SUMMARY REPORT

Workshop on the Role of Motorised Two-Wheelers in Sustainable Transport in Asia and the Future of Electric Two-Wheelers

27 November 2017
Manila, Philippines

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Clean Air Asia was established as the leading air quality management network for Asia by the Asian Development Bank, World Bank and USAID in 2001, and operates since 2007 as an independent non-profit organisation. Clean Air Asia has offices in Manila, Beijing and Delhi, networks in eight Asian countries (China, India, Indonesia, Nepal, Pakistan, Philippines, Sri Lanka, and Viet Nam) and is a UN recognised partnership of more than 240 organisations in Asia and worldwide

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Abbreviations

2W	Two-wheelers
ASEAN	Association of Southeast Asian Nations
BMZ	*Deutsches Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (*German Federal Ministry for Economic Cooperation and Development)
CO_2	Carbon Dioxide
DEDE	Department of Alternative Energy Development and Efficiency
DOTr	Department of Transportation, Philippines
e2W	Electric two-wheelers
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH (German International Cooperation Agency)
KLTSP	Kuala Lumpur Transport Strategic Plan
NAMA	Nationally Appropriate Mitigation Action
NDC	Nationally Determined Contribution
TUEWAS	GIZ Sector Network Transport, Environment, Energy and Water in Asia

1 Background

In Asia, motorised two-wheelers are an important mode of transportation, offering people an affordable and flexible alternative to car and often clogged streets and (where exist) overloaded public transport systems.

In ASEAN, a lot of policy attention has been given to passenger car and pick-up truck ownership, which is growing rapidly across the ten member states, but relatively little regulatory attention has been given to 2W, which are the predominant transport mode in the region.

Many of the existing fuel driven 2W are old and inefficient and emit substantial amounts of particulate matter and black carbon and thus have a high share to local air pollution. Two-wheelers are often involved in road accidents. Electric two-wheelers (e2W) are a good entry point to electro-mobility as experts agree that they provide net carbon benefits regardless of the "upstream" electricity-carbon mix.

In contrast, in most Chinese cities today, fuel driven 2W are banned from the road. On the other hand the Chinese e2W market has exploded in the last 15 years. Currently there are more than 200million e2W on the streets of China. With a range up to 80 km and a top speed of 60 km/h they are an important part of the individual mobility, in particular in Chinese cities, which are often suffering from heavy congestion. For many people e2W are the mode of choice to commute between home and work and with their low cost (simple models less than 500 USD) they also offer individual mobility to low income households.[1]

Although e2W are an important mode of transport, they are not adequately regulated and are not actively supported by the government, as they are perceived as a safety risk in urban transport.

The workshop aimed at addressing the role and the challenges of motorised 2W as part of (urban) transport systems and offered the opportunity to exchange information and experiences within the ASEAN and China regarding related policy definitions, regulations and technical expertise.

The event covered the following topics

- Social, economic and environmental aspects of motorised two-wheelers
- Policies, standards and regulations
- Urban infrastructure characterisation of the use of electric two-wheelers
- Perception and acceptability of electric two-wheelers

The workshop was attended by policy makers from six different countries in Asia, a number of representatives of academia and other international organisations working on motorised two-wheelers. (Please see the participant list in Annex 2.)

[1] *Electric two-wheelers refer to pedelecs (pedal-assist electric two-wheeler which has a top speed of 25 km/h), e-bikes (no pedal-assist needed, with top speed between 25-50 km/h), and e-scooters (with top speed above 50 km/h)*

The workshop was jointly organised by the GIZ Sector Network Transport, Environment, Energy and Water in Asia (TUEWAS), the regional GIZ project "Transport and Climate Change" funded by the German Federal Ministry for Economic Cooperation and Development, the "Sino-German Cooperation on Low Carbon Transport" project (CLCT) funded by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, the United Nations Environment Programme (UN Environment) and Clean Air Asia (CAA) and took place at the Makati Diamond Residence in Makati, Manila.

2 Summary of Meeting

2.1 Welcome and Opening Remarks

Ms. Julia Nagel (GIZ) opened the workshop by thanking the Department of Transportation in the Philippines, especially the office of Assistant Secretary Mark de Leon as well as the office of International Cooperation for hosting this event. She introduced Sebastian Ibold from GIZ as the moderator of the event as well as Bert Fabian from UN Environment and Pia Agatep from CAA as co-organisers.

Mr. Ibold reminded the participants about the objectives of the workshop and highlighted why this workshop was organised. He stressed the importance of sustainable low carbon urban transport development in the light of global climate change and called for ambitious action as the transport sector is responsible not only for a high share of carbon emissions but also for congestion, local air and noise pollution and by this often reduced urban life quality. Mr. Ibold mentioned that the two-wheelers workshop is a great chance to exchange on the needs for implementing strong data based policies and regulations, infrastructure adaptation and strict safety standards but also incentives to promote e2W as part of national decarbonisation strategies. By this, the workshop can raise awareness and contribute to a sustainable future of motorised 2W in urban transport systems. He also presented the workshop programme, which included two main components. First, was to get an overview from different countries on the situation and status quo of motorised two-wheelers, followed by an interactive discussion on the future challenges and pathways for the sustainable integration of 2W in urban transport. The second part of the workshop focused on electric two-wheelers and their future role, which was elaborated by different experts as part of a panel discussion.

2.2 Workshop Proceedings

2.2.1 'Two-wheelers in the work of GIZ' by Ms. Julia Nagel

Ms. Nagel began by introducing GIZ, TUEWAS and two GIZ transport projects, namely Transport and Climate Change (TCC) and the Sustainable Urban Transport Project (SUTP) to the workshop participants. She highlighted GIZ's work around the world and across a wide range of topics, among which transport and climate change is a significant component. The TUEWAS Sector Network aims at facilitating knowledge exchange between GIZ projects working on similar topics in Asia. TCC works with the ASEAN Secretariat; it has been active since 2012 and will continue until the end of 2018, and is funded by the German Federal Ministry for Economic Cooperation and Development. TCC has implementation partners in five ASEAN Member States (Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam), but also aims to provide a broader benefit through regional activities, including supporting the improvement in terms of energy efficiency of two-wheeler fleets in countries. She highlighted that given the sheer numbers of two-wheelers in the region, there is a huge potential for CO_2 mitigation from this transport mode. Besides CO_2 mitigation, the transport

mode offers great potential benefits for air quality improvement if existing fleets become more energy efficient and cleaner. SUTP assists developing cities worldwide to achieve their sustainable transport goals by offering training and capacity building and the dissemination of knowledge products. The SUTP Sourcebook series investigates key areas of sustainable transport policy frameworks in developing cities. This series includes a Sourcebook on "Two- and Three Wheelers", which will be updated early 2018.

Last but not least, one of the key principles of GIZ´s works in the field of sustainable transport was highlighted: The Avoid-Shift-Improve approach (ASI) for transport energy efficiency, meaning avoid unnecessary trips, shift to more sustainable transport and improve the existing technologies and standards for more energy efficient transport systems.

Please find the presentation here.

2.2.2 'Electric 2- and 3-wheelers' by Mr Bert Fabian

Mr. Fabian, Programme Officer at the Air Quality and Mobility Unit at UNEP based in Nairobi, started by introducing the UN Environment approach of promoting sustainable low emission transport through a number of different programmes and initiatives before he focused on two-wheelers. UNEP, together with other international partners is implementing the "Transitioning from Internal Combustion Engine (ICE) to electric 2- and 3-wheelers in Developing and Transitional Countries"-Initiative on behalf of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety. The initiative has seven partner countries, among them are Thailand, Viet Nam and the Philippines in Southeast Asia. He explained that two-wheelers poses several issues due to their CO_2 emissions which will continue in the future based on the trends for growing two-wheelers fleets, not only in Asia but also worldwide. He also emphasised that while there are so many motorised two-wheelers on the road, particularly in Southeast Asia, it seems they are not well integrated into national policies. Electric two-wheelers in comparison emit substantially less CO_2 and air pollutants and offer an easy entry point for e-mobility in many countries. The development of (e-)two-wheelers has to be supported by sound and strong policies to properly integrate them into urban transport systems.

Please find the presentation here.

2.2.3 'Status quo, overview of policies and challenges in the Philippines' by Ms. Pia Agatep*

Ms. Agatep, Transport Projects Specialist working with CAA presented on the status quo, of policies and challenges regarding two-wheelers and their role in urban transport in the Philippines. CAA is a non-governmental organisation based in the Philippines, aiming at reducing both air pollution and CO_2 emissions and thereby contributing to more liveable and healthy cities. She highlighted that in the Philippines, the enforcement of policies is key on the agenda. In 2016, about 60% of total vehicle registrations in the Philippines were two-wheelers. She also cited that in the same year, there was a 34% growth in sales compared to 2015, the highest in Asia. Two-wheelers serve not only for private transportation but also have a significant role in urban freight and logistics. Similar to other countries, reasons for the rapid growth are that two-wheelers are very cheap, easy to possess and easy to navigate in congested urban areas or on unpaved roads in rural areas. In addition, regarding fuel expenses the motorcycle is competitive in terms of price and overall accessibility vis a vis public transportation.

There are a number of policies in the Philippines that address two-wheelers to ensure safety standards and from September 2017 onwards, only Euro 3 compliant products were allowed to be imported or produced in order to improve the energy efficiency and general standards of 2W. However, challenges remain in the enforcement of law and lack of equipment for proper emission testing.

The questionnaire following the lecture focused on the different classifications of two-wheelers and how they are regulated in different countries. It was noted that a proper classification and standard development is key for policies to be effective and enforced. In Germany for example, the cut-off point for e-bikes or pedelec (pedal electric cycle) is 30km/h, meaning that if the e-bike is faster than 30km/h, it is required to use the main road. The registration of e-bikes and the use of helmets also became mandatory.

With regards to the important role of two-wheelers in urban transport and especially the growing demand for fast and reliable urban freight services it was noted that “two-wheelers are the oil to facilitate transportation in an urban context” and are an important economic factor. In Viet Nam, a growing number of university students work as drivers for services like Uber and GrabMoto to finance their studies. Another challenge for the Philippines is that the government is focusing its development on motorways and mass transit systems, which has been called the "golden age of infrastructure". Infrastructure development is not geared to the requirements of 2W. Indonesian participants shared their perspective with similar experiences and mentioned the dramatic growth of two-wheelers experienced in the past years as a main challenge.

Please find the presentation here.

2.2.4 ‘Viet Nam Traffic Safety for 2 Wheelers: Challenges and Strategies’ by Ms. Trinh Thu Ha

Ms. Trinh Thu Ha from the Deputy Chief Office of the National Traffic Safety Committee (NTCS) in Viet Nam presented on the challenges and strategies for two-wheeler safety in Viet Nam. NTSC´s main role is to advise the vice minister and the government ministries on traffic and road safety as well as to coordinate between the different ministries. According to Ms. Ha, about 80% of the people in Viet Nam are using the motorcycle every day. She raised the awareness of all participants by highlighting that the number of annual road deaths reached 11,000 in 2011 and that this tragedy has also a significant impact to the economy, equalling to an annual GDP loss of 2%. Two-wheeler (motorcycle) drivers are among the most vulnerable road users and the motorisation ownership is constantly growing with around 9,000 new daily registered new motorcycles (2014). The total number is estimated to be up to 60million motorcycles in circulation, which makes the most popular means of transportation in Viet Nam.

At the end of 2007, the Government started to introduce and enforce road safety measures, for example the wearing of helmets became mandatory by law. Traffic safety became also part of education programmes in schools given the fact that many road accident victims are high school students. Other challenges include irresponsible driving behaviour as well as other road safety issues such as dangerous intersections and general infrastructure capacities, which cannot handle the growing amount of vehicles. The Viet Namese Government continues to focus on the development of policies on road safety (i.e. drunk driving policies) in 2017 and on introducing emission testing and inspection programmes for

motorcycles in the future. For 2030, the introduction of restricted motorcycle areas in some cities is planned.

A brief discussion followed with participants discussing the pros and cons of introducing restrictions on the use of motorcycles. Participants agreed that there should not be any general ban on motorcycles. Transport should rather be regulated in an effective and integrated manner and provide good public transport and non-motorised transport facilities. This would make a potential ban of motorcycles as a complementing transport mode unnecessary.

Please find the presentation here.

2.2.5 'Two-wheelers in Malaysia' by Dr. Horizon Gitano-Briggs

Dr. Horizon Gitano, two-wheeler expert from Malaysia and head of Focused Applied Technologies, introduced and explained the status quo and current situation of electric and fuel-driven two-wheelers in Malaysia. He started his presentation by highlighting the convenience of two-wheelers in Asia, which makes them the dominant and most used transport mode in many countries in the region. He emphasised how important two-wheelers are in urban transport systems, especially for the first and last mile connectivity. Malaysia has about 10million two-wheelers on the roads. He put emphasis on the high energy efficiency of two-wheelers compared to other transport modes and introduced the different classes and definition of motorcycles in Malaysia and the different standards that have been developed. Standards are needed to address three main areas: Safety, product quality and compatibility.

Besides standard development, Malaysia has undertaken other ways to make two-wheeler riding safer. It is the leading country in the ASEAN region for motorcycle only infrastructure. There are over- and underpasses that allow motorcyclists to safely cross highways or other main intersections without interruption or waiting time at intersections. Dr. Horizon elaborated on more technical details of standards as well as challenges to introduce policy challenges which come along with them, for example the need for appropriate testing facilities for standards.

Clarifications and further details were made on the different testing facilities and standards. The importance of having sound and reliable data for any kind of decision making was emphasised: "Policies should be made based on data and not on opinions".

Please find the presentation here.

2.2.6 'Two-wheelers in Thailand' by Ms. Minta Poowatanavong

Ms. Poowatanavong from the Department of Alternative Energy Development and Efficiency (DEDE), Ministry of Energy in Thailand presented on motorised two-wheelers in Thailand. She gave an overview on the status quo and the existing challenges on motorised 2W and highlighted the role of electric 2W in Thailand. Transportation is the biggest consumer of energy with 38% in 2016. In 2017, 54% of all registered vehicles were motorcycles, which equals around 20.5million motorcycles, from which only 1,324 units were registered as electric 2W in 2016. Reasons for the popularity of 2W are very similar to other countries, with motorcycles being cheap, reliable and flexible especially in congested cities like Bangkok. While there are policies in place to ensure safety, effective enforcement of law is often

lacking. Other challenges lay in poor rider habits and limited data to analyse motorcycle consumption and usage in Thailand. With regards to electric 2W, it was emphasised that the perspectives and views of all stakeholders need to be considered including government agencies, manufacturers and especially the users. Thailand is currently undertaking a number of activities to introduce e-mobility, not only for two-wheelers but also for three-wheelers (Tuk-Tuks) and electric buses and cars, for example by implementing charging stations throughout the country. As for electric two-wheelers, DEDE, together with the Ministry of Industry is working on the development of minimum and high energy performance standards (M/HEPS) for electric 2W and charging stations. This will help to prevent low performing motorcycles from entering the market.

Please find the presentation here.

2.2.7 'E-bikes in China: Status, Challenges and Future' by Dr. Jiangyan Wang

Dr. Wang from the China Sustainable Transportation Center (CSTC) provided insights on the current development, advantages and challenges, related policies and future outlook for e-bikes in China. Different from other presented country perspectives, China uses the term e-bikes instead of electric two-wheelers. As an important transport mode for short and medium distance travel, especially in congested city areas, e-bikes are highly popular in China and their number is continuous growing. E-bikes usually cost between 500 and 2,000 USD and have an average speed of 24km/h (they can reach a speed up to 60 km/h). Not many people wear helmets and problems occur when traffic laws are not obeyed. Especially due to increasing e-commerce related logistic volumes, e-bikes are also often used for urban delivery services. E-bike users in China face a whole set of challenges. Narrow bike lanes, roadside parking and conflicts with buses at station areas are among the reasons that pose safety issues for e-bikes and reasons for concern but even though the number of e-bikes in China is growing, there is a lack of national policies towards e-bikes. There is no record about accidents due to lack of registrations and also sound insurance policies are missing. Some cities in China started to ban e-bikes from certain areas in the city as an answer to the growing vehicle stock and growing numbers of accidents instead of developing and implementing standards and policies to address the challenges. One challenge is that there is no unified management among the different departments that would need to define and implement registration standards. Regarding the future, a positive attitude is needed and ministries need to work together in order to come up with national policies to address safety issues and set up proper registration standards that applies nationwide. From an infrastructure point of view, separate lanes for bikes and e-bikes are needed and instead of "complaining about e-bikes not being safe, one need to make them safer". Or to put it differently: "They will not go away".

Discussion concentrated on how to handle lead acid batteries given the environmental challenges in recycling them. One concept would be to include the batteries into the registration systems for e-bikes, which would facilitate easy tracking and disposal mechanisms.

Please find the presentation here.

3 Group Discussions

Following the input presentations, Mr. Sudhir Gota gave a brief input on the future of two-wheelers. He presented estimated growth for particulate matter and NOx emissions, growing energy consumption and vehicle activity between now and 2050 without actions being taken and presented a number of options to address the predicted growth. He ended his short input by asking if two-wheeler future is electric without giving an answer to the question.

Participants were then divided into four small breakout groups to further discuss the role of two-wheelers in urban transport systems. The groups were asked to come up with:

- Five Challenges and five solutions for integrating two-wheelers into urban transport systems in the future, and an answer on the question:
- Will we see a significant market penetration of electric-two-wheelers in ASEAN and in which year the sales of electric two-wheelers will exceed the sales of fuel driven two-wheelers?

Results of the groups: The different groups elaborated a set of structured key findings, where one aspect was dominating: The need for strong data based policies, safety and emission standards and regulations. To achieve this, awareness rising and a clear communication of the opportunities coming along with two-wheelers in urban transport systems and the needed measures is necessary. Another key finding was that (early) urban infrastructure development and adaptation but also land use planning should go hand in hand with the implementation of two-wheeler promotion and regulation. For this, inter-sectoral and inter-ministerial approaches are needed. The participants also concluded, that awareness rising has to come along with early education on road safety and driving behaviour. After all, incentives to promote electric two-wheelers (as in many ASEAN countries an important part of national decarbonisation strategies) are needed to ensure a sustainable future for two-wheelers in urban transport systems.

The detailed results can be found in Table 1.

Table 1 Results of group discussions

	Challenges	Solutions	E2W > Conventional 2W
Group 1	Registration, Inspection and Maintenance (e.g. unregistered motorcycles used in crimes, lack of implementation and enforcement)	- Stricter enforcement and apprehension - Automate registration (unified system)	2067 (In ASEAN)
	Safety (no helmets, education, enforcement of rules etc.)	- Capacity building - Awareness raising of the public - Policies	
	Policy & Standards (not consistent at the moment, pollution due to quality and condition of motorcycles)	- Forums to stimulate discussion among the private sector - Harmonise standards in ASEAN	

		- Transport database for concrete policies	
	Behavior/Perception (dislike motorcycles)	- Awareness from the government - Education	
	Infrastructure (too much traffic)	- Lane management, improving traffic light management - New infrastructure (new lanes for e-motorcycles/bikes)	
Group 2	Safety	- Speed/weight based regulations	2027
	Regulation and enforcement	- Capacity building for policy makers/public awareness	
	Public transport conflict ("stealing passengers", e.g. shifting from public transport to two-wheelers or, not shifting to public transport)	- Energy Efficiency Taxation	
	Life-cycle assessment	- Assessment, labeling, data collection and processing standards	
	Urban Planning	- Integrated planning (land use, urban patterns, infrastructure, design guidelines etc.)	
Group 3	Lack of capacity of local production	- Standards for products, safety standards - Capacity building	2036
	Improve users perception, performance, environment, price	- Registration and education	
	Raw material and waste of electric two-wheelers	- Recycling standards and registration	
	Lack of public awareness and education	- Agenda setting and public awareness. - Promotion of electric two-wheelers as a solution, not a problem	
	Lack of political will	- Awareness raising - Education - Capacity development	
Group 4	Lack of battery management	- Battery lifecycle management (Buy-back)	2031
	Safety challenge: Drivers	- Enforcement	
	Safety challenge: Lack of infrastructure	- Dedicated two-wheelers (pedelec, e-bikes) lanes	
	Registration, categorisation, licensing, insurance (policies)	- Properly categorise 2W, formally register and set-up other policies on licensing, insurance	
	Price of e-bikes – how to make them more competitive and availability	- Develop incentives, reduced tariff, include in industrial promotion	
	Battery range for long distance	- Battery swapping, charging	

	trips	infrastructure, high-end rentals - Technology	

4 Panel discussion on the future role of electric two-wheelers in urban transport

The last session of the workshop focused on electric two-wheelers and their future role in urban transport systems. Mr. Ibold opened the panel discussion by inviting the four panellists to the stage and encouraged them to briefly introduce themselves. The panellists were: Dr. Nuwong, fuel economy and 2W expert from the Materials Technology Center in Thailand, Dr. Tran Quang Vinh from the Hanoi University of Science and Technology in Viet Nam, Dr. Chana Yiangkamolsing from the Electric Vehicle Association of Thailand, and Ms. Diane Fajardo, Project Communications Officer from the Department of Transportation, Philippines.

The discussion was started by Mr. Ibold asking all panellists “How they see the future role of electric two-wheelers in urban transport systems, with a focus on technical, economic, social and environmental challenges and opportunities”.

Ms. Fajardo elaborated that for the Philippines, the biggest challenge is the lack of standards, which would allow for a proper policy development and more importantly, implementation. Furthermore, policy makers need to encourage and set incentives for the industry to have electric 2W on the market. However, for this technical assistance and standardisation is needed. In Thailand, the situation seemed promising 10 years ago with growing numbers of electric two-wheelers produced by a local e-scooter company. Due to poor after sale service, the company collapsed and currently there are only around 1,000 registered electric 2W on the market. The majority of them (95%) are Chinese imports. The main challenge for further growth was identified as the high costs by Dr. Chana. Dr. Nuwong added that there was a policy addressing and emphasising to have 75% of all motorcycles electrified by 2030; however, it was taken out of Thailand´s national electric vehicle policy. The government is giving mixed signals on whether imports should be supported or not. Regarding battery recycling, lead acid batteries were mentioned but also not perceived as a main challenge assuming that the market will steer battery recycling, once critical numbers are reached. Another challenge that was mentioned for Viet Nam was a declining popularity of electric 2W from the public in general with the price being a key issue. As one reason for declining popularity, the bad quality of imported motorcycles was stressed. Regulations are under way, even though not so strict and integrated as in other countries. It was further emphasised that the technical issues, due to low quality imports need to be solved first. This will influence the price and users will see the benefits of electric 2W over conventional fuel driven 2W. Another environmental challenge identified, is the lack of continuous inspection and maintenance facilities for in-use motorcycles. 2W are controlled upon registration but there is no mechanism to control them while being used. That also makes it difficult to have good data on total numbers of motorcycles.

Electric 2W are currently not included in the CO_2 based excise tax scheme in Thailand and there are no subsidies for electric 2W at the moment and the question about whether there is a political will from the government or not aroused. Thailand is giving incentives to the automotive industry with emphasis on e-mobility. Honda Thailand also announced to start

with e-scooter production in Thailand but is facing the issue of e-scooters being three times more expensive than conventional scooters. One suggestion to accelerate the introduction of e-mobility in general was to start with the electrification of different typical and traditional transport modes that exist in the countries, such as Tuk-Tuks in Thailand or Tricycles in the Philippines as an easy entry point to e-mobility.

It was further discussed whether imports e.g. from China or building up own production helps to establish electric 2W in the region. In Viet Nam, imports are currently not allowed but this will change in 2018 and might bring change to the market. In Thailand, there are only small manufacturers and importing components is taxed with 10%. The issue of maintenance remains though. In the Philippines, enabling laws exist but the key issue and concern for the government is to focus on standard development, which will further support the industry starting with their own production. Improving public transport systems is currently the main priority in the Philippines. Nevertheless, there are new mobile motor vehicle inspections being introduced in 2018, which will also include motorcycles. Improving the inspection and maintenance is a first step towards cleaner fleets and will eventually pave the way for electric 2W to further improve air quality and reduce CO_2 emissions.

Another part of the discussion focused on the question on how to make electric 2W more attractive for consumers and especially the younger generations, also considering the general perception of electric 2W not being safe and the problem that manufacturers make them faster and faster if policies are not keeping up. While in many ASEAN countries there is one license that allows you to drive all classes of 2W, it was suggested to introduce a special license for high-powered 2W (over 250cc) to control the use of 2W and improve safety. On improving the overall perception and attractiveness of electric 2W, a few examples were given and discussed such as leasing schemes that allow delivery companies, e.g. KFC in Malaysia, to use an electric vehicle fleet. It was also noted that electric two-wheelers could be attractive for the tourism sector. A few historical sites in Myanmar (Bagan) and Cambodia (Angkor Wat) started to advertise for e-scooters for visiting the sites, which also helps to preserve the building heritage.

Other options to increase the demand from the government side are either restrictions or incentives for the case of Thailand. Considering that mandating and enforcing are not very popular, manufacturers should be given incentives. Another option would be to make use of Corporate Social Responsibility budgets, which could be used for e-mobility or awareness raising campaigns, including aspects of global warming and the advantages that electric 2W can bring. The tourism sector has potential to introduce new forms of mobility.

Besides these options, pricing was seen as a key aspect and instrument to regulate the take-off of electric scooters. It was also agreed that support from the government is crucial to make electric two-wheelers more economic feasible and thus, slowly improving existing fleets. Nevertheless, the key is to ensure sustainable, livable and healthy cities that provide a number of different transport options, ideally based on a strong public transport backbone.

5 Closing

Ms. Nagel and Mr. Ibold closed the workshop by thanking all participants for their contributions and the fruitful discussions. It was summarised that 2W are an important means of transportation in many of the ASEAN countries and China and are often the entry

mode of individual mobility for low income households, also functioning as small business vehicles. Nevertheless, the mode is also a significant source of local noise and air pollution, carbon emissions, high (often deadly) accident rates and is often neglected when it comes to priorities in transport policy development and infrastructure setup and adaptation.

Having strong data based policies and regulations in place is the key in order to successfully integrate 2W into sustainable urban transport system. Similar to non-motorised transport, infrastructure adaptations to ensure safety are needed in certain areas. Incentives to promote the use of electric 2W are one measure that can be taken by the governments to help the improvement of existing motorcycle fleets and to reduce CO_2 emissions in the long run. In addition, any development in the transport sector towards e-mobility should be supported by a low-carbon energy transition. Furthermore, upcoming trends and new use cases and business models such as smart scooter sharing should be considered as potential contributions to the sustainable development of the transport sector.

Some of the participants concluded, that working on a roadmap towards a strong 2W alliance and exchange platform could be a good topic for a follow-up on the workshop. The participants agreed on, that based on the very good results, it would be necessary to have another workshop on the topic in 2018.

All participants were invited for a network dinner to continue with the discussion.

Annex 1: Workshop Agenda

Monday, 27 November 2017

Time	Activity	Responsible/Speaker
08:45	**Registration**	
09:00	**Welcome remarks and objectives of the workshop**	Sebastian Ibold, GIZ
09:15	**Powered Two-wheelers in the work of GIZ**	Julia Nagel, GIZ
09:40	**Why electric two-wheelers? Status quo and current trends**	Bert Fabian, UNEP
10:10	**Country Input Philippines – Status quo, overview of policies and challenges**	Pia May Agatep CAA, Philippines
10:35	*Coffee and tea*	
11:00	**Country Input Viet Nam - Status quo, overview of policies and challenges**	Ms. Ha Trinh Thu, NTSC, Viet Nam
11:25	**Country Input Malaysia – Status quo, overview of policies and challenges**	Dr. Horizon, Malaysia
11:50	**Country Input Thailand – Status quo, overview of policies and challenges**	Ms. Minta Poowatanavong, DEDE, Thailand
12:15	**Networking and lunch break**	
13:20	**Country Input China – China´s experiences on electric two-wheelers in urban transport**	Jiangyan Wang, CSCT, China
13:40	**Interactive discussions on the role and issues of powered two-wheelers in urban transport**	Moderated by Sudhir Gota
15:00	Coffee and tea break	
15:30	**Panel discussion: Role of Electric two-wheelers in sustainable transport – What are the biggest obstacles and easiest entry points?** - *Academia- Dr Vinh, HUST, Viet Nam, Dr. Nuwong, Thailand* - *Associations – Prof Chana, EVA Thailand* - *National and Local Government – Ms. Diane Fajardo, DOTr Philippines*	Moderated by Sudhir Gota and Sebastian Ibold
17:00	**Feedback and outlook for next steps**	GIZ/UNEP
18.00	**Closing, Dinner and Informal Networking**	GIZ/UNEP

Annex 2: List of Participants

	Title	Name	Affiliation
1	Ms.	Pia Agatep	Clean Air Asia
2	Mr.	Pinto Anugrah	ASEAN Center for Energy
3	Mr.	Stefan Bakker	Indpendent Expert
4	Atty.	Glynda Bathan	Clean Air Asia
5	Mr.	Nuwong Chollacoop	National Metal and Materials Technology Center, Thailand
6	Ms.	Melissa Cruz	GIZ Transfer
7	Asec.	Mark Richmund de Leon	Department of Transportation, Philippines
8	Ms.	Kathleen Dematera	Clean Air Asia
9	Ms.	Hannah Fatima Ebrp	GIZ TCC
10	Mr.	Bert Fabian	UNEP
11	Dr.	Horizon Gitano	Focus Applied Technologies, Malaysia
12	Mr.	Sudhir Gota	Independent Expert
13	Ms	Nur Farhana Helme	Malaysia Automotive Institute
14	Mr.	Sebastian Ibold	GIZ China, CLCT
15	Mr.	Nopporn Jarrongkiat	Office of Transport Policy and Planning, Thailand
16	Mr.	Aditya Mahalana	GIZ TCC
17	Ms.	Caroline Lourdes Mangalili	Department of Transportation, Philippines
18	Ms.	Anna Patricia Mariano	GIZ TRANSfer
19	Dr.	Christian Mettke	GIZ TRANSfer
20	Ms.	Norzailah Abd. Muin	Malaysia Automotive Institute
21	Ms.	Julia Nagel	GIZ TCC
22	Ms.	Minta Poowatanavong	Department of Alternative Energy Development and Efficiency, Thailand
23	Mr.	Natikorn Prakorbboon	Department of Alternative Energy Development and Efficiency, Thailand
24	Mr.	Ahmad Safrudin	KPBB, Indonesia
25	Ms.	Elena Scherer	GIZ TRaCs
26	Mr.	Friedel Sehlleier	GIZ TCC
27	Mr.	Alan Silayan	Clean Air Asia
28	Mr.	Mark Tacderas	Clean Air Asia
29	Ms.	Ha Thu Trinh	NTSC Office, Viet Nam
30	Ms.	Kriztia Torayno	GIZ TCC
31	Dr.	Vinh Tran Quang	Hanoi University of Science and Technology
32	Mr.	Tali Trigg	GIZ TCC
33	Dr.	Jiangyan Wang	China Sustainable Transportation Center
34	Prof.	Chana Yiangkamolsing	Electric Vehicle Association Thailand
35	Mr.	Guillermo Francino	Department of Transportation, Philippines

	Title	Name	Affiliation
36	Ms.	Raquel De Leon	Department of Transportation, Philippines
37	Ms.	Emily Rose Baduya	Department of Transportation, Philippines