



# **BUS OPERATOR CHALLENGES FOR E-BUS**

**ANDY OETARIO – DIRECTOR OF PT MAYA SARIBAKTI UTAMA**

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# BACKGROUND

1. Air pollution has become a serious health issue
2. Climate changes
3. Limitation of non-renewable energy
4. Blue sky policy
5. Commitment to net zero emission for public transport
6. More than 70% global municipal bus fleet to be electric by 2040
7. Target to operate fully electric busses in Indonesia (when, how, and the stakeholders readiness)

# CHALLENGE AS A BUS OPERATOR

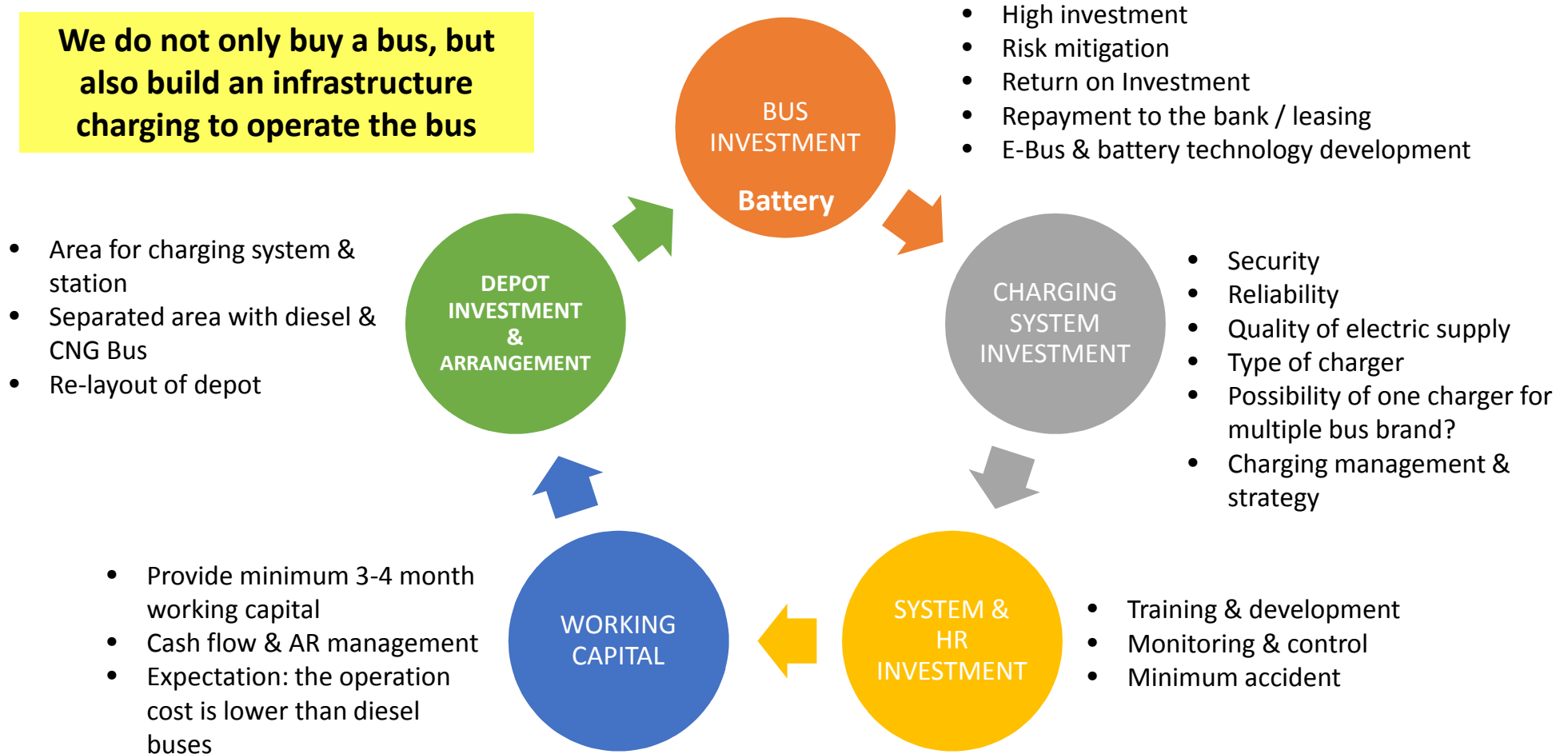
THE CHALLENGE	EXPLANATION
<b>NEW TECHNOLOGY</b>	Internal Combustion Engine (ICE) to Electric Vehicle (EV)
<b>NEW BUSINESS MODEL</b>	<ul style="list-style-type: none"><li>• Preparation</li><li>• Investment &amp; financing</li><li>• Build energy infrastructure</li><li>• Charging management</li><li>• Operation &amp; technical aspects of e-bus</li></ul>
<b>NEW APPROACH</b>	<ul style="list-style-type: none"><li>• Regulator</li><li>• Electricity Provider</li><li>• Bus Operator</li><li>• Bus Dealer</li><li>• Bank / Leasing Company</li><li>• Insurance Company</li></ul>
<b>NEW CULTURE AND HABBIT</b>	<ul style="list-style-type: none"><li>• Need time to convert from diesel or gas fueled (CNG) to electric</li><li>• Human resources support</li><li>• System &amp; procedures</li></ul>

# CHALLENGE AS A BUS OPERATOR

THE CHALLENGE	EXPLANATION
<b>NEW UNCERTAINTY</b>	<ul style="list-style-type: none"><li>• Electricity quality and supply</li><li>• The contract</li><li>• Return on investment</li><li>• Investment risk</li><li>• Financing support</li><li>• Operation risk (like: charging system, maintenance, battery management, spare parts and battery supply, charging back-up, accident, etc)</li></ul>
<b>NEW ANTICIPATION</b>	<ul style="list-style-type: none"><li>• Technology changes (especially battery)</li><li>• Road map for bus fleet by propulsion type in the future (&gt; 20 years)</li><li>• Regulation changes</li><li>• Government support</li><li>• Political</li></ul>

# THE INVESTMENT

**We do not only buy a bus, but also build an infrastructure charging to operate the bus**



# RELATED STAKEHOLDERS

## PLN (The National Electricity Company)

- Tariff per KWh
- Continuity & quality of supply
- Support for e-bus

## SBU OF MUNICIPAL GOVERNMENT

- Tariff: Rp / Km or other approach
- Contract & support
- Operation planning & payment
- Infrastructure to support e-bus

## TRANSPORT DEPARTMENT

- Conducive regulation
- Fair referee
- The road map for bus fleet by propulsion type (short – medium – long term)

\*SBU: Strategic Business Unit

# RELATED STAKEHOLDERS

## BUS DEALER

- The choice of bus dealer
- After sales service (experience & capabilities)
- Lead time of battery & spare parts supply
- Charging station (part of the e-bus)

## BANK / LEASING

- Business feasibility & projection
- Risk management
- Bankability
- Equity participation of bus operators

## INSURANCE

- Pass experience of claim
- TLO / all risk partial (exclude battery due to lead time) / all risk comprehensive (subject to condition)
- Process of claim (inc. spare parts and battery supply)

# RELATED STAKEHOLDERS

## BODY BUILDER

- E-bus model
- Quality
- Lead time
- Tax tariff for e-bus importation

## ELECTRICITY CONTRACTOR

- Build the charging infrastructure
- Electricity connection to pool
- Charging system maintenance

## OTHER PARTIES

- Custom and permit
- Tire management
- Body reparation
- Bus washing operator



# CONCLUSION

1. Collaboration is the key of success
2. Blue print for bus fleet by propulsion type (diesel, CNG, e-bus, or others) has to be clear for short, medium, and long term vision
3. Important: technical and business feasibility approach
4. The portion of government investment / subsidy
5. The development of e-bus infrastructure
6. Step by step study and implementation
7. E-bus is a high investment and more riskier than diesel bus
8. Bus operators and related stakeholders have to be ready for the implementation of e-bus