



Institute for
European
Environmental
Policy

**AN ANALYSIS OF THE OBSTACLES TO INCLUSION OF ROAD
TRANSPORT EMISSIONS IN THE EUROPEAN UNION'S EMISSIONS
TRADING SCHEME**

**Final Report: Commissioned by the Viennese based NGO "Mobility for the
Future" or VCOE.**

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TABLE OF CONTENTS

| | | |
|------------|---|-----------|
| 1 | INTRODUCTION | 4 |
| 1.1 | Brief Overview of the EU-ETS | 6 |
| 1.2 | Current Climate Change Policy Context..... | 7 |
| 1.3 | EU Climate Change Policy for Road Transport | 8 |
| 2 | BACKGROUND ON EMISSIONS TRADING: INCLUSION OF ROAD TRANSPORT | 12 |
| 2.1 | Road Transport and the EU-ETS..... | 13 |
| 2.2 | Determining a Point of Obligation for Emissions Trading and Road Transport..... | 15 |
| 2.3 | Learning from the Inclusion of Aviation: MRV Guidelines | 16 |
| 2.4 | Challenges Related to Integration of Road Transport in to Emissions Trading..... | 18 |
| 3 | CONCLUSION: PROSPECTS FOR THE INCLUSION OF ROAD TRANSPORT IN TO THE EU-ETS..... | 19 |

Summary of Report Findings

- Emissions trading, in and of itself, is limited in its ability to adequately mitigate greenhouse gas emissions from road transport.
- Legislating climate change mitigation measures for road transport can significantly contribute to the overall greenhouse gas mitigation efforts for the European Union.
- Monitoring, reporting and verifying emissions reductions from vehicles will add a significant transaction cost to the implementation of any road transport mitigation.
- There is no one policy instrument that is likely to have a significant impact on the reduction of greenhouse gases from road transport. Reducing greenhouse gas emissions from road transport is likely to be accomplished through the introduction of integrated measures. These measures can include: improved fuel efficiency, improved vehicle efficiency and behavioural modification measures.
- While standards to improve vehicle performance can be legislated by governments, overcoming growing trends in personal vehicle purchasing behaviour will be necessary.
- Although expanding the scope of the EU-ETS to include emissions from road transport may not be an immediate reality, there may be scope to include the sector at some point in the future. This will depend largely on the relative abatement costs for other sectors, and the potential for the larger industrial sectors to successfully mitigate emissions.
- Integrating emissions from road transport in to the EU-ETS may be eventually required in order to help impact trends in vehicle purchasing. The possibility that trading will achieve this objective will depend largely on trading scheme design. Given that reductions from road transport may command a different measurement standard, and may not be on par with the monitoring and reporting standards for other installations in the E.U., there is the possibility of establishing a closed emissions trading scheme for road transport only.

1 INTRODUCTION

This report has been commissioned by the Austrian non-governmental organization “VCO: Mobilitat mit Zunkunft” (Mobility with Potential), whose principle aim is to promote environmentally friendly transport. The report will serve as the basis for an informative fact sheet to be distributed to the general public both in English and German. This information will be used to help raise awareness around the importance of addressing vehicular greenhouse gas emissions.

Reducing emissions from road transport at the European Union (EU) level will contribute to global efforts to mitigate greenhouse gases thereby reducing the potential impacts of climate change. There are a number of ancillary benefits associated with greenhouse gas mitigation from cars that involve potential improvements to air quality through the reduction of particulates, sulphur dioxide, nitrogen oxides, volatile organic compounds and other criteria gases. In improving the fuel efficiency of cars, the EU is also reducing its dependence on foreign oil imports.

The key objective of this work is to investigate the prospect of using emissions trading as a mechanism through which to achieve cost effective reductions of greenhouse gases from road transport.¹ This report looks at prospects for including road transport as part of an expanded EU-ETS (European Union – Emissions Trading Scheme), focussing on a number of the associated barriers in so doing. The barriers described relate primarily to: the legal dimensions of emissions ownership; the difficulties associated with reporting, monitoring and verifying mobile emissions sources; the dynamics amongst players involved in the production of “well to wheel” emissions; and the jurisdictional complexities of managing emissions trading for mobile sources.

This analysis is being completed despite the fact that the idea of including road transport in the EU-ETS scheme has largely been rejected by policy makers even in a post-2012 context. The recommendations being presented as part of this report will consider the possibility that emissions trading in the sector could become a reality only beyond 2020. In the concluding section, a brief analysis is provided on the prospects for including road transport as part of a closed system although the emphasis of the analysis completed focuses heavily on the prospects for integration in to the EU-ETS.

There are a number of ways to consider the review of emissions associated with the road transport sector. Road transport emissions can be characterized either in terms of “well-to-wheel” emissions, or in terms of “tank-to-wheel” emissions. “Well-to-wheel” emissions reflect the total volume of greenhouse gases emissions generated in the drilling, refining, distribution, and consumption of fuel; “tank-to-wheel” emissions, or tailpipe emissions, exclude the greenhouse gases generated before the fuel reaches the vehicle. While “well-to-wheel” emissions can be attributed to fuel suppliers, the notion of “tank-to-wheel” emissions are attributed to individual

¹. Road transport in the context of this report refers to passenger vehicles, trucks and vans.

vehicles. Emissions produced by the automotive manufacturing process are not discussed as part of this report.

Given the challenges associated with the inclusion of mobile sources in to any cap and trade scheme, the report will offer a number of cost effective mitigation solutions based more on the option for more “integrated measures”. Addressing greenhouse gas emissions from transport will involve implementing a number of mitigation measures simultaneously. These measures range from fiscal measures including taxation, improvements in vehicle efficiency, increased availability of alternative fuels, and measures aimed at modifying driving behaviour.

According to data available from the European Environment Agency, emissions from road transport comprise the second largest source of greenhouse gases in the European of Union (EU) in 2006. The sectoral breakdown of greenhouse gas emissions in the EU in 2006 was as follows²:

| Sector | Percentage contribution to EU Emissions |
|------------------------------|--|
| Waste | 3% |
| Industrial Processes | 8% |
| Agriculture | 9% |
| Transport | 21% |
| Energy (excluding transport) | 59% |

According to a report issued by McKinsey and Company in March of this year, “Well-to-wheel” carbon emissions from these vehicles accounted for about 7 percent of global greenhouse gas emissions in 2006. Annual greenhouse gas emissions from passenger vehicles are expected to climb by more than 54 percent by 2030, reaching 4.7 gigatonnes (Gt).³

Other data obtained from the European Environment Agency illustrate the rate at which road transport emissions are continuing to grow within the European Union:

Table ES.1 Overview of EU-27 and EU-15 source categories whose emissions increased or decreased by more than 20 million tonnes CO₂-equivalents in the period 2006–2007

| Source category | EU-27 | EU-15 |
|---|--------------|--------------|
| Million tonnes (CO₂-equivalent) | | |
| Public electricity and heat production | + 15.0 | + 10.7 |
| Road transport | + 5.3 | + 1.7 |
| Cement production | + 4.5 | + 2.0 |
| Consumption of halocarbons | + 4.4 | + 3.1 |

². See: <http://dataservice.eea.europa.eu/atlas/viewdata/viewpub.asp?id=3899>

³. McKinsey, Roads towards a low carbon future: Reducing CO₂ emissions from passenger vehicles in the global road transport system, p. 1.

| | | |
|--|---------------|---------------|
| Manufacture of solid fuels | + 3.6 | + 1.0 |
| Fugitive emissions | - 3.1 | - 2.2 |
| Iron and steel production | - 3.8 | - 2.2 |
| Manufacturing industries (excl. iron and steel) | - 4.7 | - 8.2 |
| Households and services | - 79.1 | - 66.8 |
| Total Change | - 59.4 | - 64.0 |

As you can see with respect to the information provided above, emissions from road transport have continued to increase despite decreases for all the other major sectors. Interpretation of this data should however consider the ongoing use of diesel oil in the Czech Republic, Lithuania, Slovakia and Slovenia throughout this period.

There are numerous explanations for the upward trend in transport emissions even despite the current economic recession. Achieving reductions from vehicles has been difficult given the role of the individual and the dynamics of private vehicle ownership. While authorities can prescribe standards around vehicle design and the carbon content of fuel, it will be difficult to encourage consumers to pay more for cars that have positive outcomes for the environment.⁴ At the global level, there is increasing pressure from consumers in developing countries who continue to see private vehicle ownership as a status symbol. Globally it is anticipated that the number of cars on the road will increase from 730 million in 2006 to approximately 1.3 billion by 2030.⁵

1.1 Brief Overview of the EU-ETS

The EU-ETS is currently the driver for the world's carbon market. In 2008, EUA trading within the Emissions Trading Scheme for 2008 reached a total of 3.1 billion metric tonnes valued at €67bn (\$90bn). On a global level, the demand for EUAs, which are typically priced at approximately €14 a tonne, has typically stimulated a demand for investment in credits from the Kyoto mechanisms thus resulting in the development of projects under the Clean Development Mechanism and Joint Implementation.

The EU-ETS was established on the basis of Directive 2003/87, which has been subject to numerous amendments as the scheme has expanded to include new sectors. The scheme has comprised two periods: one which was implemented from 2005-2007, with the second one being implemented from 2008-12. The sectors covered for the first two trading periods included energy activities with a thermal input exceeding 20 MW; production and processing of ferrous metals; the mineral industry (cement, glass and ceramics); and industrial activities related to pulp and paper.

The first trading period of the EU-ETS occurred from 2005-07, and was based on the allocation of EUAs to member states as part of National Allocation Plans or "NAPs".

⁴ . McKinsey, p. 18. Data for drivers in the United States indicates that 74% of all vehicle purchasers place value for money ahead of the environment.

⁵ . McKinsey, p. 2.

Member states determined their own total amounts of EUAs on the basis of their historical emissions and their Kyoto targets, which were individually approved by the Commission. For a three year period beginning January 2005, member states were able to allocate free allowances for 95% of their emissions which resulted in a significant over-allocation of credits and a subsequent dip in the price of carbon. As the scheme has evolved, the amount of free allowances has diminished, with a move towards auctioning of credits in order to increase the scarcity of carbon thereby raising price.

Changes to the EU-ETS in a post 2012 scenario will have numerous implications for sectoral coverage and for allocation. Apart from a move to auctioning, sectoral coverage will expand to new areas of industry including ammonia and aluminium, and will for the first time include mobile sources from the aviation sector. This inclusion represents the first time emissions from the transportation sector have been included in a cap and trade scheme. It represents numerous challenges in terms of reporting and monitoring emissions, and offers a number of lessons learned for road transport.

1.2 Current Climate Change Policy Context

Consideration of greenhouse gases from road transport comes at a pivotal time in global and European climate change policy. The recent adoption of the Climate Action and Renewable Energy package by the European Parliament, demonstrates the EU's ongoing commitment to the mitigation of greenhouse gases and the need to increase the EU's share of renewables as part of its overall energy mix. Generally speaking, the EU is committed to "reducing its overall emissions to at least 20% below 1990 levels by 2020."⁶ Should negotiations at COP XV in Copenhagen result in a binding international agreement, this reduction effort will increase to 30%. In this scenario, other developed countries would need to match EU mitigation goals.

With respect to energy supply, the EU is also aiming to increase its percentage share of renewable energy as part of its overall energy mix. The recent CARE package outlines the EU's goal to increase the share of renewables by 20% by 2020. The specific contribution of each member state to this overall goal will be determined based on the differentials in GDP, and will ultimately help decrease the EU's dependence on foreign sources of energy. From a transportation perspective, enhancing the EU's energy independence could also mean a minimum 10% share for bio-fuels in the production of petrol and diesel by 2020 although this remains a decision of individual member states.

In addition to promoting the uptake of carbon capture and storage, another central element of the new CARE package is the extension and or expansion of the EU-ETS. Emissions from the sectors covered by the system will be cut by 21% by 2020 compared with levels in 2005. A single EU-wide cap on ETS emissions will be set, and free allocation of emission allowances will be progressively replaced by auctioning of allowances by 2020.

⁶ For more information consult the DG Environment website, http://ec.europa.eu/environment/climat/climate_action.htm.

EU policy on energy and climate change can be divided into two overall categories: policy aimed at sectors under the European Union's Emissions Trading Scheme, and those comprising what are known as the "non-traded sectors." According to the DG Environment website, "Emissions from sectors not included in the EU ETS – such as transport, housing, agriculture and waste – will be cut by 10% from 2005 levels by 2020. Each Member State will contribute to this effort according to its relative wealth, with national emission targets ranging from -20% for richer Member States to +20% for poorer ones."

1.3 EU Climate Change Policy for Road Transport

As stated above, the target for non-traded sectors in the EU, including road transport is to cut 2005 emissions levels by 10% by 2020. This overall goal encompasses a number of policies, a target which is also quantified in terms of a gCO₂e/km vehicle emissions performance target. This legislation and regulation outlined below are part of an integrated approach to ensure that emissions from light duty vehicles do not exceed 120g CO₂Eg /km by 2012. Overall, these policies are expected to result in a 19% reduction of carbon dioxide by 2012.⁷

In summary, the 2012 120g CO₂E/km target encapsulates a number of different measures including: vehicle efficiency improvements, the use of bio-fuels, efficiency standards for air-conditioning systems, compulsory fitting of accurate tyre pressure monitoring systems, setting maximum tyre rolling resistance limits in the EU for tyres fitted on passenger cars and light commercial vehicles, the use of gear shift indicators (taking into account the extent to which such devices are used by consumers in real driving conditions). Note that a similar performance standard is being applied to light-commercial vehicles (vans).

The regulations and standards outlined above would need to be considered in addition to fiscal measures such as taxation which may be undertaken at the Member State level, in addition to behavioural modification measures such as eco-driving, and in addition to any potential initiatives launched by the private sector. While it has taken some time to establish a clear set of mitigation measures for the road transport sector, some initiatives have been undertaken by industry. The car manufacturing industry has been heavily involved in the design of a vehicle emissions performance standard. In 1995, the European Automobile Manufacturers' Association (EAMA) initiated a voluntary industry commitment which looked to improve customer information and the promotion of fuel-efficient cars through the use of fiscal instruments such as taxation. In 1998, the EAMA made a further commitment to reduce average emissions from new cars sold to 140g CO₂/km by 2008.

However despite these efforts, the most recent statistics on emissions from road transport as outlined in the EEA table above indicate that voluntary measures have proved ineffective in terms of achieving greenhouse gas emissions reductions. The legislative measures recently concluded by the European Commission offer some reassurance that those emitting greenhouse gas emissions in the road transport sector may finally be forced to implement concrete abatement measures.

⁷ . See: http://ec.europa.eu/environment/air/transport/co2/co2_home.htm

For this reason, the adoption of two legally binding measures offers the potential to achieve real reductions in the road transport sector. These measures include: Directive 2009/30/EC: Reducing GHG Emissions from transport fuels, and Regulation EC/443/2009 Setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO2 emissions from light duty vehicles. The conclusion of the legislation on vehicle emission performance is perhaps even more positive in terms of concrete action, as it implies that legislation will be uniformly applied across all member states. Directive 2009/30/EC will require transposition at the member state level.

Directive 2009/30/EC sets a binding target for the reduction of life cycle GHG emissions. Member states will require fuel suppliers to reduce life cycle GHG emissions per unit of energy from fuel and energy supplied by up to 10% by 31 December 2020. 'Life cycle GHG emissions' means all net emissions of CO₂, CH₄, and N₂O that can be assigned to the fuel or energy supplied. This includes emissions from the extraction or cultivation of fuel sources (emissions associated with land use change), transport and distribution, processing and combustion. Given that this definition encompasses bio-fuels, this directive may limit the use of bio-fuels to meet the target outlined in the CARE package. The acceptability of bio-fuels in the context of this directive will depend largely on the conclusion of the applicable sustainability criteria.

Regulation EC/443/2009 involves setting new CO₂ emissions performance requirements for light duty vehicles. Car manufacturers must ensure that their average annual CO₂ emissions do not exceed 130g CO₂E/km. Manufacturers' average emissions are determined based on a proportion of their new passenger cars registered that year; this proportion has been mandated at 65% in 2012, rising to 100% by 2015. If targets are exceeded manufacturers must pay an excess emissions premium. The legislation also outlines a longer term target of 95g CO₂E/km set for 2020.

According to the legislation, an emission performance standard will provide more flexibility than national reduction targets. In coming up with a performance standard, the regulation will have to account for market imperfection and competition among auto manufacturers while ensuring a certain amount of policy predictability. Accounting for market imperfection will involve tracking the utility of vehicles on a linear basis. As such the legislation recommends collecting data vehicle mass, and on the basis of footprint (track width times wheelbase). The most recent standards apply to new passenger cars registered in the Community for the first time; but standards may be adjusted in 2014 on the basis of new data. The average specific emissions for new cars registered in the Community for which member states are responsible should not exceed the overall average emissions performance for previously registered cars.⁸

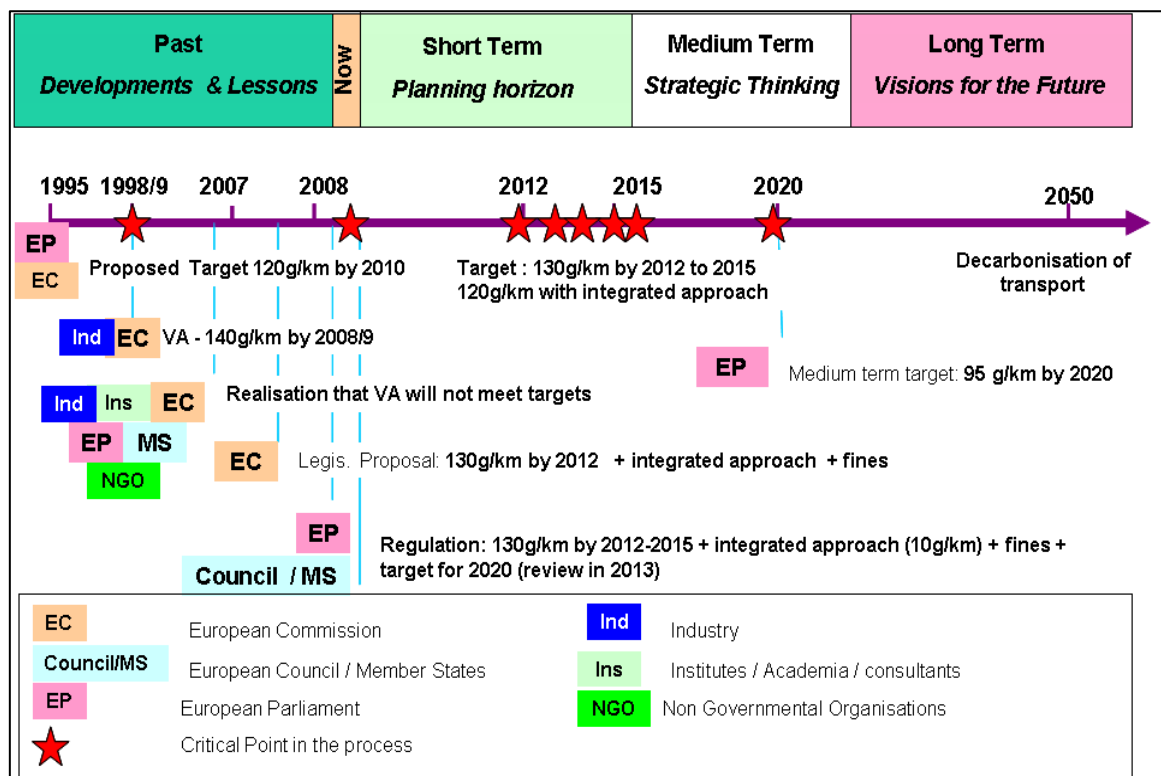
The process of moving from recognition of the problem of CO₂ emissions from passenger cars, to formal statements of ambitions to address them (the 120g/km target), to instruments (voluntary agreements), to a proposed legislative successor, to

⁸. REGULATION (EC) No 443/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL OF 23 APRIL 2009, P. 2.

actual agreement on legislative text, has been long, with actual commitments falling short of stated ambitions. Proposals have meet consistent opposition from the car manufacturing lobby, particularly given the formation of the CARS21 High Level Group. CARS21 has been focused more on the (short term) automotive industry interests than practical steps to meeting the (CARS21-) recognised need to largely decarbonise passenger transport by 2050.

Figure 4 provides an overview of the history of the process, underlining the dynamic nature of the targets given the range of pressures on policy making in such a sensitive area. It is worth noting that non-governmental organizations were heavily involved in lobbying for the vehicle emissions performance target.

Figure 4: Developments in the legislative process: key steps and stakeholders



** Note that this figure has been taken from an unpublished internal IEEP document.

While the objective of this report is to consider road transport in the context of emissions trading, a description of the applicable legislation is crucial in order to determine the sector's scope for additional reductions. To impose an emissions reduction cap on the road transport sector in combination with these existing targets, may place an unnecessary burden on the industry while possibly resulting in double counting of emissions reductions. This will be discussed in further detail in subsequent chapters.

There are a number of standard design elements involved in establishing an emissions trading scheme which cannot be ignored in considering the integration of road transport in to the EU-ETS. An impact assessment of the sectoral expansion of the EU-ETS completed by the European Commission, considered a number of design

elements that will need to be compared against the unique characteristics of the road transport sector. That is in addition to considering potential changes to the EU-ETS in a post-2012 scenario. These design elements will be examined in further detail in the next Chapter.

2 BACKGROUND ON EMISSIONS TRADING: INCLUSION OF ROAD TRANSPORT

A number of concepts and terms referred to in this report require definition and or clarification to allow for a comprehensive understanding of the analysis undertaken. In referring to “road transport” and consequently to emissions from light duty vehicles, the author of this report has considered the particular dynamics of private car ownership. In evaluating the overall potential of emissions trading to reduce emissions, one cannot ignore the increasing trend in private vehicle ownership. One needs to consider to what extent any mitigation measure for road transport can overcome this trend. It is important to consider policies that impact consumer behaviour both with respect to trends in vehicle purchasing, but also those that may impact individual driving behaviour.

Designing an effective emissions trading scheme must consider a number of key policy elements and the application of various standards. From a technical standpoint, the applicable standards relate primarily to the quantification, monitoring, reporting and verification (MRV) of emissions. In order to guarantee the generation of a fully fungible commodity within a given trading scheme, the standard to quantify, monitor and verify emissions reductions must be uniformly applied to all sectors covered. A comparison to the aviation outlined in this chapter will demonstrate some of the challenges associated with undertaking the MRV of mobile sources.

From a legal standpoint, ownership of carbon must be a key consideration and is typically addressed in allocating emissions targets among trading entities. Once a specific reduction target is determined, (the time horizons for targets are normally determined in the context of a given trading scheme), the reduction burden is divided up among different trading entities in the scheme. Those complying with the imposed reduction target are known as “points of obligation”, and are typically legally required to reduce emissions.

More generally speaking, the points of obligation for road transport could be categorized either according to either upstream or downstream points of obligation. Imposing a compliance burden on upstream emitters would typically involve obligating fuel suppliers to account for emissions reductions; while imposing a compliance burden on downstream emitters would involve obligating vehicle owners to account for emissions reductions. There are therefore three distinct points of obligations with respect to imposing an emissions target on the road transport sector: fuel suppliers, vehicle owners and car manufacturers.

On a global level, road transport has not yet been included as part of any emissions trading scheme, although it is also being considered as part of the design of a new cap and trade program for California. Offsets projects been considered under the aegis of the Clean Development Mechanism for example, although there have been some difficulties associated with the calculation of baseline emissions. Referring to the specific example of expanded and improved bus corridors, it has been difficult to make certain assumptions around the behaviour of the average consumer in terms of reduced vehicle use and increased uptake of public transport. This further illustrates

the ongoing challenge that the road transport sector will face in terms of overcoming trends in private vehicle ownership.⁹

Mobile sources have increased in importance as part of the EU's overall climate change mitigation policy. Over the past couple of years, discussions around the mitigation of greenhouse gases have looked beyond the standard industrial sectors and power generation to include shipping emissions. Indeed, the inclusion of aviation in to the EU-ETS in 2012 represents the first time that mobile sources will be traded within an emissions trading scheme. A number of the policy design elements that were established in order to integrate emissions from aviation in to the EU-ETS will be discussed below.

The possibility that road transport could be included in the EU-ETS has been a subject of discussion among officials at the European Commission as part of a routine impact assessment completed in completed in January of 2008, and was indeed looked at with respect to the extension of the EU-ETS beyond 2012 and its possible sectoral expansion. The issues and technical barriers described above were considered in the review of road transport inclusion. Overcoming such barriers was a key consideration in the formulation of proposed policy solutions. This is described below with respect to the European Commission's impact assessment on sectoral expansion of the EU-ETS.

2.1 Road Transport and the EU-ETS

The CARE package as described in Chapter 1 included Directive 2009/29/EC, "Improving and extending the EU ETS – EU ETS established by Directive 2003/87/EC". From January 1 2013 (phase III of EU ETS, 2013-2020) the revised ETS will incorporate new sectors including petrochemicals, ammonia and aluminium, nitrous oxide and perfluorocarbons, and aviation. A single EU-wide cap on total allowances will replace national-determined caps, and a principle of full auctioning for the allocation of allowances will begin in 2013 with power stations.

The extension of the EU ETS beyond 2012, and the consideration of this particular Directive, was subject to a standard impact assessment. This included consideration of the inclusion of additional sectors including road transport. The sectors outlined in the paragraph above were reviewed in light of three distinct principles: effectiveness, efficiency and consistency. In other words, reductions were considered in terms of their ability to deliver reductions that could be considered environmentally effective, cost effective and that were found to be consistent with other relevant policies.

⁹ Desbarats, Jane, "Expert review of CDM Methodology: GHG Reductions through Improved Occupation Rate of Public Transport Units", 28 July, 2006.

These three principles were reviewed on the basis of both the downstream and upstream approaches to organizing the points of obligation for the inclusion of road transport as part of emissions trading. Looking at the downstream approach, vehicle owners would receive allowances as part of an overall carbon budget. Allowances would be deducted from this account corresponding to the total level of emissions generated from fuel combustion.

With respect to an upstream approach, the point of obligation would be placed on the fuel supplier. Suppliers would be required to surrender allowances corresponding to the total amount of fuel sold and the resulting tonnes of emissions reductions associated with the combustion of that fuel. The other upstream option would be to have vehicle manufacturers surrender allowances that would be equivalent to the lifetime emissions for vehicles sold.

Reviewing the Environmental Effectiveness of Including Road Transport in to the EU-ETS

Should it be possible to accurately account for emissions reductions from the road transport sector as part of its inclusion in to the EU-ETS, it could have significant benefits for the environment. According to the impact assessment completed for the European Commission, including road transport would cover an additional 875 MT of CO₂E thereby increasing the coverage of emissions in the EU from 37% to 54%. Improvements in fuel efficiency and possibly even changes to driving behaviour would also lead to a reduction in criteria gases such as nitrogen oxides, sulphur dioxide, particulate matter and other criteria gases. The co-benefits of reducing greenhouse gases from road transport could help to improve local air quality and reduce smog.

Reviewing the Efficiency of Including Road Transport in to the EU-ETS

The standard argument against including road transport in to any emissions trading scheme is the relatively high administrative cost. This cost is considered exorbitant in light of the complex monitoring, reporting and verification (MRV) requirements involved in accounting for reductions from the sector. Apart from cost, reviewing how MRV would be undertaken for road transport in a potential emissions trading scheme, one would need to consider: whether emissions can be monitored and verified within an acceptable uncertainty range; the complexity of actual data collection; and the associated project boundaries in undertaking emissions measurement. These more detailed technical elements will be discussed further.

With respect to cost, the impact assessment considers the MRV dynamic in the context of either a downstream or an upstream approach that could be used to organize points of obligation for road transport in emissions trading. The impact assessment contends that the downstream approach would be relatively easy to monitor electronically. At the same time, an upstream approach could be even more straightforward if one were to use existing reporting infrastructure as part of fuel duty reporting requirements for example.¹⁰

¹⁰. Helen Watters and Miles Tight, "Designing an Emissions Trading Scheme Suitable for Surface Transport", February 2007, p. 19.

Reviewing the Policy Consistency Associated With the Inclusion of Road Transport in to the EU-ETS

Including road transport in to the EU-ETS would need to consider the cross-cutting impact of existing policy. In addition to those policies designed explicitly for the road transport sector that are outlined in Chapter 1, how would emissions trading interact with policy on fuel taxes for example. One needs to consider how much of a burden is being placed on industry, and whether the imposition of two many reduction requirements will result in the double counting of emissions reductions. It is possible that given the compliance cost associated with emissions trading, that fuel duties or taxes could decrease particularly if the price of fuel increases over time. If the implementation of emissions trading in road transport is successful, it is likely to replace existing taxation measures given that it provides greater flexibility in terms of meeting reduction targets.¹¹

Given existing legislation for the road transport sector, one could question whether its inclusion as part of an emissions trading scheme would result in additional emissions reductions. For an entity to sell credits that result from a legislative obligation could result in “anyway” credits. Although additionality is not as strict a requirement under the EU-ETS as it is for the offsets market, the sale of less meaningful reductions could have implications for the price of carbon while at the same distorting the real cost of abatement for the sector.

2.2 Determining a Point of Obligation for Emissions Trading and Road Transport

As outlined in the introductory chapter, determining specific points of obligation within the road transport sector will be crucial in guaranteeing its successful integration in to an emissions trading scheme. Looking at the prospect for integrated measures, it may be possible to combine different measures that are imposed on different points of obligation while integrating mitigation strategies that complement one another. Some of the advantages and disadvantages of imposing targets on the three points of obligation are described below.

Imposing Reduction Targets on Fuel Suppliers

Imposing targets on upstream emitters such as fuel suppliers would essentially involve targeting companies that may already be complying with EU-ETS emissions reduction targets due to the existing coverage of emissions from oil refining processes. This could have numerous advantages with respect to their experience dealing with the applicable standards and legislation from the EU-ETS.

However, in terms of actually driving changes within the road transport sector, fuel suppliers may also be better placed to offset any additional emissions targets through purchases of credits under the Kyoto mechanisms, or by trading on the EU market.

¹¹ . Ibid, p. 28.

Looking at the proposed design for an upstream point of obligation as outlined in the European Commission's impact assessment, fuel suppliers would only be obligated to surrender carbon credits on the basis of fuel sold. This relieves them of the responsibility to undertake actual changes to their operations if the comparative cost of purchasing carbon elsewhere is cheaper.

With respect to a number of the proposed changes as part of the emissions trading scheme in a post 2012 context, fuel suppliers would also have more experience in terms of dealing with changes to credit allocation mechanisms. This could be a potential consideration when full auctioning is introduced to all sectors in the EU-ETS.

Imposing Reduction Targets on Car Manufacturers

Referring to the proposed emissions trading design outlined in the EU's impact assessment, imposing a point of obligation on vehicle manufacturers would obligate them to account for emissions from the lifetime of each vehicle sold. They would therefore need to surrender an equivalent number of tonnes of emissions reductions credits. Designing a scheme that places a compliance burden on this point of obligation could in fact drive potential emissions reductions from vehicles; manufacturers would be incentivized to minimize emissions in order to reduce their compliance cost. This would ultimately depend on the relative abatement cost of producing low emission vehicles as opposed to simply purchasing either carbon credits from the Kyoto mechanisms, or from simply trading on the EU market.

Imposing Reduction Targets on Vehicle Owners

Referring also to the proposed emissions trading design outlined in the EU's impact assessment, imposing a point of obligation on vehicle owners would force them to purchase fuel against an assigned carbon budget. Carbon credits equivalent to the amount of fuel combusted would be deducted from an individual's account at the point of purchase.¹² Out of all the points of obligation, the potential to impose a compliance target on the individual would perhaps have the biggest impact on potential mitigation resulting from the sector. Unless vehicle owners are able to purchase carbon credits to offset deductions from their carbon accounts, their only alternative to minimizing their own vehicle use is to either drive less or to purchase low emission vehicles. This would help drive purchases of electric vehicles and could help incentivize the purchase of low carbon fuels.

2.3 Learning from the Inclusion of Aviation: Monitoring, Reporting and Verification Guidelines

Referring again to the European Commission's impact assessment, its review of the efficiency of including road transport in the EU-ETS raised a number of potential questions with respect to the MRV of road transport emissions. Emissions would need to be monitored and verified within an acceptable range of data uncertainty, data

¹² . The example described in the Impact Assessment refers only to personal vehicular fuel use.

would need to be collected in a cost effective manner, and emissions would need to be monitored and verified within a determined project boundary.

The conclusion of MRV guidelines for the aviation sector was based on the consideration of a number of key principles of the EU Monitoring and Reporting Guidelines; more commonly applied to stationary installations. This involved looking in to concepts such as data uncertainty thresholds, the definition of project boundaries, and the cost of data collection. As such, the legal definitions of a number of key terms were modified to accommodate emissions sources from the aviation sector.

With respect to project boundary, it essentially involved defining the appropriate emissions sources, which in the case of aviation, included individual planes. This consequently required airlines to account emissions for the emissions from their entire fleet as a whole, for all flights arriving in to and departure from the European Union. Determining the ownership of a vehicle fleet, given the private ownership dynamic is simply not possible.

The EU MRG of 2007 describes how all sectors should be aiming to achieve the lowest level of uncertainty in monitoring and verifying emissions. Installations are assigned various uncertainty ranges based on specific emissions thresholds; those with lower emissions are assigned the lowest uncertainty range of $\pm 2.5\%$. Given the complex nature of the aviation sector, the MRV guidelines proposed applying a $\pm 2.5\%$ uncertainty range to the entire aviation sector, and that data quality be verified on the basis of calibration certificates for on-flight fuel use meters.

Assigning an uncertainty range to the verification of emissions reductions from road transport would not be straightforward. A similar generalization would need to be made with respect to instrumentation, or even regulation, that applied to the emission performance of cars. It would need to be undertaken by a government agency that could account for the total number of registered vehicles. It is unclear whether it would be possible to prescribe a data uncertainty range with this type of emissions data.

This further begs the question of whether it is at all feasible to apply MRV standards to the road transport sector that are in any way consistent with those applied to other sectors, even for mobile sources from aviation. For aviation, all emissions can at the very least be tracked by aircraft operators who would have records on fuel use, distances flown, and flight weight. An entity would need to take responsibility for similar data parameters associated with the road transport sector.

One needs to consider whether the issue of MRV for the road transport sector would differ based on its imposition on different points of obligation. Although it would be possible to more accurately monitor emissions from upstream emitters such as fuel suppliers, emissions reductions would still need to be verified. While you can calculate emissions from transport using fuel sales receipts, the creation of a marketable reduction would require some sort of verification. In order for MRV for road transport to comply with the rigour of the EU-ETS, this would need to be a consideration. It isn't clear how this could be accomplished without accounting for the combustion efficiency of individual cars that would be covered under the scheme.

Some of the challenges related to data quality and project boundary would still apply even if the point of obligation were imposed upstream.

2.4 Challenges Related to Integration of Road Transport in to Emissions Trading

Generally speaking, the review undertaken by the European Commission as part of the impact assessment reveals that including road transport in the EU-ETS may offer a number of advantages in terms of environmental effectiveness. However, issues related to MRV raise certain questions with respect to cost effectiveness, and the possibility that credits created through mitigation measures in road transport may be created on the basis of different measurement standards. As such, carbon credits created through emissions trading from transport may not be considered fully fungible with credits from other sectors.

In addition, although there may be certain advantages in terms of generating overall reductions in greenhouse gases, the imposition of a reduction target on the different points of obligation needs to be considered. Imposing reduction targets on either fuel suppliers or car manufacturers may not result in any changes to the emissions profile for the sector, given the possibility that they could purchase emissions offsets from the Kyoto mechanisms or could simply trade on the EU market. Assuming the price of carbon and fuel remain high, imposing reduction burdens on the individual vehicle owner may incentivize more changes to the sector in terms of changes to driving behaviour and vehicle purchase.

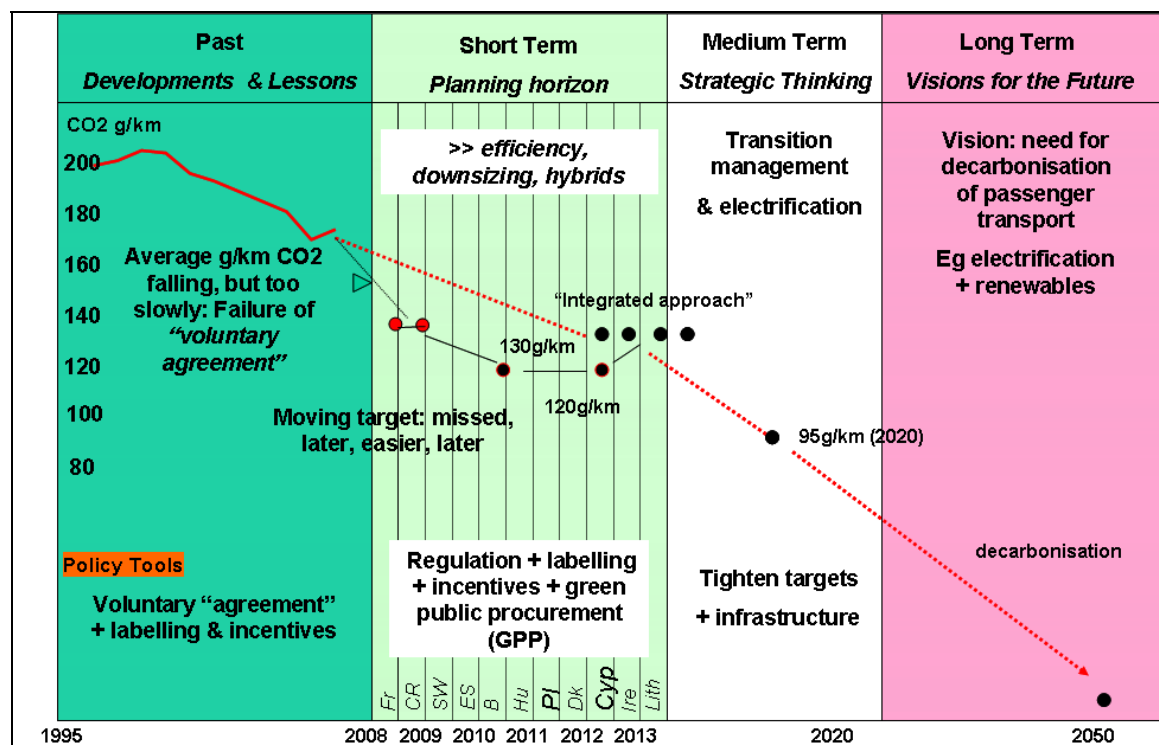
Any recommendations around the inclusion of road transport in to the EU-ETS will also need to consider the impact of existing legislation on prospective additional reductions. The benefit of legislation and standards are outlined in the next Chapter.

3 CONCLUSION: PROSPECTS FOR THE INCLUSION OF ROAD TRANSPORT IN TO THE EU-ETS

As discussed in Chapter 2, it may be difficult to determine what percentage of emissions reductions from road transport would be eligible to trade under the EU-ETS given the conclusion of recent legislation. The overall EU goal is to reduce greenhouse emissions from vehicles to 120g CO₂E/km. While the specific vehicle emissions performance regulation has mandated a standard of 130g CO₂E/km, one can assume that the additional 10g of reductions/vehicle will result largely from the following policies: the EU bio-fuels target, and a number of other measures.

Typically, emissions trading involves selling reductions that are additional, or “beyond business as usual.” Therefore, if a large percentage of reductions are legally mandated, there may be a limited number of tonnes available for sale on the market. To what extent could emissions trading address this additional 10g of reductions per vehicle? How could vehicle emissions performance be improved to encourage complete decarbonisation of the sector by 2050? What technologies are appropriate and how can they be encouraged? What contribution can emissions trading make towards meeting this goal?

Figure 5: A long term vision for reducing specific CO₂ emissions from passenger cars



There can be no doubt that there is a continued need for legislative approaches to ensure progress. Legislation requiring ever lower specific CO₂ emissions per km will be required. Whether this remains simply as a g/km CO₂ target for manufactures or whether a trading scheme will be introduced in the future is an open to the type of discussion being presented as part of this report.

There may be a number of advantages associated with legislating either fuel efficiency or vehicle efficiency standards over emissions trading. Implementing regulation and other types of legislation may be more capable of encouraging research and development in to the sector, while as explained in the previous chapter, emissions trading may simply result in the purchase of offsets depending on the price of carbon. Looking in particular at the EU-ETS, expanding the scheme to include upstream emitters from road transport, could result in increasing competition for reductions with lower marginal abatement costs.

With respect to meeting actual reduction targets, legislating targets can provide greater certainty particularly in cases where financial penalties are imposed. The vehicle emissions performance regulation for example, does outline a number of financial penalties in cases where car manufacturers fail to meet their targets. They may also be quicker to implement, and do not require the same amount of up front technical analysis associated with the derivation of baselines under emissions trading for example nor the cost associated with the allocation of carbon credits. However, the implementation of fuel efficiency measures may make it cheaper to drive thus increasing the overall total of kilometres driven. With emissions trading, there is no rebound effect; there is less likelihood that the demand for vehicles will increase given the carbon price signal.

In addition to legislated standards and environmental improvements, there is the possibility to discourage fuel use through taxation measures. However, according to the information reviewed in completing this report, the public response to changes in fuel price is relatively inelastic.¹³ Increasing rates of vehicle ownership indicate that traffic has increased despite rising fuel prices.¹⁴ At the same time, tax levels would also have to be constantly changed on the basis of changing oil prices. So although emissions trading may be more costly to implement, there is more certainty with respect to its ability to deliver emissions reductions.

There are a number of other economic realities to consider in integrating road transport in to the EU-ETS. As briefly described above, including road transport may result in increased competition for reductions in other sectors where marginal abatement cost is typically lower. The Swedish Environmental Protection Agency argues that if road transport is included in the EU-ETS, the total cost of emissions will increase. Depending on the stringency of the cap, and the increased demand for reductions, the scarcity of emissions reductions may increase the marginal abatement cost. Typically, the marginal abatement cost of reductions from the road transport sector is higher than that for a number of other sectors. In addition, the price of

¹³. Watters and Tight, p. 28.

¹⁴. Ibid, p. 28.

emissions reductions will also be significantly affected by the move from free allocation to auctioning.

Including road transport in the EU-ETS could also lead to an increase in the price of allowances which could have negative impact on the competitive advantage of companies exposed to international competition thus leading to CO₂ leakage. The potential for CO₂ leakage would depend largely on which point of obligation would inherit a reduction target; if it were fuel suppliers or car manufacturers then there is the distinct possibility that emissions obligations would be undertaken outside the European Union.

Looking longer term, the carbon intensity of fuel will have to decrease under a cap and trade scheme. As the cap becomes more and more stringent, and carbon scarcer, the prospect for additional reductions will decrease. There will simply be fewer and fewer actual measures that will result in real emissions reductions. The alternative to improvements in fuel quality would either be changes in the use of vehicular technology (through the use of zero emission vehicles), or a reduction in the amount of kilometres driven. For the decarbonisation of the sector to occur, the trading scheme will need to eventually force the individual to make changes in decisions related to both vehicle purchases and driving behaviour.

In providing final recommendations with respect to the inclusion of road transport in to the EU-ETS, there are a number of factors to consider. These factors include: the overall potential of emissions trading; the potential point of obligation; the prospect for effective MRV; political acceptability and environmental effectiveness. Essentially, using emissions trading to undertake emissions reductions from the road transport sector may help generate additional reductions using measures for which it may be difficult to legislate reductions throughout the European Union. Due to the subsidiarity principle, it may be difficult to legislate behavioural modification measures in such a wide range of different countries.

As discussed throughout this report, imposing reduction targets on the upstream emitters of the road transport sector (including fuel suppliers and car manufacturers) may not necessarily result in environmental improvements. Fuel suppliers and car manufacturers may have the option of offsetting their emission targets elsewhere. Imposing a reduction target on individual vehicle owners may result in more immediate environmental improvements. This is assuming that individuals are not allowed to purchase emissions offsets from the international carbon market, nor trade on the EU market.

The effectiveness of emissions trading and road transport may be limited by prospects for effective monitoring, reporting and verification. Given that it may be difficult to impose the same type of MRV standards on road transport as for other sectors traded in the EU-ETS, it is likely that an emission unit from this sector would not be fully fungible with units from other sectors covered under the EU-ETS. The possibility that vehicle owners could form part of a closed scheme where they could trade amongst each further warrants further consideration.

As it currently stands, the price of carbon in the EU-ETS may be too low to encourage mitigation in the road transport sector. As discussed throughout the body of this report, expanding the scope of the EU-ETS to include another sector may contribute to more global mitigation should upstream emitters be able to purchase credits on the international carbon market. Looking at the possibility of trading among downstream emitters, the MRV standards that would apply to trading among individual vehicle owners may not comply with those of the rest of the EU-ETS. For this reason, the prospect of implementing a road transport trading scheme, that would be closed to other sectors may be desirable unless MRV standards could be appropriately harmonized across all sectors.

Having a closed scheme for road transport would not however avoid the possibility of carbon leakage – an element of the ongoing EU-ETS that is commonly criticized. Car manufacturers and fuel suppliers could choose to relocate to other areas of the world where the cost of greenhouse gas mitigation is lower. While a closed system may be required due to some of the challenges associated with emissions measurement and credit fungibility, it would still incur an administrative cost. With respect to marginal abatement cost, a closed system may be disadvantageous in the later stages of a potential scheme. With fewer mitigation options available to an upstream point of obligation (either a fuel supplier or car manufacturer), the abatement cost may rise to a level where companies in the transport sector incur a higher cost of compliance than other sectors.

Looking at the overall design of a potential closed scheme, or as a new sector to be included in the EU-ETS, it is possible that imposing a reduction target on downstream vehicle owners and allocating them personal carbon budgets may be more politically acceptable. Imposing reduction targets on fuel suppliers would increase the price of fuel, while imposing reduction targets on car manufacturers would increase the price of vehicles and could affect the financing of research and developing in to zero emission vehicles. Allocating free carbon allowances to individual vehicle owners could be used to monitor their driving behaviour would provide them with more freedom in terms of determining their own fuel consumption. This could help incentivize more behaviour change within the sector, thereby helping to reverse a growing trend in private vehicle use.

Bibliography

Blom, M.J.; Kampman, B.E.; Nelissen, D; “Price effects of incorporation of transportation into EU ETS”, CE Delft (and Ecofys), 2007.

COMMISSION STAFF WORKING DOCUMENT, *Accompanying document to the Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directive 2003/87/EC so as to improve and extend the EU greenhouse gas emission allowance trading system, Impact Assessment*, {COM(2008) 16 final}, {SEC(2008) 53}.

Communication from the Commission to the Council and the European Parliament, “Results of the review of the community Strategy to reduce CO₂ emissions from passenger cars and light commercial vehicles”, COM(2007), 2007.

Ecofys, “Inclusion of additional sectors and gases in the EU emissions trading scheme”, Report under the project “Review of the EU emissions trading scheme”, 2006.

“Impacts of regulatory options to reduce CO₂ emissions from cars, in particular on car manufacturers”, Report to European Commission, December, 2008.

Raux, Charles, “The use of transferable permits in transport policy”, Transportation Research Part D 9, p. 185-197.

Regulation (EC) No 443/2009 of the European Parliament and of the Council, of 23 April, 2009, “setting emission performance standards for new passenger cars as part of the Community’s integrated approach to reduce CO₂ emissions from light duty vehicles.”

“Roads toward a low-carbon future: Reducing CO₂ emissions from passenger vehicles in the global road transportation system”, March 2009, McKinsey & Company, New York City.

“Road Transport and the EU Emissions Trading Scheme”, Department for Transport Discussion Paper, United Kingdom,
<http://www.dft.gov.uk/adobepdf/165252/euemistraschemepdf>.

“Road Transport Emissions in the EU Emission Trading System”, Nordic Council of Ministers, Copenhagen, 2007.

The Climate Policies of the European Union: Internal and External Dimensions (working title), Mitigating CO₂ Emissions from Cars in the EU, Patrick ten Brink, Institute for European Environmental Policy, Brussels, 2009. (Draft Report)

“The Cost and Effectiveness of Policies to Reduce Vehicle Emissions”, Joint Transport Research Centre, report from round table, January 31 – 1 February 2008, Paris.