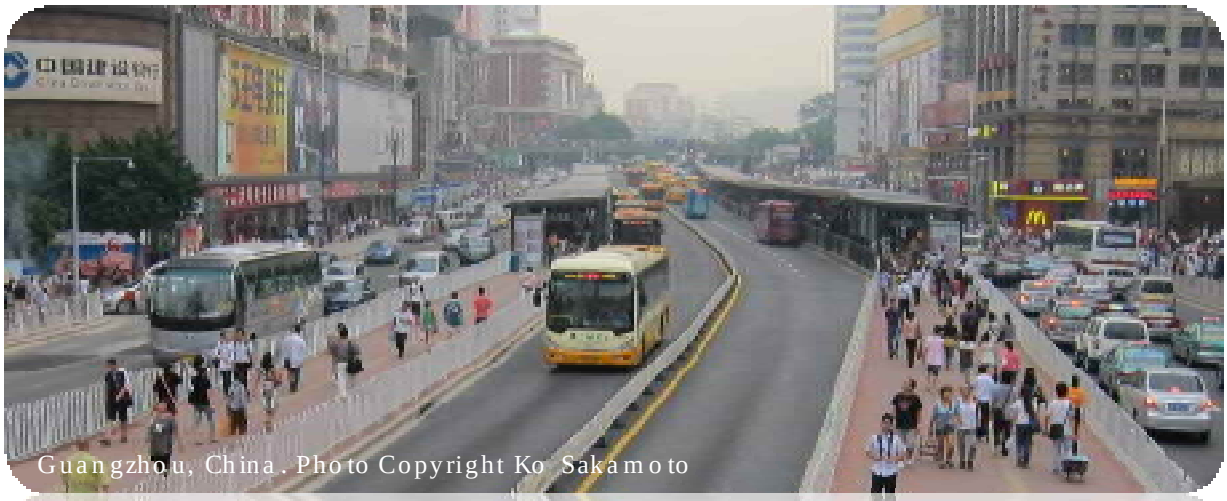
T-MAPPER: Transport Measures And Policies to Promote Emission Reductions

Final Report



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The views expressed are those of the authors and not necessarily those of the European Commission.

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Executive Summary

E.1 Background and trends: Enhanced action in transport is urgently needed both in and outside of Europe to tackle climate change

Transport is vital in supporting the economic and social wellbeing of citizens in Europe and across the world. At the same time, the sector poses a large challenge in terms of mitigating climate change to within 2 degrees above pre-industrial levels,[1] as one of the largest and fastest growing sources of greenhouse gases (GHGs).

In Europe, the transport sector was responsible for 22% of total EU GHG emissions in 2005, increasing by 28% between 1990 and 2006 (EEA, 2009a). For the EU to successfully meet its stated emission reduction targets of a 20% reduction compared with 1990 levels unilaterally by 2020, actions within transport must be enhanced (EC, 2010a).[2]

Globally, transport currently accounts for 23% of carbon dioxide (CO_2) emissions, and is expected to grow strongly over the next 20 years (IEA, 2009). As highlighted in Figure 1, non-OECD countries (the majority of which are outside of the European Economic Area, EEA) are likely to be responsible for the vast majority of the growth as their economies develop and motorisation continues at a rapid pace.

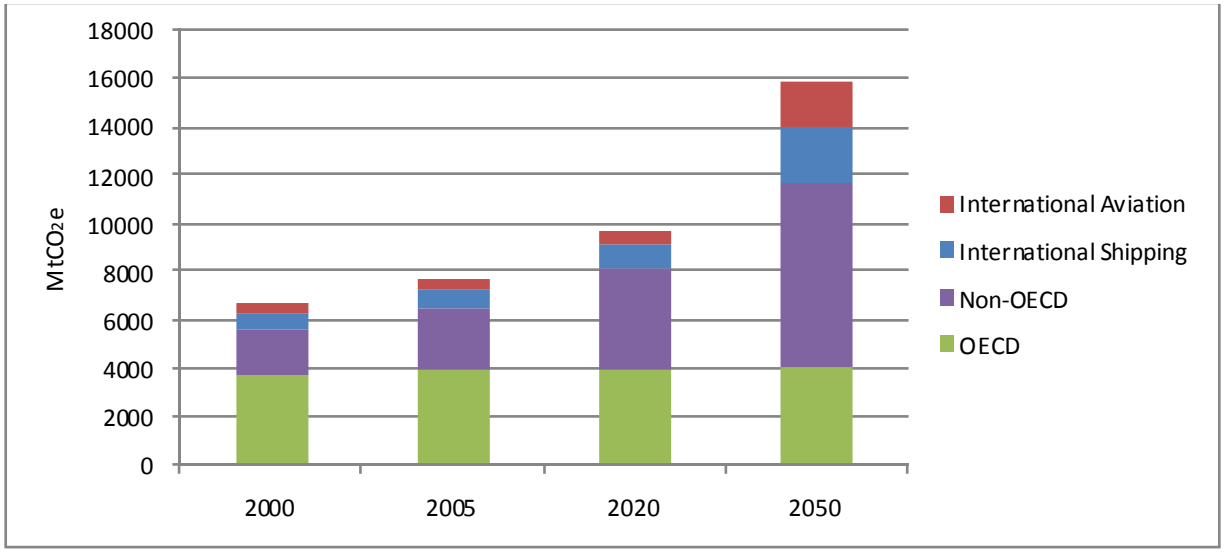


Figure 1: Transport Emission Projections
(Source: IEA 2009 and DfT, 2009)

Efforts to reduce GHG emissions from the European transport sector need to continue, but it is also important for the EU and its Member States to recognise how they can support and enable the reduction of emissions in non-EEA countries, especially in developing countries where the majority of the increase in emissions are set to take place.

[1] The IPCC (2007) states that global cuts in greenhouse gas (GHG) emissions of up to 50% in developing countries and over 80% in developed countries will be required by 2050 to keep climate change to 2 degrees Celsius above pre-industrial level.
[2] See http://ec.europa.eu/clima/policies/brief/eu/index_en.htm

Box 1: The potential role of the EU as a leader in tackling transport emissions across the world

There is a significant opportunity currently for the EU to use its expertise, experience and resources to help reduce or avert the growth in emissions in developing countries. This stems from:

- The fact that the EU is a proactive "agenda setter" for climate related instruments (and surrounding policies), and continues to exercise a leading role within the climate negotiations.
- The significant levels of international support the EU makes available, both through its own instruments such as the European Development Fund and Development Cooperation Instrument, as well as through multilateral channels such as the World Bank.
- The many examples of good practice that can be found Europe with regards to transport policy, including fuel/vehicle standards and taxes on the national level, and transport demand management, high quality public transport and provision for non-motorised transport at city level.

E.2 The dual objectives and approach of the project: Learning from policies in, and understanding how to support actions in countries

In awareness of the above situation, DG-Climate Action of the European Commission (EC), commissioned a study known as "Transport Measures and Policies to Promote Emission Reductions (T-MAPPER)", in order to:

1. Provide a comprehensive understanding of policies being enacted outside the EEA to reduce the climate impact of the transport sector, some of which could be transferred to EEA countries, and;

2. Provide information on possible instruments to support the reduction, or avoidance, of increases in carbon emissions from transport in non-EEA countries.

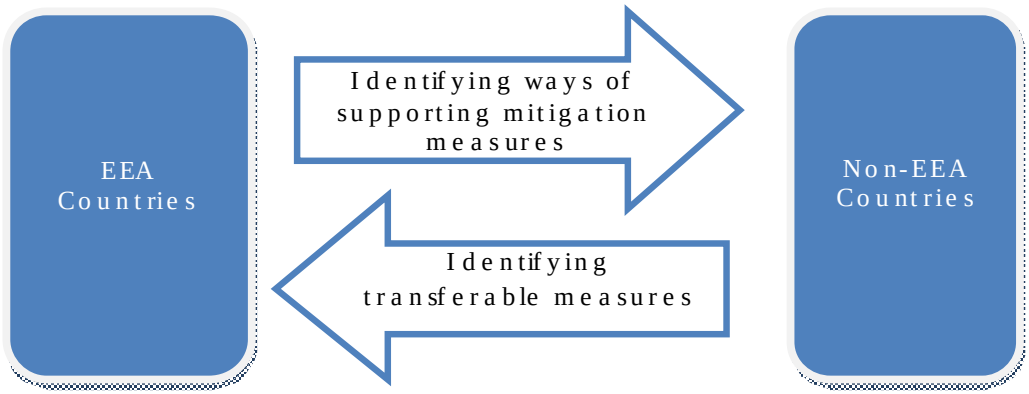


Figure 2: The two main objectives of the project

These objectives were met through two main tasks:

1. A review of transport mitigation measures in 20 non-EEA countries - as shown in the figure below,[3] by key transport and climate experts.[4]

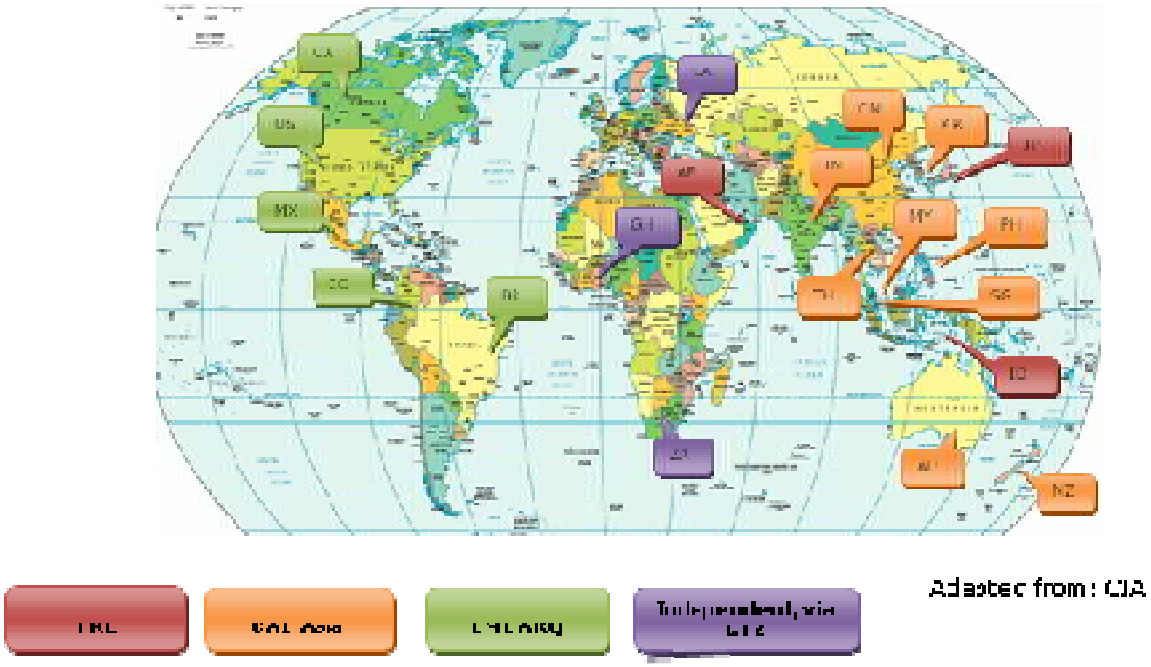


Figure 3: Selected countries and reviewers

The review aimed to provide a comprehensive understanding of policies within these 20 countries, which mitigate emissions in the transport sector. A range of information was collected including the type of policy (planning, economic, regulatory, information, technology) and the main actors involved in implementing them. The identified policies were then assessed in terms of their:

- Ability to support the "Avoid, Shift or Improve[5]" strategy outlined in Figure 16;
- Effectiveness at mitigating carbon (both through reducing motorised transport; activity and improving emission factors of vehicles and fuels);
- Cost effectiveness;
- Broader co-benefits (especially with regard to the creation of green jobs);
- Key barriers towards implementation;
- Transferability to other parts of the world; and

[3] The 20 countries comprised: Australia (AU), Brazil (BR), Canada (CA), China (CN), Colombia (CO), Ghana (GH), India (IN), Indonesia (ID), Japan (JP), Malaysia (MY), Mexico (MX), New Zealand (NZ), Philippines (PH), Singapore (SG), South Africa (ZA), South Korea (KR), Thailand (TH), United Arab Emirates (UA), Ukraine (UA) and the United States of America (US).

[4] This included TRL, whose staff reviewed policies in Indonesia, Japan and the United Arab Emirates (UAE), The Clean Air Initiative for Asian Cities, whose staff received policies in the Asian region, Embarq, the WRI Center for Sustainable Transport, whose staff reviewed policies in North and Latin American countries, John Apelbaum of Apelbaum Consulting, who reviewed policies in Australia and New Zealand, Stefan Denzinger of Denzinger Consulting, who reviewed policies in South Africa, Charles Amoatey who reviewed policies in Ghana, and Iryna Stavchuk of DREBERIS, who reviewed the policies in Ukraine. The authors remain grateful to the German Technical Cooperation (GTZ) for providing access to their consultants in South Africa, Ghana and Ukraine.

[5] Also known as ASI, this recognises that mitigation of transport emissions can result from either 1) the Avoidance of transport activity, 2) Shifting towards lower emitting modes such as public transport or non-motorised transport, or 3) Improving the carbon efficiency of vehicles and fuels. See Dalkmann and Brannigan (2007) for further details.

- Requirements for international support.

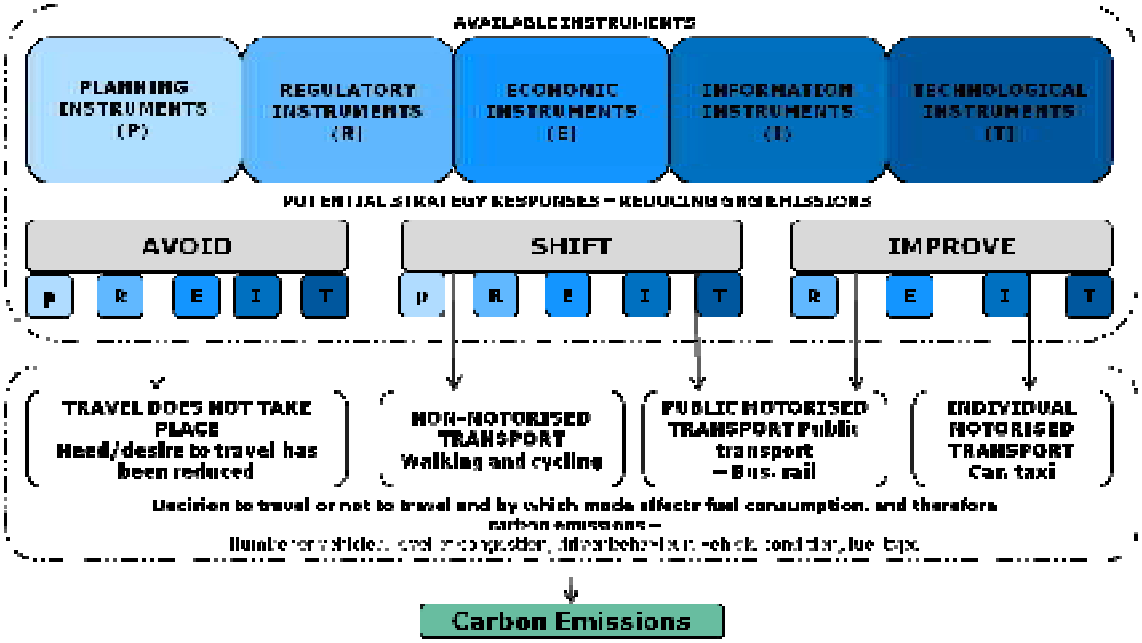


Figure 4: Policy instruments for transport GHG mitigation
(Source: Dalkmann and Brannigan, 2007)

2. Identification of channels that the EU could utilise to support transport emissions reduction in non-EEA countries

Ways in which the EU and its Member States (as developed countries) can support the mitigation of transport emissions in non-EEA countries were explored. It involved the scoping of potential channels to support the reduction of GHG emissions from transport in non-EEA countries, the assessment of such channels, and the development of recommendations for the EU in ensuring that such support can be implemented in an effective manner.

E.3 Findings from the review of 20 non-EEA countries: What Europe can learn from the rest of the world

There is a diverse set of policies available to policy makers to mitigate transport emissions.

In the 20 countries reviewed, 690 policies are found at the local, regional and national level, with the potential to mitigate transport GHGs. More than 220 policies (30%) can reduce CO_2 by more than 10% over a 10 year period, compared against business as usual. The most effective policies centre around:

- mass rapid transit systems and rail improvements;
- support and infrastructure for non motorised transport;
  emission and fuel economy standards;
- national policies on climate change and associated legislation.

A wide range of policies exist across the 'avoid, shift and improve' categories with, on the whole, a greater number of polices that support improve measures rather than avoid and

shift. The policies identified support the use of a range of different planning, regulatory, economic, informational and technological instruments to bring about emission reductions. Interventions in the rail sector are developed independently of policies for other subsectors.

> Box 2: The use of economic instruments
>
> Focusing on economic instruments subsidies, taxes and charges are being used to support the reduction of emissions from the transport sector. Canada was noted as one country where economic instruments have been used successfully to support the reduction of transport emissions. Their EcoAuto rebate programme, which concluded in March 2009, encouraged Canadians to buy new fuel-efficient vehicle using rebates of between $1000 (CAN) and $2000 for those purchasing eligible fuel efficient vehicles in 2006, 2007 or 2008. The success of the programme has been demonstrated through the fact that over 169,800 rebates were issued over the two year programme.

A few countries have effective policies to tackle freight – a largely neglected subsector.

Only 5% of the policies identified focus solely on freight transport, highlighting that the sector could benefit from increased attention. The EU could learn from countries such as Japan, which is taking proactive steps to address freight emissions, including:

- Implementation of CO_2 saving by co-operation between shippers and logistics operators;
- Modal shift to railway and marine transportation, through the provision of infrastructure and improving inter-modal cooperation;
- Speed restrictions at 90km/h of large trucks on expressways, through the use of speed limiter devices.

Policies at local level have the potential to change behaviour, whilst national policies have a large potential to change technology.

Policies effective in mitigating greenhouse gas levels are being delivered at different levels, depending on whether the emission reductions are being achieved through behaviour change or an improvement in emission factors. In general:

- Local level policies dominate those delivering the most substantial reduction in vehicle kilometres travelled (through travel demand management, the improvement of public transport systems and the implementation of mass rapid transit schemes).
- National policies dominate those delivering the most substantial improvement in emissions factors (through supporting the update of low emission vehicles and fuels and supporting rail improvements).

Sub-national policies should be considered as a key aspect of mitigation actions. This particularly applies to “avoid” and “shift” policies as local policy makers have direct control over policies that are the most effective at supporting behaviour changes to “avoid” private motorised travel and “shift” to less carbon intensive modes.

A large proportion of transport mitigation policies are highly cost effective and also cost negative – either for households, government budgets, or both.

Based on qualitative analysis, most policies were highlighted as being able to deliver a tonne of carbon reduction at under 30 USD.
This is encouraging, and fortifies findings in other studies such as Cambridge Systematics (2009),[6] World Bank (2009)[7] and McKinsey & Company (2009)[8] that certain interventions in the transport sector are highly cost effective. Note however, that financial support for transport may still be required, to offset the large capital requirements that are needed at the outset of projects, for example the development of public transport infrastructure.

The key policies leading to cost savings for households include measures to reduce congestion and improve provision for public and non-motorised transport, the promotion of fuel economy measures and tax reduction and subsidies. These policies are likely to see easier implementation due to their high political acceptability.

Taxing fuel inefficient vehicles and cars, charging road users through parking and congestion changes and improving fleet management is generally supportive of government budget savings (or revenue generation).

Many transport mitigation policies deliver positive economic impacts.

The review has identified that many mitigation policies have a positive impact on employment. Based on a qualitative analysis, policies and measures that are likely to lead to the creation of jobs, especially green jobs (which support the development of sustainable transport) were identified as:

- Development of high fuel economy vehicles;
- The development of infrastructure for public transport;
- Promotional campaigns to encourage behaviour change.
- The implementation of national policies and legislation, such as India's National Urban Transport Policy (see box below);

It should be recognised that some of the jobs created, such as those involved with the development of infrastructure for public transport (for examples the new Metro tracks sections in Ukraine) will be short term, whilst others, such as the operation of the integrated transportation systems provided (for example the Integrated public transportation system in Malaysia) will support the development of jobs over a longer time period.

[6] The "Moving Cooler" study suggests that a holistic set of policies based on the Avoid, Shift, and Improve strategy (incorporating behavioural change) can be delivered at net negative cost. The savings in fuel costs that arise from a mixture of behavioural and technological changes far outstrip the policy implementation costs.
[7] Known as the MEDEC study, the World Bank notes that in Mexico projects targeted at improving the efficiency of bus networks, rail freight and vehicle-inspection schemes prove to be highly cost negative.
[8] Mc Kinsey (2009) notes that measures to improve the fuel economy of vehicles also tend to be cost-negative interventions.

Box 3: Case study: using national policy to support the strategic creation of green jobs: India's National Urban Transport Policy (NUTP)

The primary objective of India's NUTP is to encourage modal shift from private vehicles to public and non-motorized transport. The NUTP supports capacity building programs at both the institutional and individual level across India to ensure that the workforce has the correct skills to be able to develop and implement schemes effectively.

A knowledge management centre is being established to service the needs of all urban transport professionals (technical advice, data provision etc). A major exercise of training and skill development of the public officials and other public functionaries is planned to make such officials aware of the nuances of urban transport planning and the specific issues involved in managing city transport.

Through its capacity building programme and funding the policy supports the strategic creation of the appropriate skills and green jobs within the sustainable transport sector.

The EU could, e.g. through the capacity building efforts supported by the European Development Fund (EDF) or the Development Cooperation Instrument (DCI), support non-EU countries to develop similar strategic policies to help ensure that investments in transport effectively supports the creation of green jobs.

Figure 5: Modern public transport in Delhi, India
(Photos: Kodukula and Mohsin, GTZ Photo CD)

See: Ministry of Urban Development Government of India (2010) National Urban Transport Policy http://www.urbanindia.nic.in/policies/TransportPolicy.pdf

Many policies to address climate change also deliver other environmental and social benefits.

The findings show that there are examples of policies delivering social and environmental benefits whilst also reducing carbon emissions from the transport sector, with a particularly positive impact on air pollutions levels identified.

A number of policies deliver the broadest range of environmental and social benefits as well as supporting the reduction of emission from the transport sector. These centre upon those which:

- Support sustainable land use;
- Promote and develop non-motorised public transport; and
- Develop integrated and strategic urban public transport systems.

Consideration of the effects of policies and measures on employment levels and broader social and environmental co-benefits should be considered whenever sustainable transport

policies are developed, to help ensure that investment in transport effectively supports the creation of green jobs and that the broader co-benefits are maximised.

Most policies are free from any technical, political or institutional restrictions to their implementation.

Although many policies do not face major barriers to their implementation, around 40% were found to face some form of restriction, including:

- Technical restrictions for policies focussing on alternative fuels, low emission vehicles, rail, transport demand management measures and urban public transport.
- Political restrictions to the implementation of fuel taxes, legislation on climate change and transport demand management measures in many countries.
- A lack of institutional capacity and coordination leading to barriers in the implementation of non-motorised transport and urban public transport.

There is some variation in the types of the barriers experienced in Annex 1 and non-Annex 1 countries, for example:

- Technical issues are a greater barrier in non-Annex 1 than Annex 1 countries
- Institutional barriers dominate in non-Annex 1 countries, relating to the implementation of non motorized transport and public transport.
- Fewer institutional barriers are experienced in Annex 1 countries, with the exception of Ukraine, where there are a number of barriers relating to non motorised transport, traffic demand management.

The majority of policies are transferable to EEA countries.

EEA countries can learn from countries such as engagement with private operators in the US, the promotion of teleworking, energy efficiency of railways and modal shift in freight from Japan, cleaner buses in Australia, cycling master plans in Brazil, and high-capacity Bus Rapid Transit systems in China, Mexico and Colombia.

Furthermore, policies are transferable beyond the traditional North-South route (developed country to developing country) commonly acknowledged, and include those which can be transferred between developing countries (South-South transfers) and also from developing countries to developed countries (South-North transfers). For example more than 80% of policies identified in developing countries (non-Annex 1) were found to be transferable to other developing countries, although with some issues that need to be overcome.

Box 4: Transferring knowledge on private sector involvement

Europe can transfer ways of involving private operators of freight and passenger transport to increase environmental performance. In the US, the "SmartWay" partnership between the US Environmental Protection Agency (EPA) and the freight industry aims to increase the availability and market penetration of fuel efficient technologies and strategies that help freight carriers achieve higher environmental perfomance for their vehicle fleet. EPA offers various financing options to allow freight carriers to upgrade their fleet, and estimates GHG emissions reductions of up to 32 tons/truck/year.

The EU can benefit from the implementation of such practices, to further enhance the environmental efficiency of transport operators in the private sector. This may involve coordinated programmes between various European Commission bodies, including but not limited to DG-MOVE, DG-CLIMA and DG-Enterprise and Industry. It may also be linked to existing initiatives such as the Action Plan for sustainable consumption and production (SCP) and sustainable industrial policy (SIP)

See EC, 2008 at: http://ec.europa.eu/enterprise/policies/sustainable-business/environment-action-plan/index_en.htm)

Differences in the types of policies that are most transferable between the different categories were identified:

- Between developed countries (North-North transfer): technical issues relating to teleworking, intelligent transport systems and improving the energy efficiency of vehicles;
- Between developed and developing countries (North-South transfer): vehicle and emissions standards and policies and measures relating to the development of non motorised transport
- Between two developing countries (South-South transfer) and developing to developed (South-North) the implementation of Bus Rapid Transit systems.

BRT showcases the potential for the EU to further support South-South and also South-North transfer to mitigate GHGs in a cost effective manner, and also to promote sustainable mobility in cities across the world.

Box 5: Bus Rapid Transit: an example of south-south and south-north transfer

Bus Rapid Transit (BRT) saw initial large-scale implementation in Latin America, in cities such as Curitiba (Brazil) and Bogota (Colombia) starting in the 1980s. Since then, this cost effective mass transit technology has been transferred to other world regions such as Indonesia (Jakarta), South Africa (Johannesburg) and Guangzhou (China) to name a few locations. Non-governmental organisations such as the Institute for Transportation and Development Policy (ITDP) and Embarq (the WRI Center for Sustainable Transport) have been instrumental in the replication of good practice.

The example of BRT showcases the potential for the EU to further support South-South and also South-North transfer to mitigate GHGs in a cost effective manner, and also to promote sustainable mobility in cities across the world. BRT is increasingly being adopted in European cities, for example in Swansea, UK. Research programmes, supported, for example, by European research grants under FP-7/8, could be targeted at understanding the transferability of BRT to European cities.

Figure 6: Bus Rapid Transit in Guangzhou, China
(Photo: Ko Sakamoto)

Box 6: Matching the demand for and supply of support for sustainable transport

There is both the demand by non-EEA countries (in particular developing countries) and supply (by European and multilateral channels) for supporting mitigation actions in the transport sector, which when appropriately matched, is likely to lead to the required upscaled actions in the transport sector.

Figure 7: The demand and supply for support in transport mitigation actions

The majority of policies in non-Annex 1 countries are able to benefit from all three types of support: capacity building, financial and technological.

There is a clear link between those policies noted as facing a high level of technical restriction, and their need for technology transfer. Almost all policies, for which technology transfer was needed, also acknowledged further benefits from capacity building and financing, suggesting that such support efforts are strongly related to each other and that they must be supported as a package

Latin America, Asia, Africa, the Middle East and the Former Soviet Union are regions where the need for support in all of the above categories are highest.

International capacity building, financial and technological support provided as a package of measures could help to overcome any political, technical barriers to the implementation of policies, as well as being able to support improvements in institutional co-ordination and capacity.

As shown in E.5, there is a wealth of channels available to European policy makers that can collectively supply the required support mentioned above.

E.4 Recommendations for EU policy makers on enhancing transport mitigation actions within the EU: Climate and Transport Policy Makers can jointly lead EU efforts.

In view of the findings from the review of policies in 20 countries, the following recommendations can be made for EU policy makers in transport (DG-MOVE) and climate (DG-CLIMA).

Transport policy makers (DG MOVE) may:

Transport policy objective	Recommendation
Include mitigation as a core objective.	Consider including climate mitigation as a core objective embedded within the new Transport White Paper.
Provide policy guidance to Member States on the options to mitigate emissions from transport.	Include information on the likely costs and benefits of different policies, barriers to implementation, potential negative side effects and case studies providing examples of effective implementation to support action. The guidance provided could be tailored to the right level of governance - for example there is the need to focus on the local/regional as well as national level as many transport mitigation policies, particularly those that are effective at supporting behaviour changes, are applied locally rather than nationally.
Measure the carbon footprint of transport investments, and use this as a key criterion for investment decisions.	Ensure progress and outcomes on carbon mitigation are monitored effectively, for example through a requirement for ex-ante and ex-post carbon footprinting for transport projects financed by the EC/EU. This could build on processes being developed internationally, for example by the Asian Development Bank to measure the carbon impacts of its investments.
Identify gaps in transport policies that need to be closed, in order for the EU transport sector to meet contribute to overall mitigation targets.	Conduct a gap analysis of the areas of transport policy which has so far been neglected in Europe in light of climate change mitigation, for example the freight sub sector. Categorise these by level of implementation – EU wide, Member State, or local to aid their future implementation.
Support action in the freight sector.	Facilitate research and implementation of mitigation actions in the freight sector, building on good practice identified in countries such as in Japan. Consider building on existing initiatives such as the MARCO POLO initiative to provide required support, especially in areas of green logistics, fleet management, driver training etc. Tailor the support to cover both inter-city and inner-city freight providers.
Generate green jobs most effectively.	Support investments that create green jobs, for example public transport infrastructure and operations whilst reducing emissions from transport.
Pursue the most cost-effective solutions.	Support policies that maximise saving to the public and private sector such as eco-driving, fleet management and

	green procurement.
Correct for distorted transport prices.	Support congestion charging and higher parking charges in congested urban areas.
Raise revenue to actively support low carbon transport.	Promote policies such as vehicle licensing, congestion or parking charges and explore options for ring-fencing revenue for investment in sustainable transport infrastructure.
Support the development of legislation on vehicle and fuel standards.	Highlight effective policies such as Japan's 'Top Runner Standards' and support their implementation in the EU context, so that standards are always aligned to the best available technology.
Disseminate good practice from non-EEA countries.	Consider expansion of existing initiatives such as CIVITAS to cover non-EEA countries and supporting twinning arrangements.

Climate policy makers (DG CLIMA) may:

Climate policy objective	Recommendation
Catalyse actions on climate change in the transport sector by Member States	Build capacity and raise awareness, for example through developing a capacity building programme (covering governance, road safety, climate change etc and the inter-correlation between the different issues).
Coordinate actions with transport policy makers in specific areas most relevant to climate negotiations.	Strengthen the collaboration with transport policy makers in fields which are particularly relevant for climate policy, including on aviation and maritime emissions.

E.5 Findings on the potential support channels: How the EU can support transport mitigation policies in non-EEA countries

There is no shortage of channels of support.

There are currently 16 channels available to European policy makers through which mitigation actions in the transport sector can be supported in non-EEA countries.

These are categorised under three groups in descending order of the influence of European policy makers, namely those for which;

- The European Commission has a major role in programming and implementation (hereafter "EC channels");
- The EU and its institutions and Member States (including Switzerland), have a decisive role (hereafter "Other EU related channels")
- The influence of the EU and the EEA countries is indirect, but significant, namely channels implemented through international bodies and policy processes (hereafter "International channels").

The figure below provides an overview of the identified channels under these three groups.

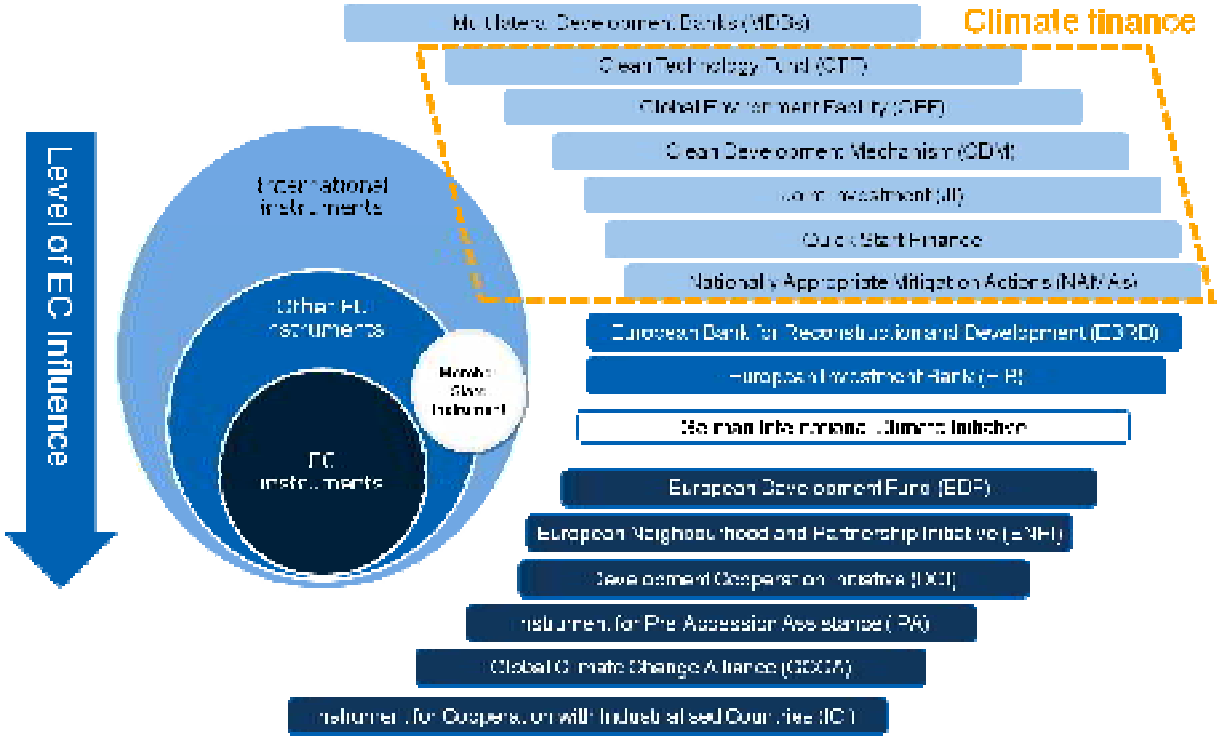


Figure 8: Overview of support channels identified

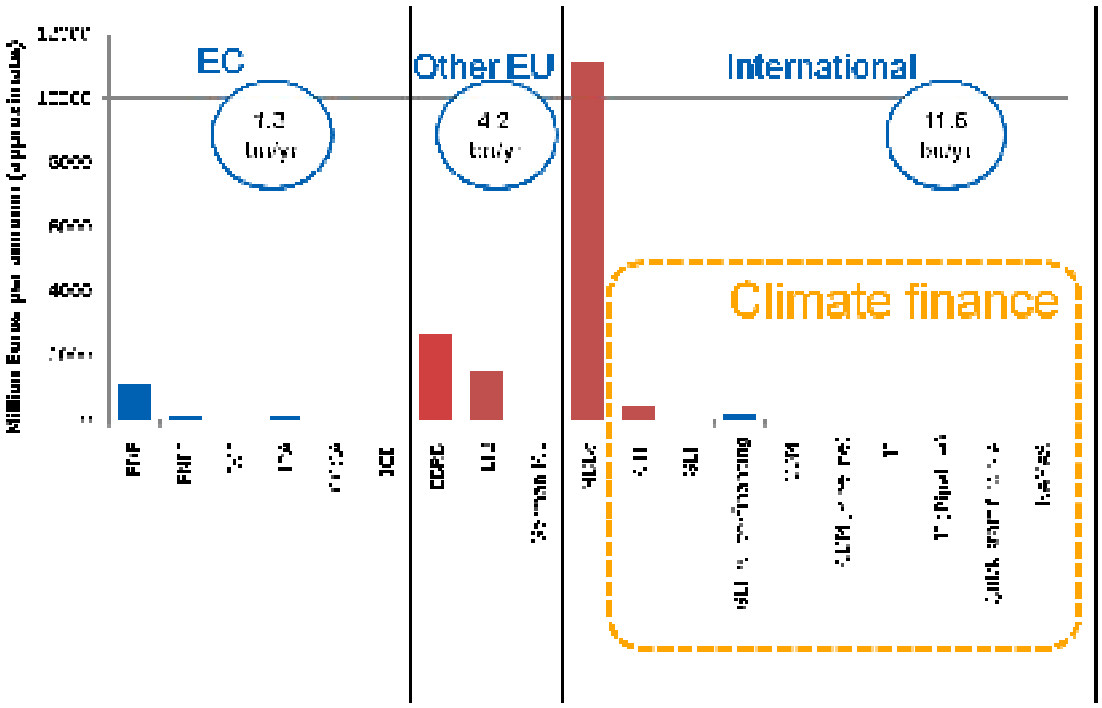
The key points of importance of these three groups of channels to EU policy makers is summarised in the table below.

Table 1: Key points of importance of the three groups of channels to EU policy makers

Group of policy	Why are they important to EU policy makers?
European Commission (EC) channels	- EC is the largest aid provider world wide - Large amount of resources involved (especially the European Development Fund - EDF) - Huge potential to cover transport in all aspects (capacity building, technology transfer and financing) and promote EU knowledge
Other EU channels	- EC has a very large influence on their activities - Very large sums of finance involved, especially through the European Investment Bank (EIB) and European Bank for Reconstruction and Development (EBRD)
International channels	- EU is a large donor to multilateral development banks (especially World Bank) who mobilise vast amounts of finance - EU is a proactive "agenda setter" for climate related instruments (and surrounding policies)

Significant levels of financial resources are available.

As shown in the figure below, approximately €1.3 billion per annum is provided via EC channels, €4.2 billion per annum from other EU channels, and a further €11.6 billion from international channels (mainly via multilateral development banks).



*Note: Red columns contain a large proportion of loans and cannot be directly compared with grant based instruments

Figure 9: Levels of financial resources for the identified channels

Support provided collectively covers capacity building, technology transfer and financing.

Collectively, there is a range of channels that are suited for;

- Capacity building (e.g. for transport policy formulation, public transport management and overall institutional strengthening)
- Technology transfer (e.g. for rail and transport demand management)
- Financing including both;
    - Grants, to provide support to the least developed countries (e.g. road building in African countries) as well as to support capacity building and training programmes.
    - Loans, which are provided mainly for construction of large transport infrastructure in middle income and neighbourhood countries, especially road and rail infrastructure.

Already, these types of support are being blended for the support being provided by Europe across the world, for example by combining loans provided by EBRD or EIB with grants offered by EC channels such as the European Neighbourhood and Partnership Initiative (ENPI).

In sum, the orientation of support is generally towards supporting infrastructure for motorised private transport – whilst capacity building may be better served.

The emphasis on infrastructure for motorised transport is likely to encourage further motorisation, and hence emissions. Climate change mitigation does not feature in most of the instruments as a key objective, nor are the impacts on carbon measured for the interventions that are supported by these support mechanisms.

In future, all have the potential to provide more attention towards capacity building, e.g. strengthening institutions, providing courses (at dedicated academies and large universities) in sustainable transport, as well as investments towards sustainable (urban) transport.

EC channels are focused in supporting the African, Caribbean and Pacific (ACP) region, especially for improving and maintaining road infrastructure.

Support in the transport sector from EC channels is generally centred upon the European Development Fund (EDF), European Neighbourhood and Partnership Initiative (ENPI) and Development Cooperation Instrument (DCI). Regions supported by EDF (ACP countries) receive the majority of EC support in transport. Most of these resources are used to improve/maintain road infrastructure (most interurban) to support sustained economic growth. In the region supported by ENPI, the Neighbourhood Investment Facility supports investment projects for infrastructure. The DCI region (Asia and Latin America) has so far received limited interventions. Most of resources are targeted at improving roads, and to a lesser extent on air transport.

These are augmented by other channels such as:

- The EU-Africa Partnership on Infrastructure, which currently focuses on interurban roads, but in future may support the improvement of urban transport infrastructure (including those for non-motorised transport and public transport), as well as capacity building for the management/operation of public transport, logistics etc.

- Instruments for Pre-Accession Assistance (IPA) – which can be utilized to incentivise/support pre-accession countries to the EU to develop/harmonise databases and robust inventories for GHGs in the transport sector, and develop strong national and local policies for sustainable transport.
- Global Climate Change Alliance – which has the potential to support in future the adaptation of transport infrastructure, and the development of transport methodologies for CDM/NAMAs applicable to Least Developed Countries.
- Instrument for Cooperation with Industrialised Countries - which has the potential to support knowledge and technology transfer between developed countries on sustainable transport policy formulation, public transport, clean vehicles and ICT technology.

Other EU channels focus on loans to support large investments in road and rail infrastructure, especially in neighbourhood countries.

The European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD) both provide large loans used for the building, expansion, maintenance and rehabilitation of transport infrastructure (mainly roads and rail). The EIB focuses its activities on South-East and Eastern Europe, Africa, Russia, Asia and Latin America, whereas EBRD targets Central Europe and Asia. Both have a large potential to support large infrastructure projects for public transport.

International channels are dominated in scale by multilateral development banks, which are starting to shift their funding towards sustainable transport, and measure the impacts of their investments on carbon.

The EU is a major contributor to multilateral development banks (MDBs). For example, the EU contributed €467 million to the World Bank in 2009. Contributions are also provided to regional banks such as the African Development Bank (AfDB), Asian Development Bank (ADB) and Inter American Development Bank (IDB).

Current financing in transport by MDBs is generally skewed towards road infrastructure. However, new initiatives are being taken by ADB (Sustainable Transport Initiative) to increase by 2020 the relative share of urban transport to 30% of its transport investments, and to measure the carbon footprint of its activities. The African Development Bank has also announced a window for sustainable transport within the mitigation part of the Africa Green Fund to be soon made operational. The EU can lobby for similar approaches in other MDBs, and consider mainstreaming such practices across all EC/EU channels.

Support via climate-specific channels available at the international level is small but growing.

The impact international climate funds are still limited (ca. 0.16 $MtCO_2eq$ per annum for the Clean Development Mechanism, and 13 $MtCO_2eq$ per annum for the Global Environment Facility – GEF, and the Clean Technology Fund – CTF combined).

However, there is the scope for the impact on GHG emissions to be much more substantial in future, if such instruments can catalyse changes in transport policy in the recipient countries. In addition the Quick Start Finance provided in the context of the Copenhagen Accord - $10 billion per year for mitigation and adaptation - provides an opportunity for the EC to make a substantial and targeted impact on GHG emissions in non-EEA countries. EU Member States are a major donor to Quick Start Finance, mobilising €2.35 billion Euros in 2010 as part of its overall commitment to provide €7.3 billion for the period 2010-2012.

The emergence of NAMAs presents an opportunity to support the mitigation of transport emissions in developing countries.

26 out of 43 countries have so far announced their intention to carry out Nationally Appropriate Mitigation Actions (NAMAs) in the transport sector, in reaction to the Copenhagen Accord (see Binsted et al, 2010). Several of these countries have already started preparation of their transport NAMAs, for example Mexico, Chile and Argentina.

Developing countries have the opportunity to include measures that address the transportation sector. The financial framework to support NAMAs is starting to emerge, for example through the Green Climate Fund adopted as part of the Cancun Agreement at COP16 (2010). Financing for NAMAS can be made available partially upfront, to cover capacity building, finance planning and technology transfer, as opposed to when emissions reductions are realised.

There is fragmentation across the support channels.

This is partly a result of several EC Directorates providing support via different mechanisms. EuropeAid provides a co-ordinating function across the EC but that there this function could be improved. The link between EC, EU and international channels could also be strengthened, e.g. by harmonising goals, methodologies and procedures.

E.6 Recommendations for EU policy makers on enhancing transport mitigation actions in non-EEA countries

In view of the findings on the current support channels available to European policy makers, recommendations can be provided to;

- Development policy makers (DG-Development, DG-External Relations, DG-EuropeAid) – utilising its position as one of the largest aid providers in the world.
- Climate policy makers (DG-CLIMA) – using its large influence on climate policy.
- Transport policy makers (DG-MOVE) – using its wealth of sectoral expertise.

Development policy makers (DG Development/DG External Relations/DG EuropeAid) may:

Topic	Specific Recommendations
Reorient development policies and promote sustainable development	• Recognise that transport is a key sector for sustainable development, and ensure a prominent position of the sector within the development goals of future EU development policy (i.e. in the Green Paper on European development policy[9]) • Ensure sustainability criteria are at the centre of policy making. Account for carbon in all projects / programmes supported through EU/EC channels. Follow (and surpass) ADB's lead in this regard. • Reorient /earmark assistance towards support for sustainable transport, specifically: o Infrastructure for public transport; o Technology; o Transport Demand Management; and

[9] EU development policy in support of inclusive growth and sustainable development: Increasing the impact of EU development policy. Available at: http://ec.europa.eu/development/icenter/repository/GREEN_PAPER_COM_2010_629_POLITIQUE_DEVELOPPEMENT_EN.pdf

	○ Land use planning. • To this end, create: ○ Sustainable transport windows/funds/initiatives under EC/EU assistance channels that specifically support sustainable transport, following the example of the ADB's Sustainable Transport Initiative. ○ Transport windows within climate oriented funds/mechanisms within EC/EU development instruments ○ A stream of resources from the EU-Emissions Trading Scheme (EU-ETS) that would invest part of the revenues from the sale of credits to the aviation sector for use in supporting sustainable transport in developing countries. • Differentiate the type of support by the level of development of the recipient country. Least Developed Countries would require financing (grants), whereas Medium Income and Emerging Economies may require loans. All countries would require capacity building and technology transfer, albeit at different scales and levels.
Ensure Inclusiveness	• Reorient support towards providing access, not traffic. • Support the development of non-motorised and public transport, especially in urban areas. This will support emission reductions and ensure inclusivity as the majority of developing country citizens do not (will not) have a car, even in 2030. • Combine support for infrastructure with services (e.g. the provision of road infrastructure in parallel with improvements to logistics).
Ensure high impact/ leverage	• Leverage changes in Multilateral Development Banks (MDBs), using the EC/EU's influence as a key stakeholder. For example, support the mainstreaming of carbon footprinting in the decision making processes of MDBs. • Leverage further financial resources from the private sector, for transport infrastructure and operations. • Leverage changes to domestic policies by increasing support for capacity building, for example in: ○ Financing sustainable transport, utilising lessons learned from Road Funds to create a "sustainable transport fund" in non-EEA countries, which would help secure a stream of funding. ○ The management and operation of public and non motorised transport systems. ○ Transport Demand Management ○ Integrated transport and land-use planning ○ The measurement, reporting and verification (MRV) of greenhouse gases in the transport sector (through supporting e.g. a "Transport Data Initiative") • Capacity building could be facilitated by setting up "Centres of Excellence" and/or "sustainable transport academies", for each region, or by theme.

Climate policy makers (DG Climate Action) may:

Topic	Specific Recommendations
Make available quick start finance for sustainable transport	• Promote a transport window under quick start finance, and facilitate the actions of EU Member States in their support for sustainable transport. • Encourage developing countries to "raise their hand" for quick start finance in transport (for example via acting as a Facilitation agency)
Make available long term finance for sustainable transport	• Promote a transport window within the proposed Green Climate Fund under the UNFCCC, to support; o The formulation of transport NAMAs; o Capacity building, especially on MRV; o Project implementation; • Link such support to Millennium Development Goals (MDGs) and other relevant EU programmes.
Promote reform of carbon market	• Promote the reform of existing carbon markets such as the CDM to include transport, using its CER buying power. • Promote the further upscaling of carbon markets, e.g. using programmatic and sectoral approaches. • Engage in the dialogue on standardised baselines for which consultations will occur in 2011, under the UNFCCC SBI[10]. • Ensure that climate finance is used for transformative interventions, for example capacity building for sustainable transport, data collection, MRV and policy formulation.
Develop transport-compatible MRV methodologies	• Support the development of additional transport methodologies for CDM, CTF, GEF and NAMAs, under a "Transport MRV Initiative".
Place a price on transport carbon and stimulate sector-wide changes	• Push for removal of fossil fuel subsidies, through support for the initiative taken up by the G20. • Ensure that prices for biofuels reflect their overall environmental/carbon footprint.
Coordinate the different streams of support relevant to climate mitigation	• In order to avoid fragmentation of climate and development funding, as well as the financial flows at local, national and international level, DG-CLIMA, together with other DGs could promote coherence among the various bilateral and global funds and support a greater involvement of recipient countries in the funding formulation.

[10] At the COP16 in Cancun, it was decided that under CDM, standardized baselines should be developed, as appropriate, inter alia, for energy generation in isolate systems, transport and agriculture. It is envisaged that the UNFCCC secretariat will organize a workshop on transport and CDM in the middle of 2011. In the run-up to this decision, the Transport Research Foundation (TRF) submitted recommendations for methods of standardisation which can help improve the efficiency, applicability and environmental integrity of CDM in the transport sector. See: http://unfccc.int/resource/docs/2010/smsn/ngo/185a.pdf

Transport policy makers (DG MOVE) may:

Topic	Specific Recommendations
Leverage change in transport policy in other parts of the world	• Work with other governments to mainstream EU standards on vehicles and fuels across the world (either through existing bodies such as the International Transport Forum, or through a new multilateral body.) • Share expertise in transport planning, public transport operations, TDM etc through a global version (or regional versions) of CIVITAS.
Bridge the gap between transport and climate policy	• Work with DG-CLIMA to support the development of transport NAMAs and MRV methodologies.

E.7 Outlook for the future: Filling in the gaps to move towards implementation of the actions identified

In order to fully implement the recommended actions, the following steps are required for further investigation and analysis.

To better understand how the EU may implement those measures employed in non-EEA countries to meet its own climate mitigation targets and contribute to green growth;

- Explore measures and policies across a wider range of countries not covered by the current review of 20 countries. Expand the database developed by T-MAPPER to cover a larger set of countries.
- Explore more in detail at what level of EU policy making the identified policies may be introduced, e.g. at EU-wide, Member State or local government level.
- Identify in particular which particular Member States / local governments within the EU can most benefit from the transfer of non-EEA policies identified by this review. In parallel, explore Member State/ locally specific barriers that may hinder the effective transfer of non-EEA policies.
- In view of the economic climate and limited government budgets, explore in particular how the cost-saving measures identified within this review can be rapidly deployed within the EU.
- In view of supporting green growth, empirically model the impacts of the identified transport policies on economic growth, especially green jobs.

To better understand how the EU may assist non-EEA countries in taking mitigation actions in the transport sector even further:

- Investigate what other policies being adopted by non-EEA countries are working in the opposite direction to carbon reduction (i.e. posing barriers) and how such policies are financed. Identify how the EU can help reduce such barriers.
- Model the impacts of current EU support in the transport sector (through all the channels identified) on GHGs. Utilise tools used already by e.g. the Asian Development Bank, to calculate the carbon footprint of EU support activities.

- If there is sufficient available data, undertake ex ante and ex post impact studies of a selection of measures to identify those intervention that are most effective in addressing climate change and promoting green jobs in non-EEA countries.
- In cases where data is not sufficiently available, identify how the EU can support data collection and monitoring through its capacity building efforts, which in the long run would also enable MRV NAMAs to be formulated in the recipient countries.
- Identify measures that would most effectively involve the private sector, especially from the investment community, to become involved directly in the financing of climate change measures in non-EEA countries.
- Investigate the impact that the adoption of the polluter pays principle in transport in non-EEA countries would have upon travel behaviour, carbon emissions and employment in green jobs.
- Enquire into how many of the planned policies in non-EEA countries will actually be implemented and the impact that this will have on their carbon emissions. Periodically monitor the situation regarding the policies that were identified in the review, to see how ―planned policies actually become implemented, and also to identify how international support (if given) has supported their implementation.
- Investigate what the EU can do to systematically learn and transfer best practice across countries, particularly those where the governance structures are less stable.
- Commission detailed research into other developing countries, either individually or region specific, to further understand the mechanisms by which finance is being applied to address carbon emissions and to identify how the EC can best contribute on a case by case basis.
- Utilise the methodology that has been developed under T-MAPPER to further explore policies in specific regional such as Africa and support the development of tailored programmes of support.

Contents

Executive Summary 3
E.1 Background and trends: Enhanced action in transport is urgently needed both in and outside of Europe to tackle climate change 3
E.2 The dual objectives and approach of the project: Learning from policies in, and understanding how to support actions in countries 4
E.3 Findings from the review of 20 non-EEA countries: What Europe can learn from the rest of the world 6
E.4 Recommendations for EU policy makers on enhancing transport mitigation actions within the EU: Climate and Transport Policy Makers can jointly lead EU efforts 14
E.5 Findings on the potential support channels: How the EU can support transport mitigation policies in non-EEA countries 16
E.6 Recommendations for EU policy makers on enhancing transport mitigation actions in non-EEA countries 20
E.7 Outlook for the future: Filling in the gaps to move towards implementation of the actions identified 23

SECTION I: Background and Introduction to T-MAPPER 35
1 Introduction 36
1.1 Action in transport is crucial to meet the climate challenge 36
1.2 Europe needs to accelerate its actions in transport, including transferring best practice from non-EEA countries 38
1.3 Europe can support further mitigation actions in non-EEA countries 40
2 The T-MAPPER Project 42
2.1 Objectives 42
2.2 Overall methodology for the project 42
2.3 Structure of the report 44

SECTION II: Identifying transport measures in non-EEA countries 45
3 Evaluation of non-EEA country measures 46
3.1 Selecting the countries for review 46
3.2 Developing a policy evaluation framework 50
3.2.1 Categorisation of policies 52
3.2.2 Evaluation criteria 53
3.2.3 Evaluation scoring and guidance 55
3.2.4 The data analysis process 60
4 Findings from the country reviews 61
4.1 Types of policies identified 61
4.2 The main actors for implementing the policies 68

4.3 The effectiveness of the policies at mitigating carbon emissions 72
4.4 The cost effectiveness of the policies identified 79
4.5 The broader co-benefits delivered by the policies 84
4.5.1 Impact on employment 85
4.5.2 Other social and environmental impacts 89
4.6 Key barriers towards the implementation of the policies 93
4.7 The transferability of the identified policies 100
4.8 Requirements for international support 105
4.9 Key findings from the country reviews 108

SECTION III: Identifying instruments for Europe to support measures in non-EEA countries 112
5 Scoping and evaluation of potential channels to support GHG reduction in non-EEA countries 113
5.1 Scoping of channels 113
5.2 Assessment of channels that support GHG reductions 115
6 Findings from the review of support channels 117
6.1 Overview of findings 117
6.2 European Commission channels 120
6.2.1 European Development Fund (EDF) 122
6.2.2 European Neighbourhood and Partnership Instrument (ENPI) 127
6.2.3 Development Cooperation Instruments (DCI) 131
6.2.4 Instruments for Pre-Accession Assistance (IPA) 133
6.2.5 The Global Climate Change Alliance 135
6.2.6 Instrument for Cooperation with Industrialized Countries (ICI) 137
6.3 Other EU related channels 139
6.3.1 The European Bank for Reconstruction and Development (EBRD) 139
6.3.2 The European Investment Bank (EIB) 145
6.4 International channels 150
6.4.1 Multilateral Development Banks 150
6.4.2 Clean Technology Fund 155
6.4.3 The Global Environmental Facility (GEF) 158
6.4.4 Clean Development Mechanism (CDM) 161
6.4.5 Joint Implementation (JI) 164
6.4.6 Copenhagen Quick Start Finance 166
6.4.7 Future Channel: Nationally Appropriate Mitigation Action (NAMAs) 168
6.5 Interpretation of findings on channels which can support the mitigation of transport emissions in non-EEA countries 171

SECTION IV: Conclusions and Recommendations for the EU 176
7 Conclusions 177
8 Recommendations 180
8.1 To further accelerate mitigation of transport GHGs within the EEA 180
8.2 In supporting transport mitigation actions in non-EEA countries 182
9 Outlook for the future 187
References 190

ANNEXES 195
Appendix A Country case studies 196
Australia 198
Brazil 200
Canada 202
China 204
Colombia 206
Ghana 208
India 210
Indonesia 212
Japan 214
Malaysia 216
Mexico 218
New Zealand 220
Philippines 222
Singapore 224
South Africa 226
South Korea 228
Thailand 230
United Arab Emirates 232
Ukraine 234
United States of America 236
Appendix B Data tables from the country analysis 238
Appendix C Evaluation of support instruments 274

List of Figures

Figure 1: Transport Emission Projections (Source: IEA 2009 and DfT, 2009) 3
Figure 2: The two main objectives of the project 4
Figure 3: Selected countries and reviewers 5
Figure 4: Policy instruments for transport GHG mitigation (Source: Dalkmann and Brannigan, 2007) 6
Figure 5: Modern public transport in Delhi, India (Photos: Kodukula and Mohsin, GTZ Photo CD) 9
Figure 6: Bus Rapid Transit in Guangzhou, China (Photo: Ko Sakamoto) 12
Figure 7: The demand and supply for support in transport mitigation actions 13
Figure 8: Overview of support channels identified 16
Figure 9: Levels of financial resources for the identified channels 17
Figure 10: Transport GHG emissions within the EU, 1990-2007 (Source: EEA, 2009) 36
Figure 11: Transport Emission Projections (Source: IEA 2009 and DfT, 2009) 37
Figure 12: Financial resources affecting transport (Adopted from Sakamoto et al 2010, based on UNFCCC 2007 data) 40
Figure 13: The two main objectives of the project 42
Figure 14: Overview of tasks 43
Figure 15: Country selection process 47
Figure 16: Policy instruments for transport GHG mitigation (Source: Dalkmann and Brannigan, 2007) 51
Figure 17: The number of current and planned policies in the 20 countries reviewed 62
Figure 18: Percentage of passenger, freight and mixed policies by country 63
Figure 19: Avoid, shift and improve distribution across all policies (for current and planned policies combined) 65
Figure 20: Percentage of policies categorised by strategic instrument 65
Figure 21: Level of implementation of the policies by region 68
Figure 22: Comparison of govemance for policies that bring 25% or more reduction of traffic activity and emission factors over a 10 year period (compared to BAU) 75
Figure 23: Total potential for mitigating carbon emissions, as stated by reviewers, over a 10 year period (compared to BAU) 76
Figure 24: Cost effectiveness for private and public US$/$CO_2$ saved 79
Figure 25: The number of green and other jobs created by policies and measures (for current policies only) 85
Figure 26: Potential social and environmental impacts of the policies and measures reviewed (for current policies only) 89
Figure 27: level of constraints experienced or expected (Current and Planned policies) 93
Figure 28: The transferability of policies 101
Figure 29: Percentage of polices that can benefit from international support across the different regions 105
Figure 30: Percentage of polices that can benefit technology transfer for each level of technical constraints faced 106
Figure 31: The relative influence of the EC with regards to the categories of channels identified 114
Figure 32: Disbursements/commitments from the main 3 EC instruments to the transport sector in year 2009, by region (Data source: EuropeAid Co-Operation Office, 2009) 121
Figure 33: Disbursement of the EC channels from 2002 to 2008 by subsector 123
Figure 34: Disbursement of the EC channels from 2002 to 2008 by type of aid 124
Figure 35: Total number of projects and their total value between 2000 and 2009 (Source: EBRD, 2010) 140
Figure 36: EBRD transport investment by mode (Source: EBRD, 2010) 141
Figure 37: Recently commissioned projects by the EBRD (Source: EBRD, 2010) 142
Figure 38: EIB transport investments by year to countries outside of the EU (Data Source: EIB, 2010. Sum for 2010 incomplete) 146
Figure 39: ADB's Sustainable Transport Initiative: Subsector shares of transport lending – Actual, Pipeline and Target (Source: ADB, 2010) 152
Figure 40: Levels of financial resources for the identified channels 172
Figure 41: The demand and supply for support in transport mitigation actions 178
Figure 42: The number of current and planned policies in the 20 countries reviewed 238
Figure 43: Percentage of passenger, freight and mixed policies 238
Figure 44: Percentage of passenger, freight and mixed policies by country 239
Figure 45: Percentage of passenger, freight and mixed policies by current or planned 239
Figure 46: Percentage of policies relating to one, more or all modes 240
Figure 47: Number of policies relating to one, more or all modes by country 240
Figure 48: Percentage of policies relating to each mode 241
Figure 49: Percentage of policies relating to each mode 241
Figure 50: Type of policy (a) 242
Figure 51: Type of policy (b) 242
Figure 52: Avoid, Shift and improve for current and planned 246
Figure 53: Avoid, Shift and improve 247
Figure 54: Avoid, Shift and improve by implementation level 247

Figure 55: Level of implementation for current (top) and planned (bottom) policies 248
Figure 56: Level of implementation by region 249
Figure 57: Implementing actor for current (top) and planned (bottom) 250
Figure 58: Implementing actor by region 251
Figure 59: Reduction potential by ASI for current (top) and planned (bottom) 252
Figure 60: Reduction potential by ASI 253
Figure 61: Improving potential by ASI 254
Figure 62: Improving potential by ASI for current (top) and planned (bottom) 255
Figure 63: Improving potential by implementation level 257
Figure 64: Potential total 257
Figure 65: Comparison of governance for policies that bring 25% or more reduction of traffic activity and emission factors 258
Figure 66: Public and private cost effectiveness 258
Figure 67: the number of green jobs created by policies and measures (for current policies only) 262
Figure 68: The number of other jobs created by policies and measures (for current policies only) 264
Figure 69: Social impacts - Redistributive effects 266
Figure 70: Social impacts - Accessibility enhancement 266
Figure 71: Social impacts - Safety improvement 267
Figure 72: Environnemental impacts – congestion relief 267
Figure 73: Environmental impacts – Noise and vibration reduction 268
Figure 74: Environemental impacts – air pollution reduction 268
Figure 75: Level of technical constraint experienced or expected 269
Figure 76: Level of political constraint experienced or expected 269
Figure 77: Level of institutional constraint experienced or expected 269
Figure 78: The transferability of policies between Annex 1 and non-Annex 1 countries 271
Figure 79: The number of polices that can benefit from capacity building support across the different regions 272
Figure 80: The number of polices that can benefit from financial support across the different regions 272
Figure 81: The number of polices that can benefit from technological support across the different regions 273

List of Tables

Table 1: Key points of importance of the three groups of channels to EU policy makers 17
Table 2: Selected countries for the T-MAPPER reviews 49
Table 3: Avoid, Shift and Improve polices in developed and developing countries 50
Table 4: Country review categorisation criteria 52
Table 5: The selected criteria and the scoring process 56
Table 6: Collecting information on international support needs 58
Table 7: Example of completed country review (South Africa) 59
Table 8: Examples of types of economic policies and measures identified 66
Table 9: Policies identified with potential to reduce traffic volume by more than 25% over a 10 year period (compared to BAU) 72
Table 10: Policies which had potential for improving emission factors by more than 25% over a 10 year period (compared to BAU) 74
Table 11: Most effective at reducing carbon emissions over a 10 year period (compared to BAU) when behaviour change and improvement in emission factors are considered jointly 76
Table 12: Measures that save households money 80
Table 13: Cost negative measures for governments 82
Table 14: Current policies that have or are leading to the creation of thousands of jobs 86
Table 15: Current policies that have or are leading to the creation of thousands of green jobs 88
Table 16: Policies that have the most significant positive environmental and social effects 90
Table 17: Policies with a high level of technical restriction 94
Table 18: Policies with a high level of political restriction 96
Table 19: Policies with a high level of institutional restriction 98
Table 20: Examples of the types of policies that are transferable 102
Table 21: Key points of importance of the three groups of channels to EU policy makers 114
Table 22: Evaluation criteria for the assessment of channels 116
Table 23: Overview of identified channels 118
Table 24: Example summary table of a support channel 119
Table 25: Summary of the three main EC instruments 120
Table 26: Projects supported through the Neighbourhood Investment Facility (NIF) of the ENPI (2008-2010) 128
Table 27: Projects supported through the IPA 134
Table 28: Recent (2009 and 2010) projects supported by EIB outside of the EU 147
Table 29: Key points of importance of the three groups of channels to EU policy makers 171
Table 30: Representative types of support being demanded and supplied 179
Table 31: Economic policies 243
Table 32: Number of Government and Private Policies (jointly) by country 251
Table 33: The policies that had potential for reduction of more than 25% 253
Table 34: the policies that had potential for improving of more than 25% by region 254
Table 35: Policies that had a total potential for mitigating carbon emissions of more than 25% 256
Table 36: Policies that caused SAVINGS to the Government budget 259
Table 37: Policies that caused SAVINGS to the household 260
Table 38: Current policies that are expected to create more than thousands of green jobs 263
Table 39: Current policies that are expected to create more than thousands of other jobs 264
Table 40: List policies with a high level of restriction (Current) 270
Table 41: List policies with a high level of restriction (Planned) 270
Table 42: Scoping of European and International support instruments 274
Table 43: Evaluation of European and International support instruments 275

List of Boxes

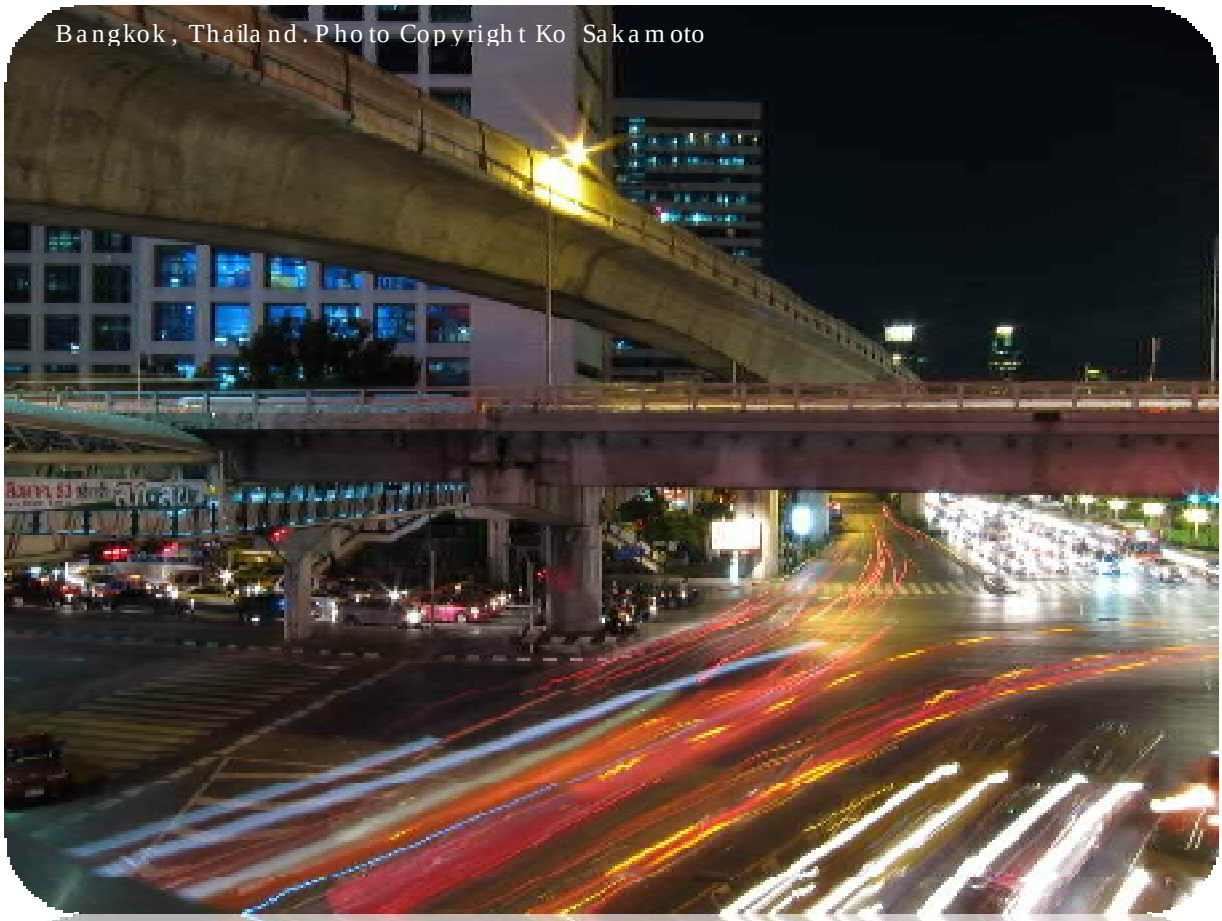
Box 1: The potential role of the EU as a leader in tackling transport emissions across the world 4
Box 2: The use of economic instruments 7
Box 3: Case study: using national policy to support the strategic creation of green jobs: India's National Urban Transport Policy (NUTP) 9
Box 4: Transferring knowledge on private sector involvement 11
Box 5: Bus Rapid Transit: an example of south-south and south-north transfer 12
Box 6: Matching the demand for and supply of support for sustainable transport 13
Box 7: The potential role of the EU as a leader in tackling transport emissions across the world 37
Box 8: Actions are already being taken at the EU level 39
Box 9: Approaches to policy evaluation 53
Box 10: Thinking ahead: Action plans and national strategies on low carbon transport 62
Box 11: Mitigation actions in freight: the case of Japan and the USA 64
Box 12: A focus on economic instruments 66
Box 13: Key findings: the types of polices identified 67
Box 14: Leveraging change at the sub-national level 69
Box 15: Examples of action by NGOs to catalyse changes in national and local transportation policy 70
Box 16: Key findings: The actors 71
Box 17: Supporting the reduction in traffic volume: Electronic Road Pricing (ERP) in Singapore 73
Box 18: Legislation driving change: The California Assembly Bill 73
Box 19: Measurement of exhaust fumes in Ghana 74
Box 20: Fuel consumption efficiency standards leading to emission reductions in Japan 77
Box 21: Key findings: which polices were the most effective 78
Box 22: Saving households money and reducing peak traffic volume in Singapore 81
Box 23: Fleet targets helping to reducing government spending: The Australian Capital Territory (ACT) Government's Fleet Target 83
Box 24: Key findings: the most cost effective policies 84
Box 25: Using national policy to support the strategic creation of green jobs: India's National Urban Transport Policy (NUTP) 87
Box 26: Integrating transport planning and land use planning, the case of Kuala Lumpur, Malaysia 90
Box 27: Canada's Green Municipal Fund (GMF) supporting the environment in addition to mitigating greenhouse gas emissions 91
Box 28: Key findings on policies and measures that deliver broader positive impacts 92
Box 29: A large appetite for technologies in rail transport 95
Box 30: Overcoming political restrictions for Transport Demand Management 97
Box 31: The need for strong institutional coordination for public transport and non-motorised transport 99
Box 32: Key findings: the key barriers likely to restrict the implementation of policies 100
Box 33: BRT: an example of south-south and south-north transfer 103
Box 34: Transferring knowledge on private sector involvement 103
Box 35: Key findings: the transferability of policies 104
Box 36: Key findings: International support requirements 107
Box 37: An overview of the external assistance managed by the European Commission 120
Box 38: The EU-Africa Partnership on Infrastructure 125
Box 39: Environmental considerations within European Commission development projects/programmes 126
Box 40: The European Neighborhood Policy 2010: Sectoral Progress Report for Transport 130
Box 41: Examples of recently supported transport projects 142
Box 42: The EBRD's carbon footprinting and Environmental and Social Policy 143
Box 43: The German International Climate Initiative (ICI) as an example of a Member Country Initiative 149
Box 44: The Asian Development Bank's Sustainable Transport Initiative 152
Box 45: Mexico CTF Investment Plan – Transportation Component 157
Box 46: Ghana Urban Transport 160
Box 47: BRT in Bogotá, Colombia: TransMilenio Phase II to IV 163
Box 48: Procera Biodiesel Production Plant, Fundulea, biodiesel production and use for transportation in Romania 165
Box 49: Key findings on channels which can support the mitigation of transport emissions in non-EEA countries 175
Box 50: Key recommendations to further accelerate mitigation of transport emissions within the EEA 182
Box 51: Key recommendations on supporting transport mitigation actions in non-EEA countries 186

Acronyms

AAU	Assigned Amount Units
ACP	Africa, Pacific and Caribbean
ACT	Australian Capital Territory
ADB	Asian Development Bank
AEC	ASEAN Economic Community
AfDB	African Development Bank
AfT	Aid for Trade
ALA	Asia and Latin America
ASEAN	The organization of Southeast Asian Nations
ASI	Avoid Shift Improve
ASSET	Advanced Safety and Driver Support for Essential Road Transport
BAU	Business As Usual
BRT	Bus Rapid Transit
CAI	Clean Air Initiative
CANTIQUE	Concerted Action on Non Technical measures and their Impact on air QUality and Emissions
CDM	Clean Development Mechanism
CEP	Country Environmental Profiles
CER	Certified Emission Reductions
CIF	Climate Investment Funds
CMP	Conference of the Parties under Kyoto Protocol
CO_2	Carbon dioxide
COP	Conference of the Parties
CSP	Country Strategy Papers
CTF	Clean Technology Fund
DAC	Development Assistance Committee
DCI	Development Cooperation Instrument
DfID	Department for International Development of the UK
DG	Directorate General
DREBERIS	Dresdner Beratung für internationale Strategien
EBRD	European Bank for Reconstruction and Development
EC	European Commission
ECN	The Energy Research Centre of the Netherlands
EDF	European Development Fund
EDP	Environmentally Adjusted Net Domestic Product
EEA	European Environment Agency
EIB	European Investment Bank
EMBARQ	The WRI Center for Sustainable Transport
ENPI	European Neighbourhood and Partnership Instrument
EPA	Environmental Protection Agency
ERP	Electronic Road Pricing
ERU	Emission Reduction units
ETS	European Union Emissions Trading Scheme
EU	European Union
EUA	European Union Allocation
EU-ETS	EU Emissions Trading System
FSU	Former Soviet Union

GCCA	Global Climate Change Alliance
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEF	Global Environmental Facility
GHG	Greenhouse gas
GMF	Green Municipal Fund
GPS	Global Positioning System
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
GVG	Green Vehicle Guide
ICF	Infrastructure Crisis Facility
ICI	Instrument for cooperation with Industrialised Countries
ICPCs	International Cooperation Partner Countries
IDB	The Inter-American Development Bank
IEA	International Energy Agency
IEG	Independent Evaluation Group
IFI	International Financial Institution
INFRA	Infrastructure Recovery and Assets Platform
IPA	Instrument for Pre-accession Assistance
IPCC	Intergovernmental Panel on Climate Change
ISIS	Istituto di Studi per l'Integrazione dei Sistemi
ITDP	Institute for Transportation and Development Policy
ITPS	Institution for Transport Policy Studies
ITS	Intelligent Transport Systems
IWW	Inland Waterways
JAA	Joint Aviation Authorities
JI	Joint Implementation
LDCF	Least Developed Countries Fund
LDC	Least Developed Country
LEVs	Low Emission Vehicles
LPG	Liquefied petroleum gas
MCA	Multi Criteria Analysis
MDBs	Multilateral Development Banks
MDGs	Millennium Development Goals
MRV	Measurement, Reporting and Verification
NAMA	Nationally Appropriate Mitigation Action
NAP	National Allocation Plan
NAPA	National Adaptation Programmes of Action
NDP	Net Domestic Product
NEPAD	The New Partnership for Africa's Development
NGO	Non-Governmental Organisation
NIF	Neighbourhood Investment Facility
NIP	National Indicative Programs
NMT	Non-Motorised Transport
NUTP	Indian National Urban Plan
OCT	Overseas Countries and Territories
ODA	Official Development Assistance
OECD	Organisation for Economic Co-Operation and Development
OPC	Off-Peak Car Scheme
PKM	Passenger kilometre
PoA's	Programmes of Activity

PPP	Public-Private Partnership
PT	Public Transport
REST-AP	Regional Environmentally Sustainable Transport Action Plan
SBI	Subsidiary Body for Implementation
SBSTA	Subsidiary Body for Scientific and Technological Advice
SCCF	Special Climate Change Fund
SCF	Strategic Climate Fund
SCP	Sustainable Consumption and Production
SEA	Strategic Environmental Assessment
SEI	Sustainable Energy Initiative
SICAs	Specific International Cooperation Actions
SIP	Sustainable Industrial Policy
SLOCAT	Partnership on Sustainable Low Carbon Transport
SME	Small and Medium sized Enterprises
SPECTRUM	Study of Policies regarding Economic instruments Complementing Transport Regulation and the Undertaking of physical Measure
STI	Sustainable Transport Initiative
TAIEX	Technical Assistance and Information Exchange
TDM	Transport Demand Management
TENs	Trans-European Networks
TKM	Tonne kilometre
T-MAPPER	Transport Measures and Policies to Promote Emission Reductions
TRACECA	Transport Corridor, Europe - Caucasus-Asia
TRL	Transport Research Laboratory
UAE	United Arab Emirates
UIC	Union of Railways
UNEP	United Nations Environment Programme
UNFCCC	United Nation Framework Convention on Climate Change
USA	United States of America
VKM	Vehicle kilometre
WB	World Bank
WBCSD	World Business Council for Sustainable Development
WTO	World Trade Organisation



SECTION I:
Background and Introduction to T-MAPPER

1 Introduction

1.1 Action in transport is crucial to meet the climate challenge

Transport is vital in supporting the economic and social wellbeing of citizens in Europe and across the world. At the same time, the transport sector poses a large challenge in terms of mitigating climate change to within 2 degrees above pre industrial levels,[11] as the sector is one of the largest and fastest growing sources of greenhouse gases (GHGs).

At the European level, the transport sector was responsible for 22% of total EU GHG emissions in 2005, increasing by 28% between 1990 and 2006 as shown in Figure 10 (EEA, 2009b). This compares to a 3% reduction in emissions across all other sectors.

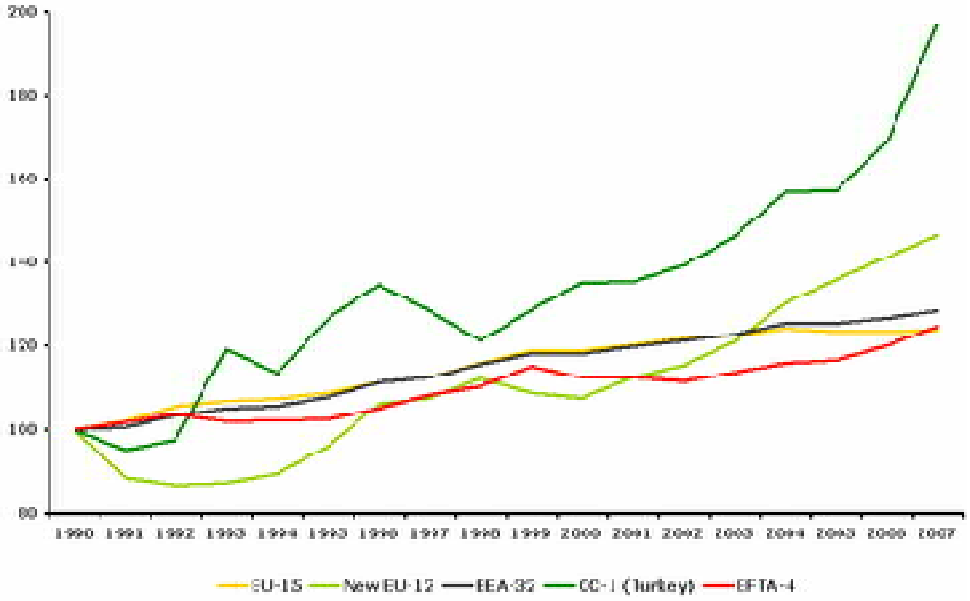


Figure 10: Transport GHG emissions within the EU, 1990-2007 (Source: EEA, 2009)

If the EU is to be successful in meeting its stated emission reduction targets of 20% unilaterally by 2020 compared with 1990 levels (with the potential to be increased to 30% with a strong future global agreement), it is evident that the transport sector will need to implement further actions to reduce significant emissions from this sector (EC, 2010a).[12]

Globally transport currently accounts for 23% of carbon dioxide (CO_2) emissions, and this is expected to grow strongly over the next 20 years (IEA, 2009). As highlighted in Figure 11, non-OECD countries (the majority of which are non-EEA countries) are likely to be responsible for the vast majority of the growth in GHG emissions from the transport sector as their economies develop and motorisation continues at a rapid pace.[13]

[11] The IPCC (2007) states that global cuts in greenhouse gas (GHG) emissions of up to 50% in developing countries and over 80% in developed countries will be required by 2050 to keep climate change to 2 degrees Celsius above pre-industrial levels.
[12] See http://ec.europa.eu/clima/policies/brief/eu/index_en.htm
[13] It is also important to ensure that international maritime and aviation emissions are reduced, as they are predicted to grow rapidly.

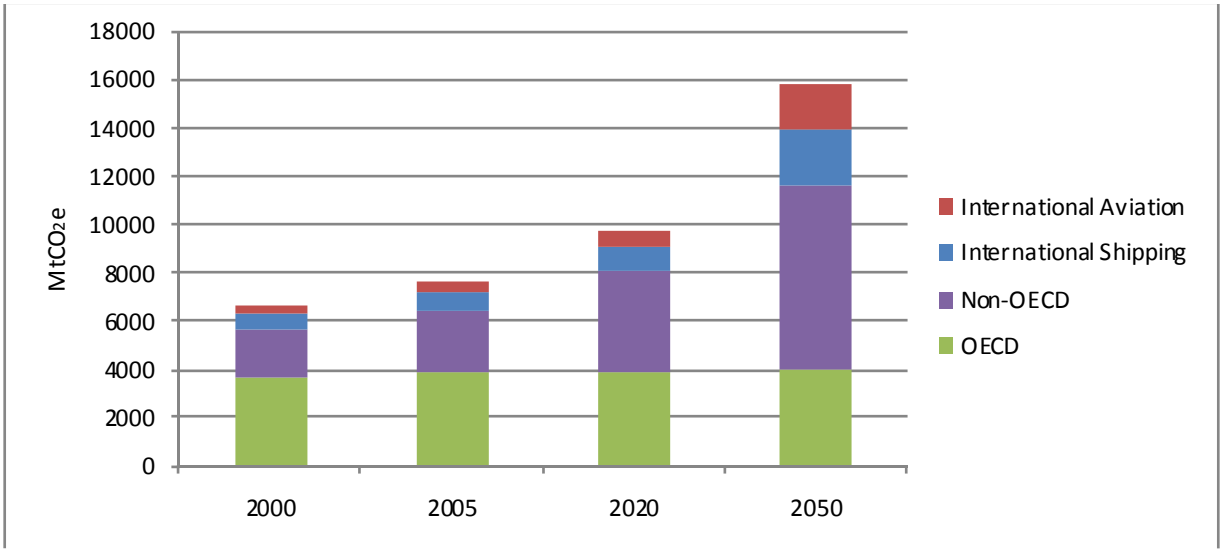


Figure 11: Transport Emission Projections
(Source: IEA 2009 and DfT, 2009)

Efforts to reduce GHG emissions from the European transport sector need to continue, but it is also important for the EU and its Member States to recognise how they can support and enable the reduction of emissions in non-EU countries, especially in developing countries where the majority of the increase in emissions are set to take place.

Box 7: The potential role of the EU as a leader in tackling transport emissions across the world

There is a significant opportunity currently for Europe to use its expertise, experience and resources to help reduce or avert the growth in emissions in developing countries. This stems from:

- The fact that the EU and its Member States is a proactive "agenda setter" for climate related instruments (and surrounding policies), and continues to exercise a leading role within the climate negotiations.
- The significant levels of international support the EU makes available, both through its own instruments such as the European Development Fund and Development Cooperation Instrument, as well as through multilateral channels such as the World Bank.
- The many examples of good practice that can be found Europe with regards to transport policy, including fuel/vehicle standards and taxes on the national level, and transport demand management, high quality public transport and provision for non-motorised transport at city level.

In awareness of this situation, DG-Climate Action of the European Commission (EC) commissioned a study known as "Transport Measures And Policies to Promote Emission Reductions (T-MAPPER)", in order to:

1. Provide a comprehensive understanding of policies being enacted outside the EEA to reduce the climate impact of the transport sector, some of which could be transferred to EEA countries, and;

2. Provide information on possible instruments to support the reduction, or avoidance, of increases in carbon emissions from transport in non-EEA countries.

1.2 Europe needs to accelerate its actions in transport, including transferring best practice from non-EEA countries

The EU's 2006 update of its 2001 Transport White Paper 'European transport policy for 2010: time to decide' (EU, 2001), introduced policy measures that Member States should implement to address high levels of energy consumption from the transport sector. This emphasised the need for European transport policy to reflect, and to become more integrated with, strategies relating to environmental commitments such as the Kyoto Protocol. This current White Paper sets the agenda for European transport policy until 2010, with a new White Paper being developed and due for completion in the near future.

The new White Paper is expected to define a vision for the future of transport in Europe, and also detail specific steps to be taken in the sector between 2010 and 2020. It has been stated that future transport policy should reflect the main objectives of Europe, namely to:

'Achieve transport sustainability, which requires action to promote competitiveness and reduce environmental impact while simultaneously ensuring that future generations have access to safe, secure, reliable and affordable mobility resources to meet their own needs and aspirations'. [14]

The White Paper will focus on policies to achieve sustainable transport and the revision of the TEN-T guidelines will do so to meet the infrastructure needs of the EC.

Recent work, including the EEA's 'Towards an Efficient Transport System' report (EEA, 2009c) represent a growing consensus that further mitigation of transport emissions in Europe is possible, and that they require the implementation of a wide-ranging list of policies including those which impact on:

- Technology – e.g. for vehicles and fuels.
- Behavioural change – including a shift towards public transport and non-motorised transport for passengers and a shift towards rail and water in the freight sector, enabled by a close link between transport and land use planning.

For the EU to accelerate mitigation actions in the EU transport sector, the EU can benefit from the experience of other (non-EEA) countries in developing and applying policies with a positive impact on climate mitigation.

[14] The White Paper is being informed by two public consultations, one on the Green Paper 'Trans-European transport network: A policy review,' and another on 'A sustainable future for transport.' The consultation on the Two supporting policy documents aimed to identify ways in which challenges facing the sector could be addressed, including policy measures that stakeholders would like incorporated in the White Paper.

Box 8: Actions are already being taken at the EU level

Already the European Union (EU) has recognised and responded to the need to tackle carbon emissions. Central to this action is the EU Climate and Energy Policy, which will be enacted by 2011 (EC, 2008b). This commits the EU to meet legally binding targets by 2020 in relation to GHG emissions, energy consumption and renewable energy. It also sets specific requirements to be met by the aviation sector—a reduction of 10% below 2005 GHG emissions by 2020—which will be included in the EU Emissions Trading System (EU-ETS) from 2012.

Apart from aforementioned White Paper, there are several other important European initiatives being taken by the European Commission which are relevant to this topic. The EC's Work Plan for 2010 highlights inter alia:

- Energy Action Plan 2011-2020: A holistic document is expected to be published in early 2011 setting out key priorities.
- Interim document on the Energy Action Plan: At the initiative of the Spanish EU Presidency, the Commission is requested to come forward with an interim document on the Action Plan in May 2010.
- Energy Taxation Directive: The Commission will develop and publish a proposal to revise current rules to ensure CO_2 is taken into account in minimum levies.
- Energy efficiency: An Action Plan will be developed, focusing especially on the building and transport sectors, as well as energy supply systems.
- 2050 Energy Vision: A roadmap towards a 2050 low carbon energy vision will be drafted, looking towards decarbonisation of energy and transport.
- Energy infrastructure package: This will set out priorities for interconnections and the development of smart grids.
- Communication on "Mainstreaming Climate Adaptation and Mitigation in EU policies and climate proofing of financial instruments
- Communication on a 30% emissions reduction: This will set what measures would be necessary to step up the EU emissions reduction goal to 30% by 2020, if this is agreed by EU leaders.
- Integration of adaptation and mitigation: Following up on 2009's White Paper, this will look to integrate climate adaptation and mitigation in policies and programmes.
- Transport technology: A Sustainable Transport Technology Plan is expected to be published, setting out technology development needs to achieve decarbonisation by 2050.
- Biofuel sustainability: A Commission Communication will set out how to implement the sustainability scheme for biofuels.
- Green vehicles: A Communication will set out a strategy for the decarbonisation of transport vehicles.

Furthermore, several initiatives are taken with regards to improving the effectiveness of the external (development) assistance provided by the EC, including for example a consultation by DG-Development on the future of budget support. (see http://ec.europa.eu/development/icenter/featured_20101019_eu_budget_support_en.cfm).

1.3 Europe can support further mitigation actions in non-EEA countries

In addition, and in contribution to a global effort to curb the growth of emissions particularly in developing countries, the EU is well positioned to provide a range of support to accelerate actions in non-EEA countries. Such support may be provided as:

- Financing
- Capacity building
- Technology transfer

With regards to financing, Sakamoto et al (2010) acknowledges that the development of transport is shaped by a wide range of financial flows, the largest being domestic public and private flows (available generally in trillions of dollars), Official Development Assistance (available in billions of dollars) and climate finance (available in millions of dollars).

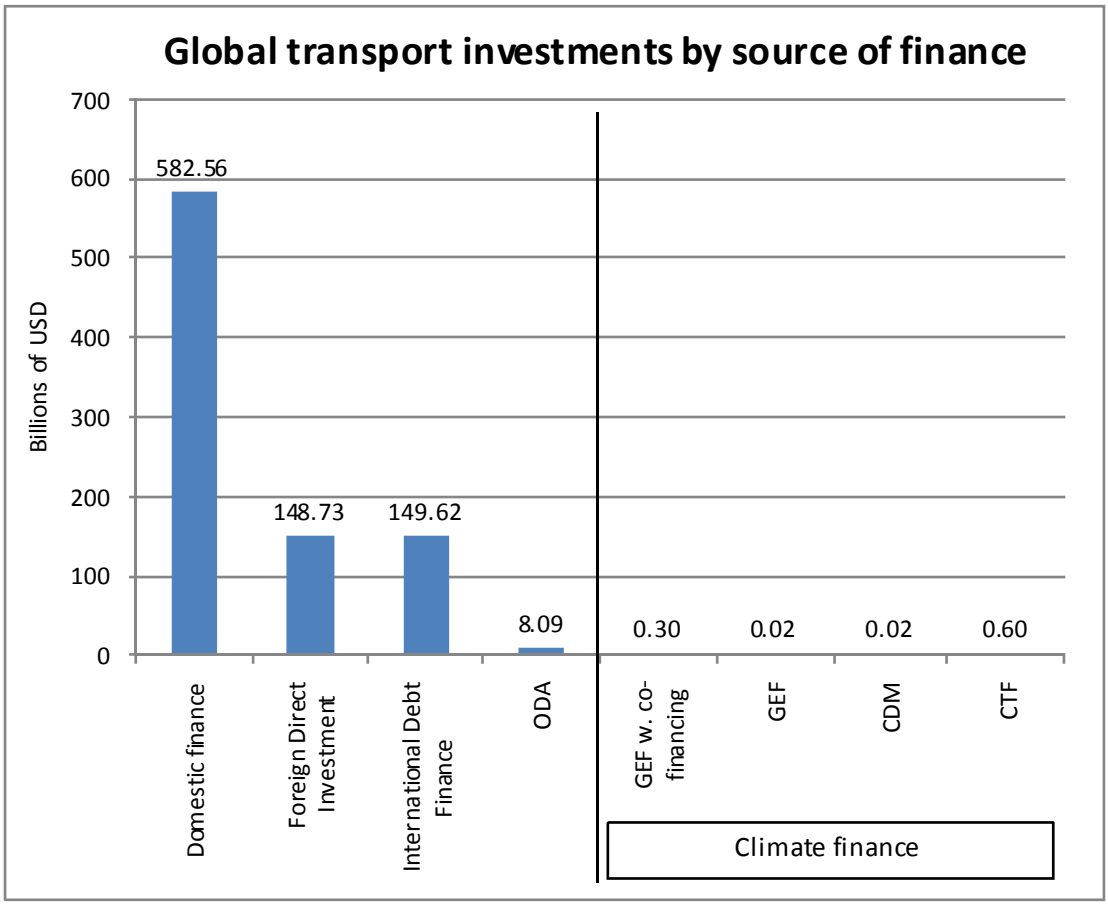


Figure 12: Financial resources affecting transport (Adopted from Sakamoto et al 2010, based on UNFCCC 2007 data)

This shows the potential impact that the EU can make in shaping transport patterns in non-EEA countries, through e.g. its ODA programmes and contribution to climate finance.

In terms of technology transfer and capacity building, the EU has a large potential to provide for the development of sustainable transport in non-EEA countries through its

technical assistance programmes, thereby assisting in the mitigation of GHGs from the transport sector in those countries.

To ensure effective, efficient and permanent reductions in transport emissions, such support must recognise the existence of the broad range of policies available; including policies which are primarily aimed at other objectives, such as reducing local air pollution. Furthermore, any strategy to reduce GHG emissions should recognise the importance of decisions and developments made outside the transport sector. Policies developed, and implemented, must recognise the consequences of activities within other sectors and be based upon an analysis of these factors if they are able to have the maximum impact upon emission reductions (see EEA, 2009a).

2 The T-MAPPER Project

2.1 Objectives

Within the above context, the European Commission (EC) commissioned a study referred to as "Transport Measures And Policies to Promote Emission Reductions (T-MAPPER)", whose main aims were to:

1. Provide a comprehensive understanding of policies being enacted outside the EEA to reduce the climate impact of the transport sector, some of which could be transferred to EEA countries, and;

2. Provide information on possible instruments to support the reduction, or avoidance, of increases in carbon emissions from transport in non-EEA countries.

The above two objectives are illustrated in Figure 13 below, and shows how the objectives mutually support EEA and non-EEA countries in their efforts to mitigate transport emissions.

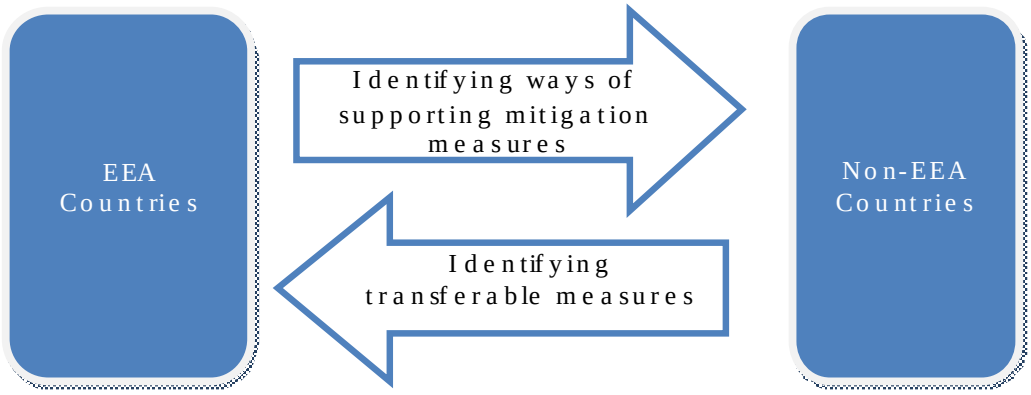


Figure 13: The two main objectives of the project

2.2 Overall methodology for the project

These objectives were met through the following two tasks:

- Task 1: Evaluation of non-EEA country measures - primarily focused on collecting information to provide a comprehensive understanding of policies being enacted outside the EEA. Measures for reducing GHG emissions were evaluated for 20 countries. The evaluation required development of a standard format and evaluation framework. Analysis included assessing the transferability of non-EEA country measures to EEA countries.
- Task 2: Identification of instruments for the EU to support transport emissions reduction in non-EEA countries - primarily focused on analysing ways in which the EU and its Member States (as developed countries) can support the mitigation of transport emissions in non-EEA countries. It involved the scoping of potential instruments to support the reduction of GHG emissions from transport in non-EEA countries, the assessment of such instruments, and the development of

recommendations for the EU in ensuring that such support can be implemented in an effective manner.

The above tasks were further split into sub-tasks, as summarised in Figure 14 and elaborated further in Chapter 3.

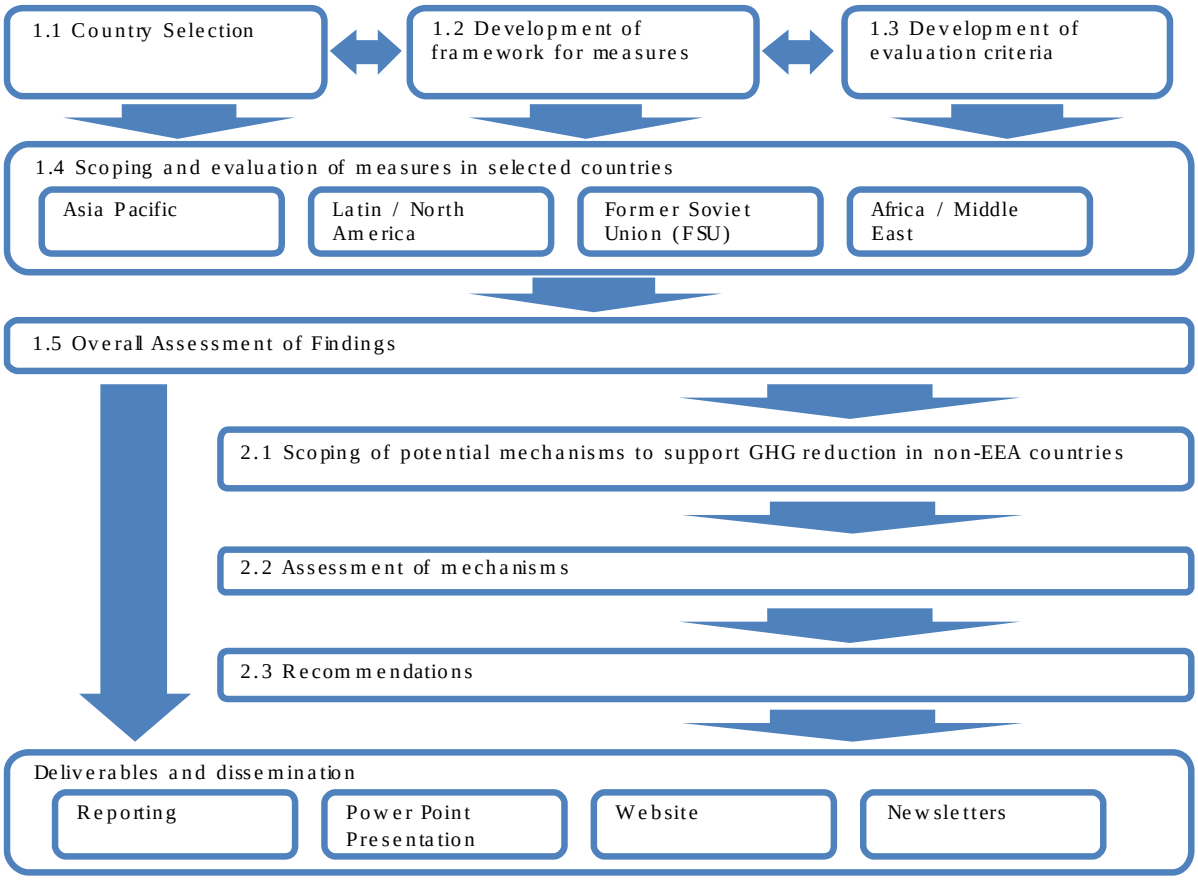


Figure 14: Overview of tasks

2.3 Structure of the report

This report presents the findings of the T-MAPPER project and its two tasks, and is structured as follows:

Section I provides the introduction and background of the study. Specifically;

- Chapter 1 provides an introduction to the role of the transport sector in GHG emissions, trends and predictions for future levels of emissions.
- Chapter 2 provides an overview of the project and the methodology.

Section II provides the details of how the project has met the first objective of the study—to provide a comprehensive understanding of policies enacted outside the EEA to reduce the climate impact of the transport sector, some of which could be transferred to EEA countries.

- Chapter 3 includes information on how the evaluation framework was developed.
- Chapter 4 presents the key findings from the review.

Section III provides the details of how the project has met the second objective of the study—to provide information on possible instruments to support the reduction, or avoidance, of increases in GHG emissions from transport.

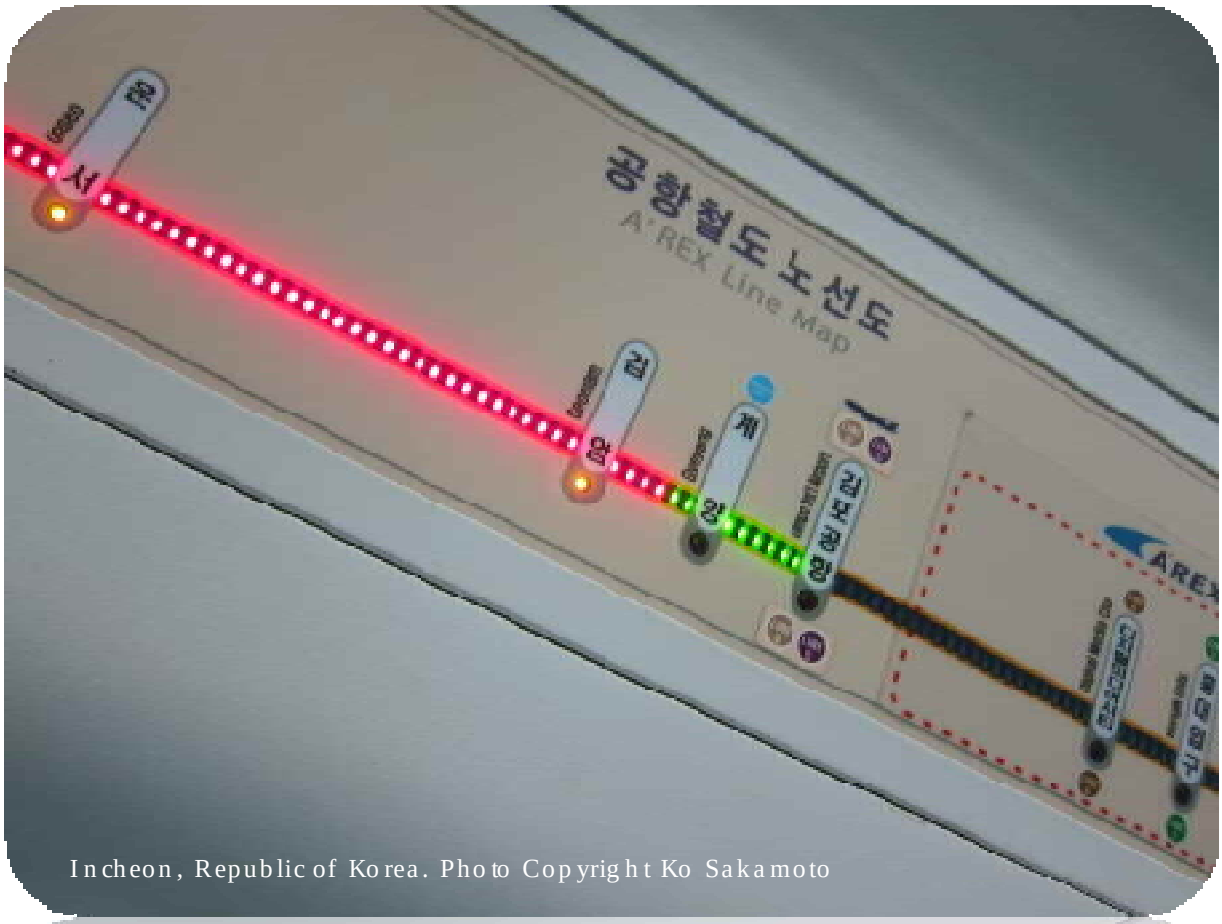
- Chapter 5 describes instruments to support reductions in the impact of transport were scoped and assessed.
- Chapter 6 presents the key findings from this analysis.

Section IV provides the summary and recommendations. Specifically;

- Chapter 7 provides the conclusions of the T-MAPPER project.
- Chapter 8 provides key recommendations for EU policy makers.
- Chapter 9 provides ideas for further research, based on the findings of this report.

Annexes provide further details of the project, including summary findings and recommendations by country, summary charts, figures and tables.

Further data on the policies reviewed is available on the T-MAPPER website http://www.sutp.org/T-MAPPER/



Incheon, Republic of Korea. Photo Copyright Ko Sakamoto

SECTION II: Identifying transport measures in non-EEA countries

3 Evaluation of non-EEA country measures

To provide a comprehensive understanding of policies being enacted outside the EEA and to reduce the climate impact of the transport sector, Task 1 focused upon:

- Selecting 20 countries whose measures for reducing GHG emissions were evaluated (sub-task 1.1);
- Developing a standard format and evaluation framework for the GHG reduction measures (sub-task 1.2 and 1.3);
- Scoping and evaluating the policies and measures in the 20 selected countries (sub-task 1.4); and
- Analysing the findings (sub-task 1.5).

3.1 Selecting the countries for review

The initial sub-task (1.1) was the selection of 20 countries whose GHG reduction measures were reviewed and evaluated.

As a precondition, it was requested that the selected countries for review needed to include:

- All non-EEA UNFCCC Annex 1 countries
- United States of America, China and India

In addition, the other selected countries needed to reflect a coverage of different continents, stages of development, size, geography and economic and social conditions.

On these bases, a three-stage selection process was developed to select countries which reflect the objectives of the project and the EC's specifications for the range of countries suggested for review.

Stage 1 of the selection process eliminated countries, from the 192 UN Member States, based on the following criteria:

- Removal of EEA countries (a key specification for this study). Both Switzerland and Turkey were removed; the former because it broadly follows EU legislation and approaches.
- Removal of countries ranking below 40% in the World Governance Indicator - Government Effectiveness (World Bank, 2010). As the study evaluated the effectiveness of transport policies, countries with weak governance are considered not to be appropriate for selection.
- Removal of Small Island states, reflecting the view that these countries have comparatively limited transport networks. Singapore was included due to the existence of many well-known transport measures and policies such as electronic road pricing.

Stage 2 narrowed the selection of countries based on criteria that reflected the need for variation in the selection of countries for study, i.e. a balanced representation of:

- World regions,
- Countries with large, medium and small total populations,

- Countries with high, medium and low population densities,
- Countries with high, medium and low per capita GDP.

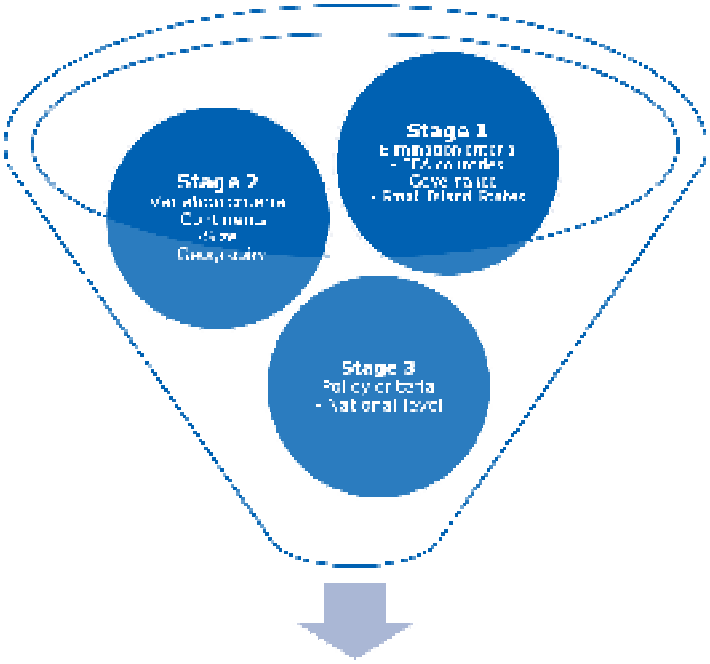
Stage 3 identified initial carbon emission reduction policies and measures within the potential countries. A focus was on national policies to reflect the level at which the EU provides support.

In addition to a selection based on the criteria discussed above, it was important to recognise the potential risks faced by the project team in reviewing these countries. The short list of selected countries was qualitatively assessed of their risks based on:

- Access to country specific information – a perceived low risk if one of the project partners had direct access, i.e. through sub-offices or partners; and

- Institutional barriers - such as obstructive administrations which may lead to delays in gathering information.

Figure 15 shows the 3 stage process and the resulting 20 countries.



Australia (AU)	Ghana (GH)	Mexico (MX)	South Korea (KR)
Brazil (BR)	India (IN)	New Zealand (NZ)	Thailand (TH)
Canada (CA)	Indonesia (ID)	Philippines (PH)	UAE (AE)
China (CH)	Japan (JP)	Singapore (SG)	Ukraine (UA)
Colombia (CO)	Malaysia (MY)	South Africa (ZA)	USA (US)

Figure 15: Country selection process

Table 2 below provides the details of the countries identified using the selection methodology developed for this study.

The reviews were conducted by a team of experts from across the world, namely:

- TRL, whose staff reviewed policies in Indonesia, Japan and the United Arab Emirates (UAE);
- The Clean Air Initiative for Asian Cities, whose staff received policies in the Asian region;
- Embarq, the WRI Center for Sustainable Transport, whose staff reviewed policies in North and Latin American countries;
- John Apelbaum of Apelbaum Consulting, who reviewed policies in Australia and New Zealand;
- Stefan Denzinger of Denzinger Consulting, who reviewed policies in South Africa;
- Charles Amoatey who reviewed policies in Ghana; and
- Corinna Weigelt of DREBERIS, who reviewed the policies in Ukraine[15].

[15] The authors remain grateful to the German Technical Cooperation (GTZ) for providing access to their consultants in South Africa, Ghana and Ukraine.

Table 2: Selected countries for the T-MAPPER reviews[16]

No	Country	Annex 1	GDP / capita (PPP, USD)	Size (sq km)	Population (thousands)	Road sector energy consumption (ktoe)	Car ownership (total vehicles/ 1,000 pop)	Reviewer
1	Australia	YES	41,362	7,692,024	21,374	124,068	653	CAI-Asia
2	Brazil	NO	9,273.44	8,514,876	192,304	235,556	198	EMBARQ
3	Canada	YES	38,400	9,984,670	33,478	269,369	597	EMBARQ
4	China	NO	5,962.70	9,327,430	1,325,640	1955,766	32	CAI-Asia
5	Colombia	NO	8,587	1,141,748	42,888	29,048	66	EMBARQ
6	Ghana	NO	1,572	238538	23,416	9,502	33	Charles Amoatey
7	India	NO	2,762	2973190	1,139,965	594,913	15	CAI-Asia
8	Indonesia	NO	3,986.52	1,811,570	228,249	190,647	76	TRL
9	Japan	YES	34,100	364,500	127,704	513,519	595	TRL
10	Malaysia	NO	14,072	328,550	26,993	72,589	641[17]	CAI-Asia
11	Mexico	NO	14,825	1,958,201	107,400	184,262	244	EMBARQ
12	New Zealand	YES	25,442	268,670	4,315	16,771	729	CAI-Asia
13	Philippines	NO	3,521	299,764	88,574	39,980	32	CAI-Asia
14	Singapore	NO	51,142	670	4,839	26,754	149	CAI-Asia
15	South Africa	NO	10,119	1,214,470	48,687	134,337	159	Denzinger Consulting
16	South Korea	NO	27,646	98,730	48,607	222,197	338	CAI-Asia
17	Thailand	NO	8,224.63	510,890	67,386	103,991	134	CAI-Asia
18	UAE	NO	36,536	83,600	5,066	18,073	350	TRL
19	Ukraine	YES	7,347	579,350	46,258	137,342	140	DREBERIS
20	USA	YES	46100	9826675	308930	2,339,942	820	EMBARQ

[16] Data (unless otherwise specified) provided by GTZ, based on International Road Federation.
[17] Indicative, and based on: http://www.nationmaster.com/graph/tra_mot_veh-transportation-motor-vehicles

3.2 Developing a policy evaluation framework

There are a wide range of individual policy measures that contribute to carbon emission reductions in the transport sector. This project was based upon a comprehensive awareness and understanding of the range of these available policies. To meet the ultimate objectives of the project, it was important that the most relevant policies from each selected country were identified.

Policies subject to review were those which reduced, or have the potential to reduce, CO_2 emissions from the transport sector through the following key means:

- Avoid or reduce unnecessary trips (trip lengths) through e.g. better land use planning;
- Shift travel to, or maintain the share of, lower emitting modes (such as non motorised transport and public transport); and
- Improve the energy and carbon efficiency of each mode.

The above three categories of policies (introduced in Chapter 1 and hereafter referred to as "Avoid, Shift and Improve" or "ASI") apply in principle to both developed and developing countries. However, a difference in focus is to be observed, as noted in the table below.

Table 3: Avoid, Shift and Improve polices in developed and developing countries

Policy category	Developed Countries	Developing Countries
Avoid	• Emphasis on reduction of vehicle travel demand through Transport Demand Management (TDM), land-use planning and optimized logistical/supply chains.	• Emphasis on avoiding unnecessary generation of transport through integrated land-use and transport planning
Shift	• Shift from private vehicles to non-motorised transport (NMT) and public transport, and from trucks/lorries to rail	• Discourage shift from NMT and public transport to private vehicles • Develop rail networks to provide an alternative to road freight transport
Improve	• Improve efficiency of fuels and vehicles, encourage down-scaling vehicle/engine size	• Ensure that future vehicles/fuels are as clean as possible, encouraging use of small efficient cars and freight vehicles

The ASI approach was developed in recognition of the need for a broad strategic approach to mitigation in the transport sector incorporating all relevant policy actions and measures. The approach has been endorsed by key international stakeholders including the 50 organisations of the Partnership on Sustainable Low Carbon Transport (SLoCaT)[18]. The ASI approach has also been advocated in a wide range of documents; UNEP, for example, has incorporated the approach in recommendations to the UNFCCC on how to support a robust and coherent climate change policy framework (UNEP, 2009), and it has been featured in the Bellagio Declaration on Climate Change (Allen et al, 2009). The most recent TERM[19] report by the European Environment Agency (EEA) also uses this framework to map out

[18] SLoCaT is a partnership of UN organisations, multilateral development banks, technical co-operation agencies, NGOS and research organisations. Its aim is to improve knowledge about sustainable low carbon transport, help to develop better policies and to catalyse their implementation. See http://www.slocat.net.
[19] Indicators tracking transport and environment in the European Union.

potential policy paths that would put the EU towards a low carbon trajectory in the transport sector[20]. Similarly, the draft Climate Change Strategy of the Interamerican Development Bank (IDB), the Sustainable Transport Initiative of the Asian Development Bank (ADB) and the Global Environment Facility's new White Paper on sustainable transport all feature this strategy at their core.

The ASI approach reflects the fact that individual measures are often combined to form packages of measures, and that this is often the most effective approach to GHG mitigation. The selection and categorisation framework enables information about different policy packages to be recorded, along with the context and potential synergies of direct relevance to the effectiveness of each measure.

The approach therefore encompasses policies and measures that can counteract increases in the demand for travel, traffic generated, and total GHG emissions that are likely to be experienced in a business as usual (BAU) scenario. Some policies may even go beyond what is conventionally regarded as "transport policy".

Policies to Avoid, Shift and Improve transport can be further categorised into five distinct types, namely:

- Planning;
- Regulatory;
- Economic;
- Information; and
- Technology instruments.

These types of policy instruments and the type of reduction strategies that have the potential to contribute towards lower GHG emissions are summarised in Figure 16 below.

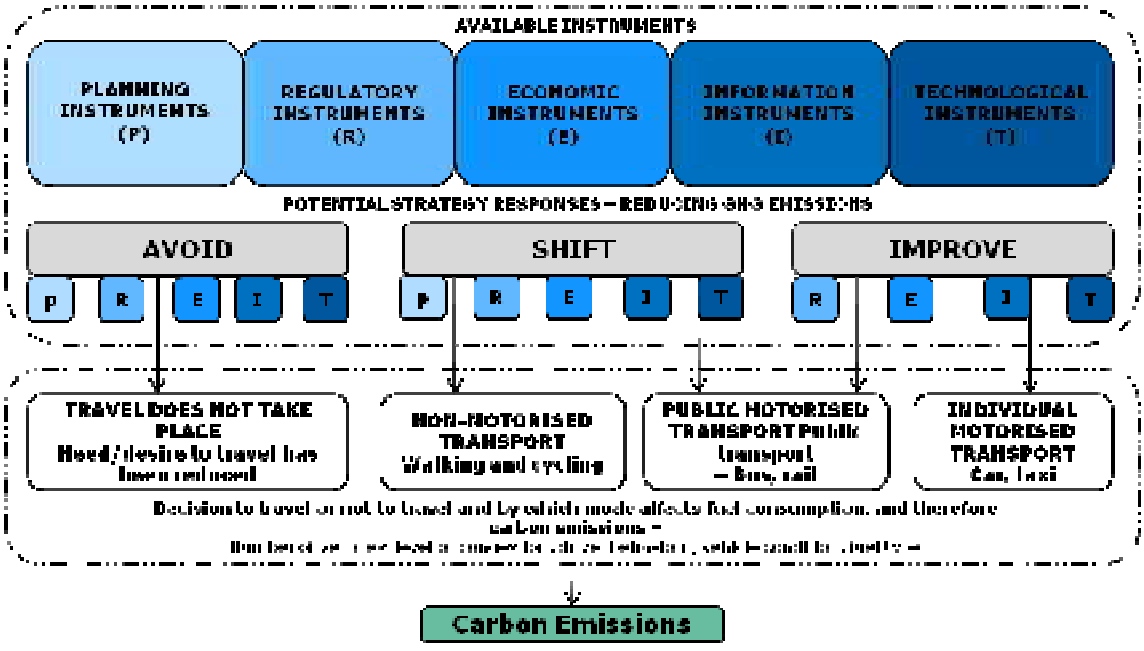


Figure 16: Policy instruments for transport GHG mitigation
(Source: Dalkmann and Brannigan, 2007)

[20] See http://www.eea.europa.eu/publications/towards-a-resource-efficient-transport-system

3.2.1 Categorisation of policies

Several criteria were included within the reviews in order to categorise policies (Table 4). In addition to these categorisations, reviews also requested details on:

- The descriptions of identified policies;
- Whether they were part of a package/strategy; and
- The primary objective of the policy.

Further information was collected for economic instruments, as follows:

- Type of economic instrument (i.e. subsidy, tax, charge, trading etc);
- Administration Body;
- Secondary purposes;
- Revenue generation (mechanism, amount);
- Use of revenue raised (purposes, amount);
- Prerequisite/enabling factors; and
- Challenges to implementation.

Table 4: Country review categorisation criteria

Criteria	Sub-criteria
Area	Country Code
	City / Region
Level of implementation	National
	Regional
	Municipal
Implementing actor	Government
	NGO
	Private businesses
Status	Current (C) or Planned (P)
Passenger or freight	Passenger
	Freight
Mode	Road
	Rail/light rail
	International maritime
	Sea/inland waterway
	International aviation
	Domestic aviation
Impact	Avoid
	Shift
	Improve
Type of policy	Planning
	Regulatory
	Economic
	Information
	Technological

3.2.2 Evaluation criteria

In developing an evaluation framework for the policies identified, a coherent set of criteria for the identification, measurement and interpretation of the main impacts of policy measures for reducing GHG emissions in the transport sector was developed.

Box 9: Approaches to policy evaluation

The evaluation of transport policy is a topic of its own, and throughout the past decades many attempts have been made to develop evaluation frameworks that improve the understanding of transport policy and its impacts. CIVITAS initiative (2009), ASSET (2009), SPECTRUM (2005) and CANTIQUE (2003) are just a few examples at the European level.

The evaluation framework developed for this study builds on such previous work, and considers at its core a set of criteria for policy evaluation within, and across, a broad framework (i.e. with the capability to capture all the basic dimensions of policy assessment; economic, social and environmental) while encompassing at the same time the barriers and transferability issues which can be of particular relevance in non–EU countries.

As noted by Crabbé & Leroy (2008), there are various approaches to policy evaluation, for example needs analysis; program theory evaluation; case study evaluation: case study research; experiment and quasi-experiment; formative/developmental evaluation; goal-free evaluation; impact assessment; cost-effectiveness analysis and cost-benefit analysis; logframe method/logical framework approach; multi-criteria analysis and realistic evaluation.

This study uses a framework similar to multi-criteria analysis (MCA) in which each policy is scored against selected criteria in order to determine the best alternative. Each criterion could be further weighted to produce an overall score, allowing comparison and ranking of the alternatives. (Crabbé & Leroy, 2008).

To ensure as much transparency as possible, this study does not attach weights to each criterion. Rather, policies are assessed against each criterion separately, and the findings are presented for each criterion.

The review framework was designed with the following considerations:

- Allow for a bottom-up process, where information from country reviewers (each experts of transport and climate policy in their respective countries) would provide information under a harmonised reporting structure.
- Identify the key evaluation criteria, linking the ASI strategy with the insights arising from EU research projects.
- Combine qualitative and quantitative information.
- Categorise the information in a readily usable format.
- Minimise the risk of loss of information.

The key evaluation criteria used for assessing the identified impact reduction policies were as follows:

- Potential to deliver change in GHG emissions
  The potential for change is related to the impact of a measure upon the reduction in carbon emissions, which can generally be brought by;

  1. Changes to behaviour – represented by changes to passenger kilometres (PKM) and tonne kilometres for freight (TKM) and/or
  2. Changes to technology – represented by improvements in emission factors (emission/PKM or TKM).[21]

  The evaluation involved asking the reviewer of each country to estimate the impact of each policy on these two parameters (compared to BAU, and across a 10 year period), as well as for the aggregate impact of transport volume reduction and improvement to emission factors.

- Cost effectiveness
  The cost effectiveness of measures evaluated how costly it is to achieve CO_2 reduction as defined in terms of US$ per ton of CO_2 avoided. Costs in this context included both public as well as private resources. Analysis of cost effectiveness depended on the availability of suitable evidence. For this project, country reviewers were asked to assess the cost of implementing each policy, and divide this by the reductions in CO_2 delivered by the policy. In practice, data on both costs of implementation and CO_2 reductions were difficult to attain for most policies, and the majority of projects were assessed based on publically available information and expert judgement of the reviewers.

- Broader impacts (or co-benefits)
  The broader economic, environmental and social impacts were addressed in order to evaluate a wider range of potential impacts beyond the reduction of carbon emissions:

  - Impact on jobs - ability to create jobs and sustainable economic growth,[22] and especially "green" jobs.[23]

  - Other social and environmental impacts – including redistributive effects, accessibility enhancement, congestion relief, safety improvement, air pollution reduction (for example through reduced levels of congestion), noise and vibration reduction.

[21] Emission factors are typically used to express the emissions arising from a unit of transport activity, for example CO_2 per vehicle kilometre. They are a measure of the environmental efficiency of a unit of transport activity, and is generally associated with technology. For example, a new fuel efficient engine would reduce the fuel consumption per kilometre, and hence the emission factor would be reduced.

[22] Sustainable economic growth in operational terms is the upward trend in environmentally adjusted net domestic product (EDP) – obtained by subtracting the costs of natural resource depletion and environmental degradation from net domestic product (NDP) – under certain conditions and assumptions.

[23] The impact of a policy on job creation is difficult to ascertain, as it depends heavily on the assumptions on labour intensiveness of the investments themselves, as well as the knock-on effects on other jobs. Absent a quantitative model, this review involved the country reviewers qualitatively assessing the potential employment impacts arising from the implementation of a policy, based on historical trends and the size of the transport subsector affected by the policy.

In climate policy, these are often referred to as 'co-benefits' of mitigation actions. However, as noted in Leather et al (2010), policies in the transport sector are rarely driven by climate mitigation. Climate mitigation is often perceived as a co-benefit to addressing congestion, accessibility etc.

- Barriers towards implementation
  Barriers towards the successful implementation of the policy were assessed, including:
  - Financial – noting that high cost interventions are less likely to obtain funding. At a time of economic constraints, high investment measures to address climate change could receive low priority within either the public or private sector.
  - Technical - some measures could be constrained by technical requirements and could impact upon transferability, for example, specific technology availability within non-Annex 1 countries.
  - Public and political acceptability – the feasibility of measures to be implemented will depend upon the willingness of political leaders to prioritise and adopt climate change programmes. This will, at least in part, be a consequence of the public acceptability of proposed measures. Interventions may not be acceptable if they require additional personal expense, require unacceptable behavioural change, are difficult to implement or are not effectively marketed to potential users.
  - Institutional arrangements - coordination between institutions will determine successful implementation of measures. Governance issues will also determine the feasibility of implementing some measures.

- Transferability
  The replicability of an intervention will depend upon the extent to which the measure can be successfully adopted in other countries. While a measure may be very effective in one set of circumstances, it may not work elsewhere, for example, because of social norms, local climate, governance etc. The review evaluated the level of transferability from the reviewed country to Annex 1 and non-Annex 1 countries through qualitative professional judgments.[24]

3.2.3 Evaluation scoring and guidance

A scoring system was developed to strengthen the level of consistency in the evaluation of the policies across the twenty country reviews. Reviewers were provided with guiding questions to facilitate the evaluation of each criteria, which were marked as numbers (e.g. 1,2,3), each corresponding to a certain quantitative or qualitative level/range under each criterion.[25] These are summarised in the table below. Unless otherwise stated, impacts were assessed to cover changes occurring over a 10 year period.

Again, due to the bottom-up and qualitative nature of the scoring process, the assessment relies heavily on the professional judgement of the country reviewers. The findings from the evaluation should therefore be treated as indicative, and not based on quantitative

[24] The findings of the country reviews were reviewed by members of an independent steering committee set up for the project. The committee was made up of international climate change experts, with countries allocated based on the expertise of the steering committee member.
[25] This methodology was revised based on comments received by DG-Climate Action and DG-MOVE, for which the authors are grateful.

modelling, which was beyond the scope of this project. The development of quantitative methodologies to address these issues is strongly welcomed, and several suggestions in this regard are listed in the Outlook section in Chapter 9.

Table 5: The selected criteria and the scoring process

Criteria		Indicator	Guidance	Scoring
Potential to deliver change in GHG		Potential for reduction in PKM/VKM of private motorised transport	In percentage terms and compared to business as usual, what level of reduction in PKM/TKM has the measure achieved or will achieve, within 10 years of implementation and within the geographical scope covered by the policy?	3 = more than 25% (compared to BAU) 2 = between 10 and 25% 1 = less than 10% 0 = none -1 = adverse impact
		Potential for improving emission factor (emission/PKM or TKM)	In percentage terms and compared to business as usual, what improvement in the average emission factor of the entire transport vehicle fleet has the measure achieved or will achieve, within 10 years of implementation and within the geographical scope covered by the policy?	3 = more than 25% (compared to BAU) 2 = between 10 and 25% 1 = less than 10% 0 = none -1 = adverse impact
		Total potential for reducing GHGs	In percentage terms and compared to business as usual, what level of GHG mitigation has the measure achieved or will achieve, within 10 years of implementation and within the geographical scope covered by the policy, considering the combined impacts of reduction in transport volume and improvement in emission factors?	3 = more than 25% (compared to BAU) 2 = between 10 and 25% 1 = less than 10% 0 = none -1 = adverse impact
Cost effectiveness		Private US$/t$CO_2$ saved	What is the magnitude of private investments per ton of CO_2 avoided?	3 = if more than 100$ per ton CO_2 avoided 2 = if between 30$ and 100$ per ton CO_2 avoided 1 = if less than 30$ per ton CO_2 avoided
		Public US$/t$CO_2$ saved	What is the magnitude of public investments per ton of CO_2 avoided?	3 = if more than 100$ per ton CO_2 avoided 2 = if between 30$ and 100$ per ton CO_2 avoided 1 = if less than 30$ per ton CO_2 avoided
Broader Impacts	Jobs	Creation of green jobs	What magnitude of additional green jobs has/would the implementation of the measure bring?	3 = Tens of thousands of jobs or more 2 = Thousands of jobs 1 = Hundreds of jobs 0 = No significant impact -1 = adverse impact
		Creation of other jobs	What magnitude of additional jobs, other than green jobs, has/would the implementation of the measure bring?	3 = Tens of thousands of jobs 2 = Thousands of jobs 1 = Hundreds of jobs 0 = No significant impact -1 = adverse impact
	Other social and environmental impacts	Congestion relief	Has there been/ can one expect any reduction in the level of congestion following the measure implementation?	3 = Significant reduction 2 = Moderate reduction 1 = Slight reduction 0 = No impact -1 = adverse impact
		Redistributive effects	Are there any positive redistributive effects (e.g. support lower income households) induced by the transport policy?	3 = Significantly positive 2 = Moderately positive 1 = Slightly positive 0 = None -1 = Negative impact
		Accessibility enhancement	Has transport accessibility been improved owing to the measure's implementation?	3 = Significant improvement 2 = Moderate improvement 1 = Slight improvement

Criteria		Indicator	Guidance	Scoring
				0 = None -1 = Negative impact
		Safety improvement	Have there been/ can one expect any improvements in transport safety owing to measure implementation?	3 = Significant improvement 2 = Moderate improvement 1 = Slight improvement 0 = None -1 = Negative impact
		Air pollution reduction	Has there been / can one expect a reduction of air pollution levels following the measure implementation?	3 = Significant reduction 2 = Moderate reduction 1 = Slight reduction 0 = No impact -1 = adverse impact
		Noise and vibration reduction	Has there been / can one expect any reduction of level of noise/vibration following the measure implementation?	3 = Significant reduction 2 = Moderate reduction 1 = Slight reduction 0 = No impact -1 = adverse impact
Feasibility	Financial	Cost to private sector	What is the level of compliance costs for the private sector in terms of percentage of revenue of the company?	3 = over 10% 2 = below 10% 1 = negligible 0 = none -1 = savings
		Costs to households	What is the level of financial impact as a percentage of the household budget?	3 = over 10% 2 = below 10% 1 = negligible 0 = none -1 = savings
		Costs to government budget	What is the level of implementation costs as a percentage of the government transport budget?	3 = over 10% 2 = below 10% 1 = negligible 0 = none -1 = savings
	Technical	Technical constraints	Is the required technology already in place? Is the availability of technology or alternative fuels supply (e.g. biofuels) guaranteed in a mid to long term period?	2 = High level of restriction 1 = Low level of restriction 0 = None
	Public / political acceptability	Likelihood of disapproval by voters/ politicians	Has public involvement been encouraged throughout the policy process? Have awareness raising activities been undertaken during measure implementation?	2 = High level of restriction 1 = Low level of restriction 0 = None
	Institutional	Likelihood of institutions (and coordination between them) to restrict implementation	Do institutional agreements (e.g. NAMAs by Developing Countries) for addressing CO_2 emissions exist? Are policies for reducing climate impact of transport sector considered as one of primary governance issues?	2 = High level of restriction 1 = Low level of restriction 0 = None
Transferability		To Annex 1 countries incl. EU	Does the measure have potential to be transferred to Annex 1 (industrialised) countries?	2 = Yes 1 = In principle yes, but some political/social/economic issues need to be addressed before transferring it 0 = No
		To non-Annex 1 countries	Does the measure have potential to be transferred to non- Annex1 (developing) countries?	2 = Yes 1 = In principle yes, but some political/social/economic issues need to be addressed before transferring it 0 = No

In addition, information was also collected on what type of international support (i.e. capacity building, technology transfer or financing) each policy would benefit from receiving (mainly for non-Annex 1 countries), or conversely, whether a policy could contribute to such international support through their transfer to other countries. These three areas of support were selected as they are the focus of discussion on the assistance that is likely to be required for supported National Appropriate Mitigation Actions (NAMAs)[26] that are currently being discussed as part of the international climate change negotiations.

Table 6: Collecting information on international support needs

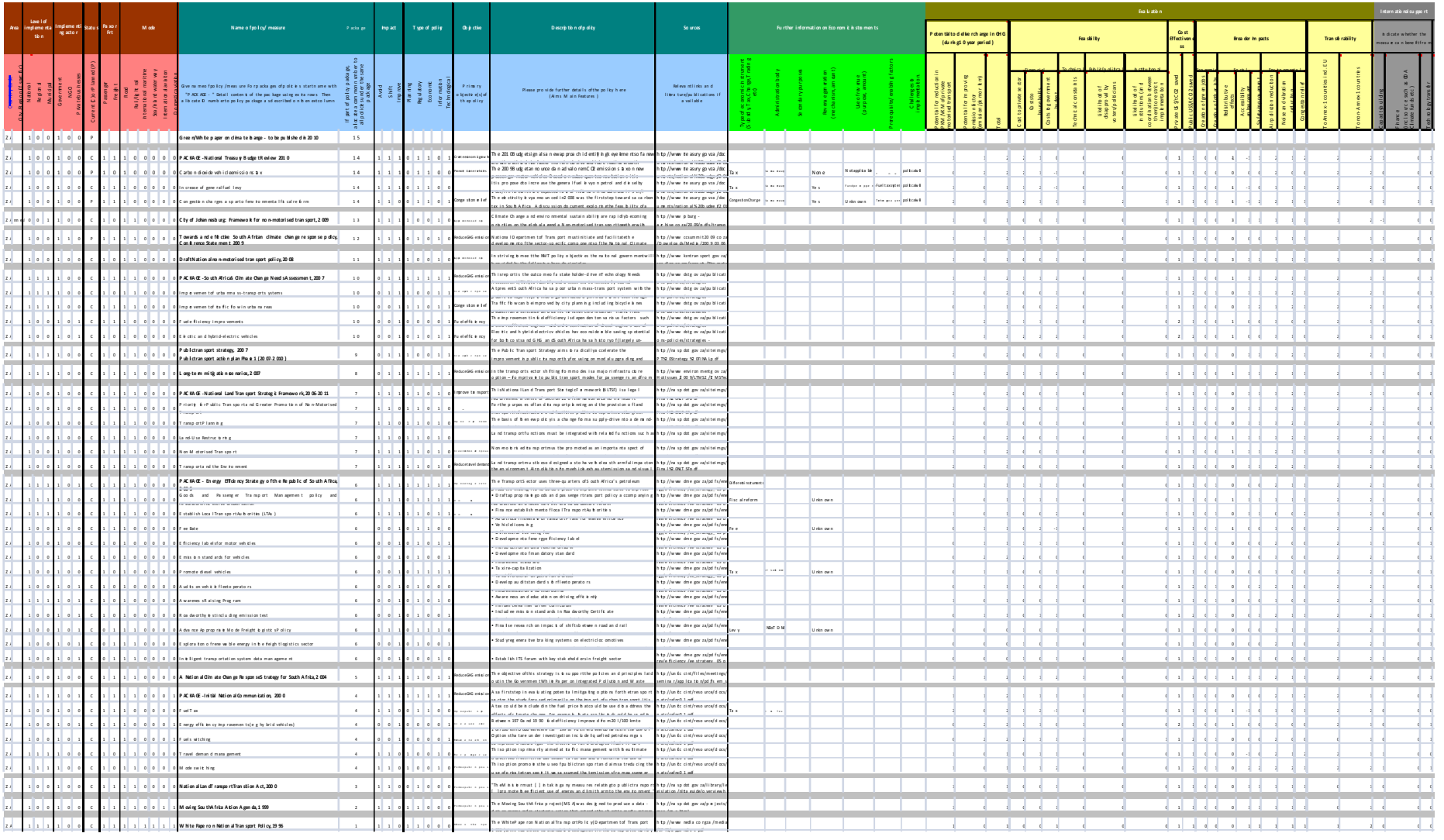
International support	Capacity building	1 = Can benefit from capacity building from other countries 0 = No -1 = Can be potentially transferred to other countries and help capacity building efforts
	Finance (incl. source such as ODA, Climate funds etc.)	1 = Can benefit from financing from other countries 0 = No -1 = Can be potentially used as a revenue source for financing activities in other countries
	Technology transfer	1 = Can benefit from technology transfer from other countries 0 = No -1 = Can be potentially transferred to other countries

For each country identified in task 1.1, all known policies and measures to address transport carbon emissions were scoped, categorised and evaluated according to the categorisation/evaluation criteria laid out earlier. The figure overleaf depicts an example of a resulting country review.

Further information on each country reviews is provided in the Appendix and further data is made available on the project website at www.sutp.org/T-MAPPER.

[26] See Section 6.4 for further information concerning NAMAs.

Table 7: Example of completed country review (South Africa)



3.2.4 The data analysis process

The data obtained from the above analysis underwent the following process, to draw out the findings presented in the next chapter:

1. The quality of the data from the 20 countries was reviewed both by the project management team at TRL, to amend for any inconsistencies and irregularities. This was conducted through the detailed examination of the received data using the statistical software SPSS, which allowed for the highlighting of any outliers or anomalies in the data received.

2. The data underwent a further review by members of the steering committee[27] to ascertain as to whether all key policies of each reviewed country were picked up. The country experts updated the information in their reviews, based on this feedback.

3. The finalised dataset was fed back into SPSS, to conduct the various analyses for which the findings are presented in the next Chapter. This involved, depending on the nature of the analysis:

    - The appropriate weighting of cases by the number of policies per country, so that the impact of one country with a larger set of policies would not skew the overall findings;

    - The cross-tabulation of data, to ascertain any relationships between two or more variables; and

    - The panelling of the data to ascertain whether trends were shared or different between groups of policies, countries etc.

The analysis was conducted to the best possible rigour. However, due to the qualitative nature of the data collected, readers should caution from over-interpreting or generalising the information presented in the next section – rather they should be taken as indicative findings from the policies that were scoped within this project.

Also note that for some countries, certain data was not readily available. Such missing data have been excluded from the analysis presented in the next chapter.

[27] See Acknowledgement section for full names

4 Findings from the country reviews

The following sections present the key findings from the country reviews. The findings indicate:

- The types of policies identified.
- The main actors for implementing the policies.
- The effectiveness of the policies identified, in mitigating carbon.
- The cost-effectiveness of the policies identified.
- The broader co-benefits delivered by the policies.
- The key barriers towards implementation of the policies.
- The transferability of the identified policies to other parts of the world.
- Requirements for international support.

The level of bias in the results has been limited as a result of each of the assessments being independently reviewed by a member of a steering committee of international climate change and transport policy experts. However it should be noted that the findings are qualitative and based on expert judgment, as noted in the previous chapter.

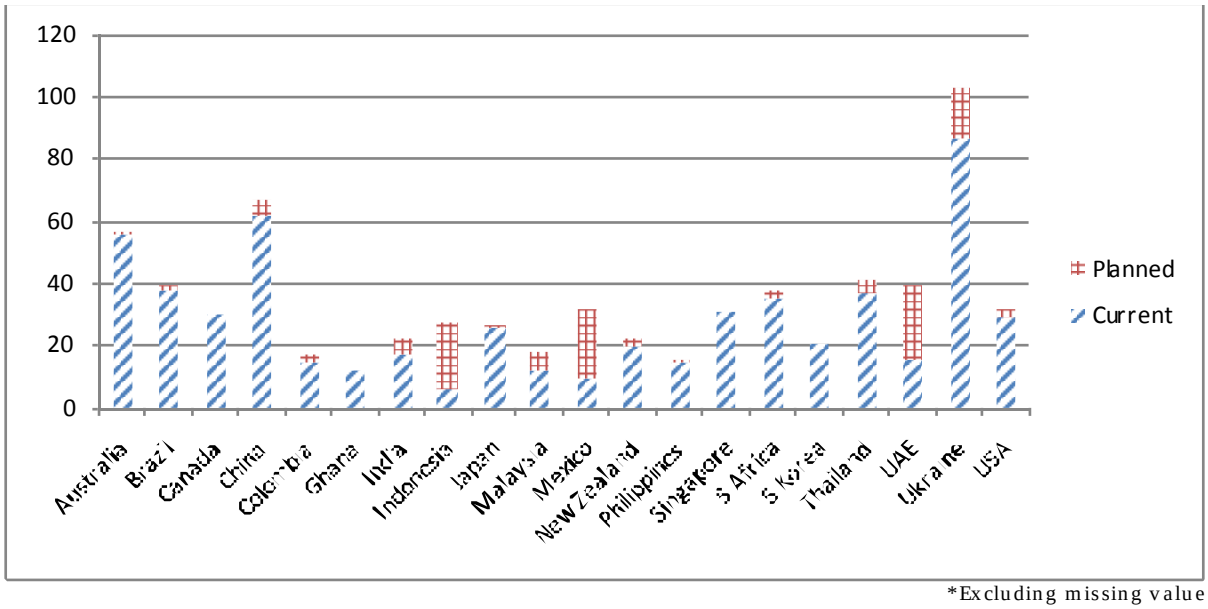
4.1 Types of policies identified

The review of 20 countries identified 690 policies which can mitigate carbon emissions from the transport sector, which are either currently being implemented or are planned.[28] This report presents a summary of the findings from the data. Further data on the policies reviewed will be available for free download on the T-MAPPER website http://www.sutp.org/T-MAPPER/.

Figure 16 shows the split of current and planned policies in the 20 countries reviewed.

Note that the number of policies listed for a country does not necessarily provide a robust indication of the level of mitigation action in that country. This is due to how policies are reported by each country. For example, in some countries a package of measures is in place which is listed as a single policy but in others each measure is listed separately.

[28] The review focussed on current and planned policies that mitigate emissions from the transport sector. Policies that either have no effect on emissions or currently or are expected to have a negative impact have not been considered.



*Excluding missing values

Figure 17: The number of current and planned policies in the 20 countries reviewed

The majority of the policies reviewed are currently being implemented in their respective countries. In addition, the review identified planned policies that will be implemented in the future, although this is not the case for each country. For example there are a higher number of planned policies in the United Arab Emirates, Mexico and Indonesia, described in more detail in the box below.

Box 10: Thinking ahead: Action plans and national strategies on low carbon transport

Some countries were identified as having a high number of planned policies reflecting the existence of strong roadmaps/ policy vision documents, which outline the transport policies in the coming years. These were found at:

- Local/Urban Level: In the United Arab Emirates (UAE) the Plan Abu Dhabi 2030 provides a comprehensive plan for the development of the city that will guide planning decisions for the next quarter of a century.
- Regional Level: In Mexico, in addition to national level efforts, a state-level climate change action plan has been developed in the state of Veracruz. This Action Plan serves as the first model for other Mexican States to develop similar plans in the future.
- National Level: In Indonesia, Sectoral Roadmaps have been developed that set national goals, sectoral targets, milestones and priorities for actions with regards to adaptation and mitigation of climate change for all affected sectors of the economy, including transport.

Such strategies/plans may be useful in setting out a clear pathway for the transport sector in mitigating its emissions. This is an area where the EU may support both its own Member States, as well as non-EEA countries in their efforts to develop such plans, and support their implementation. For example within the EU climate change mitigation could be included as a core objective in the new Transport White Paper (see Chapter 1).

Policies were found for both passenger and freight transport (as illustrated in Figure 18). Around half of all policies addressed passenger transport. In contrast only 5% were focussed solely on freight transport. This may reflect:

- The focus in the policy decision-making process towards passenger transport, and
- The nature of freight transport being a subset of boarder policies, for example industrial policy. Such policies are beyond the scope of this project and have not been picked up in the review.

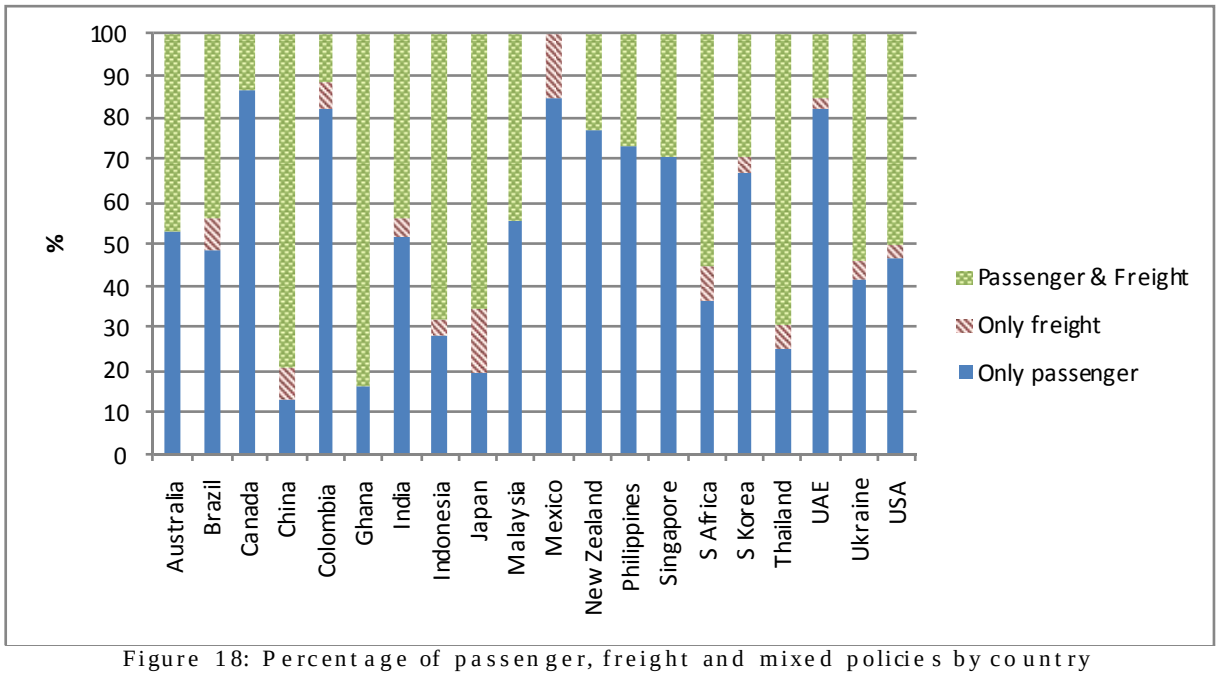


Figure 18: Percentage of passenger, freight and mixed policies by country

Box 11: Mitigation actions in freight: the case of Japan and the USA

Japan was identified as a country that is proactively trying to address the level of emissions from the freight sector. In the case of Japan mitigation policies that address freight included:

- Implementation of CO_2 saving by co-operation between shippers and logistics operators
- Modal shift to railway and marine transportation, supported through a range of measures including:
    - Implementing projects to strengthen railway cargo capacity
    - Promoting efforts through a Green Logistics Partnership Conference
    - Supporting the introduction of new high performance rolling stock
    - Supporting efforts by railway operators to improve transport quality
    - Applying the Energy Conservation Act to shippers and railway operators
    - Improving the level of awareness of environmentally friendly railway cargo transportation
- Speed restrictions of large trucks on expressways (requiring business operators to limit speed to 90 km/h)

The USA is also taking action to tackle emission from the freight sector. For example the SmartWay Transport Partnership aims to increase the availability and market penetration of fuel efficiency technologies and strategies that help freight carriers achieve higher environmental performance for their vehicle fleet.

Policies identified addressed all subsectors[29] of transportation, with nearly 80% addressing one subsector of transport only. Nearly 85%[30] of all policies identified were shown to be applicable to the road subsector, followed by 28% for rail.

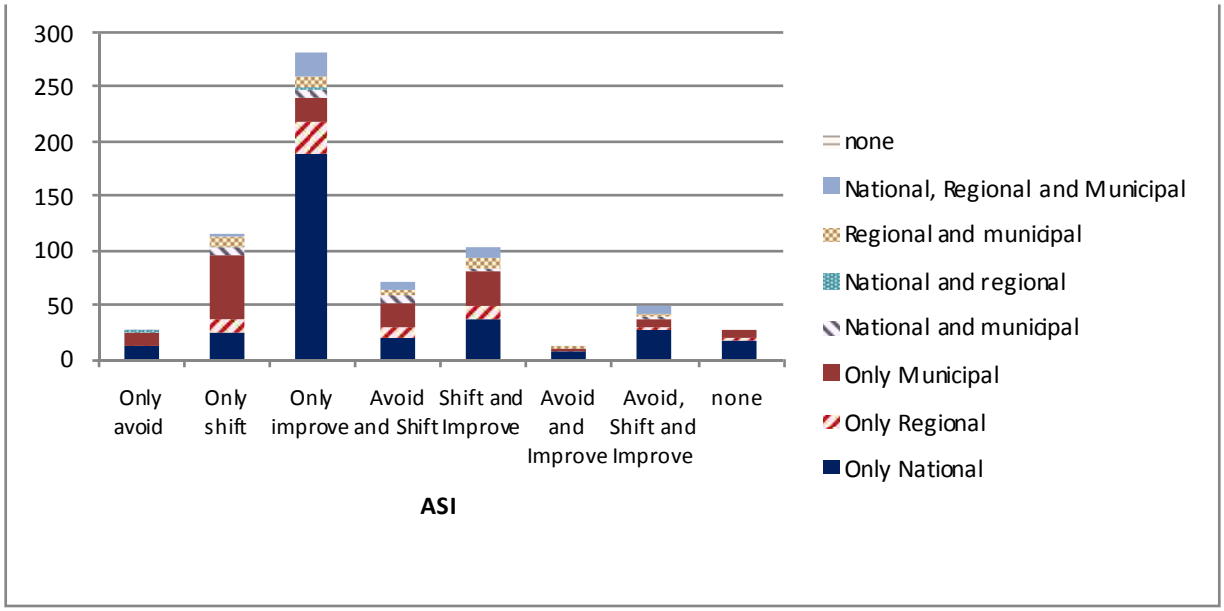
Policies applicable to rail were found to be formulated relatively independent from other sectors, perhaps similar to the situation in the EU, where policies on rail are often governed separately to those for road (see next section on actors and governance).

With regards to the breakdown of policies that support avoid, shift and improve (ASI) measures to reduce carbon emissions, the review identified a mix of polices across the ASI categories. On the whole, there were a greater number of policies that support improve measures than those which support measures to "avoid" and "shift" carbon emissions (as illustrated in Figure 19 below). This trend has been shown to be consistent across current and planned policies.

The majority of "improve" policies were found to be governed at the national level as illustrated in Figure 19. This is expected to be due to the nature of the policies, such as fuel economy, which are most appropriately governed through legislation and standards that need to be developed and implemented at the national level. On the other hand, municipal level orientation is important in the implementation of "avoid" measures, both when implemented independently and jointly with "shift" and "improve" measures. This is likely to be due to the importance of local planning in supporting "avoid" measures such as travel

[29] The modes included in the all modes category are road, rail/light rail, international maritime, international aviation, domestic aviation and transportation via sea/inlands waterways
[30] Percentages include policies that were applicable to more than one subsector

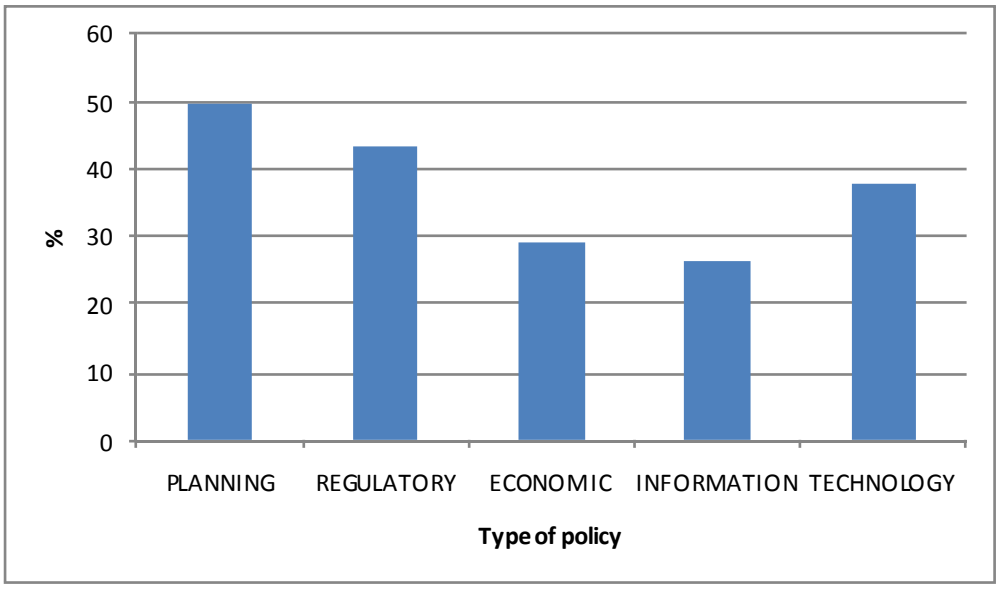
demand management. The above finding generally matches the situation in the Europe, where standards on vehicles and fuels are set at the EU level, whereas decisions on local transport policies are set at sub-national levels.



*Weighted by country.

Figure 19: Avoid, shift and improve distribution across all policies (for current and planned policies combined)

With regards to the types of strategic instrument, Figure 20 indicates that a range of instruments have been identified in the scoping of policies.



*Weighted by country. The total percentage in the chart does not amount to 100% due to some policies being allocated to more than one category

Figure 20: Percentage of policies categorised by strategic instrument

Box 12: A focus on economic instruments

Economic instruments can be used to build environmental costs into transport prices, and thereby change the behaviour of consumers, businesses and public sector actors alike. Their optimal use can allow for a cost-effective and efficient way of mitigating GHGs, and also contribute to public finances. Their use is likely to become central in the shift towards a green economy, at both the international and EU level.

Subsidies, taxes and charges are being used to support the reduction of emissions from the transport sector across the world. The table below highlights the main sub-categories within each of these instruments and provides examples of some of the different types of policies and measures both in place currently and those which are planned for the future.

Table 8: Examples of types of economic policies and measures identified

Type of economic instrument	Sub-category	Examples (policies and measures)
Subsidies	Low emission vehicles subsidies	• Fiscal incentives for the use of cleaner vehicles in public transport (Mexico) • Green vehicle rebate (Singapore) • EcoAUTO rebate programme (Canada) • Local and subsidies for vehicles "old-for-new" program (Beijing and Shanghai) • Partial stamp duty concessions for LEV's (Australia)
	Fuel subsidies	• Subsidio ao diesel (Diesel subsidy) (Brazil) • Subsidy for sugar cane (Brazil)
	Subsidies for public transport	• Park and Ride Scheme (Singapore)
Taxes	Vehicle tax	• Tax relief for fuel efficient vehicles (Canada) • Ontario Alternative Fuel Vehicle Tax rebate (Canada) • Reduced purchasing tax for low-emission cars (China) • Tax reduction for engine modification for the use of biofuels (Ukraine) • The US Energy Policy Act (EPAct): The hybrid vehicle tax credit (USA) • Excise tax on fuel inefficient vehicles (Canada) • Energy Tax Act of 1978: The Gas Guzzler Tax (USA)
	Fuel tax	• Reduction of excise tax on biofuels and biofuel additives to petrol (Ukraine) • Reduction of excise tax on Gasohol and Biodiesel (Thailand)
Charges	Road user charging	• Congestion charges (S Africa) • Low emission zone (UAE) • Salik Road Toll (UAE)
	Parking	• Parking pricing policy (Colombia)
Trading Mechanisms	Carbon emissions trading	• Tasmanian Government Air Travel Offset (Australia)

Economic instruments continued

As highlighted in Table 8, Canada has a number of economic instruments in place, including taxes and subsidies to support the uptake of more fuel efficient vehicles. For example Canada ran a successful EcoAuto rebate programme where those who purchased fuel efficient vehicles were eligible to receive rebates. Rebates of between $1000 (CAN) and $2000 were available for those purchasing eligible fuel efficient vehicles in 2006, 2007 or 2008.The success of the programme has been demonstrated through the fact that over 169,800 rebates were issued over the two year programme (Transport Canada, 2009).

Economic instruments such as the ones shown in the table above can be clearly linked to the Avoid, Shift and Improve strategies to reduce GHGs from the transport sector, as described below:

- The number of trips and trip distances can be avoided through road user charging and parking charges.
- Subsidies for public transport encourage users to shift away from private vehicles.
- To improve the environmental performance of vehicles, the uptake of lower carbon vehicles and limit the usage of more carbon intensive vehicles can be encouraged, for example through vehicle taxes differentiated by environmental performance.

The positive mitigation effects of these economic instruments are likely to be higher, if they are used in conjunction with each other.

Box 13: Key findings: the types of polices identified

The review has identified that:

- A wide range of policies exist across the 'avoid, shift and improve' categories with, on the whole, a greater number of polices that support improve measures rather than avoid and shift. The policies identified support the use of a range of different planning, regulatory, economic, informational and technological instruments to bring about emission reductions.
- Economic instruments such as subsidies, taxes and charges can be used to support the reduction of emissions from the transport sector for examples in the case of the successful Canadian EcoAuto rebate programme.
- Only 5% of the policies identified focus solely on freight transport, highlighting that the sector could benefit from increased attention. The EU could learn from countries such as Japan and the USA, who are taking proactive steps to address freight emissions
- Policies for rail were found to be developed relatively independently of policies for other sub-sectors (road etc).

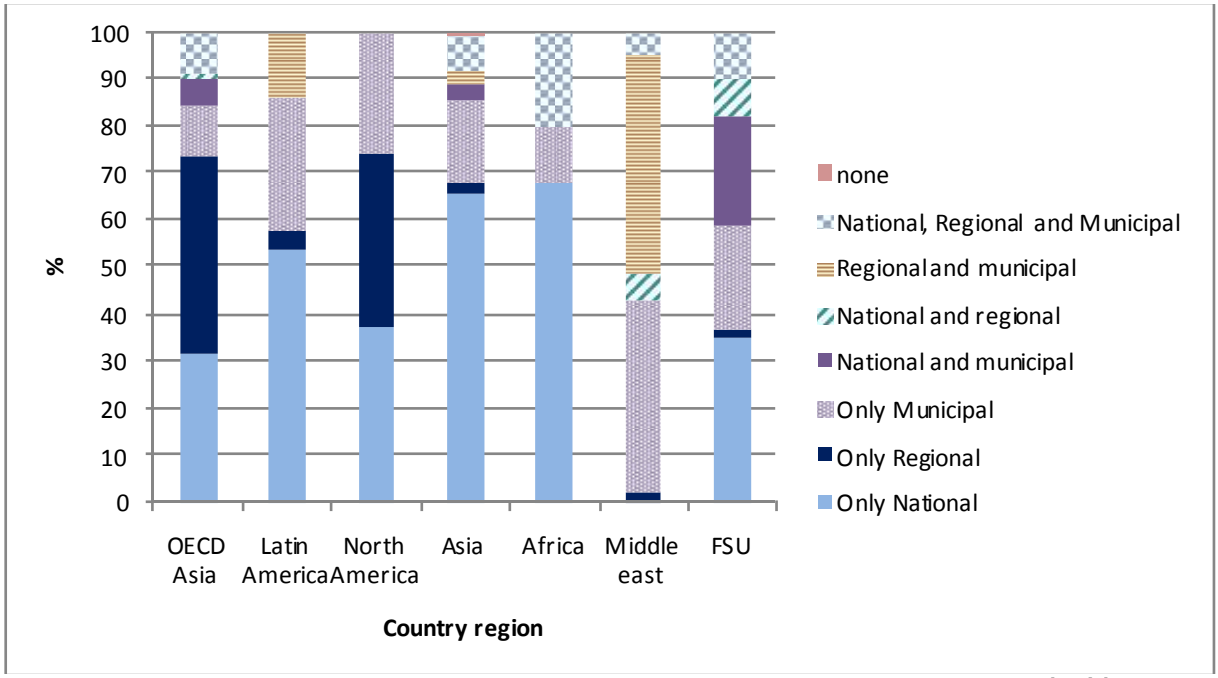
4.2 The main actors for implementing the policies

In terms of the governance of the policies, the review identified:

- 50% of the current policies being addressed at the national level,
- 20% at the municipal level, and
- 15% at regional level.

The following trends were observed for each region (see Figure 21):

- Joint national, regional and municipal level orientation is uncommon across most regions
- Asia and Africa have a strong national-level orientation with limited or no regional component;
- North America and OECD Asia[31] have a strong regional component;
- Latin America and the Middle East have a relatively stronger municipal level orientation;
- In the Middle East national orientation is very limited in contrast to the other regions. Regional and municipal level orientation dominate with each state/emirate leading transportation policy formulation.



*Weighted by country

Figure 21: Level of implementation of the policies by region

[31] The OECD Asia region is comprised of Australia, New Zealand, Japan and South Korea

Box 14: Leveraging change at the sub-national level

Colombia and Mexico (in the Latin America region) are two examples of countries which were found to possess a large number of sub-national policies relevant to transport GHG mitigation.

Bogotá is the largest city in Colombia and figures in the 30th largest cities of the world. Bogotá's growth has placed a strain on its roads and highways, but within the past decade significant efforts to upgrade the infrastructure have been undertaken, including a Bus Rapid Transit network and first metro line coupled with vehicle plate restrictions. An integrated, long-term plan for the region and city is planned to reduce uncontrolled urban expansion and improve the organization of the city

In Mexico, the State of Nuevo Leon, located to the northeast of the country, has developed a local climate change programme through which strategies on mitigation and adaptation to climate change for the state have been identified and set.
Local policy makers can therefore have a key role to play in the mitigation of transport greenhouse gas emissions. Raising awareness of the importance of mitigating transport emissions with such policy makers would be beneficial to help ensure that they use their leverage on local level policies to help link the main motivation for sustainable transport interventions (i.e. better accessibility, reduced congestion and enhanced air quality) with climate mitigation.

Such initiatives may benefit further from support by external donors such as the EU, who may support transfer of knowledge between cities with instruments such as the DCI (see Section 6.3)

Current policies were found to be implemented by government actors, although in approximately 20% of cases the private sector was noted as working together with government to achieve the policies in some situations.

A number of non-governmental actors were also identified as being engaged with mitigation actions including:

- Public transport operators (for policies related to public transport).
- Freight operators (for policies related to freight and logistics).
- NGOs such as Embarq and ITDP (for policies related e.g. to Bus Rapid Transit and non-motorised transport, especially in developing countries.)

Box 15: Examples of action by NGOs to catalyse changes in national and local transportation policy

A number of NGO actors are working to support changes in national and local transportation policy particularly in relation to Bus Rapid Transit and Non Motorised Transport in developing countries, for example:

The Institute for Transportation and Development Policy (ITDP), work with cities worldwide to bring about sustainable transport solutions that cut greenhouse gas emissions, reduce poverty, and improve the quality of urban life. As part of their work they support the sharing of knowledge about the successes of existing BRT systems and provide high-level technical assistance to cities pursuing BRT projects across the world. They have in recent years provided direct assistance to city governments and been involved in the research, planning, and construction of BRT systems in Argentina, Brazil, China, India, Mexico, South Africa, Tanzania (ITDP 2010).

The EMBARQ global network catalyzes environmentally and financially sustainable transport solutions to improve quality of life in cities. One of their key objectives is to reduce fuel use, air pollution, and greenhouse gas emissions from the transport sector. Between 2009 and 2010 they worked on a range of sustainable transport projects including supporting the establishment of India's first long-term public-private partnership (PPP) in Indore in India. This partnership has enabled the city to expand its transit system to 225 buses and double capacity to 220,000 daily trips. The city also began developing a BRT system, which is expected to be operational by June 2011. EMBARQ advised on important changes to the BRT system design, including high-platform island stations to ensure level-boarding, making the system more efficient, convenient and accessible for all passengers (EMBARQ, 2010).

Box 16: Key findings: The actors

The review has identified that:

- Around half current policies were found to be addressed at the national level, followed by around 20% at the municipal level, and 15% at regional level.
- Regional differences were identified in the level of implementation with Latin America for example identified as a region where there were a larger number of sub-national policies relevant to transport GHG mitigation. Local policy makers can therefore have a key role to play in the mitigation of transport greenhouse gas emissions.
- However, a large number of "Avoid" policies were implemented at sub-national level. The EU can support such policies through developing a capacity building programme for local policy makers (on low carbon transport policy formulation), and facilitate the sharing of best practice through extending programmes such as CIVITAS to cover countries outside of the EU and support twinning arrangements. (For further information see http://www.civitas-initiative.org/main.phtml?lan=en)
- Most policies were found to be implemented by government actors, although the private sector was found to be working together with government to achieve policy targets, especially in Latin America, Africa and Asia.
- NGOs such as Embarq and ITDP were found to be playing a major role in building capacity and providing sectoral expertise in developing countries, particularly related to Bus Rapid Transit and Non-Motorised Transport.

4.3 The effectiveness of the policies at mitigating carbon emissions

The policies identified were assessed in terms of their ability:[32]

- To change behaviour and thus reduce the level of motorised traffic volume (PKM or VKM) reflecting both "avoid" and "shift" policies;
- To improve technology and thereby reduce emission factors (CO_2/PKM, CO_2/VKM); and
- To mitigate carbon dioxide as a result of both of the above.

Most effective polices at changing behaviour

The review identified a large number of policies that have the potential to reduce traffic volume (VKM) with the level of change affected varying greatly across the 690 policies assessed. The policies that were the most effective at reducing the volume of traffic based on qualitative assessment (i.e. are currently or are expected to lead to a reduction in vehicle kilometres travelled of more than 25% over a 10 year period compared to business as usual) are listed in the table below.[33] Table 9 highlights that these policies were generally "Avoid" or "Shift" policies, in the main implemented at the local level. These policies focus on:

- The implementation of mass rapid transit systems;
- Travel demand management;
- Support and investment in the development of non-motorised transport.

Table 9: Policies identified with potential to reduce traffic volume by more than 25% over a 10 year period (compared to BAU)

Policy/measure	Example policies and measures	Current (C) or planned (P)
Mass Transit Systems	• Bus rapid transit (BRT) in Accra (Ghana) • Mass Transit Systems (SITM) in major cities over 600,000 population (Colombia) • Promotion of BRT systems for metro cities (Philippines)	C C C
High speed rail	• California High Speed Rail (HSR) System (USA) • Public Transport Package - III- High Speed Rails (S Korea)	P C
Travel Demand Management	• Enhance the effectiveness of Electronic Road Pricing (Singapore) • TDM Package - Car Free Day (S Korea) • TDM Package - Congestion charging. (S Korea) • TDM Package - No Driving Days (S Korea) • Transport Planning (S Africa) • Travel demand management strategies (Malaysia)	C C C C C P
Development of non motorised transport	• Bikeways and walkways programme in Manila (Philippines) • Non Motorized Package - Bike lanes (S Korea) • Promoting Non-motorized transport (NMT) (China)	C C C
Legislation	• California Assembly Bill (AB) 1493: Passenger vehicle GHG standards (USA) • California Assembly Bill (AB) 32: Global Warming Solutions Act (USA)	C C
Vehicle quota systems	• Vehicle plate restrictions, Bogota, Medellín, Bucaramanga, Cali, Barranquilla, Cartagena, and Pasto (Colombia)	C

[32] The assessment methodology uses PKM and VKM as a proxy's of behaviour change, however it is noted that behaviour change includes other types of changes

[33] Note that this is compared with a Business as Usual scenario, and is specific to the geographical scope that it covers. The scoring therefore does not reflect absolute levels of GHG reduction.

The findings demonstrate the effectiveness of packages of measures in reducing traffic volume. For example in the case of South Korea the Travel Demand Management package includes a number of individual measures to reduce travel demand, including:

- Parking management;
- No driving days;
- Fuel reforms;
- Vehicle restrictions (plate number scheme); and
- Congestion charging.

These measures, delivered as part of a strategically planned package, are cumulatively expected to reduce traffic volume by more than 25% over a 10 year period (compared to BAU).

Box 17: Supporting the reduction in traffic volume: Electronic Road Pricing (ERP) in Singapore

Electronic road pricing (ERP) in Singapore is one policy that has been identified as having the potential to reduce traffic volume by more than 25% over a 10 year period (compared to BAU). The future effectiveness of the scheme is being supported through a number of enhancements:

- Making refinements to ensure that 85% of motorists will be assured of smooth travel on roads with ERP, as opposed to today, where a significant proportion of motorists may, for some routes, experience speeds below the optimal speed ranges;
- Revising the ERP rate structure to ensure that rates remain effective in influencing motorists' behaviour;
- Introducing the Singapore River Line to more effectively manage congestion within the city area in the evening;
- Upgrading the ERP technology in the longer term for greater effectiveness.

The findings of the review also indicate a focus on mass rapid transit systems in developing countries such as Ghana, Columbia and the Philippines which could indicate the countries' recognition of the anticipated rapid rate of motorisation.

Box 18: Legislation driving change: The California Assembly Bill

The Global Warming Solutions Act in California, USA requires by law a reduction of GHGs to 1990 levels by 2020. This Bill helps put climate change on the national agenda and increases awareness of other states. The Bill was led by a comprehensive scoping plan which included a range of GHG reduction actions including in the transport sector such as direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives and an implementation regulation to fund the program.

Most effective policies at improving emission factors

A range of policies, which would impact positively on emission factors, were also found as part of the policy review.

The table below illustrates the polices and measures in place that the expert reviewers considered to be the most effective in improving emission factors (i.e. supporting more than 25% improvement in emissions factors over a 10 year period compared to BAU) across different regions. The table highlights that such policies focus on promotion of low-emission vehicles, vehicle standards, climate change legislation, clean air standards, monitoring schemes and others.

Table 10: Policies which had potential for improving emission factors by more than 25% over a 10 year period (compared to BAU)

Region	Policy / measure	Current (C) or planned (P)
Promotion of LEVs	• Electric and hybrid-electric vehicles (S Africa) • Promote new energy (low emission) vehicles (China) • Promoting new energy vehicles - private vehicles (China) • Promoting new energy vehicles - public vehicles (13 cities in pilot) China)	C C P C
Vehicle Standards	• Corporate Average Fuel Economy (CAFE) standards(USA) • California Assembly Bill (AB) 1493: Passenger vehicle GHG standards (USA)	C C
Climate change legislation	• California Assembly Bill (AB) 32: Global Warming Solutions Act (USA)	C
Others	• SmartWay Transport Partnership (USA)	C C

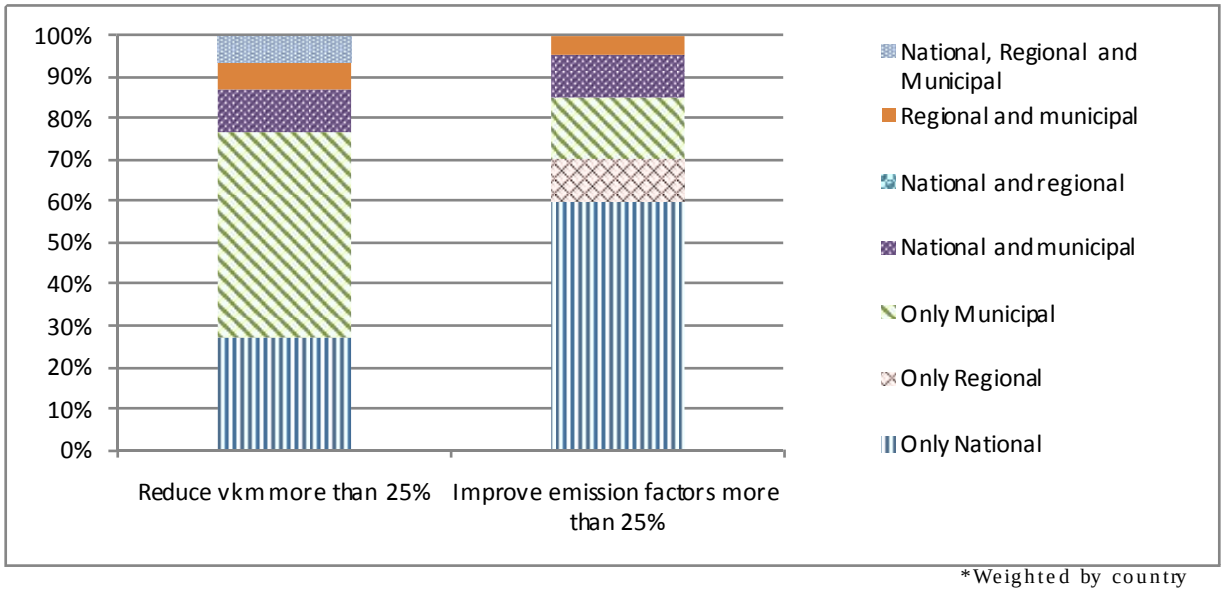
Box 19: Measurement of exhaust fumes in Ghana

Unless appropriate measuring /monitoring is in place, there is no way to verify and motivate the reduction of GHGs in the transport sector. Ghana currently has a process in place to measure exhaust fumes which may be extended in future to cover measurement of carbon emissions. This is a good example of efforts being taken to improve the monitoring of emissions from the transport sector in a developing country where often the issue of measurement takes second priority. The EU, through its external support, may assist such efforts to be replicated in other developing countries.

Policies effective in mitigating carbon emissions are being delivered at different levels, depending on whether the emission reductions are being achieved through behaviour change or an improvement in emission factors (as illustrated in Figure 22). In general:

- Local level policies dominate those delivering the most substantial reduction in vehicle kilometres travelled (through travel demand management, the improvement of public transport systems and the implementation of mass rapid transit schemes).

- National policies dominate those delivering the most substantial improvement in emissions factors (through supporting the update of low emission vehicles and fuels and supporting rail improvements)



*Weighted by country

Figure 22: Comparison of governance for policies that bring 25% or more reduction of traffic activity and emission factors over a 10 year period (compared to BAU)

Most effective policies for mitigating carbon dioxide as a result of both behaviour change and reduced emission factors

In total more than 220 policies (30% of the total) were identified as having the potential to reduce GHGs by more than 10% over a 10 year period (compared to BAU) (including both polices that support this improvement through behaviour change and an improvement in emission factors). Furthermore, 32 policies (around 5%) were identified to bring more than 25% reduction of transport emissions (see Figure 23).

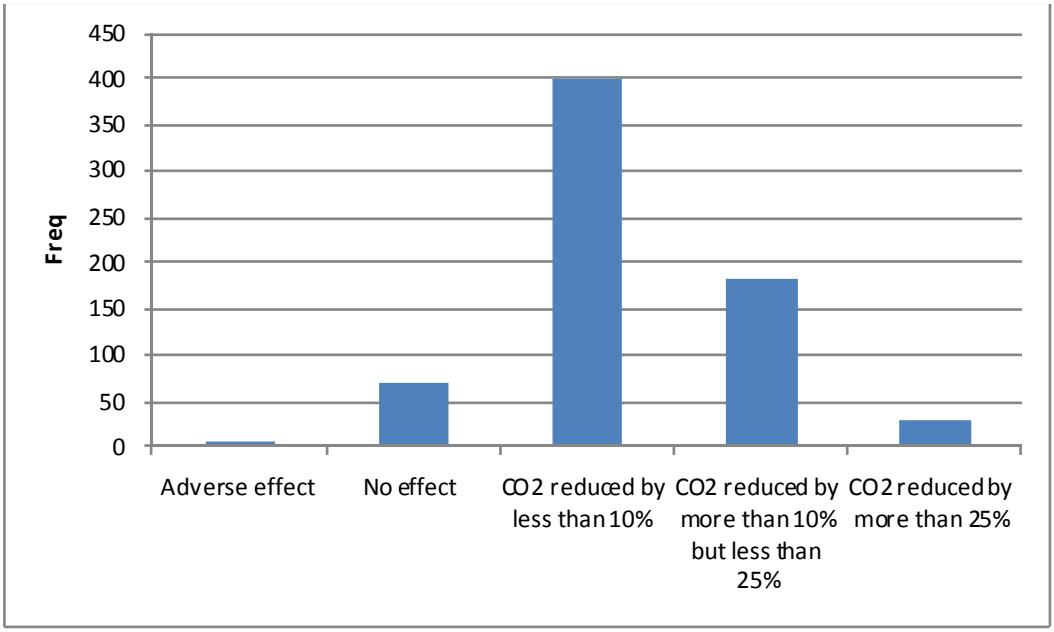


Figure 23: Total potential for mitigating carbon emissions, as stated by reviewers, over a 10 year period (compared to BAU)

As shown in the table below, these policies generally comprised mass rapid transit systems and rail improvements, support and infrastructure for non motorised transport, emission standards, fuel economy standards, and national policies on climate change and associated legislation.

Table 11: Most effective at reducing carbon emissions over a 10 year period (compared to BAU) when behaviour change and improvement in emission factors are considered jointly

Category	Example policies and measures	Current (C) or planned (P)
Mass rapid transit systems	• Bus rapid transit (BRT) in Accra (Ghana) • Mass Transit Systems in major cities over 600,000 population (Colombia) • Promotion of BRT systems for metro cities (Philippines)	C C
Rail improvements	• High speed rail RIO-SP (TAV Brasil - Trem de Alta Velocidade) (Brazil) • Light Rail Transit and Monorails for the WC2014 (Brazil) • Public Transport Package - III- High Speed Rails (S Korea) • Reform of the national railway system (Ukraine)	P C C C
Support and infrastructure for non motorised transport;	• Non Motorized Package - Bike lanes. (S Korea) • Promoting Non-motorized transport (NMT) (China)	C C
Emission standards	• California Assembly Bill (AB) 1493: Passenger vehicle GHG standards (USA) • New Vehicle Emissions Standards (Canada)	C C
Fuel Economy Standards	• Corporate Average Fuel Economy (CAFE) standards (USA)	C
Climate change policy/legislation	• National Policy on Climate Change (Brazil) • California Assembly Bill (AB) 32: Global Warming Solutions Act (USA)	C C

Box 20: Fuel consumption efficiency standards leading to emission reductions in Japan

Fuel consumption efficiency standards have been in place in Japan for passenger vehicles since July 2007 and for trucks and utility vehicles since April 2006. New standards have been developed (targeted for fiscal 2015) which aim to improve fuel economy values by:

- 23.5 percent for passenger cars (from 13.6 kilometers to 16.8 kilometres per litre),
- 7.2 percent for small buses
- 12.6 percent for small freight trucks.

Japan is continuing to support fuel efficiency standards through proactively promoting the uptake of automobiles conforming to the 2015 fuel consumption efficiency standards, encouraging a shift from the less efficient 2010 fuel efficiency standards (which require 13.6 kilometers per litre on average for passenger cars).

The 2010 targets have already yielded approximately a 22 percent improvement in fuel economy between fiscal 1995 and fiscal 2004.

In the EU the Directive on the Promotion of Clean and Energy Efficient Road Transport Vehicles aims to support the introduction of environmentally-friendly vehicles. The Directive requires that the energy and environmental impacts of vehicles as a result of their whole lifetime operation are taken into account in purchasing decisions. The directive sets technical specifications for energy and environmental performance and award criteria to help guide purchasing decisions.

It is hoped that in the longer term the directive will support increased sales, helping to reduce costs through economies of scale, resulting in progressive improvement in the energy and environmental performance of the whole vehicle fleet.

Box 21: Key findings: which polices were the most effective

- Based on qualitative assessment a small number of both current and planned policies are either currently leading to or are expected to lead to a reduction in kilometres travelled of over 25% over a 10 year period (compared to BAU). The focus of these policies is on:
  - The implementation of mass rapid transit schemes;
  - Travel demand management (such as through Electronic Road Pricing in Singapore) Support and investment in the development of non-motorised transport in urban areas

- A small number of policies are either currently leading to or are expected to lead to an improvement in emissions factors of over 25% over a 10 year period (compared to BAU). The focus of these policies is on:
  - Improvements to the efficiency of rail
  - Fuel economy measures, such as the ambitious 2015 standards in Japan in Japan

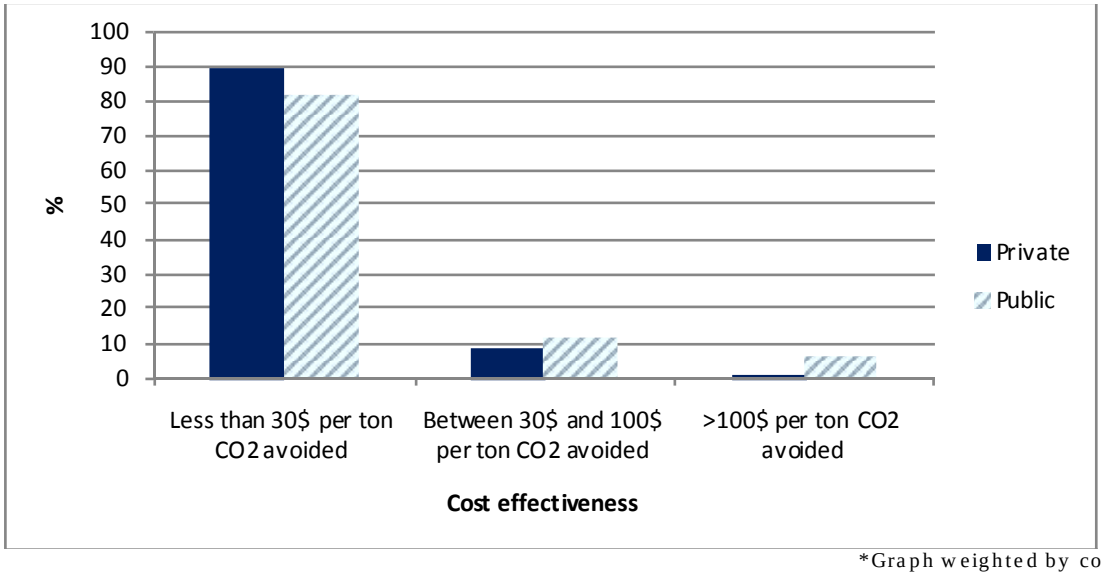
- Policies effective in mitigating greenhouse gas levels are being delivered at different levels, depending on whether the emission reductions are being achieved through behaviour change or an improvement in emission factors. In general:

  - Local level policies dominate those delivering the most substantial reduction in vehicle kilometres travelled (through travel demand management, the improvement of public transport systems and the implementation of mass rapid transit schemes).
  - National policies dominate those delivering the most substantial improvement in emissions factors (through supporting the update of low emission vehicles and fuels and supporting rail improvements).

- Sub-national policies should be considered as a key aspect of mitigation actions. This is particularly with regards to “avoid” and “shift” policies as local policy makers have direct control over policies that are the most effective at supporting behaviour changes to “avoid” private motorised travel and “shift” to less carbon intensive modes.

4.4 The cost effectiveness of the policies identified

As highlighted in Figure 24 the qualitative analysis has shown that the majority of current policies have the ability to deliver a tonne of carbon reduction at under 30 USD for both the private and public sector (see Figure below)[34].



*Graph weighted by country

Figure 24: Cost effectiveness for private and public US$/$CO_2$ saved

This is encouraging, and fortifies findings in other studies such as Cambridge Systematics (2009)[35] World Bank (2009)[36] and McKinsey & Company (2009)[37] that interventions in the transport sector are highly cost effective. Note however, that financial support for transport may still be required, to offset the large capital requirements that are needed at the outset of projects, for example the development of public transport infrastructure.

Furthermore, the policies and measures outlined in the table overleaf were identified as having the ability to save households money.

[34] It should be noted that reviewers generally found it challenging to assess the cost effectiveness of policies for a number of reasons including a lack of data on the costs of policy implementation and Inconsistencies in how costs are measured and the results presented should be viewed with this in mind.
[35] The "Moving Cooler" study suggests that a holistic set of policies based on the Avoid, Shift, and Improve strategy (incorporating behavioural change) can be delivered at net negative cost. The savings in fuel costs that arise from a mixture of behavioural and technological changes far outstrip the policy implementation costs.
[36] Known as the MEDEC study, the World Bank notes that in Mexico projects targeted at improving the efficiency of bus networks, rail freight and vehicle-inspection schemes prove to be highly cost negative.
[37] Mc Kinsey (2009) notes that measures to improve the fuel economy of vehicles also tend to be cost-negative interventions.

Table 12: Measures that save households money

Category	SubCategory	Example policies/measures	Current (C) or planned (P)
Tax reduction on lower emission vehides and fuels	• Tax reduction on lower emissions fuels and vehicles	• Manitoba Hybrid Electric Vehicle Rebate Program (Canada) • Reduction of excise tax on biofuels (Ukraine) • Green tax plan for motor vehicles (Japan) • British Columbia Sales Tax Relief for Hybrid Vehicles (Canada) • Tax reduction for engine modification for the use of biofuels (Ukraine)	C C C C C
Fuel Economy	• Anti-idling campaigns • Eco-driving • Fuel efficient vehicles	• Eco-driving (CONUEE) (Mexico) • Fuel Economy – Labelling (New Zealand) • Fuel flexible vehicles (Thailand) • Fuel quality improvement (Diesel Sulfur content) (Colombia)	C C P C
Subsidies	• Old for new vehicle subsidies • Subsidies for purchasing lower carbon emitting vehicles	• Local & state level subsidies for Vehicle "Old-for-New" Program (China) • Partial stamp duty concession for LEVs. (Australia) • Reducing Import Duty on parts for Hybrid Vehicles (Philippines) • Subsídio ao Diesel (subsidy for diesel) (Brazil) • Subsidy on Purchasing Tax of Small-Energy Vehicles (China)	C C C C C
Public transport improvements	• Mass rapid transport • Strategic public transport schemes	• Mass Transit Systems (SITM) in major cities (Columbia) • Strategic Public Transport Systems (SETP) in smaller cities (Columbia) • Integrated public transportation system (NPP 28) (Malaysia)	C C C
Improve non-motorised transport infrastructure	• Development schemes	• Bikeway infrastructure development (Columbia)	C
Congestion relief **National and regional strategies and legislation**	• Traffic flow management • Climate Change Policies • Clean Energy Acts	• Promotion of traffic flow management (S Africa) • Dedicated Freight Corridor Programme (DFC) (India) • Maryland Clean Energy Incentive Act: Tax Credits (Electric & Hybrid-Electric (USA) • National freight policy (Colombia) • National Strategy on Climate Change (2008 - 2012) (Thailand) • National Urban Transport Policy (NUTP) (India) • The US Energy Policy Act (EPAct): The Hybrid Vehide Tax Credit (USA)	C P C C C C C

Table 12 highlights that the policies fall into a number of key categories:

- Fuel economy measures, such as eco driving and anti idling campaigns;
- Subsidies on lower emissions vehicles;
- Public transport improvements;
- Improvements to non-motorised transport infrastructure;
- Measures to reduce congestion levels;
- Improvement to infrastructure for both public and non motorised transport;
- National and regional strategies and legislation including clean energy, freight, climate change and urban transport policies; and
- Tax reduction on lower emission vehicles and fuels;

Due to their cost saving nature, these policies are likely to be positively received by households and therefore are more likely to be successfully implemented that those which cost households extra expenditure.

Box 22: Saving households money and reducing peak traffic volume in Singapore

Singapore's Off-Peak Car Scheme (OPC) scheme was implemented on the 1st of October 1994 with an updated scheme launched on the 25 January 2010.

The OPC scheme offers new and existing car owners the option to save on car registration and road taxes in return for reduced usage of the cars. Vehicle owners who register a new car as an OPC under the revised OPC scheme will continue to enjoy an up-front tax rebate of up to 17,000 Singapore Dollars that was available under the old scheme but will enjoy a number of additional perks including:

- unrestricted usage of cars registered under the scheme on Saturdays and evenings of public holidays;
- cash rebates for conversion of normal cars to the revised OPC scheme of up to 1,100 Singapore Dollars for every six months' registration as an OPC

These initiatives aim to make the OPC scheme more attractive so as to encourage more car owners to opt into the scheme. This serves to support LTA's overall objective to better manage congestion during peak periods.

Measures were also identified as providing cost savings (or additional revenue) to Governments in addition to mitigating carbon emissions. These policies and measures are outlined in Table 13.

Table 13: Cost negative measures for governments

Category	Sub categories	Example policies/measures	Current or Planned
Taxes	• Vehicle emissions tax • Fuel tax	• Energy Tax Act of 1978: The Gas Guzzler Tax (USA) • Excise Tax on Fuel Inefficient Cars (Canada) • Federal gas tax (USA)	• C • C • C
Charging road users	• Congestion charging	• Congestion fees (e.g. Indonesia) • Congestion pricing plan (China)	• P • P
Fleet Management	• Fleet targets • Fleet strategies	• ACT government fleet target (Australia) • Green fleet strategy (Australia) • Anti-idling campaign (Thailand)	• C • C • C
Parking	• Parking management	• Parking fee reform (China)	• C
Carbon offsetting	• Air travel offsetting	• Tasmanian Government air travel offset (Australia)	• C
Licensing	• Public transport licensing	• Bus route licensing (Ghana)	• C

The table highlights that the focus of current and future policies and measures is on:

- Charging road users through congestion and parking charges;
- Improving fleet management for example through targets and strategies to increase the usage of more fuel efficient vehicles;
- Taxing fuel inefficient vehicles and fuel tax;

Box 23: Fleet targets helping to reducing government spending: The Australian Capital Territory (ACT) Government's Fleet Target

In September 2004 the ACT Government committed that 10% of its fleet would comprise fuel-efficient, low-emission vehicles by 2008, a target that was met more than two years ahead of schedule.

Only vehicles that rate four stars or better using the Federal Government's Green Vehicle Guide (http://www.greenvehicleguide.gov.au) have been counted toward the target. The star rating is based on the sum of air pollution and greenhouse gas ratings for the vehicle, with the greenhouse gas rating based on both the fuel consumption and the level of CO_2 emissions for the vehicle. Vehicles with a greenhouse gas rating of the highest score of 10 have emissions of less than 60 g/km. Equal weighting is given to both these ratings to arrive at a combined Green Vehicle Guide (GVG) rating. To achieve 4 stars vehicles have to score 16 or above out of 20.

The introduction of these vehicles has helped the ACT Government to save money through fuel economy while also improving the environmental performance of its fleet.

This measure highlights how carbon emissions from the transport sector can be reduced at the same time as reducing government spending, through the design of government procurement procedures. The development of these kinds of measures, both within the EU's Member States as well as within non-EEA countries, will help to ensure that efforts to reduced carbon emissions from the transport sector are continued despite the current economic climate.

Box 24: Key findings: the most cost effective policies

Based on qualitative analysis, most policies were highlighted as being able to deliver a tonne of carbon reduction at under US$30.

This is encouraging, and fortifies findings in other studies such as Cambridge Systematics (2009) World Bank (2009) and McKinsey & Company (2009) that interventions in the transport sector are highly cost effective. Note however, that financial support for transport may still be required, to offset the large capital requirements that are needed at the outset of projects, for example the development of public transport infrastructure.

Promotion of the following kinds of policies will help ensure cost savings to households:

- Measures to reduce congestion levels (for example through traffic flow management in South Africa and dedicated freight corridors in India)
- Improvement to infrastructure for both public and non motorised transport (for example the introduction of more efficient public transport mass rapid transit schemes and strategic public transport systems in Columbia)
- Fuel economy measures such as the promotion of eco driving and anti idling campaigns
- Tax reduction and subsidies on lower emission vehicles and fuels (for electric vehicles in Japan, Canada, Australia, China and the Philippines and the reduction of excise tax on biofuels in the Ukraine)

These policies are likely to see easier implementation due to their high political acceptability.

On the other hand, government budget savings (or revenue generation) can be supported though:

- Charging road users through congestion and parking charges (for example the use of road charging in urban areas such as Electronic Road Pricing in Singapore)
- Improving fleet management (for example the Australian Capital Territory (ACT) Government introduce fuel efficient and low emission vehicles to its fleet by 2008)
- Taxing fuel inefficient vehicles and fuel tax (for example The introduction of the Gas Guzzler tax through the 1978 Energy Tax Act in the USA which taxes fuel inefficient cars more heavily)

4.5 The broader co-benefits delivered by the policies

Based on qualitative analysis the review also identified the wider co-benefits (see 3.2.2) that are supported by transport mitigation projects, including:

- Employment impacts, focusing on the ability of the policy or measure to generate jobs, and in particular green jobs.

- Other social and environmental impacts, focusing particularly on improving:

    - Accessibility;
    - Safety levels;

- Redistributive effects such as development of cycle tracks (India) and integrated public transport systems (Malaysia);
- Redesigning communities to reduce greenhouse gases (US);
- Reduced congestion;
- Lower levels of noise and air pollution.

The analysis in this chapter focuses on the policies that are currently in place and does not consider planned policies.

4.5.1 Impact on employment

The review identified current policies that have or are leading to the creation of jobs; both green[38] and other based on the expert opinion of the country reviewers.

Figure 25 below indicates that there are over 300 policies that are supporting the creation of hundreds of jobs with over 200 in total supporting significant levels of job creation (thousands of jobs).

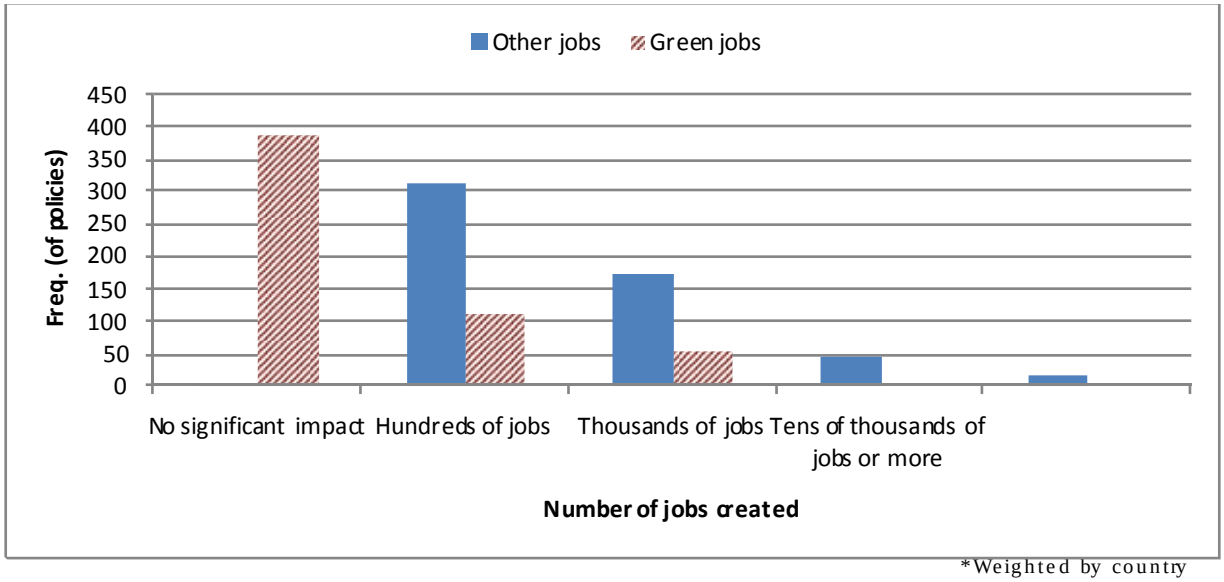


Figure 25: The number of green and other jobs created by policies and measures (for current policies only)

Table 14 categorises some of the key policies that are expected to create thousands of jobs.

[38] In the absence of a formal definition of green jobs (in the transport sector), for the purpose of this report we have defined green jobs as those which support the development of green sustainable transport through research, development, production and operation/management of: infrastructure to support green transport modes; green vehicles and transport modes; alternative (cleaner) fuels; and technologies to enact green transport, such as Intelligent Transport Systems and green logistics. The forthcoming Green Economy Report by UNEP provides further discussion on green jobs in the transport sector (http://www.unep.org/greeneconomy/). In future, a robust definition of green jobs would be useful in ensuring that priorities on employment are fully in line with those for green transport.

Table 14: Current policies that have or are leading to the creation of thousands of jobs

Category	Sub categories	Example policies/measures
Mass rapid transit schemes	• Bus rapid transit schemes	• Bus rapid transit (BRT) in Accra (Ghana) • Bus Rapid Transit corridors and busways for the World Cup 2014 host cities (Brazil) • Rapid transit System Network Expansion (Singapore)
Rail improvements	• High speed rail • Development of Metro systems	• Integrated high-speed rail system (Malaysia) • Integrated Railway Modernization Plan (India) • Light Rail Transit and Monorails for the World Cup 2014 (Brazil) • Reform of the national railway system (Ukraine) • Dubai Metro (UAE) • Construction of new Metro tracks sections (Ukraine) • Suburban train (e.g. Mexico)
Fuel efficiency	• Improving the fuel efficiency of vehicles	• Improvements in the fuel efficiency of automobiles based on continued implementation of the Top Runner Standard (Japan)
Alternative fuels/energy	• Developing the use of bio-fuels	• Biofuels as transport fuels (Philippines) • Promoting the use of renewable energy (Ghana) • Solar traffic lighting project (Ghana)
Integrated transport planning	• Integrated transportation systems	• Integrated national transportation network (Malaysia) • Integrated public transportation system (Malaysia) • Strategic Public Transport Systems in smaller cities between 250,000 and 600,000 population (Colombia) • Strategy for urban traffic in the city Lviv (Ukraine)
National policies	• Urban Renewal policies • Climate Change Policies	• Jawaharlal Nehru National Urban Renewal Mission (JnNURM) - which includes public transport and NMT reforms, institutional structure improvement, visioning and preparation of development plans and transport plans (India) • National Urban Transport Policy (NUTP) (India) • National Plan on Climate Change (Brazil) • Urban Massive Transport Program (FONADIN) (Mexico)

The policies and measures focus on:

- Large infrastructure development projects;
- Integrated transport planning;
- Supporting the development and update of alternative fuels;
- The implementation of national policies, such as India's National Urban Transport Policy described in Box 17.

Some of the jobs created, such as those involved with the development of infrastructure for public transport (for example the new Metro tracks sections in Ukraine) will be short term, whilst others, such as the operation of the integrated transportation systems provided (for example the integrated public transportation system in Malaysia) will support the development of jobs over a longer time period.

Box 25: Using national policy to support the strategic creation of green jobs: India's National Urban Transport Policy (NUTP)

The primary objective of India's NUTP is to encourage modal shift from private vehicles to public and non-motorized transport. It encourages integrated land use and transport planning, the development of public and non-motorised transport modes, the introduction of intelligent transport systems and cleaner technologies through priority investments.

The NUTP supports capacity building programs at both the institutional and individual level across India to ensure that the workforce has the correct skills to be able to develop and implement schemes effectively.

A knowledge management centre is being established to service the needs of all urban transport professionals (technical advice, data provision etc). The programme will also sponsor regular research to help formulate the right mitigation strategies.

At the individual level, a major exercise of training and skill development of the public officials and other public functionaries is planned to raise awareness of the nuances of urban transport planning and the specific issues involved in managing city transport. This training programme will be targeted at personnel belonging to the state transport departments, municipal corporations, metropolitan development authorities, traffic police, environmental authorities, state transport corporations, public works departments, etc.

Through its capacity building programme and funding the policy supports the strategic creation of the appropriate skills and green jobs within the sustainable transport sector.

The EU could (e.g. through the capacity building efforts supported by the EDF or DCI) may support non-EU countries to develop similar strategic policies to help ensure that investments in transport effectively supports the creation of green jobs.

Table 15 highlights the policies that are expected to lead to the creation of thousands of green jobs.

Table 15: Current policies that have or are leading to the creation of thousands of green jobs

Category	Sub categories	Example policies/measures
Legislation and standards	• Passenger vehicle GHG standards	• California Assembly Bill (AB) 1493: Passenger vehicle GHG standards (USA) • Canadian Environmental Protection Act (CEPA) Part 7, Division 5: Vehicle, Engine and Equipment Emissions (Canada) • Corporate Average Fuel Economy (CAFE) standards (USA) • Metro Railway (Amendment) Act 2009 (India)
National policies	• To support the development of industry • Urban renewal policies	• Implement and improve "The Automobile Industry Development Policy" (China) • Jawaharlal Nehru National Urban Renewal Mission (JnNURM) – which includes public transport and NMT reforms, institutional structure improvement, visioning and preparation of development plans and transport plans. (India) • National Strategy on Climate Change B.E. 2551-2555 (2008 - 2012) (Thailand) • National Urban Transport Policy (NUTP) (India) • The Automobile Industry Development Programme (China)
Alternative fuels	• Supporting the uptake of alternative fuels for transport • Invest in clean technology	• Biofuels as transport fuels (Philippines) • Commercial Aviation Alternative Fuels Initiative (CAAFI) (USA)
Fuel economy	• Improving the fuel efficiency of vehicles • Improving the fuel efficiency of public transport • Energy conservation programmes	• Energy Conservation Program - Park and Ride (Thailand) • Energy Conservation Program - Transport System Efficiency (Thailand) • Enhancing energy efficiency of railways (Japan) • Improvements in the fuel efficiency of automobiles based on continued implementation of the Top Runner Standard (Japan)
Public transport infrastructure development/improvement	• Developing urban public transport	• Developing Metro/LRT/Mono Rail (India) • Implementation of BRT (India) • Integrated Railway Modernization Plan (India)
Promotional campaigns	Promote: • the use of more low emission vehicles, • energy management, • alternative fuels, • non motorised transport, • virtual communication to reduce travel demand.	• Promote new energy (low emission) vehicles (China) • Promoting Contract-based Energy Management (China) • Promoting the use of renewable energy (biofuels) (Ghana) • Promotion of LPG (Indonesia) • Promotion of road planning prioritising pedestrians/bicycles (Japan) • Promotion of telework and other transport substitution by information and communications technology. (Japan)

The policies and measures focus on:

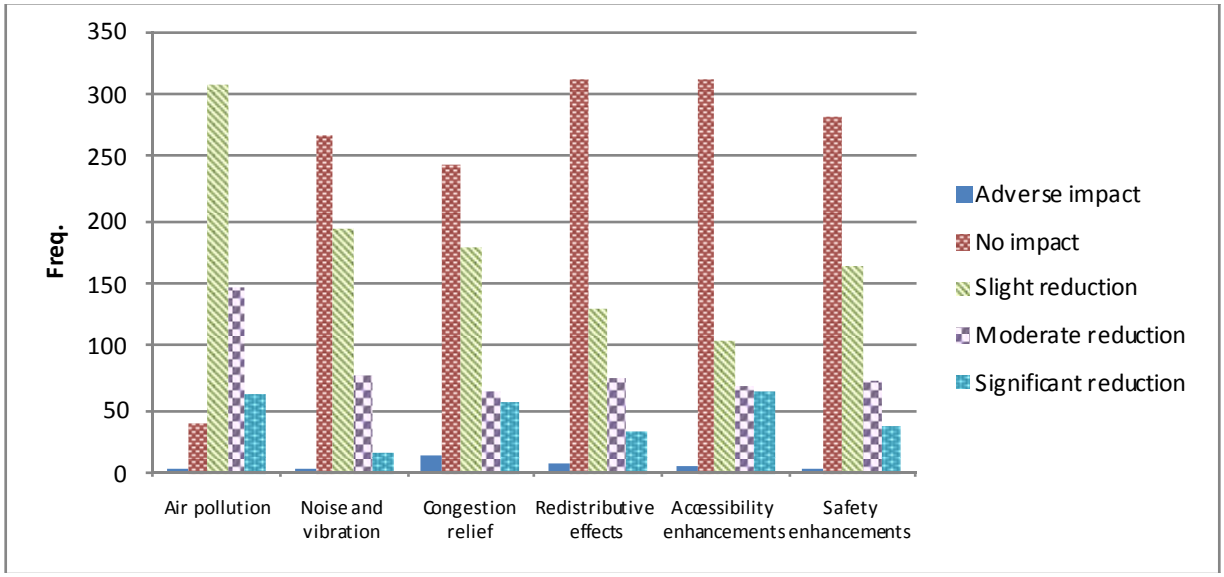
- The implementation of national policies and legislation and ensuring that relevant emissions standards are adhered to.
- Improving the fuel economy of both public and private vehicles.
- The development of infrastructure for public transport.
- Promotional campaigns to encourage behaviour change both in terms of the reduced demand for travel and to shift travel to more fuel efficient modes of transport.

There is substantial overlap in the policies that have or are expected to create significant numbers of green jobs and jobs in general.

Again it will be important to ascertain if the jobs created by some of these projects will be short term or are expected to support green jobs over the longer term.

4.5.2 Other social and environmental impacts

Figure 26 shows the impacts that the policies reviewed have on society and the environment based on the expert judgment of the reviewers. The findings show that there are examples of policies delivering social and environmental benefits whilst also reducing carbon emissions from the transport sector. The most positive impact is on air pollution levels, where the majority of policies have a slightly positive impact.



*Weighted by country

Figure 26: Potential social and environmental impacts of the policies and measures reviewed (for current policies only)

The table below provides further details on the policies that have a significantly positive effect on each of the variables and those where a negative impact has been noted. There are a number of cross cutting themes which deliver the broadest range of environmental and social benefits including:

- Supporting sustainable land use;
- Promoting and developing non-motorised public transport; and
- Developing integrated and strategic urban public transport systems.

Box 26: Integrating transport planning and land use planning, the case of Kuala Lumpur, Malaysia

The primary objective of the Kuala Lumpur City Plan 2020 'Towards a World Class City' currently in draft, is to create a world class city by:

- Supporting the development of a comprehensive and integrated transportation system that caters for the needs of inter and intra city travel;
- Integrating land use development with public transportation and road network.

The emphasis of the Plan is to move towards giving 'People Priority', whereby the priority use of road space must take into consideration people's safety and comfort in travel and in the use of road space.

Table 16: Policies that have the most significant positive environmental and social effects

Impact	Representative types of policies and measures with a positive impact
Air pollution	• Improving freight logistics and general traffic management • Legislation to reduce GHG emissions • Introducing new vehicle emission standards • Investing in clean technology • Renewing public transport and government fleets • Idling restrictions • Supporting the uptake of electric and hybrid vehicles • Supporting fuel economy and the introduction of alternative fuels • Land use restructuring
Noise and vibration	• Implementing road user charging • Developing strategic urban public transport systems • Introducing metro or tram systems • Promoting and developing non-motorised public transport • Introducing multi-modal distribution centres
Congestion relief	• Development of metro, tram and mass rapid transit systems • Improved integration of public transport • Introducing multi-modal distribution centres • Road user charging • Supporting modal shift • The introduction of zones of restriction, such as low emission zones • Programmes to restrict vehicle usage, for example via license plate auctioning
Redistributive effects	• Improving urban public transport, for example through developing metro and mass rapid transport systems and reforming bus services • Ensuring equality of access, for example for low income groups • Developing infrastructure for non motorised transport • Sustainable Land use

Accessibility	• Sustainable Land use • Renewal of bus stations • Development of pedestrian facilities in the city • Improving traffic flow in urban areas • Improvement of public transport infrastructure and services
Safety	• Developing dedicated infrastructure for non motorised transport such as bikeways and pedestrian facilities • Safe routes to schools • Introducing speed limits in residential areas and pedestrian zones • Improving public transport provision and infrastructure, for examples through the renewal of bus stations and shelters

Box 27: Canada's Green Municipal Fund (GMF) supporting the environment in addition to mitigating greenhouse gas emissions

The primary objective of Canada's Green Municipal Fund was to provide funding for municipal initiatives that benefit the environment. The GMF offers loans at below market rates and grants to municipalities for sustainable community plans or projects. Transportation projects are eligible for loans of up to $4 million (CAN) and grants of up to $400,000 (CAN) if planners and local officials can demonstrate that the projects will benefit the environment. Each project must have clear sustainability goals (e.g. 10% GHG reduction from transportation in a given city); indicators (e.g. reduction in fossil fuel consumption) and data collection methods (e.g. fuel sales). This is a good example of how funds can be successful in supporting wider environmental benefits as well at the reduction of emissions from transport.

Trade-offs were observed for other types of policies, for example:

- The higher cost of electric vehicles which reduced their level of accessibility;
- The higher level of air pollution caused by bio-fuels in comparison to traditional fuels;
- Hybrid and alternative-fuel vehicles increasing traffic congestion due to the rebound effect (for example where consumers may drive their cars longer distances due to the increased affordability of fuel brought about by the efficiency improvements).

It should be noted that some policies and measures were highlighted as having a negative social or environmental impact. For example accessibility would likely be reduced by policies and measures that would make travel by private vehicle more expensive (for example via congestion charging, parking fees, vehicle and fuel taxation)

The promotion of alternatively fuelled vehicles , through reduced rates of import duty and vehicle financing and credit schemes, could have a number of negative impacts if not managed effectively for example:

- The increased level of production required to meet demand could have a negative impact if biofuels are not produced sustainably.
- Increasing the total number of vehicles of the roads would be likely to have a negative impact on congestion levels.

The potential negative impacts of policies should be considered when developing and implementing sustainable transport policies. Routes must be found to ameliorate these

through the implementation of strategic and integrated policies and measures. For example, the potential negative impacts of the introduction of electric vehicles on congestion levels could be addressed through an integrated approach, ensuring that policies to support their uptake are not conducted in isolation, but developed in conjunction with polices to support travel demand management. At the moment, no evidence was found of such strategic thinking within the countries reviewed.

Box 28: Key findings on policies and measures that deliver broader positive impacts

The review has identified that many mitigation policies have a positive impact on employment as well as delivering other social and environmental benefits.

Based on qualitative analysis, policies that are likely to lead to the creation of jobs, specifically green jobs which support the development of green sustainable transport, were found to focus on:

- Improving the fuel economy of both public and private vehicles.
- The development of infrastructure for public transport.
- Promotional campaigns to encourage behaviour change.
- The implementation of national policies and legislation, such as India's National Urban Transport Policy.

The findings show that there are examples of policies delivering social and environmental benefits whilst also reducing carbon emissions from the transport sector, with a particularly positive impact on air pollutions levels identified. There are a number of cross cutting themes which deliver a broad range of environmental and social benefits including:

- Supporting sustainable land use (for examples through integrated transport and laun use planning in Kuala Lumpur).
- Promoting and developing non-motorised public transport.
- Developing integrated and strategic urban public transport systems.

The effects of policies and measures on employment levels and broader social and environmental co-benefits should be considered whenever sustainable transport policies are developed. This will help ensure that investment in transport effectively supports the creation of green jobs and that the broader co-benefits are maximised.

4.6 Key barriers towards the implementation of the policies

The review identified policies which were susceptible to political, institutional and technological barriers.

An overall analysis reveals that many policies were not constrained in these three categories. Institutional constraints impacted on the largest number of policies, followed by technical, then political constraints (see figure below).

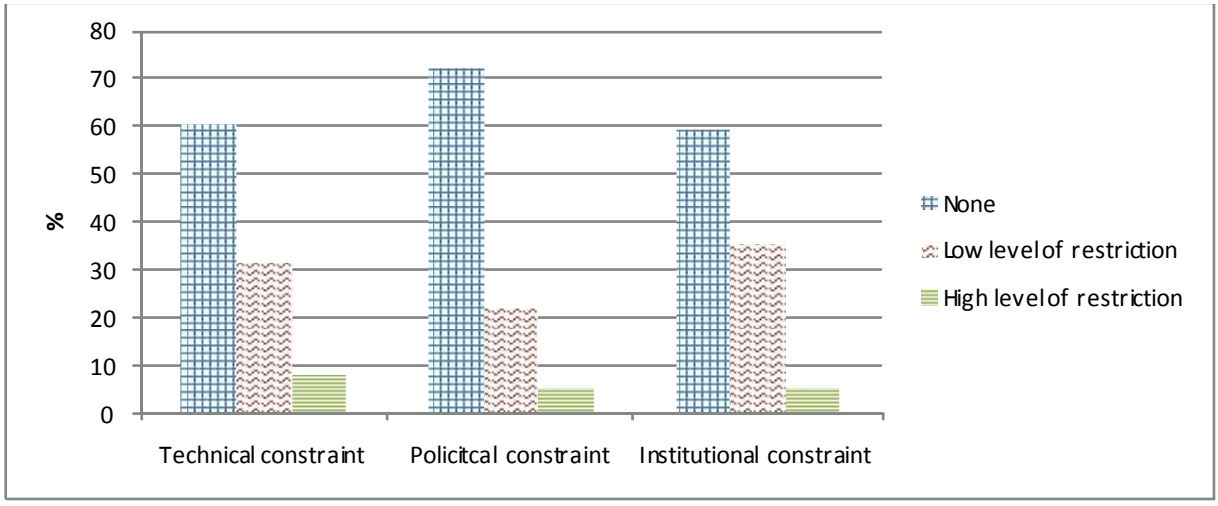


Figure 27: level of constraints experienced or expected (Current and Planned policies)

The key areas in which high levels of technical restrictions were found, are summarised in the table below.

Table 17: Policies with a high level of technical restriction

Type	Specific examples from countries	
	Annex 1	Non-Annex 1
Alternative fuels	• Australia – Australian centre for renewable energy • Ukraine - Conducting research and development work on the modernization and adaptation of diesel internal combustion engines to use biodiesel	• Ghana - Promoting the use of renewable energy (biofuels) • Brazil - subsidy for diesel
Low emission vehicles	• Japan - Enhancing energy efficiency of aircraft	
Inspection and Maintenance		• Brazil - Inspection/Maintenance Program
Non motorised transport		• Philippines - Bike on Bike off - LRT • Colombia - Bikeway master plans • Philippines - Bikeways and Walkways Program in Metro Manila
Rail	• Canada - Montréal - New York and Montréal - Boston High Speed Rail corridors under study	• Brazil - High speed rail RIO-SP (TAV Brasil - Trem de Alta Velocidade
TDM		• Indonesia - Electronic Road Pricing/Congestion Charging
Urban public transport		• Indonesia - Development of Monorail in Jakarta; Development of MRT in Jakarta, consisting of two main lines (North-South and East-West corridors) totalling 110 km; Construction of electric railways • Indonesia - Construction of electric railways
Aviation	• Japan - Enhancing energy efficiency of aircraft	

In particular:

- Annex 1 countries faced restrictions in terms of alternative fuels, high speed rail and increasing the energy efficiency of vehicles. In depth research would be beneficial to identify why such barriers exist for these measures, to work with countries where the

barriers exist to develop ways to overcome them and to learn from any countries that have successfully overcome the barriers.

- Non Annex 1 countries faced restrictions in terms of the implementation of urban public transport, high speed rail and non motorised transport and in the implementation of travel demand measures.

Examples of the types of technical barriers that may be faced in the implementation of such policies include:

- Travel demand management: a lack of knowledge of the electronic road pricing infrastructure available, effective scheme design and implementation processes and the technology required for the subsequent operation of the road pricing scheme;
- Non motorised transport: a lack of capacity to be able to implement and manage the operation of technological measures to support a shift to non motorised transport, such as the payment systems for bike loan schemes within a city;
- High speed rail: a lack of knowledge of the latest high speed rail technology for examples for tracks, crossing and trains and a need to ensure that technology used is compatible across borders to ensure interoperability

Europe can help to reduce these barriers through providing support for technology transfer for example through facilitating the establishment of centres of excellence and/or sustainable transport academies for each region or by theme.

Box 29: A large appetite for technologies in rail transport

The review identified a large need for technology transfer in rail. This covered both developed countries (such as for high speed rail in the US), and developing countries (such as rail modernisation in India).

European actors, including those in the private sector, can transfer their expertise in rail for the benefit of low carbon transport development in non-EU countries through a variety of channels, including capacity building programmes provided through EU development assistance such as the EDF, ENPI and DCI (see Section III). Co-operation with international rail institutions, e.g. the Union of Railways (UIC) may also prove beneficial to mobilise sector-specific expertise.

In terms of political restrictions, those listed in Table 18 below were found to possess a high level of restriction.

Table 18: Policies with a high level of political restriction

Type	Specific examples from countries	
	Annex 1	Non-Annex 1
Alternative fuels		• Ghana - Promoting the use of renewable energy (biofuels)
Fuel tax	• USA - Federal gas tax	
ICT	• Japan - Promotion of telework and other transport substitution by information and communications technology.	
Legislation on climate change	• USA - California Senate Bill (SB) 375: Redesigning Communities to Reduce Greenhouse Gases	
Inspection and maintenance of vehicles		• India - Inspection and Maintenance - Pollution under check (PUC)
Planning	• USA - Compact, mixed use development in the Sacramento Region	
Public transport		• Philippines - Promotion of BRT systems for metro cities • Singapore - Rapid Transit System Network Expansion
Rail	• Canada - Montréal - New York and Montréal - Boston High Speed Rail corridors under study • USA - California High Speed Rail (HSR) System	• South Korea - Public Transport Package - III - High Speed Rails
TDM (e.g. congestion and parking charges)		• South Africa - Congestion charges, as part of environmental fiscal reform • China - Congestion pricing plan

In particular:

- Annex 1 countries faced restrictions in terms of planning, high speed rail, fuel tax and legislation.

  Non-Annex 1 countries faced restrictions in terms of travel demand management, public transport and the inspection and maintenance of vehicles.

Box 30: Overcoming political restrictions for Transport Demand Management

To overcome the political constraints surrounding TDM measures such as congestion charging, European policy makers may develop guidance for EU Member States on how such barriers could be overcome.

The EU can learn from experience in non-EEA countries, considering the potential for policies which have not been implementation in EU countries but have been successfull elsewhere to be applied in the EU context. For example vehicle plate auctioning has been largely successful in curbing congestion in Singapore but has not yet been implemented in EU member states. The success of such schemes depends very much on the local context so there may be opportunities for local policies makers in EU member states to adopt such a scheme to support the mitigation of carbon emissions from transport.

Finally, in terms of institutional challenges, the review found a number of types of policies most susceptible to lack of institutional capacity and coordination, as shown in Table 19 below.

- In terms of Annex 1 countries Ukraine faced the highest level of institutional challenges covering a range of issues from non motorised transport to traffic demand management.

- Non-Annex 1 countries particularly faced restrictions in terms of the implementation of non motorised transport. Europe could help to reduce these barriers through provided capacity building support.

Table 19: Policies with a high level of institutional restriction

Type	Specific examples from countries	
	Annex 1	Non-Annex 1
Alternative fuels	• Ukraine - Conducting research and development work on the modernization and adaptation of diesel internal combustion engines to use biodiesel	• India - Auto Fuel Policy
Legislation	• California Assembly Bill (AB) 32: Global Warming Solutions Act	• India - Fuel Economy Standards
NMT	• Ukraine - Improvement and development of bicycle paths in the city of Kiev	• Colombia - Bikeway infrastructure development and Bikeway masterplans • Philippines - Bikeways and Walkways Program in Metro Manila • India - Development of pedestrians facilities in city
Rail	• Japan - Development of new routes including railway routes • Ukraine - Reform of the national railway system	• Singapore - Rapid Transit System Network Expansion
TDM	• Ukraine - Strategy for the urban traffic in the city Lviv	
Urban public transport		• Mexico - Urban Massive Transport Program (FONADIN)
Others including research, monitoring and the development of logistics	• Ukraine - Conducting research and development work on the modernization and adaptation of diesel internal combustion engines to use biodiesel	

Box 31: The need for strong institutional coordination for public transport and non-motorised transport

In particular, policies surrounding non-motorised transport and urban public transport were noted by many reviewers as being challenged institutionally. This may reflect the fact that;

- Non-motorised transport is often not allocated responsibility to any authority. Jurisdiction on road management cut across many different authorities, often mirroring the network hierarchy of roads. National governments are often allocated responsibility of trunk roads, state/regional govemments for semi-trunk roads, and local authorities for local roads. Responsibility for non-motorised transport infrastructure is often "lost" within this maze of institutions.
- Likewise for urban public transport, there are many stakeholders engaged from both public and private sectors, making their reform particularly difficult

The EU can learn from key countries and support the transfer of knowledge of key countries which have managed to overcome such challenges to enable Member States (as well as in other countries where it provides external assistance with instruments under their control, see Section 6.2) to learn from good practice identified. For example, the Land Transport Authority of Singapore coordinates the planning and implementation of transport policy across all modes of transport ensuring their full integration.

Box 32: Key findings: the key barriers likely to restrict the implementation of policies

Although many policies do not face major barriers to their implementation, around 40% face some form of restriction, as follows:

- Technical restrictions are found for some policies focussing on alternative fuels, low emission vehicles, rail, transport demand management measures and urban public transport.
- Political restrictions hinder the implementation of fuel taxes, legislation on climate change and transport demand management measures in many countries.
- Institutional capacity and coordination are major barriers in the implementation of non-motorised transport and urban public transport.

There is some variation in the types of the barriers experienced in Annex 1 and 2 countries.

- Technical issues are a greater barrier in Non annex 1 countries than Annex 1 countries.
- The political barriers that dominate in Annex 1 countries relate to planning, high speed rail, fuel tax and legislation whilst in non-Annex 1 countries the main barriers existing relate to travel demand management, public transport and the inspection and maintenance of vehicles.
- City level institutional barriers dominate in non-Annex 1 countries, relating to the implementation of non motorized transport and public transport. Fewer institutional barriers are experienced in Annex 1 countries, with the exception of Ukraine, where there are a number of barriers relating to non motorised transport, traffic demand management and the reform of the railways system.

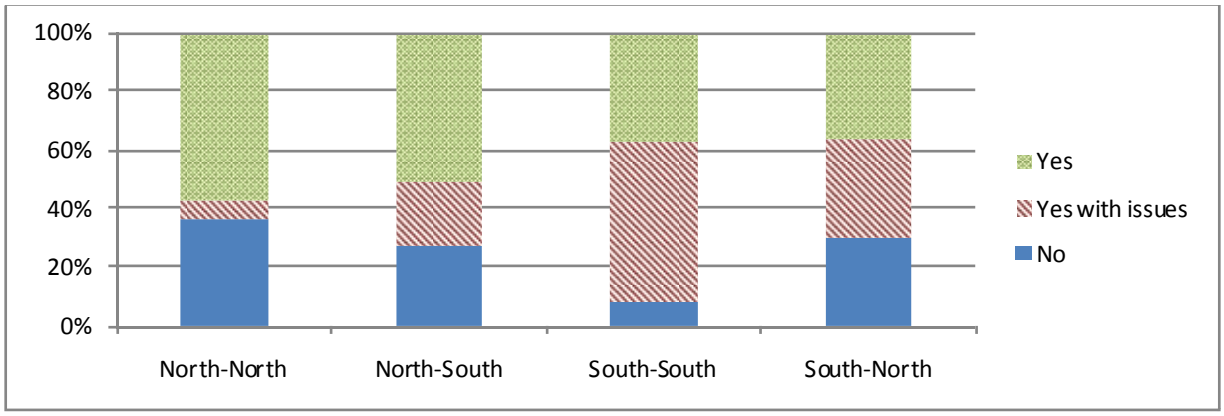
In depth research would be beneficial to identify why such barriers exist for these measures, to work with countries where the barriers exist to develop ways to overcome them and to learn from the experience of other countries that have addressed such barriers. The EC facilitate the establishment of Centres of Excellence to target its capacity building, technology transfer and financial support to the areas of need identified in non-EEA countries (see 1.5 and 1.6 for further details).

4.7 The transferability of the identified policies

The transferability of the policies included in the review was considered for the following as outlined in Figure 28:

1. Between developed (Annex 1) countries, i.e. a North-North transfer;
2. From a developed (Annex 1) country to a developing (non-Annex 1) country, i.e. a North-South transfer;
3. Between developing (non-Annex 1) countries, i.e. a South-South transfer;
4. From a developing (non-Annex 1) country, to a developed (Annex 1) country i.e. a South-North transfer.

The qualitative analysis indicates that on the whole, the majority of policies can be transferred across all categories. More than 80% of policies identified in developing countries (non-Annex 1) were found to be transferable to other developing countries, although with some issues that need to be overcome.



* weighted by country

Figure 28: The transferability of policies

Table 20 below shows the key policies that have been identified as transferable in each of the categories. It shows that beyond the traditional North-South transfers commonly acknowledged, that there is a wealth of transport policies that can be transferred between developing countries (South-South transfers) and also from developing countries to developed countries (South-North transfers).

Table 20: Examples of the types of policies that are transferable

Type of transfer	Types of policies identified[39]	Examples policies
North - south	• Cycling and walking environment improvement • Fuel quality • Vehicle/ emission standards	• Bicyde parking (Australia) • Fuel quality standards (Australia) • Biomass fuels (Japan)
North - north	• Teleworking • Improvement of traffic flow through e.g. vehicle information systems • Improving energy efficiency of public buses and rail rolling stock • Partnerships with private transport operators	• Promotion of telework and other transport substitution by information and communications technology (Japan) • Rail Clearways Program (Australia) • Enhancing energy efficiency of railways (Japan) • ClimateSmart 2050 - Cleaner buses (Australia)
South - south South - north	• Bus Rapid Transit • Cycling master plans • Fuel tax reform • Promotion of biofuels	• Bus Rapid Transit corridors and busways for the WC2014 host cities (Brazil) • Bikeway masterplans and infrastructure development (Colombia) • Fuel tax (South Africa) • Cycling Master Plan (Brazil) • BRT system (China, Mexico, Indonesia) • Promotion of biofuels (Indonesia)

The table highlights differences in the types of policies that are most transferable between the different categories:

- Between developed countries (North-North transfer): technical issues relating to teleworking, intelligent transport systems and improving the energy efficiency of vehicles;
- Between developed and developing countries (North-South transfer): vehicle and emissions standards, policies and measures relating to the development of non motorised transport;
- Between two developing countries (South-South transfer) and developing to developed countries (South-North) the implementation of Bus Rapid Transit systems.

[39] Selection by authors based on expert judgment

Box 33: BRT: an example of south-south and south-north transfer

Bus Rapid Transit (BRT) was a concept which saw initial large-scale implementation in Latin America, in cities such as Curitiba (Brazil) and Bogota (Colombia) starting in the 1980s.

Since then, this cost effective mass transit technology has been transferred to other world regions such as Indonesia (Jakarta), South Africa (Johannesburg) and Guangzhou (China) to name a few locations. Non-governmental organisations such as the Institute for Transportation and Development Policy (ITDP) and Embarq (the WRI Center for Sustainable Transport) have been instrumental in the replication of good practice.

The example of BRT showcases the potential for the EU to further support South-South and also South-North transfer to mitigate GHGs in a cost effective manner, and also to promote sustainable mobility in cities across the world.

BRT is increasingly being adopted in European cities, for example in Swansea, UK. Research programmes, supported, for example, by European research grants under FP-7/FP-8, could be targeted at understanding the transferability of BRT to European cities.

Box 34: Transferring knowledge on private sector involvement

One key area identified as highly transferable from other developed countries to the EU was in ways of involving the private operators of freight and passenger transport to increase the environmental performance of the sector. Two of such examples are given below:

- In the US, the "SmartWay" partnership between the US Environmental Protection Agency (EPA) and the freight industry aims to increase the availability and market penetration of fuel efficiency technologies and strategies that help freight carriers achieve higher environmental perfomance for their vehicle fleet. EPA offers various financing options to allow freight carriers to upgrade their fleet, and it estimates that it can achieve GHG emissions reductions of up to 32 tons/truck/year.

- In Japan, passenger transport operators and specified cargo transport operators of a sufficient size need to submit Energy Efficiency Plans to the government and report on their annual energy use. Designated cargo owners (865 businesses) with freight tonnage of more than 3000 TKM need to submit Energy Efficiency Plans (including modal shift, increasing the use of trucks for business use instead of those for personal use, and joint order placement) to the government, and report on annual energy use.

The EU can benefit from the implementation of such practices, to further enhance the environmental efficiency of transport operators in the private sector. This may involve coordinated programmes between various European Commission bodies, including but not limited to DG-MOVE, DG-CLIMA and DG-Enterprise and Industry. It may also be linked to existing initiatives such as the Action Plan for sustainable consumption and production (SCP) and sustainable industrial policy (SIP) (see http://ec.europa.eu/enterprise/policies/sustainable-business/environment-action-plan/index_en.htm)

Box 35: Key findings: the transferability of policies

The review found that the majority of policies can be transferred across countries. This goes beyond the traditional North-South transfers commonly acknowledged, and includes those which can be transferred between developing countries (South-South transfers) and also from developing countries to developed countries (South-North transfers). For example more than 80% of policies identified in developing countries (non-Annex 1) were found to be transferable to other developing countries, although with some issues that need to be overcome.

Differences in the types of policies that are most transferable between the different categories were identified:

- Between developed countries (North-North transfer): technical issues relating to teleworking, intelligent transport systems and improving the energy efficiency of vehicles;
- Between developed and developing countries (North-South transfer): vehicle and emissions standards and policies and measures relating to the development of non motorised transport
- Between two developing countries (South-South transfer) and developing to developed (South-North) the implementation of Bus Rapid Transit systems.

BRT showcases the potential for the EU to further support South-South and also South-North transfer to mitigate GHGs in a cost effective manner and to promote sustainable mobility in cities across the world. Research programmes supported, for example, by European research grants under FP-7/FP-8, could be targeted at understanding the transferability of BRT to European cities. Existing initiatives, such as CIVITAS, could also be expanded to cover non - EEA countries.

Involving the private operators of freight and passenger transport to increase the environmental performance of the freight sector, was identified as highly transferable from other developed countries to the EU, with the opportunity to learn from programmes such as “Smartway” in the USA and Energy Efficiency Plans in Japan.

4.8 Requirements for international support

Three key areas of support requirements were explored through the review namely:

- Capacity Building
- Financing
- Technology Transfer

In the context of the ongoing climate negotiations, a key topic is how developed countries can support developing countries to implement "Nationally Appropriate Mitigation Actions" for both the mitigation of and adaptation to climate change (see section 6.4.7). Capacity building, technology transfer and financing are identified as the crucial elements to support these actions.

The review found that Latin America, Asia, Africa[40] the Middle East (with the exception of financial support) and the Former Soviet Union were regions where the need for support in all of the above categories was highest. This may highlight the need for international support to be provided in a balanced and comprehensive way covering capacity building, technological and financial support, to ensure their success. A focus on only one type of support may not be adequate, to reduce the barriers to the implementation of these policies as was found in Section 4.6.

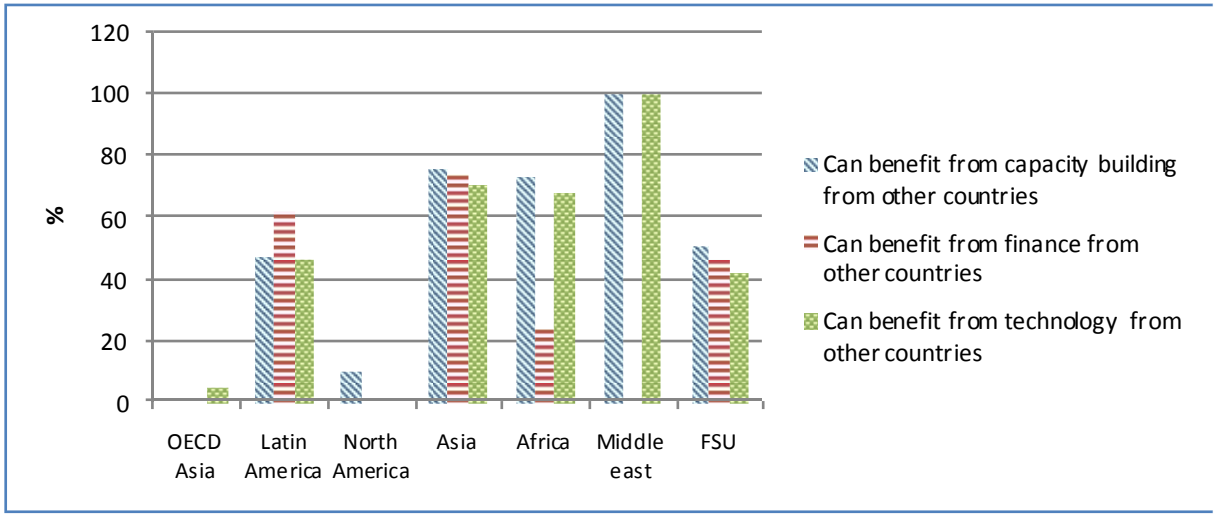


Figure 29: Percentage of polices that can benefit from international support across the different regions[41]

International support requirements for capacity building were typically required for:

- National/urban transport plans/strategies;
- Implementation of fuel taxes, congestion charging and other economic instruments;
- Legislation/regulations on climate change, air pollution, fuel/vehicle standards etc;
- Transport demand management measures, including parking policy formulation;
- Planning for non-motorised transport;

[40] Please note that the percentages for Africa are based on data from the country reviews for South Africa and Ghana. Of a total of 50 policies reviewed 28 were in South Africa and 12 in Ghana. 11 of the 12 Ghanaian policies were identified as being able to benefit from financial support in relation to only 1 in South Africa leading to the lower total percentage score than may be expected.

[41] Note: Middle East currently excluded from the analysis due to data constraints.

- Urban public transport operation; and
- Maintenance of transport infrastructure.

Whilst the key policies identified in need of financial support were found to be:

- Public transport and non-motorised transport infrastructure;
- New/replacement vehicles (for road) and rolling stock (for rail); and
- Financial resources to enable capacity building.

Looking at technology transfer and comparing to technical constraints (as illustrated in Figure 27), the review found a clear link between those policies noted as facing a high level of technical restriction, and their need for technology transfer (see figure below).

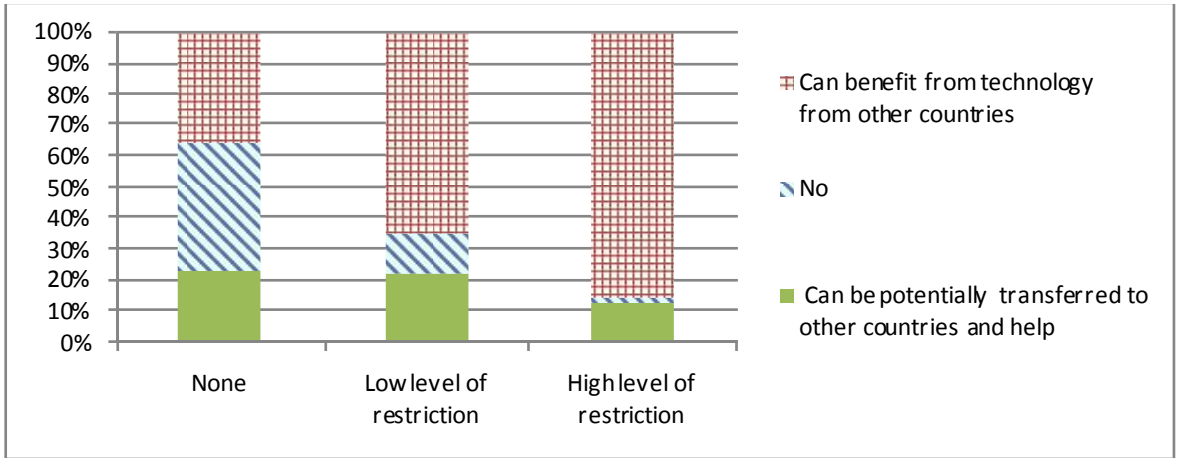


Figure 30: Percentage of polices that can benefit technology transfer for each level of technical constraints faced

Such needs were typically identified for:

- (High speed) rail, MRT and monorail systems;
- Bicycle and walking infrastructure;
- Monitoring of emissions;
- Hydrogen and gas powered buses;
- Alternative/better quality fuels;
- Electronic road pricing;
- Intelligent transport systems (ITS).

Almost all policies, for which technology transfer was needed, also acknowledged further benefits from capacity building and financing, suggesting that such support efforts are strongly related to each other and that they must be supported as a package.

Box 36: Key findings: International support requirements

The majority of policies being implemented or planned in non-Annex 1 countries were felt to be able to benefit from all three types of support: capacity building, financial and technological.

The review found a clear link between those policies noted as facing a high level of technical restriction, and their need for technology transfer. Almost all policies, for which technology transfer was needed, also acknowledged further benefits from capacity building and financing, suggesting that such support efforts are strongly related to each other and that they must be supported as a package.

It was identified that Latin America, Asia, Africa and the Former Soviet Union were regions where the need for support in all of the above categories was highest.

International capacity building, financial and technological support provided as a package of measures could help to overcome many political and technical barriers to the implementation of policies, as well as being able to support improvements in institutional co-ordination and capacity building.

4.9 Key findings from the country reviews

There is a diverse set of policies available to policy makers to mitigate transport emissions.

In the 20 countries reviewed, 690 policies are found at the local, regional and national level, with the potential to mitigate transport GHGs. More than 220 policies (30%) can reduce CO_2 by more than 10% over a 10 year period, compared against business as usual. The most effective policies centre around:

- mass rapid transit systems and rail improvements;
- support and infrastructure for non motorised transport;
  emission and fuel economy standards;
- national policies on climate change and associated legislation.

A wide range of policies exist across the 'avoid, shift and improve' categories with, on the whole, a greater number of polices that support improve measures rather than avoid and shift. The policies identified support the use of a range of different planning, regulatory, economic, informational and technological instruments to bring about emission reductions. Economic instruments such as subsidies, taxes and charges can be used to support the reduction of emissions from the transport sector for examples in the case of the successful Canadian EcoAuto rebate programme.

Only 5% of the policies identified focus solely on freight transport, highlighting that the sector could benefit from increased attention with the opportunity to learn from countries such as Japan and the USA, who are taking proactive steps to address freight emissions.

Mitigation policies in the transport sector are largely being implemented by Government Actors

Most policies were found to be implemented by government actors, although the private sector was found to be working together with government to achieve policy targets, especially in Latin America, Africa and Asia. NGOs such as Embarq and ITDP were found to be playing a major role in building capacity and providing sectoral expertise in developing countries, particularly related to Bus Rapid Transit and Non-Motorised Transport

Policies at local level have the potential to change behaviour, whilst national policies have a large potential to change technology.

Policies effective in mitigating greenhouse gas levels are being delivered at different levels, depending on whether the emission reductions are being achieved through behaviour change or an improvement in emission factors. In general:

- Local level policies dominate those delivering the most substantial reduction in vehicle kilometres travelled (through travel demand management, the improvement of public transport systems and the implementation of mass rapid transit schemes).
- National policies dominate those delivering the most substantial improvement in emissions factors (through supporting the update of low emission vehicles and fuels and supporting rail improvements).

Sub-national policies should be considered as a key aspect of mitigation actions. This particularly applies to "avoid" and "shift" policies as local policy makers have direct control over policies that are the most effective at supporting behaviour changes to "avoid" private motorised travel and "shift" to less carbon intensive modes.

A large proportion of transport mitigation policies are highly cost effective, and also cost negative – either for households, government budgets, or both.

The qualitative analysis has shown that the majority of current policies have the ability to deliver a tonne of carbon reduction at under 30 USD for both the private and public sector future.

This is encouraging, and fortifies findings in other studies such as Cambridge Systematics (2009)[42]World Bank (2009)[43] and McKinsey & Company (2009)[44] that interventions in the transport sector are highly cost effective. Note however, that financial support for transport may still be required, to offset the large capital requirements that are needed at the outset of projects, for example the development of public transport infrastructure.

Promotion of the following kinds of policies will help ensure cost savings to households:

- Measures to reduce congestion levels (for example through traffic flow management in South Africa and dedicated freight corridors in India)
- Improvement to infrastructure for both public and non motorised transport (for example the introduction of more efficient public transport mass rapid transit schemes and strategic public transport systems in Columbia)
- Fuel economy measures such as the promotion of eco driving and anti idling campaigns
- Tax reduction and subsidies on lower emission vehicles and fuels (for electric vehicles in Japan, Canada, Australia, China and the Philippines and the reduction of excise tax on biofuels in the Ukraine)

These policies are likely to see easier implementation due to their high political acceptability.

On the other hand, government budget savings (or revenue generation) can be supported though:

- Charging road users through congestion and parking charges (for example the use of road charging in urban areas such as Electronic Road Pricing in Singapore)
- Improving fleet management (for example the Australian Capital Territory (ACT) Government introduce fuel efficient and low emission vehicles to its fleet by 2008)
- Taxing fuel inefficient vehicles and fuel tax (for example The introduction of the Gas Guzzler tax through the 1978 Energy Tax Act in the USA which taxes fuel inefficient cars more heavily)

The majority of transport mitigation policies deliver positive economic impacts.

The review has identified that many mitigation policies have a positive impact on employment. Based on a qualitative analysis, policies that are likely to lead to the creation of jobs, especially green jobs which support the development of sustainable transport include:

[42] The "Moving Cooler" study suggests that a holistic set of policies based on the Avoid, Shift, and Improve strategy (incorporating behavioural change) can be delivered at net negative cost. The savings in fuel costs that arise from a mixture of behavioural and technological changes far outstrip the policy implementation costs.
[43] Known as the MEDEC study, the World Bank notes that in Mexico projects targeted at improving the efficiency of bus networks, rail freight and vehicle-inspection schemes prove to be highly cost negative.
[44] Mc Kinsey (2009) notes that measures to improve the fuel economy of vehicles also tend to be cost-negative interventions.

- Development of high fuel economy vehicles;
- The development of infrastructure for public transport;
- Promotional campaigns to encourage behaviour change.
- The implementation of national policies and legislation, such as India's National Urban Transport Policy (see box below);

Many policies to address climate change also deliver other environmental and social benefits.

The findings show that there are examples of policies delivering social and environmental benefits whilst also reducing carbon emissions from the transport sector, with a particularly positive impact on air pollutions levels identified.

There are a number of cross cutting themes which deliver a broad range of environmental and social benefits including:

- Supporting sustainable land use (for example through integrated transport and land use planning in Kuala Lumpur).
- Promoting and developing non-motorised public transport.
- Developing integrated and strategic urban public transport systems.

Most policies are free from any technical, political or institutional restrictions to their implementation.

Although many policies do not face major barriers to their implementation, around 40% face some form of restriction:

- Technical restrictions are found for some policies focussing on alternative fuels, low emission vehicles, rail, transport demand management measures and urban public transport.
- Political restrictions hinder the implementation of fuel taxes, legislation on climate change and transport demand management measures in many countries.
- Institutional capacity and coordination are major barriers in the implementation of non-motorised transport and urban public transport.

There is some variation in the types of the barriers experienced in Annex 1 and non-Annex 1 countries.

- Technical issues are a greater barrier in non-Annex 1 countries than Annex 1 countries.
- The dominant political barriers in Annex 1 countries relate to planning, high speed rail, fuel tax and legislation whilst in non-Annex 1 countries the main barriers existing relate to travel demand management, public transport and the inspection and maintenance of vehicles.
- City level institutional barriers dominate in non-Annex 1 countries, relating to the implementation of non motorized transport and public transport. Fewer institutional barriers are experienced in Annex 1 countries, with the exception of Ukraine, where there are a number of barriers relating to non motorised transport, traffic demand management and the reform of the railways system

The majority of policies can be transferred across countries.

This goes beyond the traditional North-South transfers commonly acknowledged, and includes those which can be transferred between developing countries (South-South transfers) and also from developing countries to developed countries (South-North transfers). For example more than 80% of policies identified in developing countries (non-Annex 1) were found to be transferable to other developing countries, although with some issues that need to be overcome.

Differences in the types of policies that are most transferable between the different categories were identified:

- Between developed countries (North-North transfer): technical issues relating to teleworking, intelligent transport systems and improving the energy efficiency of vehicles;
- Between developed and developing countries (North-South transfer): vehicle and emissions standards and policies and measures relating to the development of non motorised transport
- Between two developing countries (South-South transfer) and developing to developed (South-North) the implementation of Bus Rapid Transit systems.

BRT showcases the potential for the EU to further support South-South and also South-North transfer to mitigate GHGs in a cost effective manner, and also to promote sustainable mobility in cities across the world. Research programmes, supported, for example, by European research grants under FP-7, could be targeted at understanding the transferability of BRT to European cities. Existing initiatives, such as CIVITAS, could also be expanded to cover non - EU countries.

Involving the private operators of freight and passenger transport to increase the environmental performance of the freight sector, was identified as highly transferable from other developed countries to the EU, with the opportunity to learn from programmes such as “Smartway” in the USA and Energy Efficiency Plans in Japan.

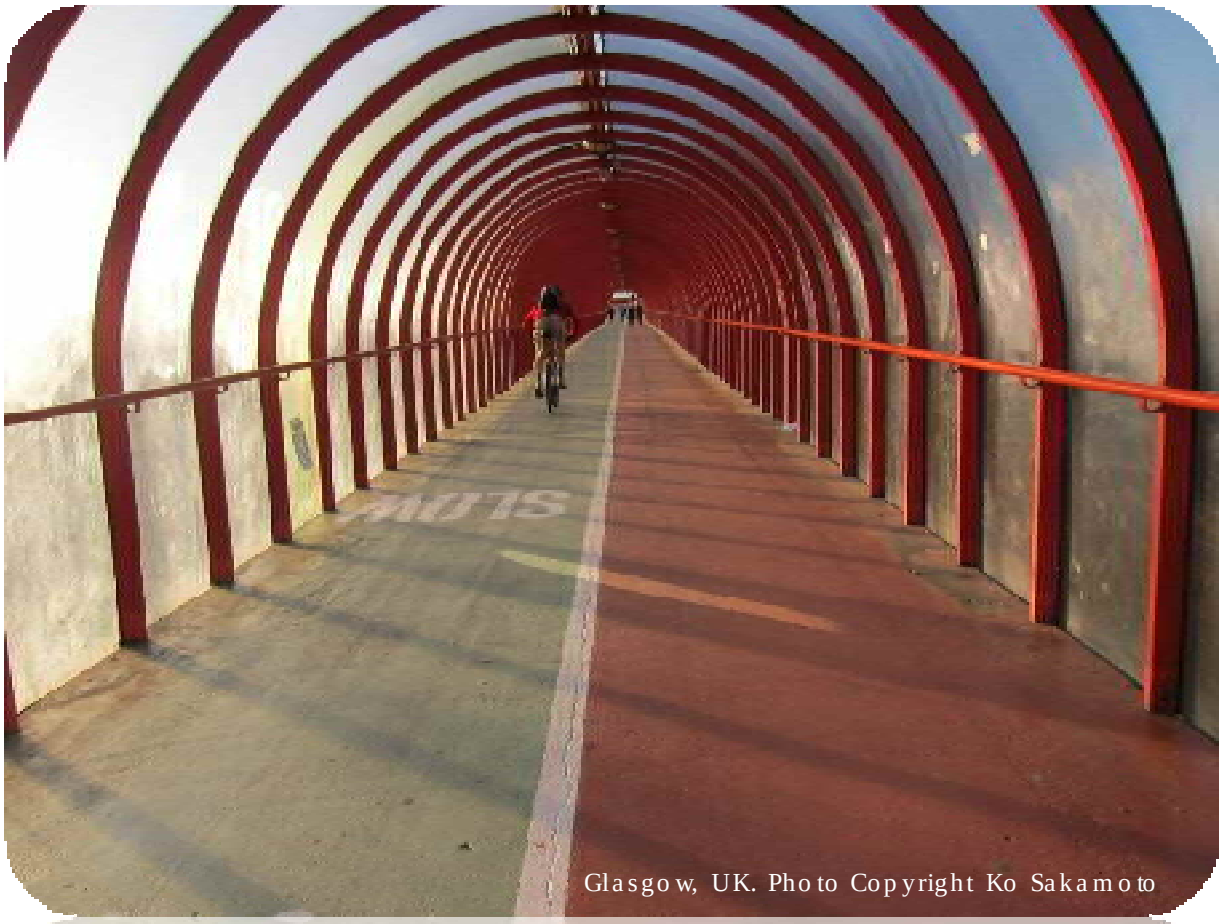
Most policies in Annex 1 countries could benefit from international support.

The majority of policies being implemented or planned in non-Annex 1 countries were felt to be able to benefit from all three types of support: capacity building, financial and technological.

The review found a clear link between those policies noted as facing a high level of technical restriction, and their need for technology transfer. Almost all policies, for which technology transfer was needed, also acknowledged further benefits from capacity building and financing, suggesting that such support efforts are strongly related to each other and that they must be supported as a package

It was identified that Latin America, Asia, Africa and the Former Soviet Union were regions where the need for support in all of the above categories was highest.

International capacity building, financial and technological support provided as a package of measures could help to overcome any political, technical barriers to the implementation of policies, as well as being able to support improvements in institutional co-ordination and capacity. This is explored further in the next part of the report, in Section III.



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SECTION III: Identifying instruments for Europe to support measures in non-EEA countries

5 Scoping and evaluation of potential channels to support GHG reduction in non-EEA countries

The second objective of this project was to seek ways in which the reduction, or avoidance, of increases in transport GHG emissions in non-EEA countries can be further supported by the EU, and in particular the European Commission (EC). This chapter presents the methodology taken within Task 2 of the T-MAPPER project, which was used to:

1. Scope the various channels available to the EU in pursuing this objective; and
2. Evaluate them against key criteria to ascertain their suitability to support mitigation actions in the transport sector in non-EEA countries.

5.1 Scoping of channels

The first step concerned the scoping of potential channels that can support the reduction of GHG emissions from transport in non-EEA countries. The scoping exercise involved developing an overview and classification framework of the existing channels in the light of their main activities, and areas of intervention, followed by their detailed review.

The scoping was generally based on publically available information, including websites of the individual channels and their governance body/bodies, as well as third-party websites such as climatefundsupdate.org.

In terms of the classification of the channels, the scoping differentiated between:

- Those channels for which the European Commission has a major role in programming and implementation, mixed in some cases with other stakeholders (hereafter "EC channels");
- Those which the EU and its institutions and Member States (including Switzerland) have a decisive role, due, for example, to their strong representation on the board of these channels (hereafter "Other EU related channels"); and
- Channels implemented through international bodies and policy processes for which the influence of the EU and the EEA countries is indirect, but significant (hereafter "International channels") due to the contributions the EU and its Member States make to these multilateral channels of support.

In addition, the scoping exercise also acknowledged the German ICI (International Climate Initiative) as an example of a financing channel by a particular Member State.

This classification reflects the relative influence that the European Commission may exercise, in the activities being supported by the respective instruments. The figure overleaf provides an overview of the identified channels under these three groups.

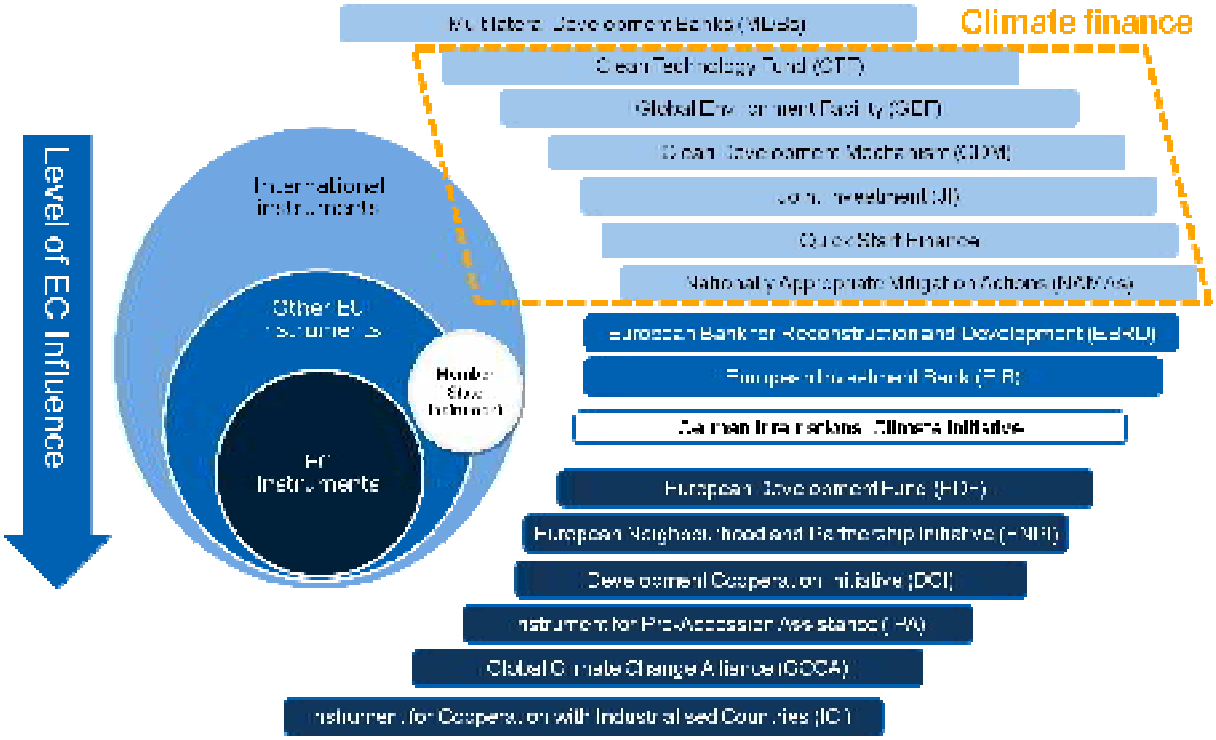


Figure 31: The relative influence of the EC with regards to the categories of channels identified

The key points of importance of these three groups of channels to EU policy makers is summarised in the table below.

Table 21: Key points of importance of the three groups of channels to EU policy makers

Group of policy	Why are they important to EU policy makers?
European Commission (EC) channels	- EC is the largest aid provider world wide - Large amount of resources involved (especially the European Development Fund - EDF) - Huge potential to cover transport in all aspects and promote EU knowledge
Other EU channels	- EC has a very large influence on their activities - Very large sums of finance involved, especially through the European Investment Bank (EIB) and European Bank for Reconstruction and Development (EBRD)
International channels	- EU is a large donor to multilateral development banks (especially World Bank) who mobilise vast amounts of finance - EU is a proactive “agenda setter” for climate related instruments (and surrounding policies)

For each identified channel, the following information was collected:

- The extent to which the channel supported climate change mitigation as the core objective (climate specific, vs. climate relevant)
- The extent to which the channel supported transport as the core sector (transport specific vs. transport relevant)
- The types of support provided, i.e. capacity building, technology transfer and financing
- Implementation body – differentiating between the EC, other EU multilateral, EU Member State, or non-EU.
- Regions/countries being targeted by the channel
- Total scale (in financial terms) and the proportion spent on transport
- Main aims of the transport sector
- Typical examples of application in the transport sector (if included in the channel)

This information was organized in an Excel spreadsheet template, similar to the country review evaluation framework developed in Task 1. This led to the next step in assessing these channels against key criteria, as discussed in the next section.

5.2 Assessment of channels that support GHG reductions

The second step involved the evaluation of the identified channels against criteria, which was developed in answer to the following key questions:

- What are their potential to support Avoid, Shift and Improve measures in the transport sector?
- Do the channels pose any challenges in terms of their governance, i.e. acceptability by donors/recipients, compatibility with UNFCCC agreements, and extent of transaction costs?
- What has been the impact on GHG emissions (i.e. their effectiveness) to date?
- What is their potential effectiveness in the future?
- How cost-effective are the channels in achieving emission reductions?
- What are their broader impacts on sustainable development, more precisely their ability to deliver co-benefits in economic, social and environmental terms?

In order to answer these questions a set of sub-criteria were developed against which each of the channels were scored. This is shown in the table below.

It is important to note that the evaluation has generally been qualitative in nature, due to either:

- The lack of concrete data on impact of the interventions supported by the support channels on GHG emissions; or
- The large differences in the nature of the support channels.

Therefore the scores represent an expert judgement based on the best available level of data.

Table 22: Evaluation criteria for the assessment of channels

Criteria	Sub-criteria	Scoring approach
Potential to support A/S/I	Avoid	**Yes**, if the channel is (based on past trends and future plans) supportive of Avoid, Shift or Improve policies. **No**, if otherwise.
	Shift	
	Improve	
Governance	Acceptability by donors	**High**, if donors are likely to face relatively low political and administrative barriers towards disbursing resources through the channel. Low, if otherwise.
	Acceptability by recipients	**High**, if recipient countries are likely to face relatively low political and administrative barriers towards receiving support through the channel. **Low**, if otherwise.
	Compatibility with UNFCCC agreements	**High**, if the channel is part of, or in support of the UNFCCC framework. **Low**, if otherwise.
	Transaction cost	**High**, if more than 10% of the support package is typically spent for preparation, administration and other ancillary activities. **Low**, if otherwise.
Mitigation impacts	Ex-post evaluation of impact on Greenhouse Gases (GHG)	Based on published assessments and wherever data permits, an ex-post estimation of the impact of the channel's support portfolio in the transport sector (measured as Mt CO_2-eq/yr) .divided into the following classes: - -1: likely to be negative - 1: <0.1 Mt/yr (very low) - 2: 0.1-1 Mt/yr (low) - 3: 1-10 Mt/yr (medium) - 4: 10-100 Mt/yr (high) - 5: >100 Mt/yr (very high)
	Ex-ante evaluation of impact on Greenhouse Gases (GHG)	Estimated potential impact in the future, based on the ex-post assessment, the available funds per year, and the type of activities typically implemented (we assume there is to some extent scope to shift activities to a sustainable direction), divided into the following classes: - -1: likely to be negative - 1: <0.1 Mt/yr (very low) - 2: 0.1-1 Mt/yr (low) - 3: 1-10 Mt/yr (medium) - 4: 10-100 Mt/yr (high) - 5: >100 Mt/yr (very high)
	Cost effectiveness	Total impact to date divided by the financial amount; for carbon credit instruments the price of (primary) credits
Environmental impacts	Air quality	Rough ex-ante assessment: if most measures (i.e. on balance) are likely to have a positive impact on these environmental and social impacts, whereby: - 2=High, - 1=Low, - -1= Negative impact
	Noise	
Social impacts	Equity	
	Road safety	
	Accessibility	
Economic impacts	Security of oil supply	
	Congestion	

6 Findings from the review of support channels

6.1 Overview of findings

The scoping exercise identified 16 different channels available to European policy makers to support, or potentially support the mitigation of transport carbon emissions in non-EEA countries.

In terms of scope, these channels were shown to provide a range of support in the transport sector, including:

- Financing, in the form of both loans and grants;
- Technology transfer; and
- Capacity building.

The scale and scope of these channels are summarised in the table overleaf.

Table 23: Overview of identified channels

Channel type	Name of Channel	Transport Amount (M€/yr)	Capacity Building	Technology Transfer	Finance (Grant)	Finance (Loan)	Finance (Crediting)	Support for climate mitigation	Support for transport
EC	European Development Fund (EDF)	1100	✓	✓	✓			*	*
	European Neighbourhood and Partnership Instrument (ENPI)	86	✓	✓	✓	✓		*	*
	Development Cooperation Initiative (DCI)	20	✓	✓	✓			*	*
	Instrument for Pre-Accession Assistance (IPA)	109	✓	✓	✓			*	*
	EU Policy on Climate Change (GCCA)	0	✓		✓			*	*
	Instrument for Co-operation with Industrialized Countries (ICI)	0	✓	✓	✓			*	*
EU other	European Bank for Reconstruction and Development (EBRD)	2628	✓	✓		✓		*	*
	European Investment Bank (EIB)	1540	✓	✓		✓		*	*
Member State	German International Climate Initiative (German ICI)	4	✓	✓	✓	✓		**	*
International	Multilateral Development Banks (MDBs)	11140	✓	✓	✓	✓		*	*
	Clean Technology Fund (CTF)	434	✓	✓	✓			**	*
	Global Environmental Facility (GEF) GEF w. co-financing	21.2 213	✓	✓	✓			**	*
	Clean Development Mechanism (CDM)	1		✓			✓	**	*
	CDM Pipeline	19.5							
	Joint Implementation (JI)	0		✓			✓	**	*
	JI Pipeline	2.3							
	Quick start finance	0	✓	✓	✓			**	*
	National Appropriate Mitigation Actions (NAMAS')	0	✓	✓	✓	✓	✓	**	*

Stars represent support for climate change mitigation and support for transport: * =Relevant, ** = Specific

The following sections provide the findings for each of the identified channels. They are generally presented in the order of financial scale, i.e. Euros available per annum for transport-related activities, based on the information available.

Key information for each identified channel is presented in a concise and standardised tabular format (see example below).

Table 24: Example summary table of a support channel

Type	EC / EU / International	Support for A/S/I		Improve and Shift
Governance body	Name of institution	Governance	Donor acceptance	High or Low
Target regions/countries	Name of regions or countries		Recipient acceptance	High or Low
Amount (overall/ transport) annual	In Euros		Compatibility with UNFCCC	High or Low
Type of support	e.g. Grants / Loans		Transaction costs	High or Low
Support for climate change mitigation	Mitigation specific or relevant	Mitigation impacts (ex ante/ex post)		CO_2 eq/year (approximate)
Support for transport	Transport specific or relevant	Cost effectiveness		Euros/tonne of CO_2eq (where data allows)
Examples of supporting transport	• List of examples	Main Co-benefits (environmental, social and economic impacts		• List of main co-benefits

This is followed by:

- A brief description of the channel.
- The type(s) of support provided in the transport sector.
- A brief assessment of their impact on mitigation.
- Potential improvements to further support mitigation of transport emissions.

Boxes illustrate appropriate case studies and/or good practice being supported by the channel in question.

Findings from individual channels are then compared to draw out key findings with regards to the current level and nature of support provided by the EU to mitigation actions in the transport sector of non-EEA countries.

Recommendations for the EU in further enhancing such support are provided in Chapter 8.

6.2 European Commission channels

This section presents the findings on those channels which are directly managed by the European Commission. Before examining these channels separately, the relationship between the various channels is briefly provided in the box below.

Box 37: An overview of the external assistance managed by the European Commission

Development assistance provided by the European Community flows through three main instruments:

- The European Development Fund (EDF), which covers African, Caribbean and Pacific (ACP) countries;
- The European Neighborhood Partnership Instrument (ENPI), which covers the neigbouring countries of the EU (Eastern Europe and southern Mediterranean countries); and
- The Development Cooperation Instrument (DCI) which covers South Africa, Latin America, Asia (including Central Asia) and the Middle East.

In terms of the governance of these instruments, the strategies and policies of the EDF are designed by the Directorate General (DG) Development, and those for ENPI and DCI by DG-External Relations. EDF is separate to the general budget of the EC.

The EuropeAid Co-operation Office (which is a separate DG), turns into practical actions the strategies and policies put forward by the other two DGs, and aims to "put the European Commission's external aid instruments to use in close collaboration with its partners." (EuropeAid, 2010)

The relationship between the three main EC instruments, supported regions, responsible DGs and budgetary sources are summarized in the table below.

Table 25: Summary of the three main EC instruments

Instrument	Supported regions	Strategy / policy development	Implementation	Funding
EDF	Africa Caribbean Pacific	DG-Development	EuropeAid	EDF budget
ENPI	Eastern Europe Southern Europe	DG-External Relations		General EU budget
DCI	South Africa Latin America Asia Middle East			

Box (continued)

According to EuropeAid (2010), and as shown in the figure below, support to the transport sector through these three main instruments can be summarised as follows;

- Regions supported by EDF (ACP countries) received the majority of EC support in transport. Most of these resources were used to improve/maintain road infrastructure, with the aim of supporting sustained economic growth.
- In the region supported by ENPI, the Commission created the Neighbourhood Investment Facility to support investments projects for infrastructure in sectors including for transport. These countries benefit further from other regional programmes such as TRACECA and from national indicative programmes.
- The region covered by DCI (Asia and Latin America) had so far received limited interventions in the transport sector. Most of this is targeted at improving roads, and to a lesser extent at air transport.

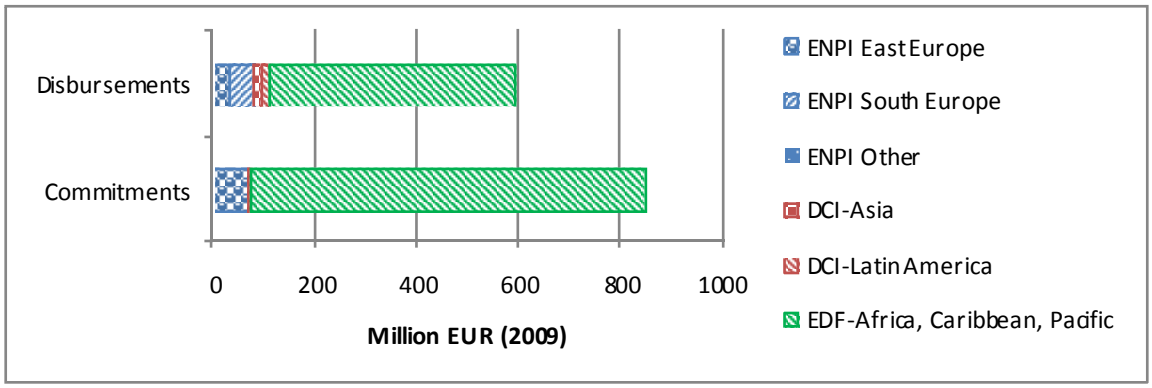


Figure 32: Disbursements/commitments from the main 3 EC instruments to the transport sector in year 2009, by region
(Data source: EuropeAid Co-Operation Office, 2009)

In addition to these three main instruments, there are other instruments which serve a specific purpose/country group, some of which go beyond the classical boundaries of "development assistance". In this section, three of such instruments are presented, namely:

- Instruments for Pre-Accession Assistance (IPA)
- The Global Climate Change Alliance (GCCA)
- The instrument for co-operation with industrialized and other high-income countries and territories (ICI)

6.2.1 European Development Fund (EDF)

Type of channel	EC channel	Support for A/S/I		Avoid Shift Improve
Governance body	EC (DG-Development/ EuropAid)	Governance	Donor acceptance	High
Target regions/countries	African, Caribbean and Pacific, Overseas countries and territories		Recipient acceptance	High
Amount (overall/ transport) annual	€3.7 billion/ €1.1 billion		Compatibility with UNFCCC	Low
Type of support	• Finance (Grants) • Capacity Building • Technology Transfer		Transaction costs	No data
Support for climate change mitigation	Mitigation relevant	Mitigation impacts (ex ante/ex post)		Ex ante : likely negative Ex post : no data
Support for transport	Transport relevant	Cost effectiveness		No data
Examples of supporting transport	• Infrastructure development • Capacity building (rules and regulation)	Co-benefits (environmental, social and economic impacts		Air quality: High Noise: Low Equity: Low Road safety: High Accessibility: High Security of supply: Low Congestion: Low

Description of the channel

The European Development Fund (EDF) is one of the main channels for providing Community development aid. Its support targets 70 African, Caribbean and Pacific countries (ACP) and the EU's overseas countries and territories (OCTs). It was established in 1957, in the context of the Treaty of Rome, with a view to granting technical and financial assistance, initially to African countries (at that time still colonized). Africa remains the largest beneficiary of the EDF. The EDF is also by far the most important fund in terms of resources, both generally and in relation to transport projects.

The fields of intervention of the EDF cover economic development, social and human development, and regional cooperation/integration.

Type of support in transport

Transport is a major sector that is targeted by the EDF, and is positioned within the category of "economic infrastructure". Support in this sector includes a variety of activities, mainly in the fields of infrastructure provision and capacity building, as described below:

- Building, upgrading and rehabilitating urban and rural roads.
- Supporting the implementation of the AU/NEPAD Infrastructure Initiatives.
- Improving the legal and regulatory environment for Public-Private Partnerships.
- Building capacities in the field of safety standards and regulations, in particular for air and maritime transport.
- Supporting road sector development programs, including institutional strengthening and capacity building for sector institutions.
- Playing an active role in sector policy and strategy formulation, institutional reform and formulation of sector investment programmes.

Support for road transport (mainly road infrastructure and maintenance) has consistently been the largest element of transport support by the EDF (together with the ENPI and DCI); although in recent years a growth in the areas of transport policy and administrative management is observed (see Figure below[45]).

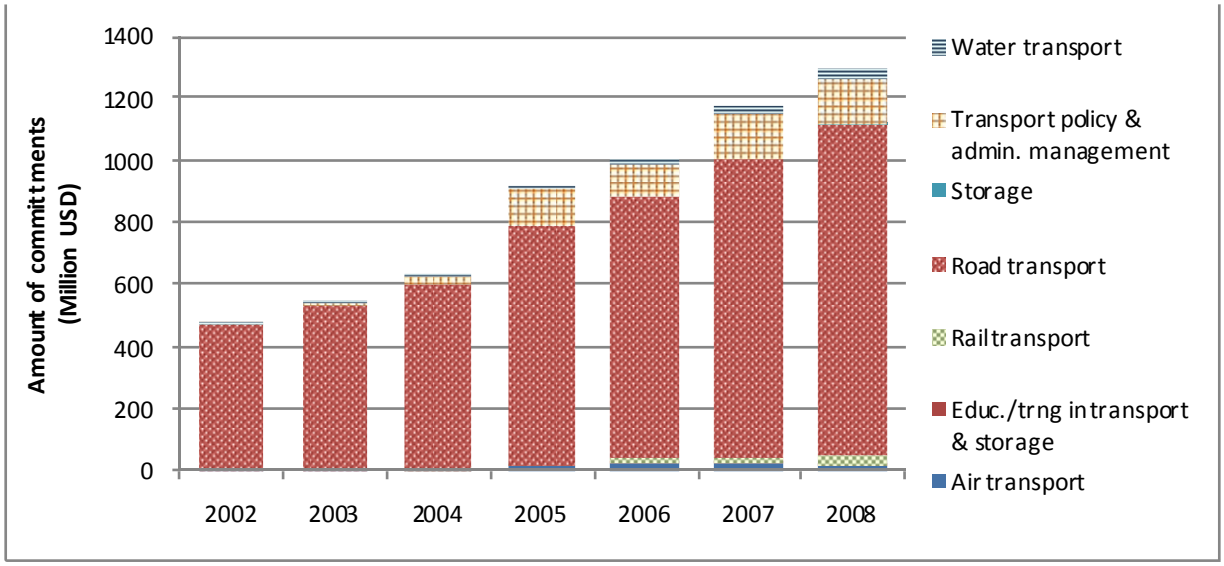


Figure 33: Disbursement of the EC channels from 2002 to 2008 by subsector

In terms of the types of support being provided by the EC channels, the figure below shows that the predominant type has been traditional investments, e.g. road construction and maintenance projects. However in recent years, there has been an increase in "sectoral" support, which includes, for example, institutional capacity building and formulation of sectoral strategies in the recipient countries (e.g. a targeted reform of transport policy in Egypt, or region-wide sectoral capacity building efforts in African countries).

[45] Due to reporting formalities and the structure of the dataset of the OECD, the figures do not differentiate between the different EC mechanisms being provided as ODA. These should be seen as an aggregate of all EC assistance, and not related only to the EDF.

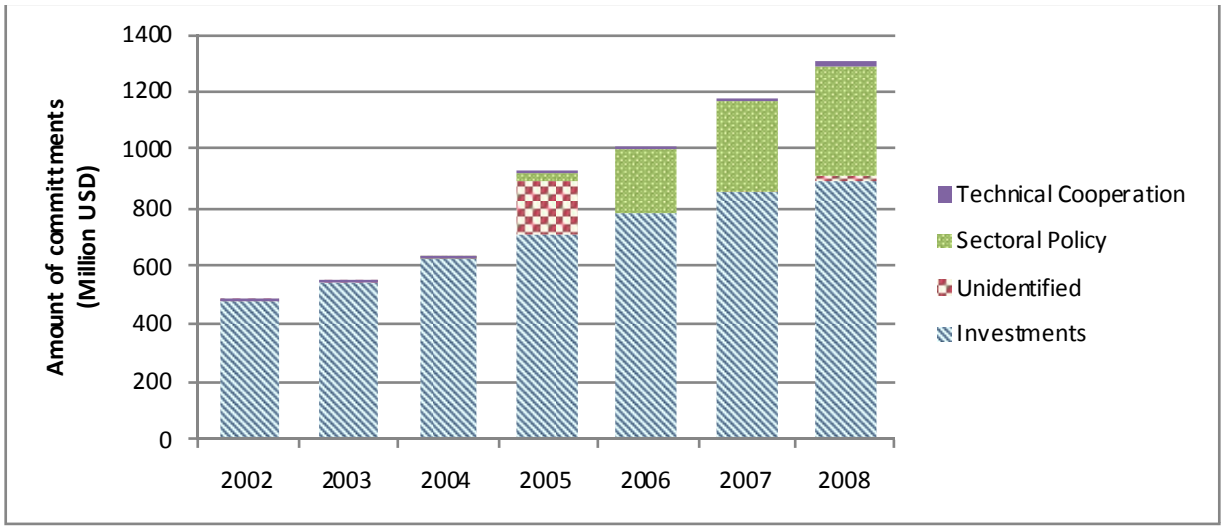


Figure 34: Disbursement of the EC channels from 2002 to 2008 by type of aid

Mitigation impacts

The EDF currently has an emphasis on road infrastructure projects. Many of these have been commissioned to fulfil necessary economic and social functions but their impact on GHG mitigation is likely to be negative, as they are likely to generate motorised traffic.

Potential improvements to further support mitigation of transport emissions

In order to enhance the GHG mitigation effect of EDF, the following adjustments could be considered by European policy makers:

- Include a GHG impact assessment at the option generation and appraisal stage of all major activities supported by EDF meeting certain threshold levels.
- Consider and support cost-effective mitigation options in the transport sector, especially towards urban transport which has so far not been the focus of the EDF.

In this context, the EDF could mirror initiatives being taken by other development institutions such as the Asian Development Bank and its Sustainable Transport Initiative (STI). See Box 44 in Section 6.4.1 for further details.

Box 38: The EU-Africa Partnership on Infrastructure

Approximately 1.7 billion Euros (2008-2013) from the EDF – of which 380 million Euros is for the transport sector – is focused towards support for the EU-Africa Partnership on Infrastructure, which is part of the EU-Africa Partnership Strategy.

The main aim is to improve infrastructure networks and services of the African continent, including projects in infrastructural sectors such as transport, energy, water and information and communication technologies to secure the interconnectivity of the African continent and its different regions.

The Fund's activity stems from the insufficiency of infrastructure on the African continent that severely constrains economic growth and hampers human and social development. Road transport accounts for 90% of inter-urban transport but physical links and services are inadequate. Rail network coverage is sparse and the interconnectivity of networks is, in general, low. Many maritime ports struggle to offer competitive services and inland waterways are poorly integrated into transport networks

Financing for programmes under this Partnership utilises the EU Infrastructure Trust Fund, which is an innovative co-financing instrument for leveraging further funding for these projects. It brings together the EU, Member States, the European Investment Bank (EIB) and European development financing institutions.

Considering the emphasis on road infrastructure projects the impact of the projects, being supported through this instrument could be negative due to the induced traffic it would create.

However, if appropriately targeted, the Partnership has the potential to create a low-carbon, sustainable transportation network in Africa. To this end investments may be increasingly directed towards:

- Infrastructure for public transport and non-motorised transport, especially in urban areas.
- Intercity rail networks to provide a viable alternative to private cars and lorries/trucks, including access to ports.
- Capacity building on management and operation of public transport, management of logistics, and the maintenance/management of all transport assets, including those for public transport and non-motorised transport.

For further information, see:
http://www.africa-eu-partnership.org/partnerships/trade-regional-integration-and-infrastructure

Box 39: Environmental considerations within European Commission development projects/programmes

For projects supported by the European Commission, the main tool for pursuing environmental integration in national programming in developing countries is the drafting of Country Environmental Profiles (CEP), which contribute to the preparation of Country Strategy Papers (CSP) and National Indicative Programs (NIP).

The CEPs began to be promoted from 2001 by the EC. By the end of 2002, an internal EC assessment identified only six CEPs in a sample of 60 countries, out of which only three were considered of 'good' quality. The first generation of CEPs tended to consist of very short documents which did not provide adequate information for the purposes of environmental integration in programming.

From September 2004, the instructions for geographical programming included the need to carry out a CEP. For this reason 2004 was the year when more CEPs were initiated, albeit most of them were first generation, short and non-rigorous documents. In 2005, more structured and detailed CEPs started to be prepared and they are now becoming the norm rather than the exception. At the moment, in the context of the 10th European Development Fund 2008-2013, most countries have prepared a CEP/NIP. According to the "European Consensus" general approach this is the main input to the definition of Country Strategic Papers (CSP), in which the EC non-aid policies (improving coordination and harmonization) are integrated with the national strategy to attain the Millennium Development Goals (MDGs).

As far as transport is concerned, by means of the Strategic Environmental Assessment, an EC-led SEA may be required (in coordination with the partner government and other donors). In this case, the main purpose of the SEA would be to inform the EC process of transport and environment integration (that is, what to include in the country strategy to address environmental concerns, such as specific indicators, technical assistance, and so on) and also to issue recommendations to enhance the government's transport program.

Such SEAs could in future incorporate the carbon footprint of interventions being supported by EC instruments such as the EDF, so that the carbon generating consequences of interventions can be considered ex-ante, and ways of mitigating such increases in carbon be identified.

See: EC (2010c) for further details. Available at : http://www.environment-integration.eu/component/option,com_frontpage/Itemid,155/lang,en/

6.2.2 European Neighbourhood and Partnership Instrument (ENPI)

Type of channel	EC channel	Support for A/S/I		Shift Improve
Governance body	EC (DG External Relations/ EuropeAid Co-Operation Office)	Governance	Donor acceptance	High
Target regions/countries	EC neighbouring countries		Recipient acceptance	High
Amount (overall/ transport) annual	€1.6 billion / €86 million		Compatibility with UNFCCC	Low
Type of support	• Grants and Loans		Transaction costs	Low
Support for climate change mitigation	Mitigation relevant	Mitigation impacts (ex ante/ex post)		Ex ante : negative to low Ex post : no data
Support for transport	Transport relevant	Cost effectiveness		No data
Examples of supporting transport	• Standards and Regulations • Infrastructure development	Main Co-benefits (environmental, social and economic impacts		Air quality: Low Noise: Low Equity: Low Road safety: Low Accessibility: Low Security of supply: Low Congestion: Low

Description of the channel

The European Neighbourhood and Partnership Instrument (ENPI) provides EC assistance at a bilateral or regional level to 17 countries neighbouring the EC[46]. The instrument is managed by the EuropeAid Co-Operation Office which is responsible for a) identifying needs, b) carrying out feasibility studies, and c) preparing all the necessary financial decisions and controls. ENPI supports several actions in various sectors, including energy, telecommunication and transport, which covers "interconnections, networks and their operations, enhancing the security and safety of international transport and energy operations and promoting renewable energy sources, energy efficiency and clean transport".

Approximately 90% of the available resources are targeted at supporting bilateral initiatives, i.e. country-specific initiatives and regional actions involving two or more partner countries. A large proportion of this is used for institutional capacity building in the recipient countries, in areas such as public administration. The remaining 10% is used to support multi-party initiatives such as cross-border partnerships and the Neighbourhood Investment Facility (NIF)[47] which aims to leverage further funding from development banks for infrastructure projects.

Type of support in transport

Support provided by the ENPI in the transport sector includes:

- Capacity building support – This includes workshops on emission trading schemes in aviation through the TAIEX (Technical Assistance and Information Exchange) programme, e.g. involving Turkish authorities and private sector operators to learn how to include the aviation sector in the EU-Emissions Trading Scheme.

[46] These are Algeria, Armenia, Azerbaijan, Belarus, Egypt, Georgia, Israel, Jordan, Lebanon, Libya, the Republic of Moldova, Morocco, the occupied Palestinian territory, Syria, Tunisia, Ukraine and Russia.
[47] See http://ec.europa.eu/europeaid/where/neighbourhood/regional-cooperation/irc/investment_en.htm

- Financial support (for infrastructure development) – This is conducted through the Neighbourhood Investment Facility (NIF), which as aforementioned, is designed to facilitate the activities of several international financial institutions IFIs (i.e. development banks such as EBRD, EIB) and promote investments in countries under the ENPI area. Examples of transport interventions since the inception of this instrument in 2008 are provided in the table below.

Table 26: Projects supported through the Neighbourhood Investment Facility (NIF) of the ENPI (2008-2010)

Country	Name	Stated Objective	IFIs involved	Total (M€)	NIF grant (M€)
Morocco	Integrated sustainable development of urban transport in Rabat and Salé -Construction of the infrastructure of the tramway network	Sustainable improvement of mobility and urban environment in Rabat-Salé through the construction of a tramway network with a total length of 19 km and 32 stations.	Lead: AFD Other: EIB	348	8
Morocco	Second national programme for rural roads	To construct new rural roads which will improve the accessibility of more than 3 million people to basic social services such as education and healthcare, combined with a reduction of transportation costs and enhancement of economic productivity.	Lead: EIB Other: AFD	397	9.8
Tunisia	Tunis Light Railway	To modernize certain priority sections of the light railway network of the city of Tunis and improve access to public transport and contribute towards equitable and environmentally friendly socio-economic development.	Lead: AFD Other: EIB & KfW	550	28
Ukraine	Technical Assistance Support for Ukrainian Municipalities	To support the EBRD with investments in Ukrainian municipalities such as Zhytomyr, Rivne, Lviv, Energodar and Ivano-Frankivsk in the water, district heating and urban transport sub-sectors.	Lead:EBRD Other: EIB (tbc)	135	5
Moldova	Chisinau Airport Modernisation Project II	To rehabilitate/upgrade the airport to support its further commercialisation	Lead: EBRD Other: EIB	46.25	1.75
Moldova	Road Rehabilitation project	To stop the deterioration of the road network in the Republic of Moldova and to ensure that key road links are maintained.	Lead: EBRD Other: EIB	92.5	12
Armenia	Yerevan Metro	To restore reliable operations for the Yerevan Metro and contribute to the improvement of urban transport in the city.	Lead:EBRD Other: EIB	16.7	5
Georgia	Tbilisi Railway Bypass Environmental Clean-up	To construct a new railway route bypassing the central area of the city of Tbilisi, improving the efficiency and safety of rail operations as well as supporting trans-European inter-connections.	Lead: EBRD Other: EIB	253.5	8.5
Moldova	Chisinau Transport Project	To improve public transport services in the city of Chisinau. By upgrading Chisinau's trolleybus fleet, it will have a strong positive impact on the environment and also improve social services and social infrastructures primarily benefiting the lower-income population of the capital.	Lead: EBRD Other: EIB	15.45	3

Mitigation impacts

Mitigation of climate change is currently not a primary consideration for the types of projects being supported, although sustainable development and environmental protection are noted as objectives of the ENPI.

The outcome in terms of CO_2 emissions may have either a positive or negative effect, depending on what type of transport receives financing from this channel.

There could be significant GHG impacts for specific projects being supported by the NIF aimed at promoting public transport and rail transport in the recipient countries (with potential to shift transport demand to these modes).

Considering the ability of the channel to leverage large financial resources many times beyond its own contribution, the impacts are potentially substantial. In addition, there are likely to be positive impacts on equity (allowing transport activities to the poor) and safety.

Furthermore, the capacity building activities being supported by this channel have the potential to support the strengthening of sustainable transport policy making capability in the recipient countries, which would also has a transformative impact.

Potential improvements to further support mitigation of transport emissions

To maximise the potential for this channel to further support mitigation actions in the transport sector, the EC may:

- Make the grants conditional upon an impact assessment[48] that includes the carbon footprint of the projects being supported. The NIF may prioritise grants for those projects which have the capability to mitigate transport emissions.
- Target the capacity building efforts under this channel in areas that are supportive of sustainable low carbon transport. For example, twinning schemes (between cities in the EU and a neighbourhood country) may be used to directly transfer knowledge and technology between cities with good practice (e.g. Copenhagen and its cycling infrastructure) with recipient cities.

[48] See ADB (2010). on the use of a sketch-plan model to measure the carbon footprint of transport projects supported by the Asian Development Bank. Available at: http://www.adb.org/documents/evaluation/knowledge-briefs/reg/EKB-REG-2010-16.pdf

Box 40: The European Neighborhood Policy 2010: Sectoral Progress Report for Transport

The following excerpt from the European Neighborhood Policy 2010's sectoral progress report on transport provides an overview of the types of issues being addressed by the ENPI, most notably the improvement of safety, sustainable financing, development of road/rail network and harmonization of standards:

- "In the road sector, alignment with international standards on road worthiness and driving times and rest periods is an ongoing process for most countries. Road maintenance and funding remained a challenge. Moldova set up a road fund and there are plans to do so in Lebanon. Tunisia and Morocco continued to implement their comprehensive fleet renewal schemes.

- A comprehensive reform of the rail sector is ongoing in a number of countries. Some of the partners are also developing and upgrading their rail networks. Jordan and Syria have ambitious plans for network development and extension, while Morocco is pursuing plans to introduce high speed passenger trains.

- In the aviation sector, negotiations on a Common Aviation Area Agreement have been launched with Georgia. The discussions with Ukraine on such an agreement should be concluded in 2010. Negotiations on comprehensive Euro-Mediterranean Area Agreements continued with Israel and should be finalised in 2010 with Jordan and Lebanon. Most countries continued to implement a policy of gradually introducing EU standards. All Eastern neighbouring countries have signed a working arrangement with the European Aviation Safety Agency to ensure continuation of pan-European safety coordination following the dissolution of the JAA (Joint Aviation Authorities). However, the need to strengthen civil aviation administrations and in particular safety oversight and the performance of carriers remains a priority."

Directly quoted from:
EC (2010d) http://ec.europa.eu/world/enp/pdf/progress2010/sec10_513_en.pdf

6.2.3 Development Cooperation Instruments (DCI)

Type of channel	EC channel	Support for A/S/I		Improve
Governance body	EC	Governance	Donor acceptance	High
Target regions/countries	47 Non-EU countries: Latin America, Asia and Central Asia, South Africa and the Gulf Region		Recipient acceptance	High
Amount (overall/ transport) annual	€1.4 billion / €20 million		Compatibility with UNFCCC	Low
Type of support	• Grants and Loans		Transaction costs	Low
Support for climate change mitigation	Mitigation relevant	Mitigation impacts (ex ante/ex post)		Ex ante : likely negative Ex post : no data
Support for transport	Transport relevant	Cost effectiveness		No data
Examples of supporting transport	• Capacity building (rules and regulation)	Main Co-benefits (environmental, social and economic impacts		Air quality: Low Noise: Low Equity: Low Road safety: Low Accessibility: Low Security of supply: Low Congestion: Low

Description of the channel

Launched in January 2007, the Development Co-operation Instrument (DCI) has replaced a wide range of geographic and thematic instruments which were created over time in order to improve the effectiveness of EU development cooperation.

In general, the Development Cooperation Instrument (DCI) states three main functions:

- To provide assistance to South Africa and 47 developing countries in Latin America, Asia (including Central Asia) and the Middle East which is not covered by other EU channels.
- To support the adaptation processes of the sugar sector in 18 ACP Sugar Protocol countries following the reform of the EU's sugar regime.
- To run five thematic programs: investing in people; the environment and the sustainable management of natural resources including energy; non-state actors and local authorities in development; food security; migration and asylum.

Type of support in transport

As far as transport is concerned, in 2008 three support programmes with a value of €12 million in capacity building, air transport integration and projects, and the protection of intellectual property rights, has been allocated in the context of supporting programs for ASEAN (the organization of Southeast Asian Nations). The key objectives were:

- To contribute towards sustainable ASEAN economic growth and the integration of the ASEAN Economic Community (AEC), through the development of the civil air transport sector.
- To develop the institutional frameworks and strengthen institutional capacities within ASEAN with a view to achieve a safe, secure and sustainable ASEAN Single Aviation Market by 2015 based on high regulatory standards.

Mitigation impacts

In general, this channel currently supports few transport relevant measures, with no direct reference to GHG mitigation.

Potential improvements to further support mitigation of transport emissions

In future, the DCI may provide important resources to plug a major gap in support for capacity building in sustainable, low carbon transport, e.g. the formulation of sustainable transport master plans in developing cities, and the training of local staff with regards to policy formulation. This can be expanded to subsectors other than aviation, as noted in the example of ASEAN above.

For the above to occur, the EC may consider amongst others:

- Scaling up the resources available for transport under the DCI, particularly considering the large scale of transport GHG mitigation potential in the areas of the world which this covers, particularly Latin America and Asia.
- In combination with the reform of policies surrounding e.g. the EDF, ensure that the impact of the projects being supported by this channel takes into account their carbon generating impacts, and select/prioritise projects accordingly.

6.2.4 Instruments for Pre-Accession Assistance (IPA)

Type of channel	EC channel	Support for A/S/I		Avoid Shift Improve
Governance body	EC	Governance	Donor acceptance	High
Target regions/countries	Pre-accession countries: Western Balkan countries		Recipient acceptance	High
Amount (overall/ transport) annual	€1.6 billion / €109 million		Compatibility with UNFCCC	Low
Type of support	• Grants • Capacity building		Transaction costs	No data
Support for climate change mitigation	Mitigation relevant	Mitigation impacts (ex ante/ex post)		Ex ante : likely negative Ex post : no data
Support for transport	Transport relevant	Cost effectiveness		No data
Examples of supporting transport	• Capacity building (rules and regulation)	Main Co-benefits (environmental, social and economic impacts		Air quality: Low Noise: Low Equity: Low Road safety: Low Accessibility: High Security of supply: Low Congestion: Low

Description of the channel

The IPA instrument has been operating since 2007, as a financial instrument for EU pre-accession countries. All the previous funding has been channelled through a single, unified instrument designed to provide support for the "transition and institution-building" component aimed at financing capacity-building and institution-building and the "cross-border cooperation" component, both in candidate countries and potential candidates. It aims at supporting these countries in their efforts to come closer to European standard and policies.

Type of support in transport

EU assistance addresses institutional and legislative reforms, which must provide the necessary regulative platform for launching major investment in transport infrastructure, for example:

- Identifying and preparing infrastructure projects to address priority needs
- Managing the implementation of road and rail construction contracts funded by the EU and other bilateral donors and by the major international financing institutions, the European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD).
- Improving the legal and regulatory framework in the transport sector and supporting the Ministry of Transport in preparing an over-arching Transport Development Strategy.
- Assisting institutional and legislative reforms in the transport sector, including the preparation of a strategy to open the way to market liberalization.

The IPA currently supports the transport sector in Turkey, Croatia and Macedonia as shown in the table below.

Table 27: Projects supported through the IPA

Country	Assistance in transport
Turkey	• Improvement of railway infrastructure Improvement of maritime infrastructure • Technical Assistance (administrative capacity of institutions)
Croatia	• Upgrading of rail transport system • Upgrading of inland waterway system • Technical assistance
Macedonia	• Upgrading the road section of the Pan-European Corridor X • Construction of motorway section Demir Kapija Smokvica

Mitigation impacts

The focus on large infrastructure projects, institution building and capacity building means that this channel may have a transformative impact on how transport is shaped in the recipient countries. The channel may be suited towards building the appropriate institutions within pre-accession states for sustainable, low carbon transport, including national transport ministries, local transport authorities etc, and their capacity to formulate sustainable transport policy.

The GHG impact of such interventions are difficult to quantify, but may be large if resources are successful in changing the flow of finance towards sustainable transport policies and modes.

Potential improvements to further support mitigation of transport emissions

The channel may be utilised to incentivise/support pre-accession countries to the EU to initiate measures including:

- The development and harmonisation of databases and robust inventories for GHGs, including in the transport sector, which will be required for reporting and monitoring as such countries[49] are likely to be added to the Annex 1 list of countries under the UNFCCC as they join the EU.
- Strong national and local policies (integrated within the countries' Transport Development Strategies as noted in the case of Indonesia – see Chapter 4) that promote low carbon, sustainable transport to assist the EU in meeting its overall GHG reduction obligations.

[49] Of countries eligible for the IPA, Turkey and Croatia are already Annex 1 countries under the UNFCCC. Other countries which may require this transition include Macedonia, Albania, Serbia, Montenegro and Bosnia & Herzegovina.

6.2.5 The Global Climate Change Alliance

Type of channel	EC channel	Support for A/S/I		N/A
Governance body	EC	Governance	Donor acceptance	High
Target regions/countries	Least Developed Countries (LDCs) and Small Island Developing States (SIDS)		Recipient acceptance	High
Amount (overall/ transport) annual	• €33.3 million (excluding further contributions from EDF)/unknown		Compatibility with UNFCCC	High
Type of support	• Finance (grants) • Capacity building		Transaction costs	Low
Support for climate change mitigation	Mitigation relevant	Mitigation impacts		Ex-ante: Low Ex-post : no data
Support for transport	Transport relevant	Cost effectiveness		No data
Examples of supporting transport	• No direct examples to date • In future, the mechanism may contribute to the adaptation of transport infrastructure	Main Co-benefits (environmental, social and economic impacts		Air quality: Low Noise: Low Equity: Low Road safety: Low Accessibility: Low Security of supply: Low Congestion: Low Other: Increasing resilience of transport infrastructure

Description of the channel

The Global Climate Change Alliance (GCCA) of the European Commission aims at deepening the dialogue with, and stepping up support to developing countries (particularly those most affected by climate change) to mainly implement adaptation measures[50] in these countries. Mitigation activities that also contribute to poverty reduction are also being supported. There are currently five priority areas for the GCCA, namely (1) adaptation to climate change, (2) reducing emissions from deforestation, (3) enhancing the participation of poor countries in the CDM, (4) promoting disaster risk reduction, and (5) integrating climate change into poverty reduction efforts (GCCA, 2010a).

Type of support in transport

The GCCA has only been in operation since 2008, and there is to date no project that has specifically addressed the transport sector[51].

However, it is thought that the channel may be used for the protection of transport infrastructure from extreme weather events and rising sea levels. Roads, bridges, airports are often built in, or near, environmental sensitive areas. Thus the protection and resilience of these infrastructures is important for achieving sustainable development in the long term. Likewise, the stated objective of enhancing participation of poor countries in the CDM could in future be linked to developing transport methodologies which are particularly relevant for LDCs, for example, non-motorised transport. The channel may also help to ensure that

[50] Adaptation has not been within the scope of this report. However, this instrument has been included in the review due to the future potential of this instrument to support mitigation actions.
[51] See GCCA (2010b) http://www.gcca.eu/cgi-bin/view.pl?&page=41&lg=2&url_content=GCCA-Beneficiaries for a list of projects that have been supported by the GCCA to date.

integrated land-use and transport planning and measures to provide pro-poor transport options (public transport and non-motorised transport) are provided in LDCs.

Mitigation impacts

The support provided by this channel focuses predominantly on adaptation measures, as opposed to mitigation. Also considering the small scale of overall resources, it is likely that this channel has negligible impact on transport GHGs.

Potential improvements to further support mitigation of transport emissions

In future, this initiative may also envelop wider actions including the support of mitigation actions in the transport sector, especially where adaptation and mitigation efforts may mutually enforce each other.

6.2.6 Instrument for Cooperation with Industrialized Countries (ICI)

Type of channel	EU channel	Support for A/S/I		Improve
Governance body	EU	Governance	Donor acceptance	High
Target regions/countries	Australia, Bahrain, Brunei, Canada, Chinese Taipei, Hong Kong, Japan, Republic of Korea, Kuwait, Macao, New Zealand, Oman, Qatar, Saudi Arabia, Singapore, UAE, USA		Recipient acceptance	High
Amount (overall/ transport) annual	€24 million/unknown		Compatibility with UNFCCC	High
Type of support	• Grants		Transaction costs	Low
Support for climate change mitigation	Mitigation relevant	Mitigation impacts		Ex ante: Low Ex post : no data
Support for transport	Transport relevant	Cost effectiveness		No data
Examples of supporting transport	• Technology transfer • Capacity building	Main Co-benefits (environmental, social and economic impacts		Air quality: Low Noise: Low Equity: Low Road safety: Low Accessibility: Low Security of supply: Low Congestion: Low

Description of the channel

The instrument for co-operation with industrialized and other high-income countries and territories (ICI) aims to strengthen the Community's relationships with other developed countries. This instrument can be considered as the resulting operative tool with which the EU supports its bilateral relations with industrialized and other high-income countries and territories, especially in North America, East Asia, South-East Asia and the Gulf region.

The areas of cooperation supported by the ICI generally include science, simulation of trade/investment, political/economic/social dialogue, education/training, research, technology and enhancement of EU visibility in partner countries.

Type of support in transport

Only introduced in 2006, there is currently no evidence of support being provided specifically in the transport sector to mitigate its emissions. However, within its aims there is the mention of support to provide "the promotion of cooperative projects in areas such as research, science and technology, energy, transport and environmental matters – including climate change, customs and financial issues and any other matter of mutual interest between the Community and the partner countries." (OJEU, 2006)

Mitigation impacts

The nature of the support being provided by the ICI leans more towards capacity building and technology transfer, rather than funding for actual (transport) projects. The impact of this instrument on GHGs is therefore indirect, and depends on how much of its resources are spent for initiatives that are supportive of sustainable transport. It also depends on the extent this is translated into actual changes by public and private actors.

Potential improvements to further support mitigation of transport emissions

The ICI has the potential to support knowledge and technology transfer between developed countries, for example through:

- Training in areas of sustainable transport policy formulation and operation; or
- R&D projects on public transportation systems, clean vehicles, and ICT technology[52] to mitigate actual passenger journeys.

To increase the appetite for such opportunities from eligible entities to the ICI, the EC may seek (in cooperation with transport and climate change experts) to develop practical guidance that could include a list of the types of support that could be provided by the ICI which may help promote the mitigation of transport GHGs, including in the freight sector which has so far not received much attention, as shown in Chapter 4.

[52] Refer to Chapter 4 for technology needs that were identified in the country review.

6.3 Other EU related channels

6.3.1 The European Bank for Reconstruction and Development (EBRD)

Type of channel	EU channel	Support for A/S/I		Avoid Shift Improve
Governance body	EU	Governance	Donor acceptance	High
Target regions/countries	Central Europe and Asia		Recipient acceptance	High
Amount (overall/ transport) annual	€17.52 billion/€2.63 billion (average between 2000 and 2009, includes investments in EU countries of Eastern and Central Europe)		Compatibility with UNFCCC	Low
Type of support	• Loans		Transaction costs	Low
Support for climate change mitigation	Mitigation relevant support measures	Mitigation impacts (ex ante/ex post)		Ex ante : likely negative Ex post : no data
Support for transport	Transport specific supporting measures	Cost effectiveness		No data
Examples of supporting transport	• Capacity building (rules and regulation) • Infrastructure development	Main Co-benefits (environmental, social and economic impacts		Air quality: Low Noise: Low Equity: Low Road safety: High Accessibility: High Security of supply: Low Congestion: Low

Description of the channel

The EBRD is an international financial institution that was established to 'assist countries to develop into market oriented economies.' The EBRD is owned by 61 countries and two (EIB and EU) intergovernmental institutions. It invests primarily in private sector clients but also in public sector clients by providing finance to actors that cannot obtain credit from other commercial lenders. Activities must be commercially viable to be considered for financing but the EBRD is less risk averse than commercial banks, which enables it to support demonstration projects and other entrepreneurial initiatives. Investments made typically range from €5 million to €230 million (up to 35% of the total project cost) and can take the form of loans, equity, guarantees, leasing facilities and trade finance.

The EBRD's key focus and challenges are as follows:

- Promoting productive, competitive private sector activity.
- Investing in infrastructure to support private and entrepreneurial activities.
- Promoting environmentally sustainable development.

It seeks to fulfil these challenges by focusing on activities in the business sectors, agribusiness, energy efficiency & climate change, financial institutions, micro, small & medium business, municipal & environmental infrastructure (including transport), natural resources, power & energy, property & tourism and telecoms, informatics & media.

These activities are supported in 29 countries, which are located in Central, Eastern and South Eastern Europe, Turkey, Russia, the Caucasus and Central Asia. The EBRD prepares a country strategy for each of these countries to support the identification of local

conditions that the EBRD's approach and strategy should take into account when investing in these countries.

Type of support in transport

In the field of transport, the EBRD's lending activities cover a wide variety of activities, notably the building, expansion, maintenance and rehabilitation of transport infrastructure. As shown in Figure 35 below, between 2000 and 2009 the EBRD has supported 176 projects in the transport sector that collectively have a total project value of €26.3 billion and represent 15% of the EBRD's total project portfolio.[53]

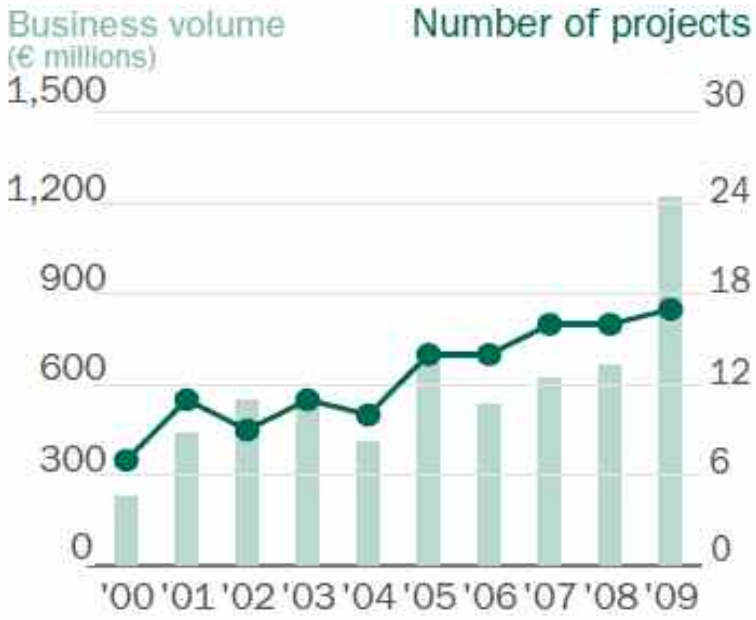


Figure 35: Total number of projects and their total value between 2000 and 2009 (Source: EBRD, 2010)[54]

The EBRD bank strategy stresses the key role of an efficient transport sector in the operation of regional markets, as the drive to integrate national economies continues. The recognised link between transport links and economic growth is also reflected in its 2009 Annual Report where it reiterates its support for such activities in the current economic climate. This aim is pursued through the financial support to regional initiatives, such as the REBIS (Regional Balkans Infrastructure Study) initiative in the Western Balkans and the TRACECA (Transport Corridor, Europe - Caucasus-Asia) initiative in Central Asia and the Caucasus.

The EBRD supports local and national projects although it has tended to focus on infrastructure projects in strategic road, rail, shipping and aviation sectors (see Figure 36 and Box 41 below).

[53] Note that this includes activities within EEA countries, such as Central and Eastern Europe.
[54] See EBRD (2010) http://www.ebrd.com/downloads/research/factsheets/transport.pdf

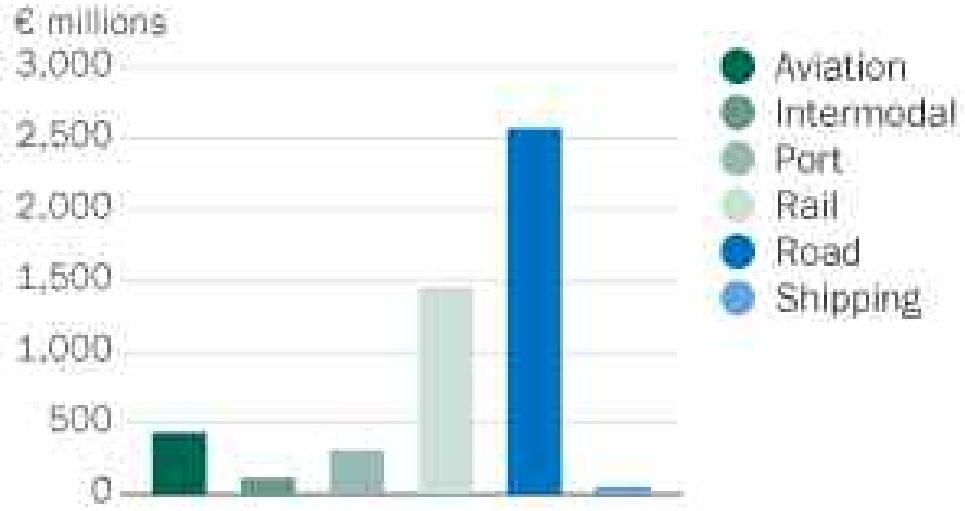


Figure 36: EBRD transport investment by mode (Source: EBRD, 2010)[55]

[55] See: http://www.ebrd.com/pages/sector/transport.shtml

Box 41: Examples of recently supported transport projects

In early 2010 the EBRD published a list of 'recently' commissioned projects (see Figure 37 below). These are primarily large scale infrastructure projects. Some infrastructure projects have been designed to reduce GHG emissions. These include a recent loan of approximately €49.2 million awarded to Warsaw Tramways (which is owned by the city) to modernize Warsaw's tram system by financing investment in trams, tracks, stations and other related infrastructure.

Project	Country	EBRD finance (€ million)
Ukraine Railways: Rolling Stock Renewal Project	Ukraine	43.7
Regional and Local Roads Programme	FYR Macedonia	50.0
South-West Corridor Road Project	Kazakhstan	125.8
Montenegro Rail Infrastructure Emergency Project	Montenegro	4.0
Serbia Railways EMUs	Serbia	100.0
Odessa Terminal Holdco Limited	Ukraine	25.9
RZD	Russia	349.5
Osh-Isfana Road Upgrading Project	Kyrgyz Republic	24.5
R1 Motorway - Slovakia	Slovak Republic	199.8
K10	Serbia	150.0
Mahovljani Interchange	Bosnia and Herzegovina	21.0
Volga-Balt Transport Holding Ltd	Russia	10.5
Euroterminal Odessa Project	Ukraine	6.3
Montenegro Rail Infrastructure Emer Rehab Project II	Montenegro	15.0
Russia: Fesco II	Russia	69.9
Armenia International Airport Phase II	Armenia	28.0

Figure 37: Recently commissioned projects by the EBRD
(Source: EBRD, 2010)

A key element in the decision to award the loan to Warsaw Tramways was to encourage a shift from the private car to tram. Warsaw has high level of congestion and tram speeds are relatively slow owing in part to the old trams in use and outdated traffic control measures. The project will support the introduction of 186 energy efficient modern trams (and 29km of track) using regenerative braking technology that will also contribute to reducing emissions. It has been designed as a 'green' demonstration project and as a component to Warsaw's Sustainable Urban Transport Strategy. The EBRD estimates that the anticipated modal shift from private car to tram should lead to the reduction of approximately 30,000 tonnes of CO_2 annually.

In connection with this loan, the EBRD is also, for example, supporting Polish authorities to develop a framework to monetise carbon emission reductions in urban transport to support the sale of carbon credits. When verified, it is anticipated that the methodology developed will be applied to other urban transport projects.

Source: EBRD (2010b) Green commuting in Warsaw. Available from http://www.ebrd.com/pages/project/case/2010/poland_trams.shtml

Mitigation impacts

The transport investments conducted by the EBRD generally focus on the building and maintenance of large transport infrastructure, particularly roads, and railways.

On aggregate, it is likely that this will lead to an increase in transport emissions, as the new roads are expected to generate new traffic.

Box 42: The EBRD's carbon footprinting and Environmental and Social Policy

The Bank assesses the change in annual greenhouse gas (GHG) emissions that each year's new investment portfolio signings are predicted to make once the projects are fully implemented. Detailed assessments are made for projects that are likely to be significant GHG emitters or savers. The Bank states that its investment portfolio as a whole in 2009 was carbon negative.

EBRD's Environmental and Social Policy "mandates annual GHG assessment for all projects associated with facilities emitting more than 100 kilotonnes of CO2 equivalent per annum, a lower threshold (20 kilotonnes of CO2eq) has historically been used for the portfolio assessment, even though the smaller projects make only a very minor contribution to the aggregate portfolio emissions." (EBRD, 2010c)

It is unclear, to what extent transport projects are included in such assessment, and whether the induced demand of new infrastructure (and resulting emissions) are considered in such evaluation.

Also, the evaluation criteria used by the EBRD vary between tenders, although in all cases the functional, commercial and technical performance of the tender is evaluated in accordance with the tender requirements. The EBRD dictates that every investment should strengthen sustainability but the weight given to environmental performance in the evaluation process is unclear. The only apparent condition is that legal environmental standards (which vary from country to country) are met.

There is, however, evidence that the EBRD is increasing awareness of the benefits of supporting GHG emission reduction activities. The EBRD has, for example, announced a second phase of its Sustainable Energy Initiative (SEI), which comprises objectives to increase financing of energy efficiency and renewable energy initiatives with the ultimate aim of reducing carbon emissions. 17% of the Bank's total lending is now covered under SEI. Transport energy efficiency is now a stated objective under the SEI, and several transport-related projects have been signed, including:

- Nine projects in urban and public transport, including the metro in Kiev, Ukraine, trolleybus modernisation in Kaunas, Lithuania and buses in Pula, Croatia.
- Other energy efficiency schemes in transport including a €100 million loan to Serbia Railways for the replacement of an ageing passenger fleet for use on the country's main intercity services, has been provided, with projected annual emissions reductions of 130,000 tCO2eq.

The Bank is also increasing its links with climate instruments such as the Climate Investment Funds and the Global Environment Facility, with six joint projects with these climate instruments in preparation.

Potential improvements to further support mitigation of transport emissions

There are numerous ways in which the EBRD can position itself to help to ensure that activities that it supports contribute to the reduction of emissions. The EBRD's operational strategy indicates an awareness of the value in reducing emissions, but it does not yet appear to have been mainstreamed. Opportunities for doing so include the following:

- Further mainstreaming transport into the Bank's Sustainable Energy Initiative.
- Incorporate the anticipated impact on GHG emissions in the evaluation criteria used by the EBRD to evaluate all tenders, including the impacts of induced transport demand.
- Mainstream terminology relating to climate change mitigation by incorporating it in all of the EBRD's strategy and guidance documents.
- Standardise the inclusion of GHG emission levels and scenarios in each country strategy.
- Request GHG emission calculations, both ante and post, to be conducted in relation to all activities supported.
- Support and where possible contribute towards international efforts to develop a GHG emission reduction methodology for the transport sector.
- Analyse the potential for existing work on GHG measurement methodologies to be integrated into the activities of the EBRD and actively seek to bridge gaps in understanding.

6.3.2 The European Investment Bank (EIB)

Type of channel	EU channel	Support for A/S/I		Avoid Shift Improve
Governance body	EU	Governance	Donor acceptance	High
Target regions/countries	EU countries, Africa, Russia, Asia and Latin America		Recipient acceptance	High
Amount (overall/ transport) annual	Overall unknown/€1,54 billion (outside EU)		Compatibility with UNFCCC	Low
Type of support	• Loans		Transaction costs	Low
Support for climate change mitigation	Mitigation relevant support measures	Mitigation impacts (ex ante/ex post)		Ex ante : likely negative Ex post : no data
Support for transport	Transport specific supporting measures	Cost effectiveness		No data
Examples of supporting transport	• Capacity building (rules and regulation) • Infrastructure development	Main Co-benefits (environmental, social and economic impacts		Air quality: Low Noise: Low Equity: Low Road safety: High Accessibility: High Security of supply: Low Congestion: Low

Description of the channel

The EIB is owned by the 27 EU Member States and supports the policy objectives of the EU. Its operational strategy is to finance viable capital projects serving EU objectives and to borrow on the capital markets to finance these projects. The majority of financial support is allocated to EU member states (in 2009 this was the destination of 89% of financing, with a value of €79 billion). It does, however, provide support to over 150 countries across Europe, Asia, Africa and South America. The external financial support is provided under the EU's commitment to external co-operation and development policies (these are specifically private sector development, infrastructure development, security of energy supply and environmental sustainability). In 2009, 10,283 projects were funded in non-EU countries with a value of over €5.1 billion.

The EIB provides financial support to both public and private sector actors in 'most sectors.' To be eligible for financial support projects must contribute to one of the following EU policy objectives:

- Cohesion and convergence promotes developing regions within the EU and is key to the integration objectives of the Union.
- Support for small and medium sized enterprises (SMEs) is central to the EU's economy and employment.
- Environmental projects play an important role for the EIB, protecting and improving the natural environment, and promote social well-being in the interest of sustainable development.
- Innovation supports the goal of establishing a competitive, innovative and knowledge-based European economy.
- Trans-European Networks (TENs) are large infrastructure networks of transport, energy and telecommunications underpinning the developmental and integration goals of the European Union.
- Promoting sustainable, competitive and secure energy sources.
- Support for human capital, notably health and education.

Support provided by the EIB can take the form of loans, technical assistance (provided by experts to complement financial support), guarantees, venture capital, and microfinance (which can itself take the form of loans, equity, guarantees and technical assistance).

Types of support in transport

The EIB supports the EU's policy, a key element of which is Transport Trans-European Networks (TENs), a term used to refer to large infrastructure networks across Europe that are considered to be fundamental in realising the integration and development goals of the EU. Transport infrastructure is a core component of the TENs programme and as such most EIB support for the transport sector has focused upon infrastructure projects. For the period 2004 to 2013, for example, the EIB has committed to providing at least €75 billion for transport TENs projects.

Outside of the EU, the EIB invests mainly in regions in the vicinity of the EU, such as South-East Europe and Mediterranean countries, as shown in the figure below. Transport investments can be seen as generally growing over time.

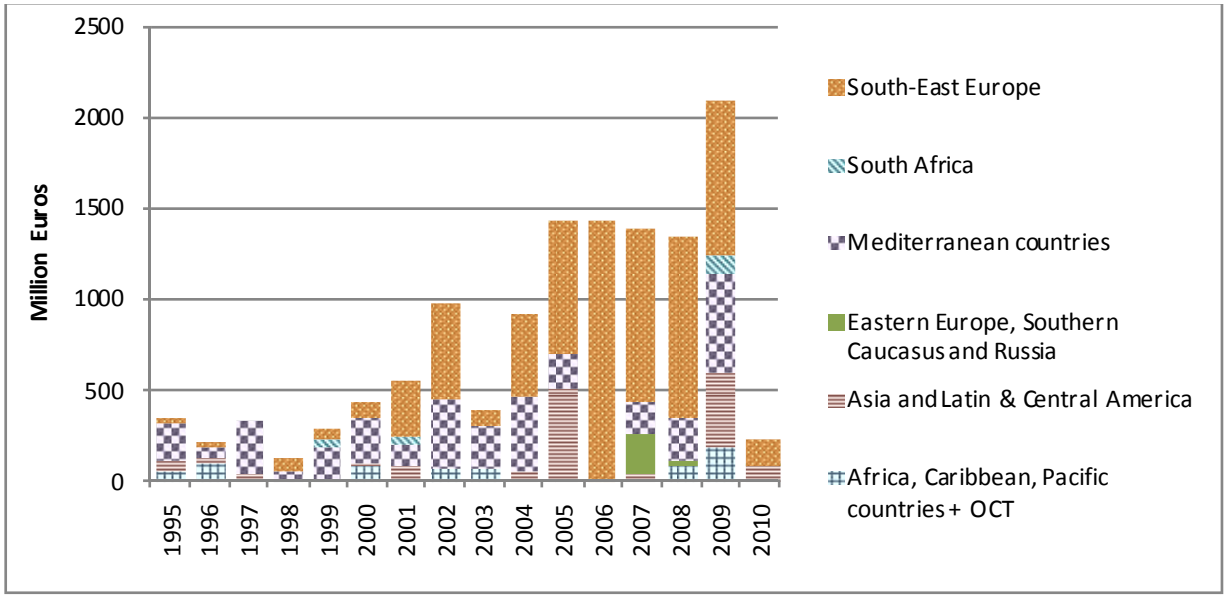


Figure 38: EIB transport investments by year to countries outside of the EU (Data Source: EIB, 2010. Sum for 2010 incomplete)

A list of recent projects supported by EIB outside of the EU is provided in the table below. Note that the majority of investments are targeted at heavy transport infrastructure, such as roads/highways, bridges, intercity railways, ports, and airports.

Table 28: Recent (2009 and 2010) projects supported by EIB outside of the EU

Region	Country	Name	Million EUR
Africa, Caribbean, Pacific countries + OCT	**Congo**	PORT AUTONOME DE POINTE NOIRE	29.0
	Dominican Republic	BTA TOLL ROAD	32.0
	Kenya	JKIA UPGRADING AND REHABILITATION	63.9
	Mozambique	BEIRA CORRIDOR PROJECT	23.0
	Mozambique	BEIRA CORRIDOR PROJECT	42.0
Asia and Latin & Central America	Panama	PANAMA CANAL EXPANSION	396.6
	Vietnam	HANOI METRO LINE	73.0
Eastern Europe, Southern Caucasus and Russia	Armenia	YEREVAN METRO REHABILITATION	5.0
	Moldova, Republic of	CHISINAU TROLLEYBUSES	5.0
Mediterranean countries	Morocco	TRAMWAY RABAT	15.0
	Morocco	ADM VI	225.0
	Tunisia	AUTOROUTE SFAX - GABES	234.0
	Tunisia	AEROPORT ENFIDHA	70.0
South Africa	South Africa	RSA TOLL ROAD INVESTMENTS	120.0
South-East Europe	Albania	SECONDARY AND LOCAL ROADS PROGRAMME	50.0
	Croatia	CO-FINANCING EU IPA ISPA 2007-2011	66.0
	Croatia	CROATIAN ROADS REHABILITATION II	60.0
	Montenegro	ROADS AND BRIDGES REHABILITATION	30.0
	Serbia	BELGRADE BY-PASS	40.0
	Serbia	BELGRADE CITY SAVA BRIDGE	70.0
	Serbia	CORRIDOR X (E-75) MOTORWAY	384.0
	Turkey	ISTANBUL-ANKARA RAILWAY	293.2

Mitigation impacts

In its remit to support EU policy objectives the EIB specifically finances climate change mitigation and adaptation projects. It also supports wider projects that contribute towards 'environmental protection and sustainable communities' and 'sustainable, competitive and secure energy.' 'Environmental sustainability' is one of the EIB's six priority objectives for its lending activity as detailed in its Operational Strategy. There are three objectives for defining the priority area of environmental sustainability. These are:

- To ensure that all projects are compliant with EU environmental principles and standards.
- To promote specific projects that protect and improve the natural and built environments and foster social well-being, in support of EU policy
- To manage the EIB's environmental footprint.

The EIB's Statement of Environmental and Social Principles and Standards[56] details that the EIB:

[56] http://www.eib.org/attachments/strategies/eib_statement_esps_en.pdf

- Seeks to identify and finance projects that add value through the protection and improvement of the natural environment in all sectors.
- Only funding projects that comply with environmental EIB requirements (which can exceed standards set in legislation) and requires in particular that climate change considerations are integrated into the lending policies and practices of the EIB.
- Has an environmental lending target that requires all projects to promote one or more of the EU's environmental sustainability objectives.
- Undertakes environmental assessments for all projects financed.
- Optimises the scope for energy efficiency in all its projects and aligns its operations with EU climate policy investment priority.
- Periodically reviews lending policies to make them consistent with EU climate policy and emerging climate change considerations.
- Requires proposers to systematically estimate expected GHG emissions for projects in carbon intensive sectors (it is unclear whether this includes the transport sector) and apply associated mitigation measures.
- Incorporates GHG emission costs for schemes that could potentially produce significant quantities of GHGs in the financial and economic analyses that inform financing decisions.
- Works in co-operation with other international financial institutions to explore and develop methodologies for measuring and reporting carbon impacts of projects that it finances. These will be used to inform project choice.

In their transport lending policy[57] the EIB details its support for a wide range of transport projects including those that have the explicit aim of achieving GHG emission reduction and the gradual increase in value (both absolute and relative) of such projects to the EIB's portfolio. These projects include research and development initiatives as well as support for urban transport systems.

The EIB can therefore be seen to have multiple processes and eligibility criteria in place to help to ensure that all projects supported have a positive impact on the environment. There are also specific provisions made to ensure that climate change considerations are incorporated into project design and selection in particular.

As highlighted in the last section, current policies of the EIB have not, however, manifested themselves in commitments to sustainable transport projects, with the future portfolio also dominated by investment in road and aviation infrastructure.

Potential improvements to further support mitigation of transport emissions

The EIB has provisions in place to ensure that developments in the climate change debate are reflected in their lending policy. There are, however, several steps that the EIB could take to aim to reduce the carbon footprint of activities that it supports. These include the following:

- Increase support for non-EU countries, especially Middle Income and Emerging Markets, who may benefit from the concessional loans provided by the EIB to help finance transport infrastructure, particularly for public transport (e.g. BRT and rail).

[57] EIB (2007) http://www.eib.org/attachments/strategies/clean_transport_lending_policy_en.pdf

These loans should be provided in conjunction with capacity building and technology transfer from other instruments, for example the EDF, ENPI and DCI.

- Reflect the need for prompt action (i.e. by prioritizing transformative actions in the transport sector) to help ensure that developing countries do not follow the same resource intensive development trajectory experienced in more developed countries.
- Require that all projects identify, quantify and value GHG impacts (both ex-ante and ex-post) and that this information is used to inform investment decisions.
- Increase the weighting given to environmental (particularly climate change) considerations in investment decision, particularly in carbon intensive sectors.
- Incorporate a requirement for climate change mitigation activities in all activities that are likely to have a negative impact upon GHG emissions, regardless of magnitude.

Box 43: The German International Climate Initiative (ICI) as an example of a Member Country Initiative

EU member countries provide considerable financial support to development activities in addition to contributions that they make to EU institutions such as the EIB. The German ICI, which was established in 2008 as a complement to Germany's existing development assistance, is an example of such a programme. It specifically provides climate finance (for both climate change mitigation and adaptation) to transition (in Central and Eastern Europe), developing and newly industrialising countries. Most funding is provided to the G5 states - Brazil, China, India, Mexico and South Africa.

With a budget of approximately €120 million a year, which is obtained from the revenues of the sale of emissions allowances to German industry, it focuses on support for projects and activities that: promote a climate-friendly economy; promote measures for adaptation to the impacts of climate change; and promote measures for the preservation and sustainable use of natural carbon sinks. This is counted as part of Germany's contribution to the Quick Start Finance committed in the context of the Copenhagen Accord.

A theme of the ICI is 'climate friendly economy' (which is currently the main focus of the ICI and has to date received 60% of all finance allocated). 'Reduction of emissions in the transport sector' is one of five components of this theme. The theme supports projects and activities in the fields of technology transfer, policy advice, research co-operation, capacity building, training, the elaboration of studies and strategies, and interventions that lead to the implementation of energy efficiency improvements – particularly innovative pilot measures. Transport projects supported outside the EU to date include grants for electric transport, low carbon urban transport strategies, modernisation of transport systems, and integrating transport as a component in activities in other sectors.

See Binsted et al (2010b) for practical information on how to access climate financing for sustainable transport, including the German ICI. Available at:

http://www.transport2012.org/bridging/ressources/files/1/956,TD05_FinGuid.pdf

6.4 International channels

6.4.1 Multilateral Development Banks

Type of channel	International	Support for A/S/I		Avoid Shift Improve
Governance body	Non-EU	Feasibility	Donor acceptance	High
Target regions/countries	Developing countries		Recipient acceptance	High
Amount (overall/ transport)	Overall budget unclear/ For transport: • WB US$8.81 billion(€6.31 billion) (2009); • IDB US$2.02 billion (€1.45 billion) (2009); • ADB US$2.35 billion (€ 1.68 billion) (2009), plus grants of US$355 (€254.7) • AfDB US US$2.03 billion (€1.45 billion) (2009)		Compatibility with UNFCCC	Low to High: Some of the funds compatible with the UNFCCC missions (e.g.: GEF, CTF, SECCI Fund).
Type of support	• Loans, grants, derivatives, guarantees • Technical support • Capacity building.		Transaction costs	Low: Maximum of 5% eligible for administrative expenditure (2006 agreement with WB)
Support for climate change mitigation	Not all funds administered by MDBs take climate concerns into consideration.	Mitigation impacts (ex ante/ex post)		Ex-ante: negative to low Ex-post: no data
Support for transport	Support is provided to numerous sectors, including transport.	Cost effectiveness		no data
Examples of supporting transport	• Road • Ports • Railways • Airports • Urban transport(e.g.: metros, BRTs, NMT)	Main co-benefits (environmental, social and economic impacts		Air quality: High Noise: Low Equity: High Road safety: High Accessibility: High Security of supply: High Congestion: Low

Description of the channel

The European Union is major contributors to various multilateral development banks such as the World Bank (WB), Asian Development Bank (ADB), African Development Bank (AfDB), and the Inter-American Development Bank (IDB). The World Bank Group receives the bulk of contracts signed, with €467 million in 2009, compared to €7.34 million for AfDB, and €1.35 million for IDB, and to €17.0 million for ADB in 2007.

A large share of finance from donor countries is allocated to multi-donor trust funds. Resources are then disbursed through loans, grants, derivatives, guarantees, technical support, and training. The MDBs also offer the possibility of channelling funds to debt cancellation for poor countries.

As noted in Chapter 2, development aid (as indicated in the figures above) far exceeds the climate finance that is provided by channels that are mentioned in the remainder of this section.

Type of support in transport

The allocation of EU funds through MDBs did not provide any indication to the transport sector specifically. However, these organisations are major supplier of transport assistance in developing countries. The World Bank in 2009 provided US$8.81 billion (€6.31 billion), equal to 15% of the Bank commitments for the year (World Bank, 2010b). The World Bank provides 2% of the total infrastructure spending in developing countries.

In 2009, the Inter-American Development Bank allocated 10.9% of its lending activity, corresponding to a total of US$1.45 billion (€1.04 billion) to transportation (IDB, 2010). In 2009, ADB lent US$2.35 billion (€1.68 billion) per annum on transportation, and provided US$355 (€254.7) in grants (ADB, 2010). It is expected that transport lending from ADB will increase to US$ 5.89 billion (€4.26 billion) per annum in the 2009 – 2011 period. The African Development Bank allocated US$2.03 billion (€1.45 billion) for transport in 2009, which accounts for 33.1% of infrastructure investments conducted by the Bank.

Current financing by MDBs are focused mainly on road construction and maintenance. However, there is now a trend of shifting resources towards sustainable transport, especially in urban areas.

For example in 2007, 75% of the World Bank transport portfolio was dedicated to the construction of road infrastructure. In 2008 the share of the road and highway sector decreased to 57%. The World Bank Business Strategy 2008–2012 takes into account the recommendations provided by the Bank's Independent Evaluation Group (IEG) that have remarked that the 'Bank's transport operations should go beyond intercity highways and give more attention to issues of environmental damages, energy efficiency and climate change, traffic congestion, safety, affordability and trade' (World Bank 2009b). However, in 2009, the share of lending to road and highway projects grew again, in good part due to the prominence of road investments in many national economic stimulus plans. In this framework, the WB has launched the Infrastructure Recovery and Assets Platform (INFRA) which will provide US$45 billion (€32.6 billion) in infrastructure lending over the next 3 years and set up the Infrastructure Crisis Facility (ICF) focused on stimulating private investments.

In 2008, 87% of the IDB transport portfolio was committed to road infrastructure, with a large emphasis on the development of primary roads. Urban transport receives 9% of investments with a focus on the financing of Bus Rapid Transit and Metro systems. Since 2009, IDB has been developing a Regional Environmentally Sustainable Transport Action Plan (REST-AP) aimed at increasing the share of investments in projects that limit GHG emissions and that minimize other negative externalities, while fostering economic growth and social inclusion. The REST-AP bases its strategic priorities on the Avoid-Shift-Improve approach. In 2009 and 2010 a shift has started towards the provision of maintenance services to secondary and tertiary road networks. Other impacts of the REST-AP are still to be quantified.

During the period of 2004-2008, ADB has allocated 81% of its lending activities to roads and highways. The ADB Sustainable Transport Initiative (STI), approved in July 2010, has climate change as one of its four main pillars, the others being urban transport, cross-

border transport and logistics, and road safety and social sustainability. The ADB STI specifically acknowledges the Avoid-Shift-Improve approach as the basis for future support to climate change mitigation in the transport sector. Based on the STI, a significant shift away from road infrastructure investments towards rail and urban transport systems is foreseen (see Box below).

Box 44: The Asian Development Bank's Sustainable Transport Initiative

The Sustainable Transport Initiative (STI) of the Asian Development Bank (ADB) aims to shift the relative size of investments from road to rail and general urban transport (which would include public transport and non-motorised transport infrastructure), as shown in the figure below. The bank is also taking steps to evaluate the carbon footprint of its lending activities (see ADB, 2010)

Figure 39: ADB's Sustainable Transport Initiative: Subsector shares of transport lending – Actual, Pipeline and Target (Source: ADB, 2010)

European institutions such as the European Commission, European Investment Bank and European Bank for Reconstruction and Development can adopt similar initiatives, to ensure that financial resources are shifted towards sustainable transport, and to ensure that carbon impacts of investments are accounted for in the decision making process.

Furthermore, the African Development Bank has recently announced an Africa Green Fund, which would contain a window for sustainable transport within the mitigation part.

Mitigation impacts

Many of policy interests of the EU in relation to external aid, such as promoting the achievement of the MDG and addressing climate change challenges, require cooperation on a global scale. It is generally felt that working with MDBs in multi-donor arrangements, including trust funds, is an effective way to achieve donor co-ordination and enable the mobilization of greater volumes of external assistance, making possible achieving economies of scale.

In addition, working through the MDBs should reduce transaction costs for partner countries making more efficient use of funds available. As an example, in 2006, the European Commission negotiated with the World Bank Group that a maximum of 5% of the cost of a project could be used cover the administrative expenditure to implement operations financed by the Commission.

One of the fundamental principles of multilateralism is independence from direct donor control. A greater degree of independence allows MDBs to allocate their resources more efficiently in terms of promoting social and economic development and lends credibility to their policy advice. While keeping this in mind, the European Commission can ensure close cooperation with MDBs through several platforms and channels, for example, through Limelette process, the Tunis Process, annual reviews of coordination and cooperation, and annual consultations on the implementation of Framework Agreements.

It should be noted that GHG emissions mitigation is not a requirement of all funds administered by the MDBs. Cost-effectiveness of interventions is a principle widely practices throughout the MDBs, induding on climate specific funds.

Potential improvements to further support mitigation of transport emissions

The EU may encourage MDBs to:

- Develop and implement Climate Change Strategies and multiannual Action Plans to provide the framework and guide operations in the transportation sector. This should increase transparency of strategic priorities and predictability of investments and commitments to low-carbon transportation.
- Mainstream climate throughout MDBs policies and programs as to avoid inconsistencies, duplication and misdirected efforts.
- Build the capacity of staff in operations and country offices as well as of government counterparts in the identification of opportunities for investments in low-carbon sustainable transportation options.
- Create incentives for staff and government counterparts, for example, through the allocation of technical cooperation resources for alternative analysis and feasibility assessments of project with reduced carbon footprint.
- Support developing countries to develop low-carbon development plans and associated investment plans. This should enable developing countries take ownership of their development strategies and help link climate change to national objectives and priorities. Elements of development plans may address enabling environments for sustainable low-carbon transportation and investments in programs and projects at national and sub-national levels.

- Assist in the identification of funding sources to implement plans and in the development of financial mechanisms that sustain low-carbon development measures in the long term.
- Coordinate support to developing countries with other MDBs and donors to avoid duplication and maximise impact and effectiveness of efforts. A broad donor-wide engagement can be facilitated by MDBs through the establishment of financial mechanisms such as climate/transportation trust funds that attract co-financing, support shared analysis and joint donor missions. An effective instrument to use as a reference is the Clean Technology Fund.
- Have policy based loans and other instruments that support reforms in the legal and policy framework in developing countries, institutional capacity building, and that broadly creates conducive enabling environments for low carbon development.
- Develop and maintain an information system that accounts for costs and benefits of different investments and financial support modalities. As part of this effort, MDBs should analyze the carbon footprint of transportation project portfolios and on a second phase the carbon footprint of project pipelines. Results of this analysis should be made public through regular reports.
- Shift priorities towards sustainable transport, by setting up targets (such as with the ADB) and transport windows within climate-specific budget lines (in the case of the African Development Fund) and to measure the impact of investments on carbon emissions.
- Consider increasing contributions to regional development banks, which currently receive only 5% of total EU contributions to multilateral development banks (as currently 95% goes to the World Bank).

6.4.2 Clean Technology Fund

Type of channel	International	Support for A/S/I		Avoid Shift Improve
Governance body	Non-EU	Feasibility	Donor acceptance	High
Target regions/countries	Developing countries		Recipient acceptance	High
Amount (overall/ transport)	US$ 4.3 billion (€3.11 billion) / US$600 million (€434.3 million).		Compatibility with UNFCCC	High
Type of support	• Capacity Building • Technological Transfer • Finance (grant)		Transaction costs	Low
Support for climate change mitigation	Mitigation specific	Mitigation impacts (ex ante/ex post)		10 $MtCO_2eq/yr$ (Ex-post). Ex-ante : high
Support for transport	Transport relevant	Cost effectiveness		$6/tCO_2eq$ (€4.3/tCO_2eq)[58]
Examples of supporting transport	• BRT • Rail • Low carbon technologies • Efficiency • Institutional development.	Main Co-benefits (environmental, social and economic impacts		Air quality: High Noise: Low Equity: Low Road safety: Low Accessibility: Low Security of supply: High Congestion: Low

Description of the channel

In 2008, The World Bank's Board of Directors approved the Climate Investment Funds (CIF) which represents a collaborative effort among MDBs and countries to mobilize additional finance for climate mitigation and adaptation activities. The CIF include the Clean Technology Fund (CTF) and the Strategic Climate Fund (SCF) which are both governed by a Trust Fund Committee.

The CTF is designed to fill an immediate financing gap pending an agreement on the post 2012 climate regime, and aims to provide scaled-up financing for 'transformational actions' that contribute to demonstration, deployment and transfer of low-carbon technologies with a significant potential for long-term GHG emissions reductions. To date, US$4.3 billion (€3.1 billion) have been approved by the CTF, leveraging a total of US$36 billion (€26 billion) from other sources. The investment for the transport component is estimated to be US$9.3 billion (€6.7 billion), while the CTF contributes US$600 million (€434 million).

The continuation of the CTF is uncertain as it states that "the CTF will take necessary steps to conclude its operations once a new [UNFCCC] financial architecture is effective".

Type of support in transport

The CTF allocates funds through approved investment plans designed to achieve nationally-defined objectives and developed in close collaboration with interested governments, private sector and other stakeholders. The funds are disbursed as grants, concessional loans, and guarantees.

[58] Assumes lifetime of 10 years for each investment. Note that the transport projects are financed by a number of sources, therefore the 'cost effectiveness' figures should be interpreted with caution.

As of October 2010, 13 country investment plans and a regional investment plan had been endorsed by the CTF. The transportation sector is included in seven country investment plans – Egypt, Morocco, Mexico, Thailand, Philippines, Vietnam and Colombia.

In the transportation sector, the CTF underlines as priorities: modal shifts to public transportation in major metropolitan areas, the establishment and improvement of vehicle fuel economy standards and fuel switching to lower carbon alternatives.

Mitigation impacts

The CTF has been an influential force in the promotion of low-carbon development paths, and addressing the transportation sector, in recipient countries. CTF investments are expected to lead to a reduction of 10 $MtCO_2eq/yr$ from the transportation sector. Considering emissions reductions during a 10 year period, the CTF is estimated to have a cost-effectiveness of \$6/tCO_2-eq (€4.4/tCO_2-eq).

By supporting the development of investment plans led by developing countries, the CTF creates an opportunity for developing countries to consider low-carbon development options, identify priorities that align well with national needs, and then have basis from which to seek the necessary financial and technical support from developed countries. Donor countries to the CTF Trust Fund are part of its governing committee and thus have the opportunity to influence funding decisions.

The transformational impact of investments is achieved by promoting enabling environments for low carbon development, through institutional capacity building and reforms of regulatory and policy frameworks. Transformational impact is also supported by the scale of investment. CTF has been able to leverage finance from other sources, namely from the MDB's financial portfolios.

Potential improvements to further support mitigation of transport emissions

The European Union can play a role in supporting this mechanism through financial donations while it is still in operation, capturing the lessons learned and applying them in the design of new financial mechanisms, and through active participation in the CTF Trust Fund Committee.

In terms of recommendations for improvement in CTF operations, the results framework used by CTF should explicitly capture improvements in sectoral governance, institutional capacity, policy and regulatory environments. In addition, the EU could encourage the development of guidance and methods for the ex-ante and ex-post analysis of GHG emissions impacts from investment plans, and aim to harmonise this with measurement, reporting and verification (MRV) methodologies used in other climate instruments such as GEF or the future NAMA framework.

Box 45: Mexico CTF Investment Plan – Transportation Component

The approved CTF investment plan for Mexico seeks to significantly reduce emissions from the transport sector in cities that are among the largest GHG emitters in the country (Guadalajara, Monterrey, Puebla, Leon, Mexico City Metropolitan Area), and others with over 0.75 million inhabitants (Chihuahua, Mexicali). A comprehensive and systemic approach to urban mobility is to be adopted in each city that links urban development options with air quality goals, carbon emissions reductions and the efficiency and safety of transport operations. These measures are expected to result in savings of about 2 million tons of CO_2 per year.

The CTF co-financed investments will be used towards:

1) Modal shift to low carbon alternatives. This includes the development and accelerated expansion of BRT systems and light rails, linked to other low carbon or non-motorized transport options; urban zoning tied to improvements in access to public space.
2) Promotion of low carbon bus technologies such as hybrid diesel electric and CNG electric vehicles, with 100% scrapping of displaced rolling stock.
3) Capacity building for local institutions – business, financial, operational, administrative, procurement, environmental, infrastructure, safeguards, regulatory, institutional.

The financing plan is as follows (US$ million, Source CTF, 2010):

Source	Local	Foreign	Total
GoM	750		750
IBRD *		600	600
IDB *		150	150
Carbon Finance		50	50
CCIG		1	1
GEF		6	6
CTF (IBRD)		200	200
Private Sector	250	393	643
Total	1,000	1,400	2,400

* Notional amounts, revisable according to Government plans

6.4.3 The Global Environmental Facility (GEF)

Type of channel	International	Support for A/S/I		Avoid Shift Improve
Governance body	Non-EU	Feasibility	Donor acceptance	High
Target regions/countries	Developing Countries		Recipient acceptance	High
Amount (overall/ transport)	US$9.85 billion (€7.09 billion) / US$249 million (€212 million) (both 1999 to 2010).		Compatibility with UNFCCC	High
Type of support	• Finance (grant) • Capacity building		Transaction costs	High
Support for climate change mitigation	Mitigation specific support measures	Mitigation impacts (ex ante/ex post)		During GEF2-4 (since 1999): Direct - 31.5 $MtCO_2$. Indirect - 34.5 Mt CO_2
Support for transport	Transport specific supporting measures	Cost effectiveness		US$7/$tCO_2$(€5/tCO2) (direct reductions only, not counting co-financing)
Examples of supporting transport	• Low-carbon vehicles • NMT • BRT • Transport planning • Awareness raising	Main Co-benefits (environmental, social and economic impacts		Air quality: High Noise: Low Equity: Low Road safety: Low Accessibility: Low Security of supply: High Congestion: Low

Description of the channel

The Global Environmental Facility (GEF), established in 1991, is the financial mechanism for four Rio conventions (United Nations Convention on Biological Diversity, the UNFCCC, the Stockholm Convention and the United Nations Convention to Combat Desertification) and collaborates closely with other treaties and agreements.

The GEF has ten executive and implementing agencies that collaborate with eligible countries to develop, submit and implement projects and programs in line with the GEF strategy and overall GEF policies. Projects and programs are approved by the GEF Council, which is made up of both recipient countries and donor countries.

The GEF has provided primarily grants and to a lesser extent concessional funding to recipient countries for projects and programs that have the explicit purpose of protecting the global environment in six focal areas: climate change (mitigation and adaptation), biodiversity, international waters, persistent organic pollutants, ozone depletion and land degradation (desertification and deforestation).

The GEF Trust Fund is the common funding resource of the Global Environment Facility and was established in 1994 succeeding to the Global Environmental Trust Fund pilot phase. The Trust is financed by voluntary pledges of donor nations that commit money every four years through a process called 'GEF replenishment'.

During GEF2-4 (since 1999), US$9.85 billion (€7.09 billion) were allocated to the climate change focal area. The GEF fifth replenishment, covering the period of 1 July 2010 to 30 June 2014, provides an allocation to the same focal area of US$1.35 billion (€977 million),

Type of support in transport

Under GEF2-4, 45 projects totalling US$249 million (approx. €212 million) were allocated to transportation, and this leveraged more than US$2.5 billion (€2.13 billion) in co-financing (Dalkmann and Huizenga, 2010).

The largest share of transport projects is located in Latin America and Asia. Such projects include public transport investments such as Bus Rapid Transit (29%), non-motorised transportation (29%), Transport Demand Management (8%), improvement in vehicle technologies (6%), and other (28%) (includes national policy development, awareness raising, capacity building and land use reform.) In absolute terms the share of investment in alternative vehicles is growing (25%) (ITDP, 2009).

Under GEF5, US$250 million (€181 million) is allocated to Objective 4: Promote energy efficiency, low-carbon transport and urban systems. For GEF-5 the objective is to "promote energy efficient, low-carbon transport and urban systems", and support is given to a broader set of activities including land-use and transport planning. The key targets under GEF5 are for 20-30 cities to adopt low-carbon programs and the mobilization of US$1.2 billion (€ 868 million) additional investments.

Mitigation impacts

The estimation of the impacts from GEF projects on GHG emissions is not straightforward since methods used by each project varied greatly. Since 1999, transportation projects are expected to have produced reduction of 31.5 megaton (Mt) of direct CO_2 emissions and 34.5 Mt of indirect CO_2 emissions.

Analysis of results, achievements and progress towards impact show that the GEF is able to deliver once projects are approved and implemented. Other key findings state that GEF support has been crucial in putting climate change on the national agenda of many developing countries and that GEF support has enabled countries to reduce and avoid GHG emissions and transform markets. Countries have used GEF support to introduce new policies and to develop the requisite environmental legislation and regulatory frameworks. GEF support has grown relative to that of other donors on environmental issues.

Potential improvements to further support mitigation of transport emissions

The EU is a major contributor to the GEF Trust Fund and has great interest in seeing that these funds are delivered efficiently.[59] Influence on the GEF priorities and operations can be exerted through the UNFCCC process as the GEF is accountable to the Convention.

As part of the recommendations for GEF 5 reforms, there is a highlight on the need to improve the effectiveness and efficiency of the GEF through: "(i) enhancing accountability to the conventions; (ii) streamlining the project cycle and refining the programmatic approach; (ii) enhancing engagement with the private sector; (iii) implementing the results-based management framework; (iv) clarifying roles and responsibilities of GEF entities, including

[59] The GEF Trust Fund has 39 donors that have committed funds. The largest donor is the US with 20-21% share, followed by Japan with 17-18% share, then Germany with 11% share, France with 7% and UK with 6-7% share. As a whole EU member states have the largest share of contributions. EU Member States have pledged over 900 million USD to the GEF Trust Fund under the fourth replenishment (2006-2010).

sharing responsibilities for the mobilization of resources and (vi) enhancing engagement with civil society organizations." (GEF, 2009)

More specifically for interventions in the transport sector, EU policy makers may use their influence to:

- Ensure that GEF investments are targeted at catalytic activities such as capacity building, development of enabling policy frameworks at national and local levels, and public awareness levels.
- In particular, use GEF support for areas with less on the ground experience such as freight and logistics.
- Utilise GEF methodologies on GHG assessment for other climate and development instruments. Link such efforts with the creation of databases in developing countries, to enable better reporting of their transport emissions to the UNFCCC.
- Support the development of institutional and regulatory frameworks and financial structures to encourage private sector participation.
- Ensure a specific acknowledgement and targeting of co-benefits, such as air pollution. Aim to quantify such co-benefits.

For further detailed see Dalkmann and Huizenga (2010)[60] on the potential future role of GEF in supporting sustainable transport.

Box 46: Ghana Urban Transport

Quoted From: GEF, Investing in Sustainable Transport the GEF Experience (2009)
GEF Agency – World Bank
GEF: US$ 7.35 million (€5.32 million)
Co-financing: US$ 83 million (€60 million)
The project is expected to result in a direct reduction of 240 ktCO_2 during the timeframe of the project.

The project addresses institutional, management, and regulatory issues to improve personal mobility in cities in Ghana, with an initial focus on Accra and Kumasi metropolitan areas. Project activities are designed to:

- Strengthen the capacity of ministries, local authorities, agencies, and operators concerned with urban transport.
- Update the integrated urban and transport development plans for the greater Accra Metropolitan Area, resulting in a better integration of urban development and transport planning, and supporting urban growth that is more compatible with the development of transport infrastructure and services.
- Manage the traffic in Accra and Kumasi and enforce traffic rules and education.
- Implement a BRT infrastructure in Accra (including segregated bus-ways, interchange facilities, and terminals and facilities for pedestrians and non motorized transport).

[60] Available at: http://www.transport2012.org/bridging/ressources/documents/2/968,For-website-Sustainable-transport.pdf

6.4.4 Clean Development Mechanism (CDM)

Type of channel	International	Support for A/S/I		Shift Improve
Governance body	Non-EU	Feasibility	Donor acceptance	High
Target regions/countries	Non-Annex I countries		Recipient acceptance	High
Amount (overall/ transport) annual	US$7.5 billion / Transport: US$1.6 million (€1 million)		Compatibility with UNFCCC	High
Type of support	• Finance (crediting)		Transaction costs	High
Support for climate change mitigation	Mitigation specific	Mitigation impacts (ex ante/ex post)		Ex post: As of Dec 2010, 4 registered projects reduce 0.16 $MtCO_2eq/yr$. Ex ante: Including those in pipeline, 33 projects expected to reduce 3.5 Mt CO_2eq/yr (ex-post).
Support for transport	Transport relevant	Cost effectiveness		Varies with the CER market price, in the order of $10/$tCO_2eq$
Examples of supporting transport	• Rail • BRT and other public transport • Biodiesel for transport • Regenerative braking	Main Co-benefits (environmental, social and economic impacts		Air quality: High Noise: Low Equity: Low Road safety: Low Accessibility: Low Security of supply: High Congestion: Low

Description of the channel

The CDM is a flexible mechanism under the Kyoto Protocol/UNFCCC, designed to offset emissions in developed countries with more affordable GHG emissions reductions in developing countries. In practice, once additional GHG emissions reduction have been verified as a result of a project or program intervention in a developing country, Certified Emissions Reductions (CERs) are granted and can be traded with businesses, industries, or countries that are not meeting their own CO_2 emission targets. To ensure the additionality of emissions reductions, the CDM Executive Board needs to approve the methodologies to monitor and verify emissions reductions and to register transportation project or program.

Type of support in transport

The CDM has so far been limited to 4 transportation projects registered with the CDM-Executive Board, namely:

- A Bus Rapid Transit scheme in Bogota, Colombia;
- Regenerative braking technology on the Delhi metro;
- A cable car metro system in Medellin, Colombia; and
- A biodiesel project in Paraguay.

A further 29 transportation projects and one Programme of Activities (PoA) are currently in the CDM pipeline. These are located in Chile, China, Colombia, Ecuador, India, Mexico, Paraguay, the Philippines, and South Korea and cover a variety of project types, including (i) bus rapid transit, (ii) regenerative braking in rail, (iii) biodiesel for transport, (iv) mode shift: road to rail for freight and passenger transportation, (v) electric motorbikes, (vi) efficient operation of metro system, (vii) cable cars, and (vii) scrapping old vehicles (UNEP/Risø, 2010).

Compared to its share of global GHG emissions, the transport sector is underrepresented in the CDM. Being a market based mechanism the initial focus is drawn to the "low-hanging fruits", projects that offer large and easy to achieve emissions reductions. The application of the CDM in the transport sectors faces a number of barriers including:

- Difficulty in demonstrating additionality - the broader set of co-benefits (economic and social) produced by a transport project and the low amount of finance provided by the CDM makes it difficult to justify that the project would have not occurred without CDM support.
- Difficulty in establishing baseline scenario;
- Complexity and high cost associated with designing methodologies that can capture all the impacts of a transport intervention;
- Lack of transport activity data necessary to calculate impact on emissions;
- High transaction costs in relation to future uncertain revenues.

Even in the few cases in which transport projects could be financed through the CDM, the financial support received could be usually less than 2% of the overall costs for large-scale infrastructure investments.

Mitigation impacts

As of December 2010, there are 4 registered projects in transport, and a further 29 transport projects plus one PoA in the pipeline. The registered projects reduce 1.6 $MtCO_2eq/yr$. If all the transport projects in the pipeline are realised, they are expected to reduce 3.28 $MtCO_2$-eq/yr, which is only around 0.6% of the total reductions of the current pipeline.

To estimate the size of financial flows related to CDM, a price estimate is required since the price of CERs is negotiated in individual contracts and varies greatly based on the specific terms and risks sharing agreement between the parties of the contract. Assuming an average price of US$10 per CER, the 4 transport projects currently registered generate US$ 3 million (€2.14 million), and the 29 transportation projects currently in the pipeline are expected generate US$33 million (€24 million) per annum, if they are actually registered.

Potential improvements to further support mitigation of transport emissions

The EU can influence the CDM through the negotiations under the UNFCCC (AWG-KP) and through participation in the CDM-Executive Board. It should be noted that members of the CDM-EB participate on their personal capacity.

The role of the CDM in addressing GHG emissions from the transportation sector could be enhanced, to some extent, by:

- Further development of Programmes of Activities, and possibly sectoral-CDM;
- Lowering transaction costs through development of standardised baselines and more approved transport methodologies that are broadly applicable. At the 16t session of the Conference of Parties in Cancun, the Subsidiary Body on Implementation (SBI) decided under CDM to support the creation of standardized baselines for several key sectors including transport. It is expected that the UNFCCC secretariat will organize a workshop on transport and CDM in the middle of next year, to which the EC may also contribute;

- Capacity building activities and platforms to access information and guidance in respective language. This capacity building and information efforts should address transparency of institutional and legal arrangements; and
- Favouring CERs for projects with high sustainable development characteristics to promote such impacts of the CDM. Sustainable transport projects, with their large co-benefits in air pollution/noise/congestion/accident mitigation, would score highly in this regard and receive a larger level of credits.

Box 47: BRT in Bogotá, Colombia: TransMilenio Phase II to IV

The Transmilenio BRT system was registered in 2006, as the first transport project under the CDM. The system comprises:

- Dedicated bus lanes, new bus-stations and integration stations ensuring smooth transfers to feeder lines.
- Modern bus technology (GPS equipped, Euro II/III engines, capacity of 160 persons, platform-level access, room for disabled persons)
- An operational fleet centre which manages bus dispatch and passenger information
- A pre-board ticketing using magnetic ticketing system that streamlines the boarding process.

The Project is expected to contribute to improve public transport efficiency, favour the modal switch and increase load /occupancy rate. The project aims at promoting sustainable development by improving environment and social well being and by creating 1500 temporary jobs.

According to Gruetter (2010), total emission reductions monitored in year 2009 were 79,326 tCO2eq. More than 134 million extra passengers were transported due to the CDM scheme, bringing the total to up to nearly 450 million passengers across the entire network in the year 2009 (Gruetter et al, 2010).

Photo: Transmilenio, 2007

See:
http://cdm.unfccc.int/filestorage/96YVXI7FQ5JEC2GT1NDWR4MQUP8K0Z/Monitoring%20Report%204.pdf?t=YlJ8MTI5Mjg2NTUyMi4wMQ==|veCIWJIaIBbKVkp96ejwwkU-6-A=

6.4.5 Joint Implementation (JI)

Type of channel	International	Support for A/S/I		Shift improve
Governance body	Non-EU	Feasibility	Donor acceptance	High
Target regions/countries	Annex I countries (mainly Russia, Ukraine, central and eastern European countries)		Recipient acceptance	High
Amount (overall/ transport)	€873 million Euros/yr (until 2012)/ €2 million/yr		Compatibility with UNFCCC	High
Type of support	• Technology Transfer • Finance (crediting)		Transaction costs	High
Support for climate change mitigation	Mitigation specific support measures	Mitigation impacts (ex ante/ex post)		Ex ante: 0.37 $MtCO_2$/yr (for projects in pipeline) Ex post: no data.
Support for transport	Transport specific supporting measures	Cost effectiveness		Insufficient data
Examples of supporting transport	• Biodiesel production for use in transport vehicles	Main Co-benefits (environmental, social and economic impacts		Air quality: High Noise: Low Equity: Low Road safety: Low Accessibility: Low Security of supply: High Congestion: Low

Description of the channel

Joint Implementation (JI) allows Annex 1 countries to invest in projects that contribute to emission reduction and sustainable development in other industrialized countries. JI projects are granted Emission Reduction Units (ERUs) that can be traded with businesses, industries, or countries that are not meeting their own CO_2 emission targets nationally. In order to respect the overall emissions assigned, the JI host country is requested to convert an appropriate number of its issued Assigned Amount Units (AAUs) into ERUs and transfer them to the investing Annex I country.

As of December 2010, 406 JI projects and PoAs were in the pipeline, out of which 193 were registered, the majority of which were renewable energy, energy efficiency and methane reduction projects carried out in 'transition economies' such as Russia and Ukraine, and Eastern Europe.[61]

Type of support in transport

The project pipeline includes one ethanol and three biodiesel projects (one registered) in Bulgaria and Romania. Other transport project types are absent from the JI pipeline.

The limited application of JI projects in the transport sector is likely to arise from the difficulties regarding transport baseline methodologies as well as more generally the overall complexity of the transport sector. Similar to the CDM, the JI project procedure requires the estimation of emission reductions that would not have otherwise occurred in the absence of the project. The volume of emissions eligible for credits is the difference between the baseline and the emissions from the project activity. In order to avoid double counting, it is impossible to have a JI project at installations covered by the European Trading System.

[61] UNEP RISOE http://cdmpipeline.org/ji-projects.htm

Mitigation impacts

The total reduction of the transport-related projects in the pipeline (as in the PDDs) is 0.37 $MtCO_2eq/yr$. (UNEP/Risø, 2010). However, these projects are yet to be registered, and therefore the mitigation potential of JI in the transport sector is yet to be made clear.

Potential improvements to further support mitigation of transport emissions

Due to the relatively low demand for ERUs in general, JI is not likely to play a large role in reducing transport emissions, but to further enhance its role similar options as mentioned for the CDM could be beneficial.

Box 48: Procera Biodiesel Production Plant, Fundulea, biodiesel production and use for transportation in Romania

From: Project Design Document Form
Amount of Reduction: 72,083 tCO_2 eq. per annum

The purpose of the project activities is to produce biodiesel from virgin vegetable oil (produced in Romania) for substituting from petroleum diesel. The pure or blended diesel will be supplied to consumers within the host country borders, for the use in transportation sector. By using a blended biodiesel (20% biodiesel, 80% petroleum diesel) no modifications to existing vehicles will be required. Blending will be done by a third party (fuel distributor) bound to the producer to ensure that the blending proportions and amounts are monitored and meet all the regulatory requirements.

The reduction of Greenhouse Gas emissions (GHG) will be achieved by partially or fully replacing petroleum diesel in the Romanian transportation sector. The new biodiesel factory will be localized in the southeaster part of Romania, in the city of Fundulea. Its average output capacity is of 35 000 tonnes/per year.

6.4.6 Copenhagen Quick Start Finance

Type of channel	International	Support for A/S/I		Avoid Shift, Improve
Governance body	Non-EU	Feasibility	Donor acceptance	High
Target regions/countries	Developing Countries (Annex I)		Recipient acceptance	High
Amount (overall/ transport) annual	US$ 10 billion (€7.27 billion)/ not yet confirmed		Compatibility with UNFCCC	High
Type of support	• Finance (crediting) • Capacity building for the Copenhagen Funds. • Technological for the Technology Funds		Transaction costs	Low to High
Support for climate change mitigation	Mitigation specific	Mitigation impacts (ex ante/ex post)		insufficient data
Support for transport	Transport relevant	Cost effectiveness		insufficient data
Examples of supporting transport	• Support mitigation and adaptation of projects, programs and policies.	Main Co-benefits (environmental, social and economic impacts		Air quality: High Noise: Low Equity: Low Road safety: Low Accessibility: Low Security of supply: High Congestion: Low

Description of the channel

The Copenhagen Accord,[62] an outcome of the UNFCCC COP15 meeting in December 2009, detailed that developed countries would collectively provide approximately US$30 billion (€21.8 billion) in 'fast-start' aid for developing countries between 2010 and 2012 (for adaptation and mitigation). The need for short term finance was reiterated in the COP16 decision at Cancun, where developed country parties were invited to submit to the Secretariat information on resources for fast start finance (as well as long term finance) by May 2011, 2012 and 2013.

The Copenhagen Accord was not legally binding and there was no specified funding obligations for individual countries, but a number of countries stated their intentions to pledge commitment. This included the EU and its Member States, which as of December 2011 have collectively mobilised €2.35 billion of fast start finance, as part of its overall commitment to provide €7.3 billion for the period 2010-2012,

Around 44.7% of the overall funding is provided through bilateral channels, whereas the remainder is mobilised through multilateral channels such as the CIF, GEF, Adaptation Fund and so forth.

Of the resources mobilised in 2010, adaptation received around 35.9%, mitigation 45.6% and REDD+ 16%.

Type of support in transport

As of the end of 2010, only one transport project – a German funded project to improve urban transport in India - has been reported under quick start finance provided by EU and its Member States (See section on German ICI). Much of the fast start finance for 2011

[62] Accessible from http://unfccc.int/resource/docs/2009/cop15/eng/l07.pdf.

onwards is yet to be allocated, and so as a large emitter of GHG emissions internationally opportunities exist for the transport sector. Developing countries should therefore "raise their hands" and demonstrate the need for finance for mitigation activities in the land transport sector. This has already begun with the National Appropriate Mitigation Actions submitted by Non-Annex 1 Parties[63] to the UNFCCC, for support. As of September 2010, 26 of the 43 submissions explicitly referred to actions in the transport sector.[64]

Potential improvements to further support mitigation of transport emissions

To facilitate transparency, the EU could encourage the accounting and tracking of disbursements of Quick Start Finance through existing mechanisms, and analysing how much has been disbursed to the transportation sector specifically.

The EU could also ensure that its Member States provide support to the recipients to aid MRV efforts, so as to increase the possibility for them to receive support for MRV NAMAs in the future (see next section on NAMAs). As financing remains a key component of securing trust within the UNFCCC process, the EU may work to ensure the transparency of the disbursed amounts through Quick Start Finance, including for example information on the activities supported per sector. Such information would be useful to present in existing information channels, such as www.faststartfinance.org which was initiated by the Dutch Government.

The European Commission, whilst respecting the priorities and actions of each Member State, may help coordinate the efforts that are taking place under Quick Start Finance, so as to match recipient country demand against resources in crucial sectors including transport.

[63] Non-Annex I Parties are primarily developing countries and those most vulnerable to the potential economic impacts of responses to climate change. A list can be found at http://unfccc.int/parties_and_observers/parties/non_annex_i/items/2833.php.
[64] For the list of submissions see http://unfccc.int/home/items/5265.php. For an analysis, see Binsted et al. (2010), at: http://www.transport2012.org/bridging/ressources/files/1/913,828,NAMA_submissions_Summary_030810.pdf

6.4.7 Future Channel: Nationally Appropriate Mitigation Action (NAMAs)

Type of channel	International	Support for A/S/I		Avoid Shift Improve
Governance body	Non-EU	Feasibility	Donor acceptance	Potentially High
Target regions/countries	Developing Countries (Annex I)		Recipient acceptance	Potentially High
Amount (overall/ transport) annual	US$100 billion (€72.7 billion)/ not yet confirmed		Compatibility with UNFCCC	High
Type of support	• Financing • Capacity building • Technology transfer		Transaction costs	Unknown
Support for climate change mitigation	Mitigation specific	Mitigation impacts (ex ante/ex post)		Ex ante: likely to be very high Ex post: no data
Support for transport	Transport relevant	Cost effectiveness		No data
Examples of supporting transport	• Transport policy development • Infrastructure development	Main Co-benefits (environmental, social and economic impacts		Potentially: Air quality: High Noise: High Equity: High Road safety: High Accessibility: High Security of supply: High Congestion: High

Description of the channel

A key topic in the ongoing negotiations on the Post-2012 climate regime is on how to provide support for actions in developing (non-Annex 1) countries. A core concept in this regard is that of "Nationally Appropriate Mitigation Actions" which could either be:

- Voluntary (or unilateral) NAMAs: Taken up voluntarily by developing countries, without external support;
- Supported NAMAs: for which the industrialised countries are to provide support in terms of capacity building, technology transfer and financing; or
- Credited NAMAs: for which developing countries can receive credits through the carbon market (e.g. through CDM).

The Copenhagen Accord of 2009, which was a political statement "taken note of" by the Conference of Parties (COP) to the UNFCCC, contained provisions for the creation of a Copenhagen Green Climate Fund, whereby 'developed countries commit to a goal of mobilizing jointly $100 billion (€72.7 bn/yr) a year by 2020 to address the needs of developing countries. This funding will come from a wide variety of sources but 'a significant portion of such funding should flow through the Copenhagen Green Climate Fund'.

Building on the provisions within the Copenhagen Accord, the most recent climate summit (16th session of the Conference of Parties – or COP16 in Cancun) resulted in an agreement that developed countries would provide support for preparation and implementation of developing country NAMAs, and that a registry will be set up to match finance, technology and capacity building support to NAMAs seeking international support.

The establishment of a Green Climate Fund was also decided, which would initially be administered by the World Bank. The source and scale of the Fund is yet to be decided, and is likely to be a key issue for further negotiations in 2011 onwards.

Financing for NAMAs is likely to come from a mixture of sources, including public and private sources. Work was conducted by an Advisory Group on Climate Finance (AGF) convened by the UN Secretary General, which provided recommendations to the COP in late 2010. Revenue from international transport (aviation and maritime) was also suggested as a key source of finance.

Type of support in transport

Whilst both the Copenhagen Accord and the Cancun Agreement do not contain any specific provision for the transport sector, the NAMA framework, if designed properly, could support a range of support that is required in transport, including:

- Capacity building – e.g. for sustainable transport policy formulation, as well as the Measurement, Reporting and Verification (MRV) of transport sector emissions;
- Technology transfer - e.g. for public transport systems, clean vehicles and fuels, and non-motorised transport;
- Financing - e.g. for public transport infrastructure.

The analysis conducted by the 'Bridging the Gap' Initiative[65] shows that, if compared with the Kyoto flexible mechanism, the NAMAs channel could better integrate the transport sector into the climate change process. Indeed, 26 of the 43 countries that submitted NAMAs to the UNFCCC by September 2010 explicitly refer to the land transport sector[66].

Several of these countries have already started preparation of their transport NAMAs, for example Mexico, Chile and Argentina.

Mitigation impact

The mitigation impact (and cost effectiveness) of NAMAs are likely to be large, especially if they succeed in providing transformative changes in developing countries, for example through supporting integrated land use and transport policy, or the establishment of fuel and/or vehicle regulation.

Potential improvements to further support mitigation of transport emissions

To facilitate mitigation of emissions in the transport sector:

- Developing countries should be encouraged to include measures that address the transportation sector. Coordination among Ministries and Secretariats at national and sub-national levels can facilitate the conception and inclusion of transportation sector in the NAMAs submitted to the UNFCCC for registration.
- Finance for supported NAMAS should be done partially upfront, for example to cover capacity building, finance planning and technology transfer, as opposed to when emissions reductions are realized. Some funds can be allocated once emissions reductions have been verified to encourage accountability.

[65] Binsted,A,, Bongardt, D., Dalkmann, H. and Wenaere, M. (2010c) 'What's next: the outcome of the climate conference in Copenhagen and its implications for the land transport sector' Bridging the gap initiative. Dalkmann, H. and Binsted, A. (2010) 'Copenhagen Accord and NAMA Submissions, implications for the transport sector' Bridging the gap initiative, and Sethi, T and Binsted, A (2010a) Copenhagen Accord NAMA Submissions Implications for the Transport Sector -Addendum.
[66] See http://www.transport2012.org/bridging/ressources/files/1/828,NAMA_submissions_Summary_030810.pdf

- Financing should cover both barrier removal costs and capital costs, as needed. Guidance and facilitation should be provided to coordinate contributions from donors and different sources of finance, including private sector finance.
- A specific financing window for transportation should be considered since this sector is a large contributor to global GHG emissions, emissions reductions from transportation can be achieved in different timeframes from those in other sectors, and this sector presents specific MRV challenges.
- The source of financing for NAMAs could be further considered. The EU and its Member States may consider additional sources of funding for NAMAs, for example revenues from the sale of aviation credits within the EU-Emissions Trading Scheme (EU-ETS).
- When designing MRV requirements and methodologies, special attention needs to be given to the challenges and needs of the transportation sector, for example, difficulty in demonstrating additionality, establishing assessment boundaries, addressing suppressed demand and rebound effects.

6.5 Interpretation of findings on channels which can support the mitigation of transport emissions in non-EEA countries

There is no shortage of channels of support.

There are currently 16 channels available to European policy makers through which mitigation actions in the transport sector can be supported in non-EEA countries.

These are categorised under three groups in descending order of the influence of European policy makers, namely those for which:

- The European Commission has a major role in programming and implementation (hereafter "EC channels");
- The EU and its institutions and Member States, have a decisive role (hereafter "Other EU related channels"); and
- The influence of the EU and the EEA countries is indirect, but significant, namely channels implemented through international bodies and policy processes (hereafter "International channels").

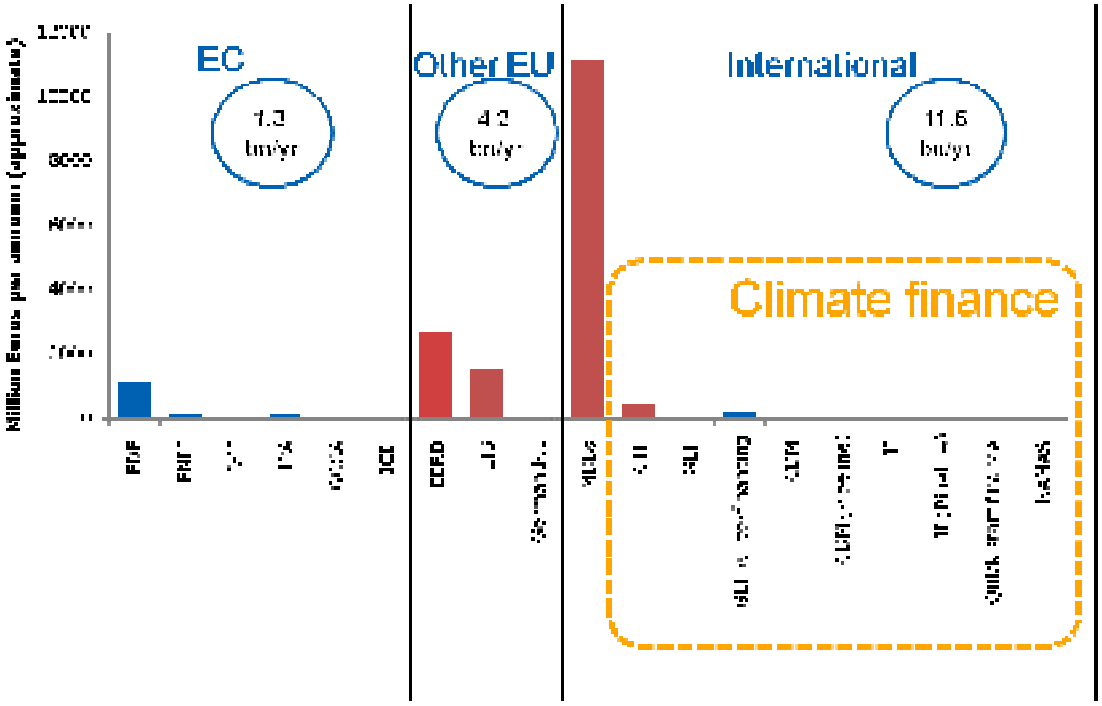
The key points of importance of these three groups of channels to EU policy makers is summarised in the table below.

Table 29: Key points of importance of the three groups of channels to EU policy makers

Group of policy	Why are they important to EU policy makers?
European Commission (EC) channels	- EC is the largest aid provider world wide - Large amount of resources involved (especially the European Development Fund - EDF) - Huge potential to cover transport in all aspects (capacity building, technology transfer and financing) and promote EU knowledge
Other EU channels	- EC has a very large influence on their activities - Very large sums of finance involved, especially through the European Investment Bank (EIB) and European Bank for Reconstruction and Development (EBRD)
International channels	- EU is a large donor to multilateral development banks (especially World Bank) who mobilise vast amounts of finance - EU is a proactive "agenda setter" for climate related instruments (and surrounding policies)

Significant levels of financial resources are available.

As shown in the figure below, approximately €1.3 billion per annum is provided via EC channels, €4.2 billion per annum from other EU channels, and a further €11.6 billion from international channels (mainly via multilateral development banks).



*Note: Red columns imply loan-based channels and cannot be directly compared with grant based channels

Figure 40: Levels of financial resources for the identified channels

Support provided collectively covers capacity building, technology transfer and financing.

Collectively, there is a range of channels that are suited for;

- Capacity building (e.g. for transport policy formulation, public transport management and overall institutional strengthening)
- Technology transfer (e.g. for rail and transport demand management)
- Financing including both;
    - Grants, to provide support to the least developed countries (e.g. road building in African countries) as well as to support capacity building and training programmes.
    - Loans, which are provided mainly for construction of large transport infrastructure in middle income and neighbourhood countries, especially road and rail infrastructure.

Already, these types of support are being blended for the support being provided by Europe across the world, for example by combining loans provided by EBRD or EIB with grants offered by EC channels such as the European Neighbourhood and Partnership Initiative (ENPI).

The orientation of support is generally towards supporting infrastructure for motorised private transport – whilst capacity building may be better served.

The emphasis on infrastructure for motorised transport is likely to encourage further motorisation, and hence emissions. Climate change mitigation does not feature in most of the instruments as a key objective, nor are the impacts on carbon measured for the interventions that are supported by these support mechanisms.

In future, all have the potential to provide more attention towards capacity building, e.g. strengthening institutions, providing courses (at dedicated academies and large universities) in sustainable transport, as well as investments towards sustainable (urban) transport.

EC channels are focused in supporting the African, Caribbean and Pacific (ACP) region, especially for improving and maintaining road infrastructure.

Support in the transport sector from EC channels is generally centred upon the European Development Fund (EDF), European Neighbourhood and Partnership Initiative (ENPI) and Development Cooperation Instrument (DCI). Regions supported by EDF (ACP countries) receive the majority of EC support in transport. Most of these resources are used to improve/maintain road infrastructure (most interurban) to support sustained economic growth. In the region supported by ENPI, the Neighbourhood Investment Facility supports investment projects for infrastructure. The DCI region (Asia and Latin America) has so far received limited interventions. Most of resources are targeted at improving roads, and to a lesser extent on air transport.

These are augmented by other channels such as:

- The EU-Africa Partnership on Infrastructure, which currently focuses on interurban roads, but in future may support the improvement of urban transport infrastructure (including those for non-motorised transport and public transport), as well as capacity building for the management/operation of public transport, logistics etc.
- Instruments for Pre-Accession Assistance (IPA) – which can be utilized to incentivise/support pre-accession countries to the EU to develop/harmonise databases and robust inventories for GHGs in the transport sector, and develop strong national and local policies for sustainable transport.
- Global Climate Change Alliance – which has the potential to support in future the adaptation of transport infrastructure, and developing transport methodologies for CDM/NAMAs applicable to Least Developed Countries.
- Instrument for Cooperation with Industrialised Countries - which has the potential to support knowledge and technology transfer between developed countries on sustainable transport policy formulation, public transport, clean vehicles and ICT technology.

Other EU channels focus on loans to support large investments in road and rail infrastructure, especially in neighbourhood countries.

The European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD) both provide large loans used for the building, expansion, maintenance and rehabilitation of transport infrastructure (mainly roads and rail). The EIB focuses its activities on South-East and Eastern Europe, Africa, Russia, Asia and Latin America, whereas EBRD targets Central Europe and Asia. Both have a large potential to support large infrastructure projects for public transport.

International channels are dominated in scale by multilateral development banks, which are starting to shift their funding towards sustainable transport, and measure the impacts of their investments on carbon.

The EU is a major contributor to multilateral development banks (MDBs). For example, the EU contributed €467 million to the World Bank in 2009. Contributions are also provided to regional banks such as the African Development Bank (AfDB), Asian Development Bank (ADB) and Inter American Development Bank (IDB).

Current financing in transport by MDBs is generally skewed towards road infrastructure. However, new initiatives are being taken by ADB (Sustainable Transport Initiative) to increase by 2020 the relative share of urban transport to 30% of its transport investments, and to measure the carbon footprint of its activities. The African Development Bank has also announced a window for sustainable transport within the mitigation part of the Africa Green Fund to be soon made operational. The EU can lobby for similar approaches in other MDBs, and consider mainstreaming such practices across all EC/EU channels.

Support via climate-specific channels available at the international level is small but growing.

The impact international climate funds are still limited (ca. 0.16 $MtCO_2eq$ per annum for the Clean Development Mechanism, and 13 $MtCO_2eq$ per annum for the Global Environment Facility – GEF, and the Clean Technology Fund – CTF combined).

However, there is the scope for the impact on GHG emissions to be much more substantial in future, if such instruments can catalyse changes in transport policy in the recipient countries. In addition, the Quick Start Finance provided in the context of the Copenhagen Accord - $10 billion per year for mitigation and adaptation - provides an opportunity for the EC to make a substantial and targeted impact on GHG emissions in non-EEA countries. EU Member States are a major donor to Quick Start Finance, mobilising €2.35 billion Euros in 2010 as part of its overall commitment to provide €7.3 billion for the period 2010-2012.

The emergence of NAMAs presents an opportunity to support the mitigation of transport emissions in developing countries.

26 out of 43 countries have so far announced their intention to carry out Nationally Appropriate Mitigation Actions (NAMAs) in the transport sector, in reaction to the Copenhagen Accord (see Binsted et al, 2010). Several of these countries have already started preparation of their transport NAMAs, such as Mexico, Chile and Argentina.

Developing countries have the opportunity to include measures that address the transportation sector. The financial framework to support NAMAs is starting to emerge, for example through the Green Climate Fund adopted as part of the Cancun Agreement at COP16 (2010). Financing for NAMAS can be made available partially upfront, to cover capacity building, finance planning and technology transfer, as opposed to when emissions reductions are realised.

There is fragmentation across the support channels.

This is partly a result of several EC Directorates providing support via different mechanisms. EuropeAid provides a co-ordinating function across the EC but that there this function could be improved. The link between EC, EU and international channels could also be strengthened, e.g. by harmonising goals, methodologies and procedures.

Box 49: Key findings on channels which can support the mitigation of transport emissions in non-EEA countries

- There is no shortage of channels of support – with 16 instruments available at either European Commission, European Union or International level.
- Significant levels of financial resources are available, with nearly €5.5 billion per annum provided from EC and other EU instruments, and a further €11.6 billion from international instruments (mainly via multilateral development banks).
- The elements of support are there, including capacity building, technology transfer and financing (both grants and loans).
- The orientation of support is generally towards supporting infrastructure for motorised private transport.
- EC instruments are focused in supporting the African, Caribbean and Pacific (ACP) region, especially for improving and maintaining road infrastructure.
- Other EU instruments focus on loans to support large investments in road and rail infrastructure, especially in neighbourhood countries.
- International instruments are dominated in scale by multilateral development banks, who are starting to shift their funding towards sustainable transport, and measure the impacts of their investments on carbon.
- Support via climate-specific instruments available at the international level is small but growing.
- The emergence of NAMAs presents an opportunity to support the mitigation of transport emissions in developing countries.
- There is fragmentation across the support instruments.

SECTION IV: Conclusions and Recommendations for the EU

7 Conclusions

In recognition of the need to enhance actions in the transport sector both within and outside of Europe, this study aimed to:

- Provide a comprehensive understanding of policies being enacted outside the EEA to reduce the climate impact of the transport sector, some of which could be transferred to EEA countries, and
- Seek information on possible channels available to the EU to support the mitigation of GHG emissions from transport in non-EEA countries.

These objectives were met through two main tasks:

1. A review of transport mitigation measures in 20 non-EEA countries by key transport and climate experts.

The review aimed to provide a comprehensive understanding of policies within these 20 countries, which mitigate emissions in the transport sector. A range of information was collected including the type of policy (planning, economic, regulatory, information, technology) and the main actors involved in implementing them. The identified policies were then assessed in terms of their:

- Ability to support the "Avoid, Shift or Improve" strategies
- Effectiveness at mitigating carbon (both through reducing motorised transport; activity and improving emission factors of vehicles and fuels);
- Cost effectiveness;
- Broader co-benefits (especially with regard to the creation of green jobs);
- Key barriers towards implementation;
- Transferability to other parts of the world; and
- Requirements for international support.

2. Identification of channels that the EU could utilise to support transport emissions reduction in non-EEA countries

Ways in which the EU and its Member States (as developed countries) can support the mitigation of transport emissions in non-EEA countries were explored. It involved the scoping of potential channels to support the reduction of GHG emissions from transport in non-EEA countries, the assessment of such channels, and the development of recommendations for the EU in ensuring that such support can be implemented in an effective manner.

The detailed findings of these two tasks are provided in Section 0 (for Task 1) and Section 6.5 (for Task 2).

In conclusion, the review of 20 countries found that:

- There is a diverse set of policies available to policy makers to mitigate transport emissions.
- A few countries have effective policies to tackle freight – a largely neglected subsector.
- Policies at local level have the potential to change behaviour, whilst national policies have a large potential to change technology.

- A large proportion of transport mitigation policies are highly cost effective, and also cost negative – either for households, government budgets, or both.
- The majority of transport mitigation policies deliver positive economic impacts.
- Most policies to address climate change also deliver other environmental and social benefits.
- Most policies are free from any technical, political or institutional restrictions to their implementation.
- The majority of policies are transferable to EEA countries.
- The majority of policies in non-Annex 1 countries can benefit from three types of support: capacity building, financing and technology transfer.

The review of support mechanisms identified that:

- There is no shortage of channels of support – with 16 instruments available at either European Commission, European Union or International level.
- Significant levels of financial resources are available, with €1.3 billion per annum provided via EC channels, €4.2 billion from other EU channels, and a further €11.6 billion from international channels (mainly via multilateral development banks).
- The elements of support are there including capacity building, technology transfer and financing (both grants and loans).
- The orientation of support is generally towards supporting infrastructure for motorised private transport.
- EC instruments are focused in supporting the African, Caribbean and Pacific (ACP) region, especially for improving and maintaining road infrastructure.
- Other EU instruments focus on loans to support large investments in road and rail infrastructure, especially in neighbourhood countries.
- International instruments are dominated in scale by multilateral development banks, which are starting to shift their funding towards sustainable transport, and measure the impacts of their investments on carbon.
- Support via climate-specific instruments available at the international level is small but growing.
- The emergence of NAMAs presents an opportunity to support the mitigation of transport emissions in developing countries.
- There is fragmentation across the support instruments.

Considering the outcomes of the two tasks jointly, the project identified that there is both the demand by non-EEA countries (in particular developing countries) and supply (by European and multilateral channels) for supporting mitigation actions in the transport sector, which when appropriately matched, is likely to lead to the required upscaled actions in the transport sector.

Figure 41: The demand and supply for support in transport mitigation actions

Representative types of support being demanded and supplied are shown in the table below. As shown in section 4.6, supporting these policies and interventions allow for the reduction of technical, political and institutional barriers that are generally attached to them.

Table 30: Representative types of support being demanded and supplied

	Demand	Supply
Capacity building	• National/urban transport plans/strategies • Implementation of fuel taxes, congestion charging and other economic instruments • Legislation/regulations on climate change, air pollution, fuel/vehicle standards etc. • Transport demand management measures, including parking policy formulation • Planning for non-motorised transport • Urban public transport operation • Maintenance of transport infrastructure	• EDF, ENPI and DCI providing capacity building in key areas of transport policy which could be expanded to cover low carbon transport components • Multilateral development banks increasingly providing capacity building and technical cooperation in sustainable transport. • GEF, CIF and other climate instruments providing capacity building elements • Future NAMA framework likely to support capacity building in transport sector
Technology transfer	• Alternative fuels • Low emission vehicles • Technologies surrounding rail transport (including high-speed rail) • Urban public transport technologies	• ENPI and other EC channels that support technology transfer, particularly in neighbourhood countries • ICI has potential to support technology transfer between industrialized countries • Future NAMA framework expected to include a technology mechanism
Financing	• Public transport and non-motorised transport infrastructure • New/replacement vehicles (for road) and rolling stock (for rail) • Financial resources to enable capacity building	• Grants provided by EC channels such as EDF, ENPI, DCI and IPA, especially in Africa (for road construction and maintenance) and in neighbourhood countries (for rail and road infrastructure) • Large levels of loans provided by EIB and EBRD, as well as multilateral development banks for transport infrastructure. Investments starting to shift towards sustainable modes. • Climate finance (such as CTF and GEF) increasing in scale and scope, and utilized for transformative activities such as formulation of sustainable urban transport plans and capacity building.

The appropriate matching of this demand and supply will be supported through the recommendations provided in the next chapter of this report.

8 Recommendations

In view of the findings of the T-MAPPER study, there are a number of actions that EU policy makers may take, to;

1. Further accelerate the mitigation of transport GHGs within the EEA, and
2. Further support transport mitigation actions outside of the EEA.

These actions are listed in the following two sections.

8.1 To further accelerate mitigation of transport GHGs within the EEA

In view of the findings from the review of policies in 20 countries, the following recommendations can be made for EU policy makers in transport (DG-MOVE) and climate (DG-CLIMA).

Transport policy makers (DG MOVE) may:

Transport policy objective	Recommendation
Include mitigation as a core objective.	Consider including climate mitigation as a core objective embedded within the new Transport White Paper.
Provide policy guidance to Member States on the options to mitigate emissions from transport.	Include information on the likely costs and benefits of different policies, barriers to implementation, potential negative side effects and case studies providing examples of effective implementation to support action. The guidance provided could be tailored to the right level of governance - for example there is the need to focus on the local/regional as well as national level as many transport mitigation policies, particularly those that are effective at supporting behaviour changes, are applied locally rather than nationally.
Measure the carbon footprint of transport investments, and use this as a key criterion for investment decisions.	Ensure progress and outcomes on carbon mitigation are monitored effectively, for example through a requirement for ex-ante and ex-post carbon footprinting for transport projects financed by the EC/EU. This could build on processes being developed internationally, for example by the Asian Development Bank to measure the carbon impacts of its investments.
Identify gaps in transport policies that need to be closed, in order for the EU transport sector to meet contribute to overall mitigation targets.	Conduct a gap analysis of the areas of transport policy which has so far been neglected in Europe in light of climate change mitigation, for example the freight sub sector. Categorise these by level of implementation – EU wide, Member State, or local to aid their future implementation.

Support action in the freight sector.	Facilitate research and implementation of mitigation actions in the freight sector, building on good practice identified in countries such as in Japan. Consider building on existing initiatives such as the MARCO POLO initiative to provide required support, especially in areas of green logistics, fleet management, driver training etc. Tailor the support to cover both inter-city and inner-city freight providers.
Generate green jobs most effectively.	Support investments that create green jobs, for example public transport infrastructure and operations whilst reducing emissions from transport.
Pursue the most cost-effective solutions.	Support policies that maximise saving to the public and private sector such as eco-driving, fleet management and green procurement.
Correct for distorted transport prices.	Support congestion charging and higher parking charges in congested urban areas.
Raise revenue to actively support low carbon transport.	Promote policies such as vehicle licensing, congestion or parking charges and explore options for ring-fencing revenue for investment in sustainable transport infrastructure.
Support the development of legislation on vehicle and fuel standards.	Highlight effective policies such as Japan's 'Top Runner Standards' and support their implementation in the EU context, so that standards are always aligned to the best available technology.
Disseminate good practice from non-EEA countries.	Consider expansion of existing initiatives such as CIVITAS to cover non-EEA countries and supporting twinning arrangements.

Climate policy makers (DG CLIMA) may:

Climate policy objective	Recommendation
Catalyse actions on climate change in the transport sector by Member States	Build capacity and raise awareness, for example through developing a capacity building programme (covering governance, road safety, climate change etc and the inter-correlation between the different issues).
Coordinate actions with transport policy makers in specific areas most relevant to climate negotiations.	Strengthen the collaboration with transport policy makers in fields which are particularly relevant for climate policy, including on aviation and maritime emissions.

Box 50: Key recommendations to further accelerate mitigation of transport emissions within the EEA

There are many opportunities for the EU policy makers to utilise good practice and experience form non-EEA countries to catalyse action in EU Member States.

Transport policy makers (DG-MOVE) may focus its efforts to:

- Develop a sectoral policy framework that includes climate mitigation as a core objective.
- Provide policy guidance to Member States on the options to mitigate emissions from transport.
- Measure the carbon footprint of transport investments, and use this as a key criterion for investment decisions.
- Identify gaps in transport policies, via a gap analysis, with respect to actions for climate mitigation.
- Choose policies that generate green jobs, whilst maximising emissions reductions, for example investments in public transport infrastructure and operations.
- Pursue the most cost-effective solutions, which maximise savings to the public and private sector including eco-driving, fleet management and green procurement.
- Correct for distorted transport prices via implementation of e.g. congestion charging and higher parking charges in urban areas.
- Raise revenue to actively support low carbon transport, e.g. from vehicle licence plate auctioning, congestion charging and parking charges.
- Support the development of legislation on vehicle and fuel standards, learning from Japan's Top-Runner Standard method.
- Support the dissemination of good practice from non-EEA countries, e.g. via expansion of CIVITAS to non-EEA countries.
- Support action in the freight sector which has so far been largely neglected.

Climate policy makers (DG-CLIMA) may:

- Provide policy guidance to Member States on how to mitigate transport emissions.
- Catalyse actions on transport mitigation via capacity building programmes.
- Coordinate actions with transport policy makers in areas such as aviation.

8.2 In supporting transport mitigation actions in non-EEA countries

In view of the findings on the current support channels available to European policy makers, recommendations can be provided to;

- Development policy makers (DG-Development, DG-External Relations, DG-EuropeAid) – utilising its position as one of the largest aid providers in the world.
- Climate policy makers (DG-CLIMA) – using its large influence on climate policy.
- Transport policy makers (DG-MOVE) – using its wealth of sectoral expertise.

Development policy makers (DG Development/DG External Relations/DG EuropeAid) may:

Topic	Specific Recommendations
Reorient development policies and promote sustainable development	• Recognise that transport is a key sector for sustainable development, and ensure a prominent position of the sector within the development goals of future EU development policy (i.e. in the Green Paper on European development policy[67]) • Ensure sustainability criteria are at the centre of policy making. Account for carbon in all projects / programmes supported through EU/EC channels. Follow (and surpass) ADB's lead in this regard. • Reorient /earmark assistance towards support for sustainable transport, specifically: o Infrastructure for public transport; o Technology; o Transport Demand Management; and o Land use planning. • To this end, create: o Sustainable transport windows/funds/initiatives under EC/EU assistance channels that specifically support sustainable transport, following the example of the ADB's Sustainable Transport Initiative. o Transport windows within climate oriented funds/mechanisms within EC/EU development instruments o A stream of resources from the EU-Emissions Trading Scheme (EU-ETS) that would invest part of the revenues from the sale of credits to the aviation sector for use in supporting sustainable transport in developing countries. • Differentiate the type of support by the level of development of the recipient country. Least Developed Countries would require financing (grants), whereas Medium Income and Emerging Economies may require loans. All countries would require capacity building and technology transfer, albeit at different scales and levels.
Ensure Inclusiveness	• Reorient support towards providing access, not traffic. • Support the development of non-motorised and public transport, especially in urban areas. This will support emission reductions and ensure inclusivity as the majority of developing country citizens do not (will not) have a car, even in 2030. • Combine support for infrastructure with services (e.g. the provision of road infrastructure in parallel with improvements to logistics).
Ensure high impact/ leverage	• Leverage changes in Multilateral Development Banks (MDBs), using the EC/EU's influence as a key stakeholder. For

[67] EU development policy in support of inclusive growth and sustainable development: Increasing the impact of EU development policy. Available at: http://ec.europa.eu/development/icenter/repository/GREEN_PAPER_COM_2010_629_POLITIQUE_DEVELOPPEMENT_EN.pdf

	example, support the mainstreaming of carbon footprinting in the decision making processes of MDBs. • Leverage further financial resources from the private sector, for transport infrastructure and operations. • Leverage changes to domestic policies by increasing support for capacity building, for example in: o Financing sustainable transport, utilising lessons learned from Road Funds to create a "sustainable transport fund" in non-EEA countries, which would help secure a stream of funding. o The management and operation of public and non motorised transport systems. o Transport Demand Management o Integrated transport and land-use planning o The measurement, reporting and verification (MRV) of greenhouse gases in the transport sector (through supporting e.g. a "Transport Data Initiative") • Capacity building could be facilitated by setting up "Centres of Excellence" and/or "sustainable transport academies", for each region, or by theme.

Climate policy makers (DG Climate Action) may:

Topic	Specific Recommendations
Make available quick start finance for sustainable transport	• Promote a transport window under quick start finance, and facilitate the actions of EU Member States in their support for sustainable transport. • Encourage developing countries to "raise their hand" for quick start finance in transport (for example via acting as a Facilitation agency)
Make available long term finance for sustainable transport	• Promote a transport window within the proposed Green Climate Fund under the UNFCCC, to support; o The formulation of transport NAMAs; o Capacity building, especially on MRV; o Project implementation; • Link such support to Millennium Development Goals (MDGs) and other relevant EU programmes.
Promote reform of carbon market	• Promote the reform of existing carbon markets such as the CDM to include transport, using its CER buying power. • Promote the further upscaling of carbon markets, e.g. using programmatic and sectoral approaches. • Engage in the dialogue on standardised baselines for which consultations will occur in 2011, under the UNFCCC SBI[68].

[68] At the COP16 in Cancun, it was decided that under CDM, standardized baselines should be developed, as appropriate, inter alia, for energy generation in isolate systems, transport and agriculture. It is envisaged that the UNFCCC secretariat will organize a workshop on transport and CDM in the middle of 2011. In the run-up to this decision, the Transport Research Foundation (TRF) submitted recommendations for methods of standardisation

	• Ensure that climate finance is used for transformative interventions, for example capacity building for sustainable transport, data collection, MRV and policy formulation.
Develop transport-compatible MRV methodologies	• Support the development of additional transport methodologies for CDM, CTF, GEF and NAMAs, under a "Transport MRV Initiative".
Place a price on transport carbon and stimulate sector-wide changes	• Push for removal of fossil fuel subsidies, through support for the initiative taken up by the G20. • Ensure that prices for biofuels reflect their overall environmental/carbon footprint.
Coordinate the different streams of support relevant to climate mitigation	• In order to avoid fragmentation of climate and development funding, as well as the financial flows at local, national and international level, DG-CLIMA, together with other DGs could promote coherence among the various bilateral and global funds and support a greater involvement of recipient countries in the funding formulation.

Transport policy makers (DG MOVE) may:

Topic	Specific Recommendations
Leverage change in transport policy in other parts of the world	• Work with other governments to mainstream EU standards on vehicles and fuels across the world (either through existing bodies such as the International Transport Forum, or through a new multilateral body.) • Share expertise in transport planning, public transport operations, TDM etc through a global version (or regional versions) of CIVITAS.
Bridge the gap between transport and climate policy	• Work with DG-CLIMA to support the development of transport NAMAs and MRV methodologies.

which can help improve the efficiency, applicability and environmental integrity of CDM in the transport sector. See: http://unfccc.int/resource/docs/2010/smsn/ngo/185a.pdf

Box 51: Key recommendations on supporting transport mitigation actions in non-EEA countries

There are many opportunities to EU development, climate and transport policy makers to take action to support the reduction in transport emissions in non-EEA countries.

Development policy makers may:

- Ensure inclusiveness by reorienting support towards non-motorised and public transport, especially in urban areas, coupled with support for technology, TDM and land-use planning.
- Promote sustainable investments by ensuring that all activities by EC/EU instruments are assessed in terms of their carbon impacts.
- Leverage changes in MDBs to ensure that carbon footprinting is mainstreamed.
- Leverage changes to domestic policies by providing capacity building in financing mechanisms (e.g. a "sustainable transport fund"), management/operation of public and non-motorised transport, TDM, land use planning and MRV of GHGs in the transport sector.
- Consider the creation of "centres of excellence" and/or "sustainable transport academies" for each region, or by theme.

Climate policy makers may:

- Secure quick start finance for sustainable transport via promoting a transport window and increasing recipient appetite for actions in transport.
- Secure long term finance for sustainable transport via promoting a transport window within the future UNFCCC climate fund.
- Promote the reform of the carbon market via supporting the development of new transport methodologies for transport, and promoting programmatic and sectoral approaches.
- Push for the removal of fossil fuel subsidies and ensure prices for biofuels reflect their true environmental costs.

Transport policy makers may use their sectoral expertise to:

- Streamline EU standards on vehicles and fuels across the world.
- Share expertise in transport planning, public transport and TDM.
- Develop transport compatible MRV methodologies and support the development of transport NAMAs.

9 Outlook for the future

In order to fully implement the recommended actions, the following steps are required for further investigation and analysis.

To better understand how the EU may implement those measures employed in non-EEA countries to meet its own climate mitigation targets and contribute to green growth;

- Explore measures and policies across a wider range of countries not covered by the current review of 20 countries. Expand the database developed by T-MAPPER to cover a larger set of countries.
- Explore more in detail at what level of EU policy making the identified policies may be introduced, e.g. at EU-wide, Member State or local government level.
- Identify in particular which particular Member States / local governments within the EU can most benefit from the transfer of non-EEA policies identified by this review. In parallel, explore Member State/ locally specific barriers that may hinder the effective transfer of non-EEA policies.
- In view of the economic climate and limited government budgets, explore in particular how the cost-saving measures identified within this review can be rapidly deployed within the EU.
- In view of supporting green growth, empirically model the impacts of the identified transport policies on economic growth, especially green jobs.

To better understand how the EU may assist non-EEA countries in taking mitigation actions in the transport sector even further:

- Investigate what other policies being adopted by non-EEA countries are working in the opposite direction to carbon reduction (i.e. posing barriers) and how such policies are financed. Identify how the EU can help reduce such barriers.
- Model the impacts of current EU support in the transport sector (through all the channels identified) on GHGs. Utilise tools used already by e.g. the Asian Development Bank, to calculate the carbon footprint of EU support activities.
- If there is sufficient available data, undertake ex ante and ex post impact studies of a selection of measures to identify those intervention that are most effective in addressing climate change and promoting green jobs in non-EEA countries.
- In cases where data is not sufficiently available, identify how the EU can support data collection and monitoring through its capacity building efforts, which in the long run would also enable MRV NAMAs to be formulated in the recipient countries.
- Identify measures that would most effectively involve the private sector, especially from the investment community, to become involved directly in the financing of climate change measures in non-EEA countries.
- Investigate the impact that the adoption of the polluter pays principle in transport in non-EEA countries would have upon travel behaviour, carbon emissions and employment in green jobs.
- Enquire into how many of the planned policies in non-EEA countries will actually be implemented and the impact that this will have on their carbon emissions.

Periodically monitor the situation regarding the policies that were identified in the review, to see how ―planned policies actually become implemented, and also to identify how international support (if given) has supported their implementation.

- Investigate what the EU can do to systematically learn and transfer best practice across countries, particularly those where the governance structures are less stable.
- Commission detailed research into other developing countries, either individually or region specific, to further understand the mechanisms by which finance is being applied to address carbon emissions and to identify how the EC can best contribute on a case by case basis.
- Utilise the methodology that has been developed under T-MAPPER to further explore policies in specific regional such as Africa and support the development of tailored programmes of support

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Shanghai, China. Photo Copyright Ko Sakamoto

ANNEXES

Appendix A Country case studies

This appendix provides further information on the 20 countries that were reviewed in the T-MAPPER project, in a concise, two page format per country.

It aims to outline;

- The background of each country in relation to its transport and climate policies,
- The key policies that are successful in mitigation potential and transferability- both of which are key to this project,
- Cases of good practice, and
- The key areas that the country could either help to provide to other countries, or areas that they can benefit from.

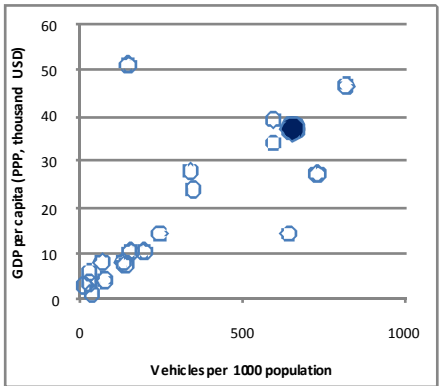
The criteria used in determining which policies to highlight, were mitigation potential and secondly, transferability, based on the individual country reviews.

The country summaries are designed to be a clear overview of the reviews and allow comparison with other countries.

Australia

Country characteristics		Transport Statistics	
Population (thousands)	21,874	Total road sector energy consumption (ktoe)	124,068
Size (sq km)	7,692,024	Car ownership (a) (per capita)	653
GDP/capita (PPP,USD)	41,362	Road density (km roads/km^2 land area)	0.11

Data source IRS, 2007.



Key trends in the transport sector

Australia has an extensive network of road, rail, sea, air, and pipeline transportation. Road, rail and air transport have an increasing market share, with declining shipping and river transportation. Much of the investment over the past 50 or so years has been in road infrastructure, with a much smaller share of investment in waterways and rail. Without Government support, Australian shipping for international trade is now non-existent. Airports are publicly owned and operated and receive steady capital investment.

Current trends in urban transportation show an increased investment and travel away from road transport (for passenger and, to a lesser extent, freight transport) towards rail, bicycles and walking. There is also an emphasis in investments in improved vehicle technology, quality service and security levels in public transport, increased bicycle and walking precincts and improved freight connectivity.

The Federal Government has highlighted their commitment to climate policy, by designating a Department of Climate Change, and has planned to implement a Carbon Pollution Reduction scheme which involves emissions trading. Australia's ETS scheme is on hold until at least 2013.

Representative mitigation policies / measures with high potential to deliver reductions in transport GHG emissions

Policy/measure	Explanation (brief)	Status
New South Wales Greenhouse plan	The NSW government has undertaken a plan to increase reliability, capacity and improve service frequency on the Sydney metropolitan rail network and extend the clean car benchmark program.	**Current**
Rail Clearways Program	The NSW government has implemented a program to improve capacity and reliability on CityRail's Sydney suburban network.	**Current**
Tackling climate change - government action plan	This action plan includes provisions for reducing trip lengths and the need for motorised travel; promotes more sustainable travel behaviour, improves vehicle and fuels emissions performance, and shifts transport demand towards lower GHG emission modes across the whole country.	**Current**
Sustainable transport energy for rail	Expanded and invested in the Perth passenger rail network (including the new Mandurah rail line).	**Current**
Sustainable transport energy for buses	All new buses purchased in Perth (Transperth) are fuelled by CNG to reduce dependency on conventional fuels.	**Current**
Green taxi fleet for Perth	The Perth regional government has introduced environmentally friendly petrol- electric hybrid vehicles or "green taxis" into Perth's taxi fleet.	**Current**

Good practice

Green car innovation fund
The primary objective of this policy is to reduce fuel consumption and GHG from passenger vehicles. AUD 1.3 billion has been allocated over 10 years to Australian companies for projects to enhance R&D and commercialisation of technologies, in order to significantly reduce fuel consumption & GHG emissions from cars. Grants are provided at a ratio of $1 of government funding for every $3 of eligible expenditure, which are contributed by the grantee. Such schemes are good examples of how governments can leverage the private sector to fully contribute to mitigation efforts.

International contributions

Finance

Australia possesses the internal capacity to finance most of its projects. It may contribute to global efforts, e.g. by taking a lead in supporting NAMAs in developing countries, and setting up emission trading schemes that cover transport.

Capacity Building

Australia can provide capacity building support in areas such as:

- Development of low-carbon development plans
- Establishing national MRV schemes
- Improvement in Rail efficiency
- Planning and implementing alternative fuels and vehicle technologies in bus and taxi fleets

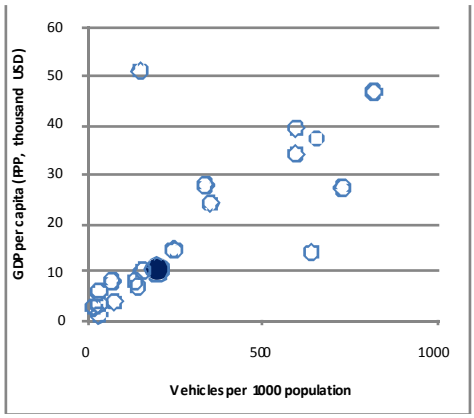
Technology Transfer

Australia may provide expertise gained in the implementation of alternative fuel technologies for buses and taxis to other countries.

Brazil

Country characteristics		Transport Statistics	
Population (thousands)	192,304	Total road sector energy consumption (ktoe)	235,556
Size (sq km)	8,514,876	Vehicle ownership (a) (total cars/1,000 pop)	198
GDP/capita (PPP,USD)	9,273.44	Road density (km roads/km2 land area)	0.20

Data source IRS, 2007.



Key trends in the transport sector

84% of Brazil's population live in urban areas. Congestion is affecting most of the metropolis and is already considered as one of the key urban problems. By the end of the 1970´s Brazil had a leading role in high-flow bus priority systems. Now the momentum and potential for urban transport projects is building with the PAC for Mobility - the plan to accelerate the growth - and the selection of 12 Brazilian cities to host the 2014 FIFA World Cup. The tournament offers an unprecedented opportunity to upgrade transit systems, renovate urban public spaces and attract transit-oriented development along major transit corridors.

The Interministerial Commission on Climate Change (CIMGC), composed of nine ministries and headed by the Ministry of Science and Technology, was established in 1999 for the purpose of co-ordinating governmental discussions on the theme. Though CIMGC deliberates on government policies, it welcomes the involvement of all stakeholders and representatives of civil society. Indeed, the Brazilian government encourages wide and inclusive debate as a key element for addressing the issue of climate change, and the level of participation of civil society has increased significantly.

Brazil is developing a national plan to combat climate change in addition to actions already in place, which include extensive reliance on renewable energy for electricity production. In the transportation area, in the past 30 years, Brazil has been using sugar cane for automotive fuels and is a leading producer of biodiesel.

Mitigation policies/measures with high potential to deliver reductions in transport GHG emissions

Policy/measure	Explanation (brief)	Status
National Policy on Climate Change	The Plan defines concrete actions and measures aimed at emissions mitigation and adaptation to climate change.	**Current**
Light Rail Transit and Monorails for the WC2014	This policy aims to develop LRT for the integration of Airports to World Cup stadium, city centre or hotel sector, financed by national and international loans.	**Planned**
High speed rail RIO-SP	This involves developing high speed rail linking main airports of Rio and Sao Paulo.	**Planned**
National Fund for Climate Change	The fund is the first in the world that aims to use profits from oil companies to invest in studies and projects to prevent and mitigate climate change (from 2011 on).	**Planned**
UNICA	UNICA is the largest representative organization of sugar-cane and ethanol in Brazil which aims to consolidate ethanol as a global commodity in transportation sector.	**Current**
Transport project	This involves improvement of environmental performance: reduction of emissions, use of cleaner technologies, maintenance of vehicles, and public awareness on a national scale.	**Current**

Good practice

Federal investments in public transport in World Cup 2014 cities

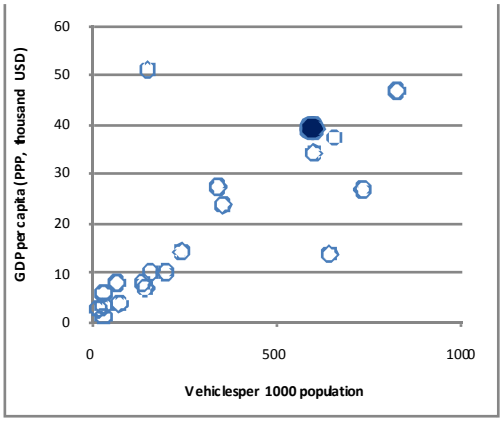
Brazil is investing in public transport in many of the cities that host the World Cup games in 2014. For example, light rail transit and monorails are being constructed to improve access from the airport to World Cup stadiums, city centres or hotel sectors. Furthermore, BRT and bus routes are being improved in cities across Brazil These would be financed by national and international loans (Brasilia, Fortaleza, Manaus, São Paulo). This is a good example of how a major event can catalyse sustainable transport.

International contributions

Finance	Capacity Building	Technology Transfer
Brazil would benefit from financial support in the development of comprehensive urban mobility strategies and in the implementation of projects like BRT and High Speed rail. It may contribute to global efforts to fund and promote biofuels/renewable energies.	Brazil would benefit from capacity building in areas such as: • Controlling the use of motorbikes • Congestion pricing and parking policies • Improving efficiency of freight transportation in urban environments • Establishing vehicle Inspection and Maintenance schemes • Accessing carbon funds and the carbon market • Implementing public-private partnerships Brazil can provide capacity building in public transportation design and implementation, and on biofuel friendly policy schemes.	Brazil may support other countries in biofuels and renewable energies.

Canada

Country characteristics		Transport Statistics	
Population (thousands)	33,478	Total road sector energy consumption (ktoe)	269,369
Size (sq km)	9,984,670	Vehicle ownership (a) (total cars/1,000 pop)	597
GDP/capita (PPP,USD)	38,400	Road density (km roads/km2 land area)	unknown



Data source IRS, 2007.

Key trends in the transport sector

With around 80% of trips being made by car, Canada is primarily an auto-oriented country. However, over the past 20 years, local governments have been developing alternative transportation plans, such as the Ottawa TransitWay Bus Rapid Transit (BRT) system which is one of the largest in North America, or the Toronto Bike Share program. According to the Canadian Census, the average travel distance to work has increased by almost 9% between 1996 and 2006, while the share of people driving to work has declined by about 1%. During the same period, use of carpools and transit has increased by 0.9% and 0.8% respectively.

One of the top current priorities is updating vehicle emissions standards. In April 2010, Environment Canada announced it was updating existing regulations to align them with the new US Corporate Average Fuel Economy (CAFE) standards, effectively creating a single US-Canada standard. At the local level, city agencies are promoting alternative transportation, developing Bus Rapid Transit (BRT) systems, as well as bike sharing programs and pedestrian and bike walkways.

The Canadian government is committed to reducing GHG emissions by 17% from 2005 levels by 2020. It aims to achieve this goal through different policies, including an effort to have 90% of the country's electricity from non-emitting sources by 2020, introducing new regulations to limit GHG emissions from vehicles, and advancing the Clean Energy Dialogue with the US Administration. It covers GHG emissions from vehicles by setting vehicle emissions standards.

Mitigation policies/measures with high potential to deliver reductions in transport GHG emissions

Policy/measure	Explanation (brief)	Status
New Vehicle Emissions Standards	A new set of vehicle emissions standards, harmonized with those in the US, effectively creating a single US-Canada standard was announced in 2010.	**Current**
Motor Vehicle Safety Act (MVSA)	The MVSA was the first attempt from the Canadian government to regulate vehicle emissions.	**Current**
Excise Tax on Fuel Inefficient Cars	The tax applies to vehicles that have an average consumption of more than 13 litres/100 km (18mpg).	**Current**
Green Municipal Fund (GMF)	The GMF offers loans at below market rates and grants to municipalities for sustainable community plans or projects.	**Current**
Aviva Autograph Pay-as-you-drive auto insurance	Aviva Autograph is a program that offers drivers the possibility to lower their insurance premiums by up to 25%.	**Current**
New Deal for Cities and Communities	This is a provision of the 2005 Canadian federal budget that allows gas tax revenue sharing between the federal government and local governments, on a per capita basis, and also increases funding for infrastructure projects and Green Municipal Funds.	**Current**

Good practice

Green Municipal Fund (GMF)

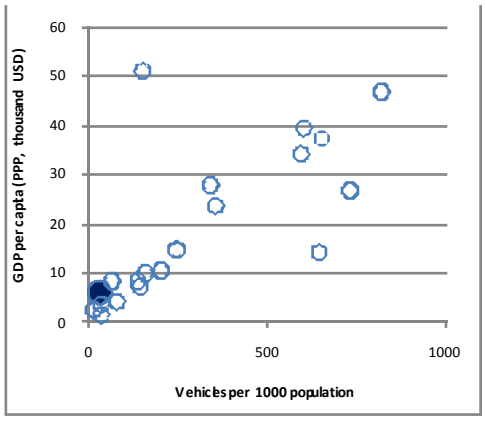
The primary objective of this was to provide funding for municipal initiatives that benefit the environment. The GMF offers loans at below market rates and grants to municipalities for sustainable community plans or projects. Transportation projects are eligible for loans of up to $4 million (CAN) and grants of up to $400,000 (CAN) if planners and local officials can demonstrate that the projects will benefit the environment. Each project must have clear sustainability goals (e.g. 10% GHG reduction from transportation in a given city); indicators (e.g. reduction in fossil fuel consumption) and data collection methods (e.g. fuel sales).

International contributions

Finance	Capacity Building	Technology Transfer
Canada may contribute to global efforts by providing funding.	Canada can provide capacity building: • Development of sub-national funding mechanism • Implementation of bicycle path and public transportation systems • Establishment of vehicle emission standards and taxes	Canada does not experience any technological constraints

China

Country characteristics		Transport Statistics	
Population (thousands)	1,325,640	Total road sector energy consumption (ktoe)	1955,766
Size (sq km)	9,327,430	Vehicle ownership (a) (total cars/1,000 pop)	32
GDP/capita (PPP,USD)	5,962.70	Road density (km roads/km2 land area)	0.36



Data source IRS, 2007.

Key trends in the transport sector

China has undergone rapid globalisation in the past 30 years, and alongside, there has been urbanisation, and greater market integration. The impressive construction of a comprehensive road transport system has facilitated and supported the rapid economic growth in the country. At the same time, highway transport (in both passenger and freight transport sectors) relies on land and energy resources and exert great impact to the environment. This has also happened in railways, and maritime transport sectors.

Policy making focuses on financial and tax policies to encourage the development of energy-saving and environmentally-friendly vehicles, and to speed up the elimination of fuel-inefficient vehicles. Formulation of industrial and consumer directed policies to encourage the development and uptake of energy-efficient and environmentally-friendly vehicles, and guide the public to embrace the idea of conservation-oriented automobile purchase and maintenance. China is also encouraging vigorous development of public transport systems, the increase in the proportion of rail transport in urban areas and the acceleration of the development of electrified railway.

The National Development and Reform Commission (NDRC) develop and implements domestic climate mitigation policies, in partnership with sectoral ministries, while the Ministry of Foreign Affairs (MOFA) leads the climate negotiations.

Mitigation policies/measures with high potential to deliver reductions in transport GHG emissions

Policy/measure	Explanation (brief)	Status
Congestion pricing plan	This is a proposal that has not been discussed yet.	**Planned**
Promoting Non-motorized transport (NMT)	Promote NMT, e.g. cycling, walking, etc.	**Current**
Demonstration Campaign of Energy-saving Project in Transport Sector - Phase I (2007)	This phase was started in 2007 and good practices were selected from 20 transport enterprises.	**Current**
Demonstration Campaign of Energy-saving Project in Transport Sector - Phase II (2008)	This phase was started in 2008 and good practices were selected from 51 transport enterprises and relevant authorities.	**Current**
Demonstration Campaign of Energy-saving Project in Transport Sector - Phase III (2009)	This phase was started in 2009, still ongoing in 2010.	**Current**
Parking fee reform	The reform aims to double daytime parking fees in Beijing downtown areas from Apr. 1, 2010 in order to curb traffic congestions.	**Current**

Good practice

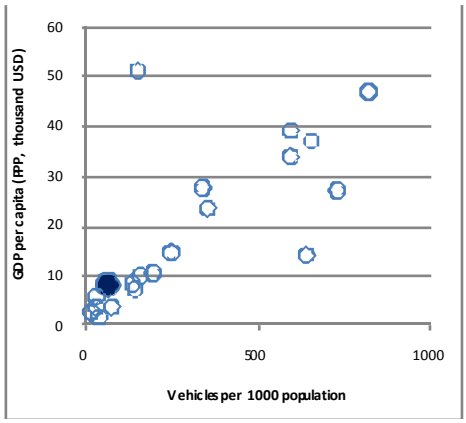
Demonstration Campaign of Energy-saving Project in Transport Sector
This project started in 2007 and aims to demonstrate the benefits and the feasibility of energy-saving (emission reduction) good practices to various stakeholders in road and waterway sectors. The documents describing good practices are posted on webpage of the Ministry of Transport. Good practices focus on: 1) efficient transport modes; 2) efficient transport company organization and operation, and fleet management; 3) efficient fuel management; 4) new energy-saving technologies and applications; 5) alternative fuels; 6) energy-saving (emission reduction) experiences from individual employee; 7) training programs and eco-driving.

International support requirements and contributions

Finance	Capacity Building	Technology Transfer
China would benefit from financial support in projects like fuel tax reform, promoting non-motorised transport and BRT.	China would benefit from capacity building in areas such as • Fuel tax reform • Congestion charging • Promoting NMT • BRT • Inter-city transportation	China would benefit from technology transfer, such as BRT.

Colombia

Country characteristics		Transport Statistics	
Population (thousands)	42,888	Total road sector energy consumption (ktoe)	29,048
Size (sq km)	1,141,748	Vehicle ownership (a) (total cars/1,000 pop)	66
GDP/capita (PPP,USD)	8,587	Road density (km roads/km2 land area)	0.15



Data source IRS, 2007.

Key trends in the transport sector

Mass transit and public transport have become one of the most prominent areas of work for national and local governments in Colombia, especially since the development of TransMilenio, the Bogota's Bus Rapid Transit System, in 2000. Though there was interest in improving public transport before, options different from metro systems (like the one built in Medellín during 1980s-1990s) had not been implemented. This generated significant changes in policy and projects on urban transport in the country. Non-motorised transport (NMT) has not had much relevance at the national level but to an extent it has in some cities. Travel Demand Management (TDM) has not really gained ground significantly at the national level but actual policies are developed in the local level (parking policies, plate restrictions, bikeway development, Bikeway master plans, etc).

Public (mass) transport is being promoted heavily since the end of 1990s, in the form of Integrated Mass Transit Systems (SITM) and Strategic Public Transport Systems (SETPs). Nationally, there is heavy support for these projects and for fuel quality improvements (Diesel sulfur content reduction), fuel surcharge (or dismounted subsidies) and fuel alternatives (CNG, ethanol biofuels, etc).

The Colombian government have a climate action plan that covers mass transit systems and fuel improvements in the transport sector.

Mitigation policies/measures with high potential to deliver reductions in transport GHG emissions

Policy/measure	Explanation (brief)	Status
Vehide plate restrictions	This measure will reduce vehicular congestion by 40%, in automobiles, and by 20%, in traditional public transport.	**Current**
Mass Transit Systems (SITM) in major cities over 600,000 population	This measure will develop full mass transit systems for cities with the goals of generating modal shift towards public transport, and to retain the high modal share of public transport in the country.	**Current**
Strategic Public Transport Systems (SETP) in smaller cities between 250,000 and 600,000 population	This will develop public transport systems for cities with the goals of generating modal shift towards public transport, and to retain the high modal share of public transport in the country.	**Current**
Parking pricing policy	This policy aims to reduce excessive use of parking infrastructure mainly by developing appropriate pricing schemes i.e. minute-based charging.	**Current**
National freight policy	This policy will improve vehicular specifications, logistics and institutional strengthening.	**Current**
Fuel surcharge 20 - 25%	Reduce excessive fuel use by charging more for fuel use, and generate revenue for public transport developments.	**Current**

Good practice

Mass Transit Systems (SITM) in major cities over 600,000 population

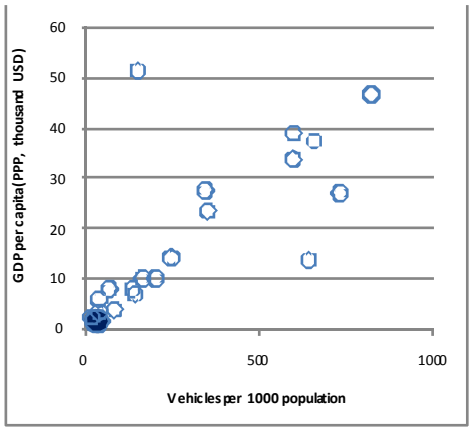
The primary objective is to encourage the development of full mass transit systems for cities over 600,000 inhabitants, with the goals of generating modal shift towards public transport, and to retain the high modal share of public transport in the country. The Bogotá system, TransMilenio, has become one of the most important references in low cost, rapid implementation, high performance transit systems in the world. It is a full Bus Rapid Transit (BRT) System with a total length of 84 Km, with integrated feeder routes. It transports 1.6 million passengers every day, and has more than 42,000 passengers per hour per direction in its peak section (the largest throughput in the world in a bus system). Cost was below USD 7.0 million per km (transit component). Bogotá system has influenced other cities in the developing world. It is also one of the few transport projects with approved CDM methodology and with certified emission reductions under UNFCCC.

International contributions

Finance	Capacity Building	Technology Transfer
Colombia would benefit from financial support to implement the Mass Transit System, the Strategic Public Transport Systems; and the national freight policy.	Colombia would benefit from capacity building in areas such as • Alternative fuels • Fuel surcharges It may support other countries in parking pricing policies and mass transit systems.	Colombia would benefit from technology transfer, for example, in alternative fuels. Colombia could transfer information on mass transit systems.

Ghana

Country characteristics		Transport Statistics	
Population (thousands)	23,416	Total road sector energy consumption (ktoe)	9,502
Size (sq km)	238538	Vehicle ownership (a) (total cars/1,000 pop)	33
GDP/capita (PPP,USD)	1,572	Road density (km roads/km2 land area)	0.25



Data source IRS, 2007.

Key trends in the transport sector

Road is the dominant mode of transport in Ghana, carrying 97% passengers and 95% freight. The transport sector has been deregulated with the private sector playing important roles, including the setting of fares. Development partners finance up to 60% of road infrastructure countrywide. The main domestic source for road finance comes from the road fund (fuel tax). There has been a general dedine in patronage of rail passenger transport, and over the past decade there has been an increase in domestic air travel. Government and donor financed metro mass transport system has been introduced to help reduce congestion in urban areas and increase access to rural districts. Technical and financial support is needed in all transport subsectors, especially interventions aimed at promoting coordination among transport institutions.

Government policy currently states that, mass transportation shall be prioritised in urban areas, aiming to move 80-85% of passengers by implementing a BRT system and developing a rail-based mass transport system as part of an integrated urban transport plan. Government intends to invest in the improvement of infrastructure for all users (but with emphasis on public transport); improvement in traffic management and provision of non-motorised modes and introduction of high capacity scheduled bus services. Regulation of the existing public transport operations by introducing route licensing and contract regimes coupled with adequate enforcement of regulation.

Ministry for Environment, Science and Technology responsible for climate policy, and have a climate action plan but this doesn't cover the transport sector, only energy.

Mitigation policies/measures with high potential to deliver reductions in transport GHG emissions

Policy/measure	Explanation (brief)	Status
Bus rapid transit (BRT) in Accra	The BRT system will increase productivity of buses.	**Current**
Bus route licensing	Operators of urban passenger transport services will be required to obtain a route operation permit from Assemblies.	**Current**
Promoting the use of renewable energy (biofuels)	This will involve encouraging people to use alternative energy sources, especially biofuel.	**Current**

Good practice

Bus rapid transit (BRT) in Accra

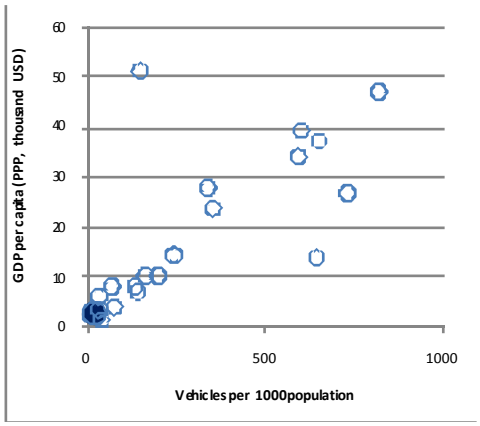
The primary objective of implementing BRT in Accra is to reduce travel time. The BRT system will increase productivity of buses, reduce CO_2 emissions, and increase general traffic speed. The physical infrastructure and operational system of the project include: Accra central area circulation loop, feeder routes, trunk route stations, terminals, passenger interchanges and bus depots. The BRT system shows how reducing travel time can result in many benefits to the city.

International support requirements and contributions

Finance	Capacity Building	Technology Transfer
Ghana would benefit from financial support in projects like BRT, bus route optimization, biofuels, efficient vehicles.	Ghana would benefit from capacity building in areas such as • BRT • Biofuels • Bus route organization	Ghana would benefit from technology transfer, for example, in BRTs, alternative fuels and efficient vehicles.

India

Country characteristics		Transport Statistics	
Population (thousands)	1,139,965	Total road sector energy consumption (ktoe)	594,913
Size (sq km)	2973190	Vehicle ownership (a) (total cars/1,000 pop)	15
GDP/capita (PPP,USD)	2,762	Road density (km roads/km2 land area)	1.01



Data source IRS, 2007.

Key trends in the transport sector

During a series of economic reform, time the development of infrastructure has accelerated at a rapid pace with most of the improvements going to the road sector. As such, there were unequal improvements compared to the other sub-sectors like rail, shipping and aviation. Though motorisation rates are relatively lower compared to other countries, private vehicle ownership has also dramatically increased in the major cities. The Indian railway is one of the largest in the world in terms of kilometres of track and total passengers and freight carried. According to the Indian Railways Yearbook (2006-2007), the railways carries over 18 million passengers and more than 2 million tons of freight daily. India also has a robust shipping and aviation industries, however, most of the efforts and projects by the national government has focused on road transport in the last decades.

Because of the JNNURM and NUTP, government efforts have focused on improving urban transport (in 65 cities), specifically in implementing projects that promote public transportation and as well as non-motorized transportation, to a certain extent. The Eleventh Five-Year plan (2007-2012) focused on improving road infrastructure in the country hence the completion of several road projects in the last few years. There are also plans to improve the rail system across the country, including the construction of high-speed rail. India has initiated dedicated freight corridor to shift from roads to rail, however, the progress has been slow when compared to roads where the investment is steadily increasing. There is also an interesting practice for inter-city rail in India, i.e. the Roll-on Roll-off Scheme where trucks are allowed to be transported in rail carriages.

Ministry of Environment and Forests (MoEF) is the nodal agency to deal with the climate change issues, policy making and implementation, and the government have a National Action Plan for Climate Change (NAPCC).

Mitigation policies/measures with high potential to deliver reductions in transport GHG emissions

Policy/measure	Explanation (brief)	Status
National Urban Transport Policy (NUTP)	It encourages integrated land use and transport planning, public transport and non-motorized modes by giving them priority in investments	**Current**
Jawaharlal Nehru National Urban Renewal Mission	It includes public transport and NMT reforms, institutional structure improvement, visioning and preparation of development plans and transport plans.	**Current**
Integrated Railway Modernization Plan	Integrated Railway Modernization Plan (2005-10) has been made with the objectives to enhance capacity, improve rail-port connectivity, higher axle load wagons to carry bulk material and development of dedicated freight corridors. The plan includes high speed travel, mechanized cleaning and improved safety features of stations and coaches.	**Current**
Developing Metro/LRT/Mono Rail	Recognizing the problem of Urban Transport a number of cities are coming up with Mass Transit System proposals (Bus Based/Rail Based).	**Current**
National Road Transport Policy (NRTP)	The policy focuses on improving the efficiency of the transport system. It recommends the use of the ""polluter pays"" principle, parking charges and environment taxes as public funds. Also supports strict inspection and certification (I&C) regime covering both safety and emission norms.	**Current**
Development of cycle tracks	Most of the cities under JnNURM are going for the development of the infrastructure for cycling in the core areas of the city.	**Current**

Good practice

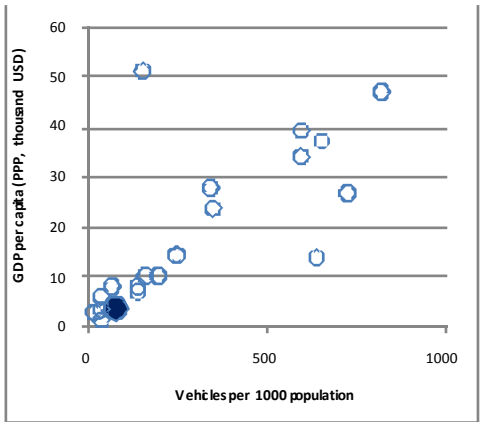
National Urban Transport Policy (NUTP)
The primary objective is to encourage a modal shift to public and non-motorized transport. It encourages integrated land use and transport planning, public transport and non-motorized modes by giving them priority in investments. The focus of NUTP is on equitable allocation of road space – with people as focus, priority for integrated public transport systems, non-motorized transport, promote multi-level parking complexes, introduction of ITS, cleaner technologies and capacity building programs all over India.

International contributions

Finance	Capacity Building	Technology Transfer
India would benefit from financial support in projects like BRT and developing metro systems.	India would benefit from capacity building in areas such as • Parking policies • Cycle plans and infrastructure • Developing railway systems It may support other countries in metro and BRT systems.	India would benefit from technology transfer, for example, in fuel economy, and metro systems. India could transfer technology in pedestrian facilities and bus services/terminals.

Indonesia

Country characteristics		Transport Statistics	
Population (thousands)	228,249	Total road sector energy consumption (ktoe)	190,647
Size (sq km)	1,811,570	Vehicle ownership (a) (total cars/1,000 pop)	76
GDP/capita (PPP,USD)	3,986.52	Road density (km roads/km2 land area)	0.20



Data source IRS, 2007.

Key trends in the transport sector

Indonesia is proactively taking steps to address climate change mitigation at both national and local level. The Government of Indonesia is committed to a voluntary 26 percent reduction below the baseline by the year 2020 unilaterally, and a further 15 percent (total 41 percent reduction) with international support (Indonesian Ministry of Finance 2009)[69]. Furthermore in Jakarta, a 30% reduction target by 2030 (compared with BAU) has been set. Indonesia has also associated itself to the Copenhagen Accord, and has made a submission of its proposed NAMAs which includes "shifting to low-emission transportation mode".

Indonesia faces a particular challenge in taking mitigation actions in the transport sector. The number of vehicles in Indonesia is predicted to grow by more than 2-fold between 2010 and 2035, with the growth expected to be largest in two wheelers and light-duty vehicles (ADB, 2006). Transport made up 23% of the total CO_2 emissions of the energy sector in 2005, with emission levels expected to increase roughly three-fold over the next 20 years (BAPPENAS, 2010). The rapid growth of car ownership is also leading to chronic congestion and increasing levels of air pollution, noise/vibration and road safety issues.

[69] Sector-specific targets are currently being set. According to the Indonesian Climate Change Sectoral Roadmap (Triastuti, 2010), it is suggested that transport could be responsible for roughly 2 % of the -26% target at the national level. Such indicative figures have not been provided for the -41% target with support, nor for the local (Jakarta) target of -30% by 2030.

Mitigation policies/measures with high potential to deliver reductions in transport GHG emissions

Policy/measure	Explanation (brief)	Status
Training programs and dissemination of smart /eco driving	This programme aims to train around 50,000 people on eco driving per year.	**Planned**
Electronic Road Pricing/ Congestion Charging	This policy will charge cars and motorcycles between 7 and 10, and 16-19 hours on weekdays.	**Planned**
Parking management	This measure will implement parking control system especially in metropolitan areas, medium and large cities across Indonesia.	**Planned**
Development of Monorail in Jakarta	This is a planned development of a 24km monorail system in central Jakarta.	**Planned**
Promotion of CNG vehides	This measure will provide socialisation and technical assistance for installing converter kits on public transport, e.g. in DKI Jakarta and other metropolitan cities.	**Current**
Promotion of biofuels	This measure will promote biofuels for public vehicles and government vehicles usage, and encourage use of waste cooking oil as fuel for buses.	**Current**

Good practice

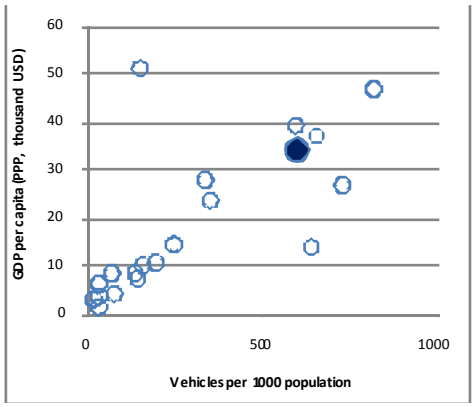
TransJakarta BRT
In Jakarta there were 14 corridors implemented with optimum routing & demand estimation. Integrated Fare System was applied for all 14 corridors, appropriate institutional form of Transjakarta and competitive bidding for bus operations and fare system. Moreover, efficient operating cost – through increased overall average speed- reduced fleet downtime and reduced fuel consumption. Full public awareness on the information on the usage of BRT & routing information system was delivered to passengers. Modal shift from PMV to BRT through TDM was improved and price for driving PMV was increased. Pedestrian & NMT (bicycle) facilities were also improved as the feeder to increases BRT trips. In Jogjakarta, there was a formalisation of paratransit, operated by a consortium company. New professional management including smart card online ticketing system, scheduled services and involving PPP and local government coordination. Finally, in Bogor, normalised bus services with new fleet running on biofuel (waste cooking oil).

International support requirements and contributions

Finance	Capacity Building	Technology Transfer
Indonesia would benefit from financial support in projects like MRT, monorail systems, and biofuels.	Indonesia would benefit from capacity building in areas such as • MRT and promotion of public transportation • Road pricing • Parking management • Biofuels	Indonesia would benefit from technology transfer, for example, in alternative fuels road pricing and parking management technologies.

Japan

Country characteristics		Transport Statistics	
Population (thousands)	127,704	Total road sector energy consumption (ktoe)	513,519
Size (sq km)	364,500	Vehicle ownership (a) (total cars/1,000 pop)	595
GDP/capita (PPP,USD)	34100	Road density (km roads/km2 land area)	3.16



Data source IRS, 2007.

Key trends in the transport sector

Japan has an extensive transport network comprising all modes. A particular feature of Japan is its rail-oriented national and urban development. The bullet train system (Shinkansen) links most major cities across the nation, most prominently the Tokaido Shinkansen which links Tokyo and Osaka.

Since the 1950s, Japan has developed its road network extensively, with the initial financial assistance of the World Bank and other foreign aid. Much of the infrastructure is developed using a Road Fund (Douro Tokutei Zaigen) which is replenished by earmarked taxes on fuel and vehicles at both national and local levels.

It has since the 1970s turned to become a donor of foreign aid, and actively supports transport sector development in developing countries (particularly in South East Asia) through its aid agencies (JICA and JBIC).

Mitigation policies/measures with high potential to deliver reductions in transport GHG emissions

Policy/measure	Explanation (brief)	Status
Promotion of telework and other transport substitution by information and communications technology.	The Government will promote the reduction of commuting traffic of trains, passenger vehicles or buses by encouraging flexible working styles free from place and time constraints with information and communications technology (telework)	**Current**
Improvements in the fuel efficiency of automobiles based on continued implementation of the Top Runner Standard	The Government will proactively promote the expansion and dissemination of automobiles conforming to the 2015 fuel consumption efficiency standards.	**Current**
Popularisation of greener vehicles (clean energy based vehicles)	This policy will promote clean energy based vehicles nationally.	**Current**
Traffic demand management	This policy will Implement and support pilot programmes contributing to the promotion of cycling.	**Current**
Facilitating the use of existing railway and bus routes	The Government will make ongoing efforts to develop public transport systems such as new railway lines, Light Rail Transit (LRT) and Bus Rapid Transit (BRT) and also promote measures toward the realisation of seamless public transport.	**Current**
Eco Driving (Promotion of the environmentally friendly usage of vehicles)	The Government will disseminate and promote eco-driving, which includes idling stop while stopping or parking, and driving at safe and constant speeds appropriate for the traffic conditions.	**Current**

Good practice

Promotion of the disseminiation of the Certification Program for Green Management

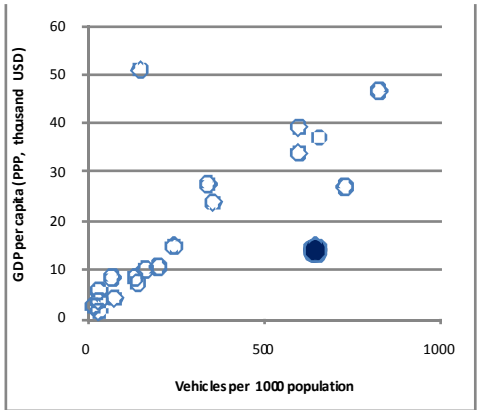
The Certification Program for Green Management, which certifies transport operators carrying out certain environmentally superior efforts such as fuel efficiency improvement, has contributed to improvements in the average fuel efficiency of the certified operators. The Government will further promote its dissemination. This is a good practice as it successfully managed to reduce GHG emissions through engagement with the private sector.

International support requirements and contributions

Finance	Capacity Building	Technology Transfer
Japan can provide funding to developing countries for emissions reduction programs and projects.	Japan could support other countries in railway and bus systems, green taxes and in energy efficiency.	Japan could transfer technology, for example, in energy efficiency measures.

Malaysia

Country characteristics		Transport Statistics	
Population (thousands)	26,993	Total road sector energy consumption (ktoe)	72,589
Size (sq km)	328550	Vehicle ownership (a) (total cars/1,000 pop)	641
GDP/capita (PPP,USD)	14072	Road density (km roads/km2 land area)	0.33



Data source IRS, 2007.

Key trends in the transport sector

Malaysia is one of the countries in Southeast Asia that sustained economic growth and succeeded in reaching a higher level of national development compared to other countries in the region in the early part of the 1990s prior to the Asian financial crisis. Despite the crisis the country has continued to develop its transport infrastructure, mainly roads, expressways, and rail for intra- and inter-city travel. With a sustained GDP of 6% year-on-year, demand for mobility and energy has also increased. Malaysia is one of the countries in Southeast Asia with the highest number of private cars per thousand people and this has led to high number of people depending on cars for daily commute. Motor vehicles account for more than 80% of the overall consumption of petroleum products. In addition, to augmenting transport infrastructure in the country, government policies have focused on biofuels and the development of its palm oil industry. The country also has a substantial indigenous supply of petroleum products that are used by the transport sector. However, the country still provides some subsidy to its petroleum products and as such has faced difficulties in improving the quality of its fuel and instituting stricter vehicle emission standards. It was only in 2009 that the country was able to implement Euro 2 equivalent vehicle emission standards. At present, govemment efforts are now focused on promoting public transportation, through rail and bus, including promoting pedestrian-friendly cities. However, it still remains to be seen if such efforts will be implemented in the future.

Current priorities of the government are into developing and expanding its urban rail and intercity rail system, including developing high-speed rail that will connect Kuala Lumpur to Singapore. Government plans also now include more reference to promote public transport including buses and provide for pedestrian-friendly cities. However, there are no clear policies when it comes to cycling and integrating these into public transport. The government has several departments that cover the climate policies and implement them, such as the Ministry of Natural Resources and Environment, Economic Planning Unit, Prime Minister Department and the Ministry of Energy, Water and Communication.

Mitigation policies / measures with high potential to deliver reductions in transport GHG emissions

Policy/measure	Explanation (brief)	Status
Environmentally Friendly Transport Infrastructure	A comprehensive and integrated transportation infrastructure that caters for the needs of inter and intra city travel will be integrated with land use planning and development.	**Current**
Travel demand management strategies	In achieving a sustainable transport for Kuala Lumpur, travel demand management provides strategies towards intervention to modify travel decisions so that more desirable transport modes and the adverse impacts of travel can be reduced.	**Current**
Integrated national transportation network (NPP23)	Integration of the nation's public and private transportation systems where an emphasis should be placed on enhanced use of public transportation services in major urban areas.	**Current**
Integrated infrastructure (NPP 29)	The NPP population projections and distribution proposals shall be utilised as the basis for infrastructure service supply and distribution programmes.	**Current**
Integrated high-speed rail system (NPP24)	All state capitals should be linked via the high-speed rail network with the rail stations acting as focal points for community and transportation activities.	**Current**
Integrated public transportation system (NPP 28)	Transportation in all major urban centres shall adopt a modal split of 50:50 between public and private transport.	**Current**

Good practice

Kuala Lumpur City Plan 2020 (Draft) Towards a World Class City

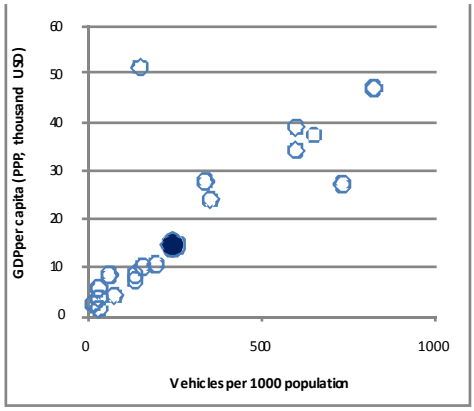
The primary objective is to create a World class city. The Draft KL City Plan 2020 aims to provide for a comprehensive and integrated transportation system that caters for the needs of inter and intra city travel and to integrate land use development with public transportation and road network. By integrating planning and development of public transport with land use framework, this encourages land use that supports public transport investments. The move towards 'People Priority' is the emphasis in this Draft KL City Plan 2020, where the priority use of road space must now take into consideration of the people's safety and comfort in travel and use of road space. This is good practice as it integrates transport planning and land use planning.

International support requirements and contributions

Finance	Capacity Building	Technology Transfer
Malaysia would benefit from financial support in projects like TDM strategies, and high speed rail.	Malaysia would benefit from capacity building in areas such as • biofuels • Public awareness and • Encouraging use of public transport	Malaysia would benefit from technology transfer, for example, in regional sustainability strategies for road networks and land use planning.

Mexico

Country characteristics		Transport Statistics	
Population (thousands)	107,400	Total road sector energy consumption (ktoe)	184,262
Size (sq km)	1,958,201	Vehicle ownership (a) (total cars/1,000 pop)	244
GDP/capita (PPP,USD)	14,825	Road density (km roads/km2 land area)	0.18



Data source IRS, 2007.

Key trends in the transport sector

Land transport is the most used way of moving goods inside and outside Mexico, and is one of the most important economical activities in the country contributing to 6.9% of the Gross Domestic Product (GDP) in 2009. Land transport has increase considerably in the last two decades, due to a bigger commercial activity generated by the North American Free Trade Agreement (NAFTA).

In 2007, according to data from the Ministry of Communication and Transport (SCT), the transport of goods by road handled around 473,800 tons, which is equivalent to 85% of the total domestic goods movement. In the case of intra-urban passenger transport, 562,575 people were transported, which is equivalent to 99.2% of the total passenger movement, including all the means of transportation.

As of 2008, there are around 24,157 million vehicles in Mexico emitting around 9 million tons of CO_2eq per year. Among the total of the vehicle fleet, automobiles represent 61.87%, freight transport 29%, and buses around 1.19%. Transport is the largest and fastest growing sector in Mexico in terms of energy consumption and is the second largest source of Greenhouse Gas Emissions (GHG), accounting for 20% of the national total.

The federal government launched in 2008 the National Infrastructure Fund (FONADIN). Its aim is to promote and foster the participation of the private sector in the expansion of infrastructure, through recoverable and non-recoverable grants that improve the projects capacity in order to attract other types of financing. This fund has a special program focused on Massive Urban Transport (PROTRAM), which supports the financing of projects related to urban transport as well as to strengthen the institutional part related to planning, regulation and management of these systems

Mexico published, in 2008, its National Program on Climate Change, and The Ministry of Environment and Natural Resources (SEMARNAT) through the Interministerial Commission of Climate Change is responsible for this.

Mitigation policies / measures with high potential to deliver reductions in transport GHG emissions

Policy/measure	Explanation (brief)	Status
Fuel Economy / CO2 standards for new light duty vehicles	The program has an integrated strategy to improve efficiency of energy consumption, giving priority to measures that have greater potential, with the aim to contribute to national security of energy supply.	**Current**
Urban Mass Transport Program (FONADIN)	The aim of the Program is to integrate urban and transport planning, and to support the development of integrated public transport systems that are safe, efficient, and cleaner.	**Current**
Suburban train	This measure seeks to reduce GHG emissions by substituting low capacity passenger transport units with a suburban train in the Metropolitan area of Mexico City.	**Planned**
BRT	The aim of the measure is to build 9 lines of BRT before 2012, with a fleet of 800 buses that will substitute small capacity buses (microbuses).	**Planned**
New Metro line	This measure aims to increase the connectivity between the east and west part of Mexico city through the construction of a new metro line.	**Planned**
Compulsory school transport	The main objective of this measure is to have compulsory group transport for private schools to promote a modal shift from private cars.	**Current**

Good practice

Compulsory school transport

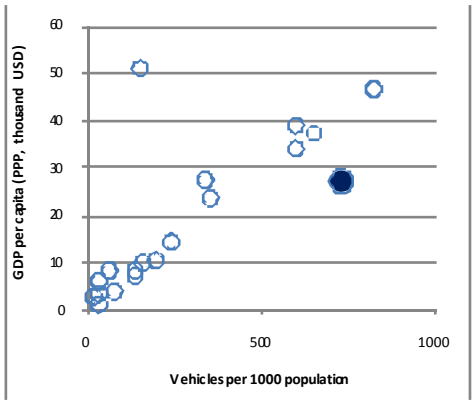
The primary objective is to encourage a modal shift from private cars and reduce congestion in the areas surrounding the schools. The program has been designed to be introduced in a phased manner. Once the program is fully operating, the estimation of reductions is around 470,958 tons of CO_2eq per year.

International contributions

Finance	Capacity Building	Technology Transfer
Mexico would benefit from financial support in projects like BRT, suburban trains, programs for emissions reduction from freight transportation.	Mexico would benefit from capacity building in areas such as • BRT • Optimization of bus routes • Tram systems and • Fuel economy policies • Freight transportation programs • Renewal of vehicle fleet and control of illegal second hand vehicle imports • Linking urban planning with transportation planning. It may support other countries in the establishment of national funds to support urban transportation.	Mexico would benefit from technology transfer, for example with new vehicle technologies.

New Zealand

Country characteristics		Transport Statistics	
Population (thousands)	4,315	Total road sector energy consumption (ktoe)	16,771
Size (sq km)	268,670	Vehicle ownership (a) (total cars/1,000 pop)	729
GDP/capita (PPP,USD)	25,442	Road density (km roads/km2 land area)	0.35



Data source IRS, 2007.

Key trends in the transport sector

New Zealand's transport system is highly dependent on roads. The predominant users of roads, accounting for about 80 percent of road traffic, are people in cars. The vast majority of freight is carried by road transport, followed by rail (18 percent in tonne-kilometres) and coastal shipping (15 percent of inter-regional freight in tonne-kilometres). There has also been a rapid increase in domestic and international air traffic. Despite growth in transport demand, New Zealand's investment in transport infrastructure has been relatively low as a proportion of GDP compared to other OECD countries. Consequently, the country is behind many of its competitors in the basic provision of transport infrastructure.

Current trends and focus areas for transport policy making reflects more effective integration between land-use and transport planning and better urban design, better integration between transport modes to provide a more efficient transport system, sustained investment in transport infrastructure, investment in developing the workforce within the transport sector, increasing the use of public transport, cycling, walking, and other shared and active modes introducing user charges for investment in transport infrastructure and services, using new technologies and fuels and, complying with international agreements relating to safety, security, and environmental standards for travel and transportation.

The government's immediate priorities for transport are infrastructure/roads and road safety.

The Government's principal policy response to climate change is the New Zealand Emissions Trading Scheme (NZ ETS). The NZ ETS introduces a price on greenhouse gas emissions to provide an incentive for people to reduce those emissions and plant forests to absorb carbon dioxide. The NZ ETS will include all sectors of the economy and all greenhouse gases covered by the Kyoto Protocol by 2015.

Mitigation policies/measures with high potential to deliver reductions in transport GHG emissions

Policy/measure	Explanation (brief)	Status
Public transport	The Government provided NZ$500 million for the electrification of the Auckland rail network.	**Current**
Cycling and walking facilities.	The government has encouraged construction of walkways and bicycle facilities.	**Current**
Biofuels.	The Government is providing a grant to biodiesel producers.	**Current**
Road user charge.	All diesel powered vehicles and other vehicles powered by a fuel not taxed at source (petrol, compressed natural gas, and liquefied petroleum gas), regardless of weight, must pay RUC.	**Current**
Auckland Regional Land Transport Strategy 2010-2040.	The government has encouraged construction of the CBD rail tunnel.	**Planned**
Electric vehicles.	The Government passed legislation to provide an exemption from road-user charges for electric vehides from October 2009 until July 2013 (valued at NZ$400 per vehicle pa).	**Current**

Good practice

Auckland Rail Network Improvements

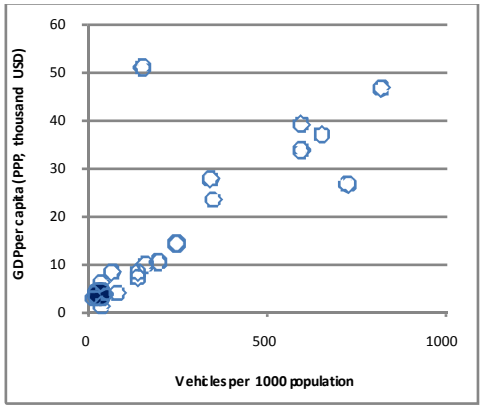
The primary objective is to improve the energy efficiency of the Auckland rail network and increase patronage. The Government provided NZ$500 million for the electrification of the Auckland rail network. The purchase of electric trains to run on the new network will also be supported by the Government. The Government will invest a total of NZ$1 billion in Auckland's rail network.

International contributions

Finance	Capacity Building	Technology Transfer
New Zealand may contribute to projects and programs that reduce emissions from transportation.	New Zealand does require international help with regards to capacity building	New Zealand does not experience any technological constraints

Philippines

Country characteristics		Transport Statistics	
Population (thousands)	88,574	Total road sector energy consumption (ktoe)	39,980
Size (sq km)	299,764	Vehicle ownership (a) (total/1,000 pop)	32
GDP/capita (PPP,USD)	3,521	Road density (km roads/km2 land area)	0.67



Data source IRS, 2007.

Key trends in the transport sector

The Philippines transport system relies on its roadways, inter-island shipping, known as "ro-ro's" (roll-on roll-off) transport, and aviation. Despite its archipelagic nature, road transport dominates other forms of transport. In 2006, its roads served approximately 1.71 billion passengers and 25.9 billion tons of freight. The Philippines has an extensive network of paved national roads, municipal roads, and secondary roads especially in the urban areas. Due to maintenance and rehabilitation costs and other competing priorities of the government, the Main Line North (266km) and Main Line South (479km) has had a difficult time and eventually became underutilized and under-maintained. This is also why most of the freight in the Philippines is transported by road on trucks and using the "ro-ro" transport to connect to various islands. Integration of the urban transport system is one of key challenges in the Philippines, especially considering the existing para-transit modes such as jeepneys and tricycles in urban areas. Most government effort in the past has been put on road development and not on providing a more holistic transport system that includes other motorized modes but as well walking and cycling.

Owing to the threat of air pollution, climate change, and fuel security, the President of the Philippines issued an Administrative Order instructing the Department of Transportation and Communications to develop a national Environmentally Sustainable Transportation (EST) strategy for the Philippines in 30 January 2009. This has resulted to an action plan proposed by government to establish targets and indicators for elements under the EST framework as developed under the Aichi Statement of the UNCRD. The government has allocated funds coming from the Special Vehicle Pollution Control Fund of the Motor Vehicle User's Charge in funding activities related to this. In addition, the government has proposed under the Clean Technology Fund the inclusion of projects on developing a BRT system for Metro Manila and Cebu as one of its projects. Most of the current efforts and plans of the government are geared towards improving passenger transport as compared to freight transport.

The Department of Environment and Natural Resources are responsible for the Climate Change Act (2009).

Mitigation policies/measures with high potential to deliver reductions in transport GHG emissions

Policy/measure	Explanation (brief)	Status
Promotion of BRT systems for metro cities	Under the EST strategy and as part of Clean Technology Fund projects, the Philippines submitted the development of the Metro Manila and Cebu.	**Current**
Expansion of urban rail in Metro Manila	The promotion and expansion of urban rail in Metro Manila was also included in the thrusts of the government to improve over-all public transport in the metropolis	**Current**
Bike on Bike off - LRT	The project encourages car users to leave their vehicles at home and use the train, bringing along their foldable bikes, and biking off towards their workplace and/or other destinations.	**Current**
Bikeways and Walkways Program in Metro Manila	The Metro Manila Development Authority initiated a bikeways and walkways program during the height of the high fuel prices in order to provide alternative transport options for the poorer sector.	**Current**
Replacement of 2-stroke tricydes	The city of Mandaluyong through a city ordinance announced the ban of 2-stroke tricycle operations in the city by end of 2010. Together with CAI-Asia and its country network Partnership for Clean Air, a micro-financing scheme was set-up to replace existing 2-strokes tricycles.	**Planned**
Jeepney engine replacement to LPG	As part of government efforts to promote fuel efficiency and reduce air pollution, the President announced in 2008 a program to replace the engines of old jeepneys with new LPG engines.	**Current**

Good practice

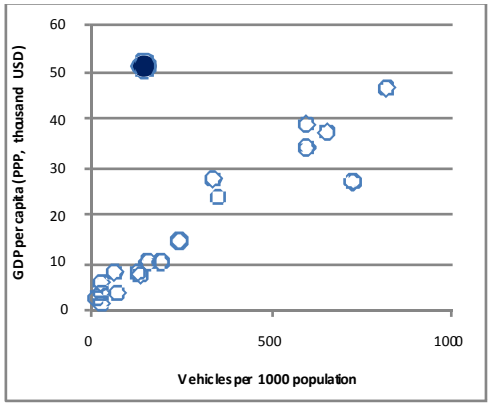
Promotion of BRT systems for metro cities
The primary objective of policy is to improve public transport. Under the Environmentally Sustainable Transportation strategy and as part of Clean Technology Fund projects, the Philippines submitted the development of the Metro Manila and Cebu. This gives a good example of the use of the Clean Technology fund.

International contributions

Finance	Capacity Building	Technology Transfer
Philippines would benefit from financial support in projects like BRT and urban rail.	Philippines would benefit from capacity building in areas such as • Cycle plans • Walkway infrastructure • biofuels	Philippines would benefit from technology transfer, for example, in alternative fuels, urban rail and BRT.

Singapore

Country characteristics		Transport Statistics	
Population (thousands)	4,839	Total road sector energy consumption (ktoe)	26,754
Size (sq km)	670	Vehicle ownership (a) (total cars/1,000 pop)	149
GDP/capita (PPP,USD)	51,142	Road density (km roads/km2 land area)	4.72



Data source IRS, 2007.

Key trends in the transport sector

Almost all parts of Singapore can be accessed by road, including islands such as Sentosa and Jurong. Public transport is dominated by the rapid transit system (RTS) and public buses. Ferryboat services are also available in accessing other islands. The Port of Singapore is one of the busiest in terms of shipping tonnage handled and is hailed as one of the best seaports in Asia.

Current EST strategies concentrate on the following; making public transport a choice mode where the current transport master plan focuses on shifting private trips to public transport by improving the services and capacity of the public transport systems such as the RTS and the public buses; integrated planning, where this type of planning aims at reducing the demand for road space, increase accessibility and reduce motorised travel; green transport where economic instruments are currently being utilized to promote cleaner vehicles such as LPG and NGV vehicles. Singapore has also moved into using ultra low sulphur diesel to address the emissions from its diesel vehicles. Efforts to improve the walking and biking facilities are also being implemented; and managing road use, such as implementing schemes which have controlled the VKT of private motorized modes such as the vehicle quota scheme, electronic road pricing among others.

The National Climate Change Committee is responsible for climate policy in Singapore.

Mitigation policies/measures with high potential to deliver reductions in transport GHG emissions

Policy/measure	Explanation (brief)	Status
Integrated Land use planning	This aims to integrate inter-modal transport facilities with building developments for seamless connectivity.	**Current**
Bus and rail integration	This aims to co-ordinate between government agencies to integrate transport with land use planning.	**Current**
Rapid Transit System Network Expansion	This policy aims to enhance the integration and efficiency of public transport services, and it will plan the Public transport network from the commuters' perspective.	**Current**
Enhance the effectiveness of Electronic Road Pricing	This will encourage major investments in new lines and extensions by enhancing the ERP scheme.	**Current**
Green Vehicle Rebate	Refine the method of measuring traffic speeds for triggering ERP rate changes by using the 85th percentile speed measurement method. This will ensure that 85% of motorists will be assured of smooth travel on ERP-priced roads	**Planned**
Vehide quota system	The Vehide Quota System was implemented on 1 May 1990. Under this system, LTA determines the number of new vehicles allowed for registration while the market determines the price of owning a vehicle.	**Current**

Good practice

Off-Peak Car Scheme

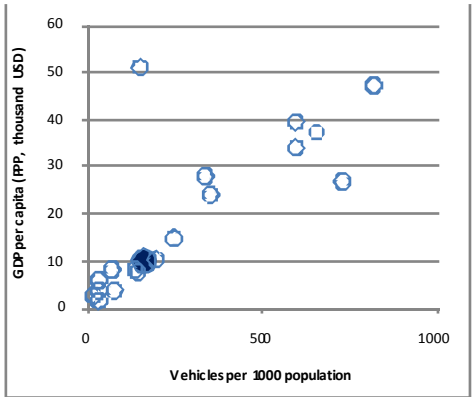
The primary objective of this scheme is to improve public transport. The OPC scheme was implemented on 1 October 1994 to replace the Weekend Car (WEC) scheme. The OPC scheme offers new and existing car owners the option to save on car registration and road taxes in return for reduced usage of the cars. From 25 January 2010, the revised OPC scheme replaces the OPC scheme. Cars converted to or new cars registered under the revised OPC scheme will enjoy unrestricted usage on Saturdays and evenings of public holidays in exchange for reduced road tax discounts.

International contributions

Finance	Capacity Building	Technology Transfer
Singapore possesses the internal capacity to finance most of its projects.	Singapore would benefit from capacity building in areas such as • Cycle plans • Park and ride schemes • Encouraging use of public transport It may support other countries in vehicle taxation and bus and rail integration.	Singapore would benefit from technology transfer, for example, in alternative fuels and land use planning.

South Africa

Country characteristics		Transport Statistics	
Population (thousands)	48,687	Total road sector energy consumption (ktoe)	134,337
Size (sq km)	1,214,470	Vehicle ownership (a) (total cars/1,000 pop)	159
GDP/capita (PPP,USD)	10,119	Road density (km roads/km2 land area)	0.30



Data source IRS, 2007.

Key trends in the transport sector

A total investment of R13,6 billion has been allocated to improve public transportation systems ahead of the World Cup. This is part of an overall investment of R170 billion into the country's transport system in the five-year period from 2005/06 to 2009/10.

The current focus is on the following activities:

- The Public Transport Strategy aims to accelerate the improvement in public transport by establishing integrated rapid public transport networks (IRPTNs), which will introduce priority rail corridors and bus rapid transit (BRT) systems in cities.
- Transnet - a focused freight-transport and logistics company wholly owned by the South African Government - will be spending R80 billion in capital expenditure on its ports, port operations and its freight rail network over the next five years.
- About R70 billion will be used by Sanral in the next three years for road infrastructure, maintenance and upgrading and an additional R3 billion for the Expanded Public Works Programme for access roads, all of which is an attempt by govemment to alleviate traffic congestion while creating jobs.
- The Taxi Recapitalisation Programme aims to have a taxi industry that supports a strong economy, puts the passenger first and meets
- By October 2009, more than 27 800 old taxi vehicles had been scrapped with more than R1.4 billion paid out to operators. A total of R7.7 billion has been allocated for the TRP.
- The Bus Rapid Transport System is a key component of the Department of Transport's integrated transport network plan.
- The Passenger Rail Agency of South Africa was launched in March 2009. About R14 billion of the money was spent on capital programmes while more than R9 billion went to operational costs. The Prasa employs 13,000 people.

Department of Environmental Affairs and Tourism (DEAT) will continue to provide a central focal point for climate change activities in South Africa, and will ensure that coordination, information management and dissemination, and integration of the government's climate change programme takes place. National Committee on Climate Change will continue to provide a forum for discussion and consultation on the country's climate change strategy.

Mitigation policies/measures with high potential to deliver reductions in transport GHG emissions

Policy/measure	Explanation (brief)	Status
Electric and hybrid-electric vehicles	Electric and hybrid-electric vehicles have considerable savings potential for both costs and GHG.	**Current**
Transport Planning	The basis of the new policy is a change from a supply-driven to a demand-driven land transport system.	**Current**
Transport and the Environment	Travel demand management measures will be implemented to limit the number of vehicles on the road.	**Current**
Priority for Public Transport and Greater Promotion of Non-Motorised Transport	This will entail the implementation of effective Travel Demand Management (TDM) measures to promote more efficient private car usage and to free up resources for public transport upgrading and promotion.	**Current**
Land-Use Restructuring	Land transport functions must be integrated with related functions such as land use and economic planning and development, through, among others, the development of corridors, densification and infilling, and transport planning must guide land use and development planning.	**Current**
Fuel Tax	A tax could be included in the fuel price that could be used to address the effects of climate change.	**Current**

Good practice

Electric and hybrid-electric vehicles

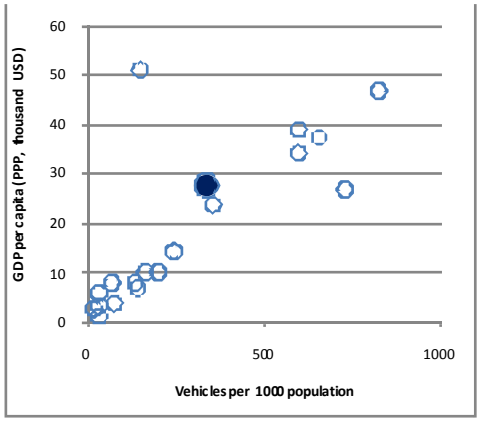
The primary objective of policy is to improve fuel efficiency. Electric and hybrid-electric vehicles have considerable savings potential for both costs and GHG, and South Africa has a history of (largely un-commercialised) innovation in this sector. Recent developments suggest that South Africa also has emerging competitive advantage in this key sector.

International contributions

Finance	Capacity Building	Technology Transfer
South Africa would benefit from financial support in projects like congestion charging schemes.	South Africa would benefit from capacity building in areas such as • Emission standards • Transport planning and • Encouraging use of public transport It may support other countries in use of non motorised transport.	South Africa would benefit from technology transfer, for example, in fuel efficiency, electric vehicles and congestion charging.

South Korea

Country characteristics		Transport Statistics	
Population (thousands)	48,607	Total road sector energy consumption (ktoe)	222,197
Size (sq km)	98,730	Vehicle ownership (a) (total cars/1,000 pop)	338
GDP/capita (PPP,USD)	27,646	Road density (km roads/km2 land area)	1.03



Data source IRS, 2007.

Key trends in the transport sector

The Blueprint for transportation in South Korea was laid is 1960's with first Five-Year Development Plan. Due to economic growth the number of cars has increased from 127,000 in 1970 to 12,694,000 in 2001, recording a 100-fold growth in thirty years. It is estimated that passenger travel demand would increase 1.5 times and freight transportation 2.1 times by 2019, compared to 2004 levels. The road system handles the bulk of movement. It has been estimated that in 2006 road traffic was responsible for 79% of energy consumption in transport sector. Projections show that the energy consumption in transport sector will increase 1.4 times from 36 million TOE in 2006 to 51 million TOE in 2030.

The raising externalities from transport sector forced the government to initiate demand management and efficiency improvement steps in the past decades. The government took the lead in several sustainable policy initiations which serves as a model for many Asian countries. The rapid pace of transport development is challenging the government initiatives and with global demand for reductions in GHG emissions, the country is fast developing its blueprint for low carbon transport for the next decade. Transport related policies include promotion of environmentally-friendly vehicles (Article 47); promotion of eco-friendly transport system in national scope (Article 52); formation of low-carbon transport system (Article 54), amongst other policies.

South Korea government has announced its medium term target for greenhouse gas emission in 2009. According to the announcement, the country would be committed to reducing emission by 30 percent from its BAU (Business-As-Usual) level projection in 2020. Currently 2% of GDP is being utilized to implement green growth policies. In order to achieve the reductions it approved Low Carbon & Green Growth' as a National strategy for the future. The enforcement decree has suggested composition of the Presidential Committee on Green Growth in the Article 10 and the establishment of a five-year plan for the national strategy for green growth in the Article 4. Thus the decree establishes the legal basis for implementing low carbon green growth strategies. The bill contains 65 Articles for guiding general policies for LCGG.

Mitigation policies/measures with high potential to deliver reductions in transport GHG emissions

Policy/measure	Explanation (brief)	Status
Public Transport Package - High Speed Rails	The Korea High Speed Rail (KHSR) Project is one of the largest single projects underway in Korea.	**Current**
Public Transport Package - Bus Improvements	The bus reform plan consisted of BRTS and exclusive bus lanes as well as the reorganization of Bus Routes in Seoul.	**Current**
Non Motorized Package - Bike lanes	This package includes the extension of bicycle networks, bicycle racks and other measures.	**Current**
TDM Package - Congestion charging	The Seoul Municipal Authority, from 1996 started charging a 2000 won congestion fee on 1-2 occupant vehicles using tunnels and major arterials linking the southern part of the Han river with the CBD.	**Current**
TDM Package - No Driving Days	It's a voluntary program to reduce congestion by offering drivers financial incentives with public awareness to limit the number of weekdays they use their vehide.	**Current**
TDM Package - Car Free Day	Seoul City encourages car free days, where they provide incentives such as free bus rides.	**Current**

Good practice

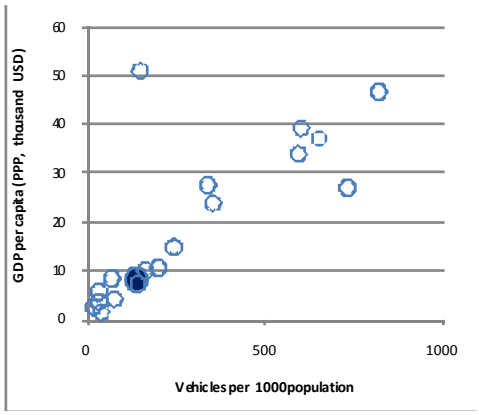
Non Motorised Package - Bike lanes.
The primary objective of policy is to reduce motorised transport usage. This Package is supported by Bill on Low Carbon Green Growth. This includes the extension of bicycle network as 3,114km by 2018, 'Road Diet' to secure bicycle space on the roads, bicycle racks within trains and buses, promotion of 'public bike' or 'bike-sharing'. Seoul specific improvements include a bicycle only network 207km in 17 routes, downtown line circulation routes 88.4km, large scale development of bicycle-friendly community (12 areas by 2012, 33 areas by 2030), pilot service of public bike system (2 areas), 16 bicycle parking buildings installation, closed type subway bicycle storage facilities. This includes the provision of government support for the local cycling industry and is a good example as it is supported by legislation supporting this.

International contributions

Finance	Capacity Building	Technology Transfer
South Korea would benefit from financial support for public transportation systems	South Korea would benefit from capacity building in areas such as • TDM measures and specifically on congestion charging	South Korea could transfer technology, for example, in high speed rail, fuel economy measures and TDM such as car free days.

Thailand

Country characteristics		Transport Statistics	
Population (thousands)	67386	Total road sector energy consumption (ktoe)	103,991
Size (sq km)	510890	Vehicle ownership (a) (total cars/1,000 pop)	134
GDP/capita (PPP,USD)	8224.63	Road density (km roads/km2 land area)	0.35



Data source IRS, 2007.

Key trends in the transport sector

Thailand's transport system has rapidly been expanding in the last few decades. Historically, inland waterways have been the dominant transport mode used in carrying products. In the 1980s, railroads and roads expanded throughout the country. Today, the extensive highway and expressway networks connect the country. Public transport infrastructure for buses and mass rail transit are also notable. River and canal transport systems are still a major form of transportation artery in the country.

The government has been moving towards measures that promote more sustainable transport systems in the country. Measures that intend to avoid motorised vehicle travel such as the promotion of cycling and walking are now being promoted, as well as measures that encourage the shift to public transport. Cleaner vehicles and fuels are also given incentives such as in the form of tax holidays.

The recent economic crisis, coupled with the volatility of global oil prices, has been the main driver of the continued push for the strengthening of the alternative fuels development in Thailand. CNG, LPG, biodiesel and gasohol are widely being promoted in the country. Also, the government is strengthening the mass and bus rapid transit systems in Thailand to encourage people to shift to public transport. Thailand is also moving towards having cleaner vehicles on its roads. It has instituted a fuel economy labelling scheme which aims to provide information to the buying public on the fuel efficiency of the new vehicles on the market. Fuel-flexible (or bi-fuelled) vehicles are also given incentives by the government. The eco-car scheme, which is aimed at giving support to car manufacturers who would like to develop more efficient and environmentally-friendly vehicles, is also being implemented.

The Ministry of Natural Resources and Environment and the National Committee on Climate Change are the relevant authorities who are overseeing the country's climate action plan.

Mitigation policies/measures with high potential to deliver reductions in transport GHG emissions

Policy/measure	Explanation (brief)	Status
National Strategy on Climate Change B.E. 2551-2555 (2008 - 2012) : Avoid	Reducing travel wanted by communication support in private sector and government sector and controlling the amount of private vehicle using in the high traffic area	**Current**
Mass Transit Systems	The government has embarked upon an ambitious program to implement 291 km of MRT track by 2009	**Current**
Promoting the use of Biofuels in BMA	This included a campaign for use of low carbon emission petroleum fuel – use of liquefied gas, e.g. CNG.	**Current**
Anti-idling Campaign	This measure was a campaign to encourage passenger car drivers to turn off their engine when parked.	**Current**
Eco-car/ Green Car	Thailand's Bank of Investment has set out a package of incentives to encourage producers of 'green' cars.	**Current**
Promotion of Alternative Fuelled Vehicles	The government embarked on a CNG Promotion, which includes duty exemptions, excise tax reductions, road tax reductions and subsidies.	**Current**

Good practice

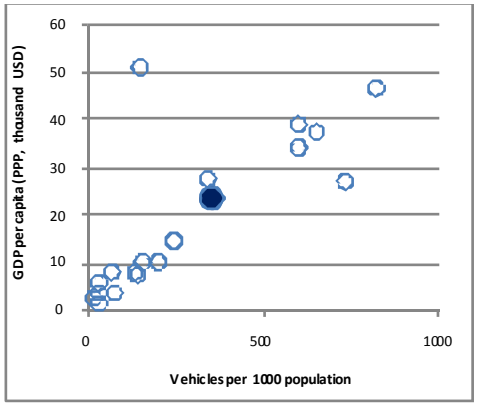
National Strategy on Climate Change B.E. 2551-2555 (2008 – 2012)
The primary objective of policy was to reduce greenhouse gas emissions in energy sector and increase efficiency of energy using and saving in transportation sector. This was undertaken by reducing travel demand by communication support in private sector and government sector.

International support requirements and contributions

Finance	Capacity Building	Technology Transfer
Thailand would benefit from financial support in projects like BRT and mass transit systems.	Thailand would benefit from capacity building in areas such as • biofuels • eco-driving and • mass transit systems	Thailand would benefit from technology transfer, for example in eco-driving and alternative fuels.

United Arab Emirates

Country characteristics		Transport Statistics	
Population (thousands)	5,066	Total road sector energy consumption (ktoe)	18,073
Size (sq km)	83,600	Vehicle ownership (a) (total cars/1,000 pop)	350
GDP/capita (PPP,USD)	36,536	Road density (km roads/km2 land area)	0.05



Data source IRS, 2007.

Key trends in the transport sector

The current status of transportation is cars-dominated, and the majority of surface transport in the Emirates is now by private car, taxi or contract bus, with a small but rapidly developing public bus system (there is virtually no maritime public transport). The existing highway network is generally constructed to a high standard but is already reaching its operational capacity at peak times in the two major towns, Abu Dhabi and Dubai. The majority of the movement of freight is on the roads. Road freight is treated very much as a second priority to the private car and is often restricted to prescribed routes (and time periods in urban areas). These routes nearly always result in longer journey times than the corresponding car routes (up to 50% longer distance) with commensurate increases in operating costs. This creates a barrier to the creation of an efficient freight sector.

Despite some transport policies which are set at a national level, the general trend is towards local transport policy decision making. Each Emirate has extensive autonomy providing policy making over local transport. The Emirates of Abu Dhabi and Dubai together, which cover the 85% of the area of the UAE, are the two leading Emirates in term of policy making. Abu Dhabi and Dubai have been developing important strategies towards a sustainable multi-layered transport system, with respect both to passengers than freight.

UAE signed in 2007 the Initial national communication to the United Nations Framework Convention on Climate Change. The United Arab Emirates (UAE) recently in 2010 became the first OPEC member state to associate itself with the Copenhagen Accord. It is also establishing a Directorate of Energy and Climate Change. The Environmental Agengy Abu Dhabi (EAD) has recently issued a report on the effects of Climate Change on the UAE. EAD is currently coordinating with the Ministry of Environment and Water to develop a Climate Change Policy for UAE. Since 2008, UAE organizes in Abu Dhabi the World Future Energy Summit "WFES", the world's foremost and must-attend annual meeting for the renewable energy and environment industry.

Mitigation policies/measures with high potential to deliver reductions in transport GHG emissions

Policy/measure	Explanation (brief)	Status
Regional Passenger Rail	This policy will develop 590km system of inter-regional rail forming part of a future UAE and GCC-wide passenger rail system.	**Planned**
Freight Rail (Union Railway)	This policy will develop 1300km system of inter-regional rail forming part of a future UAE and GCC-wide freight rail system	**Planned**
Salik Road Toll	Dubai's electronic toll collection system, launched in July 2007, which emphasizes the system's congestion management objectives as well as the choice of technology for the toll system.	**Current**
Implement Road User Charges	The method will be introduced in Abu Dhabi and will be assessed by a Pricing Strategy Study.	**Planned**
Carbon Credits for the airline's voluntary carbon offset programmes	Etihad Airways has signed a service agreement with MASDAR, the Abu Dhabi Future Energy Company, to purchase carbon credits for the airline's voluntary offset program.	**Planned**
Dubai Metro	This policy will encourage the construction of a metro network in Dubai with a total length of 318 km.	**Current**

Good practice

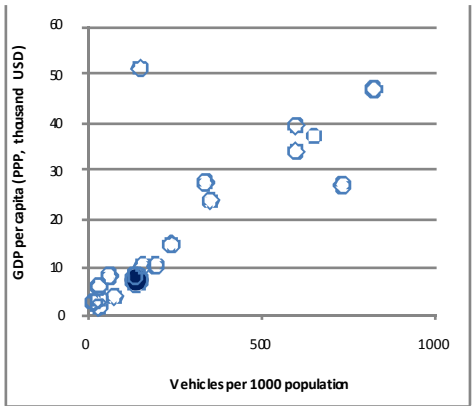
Carbon Credits for the airline's voluntary carbon offset programmes
The primary objective of this policy is to create a carbon offset programme. Etihad Airways has signed a service agreement with MASDAR, the Abu Dhabi Future Energy Company, to purchase carbon credits for the airline's voluntary offset program. As part of the agreement, the expert carbon management team within MASDAR will help to support the voluntary carbon offset programs of Etihad in sourcing and retiring high quality carbon credits. These will come from projects such as alternative energy programs and energy efficiency initiatives.

International contributions

Finance	Capacity Building	Technology Transfer
UAE possesses the internal capacity to finance most of its projects.	UAE would benefit from international expertise and sharing of experiences in the promotion of eco-driving practices, and in the establishment of public transportation and rail systems (e.g. high speed rail)	UAE would benefit from technology transfer, for example in providing bus services, metro and rail serices.

Ukraine

Country characteristics		Transport Statistics	
Population (thousands)	46,258	Total road sector energy consumption (ktoe)	137,342
Size (sq km)	579,350	Vehicle ownership (total cars/1,000 pop)	140
GDP/capita (PPP,USD)	7,347	Road density (km roads/km2 land area)	0.28



Data source IRS, 2007.

Key trends in the transport sector

The Ukrainian transport network can be characterized by a well developed rail infrastructure and an underdeveloped road infrastructure. All modes of transport are significantly below modern standards in terms of quality, safety, energy efficiency and environment. The whole sector is in a state of neglect due to the lack of investments in the last 20 years. In Soviet times public transport was the core of passenger transport. A long railway network and modern urban public transport systems, such as tram, trolleybus, bus and metro, were developed at that time. The national and urban road networks could manage the low traffic demand.

In the last 20 years the level of car ownership has risen and passengers have shifted from public transport to road transport. The state and capacity of the road network, especially in larger urban areas, has not been able to follow the increase in demand. The quality of public transport on the other hand has decreased. The amount of freight transport dropped significantly since 1990. Due to the state of the road network rail, pipelines account for most of the long distance freight transport. Road transport dominates short distance movements. The national, regional and municipal level cannot provide the financial means to modernise the transport system. World Bank, EBRD and other donors provide financial assistance to improve the national and urban transport network. The European football championship in 2012 induces investments and changes on a national and regional level.

There is a National Action plan for the realisation of the requirements of the Kyoto protocol. The Concept of the National Environmental Policy of Ukraine for the period till 2020 does not contain any particular measures on transportation. In general, the country follows the international trends in climate policy, but there is a significant lack of implementation, mainly due to lack of coordination between national, regional and local level institutions.

Mitigation policies/measures with high potential to deliver reductions in transport GHG emissions

Policy/measure	Explanation (brief)	Status
Reform of the national railway system	This is a organisational and structural reform of the railway transport to meet the traffic needs of national economy and population and improve its quality..	**Current**
Public transport improvement (Odessa)	This includes the reconstruction of approximately 16 km of tracks and related infrastructure and trams.	**Current**
Passenger and freight traffic management system (Kyiv)	This policy encourages development of an automatic traffic management system for passengers and freight to improve and optimise traffic flows.	**Current**
Traffic management system	This policy encourages the design and implementation of an Active Traffic Management System.	**Current**
Strategy for the urban traffic in the city Lviv	This plan includes the development of a transportation model for the city, preparing a feasibility study for a new tram routes, assessment of a infrastructure measures and implementation strategy in Lviv.	**Current**
Mobility concepts for EURO 2012	This policy includes the development of mobility concepts for the cities of EURO 2012 with special focus on public transport, walking and cycling and long term improvement of urban transport.	**Current**

Good practice

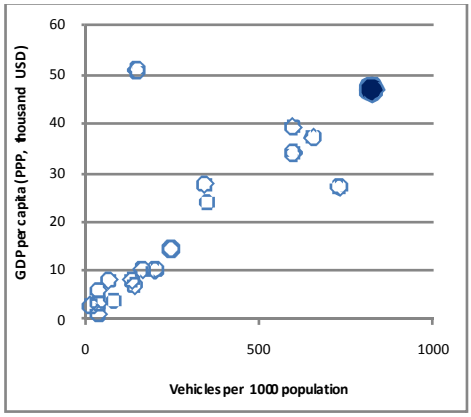
Reform of the national railway system
The primary objective of this organisational and structural reform is to improve the quality of the current railway network. This would involve developing new and existing infrastructure to meet the traffic needs of national economy and population and improve its quality.

International contributions

Finance	Capacity Building	Technology Transfer
Ukraine would benefit from financial support for upgrading the national rail system, urban public transportation, and altemative fuels.	Ukraine would benefit from capacity building in areas such as: • Metro systems • Alternative fuels • Integrated transport planning ncouraging the use of public transport and NMT.	Ukraine would benefit from technology transfer, for example, in alternative fuels.

United States of America

Country characteristics		Transport Statistics	
Population (thousands)	308930	Total road sector energy consumption (ktoe)	2,339,942
Size (sq km)	9826675	Vehicle ownership (a) (total cars/1,000 pop)	820
GDP/capita (PPP,USD)	46100	Road density (km roads/km2 land area)	0.68



Data source IRS, 2007.

Key trends in the transport sector

Over the past 50 years, the United States of America (USA) has experienced extensive suburbanisation, driven by the construction and expansion of the interstate highway system, as well as federal programs to encourage homeownership. More recently, increased awareness on issues such as air quality, climate change and accessibility has prompted the federal government, as well as local and regional entities, to seek measures promoting smart growth, transit oriented development, as well as improving the environmental performance of new vehicles. Nonetheless, the US remains predominantly an auto-oriented country, and one of the largest contributors to transportation GHG emissions in the world.

One of the top priorities at the federal level is improving the fuel efficiency of vehicles, as well as promoting alternative fuels or vehicle technologies (biofuels, hybrid and electric vehicles). This is due to concerns over air quality and GHG emissions, but is also seen as an issue of energy security, as the US is currently highly dependent on oil imports. Several regions and metropolitan areas have also enacted land use policies aimed at reducing vehicle miles travelled, or creating sufficient density to support higher frequency public transportation.

The Department of Energy (DOE) and the Environmental Protection Agency (EPA) are the primary relevant authorities. The Department of Transportation (DOT) can also set climate policies for transportations. The US Green Building Council (USGBC) is in charge of climate policy for buildings.

Mitigation policies/measures with high potential to deliver reductions in transport GHG emissions

Policy/measure	Explanation (brief)	Status
Corporate Average Fuel Economy (CAFE) standards.	National standards for vehicle fuel efficiency in miles per gallon (MPG) for passenger cars (27.5 mpg) and light trucks (20.7 mpg).	**Current**
California Assembly Bill (AB) 1493: Passenger vehide GHG standards	AB1493 requires vehicle manufacturers to improve the environmental performance of their vehicles.	**Current**
California Assembly Bill (AB) 32: Global Warming Solutions Act	AB32 requires the State of California to reduce GHG emissions to 1990 levels by 2020.	**Current**
SmartWay Transport Partnership	The aim is to increase the availability and market penetration of fuel efficiency technologies and strategies that help freight carriers achieve higher environmental performance for their vehicle fleet.	**Current**
Subtitle C - Clean Transportation, Section 122: Large Scale Vehicle Electrification Program	This section aims to facilitate the integration of electric vehicles into the electricity distribution areas across the US.	**Current**

Good practice

California Assembly Bill (AB) 32: Global Warming Solutions Act

The primary objective of policy is to reduce greenhouse gas (GHG) emissions from the transportation sector. AB32 requires the State of California to reduce GHG emissions to 1990 levels by 2020. The California Air Resources Board (CARB) is in charge of implementing key regulations to support attainment of these goals. These regulations include annual facility-based GHG emissions reporting for industrial facilities, reporting of fuel use, indirect energy use and electricity transactions in the power sector, as well as a Low Carbon Fuel Standard (LCFS) for transportation fuels. This is an example of legislation that can be passed to encourage a range of policies and measures.

International support requirements and contributions

Finance	Capacity Building	Technology Transfer
USA could provide finance for GHG mitigation actions in developing countries.	USA can provide capacity building in the design and implementation of programs for emissions reductions from freight transportation, establishment of vehicle emissions standards, establishment of public transportation systems and bicycle path networks, low carbon vehicle technology, advanced biofuels.	USA could support other countries in technology transfer, for example, in low-carbon vehicle technologies, advanced biofuels.

Appendix B Data tables from the country analysis

Data tables from the country analysis

This Annex provides selected data to support the information provided in Section 4 of the report. The data will be subject to a final round of technical checks and therefore not suitable for external publication at this stage.

What kinds of policies were identified?

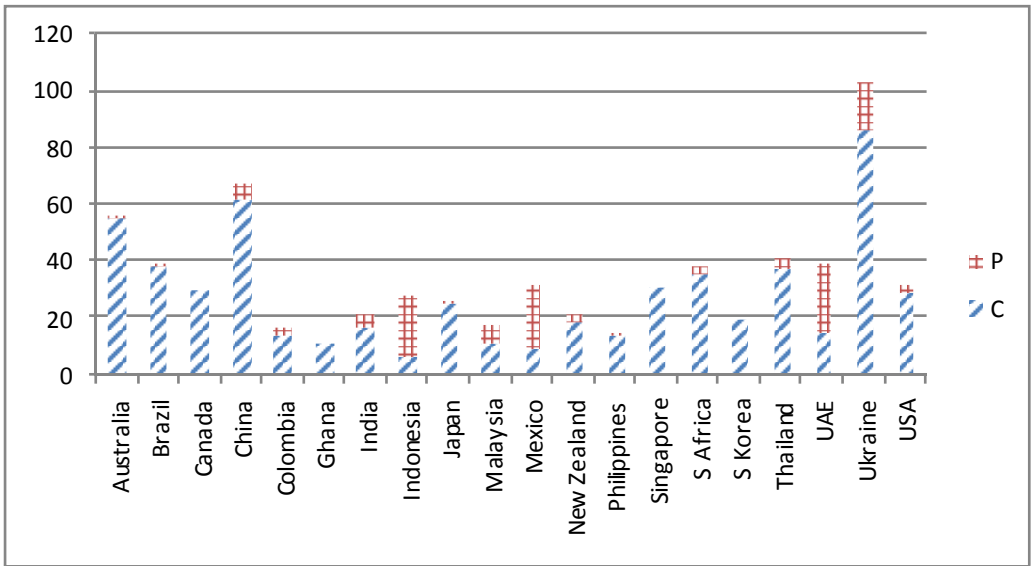


Figure 42: The number of current and planned policies in the 20 countries reviewed

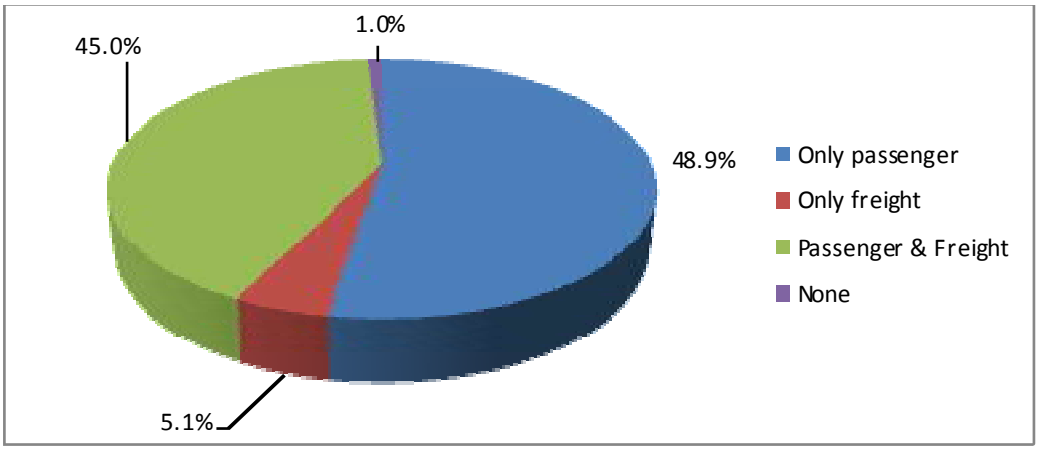


Figure 43: Percentage of passenger, freight and mixed policies

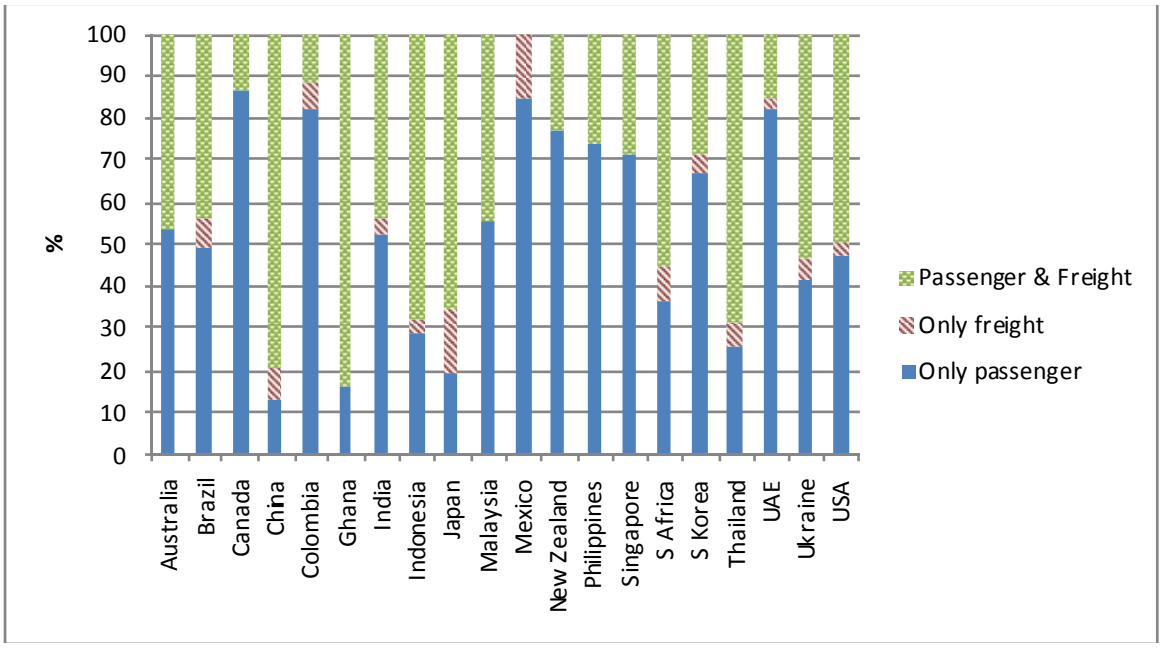


Figure 44: Percentage of passenger, freight and mixed policies by country

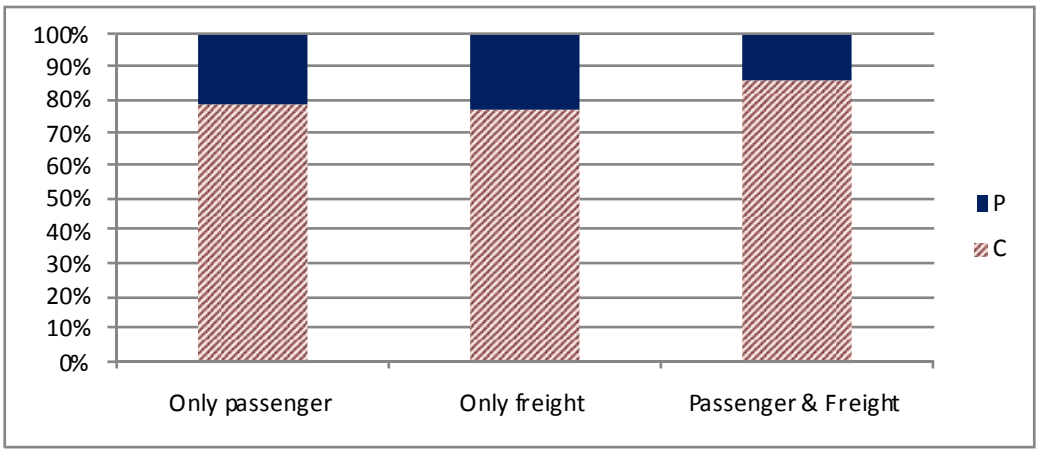


Figure 45: Percentage of passenger, freight and mixed policies by current or planned

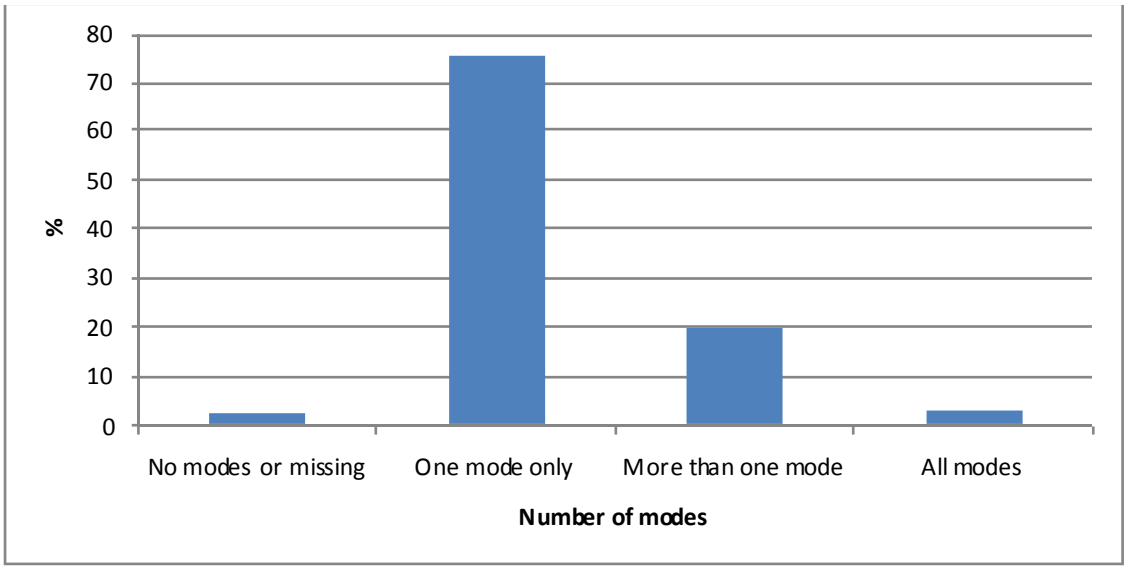


Figure 46: Percentage of policies relating to one, more or all modes

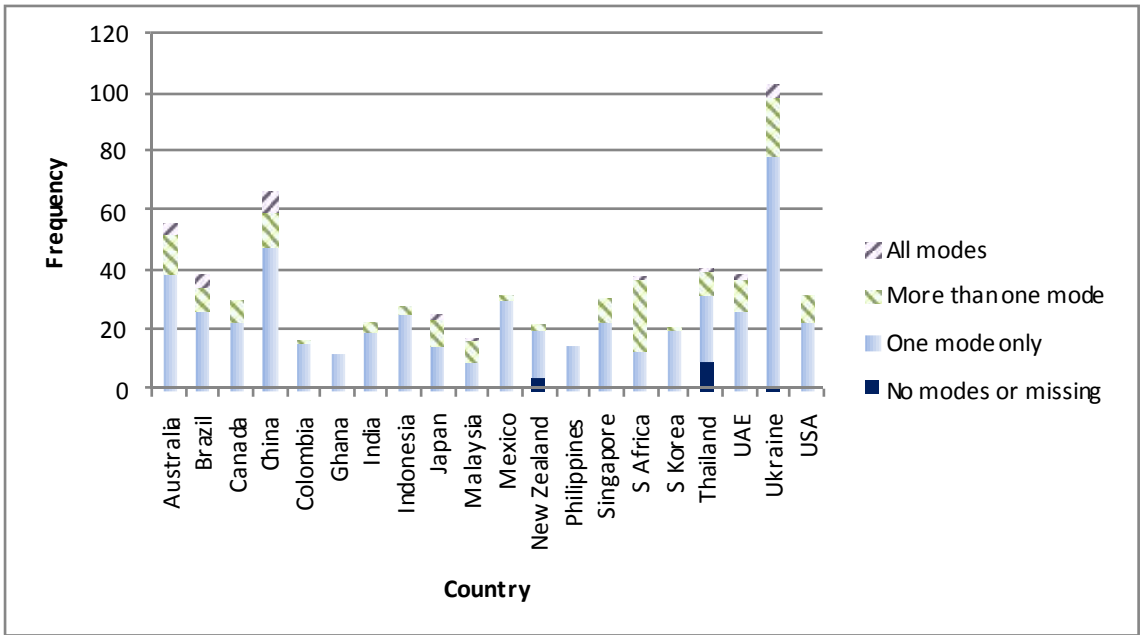


Figure 47: Number of policies relating to one, more or all modes by country

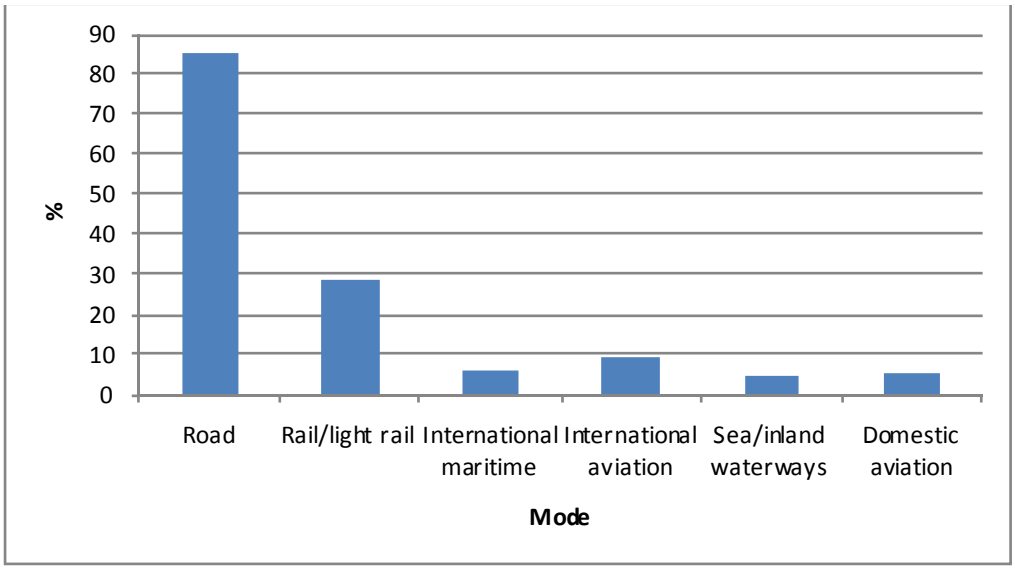


Figure 48: Percentage of policies relating to each mode

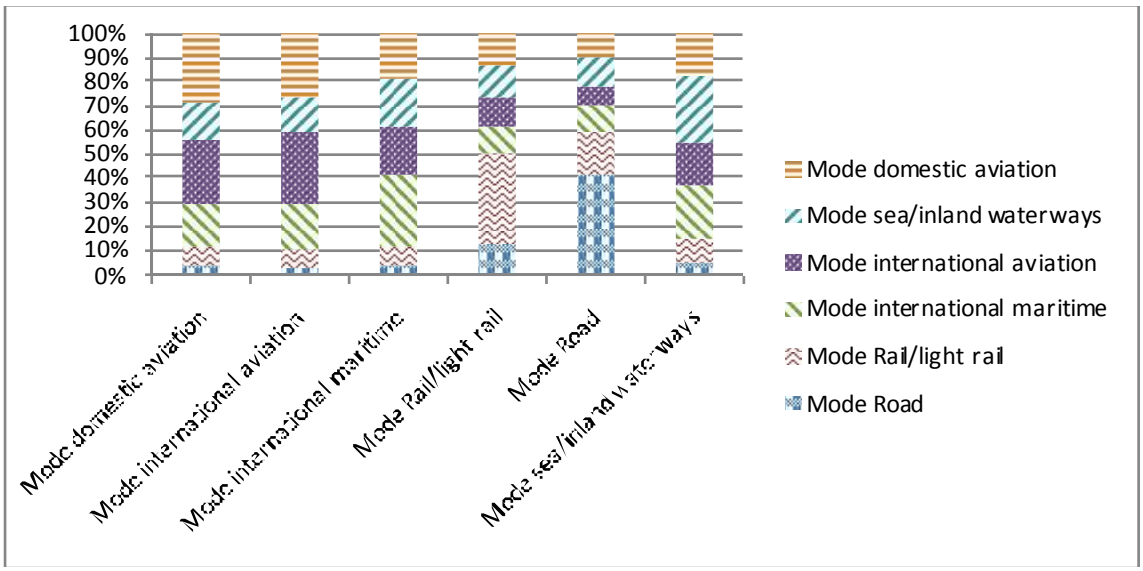


Figure 49: Percentage of policies relating to each mode

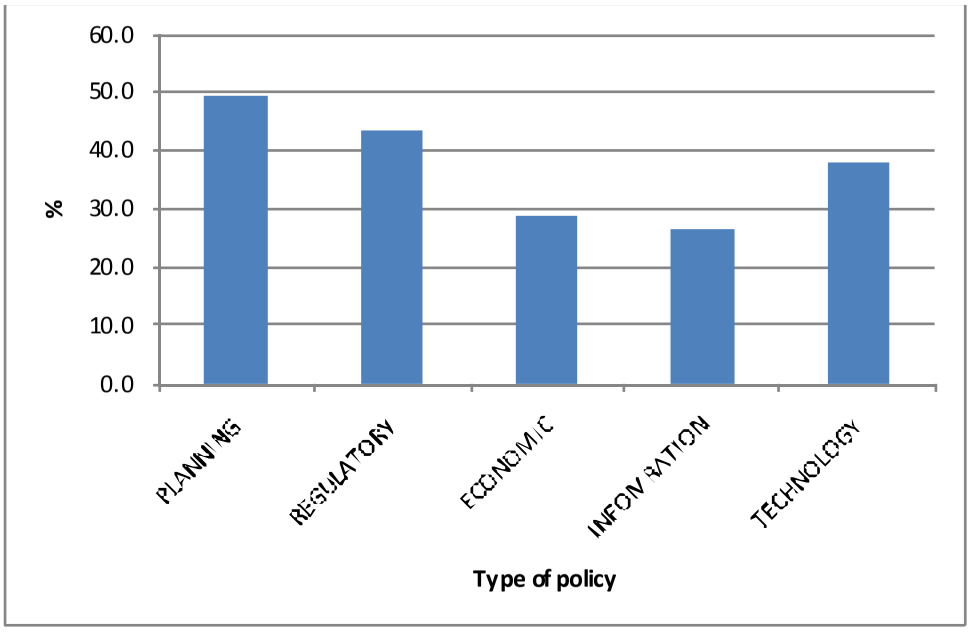


Figure 50: Type of policy (a)

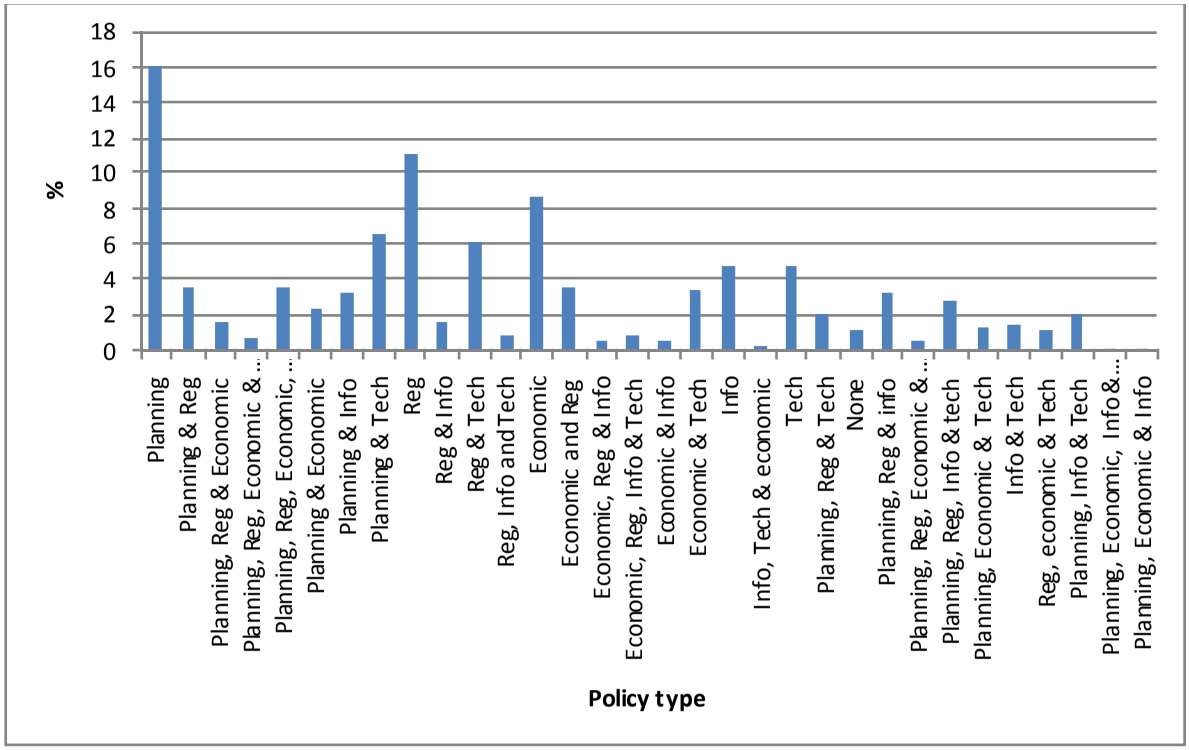


Figure 51: Type of policy (b)

Table 31: Economic policies

Off-Peak Car Scheme	National Urban Transport Policy (NUTP)
"Vehicle to rurals"	Nation's Fuel Tax Reform
actual introduction of European standards for vehides	Natural gas for public transport
Advance Appropriate Mode Freight Logistics Policy	New Deal for Cities and Communities
Alternative fuels (CNG)	New York State Energy Plan
Autogas (LPG) program	Notion on Promoting 'Smooth Traffic Project' for Urban Road Management
Aviva Autograph Pay-as-you-drive auto insurance	NSW Government Cleaner Vehicles and Fuels Strategy (multi dimensional policy. See explanation).
Bike 'n' Ride	Ontario Alternative Fuel Vehicle Tax Rebate
Biofuels	Package -Fuel Economy Measures - Promoting Compact Cars
Biofuels	Package -Fuel Economy Measures - Promoting electric Cars
Biofuels as transport fuels	Park and Ride Scheme
Biofuels.	Parking charges
British Columbia Carbon Tax	Parking Facilities (Atground, Road side parking, multilevel parking)
British Columbia Sales Tax Relieffor Hybrid Vehicles	Parking fee reform
BRT	Parking management
BRT system	Parking pricing policy
Bus rapid transit (BRT) in Accra	Parking supply policy
Bus route licensing	Partial stamp duty concession for LEVs.
Carbon dioxide vehicle emissions tax	Planning and construction of first metro line in Donetsk
China's National Climate Change Program	Prince Edward Island Tax Incentive for Hybrid Vehicles
CIDE - Contribuição de Intervenção no Domínio Econômico	Private Car Rental Scheme
City Car Share	Programa de Subvenção Econômica do Óleo Diesel Marítimo (Marine diesel oil grant program)
Clean fleet maintenance program	Programa Equalização de Custos da Cana de Açucar
Climate change action plan - 3 for free parking scheme	Programas de Inspeção e Manutenção de Veículos em uso - Inspection/Maintenance Program
Climate change action plan - Pay parking	Pró-Mob
ClimateSmart 2050 - motor vehicle transfer duty	Promote diesel vehides
ClimateSmart 2050 - Walking and cycling	Promote new energy (low emission) vehicles
Comments on the Economic Policy of Urban Public Transport Priority	Promoting Auto restricted zones
Congestion charges, as part of environmental fiscal reform	Promoting Contract-based Energy Management
Congestion fees	Promoting new energy vehicles - private vehicles
Congestion pricing plan	Promoting new energy vehicles - public vehicles (13 cities in pilot)

Construction and modernisation of tram tracks and trolleybus lines	Promoting Non-motorized transport (NMT)
Construction of new Metro track sections	Promoting production and use of unleaded fuel
Construction of new track sections and purchase of rolling stock	Promoting the use of renewable energy (biofuels)
Corporate income tax exemption	Promotion of Alternative Fuelled Vehicles
Cuts on the tax on vehicle owners	Pró-Transporte
Demonstration Campaign of Energy-saving Project in Transport Sector	Public transport improvement
Demonstration Campaign of Energy-saving Project in Transport Sector - Phase I (2007)	Public transport improvement
Demonstration Campaign of Energy-saving Project in Transport Sector - Phase II (2008)	Public Transport Package - Bus Improvements. The package is supported by several regulatory approaches - National Land Planning and Utilizing Act, and Framework act of low carbon green growth. Considered as the Seoul Bus Reform
Demonstration Campaign of Energy-saving Project in Transport Sector - Phase III (2009)	Public transport.
Detailed Rules on Impelmenting "Energy Conservation Law of PRC" in Railway Sector	Purchase of new metro wagons
Development of a network of fuel stations for CNG	Purchase of new trolleybuses and trams
Development of major airports and seaports (NPP 26)	Québec Sales Tax Rebate for Hybrid Vehicles
development of urban public transport	reduce air pollution by transport means
Early De-registration of Vehicles	Reduce purchasing tax for low-emission cars
ecoAUTO Rebate Program	Reduction of excise tax on biofuels and biofuel additives to petrol
Eco-car/ Green Car	Reduction of Excise Tax on Gasohol and Biodiesel (Notification of Ministry of Finance dated 21/9/09)
Electronic Road Pricing/ Congestion Charging	Reform of the national railway system
Energy Conservation Program - General	Regional Sustainability - for future road network
Energy Conservation Program - Transport System Efficiency	Renew public buses (RTP)
Energy Conservation Promotion Act, B.E. 2535 (1992)	Renew the government fleet
Energy Conservation Promotion Fund	Renewal of taxis
Energy Tax Act of 1978: The Gas Guzzler Tax	Replacement of 2-stroke tricycles
Enhance the effectiveness of Electronic Road Pricing	Road User's Tax Law - Special fund for air pollution control
Enhancing Energy-saving and emission reduction management in transport sector (Article 28)	Salik Road Toll
Evaluation Indicators for Urban Road Transport Management	Scrapping of federal vehicles (freight)
Excise Tax on Fuel Inefficient Cars	SmartWay Transport Partnership
Excise tax on petrol	Solar Traffic Lighting Project
Exhaust Control	Speed up phasing out old vehicles
Extension and modernisation of tracks and wagons	State of Veracruz Climate Change Program
Federal gas tax	State-level subsidies for Vehicle "Old-for-New"

	Program
Fee Bate	stimulating the use of alternative fuels
fees on air pollution in the economic sector	stimulation to improve structure of vehicle fleet
Fiscal incentives to public transport for cleaner vehides	Stimulation to increase the share of alternative fuel of the overall amount of fuel to 20 % by 2020
Flexible expressway tolls	Strategy on Urban Road Transport Management - 'Smooth Traffic Project' - in PRC Cities
Formulation Provisions for Comprehensive Urban Transport System Planning	Subsídio ao Diesel (subsidy for diesel)
Freight Package - Logistics Improvement. This is supported by Logistics Facilitation Act, Distribution Centre Development Act and Freight Industry Act and Green Growth Act	Subsidy for sugar cane in RS
Fuel Economy	Subsidy on Purchasing Tax of Small-Energy Vehicles
Fuel Economy Labelling Scheme	Suburban Train
Fuel Flexible Vehicles	support the use of less toxic fuels
Fuel subsidy dismount	Supporting the use of vehicles that correspond to European emission standards
Fuel surcharge 20 - 25%	Sustainable Land use
Fuel Tax	Tasmanian Government air travel offset
Fuel tax credit	Tax reduction for engine modification for the use of biofuels
Goods and Passenger Transport Management policy and regulatory/incentive dispensation	TDM Package - Parking Management
Green Municipal Fund (GMF)	TDM Package - Traffic Inducement Charge and Employers TDM
Green tax plan for motor vehicles	TDM Package - Car Free Day
Green taxi fleet for Perth	TDM Package - Congestion charging. The ministry of construction and transportation amended the urban traffic readjustment promotion act to enact the congestion pricing collection ordinance. This measure was supported by green transport policy
Green Vehicle Rebate	TDM Package - Fuel Reforms
Hainan "fee-to-tax" reform: Management Measures on Collection of Vehicle Fuel's Additional Tax in Hainan Special Economic Zone	TDM Package - No Driving Days
Idling restriction	Technical and technological modernization in all transport systems expanding the use of alternative fuels and renewable energy
Implement and improve "The Automobile Industry Development Policy"	The US Energy Policy Act (EPAct): The Hybrid Vehicle Tax Credit
Implement Road User Charges	Toronto AutoShare (car sharing)
Improving the traffic system in BMA	Transportation Incentive Program: Promotion and Demonstration of Energy Efficiency Improvement in the Transport Sector
Increase of general fuel levy	Travel demand managements trategies
Inspection & maintenance with economic incentive introducing clean technologies and renewable	Tricycle management and 2-stroke bans Urban Public Transport Protocol

energy in transport sector	
Introduction of high capacity buses	vehicle and boat taxation
introduction of smart cards	Vehicle emission tax
Invest in clean-tech	Vehicle Entry Permit Fees and Tolls
IPT Package - Taxi Management	Vehicle quota system (vehicle plate auction)
Jawaharlal Nehru National Urban Renewal Mission (JnNURM) - It includes public transport and NMT reforms, institutional structure improvement, visioning and preparation of development plans and transport plans.	Vehicle Registration Schemes
Jeepney engine replacement to LPG	Vehicle scrappage trial.
Land Transport Innovation Fund (LTIF)	Vehicle Tax
Local subsidies for Vehicle "Old-for-New" Program (Beijing)	White Paper: China's Policies and Actions on Climate Change
Local subsidies for Vehicle "Old-for-New" Program (Shanghai)	
Long-term mitigation scenarios, 2007	
Low Emission Zones	
LPG Vehicle Scheme Enhancement	
Manitoba Hybrid Electric Vehicle Rebate Program	
Maryland Clean Energy Incentive Act: Excise Tax Credits for Electric and Hybrid-Electric	
Maryland Smart Growth Initiative	
Measures on Implementing "Energy Conservation Law of PRC" in Road and Waterway Sector	
Modernization program for domestic shipping companies	
National Fund for Climate Change	

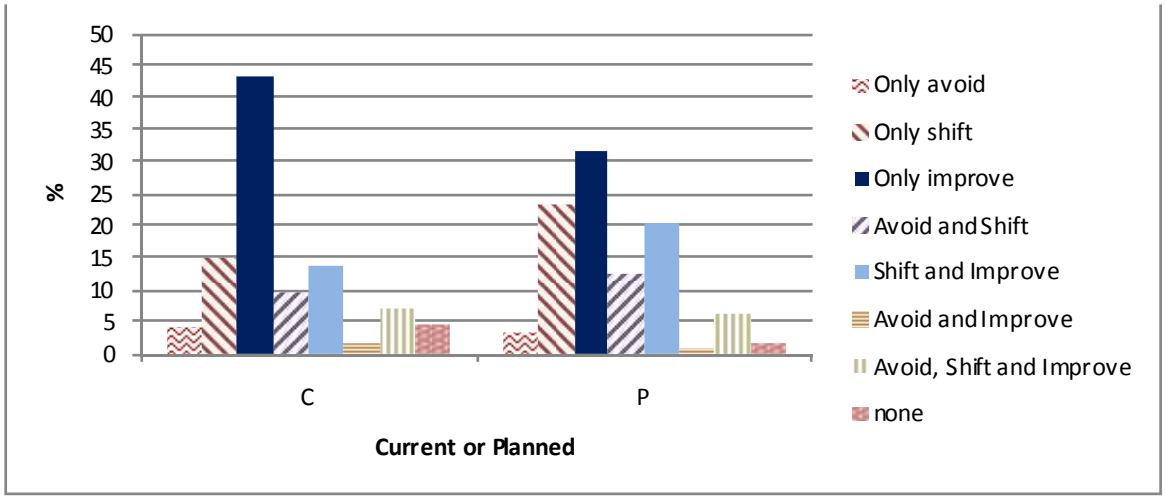


Figure 52: Avoid, Shift and improve for current and planned

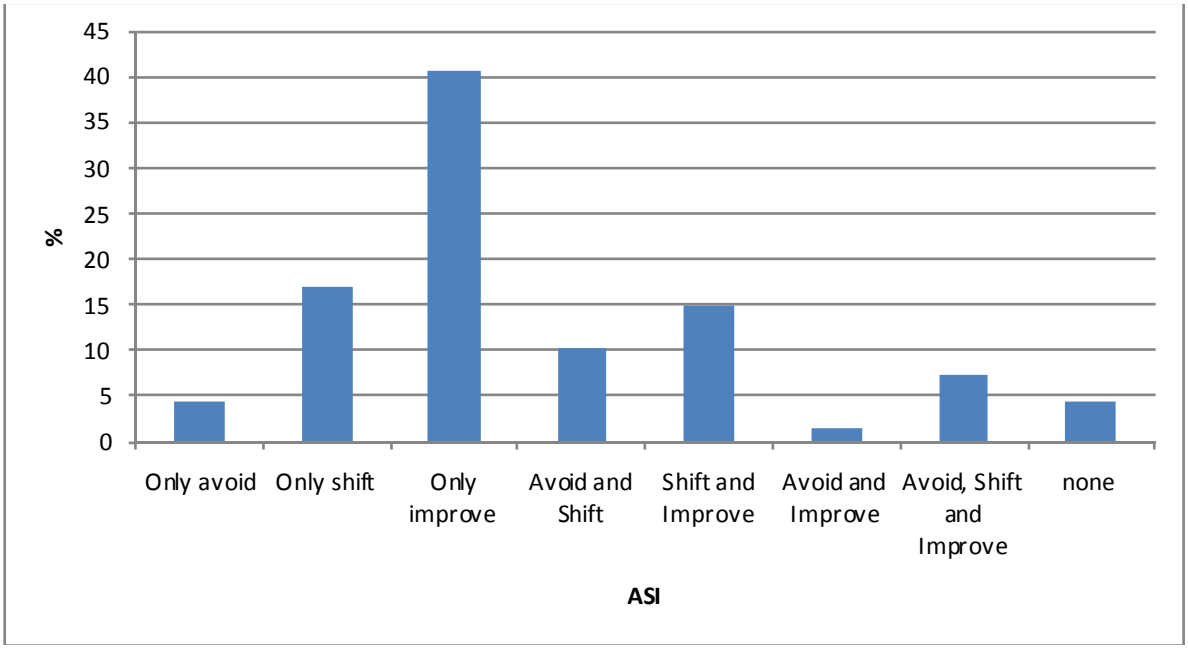


Figure 53: Avoid, Shift and improve

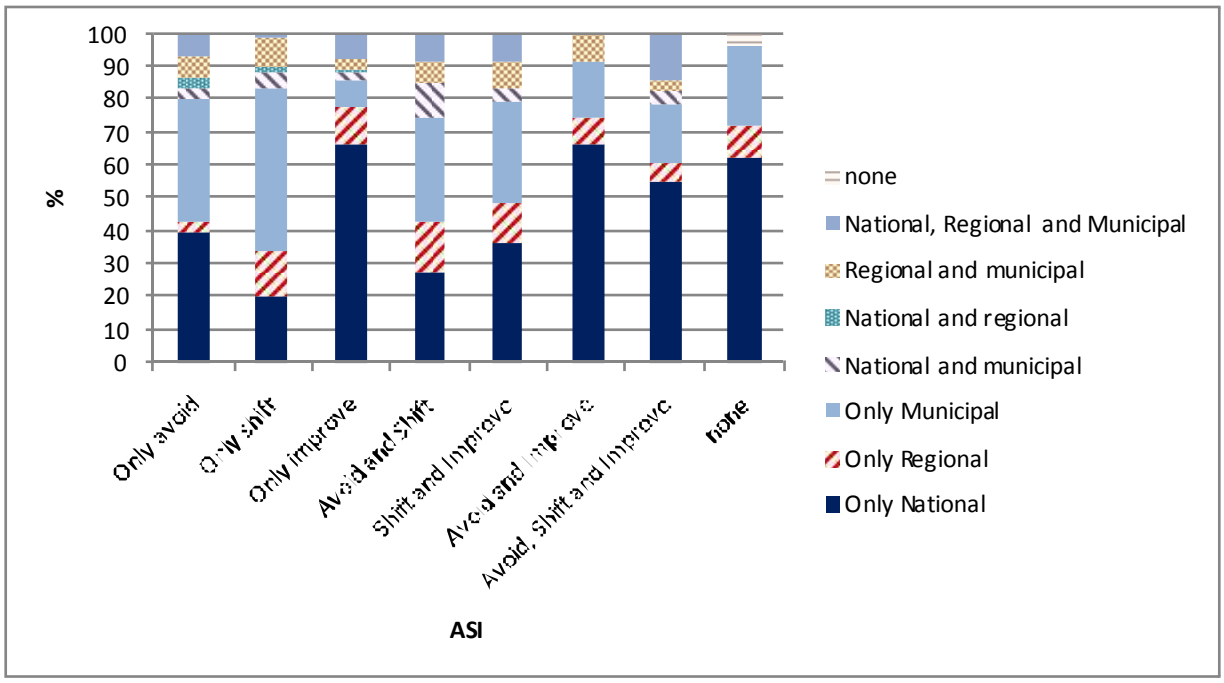


Figure 54: Avoid, Shift and improve by implementation level

Which actors were found to be implementing the policies?

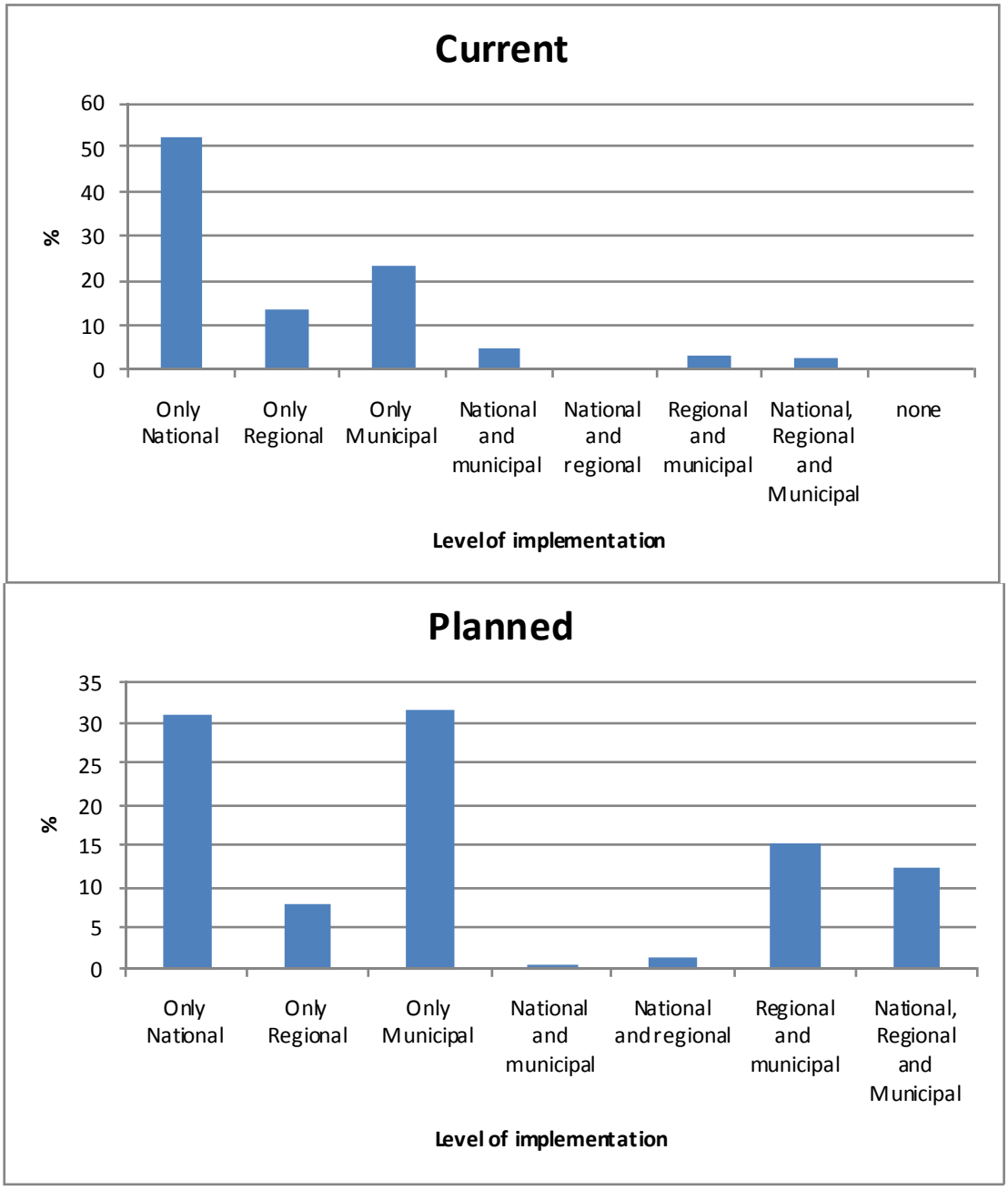


Figure 55: Level of implementation for current (top) and planned (bottom) policies

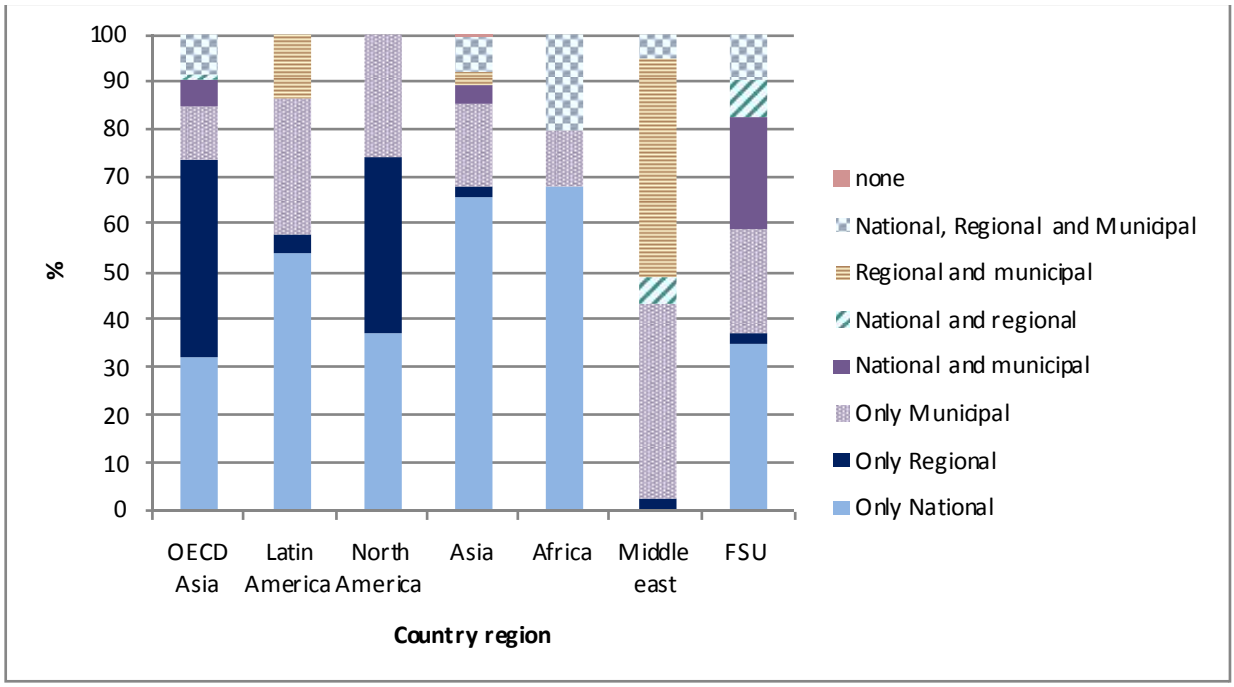


Figure 56: Level of implementation by region

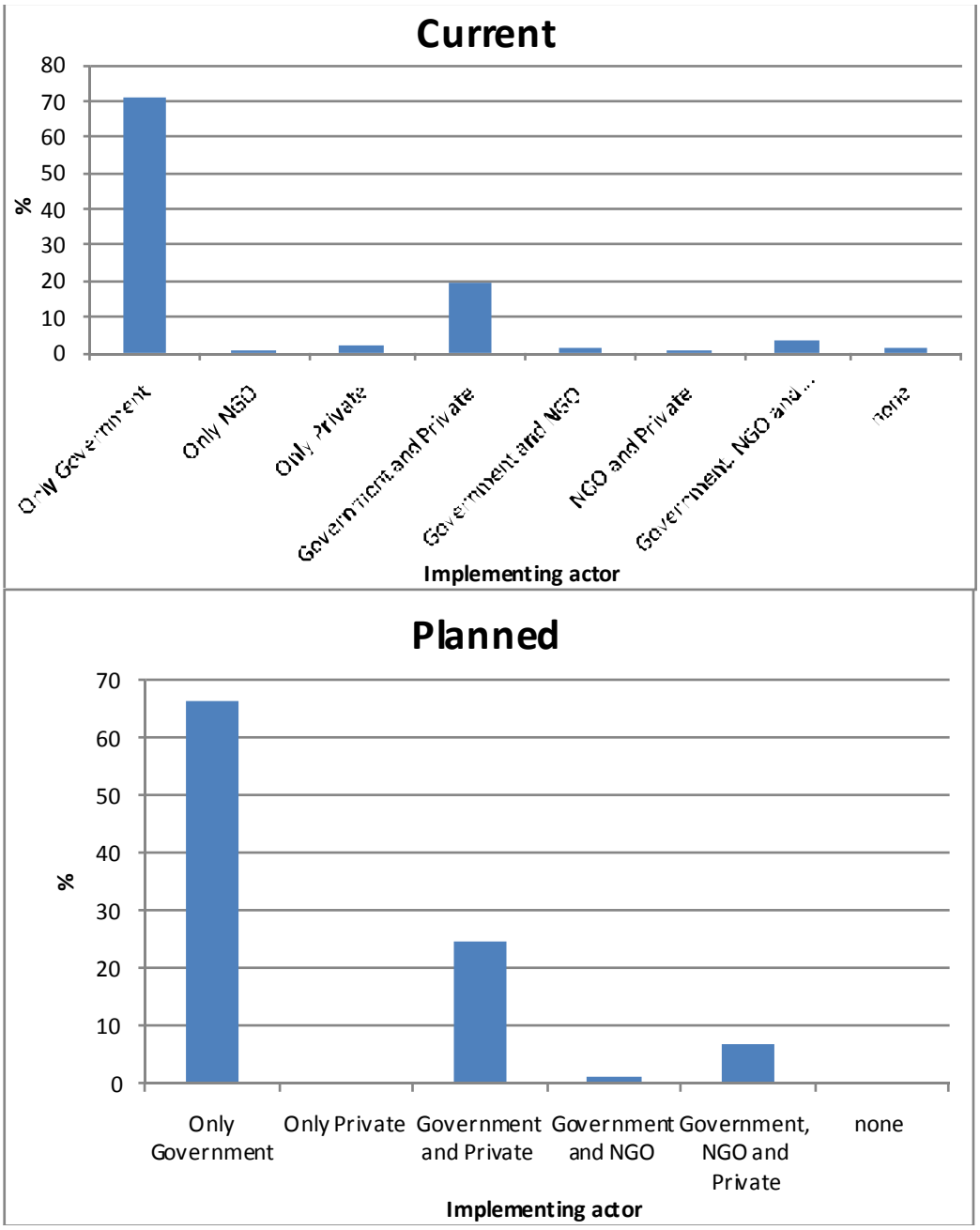


Figure 57: Implementing actor for current (top) and planned (bottom)

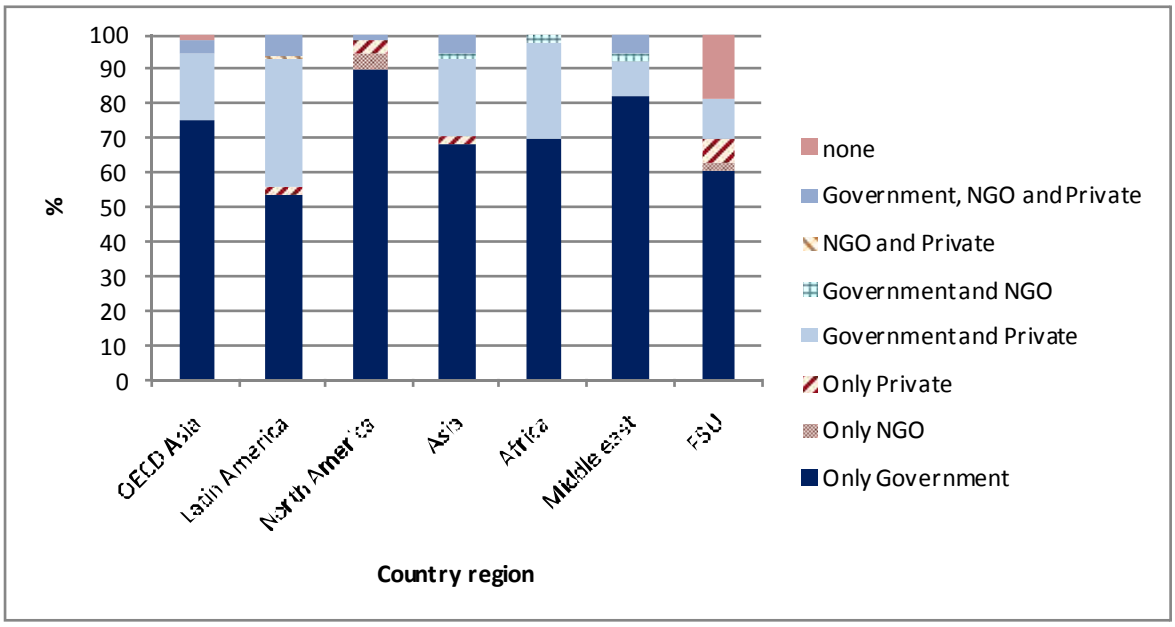


Figure 58: Implementing actor by region

Table 32: Number of Government and Private Policies (jointly) by country

Country	Number of Government and private policies
Australia	3
Brazil	13
China	27
Colombia	1
Ghana	3
India	4
Indonesia	20
Japan	16
South Korea	10
Malaysia	2
Mexico	24
Philippines	6
Singapore	1
S Africa	11
Thailand	2
UAE	6
Ukraine	12
USA	1
Total	162

Which policies were found to be most effective?

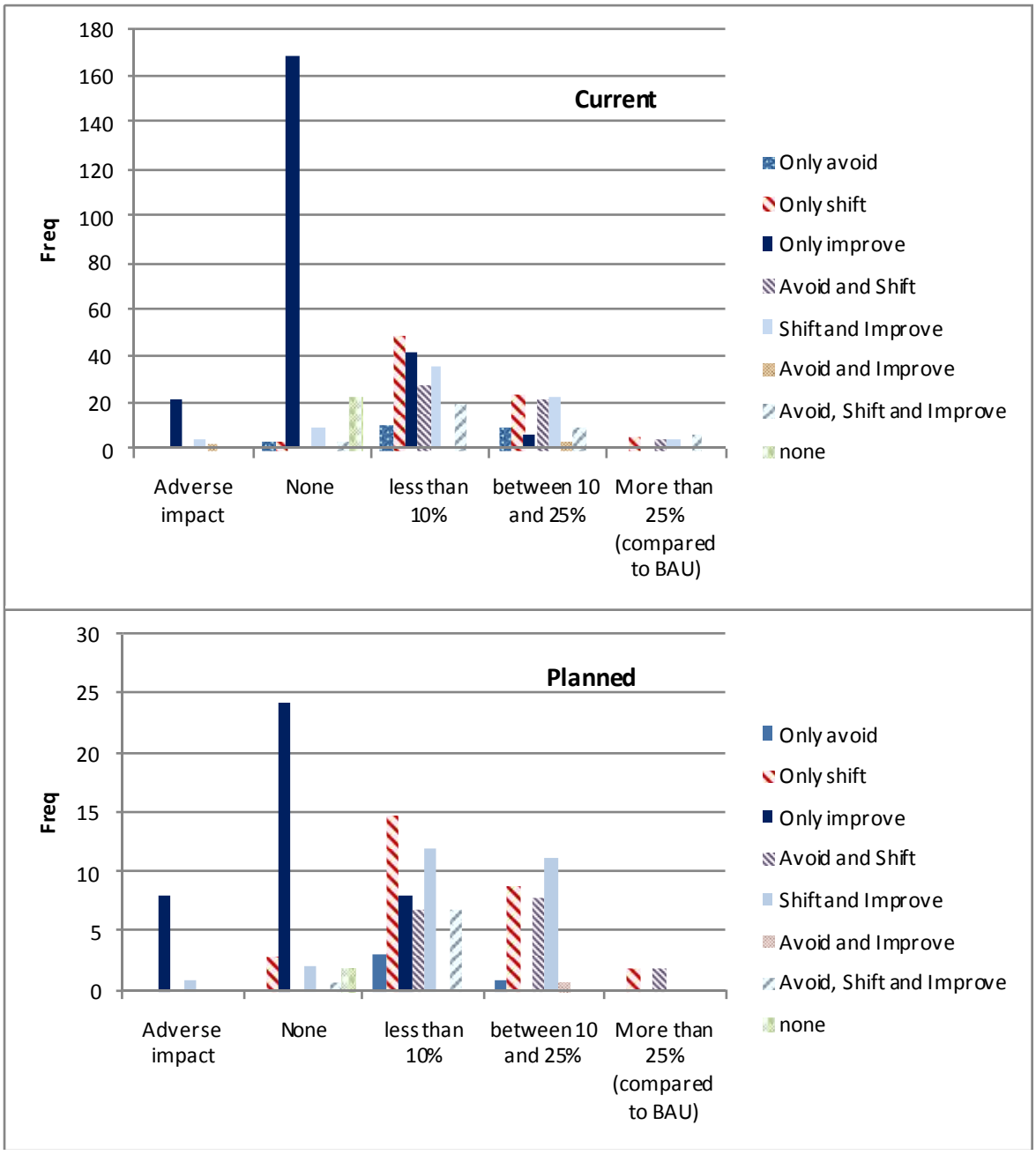


Figure 59: Reduction potential by ASI for current (top) and planned (bottom)

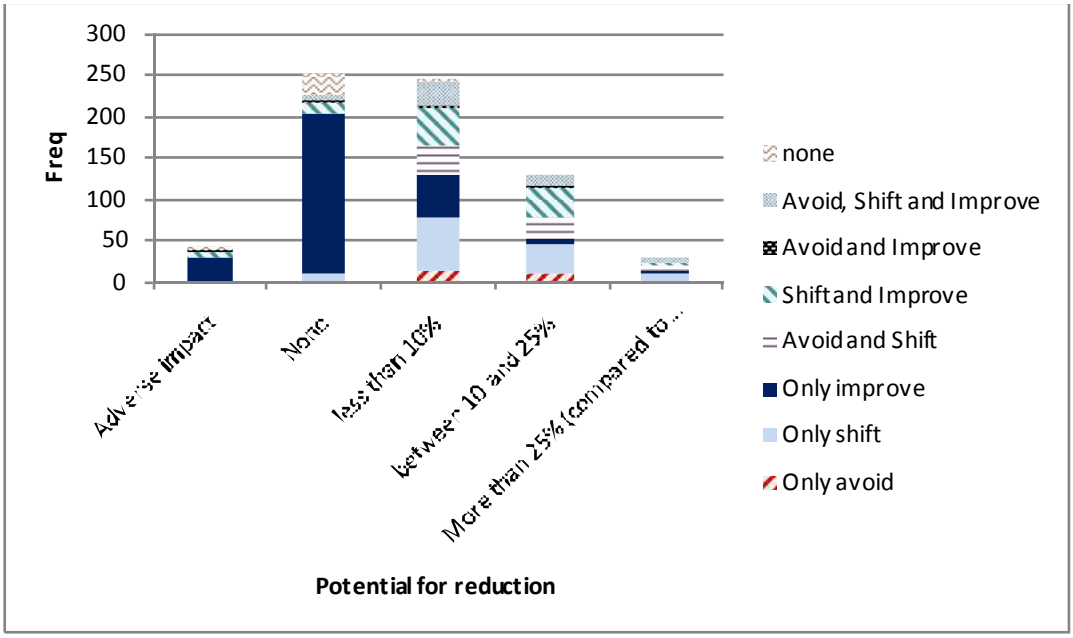


Figure 60: Reduction potential by ASI

Table 33: The policies that had potential for reduction of more than 25%

Bikeways and Walkways Program in Metro Manila
Bus rapid transit (BRT) in Accra
Demonstration Campaign of Energy-saving Project in Transport Sector
Demonstration Campaign of Energy-saving Project in Transport Sector - Phase I (2007)
Demonstration Campaign of Energy-saving Project in Transport Sector - Phase II (2008)
Demonstration Campaign of Energy-saving Project in Transport Sector - Phase III (2009)
Enhance the effectiveness of Electronic Road Pricing
Mass Transit Systems (SITM) in major cities over 600,000 population
Non Motorized Package - Bike lanes. This Package is supported by Bill on Low Carbon Green Growth
Promoting Non-motorized transport (NMT)
Promotion of BRT systems for metro cities
Public Transport Package - III - High Speed Rails
Strategic Public Transport Systems SETP) in smaller cities between 250,000 and 600,000 population
TDM Package - Car Free Day
TDM Package - Congestion charging. The ministry of construction and transportation amended the urban traffic readjustment promotion act to enact the congestion pricing collection ordinance. This measure was supported by green transport policy
TDM Package - No Driving Days
Transport Planning
Travel demand management strategies
Vehicle plate restrictions, Bogota, Medellín, Bucaramanga, Cali, Barranquilla, Cartagena, and Pasto
Vehicle quota system

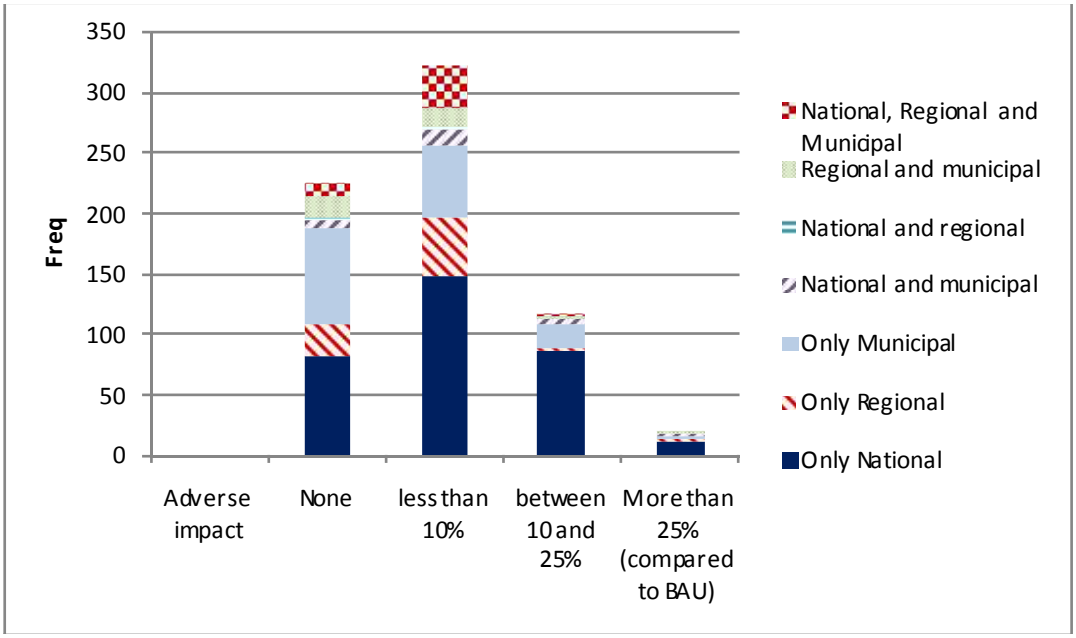


Figure 61: Improving potential by ASI

Table 34: the policies that had potential for improving of more than 25% by region

Region	Policy
OECD Asia	• Public Transport Package - III- High Speed Rails • Package -Fuel Economy Measures - Promoting Compact Cars
Latin America	• High speed rail RIO-SP (TAV Brasil - Trem de Alta Velocidade) • Light Rail Transit and Monorails for the WC2014 • Mass Transit Systems (SITM) in major cities over 600,000 population • Strategic Public Transport Systems SETP) in smaller cities between 250,000 and 600,000 population • Vehicle plate restrictions, Bogota, Medellín, Bucaramanga, Cali, Barranquilla, Cartagena, and Pasto
North America	• California Assembly Bill (AB) 1493: Passenger vehicle GHG standards • California Assembly Bill (AB) 32: Global Warming Solutions Act • Corporate Average Fuel Economy (CAFE) standards • New Vehicle Emissions Standards • SmartWay Transport Partnership
Asia	• Promote new energy (low emission) vehicles • Promoting new energy vehicles - private vehicles • Promoting new energy vehicles - public vehicles (13 cities in pilot) • Promoting Non-motorized transport (NMT)
Africa	• Electric and hybrid-electric vehicles

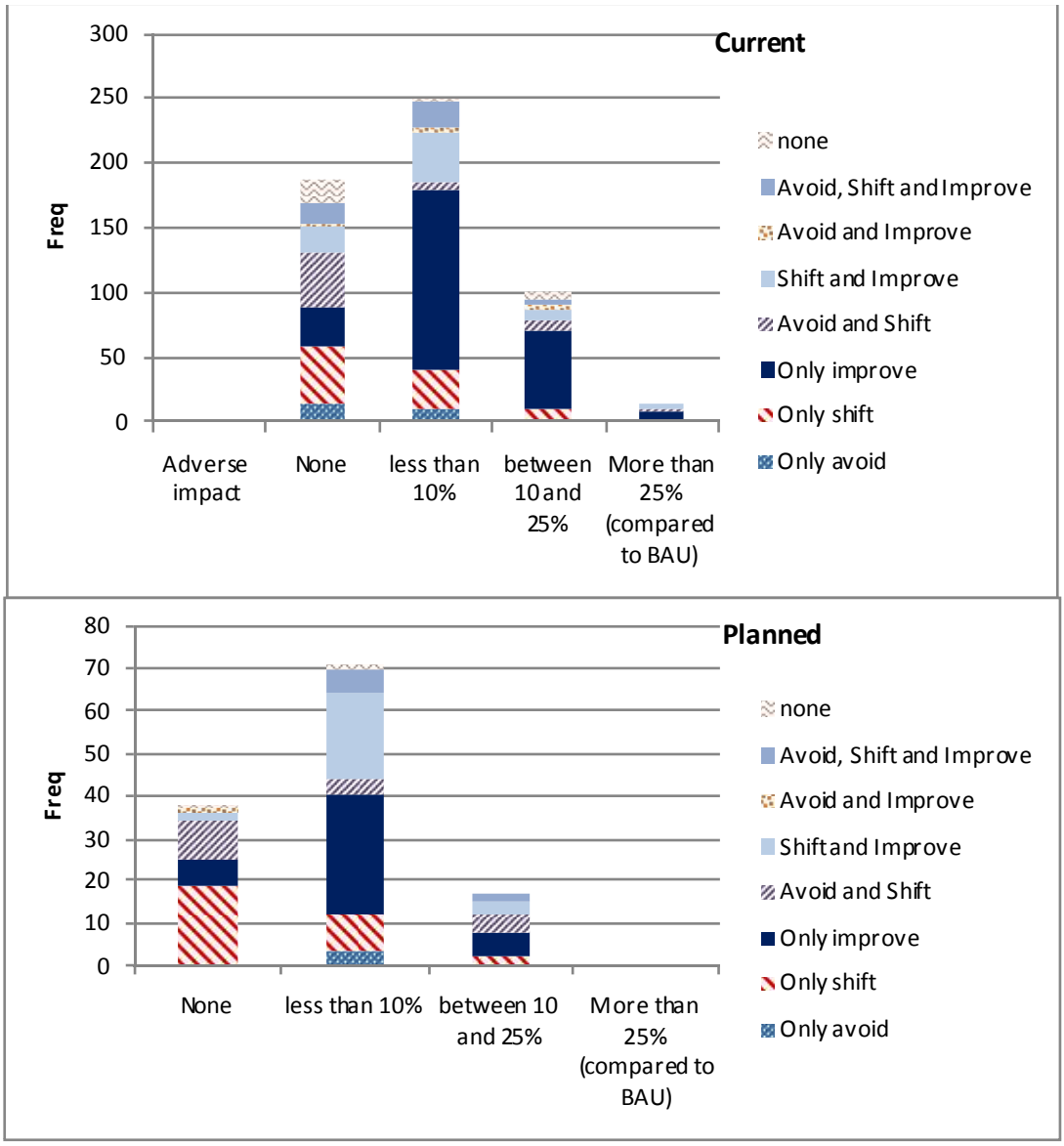


Figure 62: Improving potential by ASI for current (top) and planned (bottom)

Table 35: Policies that had a total potential for mitigating carbon emissions of more than 25%

Bus rapid transit (BRT) in Accra
California Assembly Bill (AB) 1493: Passenger vehicle GHG standards
California Assembly Bill (AB) 32: Global Warming Solutions Act
Corporate Average Fuel Economy (CAFE) standards
Demonstration Campaign of Energy-saving Project in Transport Sector - Phase I (2007)
Demonstration Campaign of Energy-saving Project in Transport Sector - Phase II (2008)
Demonstration Campaign of Energy-saving Project in Transport Sector - Phase III (2009)
Electric and hybrid-electric vehicles
High speed rail RIO-SP (TAV Brasil - Trem de Alta Velocidade)
Light Rail Transit and Monorails for the WC2014
Mass Transit Systems (SITM) in major cities over 600,000 population
National Policy on Climate Change
New Vehicle Emissions Standards
Non Motorized Package - Bike lanes. This Package is supported by Bill on Low Carbon Green Growth
Promoting Non-motorized transport (NMT)
Promotion of BRT systems for metro cities
Public Transport Package - Bus Improvements. The package is supported by several regulatory approaches - National Land Planning and Utilizing Act, and Framework act of low carbon green growth. Considered as the Seoul Bus Reform
Public Transport Package - III- High Speed Rails
Reform of the national railway system
Strategic Public Transport Systems SETP) in smaller cities between 250,000 and 600,000 population
Transport and the Environment
Transport Planning
Vehicle plate restrictions, Bogota, Medellín, Bucaramanga, Cali, Barranquilla, Cartagena, and Pasto

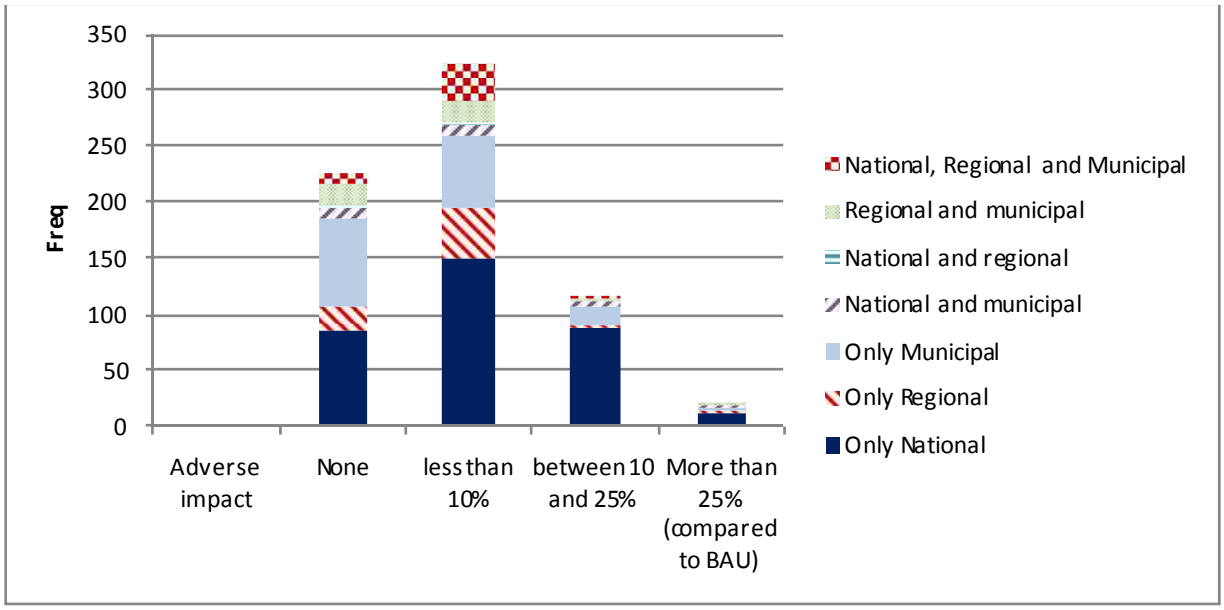


Figure 63: Improving potential by implementation level

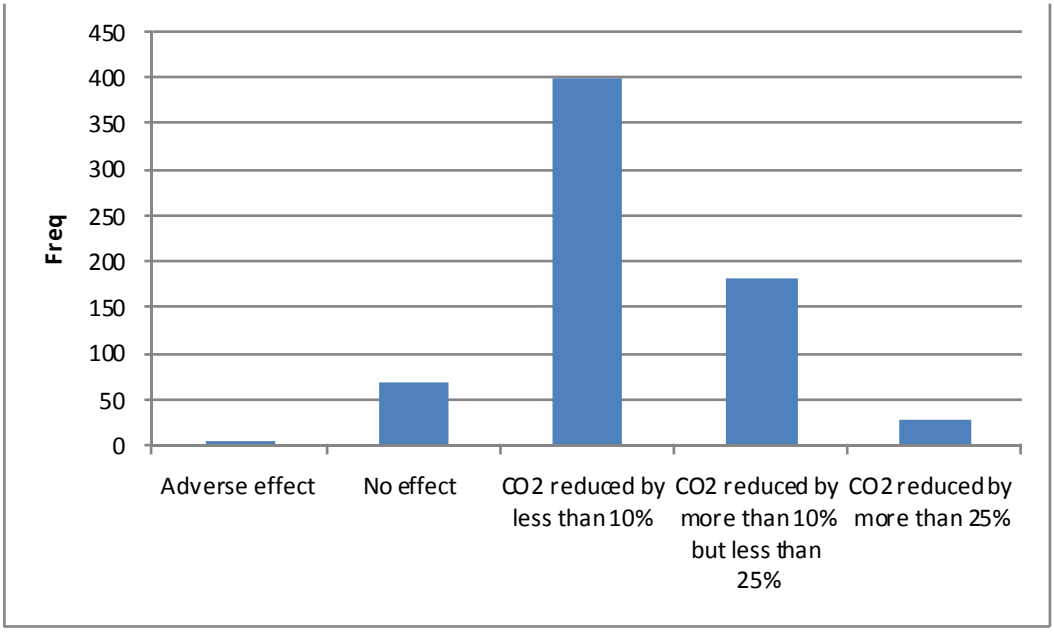


Figure 64: Potential total

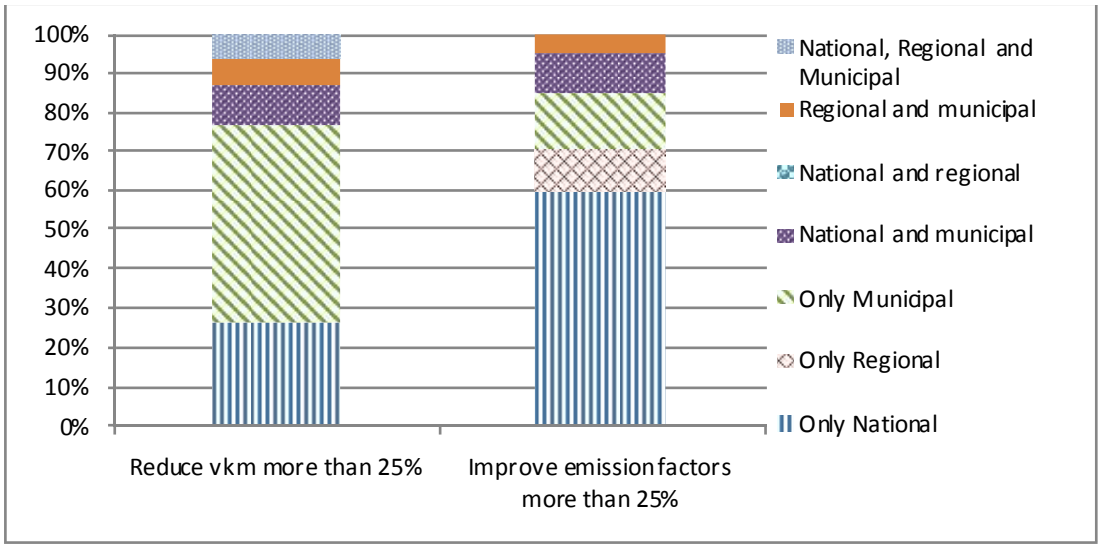


Figure 65: Comparison of governance for policies that bring 25% or more reduction of traffic activity and emission factors

Which policies were found to be most cost-effective?

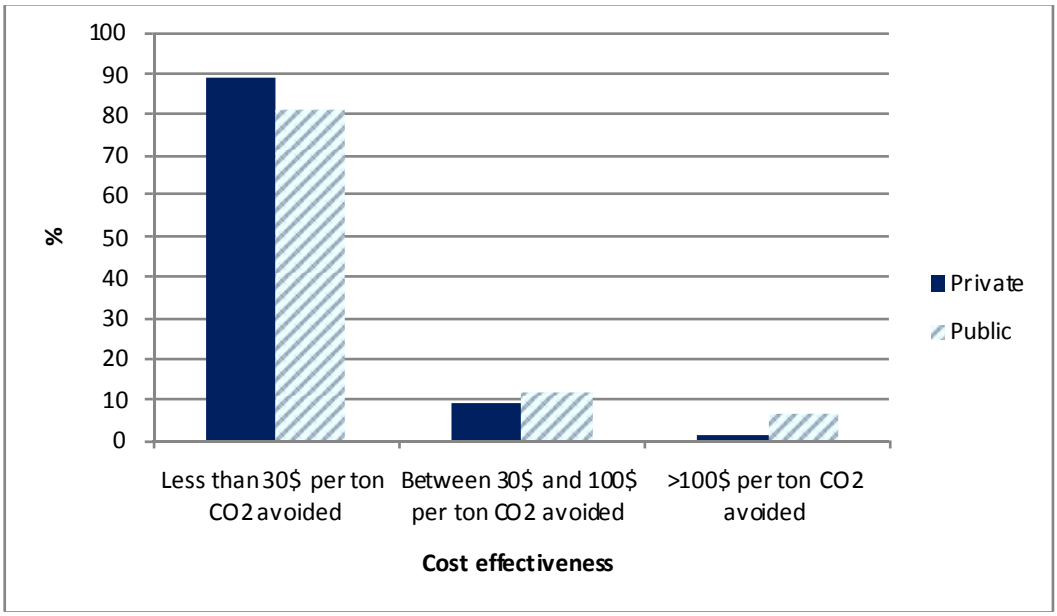


Figure 66: Public and private cost effectiveness

Table 36: Policies that caused SAVINGS to the Government budget

ACT government fleet target	Excise Tax on Fuel Inefficient Cars	Increase of general fuel levy
Anti-idling Campaign	Federal gas tax	Nation's Fuel Tax Reform
Bus route licensing	Fee Bate	Parking Facilities (At ground, Roadside parking, multilevel parking)
Carbon dioxide vehicle emissions tax	Fuel subsidy dismount	Parking fee reform
Climate change action plan - Pay parking	Fuel surcharge 20 - 25%	Parking management
Congestion fees	Fuel Tax	Promoting production and use of unleaded fuel
Congestion pricing plan	Government Energy Management Program	Tasmanian Government air travel offset
Decrease in construction works on the road	Green fleet strategy	Vehicle emission tax
Energy Conservation Promotion Fund	Hainan "fee-to-tax" reform: Management Measures on Collection of Vehicle Fuel's Additional Tax in Hainan Special Economic Zone	Vehicle quota system (vehicle plate auction)
Energy Tax Act of 1978: The Gas Guzzler Tax	Idling restriction	

Table 37: Policies that caused SAVINGS to the household

"Vehide to rurals"	Eco-Driving (CONUEE)	Integrated Railway Modernization Plan	Promoting the use of Biofuels in BMA	Transportation incentive program Promotion of Smart Driving for Energy Saving in the Transport Sector
A single card ticketing system	Eco-Driving (public Transport)	Integrated ticketing: urban buses + suburban train	Promotion of Alternative Fueled Vehicles	Vehicle scrappage trial.
Alternative fuels (CNG)	Electric vehicles.	Introduce Travel Plans	Public space recuperation	Wojhati (Journey Planner)
Alternative fuels (ethanol)	Expanding the mass transit rail system within the Bangkok metropolitan area	Jawaharlal Nehru National Urban Renewal Mission (JnNURM) - It includes public transport and NMT reforms, institutional structure improvement, visioning and preparation of development plans and transport plans.	Québec Sales Tax Rebate for Hybrid Vehicles	
Anti-idling Campaign	Facilitating the use of existing railway and bus routes	Local subsidies for Vehicle "Old-for-New" Program (Beijing)	Reduce purchasing tax for low-emission cars	
Awselni - Employees bus service	Fiscal incentives to public transport for cleaner vehicles	Local subsidies for Vehicle "Old-for-New" Program (Shanghai)	Reducing the rates of Import Duty on Completely-Knocked Down Parts and Components for Assembly of Low Engine Displacement and Hybrid Vehicles	
Bikeway infrastructure development	Flexible expressway tolls	Manitoba Hybrid Electric Vehicle Rebate Program	Reduction of excise tax on biofuels and biofuel additives to petrol	
Bikeway masterplans	Formulation Provisions for Comprehensive Urban Transport System Planning	Maryland Clean Energy Incentive Act: Excise Tax Credits for Electric and Hybrid-Electric	Reduction of Excise Tax on Gasohol and Biodiesel (Notification of Ministry of Finance dated 21/9/09)	
Bogotá - Plan de Ordenamiento Territorial	Fuel Economy - Labelling	Mass Transit Systems (SITM) in major cities over 600,000 population	Road Transport Patrol	
British Columbia Carbon Tax	Fuel Flexible Vehicles	Mobility Management Programs	Road user charge.	
British Columbia Sales Tax Relief for Hybrid Vehicles	Fuel quality improvement (Diesel Sulfur content)	National freight policy (Política nacional de transporte público automotor de carga)	Sharekni - Encourage car pooling	
Bus rapid transit (BRT) in Accra	Green tax plan for motor vehicles	National Rail Vikas Yojana (NRVY)	Speed up phasing out old vehicles	
Clean fleet	Improving the public bus	National Strategy on	State-level subsidies for	

maintenance program	system in BMA	Climate Change B.E. 2551-2555 (2008 - 2012) : Avoid	Vehide "Old-for-New" Program	
Climate change action plan - 3 for free parking scheme	Improving the traffic system in BMA	National Strategy on Climate Change B.E. 2551-2555 (2008 - 2012) : Shift	Strategic Public Transport Systems SETP) in smaller cities between 250,000 and 600,000 population	
ClimateSmart 2050 - motor vehicle transfer duty	Improving urban public transport	National Urban Transport Policy (NUTP)	Subsídio ao Diesel (subsidy for diesel)	
Cuts on the tax on vehicle owners	Inspection & maintenance with economic incentive	Ontario Alternative Fuel Vehicle Tax Rebate	Subsidy on Purchasing Tax of Small-Energy Vehicles	
Dedicated Freight Corridor Program (DFC)	Integrated high-speed rail system (NPP 24)	Partial stamp duty concession for LEVs.	Tax reduction for engine modification for the use of biofuels	
Eco Driving (Promotion of the environmentally friendly usage of vehicles)	Integrated national transportation network (NPP 23)	Prince Edward Island Tax Incentive for Hybrid Vehicles	The US Energy Policy Act (EPAct): The Hybrid Vehicle Tax Credit	
ecoAUTO Rebate Program	Integrated public transportation system (NPP 28)	Programa de Subvenção Econômica do Óleo Diesel Marítimo (Marine diesel oil grant program)	Training programs and dissemniation of smart/eco driving	
Eco-driving	Integrated public transportation system (NUP 15)	Promote 2nd hand vehicle market	Transit orientated development - Rail - (NPP 27)	

Which policies were found to deliver broader positive impacts?

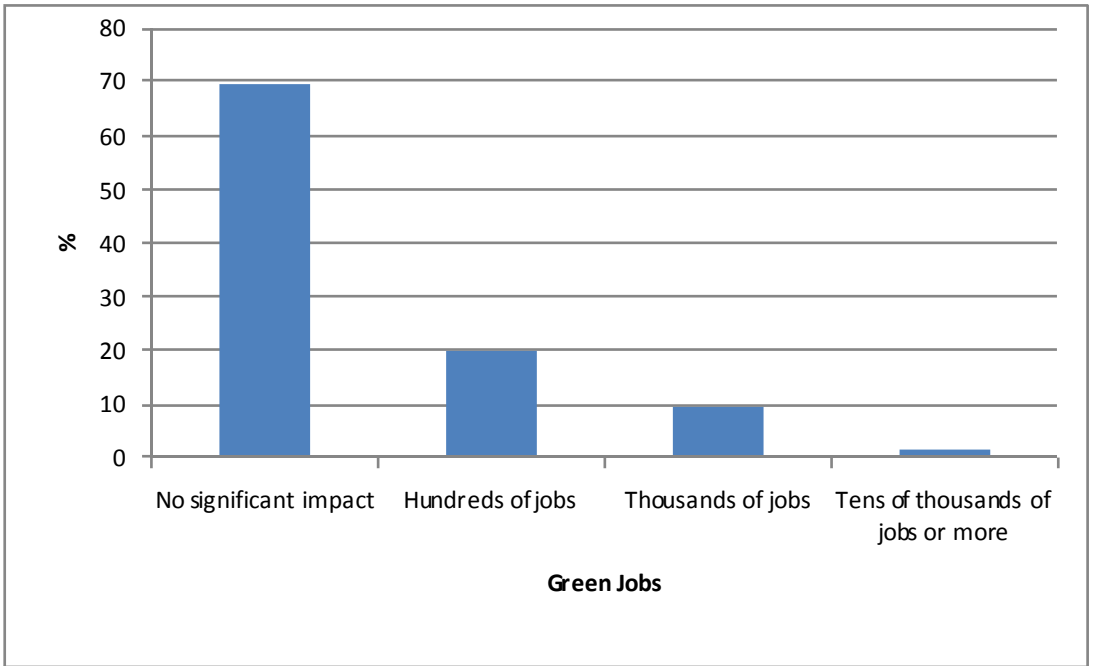


Figure 67: the number of green jobs created by policies and measures (for current policies only)

Table 38: Current policies that are expected to create more than thousands of green jobs

Automotive Mission Plan	Metro Railway (Amendment) Act 2009
Biofuels as transport fuels	Modal shift to railway and marine transportation
Biomass fuels	National Rail Vikas Yojana (NRVY)
California Assembly Bill (AB) 1493: Passenger vehicle GHG standards	National Strategy on Climate Change B.E. 2551-2555 (2008 - 2012) : Shift
Canadian Environmental Protection Act (CEPA) Part 7, Division 5: Vehicle, Engine and Equipment Emissions	National Urban Transport Policy (NUTP)
Commercial Aviation Alternative Fuels Initiative (CAAFI)	Notion on Promoting 'Smooth Traffic Project' for Urban Road Management
Construction of electric railways	Popularisation of greener vehicles (clean energy based vehicles)
Corporate Average Fuel Economy (CAFE) standards	PRO-ÁLCOOL
Detailed Rules on Impelmenting "Energy Conservation Law of PRC" in Railway Sector	Pró-Mob
Developing drop-and-hook transport (trailers)	Promote new energy (low emission) vehicles
Developing Metro/LRT/Mono Rail	Promoting Contract-based Energy Management
Dubai Metro	Promoting the use of renewable energy (biofuels)
Eco-car/ Green Car	Promotion of biofuels
	Promotion of CNG vehicles
Energy Conservation Program -Park and Ride	Promotion of LPG
Energy Conservation Program -Transport System Efficiency	Promotion of road planning prioritising pedestrians/bicycles
Enhancing energy efficiency of railways	Promotion of telework and other transport subsitution by information and communications technology.
Enhancing Energy-saving and emission reduction management in transport sector (Artide 28)	Promotion of the greening of roads and measures for natural environments
Environmentally-friendly transport infrastructure development	Pró-Transporte
ETC& ITS & ICT	Regional Passenger Rail
	Solar Traffic Lighting Project
Facilitating the use of existing railway and bus routes	Streamlining transportation by trucks
Green tax plan for motor vehides	Subtitle C - Clean Transportation, Section 122: Large Scale Vehicle Electrification Program
Implementation of BRTs	The Automobile Industry Development Policy
Improvements in the fuel efficiency of automobiles based on continued implementation of the Top Runner Standard	
Improving the traffic system in BMA	
Improving urban public transport	
Integrated Land use planning	
Integrated Railway Modernization Plan	
Invest in clean-tech	
Jawaharlal Nehru National Urban Renewal Mission (JnNURM) - It includes public transport and NMT reforms, institutional structure improvement, visioning and preparation of development plans and transport plans.	
Logistics Development Strategy	
Mass Transit Systems	

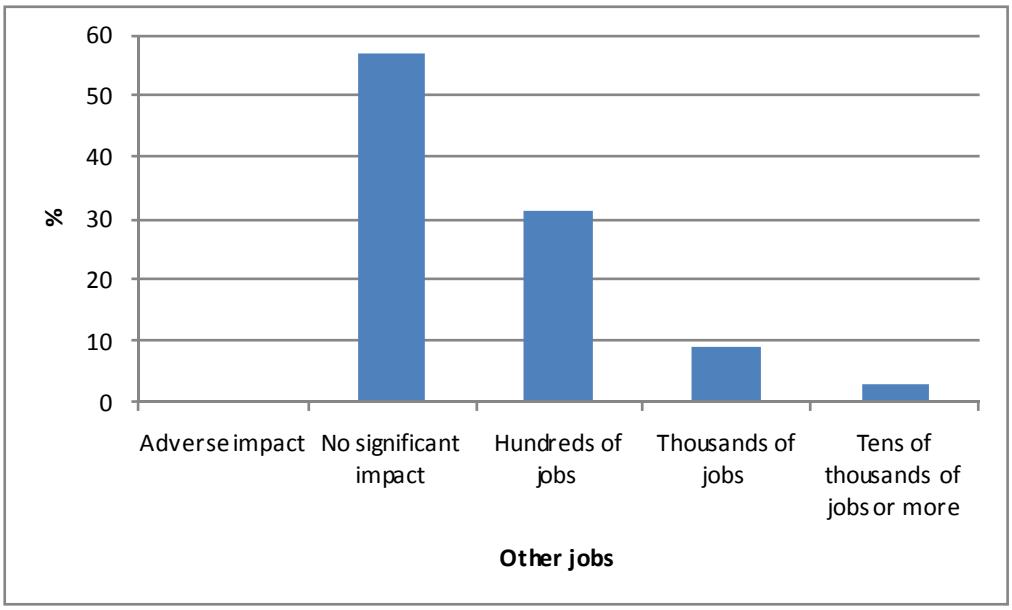


Figure 68: The number of other jobs created by policies and measures (for current policies only)

Table 39: Current policies that are expected to create more than thousands of other jobs

Automotive Mission Plan	PRO-ÁLCOOL
Biofuels as transport fuels	Promoting the use of renewable energy (biofuels)
Biomass fuels	Promotion of telework and other transport subsitution by information and communications technology.
Bus rapid transit (BRT) in Accra	Public Transport Package - III- High Speed Rails
Bus Rapid Transit corridors and busways for the WC2014 host cities	Purchase of new metro waggons
Bus route licensing	Rapid Transit System Network Expansion
Comprehensive road network (NUP 17)	Reform of the national railway system
Construction of electric railways	
Construction of new Metro track sections	Scrapping of federal vehicles (freight)
Construction of new track sections and purchase of rolling stock	Solar Traffic Lighting Project
Construction of Soekkarno Hatta Airport railway link	Strategic Public Transport Systems SETP) in smaller cities between 250,000 and 600,000 population
Dedicated Freight Corridor Program (DFC)	Strategy for the urban traffic in the city Lviv
Development of eco-airports	Transit orientated development - Rail - (NPP 27)
Development of major airports and seaports (NPP 26)	TravelSmart

Development of Monorail in Jakarta	UNICA
Development of MRT in Jakarta, consisting of two main lines (North-South and East-West corridors) totalling 110 km.	Urban Massive Transport Program (FONADIN)
Dubai Metro	Water Transport
Extension of road network (NPP 25)	
Facilitate vehicle financing and credit system	
High speed rail RIO-SP (TAV Brasil - Trem de Alta Velocidade)	
Improve urban transport system	
Improvements in the fuel efficiency of automobiles based on continued implementation of the Top Runner Standard	
Integrated high-speed railsystem (NPP 24) Integrated infrastructure (NPP 29)	
Integrated Land use planning	
Integrated national transportation network (NPP 23)	
Integrated public transportation system (NPP 28)	
Integrated public transportation system (NUP 15)	
Integrated Railway Modernization Plan	
Jawaharlal Nehru National Urban Renewal Mission (JnNURM) - It includes public transport and NMT reforms, institutional structure improvement, visioning and preparation of development plans and transport plans.	
Light Rail Transit and Monorails for the WC2014	
Masdar Personal Rapid Transit	
Montréal - New York and Montréal - Boston High Speed Rail corridors under study	
Multimodal Distribution Centres	
National Plan on Climate Change	
National Rail Vikas Yojana (NRVY)	
National Urban Transport Policy (NUTP)	
Notion on Promoting 'Smooth Traffic Project' for Urban Road Management	
Popularisation of greener vehicles (clean energy based vehicles)	

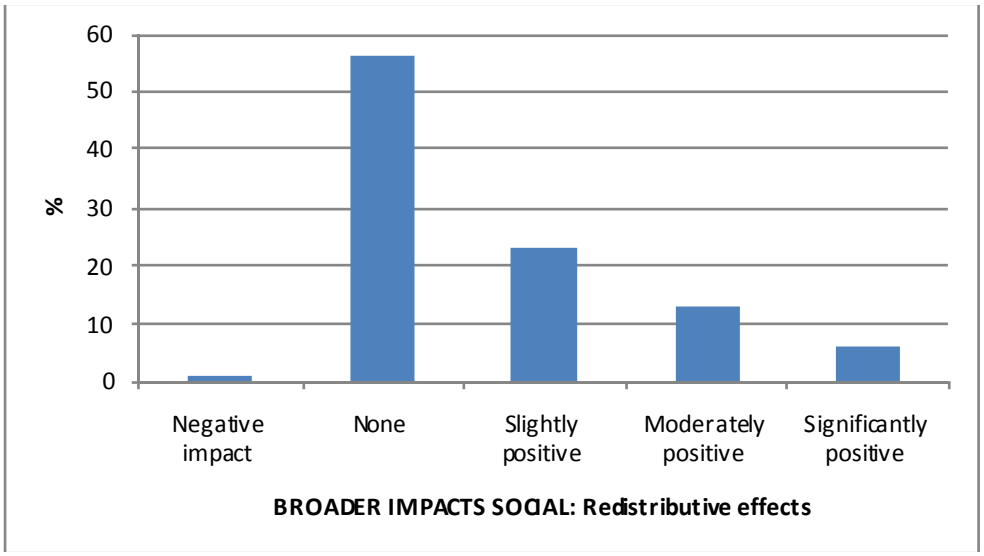


Figure 69: Social impacts - Redistributive effects

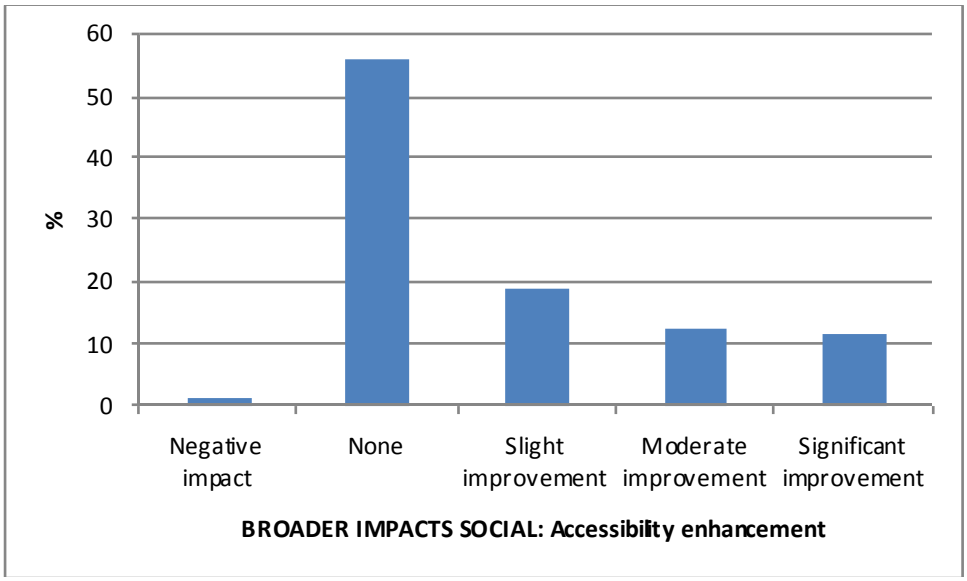


Figure 70: Social impacts - Accessibility enhancement

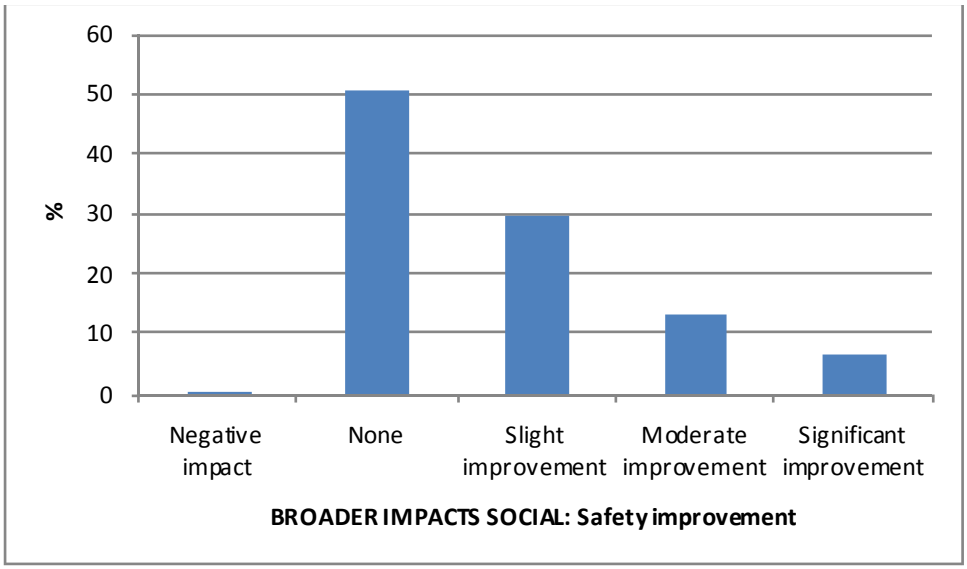


Figure 71: Social impacts - Safety improvement

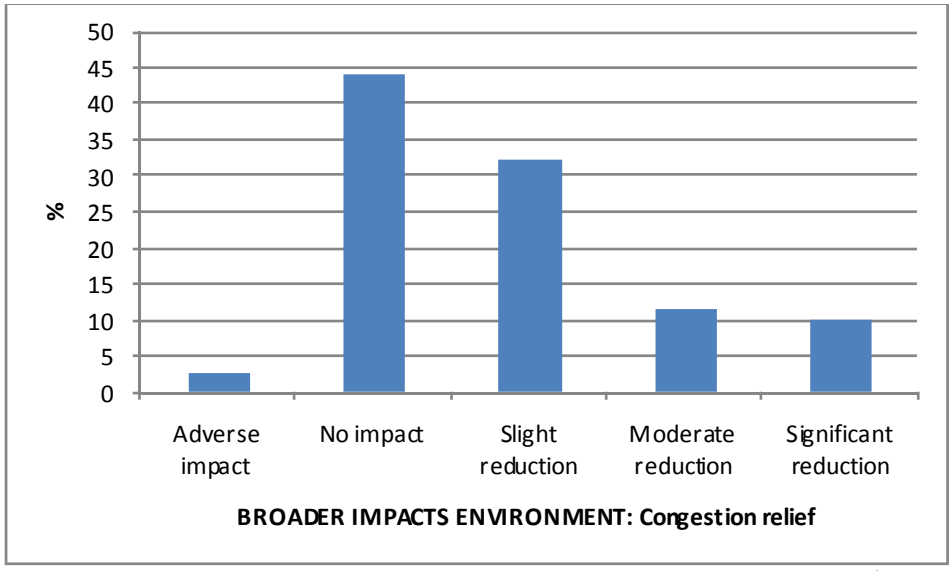


Figure 72: Environnementalimpacts – congestion relief

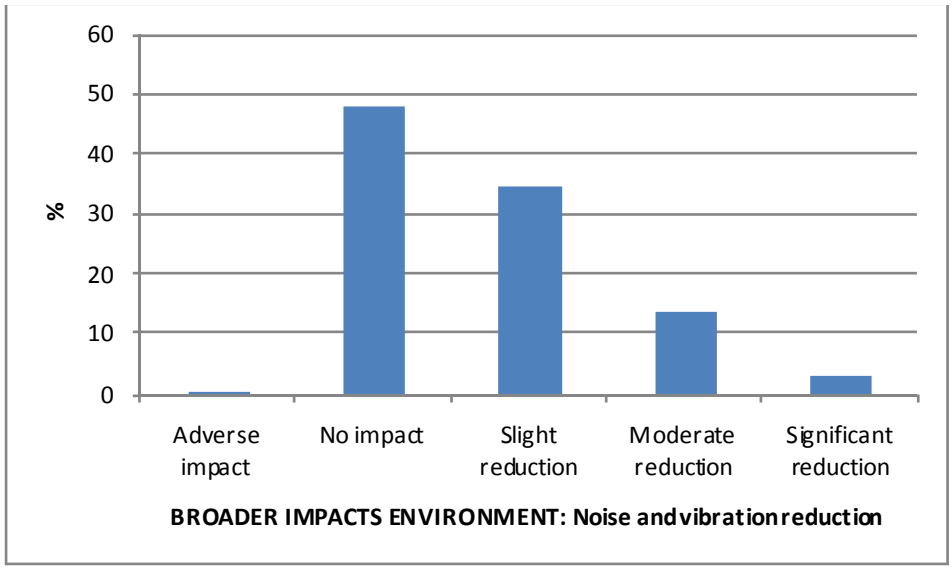


Figure 73: Environmental impacts – Noise and vibration reduction

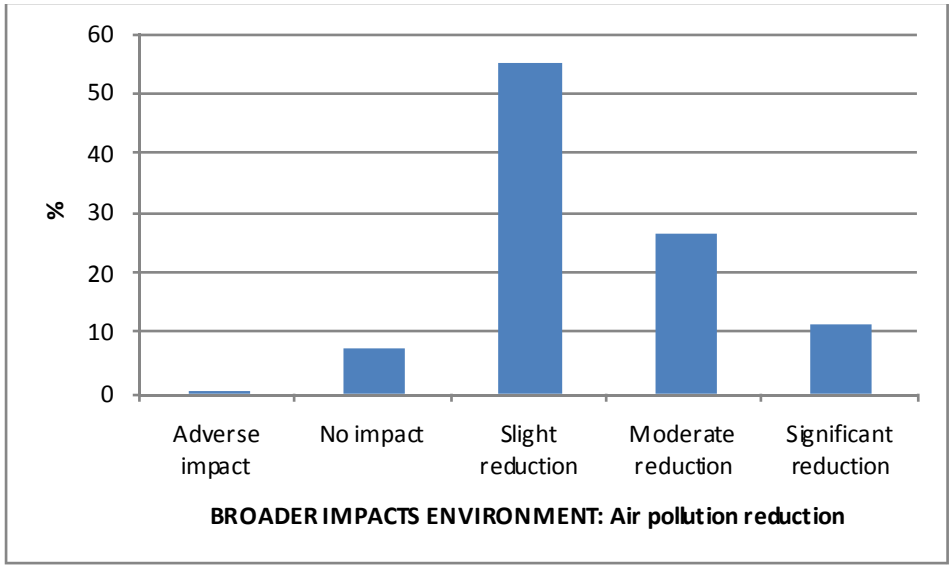


Figure 74: Environemental impacts – air pollution reduction

What were found to be the barriers to implement the policies?

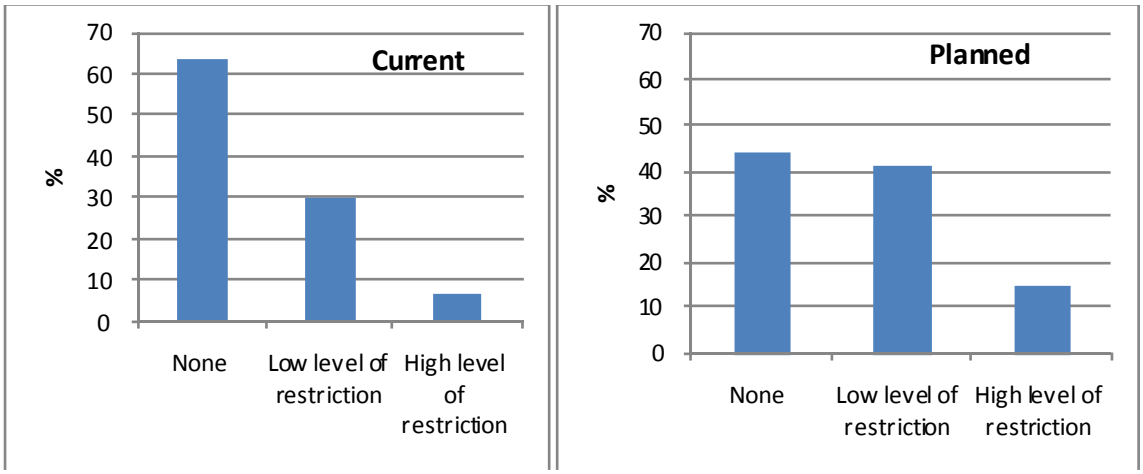


Figure 75: Level of technical constraint experienced or expected

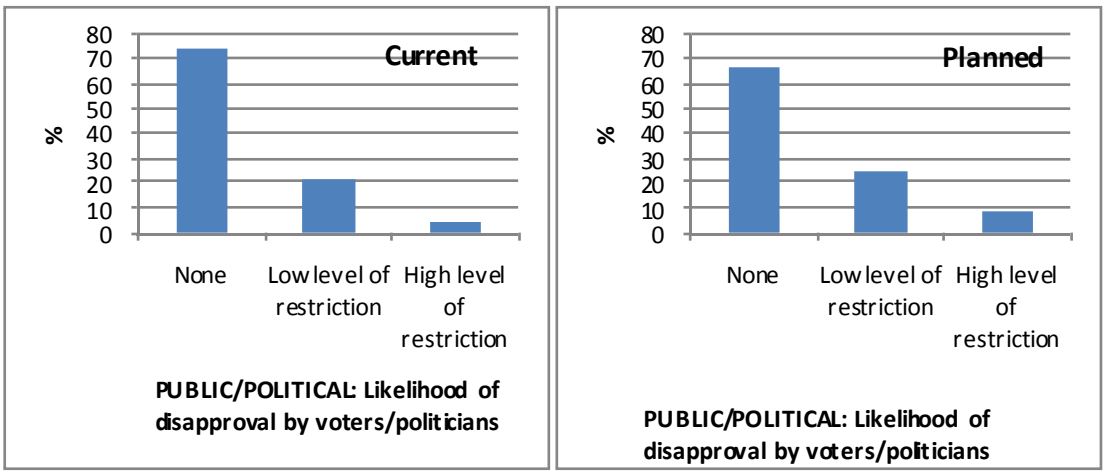


Figure 76: Level of political constraint experienced or expected

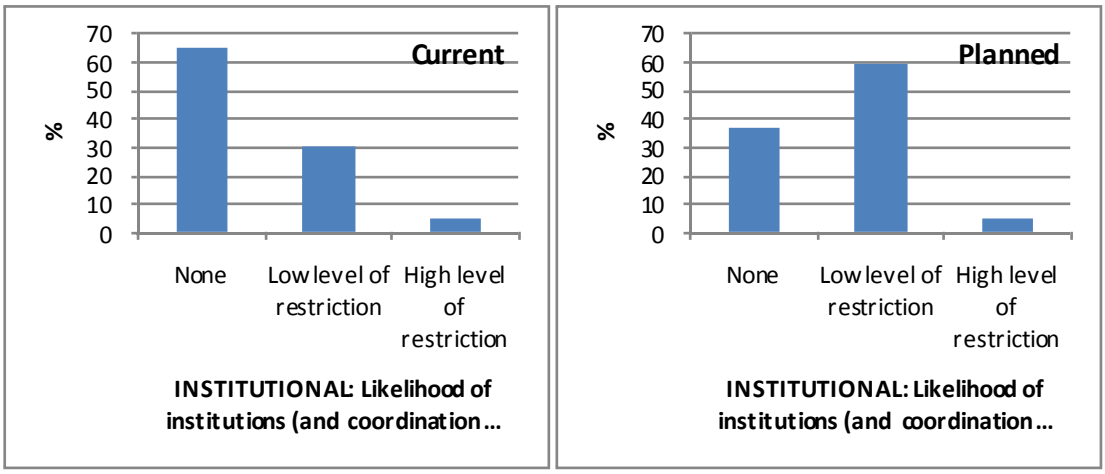


Figure 77: Level of institutional constraint experienced or expected

Table 40: List policies with a high level of restriction (Current)

Automotive Mission Plan
Bike on Bike off - LRT
Bikeways and Walkways Program in Metro Manila
Biofuels as transport fuels
Comprehensive traffic management (NUP 16)
Conducting research and development work on the modernization and adaptation of diesel internal combustion engines to use biodiesel
Enhance the effectiveness of Electronic Road Pricing
Enhancing enegy efficiency of aircraft
Enhancing enegy efficiency of ships
Fuel quality improvement (Diesel Sulfur content)
Inspection and Maintainence - Pollution under check (PUC)
Integrated Land use planning
Integrated Railway Modernization Plan
Jawaharlal Nehru National Urban Renewal Mission (JnNURM) - It includes public transport and NMT reforms, institutional structure improvement, visioning and preparation of development plans and transport plans.
Mass Transit Systems (SITM) in major cities over 600,000 population
Montréal - New York and Montréal - Boston High Speed Rail corridors under study
National Rail Vikas Yojana (NRVY)
Popularisation of greener vehicles (clean energy based vehicles)
Projeto Ônibus a Gás
Projeto Ônibus Brasileiro a Hidrogênio
Promoting the use of renewable energy (biofuels)
Strategic Public Transport Systems SETP) in smaller cities between 250,000 and 600,000 population

Table 41: List policies with a high level of restriction (Planned)

Alternative fuels (ethanol)
Australian Centre for Renewable Energy
Bogotá first metro line
CO2 emission standards for motorcycles
CO2 emission standards for passenger cars
Construction of electric railways Construction of Soekkarno Hatta Airport railway link
Dedicated Freight Corridor Program (DFC)
Development of Monorail in Jakarta
Development of MRT in Jakarta, consisting of two main lines (North-South and East-West corridors) totalling 110 km.
Electronic Road Pricing/ Congestion Charging
High speed rail RIO-SP (TAV Brasil - Trem de Alta Velocidade)
MOT on vehicles and motorbikes Promotion of ITS

How transferrable are the policies?

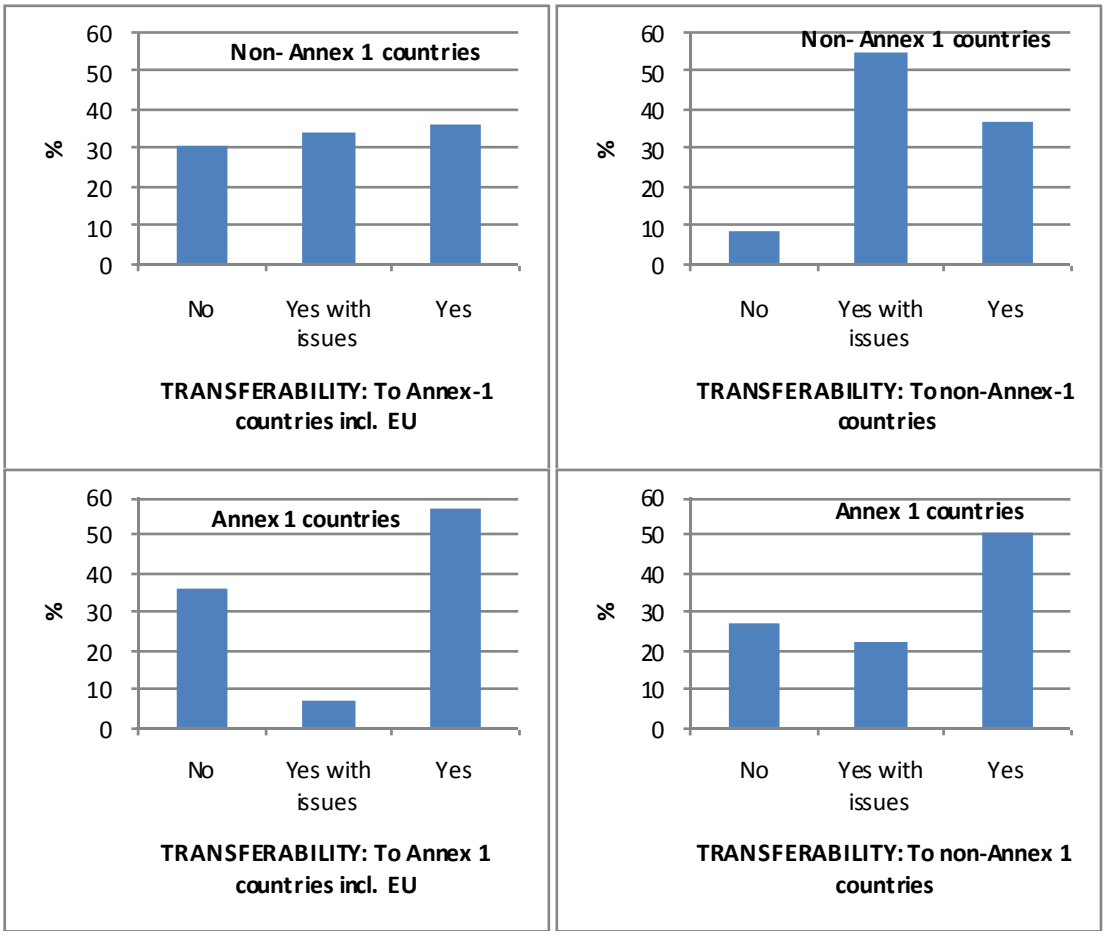


Figure 78: The transferability of policies between Annex 1 and non-Annex 1 countries

What kinds of international support were found to be needed?

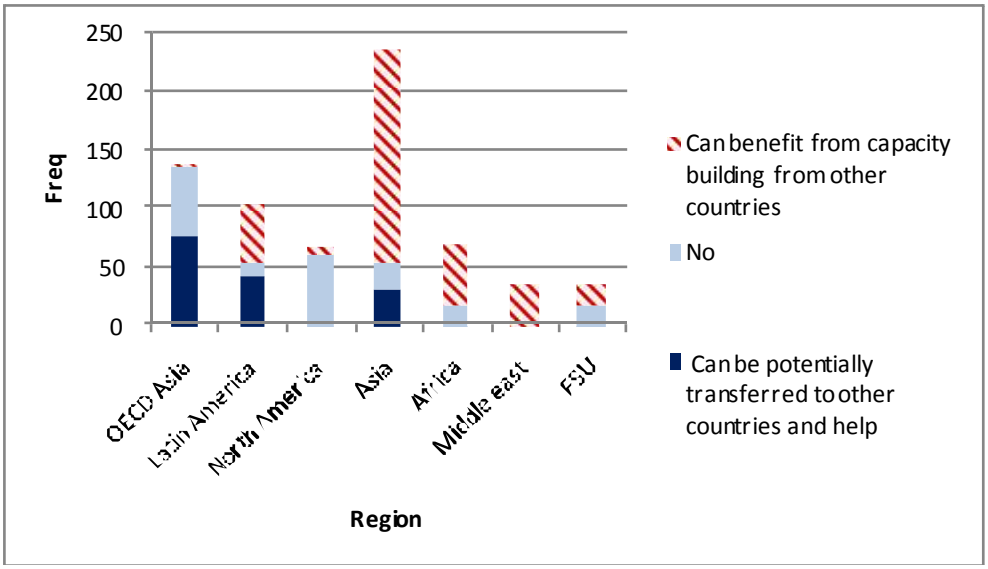


Figure 79: The number of polices that can benefit from capacity building support across the different regions

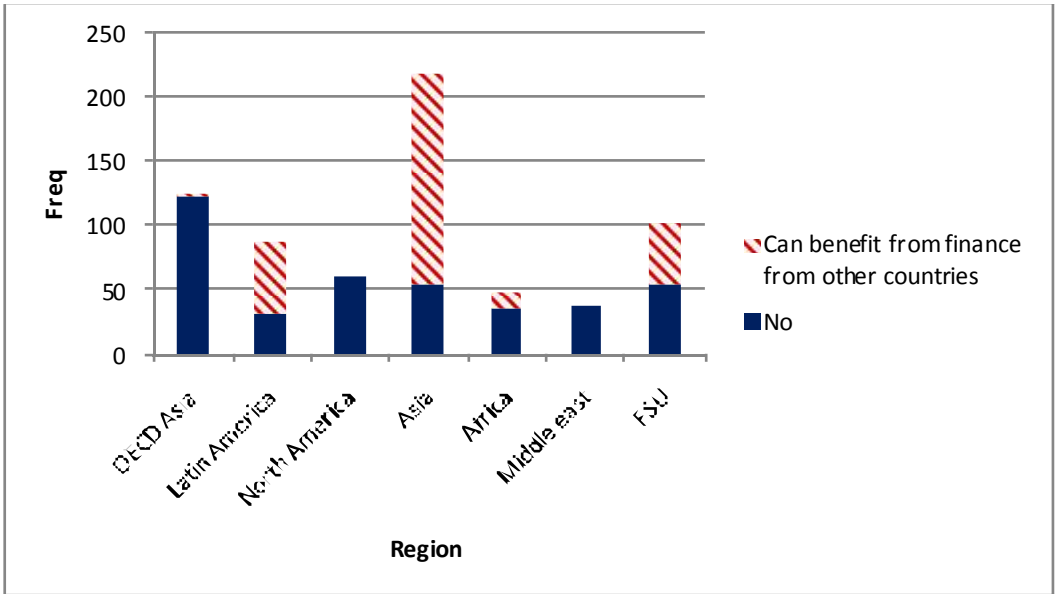


Figure 80: The number of polices that can benefit from financial support across the different regions

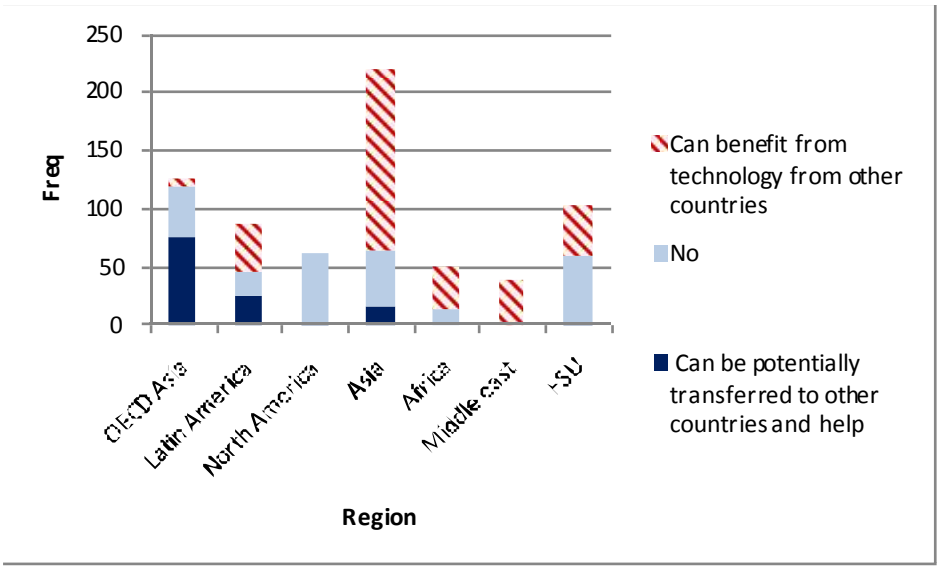


Figure 81: The number of polices that can benefit from technological support across the different regions

Appendix C Evaluation of support instruments

The table below provides the evaluation with regards to the identified instruments for supporting transport GHG mitigation in non-EEA countries.

Table 42: Scoping of European and International support instruments

Channel type	Name of Channel	Transport Amount (M€/yr)	Capacity Building	Technology Transfer	Finance (Grant)	Finance (Loan)	Finance (Crediting)	Support for climate mitigation	Support for transport
EC	European Development Fund (EDF)	1100	✓	✓	✓			*	*
	European Neighbourhood and Partnership Instrument (ENPI)	86	✓	✓	✓	✓		*	*
	Development Cooperation Initiative (DCI)	20	✓	✓	✓			*	*
	Instrument for Pre-Accession Assistance (IPA)	109	✓	✓	✓			*	*
	EU Policy on Climate Change (GCCA)	0	✓		✓			*	*
	Instrument for Co-operation with Industrialized Countries (ICI)	0	✓	✓	✓			*	*
EU other	European Bank for Reconstruction and Development (EBRD)	2628	✓	✓		✓		*	*
	European Investment Bank (EIB)	1540	✓	✓		✓		*	*
Member State	German International Climate Initiative (German ICI)	4	✓	✓	✓	✓		**	*
International	Multilateral Development Banks (MDBs)	11140	✓	✓	✓	✓		*	*
	Clean Technology Fund (CTF)	434	✓	✓	✓			**	*
	Global Environmental Facility (GEF)	21.2	✓	✓	✓			**	*
	GEF w. co-financing	213							
	Clean Development Mechanism (CDM)	1		✓			✓	**	*
	CDM Pipeline	19.5							
	Joint Implementation (JI)	0		✓			✓	**	*
	JI Pipeline	2.3							
	Quick start finance	0	✓	✓	✓			**	*
	National Appropriate Mitigation Actions (NAMAS')	0	✓	✓	✓	✓	✓	**	*

Stars represent support for climate change mitigation and support for transport: * =Relevant, ** = Specific

Table 43: Evaluation of European and International support instruments

Name of mechaism	Potential to support A/S/I			Governance				Mitigation impacts of portfolio			Environmental impacts			Social impacts			Economic impacts	
	AVOID	SHIFT	IMPROVE	Acceptability by donors	Acceptability by recipients	with UNFCCC agreements	Transaction cost	ante GHG reduction potential)	Estimated impact, ex-post (MtCO2-eq/yr)	Cost effectiveness (EUR/tCO2 eq)	Air quality	Noise	Other	Equity	Road safety	Accessibility	Security of supply	Congestion
EDF	✓	✓	✓	H	H	L	L	-1	no data	no data	H	L	L	L	H	H	L	L
ENPI		✓	✓	H	H	L	L	-1 to 1	no data	no data	L	L	L	L	L	L	L	L
DCI			✓	H	H	L	L	-1	no data	no data	L	L	L	L	L	L	L	L
IPA	✓	✓	✓	H	H	L	L	-1	no data	no data	L	L	L	L	L	H	L	L
GCCA				H	H	H	L	1	no data	no data	L	L	L	L	L	L	L	L
ICI			✓	H	H	L	L	1	no data	no data	L	L	L	L	L	L	L	L
EBRD	✓	✓	✓	H	H	L	L	-1	no data	no data	L	L	L	L	H	H	L	L
EIB	✓	✓	✓	H	H	L	L	-1	no data	no data	L	L	L	L	H	H	L	L
German ICI	✓	✓	✓	H	H	H	L	3	no data	no data	L	L	L	L	L	L	L	L
MDBs	✓	✓	✓	H	H	L/H	L	-1	no data	no data	L	L	L	H	H	H	H	L
CTF	✓	✓	✓	H	H	H	L	4	10	€ 4.30	H	L	L	L	L	L	H	L
GEF	✓	✓	✓	H	H	H	H	3	3.15	€ 5.00	H	L	L	L	L	L	H	L
CDM		✓	✓	H	H	H	H	3	0.16	€ 7.14	H	L	L	L	L	L	H	L
JI		✓	✓	H	H	H	H	2	0	no data	H	L	L	L	L	L	L	L
Quick start finance	✓	✓	✓	H	H	H	L/H	No data	No data	No data	H	L	L	L	L	L	H	L
NAMAS	✓	✓	✓	H	H	H	L/H	No data	No data	No data	H	L	L	L	L	L	H	L

Scoring for Effectiveness: -1: likely to be negative, 1: < 0.1Mt/yr (very low), 2: 0.1 -1 Mt/yr (low), 3: 1-10 Mt/yr (medium), 4: 10-100 Mt/yr (high), 5: > 100 Mt/yr (very high)
Scoring for all other indicators: 3=High, 2=Medium, 1=Low, -1= Negative impact