



PARIS PROCESS
ON **MOBILITY** AND **CLIMATE**



Partnership on Sustainable
Low Carbon Transport

TRANSPORT AND CLIMATE CHANGE
SYNTHESIS OF ANALYTICAL PRODUCTS BY THE
PARIS PROCESS ON MOBILITY AND CLIMATE (PPMC)
PREPARED FOR COP22, MARRAKECH, MOROCCO





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NOVEMBER, 2016



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List of Abbreviations

1.5DS	One Point Five-Degree Celsius Scenario	LCS	Low-carbon scenario
2DS	Two-Degree Celsius Scenario	LPAA	Lima Paris Action Agenda
ADB	Asian Development Bank	MCB	Michelin Challenge Bibendum
BAU	Business-As-Usual	MDB	Multilateral Development Bank
BMZ	German Federal Ministry for Economic Cooperation and Development	MYC	Mobilise Your City
CDM	Clean Development Mechanism	NAMA	Nationally Appropriate Mitigation Actions
CFIS	Climate Finance Instruments	NAPS	National Adaptation Plans
CO ₂	Carbon Dioxide	NDC	Nationally Determined Contributions
COP22	The 22nd Session of the Conference of the Parties	NDF	Nordic Development Fund
CTF	Clean Technology Fund	ODA	Official Development Assistance
DFIS	Development Finance Institutions	OECD	Organisation for Economic Co-operation and Development
ECF	European Cyclists' Federation	PIANC	World Association for Waterborne Transport Infrastructure
EEA	European Economic Area	PIARC	World Road Association
GT	Gigatonne	PPFS	Project Preparation Facilities
GCAA	Global Climate Action Agenda	PPMC	Paris Process on Mobility and Climate
GCF	Green Climate Fund	SDGS	Sustainable Development Goals
GEF	Global Environment Facility	SIE	Société d'Investissements Énergétique (Energy Investment Company)
GHG	Greenhouse Gas	SLoCaT	Partnership on Sustainable, Low Carbon Transport
GLZ	Deutsche Gesellschaft für Internationale Zusammenarbeit	TEM	Technical Expert Meeting
HLC	High Level Champions	TUMI	Transformative Urban Mobility Initiative
ICF	International Climate Finance	TRB	Transport Research Board
IEA	International Energy Agency	UEMI	Urban Electric Mobility Vehicles Initiative
IFFS	Infrastructure Financing Facilities	UIC	International Union of Railways
IKI	International Climate Initiative	UNEP	United Nations Environment Programme
INDCS	Intended Nationally Determined Contributions	UNFCCC	United Nations Framework Convention on Climate Change
IPCC	Intergovernmental Panel on Climate Change	WBCSD	World Business Council for Sustainable Development
ITEM-2	2nd International Transportation Energy Modeling Conference	WCA	World Cycling Alliance
JCM	Joint Crediting Mechanism	WEF	World Economic Forum
JI	Joint Implementation		
LAC	Latin America and the Caribbean		
LC2RTI	Low Carbon Road and Road Transport Initiative		



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Introduction

The Partnership on Sustainable, Low Carbon Transport, (SLoCaT) was established in September 2009 with the specific aim to promote the integration of sustainable transport in global processes on sustainable development and climate change. Over the last two years a number of global agreements have been adopted on sustainable development, most importantly the Sustainable Development Goals (SDGs), which give prominence to the central role of sustainable transport in realizing sustainable development.

The Paris Agreement on Climate Change adopted in December 2015 provides the transport sector with a clear sense of ambition and direction. It is now up to the transport sector to deliver on this ambition.

The Paris Process on Mobility and Climate (PPMC) has proven to be an excellent channel to rally the transport sector and we are happy to share an overview of the analytical materials SLoCaT has prepared in support of transformative action on transport and climate change.

SLoCaT Partnership would like to thank Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), United Nations Centre for Regional Development (UNCRD) and the World Bank for their support to the Synthesis Report.



Cornie Huizenga, Secretary General
Partnership on Sustainable,
Co-Founder of Low Carbon Transport
Paris Process on Mobility and Climate

Since its inception in 1998, the companies involved in the Michelin Challenge Bibendum have demonstrated the technical feasibility, and the economic viability, of disruptive solutions in the transport sector.

The goal set by the Paris Agreement on Climate Change of a "net zero-emission" economy as early as possible in the second part of the century is highly motivating, from a social, environmental and economic perspective. Now is the time for a massive deployment of solutions being considered as part of the Michelin Challenge Bibendum. We should go ahead without delay.

The efforts done by PPMC to better understand transport and climate change through a series of analytical products is key in being able to rally state and non-state support for the Transport action roadmap we propose between now and 2050+.

We would like to thank our partner the SLoCaT Partnership for taking the lead in developing this overview document. It highlights the urgent need to change the course of action in both areas of freight transport and people's mobility.

We are on a constructive track and look forward to further progress.



Dr. Patrick Oliva
Senior Vice President- Sustainable Mobility & Energy Transition
Co-Founder of MCB
Paris process on Mobility and Climate

I. What is at stake for the Transport Sector

A. Mitigation of Climate Change

The Paris Agreement on Climate Change calls for global CO₂ reductions to hold climate warming to a 'well-below-2-degrees' Celsius target, which is typically taken as a 1.5 degree Celsius target.

Anticipated emissions targets for the transport sector consistent with 2 and 1.5 degree Celsius scenarios (2DS, 1.5DS) are projected to be 4.7 Gt and 2 Gt by 2050, respectively, relative to 13 Gt under business-as-usual model (BAU), as shown in Figure 1:

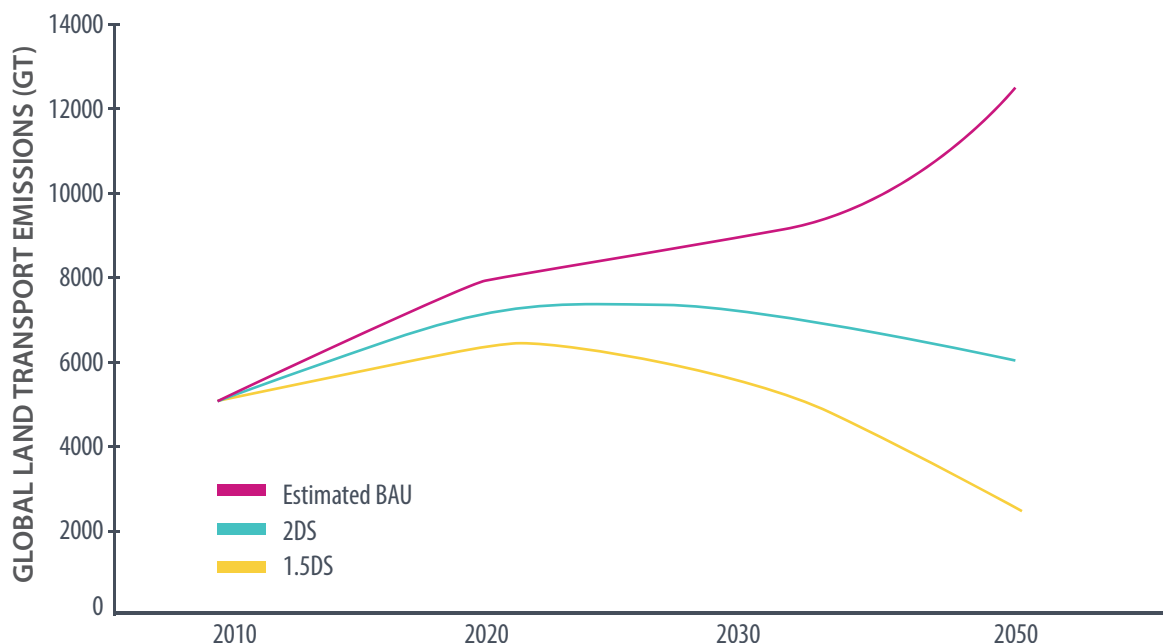


Figure 1: SLoCaT-projected BAU, 2DS, and 1.5 DS CO₂ trends for global land transport

The estimated target of 2 Gt for transportation in a 1.5DS should be seen in the context of a broader 'net zero' CO₂ target across the energy economy worldwide by mid-century (or soon after), whereby the remaining emissions (2 Gt) coming from the transport sector will likely need to be offset by reductions below zero in other sectors (such as bioenergy with carbon capture, and storage in the electric power sector). Thus a 2 Gt target for transport, which requires unprecedented transformative change within the transport sector, depends at the same time on even deeper reductions in other sectors. The relative contribution of the transport sector vis-à-vis other sectors, in terms of emission reductions, could change depending on inter-sectoral dynamics and where mitigation can be most effectively achieved.

With a projected global population of 9 billion by 2050, a 2 Gt target amounts to a little over 0.2 transport-related tonnes of CO₂ per person annually. Depending on how different modes are decarbonized, this could amount to as little as 1 medium-distance flight (e.g. 1000 km) per year and 500 km of travel by car (at an on-road efficiency of 8 liters per 100 km), assuming that both are still powered by fossil fuels. It is clear therefore that transformative changes are needed in the transport sector to ensure that future generations will continue to be able access economic opportunities and essential services. Smart planning of cities and logistics chains can help reduce the demand for travel.

Greater use of public transport, walking and cycling would lower energy use in the transport sector. Highly efficient modes such as rail and electric vehicles could provide far more mobility per unit carbon, particularly if electricity generation reaches near-zero emissions. Such tradeoffs will need to be considered in national plans and targets.

The scale of the challenge ahead in the transport sector on the path toward a decarbonized transport system is also well illustrated by a recent comparative analysis of international transportation-energy models

carried out in support of the second International Transportation Energy Modeling (iTEM-2) conference¹. The diverse set of models included a range of structures and methodologies, such as multi-sector integrated assessment models, and transport-sector focused 'bottom-up' models. These models are comprehensive, representing all countries of the world, either individually or as groups of nations. Projections and scenarios compared included reference (BAU) as well as 'low carbon scenarios', some of which are consistent with 2DS. The comparisons resulting from this effort show a wide range of results (Figure 2).

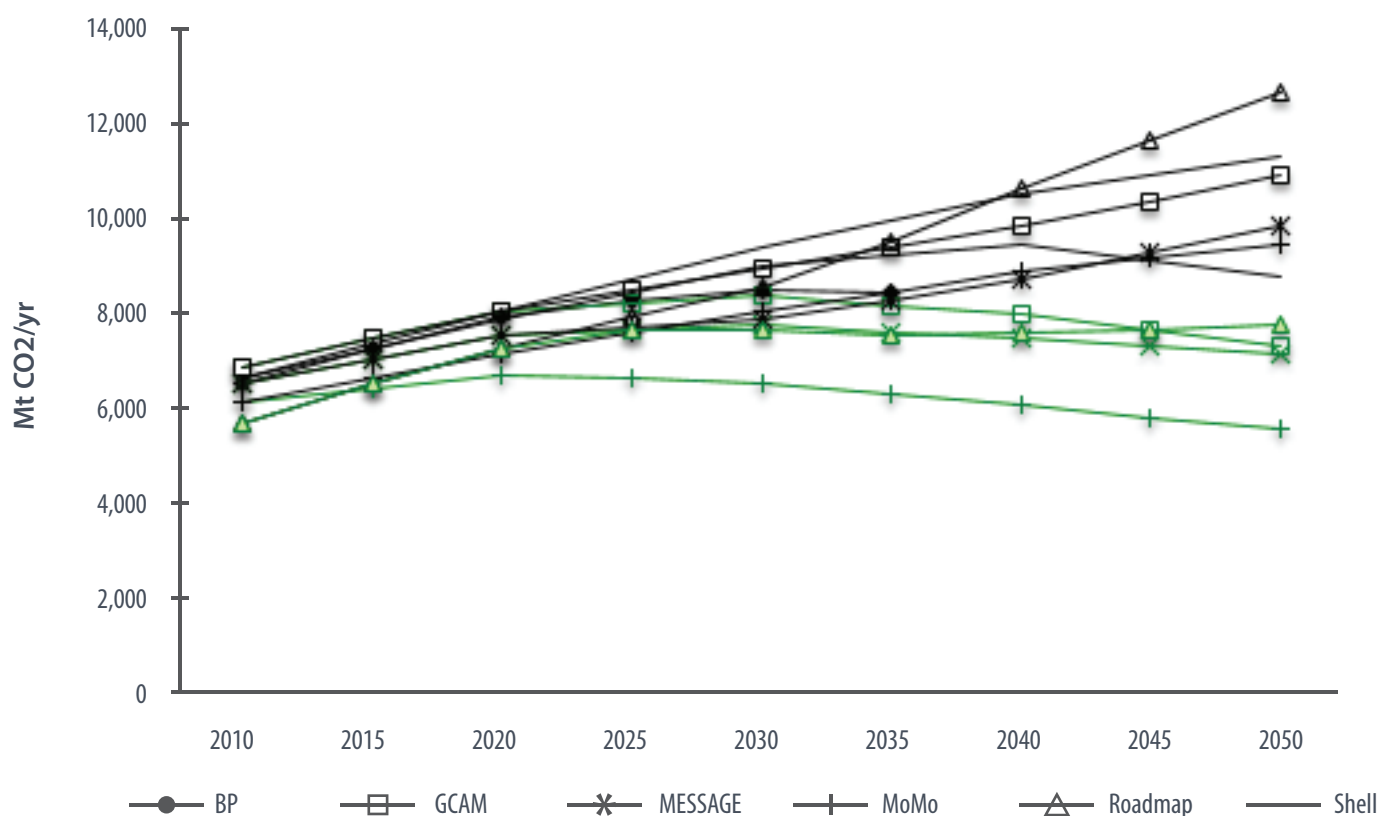


Figure 2: ITEM-2 summary of transportation CO2 projections for baseline and 'low carbon' scenarios²

¹ The second International Transportation Energy Modeling (iTEM-2) conference, hosted by Chalmers University, conducted in Gothenburg Sweden (Oct 25-26, 2016), brought together 35 transportation/energy modelers to share and compare projections from 12 global transportation/energy models.

² Origin of models: GCAM = Pacific Northwest National Laboratory, MESSAGE = International Institute for Applied Systems Analysis, MoMo = International Energy Agency, Roadmap = International Council on Clean Transportation.



The iTEM-2 comparisons, particularly those for the 'low carbon' policy scenarios, suggest that it may be challenging to achieve transport CO₂ emissions in 2050 below current levels, unless there are major advances in technology and/or changes in behavior beyond those anticipated by the models.

Over the next years there will be a need to scale up ambitions in policies as part of the development of the next generation of Nationally Determined Contributions (NDCs) and the long-term low greenhouse gas (GHG) emissions development strategies called for by the Paris Agreement on Climate Change. The development of the NDCs and long term emission reduction strategies can benefit from the Quick-Wins on Transport, Climate Change and Sustainable Development and the Global Roadmap on Decarbonizing Transport described in this report.

An important need going forward is to increase modeling capabilities at national and subnational levels, as no common approach currently exists for countries to assess strategies in an internationally consistent manner. Globally comprehensive tools, such as considered by the iTEM consortium, can aid country-focused modeling and analysis teams when considering respective NDC commitments. SLoCaT is also leading a key effort in this

context, through reviewing the CO₂ mitigation potential of countries and estimating combined BAU and low carbon impacts across available NDCs and other sources, in a 2015 study focusing on the 2DS by 2030, and a more recent study looking at both 2DS and 1.5 DS by 2050. Another relevant initiative is being led by the Asian Development Bank (ADB), which is close to prototyping a transportation model that can be calibrated by individual countries in a common framework. ADB's user-friendly and policy-oriented approach is currently being tested on a number of ADB member countries, and may be suitable for a wide range of country planning efforts. All of these approaches will be improved through interaction and knowledge sharing with national experts.

In sum, the transport sector will need to take transformative action on transport to meet the ambitious targets set by the Paris Agreement on Climate Change. Present policies on transport and climate change fall far short of a 2DS, let alone the even more ambitious 1.5DS. In developing more ambitious policies efforts like those from SLoCaT, the iTEM modeling consortium³ and ADB can provide crucial assistance to countries in developing and assessing strategies for achieving very low carbon transport futures, in order to make collective contributions towards a 2DS or 1.5DS.

³The iTEM group has now set plans for an iTEM-3 conference in autumn 2017 with at least a subset of models planning to focus more on these types of scenarios and potentially link them to national strategies under the Paris Agreement. This may be an important opportunity to link this post-Paris process with some of the best-known global transportation-energy models in the world, as an impartial source of vetting various strategies and scenarios.

B. Country Fact Sheets on Transport Emissions

Transport faces an equal challenge when it comes to adaptation to climate change. Adaptation in the transport sector is necessary for both developed and developing countries, as transport systems worldwide are vulnerable to the increasing impacts of extreme weather, and rapid

motorization increases the potential for catastrophic impacts. Crucially, sustainable transport systems must adapt to climate change, to maintain the reliability of transport’s role in economic and social development.

Climate Hazard	Potential Impact
1. Increase in extreme weather events	(a) Infrastructure damage and destruction
2. Sea-level-rise	(b) Functional interruptions and operational disruptions
3. Changes in precipitation average and intensity	(c) Increase in rehabilitation & maintenance costs
4. Permafrost degradation	(d) Changes in sedimentation affecting in-land water transport and ports’ functionality and operations
5. Heat waves, extreme cold	(e) Change in soil and slope stability (slope failure and landslides)
6. Increase in fog and wind strength	(f) Safety hazards for transport providers and users

Figure 3: Main threats of climate change to transport systems and operations.

The importance of adaptation is reflected in a general manner in the NDCs that countries are submitting to the United Nations Framework Convention on Climate Change (UNFCCC) to record their climate change related policy commitments; in particular, developing countries (or non-Annex I Parties) have called for greater emphasis on adaptation. So far, however, the priority attached to adaptation in the transport sector remains considerably behind the priority attached to mitigation (Figure 4).

To advance in action on adaptation to climate change in the transport sector it is important to:

1. Implement climate risk screenings and vulnerability assessments of transport systems and projects.
2. Leverage climate finance for adaptation, with the aim to shift public and private investments towards resilient transport systems.
3. Integrate adaptation into project and program design, including through enhanced emergency preparedness.
4. Strengthen coordination across agencies and build capacity to plan, implement, and monitor adaptation measures in the transport sector.

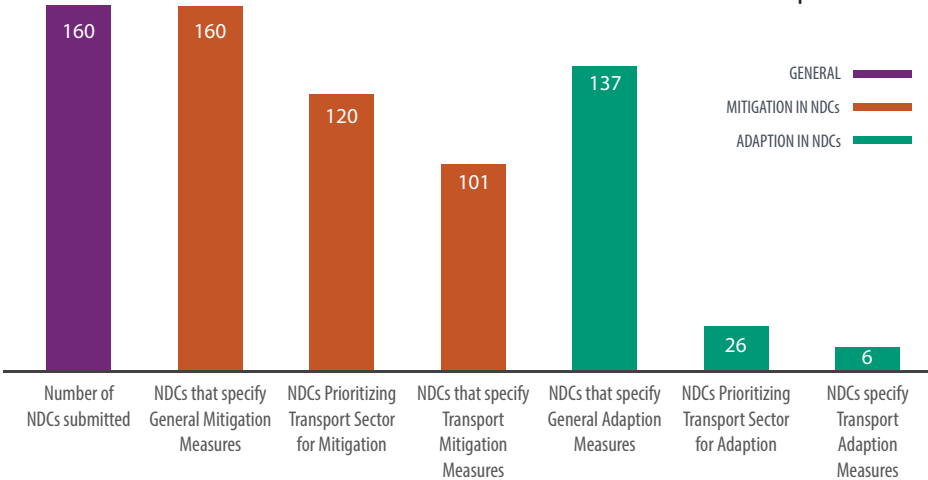


Figure 4: Relative attention to mitigation and adaptation in Nationally-Determined Contributions (NDCs).

II. Assessment of Transport Emissions

A. Historic transport sector emissions trends: 1990 – 2012

Tracking historic emissions trends in the transport sector, as documented in the 2015 SLoCaT analysis of national transport emission trends from 1990 to 2012⁴, is an essential step in defining possible transport components of NDCs from UNFCCC parties, and in helping to determine required contributions from transport to establish and achieve national and global mitigation targets. The analysis gives a broad picture of trends in transport CO₂ emission share, growth, and absolute and per-capita emissions among Annex I and non-Annex I countries.

We must have a clearer understanding of historic transport emissions trends at national levels,

to set a baseline for setting policies and taking effective future actions to reduce global transport emissions and achieve a 2DS, or a more ambitious 1.5DS, as called for under the Paris Agreement.

Historic data from the International Energy Agency (IEA) indicate that the transport sector contributed nearly 23% of global CO₂ emissions from fuel combustion in 2012. Global transport emissions grew at an average annual rate of 2.0% from 1990-2012, and up to now remains among the fastest growing sectors of CO₂ emissions from fuel combustion. Thus, maximizing mitigation ambition in coming decades requires optimizing contributions from transport.



Figure 5: Transport CO₂ Emissions Growth Across Regions

⁴ <http://www.ppmc-transport.org/slocat-analysis-of-transport-emission-trends/>



Some of the highlights of the SLoCaT analysis, which documents the large differentiation among transport emissions trends between individual regions and countries (as shown in Figure 5 above), include the following:

- In 2012 transport was the largest energy consuming sector in 40% of countries worldwide, and in most remaining countries, transport is the second largest energy consuming sector.
- It is expected that by 2016 or 2017, transport emissions from non-Annex I countries will be larger than those from Annex I countries⁵.
- Transport sector emissions growth in Annex I countries averaged 0.5% from 1990 to 2012 (with negative growth of 0.8% from 2008 - 2012), and non-Annex I countries averaged 4.8% (with positive growth of 5.5% from 2008-2012).
- Annex I Parties in particular have limited transport emissions growth to well below GDP growth rates, and even non-Annex I Parties have kept transport growth below GDP growth over this 12-year period (albeit by a much narrower margin).
- Countries which have kept gasoline prices above US\$1/liter from 2000 to 2012 show clear

reductions in transport emissions growth; however, transport CO₂ emissions have grown at a rapid rate in countries that have kept gasoline prices artificially low due to fuel subsidies.

This variation among countries leads to a number of implications for integrating transport in economy-wide emission strategies.

First, nearly all countries will need to scale up transport mitigation strategies because transport contributes a large share of overall emissions.

Second, transport emissions are growing faster than average fuel combustion related CO₂, presaging a more substantive problem for the transport sector if not tackled in the near term.

Third, many countries that currently still have low per-capita transport emissions are showing significant growth, and thus will have to take additional action to keep transport emissions in check in coming decades.

Fourth, a decoupling of transport emissions and economic growth is possible, as demonstrated by many Annex I countries as well as a number of non-Annex I countries.

⁵ Annex I and non-Annex I countries were an important part of the vocabulary of the Kyoto Protocol and generally refer to the different responsibilities countries had in terms of emission reductions under the Kyoto Protocol. Annex I countries include the industrialized countries that were members of the OECD (Organisation for Economic Co-operation and Development) in 1992, plus countries with economies in transition (the EIT Parties), including the Russian Federation, the Baltic States, and several Central and Eastern European States. These countries were expected to reduce emissions while the Non-Annex I countries, mostly developing countries, did not have such an obligation. http://unfccc.int/parties_and_observers/items/2704.php



B. Country Fact Sheets on Transport Emissions

SLoCaT decided to develop national-level transport emissions fact sheets⁶ as an important tool to help optimize mitigation potential of the transport sector in periodic revisions to NDCs, by using economy-wide reduction targets to interpolate required emission reductions from the transport sector.

Inputs to the SLoCaT country fact sheets include historic and future BAU growth trajectories for both economy-wide and transport-sector specific emissions. These trajectories are based on a number of sources, which include national communications and biennial reports/biennial update reports submitted through the UNFCCC process, and a large range of available transport sector mitigation potential studies derived by SLoCaT from modeling efforts by government agencies, development banks, and other research organizations.

Outputs of the country fact sheets include graphical presentations of alternate emissions scenarios in the transport sector. This can help in determining an appropriate degree of mitigation ambition for transport sector reductions to be reflected in economy-wide NDCs, based on ranges determined by historic transport emissions trends and assessed mitigation potential. SLoCaT members and PPMC partners can thus use these fact sheets to make a case for raising ambition for sustainable low carbon transport in communication with national delegations and in ongoing regional dialogues.

Tier I Fact Sheets have been created for about 70 developed and developing countries for which detailed targets and projection data are available. These countries account for a combined total of about 70% of current global transport sector emissions. Tier I Fact Sheets are based on emissions data reported to the UNFCCC, NDC submissions, and mitigation potential studies from internal and external sources. An excerpt from a Tier I Fact Sheet for Japan is shown in Figure 6.

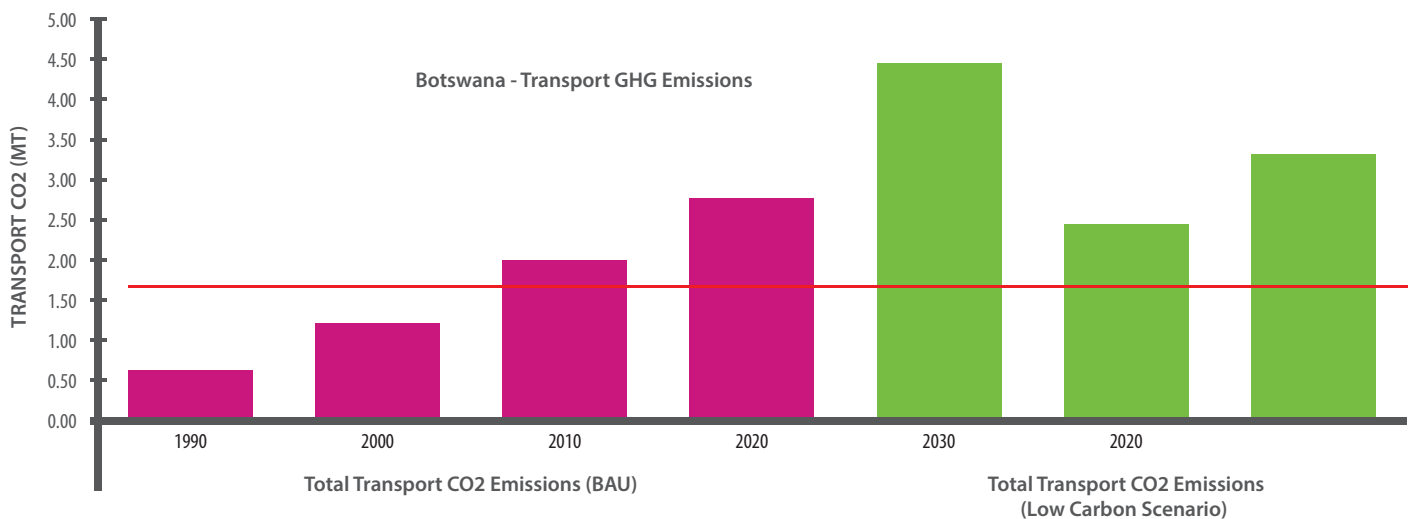


Figure 6: Japan - Projected Transport Emissions: BAU, Low Carbon Scenario, and Transport Target

⁶ <http://www.ppmc-transport.org/national-level-transport-emissions-fact-sheets/>



Tier II Fact Sheets have been created for nearly 80 countries for which less detailed targets and projection data are available, and where these must be estimated making use of detailed data available from other countries. An excerpt from a Tier II fact sheet for Botswana is shown in Figure 7 (where the red line represents the economy-wide CO₂ emissions target per NDC).



**Figure 7: Botswana - Projected Transport Emissions:
BAU, Low Carbon Scenario, and Economy-Wide Target**

C. GHG Methodologies

Measuring CO₂ in transport projects and programs is essential to driving further action on transport and climate change, through quantification of the potential contribution of low carbon transport infrastructure and services in comparison to more carbon-intensive investments. Since it can be difficult to quantify positive impacts from complex transport systems in comparison to fixed energy infrastructure, the sustainable transport sector has traditionally received less attention than other sectors from sources of climate finance.

To take stock of available methodologies, the SLoCaT Partnership has compiled a detailed qualitative assessment⁷ of 110 transport GHG emission methodologies and tools (Figure 8), which cover a range of transport subsectors and include both passenger and freight methodologies. The number of methodologies,

which has grown quite rapidly in recent years, and the scope of the methodologies and tools, indicate that action on transport and climate change is not held back by the absence of tools to analyze transport interventions.

While each of the methodologies examined was developed with the primary goal of measuring CO₂ emissions, roughly 60% of methodologies can also be used to assess other benefits of proposed measures, as shown in Figure 9. This is an important contribution, as co-benefits of climate action in transport have in many cases been a more important driver to taking action than the direct climate benefits. At the same time quantifying co-benefits can also be of importance in increasing the access of transport to climate finance, which has been limited to date.

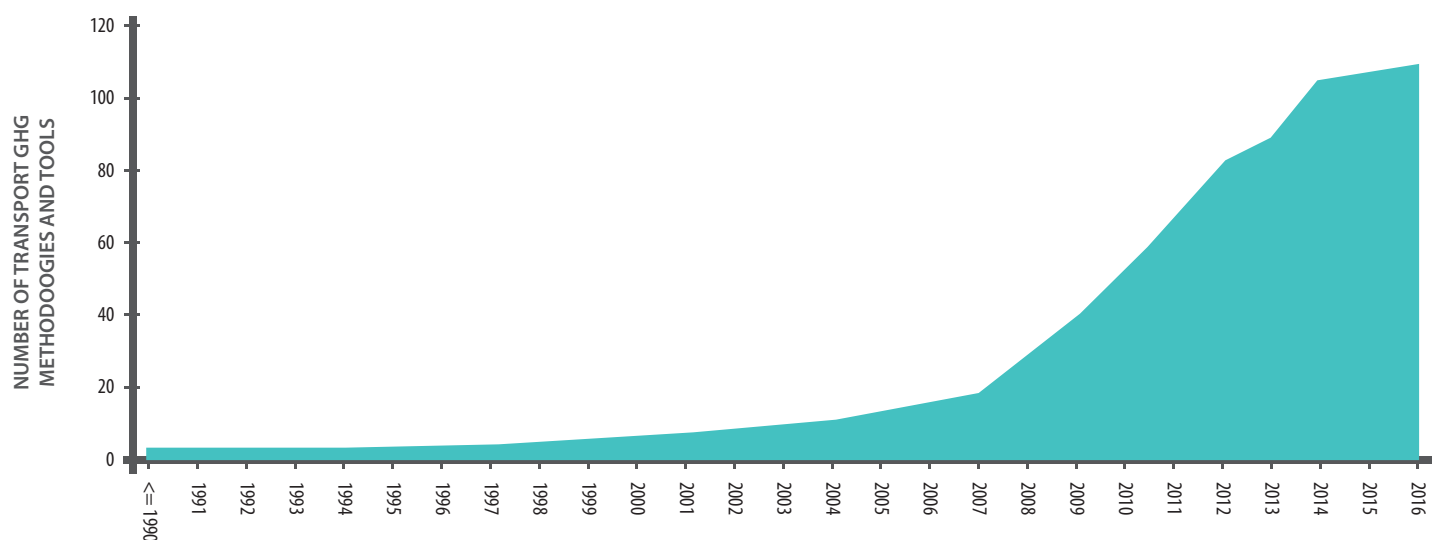


Figure 8: Number of available GHG emission methodologies and tools by year

⁷ <http://www.ppmc-transport.org/ghg-evaluation-methodologies-assessment/>

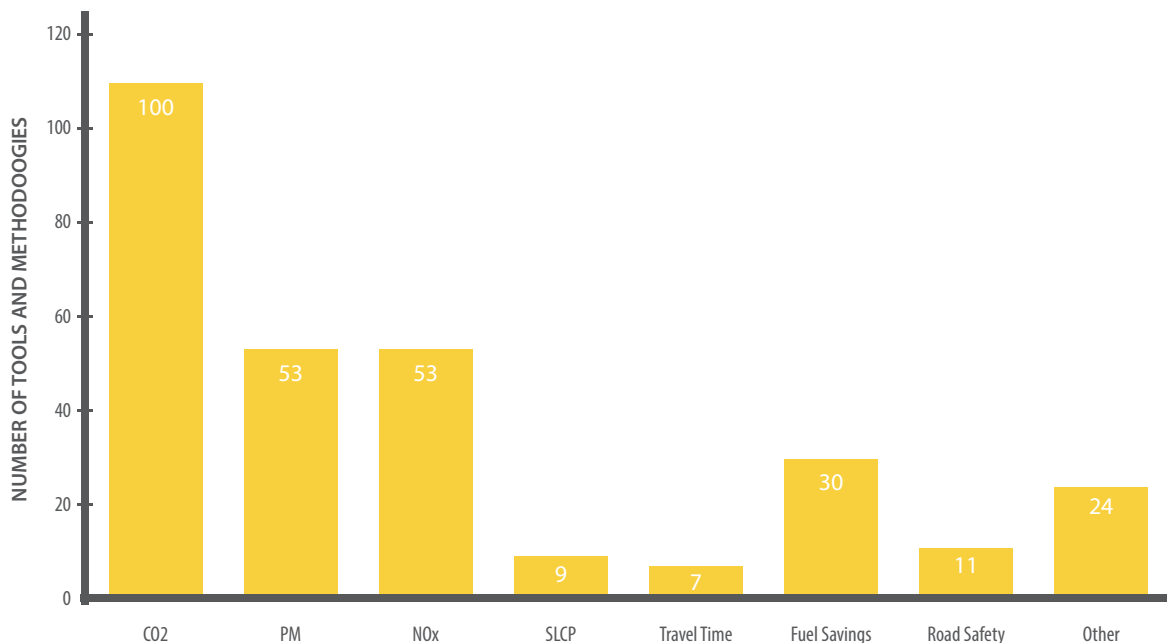


Figure 9: Co-benefits in Transport GHG Emission Methodologies and Tools

In summary, this analysis of GHG methodologies demonstrates that there is an increasingly broad range of tools in place to support the analysis of transport interventions for potential climate impact and other developmental impacts. A rapid growth in methodologies since 2007 suggests that the drive for more options to quantify CO2 reductions has in turn produced a wider set of tools to measure development co-benefits. SLoCaT analysis has yielded the following initial recommendations for further development of GHG methodologies.

First, it is noted that the majority of methodologies are project-based, which runs counter to the current trend toward more programmatic approaches to GHG mitigation strategies (e.g. in the sector-wide approaches mandated in the development of NDCs). Second, it is noted that there are relatively few methodologies to quantify impacts of transport demand management, non-motorized transport, and urban freight, which are essential pieces of a comprehensive portfolio of sustainable transport infrastructure and services.

Third, it is important for methodologies to allow BAU project baselines (as included in 82% of methodologies assessed), which reflect likely investment trajectories based on past investments and current policy frameworks (as opposed to simple 'no action' scenarios).

Fourth, while about 60% of methodologies reviewed consider an analysis period of more than one year, still 40% of methodologies limit analysis to a single year, and only 35% of methodologies allow full life-cycle analyses. It is crucial to consider longer term impacts, since almost all transport projects may require several decades to yield positive impacts.

Fifth, emerging supportive tools and methodologies provide relatively equal opportunities to evaluate the impact of 'Avoid,' 'Shift,' and 'Improve' strategies within NDCs and other climate change mitigation strategies. Sixth, the majority of tools reviewed are useful for bottom-up modeling, with roughly half useful for national level quantification and available free of charge, suggesting potential for low-cost assistance in countries lacking transport data and capacity.

Finally, it is essential that co-benefits continue to be prioritized in decision-making processes for transport policies, and that the growing trend toward incorporating co-benefits into GHG methodologies be even more far-reaching. A broader incorporation of social and developmental co-benefits (e.g. air quality, road safety, travel time, and fuel savings) into GHG emission methodologies offers the potential to improve the cost-benefit ratios of sustainable transport investments, and to better reflect the contribution of such investments toward a range of sustainable development goals.

D. Transport in NDCs

NDCs represent a unique opportunity to increase bold mitigation and adaptation measures in transport and other sectors, as for the first time, all Parties to the UNFCCC are communicating their commitments to reduce emissions and increase resilience on sectorial scales in the context of the UNFCCC system. SLoCaT has conducted an analysis⁸ to document the treatment of transport in the first generation of NDCs, and to identify key gaps and thus the potential to increase the role of transport in meeting reduction targets.

Among roughly 160 NDCs representing 187 countries that were submitted as of August 1, 2016, 75% explicitly identify the transport sector as a mitigation source, and more than 63% of NDCs propose transport sector-specific mitigation measures. In addition, 9% of NDCs include a transport sector emission reduction target, and 12% of NDCs include assessments of country-level transport mitigation potential.

Transport-related actions in the NDCs are heavily skewed towards passenger transport, which is included in 91% of NDCs identifying specific transport modes. Among these, urban transport measures are mentioned in 74% of NDCs, and heavy rail and inland waterways are also well represented, while strategies such as high-speed rail (2%), aviation (5%), and walking and cycling (14%) have received relatively less attention.

Figure 10 gives a more detailed typology of transport mitigation strategies, as distinguished among countries of different income categories.

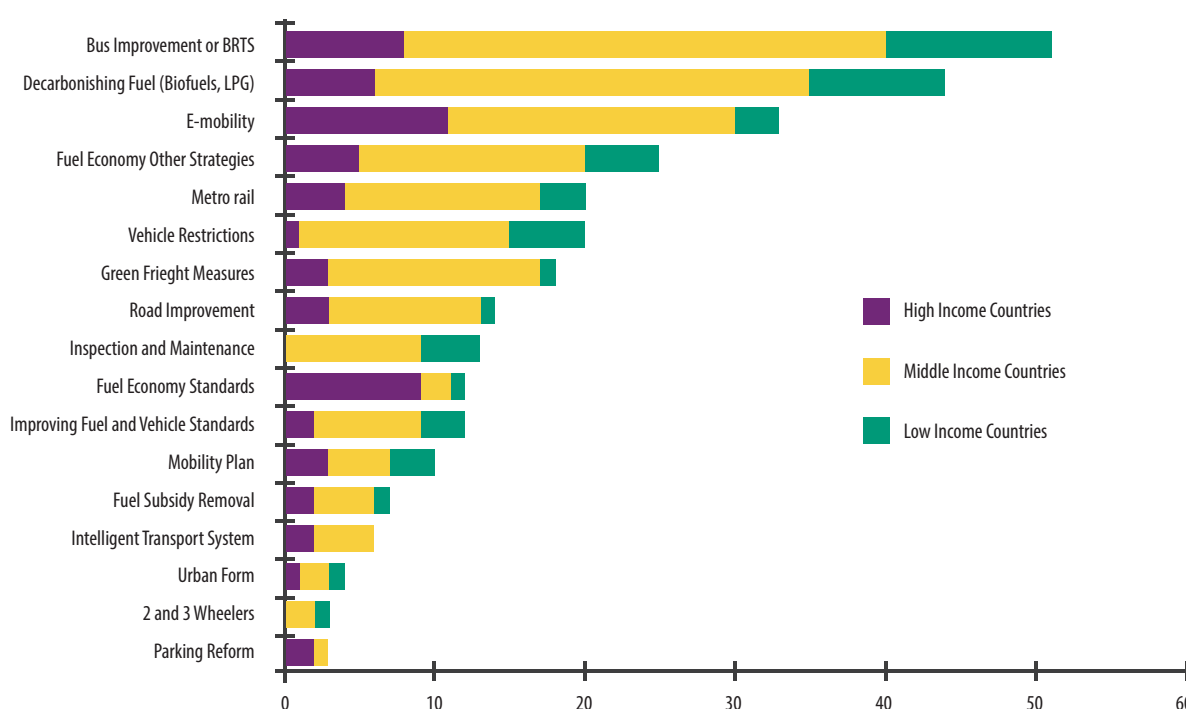


Figure 10: Typology of Transport Mitigation Strategies in NDCs

⁸ http://www.ppmc-transport.org/overview_indcs/



On an economy-wide scale, mitigation measures proposed in NDCs are expected to fall well short of a 2DS, let alone the more ambitious 1.5DS. Based on existing transport related policies and levels of ambition expressed in NDCs, the transport sector will also not attain a 2DS by 2030 through the targets and measures proposed. In order to achieve deeper emission cuts that would put the transport sector on track for a 2DS and 1.5 DS, transport mitigation ambition as expressed in NDCs will need to be intensified, and additional transport measures would need to be prioritized in implementation strategies.

Adaptation, despite being mentioned in an economy-wide scope in 83% of 160 NDCs submitted to date, has generally received much less attention than mitigation in NDCs, as outlined above. As stated, the transport sector is mentioned in general terms among climate adaptation measures in only 16% of NDCs, and an even smaller number of countries (4%) identify transport-specific adaptation strategies.

The Paris Agreement on Climate Change has various implications for solidifying the position of NDCs within the

UNFCCC framework⁹. The Agreement's requirement to increase ambition to a target of well below the 2DS and pursuing efforts to reach a 1.5DS is a strong call to accelerate the decarbonization of the transport sector. The Agreement further establishes that all countries should present National Adaptation Plans (NAPs) and that NDCs should contain nationally determined contributions on adaptation.

In summary, if we have weak pre-2020 efforts and inadequate 2020-2025 NDCs, this makes it likely that the transport sector could follow a trajectory that would make a 1.5DS increasingly unachievable by 2050. This trend sends a clear message to all sectors that there is need for disruptive change, as incremental approaches will be insufficient to make needed reductions.¹⁰

A vision of the change required is illustrated in the PPMC-SLoCaT global transport decarbonization roadmap, which is described in detail in Section III of this Synthesis paper.

⁹ <http://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>

¹⁰ SLoCaT (2015). "COP21 Final Preliminary Report" SLoCaT Partnership. December. Refer [<http://bit.ly/2cyc2hw>].

E. Implications of 2DS and 1.5DS for Transport Sector Emissions in 2050

The SLoCaT Partnership has conducted two major studies to assess the implications of global emission reduction targets for the transport sector. A first study, Emission Reduction Potential in The Transport Sector by 2030,¹¹ carried out prior to COP21 in 2015, considered the feasibility of the 2DS for the transport sector by 2030. The conclusions of this study were:

1. Without low-carbon policy interventions, a continuation of current transport activity trends could lead to a 55% increase in annual transport CO₂ emissions by 2030 when compared with 2010 levels.
2. Most of the projected transport sector emissions growth would be concentrated in developing countries, where transport emissions are projected to grow 2-4 times faster than economy-wide emissions.
3. Low-carbon scenario (LCS) projections show potential to limit transport emissions growth to 6.2 Gt of annual CO₂ emitted by 2030, which corresponds to a decrease of 24% from the BAU scenario in 2030.
4. With implementation of low-carbon policies, by 2030 global transport emissions per capita could be restricted to 2010 levels.
5. Mitigation ambition in current NDCs will not be sufficient to put the transport sector on a 2DS track by 2030.

Following the adoption of the Paris Agreement on Climate Change, in preparation of COP22, SLoCaT extended the scope of the 2030 analysis to a new report entitled Implications of 2DS and 1.5DS for Land Transport Carbon Emissions in 2050.¹² This report projects emission reduction requirements from the transport sector in 2050 to meet 2DS and 1.5DS targets.

Both the 2030 and 2050 analyses make use of an extensive literature review of roughly 450 studies carried out by SLoCaT to extract detailed bottom-up projections for BAU and low-carbon scenarios for 2030 and 2050. Attempts were made to identify at least two to three low-carbon studies per country for the about 60 countries that have carried out 'long-term' low-carbon transport emission modelling i.e. for 2050.

Figure 11 illustrates the dominance of passenger transport (vs. freight transport) and 'Improve' (vs. 'Avoid' and 'Shift') strategies in both OECD and non-OECD mitigation assessments (i.e. excerpted from 450 studies considered). There are subtle differences among different types of countries. For example, fiscal instruments are more preferred in the OECD countries, while mode shift-related policies are more prevalent in non-OECD countries. Also, OECD countries tend to utilise 'policy-packages' rather than modelling individual policies.

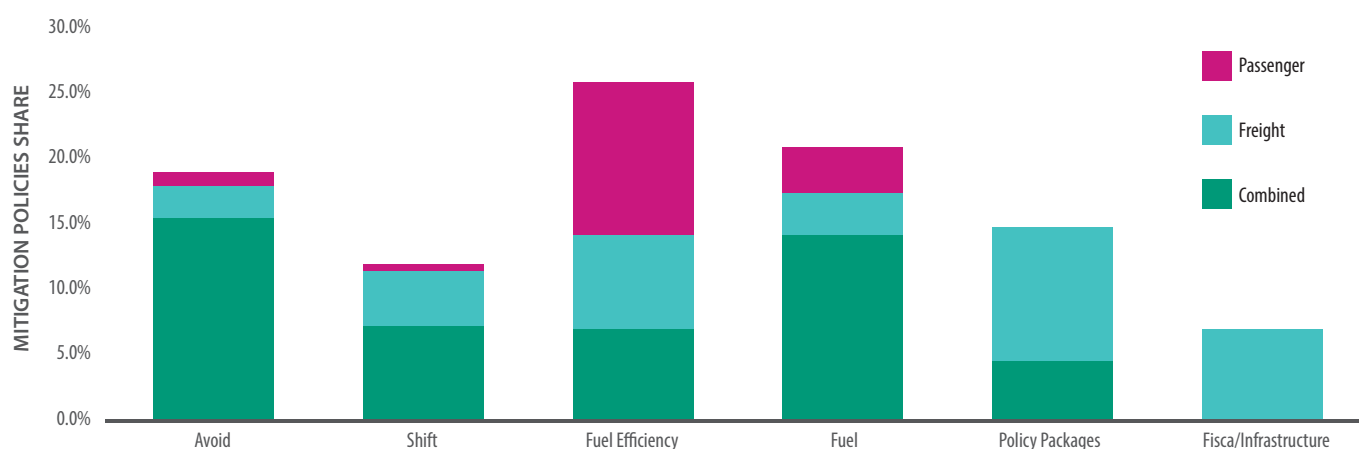


Figure 11: Typology of Policies & Measures in Mitigation Studies

¹¹ <http://www.ppmc-transport.org/emission-reduction-potential-in-the-transport-sector-by-2030/>

¹² <http://www.ppmc-transport.org/2050-report/>

The main objective of the updated assessment is to estimate the magnitude of mitigation possible in the transport sector by 2050, considering low-carbon policies proposed and/or investigated for implementation with detailed emissions projections to 2050, in 60 individual countries which in 2010 accounted for about 89% of global land transport sector emissions, about 76% of population, and about 84% of global GDP. The magnitude of emission reduction achieved through the implementation of low-carbon policies is compared with emission reductions in the transport sector consistent with achieving a 2DS target or 1.5 DS target, as defined under the Paris Agreement on Climate Change. This helps to determine a projected 'emission gap' in the transport sector in 2050.¹³

The results of this most recent SLoCaT analytical product indicate that projected 2DS and 1.5DS emission targets for the transport sector could be 4.7 Gt and 2 Gt per year by 2050, respectively, as compared to a 13 Gt projection under BAU. By implementing a set of additional low carbon transport policies identified in policy and research documents (and which go well beyond those included in NDCs), transport emissions could be reduced to about 5 Gt (or roughly 60% below BAU) by 2050. Thus, this bottom-up analysis of current mitigation measures proposed shows that they will not quite achieve a 2 degree scenario and will fall well short of a 1.5DS (Figure 12). As such, much more ambitious transport mitigation measures are needed to reach the 1.5DS targeted in the Paris Climate Agreement.

The SLoCaT research also shows that individual country transport specific modelling efforts tend to differ when compared with global estimates which are often based on macro energy-economy and integrated assessment models built on regional growth drivers. These changes are most apparent for the period 2030-2050. Individual country transport specific modelling efforts, as documented in the SLoCaT analysis (based on a range of country specific reports), tend to project more rapid increases in transport emissions than global forecasts. The second main difference is the aggregate mitigation potential that is derived from policy and research documents collected in support of this document, which indicates that transport emissions could be reduced to about 60% below BAU by 2050. This would well exceed the mitigation potential estimated by the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report which states "For the transport sector, a reduction in total CO2 equivalent emissions of 15–40% could be plausible compared to baseline activity growth in 2050."

Making full and optimal use of country-based, bottom-up assessment of demonstrated mitigation potential is key to ensuring that the upcoming efforts on facilitative dialogue, global stock taking, and long-term low GHG emissions development strategies are evidence-based, while optimizing low carbon policies in the context of sustainable development. The analysis of country-specific mitigation measures can also inform the development of region-specific policy packages in a global roadmap for decarbonizing the transport sector.

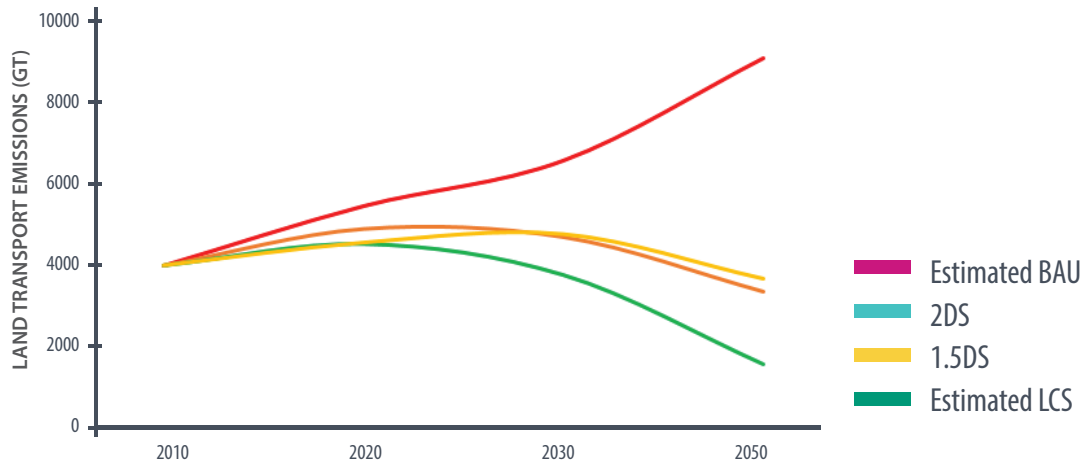


Figure 12: Projected land transport emission gap under low-carbon scenario (LCS)

¹³ IPCC, 2014: Summary for Policymakers. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

III. Accelerating Action on Transport and Climate Change

A. Transport Initiatives under the Global Climate Action Agenda

Inspired by the call to action of Secretary General Ban Ki-moon in September 2014, and followed up by the Lima Paris Action Agenda (LPAA), SLoCaT and the PPMC helped to facilitate the development of 15 transport initiatives by non-state actors in the transport sector. Following the appointment of the first two High Level Champions (HLC) in May 2016 and with a view to the longer term, the LPAA was renamed the Global Climate Action Agenda (GCAA). The 15 initiatives in place include both passenger and freight transport, and touch on all transport sectors and

modes from roads to rail, from air to waterborne transport, and from motorized vehicles to cycling (Table 1). They address both the mitigation of and adaptation to climate change. Collectively these initiatives represent hundreds of partners, and they bring together cities, regions, development organizations, the private sector, and civil society. The initiatives contribute to all components of the Avoid-Shift-Improve approach to reducing the impacts of transport, and several of the initiatives actively support the principle of co-modality.



Airport Carbon Accreditation



ITS for the Climate



UIC Low-Carbon Sustainable Rail Transport Challenge



Aviation's Climate Action Takes Off



MobiliseYourCity (MYC)



UITP Declaration on Climate Leadership



C40 Cities Clean Bus Declaration of Intent



Navigating A Changing Climate



World Cycling Alliance (WCA) and European Cyclists' Federation (ECF) Commitment



Global Fuel Economy Initiative



Low Carbon Road and Road Transport Initiative (LC2RTI)



Worldwide Taxis4 Smart Cities Initiative



Global Green Freight Action Plan



Urban Electric Mobility Vehicles Initiative (UEMI)



ZEV Alliance

Table 1: List of the 15 Global Climate Action Transport Initiatives (October 2016)



The initiatives aim to trigger more ambitious action in all major parts of the transport sector. The identification of the initiatives followed a scientific and systematic approach, and combines a top down with a bottom up approach. The systematic top down approach was based on IPCC and United Nations Environment Programme (UNEP) reports, which defined the key transport sub sectors where action needs to be taken to remain on a 2DS pathway. The bottom up process, through which organizations were invited to propose initiatives, helped to understand what initiatives stakeholders are proposing. The underlying idea of the GCAA was to make sure all key transport sub sectors were covered with impactful initiatives, which could be joined by states as well as non state actors, so that the overall global ambition of countries to act on climate change can be increased.

Collectively, these initiatives, if widely supported by state-and non-state actors and implemented at scale, can reduce the carbon footprint of an estimated half of all the passenger and freight trips made by 2025. Actions such as these can contribute to substantive savings associated with a shift to low carbon transport. The IEA estimated that savings could be as high as US\$70 trillion by 2050, as less money would need to be invested in vehicles, fuel, and transport infrastructure, thus reflects the strong economic case for the right kind of climate action in the transport sector.

The PPMC is helping to track the implementation of the transport initiatives, which includes defining targets and indicators to monitor their commitments. A PPMC status report¹⁴ developed on the occasion of COP22 presents

an overview how the GCAA Transport Initiatives define and monitor progress.

There is an increasing, but not universal, recognition from national governments of the essential roles of non-state actors in achieving, and even guiding, the mitigation efforts needed to deliver on the Paris Agreement. Section V of the COP21 Decision “Welcomes the efforts of all non-Party stakeholders to address and respond to climate change, including those of civil society, the private sector, financial institutions, cities, and other subnational authorities.” Numerous references to the role of non-party stakeholders can also be found in other parts of the COP21 Decision.

All of this bodes well for continued action on transport and climate change through a continued emphasis on the GCAA Transport Initiatives. During COP22 in Marrakesh (November 2016) the PPMC will help facilitate a Transport Showcase and Dialogue session¹⁵ as part of the Global Climate Action Agenda, with the opportunity for the initiatives to present suggestions and proposals directly to UNFCCC party representatives.

There is a developing understanding of the role GCAA can play in supporting and raising the level of ambition of the NDCs in 2018, which are a key implementation mechanism of the Paris Agreement on Climate Change, as well as the transport related targets under the SDGs adopted in 2015. Finally, those initiatives that have an urban focus will possibly get an additional lift from the Habitat III Conference which took place in October 2016 in Quito, Ecuador.

¹⁴ <http://www.ppmc-transport.org/transportinitiatives/>

¹⁵ http://unfccc.int/files/paris_agreement/application/pdf/gca-transport-programme_20102016.pdf

B. Adaptation to Climate Change

The 2015 SLoCaT study *Expanding Efforts on Climate Change Adaptation and Resilience in the Transport Sector*¹⁶ gave an overview of existing efforts on climate change adaptation in the transport sector, and mapped out a strategy how to accelerate action in this crucial field.

Developing countries have much to learn from the developed world in transport sector adaptation planning. Studies such as the European Environment Agency's report on climate adaptation in Europe's transport sector (and counterparts on the United States transit and roadway subsectors) are highly relevant to the developing world and should be emulated in other regional contexts, especially in Asia, Africa, and Latin America. By the same token, developing countries have taken the lead (albeit on a modest scale) in incorporating transport sector adaptation measures into their NDCs (likely due to their higher degree vulnerability in this area), and this degree of foresight could be emulated by developed country parties.

Adaptation in transport could be better integrated in global policy mechanisms on climate change and sustainable development. The UNFCCC Adaptation Committee, till now, gives little detail on sectorial approaches to adaptation, and associated references make only superficial reference to transport; thus, this mechanism could benefit from further detail on sectorial approaches, including transport. Linked to this, national and local-level policies on climate change and sustainable development could more fully incorporate strategies on adaptation in the transport sector. NAPs could include more detailed strategies for adaptation in the transport sector; this would allow countries to meet projected mobility demands, reduce life-cycle costs due to damage, and increase mitigation potential with efficient and reliable transport systems.

Transport should be more comprehensively represented in programs and projects on climate change adaptation. Successes in raising the profile of adaptation in transport at the project level increase the likelihood of national and local implementing agencies taking ownership and lifting these to sectorial levels through mainstreaming in policy

reforms. Specifically, climate adaptation principles could be more effectively incorporated into several areas relevant to transport projects, which include action planning, capacity building, development of tools, standards, guidelines, and funding for adaptation.

Climate change financing facilities could increase coverage of adaptation activities in the transport sector. Climate finance instruments could raise the priority of climate adaptation in project selection criteria and policy frameworks, and outreach efforts to better address capacity building needs and make progress toward sustainable development goals. In addition, the global sustainable transport community could work more closely with international financing institutions to increase the inclusion of adaptation strategies in sustainable transport projects, through shared developments of project standards. The sustainable transport community should increase outreach to country representatives, to submit robust transport adaptation project proposals based on past successes.

Advancing adaptation in the transport sector requires consolidation of efforts, and coordination of a broad set of stakeholders. The growing interest in adaptation to climate change offers an excellent opportunity to galvanize stakeholders into more ambitious action on adaptation in the transport sector. Stakeholders in such an initiative could include knowledge organizations on adaptation in transport sector (e.g. World Road Association (PIARC), World Association for Waterborne Transport Infrastructure (PIANC), International Union of Railways (UIC), European Economic Area (EEA); intermediaries to countries, cities and companies (e.g. MDB Working Group on Sustainable Transport; bilateral development agencies; 100RC, Global Partnership on Sustainable Mobility, International Road Union); and organizations providing funding for adaptation oriented activities (e.g. Global Environment Facility's (GEF) Least Developed Countries Fund and Special Climate and Development Fund, Adaptation Fund, Green Climate Fund (GCF) and Nordic Development Fund (NDF)).

¹⁶ <http://www.ppmc-transport.org/expanding-efforts-on-climate-change-adaptation-and-resilience-in-the-transport-sector/>



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C. Quick Win Actions on Transport, Climate Change and Sustainable Development

The adoption of the 2030 SDGs and the signing of the Paris Agreement on Climate Change have set clear long-term goals to improve human well-being, and have added a new level of urgency to implementing long-sought but little-realized steps toward these ends. Crucially, country-level NDCs provide initial blueprints for national climate action, including in the transport sector, and the GCAA transport initiatives are a key step to implement NDCs.

Yet these initiatives alone will not be sufficient to sustain the scale of global changes that will be required before

and beyond 2030 (a benchmark year for sustainable development) up to 2050 (a benchmark year for decarbonization of transport); these medium-long term changes are to be summarized in a decarbonization roadmap that is being developed with various transport stakeholders to detail needed technical, behavioral, and regulatory transformations. Thus, it is also essential to identify a set of immediate and ambitious actions to kick-start the transformation of the transport sector as described in the roadmap, and limit lock-in effects of a high-carbon BAU scenario.

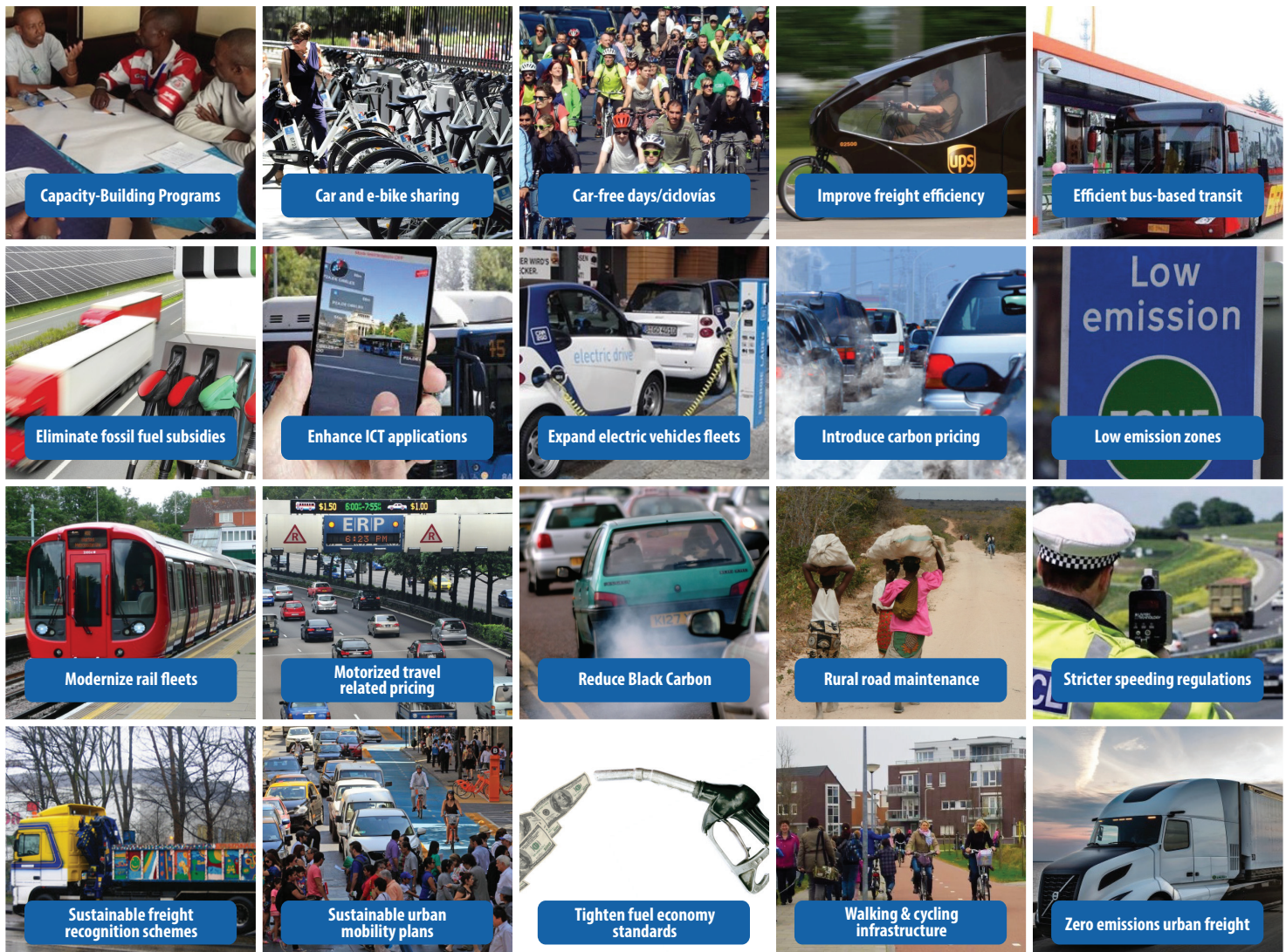


Figure 13: Transport quick-win actions



It is in this spirit that 20 transport quick win actions¹⁷ have been proposed by SLoCaT for implementation at scale in the pre-2020 period, which cohere with the global roadmap described in more detail in the following section. Quick wins are not stand-alone solutions; they are pre-2020 steps towards the implementation of a full-blown transformation that will require scaling up proven no-regret actions without delay, with some of the ensuing benefits arriving pre-2020 and others post-2020:

These quick wins have been selected with input from a broad set of transport experts and other stakeholders, and have been evaluated through multifaceted impact analysis. These actions have the potential to contribute toward reducing GHG emissions, thereby moderating climate impacts, while at the same time providing key developmental co-benefits such as improved access, increased efficiency, and enhanced safety. While the quick wins enumerated here are mitigation-focused, it is acknowledged that continued consultations will be needed to identify quick wins on adaptation in discussions before and after COP22.

These pre-2020 actions span policy, regulatory, and operational solutions for both human mobility and freight movement, thus providing a balanced toolbox to

ramp up needed actions across transport themes and modes. Similarly, quick wins structure efforts in three directions: prompting decisions to expand the implementation of solutions which have already proven their efficiency at a smaller scale or with a less ambitious scope; halting existing practices and/or regulations that run in directions opposite to what is required to set the global transport sector on a lower-carbon trajectory; and initiating without delay, and at relatively low cost, actions or decisions preparatory to full implementation of a global decarbonization roadmap.

If quick wins are to fulfill their long-term potential, they will require the support of strong champions to help carry them from conception to implementation. Quick win champions can be selected from among LPAA initiatives and other active members of the global sustainable transport community, and quick wins can be further promoted through revised NDCs and an expanded set of GCAA initiatives. SLoCaT is preparing an outreach strategy to promote the quick wins in consultation with enduring events on sustainable development and climate change, as part of a wider outreach strategy of the PPMC to help keep quick wins a continual presence throughout 2016 and beyond.

¹⁷ <http://www.ppmc-transport.org/quick-wins-on-transport-sustainable-development-and-climate-change/>



D. Global Roadmap to Decarbonize the Transport Sector

The majority of transport policy roadmaps (see Section I) do not reflect the urgency and ambition to decarbonize transport implied by the targets of the Paris Agreement on Climate Change. They have mostly a technological focus that indicates a solutions bias towards developing and rolling out new fuel/technologies without adequately considering the need for behavioural change.

Since early 2016 the PPMC, composed of Michelin Challenge Bibendum (MCB) and SLoCaT, have been advocating and developing a comprehensive global roadmap for decarbonizing the transport sector.¹⁸ The global roadmap process aims to build multi-stakeholder support for a realistic, strategic macro-vision of the transformations necessary over the next 40 to 60 years, in order to drive effective early transformative action in the transport sector (by state and non-state actors) in a coordinated, determined, and powerful way. The global roadmap will be regionally specific, taking into account the specific context of different parts of the world but in a manner that does not delve into too

many details, which in some cases has led to the use of macro-roadmap to describe the process.

The concept of the global roadmap has been well received, and work is advancing well. The global roadmap concept was presented to the EU Council of Ministers (Environment) in Amsterdam in April 2016, and received good support in particular from Germany, France, Netherlands, Austria, and the Czech Republic. China, Japan, Russia, and the OECD expressed their interest when it was presented at the International Transport Forum in Leipzig (May 2016). Its compatibility with the IEA energy scenarios was also established in June 2016. In October 2016, the Executive Council of the World Business Council for Sustainable Development (WBCSD) also expressed its support for the global roadmap process at its meeting in Chennai, India.

Ongoing work on the development of the PPMC Global Roadmap¹⁹ will consist of two main components:

¹⁸ <http://www.ppmc-transport.org/global-road-map/>.

¹⁹ More details on the proposed structure of the global roadmap can be found in <http://www.ppmc-transport.org/global-road-map-2/>

Further Development of the Global Roadmap

1. Synergistic urban transformation. Leverage aspiration for healthier, inclusive lifestyles to drive de-carbonization.
2. Low-carbon energy supply strategy. a. Renewables: Essential for low-carbon & decentralized electricity generation. b. Batteries: Battery industry must be strengthened for secured supply. c. Development of hydrogen industry.
3. Modal efficiency improvement. a. Vehicle efficiency improvements in all modes of transport. b. Vehicle occupancy. c. System operational efficiency.
4. Shortened supply chains.
5. Reduction of unnecessary travel.
6. Adapted solutions for 'rural' world.
7. Investment in adaptation & offsetting.
8. Financial & regulatory tools. a. Transport pricing. b. Fiscal incentives for rapid investment in long-term low-carbon solutions. c. Local/national regulatory frameworks. d. Risk sharing measures.

Figure 14: The Main Components of the Global Roadmap

As a first step it will be important to firmly establish the specific needs for regional and global 'transformational changes'. The next step will be to clearly describe what an efficient 2050 - 2070 transport system should look like in various national and regional contexts; this in effect becomes the 'destination' of the roadmap. This work will clarify and guide the implementation of Paris Agreement on Climate Change, as well as the 2030 Sustainable Development Agenda for the transport sector, in order to limit global climate change to 1.5DS and support sustainable development. The regional differentiation of the global roadmap will take into account the specific circumstances of developed countries (mostly OECD member states), transitional, and least developed countries (mostly developing countries with a specific focus on Africa, Asia and Latin-America and the Caribbean).

The global roadmap, which will cover all transport modes, including land, air, sea, and river, will take a balanced look across the transport sector as a whole – and focus on a broader deployment of appropriate low carbon transport solutions for passengers and freight "in the context of sustainable development and efforts to eradicate poverty" (Paris Agreement, Article 2). It will focus on identifying a balanced package of measures necessary, which will take into account the main sustainable transport paradigm: combining Avoid (i.e. reduce unnecessary travel) and Shift (i.e. shift movement of goods and people to the most efficient modes) with Improve (i.e. improve environmental performance of fuels and engines) actions in the short term in all regions of the world, while taking into account the potential of new, shared mobility solutions and supportive enabling institutional and financial mechanisms. The aim is to ensure that all the necessary policies and technologies are included in a single comprehensive, development sensitive, transport roadmap which integrates regional specifics. This will include a certain amount of prioritization of actions based on an assessment of mitigation potential, but will also take into account cost effectiveness, broader sustainable development impacts, and political acceptability.



Building Support for the Global Roadmap

In parallel to the development of the global roadmap, it is key to ensure that there is sufficient support for the roadmap. This will require building consensus and support amongst key stakeholder groups, with emphasis on government and private sector.

To build support from government stakeholders priority will be given to:

- Developed economies in Europe and USA. Consensus building can be aligned with ongoing consultation efforts in the International Transport Forum (ITF), the Transport Research Board (TRB) in the USA, and relevant national processes.
- Transitional and Developing economies in Africa, Asia and Latin America. In part use can be made of relevant ongoing transport policy processes, but additional efforts will also be made through the organization of dedicated consultation workshops in Africa, Asia, and Latin America.

Private sector engagement is crucial for the necessary transformation of the transport sector, through providing investment, delivering services, and developing new solutions. However, to trigger private sector commitment, appropriate and stable government policy and regulatory frameworks are essential; however, these are currently still lacking in many areas. For example, urban vehicle access regulations (e.g. low emission zones) can drive the rapid development and introduction of new fuels/technologies and private investment.

It is also important, however, to link up with existing groups (academic and private sector) which are developing transformation pathways. The participants in the annual ITEM conference, mentioned earlier in the document can be important stakeholders in the development and validation of the global roadmap.

IV. Financing action on Transport and Climate Change

A. Climate Finance for Transport (database)

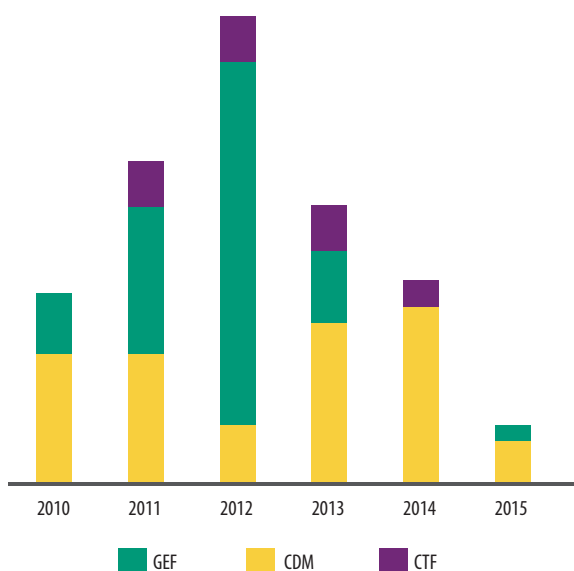
As of October 2016, SLoCaT's Climate Finance Transport Database contains information on 258 transport projects, covering the time period from 1992 to 2016. The database captures over US\$2.6 billion on transport-focused investments by CFIs.²⁰ The highest transport related allocations are made by CTF with a total of US\$1.72 billion, followed by NAMA with US\$471 million and GEF with US\$391 million.

Although the transport sector accounts for roughly a quarter of energy-related global GHG emissions, transport is quite underrepresented in the CFIs. The share of transport projects among total projects by

CFIs varies from 0.4% for CDM, 1.7% for GEF, 3.2% for IKI and 5.4% for CTF. Their activities are still very limited and they have yet to emerge as significant contributors to achieve global climate change sustainable development goals. Only NAMA has a strong focus on transport, with 45.5% of investments in the sustainable mobility field.

Since 2010, the overall trend for CDM, CTF, and GEF shows a peak of the amount of transport projects in 2012, followed by a decreasing trend to the present. In the same period NAMA projects increased, while JCM and IKI projects also slightly decreased (Figure 15).

NUMBER OF TRANSPORT PROJECTS PER YEAR (GEF-CDM-CTF)



NUMBER OF TRANSPORT PROJECTS PER YEAR (NAMA-JCM-IKI)

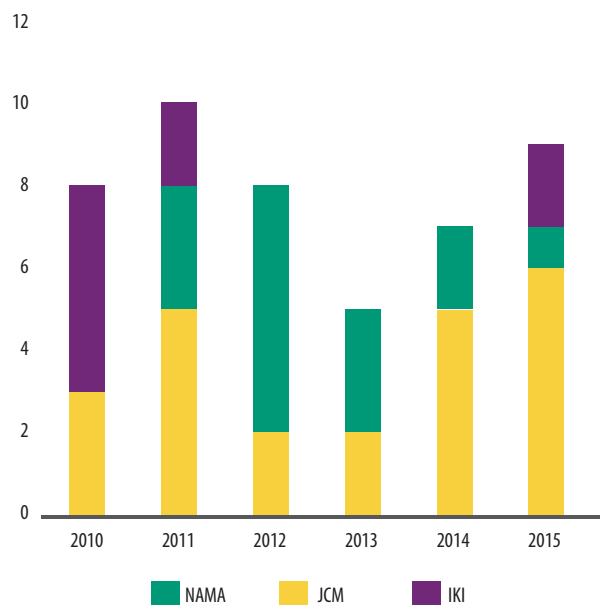


Figure 15: Transport project trends by climate finance instrument

²⁰ <http://www.ppmc-transport.org/slocat-climate-finance-transport-database/>



For climate finance to be effective in catalyzing transformative action on transport and climate change, it is important to have a balance between 'Avoid', 'Shift' and 'Improve' strategies, yet so far climate finance has had a disproportionate focus on 'Improve', and to a lesser extent 'Shift' strategies. These categories account for 90% of all CFI transport projects funded, with 'Improve' projects generally increasing over time.

Though studies show that 'Avoid' strategies can have a comparable impact to 'Shift' and 'Improve' strategies, their share of climate finance-funded transport projects remains marginal (Figure 16). Thus, climate finance instruments should strive to achieve a better balance between these categories over time.



Figure 16: Avoid-Shift-Improve project share from climate finance

In sum, transport makes a significant contribution to global GHG emissions but to date climate finance facilities have not invested proportionally to the sector's climate impact. Transport infrastructure in developing countries will require significant investments, and CFI-funded transport projects can help minimize costs and realize lower emission development pathways.



B. A Systematic Approach for the use of Climate Finance to Sustainable Transport

SLoCaT and the Gesellschaft für Internationale Zusammenarbeit (GIZ) have collaborated in the period 2014-2015 to explore the potential of climate finance to play a more robust and systematic role in funding sustainable transport. This resulted in a 2014 Policy Brief: Policy Brief: Scaling-up Sustainable, Low-Carbon Transport – overcoming funding and financing challenges, and the role of climate finance,²¹ which provided initial recommendations to policy makers on transport and climate finance on how climate finance can accelerate the realization of sustainable, low-carbon transport:

- Increase the overall availability of public funding to develop and maintain sustainable transport infrastructure and services, by expanding current sources of domestic funding and prioritizing available funding to sustainable, low carbon transport.
- Accelerate private sector investment for sustainable, low-carbon transport by sending
- the right price signals, creating clear revenue models for the operation of transport infrastructure and services, and strengthening financing modalities.
- Create predictable investment frameworks by ensuring the integrity of long-term investment and legal frameworks, strengthening development of domestic banking systems, and empowering sub-national governments to improve credit worthiness.
- Harmonize planning approaches, tools, methods, and implementation procedures by promoting the Avoid-Shift-Improve approach and adopting appraisal methodologies that balance economic, environmental, and social assessments of transport choice.

²¹ <http://www.ppmc-transport.org/policy-guidelines-on-climate-finance-for-sustainable-transport/>

This was followed in 2015 by A Systematic Approach for the Use of Climate Finance for Sustainable Transport,²² which took a more in-depth look at the role of climate finance in transport.

Transformational investments amounting to trillions of dollars are needed over coming decades to shape sustainable, low-carbon transport systems, especially in the developing regions such as Africa, Asia, and Latin America. The IEA has calculated that the adoption of a low-carbon pathway for the transport sector (as consistent with a 2DS) could generate at least US\$70 trillion in cumulative savings up to 2050, with significant potential for additional savings because of other developmental benefits.

International climate finance (ICF) can play a pivotal role in scaling up sustainable transport through systematic support in four key areas (Figure 17). Effective policies supported by ICF are needed to establish a framework for more sustainable development of the transport sector, and better investment pipelines are needed to identify, prepare and implement sustainable transport investment opportunities. ICF also has a role in expanding the financing options used for sustainable transport projects, including addressing key investment risks and lowering transaction costs. Finally, ICF can be used to increase the relevance of technical assistance and capacity building.

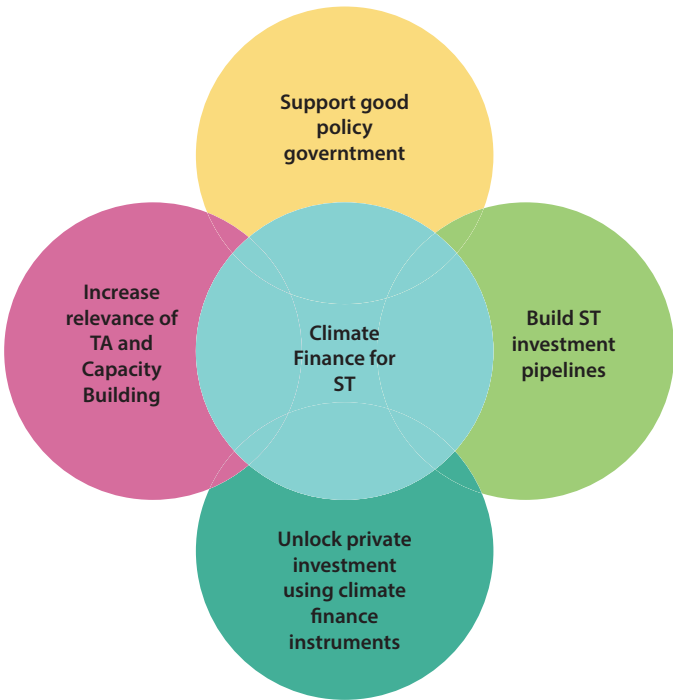


Figure 17: The pivotal role of Climate Finance

International experience shows the important role national governments play in establishing overarching planning and investment frameworks, supported by competent national and local institutions and a sound legal framework. These frameworks are needed to link desirable policies and strategies to priority investment programmes, whether financed by public and private sources, or official development assistance (ODA). Strengthening the role of sub-national governments is also important due to continuing rapid urbanization, and the challenges for governments to effectively implement local transport solutions across many growing cities.

The paper concludes that meeting the financing needs for scaling-up sustainable transport will rely on increased funding from national governments as well as expanded investment from the private sector. Thus, policymakers should explicitly promote the development of low-carbon transport measures. Climate finance should be used more systematically to address the particular characteristics of the transport sector, the diversity of transport projects, and the potential of transport to move toward climate targets while generating significant co-benefits.

To support these conclusions, the paper defines a systematic approach, showing the use of ICF in support of different stages of infrastructure development and implementation/ project cycle through a series of detailed fact sheets; these include a policy fact sheet on fuel economy standards, a program fact sheet on multi-jurisdictional sustainable transport programs, and a project fact sheet for mass rapid transit.

In sum, leadership of development finance institutions (DFIs), including multilateral development banks, bi-lateral institutions, and other domestic financing partners, is required to achieve the needed shift in approach to the transport sector and the use of both ICF and ODA. Therefore, DFIs must actively utilize their convening power and financial influence to effect a shift in consumer behavior and thus help to reduce climate impacts in the transport sector.

²² <http://www.ppmc-transport.org/a-systematic-approach-for-the-use-of-climate-finance-for-sustainable-transport/>





C. Scaling Up Sustainable Transport through Infrastructure Financing and Project Preparation Facilities

Infrastructure financing facilities (IFFs) and project preparation facilities (PPFs) can play an important role in scaling up needed transport investments to achieve climate change and sustainable development goals, particularly in rapidly motorizing countries.

SLoCaT has compiled a matrix of more than 60 infrastructure facilities,²³ which incorporates several criteria for characterizing the focus of a facility – including facility type, size, host, sectorial coverage, transport subsector focus, and sustainability agenda – and can provide insights into potential opportunities and challenges for channeling additional financing to the transport sector. In addition to the matrix, SLoCaT has conducted a review of selected global, regional, and

national IFFs and PPFs, examining the priority given to transport investments, highlighting infrastructure spending commitments, and noting key sustainability components.

Analysis of the matrix reveals that as of August 2016, IFFs and PPFs in Africa and Asia accounted for roughly one third of the global total each, while the Latin America and the Caribbean (LAC) region accounted for only 4% of facilities, despite the significant infrastructure gap in this region. In addition, 5 out of 6 project preparation and financing facilities investigated had a direct or indirect transport portfolio, which reflects the acknowledged need to scale up transport infrastructure and services across regions (Figure 18).

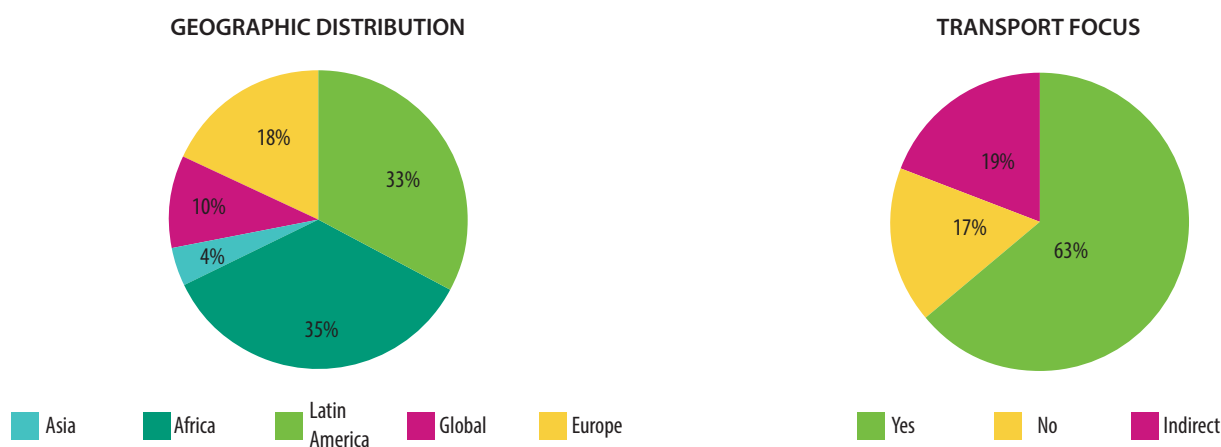


Figure 18: Analysis of Infrastructure Financing and Project Preparation Facilities

²³ <http://www.ppmc-transport.org/infrastructure-financing-facilities-project-preparatory-facilities/>



Through an initial analysis of the facility matrix and expert interviews, SLoCaT has formulated preliminary recommendations for increasing the effectiveness of infrastructure facilities in expanding sustainable transport infrastructure and services at a global scale, which include the following:

1. Project preparation should be given greater emphasis in infrastructure development. PPFs can help to develop capacity and investment pipelines so that the most promising sustainable transport infrastructure projects are identified for funding.
2. PPFs should be increased in number, and funding provided to fill gaps in regions and countries where project preparation activities are relatively underrepresented (e.g. infrastructure facilities are relatively limited LAC compared to other regions, despite a significant infrastructure gap).
3. National governments should adopt practical approaches to developing infrastructure plans, as there is currently no shared understanding of what a strategic development plan and a prioritized investment program should look like.
4. Infrastructure facilities and their host institutions should increase the coordinated use of internal strategic plans (e.g. ADB Sustainable Transport Initiative Operational Plan),

which can help to guide demand-driven processes from recipient countries in the direction of more sustainable transport projects and sub-sectors.

5. PPFs should be deployed to incentivize local governments to fund incremental transport projects, to demonstrate latent demand for sustainable transport. Such intermediate steps can help to demonstrate local government commitment, and thus can help to leverage greater funding through IFFs and/or their host institutions and funding entities.
6. PPFs (and IFIs more broadly) should help to increase the institutional capacity of city transport officials, both through sustainable transport training programs and through more comprehensive efforts (e.g. German Federal Ministry for Economic Cooperation and Development's (BMZ) Transformative Urban Mobility Initiative (TUMI) initiative), to ensure that implementing agencies are well versed in planning principles.
7. Infrastructure facilities and upstream partners could promote the transport 'quick wins' and the global roadmap for long-term decarbonization of the transport sector (currently under development by SLoCaT/PMC) to provide a menu of options for client national and local governments to base proposals on.



V. The Future of the Paris Process on Mobility and Climate

The PPMC was created in March 2015 to serve as an inclusive platform of non-state actors in particular on transport and climate change. The PPMC is a joint initiative of SLoCaT, representing over 90 organizations including UN and regional economic and social commissions, multi- and bilateral development organizations, transport sector representative organizations, think tanks, academe, business and civil society, and MCB representing over 60 private sector organizations. The rationale of the PPMC was and is that better coordination and integration of the two main type of non-state actors (public and private) could help accelerate action on transport and climate change.

The Paris Agreement on Climate Change acknowledges that even though national-level efforts are at the core of our response to climate change, and must be scaled up rapidly, they must also be complemented by strong action and support through collaboration and partnership at all levels of government, cities, the private sector, civil society as well as international and regional institutions.²⁴

In line with the evolution of the role of the non-state actors (as documented in the COP21 decision) and the creation of the GCAA and the concept of HLCs the need for mechanisms that ensure the continuity of the involvement of non-state actors is becoming more apparent. The organization of efforts of non-state actors, initially in 12 thematic areas and now in 7 thematic areas, including transport, has proven to be effective to stimulate action by non-state actors, and should be continued.

The PPMC, as one of the leaders of the transport thematic area in 2015 and 2016 till now has:

- Facilitated 15 transport initiatives under the GCAA), formerly the LPAA, through coordination of periodic reporting and outreach on the initiatives;
- Developed a range of knowledge products on transport and climate change including a detailed assessment of transport in the 165 NDCs submitted till date;
- Organized (at the invitation of the LPAA) the LPAA Transport Focus on December 3rd 2016;
- Coordinated a large series of side events on sustainable, low carbon transport at COP21, including the flagship Transport Day on December 6th. Organized daily reporting on transport at COP21;
- Initiated the development of a Global Road map on the decarbonization of transport and a series of Quick Wins on Transport, Sustainable Development and Climate Change;
- Initiated (at the invitation of the COP22 High-Level Champions), with The Energy Investment Company (SIE) as joint Focal Points for the Transport Action Area and together with the Ministries of Environment and Transport in France and Morocco, a more comprehensive inclusion of transport at COP22 through the organization of a Transport CEO Round Table meeting on November 11th, a Ministerial Round Table on November 11th and a Transport Showcase and Dialogue on November 12th.

²⁴ Climate Action Now, Summary for Policymakers 2016, UNFCCC

Paris, France



For thematic areas, such as the transport area, to continue to be effective in promoting action and following up on action it is important to ensure continuity in leadership of the thematic actions. Having leadership from within the thematic areas will help to ensure continuity as COP Presidents and HLCs rotate in and out. For such thematic leadership, like by PPMC in the case of transport, to be effective it is important to overcome the current ad-hoc approach in which organizations are invited only on a yearly basis to lead a thematic area without being clear whether this will continue to the next year. Having continuity of thematic leadership will allow organizations like the PPMC to start preparations for following COPs in a much earlier stage, which will further strengthen the quality of the contributions of the thematic areas to the annual COPs.

Having a medium term perspective in terms of continuity the PPMC will also be able to undertake activities in support of strengthening the contribution of transport to the implementation of the Paris Agreement. This includes reporting, outreach and regional consultations in support of Transport Initiatives under the GCAA as well as the Global Roadmap and Quick Wins.

Arguments for strong, continuous leadership of thematic areas under the GCAA include:

- There is a continued role (both pre-2020 as well as post-2020) for initiatives by non-state actors in demonstrating the potential for, and realizing of, ambitious action in various thematic areas, including transport;
- Realizing a 2DS goal and going well beyond this towards a 1.5DS goal will require ambitious action in all sectors, and the level of ambition stated requires growing coordination and cooperation between non-state actors and parties;
- Non-state actors and their initiatives have an important role to play in strengthening ambition as defined in for example NDCs and low GHG emission development strategies;
- Mobilizing action on transport and climate change by non-state actors is a continuous process, and annual COPs should be seen as milestone in a process of permanent mobilization rather than as a stand-alone event.



Once the PPMC were designated as the central platform for the Transport Action Area it would be able to take on the following functions in the period up to 2020:

- a. Facilitate Transport Initiatives under the Global Climate Action Agenda;
- b. Represent the Transport Sector and provide single interface with UNFCCC and the High Level Champions and in other processes;
- c. Foster cross cutting efforts such as Quick Wins on Transport, Climate Change and Sustainable Development and the Global Roadmap for Decarbonizing Transport.

The PPMC has blossomed because of its open and inclusive nature, and its direct access to well over 150 organizations and initiatives that are working on a day-to-day basis on sustainable, low carbon transport. It is vital to continue this open and inclusive architecture, and while it is important to provide the PPMC with a multi-year mandate (e.g. up to 2020), it is not suggested to make the PPMC a separate legal entity²⁵. Instead, it is suggested to request the SLoCaT Partnership and MCB continue to act as the Secretariat of the PPMC. To maintain, and further strengthen, the inclusive nature of the PPMC, SLoCaT and MCB can further articulate the 'governance structure' of the PPMC.

The PPMC has been able to make rapid progress because of its clear focus on non-State actors in its composition. It is important that such a focus is maintained and it will be able to do so through the extensive network of the SLoCaT Partnership.

It is important that the PPMC has well developed relations with countries. Ultimately it is countries that have a key role in implementing sustainable, low carbon transport at a scale that will enable the transport sector to make its fair contribution to the 2DS or 1.5DS target of the Paris Agreement. It is in this context that the PPMC would like to establish links to a small group of countries that would have a number of roles, including for example:

- Informing the PPMC on what are helpful inputs from non-state actors convened by PPMC in (a) the development and implementation of NDCs or low GHG emission development strategies, and (b) annual COPs and UNFCCC Technical Expert Meetings (TEM);
- Acting as intermediaries for the non-state transport actors convened under the PPMC in relevant global and regional processes on climate change, sustainable development, and transport, and promote the fact that PPMC outputs are tabled for feedback and discussion;
- Providing a basis for groups of likeminded countries to work with the PPMC in developing cross cutting global efforts like the Global Roadmap on Decarbonizing Transport.

²⁵ This reflects the "esprit de Paris", taken as guiding principle by the high-level champions in their ambition to be an interface between action on the ground and the UNFCCC negotiation process, and between non-Party stakeholders and Parties.



There is a strong recognition that a more active involvement of the private sector will be required, both in mitigation of and adaptation to climate change if the ambitious goals of the Paris Agreement are to be realized. The private sector is widely acknowledged as the engine of innovation, and it also is expected to provide much of the financing required to scale up sustainable transport.

Through 18 years of existence, MCB has brought together business people - from vehicle manufacturing, energy and parts supply, new technologies, finance, in all modes of transport- interested in advancing the transformation and modernization of mobility, hence committing to make it cleaner, safer, more connected, more accessible, and more affordable. Their major contribution has been to demonstrate the technical feasibility and the economic viability of proposed transformational solutions. The PPMC roadmap draws significantly from their work.

In addition, the PPMC has reached out over the last year to the Global Compact as well as the WBCSD. The latter has expressed strong interest in the (multi-stakeholder) PPMC roadmap proposal. The proposed Transport CEO Round Table on November 11th 2016 is an important step towards developing a more structured engagement of the private sector in the PPMC. It is hoped that the participants of the Round Table will endorse recommendations for the engagement of the private sector to be structured through cross-cutting business platforms like WBCSD, WEF or Global Compact, and more dedicated networks representing specific sub-sectors of the transport sector.

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