier:</p> <ul style="list-style-type: none"> <li>• Pedestrian Program: How to encourage lifestyle change of Citizen</li> <li>• Electrification: (a) Lack of supporting policies and infrastructures</li> </ul> <p><i>Solution:</i></p> <ul style="list-style-type: none"> <li>• Stakeholder engagement, use social media, etc</li> <li>• EV buses: Build the capacity through the learning process and transfer of knowledge from other places; partnership with multiple organizations and networks, matching demand and supply (match matching process) on appropriate technology, local/regional vendors/companies that will support the operations, etc</li> </ul>



# Key Messages and Future Direction

## Key Messages:

1. Transformative process on practical actions & project developments need several years, however, brought multiple benefits to the city.
2. Science based policy process is important and stakeholder engagement is key important process.
3. Several factors of enabling environment:
  - (a) Leadership of local leader
  - (b) Have enough capacity (capacity building is important);
  - (c) Stakeholder Engagement and partnership include with international organizations and
  - (d) Mobilize and blending the available resources.

**Thankyou very much for your attention!**



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