Project_Scoping
URBAN PATHWAYS
2018

VIETNAM

PROJECT SCOPING

HAI PHONG

Electric Two-Wheeler

Wuppertal Institut
UN HABITAT FOR A BETTER URBAN FUTURE
UN environment United Nations Environment Programme

Author: Alvin Meija (Climate Action Implementation Facility)
Nikhil Chaudhary (Climate Action Implementation Facility)

Editor: Oliver Lah (Wuppertal Institute)

The graphic design was prepared by Barbara Lah

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team@urban-pathways.org

Oliver Lah
+49 (0)30 2887458-16

Project Office
Schwedter Strasse 225
10435 Berlin

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URBAN PATHWAYS

The Urban Pathways project helps delivering on the Paris Agreement and the NDCs in the context of the New Urban Agenda and the Sustainable Development Goals. It has established a facility in close cooperation with other organisations and networks active in this area to support national and local governments to develop action plans and concrete implementation measures to boost low-carbon urban development. This builds on UN-Habitat's role as "a focal point on sustainable urbanisation and human settlements including in the implementation and follow-up and review of the New Urban Agenda". The project develops national action plans and local implementation concepts in key emerging economies with a high mitigation potential. The local implementation concepts are being developed into bankable projects, focusing on the access to urban basic services to create a direct link between climate change mitigation and sustainable development goals.

PROJECT CONCEPT

The project follows a structured approach to boost Low Carbon Plans for urban mobility, energy and waste management services that deliver on the Paris Agreement and the New Urban Agenda. The project works on concrete steps towards a maximum impact with regards to the contribution of urban basic services (mobility, energy and waste management) in cities to global climate change mitigation efforts and sustainable and inclusive urban development. This project makes an active contribution to achieve global climate change targets to a 1.5°C stabilisation pathway by unlocking the global emission reduction potential of urban energy, transport and resource sectors. The project will contribute to a direct emission reduction in the pilot and outreach countries, which will trigger a longer term emission reduction with the aim to replicate this regionally and globally to make a substantial contribution to the overall emission reduction potential.

PROJECT AIMS

This project implements integrated urban services solutions as proposed in the New Urban Agenda providing access to jobs and public services in urban areas, contributing to equality and social coherence and deliver on the Paris Agreement and the Sustainable Development Goals. This is the first dedicated implementation action oriented project, led by UN-Habitat to deliver on inclusive, low-carbon urban services. Securing sustainability and multiplier effect, the project aims to leverage domestic and international funding for the implementation projects that will follow from this initiative.

SCOPING STUDY SUMMARY

VIETNAM

1 COUNTRY OVERVIEW

Vietnam has a population of 93.5 million (2015) and is located in Southeast Asia between the Mekong River Delta to the south, the Red River Delta to the north and the South China Sea to the east. Between the period of 1980-2015, Vietnam's rate of population growth in rural areas significantly declined to near zero, while the resultant migration has led to rapid urbanisation across all major cities. Although the country's current level of urbanisation is low at around 35.7%, it is projected that urban areas would accommodate over half of the country's population by 2045 (Vietnam Habitat III National Report, 2016). While one-third of the current urban population is presently concentrated in the two largest metropolitan regions of Hanoi and Ho Chi Minh City, Vietnam's secondary tier of the next three largest cities, namely, Can Tho, **Hai Phong** and Da Nang, is also deemed critical in addressing the future challenges of low-carbon growth. Vietnam's economic transition to a lower-middle income country is achieved through intensive policy reforms which shifted a centrally-planned economy to a market-driven one and led to greater agricultural yields, manufacturing output and foreign investments. In 2016, Vietnam's GDP was 202.62 billion USD, while the GDP per capita was 2,060 USD in 2016 (World Bank, n.d.).

Vietnam currently contributes **0.6% of the world's total greenhouse gases (GHG) emissions** and ranks 27th globally in terms of GHG emissions (Vietnamnet, 2017). For the period of 1990-2014, the country's cumulative GHG emissions were 252 MtCO2e. During the same period, GHG emissions for energy (electricity sub-sector) were 50 metric tons, for transport: 31.9 metric tons and waste: 9.4 metric tons (WRI-CAIT, n.d.).

Electric Two-Wheeler

E-Scooter in Hai Phong

With a population of **1.96 million (2015), Hai Phong** is the third largest city in Vietnam. The city plays a critical role within the region owing to its strategic location within the Red River Delta and along the coast of the South China Sea, as well as its proximity to the capital city of Hanoi, situated 100 km to the east. The Port of Hai Phong is the largest container port in northern Vietnam, which has resulted in the city becoming one of the largest marine distribution centres with a concentration of multiple large-scale manufacturing, industrial complexes and international free-trade zones.

Transport: Similar to with all other Vietnamese cities, the dependence on motorcycles is extremely high in Hai Phong. 78% of households own a motorbike (2014) and the mode accounted for over two-thirds of total trips (OECD, 2016). To address the present lack of efficient public transport, the city could invest in strengthening the existing bus network. The city also has a proposal of introducing 220 electric buses, which is yet to be implemented.

Electric two-wheelers in Hai Phong, such as motorcycles, scooters, pedelecs (pedal-assisted electric bikes) and mopeds, can have many positive characteristics compared to their petrol equivalents. In particular, they produce less air pollution and CO2 emissions, and less noise. Also, two-wheelers, when they are used instead of cars, improve overall safety in the city and can increase the mobility of low-income citizens. Smart use of measures can foster an increase the share of electric two-wheelers in a city amid growing overall numbers of petrol-powered two-wheelers (PTWs).

Hai Phong is the largest city in Vietnam

Hai Phong´s residents´ are dependent on motorcycles

HAI PHONG


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Hai Phong
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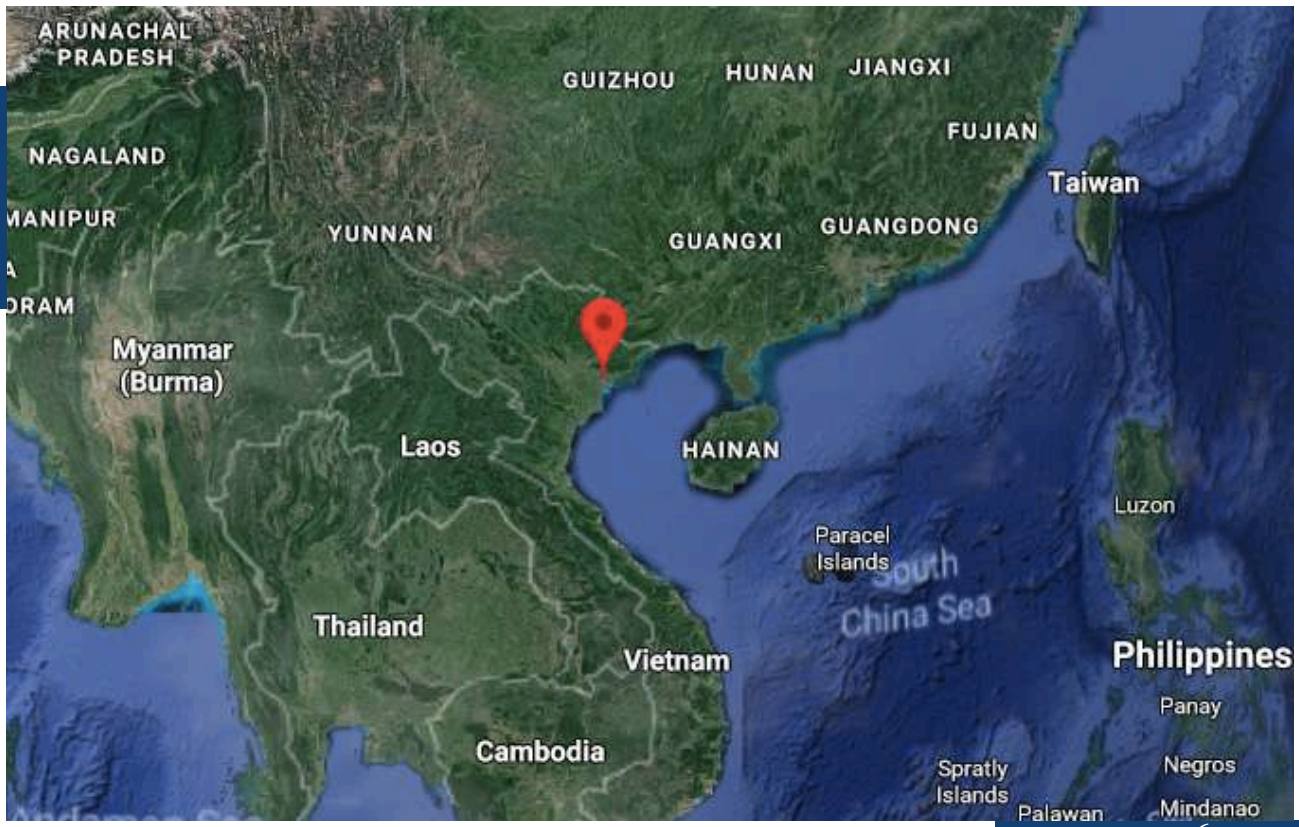
ARUNACHAL PRADESH
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Taiwan
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Myanmar (Burma)
Laos
HAINAN
Luzon
Paracel Islands
South China Sea
Thailand
Vietnam
Philippines
Panay
Cambodia
Spratly Islands
Negros
Palawan
Mindanao

WHY ELECTRIC TWO-WHEELERS

Electric two-wheelers are popular in many Chinese cities, in many cases driven by outright bans on their fossil-fuelled equivalents.

- Murcia (Spain) installed public charging stations for electric two-wheelers to encourage the deployment of electric motorcycles and electric bikes (Eltis, 2012).
- As part of the CIVITAS Initiative, Rome (Italy) introduced about 400 electric scooters and suitable recharging infrastructure.
- Rotterdam (Netherlands) and Barcelona (Spain) installed charging infrastructure for electric scooters and bicycles – and the latter launched the first electric scooter- sharing project in 2013.
- Naples (Italy) promoted electric two- wheelers by cooperating with manufacturers to offer discounts for electric scooters and pedelecs (Edegger et al. 2012).

To help replace fossil-fuelled two-wheelers (or passenger cars) with electric two-wheelers, cities can write a plan with appropriate goals based on an examination of the role and implications of electric two-wheelers in the entire local transport system. Measures in the plan could include banning non-electric powered two-wheelers (PTWs), providing dedicated parking, creating charging areas and separate lanes for electric two-wheelers, and special waiting areas at intersections for motorcycles, or excluding electric two- wheelers from city tolls.

Motorcycles in Vietnam

Vietnam has the highest per capita ownership of motorcycles in the world, with motorbikes accounting for 96% of the country's total number of vehicles (OECD, 2018). In urban areas, motorcycles are the most preferred choice for mobility because of its low relative price as well as lack of reliable public transportation. Furthermore, given the rapid economic development of the country, there has been a steep growth of car-ownership. Car-sales in Vietnam have recorded an annual growth of 39% since 2012, which is one of the highest in the region (ASEAN Automotive Federation, 2016). Vietnam's high dependence on private motorised vehicles powered by fossil fuels has resulted in negative consequences in three critical transport-related attributes – (a) GHG emissions: Transport presently accounts for 12.7% of the total GHG emissions of Vietnam (WRI – CAIT, n.d.); (b) Air quality: Air pollution in urban areas, particularly, Particulate Matter concentration, is significantly higher compared to other Asian cities (OECD, 2018); and (c) Road Safety: Vietnam registered one of the highest rates of traffic-related fatalities in Southeast Asia at 25 deaths per 100,000 inhabitants, a majority of which involved motorcycle riders (WHO, 2015). The current national policy framework that addresses urban transport is a resolution termed 'Strategy for Development of Vietnam's Transport through 2020, with a vision toward 2030' (2013). The policy identifies the development of public mass transit systems as one of most effective solutions to decongest Vietnam's urban centres and improve road safety. Although construction of roads and highways still accounts for the largest share of transport-sector investments, this is gradually changing. The two largest cities of Hanoi and HCMC, in cooperation with international development agencies, have initiated a range of public transport projects. These include – Hanoi's Bus Rapid Transit (BRT) system (14.5 km; operational since January 2017) and Metro (13 km; under construction), and HCMC's BRT (23 km; planned) and Metro system (19.7 km; under construction). Whether these projects enable a successful modal shift to low-carbon mobility in Vietnamese cities remains to be seen after they become fully operational.

RESULTS

Conventional two-wheelers contribute substantially to pollution in cities. When switching from conventional to electric two-wheelers emission of hydrocarbons and carbon monoxide can be largely avoided. Promoting electric two-wheelers can help raise awareness and change the behaviour of citizens and tourists in favour of using more sustainable forms of transport. Electric two- wheelers provide a more affordable, and more sustainable, alternative to fossil-fuelled cars, especially for low- and middle income groups.

Financial & Technical Considerations

In contrast to electric cars, charging electric two-wheelers is relatively easy and requires less infrastructure, and to date a number of small projects have demonstrated that there is potential for electric two-wheelers (in China they are gaining popularity). However, in many cities their benefits are diminished because of insufficient regulations and enforcement, and because they are not integrated properly within the transport system. In addition, cities should develop or improve charging infrastructure and guarantee charging sites.

Increasing the amount of energy that batteries can store is important in allowing electric two-wheelers to travel further distances between charges, although less so than for electric cars. Regulations should be implemented to enforce the use of sustainable lithium batteries instead of the cheaper, short-life sealed lead acid (SLA) batteries.

Technological improvements are also necessary to improve the affordability of electric two-wheelers. Electric bicycles have the potential to cause accidents due to their higher speeds (for unaccustomed riders) and traffic regulations and infrastructure not designed with them in mind. Similarly, as they also have no turn indicators or horn and are noiseless, are further points of accident potential.

In the past, some cities have implemented isolated measures regarding electric two-wheelers such as an integrated citywide electric two-wheeler plan. Improving the regulation of their use can reduce safety issues. Kuala Lumpur (Malaysia) and Taipei (Taiwan) have reduced accidents by introducing motorcycle lanes and waiting boxes at junctions (Hook and Fabian, 2009).

IMPLEMENTATION CHALLENGES

Electric two-wheelers face the same challenges and have the same benefits for most urban areas. Travel is increasing in cities, and with that typically comes increased congestion, discouraging people from using buses. Where private transport is favoured, two-wheelers provide a sensible alternative to cars, albeit with many negative side-effects (e.g. air pollution and nose). Electric two-wheelers mitigate many of those negative effects, and can be charged with standard electrical outlets, avoiding the need for new and dedicated infrastructure.

LEARNINGS FROM CHINA

China is the world's largest electric two-wheeler manufacturer and exporter, and the country with the highest number of electric two-wheelers. The national government is responsible for type approval of vehicles, and thus for defining what counts as a bicycle and what as a motorcycle.
As of 20.064, bikes with "functioning pedals" are classed as pedelecs, with the result that essentially electric scooters are classed as bicycles, and are subject to the same rules and limitations. Furthermore, many of the regulations are 'recommended', or easily circumvented (e.g. easy-to-remove speed limiters), which has led to some problems.

In action

While the Chinese national government is responsible for type approval, the cities have power over how the standards are enforced and over traffic management. In 1996, in response to air quality problems and excessive car use, Shanghai banned the sale of petrol-powered scooters, and as of 2006 only two-wheeled vehicles allowed to be sold in Shanghai are LPG, electric or only- human powered.

The ill-defined regulations regarding power output, maximum speed, licensing requirements, safety equipment (lights, indicators etc.) governing electric two wheelers has led to safety problems, and led to Shanghai banning some types in 20165.

In addition, the solid waste from electric two-wheelers is considerable higher than conventional bikes and scooters, mostly from battery disposal. While electric two-wheelers do not have a dedicated infrastructure they have to either compete with cars or bicycles and pedestrians. Both can lead to an increase of accidents. While cars can move more people, electric two-wheelers are mostly only providing mobility for one or two persons. This leads to an increase in two-wheelers in the street and can have a negative effect on congestion in cities.

Results
Figure 1, below, shows the result of the petrol-scooter ban on the type of two-wheelers present in Shanghai; a sharp increase in the numbers of e-bikes and bikes. Figure 2 shows the difference in modal share between Shanghai and Chengdu (both electric two wheeler friendly, Chengdu without LPG infrastructure) and Beijing, which is hostile to electric two wheelers, and, as expected, has a lower share of e-bike use.

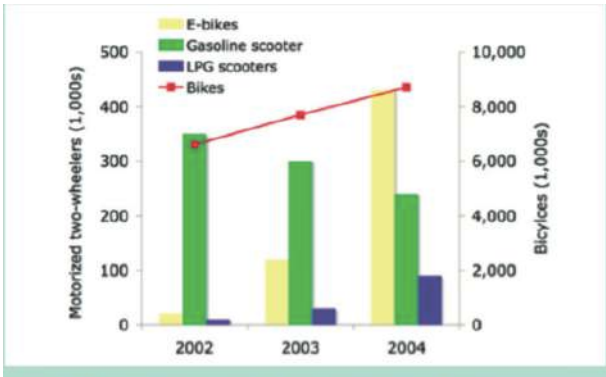

Figure 1. Effect of Shanghai's ban on petrol-powered two-wheelers.

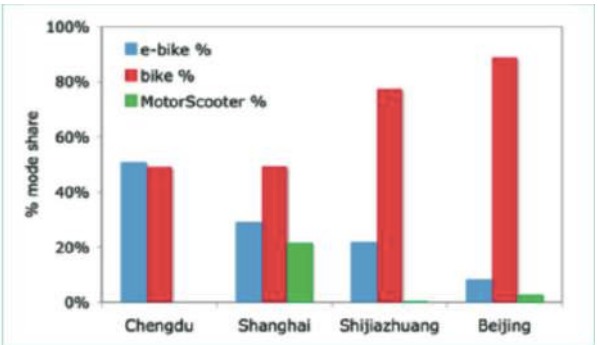

Figure 2. Comparison of modal share between cities friendly (Shanghai, Chengdu), hostile (Beijing) and neutral (Shijiazhuang) to electric two wheelers.

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