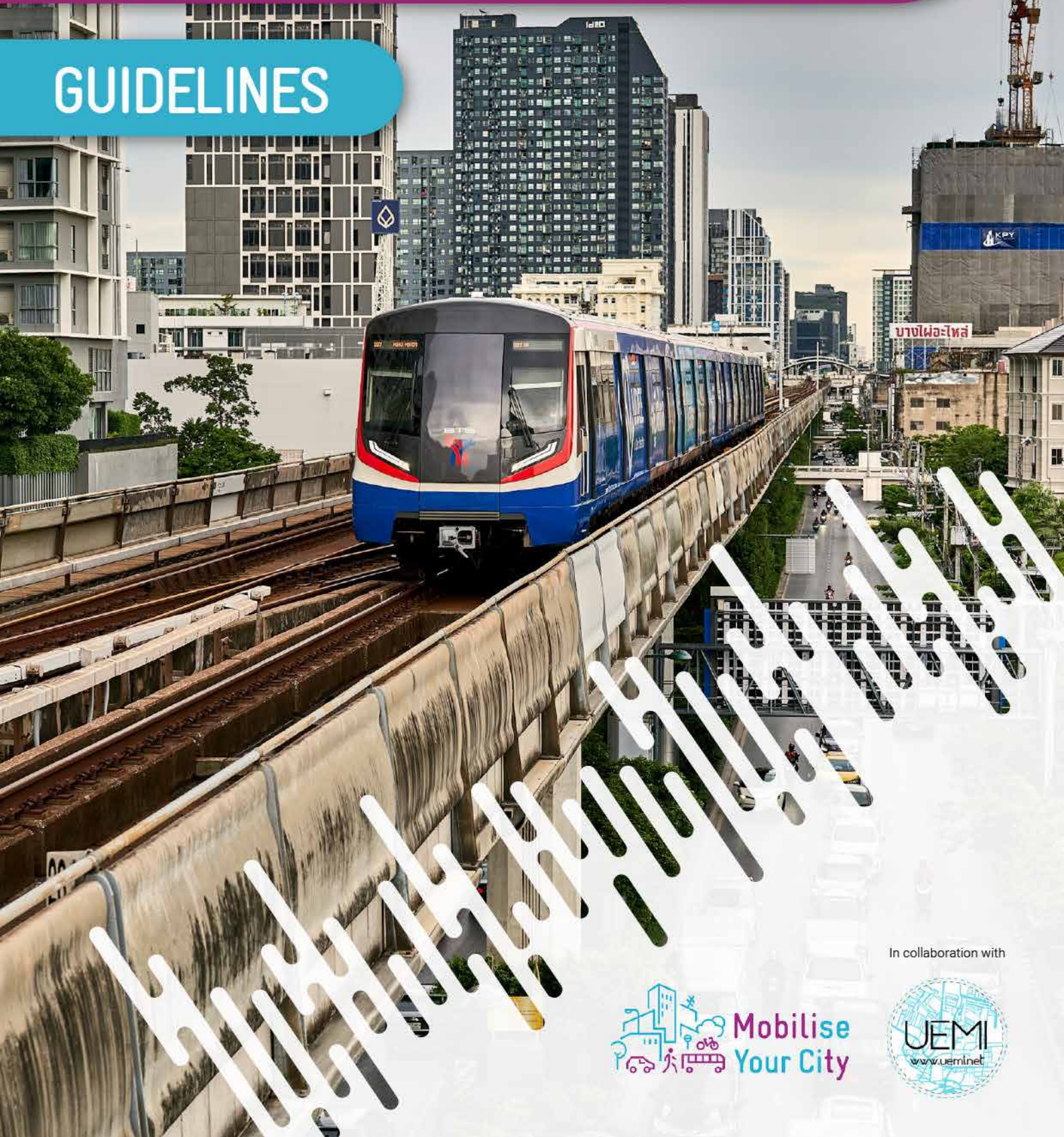


National Urban Mobility Policies & Investment Programmes

GUIDELINES



In collaboration with



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Context of this publication

This publication - the **NUMP Guidelines** - is a **“living document”**. It is used on the one hand in the work on NUMPs in countries and serves on the other hand as a basis for a consultation process with local and national government officials and institutions active in the field of sustainable urban mobility with the aim to continuously improve the guidelines.

The NUMP Guidelines were developed within the **MobiliseYourCity Partnership**. Particular attention has been paid to the methodological and advisory frameworks related to National Urban Mobility Policies and Investment Programmes (NUMPs) and Sustainable Urban Mobility Plans (SUMPs) that serve as the basis for the promotion of investments and development of attractive mobility services. The development of the NUMP Guidelines has been greatly influenced by the European **‘Guidelines for Developing and Implementing a Sustainable Urban Mobility Plan’**, produced by **Rupprecht Consult** under the framework of the **European Union’s SUMPs-Up project**.

The document was developed in collaboration with the **TRANSfer III, TraCS and Urban Pathways projects** (funded by the International Climate Initiative of the **BMU**, German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety) and the **Urban Electric Mobility Initiative** (which has received funding from the **European Commission’s** Horizon 2020 Research and Innovation Programme under grant agreement no 723970, FUTURE RADAR).

Particular support for the development of this document was provided by technical experts from the **Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH** and the **Action Platform Urban Electric Mobility Initiative (UEMI)**.

Launched at the UN Climate Summit in September 2014 in New York, the UEMI aims to contribute significantly to the overall goal of limiting the increase in global mean temperature

to two degrees Celsius above pre-industrial levels by decreasing urban CO₂ emissions globally. As one of the Action Areas of the UN Climate summit, UEMI aims to phase out conventionally fueled vehicles in cities and integrating electric mobility into a wider concept of sustainable urban transport. The UEMI partnership currently consists of over 150 partners and aims to create synergies between safety, air quality, productivity, access and climate change mitigation and actively supports local authorities, public transport operators and entrepreneurs. The UEMI Partnership pools expertise, facilitates exchange and initiates implementation oriented actions that aim to bridge the gap between urban energy and transport and boosting sustainable transport and urban e-mobility.

The MobiliseYourCity Partnership is a partnership under the Marrakesh Partnership for Global Climate Action for integrated urban mobility planning in emerging and developing countries as well as the EU Neighbourhood. The MobiliseYourCity Partnership supports and engages local and national partner governments in improving urban mobility planning, policy and finance by providing a methodological framework and technical assistance, through capacity building; and by enabling access to funding at both local and national levels. MobiliseYourCity Partnership is a multi-donor action, jointly co-financed by the European Commission’s Directorate-General for International Cooperation and Development (DG DEVCO), the French Ministry of Ecological Transition and Solidarity (MTES), the French Facility for Global Environment (FFEM), and the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB). The initiative is implemented by the partners ADEME, AFD, CEREMA, CODATU, GIZ, KfW, EBRD and the Wuppertal Institute.



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List of Acronyms

ASIF	Activity (trips in km per mode), Structure (model share), Intensity (energy intensity by mode in MJ/km), Fuel (carbon intensity of the fuel in kg CO ₂ /MJ)
BAU	Business-as-Usual
BRT	Bus Rapid Transit
CBA	Cost Benefit Analysis
CH₄	Methane
CO₂	Carbon dioxide
CO₂e	Carbon dioxide equivalent
DLR	Deutsches Zentrum für Luft- und Raumfahrt
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
ICCT	International Council for Clean Transportation
IEA	International Energy Agency
ifeu	Institut für Energie- und Umweltforschung Heidelberg GmbH
IPCC	Intergovernmental Panel on Climate Change
LRT	Light Rail Transit
MaaS	Mobility-as-a-Service
MRV	Monitoring, Reporting and Verification
MYC	MobiliseYourCity Partnership
NAMA	Nationally Appropriate Mitigation Action
NDC	Nationally Determined Contribution
NO_x	Nitrogen Oxides
N₂O	Nitrous Oxide
NUMP	National Urban Mobility Policy and Investment Programme
PKM	Passenger Kilometres Travelled
PM	Particulate Matter
PPP	Public Private Partnership
PT	Public Transport
SDG	Sustainable Development Goal
SLoCaT	Partnership on Sustainable Low Carbon Transport
SUMP	Sustainable Urban Mobility Plan
TKM	Total Kilometres Travel
UBA	Federal Environmental Agency
UEMI	Urban Electric Mobility Initiative
UNFCCC	United Nations Framework Convention on Climate Change
VKT	Vehicles Kilometres Travelled





Guide to the reader

About the guidelines

The publication of these guidelines is a **major milestone for the MobiliseYourCity Partnership**. National Urban Mobility Policies and Support / Investment Programmes (NUMPs) aim at effectively enabling local governments to tackle urban mobility challenges. Most countries have a historically grown policy framework on urban mobility. However, these frameworks are often not robust enough, do not always consider the particular needs of cities and usually fall behind compared to the ambitions expressed in the Paris Agreement and the overarching Sustainable Development Goals (SDGs).

Therefore, countries like **Brazil, China, Colombia, France, Germany, India, Mexico** and many others have developed dedicated national urban mobility policies and programmes. They address various barriers and provide a clear vision for the development of sustainable and low carbon

urban mobility systems. Those policies and programmes have led to positive results in terms of more and better integrated urban mobility improving overall quality of life and development. Many cities already benefit from improved regulation as well as technical and financial support.

With the objective that more citizens worldwide benefit from such policies and programmes these guidelines aim at **supporting policy makers in developing and emerging economies** to develop new and strengthen existing National Urban Mobility Policies and Programmes (NUMPs). The guidelines target national-level decision-makers in emerging and developing countries from the ministries of transport, urban development/cities, finance, environment, and others, involved in the process of defining and implementing NUMPs.

The guidelines are built upon the finding that cities can do a lot but need appropriate support from national government because they often

lack the required technical capacities and financial resources. Understanding the **link between national and city level** and designing a framework that allows efficient coordination and effective support from the national to the city level is crucial to improve the investment environment and to bring urban mobility systems on a sustainable and low carbon track. That is why the **MobiliseYourCity Partnership focused since its beginning on an integrated approach**, supporting the design of supportive national frameworks (NUMPs) and integrated urban mobility planning at the city level (SUMPs). The **closeness of the acronyms NUMPs and SUMPs is intended** to stress the relevance of sound and coherent planning frameworks at national and city level. The NUMP Guidelines share the spirit of the EU SUMP Guidelines and consider the promotion of SUMP processes in cities an important element of NUMPs. Further guiding principles for NUMP and SUMP processes are summarised in the “12 Messages of the MobiliseYourCity Partnership”¹.

The understanding of **National Urban Mobility Policies and Programmes (NUMPs)** is diverse around the globe. The MobiliseYourCity Partnership (2018b) defines it as follows:

What is a NUMP?

“A National Urban Mobility Policy or Investment Programme is a strategic, action-oriented framework for urban mobility, developed by national governments, enacted to enhance the capability of cities to plan, finance and implement projects and measures designed to fulfil the mobility needs of people and businesses in cities and their surroundings in a sustainable manner. It builds on existing policies and regulations and aims at harmonizing relevant laws, norms, sector strategies, investment and support programs towards an integrated approach for the benefits of cities and their inhabitants. It takes due consideration of participation and evaluation principles.”

Depending on the degree of centralisation, urban mobility can be a competence of one or several national ministries and/or local governments. Please, note that the expression **national level may also correspond to the provincial, state or regional level**, depending on the division of competences. Bringing the policy objectives of key actors together with an integrated package is a vital step towards a low-carbon, sustainable mobility system. A NUMP can be a useful process to facilitate a more coordinated approach to urban mobility policy, planning and investment.

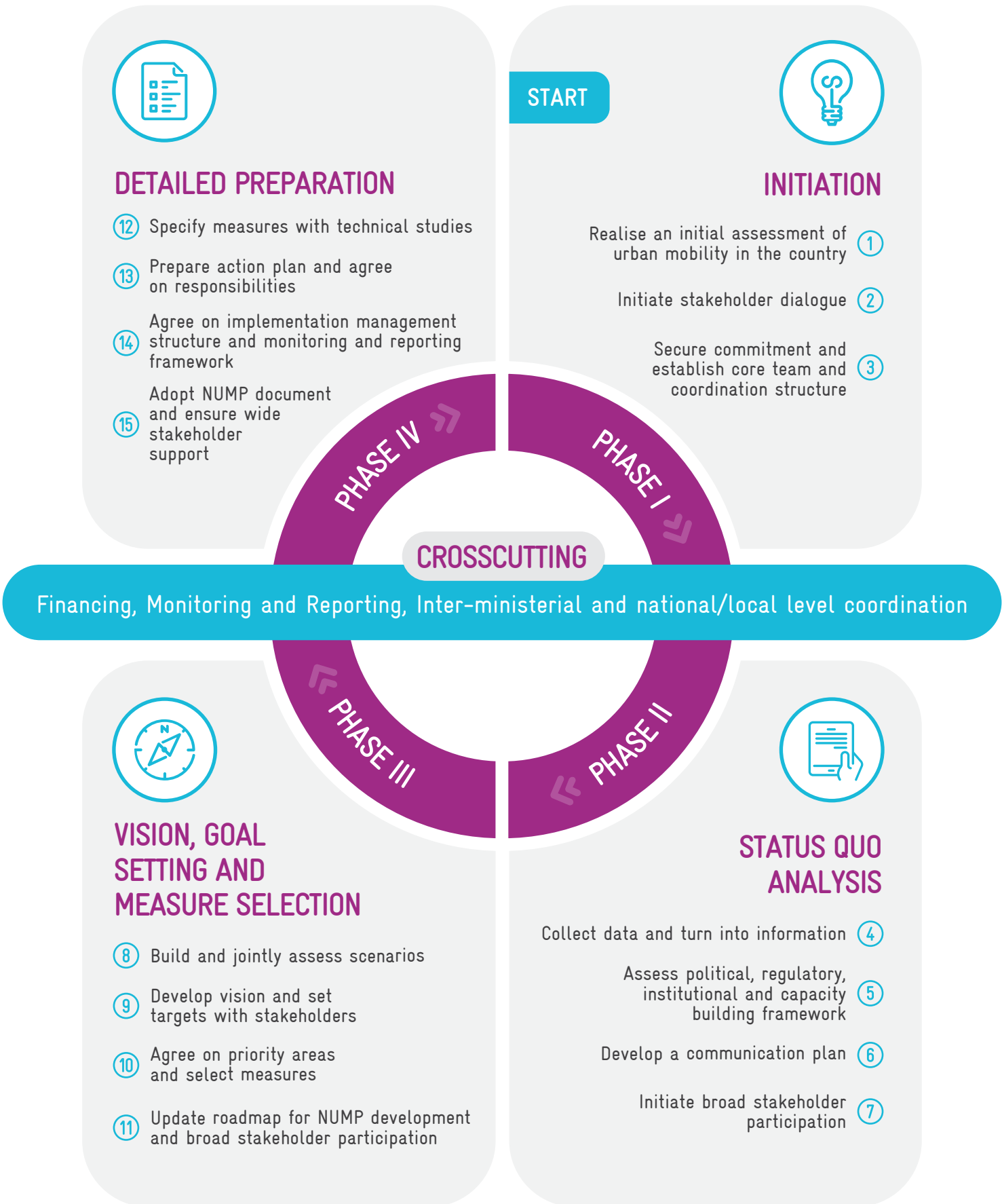
The NUMP Guidelines were developed over the last two years in a process with broad stakeholder participation. Practical experience from NUMPs in more than fifteen countries was considered. Input from well-known partners from organisations such as the French Development Agency (AFD), CEREMA, CODATU, GIZ (German Technical Cooperation), and the Wuppertal Institute for Energy, Climate, Environment enriched the guidelines over time. The guidelines have the character of a living document and are designed to be continuously improved over time. A first Draft Version 0.1 was presented during COP24 in Poland, followed by an extensive review which led to a robust version that is presented now as Version 1.0.

The logic behind the guidelines

Making use of the broad international experience of the multiple partners gathered under the umbrella of the MobiliseYourCity Partnership, a set of core building blocks and useful elements for a NUMP development process were identified and put together in these guidelines in a ‘stereotype’ NUMP development process. We call this process the **NUMP Cycle**. Nevertheless, the NUMP Guidelines are based on the experience that every NUMP development is a genuine process. Since the conditions for developing a NUMP differ from country to country, **every NUMP process is tailor-made**. The **NUMP Cycle is supposed to give orientation** and support an efficient and effective process. It is rather a list of useful ingredients but not a strict recipe to follow. The following **4 Phases and 15 Steps** constitute the NUMP Cycle.

¹ See SUMP Guidelines, available at <https://www.eltis.org/mobility-plans/sump-guidelines>. Interesting in this context is as well the new publication on national support frameworks for sustainable urban mobility planning, available at http://sump-network.eu/fileadmin/user_upload/downloads/PROSPERITY_s_National_support_frameworks_for_SUMP-1.pdf. Furthermore see: https://mobiliseyourcity.net/sites/default/files/2019-11/MYC_12_Messages.pdf.

Figure 1. The NUMP Cycle – 4 Phases and 15 Steps



Decision-makers aiming to design a NUMP can use this cycle as an orientation and starting point. It is important to note that several of the steps are connected and influence each other, i.e. a NUMP preparation is **not a routine process that starts with one step and moves in a fixed sequence through the others**. To the contrary, sound NUMP development is “nationally determined” and driven by the principle of “national appropriateness”. This is why every NUMP development process is different. It depends on the specific circumstances: on available information and resources, on already existing policies, regulation and programmes, and varies largely depending on the specific character of the NUMP. Many other factors influence the process. In the end, any NUMP needs to be tailored to the specific circumstances, and the success of any NUMP development process depends to a large extent on putting the “pieces of the puzzle” together in an efficient and targeted manner.

Practical experience shows that two elements which are crucial for long-term success do often not receive the attention they deserve: **sound financial engineering and proper monitoring and reporting**. Furthermore, these topics are of **crosscutting nature** and need to be addressed at several stages of the process to deepen the respective concepts in several iterations. That is why the partners of the MobiliseYourCity Partnership decided to dedicate **separate**

chapters with more in depth information to these two topics. This underlines as well their relevance for progress in terms of financing to allow real action and reporting striving to achieve the targets of the **Paris Agreement and the Sustainable Development Goals (SDGs)**.

Content covered

The NUMP Guidelines provide practical guidance along the 4 Phases for each of the 15 Steps of the NUMP Cycle to facilitate the process of developing a new or strengthening an existing NUMP. The guidelines cover the following content.

What is a NUMP? Why is it relevant?

Introduction: Highlights the relevance of sustainable urban mobility from a societal point of view, introduces the NUMP concept, its benefits and associated principles and highlights relevant stakeholders.



How to develop a new or strengthen an existing NUMP?

Phase I – Initiation: Is the groundwork for a successful NUMP process. Key issues, actors and stakeholders are identified in a preliminary urban mobility assessment and a core team is established.

Phase II – Status Quo Analysis: Includes an in-depth urban mobility analysis and initiates collection and analysis of information and data to provide the basis for a communication plan and a broader stakeholder engagement.

Phase III – Vision, Goal Setting and Measure Selection: Brings stakeholders together to agree on a long-term urban mobility vision. Specific goals are jointly set and measures to achieve them are prioritised.

Phase IV – Detailed Preparation: Includes the in-depth elaboration of all technical, financial, institutional and managerial elements required to get ready for a successful NUMP implementation.

NUMP Financing (crosscutting): Gives specific guidance for all financial issues to be addressed throughout the four NUMP development phases.

NUMP MRV (crosscutting): Introduces basic concepts to measure, monitor and report on (potential) GHG savings during NUMP implementation progress. Gives guidance to develop a tailor-made MRV approach for the NUMP.

Where to find additional information?

References and Further reading: Includes references and links to publications with additional information and resources.

Annexes: Presents a series of tables that list NUMP indicators (Annex 1), capacity building providers and knowledge products (Annex 3), as well as potential sources of funding (Annex 2).





How to use the guidelines

The guidelines are designed as a practical tool. The introduction is useful to get an overview of relevant issues and concepts in play. While some might want to read through the entire document the guidelines are designed in a way that you can consult the most important elements throughout the process. Its main idea is to serve as a useful and practical guide. To strengthen the practical value of the guidelines **each of the 4 Phases of the NUMP Cycle is structured in the same way:**

- Short introduction and overview table: Each phase starts by introducing the topic to the reader and gives an overview of the guiding questions, key milestones and tools.
- Concise description of each step: The steps are described in more detail, including specific guidance, practical tips, figures, example boxes, references and useful tools.
- Checklist: Each phase concludes with a checklist of core elements and milestones at a glance and facilitates on-the-job use of the guidelines.

Additional information and guidance for the different phases and steps are available on the MobiliseYourCity Partnership's website (www.mobiliseyourcity.net), the NUMP Toolkit (www.changing-transport.org/toolkits) and UEMI (www.uemi.net/toolkit.html) websites.

The following **icons** are used throughout the guidelines and refer to the following:

-  DEFINITION OF A TERM
-  IMPORTANT TIP OR REMARK
-  FURTHER READING
-  TOOLS



Introduction: National Urban Mobility Policies and Investment Programmes

Why sustainable and low carbon urban mobility matters

Global **urbanisation is rapidly increasing**, particularly in developing and emerging economies. Today, 55% of the world's population lives in urban areas. It is expected that this percentage will increase to 68% until 2050 adding another 2.5 billion urban citizens summing up to a total of 6.7 billion people living in cities (UN, 2018). This is creating great opportunities but is also a major challenge for cities and underlines the **essential role of cities in addressing the global climate crisis (NDCs) and the sustainable development goals (SDGs)**.

Mobility plays a particularly important role in this context. The transport system of a city has a major influence on quality of life, health, road safety, equity, economic prosperity and development as such. Improving urban transport systems can unlock many benefits such as better **air quality, reduced health costs, higher**

productivity and energy security. Urban transport plays a particularly important role by providing access to economic and social activities. At the same time, urban transport is responsible for a major share of local air pollution and CO₂ emissions. To limit global warming well below 2 degrees - as internationally agreed in the Paris Agreement – greenhouse gas emissions from transport need to be cut substantially. This is contrasting sharply with current projections which predict a steep rise of transport emissions in particular in emerging and developing countries (Figure 3).

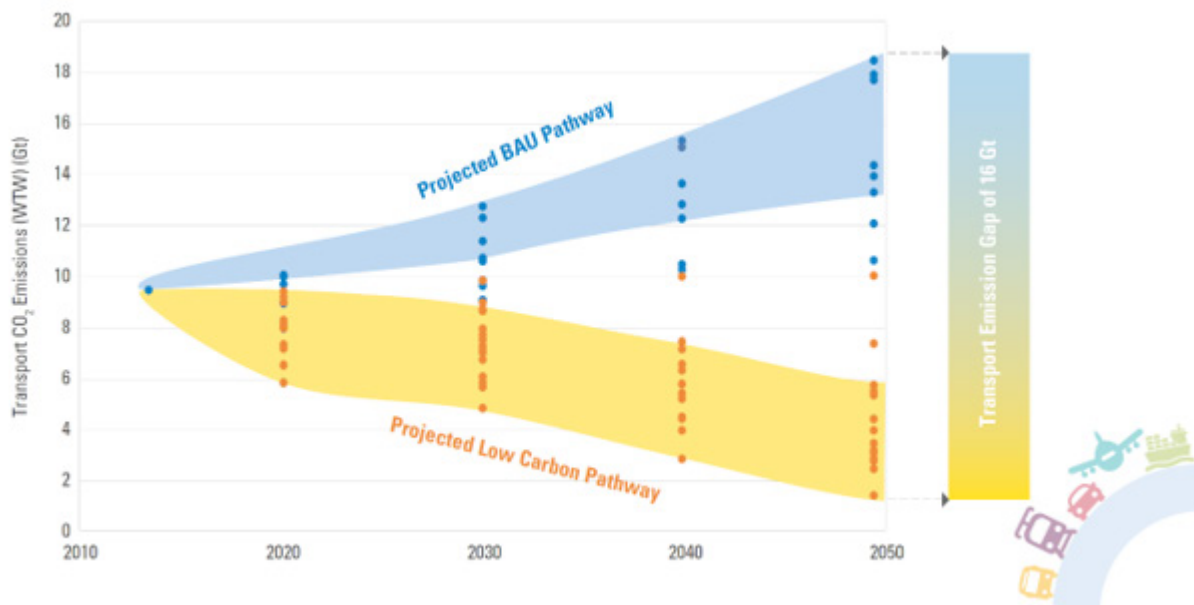
There is substantial potential to reduce these emissions and to bring the aforementioned benefits to urban citizens if an **integrated approach** is applied; combining all relevant aspects of sustainable urban mobility policy and involving all parts and levels of government

Figure 2. Direct and indirect transport targets and indicators in the SDGs



Source: SLoCaT (2019)

Figure 3. Emissions Gap for 2 Degree Scenario (2DS) and Urban Transport CO₂ Emissions

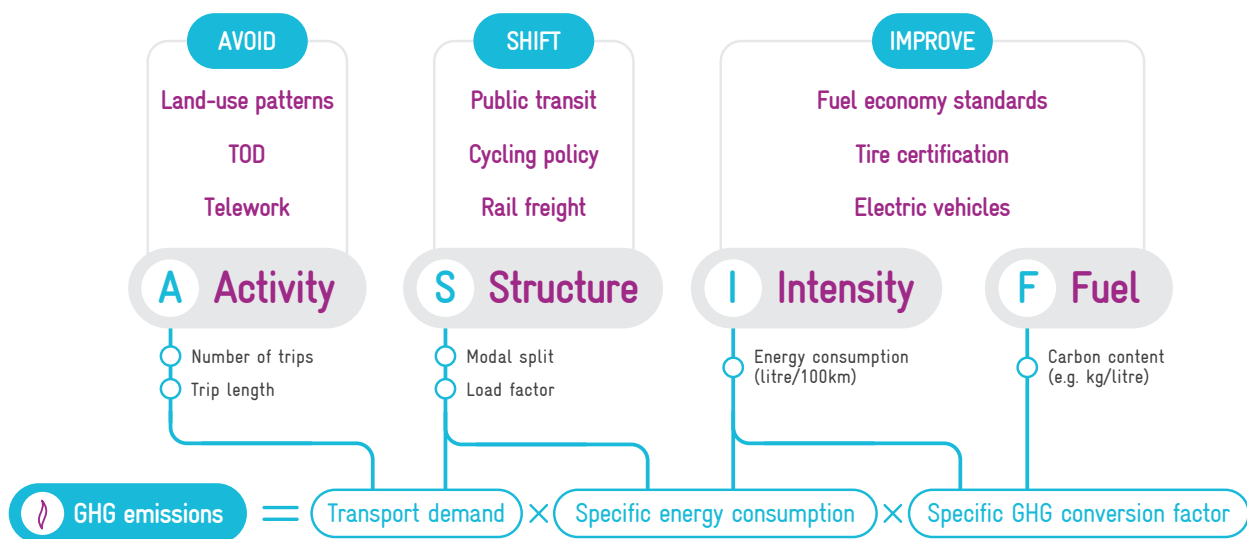


Source: SLoCaT (2018); IRENA, IEA and REN21 (2018); IEA (2017); ITF (2019)

and societal actors. A package in line with the avoid-shift-improve-fuel principle (see **Figure 4** below) that fosters low-carbon and sustainable urban mobility includes **avoided journeys** through compact urban design and **shifts to more efficient modes of transport**, the uptake of **improved vehicle and engine technologies and low-carbon fuels**, as well as investment in related infrastructure, and changes to the

built environment. **Transport** is relatively unique among the energy end-use sectors as it still **depends almost entirely on fossil-fuel products** with natural gas, biofuels and electricity making up only a small fraction (**Sims et al, 2014**). However, the modes in which people and freight are transported vary greatly with regard to their energy intensity, ranging from active travel modes (walking and cycling) to motorised modes on

Figure 4. ASIF Framework and CO₂ emission calculation



Source: MobiliseYourCity Partnership

roads such as public transport, cars, motorised two and three-wheelers and trucks, as well as rail, waterborne transport and civil aviation. The choice of modes, technologies and fuels heavily influences the transition pathways towards low-carbon urban mobility.

Actions that relieve congestion are also a potential generator of benefits, provided that the reduced congestion does not induce additional traffic². For congestion relief measures to be effective, a combination of solutions is vital to **avoid trade-offs** or induce additional travel. For example, intelligent transport and traffic management systems should be accompanied by strategies to promote the shift to lower-carbon modes, such as walking, cycling and public transport. Digitalisation, for instance, can contribute to increase the attractiveness of public transport systems and non-motorised modes, while complementing conventional climate protection and GHG emission reduction measures in urban transport. However, technology and

fuel-switching measures are unlikely to impact congestion levels and traffic flows standing alone, so these actions should be part of a wider and more comprehensive strategy. Last not least, increasing urbanisation leads to demand for additional transport infrastructure and mobility services. Currently, there is a **huge gap between investment needs and actual public and private sector investment**. Appropriate policies and investment programmes can unlock the required investment. Since infrastructure determines transport behaviour for long periods it is important to consider impacts on congestion, health, access, etc. in the design stage.

The complex nature of interventions and consequences underlines the importance of a robust, coordinated and multi-level policy and investment approach of governments, including a strong role of national governments supporting cities which often lack technical and financial resources to implement sustainable

² Time lost in traffic was valued at 1.2% of GDP in the UK (**Goodwin, 2004**); 3.4% in Dakar, Senegal; 3.3% to 5.3% in Beijing, China (**Creutzig and He, 2009**); 1% to 6% in Bangkok, Thailand (**World Bank, 2002**) and up to 10% in Lima, Peru with daily travel times of almost four hours (**JICA, 2005; Kunieda and Gauthier, 2007**).

Figure 5. How far can I travel with one tonne of CO₂?

(Values in kilometres per passenger)

A load factor of 100% assumed for all values



Source: GIZ (2014)

urban mobility measures. Urban mobility affects many areas of life, the economy and the environment. Achieving national and international policy objectives requires conducive framework conditions. **International experience shows that National Urban Mobility Policies and Programmes are an important ingredient to gear development in the desired direction.**

What is a National Urban Mobility Policy or Investment Programme (NUMP)?

In most countries planning and development of sound urban transport systems is responsibility of local governments. Nevertheless, many countries all over the world recognise that **urban mobility is not merely a local concern; it is of national interest.** Road congestion in Asia alone is estimated to cost Asian economies 2-5% of GDP per year. In China alone, air pollution caused 1.2 million premature deaths in 2010. National Urban

Mobility Policies and Programmes (NUMPs) are an opportunity for national governments to support cities cope with the challenges related to urban mobility while achieving national economic, environmental and social objectives.

An increasing number of countries establishes and continuously improves supportive regulatory framework conditions and financing instruments at the national level to support cities improve the mobility of their population. These countries recognise the **positive economic, social and environmental effects** of such support, which ultimately benefit the whole society and the economy as such. National governments have **good reasons to support cities** in the transition towards sustainable urban mobility systems. The type and form of support provided by national governments to cities varies from country to country.

NUMP examples from different countries

Brazil

National Policy for Sustainable Urban Mobility (2013): Supported by the Urban Mobility Law (2012), Brazil requires all cities with more than 20,000 inhabitants, in total around 1,600 cities, to develop a mobility master plan to promote a broad integration of urban transport services. The mobility master plan is a prerequisite for large-scale urban mass transit infrastructure funding in large cities through the Ministry of Cities' Growth Acceleration Programme for Mobility (maximum national funding share of 95%). The Brazilian Development Bank provides loans to local governments for bus funding (50% of total value to microenterprises and 30% to small or medium enterprises) through a public investment support programme.

mechanism in favour of public transport development. Funding is available at different levels: local governments for operation, regional level for trains, department level for intra-departmental buses and the city level for urban transport. The managing agency is the National Ministry of Ecology, Sustainable Development and Energy.

Colombia

National Urban Transport Policy and National Urban Transport Programme (2002): The national policy aims to develop BRTs for Integrated mass transit systems in large cities, system integration for public transport strategic systems in medium-sized cities and public transport re-organisation and traffic management measures in smaller cities. Grants for technical studies and investment projects are offered by the Programme. Grant funding from the national budget is up to 70%, with a minimum share of 10% of private investment. The main agencies involved are Ministry of Transport, Ministry of Finance and National Planning Department.

Germany

Municipal Transport Financing Law (GVFG) (1971) and Guidelines for Promoting the Purchase of Electric Buses for Public Transport (2018): Through the GVFG, the Ministry of Transport through the federal states funds the improvements of public transport that require more than EUR 50 million. The national contribution to the GVFG is up to 75% and is usually topped-up by state governments. The Guideline for the promotion of new technologies (2018-2022) has a total budget of EUR 300 million for electric bus deployment and infrastructure provided by the Ministry of Environment. Grants are provided to operators for hybrid busses (up to 40%) and electric busses (up to 80%), related infrastructure, workshop equipment and staff training (up to 40%).

France

Grenelle Act – Calls for Proposal on Urban Transport (2009): The national government is investing up to EUR 2.5 billion until 2020 to support high-level, sustainable urban mass transit projects. In 2010, the Grenelle II established a value capture taxation

India

National Urban Transit Policy (2006) and Jawaharlal Nehru National Urban Renewal Mission (JnNURM) (2005-2014): The Policy promotes improvements in public transport services and infrastructure to ensure accessibility and sustainability in urban areas. The JnNURM has a budget of over USD 20 billion to fund 35% to 90% of all types of Urban Infrastructure and rolling stock projects in large cities and cities with specific importance provided they are part of the city's mobility plan. Funding sources are the central government and state agencies, while the managing agency is the Ministry of Urban Development (MoUD).

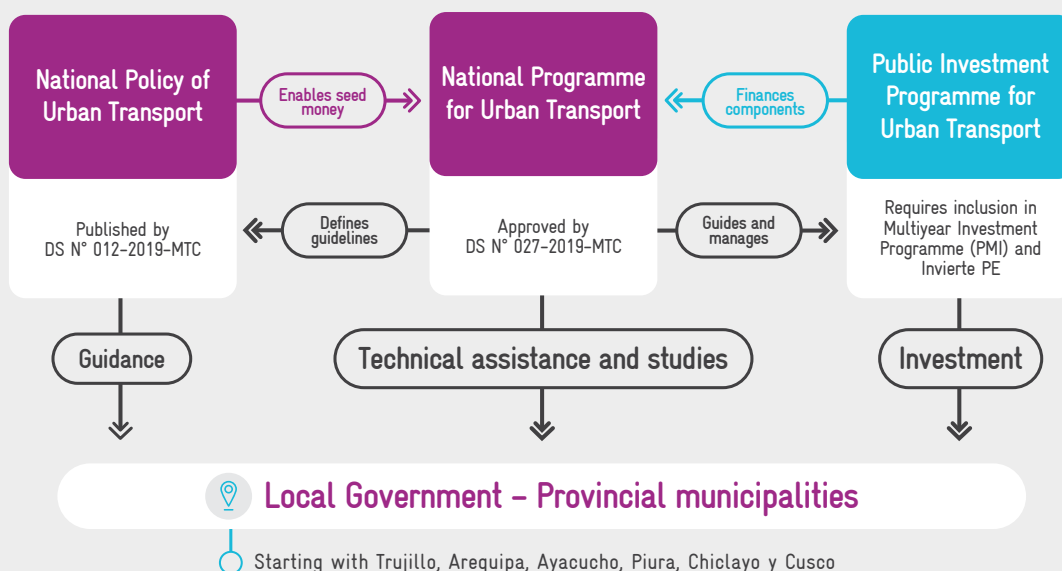
The specific design of the overall sector governance, planning framework and financial instruments depends on country specific circumstances. But the general motivation behind a National Urban Mobility Policy or Programme (NUMP) remains the same: National Urban Mobility Policies and Programmes (NUMPs) **aim at effectively enabling cities to tackle urban mobility challenges**. NUMPs recognise the important role of cities for society, the economy and the environment and are based on the finding that **cities are typically not properly equipped with the required capacities and financial resources** to overcome the urban mobility challenges resulting in particular from population growth and increasing motorisation. NUMPs are

not new; in many countries they have already proven to be effective.

Depending on the degree of centralisation, urban mobility can be a competence of one or several national ministries and/or local governments. The expression **national level may in these guidelines also correspond to the provincial, state or regional level**, depending on the division of competences. Bringing the policy objectives of key actors together with an integrated package is a vital step towards a low-carbon, sustainable mobility system. A NUMP can be a useful process to facilitate a more coordinated approach to urban mobility policy, planning and investment.

Box 1. Example – The Peruvian NUMP

This following diagram describes the environment and process of the Peruvian National Programme for Urban Transport (NPUT). It provides technical assistance and studies to the local governments on the development of sustainable urban transport systems, defines the guidelines for National Policy of Urban Transport, and guides and manages the Public Investment Programme for Urban Transport. The latter two provide national and international funding to the NPUT whilst providing guidance and investment to the local governments.



Source: MobiliseYourCity Partnership

The mission of the MobiliseYourCity Partnership is to bring the benefit of NUMPs and sound urban mobility planning in the form of city level SUMPs to as many developing countries and in the developing world as possible. The understanding of NUMPs is diverse around the globe. The MobiliseYourCity partnership defines it as follows:



What is a NUMP?

“A National Urban Mobility Policy or Investment Programme is a strategic, action-oriented framework for urban mobility, developed by national governments, enacted to enhance the capability of cities to plan, finance and implement projects and measures designed to fulfil the mobility needs of people and businesses in cities and their surroundings in a sustainable manner. It builds on existing policies and regulations and aims at harmonizing relevant laws, norms, sector strategies, investment and support programs towards an integrated approach for the benefits of cities and their inhabitants. It takes due consideration of participation and evaluation principles.”

(MobiliseYourCity Partnership, 2018b).

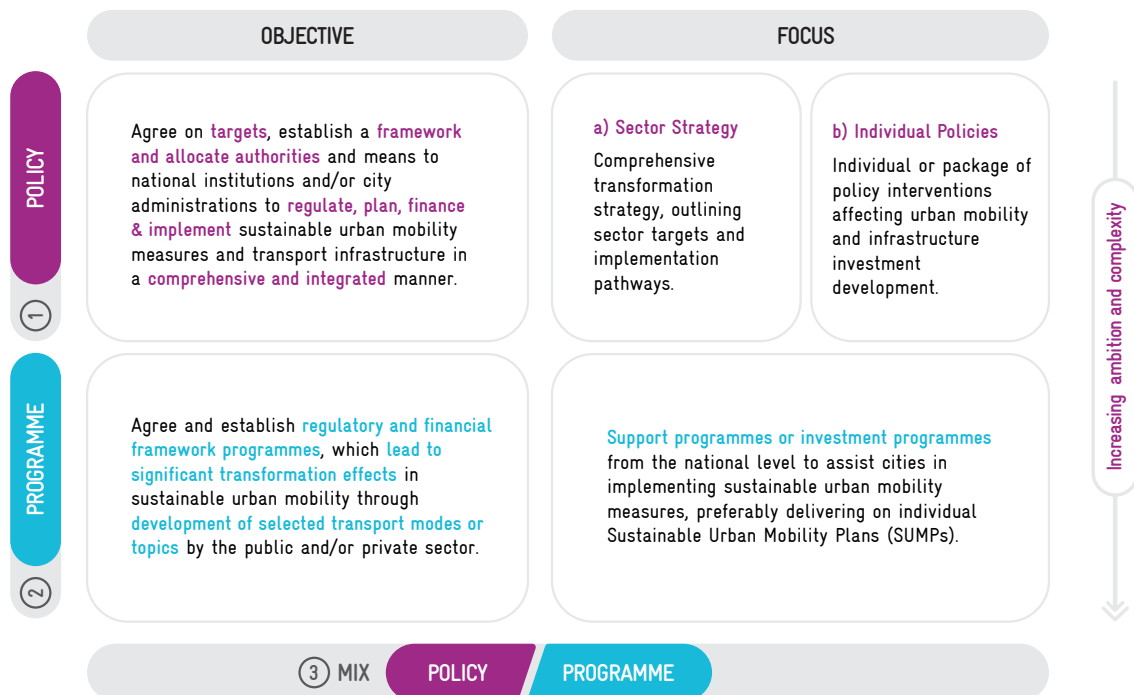
Based on international practice these guidelines distinguish **three main types of NUMPs** while acknowledging that there is no commonly agreed definition and clear distinction. National Urban Mobility **Policies** can be sectoral strategies or individual policies (or packages thereof). National Urban Mobility **Programmes** include specific actions and investments from the national level to assist cities in delivering sustainable urban mobility measures. In practice, we do often find a **Mix of Policy and Programme**. **Figure 6** at the bottom of the page contains further details.

Figure 7 on the next page shows some specific examples. The categorisation can help to get a better feel of the nature and scope of different NUMPs.

In the end, National Urban Mobility Policies and Programmes are first of all a **paradigm shift in policy making by emphasising the strategic role of national governments** in regard to sustainable urban mobility and do thus complement the natural role of cities. NUMPs shift the attention to going beyond individual measures and taking into account linkages to other sectors, objectives and actors. **A NUMP defines a predictable and longterm framework for local and national authorities as well as the private sector to drive the transition towards sustainable urban mobility.** Defining accountable targets for all stakeholders, identifying key action areas and funding mechanisms that have the greatest potential for transforming the urban mobility system are primary tasks of a NUMP. **Figure 8** on the next page illustrates different types of support and the role of the national and local governments in NUMPs.

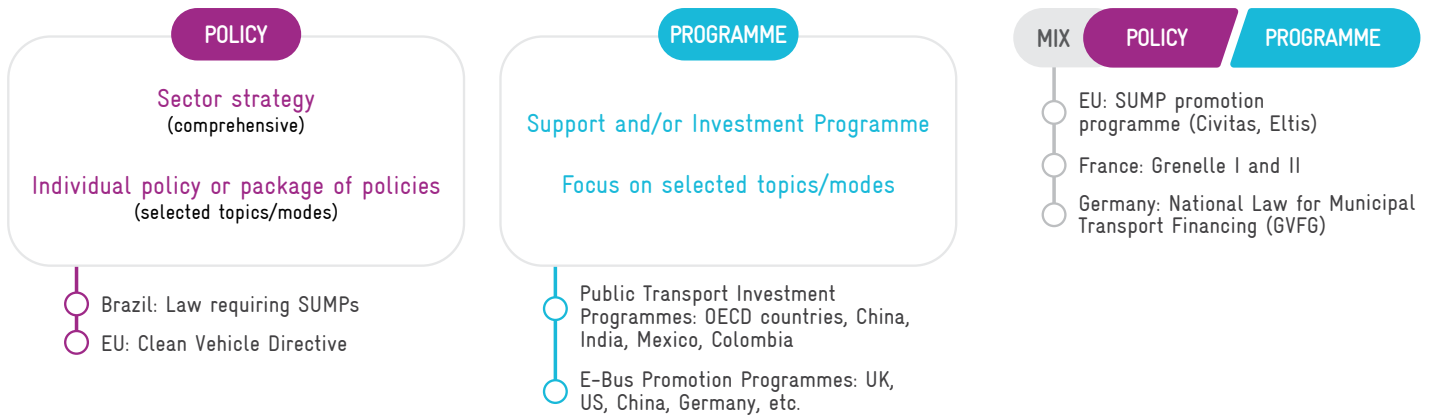


Figure 6. NUMPs – Policies, programmes or a mix of both



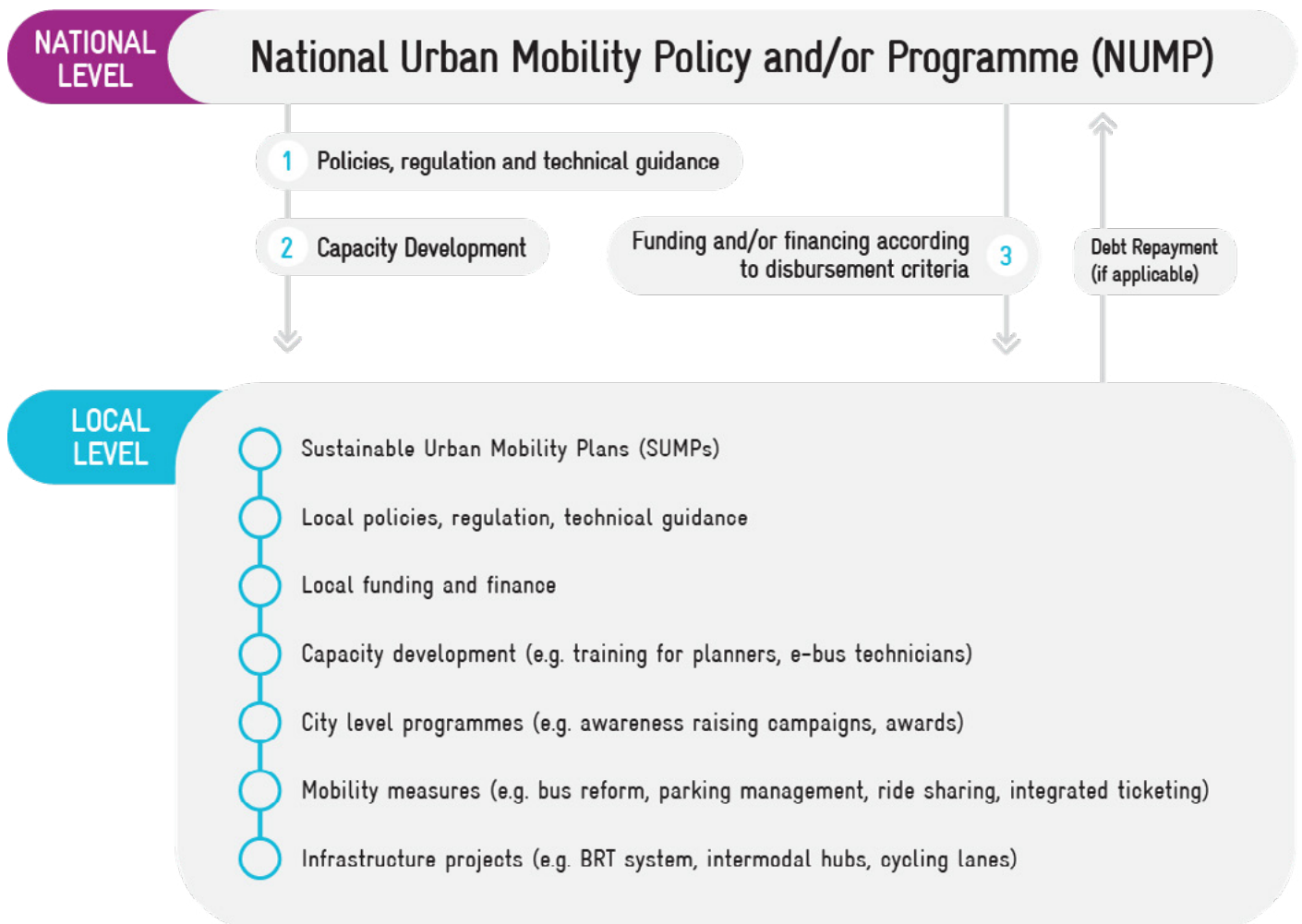
Source: MobiliseYourCity Partnership

Figure 7. NUMP types and examples



Source: MobiliseYourCity Partnership

Figure 8. NUMPs – Offering national government support to cities



Source: MobiliseYourCity Partnership

Guiding Principles of NUMPs

There are essential advantages in the approach of National Urban Mobility Policies and (Investment) Programmes compared to conventional transport programmes or master planning such as:

- **Prioritising people and quality of life – NUMP Principle 1:** NUMPs enable, facilitate and improve access through transport (not to transport) to markets, jobs, education and other services offered in urban areas. Thereby, NUMPs give a clear priority to people and their quality of life with transport being a means to development not an end itself.
- **Long-term vision with a clear focus on short and mid-term action – NUMP Principle 2:** NUMPs encompass short- and mid-term delivery plans embedded in a long-term vision for mobility, developed by engaging a wide range of stakeholders. Directing public and private national, local and international investment flows towards sustainable mobility solutions is a vital element of any NUMP. Action-driven planning processes should aim to ensure implementation of priority measures through targeted budgeting and financing, supported by lighthouse projects, (pre-) feasibility studies and monitoring and reporting tools.
- **Multi-sector and policy coordination approach – NUMP Principle 3:** An effective national urban mobility policy or programme requires an overarching and inter-ministerial approach. Policy coordination does not only aim to avoid trade-offs and contradictions, but also seeks synergies with other policy fields, such as public health and safety, climate resilience and mitigation, air quality, energy security, or innovation policy. A single-sector approach will not yield these benefits. It is thus essential to ensure the buy-in not only of the transport ministry but of several other ministries such as ministries of finance, energy, environment, public works, housing, urban development, health, education, etc., as well as the balanced, sustainable and integrated development of all transport modes.
- **Institutional cooperation and transformation – NUMP Principle 4:** NUMPs contribute to establish appropriate frameworks, efficient and effective (cooperation) processes, and, if needed, the transformation of prevailing structures to allow the development of sustainable urban mobility policies and plans. This relates to aspects such as institutional structures, budgeting and financing frameworks, technology choices, etc. The transformation towards a sustainable mobility system calls for coalitions among key local and national level public sector actors. A NUMP can provide a framework and process for bringing together departments and ministries at the same level (horizontal integration) and connect the national, sub-national and local governments in decision-making (vertical integration).
- **Participatory and multi-stakeholder approach – NUMP Principle 5:** Participatory and multi-stakeholder approaches involve representatives of the public sector and the private sector, civil society, academia, NGOs, and other stakeholders in order to establish a thorough understanding of their ambitions, leverage support for urban mobility transformation, and justify/legitimise sustainable urban mobility policies and programmes. It is crucial to engage the different stakeholders early in the NUMP process to fully understand their needs and ensure that national policy objectives (e.g. climate goals) and local objectives (e.g. jobs, air quality, etc.) are aligned. As a participatory process, developing a NUMP can facilitate the uptake of high quality sustainable urban mobility plans (SUMP) at local level as a key driver for change and enable cities and regional authorities to implement sustainable mobility measures.
- **Contribution to international commitments (Paris Agreement, SDGs, New Urban Agenda) – NUMP Principle 6:** Strengthening the linkages between sustainable urban mobility measures and their GHG emission reduction potential will help connecting sustainable urban mobility strategies with international commitments and funding opportunities. NUMPs can be a direct contribution to Nationally Determined Contributions (NDCs) in the context of global efforts to mitigate climate change. The New Urban Agenda highlights the vital role of urban mobility in delivering on the Sustainable Development Goals (SDGs) and the Paris Climate Agreement at city level.

Added value of NUMPs

As outlined above there are different types of NUMPs always tailored to the specific circumstances in terms of urban mobility, political system and division of responsibilities, urban development trends, etc. Developing and implementing a NUMP can help tap many different benefits on the transition towards sustainable urban mobility, such as:

NUMPs enable cities to prosper in a sustainable manner.

The implementation of urban mobility measures typically falls under the authority of the respective city administration. Cities are often proactive, committed and willing to take action. However, they often lack technical and institutional capacities as well as the financial resources to invest in urban mobility improvements. NUMPs can address this disconnect by providing cities with the capacities and resources they need to address urban mobility challenges as shown by the many international examples highlighted e.g. in **Section 1.2**. Furthermore, national urban mobility policies can provide relevant orientation for urban mobility planning, technology choices and typically determine the overarching governance framework on urban mobility in a country. NUMPs can play a key role to enable cities accelerate the transition towards sustainable low carbon urban mobility.

NUMPs facilitate investment in sustainable urban mobility.

Investments in more sustainable, lowcarbon modes require a reliable policy roadmap and landscape. NUMPs provide such a longterm and stable orientation for investment decisions. International experience shows that appropriate regulation and investment promotion programmes can considerably improve the investment environment and pave the way for real transformational change. Coordinating national, local and international finance and funding is a vital element to effectively enable implementation of political visions and development plans. This includes local and national funding options and finance opportunities from international climate and development cooperation. A longterm vision, robust anchorage of policies and plans within the several relevant administration institutions, flanked by effective coordination mechanisms help to channel public and private investments into implementation programmes for achieving sustainable mobility. Hence, a coherent and encompassing NUMP that outlines and substantiates key priorities and future goals serves as bedrock for longterm projects and thus can leverage national and international public and private investments in sustainable urban mobility measures and infrastructure. This will as well help moving away from single project approaches to a more comprehensive programmatic development path.



NUMPs contribute to achieve national and international policy objectives.

There is substantial potential to improve urban access, air quality, safety and the quality of life in cities along with reducing greenhouse gas emissions and local air pollutants, if an integrated approach is applied, which is characteristic for NUMPs and combines all relevant aspects of transport policy and involves all parts and levels of government and societal actors. A package that fosters low-carbon and sustainable transport includes avoided trips through compact urban design and shifts to more efficient transport modes, as well as the uptake of improved vehicle and engine performance technologies, low-carbon fuels, and infrastructure investment. A NUMP that promotes and accelerates the implementation of these measures will also contribute to achieve other national and international non-transport policy objectives in areas such as energy policy, health, housing and urban development, and society and economy. This contributes directly to the goals of the New Urban Agenda approved during the Habitat III Summit in 2016, which highlight the vital role of urban mobility in delivering on the Sustainable Development Goals (SDGs) and the Paris Agreement at city level. Strengthening the linkages between sustainable urban mobility planning measures and their GHG emission reduction potential will help connecting sustainable urban mobility strategies with international commitments and funding opportunities. NUMPs can be a direct contribution to Nationally Determined Contributions (NDCs) to limit global warming in the frame of the Paris Agreement.

NUMPs secure stakeholder commitment for transforming the urban mobility system

Achieving mobility-related local and national policy objectives – such as access to jobs and services, better air quality, climate change mitigation, and liveable cities – requires actions from a range of actors, both at the national and subnational levels of cities and regions. The multi-stakeholder approach of NUMPs fosters a common understanding, creates ownership, and secures the contribution of these stakeholders in the process of formulating a NUMP. As the development of urban mobility infrastructure and urban services often takes between ten to twenty years from planning to implementation, sustaining of such initiatives beyond individual legislative terms and individual political actors is crucial to ensure continuity. Engagement of the civil society

in a NUMP process can facilitate this. The specific form of public engagement will vary depending on factors like political culture or subsidiarity.

NUMPs improve policy coordination (horizontally and vertically).

A comprehensive NUMP serves as a reference for actions in cities, and thus aligns the efforts towards national policy goals and supports local implementation. Horizontal policy integration among national ministries avoids tradeoffs that may hamper reaching mobility-related policy goals and create synergies between sectoral strategies and measures. Moving from national-level strategies to local-level actions requires a solid institutional basis with clear responsibilities for local and national policy actors. These stakeholders will help deliver on the key priority areas and develop workable programmes incorporating policy, regulation, finance and capacity building elements. In addition, vertical policy integration ensures that mobility is consistently planned between national, regional and local levels for the benefit of both national and local actors: local contributions are aligned with national objectives and locally the transport system gets more integrated and seamless.

Who has to take action?

A transition towards a sustainable urban mobility system requires a clear and broadly accepted vision and an appropriate policy and funding framework at the national level that enables cities to address urban mobility effectively. National governments define the political, regulatory, financial and institutional environment within which cities can plan, regulate, finance and operate their transport systems. While local action is essential to shape urban mobility towards a sustainable and inclusive system, the national policy and investment framework is a key factor that enables local authorities to deliver on this.

In many cases the **lead organisation for the NUMP process** is the **ministry of transport** to ensure that local and national transport policy objectives are aligned in particular with regard to national funding. Another core actor in the NUMP process is the ministry of finance, which is responsible for key fiscal policies allocation related to transport and is the lead agency for all budgetrelevant funding and investment decisions along with the office of the head of state or government. The **urban development ministry** should be involved to ensure that urban and transport planning are closely aligned. The **ministry for the environment** will be an active supporter in the NUMP development as

this will help in the overall decarbonisation and environmental protection efforts. Similarly, the **ministries of health and economic development** will have an interest in the NUMP development to improve health and safety along with access to jobs and efficient supply chains respectively.

An **association** or national council of **local governments** should also be involved early in the process to make sure interests of local authorities are represented and actively participating in the process. Either of these organisations could be the driving force behind initial discussions about the development of a NUMP as long as the other key players can be activated to support this effort. **Technical experts** from universities, think tanks, research institutes or NGO and **civil society and private sector** representatives should be involved as well.

A NUMP is very likely to be a high-profile process, which requires **high-level political support**. In many cases, this will be the minister of transport, but other ministers may be able to initiate this process taking the angle of their department's responsibility. It may even be conceivable that a group of influential mayors initiates the discussion about a coherent policy and investment framework with the national government. In any case, the preparatory steps towards the NUMP will be carried out by technical and policy experts in the relevant departments, who are the main target audience of this guide.



Box 2. Tools and resources – MobiliseYourCity Partnership support during the NUMP process

How the MobiliseYourCity Partnership can support you

The MobiliseYourCity Partnership maintains a vibrant community of practice for its national and local government partners to facilitate exchange between peers and the wider community about various topics. These can include NUMPs, sustainable urban mobility planning, aspects related to capacity development, and financial assistance. Furthermore, the Partnership provides targeted technical assistance to its partners in order to support them to develop, or substantially improve, a national urban mobility policy or investment programme. Currently, the MobiliseYourCity Partnership supports the development of National Programmes e.g. in Thailand, the Philippines, Chile, Colombia, Uruguay and Ecuador. For detailed information on how to join the MobiliseYourCity Partnership and access the community of practice, please access the website www.MobiliseYourCity.net, or contact the MobiliseYourCity Partnership Secretariat Contact@MobiliseYourCity.net.



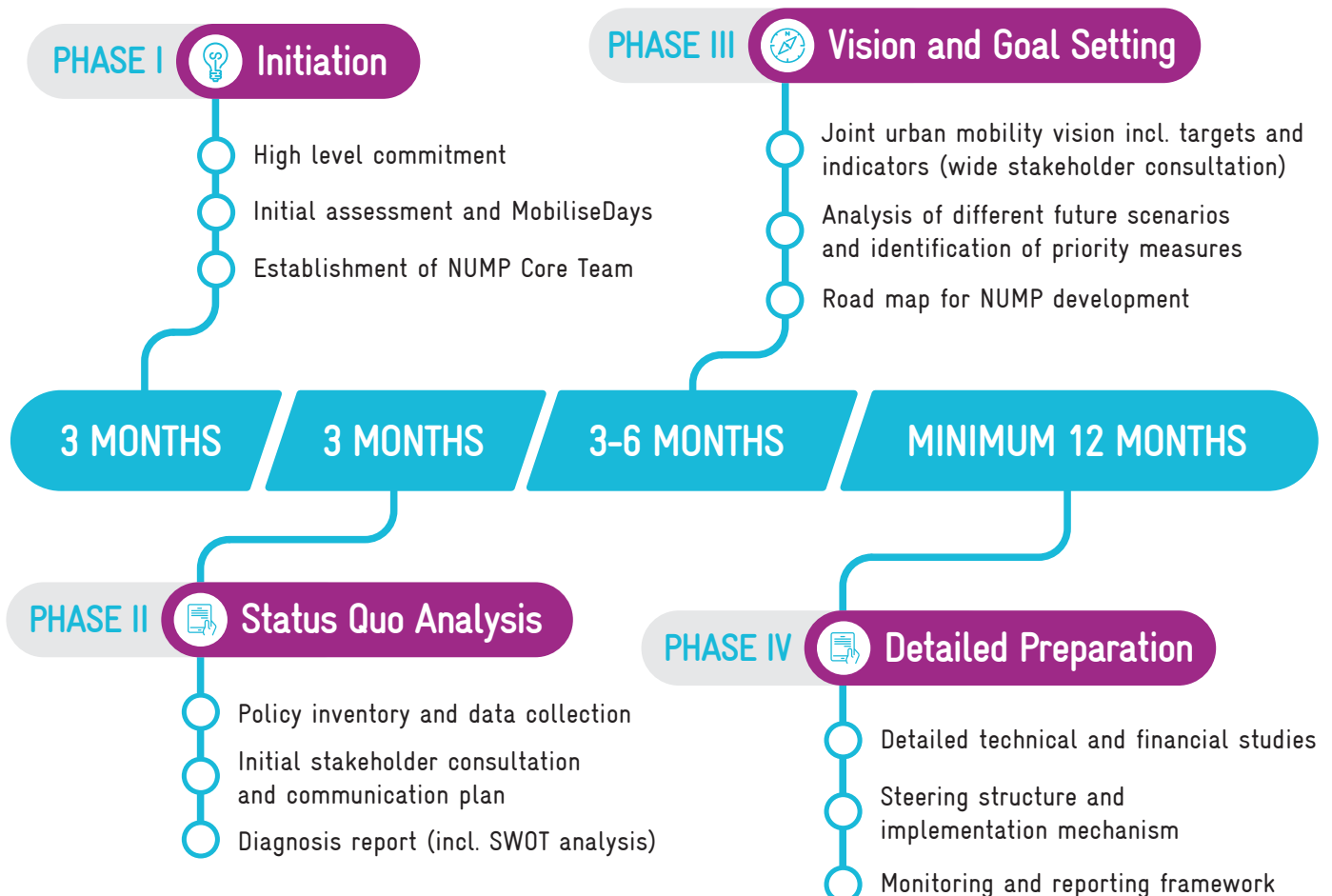
How to develop a NUMP

These guidelines are structured along the **NUMP Cycle** which consists of **4 Phases and 15 key Steps** providing orientation for the NUMP development process. The entire process is likely to require **around two years of work**, depending on the level of depth of the individual steps and on the type, scope and focus of the NUMP process. The NUMP Guidelines are based on the experience that **every NUMP development is a genuine process**. Decision-makers aiming to design (or update) a NUMP can use this cycle as an orientation and starting point.

It is important to note that several of the Steps are connected and influence each other, i.e. a NUMP

preparation is **not a routine process that starts with one step and moves in a fixed sequence through the others**. To the contrary, sound NUMP development is “nationally determined” and driven by the principle of “national appropriateness”. This is the reason why every NUMP development process is different. It depends on the specific circumstances: on available information and resources, on already existing policies, regulation and programmes, and varies largely depending on the specific character of the NUMP. The NUMP Cycle is supposed to give orientation and is rather a list of useful ingredients than a strict recipe to follow.

Figure 9. Towards a tailor-made NUMP passing through 4 Phases over two years



Source: MobiliseYourCity Partnership

Sound financial engineering and proper monitoring and reporting are crucial for longterm success of any NUMP. These topics are of **crosscutting nature** and need to be addressed at several stages of the process to deepen the respective concepts in several iterations.

That is why the guide dedicates **separate chapters** with more indepth information on these two topics. The corresponding steps and main outputs are shown in the **Table 1** on the next page for all phases and the crosscutting topics.

Table 1. NUMP development – Overview of steps, guiding questions and outputs

Phases and Steps	Guiding questions	Milestones	Duration
Phase I: Initiation			
<p>Step 1: Realise an initial assessment of urban mobility in the country</p> <p>Step 2: Initiate stakeholder dialogue</p> <p>Step 3: Secure commitment and establish core team and coordination structure</p>	<ul style="list-style-type: none"> – What is a NUMP and why should we engage? – What are our key urban mobility challenges and initial vision? – Who are the relevant stakeholders and change agents? – What are the key steps in the transition towards sustainable urban mobility? 	<ul style="list-style-type: none"> – Initial assessment report (incl. SWOT analysis) – Agreement on an initial vision on sustainable urban mobility – High-level political commitment – Core team and coordination structure established (including MobiliseYourCity Partnership Model ToR) – Agreement on a work plan – Initial data collection 	3 months
Phase II: Status Quo Analysis			
<p>Step 4: Collect data and turn into information</p> <p>Step 5: Assess political, regulatory, institutional and capacity building framework</p> <p>Step 6: Develop a communication plan</p> <p>Step 7: Initiate broad stakeholder participation</p>	<ul style="list-style-type: none"> – What is the status quo and what are important trends of urban mobility? – What are the main challenges, barriers, opportunities for an effective transformation? – What are the objectives and roles of different actors at the national, regional and local level? 	<ul style="list-style-type: none"> – Data collection in pre-structured excel data mining sheet plus collection of sources/documents – Policy inventory (document collection) – Stakeholder analysis and map – Status Quo Analysis report – Stakeholder engagement and communication plan 	3 months
Phase III: Vision, Goal Setting and Measure Selection			
<p>Step 8: Develop and jointly assess scenarios</p> <p>Step 9: Develop vision and set targets with stakeholders</p> <p>Step 10: Agree on priority areas and select measures</p> <p>Step 11: Update roadmap for NUMP development and broad stakeholder participation</p>	<ul style="list-style-type: none"> – What are likely scenarios for urban mobility? – What is our common vision for sustainable urban mobility? – What are our priority areas (e.g. public transport, urban logistics) and corresponding priority measures/actions for the transition (e.g. a bus fleet renewal programme, low emissions zones with preferential access and parking regulation for electric delivery vehicles)? – What are our specific goals or targets and respective indicators? – Is the vision realistic regarding the requirements on policy, institutions, capacities, funding? – Are all core stakeholders actively involved and engaged? 	<ul style="list-style-type: none"> – Agreement on sustainable urban mobility vision (participatory multi-stakeholder process) – Impact assessment and cost-benefit analysis of different scenarios (report and model) – Definition of priority areas, objectives, indicators and goals (incl. time schedule) – List of a bundle of prioritized measures / actions for Detailed Preparation in Phase IV – Updated roadmap for NUMP development 	3/6 months

Phases and Steps	Guiding questions	Milestones	Duration
Phase IV: Detailed Preparation			
<p>Step 12: Specify measures with technical studies</p> <p>Step 13: Prepare action plan and agree on responsibilities</p> <p>Step 14: Agree on management structure and monitoring and reporting framework</p> <p>Step 15: Adopt NUMP document and ensure wide stakeholder support</p>	<ul style="list-style-type: none"> – Which actions need to be realised exactly to implement the NUMP? – How to enable and finance the implementation of the priority measures? – Who is responsible for overall coordination and implementation of the different measures? – How does the monitoring and reporting framework enable continuous improvement? – Do all relevant stakeholders support the NUMP? 	<ul style="list-style-type: none"> – Detailed description/study of each bundle of measures including technical specification, regulatory, governance, engineering, financing, capacity development and managerial aspects – Action plan with clear responsibilities – Agreed NUMP implementation management structure (responsibilities at different levels and for all measures, list of coordinators, etc.) – Detailed financial design including financial mechanism and flow chart – Agreement on monitoring and reporting framework and monitoring plan 	Minimum 12 months
NUMP Financing (crosscutting)			
Financing Step 1: Realise financial status quo analysis	<ul style="list-style-type: none"> – On a general setting: Who are the main financial actors, and which are the main decision-making processes? What are relevant financial flows and the nature of investments in the sector, both at a national and local level? – On barriers and drivers: Which (financial) barriers prevent the implementation of sustainable urban mobility systems? Which drivers may facilitate sustainable urban mobility? 	<ul style="list-style-type: none"> – Understanding of the budgeting process, investment environment, barriers and drivers for the implementation of the NUMP 	During Phase I
Financing Step 2: Assess financial viability at the local level	<ul style="list-style-type: none"> – Is public support from national level justified respectively needed for projects at the local level? If so, how much? 	<ul style="list-style-type: none"> – Understanding of costs, revenues and funding sources and of the economic/sustainable development benefits of different potential interventions 	During Phase II
Financing Step 3: Estimate costs at the national level	<ul style="list-style-type: none"> – What are costs for design and implementation of the NUMP at the national level? 	<ul style="list-style-type: none"> – Breakdown of planned measures into individual activities to estimate NUMP costs for national government 	During Phase III
Financing Step 4: Identify funding and revenue sources at the national level	<ul style="list-style-type: none"> – What are potential national and international funding and revenue sources? 	<ul style="list-style-type: none"> – Identification of sufficient funding and financing sources for a NUMP (funding from the recurring budget, grant/subsidies, and loans) 	
Financing Step 5: Realise economic appraisal	<ul style="list-style-type: none"> – At a macro-economic level, what are costs and benefits of the NUMP? During NUMP Implementation 	<ul style="list-style-type: none"> – Awareness of the key steps in the appraisal process and the advantages and limitations of different appraisal methods (CBA, CEA, CUA, Sustainability assessments) 	During Phase IV
Financing Step 6: Do detailed financial design	<ul style="list-style-type: none"> – What would be an effective, efficient and feasible financial design? What are the possible financial instruments? – Which actors are involved in what roles? How are the financial flows and which conditions must be fulfilled for disbursements? 	<ul style="list-style-type: none"> – Development of an effective, efficient and feasible financial design – Selection of a centralised or decentralised financing programme – Financial flow-chart to visualise how different types of financial flows move between the involved actors 	
NUMP MRV (crosscutting)			
MRV Step 1: Establish the link between NUMP and GHG reduction	<ul style="list-style-type: none"> – What are basics elements of an MRV approach and GHG emission reduction in the context of NUMPs? 	<ul style="list-style-type: none"> – Develop awareness for GHG emission and GHG emission reduction basics in relation to NUMP. 	During Phase I

Phases and Steps	Guiding questions	Milestones	Duration
NUMP MRV (crosscutting)			
MRV Step 2: Assess data availability and collect basic GHG data	<ul style="list-style-type: none"> What data - such as vehicle numbers, ridership data, travel demand surveys, etc. - is available on city level and what defaults such as fuel consumption levels can be used (national or international)? Who holds such data and is data easily accessible? 	<ul style="list-style-type: none"> Collect basic GHG emission-relevant data to assess relevance and significance of sub-sectors (and possible interventions). 	During Phase II
MRV Step 3: Define scope and boundaries of the NUMP	<ul style="list-style-type: none"> What is the cause-impact relation and the corresponding boundaries of the NUMP (e.g. geographic, modes etc.)? Is the available data matching these boundaries? 	<ul style="list-style-type: none"> Definition of relevant methodological boundaries: temporal, sectoral, geographical and emissions. 	During Phase III
MRV Step 4: Build and model scenarios, update/specify scenarios	<ul style="list-style-type: none"> What is the possible (GHG) impact of the package of envisaged NUMP interventions? What actions have the biggest GHG impact? 	<ul style="list-style-type: none"> Development of baseline (business-as-usual) and intervention scenarios (ex-ante) in order to assess the GHG effect of NUMP. 	During Phases III and IV
MRV Step 5: Monitor and account real world data to understand goal achievement	<ul style="list-style-type: none"> How to develop a monitoring plan to assess the impact of the NUMP regularly during implementation? Who is responsible for monitoring? 	<ul style="list-style-type: none"> Monitor (GHG) impact of NUMP implementation against agreed targets and objectives (step 9). 	During NUMP implementation

Source: MobiliseYourCity Partnership





Phase I: Initiation Programmes

The groundwork for a successful NUMP process is realised in this first phase. In this phase, the key issues and actors are identified in a preliminary urban mobility assessment and a core team is established. Relevant stakeholders initiate dialogue and agree on a coordination and management structure. The time and effort for the development of a NUMP very much depends on the strategic environment, scope, depth and actors involved. For example, if a national climate or transport strategy is already in place and a dedicated investment programme must be developed to achieve already agreed targets, the process can be considerably faster than the development of an encompassing NUMP package that combines planning, policy and financing aspects.



START

INITIATION

- ① Realise an initial assessment of urban mobility in the country
- ② Initiate stakeholder dialogue
- ③ Secure commitment and establish core team and coordination structure

PHASE I

Phase I: Initiation

Guiding Questions

- What is a NUMP and why should we engage?
- What are our key urban mobility challenges and initial vision?
- Who are the relevant stakeholders and change agents?
- What are the key steps in the transition towards sustainable urban mobility?

Main milestones

- Initial assessment report (incl. SWOT analysis)
- Agreement on an initial vision on sustainable urban mobility
- High-level political commitment
- Core team and coordination structure established (including MobiliseYourCity Partnership Model ToR)
- Agreement on a work plan / initial roadmap for NUMP development
- Initial data collection

Tools

- Terms of reference for MobiliseDays
- Annotated outline for initial assessment report
- Templates for MoU / implementation agreement and presentation describing core team
- Agreement / Endorsed work programme
- Coordination structure tool
- Best-practices presentation on NUMP
- Data collection Excel template

These tools are part of the NUMP toolkit available at www.changing-transport.org/toolkits/nump/

Step 1: Realise an initial assessment of urban mobility in the country

The starting point of the NUMP process is an initial examination of the political, institutional, and financial environment of urban mobility. Results from this initial assessment should be compiled in a short report. The **aim of the report** is to:

- **Identify key challenges** for the transition towards a sustainable mobility system considering urban mobility planning process at national and city level, governance and regulation, budgeting and finance, technical capacities and skills as well as infrastructure and technology;
- **Identify main issues and approaches to addressing them**, including financing and investment needs;
- **Identify existing policies and strategies** (including key objectives, targets and measures) as well as ongoing and planned **programmes and initiatives**;
- **Identify key stakeholders and their responsibilities**, including national ministries and agencies, innovative approaches in cities, city networks, public transport providers, the private sector (industry, transport solutions providers), financing institutions, academia, environmental and development NGOs;
- **Support an initial collection of key data** in a structured manner (to be expanded over time during the NUMP development process).

The assessment of key ministerial and governmental strategies provides an overview of existing objectives, targets and measures that relate to urban transport. These activities might influence urban mobility in different, potentially contradictory ways: e.g. some might aim to reduce transport volumes, others might stimulate motorised individual transport demand. Therefore, a comprehensive and transparent picture of all policies is needed to allow strategic discussions and decisions by all stakeholders. It is important to understand as well the division of responsibilities between the national, the regional and the municipal level, and between national ministries. The role of other stakeholders such as transport authorities and the private/civil sector should also be explored along with funding flows, financing opportunities and priorities.



The following **guiding questions** can inform the assessment:

- Which national ministry or ministries is/are responsible for key aspects of the mobility system?
- Which activities lie within the remit of cities? How is the relationship between local, regional and national level in regard to urban mobility?
- Is there a national guideline/reference document for urban mobility? What is the core objective of the document?
- What are international commitments (NDCs) and national targets in regard to climate change and GHG emissions?

Sources for the preassessment include urban transport related regulations, policy and strategy documents, reports and scientific studies, and a limited number of interviews and stakeholder consultations. Relevant documents beyond mobility-related strategies might include:

- The national sustainable development strategy, e.g. sustainable infrastructure, convenient access to public transport for all;
- The climate strategy, e.g. greenhouse gas emissions from transport activities, emission standards for vehicles;
- The national energy strategy, e.g. the role of renewable energies and energy supply security;
- Industry, research and innovation strategies;
- The national digitalisation strategy, e.g. new mobility related business models and services;
- National health strategies, e.g. fatalities and injuries from road accidents, health damage due to air and noise pollution, positive health impacts of active mobility; or
- Financial legislation, e.g. subsidies, such as reduced VAT rates on certain fuels or the provision of subsidies.

Step 2: Initiate stakeholder dialogue

Based on the initial assessment, a **kick-off event** will open the debate on the challenges, opportunities and priorities of urban mobility policies and programmes and help to collect input from key actors. The event has the following **objectives**:

- **Validating and deepening the findings of the initial assessment (report)**
 - *Receiving feedback from key stakeholders regarding their experiences with sustainable urban mobility (including planning);*
 - *Validating the most relevant actors and their role(s);*
 - *Identifying entry points and opportunities for the development of a NUMP;*
 - *Understanding specific needs of cities and identifying focus areas to be considered;*
 - *Validating key barriers that prevent the implementation of sustainable urban mobility solutions (e.g. lack of finance, lack of expertise in city administrations, lack of acceptance, resistance of key stakeholders, etc.);*
 - *Establishing a participatory approach involving local, national, public and private stakeholders*
 - *Raising awareness regarding urban mobility challenges and opportunities;*
 - *Understanding the actors' perceptions and interests;*
 - *Facilitating the exchange between different levels of government and among ministries and city administrations;*
 - *Creating opportunities for dialogue between governmental and non-governmental actors;*
 - *Developing first solutions to overcome institutional barriers related to division of responsibilities; and*
 - *Creating a sense of ownership among political actors, public administrations, stakeholders from the private sector, and the civil society.*
- **Formulating a (basic) common vision and work programme for the upcoming process**
 - *Fostering the integration of sustainable urban mobility into sector policies;*
 - *Improving attention for all levels of governments for sustainable urban mobility measures; and*
 - *Ensuring commitment and lasting support for implementing measures towards the common vision;*
 - *Defining a framework for the NUMP process, including a roadmap, work programme.*

The group of participants should include, amongst others, representatives of national and regional ministries (including transport, finance, and others), representatives of local governments, funding organisations, and a set of cities and metropolitan regions, reflecting a variety of urban mobility situations, including public transport authorities and cities' associations. In order to get a broader picture, it is important not to restrict the group of participants to the 'transport community' but to also invite representatives of social, economic, and environmental concerns, academia, universities and think tanks, and lobby groups associated to specific transport modes and themes. Representatives of development cooperation and international funding organisations should also be invited.

With the **MobiliseDays**, the MobiliseYourCity Partnership introduced a method for this step of the NUMP development process. MobiliseDays is designed as a kick-off event for a partnership among all relevant stakeholders.



Box 3. Tools and resources – MobiliseDays

Objective

MobiliseDays facilitate the dialogue among national ministries, cities and further key stakeholders. They aim at deriving a common understanding on key issues such as:

- The state of the mobility system and on sustainable urban mobility planning in the country;
- Need for improvement in the national framework and potential targets;
- Key stakeholders to be considered in the ongoing process;
- A steering structure for the NUMP process;
- A roadmap for the NUMP process, including a clear work programme
- Financial and technical needs for the elaboration of a NUMP.

Typical agenda elements

MobiliseDays facilitate the dialogue among national ministries, cities and further key stakeholders. MobiliseDays may comprise the following:

- Current state of the mobility system and national urban mobility strategy/policy/programmes (e.g. presentation by ministry in charge of the NUMP and exchange on new elements to be included);
- SUMP: Presentation of the progress by cities and discussion on the national framework for SUMP as well as limits of SUMP implementation;
- Cities perspectives: representatives from small, midsized and large cities and regions;
- National perspectives: Ministry of Internal Affairs, Ministry of Transport, Ministry of Urban Development, Ministry of Energy, Ministry of Environment, Ministry of Development, etc.;
- Financing institutions' perspectives (commercial banks, development banks);
- International experience & good practice examples (governance, funding, capacity building);
- Identification of (elements for a) a common vision for the sustainable mobility system; and
- Draft common vision on sustainable urban mobility, information on the NUMP core team and coordination mechanism, work program for NUMP development (e.g. presentation by the lead ministry for the NUMP development followed by a discussion).
- Target group of the MobiliseDays are representatives of national ministries and subordinate authorities, selected local governments, city networks, the private sector (vehicle manufacturers, providers of transport solutions, financing institutions, academia, NGOs, etc.). The audience could generally be composed of fifty to eighty people.

Example: Tunisia NUMP MobiliseDays

The MobiliseDays in Tunisia were held in March 2017. During the two-day event the then current action plan was reviewed (a plan agreed initially during the national transport conference 2012). The event aimed at stimulating a discussion and subsequently drawing recommendations on the following 5 topics - all of them related to the NUMP process that was starting at this time:

- How to consider **climate change** in a national urban mobility policy?
- A national mobility policy for **better local strategies**;
- Amendments to the **legislative framework** for more efficient urban mobility;
- New **financing sources** for urban mobility in Tunisia;
- **Regional Transport Authorities** in Tunisia, in theory and in practice.

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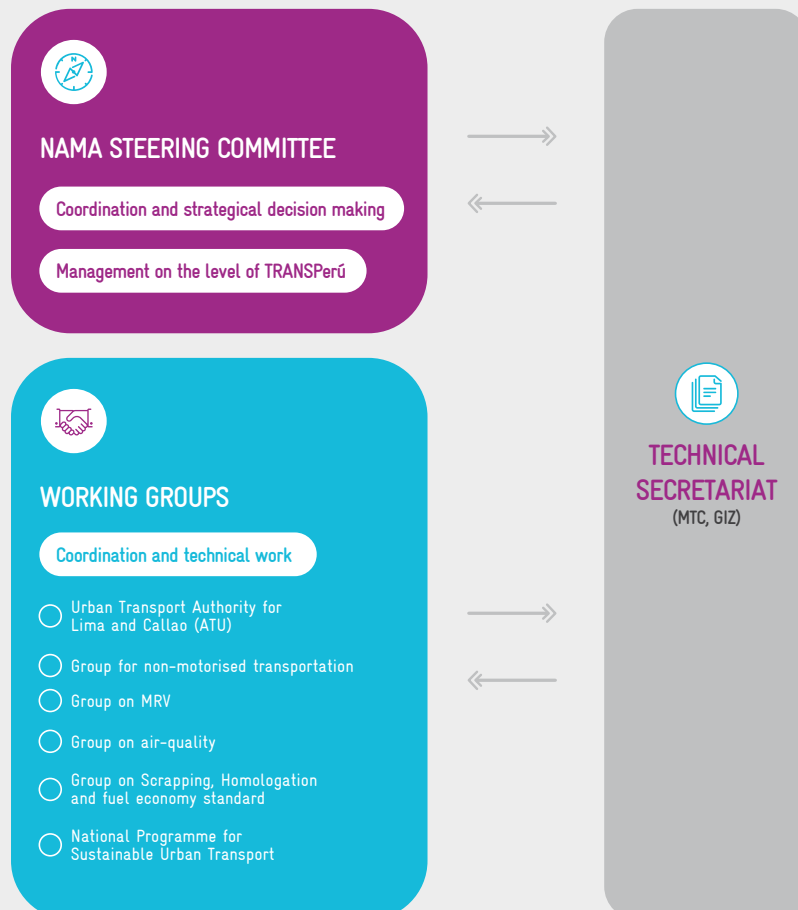


Step 3: Secure commitment and establish core team and coordination structure

A formal mandate to enter into a NUMP process can be important to ensure commitment from the main actors in the process. This formal commitment can range from an **approval by a small working group** to an **Act of Parliament**. The resolution should be based on the outcomes of the preliminary assessment and the kick-off event and should provide a formalised commitment of key political and administrative actors to contribute to the implementation of the common vision on sustainable urban mobility. **Periodic formal reporting obligations** to the parliament or the national government on the status and implementation of the NUMP increase the accountability and the permanence of the plan, and thus can be part of the resolution. Reporting periods can be defined across legislative terms to ensure continuity beyond potential changes of governments. **An operational core team** for the development of the NUMP can act as a facilitator. The team ensures continuity throughout the NUMP stages, facilitates the coordination between the stakeholders, is the interface between the tasks of the different phases, ensures the timely execution of tasks, and controls the consistency of deliverables and other outcomes. The size of the core team should strike a balance between representation and practical workability. Where possible, the process should rely on existing governance structures/committees.

Box 4. Example – Steering committee for the Sustainable Urban Transport NAMA of Peru

The Peruvian Ministry of Transport and Communications (MTC) is pursuing the creation of a national steering committee in the context of the NUMP. It is proposed that the working groups will report to the meetings of the Steering Committee and for the meetings of each working group a chairperson will be assigned and functions will be distributed to the members of the group. The Steering Committee shall report the progress in NAMA implementation to the Vice Ministers (strategic level) in order to facilitate coordination and prepare decision-making. The technical secretariat shall prepare, facilitate and follow-up to the Committee's meetings



Further reading:

NAMA TRANSPerú (p.26):

www.changing-transport.org/wp-content/uploads/2015_Capone_Velezmoro_FullConceptTransPeru.pdf

NAMA SUTRI Indonesia (p.30):

www.changing-transport.org/wp-content/uploads/2014_Henkel_etal_FullConeptNAMASUTRI.pdf

Jeepney NAMA Philippines (p. 51):

www.changing-transport.org/wp-content/uploads/2016_Full_NAMA_Concept_Jeepney_NAMA.pdf

The **steering committee** should consist of representatives from relevant ministries (interministerial planning approach). The national ministry formally responsible for mobility would usually chair the team. Since mobility is a cross-sectoral political issue, the NUMP should be considered an interdepartmental strategy of the entire government. The size, scope and mandate of the core group will depend on the process which would then be steered via the head of government's office, as is often the case with sustainable development strategies. The **coordination structure** established during the NUMP planning development is a core component of the entire process and needs to be maintained to support the implementation of actions and facilitate regular reiterations of the NUMP.

The main tasks of the core team are to:

- Ensure continuity throughout the NUMP process and participation of relevant stakeholders;
- Prepare a work plan and contract consultants and to define ToRs for contracts;
- Prepare the meetings and decisionmaking of the steering committee;
- Organise events, including the MobiliseDays; and
- Ensure monitoring and evaluation activities.

The main tasks of the steering committee are to:

- Supervise the development of the NUMP and take strategic decisions;
- Coordinate activities of the ministries with the aim of achieving a consistent approach towards sustainable mobility;
- Secure political backing and the longterm commitment of the national government and authorities involved;
- **Draft a Common Vision on Sustainable Urban Mobility and prepare a high-level inter-ministerial resolution;** and
- Serve as contact point for international cooperation partners who can provide support to the NUMP development and implementation³

³ For example, establishing a core team is a precondition for receiving technical assistance and part of the application process for the MobiliseYourCity Partnership (2018a).



Checklist Phase I: Initiation

Phase I: Initiation	✓
Initial assessment report prepared on the current urban mobility situation in the country.	
Kick-Off Event/MobiliseDays realised (agenda prepared, main issues to be addressed identified, participants selected and invited, professional moderation of the sessions ensured, documentation prepared and shared with participants).	
Initial assessment report validated (by means of a kick-off event and by the steering committee).	
Key stakeholders and their priorities identified.	
Formal commitment by key actors (high-level inter-ministerial resolution) for the NUMP process with defined reporting obligations.	
Core team established, Terms of Reference and work plan / roadmap for NUMP development agreed.	
First common vision presented, adjusted to stakeholder comments and agreed upon by the Steering Committee.	



Phase II: Status Quo Analysis

This phase includes an indepth analysis of the state of the urban mobility system and provides the collection and analysis of relevant data and the compilation of an inventory of existing documents and information to allow informed decision making. The development of a first communication plan provides the basis for a broader stakeholder engagement which is initiated in this phase.



STATUS QUO ANALYSIS

- 4 Collect data and turn into information
- 5 Assess political, regulatory, institutional and capacity building framework
- 6 Develop a communication plan
- 7 Initiate broad stakeholder participation

PHASE II

Phase II: Status Quo Analysis

Guiding Questions

- What is the status quo and what are important trends of urban mobility?
- What are the main challenges, barriers, opportunities for an effective transformation?
- What are the objectives and roles of different actors at the national, regional and local level?

Main milestones

- Data collection in pre-structured excel data sheet plus file collection with all sources /documents
- Policy inventory (document collection)
- Stakeholder analysis including a stakeholder mapping
- Status Quo Analysis report (see outline in **Box 5**)
- Stakeholder engagement and communication plan

Tools

- MobiliseYourCity Partnership Model Terms of Reference
- Interview templates
- Stakeholder Mapping
- Focus group workshop
- Data mining Excel file
- MobiliseYourCity Partnership Emissions Calculator
- SWOT analysis (qualitative + quantitative)
- Communication and stakeholder participation plan

These tools are part of the NUMP toolkit available at www.changing-transport.org/toolkits/nump/

The **main objective** of this phase is to get a clear picture of the strengths and weaknesses of various technical, institutional and financial aspects and to provide an assessment of the urban mobility situation in the country including recommendations for action. The status quo analysis provides the technical basis for the vision and goal setting (incl. accountable targets) in Phase III and aims to deliver an inventory and assessment report (**Status Quo Analysis Report**) for the country's NUMP which **should cover aspects in the box below**.

Box 5. Process guidance – Annotated outline for the Status Quo Analysis Report

Overview/inventory (Step 4)

- Urban mobility situation in the country, including state of urbanisation, mobility volumes, mobility supply, passenger mobility, urban freight, transport externalities, road safety, access of urban population to public transport, gender aspects, and data availability;
- Urban mobility planning process on the national and local (city) level;
- Links between urban mobility and other sectoral policies; and
- National policy framework for urban mobility.

In-depth assessment (Step 5)

- Stakeholder analysis and mapping;
- Assessment of the institutional framework;
- Assessment of budget and finance; and
- Assessment of local and national capacities.

Recommendations (Step 5)

- SWOT: Strengths, weaknesses, opportunities and threats to urban mobility planning and implementation in the country; and
- Recommendations derived from in-depth assessment and SWOT analysis.

This analysis should be accompanied by the development of a communication plan (**Step 6**) and goes along with growing stakeholder engagement (**Step 7**). In the following sub-chapters, all 4 steps are explained in more detail.

Step 4: Collect data and turn into information

A sound data basis is critical on the way towards a sustainable urban mobility system. The assessment of mobility related data availability, accessibility and quality is therefore a key step in the NUMP process. This step comprises an inventory of existing data and an analysis of information gaps. The inventory also assesses the quality of data, the accessibility (costs of data acquisition), and potential restrictions concerning the use of data (e.g. municipalities may not be allowed to use non-official data). In case sufficient data are not available at city level, the report should assess possibilities for additional data gathering jointly with local/national stakeholders. The inventory should also consider potential data sources beyond official statistics, such as public transport operators or providers of mobile communication services. To facilitate data collection, consideration should be given to how these actors can be obliged to collect and provide quality assured data.

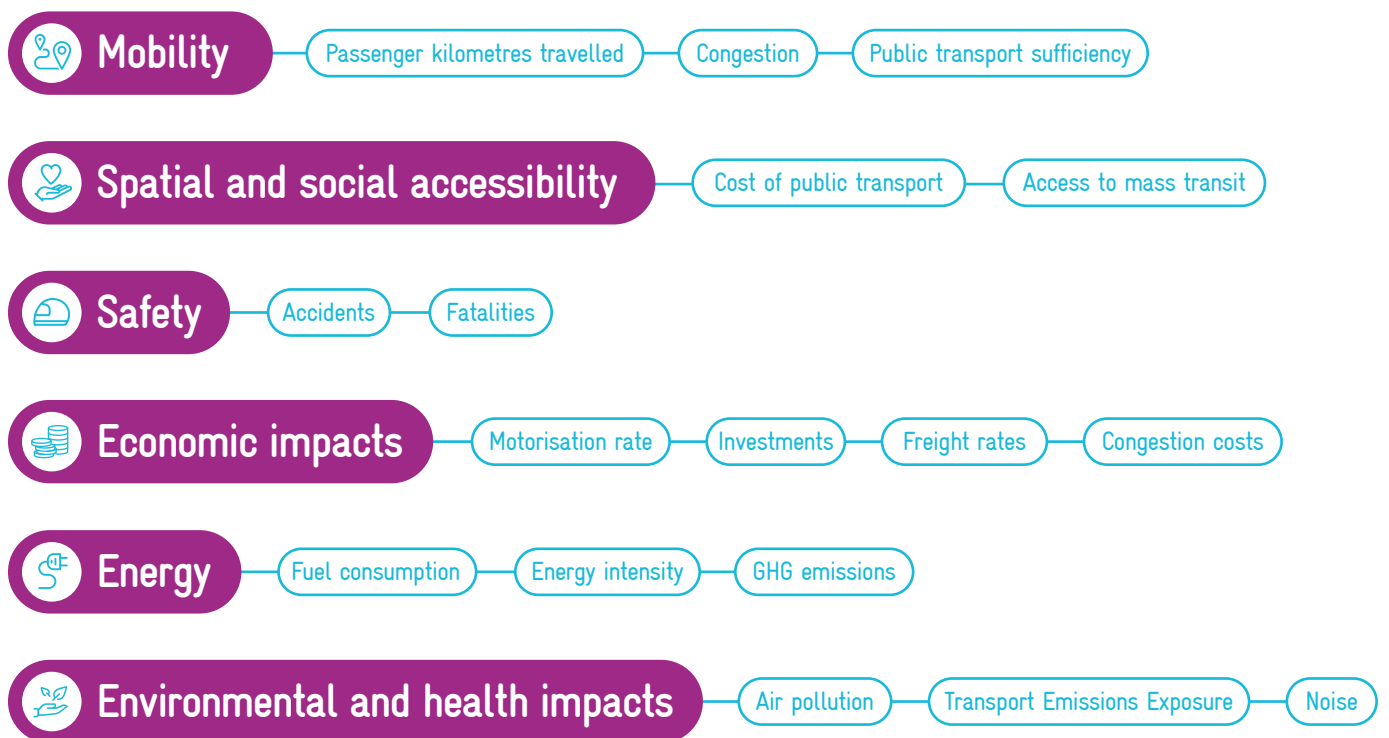
The following aspects should be included:

- Transport emissions (for GHG emission see **Chapter 7.1.**);
- Mobility volumes and travel behaviour;
- Relevant trends that affect urban mobility (e.g. urbanisation and urban sprawl, development of private car ownership, digitalisation and new mobility services, etc.);
- Mobility supply (modal split, transport modes, vehicle specifications);
- Mobility technology (technical standards and norms for planning and operating transport);
- Investments and investment priorities in the mobility sector by source (public, private, PPP) and use (long-distance vs. local; and by mode); sources and spending for infrastructure and operations management by relevant ministries over the last 10 years as well as plans for the upcoming 5 years; the possibility to earmark collected taxes or other revenues to specific purposes;

- Formal and informal public transport (incl. provisions for transport network companies);
- Access to mobility (availability, affordability, comfort, reliability, access for mobility-impaired);
- Externalities of mobility activities (main sources by mode; development over time), in particular air pollutants, noise, congestion and road safety; and
- Data availability (GHG inventories, mobility data at city and regional level, vehicle stock etc.).

The data collection should be aligned with a chosen framework of indicator categories, such as the following example.

Figure 10. Categories for data collection



Source: GIZ (2017b)



Box 6. Example – GHG MRV Framework. Reference Document on Transparency in Transport

The Reference Document on Transparency in the Transport Sector provides guidance on how to develop comprehensive and consistent national systems for monitoring mobility related emissions, including monitoring or MRV of mobility climate actions and transport GHG inventories. The document builds on existing knowledge and lessons learned in ongoing mitigation actions and experiences in GHG emissions quantification in the mobility sector in developed and developing countries. By summarising existing state of the art in one publication, the Reference Document presents decision makers in charge of building up national monitoring systems with a concise source of information.

Further reading: [GIZ \(2018b\)](#).



For bottom-up calculations of the GHG mitigation potential of mobility measures the following data is needed and should be collected at an early stage during the NUMP development process. More information can be found in the Reference Document on Transparency in Transport (see [Box 6](#) above) and [chapter 7](#) of this document.

Table 2. Data requirements for GHG bottom-up calculations

Parameter	Definition	Unit
Vehicle registration	Vehicle registration by fuel type, technology type, age, vehicle class (size) etc.	
Motorisation index	Number of vehicles for 1000 population	
PKM	Total passenger kilometres travel within boundary/Year (per mode & total)	pkm
TKM	Total ton kilometres travel within boundary/Year (per mode & total)	tkm
Trip mode share	Total passenger/freight trip share distributed among different modes	%
Load factor	Average load to total vehicle freight capacity by mode	%
Occupancy	Average vehicle occupancy by mode	
Mode shift	Share of passengers transported by project mode who would have used alternate mobility mode in absence of project	%
Specific fuel consumption by each mode	Fuel economy of each mode per fuel and technology type	L/100km
Vehicle distance driven per category	Vehicle distance driven by each mode by fuel and technology type	Km
Average speed	Average speed of each mode/type of road	km/h
CO₂ emission factor	Amount of carbon no CO ₂ released per unit of energy consumed	gCO ₂ /kJ
Other pollutants emission factors	Emission factors for PM/NO _x /BC in Kg/KM per vehicle-fuel type and technology type	Kg/km per vehicle-fuel type
VKT/capita	Vehicle kilometres travelled per person per year	Km/person
PKM/capita	Passengers kilometres travelled per person per year	Km
TKM/capita	Ton kilometres travelled per year	Km

Parameter	Definition	Unit
Market share of alternative fuels for road transport	Market share of alternative fuels for road transport	%
Electricity consumption	Electricity consumed by different mobility modes	MWh
Kilometres of infrastructure	Kilometres of infrastructure by type built	Km
Fuel consumption of transport sector	Total fuel consumed by mode per fuel type and technology type	MTOE
Transport energy consumption per GDP	Total fuel consumption from transport per unit of income (Gross Domestic Product)	ktoe/USD
Transport energy consumption per capita	Total fuel consumption from transport per population	ktoe/capita
Transport fuel consumption per PKM	Passenger Transport CO ₂ emissions per transport activity (passenger-km) (per mode & total)	MJ/PKM
Transport fuel consumption per TKM	Freight Transport CO ₂ emissions per transport activity (ton-km) (per mode & total)	MJ/Tkm
CO₂ emissions	Transport emissions of Carbon dioxide (CO ₂)	M Tons (Mt)
Transport CO₂ emissions per GDP	Total CO ₂ emissions from transport per unit of income (Gross Domestic Product)	gCO ₂ per US dollar
Transport CO₂ emissions per capita	Total CO ₂ emissions from transport per population	kgCO ₂ /Capita
CO₂ emissions per PKM	Passenger Transport CO ₂ emissions per transport activity (passenger-km)	gCO ₂ per pkm
CO₂ emissions per TKM	Freight Transport CO ₂ emissions per transport activity (ton-km)	gCO ₂ per tkm
USD/ CO₂ emissions	Ratio of total project/programme investment by Carbon savings obtained	USD/ton
CO₂ emissions per VKT	Road Transport CO ₂ emissions per transport activity (vehicle km travelled)	gCO ₂ per VKT
Infrastructure/project investment	Annual Investment for transport at national/city level or Total project investment	USD
PM emissions	Transport PM Emissions	Tons
NO_x emissions	Transport NO _x Emissions	Tons
Accident fatality/VKT	Road accident fatalities per vehicle kilometres travel	

Source: MobiliseYourCity Partnership



The data collection step is a crucial intermediate step of the NUMP development as it informs the core team and the broader stakeholder community about the status quo of the urban mobility system. It is **crucial that the collected data is transformed into digestible information** to allow the development of a communication plan and the engagement of a broad stakeholder community. Therefore, we encourage you to develop the data collection methodology jointly with experts who will be involved in the communication plan development.

Step 5: Assess political, regulatory, institutional and capacity building framework



A **sound analysis of the political, regulatory, institutional, financial and capacity framework with regards to urban mobility related issues** is a precondition for defining target areas and investment needs. Information for the analysis can come from plans, policies, strategies, legal documents and in-depth interviews with national level and city representatives and interest groups. Guidance on the assessment of financial aspects is given in the separate section on NUMP Financing in **Chapter 6**.

During this step, you should also study NGOs' and associations' position papers and local mobility plans. For assessing the situation in cities and to keep the effort manageable, it is advisable to define a limited number of representative cities that serve as comparison for the analysis. It is important to have a balanced representation of cities (by size, density, region, topography, income) and to avoid a bias towards best performing municipalities. A complementary data source can be **online or postal** surveys among cities, consisting of a set of standardised questions that reflect the identified issue areas.

Urban mobility policy inventory and assessment

The assessment builds on the initial screening carried out in Phase I. It combines quantitative and qualitative information focused on single core areas or specific applications and processes. Data sources identified during the MobiliseDays and the preliminary assessment help to conduct field investigations and interviews, focus groups with stakeholders and a review of national and local level documents.

The awareness of sustainable urban mobility varies widely between countries. It is important to know about and bring together all the elements likely to contribute to the development of a NUMP. This step aims to find answers to the following **guiding questions**:

- What is the national **vision** for urban mobility? (Does a national vision for urban mobility exist?) Are there related visions for example in the field of urban development, economic development, etc.?
- If there is an implicit or explicit **national strategy** for urban mobility, what are its strengths and weaknesses?
- What are the **environmental, economic and social stakes** of the urban mobility evolution in the cities of the country?
- What are the **national targets** for urban mobility, if any (at different time horizons, if applicable), including in terms of modal split, reduction of greenhouse gas emissions, accessibility of the population to essential urban services?
- Are the above elements gathered in a specific document? Are they disseminated through more general documents?
- Which **strategies, policies and plans from other sectors** need to be considered?

Box 7. Example – Status quo analysis of urban mobility in Thailand

To identify the challenges of sustainable urban mobility in Thailand and to define tailor-made measures to address these specific challenges, a status quo analysis was conducted. The analysis was carried out in a mix of desk research and a vast number of interviews with various stakeholders. This resulted in a SWOT table showing that for Bangkok (and other Thai cities), the implementation of TDM measures constitute a great opportunity.

Based on the study, a Visioning Workshop with all relevant Government stakeholders was carried out to jointly identify the right measures to be featured under the NUMP/Thai Clean Mobility Programme. The outline of the Thailand Clean Mobility Programme was agreed in an interministerial Steering Committee meeting at director level.

Further reading: [Capone \(2019\)](#).

It is important to know the urban mobility practices and generate an inventory / compilation and assessment of documents with **urban mobility plans, strategies, other policy documents, as well as projects and initiatives** in the country (SUMP, urban travel plan, mobility plan, traffic plan, etc.), including information on:


- Plan owner
- Project manager, if applicable
- Development and implementation processes (actors involved, phasing, timetable, etc.)
- Main themes and directions
- Planned and completed actions
- Integration of plans, such as mobility and land use
- Relationship between national- and local-level plans
- (Evaluation) Results



Part of the status quo analysis is as well the **mapping of current policies that relate to urban mobility**, which involves a systematic assessment of national level actions. This exercise aims to understand linkages – both synergies as well as contradictions – between the sustainable urban mobility vision and existing government policies (for example reducing mobility-related emissions versus increasing level of service), such as:

- Energy
- Environment
- Building and spatial planning
- Economic development
- Research and innovation, digitalisation
- Fiscal policy
- Health
- Social policy

The next step is the **in-depth assessment of policies and strategies** with regards to relevant objectives and responsibilities in the context of urban mobility. The assessment consists of a systematic analysis of documents, interviews with stakeholders and an appraisal of the findings. Policies and strategies should be assessed according to the following **guiding questions**:

- What are the objectives of the strategy with regards to urban mobility?
 - Do they formulate specific measures and policy instruments targeted at the mobility sector and/or that influence mobility behaviour?
 - Which indicators are used to define the desired state and/or to evaluate the performance of the policies or strategies?
 - How do they relate to the common vision established during the initiation stage?
 - Are the stated objectives coherent with the common vision?
 - Are there weaknesses or trade-offs in relation to the vision?
- 

Stakeholder analysis

The process of specifying a common vision for a sustainable urban mobility system can be contentious among stakeholders. It is strategically important to have **a sound understanding of the different interests**, their understanding of sustainable urban mobility, and their political power and influence. Depending on the situation and the actor, a sustainable urban mobility system can be framed as:

- A mobility issue, aiming ensure smooth
- functioning of the urban and national mobility system.
- A health issue with focus on noise and air pollution; and
- A social issue with focus and quality of life and on universal access for vulnerable groups;
- A means to develop future markets for innovative products and thus to contribute to economic development;
- A contribution to climate change mitigation;

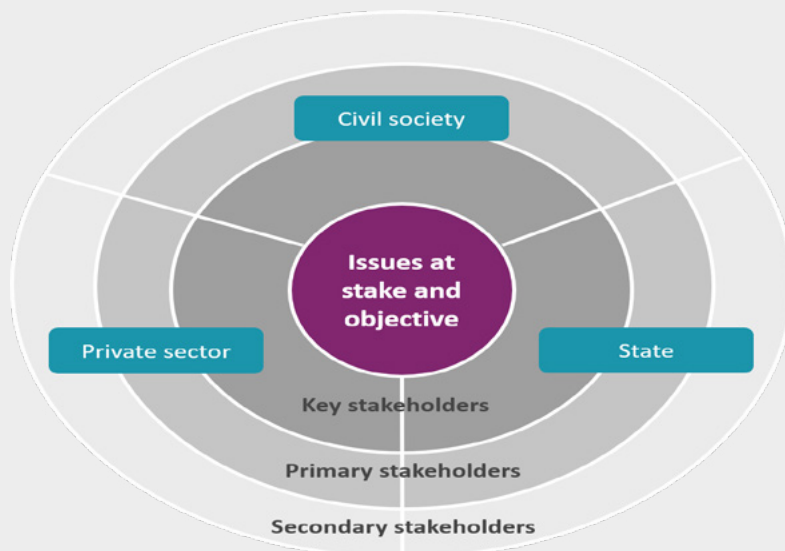


Analysing the configuration of stakeholders also comprises their specific 'red lines' in terms of objectives, targets, or types of measures such as profound scepticism against regulation or against raising fuel taxes. Veto players are actors in the process that also have the legal power or sufficient influence to halt a project or critical components of it. As such, make sure to **identify veto players**, include them in the process, understand their agendas early in the policy process and to plan how to frame discussions in ways that resonate with their lines of thinking.

Box 8. Tools and resources – Stakeholder Mapping

An easy way of structuring stakeholders and identifying key actors is by distinguishing (1) the way they are affected by changes in the mobility system and (2) by their power and influence to promote or hinder the process. They can be:

- Positively affected with high direct influence: promoters such as political parties, departments of the city administration, district mayors;
- Positively affected with low direct influence: e.g. city dwellers living in busy roads, cycling associations, pedestrians, PT organisations;
- Negatively affected with high direct influence: veto players such as departments of the city administration, political parties, labour unions;
- Negatively affected with low direct influence: shop owners, car manufacturers; and
- Not directly affected but have high influence: funding agencies, financial administration.



Further reading: <https://www.changing-transport.org/stakeholder-mapping/>

Assessment of the institutional framework

The degree to which the national level can actually guide, prescribe or direct development pathways and priorities for cities depends on the institutional framework of the respective country. Depending on the degree of devolution of power, national level decision-makers can:

- Inform cities about appropriate methods and tools for assessing the state of their mobility system;
- Link funding to mobility measures in cities;
- Make a sound assessment of the mobility situation legally binding for urban mobility planning procedures (including the specification of tasks to be concluded);
- Invest directly in sustainable urban mobility measures (e.g. e-bus or BRT investment programmes); or
- Prescribe measures and instruments that cities must implement.

With focussing on the institutional set up, this step considers urban mobility planning practices and generates an inventory of plans, strategies, other policy documents, as well as projects and initiatives in the country (SUMP, urban travel plan, mobility plan, traffic plan, etc.), including information on:

- Institutional framework and division of competencies and responsibilities between the national, regional and municipal levels:
 - *Legal regulations as well as regulatory gaps and overlaps in urban mobility planning within the country's ministries and sectors,*
 - *Entrepreneurial freedom for municipal and private operators (e.g. price regulation mechanisms for public transport, social policy obligations, access to credit markets, etc.),*
 - *Organisation of public transport system; provisions for transport network companies,*
 - *Whether cities are allowed to raise mobility-related taxes or fees (e.g. parking, road use, congestion charging, etc.) and to use other financing instruments (e.g. debt and equity financing, issuing city bonds, etc.).*

- Common, national level vision or a strategy or for urban mobility
 - *What are specific targets, timelines and responsibilities?*
- Description of institutionalised planning practices and decision making:
 - *Phase description, timelines, involved stakeholders,*
 - *Use of data and modelling in planning processes,*
 - *Cooperation within and beyond administrative boundaries,*
 - *Interlinkages with other sectoral policies,*
 - *Implementation, Monitoring and Evaluation, and*
 - *Whether there is a particular 'planning culture'.*
- Description of typical implementation processes:
 - *Public and private actors' roles,*
 - *Differences between cities and level of government*
- Analysis of main topics and policy directions. Provide examples of planned and completed actions.



Box 9. Tools and resources – Sustainable Urban Mobility Plans (SUMP)

The concept of Sustainable Urban Mobility Planning has been promoted in the European Union for many years. A collection of useful materials on local level Sustainable Urban Mobility Planning can be accessed via the **MobiliseYourCity Partnership** website.

The European Commission has developed a detailed step-by-step guide for cities to implement SUMPs. The document defines the consideration of national policy requirements and suggests national level involvement (**Eltis, 2014a**).

Under the CIVITAS initiative, various resources have been made available to help mobility planners in the transformation to sustainable mobility following SUMP principles: The CIVITAS Tool Inventory is an online database of over 100 tools and methods that helps local authorities make better informed decisions about which planning tools to apply (**CIVITAS, 2013**). CIVITAS projects PROSPERITY and SUMP-Up support local and national governments improve the quality and take-up of Sustainable Urban Mobility Plans. In addition, European policy has been analysed according to supporting mechanisms for SUMP development and monitoring. A SUMP Self-Assessment online tool is available to identify strengths and weaknesses of a given planning process (**Eltis, 2017**).

Assessment of budget and finance

The development of a robust financial structure for a NUMP is a key success factor for the implementation of a NUMP. This is the reason why these guidelines contain a separate dedicated chapter on financing (see **Chapter 6**). Experience has shown that it is important to consider questions related to financing during all phases of NUMP development specifying NUMP finance in an iterative process. A budgeting and financing status quo analysis of relevant financial issues is needed to guide the discussion and decision-making process during the NUMP development. Guidance is given in **Chapter 6**.



Box 10. Process guidance – Financial analysis for a clean bus programme

Several national governments have initiated programmes to introduce clean bus technologies in cities (e.g. the UK Low-Emission Bus Scheme, The Electric Bus Programme of China). In order to understand the required level of funding and to design funding mechanism (that describes the flows and conditions for funding) an assessment of the operators and their current investment behaviour can help to design the mechanism.

Step 1

At operator level, the comparative financial analysis estimates the financial impact of the introduction of different bus technologies (hybrid, CNG, trolley, opportunity end of route, ultrafast opportunity charging, BEB night charging, BEB intermediate charging) in reference to a regular diesel bus on the internal rate of return. The assessment covers expected revenues and capital expenditure (vehicle capital and infrastructure) and operational expenditure (fuel, labour, insurance, repair, routine maintenance, etc.).

Step 2

Analyse current funding mechanisms. Map the allocation of funds for investments in buses and describe and evaluate the role of several stakeholders in the process as it stands.

- Funding sources (institutions involved such as national and international banks, government, private sector);
- Refinancing options (general taxation, specific fiscal instruments such as energy tax or reduction of VAT) and financial sustainability;
- Funding instruments (grant, loans, guarantees, leasing);
- Funding channels (stakeholder roles and responsibilities);
- Intermediaries (e.g. leasing companies, national development banks, transit agencies); and
- Beneficiaries (e.g. operators, transit agencies)

The results allow the government to:

- Justify the provision of public funding,
- Estimate the funding requirements overtime,
- Understand the financial (and potentially economic) rate of return,
- Compare mitigation costs compared to alternative investments, and
- Develop the right funding mechanisms (correct grant size).

Assessment of local and national capacities

The transformation of the urban mobility system requires expertise and strong institutions in local and national administrations and clear guidance on how to adopt a sustainable planning approach for cities. The availability of manuals, recommendations, and best practice examples and the provision of in-job training opportunities facilitate the take up of the SUMP approach (Eltis, 2014a) and the implementation of sustainable urban mobility measures. The assessment should cover amongst others:

- Availability of methodological references, guidance documents, compendia of good practices, databases and urban mobility observatories, etc.;
- Available tools and methods (e.g. digital models for urban development and the generation of traffic allowing to test different scenarios of evolution for the systems of urban mobility);
- Mobility data centres that generate and provide relevant data sets for the national, regional, and city level (in line with reporting and evaluation criteria and accessible for to cities free of charge);
- Monitoring and evaluation guidelines and tools enabling local authorities to assess the degree of achievement of their objectives;
- Staff resources at local mobility departments and in the transport ministry; and
- Training programmes for technical staff, public and private urban mobility stakeholders:
 - *Initial training/vocational training for technical staff responsible for the implementation of sustainable urban mobility policies.*
 - *Continuing training for public and private urban mobility stakeholders to update their knowledge and practices.*
 - *Specific training for capacitybuilding to accompany the evolution of specific actors (e.g. transport operators);*
- State-to-state or city-to-city cooperation programmes;
- Dedicated academic study offers, research programmes and research centres;
- Existence of expert networks and analysis of spirit and habit of exchanging knowledge and experiences; and
- Existence and capability of local consulting firms.



SWOT Analysis with recommendations

The assessment report should cover all the elements mentioned above and conclude with a dedicated summary section on the main strengths, weaknesses, opportunities and threats (SWOT) of the existing urban mobility system, illustrate opportunities for a sectoral transition and outline factors that potentially threaten the transition (e.g. veto players, lack of capacities or financing). Draft versions of the report and of the policy recommendations together with presentations of the final report should be discussed within the core team, in the steering committee and as well bilaterally with core stakeholders such as relevant ministries.

Box 11. Example – Summaries from a sustainable mobility assessment report for Thessaloniki

A sustainable mobility assessment conducted by Perra et al (2017) in the city of Thessaloniki included a SWOT analysis. The results of the evaluation indicated that the city showed characteristics which are suitable for the implementation of sustainable mobility solutions. With this evaluation, it was possible for the authors to make recommendations which included emphasis on the following: Undertaking appropriate planning and policymaking, promoting alternatives to private car means of mobility (such as public transport, walking and cycling), encouraging multimodality in mobility and adapting of new travel patterns (for example carpooling).

Strength	Weakness
<p>Integrated regional/urban and transport planning</p> <ul style="list-style-type: none"> – High population density – Land uses mix (especially in city centre) – Access to PT and other basic services within walking distance for majority of population 	<p>Integrated regional/urban and transport planning</p> <ul style="list-style-type: none"> – Low GDP per capita – Inadequate open public spaces
<p>Effective traffic and parking management</p> <ul style="list-style-type: none"> – Adequately level of road safety 	<p>Effective traffic and parking management</p> <ul style="list-style-type: none"> – Extensive use and low speed of private vehicles – Relatively high transport cost – Relatively old fleet of PT vehicles with outdated engine technology, low level of comfort and reliability and limited size in relation to the total population – Absence of official park and ride lots
<p>Promotion of public transport</p> <ul style="list-style-type: none"> – Diesel fuelled PT vehicles – Relatively low cost of travelling by means of PT – Accessible PT vehicles 	<p>Promotion of bicycle and walking</p> <ul style="list-style-type: none"> – Bad connectivity and low density of pedestrian infrastructure – Limited bicycle network – Few streets with traffic calming measures
	<p>Promotion of “green” technologies and measures</p> <ul style="list-style-type: none"> – Limited relatively old fleet of passenger vehicles and trucks
Opportunities	Threats
<p>Effective traffic and parking management</p> <ul style="list-style-type: none"> – New mobility and information services – Paradigm shift towards sustainable mobility and adaption of new travel patterns (e.g. car-pooling) due to economic crisis – Combined after new metro construction 	<p>Integrated regional/urban and transport planning</p> <ul style="list-style-type: none"> – Descending trend of GDP per capita due to economic crisis
<p>Promotion of bicycle and walking</p> <ul style="list-style-type: none"> – Further implementation of traffic calming measures 	<p>Effective traffic and parking management</p> <ul style="list-style-type: none"> – Cancellation or further postponing of transport-projects that are still under construction due to economic crisis

Step 6: Develop a communication plan

Communication and design shapes the way people perceive, think about and position themselves to certain things in their outside world. During the development of a NUMP, the way you communicate and build a narrative around it and the way you design how people get acquainted with it, is therefore a crucial part of the NUMPs success – or its failure.

A communication strategy helps you to make sure that you find and follow the right narrative and the right design for getting exactly those people on board that are central to the NUMP process. During the communication planning process, you identify exactly those target groups you need to make your NUMP successful – or who can hamper it. You will find that each of the groups has specific characteristics, motivations and needs when it comes to being informed about your NUMP. Through the Identification of your Unique Selling Point and matching this with the characteristics of your target groups, you will discover the most effective ways to communicate, what you want them to know, and how you will reach them best.

The following two steps are essential on the way towards a first NUMP communication plan:



Identification of Target Groups

Analyse – based on the stakeholder mapping (see **Box 8**) – all groups of people who need or will be informed about your NUMP or whom you need to make your NUMP successful. Also think about the groups of people who might not be fully in favour of the NUMP. Identify their unique characteristics, their motivations, but also their needs in their daily businesses. Identify also which ways of communication they use (e.g. social media, newspaper, events) and find those people who already have a lot of influence on your target groups. Helpful instruments for this first step are:

- *Target Group Mapping*
- *Influencer Analysis*

Identification of your Unique Selling Point:

Specify the Unique Selling Point of your NUMP considering the results of the previous steps from Phase I and Phase II. What are your goals, what is your mission, what is your vision with the NUMP. Also identify which current problems you will solve with the NUMP. Helpful tools for this second step are:

- *Value Proposition 3-Circle Venn Diagram*
- *Simon Sinek's Golden Circle ("Why, How, What")* (see **Figure 11**)



Box 12. Tools and resources – How to ensure target group specific communication

- **No one-size-fits-all:** The same information may be communicated in different ways via different channels to reach different audiences, e.g. on Twitter to reach technical experts/consultants and in a personal email to inform our funders;
- Consider which language/style is **appropriate for your target group** in the specific communication situation;
- Think about through **which channels your target group consumes** the kind of information you want to convey and at what time of day, e.g. in Europe Tweets are particularly successful in the morning hours (when people get up and commute), Facebook is more popular for professional content in some African or Latin American countries than in Germany. Your local counterparts might like a regular update on progress via an email or a Power-Point presentation; and
- Try to **put yourself in the shower of your target group** – in what context do they want what sort of information try to enter information/news into their “routine”.

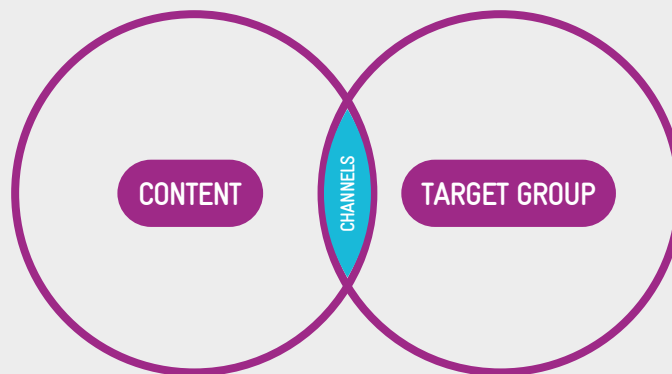
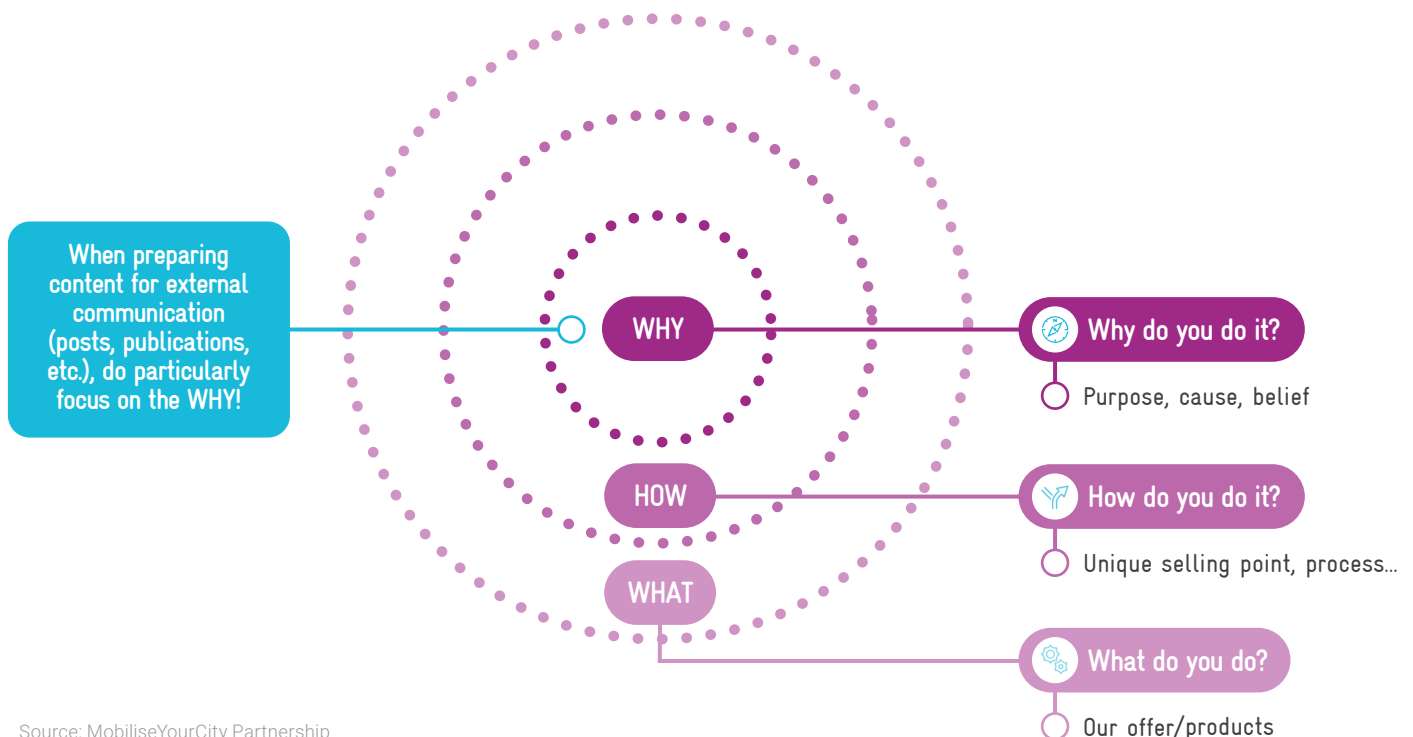


Figure 11. The Golden Circle – Why, How, What





The identification of your target groups (1) and your Unique Selling Point (2) are the key to then develop a suitable Communication Plan including the following elements:

- **Key Messages & Communication Channels**

Match your Target Groups with your Unique Selling Point.

- *Key Messages in accordance to the needs of your target groups,*
- *Key Channels you will use to most effectively reach your target groups.*

- **Corporate Design, Guidelines & Templates**

Find a suitable design for your NUMP communications and establish guidelines on how to use it. Make sure your NUMP Design reflects the needs and wishes of your target groups and your Unique Selling Point.

- *Corporate Design incl. Logo and Colour Codes,*
- *Guidelines for e.g. your NUMP core team, for graphic designers, for external communication consultants,*
- *Templates for often used communication materials (e.g. social media banners).*

- **Budget & Resources**

Identify how much resources (e.g. budget, staff) you have to allocate to implement your communication strategy and plan.

- *Budget planning,*
- *Staff planning (e.g. externally hired communication, marketing or graphic agencies),*
- *Clarification of staff roles in the communication plan.*

- **Timeline & Action Plan**

Prepare an action plan specifying what key communication messages to communicate to which target groups when and in what way. Define special communication highlights and events during the year.

- *Action plan for your communication activities and highlights throughout a year.*

You can write and follow the communication plan yourself with your NUMP core team or at best involve a professional communication and marketing agency for it to help you. Make sure you make the communication strategy one of your priorities from day one on and that all core stakeholders of your NUMP have a stake in the process and know what to communicate when to whom. Have the results of your communication strategy monitored periodically to adjust it if necessary, to make sure it always fits your needs and resources. A well-thought-through plan will help you and your target groups get on the same page for your NUMP. A consistent NUMP communication plan makes it easier for you to articulate your NUMP to your target groups the way you want it based on the findings of Steps 4-5 of the Status Quo Analysis. During Phase III (Vision, Goal Setting and Measure Selection), the communication plan needs to be updated by the NUMP core group.

Step 7: Initiate broad stakeholder participation

The involvement of interested parties is a key success factor for any NUMP. Engaging relevant stakeholders early in the process can ensure lasting commitment, enhance accountability, contribute to the evidence base for decisions, and avoid resistance in later stages that delay the implementation of major projects. Public sector participation, including subnational government and local authorities, is key to ensure the longterm commitment that is required to achieve a transformational change towards a sustainable low-carbon mobility system. Multi-stakeholder and participatory processes, however, can be very contentious. To avoid the risks of blockades and or being stuck at the lowest common denominator, a sound preparation of these processes is crucial. The result of this step is **a strategy and timeline for the active engagement of all relevant stakeholders** in the NUMP development. The involvement and thus empowerment of relevant stakeholders in the NUMP development process increases ownership for the NUMP as well as the ambition and ability to later implement the NUMP.

While involvement of the 'civic society' on the local level is common in Sustainable Urban Mobility Planning (SUMP), it is hardly conducted in national level decisionmaking. Nevertheless, strategic decisions at national level that affect mobility also need to be transparent, accountable and well legitimised. A NUMP that responds to pressing issues therefore requires formalised consultation stages that bring together key decisionmakers from the public and private sector, practitioners, academia, business associations and the civil society. The European Commission's general principles and minimum standards for consultation (EC, 2002) can serve as a starting point for designing the consultation process⁴.

Involvement of the civil society in scenario processes and other participative activities can be used to assess which mobility-related issues are considered to be most pressing and to collect potential measures and instruments to tackle these problems. **Results of the participation process support the visioning and scenario process.** Participation is not a substitute for scientific expertise but is an additional source of knowledge and legitimacy during negotiations with other ministries. Public participation formats and timing also depend on national policies (formal requirements e.g. for Strategic Environmental Assessment), the governance system as well as on the overall political culture.

Public participation involvement can yield many **benefits**:

- Enhance the knowledge base and to collect new inputs;
- Provide information on stakeholders' and the wider public's perceptions of problems;
- Help understand expectations of national level policy making;
- Increase the acceptance of defined policy objectives;
- Serve as an additional source of legitimacy in interministerial decision-making; and
- Help to anchor a policy into the national political agenda beyond individual legislative terms.



⁴ Available at https://ec.europa.eu/governance/docs/comm_standards_en.pdf



Setting up a participatory process includes **several, often time-consuming activities**, such as:

- Coordination among the ministries and departments involved;
- Definition of participatory measures, target groups, timing, formats, practical responsibilities;
- Setting up methods of participation, questionnaires and the formulation of adequate and suitable questions;
- The technical implementation of surveys and participation portals;
- Documentation, analysis and interpretation of collected data; and
- Providing feedback to respondents.



Box 13. Tools and resources – Reading material and case studies on public participation

- International Association for Participation, Public Participation Toolbox: **AP2 (2019)**.
- CH4LLENGE Participation Manual: Participation Actively engaging citizens and stakeholders in the development of Sustainable Urban Mobility Plans: **Eltis (2016)**.
- Public participation in Urban Transport Project, Liaoning, China: **Chen and Mehndiratta (2006)**.
- Public Participation Guide by the US Environmental Protection Agency: **EPA (2016)**.
- A guide to the application of public participation in planning and policy formulation towards sustainable mobility development by the **UNESCAP (2003)**.



Looking at experiences from other cities and other countries can provide valuable insights. Various international organisations have also established exchange platforms to support communities of practice. The MobiliseYourCity Partnership has set up a virtual community of practice (please consult www.mobiliseyourcity.net) and the Centre for Mediterranean Integration in Marseille, for example, has initiated an exchange and capacity building programme for sustainable urban mobility across the Mediterranean basin. One of the outcomes of this programme has been the organisation of National Urban Transport Days, allowing several countries (Tunisia, Morocco and Jordan) to make progress in the development of their NUMPs.



Checklist Phase II: Status Quo Analysis

Phase II: Status Quo Analysis	✓
ToR prepared and consultants contracted to carry out status quo analysis .	
Policy inventory (document collection) and excel file with data collection prepared and accessible for core team.	
Stakeholder analysis and map prepared and discussed in core team.	
Assessment of institutional framework, budget and finance as well as local and national level capacities realised and discussed in core team as well as with core stakeholders.	
Review process for draft versions of the status quo analysis realised (involving the core team and main stakeholders).	
Final status quo analysis report including policy recommendations developed and presented to high-level NUMP Steering Committee.	
Stakeholder engagement and communication plans developed and implementation arrangements agreed with NUMP Steering Committee.	



Phase III: Vision, Goal Setting and Measure Selection

Based on the results of the status quo analysis carried out in the previous phase, a visioning and goal setting exercise involving a broad range of governmental and non-governmental stakeholders is the centre piece of this phase. Having a look at different possible future scenarios helps build a common perspective on issues that should be addressed by the NUMP and depicts a longterm vision for mobility and a desired future state of a sustainable urban transport system (including objectives, indicators and targets). It links urban mobility to environmental concerns, social and economic development and serves as a basis for identifying priority areas and measures. It is important to develop and agree on politically binding goals, which can increase in ambition over time. The extent of the visioning and goal setting exercise will depend on the NUMP type, but should reflect on a range of objectives, including urban development, health and safety, social inclusion, gender equity, economic development, and the environment. This phase is very important since it defines the heart of the NUMP. In the end, this phase helps you to design the skeleton of the NUMP consisting of vision, goals/objectives, indicators with targets, priority areas and priority measures as illustrated in the figure below.



VISION, GOAL SETTING AND MEASURE SELECTION

- 8 Build and jointly assess scenarios
- 9 Develop vision and set targets with stakeholders
- 10 Agree on priority areas and select measures
- 11 Update roadmap for NUMP development and broad stakeholder participation

PHASE III

Figure 12. "NUMP skeleton"



Source: MobiliseYourCity Partnership



Phase III: Vision, Goal Setting and Measure Selection

Guiding Questions

- What are likely scenarios for urban mobility?
- What is our common vision for sustainable urban mobility?
- What are our priority areas (e.g. public transport, urban logistics) and corresponding priority measures/actions for the transition (e.g. a bus fleet renewal programme, low emissions zones with preferential access and parking regulation for electric delivery vehicles)?
- What are our specific goals or targets and respective indicators?
- Is the vision realistic regarding the requirements on policy, institutions, capacities, funding?
- Are all core stakeholders actively involved and engaged?

Main milestones

- Agreement on sustainable urban mobility vision (participatory multi-stakeholder process)
- Impact assessment and cost-benefit analysis of different scenarios (report and model)
- Definition of priority areas, objectives, indicators and goals (incl. time schedule)
- List of a bundle of prioritized measures / actions for Detailed Preparation in Phase IV
- Updated roadmap for NUMP development

Tools

- MobiliseYourCity Partnership Model Terms of Reference
- Fact sheet on scenario and back-casting development process
- Workshop example for the validation of scenarios, methodology, used data and assumptions
- Tools to assess scenarios by cost, GHG reduction, impacts / co-benefits
- MobiliseYourCity Partnership Emissions Calculator
- NAMA Screening Tool
- Factsheet with examples of indicators/KPIs

These tools are part of the NUMP toolkit available at www.changing-transport.org/toolkits/nump/

The **main objectives and responsibility of the NUMP core team** in this phase (Steps 8-11) are:

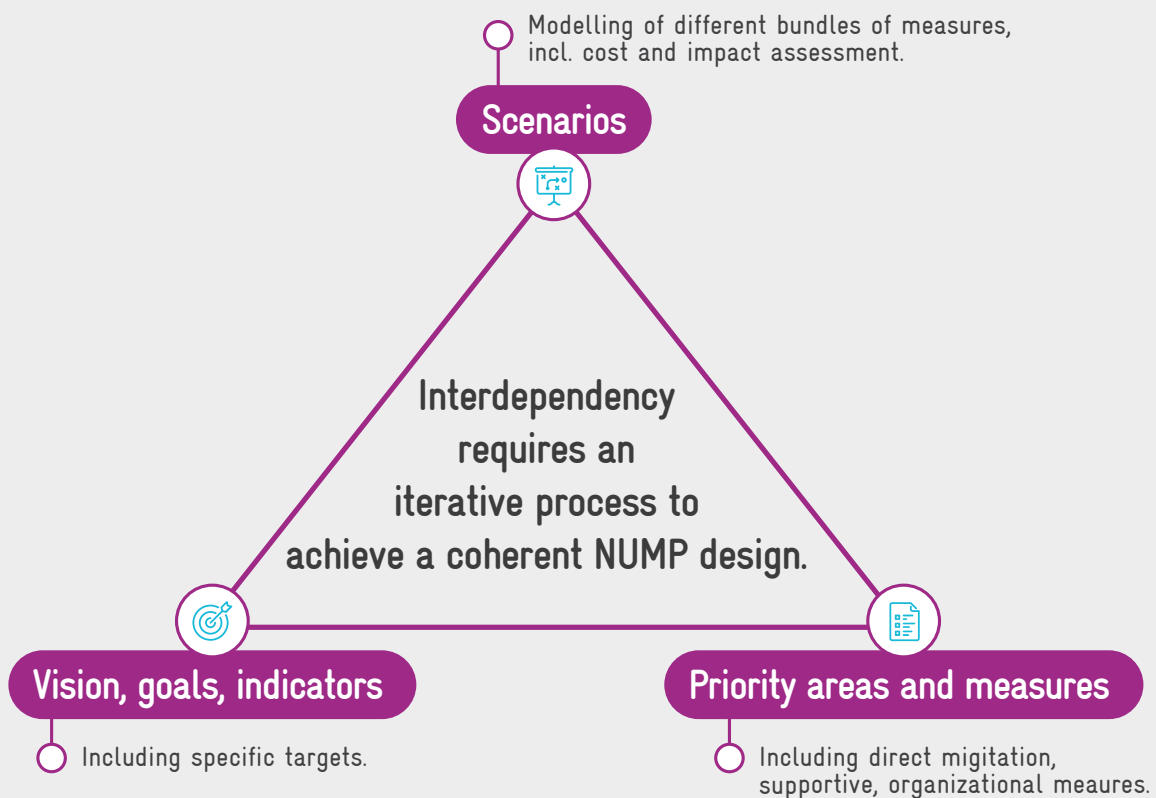
- Defining **priority areas** for the scenario based on the initial common vision and the status quo analysis (**Step 8**);
- Selecting and inviting a **balanced group of participants**, representing a broad range of stakeholders and interested parties (**Step 8**);
- Organising **scenario workshops** in appropriate formats considering the participants' level of knowledge on scenario techniques (**Step 8**);
- Collecting and communicating the results of the workshops and **developing/adjusting the common vision** (**Step 9**);
- Facilitating the **agreement on specific objectives, indicators, targets, priority areas and priority measures / actions** to be elaborated indepth in Phase IV "Detailed Preparation" (**Step 10**);
- Update **NUMP development roadmap** (**Step 11**).

Step 8: Build and jointly assess scenarios

Having in mind the initial vision (**Phase I**) and the detailed status quo analysis (**Phase II**) an important next step is to build, analyse and discuss different scenarios. Scenarios can help improve the understanding of what urban mobility could look like in the cities of your country in the future. In this way scenarios can inform and inspire the subsequent development of a specific urban mobility vision. **Scenarios** help to better **understand the likely effects of external factors** that affect urban mobility (such as new technologies and mobility services or changing social values) **in combination with alternative approaches to react to them**. By illustrating different possible developments, they allow to assess independently from each other consequences of trends, societal changes, and alternative policy priorities. Examining the effects of different scenarios strengthens the factual basis for strategic decisions. It informs and inspires the development of vision and objectives and helps to set realistic targets for strategic indicators (see **Step 9**).

Box 14. Interdependency of scenarios, vision/ goals /indicators, priority areas and measures

It is important to acknowledge that Step 8 (Scenarios), Step 9 (Vision, Goals, Indicators and Targets) and Step 10 (Priority areas and priority measures/ actions) do not perform linear in a simple one by one sequence. If you adjust your vision, you might change the scope and need additional (or less) measures. Furthermore, not only a specific bundle but many different bundles of measures can help you achieve your targets. But which bundle is the most suitable one? The different bundles have different implications in terms of financial resources, likelihood of successful implementation, etc. But it is not easy to foresee the specific impacts of different bundles. Thus, you will require modelling of different bundles and scenarios. In the end, these elements are all highly interdependent and require a cautious iterative process in order to arrive at a coherent and realistic set of targets and an underlying priority areas and measures to achieve your NUMP objectives and make the vision and become reality (see the illustration below).





Scenarios are not forecasts that aim to predict what is likely to happen in the future. Nevertheless, they can be inputs to (transport) models to assess their impact (see **Phase IV**). Forecasting and scenario building are important steps in mobility planning. Whereas a forecast is a calculation of future events that is as accurate as possible, scenarios are analytic thought experiments. In scenario studies, the focus is not only on predicting events, but also on the mapping of changes in worldviews and on forces and processes that can emerge, develop or intensify in the medium term. Scenarios are always based on human assumptions of future developments that cannot yet be accurately predicted. Therefore, scenario building and assessment can be quite controversial.



As such, it is important to define a core of elements that should be maintained throughout the NUMP process before starting the actual stakeholder involvement. Although scenario processes build on the inputs of experts and stakeholders, they require thorough preparation. It is essential to have a sound understanding of objectives, bargaining position vis-à-vis other actors and minimal outcomes to be achieved. It is also helpful to always focus on the contribution of each scenario to the overall common vision. The key is to hire experts that are able to build a model that allows assessing the scenarios and can be used for the decision-making process.

Envisioning possible futures serves as a starting point to identify transition pathways towards desired outcomes. Developing and discussing one or more common sustainability **scenarios helps to identify milestones on the route and to derive important actions towards a desired state**. To facilitate the process, it is useful to define a set of sub-scenarios on specific aspects of a future sustainable urban transport system. The following **three objective categories are important to consider** in order to ensure overall acceptance and likelihood of smooth implementation of the NUMP and should be reflected in the scenario development and assessment process:

- Social objectives
- Environmental objectives
- Economic objectives

The **GHG emissions effect** (reported in CO₂e) should be monitored at the city level, using bottom-up urban mobility inventories to calculate the total emissions of urban mobility (differentiated by mode). It is crucial to develop sound business-as-usual (BAU) scenarios that can be compared against the policy scenarios developed during the NUMP process. Usually, as a first step, a **qualitative scenario workshop produces scenarios that are agreed upon by the core stakeholders**. Those then are assessed by researchers to inform the stakeholders upon the impact of the agreed actions. This requires identifying main drivers of change and a common agreement on the main assumptions and data / values used. For the credibility and acceptance of the scenarios and corresponding modelling exercises, **assumptions and data used should be discussed and agreed upon in a further stakeholder workshop**. **Chapter 7 on MRV** describes the step-by-step focussing particularly on the aspect of GHG mitigation.

Ideally, the scenarios developed include a preliminary set of priority areas and a long list of measures from which the final set of priority areas and a short list of measures can be derived. For each of the priority areas, participants should define at least two scenarios, including one business-as-usual scenario and a sustainability scenario that resonates with the common vision. One could also consider several sustainability scenarios. Each (sub-)scenario should provide a description of key components, relevant trends, objectives and policy goals, (e.g. universal access to public transport or electrification of mobility, or an estimation of modal share) and relevant actors.

A series of scenario workshops should be organised and comprise 15-25 participants, representing key stakeholders. The scenarios will help later in the process illustrating the planned interventions, which will be a useful basis for the wider stakeholder engagement, especially for the next step, the development of a joint vision.



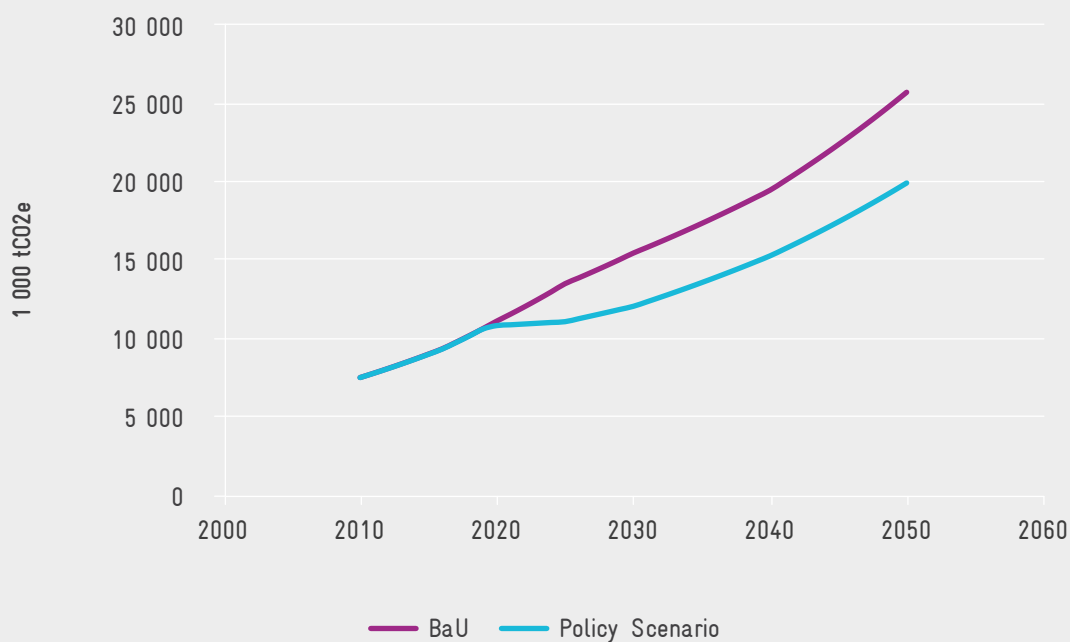
Box 15. Example – Setting ambitious goals through scenario development in Tunisia

Scenarios can be built top-down (applying a single impact, tendency or formula on the cumulated numbers of emissions / macro level) or bottom-up (accumulating the calculated impacts of several measures). For the mitigation impact of Tunisia's NUMP, a three-step bottom-up approach was applied.

In a first step, policy measures having the potential to reduce GHG emissions have been identified in existing studies, policy papers and plans, and have been completed by further measures proposed by experts. This long-list of actions has been discussed with the stakeholders of the sector during several workshops, resulting in a slightly reduced short-list of actions. In the last step, actions on the short-list which have a quantifiable impact on the input data of Tunisia's mobility GHG inventory have been analysed for GHG impact assessment. The cumulated impacts represent finally the difference / gap between the baseline scenario and the policy scenario.

Further reading: [GIZ \(2019\)](#). A useful GHG scenario approach was also developed by GIZ in Vietnam.

Emission in Business-as-usual (BaU) and policy scenario for the road and rail transport sector in Tunisia



Step 9: Develop vision and set targets with stakeholders

A common long-term (ten- to twenty-year) vision for sustainable urban mobility in the country is an **essential building block of any NUMP**. The vision entails a qualitative description of the desired future state of urban mobility in the country, which is **specified by a set of objectives** which indicate the type of change the NUMP aims for. The two – vision and objectives – provide the basis for all subsequent steps of defining indicators, setting targets and selecting priority measures / actions. Scenario building (Step 8) and vision are strongly related, and the sequence of developing them can vary for different contexts or even run in parallel or in iterations. Vision and objectives can only be solid guiding elements if they are widely accepted among stakeholders. **Co-creation** in close interaction with core stakeholders is therefore important to generate a common ownership for them. Constituting elements of a vision are shown in **Table 3** below and a real-world example of a vision from the Philippines including objective categories and indicators is illustrated in **Box 16**.

Table 3. Constructing a common urban mobility vision – Contents and guiding questions

Elements of a common vision	Guiding question
An interministerial joint understanding of the key trends and challenges; for example key findings regarding urbanisation and urban sprawl trends, increasing traffic, congestion and vehicle ownership, lack of infrastructure, poor urban air quality, increasing greenhouse gas emissions from urban mobility, unsustainable energy supply, insufficient public transport services and inadequate access to public transport, poor quality of life due to mobility emissions etc.	<i>Why do we need a NUMP?</i>
Reference to and outline of key NUMP objectives and priority areas, such as sustainable and integrated urban planning, improving the public transport system, fostering the uptake of low-carbon technical solutions in urban freight (e.g. electric vehicles) or supporting active travel modes.	<i>What do we want to work on?</i>
Formulation of measurable NUMP performance indicators and targets such as reduction of GHG emissions, reduced national fuel expenditures, increased modal share of public transport.	<i>How do we measure our success?</i>

Source: MobiliseYourCity Partnership





Box 16. Example – Setting national vision and goals for NUMP implementation in the Philippines

Twenty-five government representatives representing nine national government agencies were gathered in the Philippines to establish a joint vision for the NUMP. Prior to the visioning and strategy exercise, the results of the status quo analysis were presented. Afterwards, the participants discussed about their vision and priorities for urban mobility in the Philippines by 2030, and specific transport sector objectives that could be monitored by indicators.

The vision was presented to the Inter-Agency Technical Committee on Transport Planning (IATCTP) of the National Economic Development Authority for possible adoption into the Philippine 2040 Vision. The process was supported by GIZ.



Bayanihan:
NATIONAL URBAN MOBILITY PROGRAM VISION AND STRATEGY

SUPPORTED BY:  ON BEHALF OF:   

Vision: Towards people-first cities empowered by efficient, dignified, and sustainable mobility.

Objectives

<p> SOCIAL</p> <p>A people-first approach which ensures inclusive, comfortable, safe and dignified access to public services</p>	<p> ENVIRONMENTAL</p> <p>An urban transport system which reduces its negative impacts on the environment and on public health, towards healthy cities</p>	<p> ECONOMIC</p> <p>An efficient, affordable and economically sustainable transport which supports economic vitality for the individual and for the city</p>

Targets (ADJUSTED BY BASELINE STUDY)

	2025	2030		2025	2030		2025	2030
Reduce road fatalities	FROM BASELINE	FROM 2025	Decrease GHG emissions per passenger km	-10%	-15%	Reduce national fuel expenditure	FROM BASELINE	FROM 2025
Increase mass transit accessibility for vulnerable users	FROM BASELINE	FROM 2025	Reduce local air pollution	FROM BASELINE	FROM 2022	Decrease average congestion (mins/km)	6	5
Increase modal share of public transport	FROM BASELINE	FROM 2025	Increase km of protected bike lanes	+100%	+300%	Decrease % of income spent on transport	10%	8%

Themes & Components

NON-MOTORIZED TRANSPORT	PUBLIC TRANSPORT	URBAN FREIGHT	TRAVEL DEMAND MANAGEMENT	TRANSIT ORIENTED DEVELOPMENT
<p> Walking</p> <p> Cycling</p>	<p> 'New' Jeep</p> <p> Bus</p> <p> Rail</p> <p> Water Transport</p>	<p> Light Goods Vehicle</p> <p> Heavy Goods Vehicle</p> <p> Non-Motorized Freight</p> <p> Deliveries via Motorcycles</p>	<p> Information</p> <p> Pedestrian Zones</p> <p> Road User Charging</p> <p> Telecommuting</p>	<p> Land Use Planning</p> <p> Land Value Capture</p> <p> Urban Regeneration</p>

The **integration of NUMP specific objectives and the national commitments and objectives with regards to the Paris Agreement (NDCs) or the Sustainable Development Goals (SDGs)** should be discussed during this step and further developed along with the more in-depth MRV conceptualization (see **Section 7**). The vision and targets of the NUMP could be linked to:

- A sectoral GHG mitigation target e.g. from the country's NDC (or demonstrate the NUMP's contribution to a sector-wide mitigation target), or
- A sectoral non-GHG target (e.g. mode share in China, Fleet electrification etc.)
- Urban mobility related mitigation actions listed in the NDC.

Besides these global target categories, the NUMP vision should consider issues such as:

- Clean and healthy cities and emission reductions from mobility activities, both for GHG emissions and local pollutants,
- Energy security, increased energy efficiency and use of renewable energies in the urban mobility sector,
- Social justice, enhanced accessibility to jobs, markets, services, and social networks, particularly for disadvantaged groups,
- Affordability and quality of mobility services, including safety concerns, particularly for vulnerable groups,
- Efficient, sustainable and climate-resilient mobility infrastructure,
- Good quality jobs in mobility services, and
- Innovation and economic development from low-carbon mobility technologies and services.

An important part of this step is the identification of a set of simple, specific and – wherever possible – measurable **performance indicators** against which progress towards the vision and objectives can be measured (goal setting) and allow accountability among the public and private stakeholders. This task must be carried out considering data availability (Step 4). Indicators should be based – wherever possible – on available public data and data already employed in other policy fields (e.g. GHG reporting) in order to enhance policy integration and facilitate reporting on the NUMP progress. For **each of the indicators, targets should be defined**. To increase policy coherence, targets should relate or contribute to existing targets e.g. from the climate policy (e.g. NDCs); land use targets for transport infrastructure; targets for market penetration of low-carbon mobility technologies or targets for the access to public transport and costs of tickets.



The selection of indicators depends on the specific national and NUMP context, the joint vision and the results of the scenario process. **All identified policy objectives should be covered by at least one indicator.** Integrating a set of indicators that are already used in public policies reduces the effort of data collection, ensures policy coherence, and increases acceptance of the indicators by critical stakeholders.

Specific mobility indicators can measure the following: changes in the state of the physical, institutional, and political environment of mobility; changes in inputs and outputs (energy use and emissions), changes of the infrastructure network, changes in mobility behaviour, or institutional changes. A comprehensive indicator system covers several of these dimensions.

The common vision prepared in this phase serves as orientation and will be reviewed, deepened and fine-tuned iteratively throughout the remaining NUMP development steps. The vision should be formulated in an encouraging and persuasive way and emphasise synergies between policy fields. It is essential that the vision is in line with other relevant national strategies and policies, for example on urban development, climate and energy, health, or innovation, and outlines how it will contribute to their respective aims and objectives.



Table 4. Tools and resources – Core Impact indicators

Dimension		Potential indicators
Mobility indicators	Mobility volumes and modal share	- Passenger and freight volumes, by mobility mode (passenger-km per inhabitant; tonne-km per inhabitant)
	Mobility Infrastructure	- Length of transport network (km by mode) - Length of cycle network - Number of pedestrian crossings - Share of toll roads
Environmental Indicators	Energy Consumption for mobility activities	- Mobility final energy consumption by mode
	GHG emissions	- Mobility related emissions of greenhouse gases
	Air quality	- Total emissions of NO _x , PM, NMVOC, SO _x - Number of reported exceedances of air pollutant objectives
	Biodiversity	- Habitat fragmentation from transport infrastructure - Impacts of infrastructure projects on protected areas
	Land use	- Soil sealed for transport infrastructure (in ha per year)
Economy	Costs and Prices	- Fuel Price
	Subsidies	- Subsidies for specific mobility modes
	Costs of congestion	- Time spent in congestion (in h per capita and year)
	Public investments	- Public investments in transport network: shares by mode (road, rail, active modes, waterways in %)
Social and health indicators	Access to mobility systems for all	- Proportion of population that has convenient access to public transport (living within 500 m from PT station) - User satisfaction with PT
	Noise	- Proportion of population suffering from transport noise
	Safety and security	- Number of road fatalities - Number of accidents with fatalities and injuries
Sustainable mobility planning and policies	Internalisation of costs and pricing	- Development of mobility costs (compared to base year, by mode) - Fuel taxes (rates) - Share of toll roads (% of road network)
	Mobility behaviour	- Development of modal share (by mode, in %) - Car use (in km per year, cars per-capita) - Motorisation rates (Number of passenger cars per household)
	Integrated & sustainable Planning	- Number of cities with a SUMP - Number of cities with green zones
Innovations	Innovations in the transport system	- Share of new cars with non-petroleum fuel engine - Share of final renewable energy consumption, by mode - Number of bike and car sharing systems implemented - Share of cities with integrated ticketing systems

Step 10: Agree on priority areas and select measures



After having agreed on the vision and targets of the NUMP, a critical step for the way forward is the evaluation of potential **NUMP priority areas** (such as electric mobility, high quality public transport, parking management, SUMP promotion, etc.) and of **NUMP priority measures** (such as introduction of a law requiring SUMPs, electric bus investment programme, establishment of a urban transport authority, etc.). Some NUMP might include several priority areas. The areas can look very different depending on the particular NUMP. Alternatively to a grouping along mobility topics (see above) another option is to go for a functional structure (as in the example of Peru, see box below). Peru structured its NUMP along the areas of institutionalisation, regulation, technical and financial support.

The agreement on priority areas and measures does not happen in isolation from the previous steps but requires iterations with Step 8 (Scenario Assessment) and Step 9 (Vision and Targets). It is necessary to assess (in different scenarios) which bundle(s) of measures are capable and best suited to achieve the targets set in Step 9. Since this has as well implications in terms of required financial resources and impacts, it might happen that the budget and/or ambition of the targets (and/or the measures) need to be adjusted accordingly. In the end, all this is an iterative process with the aim to arrive at a coherent and realistic set of targets and an underlying priority areas and measures to achieve your NUMP objectives and make the vision and become reality. In some cases, it can be useful to summarise the priority areas and measures in (sub-) sectoral strategies. These strategies can be derived from the scenarios using back-casting, which is a method to understand ways to achieve a desirable outcome.



Box 17. Types of NUMP Measures – Definition

In the frame of the NUMP Guidelines a measure is a **broad type of action that is implemented to contribute to the achievement of one or more NUMP objectives, or to overcome one or more identified barriers. Examples** range from infrastructure, regulation, management and service measures to behavioural, information provision and pricing measures.

These guidelines distinguish **three types of measures**. This is as well helpful for the assessment of the GHG mitigation impact.

- **Direct mitigation measures**, i.e. those measures that do actually mitigate GHG emissions, e.g. bus fleet renewal combined with bus scrapping.
- **Supportive measures**, i.e. measures that do not mitigate emissions but are required to ensure that the direct GHG mitigation measures do actually work. In that sense supportive measure are “enablers” for direct GHG mitigation measures. In general, these measures include improvement of framework conditions, training and organizational development. Examples include e.g. training of O&M staff for electric buses.
- **Organizational measures** (the implementation arrangement for process coordination and project management), i.e. measures for sound management and coordination of the overall process to implement the mitigation action.

The status quo analysis (in particular the barriers chapter of the report; **Phase II**), the different scenarios (Step 8) and the NUMP vision as well as its specific objectives (Step 9) provide important inputs and good orientation to come up with **potential priority areas** of the NUMP. Typically, a first long list of potential measures can be derived from these steps. The more challenging part is the identification of those measures that are best suited to achieve the objectives of the NUMP (**priority measures**). Typically, these are not isolated measures but consist of smart bundles or packages of measures. The assessment and selection of measures aims to identify the most suitable and cost-effective measures to achieve your vision and objectives.

In order not to oversee relevant options and capture as well innovative ideas, a **comprehensive long list of potential measures** should be created based on your own organisation's and the NUMP core team's expert knowledge, databases of measures and a consultation among the core stakeholders. To achieve a set of effective measures that realistically fits with the available resources and in the specific country context, a transparent **assessment of all options** on the long list needs to be conducted. The assessment will be guided not only by effectiveness in terms of contribution to objectives, but also by acceptability, value for money, likelihood of successful implementation, etc. Especially in times of tight budgets, it is crucial to get the most impact possible for the resources spent.

To inform the assessment of options it is important to **collect information on the measures** and to review the information included in the status quo analysis. Results of technical studies conducted in the mobility sector should form the basis of the collection process. Ideally these studies should provide representative data regarding the mitigation potential and the co-benefits of potential measures. To complement, it is recommended to draw on additional expertise of researchers and consulting firms.



For the assessment or **screening of measures** and the selection process of priority measures **five criteria** have proven useful in practice in several cases. However, since each country is unique and the framework for the selection process will differ, criteria can be added, deleted and/or modified to the specific context. The five criteria are listed in the following. The NAMA Screening Tool⁵ can serve as a tool to guide you through this process.

1: Paradigm shift potential/Potential for transformational change

- Impacts beyond a one-off project or programme,
- Potential for scaling-up and replication,
- Structural changes compared to situation without the priority area, and
- Knowledge and learning potential.

⁵ http://transferproject.org/wp-content/uploads/2014/04/GIZ_TRANSfer_Tool-1-2-1-Screening.pdf

2: Likelihood of successful implementation

- Development status of the measure: idea, existing regulation, included in budget, implementation started, etc.,
- Number and diversity of stakeholders, social acceptance,
- Technical and operational feasibility taking capacity of main stakeholders into account,
- Commitment of core decision makers, and
- Potential to overcome any further barriers to implementation

3: GHG mitigation potential

- Direct emission reduction potential of the measure, and
- Indirect or long-term mitigation impacts

4: Further benefits for sustainable development/co-benefits

- Social: access to mobility, road safety, comfort increase,
- Economic: economic growth, job creation, congestion reduction, security of energy supply,
- Environmental: local air quality, noise reduction, and
- Institutional: improved institutional set-up and framework conditions.

5: Economic and financial feasibility

- Abatement cost per tonne of CO₂e,
- Relation of costs⁶ and expected benefits,
- Cost of MRV (complexity in methodology; data availability & need for new data; technical capacity of core stakeholders),
- Feasibility to close funding gaps with public resources (domestic or international),
- Access to finance (domestic and international, public and private), and
- Financial risks.

All options from the long list should be ranked according to the criteria described above. As quantification is difficult, a scoring scale can be used for priority setting (++ , + , o , - and --). **Table 5** on the next page is a tool that provides broad guidance on the scoring of each criterion and **Table 6** on the same page can be used for the actual screening process.

⁶ Consider all costs: technical design, construction, enforcement, operation and maintenance, capacity building, MRV.



Table 5. Guidance on scoring for the prioritisation of measures

Criteria	Scores				
	++	+	o	-	--
Paradigm shift potential / Potential for transformational change	very high	High	Middle	Low	very low
Likelihood of successful implementation	High chance of success	Good chance of success for at least the main parts	Medium-good chance for most parts	High barriers for several parts	Very high implementation barriers
GHG mitigation potential (MtCO ₂ e/yr)	>1	0.5 – 1	0.1 – 0.5	0 – 0.1	only indirect
Co-Benefits	very high	High	Middle	Low	Negative
Economic and financial feasibility	Very good cost-benefit ratio and very good chances to be financed	Good cost-benefit ratio and good chances to be financed	Moderate cost-benefit ratio and some barriers to be financed	Low cost-benefit ratio and high barriers to be financed	Negative cost-benefit ratio and high barriers to be financed
	Very high cost of MRV	High cost of MRV	Medium cost of MRV	Low cost of MRV	Very low cost of MRV

Source: GIZ (2015b)



Table 6. Screening table for the prioritization of measures

Evaluation criteria	Priority area 1	Priority area 2	Priority area ...
Paradigm shift potential / Potential for transformational change	insert score	insert score	insert score
Likelihood of successful implementation	insert score	insert score	insert score
GHG mitigation potential	insert score	insert score	insert score
Co-Benefits	insert score	insert score	insert score
RANKING:	indicate rank	indicate rank	indicate rank

Source: GIZ (2015b)

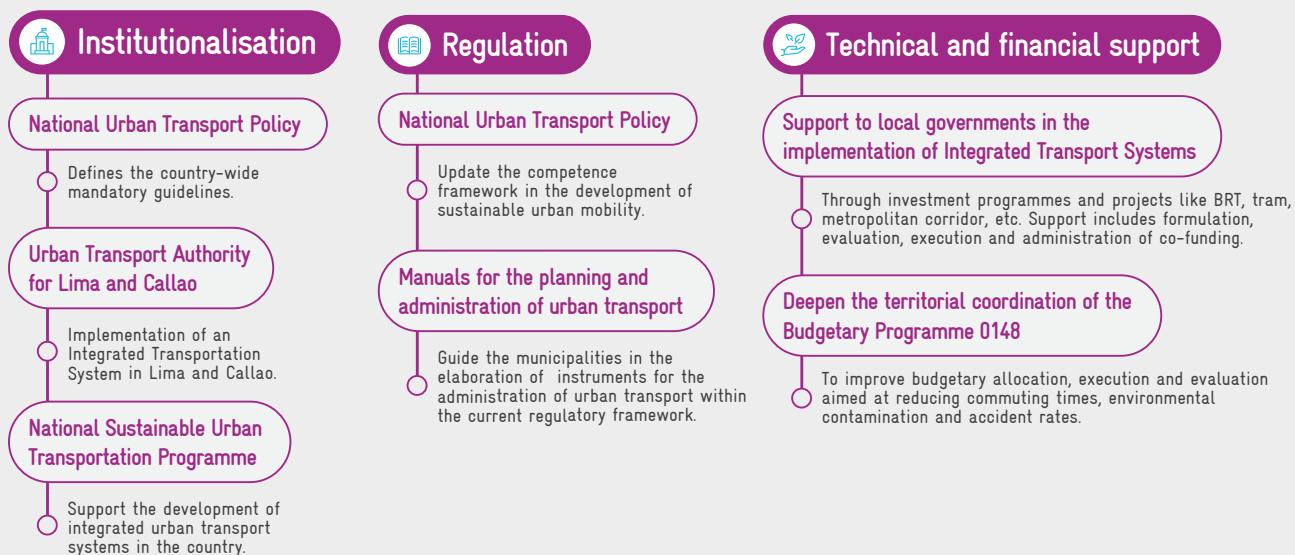
Alternatively, a ranking of options can take place, in which each option receives an ‘overall score’. The overall score across the six criteria can be based on a weighted average in which the criterion “Likelihood of successful implementation” might take a larger weight than the others. The scoring table can be filled in with relevant information as input for discussion, joint completion and participatory evaluation with relevant stakeholders. Alternatively, a blank version of the table can form the starting point of a discussion with the stakeholders.

In any case, the completed version of the table should be used as a basis for decisions on the short list. As indicated before, it might be necessary to go back to the modelling of different options of bundles of priority measures to verify your choice and create the level of confidence necessary for a final decision considering in more detail expected costs and likely impacts. In case of relevant decision makers not having participated in the screening / assessment procedure, it is recommended to seek approval at the corresponding political level. Moreover, it is useful to take a very clear decisions on the priority measures and to specifically define those which need to be further specified in the Detailed Preparation Phase (**Phase IV**).



Box 18. Example – Priority measures of the TRANSPerú NAMA

Supported through the NAMA Support Project (NSP), BMZ implementers and the framework of MobiliseYourCity Partnership, the Peruvian Ministry of Transport and Communications (MTC) has developed a coherent sector strategy for urban mobility, prioritising sustainable mobility measures in Peru. Institutionally, this strategy is backed by the National Urban Transport Policy, as well as the creation of the Urban Transport Authority for Lima and Callao (ATU) and the National Sustainable Urban Transport Programme.



Further reading:

- Urban Transport Authority for Lima and Callao (ATU) (**Law N° 30900, 2018**).
- National Urban Transport Policy (**Decreto Supremo N° 012-2019-MTC, 2019**).
- National Sustainable Urban Transport Programme (**Decreto Supremo N° 027-2019-MTC, 2019**).

Step 11: Update roadmap for NUMP development and broad stakeholder participation

As an intermediate step in the process, the NUMP development roadmap should be updated to reflect on the work carried out so far and the way ahead. This step would also benefit greatly from a broader stakeholder participation, including a wider group of public authorities, private sector representatives and civil society, for the reasons described e.g. in Step 7 on stakeholder participation.



Checklist Phase III: Vision, Goal Setting and Measure Selection

Phase III: Vision, Goal Setting and Measure Selection	✓
Consultants contracted to model different scenarios (modelling expert) and to facilitate the moderation of a series of workshops (facilitation expert).	
Workshop(s) realised with core stakeholders to develop and agree on scenarios, priority areas, long list of measures / actions, assumptions, and data used for modelling.	
Common long-term vision, objectives, indicators and targets jointly formulated in workshop(s) with core stakeholders and approved by Steering Committee.	
Priority areas and short list of priority measures / actions agreed upon by core stakeholders and approved by high-level Steering Committee.	
Roadmap for NUMP development contextually updated.	





Phase IV: Detailed Preparation

The Detailed Preparation of the NUMP in Phase IV is vital to prepare the ground for successful implementation of the NUMP. After this phase, all actions necessary to make the vision reality by implementing the mobility measures that were prioritised for the NUMP have been specified in detail. Funding is available and a financial structure to channel the financial resources is agreed on. The NUMP document is adopted and most importantly, stakeholders will have agreed on an effective and efficient implementation mechanism including a monitoring and reporting framework and an action plan with a clear allocation of responsibilities. This phase includes active support to translate the objectives set at the national level into local level projects. This can include the formulation of Sustainable Urban Mobility Plans (SUMPs) but also bus fleet renewal schemes or measures to strengthen the capacities of local decision makers.



DETAILED PREPARATION

- 12 Specify measures with technical studies
- 13 Prepare action plan and agree on responsibilities
- 14 Agree on implementation management structure and monitoring and reporting framework
- 15 Adopt NUMP document and ensure wide stakeholder support

PHASE IV

Phase IV: Detailed Preparation

Guiding Questions

- Which actions need to be realised exactly to implement the NUMP?
- How to enable and finance the implementation of the priority measures?
- Who is responsible for overall coordination and implementation of the different measures?
- How does the monitoring and reporting framework enable continuous improvement?
- Do all relevant stakeholders support the NUMP?

Main milestones

- Detailed description/study of each bundle of measures including technical specification, regulatory, governance, engineering, financing, capacity development and managerial aspects
- Action plan with clear responsibilities
- Agreed NUMP implementation management structure (responsibilities at different levels and for all measures, list of coordinators, etc.)
- Detailed financial design including financial mechanism and flow chart (see guidance in [Chapter 6](#))
- Agreement on monitoring and reporting framework and monitoring plan

Tools

- MobiliseYourCity Partnership Model Terms of Reference
- Outline for technical studies
- Fact sheet template for measure description
- NUMP document template to describe a NUMP in a comprehensive document
- NUMP implementation management structure (steering structure tool)
- Outline monitoring plan
- MobiliseYourCity Partnership Emissions Calculator

These tools are part of the NUMP toolkit available at www.changing-transport.org/toolkits/nump/



The **main objective** of this phase is to **prepare for effective implementation** of the NUMP. It depends on the resources, the capacities and the efficiency of the implementing agencies on the national and local level. It requires:

- A strong coordinating institution to mitigate split responsibilities and lack of coordination,
- Sufficient and well-trained staff in city administrations (planners, public transport authorities, public works authorities),
- Sufficient financial resources with efficient financial mechanisms,
- High level political commitment on local and national level and alignment of national-level policies,
- Committed NUMP steering committee with a sound understanding of the approach, and how to create a sense of ownership at municipal level,
- Clear guidance, such as implementation standards and technical specifications, and
- A well-defined implementation monitoring process with reporting obligations.

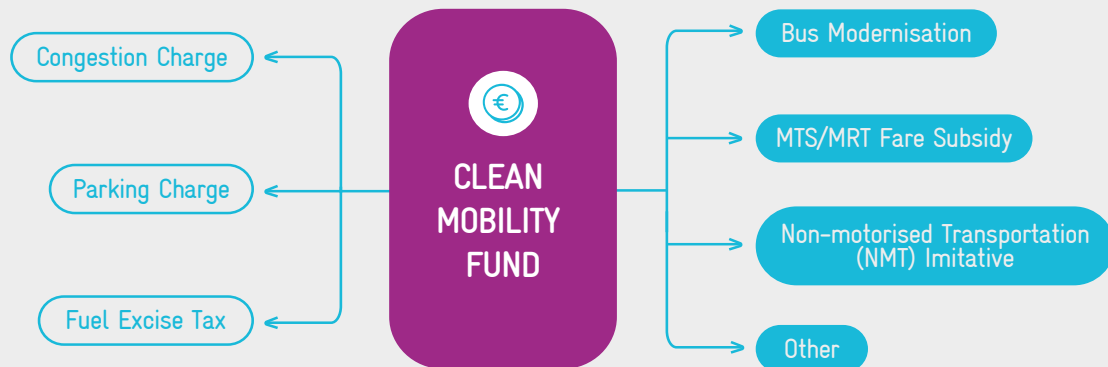
Step 12: Specify measures with technical studies

To arrive at an actionable NUMP, detailed technical studies are needed for the selected priority areas (sub-sectors or components of the NUMP such as public transport, urban logistics, non-motorised transport or transport demand management) and the specific (bundles of) priority measures of the NUMP (e.g. bus modernisation programme, investment programme for better cycling and walking, urban logistic improvement, etc.). Those technical studies should include:

- **Baseline / status quo analysis** (if not already conducted during the status quo analysis, or update/ further specification for bundle of measures in question);
- Identification of **main barriers and challenges** regarding a sustainable transformation;
- **Detailed description of the measures** (and technologies), i.e. actions to take to overcome the barriers including assessments of:
 - **Technical feasibility** (incl. standards and minimum criteria for technologies)
 - *Required adjustments to improve the policy framework and institutional set-up* (**Policy and governance**)
 - *Capacity of the market and relevant stakeholders to implement the measures* (**Capacity development**)
 - *Different options to implement the (bundle of) measures* (**Implementation mechanism**)
 - *Different technological solutions (e.g. battery electric buses vs hybrid buses; **Technologies**) according to their: total costs of ownership, mobility capacities in relation to existing and expected mobility demand, emissions of GHGs, noise and air pollutants compared to conventional mobility technologies, their specific infrastructure-requirements (incl. planning costs), their short- to mid-term availability, their practicability in different situations (e.g. power recuperation in mountainous cities for e-buses);*
- Financial design (**Budgeting and Finance**, see [Chapter 6](#));
- Impact assessment (**MRV**, see [Chapter 7](#)).

Box 19. Example – Development of the Thailand Clean Mobility Programme (TCMP)

After defining the priority areas and measures that should be addressed by the Thai Clean Mobility Programme (TCMP), detailed technical studies on the major components of the programme were carried out to evaluate the feasibility of the measures and design a ready-to-implement programme set up. For each of the topics, presented below, an inter-ministerial working group was established that meets on a bi-monthly basis to discuss and agree on study results and updates. A Steering Committee oversees the working groups and meets approximately every 4 months to take decisions on design options and next steps in the development of the programme.



Objective: Decrease PM_{2.5} emissions and improve air quality and quality of life, decrease CO₂ emissions to comply with Thailand's NDCs, achieve equitable access to mobility for all income groups and improve traffic safety.

Box 20. Testing Mobility Innovations in Urban Living Labs

To enable transformative change towards sustainable urban mobility it is vital to go beyond a mere technical perspective on vehicle technologies and take a systemic approach. Addressing mobility innovation as a component of an intermodal concept can help assisting in the wider transition towards sustainable urban mobility. Testing innovative urban mobility solutions that could be considered in the context of a NUMP can be a vital step to analyze the potential of new measures and assess political, legal, technical, social, economic and financial implications. To operationalize urban Living Labs, projects such as Urban Pathways and SOLUTIONSplus can help with the facilitation of cooperation between local, regional and national decision-makers, operators, industry and businesses to develop innovative e-mobility solutions that not only fit into the local context but also are scalable and replicable. The Living Lab approach taken in these projects considers mobility as a socio-technical system that consists of technologies, regulations, institutional settings, the economic system, interests, influence and power structures, behavioural patterns, and social norms. It considers that technological innovations should be integrated with existing transport services and networks in the frame of sustainable urban mobility planning tailored to the specific local economic, technological, social, political and environmental context. The integration of mobility innovations into the wider frameworks of Sustainable Urban Mobility Plans (SUMPs) and National Urban Mobility Policies (NUMPs) as well as business operations and industry development strategies are vital objectives of this approach.

Urban Pathways (www.urban-pathways.org), SOLUTIONSplus (www.solutionsplus.eu)

The following **Table 7** provides guidance on areas and topics that should be included in the technical studies for each (bundle of) measure(s) or component of the NUMP.

Table 7. Areas to be covered by detailed technical studies of a NUMP

Technical Area	Topics for detailed analysis/studies
Policies and regulation	<ul style="list-style-type: none"> – Update policy status quo analysis focusing on the selected measures – Develop policy roadmap with clear milestones and policy targets – Recommend policy and regulatory changes to support implementation – Develop standards and technical specifications for measures (see example in Box 21)
Governance	<p>Focal areas may include:</p> <ul style="list-style-type: none"> – Processes, responsibilities, and interactions between relevant national ministries, between national ministries and subnational governments and authorities, and within departments of relevant national ministries – Legal regulations as well as regulatory gaps and overlaps in urban mobility planning within the country's ministries and sectors – The actual or potential role of Metropolitan Transport Authorities as a means of streamlining processes and establishing clear responsibilities for the different means of urban mobility – The existence and extent of conflicting goals (for example reducing mobility-related emissions versus increasing level of service) between different national ministries or departments – The potential for public-private partnerships for supporting sustainable urban mobility planning
Capacity Development	<p>Prepare a capacity needs assessment showing the gaps in terms of individual and organizational capacities required to successful NUMP implementation and a proposal for an action plan. Aspects to analyse may concern amongst others:</p> <ul style="list-style-type: none"> – Methodological references (guidance, recommendations, compendium of good practices) – Specific tools and methods (survey and collection methods, databases, urban mobility observatories, monitoring and evaluation tools enabling local authorities to assess the degree of achievement of their objectives) – Job profiles – Vocational training and academic programmes – Cooperation programmes, state-to-state or city-to-city, to benefit from the experience gained by other – Research programmes and centres – Awareness-raising campaigns on the major challenges of sustainable development and the promotion of more environmentally friendly mobility behaviour <p>(more specific guidance in the text on the next page)</p>
Budgeting and Finance	<ul style="list-style-type: none"> – Financial status quo analysis – Cost and revenue estimation – Financial feasibility analysis – Economic viability analysis – Financial structure and mechanism of an investment programme (for more information, see NUMP Financing in Chapter 6)

Technical Area	Topics for detailed analysis/studies
MRV	<ul style="list-style-type: none"> – Basic data collection regarding GHG emission – Boundary Setting – Development of baseline and NUMP scenarios – Develop and implement monitor plan to assess NUMP impact (for more information, see MRV in Chapter 7)
Mobility Technologies	<ul style="list-style-type: none"> – Complement initial assessment and adjust orientations for the establishment of the action plan – Prepare a proposal for technological choices facilitating the implementation of the national urban mobility strategy

Source: MobiliseYourCity Partnership



One way for the national government to influence cities' implementation actions is to offer **incentives in form of capacity building and/or financial incentives** (e.g. preferential interest rates or grants to set-up a BRT system or a new parking management scheme). Another way, which is complementary, is to define **obligations** (e.g. compulsory preparation of SUMP for all cities with a certain minimum number of inhabitants as it is the case in Brazil by law) or to set **minimum standards and reference values** for services, products, and civil engineering within the NUMP framework (see the annex or related documents). Depending on the degree of subsidiarity, cities can refer or are obliged to adhere to these standards (e.g. in their procurement or planning decisions). When defining standards and specifications in the NUMP, make sure to use already existing standards and specifications wherever possible (e.g. in international standards, social and environmental legislation) and avoid any contradictions with established standards.

One example of technical specifications as part of the improvements of regulatory framework is described in the [Box 21](#) on the next page.





Box 21. Example – Standards and technical specifications for public transport services

Beyond mere infrastructure development, increasing service quality is crucial for an attractive public transport system that can compete with private car use. The European Standard EN 13816 provides a set of quality standards related to public transport services.

Standards for public transport services can define minimum requirements among others related to:

- Public transport network density and frequency,
- Accessibility of stations and their physical condition,
- Punctuality,
- Cleanliness,
- Comfort and communication,
- Training of drivers and driver behaviour,
- Salaries and social security of transport operators' employees,
- Clear and timely announcements of stops, real-time data, and
- Fare structure and ticketing integration.

Technical specifications can define for example:

- Emissions of public transport vehicles (CO₂, local pollutants and noise),
- Use of specific fuels or energy,
- Vehicle accessibility (e.g. to wheelchairs) and safety standards, and
- Information displays in vehicles and stations.

Further reading: [European Standards \(2002\)](#).



The sustainable implementation of NUMPs relies on the capacity of the stakeholders involved. Therefore, **capacity development** should be a core area of attention of any NUMP. An efficient implementation of a NUMP typically requires the national government to invest into strengthening the capacities of municipal stakeholders. National policies of programmes for to improve urban mobility at city level cannot be successfully implemented if local authorities don't have the skills, resources and capacities to respond to national policies or programmes. The focus of the capacity building approach corresponds to the type and scope of the NUMP but should include at least some strategic sustainable urban mobility planning components even if the NUMP may be focused on certain interventions, e.g. electric bus promotion.

Typical skill sets that need to be addressed are:

- **Technical skills** in mobility demand assessments, mobility provision and urban mobility policy development and implementation;
- **Legal skills**, particularly in terms of contracts between public authorities and private operators; and
- **Financial skills** in urban mobility project development and implementation.

The capacity building approach should take advantage of additional actors such as the ministry of education, universities and professional associations. Capacity building can come in different forms such as:

- **Formal education:** To develop human resources in the mid to long-term, it is important to improve cooperation with universities to integrate sustainable urban planning into relevant curricula (urban planners, transport engineers, etc.) and vocational training; and
- **Continuous education:** In the short-term, training programmes for administrative staff on the national and the local level and for the private sector should be implemented. Continuous education programmes can be funded and coordinated through a dedicated programme established in the NUMP framework and the actual training programmes could be provided by: formal educational institutions (universities, colleges, and other training facilities), public research institutions, professional associations, city associations, or private consultants.

Beyond the provision of training programmes, the capacity development would benefit from the provision of **supporting material** such as:

- Guidelines and recommendations on SUMP and NUMP development and implementation,
- Summaries of good practices to contribute to the implementation of more sustainable urban mobility policies and projects,
- Specific tools and methods at the national level to ensure the coherence of local urban mobility policies; and
- Awareness raising material on the major challenges of sustainable urban mobility and promoting more environmentally friendly mobility behaviour;

The establishment of a **resource centre (online resource and training centre)** could help to centralise capacity building actions and serve as a knowledge hub on urban mobility to support local capacity building and promote the NUMP.





Box 22. Tools and resources – Training courses for government officials

The **Transformative Urban Mobility Initiative (TUMI, 2019)** enables leaders in developing countries and emerging economies to create sustainable urban mobility. It offers technical and financial support for innovative ideas; and provides a catalogue of capacity development offers of its Partners. TUMI supports projects, leadership development and career building for urban leaders, decision-makers, planners and students.

Furthermore, there are various international, high-level urban mobility planning courses that have been in place for several years. In 2012, the World Bank (2019) launched the “**Leaders in Urban Transport Planning (LUTP)**” programme, which offers short-term diploma courses using innovative teaching and learning methods for specific geographical and language regions.

Several universities offer short-term courses targeted at employed transport officials. These courses not only provide a practical approach to the everyday issues faced by the officials but also provide certificates that enable the advancement of technical qualifications. Some such courses are:

- Global Challenges in Transport, Oxford University (**TSU, 2019**).
- Various short-term courses at the University of Leeds (**2019**).
- A programme on governance offered by the EPFL (**IGLUS, 2019**).

There are other initiatives that support capacity building at a local and national level:

- United Nations Institute for Training and Research conducts regular courses on Sustainable Mobility (**UNITAR, 2019**).
- The Urban Electric Mobility Initiative (**UEMI, 2019**) offers a number of webinars, e-learning course and regional trainings on various aspects of urban mobility.
- The International Association of Public Transport (**UITP, 2020**) has developed a portfolio of training programmes that can support public transport organisations to strengthen the capacities towards a more efficient public transport provision.
- GIZ’s **Sustainable Urban Transport Project (2017)** conducts regular trainings on sustainable mobility focussed on local decision makers.

Step 13: Prepare action plan and agree on responsibilities

Following the detailed specification of the bundles of measures that were prioritized for the NUMP, operational planning helps to break them down into **actionable tasks (or actions) for the departments and institutions that are in charge of their implementation**. On the basis of the detailed descriptions of the measures (Step 12) and related financial design and MRV Steps (see **Chapters 6 and 7**), clear responsibilities, implementation priorities and timelines need to be agreed. At this stage, it is also essential to **communicate the concrete ('actionable') content with the most affected stakeholders** and with political decision makers. The main aim of this step is to agree on a widely supported set of clearly defined actions in order to facilitate the implementation of your NUMP⁷.

⁷ This step follows closely the SUMP implementation logic, outlined in the new SUMP guidelines. https://www.eltis.org/sites/default/files/sump-guidelines-2019_mediumres.pdf



By specifying the actions, you define how exactly you want to reach the set targets. The detailed action descriptions prepare the implementation phase and help to identify relationships between actions and then decide on the order of their implementation. You define what will be carried out how and by whom, where and when during the implementation phase. Action plans should be tailor made for the specific context. **Elements of an action plan**, that can be helpful to consider are:

- Action (name, number and short description)
- Related NUMP objective/target/indicator
- Priority (very, high, middle, low)
- Implementation period
- Cost & revenues (investment cost, O&M cost, revenues)
- Funding source/ financier
- Responsible
- Involved stakeholders
- Implementation barriers / risks
- Dependency/ relationship with other actions / measures

In practice, it can be useful to distinguish several **categories of actions** to make sure everything needed for successful and smooth implementation is actually covered:

- Technical actions (incl. issues related to regulation, governance, technology, construction, etc.)
- Capacity development
- Financial actions
- Monitoring and reporting related actions
- Coordination and management (incl. active stakeholder communication and involvement)



When a final set of actions has been described, it is **time to assign responsibilities, priorities and a schedule for implementation**. A clear picture of prioritised actions and schedules and who is in charge of them is a cornerstone of every NUMP. This requires close coordination and discussion among all actors that will have a role in developing and implementing the actions. It is important to identify options for who can take the lead in implementing an action considering abilities, strength, and competences of the stakeholders. Sometimes having one party taking responsibility for a task might be the obvious way forward. In other cases, collaborative and interdisciplinary work with different stakeholders might be a better solution. Make sure to agree on clear responsibilities for each action of the measure packages. An action without a responsible party is likely not to be carried out. In order to ensure transparency, information for citizens and public support, it is useful to **make core elements of the action plan publicly available** such as timeline, responsibilities and allocation of resources.

Step 14: Agree on implementation management structure and monitoring and reporting framework

During the Initiation Phase, an initial steering structure for the NUMP development process was established (see Step 3 and example in Box 4). In this step, the NUMP core team needs to decide if this structure is as well adequate to coordinate and manage the implementation or if adjustments are needed, which is likely. The purpose of this step is to **agree on and establish a solid NUMP implementation management structure that ensures the thorough engagement of all relevant stakeholders** and defines the way how the NUMP achieves its formulated vision and targets. Agreeing on an implementation arrangement or management among the core stakeholders is essential for efficient and effective management and coordination and thus for successful implementation of the mitigation action.

NUMP implementation can include a broad variety of actions such as to draft laws or decrees, to harmonise regulation and institutional cooperation, to amend contradictory or incoherent regulations, and/or to operationalise funding schemes. Cohesion among local and national strategies, plans and policy instruments towards sustainable urban mobility greatly improves their effectiveness. Hence, the NUMP process needs to establish a solid basis and framework towards an efficient policy integration and coordination between government organisations. Contradictory priorities between local, regional and national levels can create major obstacles slowing down the NUMP implementation and respectively the SUMP development⁸, if targeted by the NUMP. The interactions between relevant national ministries, between national ministries and subnational governments and local authorities, and within departments requires efficient institutional coordination, which may take different forms, such as one or several committees, joint working groups or even a dedicated authority. The different bodies of the NUMP management structure are tasked with coordinating implementation of the different actions.

⁸ The CIVITAS project SUMP-UP conducted a consultation process with 328 cities from 27 EU member states to assess the needs of local authorities for SUMP take-up: CIVITAS SUMP-UP. Users' needs analysis on SUMP take up (CIVITAS, 2018).



In public administration, formal agreements are a powerful tool to structure and guide planning and implementation mechanisms at overarching level, regulating the authorities and responsibilities of the several institutions or institutional units involved in large and complex projects. Without such formal frameworks, tasks and action taking often remain vague and stuck due to lack of roles and mandates of required stakeholders. It is therefore recommended to **formalise the NUMP management structure in writing including formal high-level approval by the core ministries**. Active political support and a clear allocation of responsibilities and resources is crucial for success.

In practice, it proved useful to distinguish (explicitly or implicitly) three different levels when designing a management structure for such a complex endeavour as NUMP implementation. The different levels and some typical tasks are outlined below:

- **Political / strategic level:** Give strategic guidance, take strategic decisions, approve budget, work plan and annual report / progress reports, representative tasks
- **Management level:** Prepare / update action plan, implement monitoring and reporting framework, coordinate NUMP implementation, prepare annual report / progress reports, implement communication plan
- **Operational level:** Implement specific tasks / actions of the action plan regarding selected priority measures, report to management level

The **different levels usually correspond to different bodies**, e.g.

- **Steering committee** for the political / strategic level,
- **Technical secretariat** or a technical support unit for the management level and
- **Working groups** or committees for the implementation of selected parts of the action plan, often for distinguished by different priority areas, such as for example public transport.

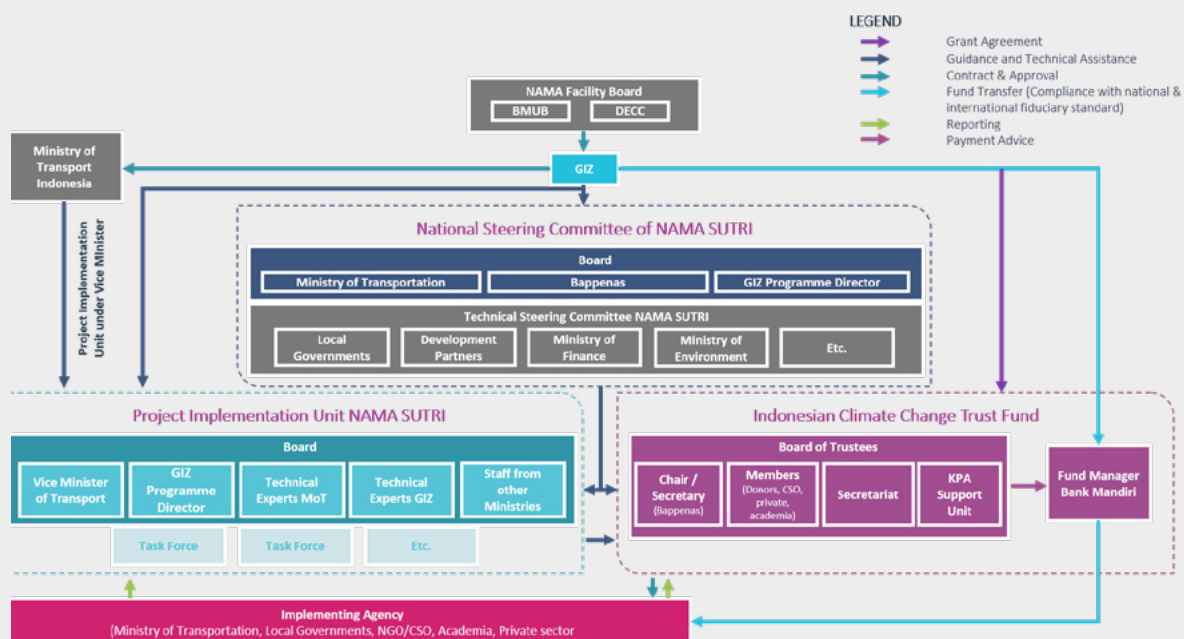




Box 23. Example – Implementation mechanism for SUTRI NAMA in Indonesia

In the case of the SUTRI NAMA project, GIZ as implementing agency phrased an implementation agreement in line with an underlying project proposal and followed up its adjustment with the various Indonesian stakeholder institutions. The implementation agreement was signed at leadership level of the Ministry of Transport as responsible line ministry, so that it could serve as guiding reference of all the project’s further activities and for all subordinate units and concerned subnational institutions.

Later-on, the implementing mechanisms, particularly the financial support mechanism was to be fine-tuned further with relevant institutions, as various detailed challenges were hardly to anticipate within the overarching implementation agreement. Hence, there need to be sufficient flexibility, openness, target-orientation and ambition in the process, to shape challenges at operations level across several institutions – which in many administrations is perceived as the main challenge in the process. Shaping requires inputs and constructive dialogue between institutions, so one of the biggest challenges is to overcome institutional barriers and hesitance. Supporting expert studies are instrumental to support such public sector dialogues, and to table robust options for decision making. SUTRI NAMA encouraged such dialogues between the Ministry of Transport (MoT), the Planning Ministry (BAPPENAS), the Ministry of Finance, a state-owned infrastructure development intermediary (PT SMI), and others.



Further reading:

- TRANSPeru (GIZ 2015b).
- NAMA SUTRI Indonesia (GIZ 2015).
- Jeepney+ NAMA Philippines (GIZ 2016b).

In case technical secretariat / technical support unit (TSU) / programme implementation unit (PIU) is established to manage NUMP implementation, the following tasks could be part of the mandate of the unit:

- Prepare the periodic reporting on the progress of NUMP implementation in line with the reporting obligation defined in the NUMP process;
- Prepare specific regulations, and infrastructure and service planning to implement the NUMP;
- Formulate standards and technical specifications for implementation measures on the local level;
- Formulate minimum quality standards for urban mobility plans;
- Co-ordinate the capacity building programme, including organising the knowledge exchange and support programme; and
- Organise workshops and training events for different groups of actors (or the supervision of contracted learning programmes) in line with the capacity building programme.

The NUMP implementation management structure shall ideally **cover the following aspects**:

- Roles and responsibilities of ministries and other stakeholders,
- Flow of funding and resources,
- Decision making processes,
- Reporting and monitoring process, and
- Coordination of the different bodies and institutions involved.



The following **tool** gives additional guidance: <https://www.changing-transport.org/tool/mitigation-action-co-ordination-and-steering-structure/>.

It is helpful to illustrate the implementation management structure with an **organizational chart** (see the example in the **Box 23**).

Setting up a financing mechanism and a monitoring and reporting framework is an important part of the design of the overall implementation management structure and key to ensure the implementation and sustainability of NUMPs. These guidelines do therefore include dedicated separate chapters on financing NUMPs (**Chapter 6**) and on Measuring and Reporting Greenhouse Gas Emissions (**Chapter 7**) with more specific guidance. A collection of useful material on urban mobility financing and MRV can be accessed via the MobiliseYourCity Partnership website: www.MobiliseYourCity.net (in the resources section) and in the further reading section at the end of these guidelines.

The overall **monitoring and reporting framework** of a NUMP should cover:

- GHG impacts (see **Chapter 7**)
- Non-GHG impact
- Implementation progress

Establishing clear procedures and responsibilities for **monitoring, evaluation and reporting** is crucial to assess the success of your NUMP, to ensure a continuous improvement of the NUMP process, to identify potential obstacles, and to safeguard the optimal use of public resources. This includes responsibilities on data collection and reporting structures. By providing a support framework and conditioning the availability of the financial and technical resources, the national level can encourage local political actors to effectively monitor and assess the impact of NUMP implementation. Data will be collected on the local level and on the national level, the monitoring, assessment and evaluation on the national level. Key is to ensure that locally collected data are consistent over all cities and allow national level aggregation.

Impact evaluation will assess the state of indicators as defined in **Step 9**. It is important not to underestimate effort and time needed for carrying out a sound monitoring and evaluation process. Thus, the elaboration of a **monitoring, evaluation and reporting plan** should start in early stages of the NUMP process and should:

- Clearly define the boundaries of the monitoring and evaluation (what will be evaluated?);
- Use a benchmark: goals, objectives, indicators and targets that should be fulfilled as the result of the NUMP as defined in **Step 9** (e.g. number of SUMP in cities);
- Provide an adequate set of indicators that refer to the NUMP indicators (as defined in **Step 9**) but also cover implementation progress aspects such as the number of national SUMP or participant's satisfaction with the learning programmes and progress on action plan implementation (**Step 13**);
- Provide a time schedule for different monitoring, evaluation and reporting tasks;
- Describe relevant data and methods for data gathering;
- Define responsibilities, reporting obligations, and reporting periods;
- Define data sources (e.g. official statistics, user feedback forms, online surveys, interviews); and target group(s) charged with collecting and providing data.

Providing standardised data entry forms helps the aggregation of such indirect effects.



Box 24. Tools and resources – MobiliseYourCity Emissions Calculator, MRV reference document, NAMA Handbook, CIVITAS Ch4llenge

The **MobiliseYourCity Emissions Calculator** supports cities and countries project the GHG impact of their SUMP and NUMP. The output of the calculator are BAU and SUMP/NUMP scenarios both for passenger and freight transport (**MobiliseYourCity 2020**).

For the monitoring, reporting and verification of GHGs, the BMU funded GIZ projects TraCS and TRANSfer developed a **reference document on Transparency in Transport** (**GIZ, 2018b**).

The **NAMA Handbook** provides practical guidance on Nationally Appropriate Mitigation Actions (NAMAs) in the transport sector to increase the sector's contribution to mitigate climate change (**GIZ, 2015b**).

The **CIVITAS Ch4llenge** project has prepared a **plan template** that can inform monitoring and evaluation activities. More information available at (**CIVITAS, 2014**).

Step 15: Adopt NUMP document and ensure wide stakeholder support

This last step is the final step of Phase IV and the NUMP Cycle before implementation. Collaboration between different stakeholders, from national and sub-national levels has already been established for widespread political endorsement. The further inclusion of the public and private sector, as well as civil society, NGOs and academia contributes to long-term commitments and stability, which are required to deliver and achieve a transformational change (GIZ. 2015b).

Step 15 is focused on the adoption of the NUMP final concept by political bodies and its public release. However, before the final publication, the NUMP concept (often in a form of a concept document) should be made available for public consultation and confirmation. This may also include the adjustments of sensitive topics that decision makers would not support and limit the widespread of the NUMP.



A complete draft of the document should include the following aspects:

- National background (**Step 4**) and short overview of development process (including stakeholder and citizen involvement (**Steps 2, 3, 7 and 10**),
- Results of mobility analysis and scenario exercise (**Steps 4 and 8**),
- Vision, objectives and key targets (**Steps 9 and 10**),
- Measure packages with their actions (including timeline, responsibilities, financing and MRV) (**Steps 12, 13 and Chapters 6. Financing and 7. MRV**), and
- Monitoring and evaluation scheme (**Step 14 and Chapter 7. MRV**).

It is also useful that the final draft is revised by other national and international colleagues, as well as by sustainable urban mobility experts to achieve a high-quality peer review. It is important to consider the time reviewers would need to avoid the delay of the final document. Coordinate with the different actors involved to successfully reach the expected publication date.

Once the NUMP document is published, it is essential to ensure wide political and public support. The final product must be ambitious enough to achieve its targets and attractive to receive interest by third parties. Consequently, the document must be graphically appealing and easy to read. As well, branding of the NUMP will contribute to be easily recognised and remembered. This may include from an attractive title of the NUMP to an identifiable colour palette and logo. The development of a short version of the document will allow wider spread among people who are not familiar with technical urban mobility issues.

Stakeholder support is translated in the ownership and acceptance of the NUMP by decision makers, public authorities and the civil society to facilitate its effective implementation. This is achieved by providing transparency, especially regarding the planned actions. A strategy to achieve this is by setting an official, dedicated information session to get feedback from relevant decision makers and key stakeholders. This contributes to widen political support and facilitate the NUMP's adoption. Feedback should also be received from other stakeholders, including organisations from the civil society and the public in general. The communication plan developed during **Step 6** will be useful to communicate the NUMP actions in a positive way and prevent negative responses from affected sectors.

Stakeholder support must also consider governmental election periods and changes during the NUMP development to ensure its endurance and pursue its implementation. This can be achieved with the setting of communications with the new government emphasising the benefits of the NUMP and the time and resources already invested in its development. The earlier alliances are made with different ministries and transport authorities, the easier it will be to legitimise the NUMP.



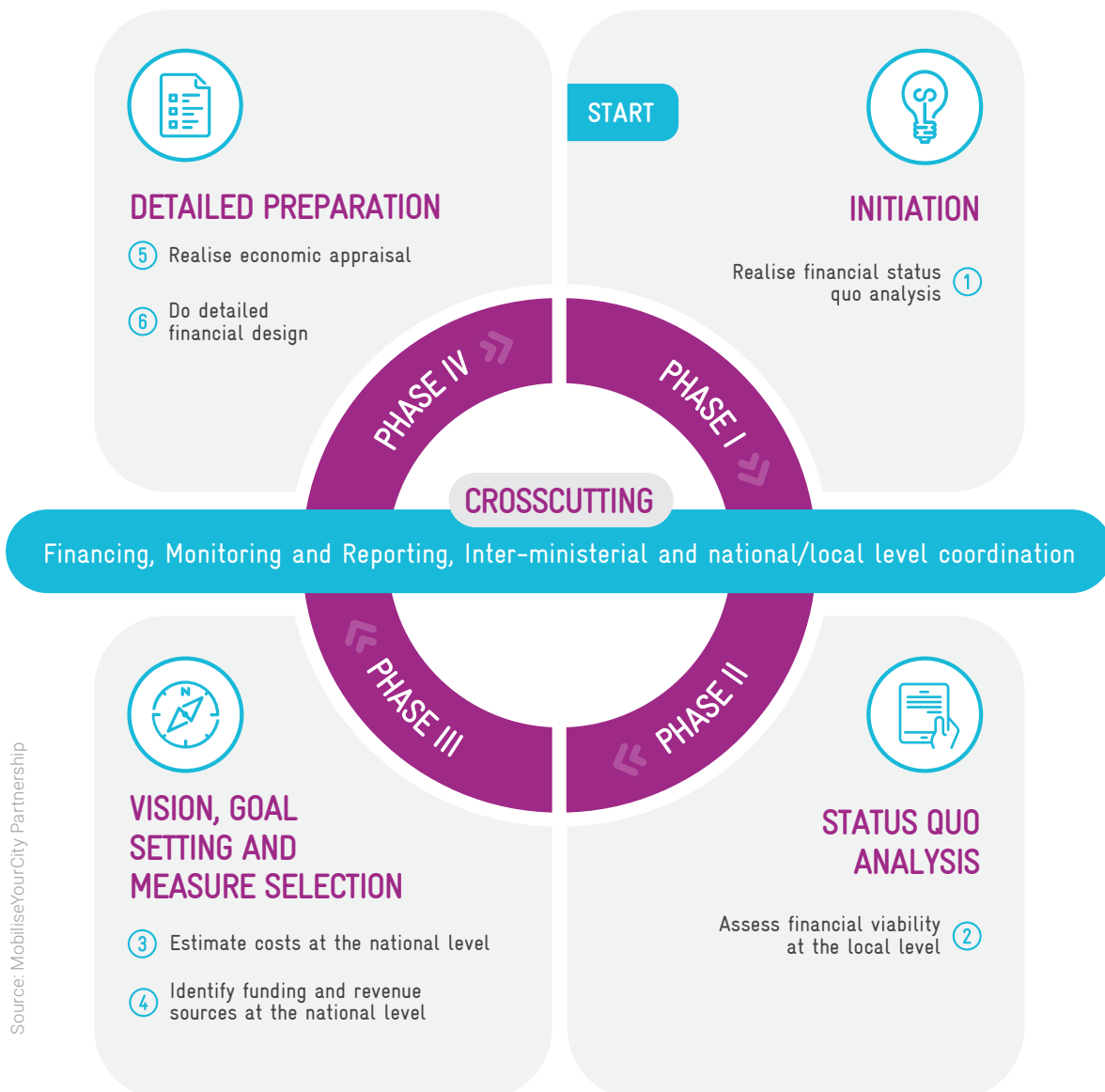
Checklist Phase IV: Detailed Preparation

Phase IV: Detailed Preparation	✓
Detailed technical studies conducted; detailed descriptions of the priority measures (i.e. actions to take to initiate the transition) are available covering: policy, regulatory framework, governance, technical and technological issues, capacity development, financing and funding, M&E and reporting.	
NUMP implementation management structure and action plan indicating clear responsibilities approved by high-level NUMP Steering Committee.	
Funding and financing structure developed and approved by high-level Steering Committee for NUMP implementation.	
Monitoring and Reporting Framework and Monitoring Plan developed and approved by high-level Steering Committee.	
Final NUMP document prepared, presented and adjusted according to comments by core stakeholders and NUMP core team.	
Final NUMP document approved by high-level Steering Committee and published with opportunity for feedback from society (public, private and civil society).	

NUMP Financing (crosscutting): Facilitating low carbon investments

The development of a robust financial design for a NUMP is a key success factor for the implementation of a NUMP. This is why we included a dedicated chapter on financing in the guidelines. Experience has shown that it is important to take into account questions related to financing during all phases of NUMP development. **Figure 13** shows the financial issues to be tackled throughout the overall NUMP development process.

Figure 13. NUMP Financing Steps along the phases of the NUMP Cycle



A financial status quo analysis of relevant financial issues (see [Section 6.1](#)) is done in parallel to NUMP Phases I 'Initiation' and II 'Status Quo Analysis'. An initial estimation of costs, identification of funding sources, a financial viability analysis and the economic appraisal happens in the phase of developing and choosing options for interventions and gathering political buy-in during NUMP Phase III 'Vision, Goal Setting and Measure Selection' (see [Section 6.2](#)). These tasks are deepened during the detailed preparation of the NUMP in Phase IV and culminate in the development of the detailed financial design (see [Section 6.3](#)). Thus, although the description of the steps may imply a consecutive order, in reality, the development of the financial design requires an iterative approach. Moreover, not all steps are equally relevant for all NUMPs. [Table 8](#) shows the different financial design steps and the main guiding questions to be answered in each step.

Table 8. Financial design steps and corresponding guiding questions

Financial Design Step	Guiding questions
<i>Financing Step 1:</i> Financial status quo analysis	<p>On a general setting: Who are the main financial actors and which are the main decision-making processes? What are relevant financial flows and the nature of investments in the sector, both at a national and local level?</p> <p>On barriers and drivers: Which (financial) barriers prevent the implementation of sustainable urban mobility systems? Which drivers may facilitate sustainable urban mobility?</p>
<i>Financing Step 2:</i> Assessing financial viability at the local level	Is public support from national level justified respectively needed for projects at the local level? If so, how much?
<i>Financing Step 3:</i> Estimating costs at the national level	What are costs for design and implementation of the NUMP at the national level ?
<i>Financing Step 4:</i> Identifying funding and revenue sources at the national level	What are potential national and international funding and revenue sources ?
<i>Financing Step 5:</i> Economic appraisal	At a macro-economic level , what are costs and benefits of the NUMP?
<i>Financing Step 6:</i> Detailed financial design	<p>What would be an effective, efficient and feasible financial design? What are the possible financial instruments?</p> <p>Which actors are involved and which are their roles? How are the financial flows and which conditions must be fulfilled for disbursements?</p>

Source: MobiliseYourCity Partnership

Different types of NUMPs, as defined in the introduction on **Chapter 1**, also **have different financing structures**.

- **Policy NUMPs** generally aim to incentivise behavioural change and investment decisions through regulatory and planning instruments without a direct investment component. Here, funding is mostly required for **design, enforcement and monitoring** of the policy measures and for accompanying **capacity building**. However, depending on the policy instrument used, policy NUMPs may have a substantial **impact on public budgets** (e.g. when changing taxation regimes). Policy NUMPs may also have a significant impact on private investments. While fuel economy standards and quotas for the purchase of clean vehicles, for example, imply relatively low costs to the public sector, private (and public) vehicle owners bear the full incremental costs for the improved technologies. Therefore, policy NUMPs may require thorough consultation processes and high-level political decisions.
- **Programme NUMPs** frequently also have a regulatory component, but they also include a direct investment support component that provides financing and/or funding for sustainable transport measures (see **Box 25** for a definition of funding and financing). **Table 10** and **Box 32** provide examples of the financing structure of different NUMPs.

Technical assistance and capacity building support for local level actors may be part of any type of NUMP – and are actually **recommended to be included in all NUMPs** as, in almost all countries, capacities for planning and implementing sustainable urban mobility measures tend to be weak, in particular at the city level. The Federal Support Programme for Mass Transit (PROTRAM) in Mexico, for example, includes technical assistance for building the institutional capacities of local institutions involved in planning, operation, and regulation of urban transport. In Colombia, the National Planning Institute supports municipalities with technical assistance for designing mass public transit projects.



Box 25. Definitions – Understanding the difference between 'funding' and 'financing'

Funding refers to revenue sources of a project or to other funding sources (e.g. government subsidies). Funding sources can be described as income for a project that does not need to be paid back. Funding can be either short-term, one-off financial flows (e.g. through government grants), or long-term, mostly annual cash flows (e.g. from user charges). For public transport projects, funding sources include user fees and ancillary revenues such as advertising, land value capture, cost savings through reductions in fuel subsidies as well as subsidies and grant programmes from government and international donors.

However, funding frequently relies on cash flows that are only generated during the lifetime of the project. Therefore, to support the upfront costs of the required investment, suitable financing mechanisms are required.

Financing mechanisms do not generate new revenues but leverage existing and/or future funding sources to pay for the construction or implementation of a project. In most cases, the implementing organisations of urban transport infrastructure projects do not have the required financial means for investments. This is why they often borrow additional funds, provided that the project is designed in a way that makes it attractive for investors. This financing, regardless of what mechanism is used, must be repaid in due course.

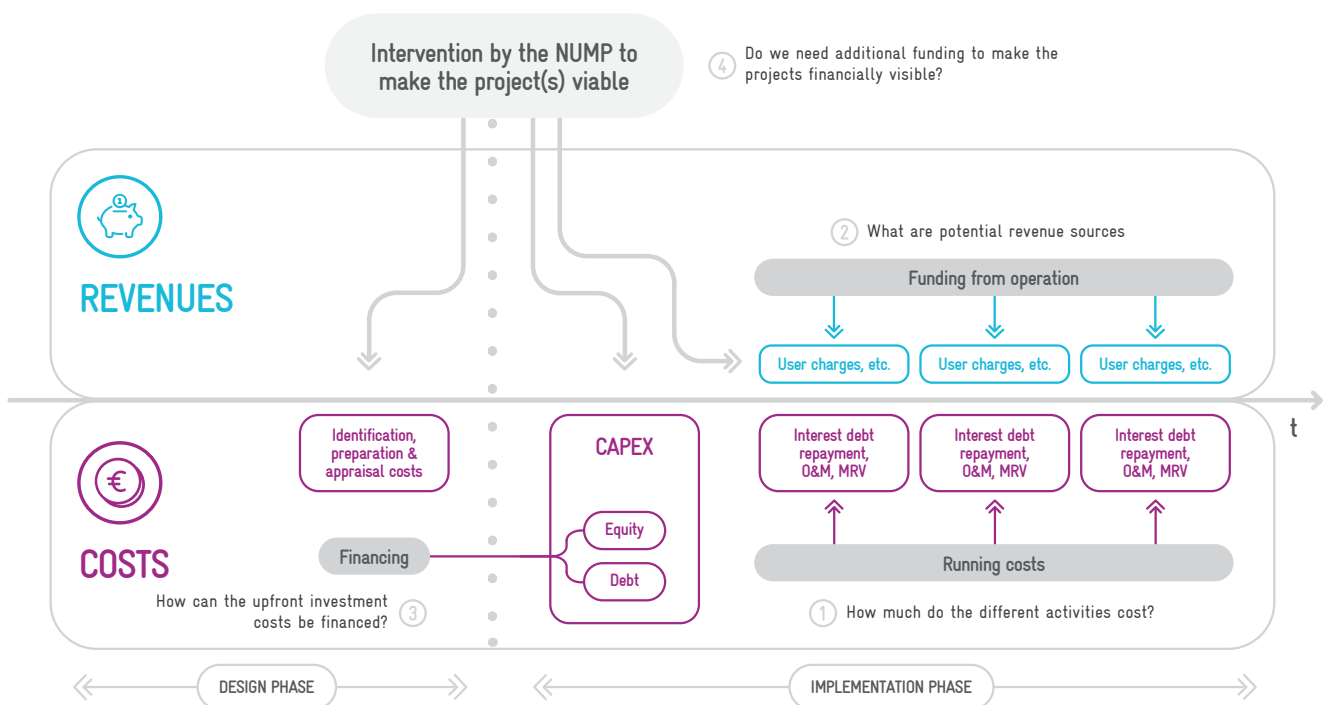


At the same time, policy and programme NUMPs have **common characteristics**, which distinguish them from direct investment projects and shape the use of funding and financing for the implementation of the NUMP. NUMPs consist of **interventions at the national level which have the aim to incentivise and support the implementation of sustainable urban transport systems in cities**. In particular, NUMPs aim to:

- Change investment decisions and behavioural patterns, and
- Mobilise local public finance and private sector finance for investments into low-carbon urban transport.

This implies that, for the development of the financial design, it is important to understand **how investment decisions are undertaken at the local level** and how viable investments into clean technologies are, as well as to understand how public finance is allocated at the national level. The following two figures demonstrate the relationship and financial flows between the local investment decisions and the NUMP. **Figure 14** shows a typical project cycle for a project in a city with support by the NUMP to make the project viable (e.g. the introduction of electric buses in a city receiving a financial incentive from the national government).

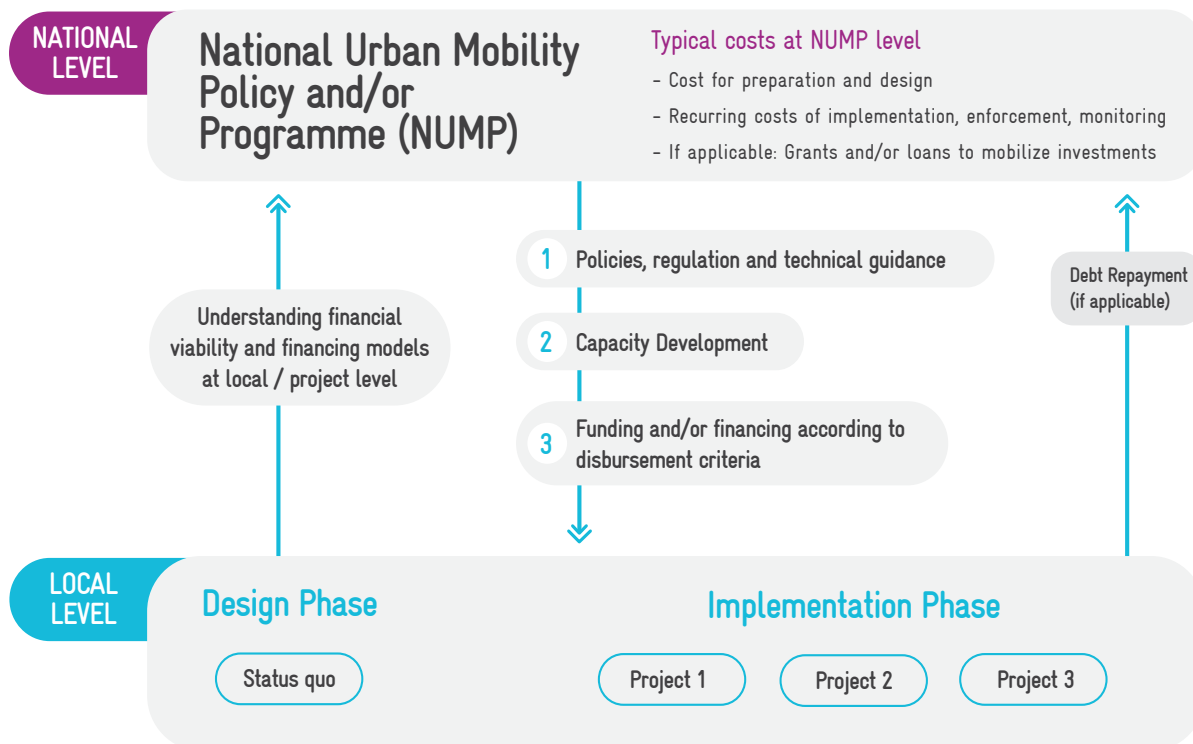
Figure 14. Financial flows and relationship between the local investment decisions and the NUMP



Source: MobiliseYourCity Partnership

Figure 15 shows several options of how the national government can support cities and highlights important elements in the relation between national and local level.

Figure 15. NUMP costs and typical elements of national government support



Source: MobiliseYourCity Partnership

Box 26 illustrates the above with an example and describes how, for the preparation of an investment support programme for electric buses in Colombia, the local and national level analysis interlink.

Box 26. Example – Preparing a support programme for electric buses in Colombia

To design a national support programme for e-buses in Colombia, the following analytical steps were undertaken to determine the most suitable financial instrument and the funding mechanism:

- Financial analysis at the level of the operator. Comparison of capital and operative expenditures at operator level to estimate the financial impact of the introduction of alternative bus technologies (i.e. hybrid, CNG and electric) in reference to regular diesel busses. Given that the goal is a national programme, different route types, cities and bus typologies were compared;
- Economic impact analysis from a national perspective. In an economic analysis, the external benefits and costs of environmental impacts (PM_{2.5}, NO_x, SO₂, CO_{2e} and noise emissions) were monetised for the full programme (the targeted number of e-buses to be introduced); and
- Funding mechanism. Based on the outcomes of the financial and economic analysis the necessary budget and the financial flows to support the fleet renewal were determined. The mechanism further identified potential co-financing sources and verified the effectiveness of the usage of funds.

NUMPs generally work with national public finance, which may be **complemented with international development and/or climate finance**. **Box 27** on the next page provides details on the use of international climate finance and ODA in NUMPs.



Box 27. Tools and resources – Using international development and climate finance in NUMPs

Over the years, the share of Official Development Assistance (ODA) going into the transport sector has dropped significantly. While about 40% of the World Bank Group’s total lending went to mobility between 1956 and 1965, in 2017, about 9% of committed ODA as reported by the OECD (or US\$ 17.8 billion) went to the “transport and storage” sector. Domestic (public) finance for mobility investment is, on average, thirty times greater than ODA. In 2015, the Multilateral Development Banks reportedly provided USD 6.3 billion of climate finance for sustainable mobility. In addition, international climate finance is provided to sustainable mobility projects in the context of bilateral development finance and through dedicated funds, such as the Green Climate Fund, the GEF and the NAMA Facility. However, sustainable transport projects have faced challenges in accessing international climate funds, as emissions reductions in the transport sector are more difficult to model and verify than for stationary energy sources. As of mid-2019, only one of 111 projects approved by the Green Climate Fund focuses on sustainable urban mobility.

Despite the relatively small contribution of ODA and international climate finance to the total investment needs for sustainable mobility, both can play an important role in complementing national public finance for the development and implementation of NUMPs. It is recommended to strategically use international climate finance to:

- Support the **development of NUMPs**;
- Support the development of sustainable mobility related strategies, policies and technical standards which form part of the **regulatory component of a NUMP**;
- Support the **development of a project pipeline for a programme NUMP**, e.g. by (co-financing project preparation facilities); or
- Finance **capacity building** measures at a national and local level.

In addition, ODA or climate finance grants may be used to **cover part of the incremental costs** for low-carbon technologies such as electric buses. **Loans** may be used to **refinance the investment component of a NUMP or** – more broadly – to **support policy reform programmes** of the transport sector through the provision of **policy-based financing packages**. Policy Based Loans are based on the joint development of reform measures by the partner government and donor(s) under the lead of the partner government. Once the reform programme has been decided, it can rapidly move to implementation through the provision of concessional loans which become part of the national budget and are implemented through the national public finance system. The concessional loans are mostly used to finance the investments for the implementation of the reform measures.

Box 31 describes an example from Peru.

Table 9 on the next page shows real world NUMP examples highlighting different financial designs and non-financial instruments used to promote sustainable urban mobility in cities via different NUMP types.

Table 9. Examples of NUMPs including financial and non-financial instruments used

Financial Design Step	Incentivised investments	Financial instrument	Non-financial instruments
Policy: Law for financing of public urban transport, Germany (GIZ and EMBARQ, 2013) .	Non-rail based public transport infrastructure, operation and maintenance	Subsidies to cities for costs of operation	Regulation
Policy: obligatory procurement quotas for clean buses (EU Clean Vehicle Directive (DIRECTIVE (EU), 2019)).	Clean vehicles	n/a	Regulation: EU Level Binding Minimum Targets for Public Procurement of Low-Emission Vehicles: 2025 - 25% low-emission buses; 2030 - 33% low-emission buses In the context of 75% of buses bring publicly procured (e.g. by local authorities)
Programme: Public transport reform programme, Philippines (Jeepney+ NAMA) (GIZ, 2016b) .	Low-carbon (mini) buses	Grants and preferential financial terms (5% deposit, 6% interest, 7years loan term, 80.000PhP grant) - for purchase of new buses that meet newly implemented vehicle standard in the country	<ul style="list-style-type: none"> - New vehicle standard - New franchising guidelines for consolidation of franchises - Fare restructuring - Modernization of operations - Route rationalization - Operators' raining programme
Programme: National E-Bus Promotion Programme, Germany (BMU, 2018; SUTP, 2018) .	Electric buses	Grant for incremental cost for additional investment over conventional buses: <ul style="list-style-type: none"> - Plug-in hybrid buses + Infrastructure: up to 40% - Battery-electric buses + Infrastructure: up to 80% - Workshop equipment & staff training: up to 40% 	
Programme: Federal Support Program for Mass Transit (PROTRAM), Mexico (GIZ and EMBARQ, 2013) .	Infrastructure, control and fare collection systems of BRT, LRT, Metro and Suburban Rail systems	Grants and loans - to cities above 500,000 inhabitants	Feasibility studies Technical Assistance
Mix of Policy and Programme: Growth Acceleration Programme, Brazil (GIZ and EMBARQ, 2013) .	Mass transit infrastructure	Loans - for infrastructure and acquisition of buses	Regulation, including a law that requires larger cities to develop a mobility master plan
Mix of Policy and Programme: Comprehensive Urban Transport Reform designed as a NAMA, Peru (GIZ, 2015c) .	Infrastructure for public transport and non-motorized transport	Grants for the design of local infrastructure investment projects Grants/loans for the investment	Results based household Technical assistance

Financing Step 1: Realise financial status quo analysis

A status quo analysis is an important prerequisite for the development of a robust financing structure for a NUMP. The following are two sets of basic guiding questions for this analysis:



Guiding questions

- **Guiding questions on the general setting:** Who are the main financial actors and decision-making processes? What are relevant financial flows and the nature of investment in the sector, both at a national and local level?
- **Guiding questions on barriers and drivers:** Which (financial) barriers prevent the implementation of sustainable urban mobility systems? Which drivers may facilitate sustainable urban mobility?

The results of this step are an understanding of the budgeting process, investment environment, barriers and drivers for the implementation of the NUMP.

(1) Guiding questions on the general setting:

An effective financial design for a NUMP ideally builds on current mechanisms, institutions and capabilities, so understanding the current nature of investments and public budgeting decisions in the sector is key. Moreover, a thorough understanding of the status quo will ensure that the chosen interventions are feasible, e.g. by being aligned with the interests of major actors in the system. The following questions may be useful:

At the local level:

- **Financial actors:** Who are the main financial actors in the sector today? What is the role of commercial banks and development banks?
- **Investments:** How are urban mobility related investments financed today? How are investment decisions taken? Do investors have adequate access to finance?
- **Public funding:** Is local public funding available? Do local actors have the required capacities to access national funds if available?
- **Private sector:** What role does the private sector play today? Could its role be strengthened? Are there public-private partnership mechanisms in place? (see as well Box below)

At the national level:

- **Business environment and investment climate:** How developed and robust are financial markets? What is the tax regime? How much regulatory and political stability is there? How well are contracts with public and private sector actors enforced? How easy is it to start, operate and close a business, including licensing and regulation?
- **National public funding:** How much of the national public budget does the sector receive today? How is funding allocated? What public funding and financing mechanisms are in place (e.g. fiscal and/or subsidy mechanisms) to transfer funding from the national to the sub-national levels?
- **International/donor funding:** Who are the main donors in the sector? Which additional donors may be interested in supporting the sector?

Box 28. Example – Private investment for sustainable urban mobility

Private investments may play a key role for achieving a sustainable urban transport system. The current amounts of private investments in low- and middle-income countries often tend to be lower than the public spending – as opposed to high-income countries where private investment tends to be proportionally higher. There are different types of private investment options available, such as public-private partnerships (PPPs) and debt and equity instruments.

- **Public-Private partnerships:** Despite the low proportion of private investment in low and middle-income countries, investments from private-public partnerships have increased significantly in recent years, often caused by investors from recently emerged countries such as China, Brazil and India. The public-private partnerships have to be in the interest of both the public investors, for granting the citizens the mobility services, as well as profitable for the private investors, e.g. improving urban infrastructure such as roads for their own use. The public-private partnerships are often project based, where the private investors often take an active role.
- **Debt and equity instruments:** The public transport system is usually run by a company, fully or partially owned by the city administration. Apart from public funding, the most common way for financing new projects and development of mobility and public transport is through debt financing, that is by loans from banks or other investors e.g. through bonds. The less common equity instruments would instead involve funding mechanisms without loans, but instead by obtaining a part of the stocks of the company carrying out urban mobility planning.

Another way of private financing is to legally oblige companies to contribute to infrastructure costs. These charges could take form for example Working Place Parking Levies, or as a Community Infrastructure Levy on planning and development of a dedicated.

Public-private partnership: GreenBiKE – Bicycle stations in New Delhi

An example of a successful public-private partnership is the “GreenBiKE” project in New Delhi, where the Delhi Integrated Multimodal Transport System (DIMTS) cooperated with Plant Advertising Pvt. Ltd. to fund new bicycle stations along the Bus Rapid Transit Corridor. Both actors benefitted of the project, as both ways of urban mobility were improved, and Plant Advertising Pvt. Ltd. was allowed to place ads on the stations for a period of five years (Deloitte, 2016).

Private investment programme: The PIL Programme in Brazil

The PIL programme, created by the Ministry of planning in Brazil in 2012, is a nationwide programme to facilitate private investment for mobility infrastructure. The programme has shown great results, even compared to similar public funding programmes called PAC1 and PAC2 (Da Rocha and Saes, 2018).

(2) Guiding questions on barriers and drivers:

A robust analysis of barriers and drivers is an important prerequisite for designing effective interventions in the context of a NUMP, as **interventions aim to remove one or several barriers** and may be facilitated by existing drivers. The financial design of the NUMP should be directly linked to the barriers to be overcome.

Specific sector and financial expertise on a local and national level are required to identify barriers in a structured manner. At the same time, analysing and determining current barriers entails a **great deal of subjectivity**. A private bus operator may disagree with an official from a Ministry of Transport on the root causes of the low service quality in public transport. Similarly, drivers often depend on estimates of future developments (e.g. on estimates of growing environmental awareness or dropping costs for clean technologies). Understanding sector dynamics and differing motivations is therefore crucial. A combination of the following elements may be useful in the barrier analysis process (Zaballa Romero, 2013):

- **Individual interviews with appropriate public and private sector stakeholders**, as well as independent experts, potentially supplemented with site visits;
- **Literature review** based on currently available information on the sector;
- **Focus groups** to test results from interviews and find consensus;
- **Market mapping**, particularly focused on mobility services from the end consumers' perspective; and
- **Independent analysis of the investment patterns** and hypothetical returns in the current sector in order to quantitatively assess these types of barriers (see **Section 6.2** on the financial viability analysis).

The majority of the analysis of barriers and drivers focuses on the local level, as this is where the final investments will happen.

For sustainable urban mobility investments, major barriers are often: lacking commercial viability of public transport systems (e.g. for their operation by private sector actors), high-upfront investment costs and lacking access to capital (e.g. in the case of public transport infrastructure), long pay-back times of investments (e.g. of fuel-efficient cars). **Box 29** provides examples of barriers for the implementation of the Indonesia Sustainable Urban Transport Programme.

Box 29. Example – Financial and market barriers for the implementation of the Indonesia SUTP

The following institutional, financial and market barriers have been identified:

At a national level:

- Institutional barriers posed by the existence of separate ministries for infrastructure development and urban transport policy lead to the development of strategies that are not always aligned;
- The decentralised allocation fund (DAK) generally provides the opportunity to finance non-motorised mobility projects as well as further project types (e.g. public transport infrastructure). However, these sources have not been tapped for the implementation of sustainable transport projects due to lack of technical sector guidance from the national level and lack of demand actively communicated by local governments;
- The current practice of the Ministry of Transportation to support urban transport strategies of local governments is limited to providing assets (e.g. buses, traffic lights). However, provided assets often do not match existing demand. In addition, due to legal barriers, the assets can only be given to provincial governments who do not have the mandate for bus transport in cities; and
- The overall amount of public funding is not sufficient to meet the investment needs of the sector. The share of urban mobility funding (excluding rail) is 0.45% of the overall budget available to the Ministry of Transport (EUR 2.62 billion in 2014). The mobility budget of the Ministry of Public Works amounted to about EUR 4 billion in 2014. Funding is mainly used for major infrastructure development such as roads, railways, airports and ferry ports.

At a local level:

- Local governments have limited fiscal capacity to finance mobility infrastructure. Many cities do not meet loan or grant requirements. Involving the private sector is challenging due to asset management regulations, local governments' limited capacity to successfully structure and manage public-private partnerships (PPPs) and high transaction costs. Lacking the necessary human resources and experience, local governments are largely passive in seizing opportunities from external funding sources.



Based on the understanding gained for the overall financial situation in the Financial Status Quo Analysis, the financial design continues as follows. To be able to choose specific interventions to form part of a NUMP and to have an adequate basis for deciding on public budget allocations, the following analytical steps are required:

- Financing Step 2: gain an understanding of the financial viability of the desired sustainable urban transport investments at the local level;
- Financing Step 3: an initial estimation of costs related to the implementation of the NUMP at the national level;
- Financing Step 4: identification of revenues/and potential funding sources for the NUMP at the national level; and
- Financing Step 5: undertake an initial (macro-economic) cost-benefit analysis of the interventions planned under the NUMP.

Financing Step 2: Assess financial viability at the local level

The results of this step are a rough understanding of costs, revenues and funding sources and of the economic/sustainable development benefits of different potential interventions. These results inform the selection process for interventions to be included in the NUMP (see **Step 10 Agree on priority areas and select measures**).

Any national intervention to incentivise local investment into sustainable urban mobility needs to be targeted to the specific context at the local level. Specifically, it is important **to understand if and how much financial support is required at the local level for public transport systems to be financially viable**. Thus, based on the status quo analysis introduced in the previous chapter, one needs to understand the **financial viability of sustainable urban transport options**, for example the difference in up-front capital requirements and cost of ownership of an electric instead of a diesel bus, or the financial viability of investing in and operating a BRT system.

A financial appraisal assesses the viability of an investment from the perspective of the project owner and/or investors, determining the viability of the investment based on the expected revenues and expenditures. The appraisal determines whether a project's financial return is sufficient to make the undertaking financially sustainable and commercially viable. In this sense, financial appraisals share some of the concepts of economic appraisal, explained in **Section 6.5 (Financing Step 5)** below. However, financial appraisals have a much narrower focus on direct cash flows to the project sponsors and investors.

The results of the financial appraisal clarify the financial barriers and thus help to determine the most appropriate economic and/or financial instrument to be used. The methodologies for determining financial viability used by different public and private actors differ somehow. While the financial appraisal for a loan from a multilateral development bank is quite straightforward, a PPP structure involving the private sector can be rather complex and wide ranging. The ADB provides a useful guide for carrying out financial appraisal in the context of the operation of the Multilateral Development Banks in **Chapter 3** of its Guidelines to Financial Management and Analysis of Projects⁹.

For developing the financial design of a NUMP, financial details of a specific project or investment are normally of less interest. Depending on the intervention, one rather **uses average values for costs, revenues and financing conditions**, or works with **a range of different scenarios reflecting the conditions in various locations across the country**. The financial viability analysis for the development of a support programme for electric buses in Colombia, for example, included various scenarios of typical bus routes and bus sizes as found in different cities across the country.

Financing Step 3: Estimate costs at the national level

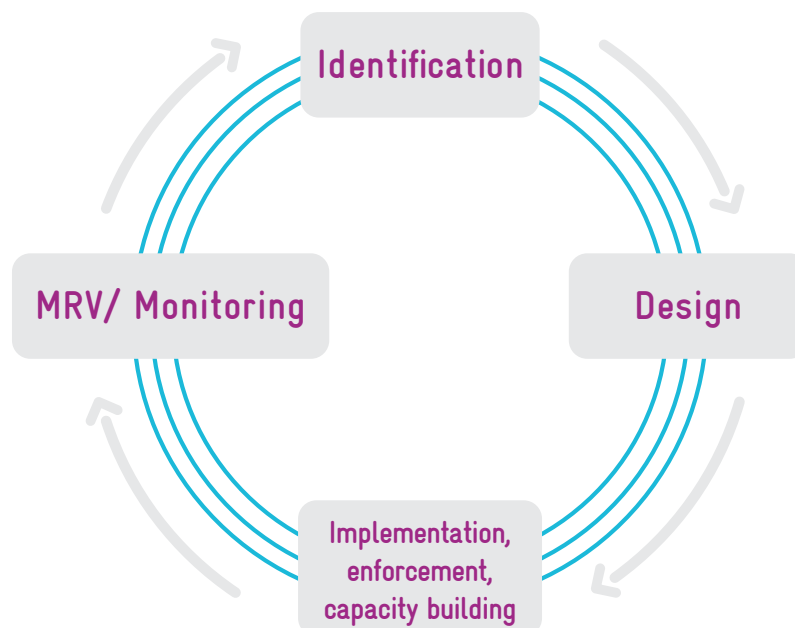
Once one sufficiently understands the local situation to identify (a choice of) interventions for the NUMP, the planned measures need to be broken down into individual activities to be able to estimate the costs of the NUMP for national government. As a structure for doing so, one can use a typical project cycle adapted to a policy- or programme-based intervention, as this ensures that costs for key components such as implementation, maintenance and monitoring – which can easily be neglected – are taken into account.

Each **activity is then assigned a cost estimate**. The specification of costs depends on available data and resources. As stated above, it is likely that one would start with rough estimations in the identification and early planning phases and move to more detailed calculations during appraisal and before reaching a final agreement with funders and investors.

A crucial step in the determination of costs for a NUMP programme is the **definition of the amount of any subsidy (e.g. for investment grants or to lower interest rates granted for a specific investment)**. The financial viability analysis described in the previous sub-chapter provides information on the funding gap for the clean technology and on any additional up-front capital requirements. Due to the strong political sensitivity of deploying subsidies, it is a delicate balance act to provide sufficient incentives for investment – which, in the case of urban public transport should ensure long-term high-quality services – whilst not allowing wind-fall profits for private sector actors. To avoid market distortions, as a rule of thumb, subsidies for low-carbon technologies should not be higher than the incremental cost of the low-carbon technology compared to the baseline technology. The final decision on the amount of a subsidy will be taken during the detailed preparation of the final structure.

It is also important to **explicitly consider costs for operation and maintenance** of public transport systems. Although in most developing and emerging economies the major focus of funding for urban mobility is still on the development of infrastructure, as markets mature a larger portion of funding is required for operation and maintenance. In addition, in any context, ensuring adequate coverage of operation and maintenance costs of public transport systems is key to ensure the high quality of the services required for public transport to remain competitive versus individual modes of transport.

Figure 16. Typical project cycle adapted to a NUMP



Source: GIZ (2015b)

⁹ See ADB document on financial management and analysis of projects, available at <https://www.adb.org/sites/default/files/institutional-document/31339/financial-governance-management.pdf>

Financing Step 4: Identify funding and revenue sources at the national level

Identifying sufficient funding and financing sources for a NUMP is key for ensuring sustainable implementation. NUMPs mostly use national public funding and financing. Thus, at the national level, 'revenue sources' generally refer to sources of **tax revenues and fees**, which form the basis for any funding the national government may provide to local actors as subsidies (see **Box 30** on justifying the use of subsidies for public transport).

Annex 2 provides a more detailed overview on potential financial sources.

Policy and programme NUMPs differ in their requirements for the type and amount of national funding and/or financing. Typical sources of funding and financing include the following:

- Funding from the **recurring budget** of the ministry of transport or its subordinate authority (both in terms of staff time and grants for the commission of external studies and consultancies) for the design, administrative implementation, enforcement and monitoring of the NUMP. If there is a strong climate component to the NUMP, the ministry of environment may be able to co-fund these activities;
- **Grants/subsidies** can be funded either through **earmarking certain shares of taxes and fees** (e.g. fuel or vehicle purchase taxes, annual vehicle taxes in line with the "transport pays for transport approach" or property taxes at the local level), or through **general tax revenues** (e.g. value-added taxes, personal income or business and corporate taxes). The funding for Mexico's Federal Support Program for Mass Transit (PROTRAM) comes for examples from the country's National Fund for Infrastructure (FONADIN) which in turn is funded by revenues from the operation of toll roads. Grants may be used by national governments to:
 - *(Co-)fund project design at the local level,*
 - *Subsidise infrastructure for public transport, non-motorised transport and rolling stock, either as upfront subsidies or by covering interests and repayments of loans without requiring subnational, thus effectively also providing a subsidy, and*
 - *Provide annual provisions for operation and maintenance to sub-national government authorities and project sponsors.*

These grants are usually part of the annual budget of the Ministry of Transport or – depending on the type of intervention supported, of a Ministry of Urban Planning or similar; and

- **Loans** provided from the **national public budget** to subnational entities. Loan funding is generally allocated by the **ministry of finance** or through **national development banks**.

Whenever it is possible to use **existing financial mechanisms**, it is recommended to do so rather than setting up new structures. Experience has shown that robust financial flows into supporting sustainable urban mobility are those that are built on **multiple funding sources**, to better withstand potential fluctuations of individual funding streams. Cities should thus be encouraged to generate funding locally, ideally through means with a positive impact on urban mobility. This may include funding from transport demand management measures such as parking pricing, license plate sales, congestion charging, or through value capture mechanisms (**GIZ and EMBARQ, 2013**).



Box 30. Tools and resources – On subsidies for public transport

For the case of modern and efficient public transport systems, revenue sources often do not cover the full costs of infrastructure, operation and maintenance. Nevertheless, accessible public transport systems are in the public interest due to their large socio-economic benefits, including the potential to reduce GHG emissions. For this reason, national and local governments frequently provide an important contribution to funding sustainable mobility infrastructure and services. In fact, domestic public funding is the greatest revenue source for mobility infrastructure investment in developed countries. As a global average, transport's share in national budgets ranges between 3 and 7 per cent (Lefevre et al, 2014). Shifting this funding towards low-carbon transport investment will be essential for reaching global climate change mitigation targets. Experience shows that in countries with good quality transport systems, a partial subsidisation of public transport through fuel, private vehicle or general tax revenues as well as toll-road fees is common practice. Because of the large socio-economic benefits of sustainable mobility services, such subsidies for public transport can be considered justified.

In France, the Versement Transport (Employers' Transport Tax) was set up in 1971 and applied to cities with more than 10,000 people, where companies with more than nine employees need to pay this tax, which finances a considerable amount of the Urban Transport Organisation Authorities' budget. It ranges between 0.5% and 2% of the payroll of the companies according to the region and public transport network. As well, employers are also required to reimburse 50% of the monthly public transport pass to their employees. This benefits employees, but also contributes to ensure dependable farebox revenues to transport operators and a high-quality public transport network (GIZ and EMBARQ, 2013).

In the case of Germany, passenger fares only partially cover public transport costs. Consequently, the federal government contributes a fixed amount of EUR 7.2 billion yearly to the sixteen German states' budgets, which is used for subsidies on railways (with an annual increase of 1.5% due to inflation compensation). The federal government also provides funds to the states for improvements in local transport infrastructure, especially in projects that require more than EUR 50 million investment, in accordance with the Municipal Transport Financing Law (GVFG). At the same time, states also cover a share of public transport costs through the ministries, state-owned railway companies or agencies, as well as through delegations to local public transport associations. They also have general authority over local and regional road public transport. By federal state law, and with the exception of the three city states, the responsibility is transferred to the urban and rural districts at a local level, which form joint associations to fulfil this task. In addition, public funds also cover operation subsidies, grants for reduced fares or free transport for disabled people, students and apprentices (GIZ and EMBARQ, 2013).



Box 31. Example – Combining a result-based budgeting approach with a policy-based loan in Peru

In the context of its National Urban Transport Policy, the government of Peru strategically combines a results-based budgeting approach with a policy-based loan from the German Development Bank KfW for the implementation of the TRANSPerú NAMA. The centrepiece of the initiative is a sector-wide policy matrix. Various donors and the Peruvian government support the implementation of this policy matrix through funding and financing contributions. KfW provides a Policy-Based Loan of USD 22mio to the Peruvian Ministry of Economy and Finance. The disbursement of the loan will be linked to the fulfilment of milestones within the policy matrix. Although funds of a policy-based loan are not attributable to a single measure ex-ante, they are foreseen to fund specific investment projects (e.g. metro lines, urban transport in secondary cities, bicycle lanes, and intermodal change stations), and support the preparation of others that will be funded directly by the government of Peru. These measures will be supported by a grant for technical assistance for improving the framework conditions (e.g. the development of fuel economy standards and a programme for secondary cities), and supporting institutional coordination and strengthening.

In parallel, further concessional loans are planned for a metro in Lima and a new national programme for improving urban public transport in medium-sized secondary cities. The government of Peru contributes funds from its national budget for the implementation of the policy matrix. TRANSPerú is the first NAMA that uses a Policy-Based Loan as a climate finance instrument.

Source: GIZ (2015c).

Financing Step 5: Realise economic appraisal

Economic appraisal is crucial for the decision-making process of major mobility projects, especially for **justifying the use of public funds**. Economic appraisal aims to determine if a mobility project intervention is **worthwhile from an overall societal point of view**. This is especially important in the transport sector, where decisions affect a wide range of actors. These include users of different modes of transport, transport operators, local residents and businesses, land and property owners, and national and local taxpayers, each with a different perspective and interest in the intervention (Adler, 1987). Many mobility projects have a poor financial performance from a micro-economic point of view without government support.

Economic appraisal is **applied widely by governments, their planning departments, and development banks**; all transport infrastructure projects receiving loans from multilateral development banks need to undergo an economic appraisal. Economic appraisals are usually performed by specialised experts, either from within the government or development banks or through external consultants. In the context of this guidebook, it is important to be aware of the key steps in the appraisal process and the advantages and limitations of different appraisal methods.

In the context of a NUMP, an economic appraisal may be used for the following purposes:

- To **prioritise between alternative interventions**, and to accept or reject a specific intervention depending on its overall benefit to society;
- To **gain political buy-in and support political decision-making**. This is especially relevant for approval processes that require significant public budget allocations and/or imply significant additional costs to the private sector or consumers; and
- To help to **adjust the design of an intervention in order to maximise its benefits and efficiency**.

A full appraisal will only take place once a larger number of potential interventions has been screened and limited to a few options. For the sake of consistency, the indicators used in the earlier stages of selecting an option should relate to the criteria to be used for the full appraisal and in the final decision (EIB, 2013). Thus, at the earlier stages of the NUMP design, the appraisal indicators should already be considered.

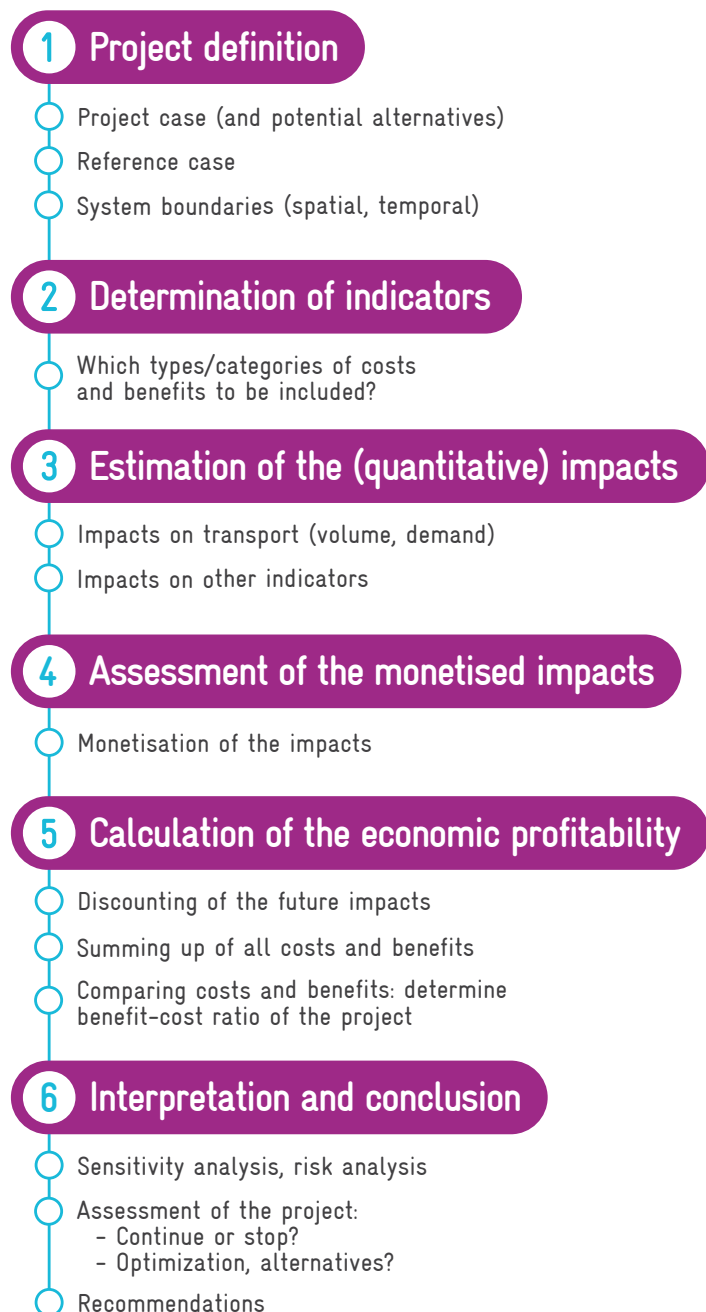
The most important economic appraisal method for mobility projects is the Cost-Benefit Analysis (CBA). The CBA is the standard approach used by public authorities and multilateral development banks to assess transport projects from a broad economic point of view, taking into account greater effects on the economy as a whole.

Figure 17 shows the main steps of a mobility Cost-Benefit Analysis.

One major advantage of the Cost-Benefit Analysis is that the various impacts can be simply summed up and compared (annual costs/benefits at present, i.e. net present value). One possible result indicator of a CBA is the benefit-cost ratio, which describes the ratio between the discounted (net present) economic benefit and the discounted economic costs (benefits/costs).

Although Cost-Benefit Analysis is the most common methodology used for the economic appraisal of transport projects, other approaches can be useful under certain circumstances. The CBA has some weaknesses specific to the transport sector that requires additional methods to give a broader picture for economic appraisal. For example, only impacts that can be monetised can be included in a CBA. Certain environmental impacts of mobility can hardly be monetised, such as negative impacts on ecosystems. In addition, a lack of quantitative data can make it impossible to conduct a complete and reliable CBA.

Figure 17. Steps of a Cost-Benefit Analysis





In these cases, other approaches can be helpful. Alternative approaches for the economic appraisal of transport projects may include:

Cost-effectiveness analysis (CEA): all relevant impacts of projects are taken into account by rating them (e.g. on an ordinal 'effectiveness' scale) and are then compared to the total costs. Its advantage is that all impacts can be taken into account, even if they cannot be monetised. However, it is not possible to draw conclusions on efficiency (profitability);

Cost-utility analysis (CUA): cost-utility analyses do not take into account monetary values. The focus is on the outcome, i.e. the impacts. The different impacts are rated on a homogeneous scale and then aggregated to a total value (utility). The main advantage is that all impacts can be considered and different impacts can be compared. However, it does not allow any conclusions on efficiency; and

Sustainability assessments: a broader approach, based on the three pillars of sustainability. This approach includes all possible impacts on the economy, ecology and society. The impacts of the three pillars are equally weighted. The aggregation of the impacts on sustainability level can be done individually, i.e. based on monetary values, utility rates or qualitatively. This approach is very broad but not yet widely used. The Asian Development Bank (ADB) has developed a Framework for a Sustainable Transport Appraisal Rating tool (ADB, 2014).¹⁰

For further information about economic appraisal, please review the Financing section from the Further Reading Chapter at the end of this document.

Financing Step 6: Do detailed financial design



Although a variety of different NUMPs exist, some generic steps for the design of a detailed financial design are applicable to most situations, as expressed in the following guiding questions:

- **Guiding questions 1:** What would be an effective, efficient and feasible financial design? What are possible financial instruments?
- **Guiding questions 2:** Which actors are involved and with which roles? How are the financial flows and which conditions must be fulfilled for disbursements?

As mentioned in the beginning of the chapter, the **development of the financial design is an iterative process**, closely linked with the overall NUMP development process. The design of the detailed financial design is part of the last phase of the NUMP development cycle. **At this point, the earlier steps of estimating costs and revenues, identifying funding and financing sources need to be repeated and deepened.** Also, depending on the complexity of the intervention, a full economic appraisal will take place. At the same time, some guiding questions of this chapter, namely the question around the effectiveness, efficiency and feasibility of the intervention and the choice of the financial instrument have, to some extent, already been addressed in earlier steps (e.g. during the choice of interventions), but they require final design steps and decisions at this stage.

¹⁰ See ADB's Toward a Sustainability Appraisal Framework for Transport. Available at: <https://www.adb.org/sites/default/files/publication/31198/sdwp-031.pdf>

Guiding questions 1:

What would be an effective, efficient feasible financial design? What are possible financial instruments?

Effectiveness, efficiency, and feasibility are not specific to NUMPs, but constitute general criteria for designing public sector interventions and setting up public finance mechanisms. **Effectiveness** is defined as the intervention's projected ability to achieve the desired goals. If the goal were a 20% modal shift from private transport to public transport and cycling, an information campaign about the environmental and health benefits of not using private cars would unlikely be effective enough. The introduction of parking fees, bicycle purchase incentives and subsidies for public transport tickets, however, may be more effective to achieve the target. Effectiveness of a financial design is directly related to its **ability to address** the main barriers hindering the implementation of the mitigation action:

- If a mitigation action is not cost competitive for the investor compared to the business-as-usual alternative, additional funding will be required to increase the returns of the investment. Similarly, if a technology is new, financial incentives may be required to convince users to take the risk of piloting the technology. A robust financial viability provides information on the required amount of subsidy;
- If a mitigation action such as the improvement of public transport infrastructure requires large up-front capital investments, the provision of loans will address the barrier of access to capital.

Ultimately, sustainable mobility financing will be used effectively if it contributes to shifting investments from conventional, unsustainable to low-carbon, sustainable mobility.

Efficiency refers to the **amount of public sector resources spent compared to the expected impact**. Generally speaking, one should aim at **using the minimum amount of public resources possible to achieve a desired objective**. Very simply speaking, in some contexts, GHG emissions could be avoided by reducing commuting distances through city planning for which direct costs tend to be limited to the salaries of government officials and experts. That would be preferable over-using larger amounts of public money for direct investments into public transport infrastructure.

As discussed earlier, when using financial incentives for a NUMP, a major challenge lies in setting the incentive high enough to be effective, but not so high as to give the recipient an unfairly large benefit or advantage. In the context of a Programme NUMP, adding a competitive element to the receipt of funding may increase efficiency



of the use of funds. Many donors and climate finance mechanisms explicitly refer to effectiveness and efficiency in their selection criteria. The Green Climate Fund for example seeks to 'make the best investment viable with the least possible concessionality'.

Feasibility refers to funding and financing mechanisms that are tailored to the maturity of the financial system and to the capacity of government to enforce regulations, and that are politically acceptable. One aspect of political acceptance may be **equity** in the sense that an intervention should **not have disproportionately negative effects on poor or marginalised population groups**. In addition, the financial design needs to **fit the political, cultural and institutional traditions of a country, as well as the degree of capacities at the local level**.

The choice of a **centralised or decentralised financing programme** is, for example, strongly influenced by the specific local characteristics. Centralised financing programmes concentrate planning, evaluation and funding roles in large, powerful institutions linked to the central government, which execute strict control over project development in a generally restricted number of cities. In contrast, in the case of decentralised financing programmes, full responsibility for the planning of mobility systems lies with local government. Under this model, the central government's role is limited to the setting of standards for the operation, technical assistance, and – above all – project funding through earmarked funds for urban mobility.

These are usually suited to capital intensive projects and are often employed by developing nations that have the need to develop infrastructure projects, but at the same time lack of qualified technical capacity and strong, coordinated and efficient subnational institutions. On the other hand, **decentralised financing programmes are adopted in many developed countries** endowed with autonomous local governments that operate with highly qualified consolidated technical teams. In addition, the choice depends on the prevailing administrative structure and the governance history of a country. Both models are not exclusive, though. Instead, it is common for national urban transport programmes to **combine elements of a centralised and decentralised financial design**, and it is possible to successfully migrate from one model to another, in a way that national centralised programmes evolve to decentralised interventions as local experience and technical capacity continuously increases.

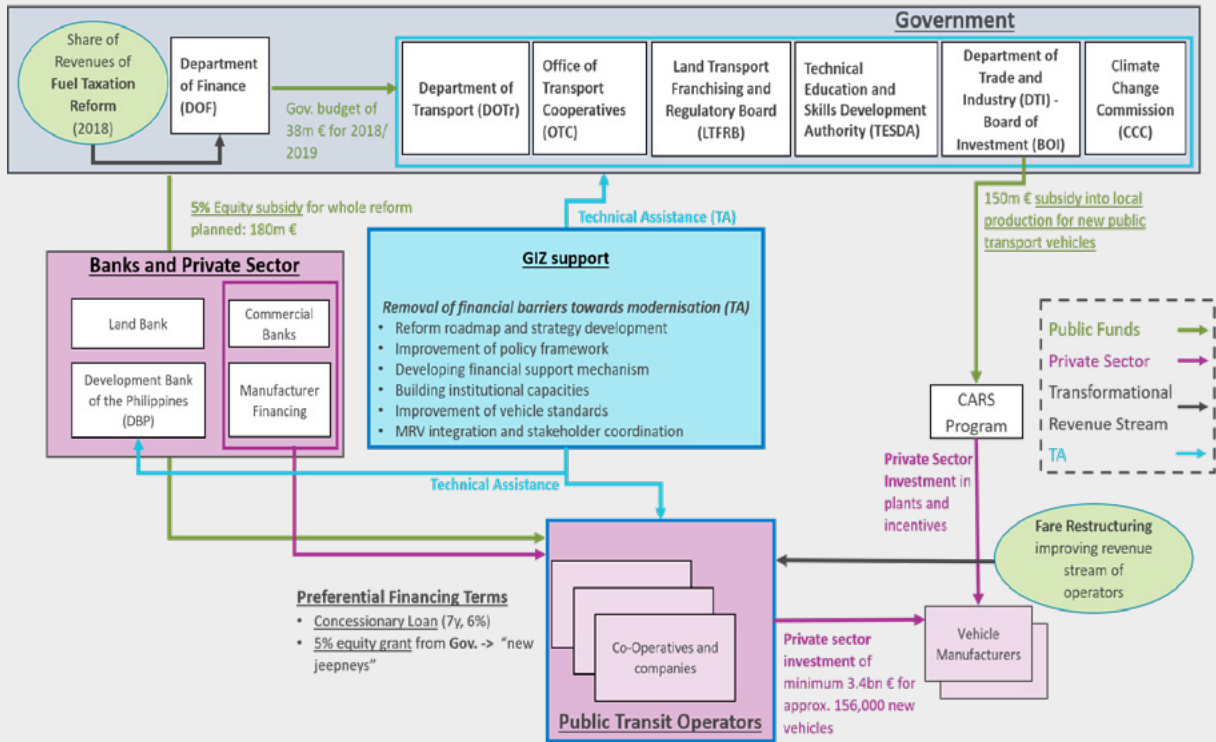
Guiding questions 2:

Which actors are involved and with which roles? How are the financial flows and which conditions must be fulfilled for disbursements?

In a final step, one defines and agrees upon important details with respect to the implementation of the financial design related to the roles and responsibilities of different actors, and to the nature and direction of financial flows, and a timeline for implementation. Financial flow-charts are a useful tool to visualise how different types of financial flows move between the involved actors (example [Box 32](#)).



Box 32. Example – Financial structure to reform the minibus sector in the Philippines



Checklist – NUMP Financing Chapter

NUMP Financing Chapter	✓
Status quo analysis of financial actors, decision-making processes, relevant financial flows and nature of investments at national and local level realised (incl. financial drivers and barriers).	
Financial viability at local level assessed.	
Costs for design and implementation of NUMP at national level estimated.	
Potential national and international funding and revenue sources identified .	
Costs and benefits of the NUMP identified and economic appraisal realised.	
Financial design prepared (incl. possible financial instruments).	



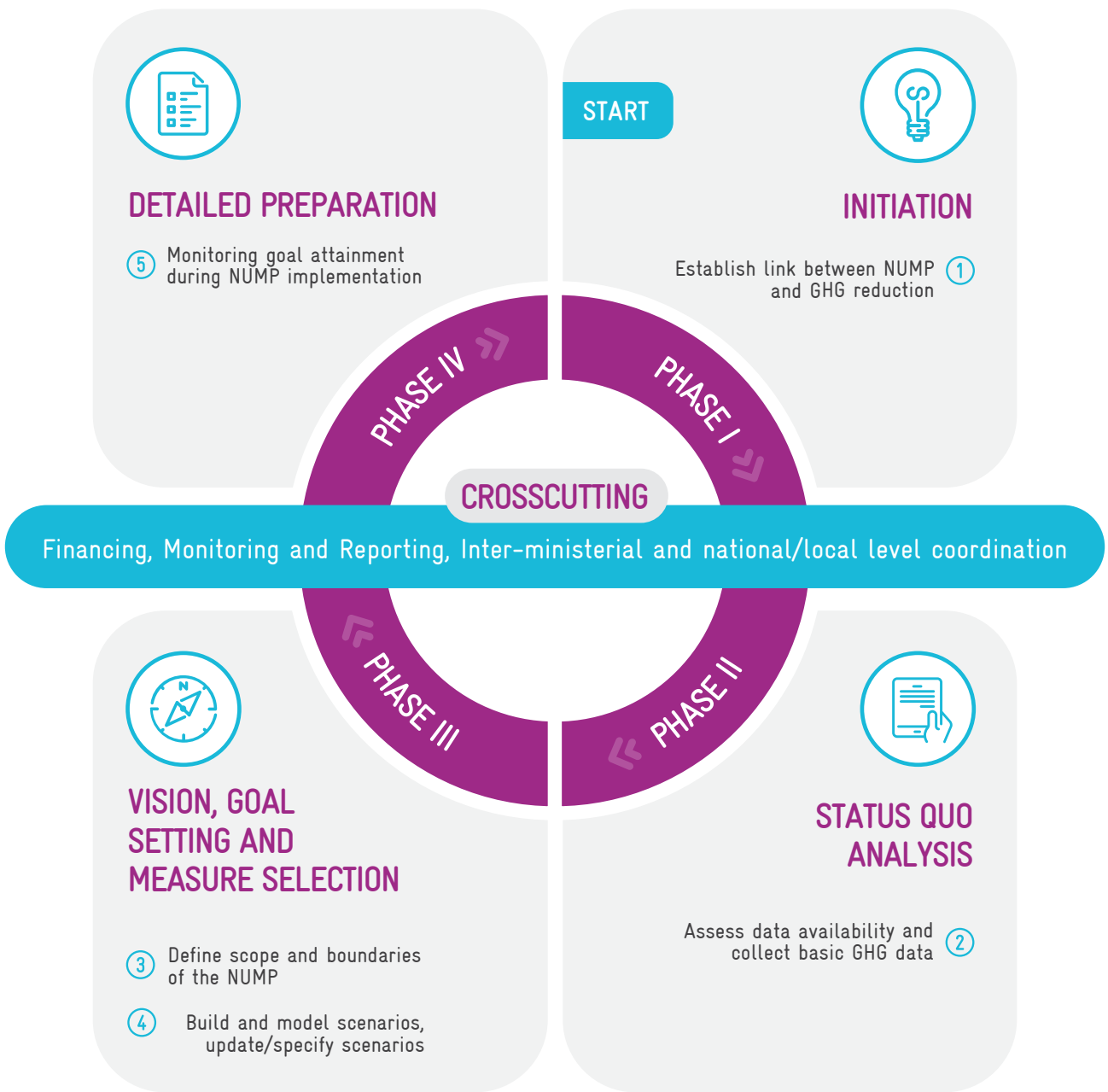
NUMP MRV (crosscutting): Measuring & Reporting Greenhouse Gas Emissions

The transport sector is a key contributor to development and economic growth, but at the same time it causes significant GHG emissions. NUMPs can help reduce emissions through contributing to the reduction of the need to travel, prioritising low carbon modes and investing in best technologies. The main objectives of this chapter are (a) introducing the basic concepts of Measurement, Reporting and Verification (MRV) of GHG mitigation actions for NUMPs and (b) guiding countries in developing a tailor-made MRV approach for their NUMP. Concepts described here are consistent with the [MRV approach of the MobiliseYourCity Partnership \(MYC 2017\)](#).

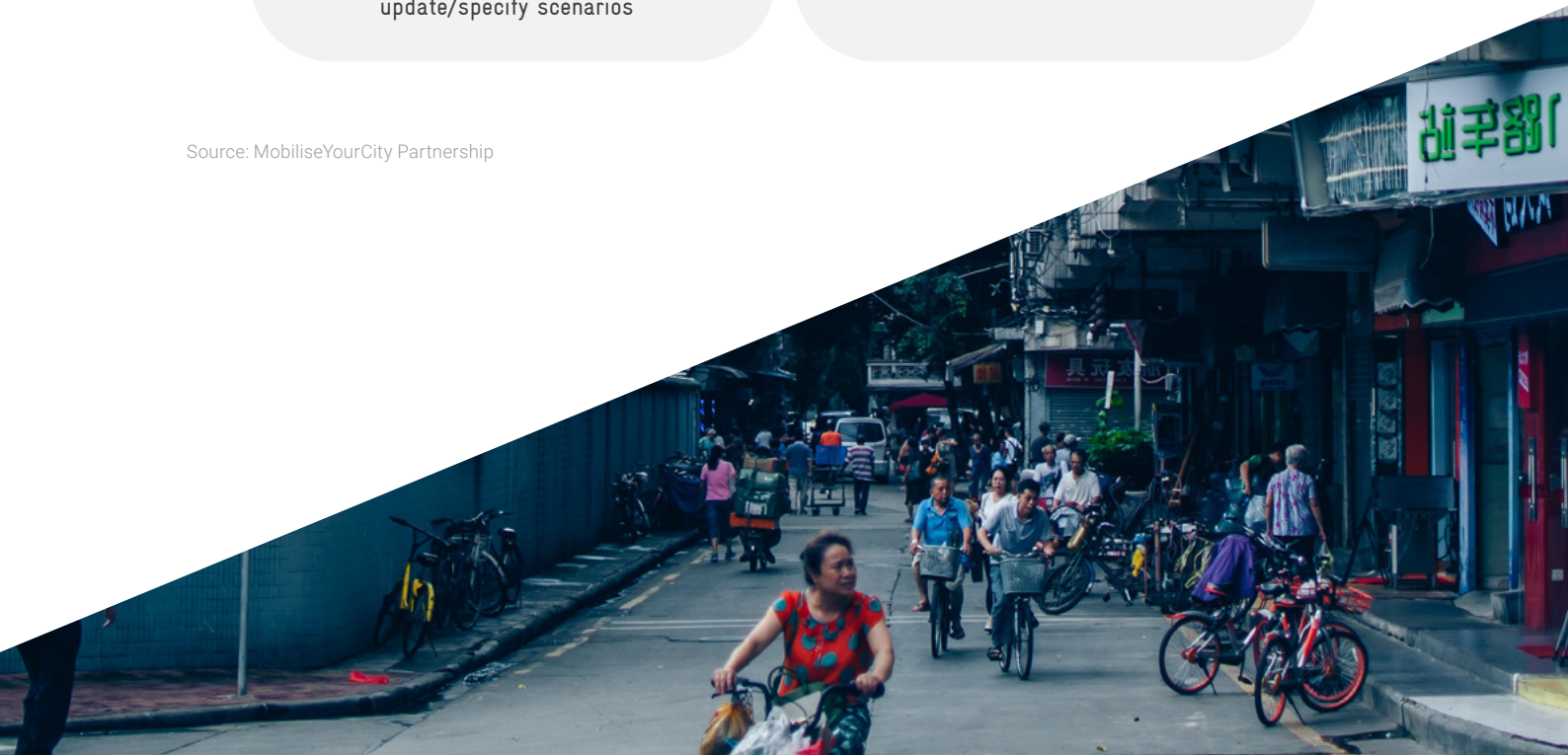
Due to the lack of data collection systems in many countries and the multitude of small, dispersed sources of emissions (vehicles), estimating ex-ante and tracking ex-post the impact of a NUMP can be challenging. However, modelling emission sources based on information about motorised vehicles and their activities is a feasible approach to overcome these challenges. Since each country is developing its NUMP based on its local context and existing institutional framework, the MRV approach also needs to be developed in consideration of country-specific data availability, needs and capacities.

Figure 18 shows the MRV issues to be tackled throughout the overall NUMP development process.

Figure 18. MRV Steps along the phases of the NUMP Cycle



Source: MobiliseYourCity Partnership



An awareness raising process, often in the form of a workshop, regarding GHG emission basics and the relationship to a NUMP (**MRV Step 1**) is done in parallel to NUMP Phase I 'Initiation'. This is followed by a basic data collection on GHG emission relevant data (**MRV Step 2**) during Phase II 'Status Quo Analysis'. It is important to allocate enough time to define the boundaries (**MRV Step 3**) for the GHG assessment during NUMP Phase III 'Vision, Goal Setting and Measure Selection' to allow appropriate target setting within the NUMP development. These tasks are followed by the development of scenarios during the detailed preparation of the NUMP in Phase III and IV. During the implementation of the NUMP it is crucial that the developed measures are being monitored against the set targets of the NUMP (**MRV Step 5**). The following **Table 10** shows the different MRV steps and the main guiding questions to be answered in each step.



Table 10. MRV Steps and corresponding guiding questions

MRV Steps	Guiding questions
MRV Step 1: Establish link between NUMP and GHG reduction	What are basics elements of an MRV approach and GHG emission reduction in the context of NUMPs? Are there resources allocated for MRV?
MRV Step 2: Assess data availability and collect basic data	What data - such as vehicle numbers, ridership data, travel demand surveys, etc. - is available on city level and what defaults such as fuel consumption levels can be used (national or international)? Who holds such data and is data easily accessible?
MRV Step 3: Define scope and boundaries of the NUMP	What is the cause-impact relation and the corresponding boundaries of the NUMP (e.g. geographic, modes etc.)? Is the available data matching these boundaries?
MRV Step 4: Build and model scenarios, update/specify scenarios	What is the possible (GHG) impact of the package of envisaged NUMP interventions? What actions have the biggest GHG impact?
MRV Step 5: Monitor and account real world data to understand goal achievement	How to develop a monitoring plan to assess the impact of the NUMP regularly during implementation? Who is responsible for monitoring?

Source: MobiliseYourCity Partnership



Why do we measure and report (and verify) GHG emissions and emissions savings in the first place?

- Well-designed MRV can increase the transparency of impacts of NUMPs and provide data and information for **national and international reporting requirements**. Internationally, countries have to report on emissions and actions in biennial reports to the United Nations Framework Convention on Climate Change (UNFCCC) and against their Nationally Determined Contributions (NDCs). At national level, emission reporting is also becoming increasingly important to show progress on the achievement of national (sectoral) climate targets and the benefits of national public policy.
- Decision-makers need to be able to **choose the most effective strategies** for the future and to understand the impacts of their past actions. Robust analysis methodologies, tools and data are essential to these efforts. Only if countries are confident about their options, they are likely to increase mitigation ambition in the sector.
- Reliable MRV systems help **accessing climate finance**. Providers of support and finance often require projects to identify their mitigation contribution. Therefore, reliable MRV is a key prerequisite to enhancing donors' trust and building pipelines of actions ready to access international climate finance.

As **NUMPs differ in design and implementation logic, the MRV concept needs to consider these differences**. In modelers language this is called "Defining the boundaries of the assessment" (c.f. **Section 7.3**). For the three different NUMP types as outlined in **Section 1.2**, **Figure 6** shows this results in different assessment types and different data needs. All three cases have in common that a comprehensive data base is essential for the development and monitoring of any NUMP.

1) Policy NUMP

For a policy NUMP that includes a national comprehensive strategy or plan describing GHG targets or a single national policy such as fuel economy standards national level data is required that allows to assess country-wide impacts (even beyond urban) of the intervention package. An example is the South African green transport strategy.

2) Programme NUMP

In contrast to this, programmes that support SUMP implementation or specific city-level mitigation actions, urban level data is required. In this case, NUMP GHG assessment would aggregate the single impacts of specific SUMPs of the participating cities (e.g. Indian comprehensive mobility plans) or specific actions (e.g. electric bus purchase programmes).

3) Mix of Policy and Programm

The last type may include very particular cases, e.g. Peru policy matrix including, that follow a combination of the two cases described above. This will result in specific requirements for the GHG assessment and more likely analyse impacts on the national level with national level data. As a general rule it is important to know that MRV needs to be considered in all phases of NUMP development (see **Table 11** and **Figure 17**). However, a key phase is the vision and goal setting as here not only the boundaries and the type of NUMP are defined but also scenarios help to understand the expected impacts.

Table 11. MRV considerations per NUMP phase

Phase of NUMP development	Considering MRV
Phase I Initiation	<p>MRV Step 1: Establish the link between NUMP and GHG reduction</p> <p>In the initiation phase, the objective is to understand the importance of urban mobility and the share of urban (vs. non-urban) GHG emissions. This includes understanding GHG emission basics and can also provide a simple MRV-expert guess or back-of-the-envelope calculation on current GHG emission within the transport sector. Furthermore, it is important to allocate sufficient budget for MRV in the beginning of the NUMP cycle.</p>
Phase II Status Quo Analysis	<p>MRV Step 2: Assess data availability and collect basic data</p> <p>The objective is to understand the transport sector and current trends and assess data availability of e.g.</p> <p>Vehicle data: Numbers and fuel consumption levels Activity data: Mileage data of vehicles (VKT/PKM/TKM) General data: inhabitants, GDP, etc. to understand trends</p> <p>Data sources can be urban (or national) statistics, travel demand or house-hold surveys as well as companies or associations. It is very important to understand who holds the data and if it is possible to get the data for the analysis.</p>
Phase III Vision, Goal Setting and Measure Selection	<p>MRV Step 3: Define scope and boundaries</p> <p>The objective is to understand the current (urban) transport GHG emission levels in detail. Collect fleet composition and mileage data in order to compile a (bottom-up) GHG inventory. It is also important to understand what models or tools can help to assess the NUMP impact.</p> <p>MRV Step 4: Build and model scenarios</p> <p>The objective is to develop a GHG emission reduction target for 2030/2040 or beyond: Assess ex-ante the GHG emissions of a baseline and “with NUMP” scenario - stakeholder processes are informed by various NUMP scenarios.</p>
Phase IV Detailed Preparation	<p>Continuation MRV Step 4: Update scenarios</p> <p>Eventually assess impacts of specific mitigation actions based on more accurate and detailed modelling considering synergies and trade-offs in the detailed preparation phase.</p>
Implementation	<p>MRV Step 5: Monitor and account real world data</p> <p>The objective is to understand goal achievement.</p>

Source: Table MobiliseYourCity Partnership



This MRV chapter consists of five sections that guide the development of a feasible NUMP MRV approach.

- The first section explains basic principles of GHG quantification which is needed to **establish the link between NUMP and GHG reduction (MRV Step 1)**.
- The second section provides an overview of which **basic data** needs to be collected to assess the status-quo (**MRV Step 2**).
- The third section (**MRV Step 3**) examines the definition of scope and boundaries of the NUMP. This definition constitutes a key element for defining the MRV approach.
- The fourth section (**MRV Step 4**) explains basic scenario and modelling methodologies.
- The fifth and last section (**MRV Step 5**) is about monitoring goal attainment during NUMP implementation.

This builds upon the approach for setting up an MRV approach for transport mitigation actions outlined in the **Reference Document on Transparency in the Transport Sector (GIZ, 2018b)**. Among others, this document **provides information on:**

- Concept of assessing GHG impact of mitigation actions (incl. boundaries, causal chain, base-line and BAU scenarios etc.)
- List of parameters for bottom-up GHG emission calculation
- Exemplary outline for an MRV chapter/report
- Case studies of MRV action



Box 33. Tools and resources – MRV guidance for transport is readily available

GIZ on behalf of the German Federal Ministry for Environment, Nature Conservation and Nuclear Safety (BMU) has been supporting its partners in measuring, reporting and verifying (MRV) emissions for many years. In order to support its partners in developing countries, GIZ works in partnership with leading institutions such as the Institute for Energy and Environment in Heidelberg (ifeu) or the Federal Environmental Agency (UBA). These institutions maintain the Transport Emission Model (TREMODO), which is used for official emission reporting in Germany. Internationally, GIZ cooperates closely with the UNFCCC Secretariat and many think tanks such as the International Council for Clean Transportation (ICCT) on providing trainings and methodological tools for MRV.

International cooperation makes understanding and monitoring mitigation actions easier through sharing of methodologies, default data (e.g. emission factors) and lessons learnt. As an entry point for practitioners to build capacities on quantifying transport related emissions, the Leaflet **A Beginners Guide to Emissions Accounting in Transport (GIZ, 2018a)** presents key publications on MRV and puts them into context. For further training needs, please do not hesitate to contact GIZ.



MRV Step 1: Basics on GHG quantification to establish link between NUMP and GHG reduction

National GHG inventories reported regularly to the UNFCCC follow the **top-down approach** based on national energy balances from the 2006/10 IPCC Guidelines (IPCC, 2006). This is required as the approach allows for comparison between countries. In the transport sector, the top-down approach is based on calculation of GHG emissions based on the total amount of 'fuel consumed' or 'sold' (in litre or tonnes) in a country, multiplied by conversion factors for different fuel types (in gCO₂eq/litre). These conversion factors are often 'national values', however, the IPCC also provides defaults that can be used.

The fact that most countries monitor fuel sales for tax purposes makes this a seemingly simple and easy way to design an energy balance. Countries not only report to the UNFCCC, but e.g. IEA member countries submit their overall energy balance sheets to the International Energy Agency (IEA). Although top-down approaches make countries' emissions inventories and energy balances comparable, they are only useful to a limited extent: They do not include electricity used in transport (e.g. in rail), because electricity is allocated to the power sector in the IPCC methodology, and they are less accurate in disaggregating CO₂eq into other GHGs such as methane (CH₄) and nitrous oxide (N₂O). In addition, numbers on fuel consumption or sale sometimes are ambiguous for several reasons: Fuels are sometimes used in other sectors than transport (e.g. diesel generators, fishery) or exported through cross-border traffic and thus provide limited information on the actual use within the country. The most important deficit is that top-down approaches do not allow for quantification of the impact of certain mitigation actions; neither do they allow for the design of scenarios estimating future emission levels. As a consequence, the **top-down approach is not suitable to assess GHG effects of a NUMP**.

The **bottom-up approach provides a mechanism to quantify emissions in much more detail**. It allows monitoring GHG emissions from different policies, programmes and projects including NUMPs. In principle, the bottom-up approach also facilitates the calculation of air pollutant emissions (see **Box 34**). Hence, the bottom-up methodology also describes data needs and helps in MRV preparation.

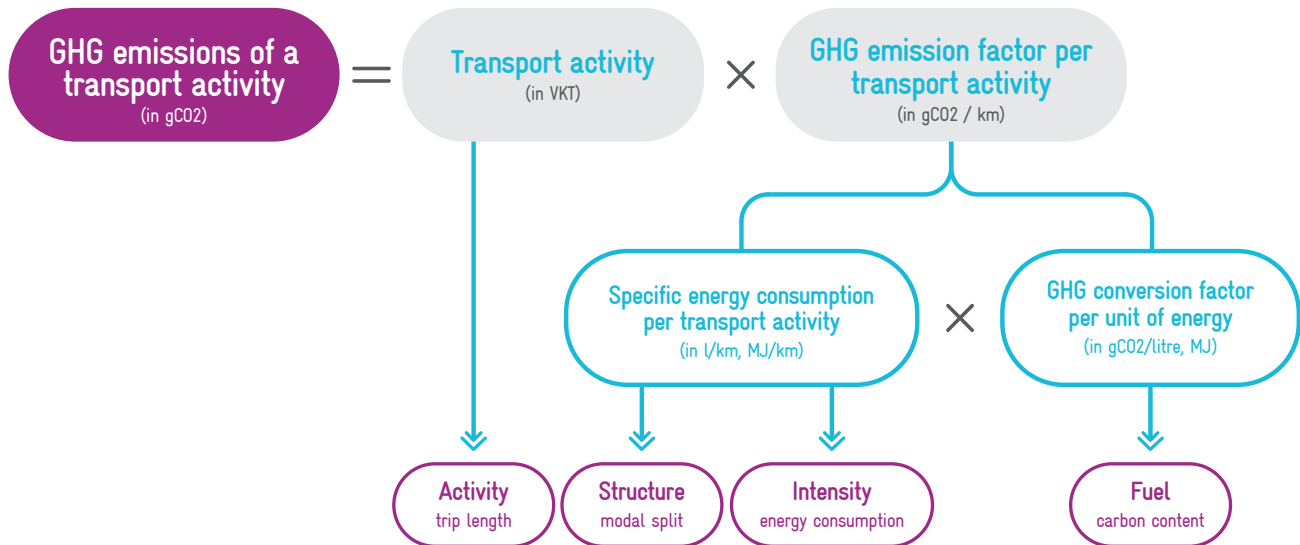
The methodology behind the **bottom-up approach** is the ASIF Framework (Schipper et al, 2000) that all GHG emission models for the transport sector are based on (see **Figure 19** on the next page). It is built upon several parameters that together constitute total transport related GHG emissions:

- **Activity and Structure:** transport demand, i.e. travel activity by mode and vehicle type;
- **Energy Intensity:** respective specific energy consumption per mode per travel activity; and
- **Fuel:** specific GHG conversion factor per energy carrier per mode (same as top-down).

Activity and mode split data are very common variables in mobility planning, but to calculate GHG emission based on the ASIF approach energy intensity or fuel consumption data by vehicle fleet are key. Many countries do not maintain their own fuel consumption database. In this case, defaults from the EU, the US or Japan can be used. This is because fuel consumption of similar vehicle types is basically the same everywhere in the world. The reason for local differences in vehicle fleet emissions are variations in fleet composition, rather than in vehicle technology.



Figure 19. ASIF Framework for calculating mobility emissions



Source: MobiliseYourCity Partnership (2017b)



Box 34. Definitions – Difference between GHG emissions and air pollutant emissions

Monitoring air pollutant emissions is not mandatory for the MobiliseYourCity Partnership reporting. However, countries that are interested in monitoring mobility-related air quality in cities can use data on mobility related GHG emissions as a first step towards calculating local air pollutants. Air pollution assessments essentially follow the same bottom-up methodology but require more disaggregated data on vehicle fleets (e.g. Euro Emissions Standards for vehicles on the road) and vehicle activity data (e.g. number of trips to calculate cold start emissions) than for GHG emissions. At the same time, GHG emissions quantification benefits from pollutant emissions modelling when it comes to quantifying the greenhouse gases CH₄ and N₂O that usually constitute less than 10% of total mobility-related GHG emissions.

MRV Step 2: Assess data availability and collect basic data in time series

During phase 2 of the NUMP development (Status-Quo Analysis) it is important to get a better understanding of the data availability. You find more information on basic data collection on GHG emission in step 4 of this document. It is crucial to consider not only data from one year but to evaluate the dynamics (time series) that drive GHG emissions in the country.

Furthermore, it is important to understand who holds the data and if the data is easily accessible. This sometimes requires negotiation or agreements between organisations about the purpose of data use and publication. It may include a rough assessment of data quality or possible issues in data sets. E.g. vehicle registries sometimes only add new vehicles but do not de-register them. This would lead to overestimating the number of vehicles on the road so correction factors may be needed.

MRV Step 3: Define scope and boundaries

During the **vision-and goal setting phase (phase III) of a NUMP**, it is important to understand the current (urban) transport GHG emission levels in detail. If some measures are already known, the cause-impact chain described in **MRV step 4** below may help to define such boundaries. An example is the geographic scope of the NUMP. If measures address the metropolitan public transport network, the boundaries of the GHG assessment should also be defined as the metropolitan region.

Getting the boundary for the assessment of the NUMP right is particularly important, since MRV procedures will focus on parameters located inside the boundary. In case the boundary is too narrow, relevant effects are neglected and the MRV leads to a flawed assessment. If the boundary is too wide, the effort, and therefore costs to monitor all the system components within the boundaries may be unnecessarily high. Hence, boundaries and level of detail of data requirements highly depend on the type of NUMP. As a rule of thumb, all processes of the intended NUMP in which GHG emissions occur should be included within a temporal, sectoral, geographical and GHG boundary. A more detailed explanation on each boundary is given below.

Temporal boundary

The temporal boundary needs to be defined by the NUMP itself, especially the target years for GHG reduction. For that, the NUMP could also be adapted to the timeline of the country's NDC and long-term low emission development strategy.

(Sub-)Sectoral boundary

The (sub-)sectoral boundary refers to mobility modes and mitigation activities covered. In the mobility sector, sub-sectoral boundaries can, for example, include the freight sector but exclude the shipping sector. In order to establish the sectoral boundary, it is necessary to determine specific activities within the mitigation action that are intended to reduce GHG emissions. Each activity points to the changes it is intended to cause to one or more indicator variables (including unintended rebound effects). For example, if the NUMP includes freight transport in cities, the travel activity of urban delivery vehicles needs to be included. In case no action in freight transport is considered, all freight-related GHG emissions can be excluded.

Usually NUMPs cover a wide range of modes and transport activities, so the boundaries are relatively comprehensive. Only if the NUMP is limited to a specific investment programme for one type of project (e.g. BRT investment programme or e-mobility subsidies for cars), the sectoral boundaries can be narrowed down substantially. One example for a sectoral boundary is the Mexican NUMP called PROTRAM. Its sectoral focus is on mass transit, specifically BRTs, LRTs, metros and suburban rail systems, for which it provides project investments in cities with over 500,000 inhabitants.

Geographic boundary

Geographic boundaries are key for NUMPs and most important to define. In general, it must be distinguished between Policy NUMPs and Programme NUMPs:

- **Policy NUMP (national level data):** If the NUMP includes a sectoral strategy (for urban mobility) or policies that e.g. regulate fuel consumption or vehicle emissions, boundaries of the NUMP will equal the national transport activity of those vehicles and their emissions since all vehicles in the country will be affected by the policy. This means that **national borders constitute the geographic boundaries**.
- **Programme NUMP (local level data):** In case the NUMP is an investment or support programme for cities (e.g. e-bus support programme for cities) or in case a NUMP incentivises SUMP development and implementation

(e.g. SUMP capacity building programme), the geographic boundaries of the specific interventions (programme boundaries) or the participating cities (SUMP boundaries) form the **geographic boundaries of the assessment**.

While in the first case, the analysis is linked to national level emission models, the second case means that the emission analysis should be done on a city or project level. Only in a second step the total GHG emission reductions (compared to the baseline) in all participating cities or for all projects will be aggregated to estimate the total impact on emission reductions of the NUMP.

However, also in the second case national level data is important (e.g. national average fuel consumption for different vehicle types). For example, national fleet composition or average annual mileages for various vehicle types can be provided as default values for cities that do not have city-specific data. This helps cities develop their own inventories and track emission reductions, while at the same time ensuring comparability across cities.

Greenhouse gases

Boundary setting also involves decisions on which GHGs are to be tracked. Usually, in the transport sector, three GHGs are accounted for, i.e. CO₂, CH₄ and N₂O. They are expressed in CO₂-equivalents (see **Box 35**). Analysis should include direct tailpipe emissions (tank-to-wheel) and upstream emissions that result from the production and transport of fuels (well-to-tank). Direct tailpipe emissions and upstream emissions should be reported in separate figures and then aggregated. Accounting for upstream emissions ensures comparability of conventional propulsion systems and electric vehicles (for which emissions only occur upstream), as well as other fuel switch options.



Box 35. Definitions – Mobility related greenhouse gases and their warming effect

GHG emissions and their global warming potential

GHGs emitted by mobility mainly consist of carbon dioxide (CO₂), in addition to small amounts of methane (CH₄) and nitrous oxide (N₂O). In order to compare the warming effects of different GHGs, the global warming potential (GWP) is used. The GWP relates the amount of heat trapped in the atmosphere by a particular GHG to the amount of heat trapped by a similar mass of CO₂. In this way, the sum of all GHG emissions can then be indicated as CO₂ equivalents. The global warming potentials (for a time horizon of 100 years) of carbon dioxide, methane and nitrous oxide are as follows:

CO₂: 1
CH₄: 34
N₂O: 298

Source: IPCC (2013, p. 714).



In addition to GHG emissions, black carbon emissions, a component of soot which is released during diesel fuel combustion, may be monitored. Black carbon has a strong warming effect as well as disastrous impacts on local air quality and public health. Monitoring black carbon emissions can therefore be extremely useful for cities. Unfortunately, due to complex interactions of black carbon in the atmosphere, its exact global warming potential is still subject to scientific uncertainties. Nonetheless, monitoring black carbon emission developments can help keep track of the order of magnitude and local air quality effects and link air quality management and GHG emission reduction.

Upstream and downstream emissions from vehicle production should not be accounted for since these are small compared to transport activity related emissions and often occur either in other countries or – if in the same country – are accounted for in other sub-sectors such as the manufacturing industry (in the national GHG inventory). Therefore, accounting for upstream and downstream emissions bears a considerable risk of double counting. Analyses of transport emissions also do not account for construction emissions from major infrastructure projects, such as metros or highways. If construction is considered in the accounting system, then it will also have to be included in the baseline emission calculations.

Example

Table 12 for the Transit Metropolis Programme is an example of the boundaries of a NUMP from China. This is an example of a geographic boundary of a “Programme NUMP” because the territorial boundary of thirty-seven participating cities yields the NUMP boundary.



Table 12. Potential system boundaries of Chinese Transit Metropolis Programme

Temporal boundary	2013 - 2020
Sectoral boundary	The MRV approach covers urban passenger mobility by metro, bus (including BRT) and cars, but not e-bikes*
Geographic boundary	<p>Due to the nature of the mitigation activity, the territorial boundary distinguishes between two layers of analysis:</p> <p>At the national level, the territorial boundary includes all thirty-seven pilot cities and their respective territorial assessment boundaries.</p> <p>At the city level, each city must determine a suitable territorial boundary for itself. For citywide activities, it is recommended to set the territorial boundary according to the boundaries that are already being used by local administrations for mobility planning, which cover most of the transport volume and correspond with the available data as much as possible.</p> <p>In the case of Beijing, the entire urban area within the 5th ring road is chosen as territorial boundary because this corresponds to the travel demand model used by the city's mobility commission and therefore also to the available mobility statistics.</p>
GHGs included	<p>The focus is on direct, activity-based GHG emissions. Monitoring covers tank to wheel CO₂, CH₄ and N₂O emissions, as well as emissions related to electricity generation, which is also included as a direct emission source.</p> <p>Indirect emissions of infrastructure operations are based on the electricity consumption of these services in the use phase (e.g. electricity used in metro stations). Other indirect upstream and construction emissions are not included in the monitoring.</p> <p>In order to account for upstream GHG emissions from fuel consumption, which lie outside of the assessment boundary, a default correction factor is applied for well-to-tank emissions based on literature, which are presented as indirect emissions. If available, national factors can replace international defaults. A rough estimation of construction emissions for metro expansion is provided based on existing literature. This is done in order to take these emissions into account as leakage¹¹.</p> <p>The assessment of indirect emissions does not include reduced emissions resulting from a decline in car production which, in turn, is linked to restricted demand. In Beijing (and other Chinese cities), demand for conventional combustion vehicles is restricted by a cap on total car registration permits. The size of the effect of this so-called 'license plate lottery' is uncertain. This in combination with a lack of data leads to the exclusion of reduced emissions from the assessment to ensure a conservative estimation.</p>

Source: GIZ (2015a)

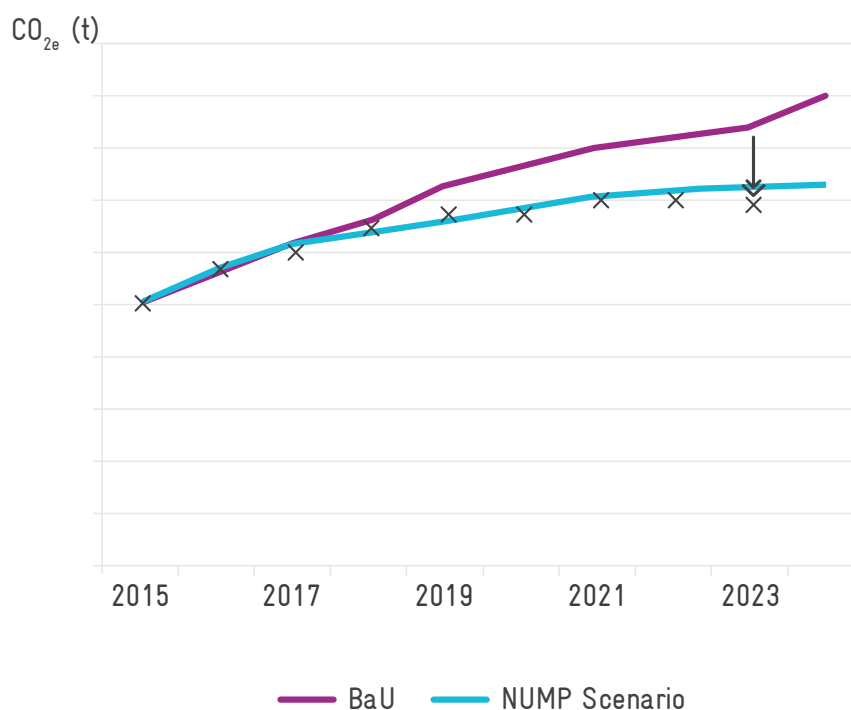
¹¹ Leakage refers to additional emissions that are directly or indirectly caused by the mitigation action, in this case the NUMP, but take place outside of the agreed project boundary (in this case mobile source emissions of metro, bus and cars).

*E-bikes were not included when this study was conducted due to missing data on travel activity but could be done today.

MRV Step 4: Build and model scenarios

MRV step 4 is an essential basis for vision and goal setting within phase 3 of NUMP. In order to assess the GHG effect of NUMPs, the overall GHG emissions associated with mobility within the boundaries of the NUMP are compared to a hypothetical business-as-usual scenario, which acts as baseline (see **Figure 20**). This scenario describes emissions that would have occurred in the absence of the NUMP based on assumptions on travel demand per mode, vehicle efficiency and fuel-related emissions. In particular, assumptions on travel demand are coupled with assumptions on GDP and population developments.

Figure 20. Comparison of real emissions



(in year x) with the BAU (purple line) and the NUMP scenario (green line)

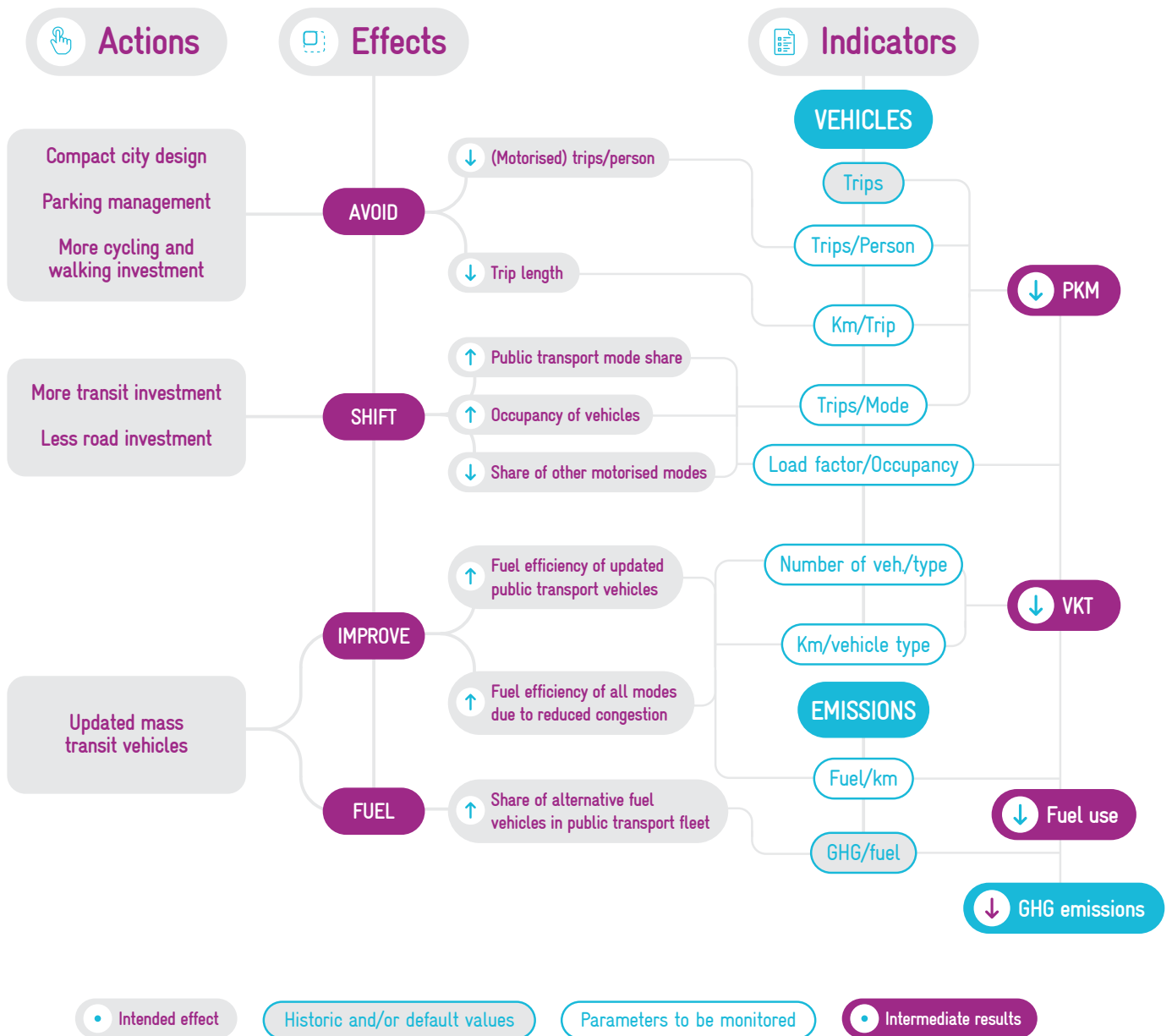
Source: MobiliseYourCity Partnership

In case the assessment is done for the national level (i.e. the NUMP includes a sectoral strategy for urban mobility or national policies and regulations), a national transport emission model is needed. In case the NUMP is an investment or support programme for cities (e.g. e-bus support programme for cities) or the NUMP incentivises cities to develop SUMP, emission models are required. Both apply the same methodology but use different kinds of data (national level vs. local level). In order to facilitate comparability, the boundary must be the same for the BAU and for the mitigation action scenario. Leakage emissions, i.e. increase of emissions that occur outside the boundaries, should be analysed in a qualitative way at least in the mitigation action proposal. For example, in case the NUMP finances investments in electric buses, the additional emissions due to battery production could be estimated roughly, using a default value for emissions per kW of battery capacity based on literature.

Ultimately, an emission model should include all direct and significant indirect effects that result from the mitigation action. Not only the boundaries but also the 'theory of intended effects' or 'cause-impact chain' are important to develop or select a model.

The cause-impact chain of NUMPs can encompass many intervention points in a bottom-up model. The combined effects of a package of ‘avoid, shift and improve’ measures will result in measurable changes in the ASIF indicators. Rather than focus on the individual effects of single measures, methodologies for these types of actions look at changes in indicators or intermediate variables holistically. The advantage of this method is that interactions and synergies are included in the results; the disadvantage is that the effect of the individual measures is not known, so it is difficult to learn which measures within the package are the most effective (see Figure 21).

Figure 21. Comprehensive urban mobility programmes and plans causal chain (passenger mobility)



Source: UNFCCC (2018)

NUMPs have the potential to change most key variables in a bottom-up model. The variables are listed on the next page, followed by the expected mechanism that causes them to change. Some methodologies focus on intermediate variables, especially vehicle kilometres travelled (VKT), in order to capture the overall effects of a programme. If VKT data are directly available or collectable (e.g. through surveys or traffic counts), trip-based data is not necessarily required for GHG emission calculations.



Depending on the activities covered by the NUMP, it will be necessary to **collect data on the following variables**:

- **Trips/person** – land use changes and non-motorised modes investment may shift some trips to non-vehicle trips which can be expected to reduce (motorised) trips per person that produce GHG emissions;
- **Km/trip** – compact cities with increased density and mixed-use bring origins and destinations closer together, reducing the length of necessary trips;
- **Mode shares** – new, improved public transport system may attract travellers from other modes;
- **Vehicle occupancy of modes** – new public transport vehicles will have higher capacity than old vehicles, improved routes will be used more, and ride sharing may increase;
- **Fuel efficiency of new vehicles** – new public transport vehicles will employ more efficient technology and have different fuel consumption and/or different drive technologies;
- **Traffic speeds** – congestion may decrease leading to higher average travel speeds which can affect fuel consumption of all modes or bus speeds could improve due to dedicated bus lanes;
- **Use of alternative fuels** – some programmes may lead to an increase in the fleet of vehicles using fuels with lower carbon intensities;
- **Passenger-kilometre (PKM)** – some methodologies may use data at PKM level, which would change based on interventions affecting the variables above; and
- **VKT** – some methodologies use data at VKT level, which would change due to interventions affecting the variables above.



Box 36. Tools and resources – MobiliseYourCity Emission Calculator

The MobiliseYourCity Emission Calculator is a Microsoft Excel based bottom-up spreadsheet model for GHG calculations in the mobility sector at the national and local level within the framework of NUMP and SUMP development. It is an open tool that can be adapted to any country's and city's needs. Since it allows for the quantification of GHG emissions at the national and city level, the tool enables governments to calculate potential effects of national and urban mobility policies, e.g. extension of public transport, promotion of electric vehicles. The tool has been developed by the Institute for Energy and Environmental Research Heidelberg (ifeu) in cooperation with the German and French development agencies GIZ and AFD. It is available in English, Spanish and French.

Download: <https://mobiliseyourcity.net/mobiliseyourcity-emissions-calculator>

MRV Step 5: Monitor and account real world data to understand goal achievement

MRV step 5 – the monitoring – is being realised when implementing the NUMP. Mobility related emissions from within the NUMP boundaries can then be tracked against the pathway to achieve the NUMP target. This requires regular updates of national (in case of NUMP as a sector strategy or policy) or local (in case of NUMP as an investment or support programme for cities) GHG emission inventories. Ideally, these inventories are also calculated using bottom-up methodology as real emissions are tracked against the calculated BAU scenario which can solely be based on bottom-up methodology. Only this way it is feasible to use the same boundaries.

The inventory approach also allows monitoring whether countries or cities are on track to meet the defined GHG emission reduction goals. Savings can be expressed in total tons of CO₂e per annum against the originally calculated baseline value in the respective year. Preferably, a national bottom-up data management system would be able to consolidate, generate or share data at appropriate levels of disaggregation. In many developing countries, bottom-up analysis tools and disaggregated data are not available. The lack of bottom-up emission models can be overcome by adapting inventory tools from developed countries or non-governmental organisations.



Box 37. Tools and resources – TrIGGER - Transport Inventory and Greenhouse Gas Emissions Reporting Tool

TrIGGER is a simple bottom-up spreadsheet model to calculate national transport GHG inventories. It is an open tool that can be easily adapted to any countries' needs. First developed together with Vietnam's Ministry of Transport to calculate national transport-related GHG emissions and report them to the Ministry of Environment, the tool has been tested and improved. TrIGGER was developed by the Institute for Energy and Environmental Research Heidelberg (ifeu).

The international TrIGGER version available for free download includes sample data from Germany to illustrate its functionality. This data does not comply with the official GHG inventory but was simplified to illustrate the tool functionality. It can be easily replaced with country-specific data. The tool comes with a comprehensive user manual.

Download: <https://www.changing-transport.org/tool/trigger/>

Monitoring Fleet Composition

The composition of a city-specific vehicle fleet strongly influences local mobility emissions. The more private cars are on the road and the larger or older the vehicles are, the higher their fuel consumption is and the higher the related GHG emissions are. In other words, GHG emissions depend on the vehicle fleet and on the distribution of VKT across the fleet's vehicle mix.

Data on the vehicle fleet is usually available from vehicle registration statistics for passenger cars, taxis, buses, trucks and motorcycles (e-bikes are mostly excluded), which include technical specifications for different vehicle types. Once the registered fleet is documented for the base year (e.g. 2019), only newly registered (and deregistered) vehicles have to be monitored each year.

If there are no big differences in fleet compositions across different cities in a country, using national averages for urban fleet composition may be considered. Where the fleet is known to be quite specific, however, these local characteristics should be accounted for. For example, prosperous metropolitan areas may have a larger number of new and larger cars than less prosperous mid-sized cities with a smaller but older fleet.

Box 38. Definitions – Fuel consumption and emission factors

Specific GHG emission factors (CO₂, CH₄, and N₂O in gCO₂e/km) apply according to different mobility characteristics. The accuracy of emission factors greatly affects the overall emission calculations.

At vehicle level, the specific energy consumption per kilometre travelled depends on technical parameters and operating conditions. In road transport, considerable differences in energy consumption and related GHG emission factors per kilometre are caused by:

- Different vehicle characteristics, such as engine type, engine capacity, vehicle age and, to a lesser extent, the emission concept (such as Euro 1-6). As emission standards are phased in over time, data on emission concepts can be used as a proxy indicator for vehicle age (based on fleet composition); or
- Different traffic characteristics, especially speed, traffic quality and road gradients. These depend primarily on transport infrastructure and traffic volumes, but also on other conditions, such as traffic lights or weather conditions.

Emission factors range from highly disaggregated factors, e.g. specific emission factors for each passenger car differentiated by vehicle size, age and emission class (e.g. EUR 4), to averaged emission factors (e.g. only one average emission factor for all buses). If average emission factors are used, these should ideally be derived from detailed factors that are aggregated based on average fleet compositions and average driving situations.

Since many factors that influence fuel consumption vary significantly from country to country, country-specific emission factors would improve the quality of the analysis. Using international default values introduces uncertainties into emissions calculations. Some countries have already adopted national average emission factors based on average national fleet compositions (number of vehicles of a certain size [engine capacity], age and fuel type per vehicle category), average driving conditions on different road types, and ideally also upstream emissions of fuels. If emission factors are only available for tank-to-wheel emissions, a correction factor for upstream emissions can be applied.

Monitoring Vehicle Mileage

The background paper **Approaches for Establishing In-Use Vehicle Stock and Vehicle Mileages** (GIZ, 2017a) can help establish a monitoring system for collecting data.

In case of a NUMP as an investment or support programme for cities, ideally all cities follow a common assessment methodology as for example outlined in the **Monitoring & Reporting Approach for GHG Emissions** (MobiliseYourCity Partnership, 2017b) for SUMP. The MobiliseYourCity Partnership follows a territorial approach for SUMP since the city's territory reflects the political and administrative sphere of influence and facilitates the assessment of each city's SUMP. It includes emissions from inhabitants and visitors alike and addresses all the local stakeholders that influence mobility within the city's territory (inhabitants, employers, public services, industry, trade etc.) (ifeu, 2014). The territorial approach is also recommended by other international guidelines, such as the **Global Protocol for Community-Scale Greenhouse Gas Emission Inventories** (WRI, 2014) or the Covenant of Mayors, and is therefore in line with state-of-the-art international best practice. In the territorial approach, vehicle mileage corresponds to all travel activity of those modes covered by the assessment boundary of the NUMP that take place in the city territory.



Box 39. Tools and resources - Approaches for assessing vehicle mileages

A joint paper by GIZ, German Aerospace Center (DLR) and IVT Research explains different approaches to establish average vehicle mileage, and it presents methods applied in Germany, USA and France to obtain an up-to-date vehicle register. It discusses the methods, their strengths and weaknesses, as well as the context of the different approaches. This is intended to help identifying approaches that are suitable for application in different country contexts. The focus of the methods discussed in this paper is the passenger car. However, special attention is also given to the applicability of the presented approaches to two-wheelers.

Download: <https://www.changing-transport.org/publication/in-use-vehicle-stock-and-mileages/>

In order to assess the GHG effect of each SUMP, the overall GHG emissions associated with mobility in each city territory are compared to a hypothetical business-as-usual scenario, which acts as the baseline. This way emission inventories at city level can be used to measure and report on the NUMP. City-level emission inventories should be based on territorial boundaries.

Concluding remarks

Countries may want to provide national average emission factors, average fleet composition or average annual mileages as default values for cities. This helps cities develop their own inventories and track emission reductions, and also ensures comparability across cities. The MobiliseYourCity Partnership Tool can be used to assess emission and potential emission savings of each city and can be localised by providing national level default indicators.

Data collection and management, as well as emission calculations, are iterative processes that can be improved over time as data availability increases. To ensure consistency and transparency in emission reporting, it is important to clearly document all data sources, definitions and assumptions. If done correctly, monitoring and reporting can greatly improve the information basis for mobility planning.

Most of the data needed for emission calculations must also be collected as part of the development of a sound NUMP. At the same time, monitoring reports can be used to communicate progress, highlight the impacts of NUMP implementation and help secure ongoing support from stakeholders.



Monitoring and Reporting Checklist

The previous sections set out the MobiliseYourCity Partnership's approach to GHG monitoring and reporting. The following checklist sums up the key elements of a successful MRV process during the development and implementation of NUMPs.



Checklist Monitoring and Reporting (M+R)

Monitoring and Reporting	✓
NUMP Phase I: Initiation	
Share of urban mobility GHG emissions (expert estimate or back of the envelope calculations) understood.	
NUMP Phase II: Status Quo Analysis	
General data availability and quality, incl. data owners and access assessed	
Basic data on vehicles, transport activity and trends collected (ideally in time series)	
NUMP Phase III: Vision, Goal Setting and Measure Selection	
Scope of the MRV approach set:	
– Type of NUMP and corresponding MRV approach defined incl. assessment of boundaries (geographic, temporal, sectoral, GHG)	
– Main effects of intended mitigation actions within the NUMP identified (e.g. using causal chains)	
– Indicators decided on (incl. what effects to include)	
– Data availability/gaps assessed in more detail	
Baseline scenario and " with NUMP scenario " developed and implemented in emission model:	
– Latest version of the MobiliseYourCity Emission Calculator or any other suitable model downloaded and adopted	
– Data collection plan developed to collect relevant data (e.g. fleet composition, mileage, emission factors etc.) on national and/or local level	
– Necessary assumptions (e.g. travel demand, GDP, population development, vehicle efficiency) decided on using stakeholder consultations	
– Use same boundaries as for the BAU-scenario	
– Estimate potential leakage emissions qualitatively	
NUMP Phase IV: Detailed Preparation	
More detailed modelling conducted to assess impacts of specific mitigation actions (optional, might require more detailed models)	
NUMP Implementation	
Data collection plan set-up and adapted to MYC Tool for monitoring	
Experts contacted to verify your report (quality assessment)	

This process must be adapted to local circumstances and decision-making processes. As a result, timing may vary from country to country.



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Annexes

Annex 1: Indicative List of NUMP Indicators

Dimension		Potential indicators	Kind of indicator
Transport indicators	Transport volumes and modal share	- Passenger and freight volumes, by transport mode (passenger-km per inhabitant; tonne-km per inhabitant)	- Driver
	Transport Infrastructure	- Length of transport network (km by mode) - Length of cycle network - Number of pedestrian crossings - Share of toll roads	- State
Environmental Indicators	Energy Consumption for transport	- Transport final energy consumption by mode	- Pressure
	GHG	- Transport related emissions of greenhouse gases	- Pressure
	Air quality	- Total emissions of NO _x , PM, NMVOC, SO _x , - Number of reported exceedances of air pollutant objectives	- Pressure - Impact
	Biodiversity	- Habitat fragmentation from transport infrastructure - Impacts of infrastructure projects on protected areas	- Impact - Pressure
	Land use	- Soil sealed for transport infrastructure (in ha per year)	- State
Economy	Costs / Prices	- Fuel Price	- Driver
	Subsidies	- Subsidies for specific mobility modes	- Driver
	Costs of congestion	- Time spent in congestion (in h per capita and year)	- Impact
	Public investments	- Public investments in transport network: shares by mode (road, rail, active modes, waterways in %)	- Driver
Social and health indicators	Access to transport systems for all	- Proportion of population that has convenient access to public transport (living within 500 m from PT station) - User satisfaction with PT	- State - State
	Noise	- Proportion of population suffering from transport noise	- Impact/ State
	Safety and security	- Number of road fatalities - Number of accidents with fatalities and injuries	- Impact - Impact
Sustainable mobility planning and policies	Internalisation of costs and pricing	- Development of mobility costs (compared to base year, by mode) - Fuel taxes (rates) - Share of toll roads (% of road network)	- State - State/ Response (S/R) - S/R
	Mobility behaviour	- Development of modal share (by mode, in %) - Car use (in km per year, cars per-capita) - Motorisation rates (Number of passenger cars per household)	- State - State - State
	Planning	- Number of cities with a Sustainable Urban Mobility Planning - Number of cities with green zones	- S/R
Innovations	Innovations in the mobility system	- Share of new cars with non-petroleum fuel engine - Share of final renewable energy consumption, by mode - Number of bike and car sharing systems implemented - Share of cities with integrated ticketing systems	- State - State - S/R - S/R

Annex 2: Potential sources of funding

National level

Fuel tax

Fuel taxes and excise duty rates ought to be set at a level, which internalises external costs (e.g. from GHG emissions). This would directly impact upon both travel demand and the vehicle technologies used and, in turn, fleet fuel consumption and CO₂ emissions. Also, fuel prices potentially have a considerable impact on rate of vehicle ownership. The influence of fuel price changes on consumption is defined as its price-elasticity. At present, there is little change in demand in response to price changes (WEC, 2009), e.g. a 10% fuel-price increase leads to only 0.11%-0.6% lower demand (Goodwin et al., 2004; Graham/Glaister, 2004; Small/Van Dender, 2007), i.e. fuel demand is inelastic in the short term. However, more sustained fuel price increases, e.g. from taxation, lead to considerable reduction on energy demand: a 10% rise in fuel prices will yield a 2.5% to 3% decrease in energy use in the first year and up to 6% after 5 years (Goodwin et al., 2004).

Fuel prices impact upon both energy demand and vehicle choice. A 10% rise in petrol prices would lead to a fleet-average CO₂ emissions reduction of ≈0.5 g/km in the first year, and up to ≈2.8 g/km in the longer term (Ryan et al., 2008). Goodwin et al. (2004) estimate the vehicle efficiency improvement resulting from a 10% fuel price increase to be 11% over the long-term.

Differentiated vehicle tax

Consumer demand can be guided by differentiated vehicle registration, purchase taxes and/or feebate schemes. This in turn can help reduce split incentives between individuals and society. These schemes need to be responsive to developments in the vehicle fleet to guarantee sufficient demand for more efficient vehicles and to increase cost-effectiveness. Circulation/ownership taxes are a reoccurring charge (typically yearly), which can be used to promote purchasing more efficient cars by calculating the charge according to cars' fuel economy, either directly or by proxy (CO₂ emissions, engine size or power-to-weight ratio). Relating taxes to greenhouse gas and harmful emissions like this is a well-established and researched policy measure, and has proven to be more cost-effective than enforcing direct controls.

Fiscal instruments can guide individual purchasing decisions, e.g. vehicle and fuel taxes can have a significant impact on the efficiency of vehicles introduced into the fleet. An increase in vehicle circulation taxes by 10% could yield a short-term decrease of 0.3 g/km in fleet CO₂ emissions, rising to 1.4 g/km in the long term (Ryan et al., 2008). The European Commission believes it is essential to differentiate taxes, rewarding energy efficient cars with considerably lower taxes and imposing significant taxes on cars with poor fuel efficiency. COWI (2002) found that substituting existing vehicle taxes with taxes dependent on only CO₂ emissions, with sufficient differentiation, resulted in the largest reductions. Where differentiated taxes are already in existence, the addition of a CO₂ emissions dependant element provides smaller, but still notable reductions. For example, the Irish CO₂ emissions-differentiated vehicle tax is estimated to have led to a 3.6–3.8% emissions intensity reduction and a yearly transport CO₂ emissions reduction of 3% (Giblin, McNabola 2008). Under a feebate system, the level of progression is being increased over time, and thus results in even greater CO₂ emissions reduction, but considerable savings also could be attained by increasing the differentiation of existing taxes.

Registration taxes

Through placing higher taxes on the purchase of less efficient vehicles, registration taxes directly impact upon consumer behaviour at the point of vehicle sale. Denmark's purchase-tax system saw an average increase in fuel efficiency of 4.1 l/100km for diesel light vehicles and 0.6 l/100km for petrol (Smokers et al., 2006). Purchase or registration taxes are very visible, which is especially helpful in guiding buyers' decisions towards more efficient vehicles and may also give way to a reduction in car ownership rates: a 10% growth in car registration taxes would see a reduction in car ownership in European cities by about 1.4% (Smokers et al., 2006), which would, consequently, result in lower overall car use and a greater share of more efficient modes in urban areas. However, this may result in negative welfare or equity implications. Taxes imposed at the time of the first registration could lead to the delay of vehicle fleet renewal, as car owners may keep their vehicles longer and may prefer to replace their current vehicle with used, rather than new ones. An ex post assessment of the Netherlands' feebates estimated that approximately 0.6-1m tonnes of CO₂ per annum was saved through the scheme (Harmsen et al. 2003), accounting for approximately 2-3% of the Netherlands' total transport sector CO₂ emissions. The Dutch system's use of direct incentives to buy very efficient cars has had a measurable impact on purchasing decisions, with the market share of cars from the highest efficiency class rising from 0.3% to 3.2%, and that for the second highest class increasing from 9.5% to 16.1% in 2002 (VROM, 2003). Subsequent to the government's decision to terminate the feebates, efficient cars' market share fell almost instantly, even though it remained higher than before the introduction of the scheme.

France has a feebate scheme in place, through which vehicles with CO₂ emissions below 60 g/km (e.g. electric vehicles and plug-in hybrids) are rewarded a rebate of up to €5,000, while inefficient vehicles see a fee of up to €2,600 for cars with CO₂ emissions above 250g/km. According to official figures, the scheme has been very successful, with sales of vehicles with CO₂ emissions less than 130 g/km increasing 45% in the first eight months of the scheme. A number of ex-ante calculations have been made of the policy potential of feebate schemes. A feebate scheme of US\$ 1,000 for every 0.01 gallon per mile improvement, if introduced in the United States for one year and then stopped, would lead to a light vehicle fleet efficiency increase of 24% over the following 10 to 15 years (Greene et al. 2005). Langer (2005) estimated that a feebate of US\$1,825/gallon/100mi (4.25 L/km) would lower the average fuel consumption of vehicles introduced into the fleet by 16% by 2010 and by 28% by 2020.

Local level

Special Improvement District (SID) levies

SID levies come historically from a local amenity based levy set up where an area needs improving and private interests initiate or are willing to contribute a levy to improve the local amenity such as sustainable transport infrastructure. SID levies are called various names in various parts of the world. In America, Special Assessment District (SAD) fees have begun to be used in Los Angeles and Seattle to fund new rail lines. The SAD is also known as BAD or Benefit Assessment Districts in Los Angeles and LID or Local Improvement District in Washington DC.

In San Francisco the process of their SID began with the establishment of a local committee by the district's residents, business owners, tenants, schools and developers. The committee prepared a local development proposal including financial plan and sought approval from local government authorities. The district residents were charged with elevated property taxes to fund the infrastructure. The involvement of developers in the committee from early stages was notable as they were perceived as a catalyst for the investment.

SID's have grown out of Business Improvement Districts (BID's) where a struggling area in a city area was to regenerate and needed to attract more people to the area. BID are common in the US and Australian cities for small area improvements. A BID is a non-profit organization for a designated commercial area involving the local land owners and is used to enhance infrastructure and services of the commercial area to help improve local business.

There are about 72 BID's in New York City serving 84,000 businesses. In BID's, businesses tax themselves for the good of the infrastructure or amenity that they create together, as they as well as the public gains.

Local governments simply collect the funds and manage the procurement of the disbursement to enable the improvements; and manage the on-going processes about the investment. BID's can be for security, for heritage conservation, access improvement or simply providing better spaces that attract people to stay and hence create value in the area.

The potential to turn a BID into a larger SID with urban rail and TOD outcomes for a larger scale sustainable transport infrastructure remains as a real option in many cities as the BID processes are well understood and trusted. A small area level SID's/ BID's can help fund priority access infrastructure such as pathways and bike lanes.

Tax increment financing (TIF)

Tax increment financing (TIF) is a tool used to fund redevelopment projects (community, sustainable transport and infrastructure projects) based on forward hypothecation of property tax due to prospective land value increase. It simply requires governments to set up a Treasury Fund that hypothecates funding from a specific area where government transit investment is improving the area resulting in land-based rates and taxes going up.

Large number of US cities uses TIF extensively for redevelopment and infrastructure provision in urban 'blight' areas. Blighted areas are usually characterized by dilapidated infrastructure, low income, unsanitary conditions, and a high rate of tax delinquency (Mathur & Smith, 2012). TIF has also been used to fund transit and station area projects in several American cities such as Chicago and Portland. TIF is considered a 'self-financing' tool as local governments do not need to put up additional fees or increase existing tax rates.

TIF has enabled cities to issue project-specific TIF bonds to raise capital costs of the project. A USD 2 billion subway extension project (to Hudson Yards) in New York City is being financed by raising funds through municipal TIF bond sales. The city of San Francisco uses a tax increment financing approach to fund transit and local development (Demaue, 2015; Clark & Mountford, 2007; Schlickman et al., 2015).

It is possible for governments to suspend or cancel TIF districts due to budget deficits or according to local and political circumstances like in the case of California and Chicago. TIF also requires significant institutional capacity to implement due to assessment, planning and compliance processes at local levels however this is a necessary part of any attempt to create urban economic value. Thus planning and implementation of TIF in developing cities could be challenging.

Business Levy

Business Levy is used in various countries such as France ('Le Versement Transport tax), Austria (Dienstgeberabgabe tax), the USA (employer/ employment tax) and the UK (Business Rate Supplement tax) to finance sustainable transport projects.

The "Le Versement" Transport tax is paid by public or private companies in France when the company has nine or more workers located within a 10,000 inhabitant urban transport zone to fund public transport services (Pascal, 2003, as cited in Milan, 2015).

In the United Kingdom the Business Rate Supplement (BRS) tax is used by local authorities to impose a levy on business taxpayers to help finance local projects that can promote economic development. BRS is a temporary tax imposed for a period to cover the full cost of the infrastructure. The development of Crossrail in the Greater London Area is financed partially by the BRS. The BRS is expected to fund GBP 4.1 billion of the GBP 14.8 billion project by 2038. The tax is proposed to be increased by 15% in revaluations to take place every five years. In the first financial year 2010-11, collection surpassed the projected amount (Roukouni & Medda, 2012; Medda & Cocconcelli, 2013).

Developer Levy

Developer Levy is charged from land developers to fund the public infrastructure gap created due to the new development. In the US, the Impact Fee is charged from the land developer as a form of developer levy. The Impact Fee is a one-time charge levied on development projects during the issue of building permits to fund new public infrastructure and services associated with new development (**Vadali, 2014**).

In Latin American countries developers are either asked to mitigate any shortage in supply of public services caused by their private project (Colombia, Guatemala and Argentina), referred to as an 'in kind payment', or are simply offered additional development rights against a 'cash payment' (in Colombia and Brazil) (**Smolka, 2013**).

Special Area Levy

Special Area Levy is used by governments to charge all land owners in a specific area to fund local transport services. In theory, Special Area Levy can be used for local transit and access infrastructure.

In Milan, such a levy was imposed on properties located up to 500 metres from local transit stations. The levy was proportional to the windfall gains on the land value to help fund the construction of the subway system (**Ridley & Fawcner, 1987**). In Australia, a Transport Improvement Levy of AUD 111 per year for every rateable property (245,687) in the Gold Coast City was introduced to fund the Gold Coast Light Rail (**SGS Economics and Planning, 2015**).

Betterment Contribution charges are a form of Special Area Levy that has been widely documented in statutory documents in the UK, Latin America, India and Australia. The overall application of a Betterment Contribution has however been poor except in a few Latin American countries.

The Indian city, Nagpur, has not been able to implement its legal Betterment Contribution charge since 1936 due to lack of an implementation strategy and framework. It is understood that the most successful cases of Betterment Contributions seem to rely on rather arbitrary technical shortcuts to keep it manageable.

Parking Levies

The use of Parking Levies as a government charge on parking spaces in a designated area have been used to fund transit. The Parking Levy is based on the notion of discouraging the use of cars as well as providing funds to help an alternative transit mode. These parking levies can be easily imposed; but if done with the involvement of community and businesses, then they enable more effective economic value to be created.

The Western Australian Government uses the Perth Parking Levy to fund the local transit, pedestrian and cycling infrastructure system; and has significant community and business support as it minimises car dependence. Perth is funding 'free' local transit through this levy. Similar levies are imposed in Sydney (the Parking Space Levy), Melbourne (Congestion Levy) and Adelaide (Transport Development Levy).

Advertising revenue

Station area and rolling stock of bus, urban rail and public bike sharing schemes are a significant means for advertising revenue. Rapid Metro Gurgaon (an urban rail) in India had an advertising revenue of 61% of the total revenue in 2014-16 - through auctioning of naming rights of the stations (even before the stations were opened) and advertisement space inside and on the exterior of the train coaches (**Deloitte Haskins & Sells, 2015**). Similar approach can now be seen in other urban rail systems in India. The Charlotte Area Transit System agency earned

about USD 5 million (5-year period) through leasing advertising rights on its bus and train rolling stock.

London's bike sharing scheme was originally branded and sponsored by Barclays Bank and subsequently by Santander UK whilst primarily private advertising agencies such as JCDecaux has been involved in several European cities.

An aggressive advertising revenue strategy can significantly benefit transit agencies such as in Rapid Metro Gurgaon. Advertising offers a wide range of revenue enhancement exploration other than the conventional advertising on rolling stock and station by transit authorities – fees tickets; vending machines; sponsorships; merchandising; station naming and others. However, advertising revenue can vary significantly between cities and regions but can be maximized through an active market oriented approach.

Road-User-Charging

Congestion charging or Road-User-Charging is a “user-pays” tool that has been implemented to check traffic congestion, manage traffic demand and generate funds for the local government. These funds could be reinvested in transport and may help in influencing the mode shift away from motorized transport. The Singapore congestion system is considered as successful as it has in the last 4 decades managed traffic congestion and improved public transport patronage. The system has been generating funds that were reinvested in the improvement of the public transport.

Norway has used toll road charging to fund transport infrastructure improvements for more than 70 years. Bergen and Oslo both used toll road charging to generate funds to rapidly construct additional parking and roads – 15 to 35 years quicker than compared to public budgetary allocation time. These funds have also been used to fund public transport; their initial overall allocation was 10% which was later revised to 20%.

In London's congestion charging scheme, a key attribute for its implementation was the economic aspect of traffic congestion as traffic speed in London business district were reduced to 13 km/hr before congestion charging. After implementation of the scheme, traffic congestion dropped by 30%. Prior to the introduction of the scheme supply of London buses service was increased.

Congestion charging systems have proven to be successful tools at reducing and managing road congestion, increasing public transport patronage levels, reducing emissions and generating substantial funds to reinvest into transport systems and infrastructure. Planning and implementation of road pricing or congestion charging require strong political and community support and local skills to successfully operate such complex schemes.

Cities such as Perth, Delhi and Mumbai have long debated implementation of such schemes but none has come close to its implementation stage. This is even after that federal government of these countries may have funded majority of the planning and implementation of congestion charging systems.

Annex 3: Capacity building providers and knowledge sources

Name	Short description	Provider and contact
MobiliseYourCity Partnership	As part of its activities, the MobiliseYourCity Partnership offers a wide range of capacity development assistance to beneficiary partners through open source policy guidance articles, plans and policies. Such policy resources include National Urban Mobility Policies and Investments Programmes (NUMPs) which offer policy guidance for national level transport actors whilst Sustainable Urban Mobility Plans (SUMP) are targeted to inform and build the knowledge base of local actors in planning for cities. Other opportunities presented to city authorities include seminars, conferences, workshops, twin-city cooperation and online study platforms for enthusiasts and practitioners in urban transport development. Capacity building programmes offered by the MobiliseYourCity Partnership cover areas in GHG emission measurement and reporting, sustainable urban mobility planning, project management, among others. The training phases are tailored to relevant urban transport initiatives such as the designing and management of public transport, mass transit, non-motorised transport and electric vehicles.	http://MobiliseYourCity.net
CIVITAS	CIVITAS is a network of cities which are committed to developing cleaner transport systems in Europe and in other parts of the world. The network has run several projects in Modules since its establishment in 2002. The current project Module spans from 2016 to 2020. Transport practitioners and city officials seeking to make change in their transport systems can resort to practical transport solutions deployed under CIVITAS initiated projects. CIVITAS run its projects under several thematic areas of urban mobility. Experiences gained from CIVITAS' sustainable transport demonstration projects can serve as knowledge reference for cities desiring to implement similar innovations.	http://civitas.eu
Eltis	Eltis is an urban mobility observatory which provides the platform for transport practitioners to exchange information, knowledge and experiences related to sustainable urban mobility within Europe. The platform makes available online tools in the form of handbooks, training materials and reports on mobility issues. Practitioners are given the opportunity to share their experiences and concerns through the online forum created by Eltis. Under its mobility plans, Eltis provides practitioners with guidelines to developing Sustainable Urban Mobility Plans (SUMP). The platform also periodically presents transport-related statistics on European countries.	http://www.eltis.org
Covenant of Mayors	The Covenant of Mayors provides a knowledge sharing platforms that offer information on best practices, lessons and relevant city examples on climate and energy projects and programmes development. The Covenant also provides an online repository of resources including topics on funding and financing opportunities, policies on energy poverty, energy efficiency, sustainable transport development, and other related themes. To inspire its members and inform other practitioners, the Covenant of Mayors also has an online database on achievements, case studies, videos and other materials to showcase the experiences gained from cities and countries implementing climate and energy innovative solutions.	https://www.covenantofmayors.eu

Name	Short description	Provider and contact
C40	Under the auspices of C40, a Climate Action Planning Framework was developed to guide city authority in formulating climate action plans that are in harmony with the objectives of the Paris Agreement. The framework is built around three pillars namely: commitment and collaboration, challenges and opportunities, acceleration and implementation. Key components of the framework include: emissions neutrality, resilience to climate hazards, inclusivity and benefits, governance and collaboration. The framework can serve as an important guide for city planners and officials in the initial stages as well as during the process of planning climate change interventions. It is expected that the framework is updated over time, as such city authorities and practitioners in the climate-related fields are presented with the opportunity to adapt to changing trends in the designing and planning of climate actions.	https://resourcecentre.c40.org/climate-action-planning-framework-home

To deliver on SUMP, a number of measures be it policy, operational and infrastructure need to be implemented, on which there is a variety of options of knowledge products and training support:

Sustainable mobility policy and infrastructure knowledge sources and capacity building providers

Name	Short description	Provider and contact
TRANSfer	The TRANSfer project provides online tools, handbooks, publications and a database of countries' transport NAMAs. Such online resources inform transport practitioners on climate related subjects such as climate financing, monitoring, reporting and verification of policies, GHG measurement, among other related climate change and adaptation issues especially regarding the transport sector.	http://www.transferproject.org/resources/
UEMI / SOLUTIONS	The urban mobility SOLUTIONS partnership provides a toolkit with policy papers and factsheets across all key areas of urban transport, including planning, vehicle technology, public transport and freight. Along with the Urban Electric Mobility Initiative, capacity building seminars and e-learning courses are provided.	http://www.uemi.net/toolkit.html
SUTP	Sustainable Urban Transport Project (SUTP) provides an online platform publicizes implementation guides and solutions on urban mobility and sustainable urban transport. These publications present opportunities for city officials and political leaders to build capacity for designing, planning and implementing innovative mobility solutions. The project also aims at serving as a hub of technical expertise in the development of sustainable urban transport strategies. Thematic areas covered by the project's capacity building materials include the following: mass transit, bus rapid transit, public transport institutions, non-motorised transport, public bicycle systems, transport and climate, among other topics.	https://www.sutp.org/en/

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