Belt and Road Initiative & Sustainable Transport

Christoph Nedopil Wang
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Preface

Announced in 2013, the Belt and Road Initiative aims to strengthen China’s connectivity with the world. It combines new and old projects, covers an expansive geographic scope, and includes efforts to strengthen hard infrastructure, soft infrastructure, and cultural ties. In February 2020, the Plan touched 138 countries with a combined Gross Domestic Product of almost $30 trillion and around 4.5 billion people.

Supporting a diverse array of initiatives that enhance connectivity throughout Eurasia and beyond could serve to strengthen China’s economic and security interests while bolstering overseas development. At the first Belt and Road Forum in Beijing in May 2017, President Xi Jinping noted that, ‘In pursuing the Belt and Road Initiative, we should focus on the fundamental issue of development, release the growth potential of various countries and achieve economic integration and interconnected development and deliver benefits to all.’

The essence of a green and sustainable Belt and Road is to integrate green development, ecological and environmental protection into every aspect of the development of the Belt and Road with the principle of energy conservation and environmental protection under the guidance of green development concepts and of sustainable development goals settled by United Nations.

The commitment to monitor and implement BRI initiatives, both by China and by partner countries, is a key prerequisite to reducing the environment impacts of BRI projects. Setting targets that aim to achieve an ambitious proportion of projects that combat climate change would help orient BRI funding toward greater sustainability.

At first sight, China’s and the EU’s different approaches seem to lead to competition. Yet, China’s BRI and the EU’s new connectivity strategy also entail complementary aspects that might encourage greater cooperation. Within the current rising trend of protectionism and the raising of individualism, China and the EU provides a link between the world’s second and third largest economies, as well as with the wider area of East Asia, indeed the most dynamic region in the world. China and the EU can also use the BRI as a platform to contribute to solving present regional issues and security challenges, thus filling the gap of leadership and offering solutions in global governance.

Toward this end, the EU has developed its own strategy for connectivity in Asia to promote the sustainable urbanization, construction of transport, digital, and energy infrastructure between Europe and Asia. The strategy aims to provide a framework of European standards for connectivity projects and seeks to provide high-quality alternatives. The EU is seeking to provide credible alternatives; given the growing pushback against the BRI in some recipient countries, the EU certainly has an opportunity to present itself as a more attractive partner by offering connectivity projects based on sustainable financing, avoiding debt traps, and taking into account environmental impact.

EC-Link Project has been developing a series of research papers meant to trigger Chinese and EU experts’ cooperation to drive the planning of resilient cities and more sustainable projects among BRI:

- Belt and Road Initiative & Sustainable Urbanization
- Belt and Road Initiative & Industry 4.0
- Belt and Road Initiative & Green Finance

Such topics, where chosen by EC-Link Team because seen as mostly relevant and pertinent in view of the future development of the Belt and Road Initiative; taking into account several levels on analysis: national, regional and international, we try to offer recommendations for the improvement of on-going dynamics in view of a better and more sustainable relations in Eurasia market. With each research paper, EC-Link Project wants to contribute not only in providing additional useful information for a better understanding of BRI but also to support an open dialogue on such relevant subject providing a fruitful baseline for further discussion.

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<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
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<td>AIIB</td>
<td>Asian Infrastructure and Investment Bank</td>
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<td>BRF</td>
<td>Belt and Road Forum</td>
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<td>BRI</td>
<td>Belt and Road Initiative</td>
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<td>BRT</td>
<td>Bus rapid transport system</td>
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<td>CDB</td>
<td>China Development Bank</td>
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<td>CRCC</td>
<td>China Railway Construction Company</td>
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<td>CREC</td>
<td>China Railway Group Ltd.</td>
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<td>CRRC</td>
<td>Chinese publicly traded rolling stock manufacturer</td>
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<td>EBRD</td>
<td>European Bank for Reconstruction and Development</td>
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<td>EIB</td>
<td>European Investment Bank</td>
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<td>EPC</td>
<td>Engineering, Procurement and Construction</td>
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<td>EU</td>
<td>European Union</td>
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<td>EV</td>
<td>Electric vehicle</td>
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<tr>
<td>GDP</td>
<td>Gross domestic product</td>
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<td>GHG emissions</td>
<td>Greenhouse gas emissions</td>
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<td>GIP</td>
<td>Green Investment Principles</td>
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<tr>
<td>GIZ</td>
<td>Gesellschaft fuer Internationale Zusammenarbeit giz GmbH</td>
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<tr>
<td>ICBC</td>
<td>Industrial and Commercial Bank of China</td>
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<tr>
<td>ICV</td>
<td>Internal combustion engine</td>
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<tr>
<td>KfW</td>
<td>German state-owned bank engaged in international development financial assistance and investment</td>
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<tr>
<td>MEE</td>
<td>Chinese Ministry of Ecology and Environment</td>
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<tr>
<td>MIIT</td>
<td>Chinese Ministry of Industry and Information Technology</td>
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<tr>
<td>MoHURD</td>
<td>Chinese Ministry of Housing and Urban-Rural Development</td>
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<td>MoT</td>
<td>Chinese Ministry of Transport</td>
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<tr>
<td>NDRC</td>
<td>Chinese National Development and Reform Commission (in charge of economic planning in China)</td>
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<tr>
<td>NEV</td>
<td>New energy vehicle</td>
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<tr>
<td>SDG</td>
<td>Sustainable Development Goal</td>
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<tr>
<td>UN</td>
<td>United Nations</td>
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<tr>
<td>VPN</td>
<td>Virtual Private Network</td>
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<td>WRI</td>
<td>World Resources Institute</td>
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Executive Summary

The Chinese driven Belt and Road Initiative (BRI) has the potential to strongly alter transportation in cities along the BRI corridors. By investing billions of dollars in BRI countries China hopes to accelerate physical and digital connectivity between China and the BRI countries for improved economic activity. As a consequence, many BRI cities, as the nexus of economic activity, will experience new developments in urban transportation, caused by more demand for urban transportation and more investment in urban transportation.

With emissions from transportation contributing to up to 40% of total emissions in 2018, BRI-related investments, however, risk to further increase both freight and passenger transport related emissions. To avoid this development path and achieve the Paris Climate Accord, strategic and tactical cooperation on developing green urban transport systems in BRI cities is paramount.

European and Chinese cooperation plays a particularly significant role in this regard: firstly, BRI cities lie at the heart of both Chinese and European interests as most BRI corridors connect Asia and Europe. Secondly, transport technologies and transport-related industries are highly relevant for Chinese and European economies. As transport technologies are currently undergoing a tremendous change, e.g. through electrification, automation, digitalization, and new forms of sharing (enabled by digitalization), cooperation on research, standards and fair market access between European and Chinese stakeholders is crucial. Thirdly, fighting climate change through improved and greener transport is in the core interest of the European and Chinese stakeholders. Achieving the transition to a green transport system in BRI cities requires massive investment of 0.4% to 0.6% of the involved nation’s GDP in both hard infrastructure and capacity building. Efficient investment and capacity building can only be achieved in coordination with the involved partners.

To achieve a green urban transport development in BRI cities, European and Chinese stakeholders at different levels should strengthen their cooperation and mutual learning in three areas:

1. political capacity building, particularly in terms of sustainable urban transport planning, enforcement of rules, incentive creation
2. technical cooperation, particularly in terms of standard setting to avoid a bi-furcation of transport standards that make interconnectivity costly and thus less sustainable
3. financial cooperation, particularly in terms of coordinating investments to achieve better and comprehensive results

The challenge in realizing these relatively obvious cooperation pathways are the complex dynamics in the development of urban transport. For one, China is a relative newcomer on the international development and cooperation space and has widened and deepened its international footprint quickly. Since its inception only in 2013, the BRI has not only seen effective and less-effective activism, but also significant Chinese transport-related investment of 164 billion USD. This makes China an ever increasingly important partner for many BRI countries and cities, while traditional development partners, such as European stakeholders, need to adapt to a new and possibly diminished role.

Secondly, transport technologies are developing rapidly and have the potential to change mobility behaviors as fast as during the introduction of motorized transportation at the beginning of the 20th century. The consequences on people, freight and transport planning of automation, shared mobility and the digital revolution are not yet understood, while the speed of development is equally overstated and underestimated.

Thirdly, global political and economic developments are all but predictable. With old forms of global governance possibly diminishing in importance, while new forms of governance are welcomed by China and other countries, uncertainty of long-term prospects is increasing.

Within this dynamic setting, decision-makers aiming to support green urban transport development need to understand possible scenarios of development to
Introduction

The Belt and Road Initiative aims to increase economic activity by improving connectivity of economic areas through infrastructure investment. As a consequence, cities along the BRI, both within China and outside China are evolving and even new cities, such as Khorgos in Kazakhstan\(^1\), are developing as new centers for trade. Within the cities, urban mobility will develop accordingly e.g. with higher economic activity, more disposable incomes, growing populations. With the right choices, this transformation of urban mobility in BRI cities can make cities greener and more livable.

This white paper provides scenario-based outlooks of urban mobility development along the BRI for policy makers and investors. The outlook is grounded on an analysis of the current urban transport landscape in China - as the dominant driver of the BRI - including its policies, stakeholders and challenges in urban transport, illustrate trends of urban transport and BRI developments.

At this point it is also important to note that the BRI is a Chinese led initiative. Therefore, while international cooperation in BRI is sought by many countries including China, the main purpose of this paper is to try to provide a better understanding of Chinese driven developments in urban transport in BRI countries.

Background: Green Urban Transport and the Belt and Road Initiative (BRI)

With its Belt and Road Initiative (BRI), China has already and continues to invest billions of dollars in building transport infrastructure in China and abroad. Cities along the BRI, as the nodes of economic activity, are expected to benefit from these investments. In regards to transport, cities should be asking several questions, among them:

- how can urban transport benefit from the BRI investments in the short- and longer term in economic terms?
- How can sustainable transport be emphasized?

In an ideal world, there would be only one answer to both questions: sustainable transport investments. However, the picture is more complex with different political, business and stakeholder interests involved, while technology, particularly in the mobility sector, is developing rapidly offering new opportunities for sustainable mobility.

3.1 Understanding green urban transport and its challenges

Urban transport is an essential service to provide mobility within the city for both people and freight. Urban transport is poised to increase, particularly in emerging economies, due to

- increase in urban population by 2.5 billion people until 2050, particularly in Asia and Africa\(^3\),
- increase in spending power due to economic growth, leading to higher needs for individual mobility and more consumption,
- higher physical connectivity of cities (e.g. through inter-city roads, rail and air traffic), allowing for more mobility,
- a growth of annual vehicle registration from 3.37 million in 2001 to 28 million in 2017, China’s privately held vehicle stock increased from 10 million in 2001 to 185 million in 2017. With increased e-commerce, urban shipments have increased by 35% per year from 9 billion in 2013 to 42.2 billion in 2017.\(^4\)

As a consequence of the fast growth in transport, the transport sector has become the “fastest growing contributor to climate emissions”, while particularly urban transport is a major contributor, as “urban transport accounts for about 40% of end-use energy consumption”. Besides carbon dioxide emissions, urban transport is responsible for black carbon emissions, which contributes both to climate change and air pollution. Urban transport also requires space for linear infrastructure, such as for roads, parking, and supporting services.

In order to move to green urban mobility, cities should consider policies that accelerate transport means for people and freight in a low-carbon (SDG 13), low-emission (air-pollution) (SDG 3) and efficient way that protects green public spaces (SDG 11). Social aspects of transport, such as affordability, safety, equality and accessibility are equally important to provide for sustainable transport. The focus of this paper will, however, be green transport.

In order to move from the current transport modality to sustainable mobility, three concepts should be considered:

- avoid traffic and thus pollution,
- shift traffic to more efficient and less polluting means of transportation,
- improve existing means of transportation.

prepare and adopt policy making. This paper developed three scenarios that extrapolate possible developments without giving predictions:

1. Ecological Urban Civilization – where international cooperation, technological development and the goal to create a green environment are aligned to create BRI cities that are focusing passenger mobility on public transport and freight transport on electric, shared and autonomous mobility

2. Development at Different Speeds – where BRI cities can choose their own development path according to their preferences. This allows all types of brown and green technologies to thrive, while coordination on finance, capacity building and technology happens in selected domains only.

3. Global slowdown – where investments only happen in strategically important BRI cities with national interests of both host and investor countries in mind.

The emission mitigation potentials for urban transport in all three scenarios vary significantly: the Ecological Civilization scenario has the potential to reduce 25% more emissions than the Development at Different Speeds scenario, while at the same time investments in the first scenario are about 25% lower compared to the Development at Different Speeds.


\(^3\) www.xinhuanet.com/politics/2018-01/08_c_1122228648.htm

The Sustainable Urban Transport Project (SUTP) of GIZ has developed 10 principles to address the sustainable urban transport challenge (see Figure 1):

1. Planning dense and human scale cities
2. Optimizing road network and its use
3. Developing transit-oriented cities
4. Encouraging walking and cycling
5. Implementing transit improvements
6. Controlling vehicle use
7. Managing parking
8. Promoting clean vehicles
9. Communicating solutions
10. Approaching the challenges comprehensively

Additional aspects for sustainable urban transport include:
- Employing new technologies in traffic planning, e.g. through the application of big data, shared vehicle use
- Optimizing traffic management, e.g. through artificial intelligence that allows for more efficient use of roads

With more economic activity expected, particularly in cities profiting from the BRI, finding sustainable solutions and investing in the right green technologies, mitigation and adaptation measures to minimize environmental impacts of urban transport is paramount.

**Figure 1:** 10 Principles of Sustainable Urban Transport

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**3.2 Investment trends for transport in the Belt and Road Initiative**

Since the announcement of the BRI in 2013, more than 170 countries and organizations have signed instruments of cooperation with China to promote the Belt and Road initiative. With the goal to improve connectivity and remove “bottlenecks of economic growth” through investments, the “total value of projects in the [BRI] scheme stands at $3.67 trillion, spanning countries in Asia, Europe, Africa, Oceania and South America”.

With the goal to increase connectivity through the BRI, investments in transport play a particularly important role. Since 2013, China spent 164 billion USD on transport related investments, plus another 13 billion USD on logistics in BRI countries (see Figure2). Particularly East Asia is a recipient of Chinese investments in transport, followed by West Africa, Sub-Saharan Africa and the Middle East. Looking at the sectors, about 42% of Chinese transport-related investments in BRI countries are going into rail, 35% in auto, 18% in shipping and the rest in aviation and others.

**Figure 2:** Chinese transport investments in BRI countries (since joining BRI)

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Some concrete projects include the construction of subways in Vietnam, Russia and Nigeria, as well as highways in Sri Lanka, Pakistan, Georgia, Croatia, Montenegro and Serbia.

However, it is important to distinguish Chinese BRI investments between construction investments and businesses going abroad. Currently, most BRI transport-related investments are construction related investments, while few Chinese companies in services and movable equipment have yet successfully expanded abroad. For example, while the ride-hailing company Uber is active in about 60 countries, Chinese Didi is only active in 6 countries. Many bike-sharing companies (such as Mobike) have expanded initially, but due to financial difficulties pulled out of almost all international markets. Also, sales of Chinese electric vehicles abroad are few of the 450,000 electric buses in operation at the end of the year, most of them were produced in China, and indeed 98% of all available electric buses were used on Chinese roads.9

3.3 Cities and urban transport development in the Belt and Road Initiative

Cities that are mostly affected by the BRI can be found along the six economic corridors of the BRI (see Figure 3): the China-Mongolia-Russia Economic Corridor, the New Eurasia Land Bridge Economic Corridor, the China-Central Asia-West Asia Economic Corridor, the China-Pakistan Economic Corridor, the Bangladesh-China-India-Myanmar Economic Corridor and the China-Indochina Economic Corridor.

Along these corridors, many cities are being connected and can thus be understood as being affected by the BRI. In their study, Derudder et al. analyzed the network externalities and connectivity of cities within these corridors (in terms of degree centrality, betweenness centrality and closeness centrality). They discovered that the following cities are particularly integrated into the current BRI – albeit within different communities (see Figure 4, Table 1):

### Figure 3: Economic Corridors of the Belt and Road Initiative

### Figure 4: City networks in the BRI

### Table 1: Relevant BRI cities along different economic corridors

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11 Derudder, Liu, and Kunaka.

12 Derudder, Liu, and Kunaka.
Accordingly, in regards to cities in China affected by the BRI, only six of the 18 Chinese provinces that are officially part of the BRI are real gateways to BRI in terms of overland corridors plus seven centers that can profit. They include Baotou (Inner Mongolia), Zhengzhou (Henan), Xian (Shaaxi), Lanzhou (Gansu), Urumqi (Xinjiang Uygur), Kunming (Yunnan), and Qingyng (Yunnan). In terms of international connectivity, centers across the priority corridors are the following: Novosibirsk, Irktusk, Yekaterinburg, and Krasnodar (Russia), Almaty and Astana (Kazakhstan), Tehran (Iran), Istanbul (Turkey), Kabul (Afghanistan), Yangon (Myanmar), Kuala Lumpur (Malaysia), Bangkok (Thailand), Hanoi (Vietnam), Singapore (Singapore), Rawalpindi, Bahawalpur, Islamabad and Karachi (Pakistan), Dhaka (Bangladesh), and Kolkata (India). Two factors will play a role how these cities’ urban transport will be impacted by the BRI:

1. Supply of funds, e.g. direct impact through investments in urban transport infrastructure (freight and passenger) through the BRI investment, and freight flow with economic connectivity and activity depending on the location and degree of integration along the BRI.
2. Demand of transport, e.g. through increased people and freight flow with economic connectivity and activity depending on the location and degree of integration along the BRI.

In addition, local political and technical factors, such as planning and operational capabilities will play a decisive role of the city’s specific developments.

### 3.4 Policies and regulations affecting urban transport in BRI cities

The development of urban transport in China and the BRI is guided, incentivized and regulated by various ministries. For Chinese BRI cities, Chinese policies determine the development. For cities in other BRI countries, similarly local laws and regulations will play the most important role. However, Chinese companies and investors investing in BRI urban mobility can follow several guidelines to improve sustainable investment.

**Chinese Green Urban Transport Policies and Regulations**

China has a complex set of regulators that govern the development of urban transport on the national, provincial and city level. The most relevant are:

- National Development and Reform Commission (NDRC) is responsible for the overall economic development strategy of China; the provincial DRCs are detailing the work of the NDRC at the local level.
- Ministry of Transport (MoT) is responsible for transport related policies, particularly public transport, inter-city road transport, vehicle standards. Provinces and cities have their specific ministries to support the development of urban transport.
- Ministry of Ecology and Environment (MEE) is responsible for emission standards and oversight.
- Ministry of Housing and Urban-Rural Development (MoHurd) is responsible for guiding the planning and construction of rural and urban areas in China.
- Ministry of Industry and Information Technology (MIIT) is responsible for vehicle technical standards (motor)

These ministries issue urban transport policies and guidelines separately and jointly, for example in regards to comprehensive planning and electrification:

**Comprehensive planning policy**

As an example, on May 20, 2019 the MoT together with 12 government ministries and departments published the Green Travel Action Plan (2019-22). In regards to urban transport, the plan emphasizes the need to improve urban public transportation systems (including construction of subways, bus lanes), the improvement of transit hubs between airports and rail, urban rail, rail-to-road; the optimization of urban road networks to increase road density; the acceleration of electric vehicles use; the improvement of public travel experience (e.g. install air conditioning, cashless payment); the improvement of “slow traffic systems” that encourages non-motorized transport (biking and walking), the improvement of parking traffic management. This Action Plan is built, for example, on the 2016 Green Transport Standard System Document issued by the MoT.

**Electrification of urban vehicles and infrastructure**

The MIIT is particularly active in setting the guidelines for the accelerated diffusion of New Energy Vehicles (NEVs). In April 2019, MIIT issued a new guidance lowering average fuel consumption from 8.2 l/100 km to 5.0 l/100 km by 2020. Furthermore, Chinese national and provincial and city governments are all encouraged to subsidize the acquisition of electric vehicles for public transport (e.g. buses), private transport (e.g. cars) and freight transport (e.g. lorries). From 2017, the Chinese government for example provides operation subsidies to the transit operators of electric buses, while also cutting diesel fuel subsidies. This was an updated policy from the 2015 policy that subsidized the acquisition of 10-12 meter electric buses with a subsidy of 120,000 RMB to 500,000 RMB (depending on the range and energy consumption of the bus).

In terms of existing vehicles, in January 2019, the MEE with other Ministries issued the regulation that accelerates the implementation of the CHINA VI emission standard in several pilot regions (e.g. Beijing, Yangtze River Delta, Pearl River Delta) from July 2020 on the national level to start from July 1, 2019.

**City networks and sustainability activities**

Chinese cities are also engaged in voluntary national and international governance networks to improve the sustainability of their urban mobility activities, such as:

- C40 network with 12 Chinese cities involved
- Alliance of Pioneering Peak Cities (APPC) with 21 Chinese cities involved
- Transit Metropolis plans with about 100 Chinese cities involved

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Figure 5: Chinese city initiatives for green urban transport
Specific BRI guidelines relevant for green urban transport

The BRI has several guidelines that support green development. As there exists no ministry or international governance system that would be able to set rules and enforce them along the BRI, the implementation of and adherence to guidelines is voluntary. Important guidelines that affect sustainable urban mobility include:

- Joint Communiqué of the Second Belt and Road Forum (BRF), April 2019. The document stresses the importance of green development and the necessity to protect the climate and the environment and adhere to the Paris Accord.

- Green Investment Principles (GIP) for Belt and Road, signed by 26 financial institutions involved in the BRI, April 2019. The Principles emphasize the need of financial institutions to evaluate and incorporate environmental risks in their decision making and be transparent about activities.

- Guidance on Promoting Green Belt and Road, May 2017. The document published by the Ministry of Environmental Protection (now MEE) elaborates on the need to build an ecological civilization that includes international cooperation, efficient use of resources and promotion of green transport.

On a legal and enforceable basis, China’s BRI investments adhere to the host-country principle. That means that currently Chinese investors and EPCs are liable only for following local laws and regulations, while a failure to adhere to international standards is without consequences.

China has also set up various working groups to support the green urbanization along the Belt and Road Initiative during the second Belt and Road Forum in April 2019. Within the Ministry of Ecology and Environment (MEE), the BRI International Green Development Coalition has subgroups on the “Improvement of Environmental Quality and Green Cities”, “Green Finance and Investment” and “Sustainable Transport”. The National Development and Reform Commission (NDRC) launched the Belt and Road Sustainable Cities Alliance. Both initiatives have Chinese and international stakeholders involved (for example the World Resources Institute/ WRI or the UN Habitat).17 Within these working groups, Chinese and international stakeholders have a platform to discuss and agree on issues regarding green urban transportation. Included in these groups are also the commercial of urban transport.

3.5 Key commercial stakeholders for urban transport in the BRI

China has built a domestic ecosystem of key private and government-owned players that influence urban transport on all levels. It is important to understand this eco-system to analyze potential actions and dependencies when incentivizing green urban transport in the BRI with different commercial interests and strategies at play.

Urban Vehicle hardware players

With a massive overall transportation and urban transportation market, China has created a car and truck industry with literally hundreds of manufacturers, particularly in the freight vehicle industry.

In the passenger car market, the top 10 Chinese car manufacturers sold about 25 million vehicles in 2018, according to the China Association of Automobile Manufacturers. The most important Chinese players in the passenger vehicle industry are Great Wall Motor, Geely Automotive Holding, SAIC, Guangzhou Automobile Group. Most of the car companies are privately held.

The urban bus market is similarly fragmented. The most important players are Yutong bus, BYD and Foton, while many small manufacturers supply buses to Chinese customers.

In the urban freight vehicle market, many small workshops provide vehicles, such as electric 3-wheelers for urban e-commerce delivery. A simple online search on June 6, 2019 for electric mini truck on the Chinese e-commerce platform Alibaba has returned 23,836 different such vehicles for sale (see Figure 6), showing the breadth of manufacturers and lack of standards.
Compared to road-bound vehicle hardware, rail-based urban transport (e.g., subway, trams), is mostly state-owned. China has built 171 subway lines and operates around 5.300 km of subway by the end of 2018. The rolling stock is predominantly supplied by state-owned CRRC. The subway construction is often done by state-owned companies, such as CRCC – China Railway Construction Corporation Limited and CREC – China Railway Group Limited

**Traffic management and smart city**

Traffic management is a crucial part for increasing efficiency of urban transport, such as traffic demand management, parking, signaling etc. Chinese cities are increasingly employing big data from cameras and other sensors to optimize transport planning and traffic management. Private companies are playing an increasing role in urban traffic management and smart city:

- Alibaba through its Hangzhou City Brain, collecting data from 20.000 cameras 10.0000 taxis to improve traffic flow
- Tencent in Jiangsu province’s smart city projects, that includes for example electronic toll collection to improve attractiveness for public transportation
- Baidu’s Xiong’an New Area with the goal to improve integration and testing of autonomous cars
- Shenzhen Urban Transport Planning Commission (SUTPC) in Shenzhen, using 750 million pieces of information daily to improve traffic planning

**Enabling services**

Relevant enabling services in urban mobility are, for example, charging infrastructure for electric vehicles, digital mobility services or satellite-based navigation.

Chinese commercial stakeholders have over the past years accelerated their research, and output in a number of areas:

- By the end of 2018, China had built about 730.000 charging stations, 80% of which were controlled by a joint-venture between the government-owned State Grid Corp and China Southern Power Grid created by the end of 2018.
- Satellite navigation capacity is provided by BeiDou – in competition to the American GPS navigation system. As of May 2019, BeiDou had 33 operational satellites that allow for higher precision (up to 0.1m) than GPS (but lower than the European Galileo precision of 0.01m). This is particularly relevant in terms of autonomous driving.
- Digital mobility services in China have been growing rapidly. The most important players are Didi Chuxing, which provides around 30 million ride-hailing rides per day (about twice as much as its American counterpart Uber) and operates several million rental bikes (bluegogo and Qinggu); Meituan, operates the Mobike shared bikes and ride-hailing in several cities.
- Digital mapping services in China exclude most non-Chinese providers (e.g., Google Maps is not available in China without using a VPN provider). Most notable Chinese mapping providers are the major digital technology companies, such as Baidu and Alibaba.

**Investors**

Urban mobility requires investment in the hardware, traffic management and enabling services. In BRI countries and within China, the largest Chinese infrastructure investors include China’s development banks, such as the China Development Bank (CDB) and China Exim Bank and various (state-owned) commercial banks, such as ICBC or the China Agricultural Bank.

In China, these banks also play, to some extent, a role in financing public urban infrastructure. In addition, provincial banks play a role in supporting local enterprises, for example in urban vehicle hardware, such as cars and trucks.

- Furthermore, much of the finance for public urban infrastructure, for example for subways or bus-rapid transit (BRT) systems and roads, comes through issuing (green) bonds by the local public transport operators. In 2018, for example, green bonds were issued to finance several urban mobility projects in China (see Table 2):

### Table 2: Bond issuance to finance green urban transport

<table>
<thead>
<tr>
<th>Issuer</th>
<th>Use of Proceeds</th>
<th>Amount (million RMB)</th>
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<tbody>
<tr>
<td>Beijing Infrastructure Investment Co. Ltd.</td>
<td>Construction of several metro lines, such as New Airport Line, Metro lines 3, 6, 7, 12, 17, 19</td>
<td>3,900 (in two phases)</td>
</tr>
<tr>
<td>Urumqi City Traffic Investment Co. Ltd.</td>
<td>Construction and operation of several bus lines</td>
<td>1,500</td>
</tr>
<tr>
<td>Wuhan Metro Group</td>
<td>Construction and operation of several metro lines, such as Metro Line 2, 5, 8, Caidian</td>
<td>5,600 (in three phases)</td>
</tr>
<tr>
<td>Yangzhou Transportation Industry Group Co. Ltd.</td>
<td>Payment and working capital of clean energy buses</td>
<td>500</td>
</tr>
<tr>
<td>Chengdu Metro Group Co. Ltd.</td>
<td>Payment of debts for Metro Lines 1, 2, 3, 4, 7, 10</td>
<td>2,000</td>
</tr>
</tbody>
</table>

In regards to digital mobility services, Chinese private enterprises, particularly the big three technology companies Baidu, Alibaba and Tencent, as well as the taxi service Didi and the food delivery service Meituan, have invested many billion EUR in the expansion of mobility services and mapping as well as new technologies such as autonomous driving.

When looking outside China into non-Chinese BRI cities, financing urban infrastructure is more complex. The big development banks are most adapted to work with national governments and their nationally linked enterprises (such as state-owned energy companies, railway companies). Most of these banks lack instruments to finance smaller projects and deal with multi-stakeholder settings on an urban scale. Therefore, other financing instruments and investors need to be found for developing urban infrastructure, for example locally managed funds, local green bonds, impact investors.
3.6 Summary of Background and Challenges

China has expressed high ambitions to develop its Belt and Road Initiative. With increasing investments, China not only hopes to increase connectivity, but consumption and broader economic development. Chinese policy makers, companies and investors already play and aim to continue to play an increasing role in providing financing, hardware and services to benefit from the development potential in BRI countries’ cities (including within China).

As a consequence, mobility both in urban and inter-urban areas will be affected along the BRI countries and cities. The most likely outcome will be a strong increase in personal mobility and freight transport, risking severe environmental consequences, particularly:

- increase in greenhouse gas emissions
- increase in pollutant emissions
- increase in space use for roads and other linear infrastructure
- increase in noise

Yet, technological developments in transport and mobility could allow making these investments and developments greener. In order to develop pathways for supporting an urban mobility development that is green and to develop scenarios for urban transport in BRI countries, it is therefore necessary to understand the next steps of technological development in the urban mobility sector. The next chapter will provide an outlook into the next phase of green urban transport in China and BRI countries.

4 The next phase of Green Urban Transport in China and BRI countries – green urban mobility innovation

The next phase of green urban transport in China and the BRI is uncertain due to a transformation of mobility technology, driven by Chinese, European and American companies.

China, to achieve its constitutionally enshrined goal of creating an “ecological civilization”, has been setting financial and other incentives to develop green innovations in and improve the ecological footprint of transportation – both in urban and in rural areas. China has also established several strategies, to accelerate innovation and developments in transport and mobility:

- Made in China 2025 released by the State Council in May 2015 identified the automotive industry as one of the ten industries to be developed in the next 10 years, with a focus, for example, to reduce traffic accidents, achieving a driving speed of automated vehicles of 120 km/h and reducing energy use and emissions.
- Internet Plus released by China’s Premier Li Keqiang in March to integrate cloud computing, big data and the Internet of Things and speed up digitalization.
- Artificial Intelligence (AI) Strategic Plan released in 2018 by the State Council to accelerate the development and application of artificial intelligence, also in mobility.

These policies, combined with more specific strategies (e.g. Draft Strategy for Innovation and Development of Intelligent Vehicles from 2018), tax and monetary incentives combined with a massive domestic market and an increasing export market (particularly through BRI) have allowed Chinese companies to join the race in shaping tomorrow’s mobility world through innovation in green mobility.

European players, such as the German mobility industry, are equally shaping the race for the future of mobility. With a long tradition of mobility, many European mobility players are counted among the most competitive and innovative in the world.

The following paragraphs will elaborate on mobility innovations that an influence on urban mobility along the BRI. For the description, the CASE framework will be used, which looks at the development of mobility innovation in terms of

- Connectivity
- Automation/autonomous driving
- Sharing
- Electrification

These four factors will particularly influence road-bound transport.

In addition, China also invests in the development of rail-based urban transport, particularly in the construction of subways. However, due to the high costs of subway construction, few BRI cities outside China have engaged China in constructing subways at this point in time (currently, China is engaged in the construction of three subway lines in BRI cities: Hanoi, Vietnam, Kuala Lumpur, Malaysia and Moscow, Russia). Therefore, the focus of this section will be on the future of road-based urban transport innovation.

4.1 Connected mobility

Connectivity in mobility is increasingly influencing urban mobility in terms of efficiency and accessibility. Connectivity refers to the possibility to digitally connect people, transport hardware, goods, and infrastructure:

- to let them communicate with each other (e.g. to warn of dangers)
- to collect data on the state of the different components (e.g. to allow for predictive maintenance and increase maintenance efficiency)
- to analyze live-data to better organize mobility services (e.g. change routing, stop-light signals,
4.2 Autonomous mobility

Autonomous driving is developing in several stages. The Society of Automotive Engineers (SAE) classifies autonomous driving along six levels from Level 0 with no automation to Level 5 with full automation where no driver is necessary anymore. Level 1 to 4 describe developments of the mobility with decreasing interaction between the vehicle and the driver.21

While today’s mobility ecosystem for both urban freight and urban passenger transport fully relies on employing drivers to transport goods and people, experts estimate that by 2020 Chinese tech companies (such as Baidu, Didi Chuxing) will be able to test their first fully autonomous driving vehicles (Level 5) on highways and certain city roads.22 Automation happens for all forms of transport – and Chinese companies are advancing the technology, for example in buses (Shenzhen based Haylion’s Alphaba), taxis and cars (e.g. Didi, Pony.ai), delivery vehicles (e.g. Alibaba, JD.com).

European players also drive autonomous mobility development. Patent application in automated vehicle platforms and smart environment by European players have risen by 330% from 2011 to 2017, compared with 16% across all technologies, according to the European Patent Office.23 Among the top ten patent applicants for automated driving from January 2010 to July 2017, 6 were European.

All in all, autonomous vehicles “are likely to change city landscapes – although this might take different directions depending on how usage develops”,24 showing the vast uncertainty of the future of urban mobility and the importance of steering investments through incentives in the desired directions.

4.3 Shared mobility

Shared mobility refers to the concept of not individually using transport hardware (such as a private car, bike, truck), but providing mobility services with that transport hardware to many people. These services can include bike sharing, ride hailing, car sharing, or truck sharing. Through digitalization, the ubiquity, efficiency and ease of access to shared mobility has increased significantly.

China has pushed shared mobility, for example in

- ride hailing through the Didi platform
- shared truck hailing and sharing through Huolala, gogovan, or 58 Suyun (which is active in over 100 Chinese cities)
- shared urban logistics facilities (with the strong support from local governments), for example in Chengdu
- shared bicycles through services like Meituan Mobike, Bluegogo

Europe has long been an advocate of shared mobility, with countless services for cars, bikes, scooters etc. such as DriveNow, Car2Go (now merged into ShareNow), CallaBike, Emov, Spin and many more. Contrary to China, the European shared mobility development is very fragmented.

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24 Schlobach and Retzer, Sandra, “Defining the Future of Mobility: Intelligent and Connected Vehicles (ICVs) in China and Germany.”
26 KPMG International.
As a result, Chinese passenger transport is already increasingly skewed towards ride-hailing. In China, ride-hailing constitutes a larger share of distance travelled than in any other country (see Figure 9).

Whether this shared mobility for passengers and freight will expand within Chinese and international BRI cities will depend – again – on the availability of shared mobility services (such as services of the ride-hailing company DiDi, shared mobility platforms for freight) and the acceptance of them. Often these services have run into local and legal resistance due to the fear of undercutting prices of incumbent transport industries.

At the same time it is important to note that shared mobility in itself is not a green solution for urban mobility. Several studies have found that, for example, ride-hailing has increased car-bound traffic and has substituted more environmentally friendly bike and public transportation use.

Whether the mobility using electricity is greener than with the current internal combustion engine is most strongly dependent on the source of energy. For example, the Asian Development Bank estimates that EVs will result in significant GHG reductions if the grid factor is below 0.8 kilogram of carbon dioxide equivalent per kilowatt-hour (kgCO₂e/kWh).29 In order to move to a zero-emission mobility, electricity production will also need to be zero emission (e.g. through wind power and solar power).

Currently, 99% of cars sold are still combustion engine cars. However, China has accelerated the electrification of all modes of urban transportation: public transportation (such as buses), private passenger transportation (cars, taxis), and urban commercial vehicles (urban freight, urban public services). China has not only become the supplier of most electric vehicles in the world, but also its biggest consumer. While total sales of vehicles in China has been on a downward trend with car sales dropping from 2017 to 2018 by 2.8% to 1.5 million (constituting about 32% of global car sales)30, the share of electric vehicles among the sales is with 7.3% twice as large as that of Europe (see Figure 10) with sales expected to hit 1.5 million in 2019 (up from 1.1 million in 2018). In Europe, electric car sales have been behind expectations, except in Norway. Although the market has grown by 70% from April 2018 to April 2019, altogether some 24,000 fully electric and 37,000 plug-in electric vehicles were sold across Europe.31

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27 Augustin Freidel, Free Floating Micro Mobility Map Europe (Maphub, n.d.), https://maphub.net/Augustin/micro
In the urban commercial vehicle space, China is similarly accelerating its electrification. In 2018, Chinese operators bought about 200,000 electric light duty commercial vehicles— that is 6% of the truck market below 6 tons. The city of Shenzhen has led the electrification of logistics, having a stock of almost 62,000 electric logistic vehicles on its roads (see Figure 11).

Most importantly for green urban transport are electric buses. Of the 425,000 electric buses in operation worldwide, China operated about 421,000 (see Figure 12), with estimates ranging that 18% of China’s total bus fleet was electrified by the end of 2018.

One important prerequisite for the electrification of mobility, particularly through battery-electric vehicles, is the availability of battery and their technology. Of the top 10 global producers of batteries for electric vehicles, 7 are Chinese, dominated by BYD and CATL (the three non-Chinese producers are Japanese Panasonic, South Korean LG and Samsung).

Sales of electric buses have grown from few thousands in 2013 per year to 200,000 expected in 2019. These electric buses in China, according to a 2019 Bloomberg study, displace about 270,000 barrels of diesel demand per day— about 3 times the displacement by all the world’s passenger electric vehicles.

One important prerequisite for the electrification of mobility, particularly through battery-electric vehicles, is the availability of battery and their technology. Of the top 10 global producers of batteries for electric vehicles, 7 are Chinese, dominated by BYD and CATL (the three non-Chinese producers are Japanese Panasonic, South Korean LG and Samsung). (see Figure 13), China’s total planned battery-making capacity is three times that of the rest of the world's.

**Figure 11: Electric Vehicle Population in Shenzhen 2015-18**

**Figure 12: Global sales of municipal e-buses**

Source: BloombergNEF’s "Electric Vehicle Outlook 2019"

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40 The Economist, “China’s Plans for the Electrified, Autonomous and Shared Future of the Car.”
While a number of challenges in the electrification of urban transport remain in China (e.g. providing sufficient charging infrastructure, battery recycling, sustainable electricity production, quality issues), the goal of China to become a global leader in electric mobility has been set in motion by the “Made in China 2025” plan, where electric mobility is one cornerstone, as well as the 13th Five-Year Plan which pushes for the further innovative and green development of China (the 14th Five-Year Plan is expected to be published in 2020, further expanding China’s green mobility ambitions).

Electrification has a massive impact on urban transportation in China and possibly in BRI countries. Whether China will be able to use the BRI to successfully accelerate its mobility electrification drive will depend on local and international support of investment and capacity building, as well as regulatory and consumer behaviors.

Indeed, the rapid developments of urban mobility in terms of technologies, behaviors and policies are possibly just a beginning for Chinese cities. Chinese cities and national governments have already implemented many impressive urban mobility transformations (such as the full electrification of Shenzhen’s bus and taxi fleets) and they continue to develop ambitious targets that will transform urban transport using automation, connectivity and shared mobility.

At the same time, Chinese international ambitions to be a standard setter, “improve the global governance system”43, grow trade and invest in infrastructure through its BRI must be understood as strategy to accelerate China’s export ambitions of Chinese domestic transport technologies.

Therefore, one expectation of the next phase of green mobility for BRI cities is an extrapolation of the path that advanced Chinese cities have already embarked on. However, other possibilities are also equally conceivable - depending on the global economic situation, local specificities and strategies, Chinese strategies, and international cooperation.


42 The Economist, “China’s Plans for the Electrified, Autonomous and Shared Future of the Car.”


Figure 13: Global EV battery market

China dominates the market of EV batteries (in shipments by gigawatts-hours)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>Market Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Contemporary Amperex Technology (China)</td>
<td>42.9%</td>
</tr>
<tr>
<td>2</td>
<td>Panasonic (Japan)</td>
<td>16.1%</td>
</tr>
<tr>
<td>3</td>
<td>BYD (China)</td>
<td>9.3%</td>
</tr>
<tr>
<td>4</td>
<td>LG Chem (South Korea)</td>
<td>5.2%</td>
</tr>
<tr>
<td>5</td>
<td>Envision AESC (China)</td>
<td>4.5%</td>
</tr>
<tr>
<td>6</td>
<td>Samsung SDI (South Korea)</td>
<td>3.7%</td>
</tr>
<tr>
<td>7</td>
<td>Guoxuan High-Tech (China)</td>
<td>3.5%</td>
</tr>
<tr>
<td>8</td>
<td>Tianjin Lishen Battery (China)</td>
<td>3.2%</td>
</tr>
<tr>
<td>9</td>
<td>Farasis Energy (Ganzhou)</td>
<td>3.1%</td>
</tr>
<tr>
<td>10</td>
<td>Shenzhen BAK Battery (China)</td>
<td>2.9%</td>
</tr>
</tbody>
</table>
The future of urban mobility is all but predictable with fast developments in technology, political and economic uncertainties as well as divergent interests of stakeholders. At the same time, China’s Belt and Road Initiative will play an important role in shaping urban transport due to the possibility of investments in infrastructure and China’s technological capabilities (which Chinese firms want to export). With a BRI that is still a young and evolving (it was conceived only in 2013) and rapid technological developments in transport innovation, developments in urban mobility in BRI cities are all but certain – with the possibility to play out in many different directions. Against the backdrop of this uncertainty over the development of urban mobility in BRI cities paired with the need to protect global goods, such as climate, biodiversity, social inclusion, it is important to understand possible development paths that help us prepare cooperation and mitigation strategies for international stakeholders (for example BRI cities with European cities), while also understanding investment needs and opportunities. Based on the technological trends in urban mobility and with the goal to better understand directions of the development of urban transport in BRI cities to support policy makers and investors in their understanding how to contribute to green urban transport in BRI cities, three scenarios of urban transport development in BRI cities are being suggested:

- Scenario 1: Ecological urban civilization
- Scenario 2: Development at different speeds
- Scenario 3: Global slowdown

The scenarios are pre-dominantly based on expert interviews and published research48. It is important to note that these scenarios serve only as an orientation of future urban transport development, but not as a prediction of the future. At the same time, the scenarios are generalizations that cannot detail developments in the very diverse cities of the BRI.

5.1 Scenario 1: Ecological Urban Civilization

Rationale and description

China is a signatory to international treaties on environmental protection (e.g. the Paris Agreement on limiting global warming through reduction in GHG emissions, partner in the Convention on Biological Diversity) and has enshrined in its constitution to build an “ecological civilization (…) in harmonious coexistence between man and nature”. The Chinese President Xi Jinping stressed that economic development should not be detrimental for the ecological environment.49 China also believes that it is a role model for the development of other BRI countries and while it adheres to the principles of non-interference in other countries, it supports the ecological growth of these countries based on Chinese experiences.

Practical consequences

Based on Chinese and international guiding principles for an ecological economy, the Chinese society, Chinese businesses, Chinese regulators and Chinese investors nationally and internationally accelerate their support of the implementation of green urban transport technologies and concepts.

By 2033, cities along the Belt and Road Initiative with infrastructure investments with Chinese participation and/or technology will see an acceleration of the application of sustainable urban transportation policies, for example:

Table 3: Ecological Urban Civilization Developments in 2033

<table>
<thead>
<tr>
<th>Passenger transport</th>
<th>Freight transport</th>
<th>Transport governance</th>
</tr>
</thead>
<tbody>
<tr>
<td>public transport, particularly electric bus rapid transport fleets (BRT) are the dominant mode of people’s transport, with on-demand pick-ups and flexible routing;</td>
<td>urban freight is delivered with electric and automated vehicles;</td>
<td>- Urban and international policies are focusing on “avoid, shift and improve” policies for urban transport;</td>
</tr>
<tr>
<td>BRT road infrastructure is the dominant urban road system</td>
<td>in order to increase efficiency, small storage facilities paired with behavioral analyses allow for a better just-in-time delivery, significantly increasing efficiency of delivery (once one delivery attempt sufficient);</td>
<td>- City governments employ integrated land-use and transport planning, such as “transit oriented development”50;</td>
</tr>
<tr>
<td>infrastructure for private cars is kept at a minimum;</td>
<td>- non-motorized transport infrastructure is expanded strongly, with tree-lined roads that give shade and protect against rain for the people on foot and on shared bikes;</td>
<td>- urban city planners are fully using big data for quicker and more accurate planning of cities according to the needs of the people, flow of goods and natural environment;</td>
</tr>
<tr>
<td>non-motorized transport infrastructure is expanded strongly, with tree-lined roads that give shade and protect against rain for the people on foot and on shared bikes;</td>
<td>- individual transport through ride-hailing or shared cars is done with electric cars;</td>
<td>- enforcement of green urban transport laws (e.g. restricted parking, no-entry zones) is implemented through smart technologies;</td>
</tr>
</tbody>
</table>
| - due to a lack of private parking spots and high taxes for car ownership, private car ownership is kept at a minimum; | - Modal shares are:
  - Walking 3% |
  - Cycle: 4% |
  - Public transport: 60% |
  - Car: 25% |
  - Other: 10% |
| - Modal shares are: | - sharedPreferences are:
  - Walking 3% |
  - Cycle: 4% |
  - Public transport: 60% |
  - Car: 25% |
  - Other: 10% |

Table 3: Ecological Urban Civilization Developments in 2033

44 Lisa Eckelt et al., The Future of Mobility: Scenarios for China in 2030 (Santa Monica, CA: RAND, 2015); Johanna Zmut et al., The Future of Mobility: Scenarios for the United States in 2030 (Santa Monica, CA: RAND, 2013) (“number of pages” 1125 source: “Library of Congress (LC),” “event-place”: “Santa Monica, CA,” “abstract”): What might one expect for the future of mobility in the United States in 2030? Mobility is defined as the ability to travel from one location to another, regardless of mode or purpose. RAND researchers used a six-step scenario development process to develop two thought-provoking scenarios that address this question. The six steps are:


Chinese and European stakeholders will be a core supplier and investor of these technologies and systems. This will allow China and Europe to expand its industries and green technologies faster by exporting them to BRI cities. This will create a win-win situation that is reducing carbon emissions, make transport more efficient and cities more liveable, while providing economic growth opportunities through trade and (digital) connectivity.

**Governance conditions**

The Ecological Urban Civilization will be achieved by pro-active Chinese, European and BRI stakeholders. In regards to governance and political conditions, the Chinese, European and international stakeholder will have

- fully understood and incorporated the Avoid-Shift-Improve approach to sustainable transport
- supported local city governments in BRI countries in developing urban planning capacity, including the use of digital technologies applying big data (e.g. to optimize public transportation routes);
- supported local city stakeholders in green mobility enforcement capacity, such as frameworks for use of digital technologies for supervision of traffic violations (e.g. parking, no-entry zones), safe street behavior (e.g. for safe biking and walking),
- applied strict regulations within China to adhere to a globally sustainable development model in terms of technology exports, financing oversight, capacity building (e.g. Chinese financial institutions stopped investing in technologies in BRI cities that contributed to pollution and GHG emissions)
- broadly integrated stakeholders in decision making processes to gain support of local people, businesses and others for green urban mobility development allowing for new forms of liveable cities that are adaptive to the local circumstances;
- Global community has found better enforcement mechanisms for green development (similar to UN’s ‘Responsibility to Protect’ framework).
- Cities have started cooperating, e.g. within the C40, the Green Belt and Road Coalition, on an elevated level that includes sharing of best practices, standards of measurement and increased transparency in reporting of data. In fact, cities are competing with each other in terms of green achievements.

**Technological conditions**

The Ecological Urban Civilization will require specific technologies to be accelerated in their development and application.

- green technologies and their application are further improved and include a full life-cycle analyses to avoid unintended consequences (e.g. battery recycling of electric vehicles);
- digital technologies are further improved, such as in big data analysis capabilities for urban planning, traffic management, route planning in localized settings;
- the broad application of green technologies has decreased prices for green technologies, such as electric buses.
- Big data and AI will improve dramatically with a flurry of innovation e.g. to monitor emissions, improve planning and operation efficiency in logistics, circular economy in packaging etc.

**Financing conditions**

The annual investments for the “Ecological Urban Civilization” scenario are about 190 billion USD per year for all low- and middle income countries, equaling around 0.45% of each countries annual GDP.\(^47\)

In order to finance transport infrastructure in the ecological urban civilization, the following steps have been taken:

- investors, such as national development banks (e.g. CDB), and commercial banks (e.g. ICBC) were encouraged to invest in green technologies only, e.g. through tax cuts for green finance instruments, stricter regulation regarding investment in non-green technologies;
- private investments in green technologies in BRI cities was encouraged through more market-driven policies, better international financial integration (both policy and technology), better investor protection also for investors of smaller investments;
- insurance premiums (e.g. with Sinosure) include environmental risks and are thus significantly higher for brown investments than for green investments. This further drove up prices for investments in brown technologies.
- new financing instruments that allow cash-strapped municipalities and public transport operators to invest in green mobility tech were supported (e.g. PAYS – see Callout Box 1)
- National governments incentivized the issuance of green bonds used for green urban transport (with a science-based definition of “green”) for different players in the market (investors, municipalities, operators)

- concessionary lending and blended finance for projects that are non-bankable have been accelerated through development banks, grants from other governments that supported also less solvent cities in investing in green urban transport;
- digital technology has allowed to invest more efficiently, lowering transaction costs through better monitoring and allocation of resources (e.g. using blockchain technology), allowing smaller investors to pool money for investments.

\(^47\) Rozenberg and Fay.
Callout Box 1: PAYS – an innovative way to finance green mobility infrastructure

“Pay As You Save (PAYS)” is an existing, proven financing approach that has been implemented previously by utilities to increase investment in a range of climate-relevant solutions. PAYS has consistently overcome the primary barriers to investment that are now facing electric buses – high upfront costs and limited access to finance for customers unqualified or unwilling to take on more debt for new equipment. In a basic transaction that applies PAYS to clean transport, there are several key stakeholders:

- Utility – supplies electricity; holds direct relationship with bus service provider;
- Bus service provider (BSP) – purchases and/or operates buses, often a municipal transit agency;
- Electric bus manufacturer – sells buses, including batteries, and charging equipment;
- Capital provider(s) – provides debt finance to the utility, if required.

Advantages:
- Accelerates bus fleet electrification
- Unchanged capital expenditure vs. diesel buses and immediate operational savings
- No additional financial liability (unless a loan or lease) on BSP’s balance sheet
- Secure on-bill payment with the ability to treat unpaid bills similarly to other services
- Leverages a stronger balance sheet and access to affordable capital
- Achieve cost recovery for deployed equipment within warranty period of ownership
- Significant additional revenue from electricity sales to BSPs as a result of PAYS
- Access to a more creditworthy counterparty
- Benefits from improved allocation of technology
- Gains exposure to an important growth industry (buses and charging infrastructure)
- Increased product sales in the new market
- Experience and expertise in the new market

Thinking outside the box for finance

Pay As You Save (PAYS) - for electrification of buses

Challenge

- Sustainable technologies (e.g., electric buses) have high up-front costs
- Returns on investment are only realized over the long term

Once the tariff is in place, the utility can leverage external debt lent against its balance sheet to pay for the cost of electric bus batteries and charging infrastructure. This allows the BSP to obtain new electric buses from a manufacturer debt-free with an off-the-books investment, paying roughly the same upfront cost as it would for equivalent diesel buses. If the upfront cost is still higher than diesel, the remaining fraction of the gap is met with grant funding from the concessional capital provider or utility incentives. The utility recovers its investment costs (including its cost of capital) from the BSP via the PAYS charge on its monthly electric bills, and once those costs are recovered, the BSP gains ownership of the battery and charger assets.

Policy cooperation

Chinese stakeholders, BRI cities and international stakeholders work together to achieve the Ecological Urbanization Scenario. European stakeholders have shown a particular interest in contributing to the green urban mobility in BRI cities and have invited China to join efforts between the EU-Asia Connectivity Platform and its BRI platforms:

- the European Union and national governments (e.g. AFD, GIZ) have supported capacity building for science-based improvements of green urban mobility planning (e.g. Sustainable Urban Transport Planning (SUTP)), traffic management (e.g. parking management), public transport alliances/transit alliances
- European public investors (e.g. EIB, KfW) have provided concessional loans to BRI cities and provincial governments, based on local knowledge due to their local presence. These loans have allowed these governments to invest in public goods that are not investible by private investors
- European private investors have been supported to invest in green technologies in BRI cities, by providing them public guarantees with strict use of proceeds and accountability provisions.
- The European Union together with other international institutions (e.g., World Bank) helped the BRI to become a multilateral strategy with open bidding for contracts and international financing.
- This allowed European private enterprises to supply technical products and services alongside Chinese companies, allowing both sides to compete on equal grounds, share experiences and learning.
- Cities along the BRI intensify their knowledge exchange through existing platforms, such as the C40, MEE.
5.2 Scenario 2: Development at Different Speeds

Rationale and description

China adheres to the principle of non-interference and impartiality, Chinese investors and companies are supporting national governments and municipalities in fulfilling their local ideas of urban mobility.

Cities along the Belt and Road Initiative with infrastructure investments with Chinese participation and/or technology will see an acceleration of urban mobility infrastructure – however with different outcomes depending on the city’s specific preferences:

**Practical consequences**

Based on the Chinese model of non-interference and impartiality, Chinese investors and companies are supporting national governments and municipalities in fulfilling their local ideas of urban mobility.

**Passenger transport**
- Ownership of private cars with internal combustion engine (e.g. gasoline) is increasing
- Cars provide the most important means of transport for many cities along the BRI;
- Electric cars are mostly not feasible due to a lack of coordinated charging infrastructure construction and cheap operating costs of conventional vehicles;
- Some cities see an improvement of public transport (e.g. diesel buses) to support more migrant workers to work in the cities;
- More environmentally ambitious cities or those cities with strong input from international organizations experience the establishment of few electric buses lines;
- Non-motorized transportation, such as biking and walking, is confined to selected areas of touristic relevance.
- Modal shares are5:
  - Walking: 1%
  - Biking: 2%
  - Public transport: 55%
  - Car: 30%
  - Other motorized: 12%

**Freight transport**
- Several logistics operators will utilize electric vehicles for urban deliveries, particularly in countries with cheap electricity, using private charging infrastructure installed by the logistics companies;
- Due to a lack of a city-wide coordinated charging infrastructure, a broader application of electric logistics vehicles is only in planning;
- Several logistics companies are adapt at using big data for better route optimization for urban deliveries, while a public platform to better pool and coordinate deliveries is missing (leading to more empty runs, multiple suppliers delivering at the same time to the same address etc.);
- Apps allow private citizens to support delivery of packages, leading to employment with little logistics efficiency.

**Transport governance**
- Private car ownership and operation is supported by national policies, e.g. fuel subsidies, low taxes and new-car subsidies;
- Road network is grown as a sign for development and public investment;
- Parking spots are increased to accommodate more vehicles at the expense of green space and non-motorized transport.

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49 Based on: Wagner, "The Billion Dollar Question - How Much Will It Cost to Decarbonize Cities’ Transport Systems?"
Governance conditions
The Development at Different Speeds scenario has been enabled by a diversified governance approach that supported short-term progress:
- Local governments and operators, depending on their financial strengths, urgency of need for mobility growth, understanding of the sustainability issue of urban mobility, have demanded very different support and investments from international partners – from pure investment in infrastructure to capacity building to support in operations.
- Many local governments – in order to speed up economic development – continue to promote the use of gasoline and other fossil fuels for mobility, e.g. through tax breaks, subsidies etc.
- Chinese stakeholders (e.g. investors, companies, government agencies) strictly adhered to the host country principle and work closely with local governments to provide the financing and technology for their desired mode of transportation, with the goal to allow all types of Chinese companies to profit from the different needs of mobility.
- International organizations, such as the World Bank, the European Investment Bank, GIZ supported few selected local cities along the BRI to incorporate best practices of urban mobility planning.
- Due to a lack of long-term planning and little stakeholder integration (due to a close relationship with the local governments that are only in office for few years), many investments in BRI cities’ mobility required re-planning, making each investment often less efficient in its utility versus investment.

Technological conditions
The Development at Different Speeds Scenario allows for a multitude of technologies to succeed:
- conventional internal combustion engines (ICVs) using diesel or gasoline continue to be the preferred mode of propulsion for both passenger and logistics vehicles due to their high reliability, low acquisition cost and cheap operations (due to low taxes on fuel).
- Electric passenger mobility will develop mostly in the richer cities that want to be seen as front-runners and innovators.
- Electric urban logistics mobility will develop quicker and spread further because a) logistics companies are more financially savvy calculating life-cycle cost; b) they are more global in operation and can use economies of scale in acquisition and operation that drive down cost of electric mobility.
- Big data and sensor technology will spread further, with data processing and artificial intelligence mostly in the big data centers in the investor countries.

Financing conditions
- The annual investment need for urban infrastructure investment in low and middle-income countries in the “Development at Different Speeds” scenario is expected to be about 250 billion USD, or about 0.5% of each country’s annual GDP. The higher cost are driven by lacking integrated planning and standards – as well as long-term consequences of quick, non-integrated and low-quality investments.
- Cities along the BRI need investments to finance their growth of urban mobility in the Development at Different Speeds scenario. The financing is done through different modes, also depending on the local capacities and transport strategies of the city:
  - BRI cities with Chinese infrastructure developers get funding – close to market rates – through Chinese mostly state-linked commercial investors (e.g. ICBC, Agricultural Bank of China).
  - BRI cities raise their own funds through issuing government or municipal bonds.
  - International financial institutions are providing concessional loans for selected green urban transport projects (e.g. financing for a BRT)
  - International donors provide grants for capacity building in urban transport planning and operation to few selected cities

5.3 Scenario 3: Global slowdown
Rationale and Description
Chinese stakeholders, BRI cities and international stakeholders loosely cooperate in agreeing on general investments and urban mobility development strategies. BRI platforms and the EU-Asia Connectivity Platform have some overlaps and joint conferences, but strategic planning and implementation happens independently. BRI cities have become smart in playing the different European (conditionality) and Chinese (non-interference) approaches against each other, hoping to get more money:
- Chinese stakeholders are in close cooperation with local city governments in developing strategies and signing Memoranda of Understanding to intensify exchange and economic cooperation.
- Chinese investors are mostly working with Chinese companies and few local companies to build and partly operate transport services in BRI cities.
- Western stakeholders are pushing for sustainable development that is low-carbon, however can only support few cities in providing finance to build this low-carbon urban transport infrastructure.
- Chinese and Western stakeholders are meeting regularly and agree that transport development needs to accelerate in a sustainable manner. However, the understanding of the priorities of sustainable development is a constant source of debate.
**Practical consequences**

With little money to spare and different super powers investing strategically in different BRI cities and countries, urban transport will develop at unequal speeds, with different standards and with short-term transport efficiency improvements. While Chinese BRI cities will partly continue to be a technological leader in the application of smart and green mobility technology, only few non-Chinese BRI cities will experience the desired inflow of transport investments focused mainly on showcasing possibilities through “pilots”, but without a deep enough pocket to drive holistic change.

### Governance conditions

The Global Slowdown scenario has been enabled by political competition, lack of investments and lack of coordination among national and international partners:

- Major countries and blocks agreed to cooperate only in parts of global trade integration and global standards, while other issues (e.g. high technology, security related technology) were considered of national security interests and thus products and services in these areas were banned from import and export.
- Environmental laws and regulations were relevant for some countries (e.g. some countries of the EU, China), but not more important than social harmony through economic development in any countries.
- Slowing trade increased national resolve for technological independence, but lowered political and financial possibilities for (green) investments in other countries and cities.
- Countries along the BRI were often forced to choose sides between the dominating super powers and their technological standards.

### Financing conditions

The annual investment in urban transport of the “Global Slowdown” scenario are most likely lower than in the “Development at different Speeds” scenario (thus, less than USD 250 billion per year in all low- and middle-income countries), however with less favorably outcomes in terms of urban mobility efficiency and quality.

Cities along the BRI see selected investments to finance urban mobility from different sources in the Global Slowdown scenario:

- Electric urban logistics mobility will continue to develop because a) logistics companies are more financially savvy taking in the full costs; b) they are more global in operation and can use economies of scale in acquisition and operation that drive down cost of electric mobility.
- Big data analyses will continue to spread, particularly for traffic safety and security, however with national laws slowing quicker application of big data and AI and different global standards regarding the application and use of big data.

### Technological conditions

The Global Slowdown scenario allows for a multitude of technologies to succeed:

- conventional internal combustion engines (ICEs) using diesel or gasoline continue to be the preferred mode of propulsion for both passenger and logistics vehicles due to their high reliability, low acquisition price and cheap operations (due to low taxes on fuel).
- Electric passenger mobility will develop mostly in the richer cities that want to be seen as front-runners and innovators.

### Passenger transport

- Private cars with internal combustion engine (e.g. gasoline) provide the most important means of transport for many cities along the BRI;
- however private car ownership is not necessarily increasing and the market for second hand cars is thriving;
- scooters are a preferred mode of transportation;
- Public transport through larger buses and smaller buses provides flexible and not centrally coordinated means of transport for the working class people;
- More environmentally ambitious cities or those cities with strong input from international organizations experienced the establishment of some electric buses lines, which could however not be properly maintained;
- Non-motorized transportation, such as biking and walking, is confined to selected areas of touristic relevance in selected cities.

### Freight transport

- Several logistics operators will utilize electric vehicles for urban deliveries, particularly in countries with cheap electricity using private charging infrastructure of the companies;
- Due to a lack of a city-wide coordinated charging infrastructure, a broader application of electric logistics vehicles is only in planning;
- Several logistics companies are adapt at using big data for better route optimization for urban deliveries, while a public platform to better pool and coordinate deliveries is missing (leading to more empty runs, multiple suppliers delivering at the same time to the same address etc.);
- Apps for private citizens to deliver packages are flourishing, allowing individuals to earn money, increasing traffic (particularly with small motor bikes).

### Transport governance

- Private car ownership and operation is supported by national policies, e.g. fuel subsidies, low taxes and new-car subsidies;
- Road network is partly grown as a sign for development, however maintenance is spotty;
- Policies are uncoordinated between different departments (e.g. land use, public transport, urban mobility planning, environmental departments) due to lack of training and capacity building.

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Based on Wagner.
Policy cooperation

Chinese stakeholders, BRI cities and international stakeholders in the Global Slowdown scenario compete to cooperate with selected cities and countries along the BRI.

- Chinese government and state-owned enterprises work closely with selected strategic local city governments in developing strategies and signing Memorandums of Understanding to intensify exchange, economic cooperation and data exchange.

- Chinese private investors are mostly absent in urban mobility development.

- Western governments are working with selected strategic cities and national governments and support urban mobility development, particularly in Eastern and Central Europe.

- Chinese and Western stakeholders are meeting regularly to discuss particularly matters of trade and cooperation and emphasize that environmental protection should be an important consideration for future work.

5.4 Summary and analysis of scenarios

The three scenarios “Ecological Urban Civilization”, “Development at Different Speeds” and “Global Slowdown” illustrate possible pathways of development for urban mobility. However, as mentioned above, these scenarios are not to be seen as predictions.

While the technological development in urban mobility will allow many developed cities to profit from a more green urban development, the availability of these technologies in BRI cities depend on the financial strength and depth of international cooperation of the involved stakeholders, such as local governments, international governments, supranational institutions (e.g. WTO), financial institutions including development banks (such as World Bank, AIIB, CDB) and private investors, as well as enterprises and the civil societies.

Accordingly, people in cities will use different modes of transport – from a more ecological mix in scenario 1 to a less ecological mix in scenario 3 (see Figure 14).

The mode of transport will have strong influence on the different emission mitigation potentials. Next to the scenario, the expected emission mitigation potentials are depending on the development stage of the city itself. BRI cities with lower incomes will have less mitigation potentials (as they are polluting less at this time due to less transport), while higher income BRI cities have a higher emissions saving potential (see Figure 15).

The necessary investment for the different scenarios and the investment instruments will also vary according to the scenario. The World Bank estimated the annual investment needs in roads and public transport in low- and middle income countries (which include many of those in the BRI) at around USD 180 billion to USD 250 billion. What is striking is that the lowest investment sum is needed with strong planning and implementation capacity that also allows for low-carbon and efficient urban transport. At the same time, different regions have different existing urban infrastructure with their own characteristics. Thus, the cost of urban infrastructure investments in these areas is varying, as can be seen in Figure 16.

Figure 14: Modal shares of urban transport in different scenarios

Figure 15: Emission mitigation potentials of “Ecological Urban Civilization” and “Development at Different Speeds” scenarios

Figure 16: Average annual cost of investment in urban transport 2015-30

51 Based on: Rozenberg and Fay, Beyond the Gap.


53 Based on: Rozenberg and Fay, Beyond the Gap.
Over a period of 35 years from 2015 to 2050, BRI cities will have to invest around 5% of their GDP in upper-middle income BRI countries, between 3.5% and 4% in lower-middle income countries and between 6% and 8% in lower-income countries. Investment in public transport operation will be particularly high, accounting for about 40% to 90% of urban transport investment, depending which pathway cities choose (see Figure 17).

Overall, from an input (investment need) and output (transport efficiency, emissions) perspective, the Ecological Civilization scenario is the most desirable scenario. Therefore, the policy recommendations will focus on supporting the pathway towards this scenario.

Creating green urban transport in BRI cities is a paramount challenge. China and Europe can work together to enable and accelerate a development that is supporting BRI cities to leapfrog from brown mobility to green mobility. The BRI should be used as an opportunity to strengthen cooperation between China and Europe along the shared goals, to which protecting the environment and the climate count.

China has reached out to many European countries and the European Union to strengthen cooperation along the Belt and Road Initiative. The European Union has agreed to ‘forge synergies between China’s Belt and Road Initiative and the EU strategy on Connecting Europe and Asia, as well as the EU Trans-European Transport Networks’ in their joint statement after the April 2019 China EU Summit.

The following policy recommendations should help improve the cooperation between China, the BRI countries and European countries/the European Union in supporting green urban transport in BRI cities. The focus of the recommendations is on environmental factors, and specifically don’t include recommendations or analyses regarding social, legal or other issues (such as data protection, data security, geopolitics). In this recommendations, it is also important that each region, country, and city have their own goals and strengths and therefore each should continue to use their unique capabilities.

Against the backdrop of providing urban transport that contributes to economic development, allows for people and goods to move safely, reliably, inclusively, low-carbon, affordable and efficiently, the following areas of cooperation should be considered and strengthened:

- political and capacity building cooperation
- technological cooperation
- financing cooperation

6.1 Political and capacity building cooperation

Building green urban transport requires strong capacity in terms of planning, building, operation, maintenance and financing capacities. Cities with the right capacities will save about 20-30% of the investment costs of urban transport infrastructure, while achieving better results in terms of environmental protection and mobility efficiency.

China and European countries should therefore support BRI cities with their specific experiences and support capacity building in BRI cities, for example:

- urban mobility and urban city planners in terms of sustainable urban mobility planning that e.g. reduces space use and travel distances through zoning, protects ecosystems, increases transport efficiency;
- urban financial authorities in terms of setting incentives for green transport (e.g. taxes, subsidies, phasing out of counter-productive subsidies);
- public transport operators in terms of transit alliances, operation and maintenance of electric buses,
- urban delivery and logistics providers in terms of application of big data for route optimization,
- policy makers in terms of setting policy and legal frameworks e.g. for shared mobility for passenger and freight,
- mobility researchers in regards to lifecycle analyses, environmental assessments,
- technological cooperation
- financing cooperation

Figure 17: Complete transport cost between 2015 and 2050 (64)

For BRI cities to be able to finance the urban transport infrastructure and operation, they will have to employ all available finance instruments – from collecting fees (for public transport), raising municipal (green) bonds, tax-based funding (e.g. through property taxes, national government transfers), international grants, concessionary loans from development banks, loans from other investors, equity investments (e.g. in forms of private-public partnerships) or other innovative forms of financing (e.g. blended finance).

64 Based on Wagner, “The Billion Dollar Question - How Much Will It Cost to Decarbonise Cities’ Transport Systems.”


construction companies in terms of efficient and environmental assessments of their materials, processes and plans (e.g. to minimize loss of biodiversity along the construction paths, protect water sources, have adaptation measures for climate change included),

- urban authorities, e.g. in terms of their technical capabilities of environmental impact assessment, as well as of measuring, evaluation and reporting (MRV) (e.g. local emission measurements, standardized reporting for improvements and comparability).

To improve green urban mobility, the cooperation and exchange between cities should be strengthened, possibly within existing frameworks (such as C40, Green Belt and Road Coalition). Cities should also engage in partner-city exchanges to learn from each other. This requires identifying cities that are suitable to cooperate and learn from each other. This means that cities should have to some extent similar features (e.g. a small German town would not be able to support a Chinese mega-city in terms of public transport planning or operation, while the same city might be helpful for a similar sized city along the BRI).

6.2 Standards and technical cooperation

Companies in the mobility space are quickly developing new technologies to improve efficiency, comfort, safety etc. of freight and passenger transportation. The CASE mobility revolution (described above) has the potential to change the way people and goods move within a few years, however with different speeds and different results for different cities and countries.

In order for countries to be able to catch up — both in terms of their own development potentials, and equally importantly in their possibility to apply these technologies most efficiently, mobility companies and policy makers should cooperate in developing common technical standards.

Standards are crucial for the interoperability and interchangeability of different systems. Standards ensure that no matter the supplier, the systems and services can a) communicate with each other, b) can be replaced beyond the life-time of a single provider and c) create competition that spurs innovation and keeps prices lower.

Indeed, in the past, “the race for transport innovation”, which is at least a century old, has already resulted in incompatible technologies, such as different train systems, different standards for road safety and road standards and even different direction of driving between many Anglo-Saxon countries and most other countries. This lack of standards carries the risk for cities to be locked in a specific technology (e.g. a charging technology), which might at some point become inefficient – in the ‘better’ case, or abandoned due to bankruptcy of the supplier – in the worst case. Switching the technology would thus require an expensive new set-up of the system.

Therefore, while fair competition between innovative companies should be engaged, technological and process standards of new mobility technologies are a prerequisite for the seamless integration of different technologies and the ability to change between suppliers of mobility technologies. These standards should include environmental evaluation that allow cities to compare the “greenness” of the transport technology.

**Technical cooperation recommendation**

1. Technical standardization should have priority to allow for compatibility, continuous maintenance and interchangeability of applied technologies

2. Technological development and application should adhere to green standards and show “greenness” of product for easy evaluation

6.3 Financial cooperation

Investment needs for BRI cities to provide green urban transportation are immense – up to 8% of a city’s GDP in 25 years. Therefore, financial cooperation should allow BRI cities a) to finance their transport needs, and b) to ensure the sustainability of the project.

Cooperation of different types of financial institutions – from private investors to public investors and even foundations that provide grants, allows BRI cities to finance different kinds of projects, e.g.

- high-risk-high-return projects (e.g. new technologies or services that have the potential to reap high benefits, such as shared mobility) through private equity investors,
- low-risk-high-return projects (e.g. new technologies or services that have the potential to reap high benefits, such as shared mobility) through private equity investors,
- low-risk-medium-return projects (e.g. provision of parking management, electric charging infrastructure) through bank loans, equity finance or municipal bonds,
- low-risk-low-return projects (e.g. public transportation) through municipal bonds or blended finance together with development banks
- negative return projects (e.g. bicycle lanes, pedestrian zones, public transportation) through grants, taxes.

In order to ensure that investments in urban transport adhere to sustainability standards, a cooperation with multilateral development banks (such as the AIIB, the World Bank, the IFC, the Asian Development Bank), many western bilateral development banks (such as the KfW, the AFD) or many private Western banks requires the application of international standards, such as the Equator Principles® that provide an advanced framework for sustainable investment. Similarly, many Chinese and some international banks have signed the Green Investment Principles, which also provide some form of guidelines, however at this point at a lower degree than the Equator Principles. Therefore, projects investments with participation of Western banks will have to show an adherence to these banks’ higher standards of sustainability.

**Financial cooperation recommendation**

1. International financial institutions should cooperate to provide the necessary funding – depending on their specific risk profiles and strategies.

2. BRI cities should require co-investments from banks that require high levels of safeguards to ensure sustainability of the project (while at the same time ensuring as little bureaucracy as possible through better project and financial planning, see above).

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7 Summary and Outlook

A green development of urban transportation in BRI countries is all but certain, yet it is possible thanks to technological developments. While China and Europe have agreed to work together for sustainable and green development, e.g. within the Paris Agreement, competing technological and economic interests of industrial stakeholders paired with a lack of capacity in BRI cities and lack of finance for capacity building has the potential to lead to unsustainable and uncoordinated transport development in BRI cities.

In order to find coordination and cooperation mechanisms for Chinese and European players as well as BRI cities, all sides need to be aware of the dynamics and different interests at play.

Chinese stakeholders including the Chinese government and European stakeholders are interested in finding new markets for their products. This makes cooperation with European stakeholders for BRI cities more challenging than with Chinese counterparts. New frameworks, such as the EU-Asia Connectivity Platform, should provide for better coordination mechanisms (with both a regional and a bilateral approach) between the EU and BRI countries and cities.

Regarding the cooperation between European and Chinese stakeholders for green urban transport in BRI cities, more trust that goes beyond a transactional relationship needs to be built. This trust needs to weather dynamic and challenging settings, such as the fast development of transport technology paired with the urgent need to reduce emissions from urban transport. In practice, this means that Chinese and European stakeholders should focus on the interests of BRI cities to contribute and profit from the development potentials in urban transport to ensure the sustainability thereof. China and Europe must strive to work together more closely on the political, financial and technological levels while ensuring that BRI countries and cities are fully integrated into the decision-making processes. This will allow for the strengths and needs of the different regions to be better utilized and understood: Chinese current experiences in relatively cheap and fast infrastructure construction, access to finance and “relatability” for local BRI governments as “brothers in non-developed countries”; European strengths in planning, quality standards, stakeholder integration and governance; local expertise in transport requirements and failed previous attempts of investments. For this, existing frameworks of cooperation must be strengthened and expanded (e.g. Euro-China Eco-City Link), parallel frameworks harmonized (e.g. EU-Asia Connectivity Platform, BRI platforms), and third country cooperation within the BRI and EU frameworks accelerated.

8 Bibliography


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