

Supporting E-mobility focusing on Electric Two- and Three-wheelers and Policies on Urban Traffic Integration in Indonesia

Workshop Report on Electric 2&3 Wheelers in Indonesia





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1 Consultation Meetings with National Policymakers

At the project’s early stage, two consultation meetings were conducted with representatives from the Indonesian Coordinating Ministry of Maritime and Investment Affairs (CMMIA) and Ministry of Transportation (MOT) to gather baseline information on the current policies, planned policies in the government’s pipeline, identify any specific focus regarding EV advancement efforts from each ministry, request relevant data, as well as informing project activities to enable further engagements during the project timeline.

The CMMIA leads the other ministries in the national EV task force as mandated by the President through Presidential Regulation No. 55/2019, while the MOT is responsible for the urban traffic management policies, including for EVs.

1.1 Consultation Meeting with CMMIA

1.1.1 Meeting details

Date	10 September 2021, 4.30 - 6 pm Jakarta time
Location	Online, via Zoom
Participants from CMMIA	<ul style="list-style-type: none"> • Deputy Assistant for Maritime and Transportation Industry (Mr. Firdausi Manti) • Division Head under the Maritime and Transportation Industry office (Mr. Arianto)

1.1.2 Key discussion points

The discussion points below are a summary of the discussion conducted during the consultation session with the CMMIA.

General Discussion

- The CMMIA pointed out that motorcycle usage in Indonesia is quite unique since they are also used for rural transportation instead of only for urban mobility. They are also used for long-distance travel, i.e. interurban trips conducted mainly during the holiday seasons. This will add more complexity to the charging infrastructure provision. Several policies are also different from other countries.
- The CMMIA viewed the transition to EV as necessary partly to provide a cleaner mobility option for the public, especially where public transport services are not sufficiently available.
- Private sector also has an important role in this EV transition.

Government key focus areas

The Government of Indonesia is pushing EV retrofits for motorcycles since the existing number of ICE motorcycles is very high (hundreds of millions). The effort is led by the Ministry of Energy and Mineral Resources (MEMR) and the MOT.

Issues regarding EV adoption in Indonesia

- The CMMIA meeting participants pointed out that there are already E2W models priced similarly to ICE motorcycles. Therefore, the public should have had sufficient options.
- With regard to the above, the CMMIA viewed the main issues hampering E2W adoption as follows:
 - a. Lack of public information and knowledge on EV, including E2W. Information about model availability and prices, EV safety, and EV operational performance are not widely available to the public. Therefore, the public is still hesitant to shift to the new technology. There needs to be capacity building for local governments, programs to educate the public regarding EVs, and pilot projects to showcase EV operational performance.
 - b. Lack of charging stations. Studies on charging station location planning and feasibility, in particular battery swap stations for E2W, are needed to accelerate infrastructure establishment.
 - c. Lack of financing schemes to buy EVs. In contrast to the various attractive financing schemes to buy ICE motorcycles, limited schemes are offered by banks and other financing institutions for E2W purchases.

Data request

Project implementation team was advised to address data requests to the Indonesian Statistical Bureau. The CMMIA currently did not own the requested data.

Inputs for the project

The CMMIA suggested that the project can include the activities below to further support the E2W transition:

1. Pilot project implementation for E2W or charging infrastructure
2. Charging infrastructure (battery swap) location assessment and feasibility study
3. ICE to electric motorcycle trade-in B2B program study
4. Public communications and education strategy and programs regarding EVs

1.1.3 Meeting documentation

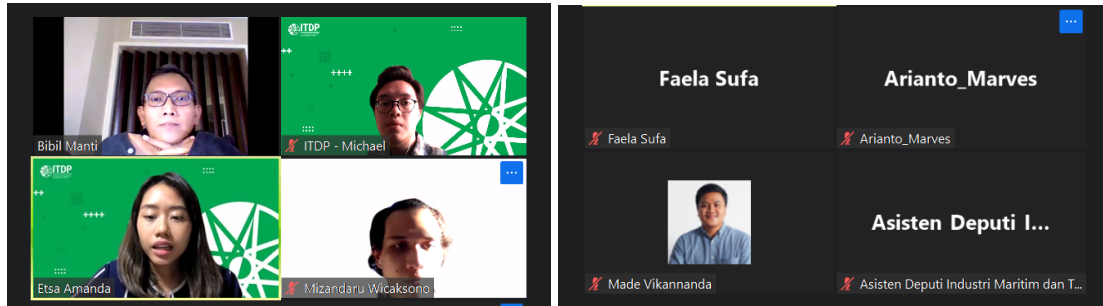


Figure 1. Consultation meeting with CMMIA

1.2 Consultation Meetings with MOT

1.2.1 Meeting details

Date	15 September 2021, 10 - 11 am Jakarta time
Location	Online, via Zoom
Participants from CMMIA	Staff of Directorate of Land Transport Facilities: <ul style="list-style-type: none"> • Surya • Irfan Baihaqi • Halim • Dimas

1.2.2 Key discussion points

The discussion points below are a summary of the discussion conducted during the consultation session with the MOT.

General Discussion

- The Directorate of Land Transport Facilities, under the Directorate General of Land Transport (DGLT), is in charge of EV adoption efforts.
- Several policies have been issued by the MOT, including EV-type test regulations and an electric car roadmap.
- No E2&3W adoption roadmap has been issued or developed by the MOT yet, except for vehicle retrofit (ICE to electric conversion).

Government key focus areas

The MOT is identifying EV charging infrastructure locations, including in secondary cities.

Issues regarding EV adoption in Indonesia

Lack of charging infrastructure was cited as the key issue.

Data request

The MOT has data on the number of ICE motorcycles and E2&3W in Indonesia.

Inputs for the project

The MOT suggested that the project can include the activities below to further support the E2W transition:

- Charging infrastructure (battery swap) location assessment, energy requirement, and technology study

1.2.3 Meeting documentation

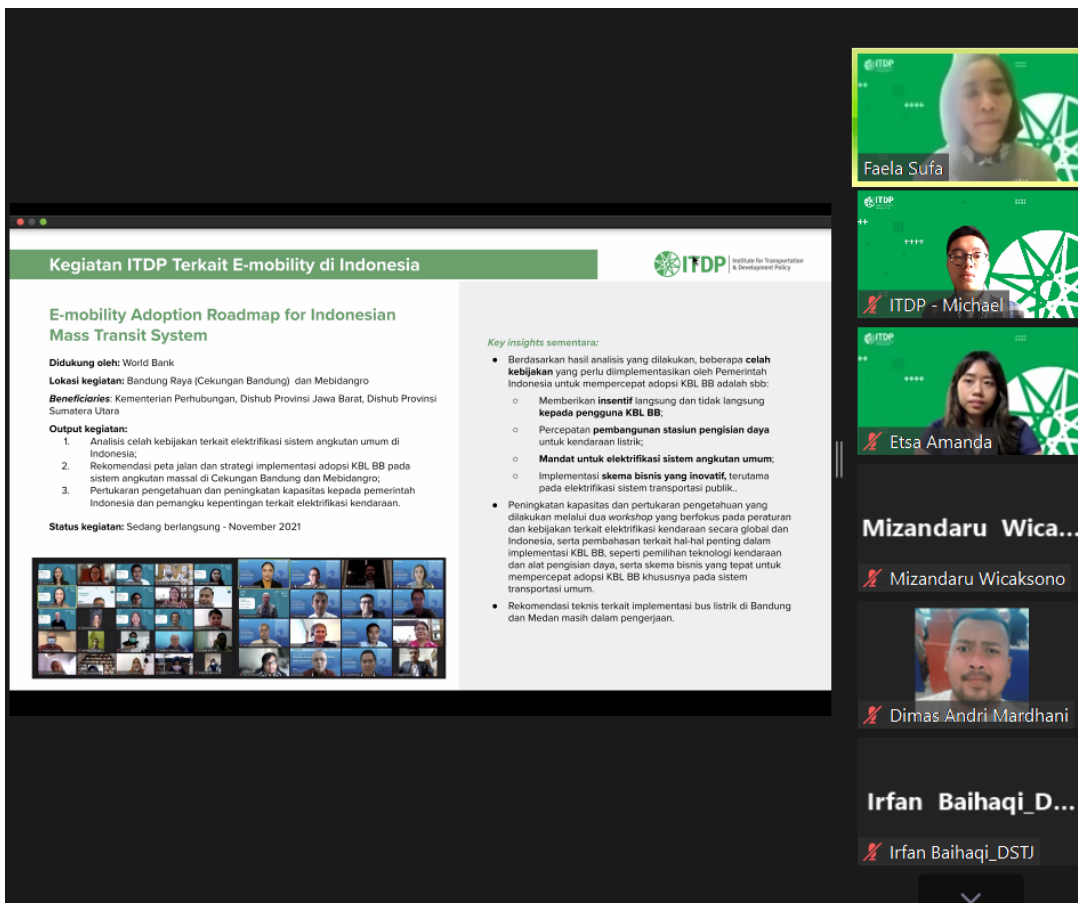


Figure 2. Consultation meeting with MOT

2 Structured Interviews with E2&3W Industry Players

To gain insights into the industry players' key challenges and needs to accelerate the uptake of E2&3W in Indonesia, a series of interviews with several domestic OEMs were conducted in April 2022.

2.1 Participants

ITDP conducted interviews with a total of three OEMs: Gesits, Smoot, and Selis. All the OEMs manufacture e-motorcycles, while Selis produces a more extensive range of E2&3W vehicles.

No	Company name	Products	Interviewee Name	Title	Discussion date
1	Gesits	E-motorcycle	Abdulllah Alwi	General Manager Sales	19-04-2022
2	Smoot	E-motorcycle	Irwan Tjahaja	Chief Executive Office	21-04-2022
3	Selis	E-motorcycle, e-bike, e-moped, Power Mobility Device (PMD), E-rickshaw, etc.	1. Robin K.H. 2. Reagan Pantja	1. General Manager Commercial 2. Head of B2G and B2B	27-04-2022

2.2 Interview Method and Questions

Separate online interviews were conducted for each OEM and each session took 45-60 minutes to complete. A list of questions was prepared in advance for the interviews. The questions were categorized into six categories: production, technical aspects, charging infrastructure, maintenance, government support, and marketing penetration.

No	Question
A	Production
1	How many of your motorcycles/electric bicycles have been sold and tested in Indonesia?
2	Regarding production, do you have any plans to focus on manufacturing your own or imported electric motorcycles/bikes? What about the current production capacity and expansion?
3	Based on your company's target/current market conditions, how long will it take for Indonesia to fully switch to electric motorcycles and provide an equitable charging infrastructure?
4	Can your motorcycle/electric bicycle be purchased without a battery? Is there a price difference?
5	What is the capital/financing scheme needed for production scale-up? And how can the government support it?

6	Does your company have any plans to produce electric bicycles in the near future?
B	Technical Aspect
1	What are the potential electric motorcycle models to be marketed in Indonesia?
2	What are the technical specifications regarding your electric motorcycle model? <ul style="list-style-type: none"> - Battery capacity (kWh), battery weight (kg), and practical range (km) - Type of electric motorcycle (automatic/gear transmission)
3	What is the estimated energy consumption for electric motorcycles and future targets? (kWh/km)
4	What types of batteries are generally used in electric motorcycles and future developments?
5	What is the energy density of the battery used by your product (kg/kWh)?
6	Is there a battery warranty from the company and what are the terms/warranty periods? Does this warranty apply to all driving purposes, for example: ride-hailing?
7	Can your motorcycle/electric bicycle use batteries from other companies? Is there a standard specification of the required battery used in your motorcycle/electric bicycle?
8	How will technology advance in the near future? (fast charging, range extension, speed boost, etc.)
9	What is the expected battery life? Or how many charge cycles? How much does it cost to replace the battery?
10	Do you have a strategy for battery waste management?
C	Charging Infrastructure
1	What is the charging method commonly used for this electric motorcycle (plug in, swap batteries) and the ideal method?
2	For motorcycles, is it necessary to have a public charging station available or is it enough to do it at home considering the relatively small charging power? How to mitigate safety issues if home charging is done?
3	Does your company provide charging stations to the public or only to private? Are there other manufacturers compatible with your electric motorcycle model?
4	What do you think about the need for standardization of batteries and plug-in connectors for electric motorcycles?
5	If plug-in is used for charger on this electric motorcycle, what is the type and power output method of charging? Is there a maximum power output limit for battery charging?
6	How long does it take for the battery to be fully charged in your electric motorcycle model? (overnight & fast charging)
7	How much does it cost to develop a plug-in terminal or swap batteries? What are the components?
D	Maintenance and battery preservation
1	Describe the maintenance plan (and cost) for the motorcycle/electric bicycle? Do you provide maintenance services nationwide? If not, what are the alternatives for the owner? Are there plans to expand after-sales service?
2	What kind of training do you have for maintenance personnel in your company?

3	What knowledge and skills should the owner have to maintain a motorcycle/electric bicycle?
4	How to maintain battery life to make it last longer?
E	Government Support
1	In your opinion, is the current government regulations sufficient to accelerate the transition to the use of electric motorcycles (including production incentives/regulations, financing, SNI standards, etc.)? What policies/regulations and incentives need to be provided to accelerate the transition?
2	What do you think about the current TKDN provisions and the applicable targets?
3	What components still require import and what is the import percentage of your product? What are the incentives or what is needed to facilitate the import of these components?
4	What kind of transportation/traffic policies need to be added to facilitate the use of electric motorcycles?
F	Marketing Penetration
1	What are your plans regarding marketing strategies and approaches to the wider community? How do you encourage people to switch to electric bicycles/electric motorcycles?
2	Do you have a plan regarding market segmentation? What is the profile of potential customers for your product?
3	What kind of partnerships do you have with other business entities (B2B schemes) or the government? (ride-hailing, e-commerce, logistics companies, operational/service vehicles, etc.) and how can this encourage the use of electric bicycles/motorcycles?
4	How do you maximize your offline and online marketing outlets?
5	5. What is the purchase scheme that you offer to consumers (0% down payment, low-interest installments, long tenure)?
G	Inputs for the Study
1	What are your expectations from this study?
2	Do you have any suggestions on our outputs (eg to support your electrification efforts, policy recommendations)?

2.3 Interview Insights

The following section contains the interview results. One of the interviewees requested for certain information to be non-company specific, therefore the information below is presented by aggregating the results from all the interviews.

1. Production

- Until September 2022, the units sold from each OEM varied, ranging from 1,000 to 7,000 units for e-motorcycles. E-motorcycles are the most popular vehicle type in the E2&3 segment.

- Regarding the minimum local component level (“TKDN”) set by the Ministry of Industry, all companies have managed to comply with it.
- Some companies feel that imports of some electrical components should be less cumbersome, not to mention local manufacturers are still unable to scalably produce a standardized battery pack such as Li-ion (a critical component for E2&3W). OEMs’ manufacturing ability is determined by multiple factors such as capital reserves, market demand, technological selection, business models, and government support/policy.

2. Technical aspects

- The technical aspects comprise a vehicle standard, battery, warranty, and waste management. In general, all companies have complied with SNI standards. One company uses the Japanese motorcycle standard, which is one of the highest manufacturing standards.
- In general, each company has its own battery standards, which differ from each company so currently there is no interoperability. Swap.id, a collaborative entity with Smoot provides battery swap services that are available largely in road-side minimarkets in Jakarta, Surabaya, and Bali.
- Especially for e-motorcycle, the battery capacity ranges from 1.4 to 2 kWh, and the weight of the battery ranges from 8 to 12 kg. In general, the motorcycle can run up to 50 to 60 km per 1 kWh with a speed of up to 70 Km/h. The lifetime of the battery ranges from 4 to 5 years.
- The most battery used is lithium-ion. The price ranges from IDR 6,000,000 to IDR 7,500,000. One company is found to use rechargeable lead acid batteries in some of their non-e-motorcycle types.
- To prolong the battery lifetime, some companies advise not to discharge the battery down to zero percent before the next charging, especially in a prolonged period as it can make the battery in sleep mode forever. Overcharging is also unallowed, it can reduce the battery health and cycle count.
- Unfortunately, battery waste management is not currently in place, this is mostly because battery manufacturing for EVs is not prevalent yet in Indonesia. Some companies argued that when the battery reaches its end-of-life it can be used to power many electrical components other than EV. They advise the government to encourage the establishment of battery recycling services or second-hand industry to grow before the excessive battery dump emerges.
- Each company provides a warranty for electrical components and batteries. For the electrical component, customers can just come to the nearest authorized dealer can fix it. One company also offers home service, where the maintenance personnel can come to the owner’s house.

3. Charging infrastructure

- According to most OEMs, charging infrastructure is something not necessarily important but good to have. All E2W types can be charged using home charging

facilities, as long as a power outlet is available. Unlike electric cars that require higher power, the usage of a DC adapter makes E2W more accessible to lower wattage. It is also possible to recharge E3W using home charging, but since it has larger capacities it depends on the model. For example, auto-rickshaw charging requires large power (above 1300 VA).

- The type of charging infrastructure that is suitable for Indonesian users is battery swap because it is fast. Available mainly in minimarkets, battery swap requires less than 10 seconds for users to switch battery packs. Despite the current fast charging technology (2-3 hours), users still consider that it takes longer to recharge the battery in a station, unlike refueling gasoline at petrol stations which only require up to five minutes (in peak hour). However, the current battery swap service is still very limited.
- Non-dedicated station charging by using an adapter also works. There were E2W pilot trips from Jakarta to Aceh and Jakarta to Mandalika (more than 1,500 km). The drivers charged their batteries using adaptors they brought in cafes, restaurants, and small shops along the roads.

4. Maintenance

- To provide maintenance most OEMs provide an offline service through dealers. They are now present in many big cities including but not limited to Jakarta, Surabaya, and Bali. Two companies are found to have nearly 50 dealers scattered nationwide. In addition to on-site service, one company appears to provide a home service, where the technicians can come to the customer's house.
- E2&3W should undergo routine maintenance, mainly to check the electrical components. Similar to ICE motorcycles, users are also instructed to regularly check technical parts including brakes, timing belts, propellers, front fork, bearing, and frame clamps.
- Most companies have various warranty periods.
- Many people are worried about crossing the flooded area - they should not. Electric motorcycles are designed to be resilient to water flooding. However, users should ensure that the motorcycles are not inundated for a long period of time, otherwise short circuit can occur when it is being used.

5. Government support

- Government support mainly should come in terms of production and financing.
- Some parts are imported from other countries because local companies are not yet able to manufacture some EV electric components, particularly battery packs and dynamos. To support domestic EV production, the government should provide import tax incentives for those specific components.
- Traffic demand management measures that restrict electric vehicles should be lifted and low-emission zones should be considered. Measures such as an odd-even policy that restricts ICE 2&3W should always be included during the adoption efforts. Also, Jakarta has been planning for the implementation of Electronic Road Pricing (ERP), just to make sure that E2&3W are not imposed. The introduction of low-emission zones can

also support the adoption of E2&3W and also make the area friendlier for all street users given the air quality improvement.

- The adoption effort should be tied together with the subsidy of electric vehicles. Right now the subsidy to lower the production price of E2&3W is not there yet.
- The policy to still have petrol fuel subsidy is contradictive to EV adoption efforts. The Indonesian government can try to adopt what has been implemented in China, where motorcycles are banned to operate and E2&3Ws are incentivized.
- In addition to that, the government should encourage people to shift to E2&3W by giving people a chance to have a riding experience. As many customers considered E2&3W could not give a comparable experience against ICE motorcycles, a company reported a change of customer interest after they decided to have people test-ride their products. Inspired by similar practices in India, it has been proven well and expedites the adoption. The way the Indonesian government can do this is basically to hold EV events where society is invited, explained, and facilitated to debunk the myth of E2&3W performance.

6. Marketing and market penetration

- To enter the market, OEMs participate in offline and online marketing. In general, attending offline events is preferred so that they can interact with customers and have a test ride. They prefer to participate in exhibitions and road shows such as Indonesia International Motor Show, Gaikindo Jakarta Auto Week, Indonesia Electric Motorshow, and Periklindo Electric Vehicle Show. In addition, to maximize the offline presence, they always strive to add dealers in any potential location nationwide, starting from major cities. One company apparently managed to have 50 dealers scattered across Indonesia
- For online marketing campaigns, they use websites and social media. They ensure the website is as informative and attractive as possible for customers because they google it to retrieve information about E2&3W. A good website returns its page on the top list which strongly determines based on search engine optimization capability. In addition, to maximize customer acquisition, social media platforms such as Facebook, Instagram, and TikTok have been utilized to execute marketing campaigns. Since social media is powerful, they consider it as a multiplier effect because customers who like the product are likely to voluntarily share it, also many influencers are targeted to influence their followers.
- In addition to B2C approaches, OEMs are also in favor of B2B and B2G. Some companies are found to have partnered with private companies such as ride-hailing companies such as Grab and Gojek, Airport operators, and Golf Park operators. They also plan to get partnered with government offices where they can provide their products as personnel vehicles, such as the Ministry of Transportation and Transport Agency. For example, a collaboration has been made between a company with the Government of Bogor, a garbage fleet (E2&3W) funded by a state-owned bank.

7. Key takeaways

- In accordance with the sources that have been obtained, e-motorcycles are the most favorite vehicles sold in the market.
- E-Motorcycle has a battery capacity of 1.4 to 2 kWh, with battery weight ranging from 8 to 12 kg and the life span of the battery ranges from 4 to 5 years. The journey taken can reach 50 to 60 km per 1 kWh with a speed of 70 km/hour.
- Each company still has its own battery standards. The production of the batteries components is still quite difficult because imports are needed and the absence of local producers that can quickly produce important components of the battery.
- So far, according to OEMs, the current battery waste management is not currently in place and there is encouragement from the company that encourages the government to form a battery recycling service to avoid excessive battery dumps.
- Charging infrastructure for E2W and E3W does not require complicated facilities, charging can be done at home, but for E3W depends on the model that allows it to require greater power. With charging a battery that takes 2-3 hours, some users still assume that charging electric vehicles still takes quite a long time compared to filling gasoline at gas stations.
- When charging it is expected not to release the battery up to zero percent and not overcharge because it will cause the battery to sleep mode and reduce the battery health and cycle.
- Each company provides a warranty for electrical and battery components, the service can be reached by visiting the nearest dealer or service from home with personnel coming to the owner's house. Most companies have various warranty periods for routine maintenance of electrical components.
- In its marketing, OEM participates in marketing offline and online. Offline marketing is done by attending events so that they can interact with customers and have a test ride. As for online marketing itself, they do marketing through websites and some social media such as Facebook, Instagram, and Tiktok. Social media itself is considered to have a big role in marketing because customers/influencers who are interested in products tend to share them voluntarily, which can expand marketing.
- Some companies have also partnered with ride-hailing companies such as Grab and Gojek, airport operators, as well as planning to cooperate with government offices such as the Ministry of Transportation and Transport Agency. This can also encourage the government to provide support for the adoption of E2W and E3W in terms of production and financing.
- Efforts are needed from the government to provide vehicle subsidies and traffic demand management steps to encourage low-emission zones that make the area more friendly for all road users given the improvement of air quality.

3 Workshop with EV Industry Players

At the end of the project, a workshop with EV industry players was conducted in collaboration with the Indonesian Young Entrepreneur Association (*Himpunan Pengusaha Muda Indonesia/HIPMI*). In the workshop, the main findings and recommendations from the project were presented and discussed. The workshop resulted in a summary of key priority policy recommendations to the government.

3.1 Participants

The event invited several Government institutions, Private companies, and Entrepreneurs.

No	Name	Institution, Title
1	Ms. Ida Nuryatin Finahari	Ministry of Energy and Mineral Resources (MoEMR), General Secretary of Electricity
2	Mr. Sayid Muhadhar	Ministry of Environment and Forestry (MoEF), General Secretary of PSLB3
3	Mr. Jadhie Judodiniar Ardajat	Ministry of National Development Planning of the Republic of Indonesia/National Development Planning Agency (Bappenas), Head of Planning
4	Mr. Muh. Aaron A. Sampetoding	Environmental Chairman of BPP HIPMI and Chief Executive and initiator of HIPMI Zero Carbon Movement
5	Mr. Robert Muda Hartawan	Chairman of Division 5 Maritime Affairs, Agriculture, Forestry and Environment BPP HIPMI
6	Mr. Sona Maesana	Chairman of BPD HIPMI Greater Jakarta
7	Mr. Robby Sugama	Chairman of HIPMI Jaya Automotive Banom
8	Mr. Halim Kalla	Entrepreneur
9	Mr. Winarto	PT Mobil Anak Bangsa, Head 2 Wheeler
10	Mr. Puryanto	PT Mobil Anak Bangsa, GM Government Relation
11	Mr. Giovanni Martin	PT VKTR Energi Mobilitas, Sales Manager
12	Mr. Kunto Adjie	PT VKTR Energi Mobilitas
13	Mr. Dwiki Ilham	PT Tomara Jaya Perkasa
14	Mr. Candra Lie	PT Tomara Jaya Perkasa
15	Mr. Hadi	PT Sokonindo
16	Mr. Mathan Kumar	Sealog, CEO
17	Mr. Sandy	Sealog
18	Mr. Gunanjar Barokah	Katalis, CEO

19	Mr. Faristama Aryasa	Katalis, CFO
20	Mr. Kristianus Sarumaha	PT Volta, GM Sales
21	Mr. Burhan	PT Volta
22	Mr. Imandio Wicaksono	PT Josun Motor Indonesia, Direktur
23	Mr. Hanif Adriansyah	PT Josun Motor Indonesia
24	Mr. Adriel Simorangkir	PT Pertamina Power Indonesia, PIC Direktur EV
25		PT PLN
26	Ms. Andini	LEN Industri
27	Mr. Raden Diky Dermawan	Benihbaik.com
28	Mr. Michael Kevin	Benihbaik.com
29	Mr. Farrel	Paramadina Entrepreneur Club
30	Ms. Faela Sufa	The Institute for Transportation and Development Policy (ITDP), Southeast Asia Director
31	Etsa Amanda	ITDP, Senior Transport Policy Associate
32	Michael Tanuhardjo	ITDP, Transport Associate

3.2 Objectives

The objectives of the "Focus Group Discussion: Entrepreneurs in Indonesia's Electrification Plan" was as follows:

1. Identify challenges faced by the private sector in starting, growing, and accelerating battery-based electric motorized vehicles (EV) demand in Indonesia.
2. To bridge the discussion between the private sector and the government in terms of accelerating the EV industry in Indonesia.
3. Generating consensus between HIPMI and stakeholders from the national electric vehicle industry on policy priority recommendations for the government.

3.3 Focus Group Discussion Insights

3.3.1 Opening and Keynote Presentations

The workshop was opened by HIPMI's Zero Carbon Movement launching event, with remarks from the Head of Environment of BPP HIPMI as well as the Chief Executive and initiator of HIPMI Zero Carbon Movement, Muh. Aaron A. Sampetoding M.Bus., Head of Division 5 of BPP HIPMI, Robert Muda Hartawan, and Director of ITDP Southeast Asia, Faela Sufa. Followed by the release ceremony and the signing of the HIPMI Zero Carbon Movement MoU by the Chairman of BPP HIPMI Division 5, Robert Muda Hartawan, and PT Eco Solution Lombok, John Higson.

After the opening agenda, the Focus Group Discussion (FGD) session began with an opening presentation delivered by ITDP Southeast Asia Director, Faela Sufa, who made a presentation entitled "Analysis of the Policy Framework Supporting the Electrification Plan in Indonesia". This presentation sparked discussions among participants from both the private and government sectors including; the Ministry of Environment and Forestry, National Development Planning Agency (Bappenas), Ministry of Energy and Mineral Resources (MEMR), battery-based electric vehicle manufacturing companies, charging infrastructure providers, as well as several state-owned enterprises related to the acceleration of EV including Pertamina and PLN.

In the presentation, ITDP presented a number of preliminary findings regarding the challenges faced by the private sector in supporting the acceleration of the adoption of EVs in Indonesia from studies and interviews with the private sector (three OEM companies of electric two-wheeler) conducted by ITDP under with the UNEP project. The challenges identified in the study include the high price of EVs compared to similar conventional vehicles, the lack of public understanding of the use and benefits of EVs, and the need to provide charging infrastructure to drive demand for EVs.

Based on these preliminary findings, a policy framework is proposed that includes the following four policy groups:

1. Policies to provide a strong legal basis for committing resources
2. Policies to reduce the total cost of ownership (TCO) of electric vehicles
3. Disincentive policy for conventional vehicle use
4. Policies to accelerate the provision of charging infrastructure

3.3.2 Focused Discussion Session

Focused discussion sessions were conducted after the presentation of the sparking issue. Participants were grouped into three discussion groups based on their line of business. Participants from government institutions, namely from the Ministry of National Development Planning of the Republic of Indonesia/National Development Planning Agency (Bappenas), the Ministry of Energy and Mineral Resources (MEMR), and the Ministry of Environment and Forestry (MoEF) were also divided into existing discussion groups. There were 25 participants in the focused discussion session.

During the focused discussion, each group was accompanied by a facilitator who guided the discussion. The participants of each discussion group were as follows:

Group 1: Two-wheeled Electric Vehicle Industry	Group 2: Electric Four Wheelers and Buses Industry	Group 3: Provision of Charging Infrastructure
<ul style="list-style-type: none"> ● Representative of Bappenas ● Chairman of HIPMI Automotive Banom ● Representative of PT Tomara Jaya Perkasa ● Director of Sealog ● Director of PT Josun Motor Indonesia ● CEO of Katalis ● Representative of PT Volta ● Representative of Selis 	<ul style="list-style-type: none"> ● Representative of Bappenas ● Secretary General of PSLB3, Ministry of MoEF ● General Manager of PT Mobil Anak Bangsa ● Head of Two-Wheeler Division of PT Mobil Anak Bangsa ● Director of VKTR Mobility Technology 	<ul style="list-style-type: none"> ● Representative of Bappenas ● Secretary General of Electricity, Ministry of Energy and Mineral Resources ● Representative of Pertamina Power Indonesia ● Representative of PLN ● Representative of Volta ● Representative of LEN Industry ● CFO of Katalis

Each discussion participant from the business segment (private sector) was asked to mention three main challenges and priority policy support needs. On the other hand, participants who represented government agencies were asked to share their current plans and programs to support the transition to EV. The discussion then proceeded with responses from other participants in the discussion group to the issues and support needs mentioned.



Figure 3. Group 3 discussion



Figure 4. Group 2 discussion



Figure 5. Group 1 discussion

3.3.3 Identification of Business Challenges in the Battery Electric Vehicle (BEV) Industry

From the focused discussion sessions, a number of key challenges encountered by business players were captured, which were elaborated into eight issues as follows:

1. High production cost of EV

- a. One of the major barriers to electric vehicle production is the battery component. The battery is still the largest cost component of the EV. The domestic battery industry is

still unable to meet the needs, but battery imports are subject to high taxes (up to 45%).

- b. With limited domestic demand, the production cost of domestic EVs is still high. As an illustration, to achieve economy of scale, a two-wheeled motor vehicle company needs to produce 50,000 units per year. Vehicle imports are still required in the early days of the adoption of EVs but are constrained by high import taxes.

2. Limited funding schemes for both consumers and businesses

- a. There are still few conventional banks that provide leasing programs for EVs with schemes that are as attractive as conventional motor vehicle leasing (in terms of interest rates, leasing periods, or down payments). From the point of view of financial institutions, EV is still a new technology and therefore has a higher funding risk.
- b. Funding schemes with longer loan tenors for EV businesses are also limited. In fact, the added value of EVs is their lower operating costs, which are realized over a longer period of time. For example, an electric bus provider has been able to secure a 10-year contract with a public transportation service provider but has struggled to find a financial institution that can provide a loan with a similar tenor.
- c. There is no subsidy for bus operators in the provision and operation of electric buses. In the current case of Jakarta, public transportation subsidies are limited to passenger fares. Subsidies for bus operators can ease the CAPEX and OPEX cost burden of electric buses.

3. There are still many incentives and facilities for the purchase and use of conventional motorized vehicles

- a. A number of government policies that still make it easy for consumers to purchase conventional motor vehicles make it increasingly difficult for EVs to compete on price. Motorcycles are still subject to 0% PPnBM and conventional passenger cars in the KBH2 segment (Four Wheel Energy Efficient and Affordable Motorized Vehicles) are still subject to a very low PPnBM (3%).
- b. The affordability of conventional motorized vehicles is also supported by many attractive leasing schemes from banks with low-interest rates and down payments.
- c. There is no regulation on limiting the age of motorized vehicles so there is no urgency by the public to transition to EV.

4. Unavailability of widespread charging infrastructure and limited incentives available

The provision of charging infrastructure should not wait for demand, because the availability of charging infrastructure is needed to encourage people to switch to electric vehicles. Additional investment to provide charging infrastructure is one of the factors for the high capital cost of EVs, especially for the electrification of public transportation fleets that require massive charging infrastructure.

5. The dilemma of the absence of battery standardization, but the technology is still rapidly evolving

Charging with a battery swap station (SPBKLU) model is preferred, especially for two- and three-wheeled electric vehicles to simplify and speed up charging. However, the acceleration of SPBKLU provision is hampered by the absence of battery standardization in terms of dimensions, voltage, and safety. Although the Indonesian National Standard (SNI) for batteries already exists and the battery size type has been limited to 3 types, standardization needs to be done to encourage compatibility between battery swap stations. On the other hand, the rapid development of battery technology needs to be considered in standardizing batteries.

6. Technical regulatory barriers related to motorized vehicles

Regulations related to gross vehicle weight (GVW) and maximum vehicle dimensions, especially for buses, have not been able to accommodate the electric vehicle models available on the market.

7. Limited multiyear contract period (three years) hinders the acceleration of electric bus provision for the national public transportation fleet

Public transportation fleets are one of the vehicle segments that can catalyze the formation of a national EV ecosystem, in addition to two-wheeled motor vehicle fleets. However, there are obstacles, such as the limitation of the contract period with national government institutions for three years. The short contract period causes industry players to hesitate to invest in the procurement of electric buses for national government programs.

8. Low community knowledge and awareness

- a. Public knowledge of the technical specifications of EV components, such as engines or batteries, is still low. This is caused, among others, by the education and campaigns about EVs that are only carried out by EV producers. In addition, the separate campaigns conducted by each EV manufacturer targets different target markets, so the information obtained by the public is incomplete.
- b. In addition, field evidence on the durability of EV components, such as batteries, is also difficult to obtain. Although there are claims from each EV manufacturer regarding the service life of vehicle batteries, the public still doubts the accuracy of these claims without strong support. Battery service life also becomes uncertain when users use battery swap station facilities, where batteries will often change hands from user to user.

3.3.4 The Government's Current Plans and Programs

In addition to identifying challenges from business actors, the discussion session also identified plans and programs that are being carried out by the government agencies present, as well as the need for collaboration or coordination with business actors.

1. Ministry of National Development Planning of the Republic of Indonesia/National Development Planning Agency (Bappenas)

- a. Bappenas is currently tasked with formulating the latest Presidential Regulation related to charging station (SPKLU) and battery swap station (SPBKLU). Related to this, Bappenas is calculating the ideal number of electric vehicles that should be achieved across Indonesia to plan the amount of charging infrastructure required. In the current scenario, the target number of EVs used in the charging infrastructure roadmap estimation is 2.1 million EV units with a ratio of home charging to public charging of 10:1.
- b. The government's priority in accelerating electric vehicles in Indonesia is currently public transportation fleets and ride-hailing fleets for electrification, then private vehicles.

2. Ministry of Energy and Mineral Resources (MEMR)

The Ministry of Energy and Mineral Resources is revising Minister of Energy and Mineral Resources Regulation No. 13/2020 concerning the Provision of Electric Charging Infrastructure for Battery-Based Electric Motor Vehicles. One of the revisions is related to the connector and power of the charging infrastructure. For example, in SPKLU, higher power is required for fast charging purposes while for home charging neither high power nor connectors that can support high electric power are required.

3. Ministry of Environment and Forestry (MoEF)

- a. MoEF is formulating a Ministerial Regulation regarding the utilization of specific waste (including electronic waste and waste).
- b. Invite businesses and HIPMI to push for waste standards and specific waste recycling including garbage and e-waste, to get fiscal incentives from the Ministry of Finance. E-waste processing has business potential.

3.4 Policy Needs to Accelerate the EV Industry in Indonesia

After identifying the challenges, participants discussed the priority government support needed by businesses to accelerate the use and industry of EVs in Indonesia. The proposed priority policies are as follows:

Priority Policy 1: Provision of fiscal incentives in the form of attractive and accessible financing schemes, subsidies, and tax incentives, accompanied by a strong legal framework.

1. Special financing quotas should be required by financial institutions for EV consumers and businesses. Such financing schemes need to be offered:
 - a. Lower leasing interest rates for the purchase of EVs compared to conventional motor vehicles
 - b. Longer funding period, up to 7-8 years, for EV business players such as EV manufacturers and fleet operators
2. Subsidies should be provided for the following five sectors:
 - a. Consumers of EVs, in the form of a subsidized purchase price of EV

- b. Electric bus fleet operators for public transportation, in the form of subsidized operating and maintenance costs of electric buses
- c. Manufacturers of EVs, especially subsidizing battery prices as a major cost component of EV production
- d. Charging infrastructure providers or owners, in the form of subsidies for electricity connection fees, power-ups, and costs related to the construction of other charging infrastructure
- e. Converting conventional vehicles to EVs

The source of subsidy funds can come from the reallocation of fuel subsidies.

3. It is necessary to provide the following tax incentives:
 - a. Income tax reduction for businesses related to the EV ecosystem and other businesses that have made efforts to reduce carbon emissions in the transportation sector.
 - b. Exemptions from import taxes on completely built-up (CBU) import taxes, especially for electric buses and for components of the CBU manufacturing industry, especially batteries, in the early days of CBU adoption.
4. It is necessary to prioritize the allocation of grants and foreign funding for the provision of public transportation, including electric public transportation.

Priority Policy 2: Taking an active role of the government in accelerating the provision of charging infrastructure, both charging stations (SPKLU) and battery swap station (SPBKLU), to encourage the creation of demand for EVs.

1. A legal framework is needed to encourage the provision of incentives by PLN to charging infrastructure providers. The incentives needed are in the form of:
 - a. Provision of minimum bulk tariffs, particularly for charging infrastructure for electric bus fleets for public transportation
 - b. Electricity connection fee waiver and power increase
2. The government provides charging infrastructure for electric bus fleets for public transportation.
3. Battery standardization is needed to encourage the acceleration of SPBKLU provision (battery swap), which can be started with voltage standardization and battery safety aspects.

Priority Policy 3: Re-evaluate conventional motor vehicle supporting policies that are counterproductive to the plan to accelerate the adoption of EV

1. There is a need to evaluate the low PPnBM (sales tax) policy for conventional motor vehicles. Among them with:
 - a. Increase sales tax for “low-cost green car” segment passenger cars
 - b. Impose sales tax on conventional motorcycles

2. Restricting the age of conventional motorized vehicles to accelerate the transition to EV.
3. Regulate the maximum design speed of conventional motorcycles. As vehicles used for urban mobility, motorcycles do not need to have high speeds. Limiting the design speed of conventional motorcycles will not only improve the competitiveness of EV, but also improve the safety of road users in general.

Priority Policy 4: Update a number of technical regulations related to maximum vehicle dimensions and weight, particularly for medium and large buses, to accommodate EV models available on the market.

Policies that need to be updated include Law No. 22/2009 on Road Traffic and Transportation and PP No. 55/2012 on Vehicles. With batteries, the average large electric bus (single bus) weighs 18 tons while the maximum GVW is now 16 tons. In addition, the maximum width for medium buses is now limited to 2.1 meters, while the average model is now 2.5 meters wide.

Priority Policy 5: Create a campaign and public education program on the benefits and use of EVs and sustainable transportation in general.

1. There is a need to launch a national program to campaign and educate the public about the EV. The campaign program aims to provide complete information to the public about EVs, from the benefits, and ease of use, to the EV model and incentives available.
2. Public campaigns and education to raise awareness of the dangers of climate change as well as road safety.

Priority Policy 6: Provide safe and secure lane infrastructure for EVs, especially electric bicycles.

Lane infrastructure, especially bicycle lanes, is needed to encourage people to switch to electric bicycles, which have lower emissions than conventional motorcycles. In addition to providing bicycle lane infrastructure that also includes suburban areas, law enforcement is also needed to sterilize existing bicycle lanes from motorized vehicles.