



TRANSPerú

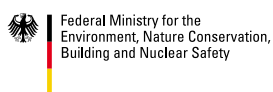
Sustainable Urban Transport NAMA Peru

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Internationale Zusammenarbeit (GIZ) GmbH**
Dag-Hammarskjöld-Weg 1-5
65760 Eschborn, Germany
T +49 61 96 79-0
F +49 61 96 79-11 15
E info@giz.de
I www.giz.de

On behalf of:



of the Federal Republic of Germany



Ministry of Transport and Communications (MTC)
Jr. Zorritos 1203
15082, Lima - Perú
I <http://www.mtc.gob.pe/>



Ministry of Environment (MINAM)
Av. Javier Prado Oeste 1440
San Isidro Lima - Perú
I <http://www.minam.gob.pe/>

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Main authors:

Carolín Capone (GIZ), Jill Velezmoro (GIZ)

Supervision:

Andre Eckermann (GIZ)

Layout:

Sandra Frankenberger

Photo credits:

Carlos Felipe Pardo

Supported by:



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Disclaimer

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List of abbreviation

AAP	Asociación Automotriz del Perú
AATE	Autoridad Autónoma del Sistema Eléctrico de Transporte Masivo de Lima y Callao, Autonomous Authority of the Electric System of the Mass Transport of Lima and Callao
AfD	French Agency for Development
ARAPER	Asociación de Representantes Automotrices del Perú
A-S-I	Avoid-Shift-Improve
ASPEC	Asociación Peruana de Consumidores y Usuarios
BAU	Business-As-Usual
BMUB	Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit, Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety of Germany
BRT	Bus Rapid Transit
CAF	Banco de Desarrollo de América Latina, Development Bank of Latin America
CC	Climate Change
CNG	Compressed natural gas
COFIDE	Corporación Financiera de Desarrollo
CTLC	Consejo de Transporte de Lima y Callao
DKTI	Deutsche Klimatechnologie-Initiative, German Climate Technology Initiative
ENCC	Estrategia Nacional de Cambio Climático, National Climate Change Strategy
ESCI	Emerging and Sustainable Cities Initiative
FICCI	Federation of Indian Chambers of Commerce and Industry
FONAM	Fondo nacional del Ambiente
GCF	Green Climate Fund
GDP	Gross domestic product
GHG	Greenhouse gases
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit, German Federal Enterprise for International Cooperation
IADB	Inter-American Development Bank
ICI	International Climate Initiative
IFC	International Finance Corporation
IMP	Instituto Metropolitano de Planificación
INDC	Intended Nationally Determined Contribution
INEI	Instituto Nacional de Estadística e Informática, National Institute of Statistics and Informatics

LAC	Latin America and Caribbean
LAIF	Latin America Investment Facility
LEDs GP	Low Emissions Development Strategies Global Partnership
LMR	Lima Metropolitan Region
MDG	Millennium Development Goal
MEF	Ministerio de Economía y Finanzas. Ministry of Economy and Finances
MINAM	Ministerio del Ambiente, Ministry of Environment of Peru
MIT	Motorized individual transport
MML	Municipalidad Metropolitana de Lima, Metropolitan Municipality of Lima
MRTS	Mass Rapid Transit Systems
MRV	Monitoring, reporting, verification
MTC	Ministerio de Transportes y Comunicaciones, Ministry of Transports and Communications of Peru
MVCS	Ministerio de Vivienda, Construcción y Saneamiento, Ministry of Housing, Construction and Sanitation
NAMA	Nationally Appropriate Mitigation Actions
NGO	Non-governmental organization
NMT	Non-motorized transport
NSP	National Sustainable Program
NSUTP	National Sustainable Urban Transport Programme
OECD	Organisation for Economic Co-operation and Development
OSITRAN	Supervisory Board for Investment in Public Transport Infrastructure, Organismo Supervisor de la Inversión en Infraestructura de Transporte de Uso Público
PESEM	Plan Estratégico Sectorial Multianual, Multi-annual Sectoral Strategic Plan
PLANAA	Plan Nacional de Acción Ambiental, National Environmental Action Plan
PlanCC	Project Planning for Climate Change, Proyecto Planificación ante el cambio climático
PPP	Public-Private-Partnership
PROINVERSIÓN	Agencia de Promoción de la Inversión Privada, Private Investment Promotion Agency
SIT	Sistema Integrado de Transporte, Integrated Transport System
SUNARP	Superintendencia Nacional de los Registros Públicos
SUT	Sustainable Urban Transport
TDM	Travel Demand Management
UCL	University College London

UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollars
WB	World Bank Group
WRI	World Resources Institute

Exchange rates

Original Currency	EUR	USD	Date
1 PEN	0.26 EUR	0.30 USD	01.09.2015

Executive Summary

Motivation and Objective

Peru contributes to global GHG emissions with a total of 124.11 MtCO₂ (2010), approximately 10% of which result from the transport sector (15.2 MtCO₂). With a share of 37.5% the transport sector represents the largest contributor in terms of energy-related emissions. Emissions have increased by 65% in the last ten years.

Peru's transport sector faces a wide range of challenges. The age of the vehicle fleet is 14 years on average resulting in high specific emission levels. While public transport in Lima still enjoys a mode share of 60%, its comparatively bad state paired with rising economic wealth of the population has led to rapidly increasing individual motorization (the number of vehicles has almost doubled between 2004 and 2014). As a result, the Peruvian society suffers from severe problems with congestion (average traffic flow at 14 km/h), air pollution, and traffic accidents. Already today, the societal cost of congestion in Lima sums up to USD 7 billion per year and it is estimated that 6,000 people / year die as a consequence of particles exposure and urban air pollution. Current problems will be aggravated if the trend towards car-dominated urban conglomerates is not reversed.

Table 1: The NAMA at a glance

Type of action	Policy NAMA based on a comprehensive policy matrix	Type of NAMA	Supported with unilateral elements
Subsector	Land based passenger transport; all modes	Geographic scope	National and subnational elements
Coordinating entity	Lead coordinating entity: Ministry of Transport and Communications (MTC), coordination is based on an inter-institutional Steering Committee		
Duration	2016 -2019	Mitigation effect and Sustainable Development Benefits (SDB)	5.6 - 9.9 MtCO ₂ (2015 - 2025) (only part of the measures considered); less congestion, less air pollution, better access to public transport, enhanced social equity, less traffic accidents

The NAMA aims to reverse the trend towards car-dominated urban conglomerates, based on two main building blocks: **the provision of high-quality public transport** and the **optimization of the vehicle fleet**. In order to enable long term sustainable development, the NAMA focusses on the implementation of **key structural changes**:

- Improved political framework conditions (e.g. fuel economy standard, strengthening of vehicle homologation),
- Construction of public infrastructure (e.g. metro lines, optimized bus fleet, cycle lanes),
- A strong institutional set-up (e.g. single transport authority for Lima / Callao).

TRANS Peru's core element is a **policy matrix**, used to plan and structure the sector transformation in a comprehensive manner. The matrix outlines objectives (outcomes), the actions required in order to achieve these objectives (outputs), and responsibilities for their implementation for the medium-term (2016 -2019).

The matrix was developed jointly in an intensive consultation process, including all stakeholders directly involved in shaping the sector's policies, by means of the creation of an inter-institutional Steering Committee. As a result, the objectives of planned measures are coherent, planned actions are feasible, and the policy reform agenda counts with high backing and ownership of relevant stakeholders.

The clear definition of specific and measurable outputs (and outcomes) further enables a sound monitoring and verification of the implementation of the NAMA.

TRANSPerú's policy matrix foresees an overall of 77 outputs, which are clustered into six mitigation areas:

1. **Integrated public mass transport system in Lima / Callao:** Construction of parts of Metro Line 2 (13.5 km) and Line 4 (8km), extension of the BRT line by 10.5 km, 12 intermodal integration spots, timetable and ticketing integration for BRT and metro systems,
2. **Non-motorized transport in Lima:** Drafting of a master plan for Non-Motorized Transport, revision and dissemination (with districts) of the outdated technical guidelines for NMT-infrastructure, mass awareness campaigns,
3. **Institutional development to improve urban transport management in Lima / Callao:** Coordination agreement between Lima and Callao, process towards the establishment of a single transport authority for Lima and Callao,
4. **Vehicle homologation and fuel efficiency for light vehicles:** Implementation of a national vehicle homologation system including technical vehicle inspections, review of emission standards, and introduction of a fuel efficiency and CO₂ emissions labelling scheme and standard, implementation of 30 NGV stations in 5 secondary cities,
5. **Modernization of the public transport vehicle fleet:** Implementation of a scrapping scheme for Lima and Callao for routes competing with organized mass transport lines (replacement of 6000 old units by 1800 modern high capacity buses), development of scrapping schemes in secondary cities,
6. **Support to local governments to strengthen sustainable urban transport:** Implementation of a sustainable urban transport policy and programme that support secondary cities in the planning, financing and implementation of sustainable urban transport measures.

Mitigation impact and sustainable development benefits

Together, the implementation of the measures outlined in the NAMA will yield a CO₂-Mitigation effect in the range of 5.6 - 9.9 MtCO₂ accumulated over the period 2015 – 2025¹ (excluding mitigation area 6). For the implementation phase of the matrix (2016 - 2019), the mitigation effect accounts for 1.1 - 2.03 MtCO₂, owed to the fact that most of the measures will contribute to the long-term effect, rather than have an immediate direct emission reduction effect. According to the Peruvian pledges in the INDCs, the country targets a total reduction of 89 MtCO₂ until 2030. The measures foreseen in the transport sector (mainly the NAMA measures and some further measures contained in PlanCC) are estimated to contribute with a reduction of 1.6 MtCO₂/a in 2030 compared to BAU.

It is important to note, that mitigation area 6 (the National Programme for Sustainable Urban Transport) is not considered in the estimation, as it was not defined with the necessary detail at the time of the estimation. As this measure is meant to transfer funding and capacities to further city governments, it can be expected that it will have a significant additional mitigation impact.

The NAMA further yields considerable sustainable development benefits (or co-benefits). Impacts include, among others, 18 million hours of saved travel time, improved air quality, reduced number of accidents and economic losses.

¹ Calculated during NAMA preparation, hence the starting date is 2015, which was thought to be the starting date for NAMA imple

Costs and Financing

The implementation of the entire policy matrix has been estimated at a cost of USD 6.2 billion, the lion's share of which will be needed for the construction of the metro and BRT lines (USD 5.9 billion). The Government of Peru has allocated significant amounts to the policy matrix, mainly to the integrated public mass transportation system in Lima. Several development banks (CAF, WB, IADB, KfW) and technical cooperation agencies have stated their strong interest and have committed considerable resources (USD 950 million for Metro Line 2). The NAMA applied for additional funds from the NAMA Facility – the British-German Fund to support NAMAs in the form of a NAMA Support Project (grant of EUR 4 million plus concessional loans of EUR 40 million, including a grant element of EUR 4 million).

The German Climate Technology Initiative (DKTI) has foreseen additional financial resources for mitigation area 6 (the set up of the National Programme for Sustainable Urban Transport) (concessional loans of up to EUR 60 million). In order to fully implement the policy matrix, further domestic and international support is needed in the range USD 95 million.

The NAMA opens up **investment opportunities for the private sector** in the range of USD 10 billion:

- Tenders for Metro Lima (several billion dollars)
- Concessions for the operation of restructured bus routes (scrapping of 6,000 old, introduction of 1,800 modern buses in Lima)
- Tenders for NMT / intermodal infrastructure in Lima (cycling lanes, parking facilities in prioritized areas)
- CO₂-label and emission standard stimulate the purchase of efficient light vehicles (Peru imports approx. 150,000 – 200,000 light vehicles yearly)

Besides direct private investments, private pension funds or similar instruments could be used to finance these systems.

1 Introduction

Peru is the sixth largest emitter of Green House Gases (GHG) in the Latin America and Caribbean (LAC) region and ranks 46th on a global scale. Since 1990, Peru's emission levels have increased by 60 percent and will continue to rise unless ambitious action is taken. In recent years, Peru has emerged as one of Latin America's more active and progressive countries on climate change by making voluntary emission reduction pledges in its forestry, energy, and waste sectors. In its INDC, submitted in September 2015, Peru pledges a reduction of emissions by 30% below a BAU-scenario in 2030 (MINAM, 2015).

Table 2: Key data of Peru

Population	Urban population	Population growth	GHG emissions	GHG per capita	Economic growth
30.9 million (2014)	78% (2014)	2%/a	124.11 MtCO ₂ eq (2011)	1.8 tCO ₂ eq	2.4%/a (2014)

Source: based on WB, 2015

In 2011, Peru emitted 124.11 MtCO₂eq, with 35% coming from the forestry, 33% from energy, and 21% from the agricultural sector. The transport sector contributes with 15.2 MtCO₂, equal to 37.5% of energy-related or 12.3% of total GHG emissions. Even though other sectors may be more significant in terms of absolute GHG emissions, the transport sector should be considered a key sector for mitigation action, considering current trends of motorization (emissions have grown by 63% during the last ten years and vehicle numbers are increasing by 150,000 – 200,000 cars per year). If current trends are not stopped or reversed, Peru will face even more severe congestion, public health problems following increased local air pollution, noise, traffic accidents, and also economic losses. According to the National Environmental Action Plan, Lima alone records 6,000 earlier deaths per year as a consequence of particles exposure and urban air pollution, causing a loss of 0.9 % of BIP (MINAM, 2010).

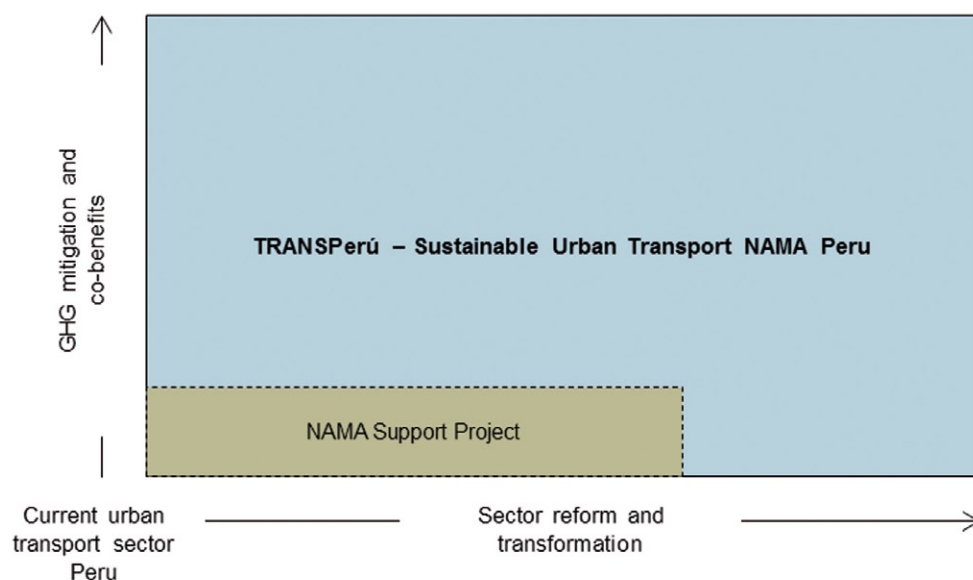
The Government of Peru has already initiated a number of projects to improve the situation in the transport sector. However, there is currently no comprehensive strategy towards a sustainable transport sector and the efforts of different actors are not coordinated, resulting in inefficient implementation. Furthermore, some significant challenges remain unaddressed and additional financing is needed to implement planned and additional initiatives. The NAMA TRANSPerú was developed during 2014 by the Peruvian Government partners with the support of GIZ and KfW, with the objective to provide an overarching master plan towards a sustainable, low-

carbon transport sector. The master plan contains the already initiated measures, which can be regarded as Peru's domestic contribution to the NAMA, and integrates additional innovative policy actions into the transformation agenda. The organization and integration of all measures into an overall comprehensive master plan allows for a higher implementation efficiency, eases coordination and monitoring, and increases the attractiveness for further investment in the sector's initiatives by providing a long-term strategy.

In the first half of 2014, a proposal for a NAMA Support Project² was developed and submitted to the NAMA Facility in July 2014. The proposal was pre-selected by the NAMA Facility Committee and the concept was further refined during the first half of 2015. The final project design for the support project was submitted to the NAMA Facility in June 2015. It focuses on the support of the implementation by providing direct technical and process support, capacity development, monitoring and financial means for key investment projects. Figure 1 shows the relation between the NAMA and its NAMA Support Project (NSP).

² The idea behind a NAMA Facility NAMA Support Project financed by the NAMA Facility is to support the implementation of NAMAs

Figure 1: Relationship of the NAMA and the NAMA Support Project



Source: own illustration

A second proposal was submitted by KfW and GIZ to the DKTI Facility³³ of the German Federal Ministry of Economic Cooperation (BMZ) with the aim to support the development and implementation of mitigation area 6 (the National Programme for Sustainable Urban Transport). While the financial cooperation component (credit line of EUR 60 million) of the proposed support project has been approved already, the technical cooperation component (donation of EUR 6 million for technical support) is expected to be approved in 2016 (current status 'earmarked').

³³ German Climate Technology Initiative

2 Overview of the Peruvian urban transport sector

2.1 The relevance of the urban transport sector in Peru

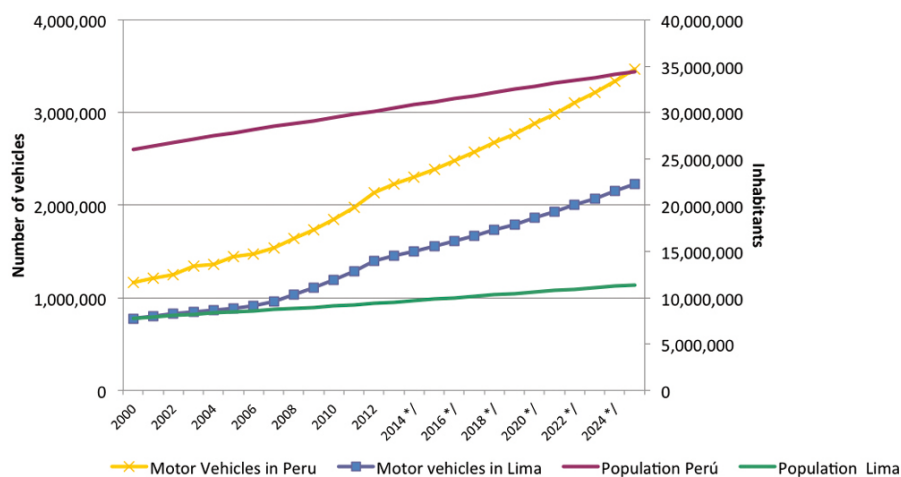
The transport sector is a major contributor to GHG emissions in Peru (15.2 MtCO₂ in 2010 corresponding to 12.2% of total, and 37% of energy-related GHG emissions). Transport-related emissions rose by almost 65% in the last 10 years (MINAM, 2010c), caused by an inefficient vehicle fleet and sharply increasing private motorization.

The majority of Peruvians (79% in 2014) live in urban environments and urban population is growing faster (1.7% in 2014) than the country's overall population (1.3%) (Worldbank, 2015), showing the importance of cities in general, especially the Lima

Metropolitan Region (LMR) with a population of approximately 10 million.

The vehicle fleet is 14 years old on average with high specific emission levels. The share of motorized individual transport (MIT) is rapidly increasing. Every year, approximately 150,000 – 200,000 new private vehicles are registered in Peru (while these officially cannot be older than 5 years by the time of importation it has been reported that the existing regulation is not always enforced). As shown in Figure 2, also in the future the number of overall motor vehicles per person is forecasted to substantially increase.

Figure 2: Evolution of motor vehicles and population in Peru (2000–2025)



Source: own illustration. * future projection

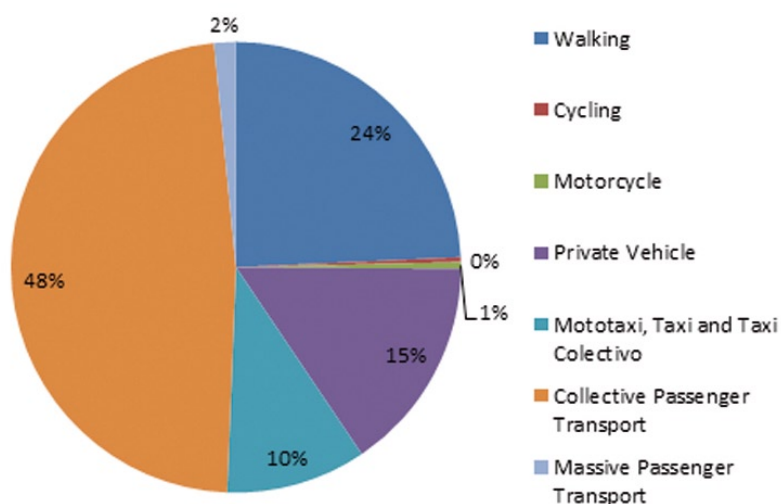
Sharply rising individual motorization is caused in part by a very limited mass transit network, currently only consisting of the Metropolitano Bus Rapid Transit (BRT) and Metro Line 1, which together carry about a million trips a day, accounting for only 5 percent of the overall 22.3 million daily trips (including trips in private and public modes and by foot). About 55% of all trips in the Lima Metropolitan Area are served by the conventional public transport system of largely unregulated, low-capacity vehicles that compete for customers on the street (causing additional congestion). There are approximately 31,000 buses, minibuses, vans and combis operating in Lima and Callao (many of them 15 to 20 years of age) on more than 560 routes that lack public transport facilities such as bus lanes, terminals or proper stops. These vehicles share the road with an increasing number of private cars, taxis and mototaxis that currently account for 23 percent of total trips, but that are seen as a much superior alternative by those who have a choice. As a consequence, Lima faces high levels of traffic congestion and low travel speeds of 14–16 km/h on average⁴, resulting in significant losses in productive time, increased pollution, as well as fatalities and economic loss related to road accidents.

⁴ Five years ago average travel speeds have been between 22–23 km/h (Transitemos, 2014)

In 2014, the first complementary bus corridor (Corredor Azul) was established as a further step towards a formalized and Integrated public mass transport system in Lima / Callao. It was meant to consolidate the many small business entities into formal, larger company structures, employ modern high capacity buses and fixed bus stops. However, these plans of the former administrations of the Municipality of Lima (MML) were put on hold by the new administration, which announced in March 2015 to reduce the number of planned complementary corridors from originally five to two, and to revise the whole concept, as it saw major drawbacks in the plans of the preceding administration, as e.g. the original concept did not employ exclusive bus lanes. This is causing adverse effects on the overall traffic situation, allowing for an increase in motorized individual transport, as high capacity buses freed up road space.

While walking still has a significant modal share (e.g. 24% in Lima and Callao), bicycles are very rarely used as mode of transportation even though the geographical and climate conditions are favorable. Although some efforts have been made in terms of building infrastructure, Lima has a bicycle share of only 0.4% of total passenger transport, as compared to shares of around 37% for some European cities such as Copenhagen, and around 3% for many Latin American cities, such as Bogotá or Santiago de Chile. Figure 3 shows the modal split for Lima and Callao in 2012.

Figure 3: Modal split in the metropolitan area of Lima and Callao



Source: own illustration based on information from JICA, 2013.

The lack of comprehensive policies has extensive economic, ecologic and social implications, especially in Lima and Callao, where:

- Transit times are expected to almost double until 2025 (compared to 1990),
- The average travel speed by car is of 14 -16 km/h,
- Approximately 120,000 licensed taxis (plus around the same number of unlicensed taxis) are interfering with other traffic by frequent stops, on-street price negotiations due to missing meters and slow speed,
- Around USD 200 million have been spent in the period of 2004-2013 due to traffic accidents, with a daily casualty rate of 12 persons due to road accidents,
- Over the same period (2004-2013) around 483,000 persons (132 per day) have suffered injuries that led to physical disabilities of varying degrees,
- The vehicle fleet (public and private) has an average age of 14 years and a significant portion of vehicles with more than 20 years,
- Traffic management systems are out-dated and frequently fail to function, resulting in daily interventions by the police attempting to keep the traffic flowing⁵.

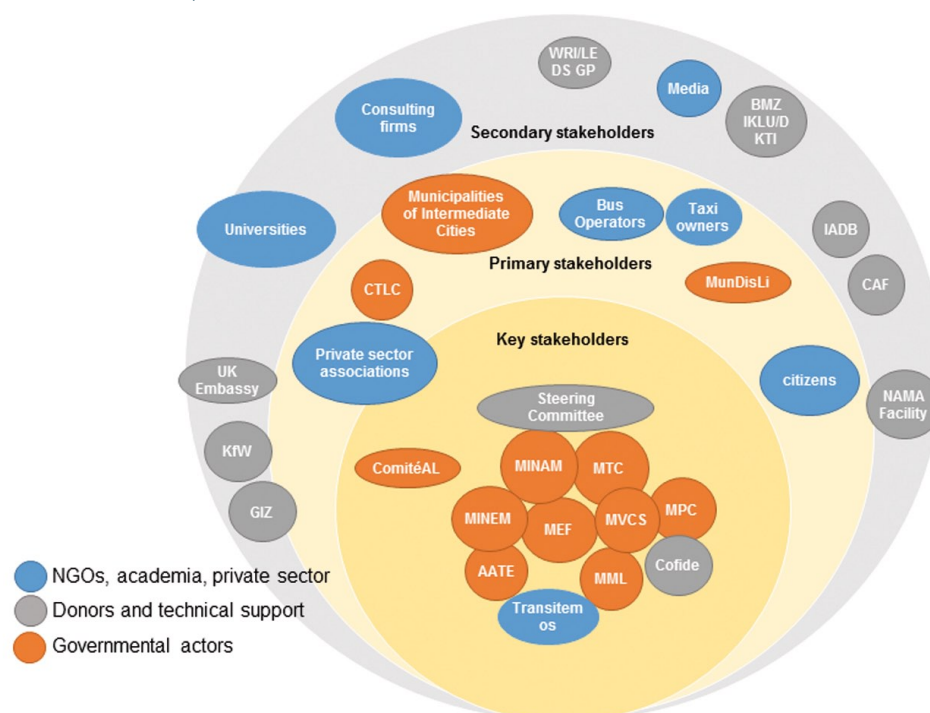
5 Even when functioning as intended, they combine to increase emissions: traffic signal timings result in extended periods where traffic is stationary and encouraging drivers to disobey them and block junctions, thus increasing further the periods where stationary traffic is emitting contaminants with no gain in movement.

2.2 Relevant stakeholders and their roles

Main implementing partners of the NAMA are the Ministry of Transport and Communications (MTC) and the Ministry of Environment (MINAM). While MTC is the responsible ministry for the overall sector policies, including climate policies and projects, MINAM is the national focal point for climate policies in general. MTC, as the relevant sector ministry is the overall coordinator of the NAMA, however, direct implementation responsibility for certain mitigation measures may fall into the responsibility of another institution (e.g. non-motorized transport in Lima / Callao falls into the responsibility of MML and Callao). Further important stakeholders for a successful implementation of TRANSPerú and their respective role within NAMA implementation are described in Table 3. Stakeholders can be roughly divided into four categories:

1. **Key stakeholders:** partner institutions that are essential for the implementation, that are directly involved in decision making, and can directly influence the implementation process.
2. **Primary stakeholder:** actors that will be directly affected by the implementation of the project, and
3. **Secondary stakeholders:** actors that are indirectly affected or are involved in the project only temporarily (incl. as well international development cooperation).

Figure 4: Stakeholder landscape of the NAMA



Source: own illustration.

Acronyms:

AATE: Autonomous Authority of the Electric Mass Transportation System of Lima and Callao
 IADB: Interamerican Development Bank
 CAF: Development Bank of Latin America
 Cofide: Financial Cooperation of Development S.A.
 ComitéAL: Management Committee of the Clean Air Initiative Lima - Callao
 CTLC: Transport Council of Lima and Callao
 GIZ: German Development Agency

MEF: Ministry of Economy and Finance
 MINAM: Ministry of Environment
 MINEM: Ministry of Energy and Mines
 MVCS: Ministry of Housing, Construction and Sanitation
 MML: Municipality of Lima (including Protransporte, NMT)
 MPC: Provincial Municipality of Callao
 MunDisLi: District Municipalities of Lima

Table 3: Stakeholders and their roles and responsibilities in the NAMA process

Key Stakeholders	Roles and responsibilities with regard to the NAMA
Ministry of Transport and Communications (MTC)	MTC is responsible for developing and implementing sector policy and programmes, including sectoral climate actions. Within the NAMA, MTC is the main implementing partner on the national level, and acts as one of the two coordinating entities of the NAMAs Steering Committee. As chair of the committee it takes an active role in the overall coordination of the transformation process. The Autonomous Authority of the Electric Mass Transportation System of Lima and Callao (AATE) , a sub-organization of MTC is in charge of the planning, construction and management of the metro system in Lima and Callao. AATE will play a prominent role in the planning, construction and management of the Metro network and in integrated ticketing.
Ministry of Environment (MINAM)	MINAM is the national focal point for climate policies and coordinates the inter-ministerial activities with regard to climate mitigation and adaptation. Within the NAMA, next to MTC, MINAM supports in the coordination of the Steering Committee and acts as vice-chair. Most likely, MINAM will take over the lead of one of the working groups to be established under the Steering Committee.
Ministry of Economy and Finance (MEF)	Among others, MEF is responsible for the attribution of budgets to the sector ministries. MEF is the recipient of the FC funds of the NAMA Support Project of the NAMA Facility against compliance with the policy matrix.
Ministry of Housing, Construction and Sanitation (MVCS)	<p>MVCS is the governing entity in Urbanism and Urban Development, and has recently been assigned by Law N° 30156 the competence of urban mobility with the objective to treat the issue of urban transport in an integral manner. Within the NAMA, it will therefore play an increasingly important role.</p> <p>MVCS further chairs the Committee of the Clean Air Initiative, an inter-institutional coordination mechanism to improve air quality in the metropolitan region, e.g. through institutional strengthening, the set-up of an information system and building of public awareness. Other members are MTC, MINEM, MINAM, MML, Municipality of Callao (MPC) and other public institutions. The NSP will coordinate closely with the actors and initiatives implemented under the Committee.</p>
Ministry of Energy and Mines (MINEM)	MINEM is responsible for the development of the national policy on fuel quality. Within the NAMA, it is involved mainly in setting obligatory emission standards for new vehicles and the emission-labelling scheme for light private and duty vehicles.
Metropolitan Municipality of Lima (MML)	MML plays a key role in the NAMA, as the metropolitan area of Lima will be the subject of major public infrastructure interventions and 90% of all trips in Metropolitan Lima fall into its territory. MML will implement the proposed measures within its range of exclusive and shared competence with the responsible entity at the national level (MTC). MML's Division for Urban Transport (GTU) is responsible for planning, regulating, and managing urban passenger transport and is committed to promote non-motorized transport measures, such as the construction of cycling lanes and bicycle parking facilities. The Metropolitan Institute for Transport of Lima – Protransporte is responsible for the BRT System in Lima and for planning, implementation, management and maintenance of improvements on major complementary corridors to the Metro and the BRT and for managing the city's bus scrapping and fleet renewal programs.

Municipality of Callao (MPC)	Next to MML, also the Municipality of Callao forms part of the metropolitan area. Within the NAMA, Callao is responsible for measures on the local level in Callao, such as non-motorized transport, improvement of the bus-network, or taxi-regulation within its range of exclusive and shared competences with the responsible entity at the national level.
Peruvian Development Bank (COFIDE)	The development bank COFIDE has a programme for Compressed Natural Gas (CNG) conversion (Cofigas), which provides loans to vehicle owners for CNG conversion. Within the NAMA, Cofide is involved in the CNG related measures and channels financial resources into the conversion of public transport buses towards the use of CNG. It further acts as the manager of the scrapping fund.
Fundación Transitemos	<p>Fundación Transitemos</p> <p>The Foundation Transitemos is a foundation, addressing problems resulting from transport activities. Transitemos is actively involved in the preparation and implementation of the NAMA by contributing to technical discussions, providing information, technical studies and financial support e.g. for capacity building measures.</p>

Primary stakeholders

Transport Council for Lima and Callao (CTLC)	The Transport Council for Lima and Callao (Consejo de Transporte de Lima y Callao – CTLC) is a governmental body that was established in 1997 to coordinate urban transport in the metropolitan region following an inter-institutional approach, however, meetings ceased. For the NAMA, it might be interesting to revitalize the CTLC as an intermediate step towards the establishment of a public transport authority.
Municipalities of intermediate cities	Municipalities in Peru are responsible for planning, regulation and supervision of the urban public transport system, operated with buses and taxis including moto-taxis. They will become an important stakeholder for measure 6 of the NAMA, which focuses on the improvement of urban transport in secondary cities.
Bus and taxi operators	Bus and taxi operators are directly affected by the restructuring of the public transport system. The owners and operators of the approximately 240,000 taxis (2/3 informal) and 35,000 micro- and mini-buses will have to be integrated in the planning and implementation process in order to take their needs into consideration. The NAMA will create job opportunities for these groups but at the same time other jobs will become obsolete with the reform. Flanking measures to absorb and avoid negative social impacts will be designed to absorb negative effects.

Private Sector Associations (ARAPER, AAP, etc.)	The private sector closely related to urban transport will participate, and also contribute economically to the implementation of the NAMA. The Unions ARAPER (representing Motor Vehicle Trade Mark Representatives) and AAP (representing the whole industrial-commercial automotive activities, down to bus body builders, workshops, spare parts stores, etc.) as well as their individual members, could provide technical information and studies, and support projects and interventions. ARAPER sponsors Cruzada Vial, a foundation focused on Lima's traffic problems. AAP sponsors Transitemos, a foundation focused on problems resulting from transport activities in transport economy, environmental care, traffic safety and health protection, nationwide. Transitemos supported the development of the NAMA and is willing to contribute to its implementation with technical information and studies and support projects and interventions.
Districts of Lima	Lima is comprised by 43 districts, each of which has its own legal administration. Especially in the context of non-motorized transport the districts become relevant for comprehensive planning. MML currently receives information on the projects planned in each district. However, in the future, the coordination between MML and the districts will have to be improved.
Citizens: Cyclists and pedestrians as well as general public	The support of the measures by the general public including all participants in (urban) transport, such as car owners, pedestrians, cyclists and public transport users is crucial for successful implementation. The support of civil society makes the transformation less vulnerable to political change. Support by civil society can be achieved by raising awareness on advantages for different groups and by integrating them into the planning and implementation process.

Secondary Stakeholders

International development cooperation and development banks (GIZ, CAF, IADB, KfW; WB)	Several Multilateral Development Banks have expressed interest in identifying and materializing investment opportunities related to the implementation of the NAMA. Planned and realized contributions to NAMA implementation are outlined in section Support to local governments to strengthen sustainable urban transport. The NAMA will benefit from technical studies carried out e.g. in the framework of investment projects. GIZ and KfW are further supporting NAMA implementation by two common projects: the NAMA Facility NSP and the DKTI project. Both of which considerably support implementation of the NAMA and contain each a financial and a technical cooperation component.
LEDSPG / WRI	LEDSPG / WRI is supporting MTC and MINAM in the development of a capacity building programme accompanying the implementation of PlanCC, a project to estimate the potential and feasibility of different mitigation measures, in the transport sector.
British Embassy in Lima	The UK Embassy is actively participating in the meetings of the Steering Committee and has been supporting the development of the NAMA. The Embassy is further following up on the activities carried out by UCL and is an active member of the Steering Committee.

Consulting firms and research institutions	Local and international consultancies act as contractors for feasibility studies, planning, design and implementation of the measures outlined in the policy matrix and may engage in capacity development measures. Results of other consultancies (e.g. PlanCC and KOTI) may be relevant for the NAMA. The University College London (UCL) has participated with technical inputs derived from a British cooperation project on low carbon transport and capacity building in the period 2011–2013, including the development of the draft NAMA for Transport for Peru in 2012.
Media	The media serve as partner and multipliers in awareness raising and sensibilization of the broader public. In the past, several expert interviews have been carried out.
NGOs related to transportation and environment	TRANSPerú is cooperating with NGOs such as Grupo Limonta, Libelula or Lima Como Vamos, as they can be (and have been) relevant in awareness-raising and knowledge sharing at the local level.

During the preparation phase of the NAMA, a Steering Committee has been established for overall stakeholder coordination. The Committee represents all stakeholders, relevant for the preparation and implementation of the different sections of the policy matrix, including actors from the national and local governments, financing institutions, as well as NGOs and academia:

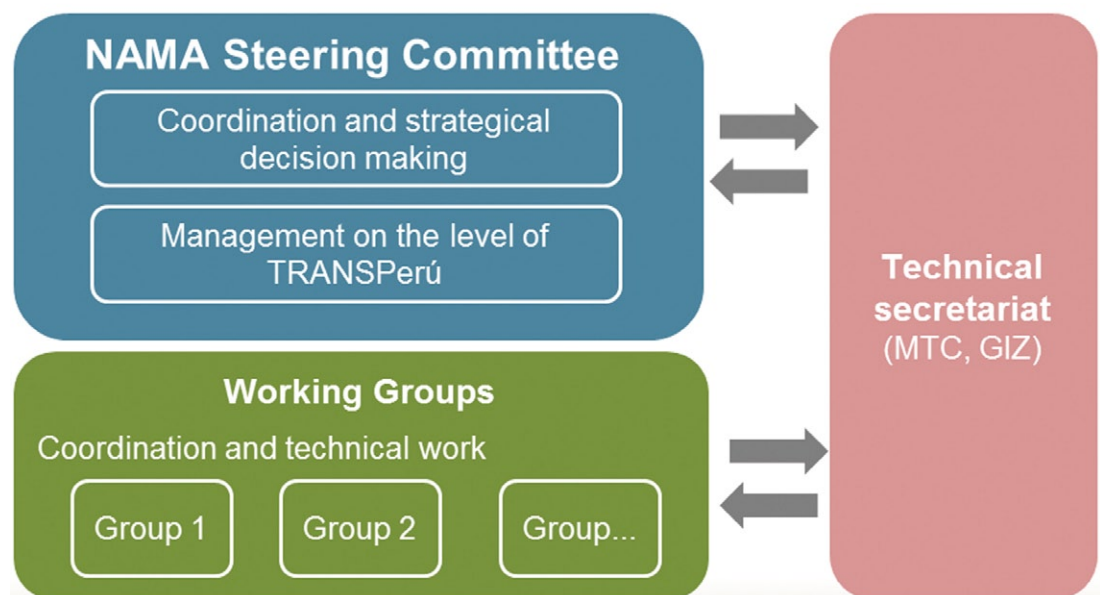
The Steering Committee functions as the overall coordinating body of the NAMA. It serves as a platform for discussion and decision making on the overall design of the NAMA and coordinates associated activities of the members. The committee functions according to established general operating rules, develops annual work plans and coordinates and monitors their compliance. It holds meetings on a bi-monthly basis and is supported in its operations by a technical secretariat (MTC and GIZ).

During the implementation of the NAMA, the steering structure will be enhanced by adding an overarching layer (strategical level) to the Steering Committee and build additional working groups for in-depth technical discussions on the key elements of the NAMA. Currently foreseen working groups are:

- Group 1: Measures relevant for Lima / Callao;
- Group 2: Scrapping, Homologation and fuel economy standard;
- Group 3: National Programme, and
- Group 4: MRV and data.

While the working groups will report to the meetings of the Steering Committee, the latter will report the progress in NAMA implementation to the Vice Ministers (strategic level) in order to facilitate coordination and prepare decision making at strategic level. Preparation, realization and follow-up to the Committee's meetings will be continued to be supported by the technical secretariat, while for the meetings of each working group a chairperson will be assigned and functions will be distributed to the members of the group.

Figure 5: Steering Committee of TRANSPerú



Source: own illustration

2.3 Financing for the Peruvian transport sector

MTC has at its disposal approximately 7% of Peru's national budget, accounting for EUR 2.8 billion per year (MEF, 2015). While this is a rather high sector budget (telecommunications does only play a negligible role as it is almost entirely privatized), around 70% is earmarked for construction and maintenance of roads and administrative purposes, whereas the budget available for investments in sustainable transportation is rather limited (e.g. this year approximately EUR 500 million are attributed to sustainable transport, being spent entirely on the construction and maintenance of the metro system). In general, the Peruvian Government has set investment priorities for the development of road, rail, port and airport infrastructure with the aim to improve its economic competitiveness (OECD, 2014). With regards to public passenger transportation, the government's investment priority lies on the enlargement of the metro system in Lima, including better interconnectivity with the Metropolitan BRT. While rail-bound mass transportation can be subsidized by the state, bus-based public transport systems are not supported financially by the national government.

In general, the influence of international development cooperation in Peru decreased during the last years because of the country's growing economic strength and its transition to a middle-income country⁶. However, bilateral-, private- and multilateral assistance increase in importance for the Peruvian transport sector (SECO 2013, p. 12-13). Public transport, with the exception of the metro system in Lima and Callao and some Mass-Rapid Transit projects, is financed on

the local and regional level. In general, municipalities do not receive sufficient funding to offer high-quality public transport services. To maintain the currently high share of public transport further support from the national level is crucial.

Most of the Peruvian public transport systems are financed and operated through public-private partnerships. The responsible public authority (e.g. national, regional, municipal) issues concessions for transport services (buses and taxis) to private companies with a duration of generally 10 years, depending on the route and responsible authority. Peru has encouraged private-sector involvement in all aspects of the economy since the early 1990s. Thus the operation of urban transport services has been in private hands ever since the national bus company ENATRU ceased operations in 1992. The bulk of urban transport is provided by semi-formal minibuses and buses, but the intention is now to group these buses into formal privately-run enterprises, as was the case in 2014 with the *Corredor Azul* in the metropolitan area of Lima. Similarly, the BRT services of the Metropolitan are operated by four private bus consortia, selected in 2009 after an extensive bidding process. Metro Line 1 was built by the government as a public works project, but train operations have been contracted out to a private concessionaire. With regard to Metro Line 2, the entire project (implementation and operations) has been concessioned to a private consortium. Future metro and BRT lines are expected to follow the same models.

⁶ According to Swiss State Secretariat for Economic Affairs (SECO)

Table 4: Comparison of public transport tariffs in the LMR

	Metro 1	Metropolitano BRT	Semi-formal public transport
Tariffs (Peruvian Sol)*	S/. 1.5/ trip (reduced S/. 0.75)	S/. 2.5 (main route or main route and feeder lines) S/. 0.5 (only feeder lines)	S/. 1 – 2 on average (depending on distance)

*1 Peruvian Sol (S/.) converts to approximately USD 0.30

Financing of the scrapping schemes

Currently there are two major scrapping schemes in place, both managed by Protransporte, the municipal operating entity for the Metropolitano BRT in Lima / Callao. System 1 aims at reducing and renovating the fleet in the area of influence of Metro Line 1 ('competing lines'). It was inaugurated in September 2014 with an overall budget of USD 17.44 million and a target to scrap 2,813 vehicles. It is financed by a framework agreement between MTC (AATE) and Protransporte. System 2 aims at reducing and renovating the fleet adjacent to the BRT line Metropolitano, and has an overall budget of USD 12 million. The system is financed by a trust fund, which was created upon the non-compliance of the consortium of the Metropolitano with its obligation for vehicle scrapping.

Table 5: Scrapping incentives

Type of vehicle	Age	Incentive (USD)
Rural truck 10 -16 seats	20-24	5,000
	above 25	4,000
Microbus 17 -33 seats	20-24	7,500
	above 25	6,000
Bus more than 34 seats	20-24	10,000
	above 25	8,000

Source: GIZ, 2014

2.4 Urban transport policy in the context of climate change

Sectoral policies, regulations and programmes

In 2012, the MTC issued its **Multianual Sectoral Strategic Plan 2012 - 2016** (*Plan Estratégico Sectorial Multianual PESEM 2012 -2016; MTC, 2011*) with the overarching goal to maintain, expand and modernize the transport infrastructure in order to promote social inclusion, enhance accessibility, and improve the competitiveness and security of the transport system and services (MTC, 2011). The PESEM defines specific objectives and appropriate measures, and outlines indicators to measure effectiveness as well as respective responsibilities. With regard to urban transport, the PESEM focuses on the improvement

of the **integrated public mass transport system** in Lima and Callao (especially on the metro system of Lima) and the creation and implementation of an institutional framework to regulate urban transport in the metropolitan region. Mass transit systems are planned to be implemented in seven further cities of the country. The PESEM highlights the general need to regulate the sector in order to operate the transport services according to international quality and safety standards (MTC, 2011).

Supreme Decree 026-2006 MTC on Maximum Allowable Emission Limits rules that as of 2007, new personal vehicles being imported into the country have to comply with Euro 3 or Tier 1 and cannot

surpass an age of 5 years. Nevertheless, the lack of stringency in enforcement and institutional capacity hinders an effective implementation and actual compliance with these regulations.

There are two **fleet renovation programmes** in operation in the Lima Metropolitan Region (MLL). The programmes target the replacement of mini- and minibuses with an age over 20 years that run on corridors next to the Metropolitano and the metro lines. With this voluntary measure MML tries to reduce competition of conventional public transport with the Metro- and BRT lines, at the same time rejuvenating the public vehicle fleet. In 2011, MTC had also launched a **Vehicle Scrapping Programme** (Programa para la Renovación del Parque Automotor - Decreto Supremo N° 023-2011-MTC; MTC, 2011), which was suspended but is expected to be revived. However, currently there is no regulation on the national level which establishes competencies and functioning of scrapping schemes on the sub-national level.

Climate Change policies, regulations and programmes

Peru's INDC has been submitted to the UNFCCC in September, 2015. The INDC pledges a reduction of GHG of 30% in 2030 compared to a Business-As-Usual (BAU) scenario (equivalent to accumulated reductions of 89 MtCO₂, until 2030), of which 20% will be reached with own resources and 10% are made conditional to financial support by the international donor community. The programme to reach this target consists of an overall of 58 measures, 50% of which have already been initiated by the government. Another 50% have been proposed and are perceived realistic (MINAM, 2015). Planned measures in the transport sector include the NAMA measures, as well as additional measures that had been analyzed in PlanCC and will have longer implementation spans than the NAMA, e.g. the introduction of hybrid and electric personal vehicles.

2.5 Peru's initiatives for a sustainable urban transport sector

The **PlanCC**, established in 2012, is based on a cooperation involving different Peruvian ministries (MEF, MINAM, MRE), private companies as well as international organizations and donors (Swiss development cooperation, Children's Investment Fund Foundation and the Climate and Development Knowledge Network). It seeks to assess the implications and feasibility of transitioning to a low-carbon economy and suggests prioritized mitigation options in different sectors. Measures proposed for the transport sector include e.g. the conversion of private, commercial and public vehicles to CNG, the introduction of hybrid and electric light-duty vehicles and the implementation of emission limits, the replacement of rural minibuses and taxis through low-emission busses, the expansion of the Metro Lima and an **integrated public mass transport system** based on a BRT and standardized buses called *Buses Patrón*, comprehending the Metro Network and interconnected with other transport modes, such as taxis, pedestrians, bicycles, long distance bus terminals, airport, etc. (PlanCC, 2014).

The Ministry of Housing, Construction and Sanitation (MVCS) chairs the **Coordination Committee of the Clean Air Initiative for Lima and Callao**, established as a platform for inter-institutional coordination of actions to improve air quality in Lima and Callao. The coordinating body includes all relevant actors and has executed various studies and workshops on topics related to the improvement of air quality in the region of Lima and Callao.

The private foundation **Transitemos** has been established in 2011 to provide support to governmental and private institutions through information, studies, expert advice, legislation analysis and proposals, training, demonstrative interventions and general coordination on mobility and transport issues (see also section 2.4). Among others, Transitemos has financed studies on the implementation of a technical motor vehicle homologation scheme, a fuel efficiency standard and a CO₂ labelling scheme for light duty vehicles.

2.6 International cooperation with the Peruvian urban transport sector

Different development banks (Worldbank, CAF, IADB, KfW) have provided abundant financial means for the Peruvian transport sector, the majority flowing into the construction of the Lima / Callao metro system (for details see 6.1).

In addition, the following **technical cooperation** agencies are active in the Peruvian urban transport sector:

The GIZ TRANSfer project (<http://transport-namas.org/>) is run by the German Agency for Development Cooperation (*Gesellschaft für Internationale Zusammenarbeit* – GIZ) and is funded by the International Climate Initiative (ICI) of the German Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB). The project aims at supporting developing and emerging countries in developing and implementing climate change mitigation strategies and NAMAs in the transport sector and supports the preparation of the TRANSPerú NAMA since January 2014.

The Japanese International Cooperation Agency (JICA) had supported Lima and Callao with the drafting of a transportation master plan in 2005. While the master plan, which planned 7 metro lines, was finally not implemented, the background studies created a comprehensive data base on urban transport demand in Lima / Callao. This database was updated in 2013.

The Korean Transport Institute (KOTI), on behalf of KOICA, the Korea International Cooperation Agency, will carry out a study to derive a new version of the urban transport master plan focused on BRTs and tariff- and ticketing integration. The project has started in 2015 and will be finalized approximately by end of 2016.

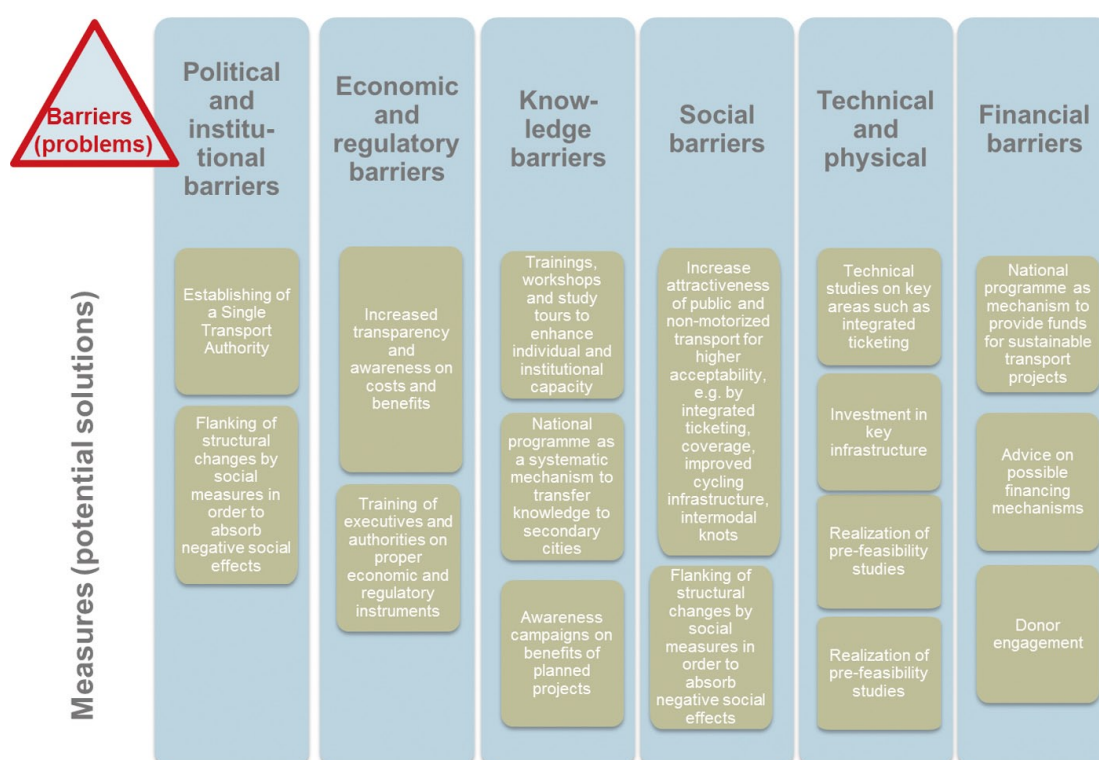
The Low Emissions Development Strategies Global Partnership (LEDS GP) and the World Resources Institute (WRI)'s initiative Embarq (<http://www.embarq.org/>) supports the establishment of a GHG inventory for the transport sector at a national level and is also actively involved in the TRANSPerú NAMA. The WRI provides support through capacity building activities, such as expert advice and peer-to-peer learning. It also provides peer-reviews on policy design, financing schemes, the development of MRV systems and their implementation.

In 2013, the UK Embassy subcontracted the University College London (UCL) to conduct, together with several Peruvian stakeholders, preliminary studies that served as input to first ideas of the TRANSPerú NAMA.

3 Barriers for sustainable urban transport in Peru

A number of barriers have been identified for the transformation of the Peruvian urban transport sector towards a low-carbon, sustainable pathway. Overcoming these barriers will be crucial to deploy funds and investments within the NAMA in an effective and efficient manner. Figure 6 summarizes the identified barriers as well as possible technical measures to address these.

Figure 6: Barriers to sustainable urban transport in Peru



Source: own illustration (based on Perspectives, 2014)

Political and institutional barriers

Overlapping mandates between different governmental levels and municipalities and a lack of inter-institutional coordination hinder integrated transport planning in the metropolitan area. Currently, three regional governmental levels are involved in transportation planning in the capital region, each of which acts independently and in the absence of overall comprehensive planning. While the Metro is operated by AATE, an entity belonging to the MTC, the BRT Metropolitano is operated by ProTransporte (under the MML). The metropolitan area of Lima / Callao further faces a particularly difficult situation, as public transport corridors cross different administrative zones, which requires intensive coordination

between municipalities and / or districts. As this often does not take place, there is an extreme overlap of bus routes accounting for more than one million km of overlapping routes (28 times the routes that would actually be needed).

In a like manner, the MTC's exclusive responsibility for rail-based public transport systems on the one hand, and the municipalities' responsibility for road-based public transport and overall urban transport planning on the other hand, may result in conflicting planning for rail and road based public transport. As a matter of fact, in the case of Arequipa, local institutions actually had started planning and implementing

a BRT system, when the national government suggested a monorail system. An additional uncertainty for municipal transport planners is a legislation which prioritizes public-private partnership projects. Based on this legislation an expression of interest of a private consortium may stop or interfere with the original plans of a municipality (as was the case in Arequipa).

Politicians, in general, tend to be reluctant to structural changes in public transport. The introduction of organized public transport and new company structures may cause that a share of current bus and taxi operators lose their jobs. Out of fear to lose votes, politicians may opt for the more popular measure, rather than choosing the measure that would prove more beneficial for society in the long term.

Moreover, on the national level, the roles and responsibilities of MTC and MVCS with regards to urban

transport are not clearly defined. While MTC claims responsibilities for planning transport in general, MVCS has recently been assigned the responsibility for urban mobility planning.

The NAMA will transfer good practice examples at international level that show how to overcome the above listed barriers (e.g. by the establishment of an independent transport authority, measures to mitigate negative social impacts of structural changes in the operating structure from an informal to a more formalized bus system, and integrated rail based system). Non-politically biased expert advice can further help to provide the necessary arguments for political decision makers to push forward unpopular measures for well organized mini-bus operators in favour of the majority of the population.

Economic and regulatory barriers

Current regulation does not reflect the A-S-I (Avoid – Shift – Improve) approach⁷, needed and internationally accepted as a guiding principle to transform a transport sector towards a sustainable development path. While public transport modes and non-motorized transport are not incentivized sufficiently, subsidies have been established e.g. for the use of CNG fuels. While meant to support environmentally friendly fuels, this incentive creates positive market signals for individual motorization. One of the reasons for these market distortions is the limited awareness of the actual costs and benefits (including social and ecologic costs and benefits) connected to different transportation modes.

⁷ *Avoid unnecessary trips; Shift to less carbon intense transport modes; Improve vehicle technology and fuels*

Another reason for non-sustainable solutions may be economic interests of political institutions. Municipalities, for example, possibly generate income by giving concessions for bus routes.

Thus, they may tend to expand the number of licences issued for bus routes instead of reorganising the system in a more efficient way with less overlapping routes.

The NAMA will help to overcome these barriers by making costs and benefits of different transport modes more transparent and by providing advice on proper economic and regulatory instruments (e.g. fuel economy standards) to favour environmentally friendly transport modes.

Knowledge barriers

As importance has only recently shifted towards sustainability issues, there is a lack of well-trained and experienced government officials, planners and engineers with knowledge on sustainable transport. This is especially true for the governments of intermediate and smaller cities, but also in the respective national ministries, which makes it difficult to design and implement comprehensive sustainable transport policies and programmes. Similarly, on the individual level, there is limited awareness of sustainable mobility, including holistic approaches towards urban mobility and sustainable driving practices.

The NAMA will help to build individual and institutional capacity by conducting workshops, trainings and study tours following a comprehensive capacity building strategy. Multiplication and widespread distribution of the effects of capacity building measures can be reached by establishing a systematic knowledge transfer mechanism (e.g. from the national level to the city level using the national programme as a vehicle).

Social barriers

Decisions of economic agents regarding cars do not follow a purely financial logic, but are influenced by social and cultural issues. Car ownership is still playing a significant role in terms of symbolizing social status. Most people prefer car-based comfort compared to low quality public transport (old, uncomfortable buses, poor physical, ticket- and timetable integration). There is still no culture of using bicycles as mode of transport, although some bike-lanes have been constructed in Lima in the past.

In addition, politicians fear protests in case of a public transport reorganisation. A shift towards more efficient and higher capacity systems is often perceived to have less need for work force – even if this is not always the case – as was demonstrated by the implementation of the Metropolitano. Nevertheless, public transport reorganization might have to be flanked by social measures, which is definitely possible as several examples show at the international and as well Latin American level.

Technical and physical barriers

The development of sustainable urban transport in Peru is hindered by a lack of infrastructure and conditions to facilitate non-motorized, and intermodal public transport. For instance, the current infrastructure does not allow for sufficiently safe bicycle commutes as cycling lanes have been built rather for recreational purposes and are interrupted and dispersed over the city. In order to establish an integrated public transport network (physically but also technically by means of ticket- and tariff integration), able to provide seamless public transportation with sufficient coverage, significant amounts of financing will be needed.

The NAMA will help to prepare the necessary infrastructure investments, such as an integrated ticketing system, public transport infrastructure, as well as the infrastructure for non-motorized transport, by supporting in the design and realization of (pre-) feasibility studies. Technical studies can support the definition of appropriate funding mechanisms.

Financial barriers

Local governments are in general underfunded to invest considerable amounts into the improvement of public transport systems. Municipalities' revenues from taxes, tariffs and conditional transfers do not enable major investment projects. In addition, local governments face difficulties to develop feasible investment projects and in the mobilization of public and private resources. On the national level, especially the construction of the integrated metro system will require huge investments, for which financing via investment loans provided by development banks will have to be mobilized.

Mitigation area 6 of the NAMA (financed by the DKTI initiative of the German Federal Ministry for Economic Cooperation and Development BMZ) will support local governments in the preparation and implementation via the National Programme for Sustainable Urban Transport, and support the national government by attracting additional private financing for the metro system.

4 The NAMA: Objectives, measures and impacts

4.1 The NAMA in a nutshell

The overall objective of TRANSPerú is a transformation of the urban transport sector towards a sustainable development path. The NAMA therefore focuses on the development and implementation of key structural changes, including:

- the improvement of political framework conditions (e.g. fuel economy standard),
- the construction of additional infrastructure (e.g. metro lines, cycle lanes), and
- the creation of a strong institutional set-up (e.g. dedicated transport authority for Lima / Callao).

The mitigation measures contained in the NAMA are clustered into six mitigation areas in a comprehensive **Policy Matrix (2016 - 2019; see Annex 1)**:

1. Integrated public mass transport system in Lima / Callao,
2. Non-motorized transport in Lima,
3. Institutional development to improve urban transport management in Lima / Callao,
4. Vehicle homologation and fuel efficiency for light vehicles,
5. Modernization of the public transport vehicle fleet,
6. Support to local governments to strengthen sustainable urban transport.

The matrix was developed jointly by all relevant stakeholders. It reflects the sectors' common transformation agenda, outlining activities, outputs, timing and responsibilities to allow for a structured and systematic sector transformation.

The lead executing agency is the Ministry of Transport and Communications (MTC), which presents the NAMA jointly with the Ministry of Environment

(MINAM). While MTC has the overall coordinating function of the NAMA, responsibilities for single measures or mitigation areas may differ, as outlined in the policy matrix (e.g. MML and MPC are responsible for many measures in the metropolitan region of Lima / Callao).

For the purpose of coordinated planning and implementation an overall **Steering Committee** was established in early 2014 (compare section 2.2). The Committee comprises all relevant political actors, financial institutions and representatives from academia and is supported by a technical secretariat.

NAMA implementation will be supported by a NAMA Support Project (NSP) of the **NAMA Facility**, a British-German Fund, which financially supports the implementation of NAMA projects. Within TRANSPerú the NAMA Facility project will support the implementation of measures outlined in the policy matrix by technical studies, financial support, capacity building measures, impact assessment, monitoring and institutional strengthening, among others. Further, KfW and GIZ have applied for a project at the German Climate Technology Initiative (DKTI) Facility, financed by the German Federal Ministry of Economic Cooperation and Development (BMZ). The project will focus on the establishment of the National Programme for Sustainable Urban Transport. While the financial cooperation component has already been approved, the technical cooperation component is expected to be approved in 2016 (status earmarked).

Table 6: Scope and general approach of the NAMA

General information	
National Implementing Entity and involved stakeholders	<p>Institution: Ministry of Transport and Communications (MTC)</p> <p>Name of contact person: Viceminister Henry Zaira</p> <p>Involved national partners: Ministry of Environment, Municipality of Lima, Protransporte, Ministry of Energy and Mines, Ministry of Housing, Construction and Sanitation, Ministry of Economy and Finance</p> <p>Involved supporting organizations: GIZ, KfW, Embarq, CAF, Fundación Transitemos; close cooperation with LEDS GP (Embarq)</p>
Geographical scope	National and city-level elements
Type of action	<p>Policy and programmatic approach: Sector transformation strategy based on the policy matrix (key structural changes to framework conditions and infrastructure)</p> <p>Envisaged instruments:</p> <ol style="list-style-type: none"> 1. Regulations 2. Economic instruments 3. Public spending / investments 4. Communication and information <p>Main mitigation actions of the policy matrix:</p> <ol style="list-style-type: none"> 1. Integrated public mass transport system in Lima / Callao 2. Non-motorized transport in Lima 3. Institutional development to improve urban transport management in Lima / Callao 4. Vehicle homologation and fuel efficiency for light vehicles 5. Modernization of the public transport vehicle fleet 6. Support to local governments to strengthen sustainable urban transport.
Transport-specific information	
Type of approach	Avoid, Shift, Improve (A-S-I)
Subsector	Urban passenger transport
Transport mode	All modes (private and public street-bound transport, metro, non-motorized)
Support related information	
Timeframe	2016-2019

Mitigation potential and sustainability benefits	<p>2015-2019: 1.1-2.03 MtCO₂ compared to BAU 2015-2025: 5.6-9.9 MtCO₂ between compared to BAU (structural measures with long-term effects) (not yet all mitigation measures included in the estimation)</p> <p>Sustainability benefits: Social benefits (health, traffic safety, physical activity), economic benefits (time savings, efficiency of the system as a whole) and environmental benefits (improved air quality).</p>
Type of NAMA	Supported with unilateral elements
Type of support requested	Technical and financial support for distinctive mitigation actions (more details in section 6)

4.2 Objective of the NAMA

The ultimate goal of the NAMA is to achieve **significant reductions in GHG emissions** and at the same time **create sustainable development benefits** (co-benefits) that lead to an improvement in the economic, social and environmental situation of the local society (e.g. reduced accident rates, less air pollution and less congestion). In order to secure long-term sustainable and low-carbon development in the sector and increase the overall impact, the NAMA focuses on the implementation of key structural changes, such as strengthened institutional and individual capacities, a favourable regulatory framework, and key infrastructure needed as a basis to mainstream

sustainable development projects and create **actual transformational change**. The NAMA approach used in TRANSPerú is further meant to increase the overall impact of climate finance by leveraging and channeling financial resources in a systematic and targeted manner utilizing the policy matrix.

The TRANSPerú NAMA's goals and activities fall under Peru's voluntary commitments to the UNFCCC, e.g. through the Intended Nationally Determined Contributions (INDC) under the UNFCCC.

4.3 Scope of the NAMA

The six mitigation areas of the policy matrix mark off the thematic scope of the NAMA. The NAMA is made up of a diverse package of measures containing policies, programmes and projects with different thematic and geographic scope (see policy matrix in Annex 1 for detail). While some of the measures address the national level (e.g. the fuel economy standard and efficiency labelling scheme), others focus on the Lima Metropolitan Region (e.g. integrated public mass transport and non-motorized transport measures), and yet others are directed at local city governments (e.g. National Programme for Sustainable Urban Transport). All measures have in common that they focus on land-based passenger transport (mostly urban transport).

The NAMA addresses different transport modes, including mass transport modes such as the Metro- and BRT lines in Lima / Callao (e.g. extension of the BRT system in Lima / Callao), non-motorized transport (e.g. construction of cycling lanes in Lima), and individual motorized vehicles (e.g. vehicle homologation, fuel economy standard and energy efficiency labelling).

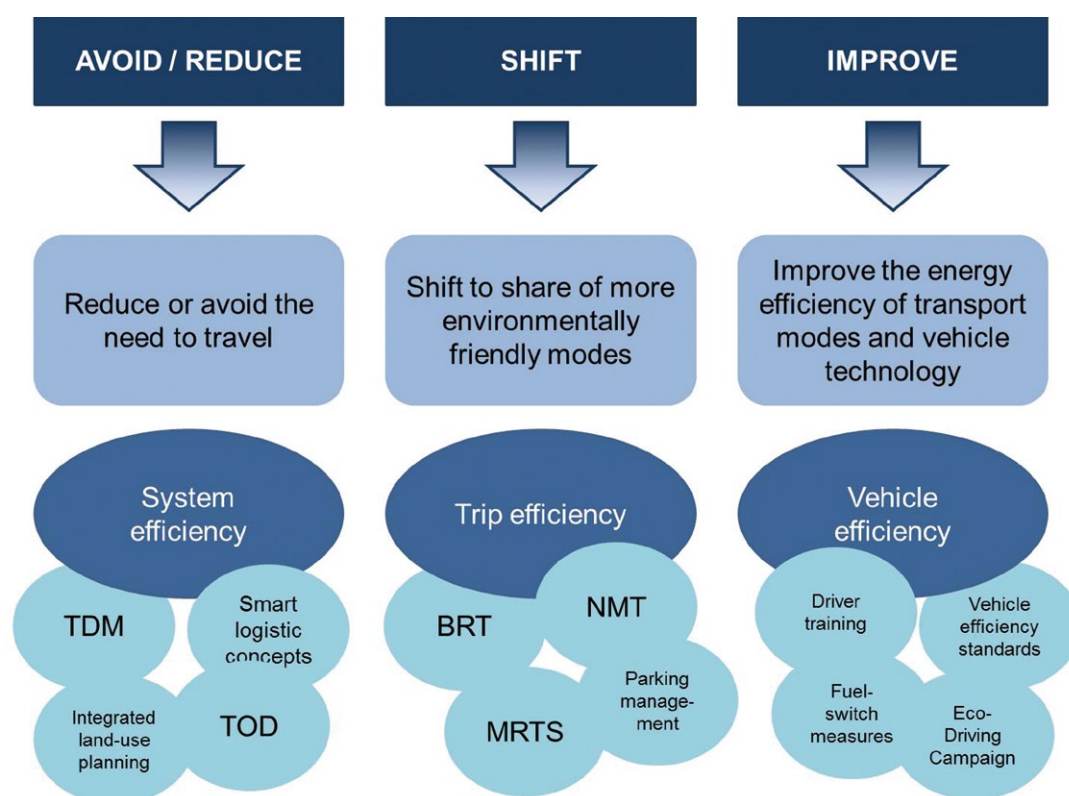
In terms of institutional scope, the TRANSPerú NAMA is developed within the framework of the National Environmental Policy, approved by Supreme Decree 012 - 2009 - MINAM, and the corresponding action plan as well as the Multi-annual Sectoral

Strategic Plan (PESEM) in the transport sector (2012 - 2016), approved by the Ministerial Resolution 224-2012-MTC/01. The main coordinating party is the MTC, which chairs a Steering Committee, containing all relevant stakeholders (for more information on the steering structure and involved actors refer to section 2.2). The NAMA will be implemented between 2016 and 2019.

The measures covered by the NAMA have been categorized according to the Avoid - Shift - Improve

(A-S-I) approach, a well-accepted paradigm in the international sustainable transport community, which states that in order to achieve sustainable transport, transport activity has to be reduced (Avoid - A), shifted to less polluting modes (Shift - S) and efficiency of transportation modes should be improved (Improve - I). Figure 8 shows the general concept of the A-S-I approach.

Figure 7: Avoid-Shift-Improve approach for potential mitigation options in the transport sector



Source: GIZ 2012, p. 5, Bongardt et al. 2010, p. 6-10

The different measures covered by the NAMA fall into different categories, as outlined in the policy matrix (see Annex 1). While mitigation area 6 can be considered to increase system efficiency (e.g. the development of urban mobility plans) and therefore falls under the *Avoid*-category, mitigation areas 1 and 2 focus on the shift towards less polluting modes or the increase of trip efficiency, and therefore fall into category *Shift*. Mitigation area 4 and 5 focus on the improvement of the vehicle fleet, and thus fall into category *Improve*. Mitigation area 3 will promote the overall reorganization and rationalization of urban transport in the LMR and can therefore be considered to have an effect on all dimensions of the paradigm.

4.4 Direct mitigation actions and supportive (facilitating) measures under the NAMA

The following section describes the major actions outlined in the NAMA's policy matrix.

4.4.1 Mitigation area 1: Integrated public mass transport system in Lima / Callao

Table 7: Characteristics of mitigation area 1

Geographical scope	Type of measure	Target group	Responsible Institutions	Major impacts (until 2019)
Lima Metropolitan Region (LMR)	<ul style="list-style-type: none"> Construction of infrastructure Design of fare collection system 	Passengers of public transport, general public	MTC, MML, MPC	<ul style="list-style-type: none"> annual time savings of 18 million hours accidents: - 17% CO2 emissions: -16%

Central direct mitigation actions in mitigation area 1 include:

1. Construction of Metro Line 2 (and parts of Line 4) and planning of Lines 3 and 4

Line 2 runs from the extreme east of the Lima Metropolitan Region (LMR) to the port of Callao in the extreme west. Planned construction of Line 2 includes an additional segment of Line 4, which connects Line 2 to the international Airport of Callao (see Figure 8). Metro Line 2 will intersect with Metro Line 1, Metropolitan BRT, and future Metro Lines 3 and 6, constituting the first step towards physical integration in a multimodal transit system.

Line 2 has been commissioned and construction will start in 2016. It is planned to become fully operational 2021. Within the period of NAMA implementation (2016 - 2019) Segment 5 of Section 1A and Segments 3, 4 and 6 of Section 1B will be constructed.

Figure 8: Planned Integration of Line 1 and Line 2 of the light rail system Source: ProInversión, 2014



Source: ProInversión, 2014

2. Extension of the BRT and initiation of the re-organisation of the current bus system

A further central building block for the integrated public transport network is the extension of the BRT trunk route. The NAMA foresees the completion of an extension in the north of the trunk route from the current final station Naranjal by 10.5 km (and 10 additional stations) to reach Carabayllo, thereby extending the public transport network towards the north and relieving congestion at Naranjal station. In addition, construction will be started on two further extensions: a link to the airport (Tomás Valle- Airport) and a link to Metro Line 1 (Grau Station – Metro Line 1).

3. Physical and system integration of the public transport system

A further step towards an integrated public transport system is its physical and tariff integration. The NAMA contributes to physical integration by piloting 12 intermodal transport knots to improve customer accessibility. Further, a unified itinerary and fare collection system for the Metro and Metropolitano lines will be implemented, increasing attractiveness for the customer, thereby incentivizing public transport use.

4.4.2 Mitigation area 2: Non-motorized transport in Lima

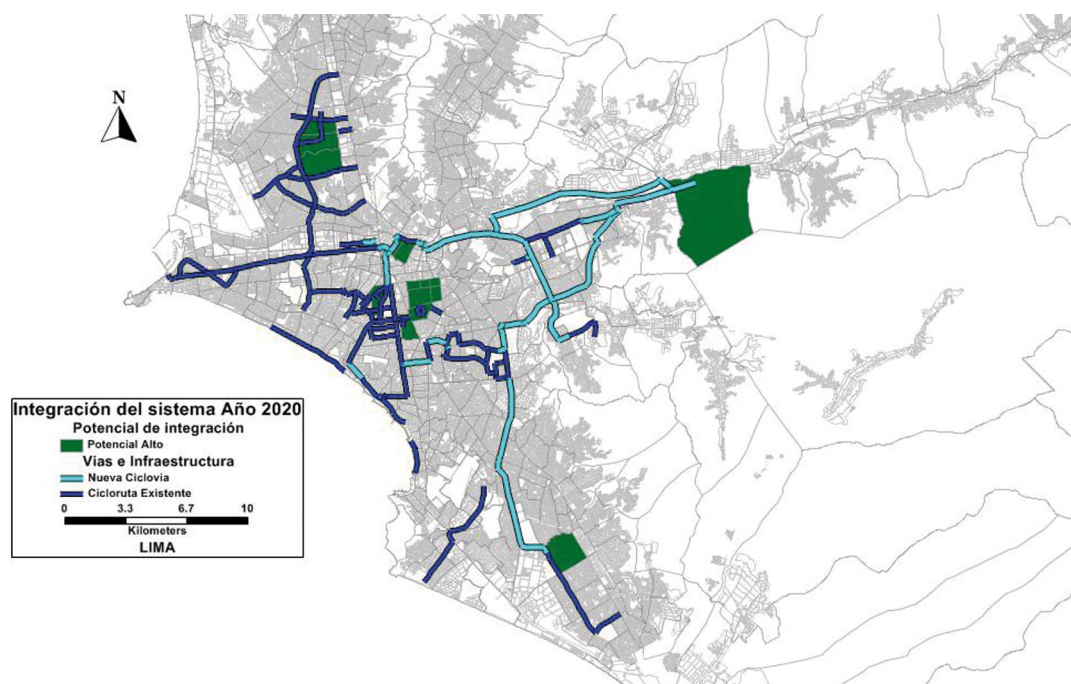
Table 8: Characteristics of mitigation area 2

Geographical scope	Type of measure	Target group	Responsible Institutions	Major impacts (until 2019)
Lima	<ul style="list-style-type: none"> • Policy and guidelines • Construction (200 km) and maintenance (126 km) of infrastructure 	Cyclists, users of public transport, general public	MML	<ul style="list-style-type: none"> • Bicycle trips: +40% • Intermodal

The Municipality of Lima counts 126 km of bicycle paths of different quality with a few additional unregistered km in the Municipality of Callao (MPC). While this is a good first achievement, mainly of the “Special Project of Non-Motorized Transport” (PEMTNM), the cycling paths do not comprise a connected network, but rather dispersed stretches of cycling lanes, that are frequently interrupted by dangerous passages, making them unsuitable for daily commutes. As a consequence, in 2012 only 0.5% of all daily trips in Lima were done by bike according to a study by JICA (JICA, 2012).

Planned actions in this area comprise the revision of the Cycling Network Master Plan (2005) for the year 2025, the elaboration of design guidelines for cycling infrastructure and their dissemination throughout the 43 districts of the metropolitan area of Lima, as well as the renewal of the whole cycling network (126 km) and the construction of additional 200 km following the new master plan. With the aim to facilitate implementation of the planned measures, a project portfolio will be established and a financing strategy developed. The implementation of the cycling network will be further supported by capacity building measures and awareness raising campaigns.

Figure 9: Current (blue) and planned (turquoise) bicycle network



Source: Tyler et al., 2014

4.4.3 Mitigation area 3: Institutional development to improve urban transport management in Lima / Callao

Table 9: Characteristics of mitigation area 3

Geographical scope	Type of measure	Target group	Responsible Institutions	Major impacts (until 2019)
Lima Metropolitan Region (LMR)	Institutional development (Urban transport authority)	General public LMR	MML, MCL, MTC	Coordination, organization and formalization of public transport

Mitigation area 3 foresees the improvement of the institutional framework for urban transport management. Excessive deregulation starting in the early 1990s and corresponding compensation policies have led to a massive increase and oversupply of privately owned public transport vehicles in Peru. The transport fleet in Lima today counts an overall of 31,500 buses and 230,000 taxis. In comparison, New York City, which has a similar population, counts only 5,700 buses and 13,000 taxis. As a result of the small size of business entities and overall informal character of public transport (only 40% of the vehicles are authorized at all), service quality has a low standard and working conditions are poor (e.g. long working hours, no formal contracts).

The bus system is organized according to a licencing system, which issues licences to transportation companies for certain routes. The sheer number of vehicles, but also a lack of coordination between the neighbouring municipal governments of Lima and Callao leads to a lack in demand orientation and vast overlaps of issued routes, resulting in congestion levels equivalent to annual economic losses of USD 1.2 million (Protransporte, 2011). The LMR's two mass transportation systems, the BRT and the metro are operated by different entities and do not have integrated schedules and ticketing systems making intermodal trips difficult and rendering them less attractive to passengers.

The central action in mitigation area 3 is the **design and creation of an urban transport authority for the Lima Metropolitan Region** with the objective to reduce the above structural deficiencies and integrate the planning and management of different transportation modes and levels of government. Within the NAMA a conceptual design for such a transport authority will be elaborated jointly by the involved institutions (mainly MML, MCL, MTC), a road map for its creation will be designed and its implementation accompanied.

4.4.4 Mitigation area 4: Vehicle homologation and fuel efficiency for light vehicles

Table 10: Characteristics of mitigation area 4

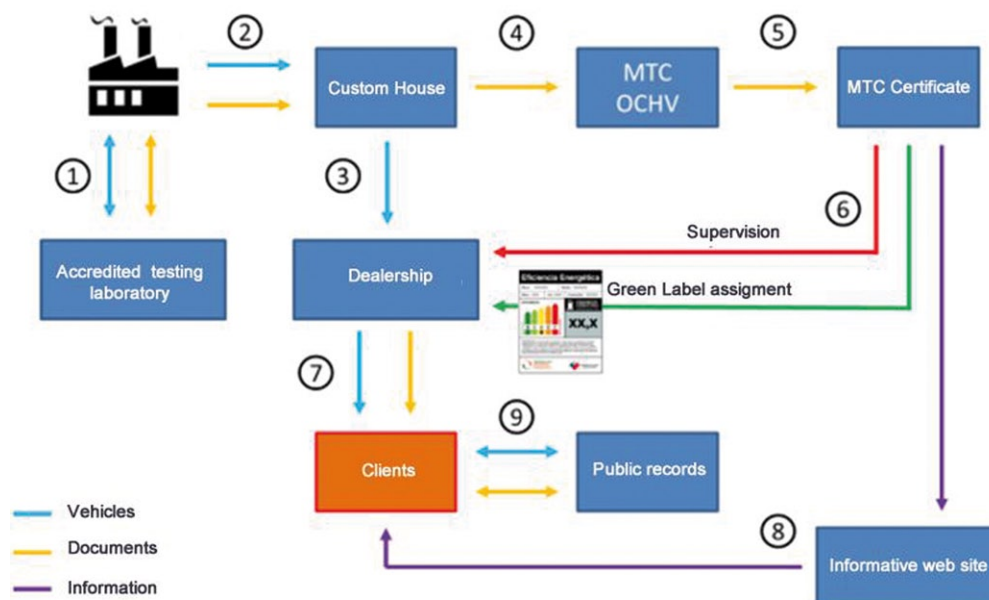
Geographical scope	Type of measure	Target group	Responsible Institutions	Major impacts (until 2019)
National level	<ul style="list-style-type: none"> • Policy and regulation • Enforcement 	Vehicle importers, vehicle owners	MTC, MINAM	100% of new vehicles comply with the established maximum allowable pollution limits. All vehicles are labelled.

Imported vehicles (Peru has no own vehicle production) must comply with Euro 3 or Tier 1 standards and cannot be older than 5 years at the time of import. However, standards are not well enforced and the system of annual technical-mechanical vehicle revisions is rather ineffective. As a result, inefficient vehicles are still entering the market and old vehicles are not eliminated through technical revisions, leading to an ever increasing age of the vehicle fleet with high specific emission levels. On the consumer side, awareness on the environmental performance of vehicles is low and there is no possibility to make an informed choice of purchase based on the comparison of efficiency and emission performance of a vehicle.

Before this background, the NAMA foresees the set-up of a comprehensive and effective vehicle inspection system (Figure 11 shows a proposal for its mechanism), including:

- **Homologation office (OCHV):** The creation of a central vehicle homologation office within the MTC to allow verification of the vehicle performance according to manufacturer specifications and preventing the import of vehicles that exceed the maximum allowable pollution limits.
- **Certification process:** The establishment of a certification process including a mechanism of technical revisions and the establishment of a test centre for imported light vehicles to examine actual performance in terms of energy consumption and emissions.
- **Fuel efficiency standards:** Specification of the maximum allowable emission limits for the vehicle fleet and development of the respective national regulation.
- **Labelling Scheme:** Introduction of a labelling scheme, including information of fuel consumption and emission performance, with the objective to make fuel consumption and emissions of cars more transparent and enable the customer to make environmentally friendly choices.

Figure 10: Proposed vehicle homologation and energy efficiency labelling



Source: Dursbeck, 2013

4.4.5 Mitigation area 5: Modernization of the public transport vehicle fleet

Table 11: Characteristics of mitigation area 5

Geographical scope	Type of measure	Target group	Responsible Institutions	Major impacts (until 2019)
LMR and further cities	Incentive scheme (scrapping)	Owners of informal public transport units (micro- and mini-buses older than 20 years)	MTC, MML, municipalities	6,000 old units replaced by 1,800 new, higher-capacity buses

With the objective to decrease competition for the BRT- and Metrolines, to gradually reduce and renew the public transport fleet, and replace small capacity vehicles by more efficient higher-capacity units, MTC and MML have started voluntary scrapping schemes for public transport vehicles aged >20 years and running in parallel to formalized transport. The programmes have so far achieved the scrapping of 2,180 vehicles, however, they lack a national framework and budget for further action.

Measures under Mitigation Area 5 of the NAMA foresee a continuation and expansion of the current scrapping scheme to include areas of influence around the metro lines, the Metropolitano and further routes of the integrated transport system. The currently project-based scheme will be elevated to a programmatic level by

establishing a budget for scrapping within the Ministry of Transport and by developing general guidelines and a regulatory framework for scrapping schemes in secondary cities. Within the implementation period of the NAMA, the designs for scrapping schemes in two further cities will be finalized based on the new regulatory framework. It is estimated that these actions will lead to the replacement of 6,000 obsolete units in the LMR by 1,800 new, higher-capacity standard buses during the implementation phase of the NAMA.

4.4.6 Mitigation area 6: Support to local governments to strengthen sustainable urban transport

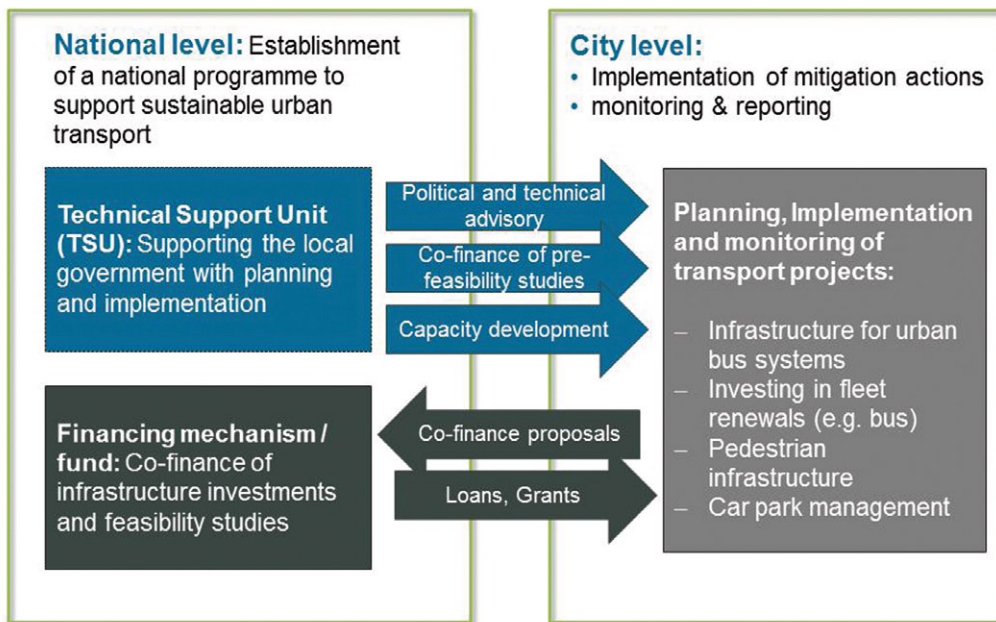
Table 12: Characteristics of mitigation area 6

Geographical scope	Type of measure	Target group	Responsible Institutions	Major impacts (until 2019)
Local governments	<ul style="list-style-type: none"> • Regulation • Incentive scheme 	Local governments, general population in secondary cities	MTC, MVCS, MEF	<ul style="list-style-type: none"> • 12 urban mobility plans • 18 public investment projects in sustainable mobility

With mitigation area 6, the NAMA addresses institutional and financial weaknesses in the area of urban transport management of local governments. Local administrations have the competence for developing urban transport projects, however, often lack the capacities and financial means to plan, implement and operate sustainable urban transport projects. Currently, the national government supports secondary cities on a project-to-project basis, however, there is no explicit policy on the national level that addresses sustainable urban transport (SUT) in a comprehensive manner and creates adequate conditions for the planning, financing, implementation and operation of SUT measures.

In the framework of mitigation area 6, a national policy and a national programme on SUT will be developed and the institutional structure will be set-up to execute the policy and programme. While the policy creates adequate conditions for project implementation, the programme will provide technical and financial support mechanisms to support local governments in their efforts to implement SUT projects. The basis functioning of such a programme is explained in Figure 11. During the NAMA implementation it is expected to approve 12 sustainable urban transport plans and 18 public investment projects.

Figure 11: Scheme of a National Programme for Sustainable Urban transport



Source: own illustration

4.4.7 Supportive and organizational measures

Supportive and organizational measures do not have a direct mitigation effect, however, they address barriers to NAMA implementation (see section 3) and secure the necessary framework conditions to achieve effective and efficient implementation. Table 13 shows supportive and organizational measures that will be required during NAMA implementation (2016 -2019).

Table 13: Supportive and organizational measures for NAMA implementation

No.	Measure
1. Supportive Measures (measures to improve framework conditions and to strengthen capacities)	
1.1	Technical assistance
	<ul style="list-style-type: none"> • Elaboration of a multi-year work plan outlining the technical support in the different mitigation areas • Establishment of technical working groups to support relevant stakeholders in the improvement of framework conditions and / or enforcement mechanisms on key topics. • Elaboration of proposals (e.g. policies, strategies, programs, laws, decrees, secondary regulation, norms, standards, enforcement mechanisms, financing mechanisms, etc.) and / or conduction of process advisory services in close cooperation with international and local partners. • Further guidance to facilitate the process from a technical proposal to the official adoption. • Realization of a proper financial engineering to ensure implementation of the respective mitigation measures (costs, financing mechanism, budgeting / fundraising).
1.2	Capacity building
	<ul style="list-style-type: none"> • Capacity needs assessment / elaboration of a capacity development strategy in close coordination with the Steering Committee. • Capacity development activities according to the assessment / strategy. • Capacity building measures including exams. • Implementation of organizational development measures with selected institutions.
1.3	MRV
	<ul style="list-style-type: none"> • Elaboration of a technical report specifying a suitable MRV system for urban transport including recommendations for pilot-testing and work plan for its set-up. • Support in data collection to close data gaps (e.g. vehicle fleet characteristics and distribution by size and technology) and generate data of appropriate quality on a regular basis. • Technical support during pilot-testing of MRV (e.g. data collection, recommendations for regular operation of the MRV system by Peruvian government). • Capacity building and technical backstopping for core government staff during MRV establishment and initial operation (in coordination with LEDS GP / WRI Embarq activities).

2. Organizational measures (NAMA coordination and management)	
2.1	Support for the Steering Committee (Coordination)
	<p>Support in the coordination of the transformation process through:</p> <ul style="list-style-type: none"> • Participatory elaboration of operating rules for the Steering Committee and its Technical Secretariat • Support in the operation of the Steering Committee • Preparation, realization and documentation of participative planning workshops to develop a yearly work programme for the implementation of the policy matrix • Preparation, realization and documentation of regular donor coordination meetings • Preparation and publication of yearly NAMA progress reports including a report on activities of the Technical Secretariat • Preparation, realization and documentation of official missions by potential further partners to monitor progress
2.2	Project Management and Outreach
	<ul style="list-style-type: none"> • Common project management activities • Establishment and operation of a website for the NAMA, development of web-based information tools • Establishment and operation of an impact monitoring for the NSP linked to the MRV system, including capacity building measures • Development of an outreach and communication strategy and work plan • Support international outreach, knowledge management and peer-to-peer learning activities with other relevant projects such as the BMUB funded project TRANSfer • Elaboration of a report with a multi-year work plan outlining the technical support in the different mitigation areas covered • Elaboration of proposals and / or conduction of process advisory services in close cooperation with international and local partners • Further guidance to facilitate the process from a technical proposal to the official adoption

4.5 Impacts of the NAMA TRANSPerú

Transformational change

The transformation of the sector towards a sustainable low-carbon sector is the overarching goal of the NAMA. Rather than focussing on single transport projects, the measures aim for long-term structural changes, thereby creating a solid basis for further mitigation action. Key structural changes targeted by the NAMA include:

- Creation of better framework conditions for sustainable urban transport: e.g. fuel efficiency standards for all new vehicles, scrapping incentives for inefficient vehicles, improved fuel consumption tax.
- Building of institutional and individual capacities: e.g. the implementation of the direct mitigation measures will be flanked by capacity building measures following a capacity needs assessment to be carried out at the beginning of NAMA implementation. Further, capacity building of local institutions and individuals will be supported via the National Programme for Sustainable Urban Transport.
- Strengthening of institutions and coordination: e.g. establishment of an urban transport authority for Lima / Callao, strengthening of the agency responsible for the electric mass transit systems in Lima / Callao (AATE).
- Facilitation of key infrastructure investments: e.g. construction of Metro line 2, multi-modal inter-connection points and 200 km of cycling lanes.

By increasing the attractiveness of sustainable transport modes and at the same time improving the environmental performance of the vehicle fleet, the NAMA hopes to reverse the trend of ever increasing individual motorization towards more sustainable transport modes.

Mitigation effect

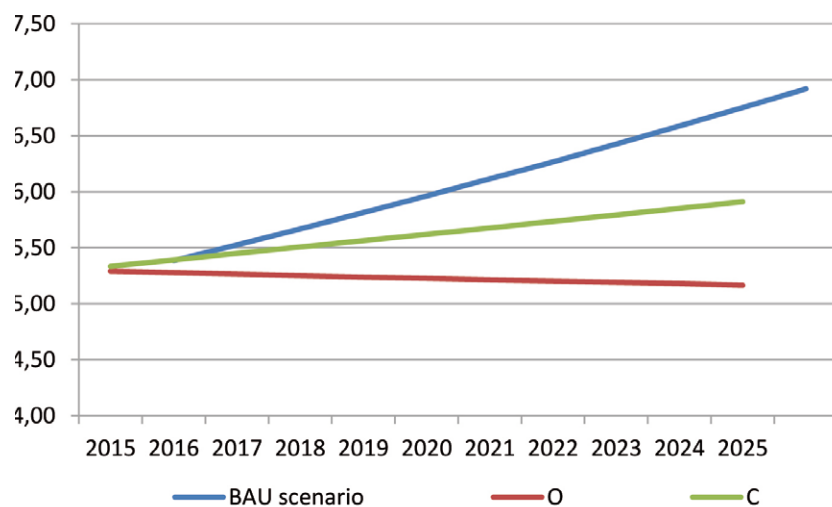
A first estimation of the CO₂ emission reduction effect was carried out during the preparation phase of the NAMA. According to these estimations, the implementation of TRANSPerú will yield a cumulative mitigation effect of 5.6 - 9.9 MtCO₂ until 2025 (excluding mitigation area 6). For the implementation phase of the matrix (2016 -2019), the mitigation effect accounts for 1.1 - 2.03 MtCO₂, given the fact that most of the measures will contribute to the long-term effect, rather than have an immediate direct emission reduction effect. According to the Peruvian INDC, the country targets an overall emission reduction of 89 MtCO₂ until 2030 as compared to a BAU scenario. The NAMA will contribute considerably to reach this target.

It is important to note, that mitigation area 6 (the National Programme for Sustainable Urban Transport) is not considered in the estimation, as it was not defined precisely enough at the time of the estimation. As this measure is meant to transfer funding and capacities to local governments, it can be expected that this measure will have a significant additional mitigation impact. Table 14 compares the expected emissions for the BAU - scenario to the expected emissions in the two mitigation scenarios (optimistic and conservative), as well as the annual and accumulated resulting emission reductions. Figure 12 shows a graphical illustration of the mitigation effect.

Table 14: Result table from the GHG emission reduction effect (MtCO₂eq)

Year		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
BAU scenario		5.39	5.53	5.67	5.81	5.96	6.11	6.27	6.42	6.59	6.75	6.92	
Emissions System 1: LMR	O	3.54	3.53	3.51	3.50	3.49	3.48	3.47	3.46	3.45	3.44	3.43	
	C	3.58	3.61	3.64	3.67	3.69	3.72	3.75	3.77	3.80	3.82	3.85	
Emissions System 2: National level	O	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.65	1.65	
	C	1.66	1.69	1.72	1.75	1.78	1.81	1.84	1.88	1.91	1.94	1.97	
Emissions System 3: Medium-sized cities level	O	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.08	
	C	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	
Emissions: all Systems	O	5.29	5.28	5.26	5.25	5.24	5.23	5.21	5.20	5.19	5.18	5.16	
	C	5.33	5.39	5.45	5.51	5.56	5.62	5.68	5.73	5.79	5.85	5.91	
Annual reduction	O	0.09	0.25	0.40	0.56	0.72	0.89	1.05	1.22	1.39	1.57	1.75	
	C	0.05	0.13	0.22	0.31	0.40	0.49	0.59	0.69	0.79	0.90	1.01	
Reduction (MtCO2eq)		O	C										
Accumulated effect 2015-2019			2.03	1.11									
Accumulated effect 2015-2025			9.91	5.59									

Source: own illustration

Figure 12: Graphical illustration of the emission reduction impact (MtCO₂eq) according to ambition level

Source: own illustration

Sustainable Development Benefits

NAMA implementation yields a number of significant sustainable development benefits. While a quantitative assessment has only been carried out for some measures to this moment, Table 15 shows a qualitative assessment of the major expected benefits associated with NAMA implementation.

Table 15: Qualitative assessment of co-benefits (sustainable development benefits) of the NAMA

Main co-benefits	Relative importance	Justification
Socio-economic benefits		
Decreased travel times and associated economic benefits	high (reduced travel time of 18 million hours yearly in Lima; in general)	Traffic congestion can be substantially decreased (metro, optimized routes and bus sizes, improved intermodality, urban mobility planning)
Reduced life-cycle costs of vehicle fleet	high	Fuel economy standard increases efficiency of light vehicle fleet
Reduced stress levels and diseases (and consequent reduced societal health costs) associated with traffic noise / air pollution	high	Long-term impact due to the reduced traffic noise / air pollution
Reduced casualties and injuries by accidents	high	Reduced traffic and modernized motor vehicle fleet
Benefits arising from increased physical activity due to active transport (walking, cycling)	high	Reduced cardiovascular diseases, less obesity, etc.
Increased employment and local businesses due to infrastructure investment	low	Direct short-term effect: infrastructure investment (labour intensive measures)
Increased competitiveness of cities as attractive places for business / families	high	A better mobility attracts families and businesses
Social inclusion of people of vulnerable groups	high	Affordable public transport; well-designed non-motorized transport means; connection of the suburbs with the city centre
Environmental		
Reduced traffic related air pollution (NO _x , SO _x and particulate matter)	high	Stringent vehicle and fuel standards, reduced fuel consumption and emissions (according to the National Environmental Action Plan – the PlanAA (MINAM, 2011) only in Lima every year 6,000 people die as consequence only of particles exposure and urban air pollution causes a loss of 0.9 % of BIP)
Rational use of scarce resources, e.g. fossil fuels	high	Stringent vehicle and fuel standards, reduced fuel consumption and emissions

5 The MRV approach: Measurement, Reporting and Verification

In the preparation phase of the NAMA, a first ex-ante estimation of the GHG emission reductions has been carried out. Using the ex-ante estimation as a basis, a fully fledged MRV system for the NAMA will be developed and set-up during the first months of NAMA implementation. Based on the monitoring and reporting of key indicators, the MRV system will serve as a tool for better informed decision making. The comparison of ex-post impacts to ex-ante estimations enables policy makers to identify good implementation practice as well as potential for improvement. The MRV will further serve to fulfil the reporting requirements linked to international support, e.g. from the NAMA Facility, DKTi and other donors. Aside from that, the MRV system is meant to help increase the overall transparency of NAMA implementation and will provide information for donors, on what their contribution has actually achieved.

The MRV system is not restricted to GHG emission reductions, but will consider further key elements that contribute to an informed decision making. Elements to be MRV'd include:

- the mitigation effect,
- sustainable development benefits,
- mobilized financial contributions, and
- the implementation progress.

This chapter describes the approach taken towards the ex-ante estimation of GHG emission reductions, including scope, methodology and data sources. It further points out next steps in the development of a fully fledged MRV system, including monitoring, verification and institutional set-up.

Box 1:

Objectives of quantifying the GHG effects of NAMAs

Before implementation:

- Choose among policy options based on their expected GHG effects
- Improve the design of policies by understanding the effects of different design choices
- Define GHG reduction goals based on potential GHG reductions from policy options
- Attract and facilitate financial support for mitigation actions by estimating potential GHG reductions

During or after implementation:

- Understand whether policies and actions are effective in delivering the intended results (for domestic or international reporting)
- Meet funder requirements to report GHG reductions from mitigation actions
- Inform and improve policy implementation
- Learn from experience and share best practices
- Evaluate the contribution of policies and actions toward broader GHG reduction goals

Source: WRI's Policy and Action Standard, 2015

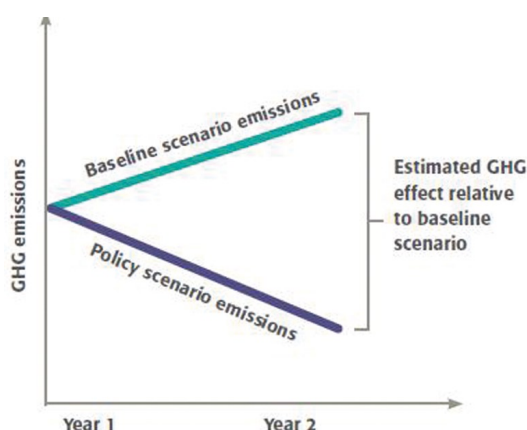
5.1 Ex-Ante GHG Impact Assessment

The ex-ante GHG impact estimation has been carried out by the Technical University of Munich in cooperation with the Swiss Knowledge Pool INFRAS. The following sections provide a summary of the estimation, more details can be obtained from the technical report (to be downloaded from the TRANSfer homepage (<http://transport-namas.org/resources/publications/>)).

5.1.1 General approach

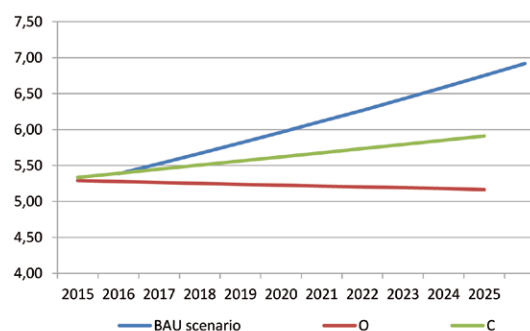
The estimation follows a scenario approach, where the GHG mitigation impact of different mitigation scenarios are compared to the impacts that result from a BAU scenario which reflects the continuation of current trends in policy and general framework conditions (demographic trends etc.). The general principle of the scenario approach is depicted in Figure 13 Figure 14 compares the estimated emission reductions for each of the three scenarios.

Figure 13: General principle of ex-ante estimations



Source: WRI, 2015

Figure 14: Comparison of the emission reduction impact of the three scenarios (MtCO2)



Source: own illustration

Major assumptions for each scenario are summarized in the following:

- 1. Business-As-Usual (BAU) Scenario:** The BAU scenario assumes that no major additional mitigation actions will take place and general development follows current trends. As a matter of fact, the average trip rate (trips per person per day) remains constant while the modal split is modified considering the increasing economic growth and trends towards increasing motorization rates (average annual growth of 3.5%). Average emission factors are slightly reduced due to the natural penetration of newer technologies into the market, without the enforcement of fuel economy standards. The emission factors of the traditional public transport modes *combi vans and minibuses* remain constant due to the lack of investment that can be expected given small and informal business entities with low financial power.
- 2. Conservative Scenario:** The conservative mitigation scenario considers the impacts of implementing measure 1, Integrated public mass transport in the LMR and measure 2, non-motorized transport in the LMR on the modal split. Improvements in the public transport network and the cycling infrastructure lead to a shift from individual motorized modes to more trips made by public transport and non-motorized modes. More importantly however, there is a considerable shift from conventional public transport towards formalized public

transport means (metro, BRT and feeding lines). The implementation of measure 4, *Fuel economy standards*, and measure 5, *the modernization of the public transport fleet*, decreases the emission factors of public transport vehicles by 5% compared to the BAU scenario.

3. Optimistic Scenario: The optimistic mitigation scenario has similar effects on the modal split as the conservative scenario however in addition it considers the effects of implementing measure 3, *the set-up of a transport authority for Lima and Callao* which boosts the effects of the other measures to a higher level.

5.1.2 Scope of the ex-ante calculation

Even though the first implementation phase of the NAMA (being equivalent to the phase of the policy matrix) runs from 2016 - 2019, the scenarios run from 2015 in order to 2025 to account for long-term effects by sector transformation and improvement of framework conditions. It is assumed that the implementation of the NAMA will unfold its full potential only in the medium term, as the NAMA mainly contains measures on the policy or programmatic level, which in general take more time to reach full impact. However, these are more significant than project-based approaches.

In order to consider interdependencies between the individual measures of the NAMA and account for different geographical scopes (some measures address the LMR while others address the national level or secondary cities), the mitigation effect was not calculated for each measure individually. Instead, measures were clustered into three systems using different geographical scopes and methodologies for the estimation of the GHG mitigation effect. Table 16 summarizes the boundaries and methodologies for each of the three system.

Table 16: Mitigation effect and used methodologies for the three system clusters

System	Boundaries	Measures with an impact on the system	Methodology
System 1: LMR	Integrated public transport in the LMR and impacts of FES and homologation on the LMR	1, 2, 3, 4 and 5	Trip-based approach
System 2: National level	FES and homologation outside the LMR (the impacts within LMR are being accounted as part of the emission estimation in system 1. System 2 excludes light duty vehicles in LMR in order to avoid duplications in the emission estimation)	4	Vehicle-kilometers-traveled-approach $E = VKT * EF(*)$
System 3: further cities (excluding the LMR for reasons of double counting)	Fleet modernization in further cities	5	$E = VKT * EF$

(*) E = Emissions; VKT = vehicle km traveled (average of km run by each vehicle); EF = Emission factor

Mitigation area 6 (*the set-up of a National Programme on Sustainable Urban Transport*) is not considered in this estimation, as the measure was not defined with sufficient detail during this stage of NAMA preparation. As this measure aims at the transfer of know-how and financial resources for sustainable urban transport measures to city administrations (compare section 4.4.6), thereby multiplying the knowledge and measures, it can be expected that a considerable additional mitigation effect will be achieved and that the actual mitigation potential is higher of what is depicted in this document.

5.1.3 Methodology system 1: Measures within the LMR

The estimation for system 1 follows the well-renowned ASIF-model. This bottom-up model describes how transport demand, modal split and efficiency characteristics of vehicles and fuels are used combine to determine GHG emissions. ASIF stands for:

- **The Activity (A)**, meaning the transport demand in person- or ton-km. If total travel distances can be reduced because people make fewer and / or shorter trips, emissions will also decrease.
- **The Structure (S)**: meaning the modal split of transportation modes. By shifting trips from higher- to lower-emitting transportation modes, e.g. from cars to public transport or cycling, GHG emissions caused by a certain trip can be reduced.
- **Intensity (I)**: referring to the efficiency of a certain transportation mode. By improving the fuel efficiency of vehicles, the same distance can be covered with less fuel and therefore GHG emissions. In the same sense, increasing occupancy rates improves efficiency, since more people or goods can be transported for (almost) the same amount of energy.
- **Fuel (F)**: referring to the carbon content (or more general emission factor) of the energy source used in motorized transportation. If GHG emissions per unit of energy consumed are reduced, total emissions will also be lower for the same distance.

The methodology used for system 1 takes the ASIF model into consideration by using the following basic equation:

$$\frac{CO_2}{day} = A * B * C * D * E$$

A is the number of inhabitants,

B are the daily trips per person per day,

C is the average travel distance per person per trip,

D is the amount of vehicle kilometres per person kilometres and

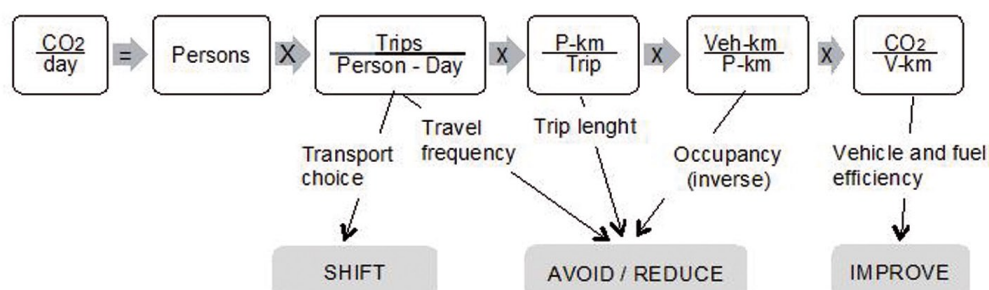
E is the amount of CO2 per vehicle kilometres travelled.

This is also presented below:

$$\frac{CO_2}{day} = Persons * \frac{Trips}{Person - day} * \frac{P - km}{Trip} * \frac{V - km}{P - km} * \frac{CO_2}{V - km}$$

While the first four factors describe the transport activity of the inhabitants, the last factor (vehicle efficiency or emission factor) refers to the efficiency of the different transport modes. The advantage of the chosen approach is that it makes visible changes in mobility behaviour and transport activity as well as the overall vehicle efficiency that can be derived by the implementation of the different sustainable transport policies, measures and projects. Figure 15 shows the type of impact (Avoid - Shift - Improve) that changes of different factors have on the transport system.

Figure 15: Impacts according to the A-S-I model



The methodology applies to all transport modes involved in the NAMA. Table 17 shows an example of the input data used for the calculations. Input data was obtained from different data sources and expert interviews (refer to section 5.1.5).

Table 17: Example for an input data table in system 1

2015	Activity				Emission Factor
Mode of Transport	Modal Split	Average Trip Rate	Average Trip Distance	Vehicle Occupancy Rate (inverse)	Emission Factor
	(%)	Trips/P-Day	Km-P/Trip	Km-Veh/Km-P	gr CO ₂ /Km-Veh
Average		2,4	7,1		
On Foot	24,3%	0,57	0,6	1,0	0
Bicycle	0,3%	0,01	1,9	1,0	0
Motorcycle	0,5%	0,01	7,1	1,0	73
Private Vehicle	15,2%	0,36	9,7	0,5	251
Mototaxi	5,9%	0,14	7,3	0,7	73
Taxi	2,6%	0,06	7,3	0,5	202
Taxi Colectivo	1,5%	0,04	7,3	0,5	233
Combi	17,4%	0,41	7,1	0,1	450
Microbus	24,8%	0,59	7,1	0,1	847
Bus	5,6%	0,13	7,1	0,0	1.363
Other - Private Transport	0,2%	0,02	7,1	1,0	251
Metropolitano 1 (form 2010)	1,2%	0,03	7,1	0,03	1.800
Metro Line 1 (from 2012)	0,3%	0,01	7,1	0,004	3.271
Input Data					
Year	2015	Population	9.948.526	Trips	23.578.007

5.1.4 Methodology system 2 and 3: Measures on the national level and measures in secondary cities

System 2 contains the introduction of a fuel economy standard for light vehicles and the improvement of vehicle homologations; system 3 contains measures of fleet modernization, such as scrapping schemes and CNG retrofit program. As these measures mainly have an impact on the fuel efficiency of vehicles, but not on transport activity or the modal split a VKT (vehicle-kilometers-traveled) approach has been chosen. This approach reflects that emission reductions caused by the above measures are mainly the result of the multiplication of the number of vehicles, the average travelled distance and the corresponding average emission factor.

$$E = Veh * VKT * EF$$

According to data from MTC, SUNARP and FONAM, 65% light duty vehicles are registered in Lima. Thus, the other 35% are the vehicles considered as part of system 2, which is affected only by mitigation area 4. Table 18 shows an example of the input data used for the calculations.

Table 18: Example of input data for the estimation of GHG emission reductions in system 2

Light Duty Vehicle	Vehicles In Peru		Activity		Emission Factor
	Vehicle Fleet at a Nacional Level	Percentage of Vehicles Registered Outside the AMLC	Vehicle Fleet Outside the AMLC	Average Distance Traveled Annually (KRV)	Emission Factor
				km/veh-year	gr CO ₂ /km-Veh
Private Vehicle	927.690	35%	324.692	14.000	251
Station Wagon	292.840	35%	102.494	14.000	251

5.1.5 Data sources and availability

The estimation is mainly based on data from the master plan on Urban Transport in the LMR carried out by the Japanese Development Agency (JICA, 2005) and its update (JICA, 2013) and a number of expert interviews carried out during a visit to Lima in 2014. Table 19 depicts where data for the estimations was taken from. A detailed description of data sources and availability can be found in the technical report prepared by TU München (to be downloaded from the GIZ TRANSfer project homepage (<http://transport-namas.org/resources/publications/>)).

Table 19: Data sources for estimations

Institution / study or database	Transport Activity							Activity and Emission factor		Emission factor				
	Modal share	Number of trips	Share of trips	Distance of trips	Km travelled	No of passengers	Occupation rate	Vehicle fleet	Fuel usage	Emission factors	Energy source	Fuel characteristics	Fleet characteristics	Driving cycles
JICA 2005	X	X	X	X			X							
JICA 2013	X	X	X					X						
MTC	X				X			X		X				
PROTRANS- PORTE				X	X	X	X		X					
GTU													X	
INFRAS										X				
MINEM											X			
OSINERGMIN									X			X		
INFOGAS								X				X		
SUNARP								X						
AAP								X						
Comité de Aire Limpio									X	X				
PLANCC				X										
Universidades										X			X	X

While data availability was sufficient for transport activity at national level as well as for the LMR, data was missing especially to calculate the emission factors (no data on the characteristics of the vehicle fleet and general traffic conditions). Also, data is more scarce on the city level. In order to derive realistic projections for the emission factors, more recent studies and data from Colombia and Chile have been used and adapted to the Peruvian case.

In order to refine the estimations and establish a solid MRV system it will be necessary to update the input data and collect additional data. Also, it will be necessary to put a continuous effort in data collection to establish a sound monitoring system.

5.2 Monitoring approach

A detailed monitoring plan and system has yet to be developed for the NAMA. The goal of monitoring is to understand whether policies or actions are effective in delivering the intended results and - according to this - adjust the design and focus of the measures. The aspects covered by the monitoring should address the overall goals of NAMA implementation, as well as the quality of the implementation process (process indicators). The TRANSPerú monitoring plan will include the following aspects, addressing the overall goals of the NAMA as well as specific monitoring needs of donors and policy makers:

1. **GHG impacts:** e.g. high importance to receive climate finance, account for the impacts in the INDCs.
2. **Sustainable Development (SD) benefits:** high importance for local policy makers,
3. **Mobilized financial resources:** high importance for industrialized countries that act as donors for the NAMA, and
4. **Transformational change:** high importance for some international donors (e.g. the NAMA Facility and the GCF) to secure long-term sustainable change. As the policy matrix constitutes a type of road map towards sector transformation explicitly targeting structural change in the sector,

monitoring of transformational change⁸ can be set equal to the monitoring of progress in NAMA implementation.

Next to these overall goals, monitoring should also cover the monitoring of some major outputs of the policy matrix (output indicators), as well as the overall quality of implementation (assessed by process indicators).

Possible Indicators

In general, the monitoring system should include outcome indicators, output indicators, and process indicators. **Outcome indicators** reflect the overall level of goal achievement (GHG mitigation, sustainable development benefits, transformational change and leverage of financial resources). Possible indicators of TRANSPerú could include:

⁸ The term transformational change stems from the understanding that a fundamental, structural change is needed to prevent dangerous levels of climate change and that NAMAs should have the potential to contribute to such a transformational change.

Table 20: Possible outcome indicators

Outcome	Possible indicators	Possible data sources
GHG mitigation effect	<ul style="list-style-type: none"> • 1.1 MtCO₂ reduced until 12/2019 (compared to BAU) • 5.6 MtCO₂ until 2025 (compared to BAU) 	<ul style="list-style-type: none"> • Inventories • Statistics on vehicle registrations, emission factors, fuel consumption, etc. • Household surveys (travel activity) • Expert interviews
SD benefits	<ul style="list-style-type: none"> • Annual time savings account for X million hours • Accident rate has decreased by X% • Air pollution has decreased by X% • Access to transport for underprivileged groups has increased by X% 	<ul style="list-style-type: none"> • Statistics on accidents, traffic characteristics, etc. • Web pages like Lima Como Vamos • Feasibility studies and monitoring reports of investment projects
Transformational change (progress in NAMA implementation)	<ul style="list-style-type: none"> • At least X% of the 77 outputs according to the policy matrix are achieved • No. of approved policies, strategies, programs, laws, decrees, standards, financing mechanisms etc. • Professionals trained in relevant aspects of SUT (capacity building) • No. of institutions strengthened 	<ul style="list-style-type: none"> • Bi-annual missions of KfW/GIZ • Technical secretariat of the NAMA • Policy documents • Minutes of trainings etc.
Financial resources leveraged	<ul style="list-style-type: none"> • EUR X of public funds have been mobilized for the NAMA • EUR X of private funds have been mobilized for the NAMA 	<ul style="list-style-type: none"> • Conventions / agreements with multilateral banks and other donors

Output indicators describe the impact the NAMA has on certain conditions of the transport system or the overall traffic situation. As the overall outcome indicators do not indicate the amount or degree a certain measure contributes to a given outcome, measuring and reporting of these indicators constitutes a useful addition, as they provide some more detailed and robust information on what has been achieved in terms of key outputs of the policy matrix. Indicators could include:

Table 21: Possible output indicators

Output	Possible indicators	Possible data sources
Changes in the transport system	<ul style="list-style-type: none"> • X km of Metro constructed. • X km of BRT constructed. • X intermodal spots constructed. • X km of cycling lanes constructed. • X vehicles >20 years scrapped. • X% of new vehicles comply with the new fuel standard and have an energy label. • X sustainable urban transport plans in cities approved. • X public investment projects in cities approved. 	<ul style="list-style-type: none"> • Bi-annual missions of KfW/GIZ via NAMA Facility project • Local statistics • Reporting by homologation office • Etc.

Monitoring of process indicators should be used with the objective to secure the quality of the NAMA implementation process, thereby contributing to its overall sustainability. Process indicators in TRANSPerú could include:

Table 22: Possible implementation indicators

Process of NAMA implementation	Possible indicators	Possible data sources
	<ul style="list-style-type: none"> • The perception of overall performance and service level of the transport system has improved by at least 10% • Satisfaction level of participants of trainings and capacity building measures 	<ul style="list-style-type: none"> • Statistics on accidents, traffic characteristics, etc. • Inventories • Household surveys • Web pages like Lima Como Vamos

5.3 Institutional Set-Up

The development and set-up of a fully-fledged MRV system including the institutional set-up is part of the supporting actions financed under the NAMA Support Project of the NAMA Facility.

In general, clear responsibilities for MRV are necessary to ensure efficient and reliable processes for data collection, quality control and management, as well as emission calculation and reporting. The monitoring plan should therefore assign clear mandates to organizations participating in the development and implementation of the NAMA.

For national NAMA oversight across sectors, a central coordinating unit may be required to (UNEP Risoe 2013):

- incorporate reporting from all line ministries and their regulatory bodies, and keep an updated registry of relevant policies and projects,
- report financial flows to policy schemes from both national and international sources (e.g. the Green Climate Fund), including actual disbursements,
- collaborate with the line ministries and record the effects of regulatory initiatives compared to the baseline.

A detailed monitoring plan has yet to be established. According to the UN Guidance for NAMA Design (UNFCCC/UNEP/UNDP, 2013) this monitoring plan should specify the following:

- assumptions and default values used and relevant data sources,
- frequency of monitoring and reporting of monitored parameters,
- description of data storage plan (e.g. use of existing geographic information systems (GIS)),
- responsibilities of specific actors with regard to monitoring and reporting,
- methodologies used to calculate mitigation benefits,
- level of accuracy to be applied (e.g. scope of a survey).

In the framework of the NAMA Facility's NAMA Support Project, a preliminary monitoring plan has been established, which will be refined until a maximum of 6 months after the start of the project.

6 Financing the NAMA: Costs, secured financing and options for investment

6.1 Overview of costs and secured financing of the NAMA

A study to estimate the costs and revenues of the NAMA was carried out in the preparation phase. While a summary of the findings is presented in this section, further details can be obtained from a technical report (spanish), to be downloaded from the project homepage (<http://transport-namas.org/resources/publications/>). It has to be noted that the calculation only considers the activities that lie within the scope of the NAMA implementation phase (policy matrix from 2016 -2019). While for some measures a full implementation will be achieved within this period, for other measures only the preparation or implementation phase will be considered. All figures refer to USD, if not otherwise indicated.

Table 23 summarizes costs and contributions according to the point of occurrence in the project cycle. Overall NAMA preparation and implementation is estimated at a cost of approximately USD 6.2 billion. Operation and maintenance costs for all measures accounts for approximately USD 240 million per year (considering the ones that are already in operation). Annual revenues are estimated at USD 198 million. The lion's share of the preparation and implementation costs arises from the metro and BRT lines to be constructed within the LMR (approximately USD 5.9 billion), leaving a total cost of USD 300 million to the rest of the measures contained in the NAMA.

Table 23: Costs and revenues of the direct mitigation measures under the NAMA (excluding NAMA Facility funds)

		Costs for preparation (USD)	Costs for implementation (USD)	Revenues (USD/year)	Costs for O&M (USD/year)
TOTAL NAMA TRANSPerú		95,189,543	6,099,465,733	197,576,000	243,931,740
Area 1: Integrated Transport in Lima / Callao		84,788,543	5,893,861,733	196,750,000	234,882,340
Area 2: Non-Motorized Transport		796,000	49,004,000		4,748,400
Area 3: Transport Authority for Lima / Callao		600,000			
Area 4: Vehicle homologation and fuel efficiency for light vehicles		1,205,000	30,000,000	826,000	1,806,000
Area 5: Modernization of public transport fleet		350,000	60,600,000		
Area 6: National Programme for Urban Transport		7,450,000	66,000,000		2,495,000
Financing	MTC	79,063,200	3,949,917,550	112,850,000	168,982,340
	PROTRANSPORTE/MMML (1)	3,657,843	209,694,183		
	Development Banks (2)	2,650,000			
	TRANSITEMOS	175,000			
	GIZ (3) (BMZ DKTi and BMUB Transfer funds)	6,651,000			
	KfW (3) (BMZ DKTi funds)		66,000,000		
	Concessionaire / Privates		1,783,250,000	84,726,000	66,826,000
Financing Gap		2,992,500	90,604,000		8,123,400

(1) PROTRANSPORTE has no budget for the activities, however there is an agreement that MTC will finance the investment

(2) The banks (IADB, CAF, WB, KfW) finance the public investment part for the Metro system

(3) excludes a grant of EUR 5 million of GIZ and concessional loans of EUR 40 million of KfW (including a EUR 4 million grant element), from the NAMA Facility Support project, which has yet to be attributed to the different elements in the matrix

With an overall sum of USD 4.2 billion, MTC contributes with a significant budget to NAMA implementation, especially the construction of the metro system (USD 4.1 billion for the construction of Metro Line 2, integration of Metro Line 1 and Line 2, and the pre-investment studies of Line 3, 4 and the commuter train).

Contributions from development banks and other donors to the implementation of the policy matrix include:

- **KfW:** EUR 200 million (promotional loan) to co-finance Lima Metro Line 2; EU-LAIF grant with CAF for Metro Lima and investment projects in medium-sized cities (feasibility study for public transport in Trujillo plus a study as part of Metro Lima of EUR 1 million grant); EUR 40 million for implementation of measures in the policy matrix (via NAMA Facility); EUR 60 million for mitigation area 6 (National Programme for Sustainable urban Transport), including a grant element financed by the German Federal Ministry of Economic Cooperation BMZ (DKTI).
- **World Bank:** USD 300 million to co-finance Lima Metro Line 2.
- **CAF:** involved in NAMA preparation and interested to support NAMA implementation linked to several ongoing and new CAF activities: concessional loans of USD 600 million to Lima Metro Line 1; USD 150 million for Metro Line 2 with substantial additional funding foreseen; EUR 600,000 to Trujillo in cooperation with KfW on an integrated urban transit system; grants foreseen for technical cooperation of up to USD 250,000 (each) to support the build-up of public transport systems in the cities of Piura and Cusco; USD 230,000 for a public bicycle scheme in some of Lima's municipalities; support for the MVCs to strengthen institutional capacity within the Ministry's new competence in the field of urban mobility.
- **IADB:** involved in NAMA preparation and interested to support NAMA implementation linked to several IADB activities: Emerging and Sustainable Cities Initiative (ESCI) with transport as one of several sectors; loan of USD 300 million for Metro Line 2; offers further support in the finalization of NAMA preparation.
- **AFD:** The French Development Agency contributes with USD 150 million to the financing of Metro Line 2.

The Government of Peru, in cooperation with KfW and GIZ, has successfully applied for a **NAMA Support Project (NSP) at the NAMA Facility** (financed by BMUB and DECC) with an overall budget of EUR 9 million of donations, of which EUR 5 million are dedicated for technical cooperation (GIZ) and EUR 4 million for financial cooperation (KfW),

which are blent into a concessional loan of EUR 40,000,000 from KfW's own resources. The technical support provided by the NSP will be split on three areas of support:

- 1) **technical advisory and capacity building** with a focus on mitigation areas 1: *Tariff and ticketing integration*, 2: *Non-motorized transport*, 3: *Set-up of a transport authority*, and 4: *Homologation and fuel efficiency*,
- 2) **support in coordination and project management**, and
- 3) **the set-up of a MRV system to monitor the impacts and efficiency of NAMA implementation.**

For mitigation area 6, KfW and GIZ have applied for funding via a **DKTI** project financed by the German Federal Ministry for Economic Cooperation and Development (**BMZ**). While the financial cooperation part has been approved already, the technical component of EUR 6 million is expected to be approved in 2016 (status earmarked).

Last but not least, the local NGO Transitemos will support NAMA implementation, especially in the areas of mitigation area 3, 4 and 5 by means of technical studies. While no explicit budget has been assigned yet, contributions are estimated to account for approximately USD 120,000 per year (480,000 for the first phase of NAMA implementation).

According to the estimations carried out by the consulting firm Taryet during NAMA preparation, there is an overall financing gap of USD 95 million for the preparation and implementation of the NAMA. Further USD 8 million / year will be needed for operation and maintenance. It has to be mentioned that the above named amount only covers the implementation phase of the NAMA (2016 - 2019). As not all measures will be completed during this phase, further costs will arise after the implementation of the NAMA (beyond 2019), e.g. for the construction of Metro Line 3 (mitigation area 1), which is prepared within the NAMA implementation phase, but will only be constructed after 2019. In a like manner, the estimations only cover the preparation and set-up (including some pilot projects) of the National Programme for Sustainable Urban Transport (mitigation area 6), while further investment projects that will be carried out at a later stage are not included. The evaluation of these costs requires a more detailed definition of the programme and the actions foreseen and will be carried out during NAMA implementation.

6.2 Cost estimations and financing per measure

The following chapter describes the cost estimations and financing contributions for each mitigation area. It has to be noted that these do not include the funds provided by the NAMA Facility Support Project, as the attribution of these funds to the single measures or mitigation areas has not yet been decided on. If not otherwise indicated, all figures are stated in USD. These preliminary estimations have been carried out during NAMA preparation. As not all of the measures were sufficiently defined at the time, the estimations should be understood as an indication of orders of magnitude. More detailed cost estimations for specific measures will be carried out during NAMA implementation.

6.2.1 Mitigation area 1: Integrated public mass transport in Lima / Callao

Funding has been secured for all actions foreseen in the policy matrix with respect to the metro and BRT network, physical integration of Metro Line 1 and 2, and the preparation of the construction of the commuter train. For the phase of NAMA implementation, a funding volume of USD 467,500 is still missing for the preparation of tariff- and ticketing integration between metro lines and BRT, where NAMA Facility funds are planned to be used. Table 24 summarizes costs and funding of the measures in this mitigation area.

Table 24: Summary of the costs and financing – mitigation area 1

		Costs for preparation (USD)	Costs for implementation (USD)	Revenues (USD/year)	Costs for O&M (USD/year)
Mitigation Area 1: Integrated Public Mass Transport Lima / Callao		84.788.543	5.893.861.733	196.750.000	234.882.340
Metro, BRT, bus network		44.221.043	5.659.039.062	157.850.000	204.882.340
Physical integration		100.000	59.822.671		
Tariff and Ticketing Integration		467.500	175.000.000	38.900.000	30.000.000
Commuter trains		40.000.000			
Financing	MTC	79.063.200	3.949.917.550	112.850.000	168.882.340
	PROTRANSPORTE/MML (1)	3.657.843	209.694.183		
	Concessionaire / Privates		1.734.250.000	83.900.000	66.000.000
	Development Banks (IADB, WB, CAF, KfW) (2)	1.600.000			
	Financing Gap	467.500	0		0

(1) PROTRANSPORTE has no budget for the activities, however there is an agreement that MTC will finance the investment

(2) The banks finance the public investment part for the Metro system

6.2.2 Mitigation area 2: Non-motorized transport

The MML currently has no financial resources for the construction and O&M of cycling infrastructure. Financial resources for the development of a technical manual on the construction of cycling infrastructure (project TRANSfer by GIZ) and the financing for the preparation of a public bicycle system in the three districts San Isidro, Miraflores and San Borja (CAF) have been secured. Transitemos is funding the preparation of a cycling route pilot in Barranco. However, financing is still needed for the elaboration and subsequent implementation of the Cycling Network Master Plan, including:

- Elaboration of the master plan for cycling infrastructure
- Construction of 200 km of cycling network

- Operation and maintenance of the cycling infrastructure
- Implementation of pedestrianization pilot projects
- Large-scale awareness campaigns

The study estimates, that altogether, a financing volume of USD 50.5 million will be needed to implement the measures foreseen under mitigation area 2.

Table 25: Summary of the costs and financing – mitigation area 2

		Costs for preparation (USD)	Costs for implementation (USD)	Revenues (USD/year)	Costs for O&M (USD/year)
Mitigation Area 2: Non-motorized transport		796.000	49.004.000		4.748.400
Master Plan, regulation and detailed studies for NMT measures		446.000	40.179.000		4.748.400
Awareness raising campaign		350.000	8.825.000		
Financing	TRANSITEMOS	35.000			
	GIZ (via BMUB TRANSfer project)	11.000			
	Development banks (CAF)	200.000			
	Financing Gap	550.000	49.004.000		4.748.400

6.2.3 Mitigation area 3: Institutional development to improve urban transport management in Lima / Callao

Mitigation area 3 contains the preparation phase of the establishment of a transport authority for the LMR. Overall costs of the measures are estimated to amount to USD 600,000. Currently, first studies are prepared for the establishment of the transport authority with funding from Transitemos and GIZ's TRANSfer project. Further funding is foreseen by the NAMA Facility NSP, however, specific amounts have yet to be established.

Table 26: Summary of the costs and financing – mitigation area 3

		Costs for preparation (USD)	Costs for implementation (USD)	Revenues (USD/year)	Costs for O&M (USD/year)
Mitigation area 3: Institutional management to improve urban transport management in Lima / Callao		600.000			
Transport Authority for Lima / Callao		500.000			
Strengthening of AATE		100.000			
Financing	TRANSITEMOS	80.000			
	GIZ (via BMUB TRANSfer project)	40.000			
	Financing Gap	480.000			

6.2.4 Mitigation area 4: Vehicle homologation and fuel efficiency for light vehicles

Estimated costs for the preparation, implementation and operation of the measures foreseen under mitigation area 4 sum up to USD 34 million throughout the NAMA implementation phase. The foundation Transitemos has set aside approximately USD 60,000 for the preparation of the homologation system. Further funding is foreseen in the frame of the NAMA Facility NSP, however, specific amounts have yet to be established.

Table 27: Summary of the costs and financing – mitigation area 4

		Costs for preparation (USD)	Costs for implementation (USD)	Revenues (USD/year)	Costs for O&M (USD/year)
Mitigation area 4: Vehicle homologation and fuel efficiency for light vehicles		1.205.000	30.000.000	826.000	1.806.000
Review of PlanCC		100.000			
Regulation on new emission standards		100.000			
Homologation system		280.000		826.000	926.000
Coverison to natural gas		225.000	30.000.000		880.000
Emission inventories		500.000			
Financing	TRANITEMOS	60.000			
	MTC				100.000
	Concessionaire / Privates		30.000.000	826.000	826.000
	Financing Gap	1.145.000	0		880.000

6.2.5 Mitigation area 5: Modernization of the public transport vehicle fleet

The implementation of the three measures foreseen in this area is estimated at a total cost of USD 61 million. While it is expected that the implementation of the vehicle inspection system is a cost-neutral measure, financing for the preparation and implementation of the fleet renovation programme is still missing. Costs for the fleet renovation programme were estimated on the basis of the existing programmes and the objectives established in the policy matrix (6,000 scrapped units) and amount to overall USD 41.8 million for the NAMA implementation phase.

Table 28: Summary of the costs and financing – mitigation area 5

		Costs of preparation (USD)	Costs of implementation (USD)	Revenues (USD/year)	Costs for O&M (USD/year)
Mitigation Area 5: Modernization of the public transport vehicle fleet		350.000	60.600.000		
Fleet Renovation programme		200.000	41.600.000		
Revision of fuel tax scheme		100.000			
Technical-mechanical vehicle inspections		50.000	19.000.000		
Financing	Concessionaire / Privates		19.000.000		
	Financing Gap	350.000	41.600.000		

6.2.6 Mitigation area 6: Support to local governments to strengthen sustainable urban transport

Total costs of USD 73.5 million are expected for the preparation and implementation of the policy and programme (cost estimation based on cost estimation of KfW, IADB and GIZ). In addition, annual operational costs of USD 2.5 million are estimated based on the assumption that a technical support centre will be established with a staff body of approximately 10 persons. While some pilot measures are considered in the KfW budget for the implementation phase of the programme, further infrastructure investments in the respective cities will need additional financing, once the programme is in place.

Table 29: Summary of the costs and financing – mitigation area 6

		Costs of preparation (USD)	Costs of implementation (USD)	Revenues (USD/year)	Costs for O&M (USD/year)
Mitigation Area 6: Support to local governments to strengthen sustainable urban transport		7.450.000	66.000.000		2.495.000
National Policy for Sustainable Urban Transport / Mobility		850.000			
National Programme for Sustainable Urban Transport / Mobility		6.600.000	66.000.000		2.495.000
Financing	IADB	850.000			
	GIZ (via BMZ IKLU/DKTI funds)	6.600.000			
	KfW (via BMZ IKLU/DKTI funds)	66.000.000			
	Financing Gap	0			2.495.000

6.2.7 Opportunities for the private sector

Since the early 1990s, Peru has encouraged private-sector involvement in all aspects of the economy. Thus the operation of urban transport services has been in private hands ever since the national bus company ENATRU ceased operations in 1992. The bulk of urban transport is provided by semi-formal minibuses and buses, but the intention is now to group these buses into formal privately-run enterprises, as was the case in 2014 with the Línea Azul (see above). Similarly, the BRT services of the Metro-politano are operated by four private bus consortia, selected in 2009 after an extensive bidding process. Metro Line 1 was built by the government as a public works project, but train operations have been contracted out to a private concessionaire. With regard to Metro Line 2, the entire project (implementation and operations) has been concessioned to a private consortium. Future metro and BRT lines are expected to follow the same models.

The NAMA contributes to open investment opportunities for the private sector of almost USD 10

billion, 80% of which would be for the current metro development programme in Lima:

- tenders for Metro Lima (several billion dollars),
- concessions for the operation of restructured bus routes (scrapping of 6,000 old, introduction of 1,800 modern buses in Lima),
- tenders for NMT / intermodal infrastructure in Lima (bike lanes, parking facilities in recently prioritized areas),
- CO₂-label and emission standard stimulating the purchase of efficient light vehicles (Peru imports approximately 150,000 light vehicles yearly).

Besides direct private investments, private pension funds or similar instruments could be used to finance these systems. A list of private financing opportunities and orders of magnitude of needed investment is provided in table 30.

Table 30: Opportunities for private financing

Measure		Type of Investment	US\$ million
Metro	Line 2 (ongoing concession)	ongoing subcontracting	600-900
	Subsequent Line	BOT concession	5000-7000
Metropolitano (BRT)	Extension of Line 1 to Chimpú Ocllo	Concessions / contracting	150-200
	Additional BRT Infrastructure	Concessions / contracting	300-400
	Acquisition of 200 BRT trunk-line and feeder buses	Loans to bus operators	50-80
	Acquisition of 1000 Buses for SIT corridors	Loans to bus operators	100-150
Integrated Transport	Integrated Fare Collection System	BOT	50-80
System (SIT)	Bus priorities through traffic engineering measures	Concessions / contracting	80-100
Non-Motorized Transport	Pedestrian Access to Metro & BRT Stations	Concessions / contracting	50-80
	Public Bike-Share Systems	BOT	10-20
Control of Air Pollution	Vehicle Inspection Framework	Concession	10-20
Modernization of Bus Fleet	Scrapping of Old Buses, Combined with Reduction of Operating Franchises	Concessions / contracting	50
Sustainable Transport in Medium Sized Cities	Traffic Engineering and Non-Motorized Transport Program, initially in two cities	Concessions / contracting	100-150
	BRT or other bus-based integrated public transport systems	Concessions / contracting	300-400

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Annex 1

Policy Matrix for the TRANSPerú NAMA

Policy MATRIX (Version: 05 June 2015)

Component – problem	Institution responsible (institutions involved)	Outputs		Outcomes (through June 2019)
		Programme 1 (through December 2016)	Programme 2 (January 2017 – June 2018)	
1. Integrated public mass transport system in Lima/Callao				
(1.1) Limited capacity and coverage of the current public mass transportation system to meet demand for 12 million public transport trips per day ⁹ with fast, safe services, greater energy efficiency and less pollution.	<u>Coverage:</u> Metropolitan Area of Lima and Callao <u>Approach:</u> ¹⁰ S-I; <u>Modes:</u> Metro <u>Starting point:</u> feasibility study for Line 2 (2013) and concession contract signed (2014)	MTC – (MML, AATE)	Metro Line 1 consolidated as a transport system on the city's south-northeast axis. Line 2, Segment 5 (Section 1A: Bypass – Santa Anita market) equipped and operational. Line 2 – Section 1B, Segments 3 and 4 (Bypass – Central Station) and Segment 6 (Santa Anita market – Municipality of Ate) under construction. Line 3 project contracted out. Line 4 studies approved. Feeder routes for Line 2, Section 1A restructured.	Lines 1 and 2 (Segment 5–Section 1A) of Lima Metro carry 5% of public transit trips in the metropolis. Annual time savings for users total 5 million hours. SJT ¹¹ CO2 emissions decrease by 4% while the accident rate decreases by 5%.

⁹ Japan International Cooperation Agency (JICA) Master Plan

¹⁰ Indication regarding Avoid-Shift-Improve approach (A = Avoid trips, S = Shift to less carbon intense modes, I = Improve vehicles and fuels)

¹¹ Integrated Transit System

Component – problem	Institution responsible (institutions involved)	Outputs		Outcomes (through June 2019)
		Programme 1 (through December 2016)	Programme 2 (January 2017 – June 2018)	
	<p>Coverage: Metropolitan Area of Lima and Callao</p> <p>Approach: S/I,</p> <p>Modes: Metropolitano¹²</p> <p>Starting point: Feasibility study and contracts to operate complementary and connecting corridors</p>	<p>Operations begun in 2 complementary corridors.</p> <p>Regular passenger transport system restructured and streamlined.</p> <p>Expansion of Metropolitano 1 underway: Naranjal Station – Carabaylo</p> <p>Pre-investment studies for expansion of Metropolitano 1 completed:</p> <ul style="list-style-type: none"> • Tomás Valle- Airport • Grau Station – Metro Line 1 	<p>Metropolitano 1 expansion operational: Naranjal Station – Carabaylo</p> <p>Expansion of Metropolitano 1 underway:</p> <ul style="list-style-type: none"> • Tomás Valle- Airport • Grau Station – Metro Line 1 <p>Improved and operational infrastructure for complementary corridors.</p>	<p>Metropolitano 1 and its complementary and connecting corridors account for 40% of public transit trips in the metropolis. Annual time savings for users total 10 million hours. SIT C02 emissions decrease by 4% while the accident rate decreases by 10%.</p>
<p>(1.2) Lack of an integrated urban transport system, including the Lima Metro, Metropolitano, complementary corridors, and feeder routes make it difficult for the population to access the system's benefits.</p>	<p>Coverage: Metropolitan Area of Lima and Callao</p> <p>Approach: S</p> <p>Modes: Metro, Metropolitano, complementary and connecting corridors, and feeder routes.</p>	<p>Studies begun to physically integrate the Lima Metropolitan Area's urban transport system.</p>	<p>Construction underway to physically integrate the Lima Metropolitan Area's urban transport system.</p>	<p>The inauguration of 12 intermodal transport interchange facilities has improved passenger accessibility and increased the number of trips on the Metropolitano and Metro by 0.5%.</p> <p>Annual time savings for users total 1 million hours. SIT C02 emissions decrease by 4% while the accident rate decreases by 1%.</p>

¹² Metropolitano is the Lima Metropolitan Area's Bus Rapid Transit (BRT) system.

¹³ Transport Management

¹⁴ Agency that operates Metropolitano

¹⁵ Callao Provincial Municipality

Component – problem	Institution responsible (institutions involved)	Outputs		Outcomes (through June 2019)
		Programme 1 (through December 2016)	Programme 2 (January 2017 – June 2018)	
(1.3) Lack of integration in terms of itineraries, technology, fares and ticketing in urban public transport systems in the city make it difficult for passengers to access the system's benefits.	<p>Coverage: Metropolitan Area of Lima</p> <p>Approach: S</p> <p>Modes: Metro, Metropolitan, complementary and connecting corridors.</p>	<p>Studies completed on fare integration involving a single fare collection and distribution system.</p> <p>Pilot of integration of itinerary and fare collection system carried out at two intersection points of the Lima Metro and the Metropolitan.</p>	<p>Unified fare collection system for the Lima Metro and the Metropolitan in process of implementation.</p>	<p>The inauguration of a unified fare collection system has reduced barriers to access to the system and has increased the number of public transit trips on the Metropolitan and Metro by 1% annually.</p> <p>Annual time savings for users total 2 million hours. SIT CO2 emissions decrease by 4% while the accident rate decreases by 1%.</p>
(1.4) Limitations of the transport system linking the Lima Metropolitan Area with nearby provinces.	<p>Coverage: Lima -Provinces</p> <p>Approach: S</p> <p>Modes: Metro, Metropolitan, commuter train</p>	<p>Pre-investment profile studies for prioritized commuter train underway.</p>	<p>Pre-investment feasibility studies completed for prioritized commuter train underway.</p>	<p>Feasibility study for the first suburban commuter train Lima - Provinces commuter rail service has been completed. The service provides interurban mass transit and connects with the urban passenger transportation system.</p>
2. Non-motorized transport in Lima				
2.1.) Limited use of non-motorised transport and poor conditions for safe and efficient mobility for pedestrians and cyclists in the Lima Metropolitan Area.	<p>Coverage: Metropolitan Area of Lima and Callao</p> <p>Approach: S</p> <p>Modes: Non-motorised transport</p>	<p>Plan on non-motorised transport for Lima and Callao, including an investment plan (project portfolio) and design for an implementation and financing strategy.</p> <p>Elaboration of pilot plan for pedestrianization of urban centres (containing the city's ...</p>	<p>System for supervising and monitoring local governments' implementation of the plan on non-motorized transport in effect.</p> <p>Implementation of the first stage of the non-motorised travel plan's project portfolio for Lima and Callao.</p>	<p>Increase in non-motorised transport. Daily bicycle trips have increased 40% while intermodal trips have increased 20%.</p>

¹⁶ Ministry of Housing, Construction and Sanitation – Directorate-General for Housing and Urban Planning Policy and Regulation

¹⁷ Regional Government of Lima Provinces

Component – problem	Institution responsible (institutions involved)	Outputs		Outcomes (through June 2019)
		Programme 1 (through December 2016)	Programme 2 (January 2017 – June 2018)	
	Starting point: MML TNM ¹⁸ pre-investment studies on non-motorised transport	... main attractions) underway. Implementation of pedestrianization pilot plans and analysis of results have begun.	Implementation of the pedestrianization pilot plans and analysis of results in process.	
(2.2.) Limited citizen awareness and involvement in furthering sustainable urban mobility.	Coverage: Metropolitan Area of Lima and Callao Approach: S Modes: Non-motorised transport	Mass public awareness and information campaigns to promote respect for pedestrians and cyclists developed. Mass awareness campaigns developed to promote non-motorised transport (divided by primary, secondary, institute and university students, and workers at public and private institutions) developed. Mega-events organised (Car-Free Day in 10 districts and in the Lima Metropolitan Area). Closure of 10 historic centres and 5 universities with the support of 3 bicycle activist communities. International Non-Motorised Mobility Forum took place.	X inspectors and advisors from provincial and district municipalities trained on the respect for cyclist campaigns. Mass communication campaigns about cycling lanes underway. Application for cyclists showing the existent cycling lane network, including a map of bicycle-friendly places and bicycle workshops developed.	

¹⁸ Non-motorized transport unit within MML

Component – problem	Institution responsible (institutions involved)	Outputs		Outcomes (through June 2019)
3. Institutional development to improve urban transport management in Lima/ Callao				
(3.1) Lack of integrated urban transport management in the Lima Metropolitan Area results in poor service, and decreased system safety and productivity.	<u>Coverage:</u> Lima Metropolitan Area <u>Approach:</u> A, S, I <u>Modes:</u> all <u>Starting point:</u> MTC proposal to create an Urban Transport Authority	MTC (all member institutions of the NAMA Committee) Updated proposal to create a Metropolitan Transport Authority for Lima and Callao. Coordination agreement regarding urban transport signed by MML and MPC.	Proposal to create a Metropolitan Transport Authority for Lima and Callao in process of dissemination and discussion. Regulations applicable to urban sustainable transport revised and updated.	Structural deficiencies have been reduced; urban transport management is more integrated among different levels of government.
(3.2) Need to upgrade the capacities of the institution responsible for electric mass transport systems in the Lima Metropolitan Area and Callao.	<u>Coverage:</u> Metropolitan Area of Lima and Callao <u>Approach:</u> S <u>Modes:</u> Metro <u>Starting point:</u> Assessment of the current state of AATE	MTC (AATE) Study completed to strengthen the management capacities of the institution responsible for the electric mass transportation systems in the Lima Metropolitan Area and Callao.	A new management model implemented for the agency responsible for the electric mass transit systems in the Lima Metropolitan Area and Callao.	New Rules of Organisation and Operations and Manual of Organisation and Operation approved. The institution responsible for the electric mass transit systems in the Lima Metropolitan Area and Callao is applying a management model using standardized processes.
4. Vehicle homologation and fuel efficiency for light vehicles				
(4.1) High levels of greenhouse gas (GHG) emissions from the transport sector create adverse environmental conditions.	<u>Coverage:</u> national <u>Approach:</u> I <u>Modes:</u> all <u>Starting point:</u> MINAM and DIGESA evaluations	MTC – DGASA ¹⁹ (MINAM ²⁰ , MINEM-DGH ²¹ , MINSADIGESA ²²)	Review of mitigation actions prioritised by Plan CC and update of the national greenhouse gas inventory for the transport sector. Second report on the review of GHG mitigation actions submitted. National plan for mitigation actions in urban transport – 2021 approved.	The National Action Plan is being implemented in Lima and ten prioritized cities.

¹⁹ Directorate General for Socio-Environmental Affairs,

²⁰ Ministry of the Environment

²¹ Ministry of Energy and Mining – Directorate-General for Energy Efficiency

²² Ministry of Health - Directorate General for Environmental Health

Component – problem	Institution responsible (institutions involved)	Outputs		Outcomes (through June 2019)
		Programme 1 (through December 2016)	Programme 2 (January 2017 – June 2018)	
(4.2) High primary pollutant emission levels from the motorised transport sector create adverse public health conditions.	<p><u>Coverage:</u> national</p> <p><u>Approach:</u> I</p> <p><u>Modes:</u> all</p> <p>Starting point: outcomes of PISA I²³, monitoring of PISA II and climate change mitigation measures established in the Plan CC for climate change.</p>	<p>Proposal for an update of the current regulation on maximum allowable limits for pollutant gas emissions applicable to the motor vehicle fleet at the national level revised.</p> <p>Compendium of applicable regulations and institutional responsibilities regarding the regulation and control of primary air pollutants completed.</p>	<p>Updated legislation and regulations concerning maximum allowable limits for pollutant gas emissions by the vehicle fleet at the national level published.</p> <p>Legal instrument at the level of the President's Cabinet Office published to realign institutional responsibilities.</p>	First report on the results of the application of the new maximum allowable limits in Lima and 10 prioritized cities has been published.
(4.3) Weaknesses in the regulation and management of the vehicle certification system affect road safety, increase emissions of CO2 and other pollutant gases and result in a lack of control over the quality of the vehicle fleet.	<p><u>Coverage:</u> national</p> <p><u>Approach:</u> I</p> <p><u>Modes:</u> all</p> <p>Starting point: existing regulations</p>	<p>Committee for vehicle homologation created and functioning.</p> <p>The edict modifying Supreme Decree 058/2003-MTC on vehicle homologation approved.</p> <p>Technical data sheets used for vehicle homologation updated.</p> <p>National Vehicle Certification Registry functioning.</p> <p>Paper-based homologation system operational.</p> <p>Project developed to regulate and label the energy efficiency and CO2 emissions of light vehicles.</p>	<p>National vehicle homologation system in operation and functioning.</p> <p>Paper-based homologation system operational.</p> <p>Physical homologation system initiated.</p> <p>Regulations approved to label the energy efficiency and CO2 emissions of light vehicles.</p> <p>Labelling the energy efficiency and CO2 emissions of light vehicles has begun.</p>	100% of new vehicles entering the Peruvian market meet technical homologation requirements and comply with the established maximum allowable pollution limits. All vehicles are certified, labelled, and comply with the energy efficiency directive.

²³ comprehensive clean air plan for Lima and Callao

²⁴ Ministry of Energy and Mining- Directorate-General of Energy Efficiency

²⁵ COFIDE is a Peruvian development bank.

Component – problem	Institution responsible (institutions involved)	Outputs		Outcomes (through June 2019)
		Programme 1 (through December 2016)	Programme 2 (January 2017 – June 2018)	
(4.4.) The decline of natural gas vehicles (NGV) and the substitution of liquid petroleum gas (LPG) in the public transport fleet.	MTC (COFIDE, MINEM-DGEE, MINAM)	<p>Reactivation and strengthening of the NGV Supervisory Board and the creation of a Technical Secretariat.</p> <p>Comprehensive plan to reactivate NGV conversion system has started.</p> <p>Review of legal framework for NGV and LPG conversion system in process.</p> <p>Reactivation and strengthening of LPG Supervisory Board completed.</p>	<p>NGV Supervisory Board and Technical Secretariat functioning.</p> <p>Strategy approved for sequential migration from fuel used by urban transport (fossil fuels – NGV – conventional electric energy – renewable energy) as a basis for changing the urban transport energy matrix.</p> <p>30 NGV stations in 5 secondary cities made operational.</p>	<p>5% increase in NGV conversion and consumption in urban transport and a 10% annual NGV conversion rate.</p> <p>Conversion to LPG through a controlled system.</p>
(4.5) Lack of detailed and updated information (inventory) of Greenhouse Gas Emissions (GHG) and primary polluting gas emissions resulting from land transport hinders the assurance of results and the achievement of environmental commitments.	MTC (MINEM DGEE, DIGESA-MINSA)	<p>Coverage: national</p> <p>Approach: I</p> <p>Modes: all</p> <p>Starting point: outcomes of PISA I²⁷ ; follow-up of PISA II.</p>	<p>Baseline for primary air pollutants, greenhouse gas emissions and emission factors approved by main cities in the country.</p> <p>Inventories presented of GHGs and local air pollutants emitted by urban transport at the national level.</p>	<p>Complete and reliable information for GHG and primary pollutant performance during the period 2016-2019 (inventory and updates) that enables decision-making.</p>

²⁶ Association of Service Stations of Peru
²⁷ comprehensive clean air plan for Lima and Callao

Component – problem	Institution responsible (institutions involved)	Outputs		Outcomes (through June 2019)
5. Modernization of the public transport vehicle fleet				
(5.1) The age of vehicles used in public transport services creates adverse conditions in terms of pollution and safety for the population.	Coverage: Metropolitan Area of Lima and 2 further cities <u>Approach:</u> I <u>Modes:</u> public buses, taxis Starting point: vehicle scrapping programme	MTC (MML, Protransporte, MPC, MEF ²⁸ , MINAM, COFIDE, Municipalities) Approval of general guidelines for fleet renewal (for secondary cities) and national legislative and regulatory framework applicable to the renewal and reduction of vehicle fleet. Strategy to modernise the vehicle fleet updated. Sector strategy to finance vehicle-scrapping programme approved (as a budget line item or a national fund for vehicle scrapping).	Scrapping program underway for Lima Metropolitan Area, in areas of influence of Metro, Metropolitan, complementary and connecting corridors, and feeder routes. Designs completed for light vehicle scrapping programmes in two intermediate cities.	Up to 6,000 obsolete urban transport units in the Lima Metropolitan Area have been retired and replaced by 1,800 new, higher-capacity standard buses
(5.2) The fuel consumption tax scheme is not consistent with the objective of reducing environmental pollution; it promotes the use of polluting fuels in public transport.	<u>Approach:</u> I <u>Modes:</u> all vehicles <u>Starting point:</u> existing scheme	MTC (MINEM-DGH, MEF, MINAM) Proposed amendment to the applicable fuel consumption tax updated to align with stated policies.	Proposal approved for national policy on use of cleaner fuels for public transport.	Negative externalities resulting from the taxation system have been reduced by X.
(5.3) Weaknesses in the vehicle inspection system create adverse conditions in terms of safety and pollution.	<u>Coverage:</u> national <u>Approach:</u> I <u>Modes:</u> all	MTC (regional governments) New legislative and regulatory framework to strengthen vehicle inspection system approved. Capacities and necessary	New vehicle inspection system implemented and fully functioning in Lima and 10 further cities.	Implementation of the new vehicle inspection system contributes to a reduction in the number of accidents and the mitigation of polluting emissions.

Component – problem	Institution responsible (institutions involved)	Outputs		Outcomes (through June 2019)
		Programme 1 (through December 2016)	Programme 2 (January 2017 – June 2018)	
	Starting point: existing scheme	equipment for inspection (supervision, monitoring, and sanctions) strengthened.		
6. Support to local governments to strengthen sustainable urban transport.				
(6.1) Lack of explicit national policies for sustainable urban transport in Peru's interior cities leads to inefficiency and a lack of safety in urban transport.	MTC (MVCS)	National Sustainable Urban Transport Policy formulated. Proposal on the institutional structure for the execution of the National Urban Transport Policy and the national urban transport programme presented.	National Sustainable Urban Transport Policy approved. Institutional structure to execute national policy and program approved by Supreme Decree and operational.	Implementation of the National Sustainable Urban Transport Policy has created adequate conditions for the planning, financing, construction and operation of sustainable urban transport measures. • 12 sustainable urban transport plans approved. • 18 public investment projects approved. Review numbers based on the number of intermediate cities identified.
(6.2) The institutional and financial weakness of local governments in the area of urban transport management hinders efforts to finance, construct, and operate efficient, sustainable public transport systems.	MTC (MEF, MVCS, Municipalities)	SNIP ²⁹ profile study formulated for the National Sustainable Urban Transport Programme to develop sustainable urban transport plans (PTUS) for the respective cities.	SNIP feasibility study approved for the National Sustainable Urban Transport Program in order to develop PTUS in the respective cities. Technical and financial assistance mechanisms for the National Programme approved. Proposal to strengthen urban transport management in cities developed and presented to provincial municipalities.	

Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

Sitz der Gesellschaft
Bonn und Eschborn

Friedrich-Ebert-Allee 40
53113 Bonn, Germany
T +49 228 44 60-0
F +49 228 44 60-17 66

Dag-Hammarskjöld-Weg 1-5
65760 Eschborn, Germany
T +49 61 96 79-0
F +49 61 96 79-11 15

E info@giz.de
I www.giz.de
I www.transport-namas.org