

Using Cap and Share to control emissions from the EU transport sector

Executive Summary.

Cap and Share is a cap and trade system in which tradable rights to whatever is being capped are distributed on an equal-per-person basis to every adult in the general population rather than being auctioned or being grandfathered (given) to existing users. Because those receiving the rights under C&S sell them within a year of receipt, it automatically compensates the least-well-off in society for the price rises that the shortages brought about by the imposition of the cap inevitably generate. This fairness and built-in fiscal neutrality make it a more politically acceptable way to control emissions than other allocation methods.

Carbon dioxide emissions from all forms of transport apart from rail are rising within the EU at a time when those from other sectors are falling. Within the transport sector, emissions from road vehicles are rising most rapidly in absolute terms. However, the EU emissions trading system is unsuited to controlling them because of the way it was designed. As only aviation and marine emissions can be taken into the ETS with reasonable ease, this is what the Commission is proposing to do.

This paper argues that capping some transport emissions and not others would be a serious mistake because the various transport modes are in competition with each other. Not only would the Commission's proposals distort competition between the modes but, because of the short-term inelasticity of the demand for transport, they are unlikely to cause total transport emissions to fall. Instead, by pushing up the cost of emissions permits throughout the ETS, they could force other areas of the EU economy to charge higher prices and/or contract. This would make the EU less competitive.

A solution to this problem would be to devise a separate emissions trading system suited to the transport sector which would not distort competition between the modes but which was linked to the present ETS. Cap and Share is administratively light way of achieving this, and thus bringing transport emissions under control.



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1. The Problem.

Transport emissions are rising rapidly in the EU. Illustration 1 shows that while emissions from all other sources of CO₂ emissions fell between 1990 and 2004, those from transport rose by 26% and are expected to rise by 35% by 2010 unless additional control measure are introduced.

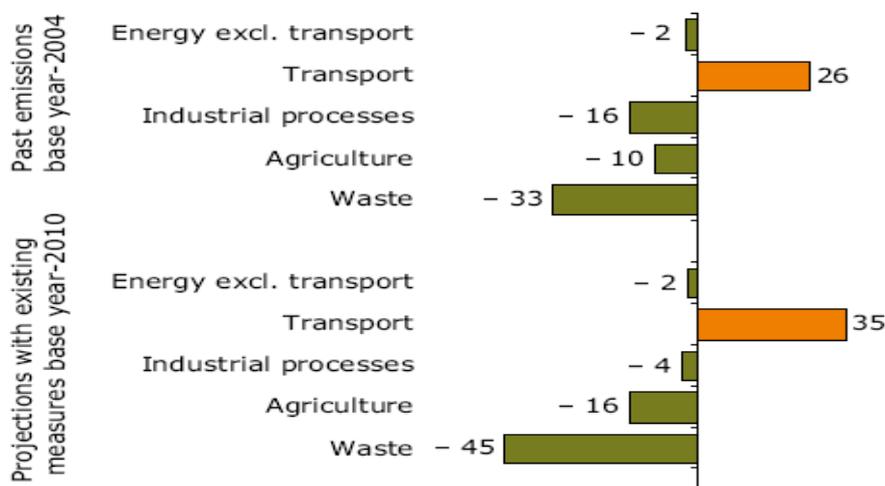


Illustration 1: The upper part of the chart shows how CO₂ emissions from the various sectors of the EU-15 economy changed between 1990 and 2004. Only transport emissions increased. The lower section shows how each sectors emissions are expected to change by 2010. It shows that transport emissions will be 35% above their 1990 level unless further control measures are introduced. Source: Greenhouse gas emission trends and projections in Europe 2006, EEA, 2006, http://reports.eea.europa.eu/eea_report_2006_9/en/eea_report_9_2006.pdf

Most of the 26% rise came from road transport although aviation and marine made significant contributions as Illustration 2 and Table 1 show. The European Commission is proposing to take aviation and marine into the EU's existing emissions trading system. This is possible as most ships and aircraft are operated by large companies and permits can be issued to the firms involved under the national allocation plan mechanism already in use in the ETS. However road transport, the fastest growing emissions source in absolute rather than relative terms, has a much more fragmented ownership and it would be an administrative nightmare to try to issue permits to each truck, van and car owner on the basis of their emissions in some base year, and to set up a system which enabled new entrants – first-time car owners, for example – to claim permits in the way that, say, a new electricity generation company can do. As the Commission itself has pointed outⁱ, inserting road transport into the present ETS “would be likely to raise significant administrative challenges for which several years’ preparation would be needed”. In short, the ETS as it is currently set up is quite incapable of handling road transport emissions on the same basis as it handles the activities it is covering at present.

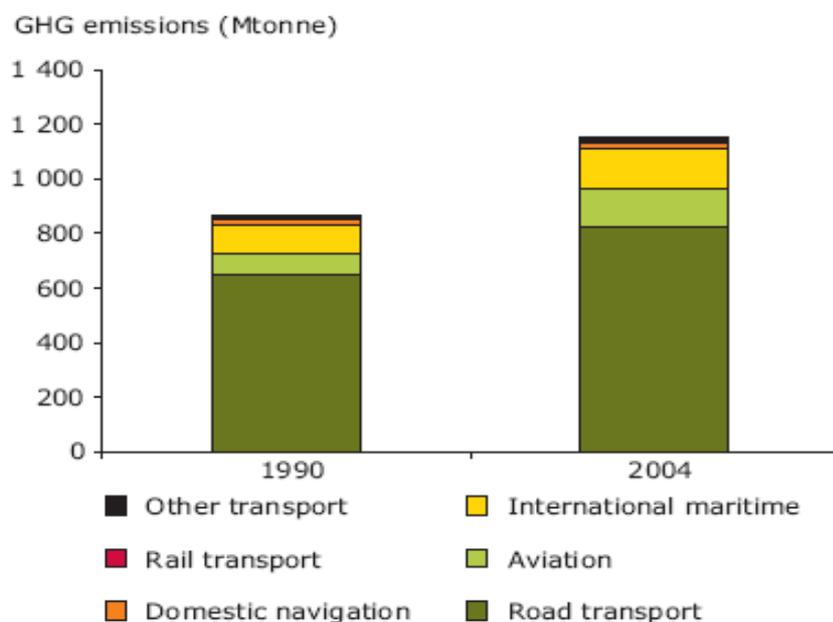


Illustration 2: While emissions from both international shipping and aviation grew between 1990 and 2004, road transport, already the biggest source of transport emissions, increased its emissions by twice as much as aviation and marine put together. Source: Greenhouse gas emission trends and projections in Europe 2006, EEA, 2006, http://reports.eea.europa.eu/eea_report_2006_9/en/eea_report_9_2006.pdf

Table 1: Change in EU-15 transport emissions, 1990-2004, mode by mode

Source	1990 ktonnes	2003 ktonnes	2004 ktonnes	Share of 2004 transport emissions	Increase 2003-4, ktonnes	Increase or decrease	Increase 1990- 2004 ktonnes	Increase or decrease
Aviation	17,517	22,462	23,342	2.74%	880	4%	5,825	33%
Road total	637,400	789,363	801,103	94.0%	11,740	1.5%	163,703	26%
Road diesel	265,972	453,582	476,294	55.9%	22,712	5.0%	210,321	79%
Road petrol	363,108	327,887	317,471	37.3%	-10,416	-3.2%	-45,637	-13%
Road LPG	7,313	6,416	5,831	0.68%	-585	-9%	-1,481	-20%
Rail	8,338	6,363	6,410	0.75%	47	1%	-1,928	-23%
Marine	19,359	20,651	21,087	2.48%	463	2%	1,728	9%
Total	682,614	838, 839	851,942	100.00%	13,103	1.56%	169,328	24.8%

Source: http://reports.eea.europa.eu/technical_report_2006_10/en/Annex_1_-_20EC_GHG_Inventory_report_2006.pdf

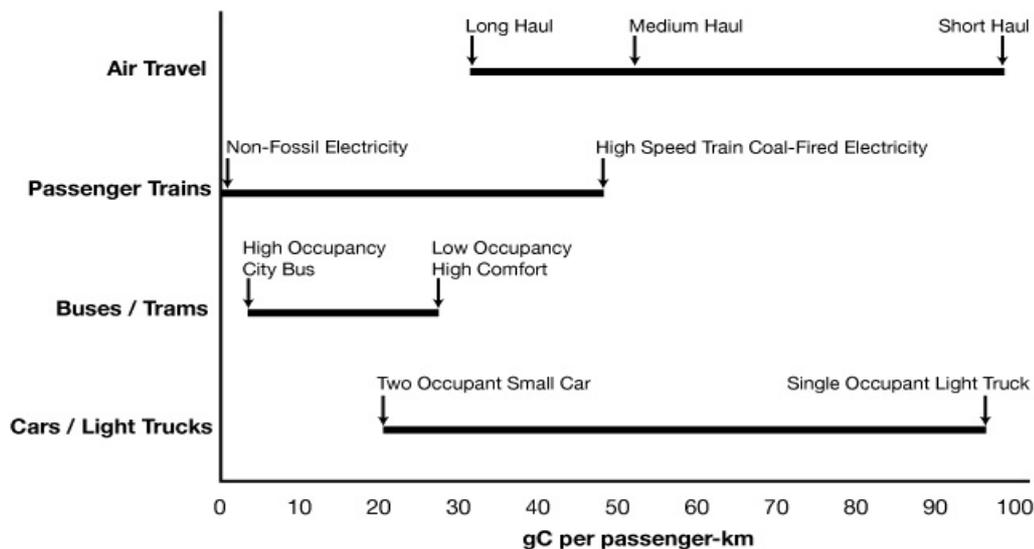


Illustration 3: There are wide variations in the level of emissions from each of the various modes of transport. A small car with all seats occupied can release less emissions than a half empty bus, while a big car or a van with only one occupant can be worse than a long-haul flight per kilometre travelled. It therefore makes no sense to discriminate against one mode of travel. The same rules should apply to them all. Source ATAG May 2006 <http://atag.org/files/PR%20LON-170002A.pdf>

The problem with the Commission's plan to take aviation and marine into the ETS while leaving road transport out is that the various transport modes compete with each other and controlling the emissions from some modes while leaving others out distorts this competition. Indeed, the ETS is already interfering with competition in countries where the railways are powered with electricity generated from fossil fuel. This is because power generation is already part of the ETS, while road, water and air transport emissions are still uncontrolled.¹

2. The Solution

There is no basis for discriminating against aviation or marine on the basis of their CO₂ emissions since there are considerable overlaps in the weight of carbon emitted per passenger per kilometre travelled using the various modes as illustration 3 shows. A similar overlap exists for emissions from freight transport. All EU transport fuels should therefore be placed under a common cap and not split up, with some in the ETS and others not.

However, as we have noted, the ETS mechanism is unsuited to handling road transport emissions. This means that a new emissions trading system needs to be set up for the transport sector and it is

¹Rail systems which generate their own fossil electricity have been given emissions permits free and have not suffered from the ETS. However, rail companies that buy in fossil electricity have been hit because they have had to pay more for it to cover the market value of the emissions released during its generation.

in this context that the use of Cap and Share is proposed. Using C&S would involve:

1. Calculating the current tonnage of CO₂ emissions from the use of transport fuels in the EU-27. This tonnage would be set as the cap.
2. Preparing an up-to-date list of everyone aged 18 and over who is permanently resident in the EU. Draft lists could be published in each member state which had been prepared by combining the electoral register with each person's tax or social welfare reference number. People would be invited to check that they were on each year's register and their details were correct.
3. Each year, or more frequently if thought desirable, each person on the register would receive through the post a certificate giving them the right to their share of the total tonnage of CO₂ to be released by the transport sector over the following twelve months.
4. Within a year of receiving his or her certificate, a recipient would be able to take it to a bank, post office or other financial intermediary and, after proving that he or she was the person named on it, sell it for whatever the market price was on that day. Any certificates not sold within the year would be cancelled.
5. The banks and post offices would deposit the certificates they had bought to their accounts with the issuing agency in each member state, exactly as if they were lodging cash to a bank account. The banks would then sell the tonnage they had registered with the agency to companies importing or producing fossil-based transport fuels anywhere in the EU-27. These companies would also maintain accounts with the issuing agencies so that tonnages could be readily transferred from vendor to purchaser.
6. Companies introducing fossil-based transport fuels into the economy of a member state would pay to its Customs authorities a sufficient emissions tonnage to cover the weight of CO₂ to be released by the fuels they sold. These payments would be collected as part of the existing fuel duty collection process.

The advantages of using C&S are:

1. It is quick, easy and cheap to implement and then to run.
2. Because everyone gets the same allocation, it will be seen as fair.
3. It automatically protects the less well-off. As the cap tightens, the price of the right to emit a tonne of CO₂ will rise. This will increase the price of motor fuels, freight and passenger transport tickets. However, the public will automatically receive full compensation for these rises from the sale of their certificates, thus avoiding knock-on inflationary wage

claims. Anyone whose lifestyle requires less transport than the EU average will come out better off. Indeed, a recent Scottish surveyⁱⁱ shows that the poor would benefit significantly. A random selection of fifty well off and fifty deprived people living in Edinburgh were interviewed to see how much they travelled during a year. The well-off residents had annual household incomes between £40,000 and £60,000 and, on average, caused transport-related CO₂ emissions of 6.97 tonnes a year whereas the deprived residents managed on £6,000 or less and their travel caused the release of 1.48 tonnes of CO₂. 36% of the emissions caused by the better off came from work-related travel, but only for 21% of emissions by the deprived. Holidays abroad were, in fact, the largest cause of emissions for the deprived and the second largest for the well off.

4. It enables different prices for emissions to be charged by the two systems. This is highly desirable in the short-term because different parts of the economy need very different levels of carbon price before those involved consider it worthwhile to cut emissions. The industries within the present ETS are very sensitive to small changes in the carbon price. For example, when the price reached €28 per tonne of CO₂ in 2006, the right to emit was costing firms using natural gas to generate electricity the same amount per kWh as the gas itself. By contrast, €28 per tonne adds an insignificant amount to the cost of a litre of petrol or diesel- the actual figures² are 6.4 cents and 7.6 cents respectively. Increases of this amount are unlikely to have any noticeable effect on consumer behaviour. People would drive just as much. They would also continue to fly. Since flying releases between 30gms (long haul) and 100gms (short haul) of CO₂ per passenger kilometre, a price of €28 per tonne on CO₂ emissions from jet kerosene would increase the cost of a ticket from London to Dublin (500km) by about €1.40 while one from London to New York (5,600km) would be €4.70 more. Consequently, as the Shell Oil company wroteⁱⁱⁱ in evidence to the US Senate Committee on Energy and Commerce in March 2007 “a single economy-wide emissions trading system is unlikely to deliver the necessary breadth of change”. Instead, it will only deliver pockets of change. The company's statement went on.

Not all sectors of the economy appear to respond in the same way to the same carbon price. At \$50 per tonne of CO₂ significant action will result in the industry and power generation sectors (even including sequestration), but such a price may not be sufficient to deliver a consumer response in the mobility sector. This may need to be in the order of \$200+ per tonne of CO₂ based on past consumer behaviour. As action needs to start in both sectors now, this implies that different policy instruments may be required.

In other presentations, such as that by David Hone, Shell International's group climate

² A litre of petrol releases 2.3kg of CO₂ when burned, and a litre of diesel 2.7kg. €28 per tonne is 2.8 cents per kg., 2.3 x 2.8 = 6.44 cents, while 2.7 x 2.8 = 7.56 cents.

change adviser, at a conference^{iv} on emissions trading and road transport in London in May 2007, the company has even mentioned carbon dioxide prices of \$400 per tonne. These may be needed since a price of \$272 (€200) per tonne would only increase the cost of a air ticket from London to Dublin by about €5 and from London to New York by €33. A litre of petrol would go up by 46 cents and diesel by 54 cents.

5. Putting transport emissions into the present ETS is likely to damage Europe's economic competitiveness. This is because the low carbon prices in the combined ETS would not curb transport emissions. These would continue to rise, pushing up the price of permits to the other sectors and, as a result, raising industry's costs, making it less able to compete internationally.
6. Having a special emissions system for transport would make it easier to take other greenhouse gases and the radiative forcing effects of aircraft condensation trails into account.
7. C&S avoids problems that would emerge if, instead of being given to the public, the rights to transport emissions were auctioned to fossil transport-fuel importers by the governments of the member states. The first problem with auctioning is to decide how great a share of the total EU transport emissions each state should be allocated,. If population was taken as the basis, the result would be very close to Cap and Share except that governments, rather than the public, would get the sales revenue. Inevitably, member states would treat the auction proceeds as a new source of tax. This could cause problems as the cap tightened and the price per tonne rose unless member states installed an extensive bureaucratic system to protect the less-well-off, a service C&S would provide automatically. There are, however, two big differences between the two cases. One is that the public would tend to oppose higher carbon prices if auctioning was carried out but welcome them if they were selling emissions rights personally. This would affect their willingness to accept a very tight cap. The other difference is that governments would be tempted to use the auction income to reduce business costs and thus improve their country's competitive situation in relation to other EU states and the outside world. Essentially, this would mean that funds were being taken from the general population to subsidise private business.
8. It would be possible to use the machinery set up for transport emissions to control emissions from domestic and small commercial heating apparatus. At present, CO₂ emissions from the latter sources are of roughly the same size as those from transport and present the same problem over their incorporation into the ETS – there are too many end users to give them all permits based on past emissions. The heating emissions could be treated in just the same way as those from transport.. The tonnage involved would simply

be added to each individual's annual allocation and sold, via financial intermediaries, to the companies selling oil, coal and gas to customers not covered by the ETS.

The advantages and disadvantages of using one system to cover both transport and most space heating need careful consideration. The advantages would be:

- a) Reductions in the emissions from both categories of source require changes in consumer behaviour and it takes relatively high emissions prices to bring them about,
- b) Almost all the EU's CO₂ emissions would be capped by the two systems. Broadly speaking, there would be one for consumers – Cap and Share – and another for industry.
- c) It would be economically efficient. If people chose to cut their emissions by turning down their thermostats so that they could continue to run a big car, they would be able to do so.
- d) Because heating emissions have been coming down, the price of emissions to the transport sector would rise more slowly than if they were treated independently. Nevertheless, people would be given a strong incentive to cut their heating requirements. Burning a litre of heating oil releases 2.9Kg of CO₂. Consequently, if emissions from transport and small-scale heating were put together in the same system and the cap on the emissions tonnage eventually became so tight that it drove the permit price up to €200 per tonne, the price of a litre of heating oil would rise by 58 cents. This would double the cost of heating a house at current oil prices but is probably many years away.

The disadvantages of combining the two types of emissions source only arise if the price of the right to emit is much higher in the C&S system than in the ETS. They are:

- a) People would find it advantageous to use more electricity for heating as their oil, gas and coal became more expensive. Depending on the source of the electricity, this could even cause overall emissions to increase as conventional fossil-fired thermal power stations waste a lot of their fuel's energy.
- b) Firms too small to be taken into the ETS would find that the cost of their heating fuels, including those for process heat, was above that of their bigger competitors under the ETS.

3. One sky, two systems

As we have seen, the adoption of C&S for transport emissions would put two parallel emissions trading systems in place. Should the two systems be linked to each other and, if so, how? Our suggestion is that a rising annual ceiling should be placed on the price of a tonne of emissions rights in the C&S system. If that ceiling price was ever reached, the central registry would buy in permits from the parallel ETS system and sell them on to the fuel distributors, pocketing the difference in price itself. On the other hand, if the price of C&S emissions tonnage fell to a level at which it was no longer acting as an effective signal to people to change, the registry could buy C&S permits and either dump them or sell them at a loss in the ETS market. The maximum and minimum emissions prices to be set in this way could be announced in advance every year, giving certainty and stability to the market.

Comparison criteria

Criterion	EU ETS	Cap & Share	Carbon tax
Costs of administration a) by firms b) by government	a) high b) high	a) zero, apart from handful of fuel importers b) moderate	a) depends on how applied b) moderate
Effect on firms within the ETS	Delivers windfall profits	Nil, if C&S and the ETS were operated in parallel.	Would cut windfall profits
Effect on SMEs	Subject to unfair competition from firms in the ETS	Neutral	Depends on how applied
Effect on 'green' SMEs	Subject to unfair competition from firms in the ETS	Positive	Positive
Effect on general public	Negative	Positive	Negative
Effect on people in poverty	Very negative	Highly positive	Negative
Ability of governments to pervert	High	Nil	High
Effect on inflation/competitiveness	Inflationary	Automatically compensates for rise in cost of living	Inflationary
Situation if energy costs increase	Price of carbon permit will fall to compensate	Price of carbon permit will fall to compensate	Political pressure to reduce tax rate.
Effect in economic recession	Price of carbon permit will fall to compensate	Price of carbon permit will fall to compensate	Political pressure to reduce tax rate.
Risk of consumer revolt	High	Low as income from permit sales rises as the tonnage of emissions is cut.	High, as shown in the UK when fuel duty protesters blockaded fuel depots
Implementable across the EU?	Yes	Yes	No, because of lack of tax harmonisation
Political feasibility	Yes, but only because of grandfathering and an absence of public debate	Yes	Likely to be highly unpopular, especially when harsh emissions cuts are required
Effect on attitudes to govt./EU	Makes the EU seem like a vehicle for big business	Makes the EU seem like a supporter of people's rights	Makes a government unpopular as the tax rate would never seem to be right

Automatically aids sequestration?	Could be developed to do this	Could be developed to do this	No.
Long-term predictability	Short (3- and 5-year) time horizons so far.	Could be given a rolling 20 year time horizon	Unpredictable
Can it guarantee to hit an emissions cut target?	Yes	Yes	No.
Can it cope with 100% of EU emissions?	No, not as currently structured	Yes, with ease	Yes, with difficulty
Capable of extension to become global system?	No, too complex	Yes.	No.
Effectiveness: can it cope with very rapid emissions cuts?	No, unless full auctioning is adopted	Yes	No.
Ability to respond to new situations	Inflexible – several years' notice required	Maximum time required to change - 12 months	Could be changed very quickly.

May 2007.

- i 'Questions and answers on the EU strategy to reduce CO₂ emissions from cars' European Commission memo, 7 February 2007.
- ii *New Directions. Rich in CO₂* by Malamo Korbetis, David S. Reay, and John Grace, Atmospheric Environment 40 (2006) pp 3219–3220
- iii The statement is at http://energycommerce.house.gov/Climate_Change/Unsolicited%20Responses/Shell.031907.resp.pdf
- iv The conference was called by the Low Carbon Vehicle Partnership at the Energy Institute on May 1st. Hone's slides are at <http://www.lowcvp.org.uk/assets/presentations/Hone.pdf>