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The EU should not shy away from setting CO_2-related targets for transport

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Abstract

Transport is the only sector in the EU where greenhouse gas emissions continue to rise. Unless this trend can be reversed, the EU will have little chance of reaching its objectives in the context of global obligations on industrialised countries to reduce their emissions between 80% and 95% by 2050 compared to 1990. Many different solutions exist, including, for example, new technology such as electrification of road transport, modal shift, optimising existing technologies and policy measures and more radical measures such as binding GHG emissions targets. While there is some merit to all of these approaches, this Policy Brief argues that current EU policy thinking is not (yet) bold enough to credibly tackle the GHG emissions challenge from transport. It argues that:

- The EU must take GHG emissions from the transport sector more seriously.
- Sound transport pricing is important but it has limitations for the transition to a low-carbon transport system.
- EU-level infrastructure policy is grossly inadequate, mainly but not only in view of the transformation of the EU transport system.
- There is too much (blind) faith in technology solutions, thereby avoiding hard questions on how to curb transport growth.
- Finally, well-designed technology deployment targets are a good way to start the transition to a low-carbon transport system.

Introduction

The transport sector is a strategic sector that is of fundamental importance to all economic activity. Transport services are an important input factor for all products. Transport costs affect competitiveness of European firms. Transport on its own also constitutes an important sector within the European economy. It contributes some 7% of GDP and more than 5% of total employment in the EU. Transport networks are the lifeblood of the EU internal market and a cornerstone of European integration.

Progressive European integration, notably via successive waves of enlargement, has led to a substantial increase in transport volumes On average, passenger transport increased by 1.7% annually since 1995 – mainly driven by air and road transport. Freight transport increased by 2.7% over the same period, primarily by road and sea. These developments have led to a recognition of the negative side-effects of mass transport in Europe, including the deterioration of infrastructure, misuse of land, congestion, air and noise pollution, increasing oil import dependency, injuries and deaths, as well as substantial amounts of greenhouse gas (GHG) emissions.

The latter is of particular concern. European transport GHG emissions keep rising quickly and with transport emissions accounting for almost a quarter of total GHG emissions, control and ultimately reduction of them will be a precondition for a credible new EU climate change strategy. Transport is a sector that offers high potential for developing new, low-carbon

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technologies. If the European Commission and member states are serious about the new post-Copenhagen narrative, i.e. that climate change policy has shifted from "reducing emissions" to "developing future low-carbon technologies" to stay at the front of the race for global technological leadership, then transport must not be overlooked.

The important role played by transport in the EU economic growth strategy was highlighted by European Commission President Barroso in the Political Guidelines for the next Commission (Barroso, 2009) which stressed the need to maintain the momentum towards a low-carbon economy and decarbonising the transport sector in particular. In the Europe 2020 Strategy (European Commission, 2010a), the European Commission finally announced new proposals to decarbonise transport, linked those with the wider sustainable growth agenda.

1. EU greenhouse gas emissions from transport need to be taken more seriously

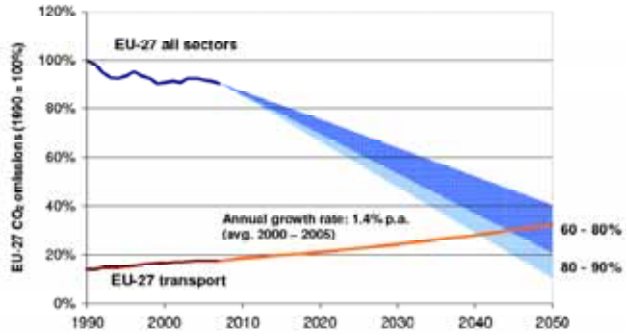
According to the European Commission's own evaluation, the EU Common Transport Policy has seen good progress in some areas, notably the liberalisation of transport services, safety and the strengthening of passenger rights. Arguably, it has also "assisted social and economic cohesion and promoted competitiveness of European industry, therefore contributing significantly to the Lisbon Agenda for Growth and Jobs" (European Commission, 2009). There has been less movement in designing an integrated response to rising GHG emissions, security of energy supply risks and the transport sector's innovation challenges arising from the need to fight climate change. EU transport policy has failed to deliver on reducing GHG emissions for example by shifting towards low-carbon modes and reversing the decline of rail as well as decoupling of freight transport growth from economic growth. The situation has been aggravated by the lack of adequate infrastructure funding and development and to an extent, the absence of efficient and effective pricing including externalities (European Commission, 2009).

In 2007 – the year for which the latest comprehensive set of figures is available – transport was responsible for almost a quarter[1] of total GHG emissions in the EU27. This represents an increase of 36% since 1990 and compares with a 15% reduction in GHG emissions across all non-transport sectors when compared to 1990 levels.[2] More than two-thirds of transport-related greenhouse gas emissions originate from road transport.

Transport remains the only sector where emissions continue to rise, mainly due to growing transport demand, which is more than offsetting efficiency improvements, mainly in passenger cars (EEA, 2009: p. 43). In addition, there is a relative decrease in the use of public transport (by passengers) as well as an increased share of road freight transport as opposed to other transport modes. [3] The European Environment Agency concludes that the modal shift is therefore taking place in the wrong direction, especially in the EU12, i.e. the member states that joined after in or after 2004 (EEA, 2009: p.43).

Transport is one of the largest energy-consuming sectors, accounting for one-third of EU final energy consumption.

Figure 1. Projected GHG emissions growth: The transport vs non-transport sector



Source: European Commission.

Under a business as usual scenario, volumes in all transport modes are projected to increase substantially, but most dramatically for road freight and passenger transport. Low-carbon modes are expected to grow less. For example, Skinner et al. (2010: p. vii), assuming a continuation of recent improvements in vehicle efficiency, expected that transport's GHG emissions in 2050 would be 74% higher than they were in 1990 and around 25% above 2010 levels. This increase is expected to be fed by growth in transport demand, particularly for maritime transport (+87% from 2010 to 2050), aviation (+103%) and road freight (+79%). As a result, the GHG emissions of maritime transport are projected to

[1] Transport accounted for 24% of total EU27 GHG emissions including international aviation and maritime navigation. Excluding the latter – as the Kyoto Protocol does – transport amounted to 19.5% of total GHG emissions (EEA, 2009: p. 21).

[2] See the website of the European Commission, DG Climate Action (http://ec.europa.eu/clima/policies/transport/index_en.htm).

[3] Freight and passenger road transport accounted for 94% of total transport-related GHG emissions in 2007 (71% when international aviation and maritime navigation are included), against 2% (15%) for navigation, 2% (12%) for civil aviation and 0.8% (0.7%) for railways (European Commission, 2010c).

increase by more than 65% between 2010 and 2050, while those of aviation and road freight are anticipated to rise by more than 50% and 45%, respectively.

This would mean that in the period around 2040 to 2050, transport emissions would overtake all other GHG emissions combined. This would be incompatible with EU and international climate targets.[4]

2. The importance and limitations of sound transport pricing

It has been an objective of EU transport policy for some time to develop a rational transport pricing system, where modes pay for their full costs, to allow for undistorted competition within and between modes. Proper pricing would also mean making available funds for infrastructure investment.

However, transport also creates emissions, congestion, noise and accidents and imposes high (external) costs on society, which are not expressed in the market price that consumers pay. These can be addressed by regulation or by internalisation of external costs through for example taxation. Both regulation and taxation would create incentives to shift to more efficient technologies, use existing modes more efficiently or use different modes, e.g. lower-carbon transport modes.

The fuel price, including the price for CO_2 and the internalisation of other externalities, is an important driver of the long-term evolution in all three areas. At the same time, such an approach has limitations. At this stage there is too much uncertainty on the true cost of climate change to calculate a reliable figure for the 'climate change externality'.[5] Dealing with external costs is complicated by the fact that transport taxes are levied at the member state level and are largely fed by objectives other than internalising external costs. The transport sector often benefits from open or hidden subsidies, which can provide perverse incentives. These include for example car registration taxes not aligned with policy objectives, tax deductions for journeys to and from work, tax-free shopping at international airports and on international ferries and the tax regime for company cars or a lack of enforcement of laws. A recent study commissioned by DG TAXUD of the European Commission has found that company car taxation in the EU actually boosts CO_2 emissions rather than curbing these (Copenhagen Economics, 2010).

Rationalising tax policies, for example, by eliminating hidden subsidies and perverse incentives and internalising external costs e.g. by including a CO_2 charge in fuel taxation and using 'kilometre charging' to internalise the external costs of air pollution and congestion can stimulate less carbon-intensive modes. Yet, pricing alone is most likely not sufficient to stimulate the transition to a low-carbon transport sector. For the delivery of a virtually carbon-neutral transport system, the stimulation of least-cost options might not be appropriate. Some of the technology options that are not yet cost effective have long lead times and therefore need to be implemented at an early stage to ensure that they contribute to meeting the 2050 targets. Therefore, additional support, partly for R&D and demonstration but mainly for deployment of new low-carbon technologies, for example in the form of a Strategic Transport Technology Plan – as currently discussed – will be needed. This will explicitly need to include the development of adequate infrastructures and related services, ideally founded on a coherent economic and fiscal policy framework. Integrating co-benefits will help minimise the social costs of the transition.

3. EU infrastructure policy is inadequate

The Trans-European Network (TEN-T), having been nominated in 1996 as the main instrument to deal with infrastructure, needs to be adapted to current and future challenges arising from growing mobility needs, urban development, scarcity of fossil fuels, climate change and environmental protection. The TEN-T policy is not driven by genuine EU objectives, as a result of a lack of funding and sovereign responsibility by the member states in infrastructure planning. This has not been reversed, despite the attempt to boost TEN-T development through the EU economic recovery plan. The way in which TEN-T projects have been designed so far (network layer + priority projects) fails to integrate the different transport modes and does not provide for an optimal functioning of transport elements (infrastructures, nodes, ICT applications, network services, operational and administrative procedures), which should work in combination in order to promote co-modality, modal shift and an efficient and effective organisation of the whole transport system.

[4] The European Council of 29-30 October 2009, called "upon all Parties … to agree to global emission reductions of at least 50%, and aggregate developed country emissions reductions of at least 80-95%"... and supported "an EU objective, in the context of necessary reductions according to the IPCC by developed countries as a group, to reduce emissions by 80-95% by 2050 compared to 1990 levels".

[5] For example, long-term damage cost estimates do not yet include all possible long-term risks, such as the feedback mechanisms that may occur in the world climate system that could lead to much more rapid and dramatic climate changes. In addition, there are major regional and local variations of impacts (see Núñez Ferrer et al., 2010).

Moreover, TEN-T policy as it now stands is not driven by climate change mitigation and adaptation objectives, not does it offer solutions to the need to transform the European transport infrastructure to the requirements of a low-carbon system. Recognising the need to review the current TEN-T policy to put it to service for the EU Transport Policy, the European Commission (2010b) recently discussed whether to make GHG emissions reductions from transport an overarching objective of this EU policy. While this is in an interesting suggestion, success will depend on whether the EU will manage to address member state sensitivities regarding their sovereign responsibility in the field of infrastructure planning and implementation but also on whether the European Commission can develop a more operational strategy to make such a paradigm shift effectively happen.

4. Blind faith in technological solutions?

Nobody can contest that a low-carbon EU transport system depends on technology advances across the transport sector. But it is equally true that technology alone – by a wide margin – will not be able to achieve EU long-term climate change objectives. This is the conclusion of most, if not all projections and scenarios.[6] This becomes evident when comparing projected transport growth and EU climate change objectives. To take just one example, for the EU to meet its climate change objectives, the Netherlands Environmental Assessment Agency (2010) estimates that EU transport emissions as a whole will have to be reduced in 2050 from baseline projections by a factor of 12. For road passenger the factor is somewhere between 20 or 25. Given the already ambitious assumptions underlying the technical scenarios, it would be very challenging (if not impossible) to deliver such levels of GHG emissions reduction by stimulating technical options alone, particularly in light of the significant uncertainties and risks associated with the principal alternative fuels and energy carriers (e.g. land-use constraints, technological and infrastructure challenges). It should also not be forgotten that the modes with the largest projected growth (e.g. aviation) have relatively fewer decarbonisation options and often have slower fleet turnovers.

It is therefore essential that both technical and non-technical options are pursued. Instead of relying on a number of key technologies, a sound transport policy will require a portfolio of different measures. This will necessarily need to include measures to curb demand, if the EU commitment is serious about reaching its self-proclaimed climate targets.

[6] See e.g. IEA (2010), Skinner et al. (2010) and Netherlands Environmental Assessment Agency (2009).

5. What next?

Similarly to the energy sector, a successful low-carbon transport strategy will need to accelerate the natural rate of investment, i.e. beyond what the market would judge being profitable. This will require additional support, partly for R&D and demonstration but mainly for deployment of new low-carbon technologies, for example in the form of the *Strategic Transport Technology Plan*, as is being discussed at the moment.

In addition to the technology push for example by the Strategic Transport Technology Plan, a number of policies, such as regulation, standards or economic instruments, can enhance the market pull. They include performance standards for vehicles, other standards (e.g. for alternative fuels, infrastructures or products), elimination of existing harmful subsidies and the use economic instruments to harmonise taxation and bring it in line with low-carbon objectives.

A particular challenge will be the development of new, low-carbon infrastructures in addition to the replacement of existing ageing and congested infrastructure. The experiences of the TEN-T offers a telling reminder that without some 'Europeanisation' of planning and financing, EU infrastructure risks being dominated by national interests, lacking inter-operability and thereby intra- and inter-modal competition; continuing to be deficient in solidarity,[7] missing an efficient (i.e. EU-wide) pricing system and therefore failing to meet the needs of Europe's transport sector during the transformation phase. Previous attempts by the European Commission have remained a patchwork of initiatives, mainly as a result of member states' reluctance to cede too much power to the EU. It is difficult to see how such infrastructure can be built without a dedicated EU fund for sustainable transport infrastructure.

In addition, we should not forget that critical to achieving low-carbon transport in the EU is timely international action on greenhouse gas emissions from aviation and maritime transport. In the absence of global action on aviation and maritime transport, the EU should develop domestic policies to address at least the emissions it can. For aviation this has happened by including the sector into the EU ETS. Action on maritime is still awaited.

[7] For example, in the case of rail infrastructure investment in member states from Central and Eastern Europe or alpine transit.

6. Are GHG emissions targets for EU transport really such a bad thing?

Add-on policies alone cannot achieve the envisaged emissions reductions in EU transport, with the implication that the other sectors, notably energy, would have to achieve even steeper emissions reductions than currently projected as compensation.

Will an EU transport policy be able give direction and ensure coherence without a headline objective, i.e. target? The climate and energy package agreed in 2008 has implicitly set the GHG objective as a headline target, while ensuring that other objectives such as security of supply and competitiveness are not jeopardised. This has been achieved by testing the impacts of the GHG target on the other objectives.

One can make a case that the GHG emissions reduction target will indeed need to become the headline objective for transport in light of the steep reductions needed. A long-term target can give a clear signal to the transport sector and will, over time, benefit low-carbon modes. Expressed differently, is it possibly to devise a European low-carbon transport strategy in the absence of a target?

Distinguishing targets

Targets can be useful in achieving policy objectives or moving sectors in a certain direction. And even if targets are not met in full, the result is likely still to be better than what would have been obtained in their absence.

Targets have been used by the EU to achieve policy objectives since its beginnings. The European Economic Community Treaty set a target for creating a Customs Union, which was achieved ahead of schedule. A similar approach was used to create the internal market by 1992. On various occasions since then, the EU has attempted to apply this apparently successful formula. The recent EU record on targets, however, is uneven. Witness the difficulties to make progress towards achieving the Lisbon target to transform Europe into "the most competitive and dynamic knowledge-driven economy by 2010", or meeting the Maastricht criteria or the positive example of the climate change targets of the climate and energy package.

It is important to distinguish among different categories of targets. The first are *hard* targets, such as the greenhouse gas emissions reductions targets under the climate and energy package. These are legally binding, and enforceable. A distinct category contains *indicative* targets. The first 2001 Directive on renewable energy for electricity and for biofuels is an example. Targets are still mandatory but differ from hard targets in the level of commitment required. Member states need to make an effort to meet them, but they can divert from them to some degree if they have good reasons. It is unclear how a lack of achievement will be sanctioned. A final category includes *aspirational* targets. These express long-term objectives or aspirations, such as the EU target that "the overall global mean surface temperature increase should not exceed 2°C above pre-industrial levels" or a 15-30% reduction in CO_2 emissions by 2020. The so-called 'Lisbon objective' of making the EU the most competitive economy falls in the same category. Such targets are meant to guide policy-making.

One should distinguish between legally-binding obligations based on EU policies and targets. An example of the former is the EU emissions trading system (ETS), the renewable targets enshrined in the 2009 renewables Directive. They are binding EU laws, enforceable by the European Commission and the European Court of Justice.

Targets best practice

If we accept that targets are a good means to express a vision of what the EU and its member states hope to achieve, they need to be long-term to allow sufficient time for the necessary investment to follow.[8] At the same time, targets need to be credible. Credibility increases when targets are realistic, achievable and backed by plausible implementation strategies either at member state or EU level. Targets need to be built upon indicators or even better, they should be quantifiable in order to ensure that their achievement can be measured. Since targets constitute a significant intervention, they should only be applied in cases where the objective to be achieved is significant. There should only be a few, and ideally only one target, to avoid the incompatibility of targets which creates additional rigidity.

Targets should concentrate on outcomes (e.g. the development of near-zero carbon technologies) instead of prescribing the solution (e.g. EVs, hydrogen cars). In that way, the market, steered by member states' policies, will choose the most appropriate solution.

Targets are best expressed on an EU-wide basis in order to ensure that resources are optimally allocated. If targets are expressed at member state level, policy should be designed in such a way that obligations are 'tradable' across borders to achieve scale, convergence and efficient allocation across member states. If subsidies are used, the overall level of subsidy for the same product or service per member state should be comparable, preventing investors from shopping around and starting a race for subsidies.

[8] For more details, see Egenhofer (2007).

What targets for transport?

What are the best kinds of targets to adopt in order to fulfil the EU's low-carbon transport objectives?

a) *Hard targets*, for example, for renewable energy, hardly seem to be an appropriate approach to drive the transport transition. The high uncertainty surrounding the technology (availability and costs) would not make such a target very credible.

b) *Aspirational targets* are not much more than a government declaration and generally do not trigger commitment by business and investors, unless they are translated into firm government policies.

c) Transport could also be included in the EU *Emissions Trading System*. This would put a ceiling on EU transport emissions and provide steering to less carbon-intensive modes. One of the principal questions with such an approach is whether diffuse sources are best covered by an ETS. The ETS to date is designed to cover large stationary emissions sources. A second issue is that the steering function of the ETS most likely would only kick-in the long-term, after 2030 or even later. To allow the ETS to steer transport would require a CO_2 price far above the existing and realistically expected price. Most studies assume that transport costs of between €100 and €200 per tonne can trigger significant abatement. In the absence of a global agreement where carbon is priced worldwide, however, such a price is unrealistic given the concerns over competitiveness of the industrial sector under the ETS. A significantly lower price would therefore leave the transport sector with little incentive to abate and innovate as it could pay its way by buying allowances. Early action to start innovating has however been identified as a crucial condition for EU transport policy.

d) The latter problem – low CO_2 price – could be avoided by introducing a *separate emissions trading system for the transport sector*. However, this would require replacing the current system of excise duties, for petrol and diesel and other transport fuels in order to avoid double regulation. While this in itself would be a long-term task, given its significant implications for member states' fiscal policies, such a system would be much more complex. Moreover, a separate emissions trading system for transport would lack the flexibility of enabling abatement options to be taken up across various sectors, thereby failing to deliver one of the principal advantage of an ETS, i.e. least-cost abatement.

e) This leaves us with *indicative targets*, i.e. the member states or the EU as a whole would express certain commitments as a somewhat in-between solution. Indicative targets are less rigid and therefore more credible, have a long-term dimension but at the same time also face credibility problems with investors. Why would one want to invest, if governments do not translate these commitments into firm policies?

Thinking about technology deployment targets

The crux of the matter is how to frame and phrase government targets or commitments to meet EU long-term climate and innovation objectives. Any target therefore will need to be examined in light of its potential to drive industrial transformation. This is complicated by the fact that low carbon transport will require co-development of different new technologies, new fuels (biofuels) and new energy carriers (electricity, hydrogen), transport modes (road, rail, intermodal), services responding to customers' needs as well as associated infrastructures and a regulatory framework. To some extent, this will require trial and error, and by extension, giving the solution provider sufficient flexibility to research, test and market new approaches and technologies.

As most of the investment (and much of the R&D) will originate from industry and private investors, the key to success is to generate an appropriate economic environment, ensuring industry buy-in.

The most promising way to steer the transport sector has been to develop a set of indicators capable of measuring the (gradual) progress towards the EU's transport carbon objectives, mode by mode. This would on the one hand integrate customers' perspectives into policy-making and thereby ensure customers' responsiveness. On the other hand and more importantly, such indicators would provide guidance for technology and equipment companies, service providers and investors alike and ultimately have a high possibility to ensure management buy-in. To date, such indicators are not yet developed, but they should not be too difficult to devise. An example of a set of indicators in the rail freight sector could be i) reliable availability of rolling stock, ii) flexible train configurations, iii) availability of integrated mobility hubs, iv) availability of a tracking system to customers, etc. In the case of EVs, such criteria could include for example, a commitment from each member state to: i) a number of pilot projects in relation to its population and/or GDP, ii) a certain number of charging stations, iii) a certain number of hybrid plug-ins or other innovation solutions, iv) kms of smart grids, etc.

Technology deployment targets offer several advantages:

- testing innovative technologies on site,

- identifying and finding solutions for technology integration issues,
- ensuring management buy-in and
- if properly managed, the ability to integrate customer orientation at an early stage.

Ultimately, only those technologies that respond to customer needs and pass a customer responsiveness threshold will be successful in the market. Too many technologies have been developed that placed excessive emphasis on the supply side – only to fail to be adopted by the market at scale.

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