A PATHWAY TOWARD AN ENERGY AND CLIMATE SENSITIVE TRANSPORT:

Current initiatives from Indonesia's Transport Sector

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OUTLINE

- About ITRA and TransJakarta
- Profile of the energy use and the National Energy Policy
- Current initiatives toward sustainable use of transport energy
  - Electric mobility in Jakarta
  - Digitalization of Indonesia Toll Road System
- Current initiative on the adaptation of climate change
  - Financing an integrated toll road, sea-wall, and urban regeneration project
- Way forward

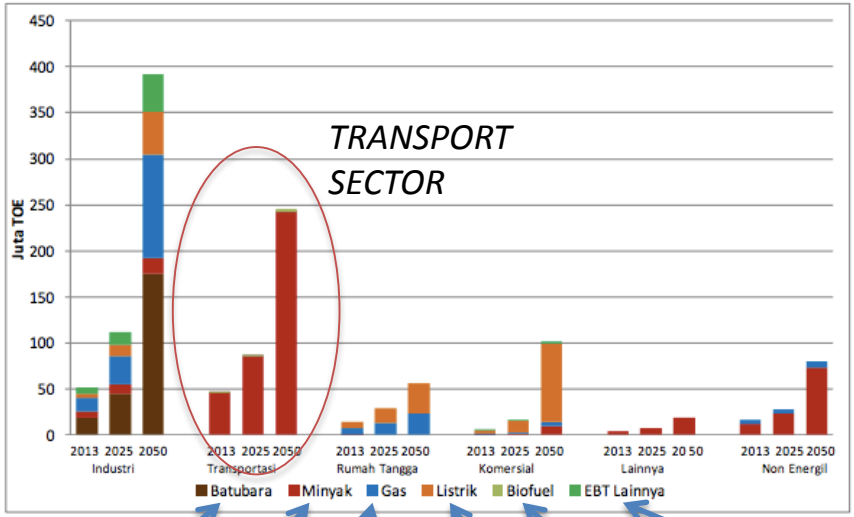
ABOUT ITRA AND TRANSJAKARTA

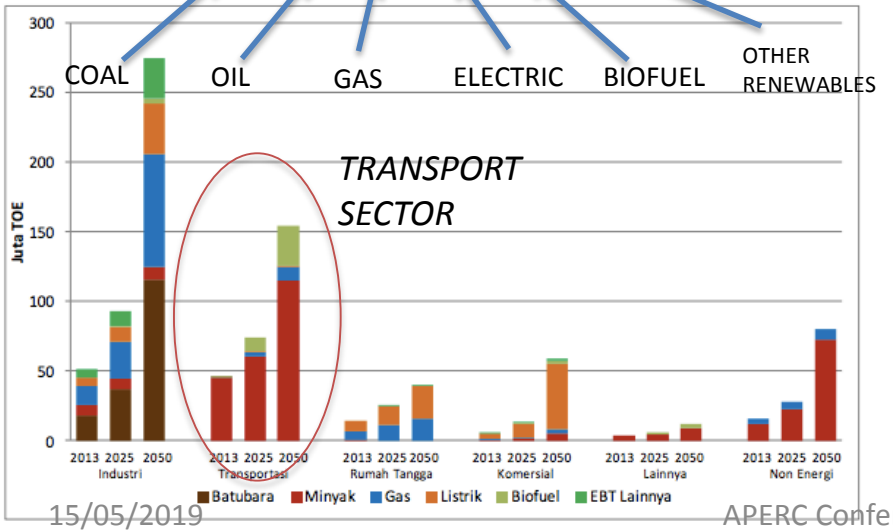
The Indonesian Toll Road Agency

- A contracting agency for toll road concession in Indonesia, holding concession agreements with 53 toll operating companies
- Operating 73 toll road segments
- Currently managing IDR 500 Trill (2015-2019 period) investment or approx 3.7 Trill ¥ (35.7 Bio USD, 2019 value)
- Oversee the operation of 1,744 KM of toll operation with approx. 4.4 Mio Daily Traffic (as per December 2018), expected to be triple by 2024
- Oversee the completion of 1,270 KM toll road construction by end of 2019
- Plan to expand the network to 2,900 KM Sumatera Toll by 2024
- Extensive logistic network, and inter-regional vehicle movements, high fossil fuel consumption

Transportasi Jakarta, LLC

- A largest bus concessionaire in Indonesia, owned by the Provincial Government of Jakarta
- A contracting body for private bus operators entering into concession agreement with TransJakarta
- Concession agreement with 17 private and state owned bus companies
- Managing 3,073 unit of buses
- Responsible for carrying more than 700,000 daily passengers (as per December 2018), expected to reach 1 Mio passenger by 2019
- Expanding the network by integrating all buses in Jakarta (more than 10,000 buses)
- Mostly using diesel-fueled engine, the mandatory use of gas-fueled buses was not successful





Source: National Energy Council, Indonesia Outlook Energy, 2014

BUSINESS AS USUAL SCENARIO

- TRANSPORT SECTOR IS THE 2ND LARGEST CONSUMER OF ENERGY
- GROW HIGHER THAN GDP
- USING MOSTLY FOSSIL FUEL
- UNSUSTAINABLE ENERGY CONSUMPTION

NATIONAL ENERGY POLICY

- TRANSPORT SECTOR IS STILL THE 2ND LARGEST COMSUMER OF ENERGY, but IS EXPECTED TO BE MORE EFFICIENT
- DIVERSIFYING THE SOURCE OF ENERGY
- REDUCING MOTORIZED TRANSPORT
- FOCUSED ON THE HIGHER USE OF BIOFUEL AND GAS

CURRENT INITIATIVES TOWARD SUSTAINABLE USE OF TRANSPORT ENERGY AND ADAPTATION OF CLIMATE CHANGE

- Electric mobility in Jakarta

- Digitalization of Indonesia Toll Road System

- Integration of toll road, sea wall and urban regeneration projects

CASE #1 :
Urban electric mobility initiative

TRANS JAKARTA Product & Service

Source: PT TransJakarta, 2019

Operating of PT. Transportasi Jakarta			
NO	Brand	Number	TYpe
1	Yutong	30	Articulated Bus
2	Ankai	30	Articulated Bus
3	Zhontong	30	Articulated Bus
4	Scania	52	Articulated Bus
5	Mercy (2542)	24	Maxi Bus
6	Ankai	36	Single Bus
7	Hino (R260)	30	Single Bus
8	Hino (CNG)	60	Single Bus
9	Mercy 1526 (Laksana)	25	Single Bus
10	Mercy 1526 (Tentrem))	25	Single Bus
11	Mercy 1526 (Tri Sakti)	25	Single Bus
12	Mercy 1526 (Rahayu Santosa)	13	Single Bus
13	Mercy 1526 (Laksana)	12	Single Bus
14	Mercy 1626 (Laksana)	21	Single Bus
15	Mercy 1626 (Restu Ibu)	5	Single Bus
16	Mercy 1626 (Tentrem)	9	Single Bus
17	Mercy 1626 (Laksana)	10	Single Bus
18	Mercedes Benz OF 917 (Tentrem)	50	Single Bus
19	Mercedes Benz OF 917 (New Armada)	50	Single Bus
20	Mercedes Benz 1726 (Laksana)	49	Low Entry Bus
21	Mercedes Benz 1726 (Nusgem)	90	Low Entry Bus
22	Scania K250 (Laksana)	150	Low Entry Bus
23	Mitshubisi- Mini Trans	100	Medium Bus
24	BCI	5	Double Decker
25	MAN	6	Double Decker
26	Mercy	16	Double Decker
27	Scania	1	Double Decker
28	Transcare Daihatsu Grand Max	4	Mini Bus
29	Transcare Daihatsu Luxio	21	Mini Bus
30	Transcare Toyota Nav1	1	Mini Bus
Total Unit Bus PT. Transportasi Jakarta		**980**	

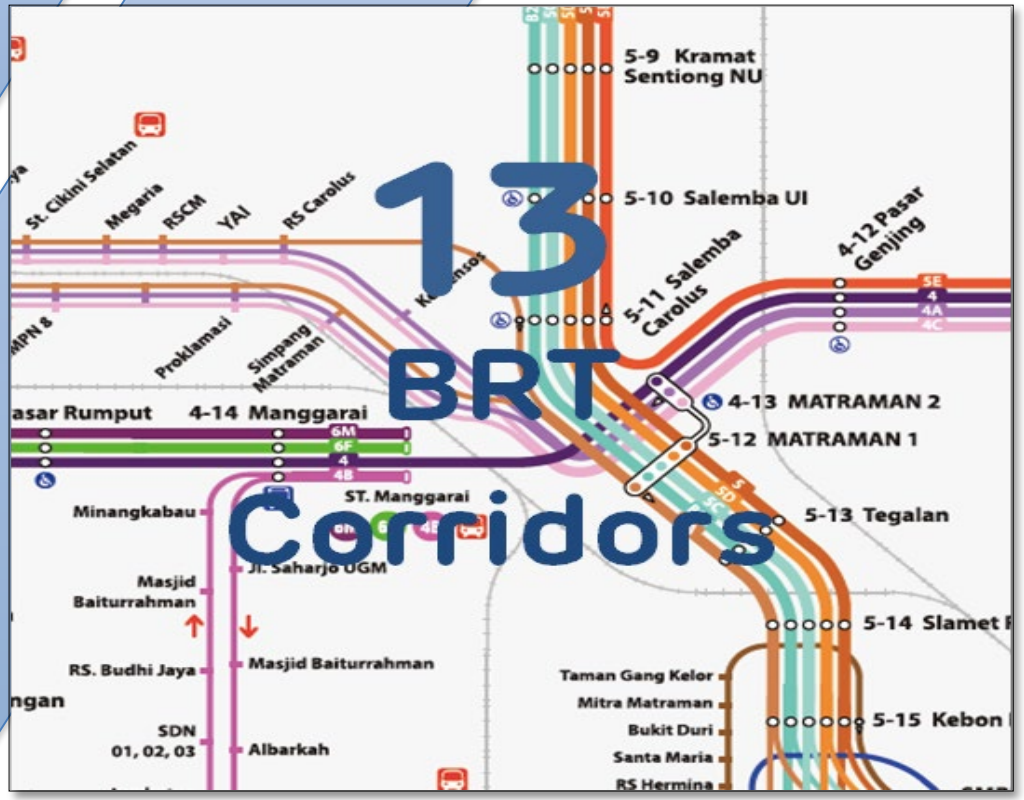
Operating of Operator Bus			
NO	Operator	Number	TYpe
1	SBU Transjakarta Busway Perum Damri Cakung	46	Articulated Bus
2	Perum PPD	494	Single Bus
3	Kopaja	310	Medium Bus
4	PT Mayasari Bakti (Scania)	56	Articulated Bus
5	PT Mayasari Bakti (Scania)	150	Maxi Bus
6	PT Mayasari Bakti (Mercy)	73	Single Bus
7	PT Steady Safe	128	Maxi Bus
8	PT BPW Pahala Kencana	15	Single Bus
(a) Sub Total		**1272**	

Ok Otrip / Jak Lingko			
NO	Operator	Number	Type
1	CoOp Wahana Kalpika (KWK)	571	Mini Bus
2	Budi Luhur (BDL)	76	Mini Bus
3	Puskopau (PKU)	47	Mini Bus
4	Lestari Jaya (LST)	37	Mini Bus
5	Komika Jaya (KMK)	19	Mini Bus
6	Kolamas Jaya (KLM)	29	Mini Bus
7	Kopamilet (KPM)	12	Mini Bus
8	Komilet Jaya (KMJ)	28	Mini Bus
9	Purimas Jaya (PRM)	2	Mini Bus
(b) Sub Total		**821**	

(a) Operating of Operator Bus	**1272**
(b) Ok Otrip / Jak Lingko	**821**
(a+b) Total Unit Bus Operator	**2093**

Total Unit Bus PT. Transportasi Jakarta	**980**
Total Unit Bus Operator	**2093**
All Unit Bus	**3073**

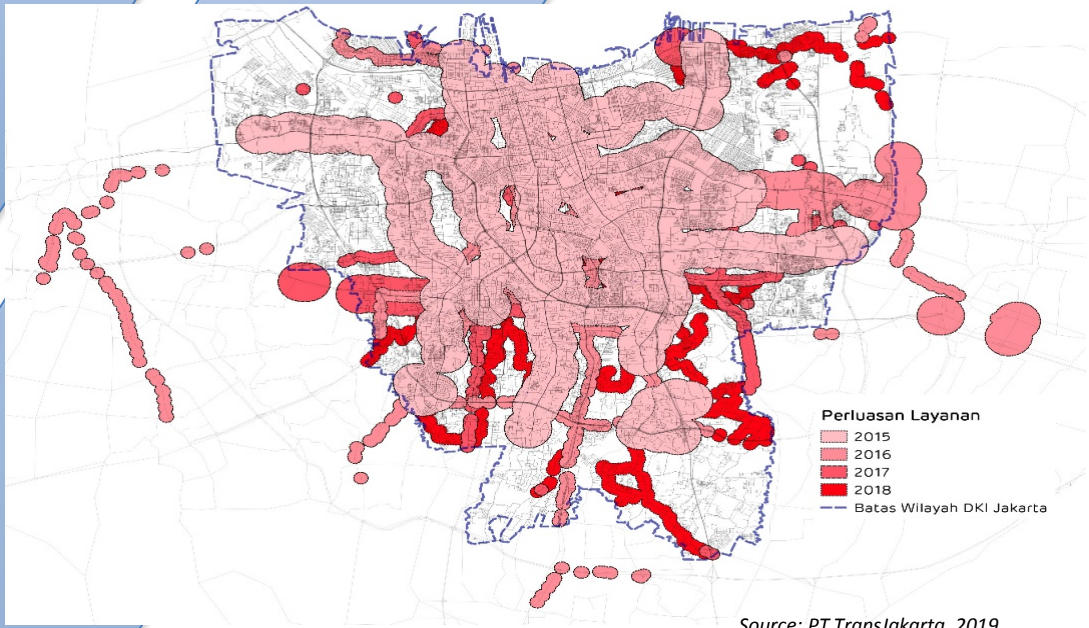
NETWORK AND MODE INTEGRATION



13 Trans Jabodetabek Routes	7 Jakarta City Tour Routes
46 BRT Routes	53 Integrated NBRT Routes
34 Micro Bus Feeder (OK O-TRIP)	21+2 Public Housing Services + Free Service Line

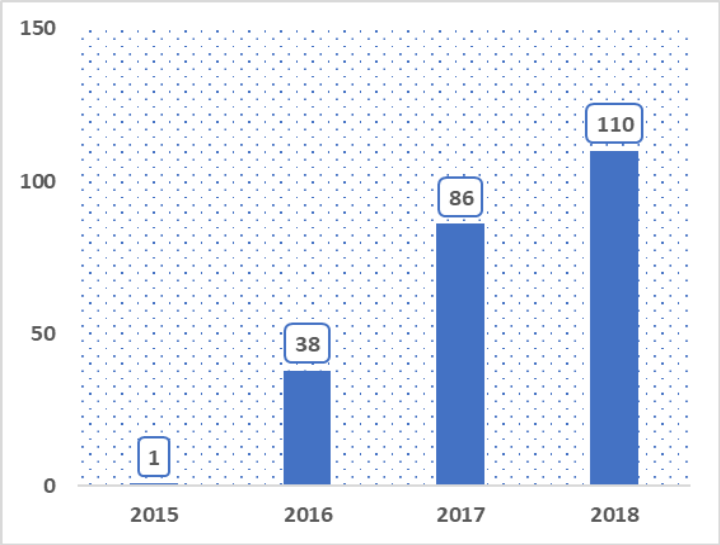
Source: PT TransJakarta, 2019

EXPANSION AND ACCELERATED SERVICE COVERAGE



Source: PT TransJakarta, 2019

Transjakarta Coverage Area Growth : 22%
Coverage Area : 438 km^2

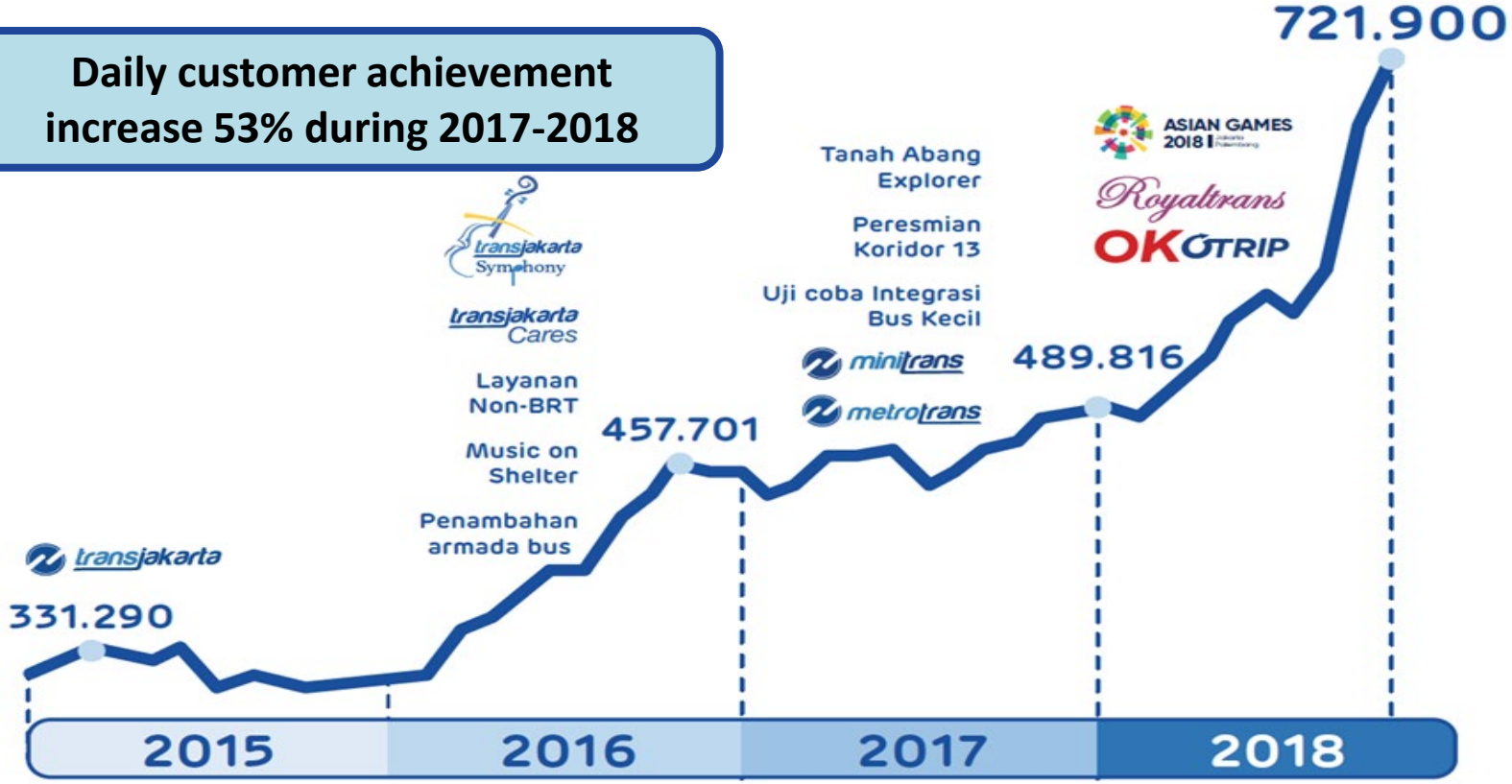


Non – BRT Route Growth : 379%

*August 2018

OPERATIONAL PERFORMANCES

Daily customer achievement increase 53% during 2017-2018



Source: PT TransJakarta, 2019

CLIMATE CONCERN OF THE NEW JAKARTA ADMINISTRATION

- Global emission of CO_2 have increase almost 50% since 1990;
- Emissions grew more quickly between 2000 and 2010 than in each of the three previous decades.
- Total trips per day in the greater Jakarta – 45 million per day (2015);
- 16.3 million private vehicles, 350,000 public vehicles in 2014. A large part is 2 wheelers;
- 46% of CO_2 emission in the city is from Transportation Sector
- Gradually moving into electric mobility, a leap from fossil-fueled mobility
- The Governor is spear-heading this policy by pushing for an electric bus system in Jakarta

INITIAL TRIAL - ELECTRIC BUS TECHNICAL PERFORMANCE CRITERIA

Charging time ≤ 4 hours

Operation time ≥ 17 hours

Daily mileage ≥ 195 km

Electric Vehicle OPEX lower than diesel bus

Based on Transjakarta current process & needs

Source: PT TransJakarta, 2019

TRIAL RUN OF ELECTRIC BUSES

To conduct electric vehicle operating trial on BRT Route #1 segment (Shelter: National Monument – Senayan Roundabout)

Operating Hours: 05:00 – 22:00

Multiple operators & brand

COMPARISON OF PERFORMANCE

Currently 5 bus manufacturers have signed MoU

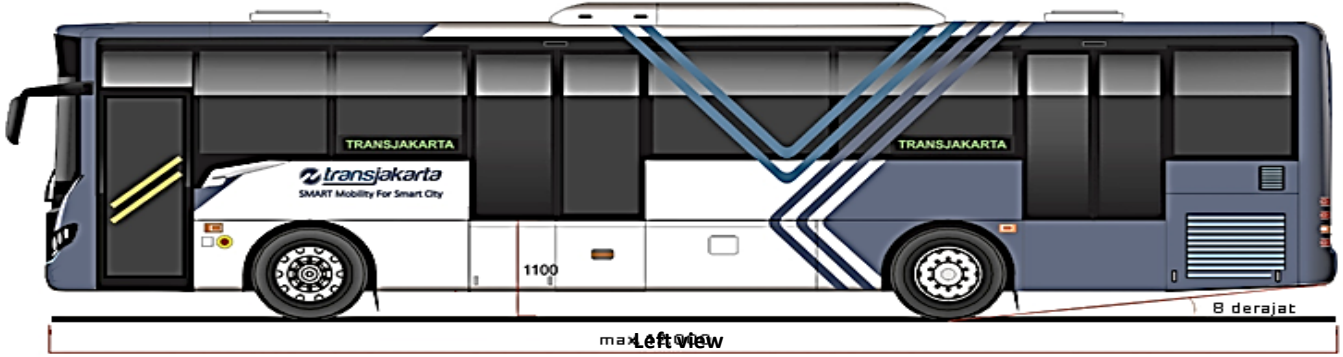
Source: PT TransJakarta, 2019

SPECIFICATION OF ELECTRIC VEHICLE

Exterior with Raised Floor

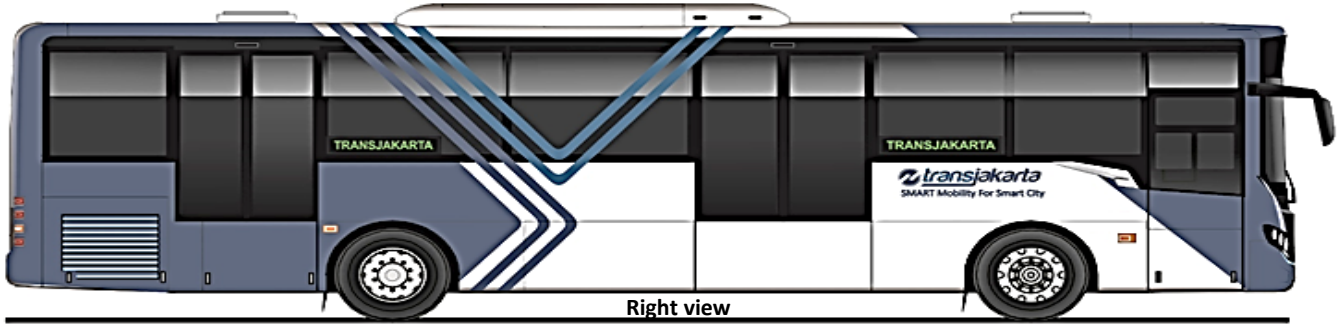
Source: PT TransJakarta, 2019

Front view



Left view

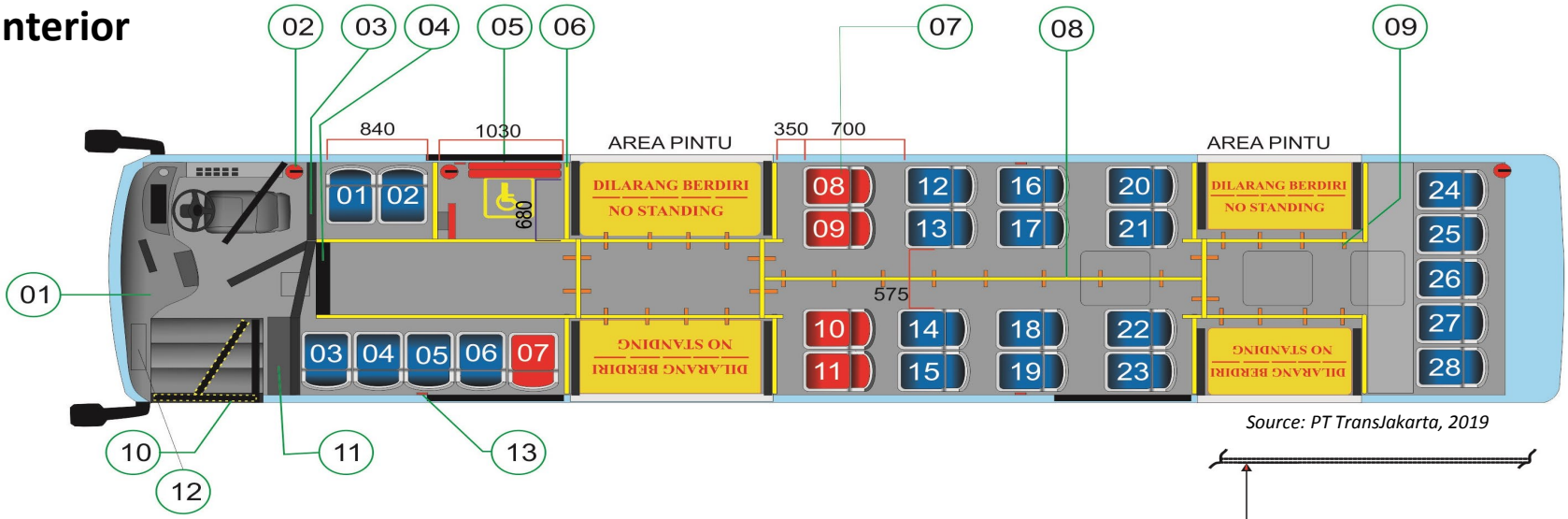
Rear view



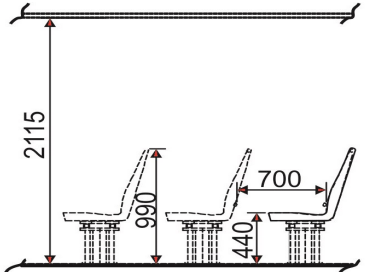
Right view

SPECIFICATION OF ELECTRIC VEHICLE

Interior



Source: PT TransJakarta, 2019



Note:

1. Dashboard
2. Fire extinguisher
3. Partition driver
4. LED display
5. Difable area
6. Partition doors
7. Passanger seats
8. Hand rail
9. Handgrip
10. Driver axit access
11. Box Electric
12. Box P3K
13. Hammers (4pcs)

CASE #2:

Multi Lane Free Flow (MLFF)

Toward digitalization of Indonesian Toll Road System

ROADMAP FOR FULLY ELECTRONIC TOLL COLLECTION
TOWARD MULTILANE FREE FLOW

GOAL

MULTILANE FREE FLOW

INTERIM

TRANSITION TO SERVER BASED ETC (SINGLE LANE FREE FLOW WITH BARRIER)

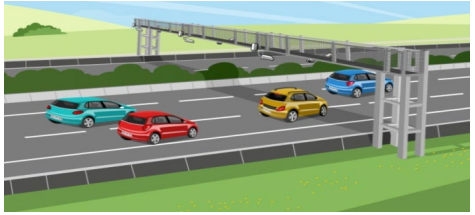
CURRENT

SINCE OCT 2017

100% ETC CHIP BASED (SMART CARD)

DES 2016

ELECTRONIC PAYMENT 23%



ADVANTAGES OF MLFF

- High speed tolling (no queue in toll plaza) – 7.300 hours/Day of transaction time
- Efficient operating cost and lower fuel consumption
- Open up doors for future digitalization

CHALLENGES

- Bank clearing and financial settlement
- Choosing the right technology
- Interoperability between toll road operators and other transportation sector (i.e. ERP)
- Preparing law enforcement

CHOICE OF TECHNOLOGY FOR MLFF

Consideration:

1. Reliability
2. Investment – user costs
3. Technology independence

Source: ITRA, 2019

ALTERNATIVE TECHNOLOGIES CONSIDERED SO FAR

ANPR
Automatic Number Plate Recognition

- Optical reader for plate number
- Database access to number plate
- Requires no OBU
- Flat tariff and post paid
- Commonly used with law enforcement technology

User Cost: 0

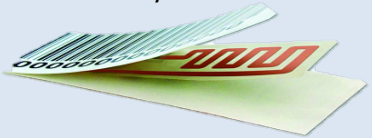
DSRC
Dedicated Short Range Communications

- Using equipment with radio frequency **5,8 Ghz**
- Requires OBU – keeping identity and transaction history
- Reliability 99.95%

User Cost : 15 – 30 USD

RFID
Radio Frequency Identification

- Using equipment with radio frequency **860 MHz – 960 Mhz**
- Requires RFID tag
- Practical and can be used for other transaction purposes
- Reliability ±99.5%



User Cost: 1 – 2 USD

GNSS
Global Navigation Satellite System

- Requires OBU to track down user
- Distance based tariff possible
- Privacy issue
- Dynamic pricing and future digitalization and data integration promising

User Cost: 350 USD

CASE #3:
Financing of climate change mitigation using bundled toll road investment

BPJT
KEM.PUPR

Source: ITRA, 2019

INVESTMENT PROFILE

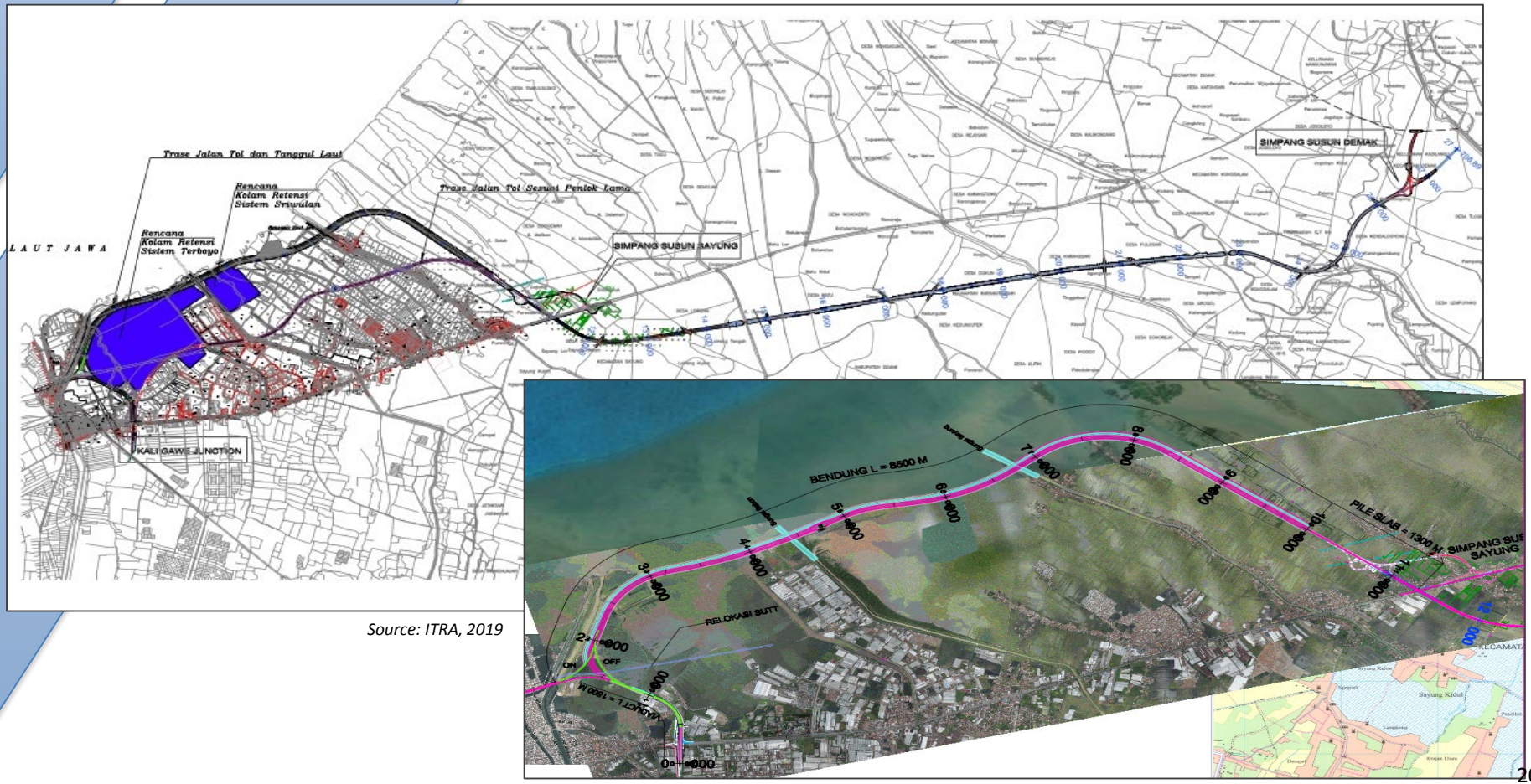
- The use of viability gap fund to attract investors
- 35 years concession period
- Combination of sea wall and toll road project

OPEN UP AN OPPORTUNITY FOR LAND DEVELOPMENT

- Clean industrial zone
- Water retention
- Power plant

BPJT
KEM PUPR

A COMBINED PROJECT OF SEA WALL AND TOLL ROAD PROJECT IN CENTRAL JAVA



Source: ITRA, 2019

CONCEPTUAL DESIGN OF TOLL ROAD – SEA WALL – AREA DEVELOPMENT PROJECT

Source: One resilient Semarang for Water as Leverage, 2019

CONCEPTUAL DESIGN OF TOLL ROAD – SEA WALL – AREA DEVELOPMENT PROJECT

Source: One resilient Semarang for Water as Leverage, 2019

WAY FORWARD

- Indonesia national and sub national governments realize that transport, energy, and climate change impacts are serious development issues
- Efficiency and competitiveness are already incorporated into national development agenda
- Investments are necessary to push for a more energy and climate sensitive initiative in transport sector
- Creative financing is necessary, in both equity and debt instruments
- Indonesia requires more global technology know-how support, more than before
- Some initiatives are underway, more to come
- Requires strong research, benchmark, and data analytics to support future policies

THANK YOU

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