

Department for Transport call for evidence: reforming the HGV road user levy

January 2018

Campaign for Better Transport is a leading charity and environmental campaign group that promotes sustainable transport policies. Our vision is a country where communities have affordable transport that improves quality of life and protects the environment.

Campaign for Better Transport is pleased to comment on the Government's call for evidence to review the existing time based system and to make the case for a distance based lorry charging system.

Summary

Campaign for Better Transport supports the Government's aim to reduce road congestion and pollution by incentivising more efficient HGV use of the road network with an effective lorry road charging system.

Currently, the industry is competitive but not efficient. The existing time based system has neither led to efficiencies, nor reduction in emissions and collisions in the UK. Empty running is now at 30 per cent the highest level for years and load utilisation has not improved either. Thus to improve economic efficiencies there should be a direct relationship between the taxes per km travelled and the marginal costs which a distance based charging system can provide. It is the calculation of these marginal costs which is crucial during the HGV levy revision.

HGVs have a wide range of impacts; these include congestion and pollution but also safety and infrastructure impacts not mentioned in the review. Currently, HGVs are only internalising around a third of their costs so until HGVs internalise more of their costs HGVs will continue to be a huge problem to society and the economy. Moving to distance based charging will have economic, productivity and competitiveness benefits as well as environmental benefits and is also likely to lead to a shift to rail, which should have further benefits

Congestion costs the UK £30 billion in 2016 with the UK ranked the fourth most congested developed country and third most congested in Europe.¹ Furthermore, the revenues from the distance based charging could be re-cycled into supporting the quality of logistics through training and technology which will help the viability and operations of SMEs, as seen in Germany.

¹ INRIX: Global Traffic Scorecard

Building more roads alone will not solve the problems as it creates new traffic. When a new road is built, new traffic will divert onto it, a well-known and long-established effect 'induced traffic'.² Therefore more efficient use by lorries of existing roads is part of the answer.

This submission includes:

- Responses to call for evidence questions
- Appendix 1 (p11): January 2018 update to the June 2014 MTRU report: *Heavy Goods Vehicles - do they pay for the damage they cause?*
- Appendix 2 (p19): European Case studies on distance based systems
 - German Maut
 - Austrian Maut
 - Swiss distance-related heavy vehicle fee

Responses to call for evidence questions

Q1. What changes could be applied to the existing levy to deliver the UK's objective in rewarding individual HGV operators that plan for more efficient route operation and to use the most modern equipment?

Government should consider using the tax revenue from distance based road pricing of HGVs to incentivise investment in digital equipment, efficient logistics and less polluting technology; improve operating centres and staff training; and provide better parking and rest facilities for HGV drivers. Any new system needs to be fair for all users and make foreign lorries pay for road usage.

Recycling revenues from the charge so as invest in improving the quality and efficiency of the UK logistics industry will improve the competitiveness of this industry against foreign competition and have wider economic benefits.

We append a detailed case study of the German Maut scheme (Appendix 2) which demonstrated a range of efficiency benefits, including reduced tonne/kilometres because of better loading rates.

Helping to drive more efficient use of our roads.

Reducing emissions which contribute to poor air quality and climate change

We answer these two points together as a distance based charging system will result in reduced lorry miles and therefore reduced congestion, pollution, collisions and road maintenance costs.

The single most effective change to achieve all the Government's stated objectives of improving efficiency, reducing exposure to collisions and reducing air and CO2 pollution would be to replace the existing time based lorry charging system with a distance based system which could relate charges paid to the real impacts HGVs have on other road users and the road network. The current daily charge bears no direct relationship to the amount of use of the network therefore the system does not incentivise more efficient use of the road network or the time at which it is used, and the system does not therefore incentivise efficient use of the network.

A distance-based lorry charging scheme could improve HGV efficiency by incentivising more efficient use of lorries, in order to reduce lorry miles. The current empty running and load utilisation

² CPRE: The end of the road? Challenging the road-building consensus (March 2017)

figures show that road haulage industry efficiency is not improving. In 2016, the average lading weight was 68 per cent.³

The existing time based system, introduced in 2014, was designed to make foreign hauliers contribute and is largely revenue neutral for UK hauliers; it is not therefore designed to make HGVs pay for the impacts they have.

These impacts are severe and are not reflected in the level or structure of current taxation of HGVs in terms of miles driven and therefore the congestion, infrastructure track costs, pollution and safety impacts. MTRU research, commissioned by CBT using DfT values, shows that HGVs are only currently paying around 32 per cent of their external costs, which is not sustainable. Charges should reflect the costs of climate change, collisions, road infrastructure damage as well as the costs of congestion to the economy.⁴

Research looking at the economic impact of introducing road charging for HGVs across Europe found that vignette solutions and tax regimes will only cover a fraction of infrastructure costs and hardly incentivise a more sustainable purchase and use of vehicles.⁵

By contrast, distance-based tolling HGVs has improved efficiency and resulted in better efficiency and lower empty running in Germany, Switzerland and Austria. Furthermore the evidence shows that tolls can be beneficial to society without placing an unbearable financial burden on freight transport. For example, the German Government has been using revenue from tolls to provide discounts for hauliers to purchase less polluting trucks.

The overwhelming conclusion from the various independent research reports cited in our submission is that distance based HGV charging systems can reduce lorry miles and therefore reduce congestion, pollution and crashes.

Furthermore a distance charging system would make it fairer for rail freight to compete if HGVs were paying a large proportion of the costs they impose on the economy and society.

A distance based charging system is also likely to lead to an increase in rail freight, as seen in Germany, which would have some large socio- economic benefits. Our evidence is that the transfer to rail on key transport corridors where there are parallel rail routes, has congestion, pollution and accident reduction benefits. The MTRU research issued in April 2017, sponsored by the DfT, shows that transferring the equivalent of 2000 HGVs a day to parallel rail routes on A14,34, M6 and M62 corridors could significantly reduce road congestion.⁶

Further research on the same corridors showed that removing 2000 HGVs could reduce NOx by 10 per cent, particulates by 7 per cent on each corridor as well as reducing overall national CO2 emissions by 2.5 per cent and killed and seriously injured by 18.⁷

A nationwide distance based HGV charging system could result in more rail freight flows, as it has done in Germany, because of more parity between the modes, and thereby further reduce

³ DfT: Domestic Road Freight Statistics, United Kingdom 2016 (July 2017)

⁴ MTRU: Impact on congestion of transfer of freight from road to rail on key strategic corridors (March 2017)

⁵ Fraunhofer: Economic impact of introducing road charging for Heavy Goods Vehicles (November 2016)

⁶ MTRU: Impact on congestion of transfer of freight from road to rail on key strategic corridors (March 2017)

⁷ MTRU: Supplementary report on environmental and safety impacts of the transfer of freight from road to rail on key strategic corridors (December 2017)

congestion and lower pollution. We agree with the conclusion of the Government's Rail Freight Strategy, that "shifting freight from road to rail can result in significant CHG emission savings as well as economic and safety co-benefits".⁸

Question 2 The current Levy already takes weight and axles into account. In reforming the HGV Road User Levy. Should the Government consider a charge based on:

a) **The Euro emission class?**

Yes, charges should vary according to the emissions level of the vehicle to encourage early take-up of cleaner technology. It should be differentiated on the basis of euro engine classes as Euro V and in particular Euro VI engines emit considerably less air pollution, particularly for NOx emissions.

There should also be charging differentiation based on the CO2 performance of trucks as there is a large different in the external costs of bigger HGVs compared to the smaller ones. The VECTO software currently being developed by the Commission would allow this. Currently there are no standards or reduction targets for truck CO2 emissions unlike cars and vans. VECTO is the first stage which will allow the measurement.

Distance travelled?

Yes. As stated above, charging on distance travelled is the best way to both measure the impact HGVs have on other road users and the road infrastructure, and to incentivise and reward efficiency. This is supported by the German and Austrian case studies appended to this submission.

b) **Any other factors**

Different charges for different weights and lengths of trucks should continue now and in the future. The bigger heavier HGVs (5 axle and above) impose higher external costs than the smaller HGVs. Therefore the new charging system needs to distinguish between small rigid HGVs and the largest HGVs.

Furthermore, the longer semi-trailers should pay more than standard 16.5 44 tonne trucks as they have higher external costs including congestion. Any further increases in vehicle dimensions and weight should be charged accordingly.

Charges should vary according to the type of road and time of day and level of congestion. Truck roads are built to a higher specification than local roads in order to cater for HGVs.

A number of other options have been suggested to improve efficiency. These include the following:-

- i) Use of longer semi trailers. Longer semi trailers have higher external costs than existing 44 tonne trucks. Load data from the initial trials fails to support the efficiency and safety arguments, with the trial lorries fully loaded for only a third (34 per cent) of their journeys, and the extra length not being used at all for around half of their journeys.⁹

⁸ DfT: Rail Freight Strategy (September 2016)

⁹ RiskSolutions: Evaluation of the Longer Semi-Trailer Trial: Annual Report 2016 (September 2017)

- ii) Allowing HGVs to use bus priority lanes. The suggestion from the TRL Freight Industry Collaboration study report to allow HGVs to use bus priority lanes ¹⁰ is flawed, given the challenges in verifying whether loads are full. This would also affect the reliability of buses and be dangerous for cyclists who use bus lanes.

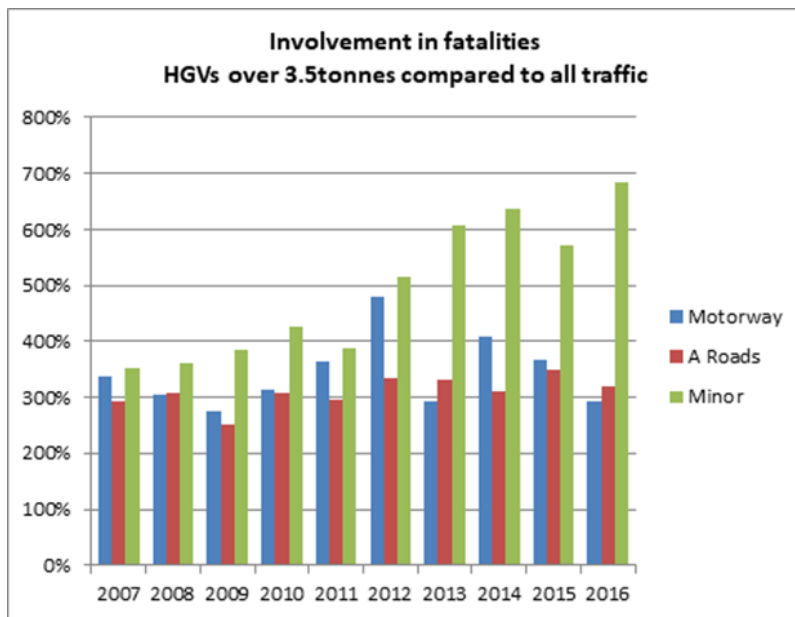
Distance based charging remains the best way to improve efficiency and reduce the adverse impacts of HGVs.

- c) **Reducing lorry mileage will reduce road infrastructure damage/maintenance costs.** More efficiency leads to less HGV miles which reduce road infrastructure damage. Lorries do cause far more damage to foundations and structures of roads than cars because the damaging power rises exponentially as weight increases. This is called the **Generalized Fourth Power Law**. The standard six-axle 44 tonne 16.5 metre truck is 138,000 times more damaging to road surfaces than a Ford Focus. Therefore some of the heaviest road repair costs are therefore almost exclusively attributable to the heaviest vehicles.
- d) **As well as reducing congestion and pollution less lorry miles will reduce collisions.** Safety benefits should be taken into account when considering the HGV Levy and the move to distance based charging. **HGV involvement rate in fatal crashes on local roads has doubled in the past ten years.**

Our ten year analysis of DfT Road Safety statistics, which show that HGVs are now twice as likely to be involved in a fatal collision on minor roads as they were ten years ago, demonstrates the benefits of reducing lorry miles. Despite only making up five per cent of overall traffic miles, HGVs are almost seven times more likely than cars to be involved in fatal collisions on minor roads.

Whilst cars are getting safer, HGVs continue to be dangerous in a collision because of their size and weight. The figures also reveal little or no improvement in the rates of fatal collisions involving HGVs on motorways and A roads. In 2014, on motorways, HGVs were involved in almost half (45 per cent) of fatal collisions although they only accounted for 11.6 per cent of the miles driven on them.

¹⁰ TRL: Freight Industry Collaboration Study report (January 2017)



Source: *Traffic statistics table [TRA0104](#), Accident statistics Table [RAS 30017](#), both DfT*

The following DfT table shows the benefits of preventing collisions

Valuation of the benefits of prevention of accidents

Table 1 presents the average values of prevention of road accidents and casualties by severity based on 2011 prices and values. Table 2 presents the average value of prevention of injury accidents by road type (2011 prices).

RAS60001: Average value of prevention per reported road accident casualty and per reported road accident: GB 2011

| Accident/casualty type | £ June 2011 | |
|----------------------------|-------------------|-------------------|
| | Cost per casualty | Cost per accident |
| Fatal | 1,686,532 | 1,877,583 |
| Serious | 189,519 | 216,203 |
| Slight | 14,611 | 23,136 |
| Average for all severities | 50,024 | 71,885 |
| Damage only | - | 2,027 |

Mode Shift benefit values for accidents

The weighted average vehicle involvement rates are set out below and would work out at 2.9 pence per mile, using mode shift benefit values. Current mode shift benefit values, which are low, are as follows: - motorways both high and low congestion 0.5 pence per mile, A roads 5.6 other roads 5.5 and weighted average 2.7 pence.

Table 1 Involvement rates for HGVs

| | Fatalities | KSI |
|------------------|-------------------------|-------------------------|
| Road type | Rate per billion veh km | Rate per billion veh km |
| Non-built up A | 13.6 | 56.3 |
| Motorway | 2.5 | 15.7 |
| Weighted average | 6.8 | 30.8 |

Source: *RAS 30017, TRA 0204, MTRU calculation*

e) ***Improving conditions for drivers away from base including improving rest areas and facilities.***

We support investment of HGV levy revenues in improvements for rest areas. An important benefit of the revised levy could be to improve the outlook and conditions for HGV drivers by raising funding for better rest facilities and training to raise standards.

This could help solve the driver shortage problem as the conditions and image of the job would improve; the average age of UK drivers has been mid-fifties for some years, with some 35,000 HGV driver vacancies in the UK.¹¹ One positive impact of the German Maut scheme (see Appendix 2) is that operators receive a package of support that can be spent on improvements including driver training.

f) ***The current HGV Levy applying to the entire UK road network. Should changes be made to the coverage of the scheme?***

No, the distance based system should continue to apply to all road types to avoid use of unsuitable roads to avoid tolls. This is important in the UK to address congestion. MDS Transmodal research highlights that an all road system could divert freight traffic from congested sections of the road network to less congested sections as the cost of using the network more closely reflects the true cost to the environment, society and the economy.¹²

Question 3 What would the impact of these changes be?

Distance based lorry road user charging would have a positive impact on all four headings in question, namely, the freight industry, UK economy, reduce emissions and improve reliability of road network

a) Impact on the freight industry

The freight industry faces challenges in the face of growing congestion, environmental impacts and a declining workforce. More efficient HGV operations would reduce lorry miles and thus reduce emissions. The road network would operate more efficiently and improve productivity, making drivers work less stressful. It could also support smaller operators as done in Germany (a case study of the German Maut scheme is included in Appendix 2).

b) Impact on the UK economy

A distance based system could reduce road congestion by improving HGV load utilisation and reduce empty running and therefore reduce HGV vehicle miles, with direct benefit to the economy in both cost and time savings.

Government figures show that nationally 30 per cent of lorries are driving around completely empty, a figure which has been growing for some years.¹³ DfT figures indicate that only 34 per cent of HGVs were constrained by volume, 13 per cent by weight and only 19 per cent limited by weight and volume in 2016¹⁴: this shows the potential to increase vehicle load factors by between 30-45 per cent with the right policies.

¹¹ FTA: The Driver Shortage: Issues and Trends An independent analysis of professional drivers in the UK logistics sector (October 2016)

¹² MDS Transmodal report: The impact of road pricing on freight transport in GB (June 2007)

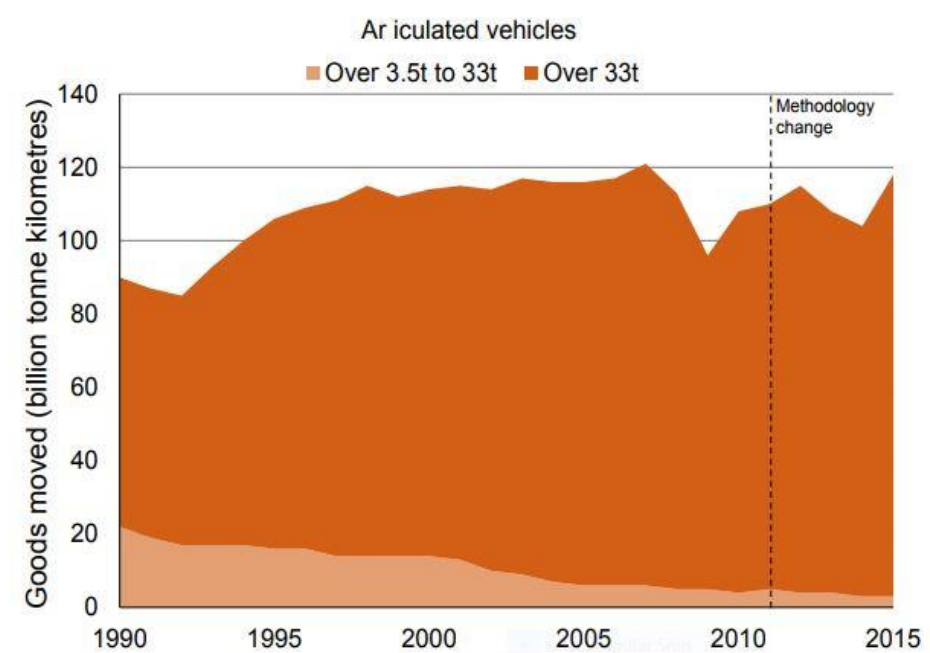
¹³ DfT: Empty running figures tables RFS0117 (July 2017).

¹⁴ DfT: CSRFT data for 2016 issued in 2017 for Freight on Rail

The DfT latest domestic road freight statistics report and its statistics confirm this behaviour and states that, there has been a shift towards using larger HGVs with the tendency for the vast majority of HGVs to be purchased at the maximum size and weight permitted which optimises the position for the largest and heaviest loads, but creates part loading for other consignments.

DfT statistics show that the proportion of freight lifted by HGVs over 33 tonnes increased from 83 per cent in 1996 to 96 per cent in 2016. In 2000, 22 per cent of HGVs were between 31 to 41 tonnes, maximum weights allowed at the time and since the increased allowance to 44 tonnes in 2001, 22 per cent of HGVs were at the maximum weight again.

The levy should result in HGVs paying charges applicable to their size, which is proportionate to their external impacts, to incentive better use, rather than encouraging unsustainable weight and length increases.



Goods moved by GB-registered HGVs, by type and weight of vehicle, 1990-2015 [DfT Table RFS0107]

While large logistics operators may get reasonable utilisation out of trucks, the medium and smaller sized operators who account for the majority of the industry do not use their trucks efficiently. 94 per cent of UK HGV fleet operators had fewer than 10 vehicles and approximately 50 per cent of operators were owner drives licensing just one vehicle.¹⁵

The German example shows how SMEs can be helped by a distance-based levy. The German example also shows that tolls can be beneficial to society without placing unbearable financial burden on freight transport and have not had a noticeable impact on consumer prices.

To improve economic efficiency there should be a direct relationship between the taxes per km travelled and the marginal costs of that road use. A recent report by MTRU analysed the relationship of the current HGV levy to lorries' external costs (detailed in Appendix 1). It found that the current HGV levy bears no relationship to the amount of use of the network.

¹⁵ UKCES: Transportation and Storage: Sector Skills Assessment (October 2012)

It examines how the taxes charged can be said to pay for HGV external costs and what these costs may be using existing DfT values. It does not revisit values for air pollution, carbon and collisions all of which need to be reviewed by the Government and increased in our view.

In particular, the MTRU report shows that the updated values used for marginal external costs used by the DfT, are an important benchmark for the different track cost estimates. A very significant amount of the real marginal costs of the largest HGVs is not being met.

In 2016, 9 billion vehicle miles were run by articulated HGVs, implying a marginal cost shortfall of about £6 billion. The largest HGVs, including all articulated vehicles and the heaviest rigids, impose high external costs which, even using the DfT 2006 Mode Shift Benefit (MSB) estimates, are not recovered by a very considerable margin.

Some of the current values have become out of date and need to be revised. Namely, carbon, accident and road space values. In particular the road space value (passenger car unit – pcu) for heavy articulated vehicles is out of date at only 2.9 times the value for cars in conditions where congestion can occur. Even on motorways this should be at least 4, and much higher on local roads.

Some new values need to be added to the current DfT marginal cost calculations including: long run marginal infrastructure costs, underspend on maintaining the local road network, non-monetised environmental impacts and wider health impacts.

If HGVs internalised a fairer element of the costs they impose on other road users and on the road infrastructure it would also allow the sustainable modes to compete more fairly.

One of the possible unforeseen consequences of charging is a migration away from the smaller HGVs to vans. There is already some evidence of flight from the lower tonnage HGVs to big vans, as vans are more lightly regulated. If a distance based levy is introduced for HGVs, impacts on van travel should be monitored and if necessary changes in van taxation or possibly extending the scope of the levy to vans that are used for the professional carriage of freight should be considered.

c) Reducing emissions and improving air quality

Road Freight is a big CO₂ emitter as HGVs contribute 17 per cent of surface access CO₂ emissions, despite making up only 5 per cent of road vehicles.¹⁶ Reducing emissions from road freight is expected to be challenging, confirmed in a report from AECOM: “*it will be very difficult to meet the 2050 goals without major reductions in GHG emissions from Heavy Goods Vehicles (HGVs).*”¹⁷

Furthermore, while electric technology means car and van emissions can be reduced significantly, the DfT has stated that it expects the existing HGV diesel engine technology to be predominant well into the next decade in its carbon review in February.

Reductions in vehicle kms as a result of efficiency would reduce emissions and improve air quality. The German system supports the purchase of cleaner trucks Euro V & VI, with the result that between 2005-2009 the proportion of Euro V and IV in the fleet rose from 2 to 62 per cent.

¹⁶ DfT Freight Carbon Review (February 2017)

¹⁷ AECOM report ECO driving for HGVs (December 2016)

HGVs account for around 21 per cent of road transport NOx emissions while making up just 5 per cent of vehicle miles.¹⁸ Any incentive to reduce HGV miles, such as a distance-based levy, will therefore make a positive contribution to improving air quality.

A shift to rail freight will play an important long-term role in reducing non-exhaust particulates (PMs). While the latest EuroVI engine technology reduces exhaust particulates, non-exhaust particulate pollution from HGV tyres and brakes, which is hard to reduce for trucks, will remain a serious problem for which there is no current solution, especially for trucks which have large tyres.

Non-exhaust particulate emissions will also continue to be a considerable health risk for electric cars and vans, a point which has not been widely acknowledged to date.

Question 9 How could the charge help to level the playing field for small and medium sized enterprises?

If the revenues are re-cycled into supporting the quality of logistics, this has potential to help the viability and operations of SMEs. A distance-based levy would be beneficial to SMEs operating on shorter routes.

The German Government has been using revenue from tolls to provide discounts for hauliers to purchase less polluting Euro V and VI trucks. While assisting all small and medium hauliers, those with up to 20 vehicles are most likely to benefit. Smaller companies get a bigger subsidy with revenues used to support SMEs when buying new trucks.

Overall, we support distance-based HGV charging systems as the best way to incentivise efficient use of fleet and road space by reducing lorry miles and therefore reducing congestion, pollution and crashes.

25 January 2018

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Campaign for Better Transport

Campaign for Better Transport's vision is a country where communities have affordable transport that improves quality of life and protects the environment. Achieving our vision requires substantial changes to UK transport policy which we aim to achieve by providing well-researched, practical solutions that gain support from both decision-makers and the public.

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¹⁸ DfT Freight Carbon Review (February 2017)

Appendix 1

January 2018 addendum to the 2014 MTRU Report on HGV external costs and charging

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- 2 Calculating the cost of HGV use
- 3 Conclusions
- 4 Executive Summary reproduced for reference purposes from the June 2014 MTRU Report: *Heavy Goods Vehicles - do they pay for the damage they cause?*
- 5 Supporting research

1 Introduction

The 2014 MTRU report “*Heavy Goods Vehicles - do they pay for the damage they cause?*” discussed a wide range of issues on costs and charges, including different approaches to track costs. This Addendum covers a smaller number of key issues, in particular the updated values used for marginal external costs used by DfT which are an important benchmark for the different track cost estimates. It is also worth highlighting two key points which have also seen some change in Government policy.

VED, RUL and a new Road Fund?

The first is the issue of “hypothecating” tax revenue for a particular purpose, or to recycle it back to the people who paid it. Obviously the vast majority of tax revenue must go to general Government expenditure on the NHS, welfare, justice, defence, etc. The annual fixed tax on vehicles (Vehicle Excise Duty: VED) has its origins in the Road Board (later the Road Fund) created in 1910. The idea was to make roads self funding. However, in 1936 the fund ceased to be hypothecated and was subsumed into general taxation¹⁹.

In the summer budget of 2015, the idea of hypothecation was once again revived for VED. The income would go towards financing the strategic road network (SRN) from the 2020/21 financial year. This has since been modified to possibly include the major roads controlled by local authorities as well²⁰ (approximately doubling the network). At the same time the existing lower rates of VED for the least polluting vehicles were largely reversed, this was designed to maintain the level of income. This would otherwise have fallen as cars became less polluting. Zero emission vehicles are still exempt from VED and thus income will eventually fall unless these are also brought in to VED. Thus the aim of the new fund is to maintain, modernise and expand about 9-10,000 miles of major roads, including the SRN.

For HGVs the main change has been a freezing of standard VED combined with part of this changed to a “Road User Levy” (RUL). This takes the form of a standard daily charge for use of the road network, although blocks of time up to a year can be purchased. It thus bears no direct

¹⁹

House of Commons Library Briefing Paper Number SN01482, 23 November 2017

²⁰

Proposals for the Creation of a Major Road Network Consultation, DfT, 23 December 2017

relation to the amount of use of the network. The main reason for introducing it was to charge foreign HGVs.

Fuel duty

There has never been any suggestion that fuel duty should be hypothecated. However, the fuel duty “escalator” (an above inflation rise in fuel duty every year) was designed to have an impact on vehicle use and on emissions, on grounds of both environmental and economic efficiency. The increases have effectively been deferred since fuel duty has been frozen since 2011.

In economic terms, the road freight users’ marginal costs have not reflected true costs and thus higher charges for road use on a distance basis would help to improve total efficiency (in both environmental and economic terms). Thus to improve economic efficiency there should be a direct relationship between the taxes per kilometre travelled and the marginal costs. It is the calculation of these marginal costs which is challenging. For example, what are the costs of road use in terms of construction and maintenance (capital and revenue)? Can all the environmental impacts be costed? Can the downstream costs such as land use impacts be included?

2 Calculating the cost of HGV use

DfT marginal external cost tables

For articulated HGVs DfT produce “Mode Shift Benefit” (MSB) tables, most recently updated in 2015 with estimates for 2020 values at 2015 prices. These calculate the marginal costs so that investment in alternatives which reduce articulated vehicle miles can be tested for value for money.

These showed a rise in costs from the original 2009 estimates, in particular those for road infrastructure and for carbon.

The tables below show the comparative values.

Table 1 Mode Shift Benefits 2015 and 2009
Pence per articulated HGV mile

| | Motorways (by level of congestion) | | Roads | | | Weighted Average 2015 | Weighted Average 2009 report |
|-----------------------------|---|------------|--------------|--------------|------------|--------------------------------------|---|
| | High | Low | A | Other | | | |
| Congestion | 99 | 24 | 72 | 78 | 57 | 52.4 | |
| Accidents | 0.5 | 0.5 | 5.6 | 5.5 | 2.7 | 2.8 | |
| Noise | 9 | 7 | 8 | 14 | 8 | 7.0 | |
| Pollution | 0 | 0 | 0.1 | 0.2 | 0.1 | 2.5 | |
| Greenhouse Gases | 6 | 6 | 7 | 9 | 7 | 3.8 | |
| Infrastructur e | 7 | 7 | 24 | 171 | 18 | 9.0 | |

| | | | | | | |
|---|-------------|-------------|-------------|-------------|--------------------|--------------------|
| Other (roads)²¹ | 6 | 6 | 6 | 6 | 6 | 6.4 |
| Gross Total | 127.5 | 50.5 | 122.7 | 283.7 | 98.8 | 83.9 |
| Taxation | -31 | -31 | -32 | -40 | -32 | -34.1 |
| | | | | | | |
| Marginal cost gap | 96.5 | 19.5 | 90.7 | 243.7 | 66.8 | 49.8 |
| Road Tax as per cent Gross marginal cost | 24 per cent | 61 per cent | 26 per cent | 14 per cent | 32 per cent | 41 per cent |

Sources: Mode Shift Benefit Technical Report, DfT 2009, Mode Shift Benefit Refresh, DfT 2015

It is clear from the above that a very significant amount of the real marginal costs of the largest HGVs is not being met. In 2016 9 billion vehicle miles were run by articulated HGVs, implying a marginal cost shortfall of about £6billion. Clearly these numbers vary a little from year to year according to traffic and the severity of impacts such as pollution or casualties. However they remain substantial and completely unmet. The issue of congestion costs is discussed fully in the original report, they must be included in the marginal cost model if economic efficiency is to be maximised. The Executive Summary and Conclusions from the 2014 MTRU report refers to this and are included as an Annex for reference purposes.

Other sources for HGV costs

The 2014 MTRU report also lists a number of academic, European and DfT sources both for different costing approaches and for different calculations. Since then there have been other analyses, for example the recent RepGraph report for the FTA “Heavy Goods Vehicles: Do they pay their way? - impacts on road surfaces”, November 2017.

This report helps to illustrate the need to understand the complexities of costs and revenues. It sets out the total tax take from HGVs including fuel duty and compares it to the overall costs of road expenditure and road maintenance. It also compares this to the Mode Shift Benefit values for infrastructure, but unfortunately uses the old 2009 values which are very significantly lower. Thus this approach has three fundamental flaws:

- Inclusion of fuel duty as though it is hypothecated income which can be counted against HGV external costs – there are no plans for this
- Using an out of date MSB value for infrastructure (50 per cent of current)
- Complete omission of any marginal external costs other than infrastructure.

In addition, it does not distinguish between different types of HGV within a 3.5 to 44 tonne weight range. The largest and heaviest HGVs (mostly but not entirely articulated) cause a great deal more road damage than smaller HGVs (over 100,000 times more than cars), as well as being more likely to be involved in fatal accidents (3 to 5 times), using a significant amount more road space (3

²¹ These include a range of effects including for the MSB report: up and downstream processes; soil and Water Pollution; nature and Landscape; driver frustration / stress; fear of accidents; community severance (including restrictions on cycling and walking); visual intrusion

to 5 times) and producing higher volumes of emissions. All this needs to be taken into account when calculating the real costs of HGV use. The MSB values reflect a proportion of these and are calculated for articulated HGVs. They are considered by DfT to approximate to the costs of rigid HGVs of a comparable weight.

The most recent figures for VED income are shown below. This does not include about £50million a year from foreign HGVs over 12 tonnes.

Table 2 Total VED revenue 2016/17

| Vehicle Excise Duty classified by vehicle taxation group | Number of vehicles (thousand) | Vehicle excise duty | As per cent of total |
|---|--------------------------------------|----------------------------|-----------------------------|
| Private and light goods | 38,610 | 5,465 | 93.0 per cent |
| Motorcycles, scooters and mopeds | 1,406 | 67 | 1.1 per cent |
| Buses and coaches | 126 | 32 | 0.5 per cent |
| Goods | 475 | 291 | 5.0 per cent |
| Other | 2,831 | 22 | 0.4 per cent |
| All vehicles | 43,448 | 5,876 | 100.0 per cent |

Source: Table TSGB1311 (RDE0103) Road taxation revenue in the United Kingdom: 2016/17

Allowing for these factors the revised conclusions should be that the VED income from HGVs is 5 per cent of the total which the Government is planning to hypothecate, and that, allowing for the higher rate of disbenefits and damage of all types, articulated HGVs would fall far short of meeting their fair share of road expenditure. Using the latest MSB values, the VED and RUL from all HGVs (£.34billion)²² would not even meet the infrastructure costs for articulated vehicles alone (£1.62billion)²³. Using the full MSB tables, articulated vehicles are on average underpaying by over 60p per mile. Even using the lowest congestion value they under pay by 19.5p per mile.

3 Conclusions

It is clear that the conclusions of the 2014 MTRU report are reinforced by the most recent changes to the DfT calculations for articulated HGV costs. Using vehicle kilometres as the basis for comparing HGV costs to other vehicles (especially cars) is clearly inadequate. HGVs produce, for example, 18 per cent of transport carbon emissions while constituting 5 per cent of road traffic. For road surface damage their impact is over 100,000 greater than for cars. The current consultation on changing the Road User Levy (RUL) needs to address these issues and move to a substantial HGV distance based charge if economic and environmental efficiency is to be optimised. This needs to distinguish between small rigid HGVs and the largest articulated vehicles.

The potential benefits are both to reduce transport costs and third party costs (externalities) including environmental impacts. For example, empty running by HGVs has actually increased over the last decade (from 27 per cent in 2006 to 30 per cent in 2016)²⁴ and a distance based charge would encourage greater efficiency. Emphasising marginal costs would mean removing annual charges to operators such as VED. Any reduction in distance travelled would have clear

²² This is calculated by adding £50million from foreign vehicles paying the Road User Levy to the VED total for 2016 in the DfT Table TSGB1311

²³ This is calculated as 9 billion vehicle miles by artics (source: TRA3105) X 18p per mile for infrastructure costs from the MSB report

²⁴ *Domestic Road Freight Statistics, United Kingdom 2016, DfT July 2017*

congestion benefits as well as a wide range of health and climate change benefits. Evidence from the Swiss and German HGV distance charging systems shows the significant potential.

If VED were removed from the HGVs covered by any distance based charge (either the current 12 tonnes or heavier) it would cause a slight fall in the income from VED which is to be hypothecated to the Road Fund. This could be covered by a reallocation of an equivalent amount from a distance based RUL. On the other hand there would be a reduction in road maintenance costs (a key factor for local authority roads).

4. Executive Summary reproduced from the 2014 Report for reference

“Background to costs and charges

There is considerable interest at the European and UK level in charging road freight vehicles in full for their external costs – those that they impose on others that are not included (internalised) in their normal operating costs. Congestion, environmental damage, road wear and accidents are examples of these external costs which are not internalised. In order to include some or all of these costs, there are now different approaches in place across the EU which charge HGVs for road use: motorway tolls in France, Spain and Italy, and “in vehicle” distance charging²⁵ in Germany, Austria, the Czech Republic, Slovakia and Switzerland. France is currently preparing to introduce an “ecotax” on HGVs on the non-motorway strategic network.

Without such charging, there is a rationale for balancing grants to modes which have lower marginal external costs. However these do not reduce road freight inefficiencies such as empty running, depot location, port of landing and general logistics practices which would arise from the generation of a freight system working at optimal efficiency.

In the context of changing size and weight limits, for example longer, heavier HGVs (LHVs or “Megatrucks”) proper charging is also seen as critical to extracting the benefits from any increase in capacity. Without this, they are likely to be counter-productive²⁶ because they would not be well utilised – i.e. suffer from the load factors already common in the UK. Around 28 per cent of HGV travel is empty running. Elements of such charges would include environmental damage, the cost of building and maintaining roads, and the delay costs imposed on other users.

This report focuses on the question of how taxes and charges can be said to “pay” for HGVs’ external costs, and what those costs may be, using existing values from European and UK research.

It does not revisit the values that are commonly used for environmental damage such as air pollution, although some are clearly inadequate. This extends to the price of carbon, currently insufficient to ensure that reduction targets are met. Thus areas of further research are also identified.

Different approaches to costs and charges

Since the 1960s there have been various attempts to count the real costs of using HGVs on Britain’s roads²⁷. Until 1995 an annual statement of costs and income for different vehicle types

²⁵ Using an on board unit or OBU, for example see *Lorry Road User Charging (LRUC) A way forward for the UK*, MTRU, October 2010

²⁶ For example see section 7 and 8 of *Longer and Heavier Vehicles for freight transport*, European Commission Joint Research Centre, July 2009

²⁷ Starting with: *Road Track Costs*, Ministry of Transport 1968

was published, entitled the “Allocation of Road Track Costs”²⁸. This covered elements such as road building and maintenance, lighting, policing and accidents.

Many different weights of HGV had their own ratio of income to cost, partly because damage to road surfaces rises extremely rapidly as axle weights increase. For example, the heaviest HGV axle does over 150,000 times more damage than a typical car axle. Other aspects of damage, also much higher than cars and vans, are related to gross weight, size or handling characteristics. In the original Road Track document, environmental impacts such as noise and air pollution, were not assessed in terms of money values, although they were acknowledged.

Since that time there has been considerable activity in terms of trying to put specific costs on environmental impacts such as noise, air pollution, and greenhouse gas emissions, and in measuring impacts on health and safety. The DfT has built on the work undertaken for Road Track Costs to develop a rationale for central Government grants to freight transport modes (rail and water) which is designed to remove the largest HGVs from the road network and thus save accidents and other costs (or reduce any damage which is not being repaired).

Originally the amount which could be paid was related to the lorry miles which would be reduced – hence the name “Sensitive Lorry Miles” (SLM) values. In 2010 this was replaced, after a consultative process²⁹, by an approach entitled “Mode Shift Benefit” (MSB) values³⁰. This report considers these in more detail in later sections.

There has thus been a continuing interest in developing the idea of what HGV costs really are, and, combined with this, to what extent the tax income from HGV use would cover these costs. There are two basic ideas as to how this should be approached.

The first is **marginal external cost**, which includes additional congestion and road maintenance as costs, but assumes the road network has been built and does not include an allowance for this. This approach seeks to match the marginal cost per mile of the external impacts of road freight to the perceived cost per mile of using a particular HGV. Obviously, the impacts of a 44 tonne articulated vehicle are much greater than a 7.5 tonne rigid HGV.

The second is the **fully allocated cost** model, which similarly identifies costs according to HGV characteristics, but includes the capital cost of the road network. This can be either as a notional depreciation and/or cost of capital, or on the basis of the typical annual spend on road construction.

In the fully allocated cost model case, congestion is often left out of the cost side since it is borne by road users as a group. However it should be noted that strictly speaking a significant amount of the congestion costs are borne by cars and are not part of the road freight user group.

Finally it must be noted that internalising either capital or congestion costs will result in a more efficient use of vehicles and a better distribution of sizes within the fleet. Low utilisation of vehicle capacity (both from empty running and part loads) is a persistent UK problem.

Thus the report explores the different approaches which can be used, to work out whether HGVs “pay their way”. It illustrates how the answer differs significantly according to what assumptions are made. It reviews the state of play in relation to the issue and what might be done in future.

As a starting point, this report reviews the values used for the marginal cost approach in the light of recent studies, bearing in mind the omissions and limitations and issues such as the mandatory

²⁸ Allocation of Road Track Costs 1995/96, Department of Transport 1995

²⁹ Review of SLM values: Phase 1 report, DfT 2008

³⁰ See Mode Shift Benefit Technical Report, DfT 2009

targets included in the Climate Change Bill for reducing greenhouse gas emissions. It goes on to assess the scale of undercharging using different assumptions.

The main conclusions of the report are set out below.

Conclusions

This report has ten main conclusions.

- 1) *The largest HGVs, including all articulated vehicles and the heaviest rigids, impose high external costs which, even using the DfT 2006 Mode Shift Benefit (MSB) estimates, are not recovered by a very considerable margin. This leads to poor economic efficiency and misallocation of scarce resources.*
- 2) *A minimum estimate is that less than 40 per cent of these costs are being charged at present – an underpayment of about £5billion a year which should be charged to the heaviest HGVs, although this income would be moderated by the reduced HGV traffic that would result.*
- 3) *Some of the current values have simply become out of date (e.g. carbon, accident, pcu values) and need to be refreshed, others such as air pollution need to be reviewed.*
- 4) *Some new values need to be added to the current DfT marginal cost calculations including:*
 - *Long run marginal infrastructure costs*
 - *Underspend on maintaining the local road network*
 - *Non-monetised environmental impacts*
 - *Wider health impacts.*
- 5) *In particular the road space value (passenger car unit – pcu) for heavy articulated vehicles is out of date at only 2.9 times the value for cars in conditions where congestion can occur. Even on motorways this should be at least 4, and much higher on local roads.*
- 6) *Improved account of marginal environmental costs needs to be taken, recent research on environmental capital and landscape values for infrastructure schemes should be reviewed as part of this process.*
- 7) *The changes required would raise the level of unpaid marginal costs which should be charged to ensure economic efficiency. This increase would be more than 50 per cent over the MSB level, depending on which costs and revenues are included and revised.*
- 8) *A comparison with full cost allocation does not change this conclusion – while congestion costs would be reduced, since some are internalised within road goods transport, road construction costs would have to be added.*
- 9) *In the case of the full cost allocation model, a contribution to general tax revenue would be expected, reducing the notional offsetting income from HGVs in the MSB.*
- 10) *The long term results of such an approach would not simply act to reduce external costs, including accidents, environmental damage and climate change. They would encourage more efficiency in the road freight sector by providing a direct stimulus to improving utilisation (load factors).*

It is clear that there are areas of work needed to refine the way environmental costs are treated, and refresh the existing elements which have an established rationale behind their monetisation. This should not detract from the serious failure to charge the heaviest HGVs their proper costs and

the need for action to remedy this. In this sense the adoption of the vignette for the UK instead of the systems now common across the EU represents a missed opportunity.”

5. Supporting research

i) MDS Transmodal study, *The impact of road pricing on freight transport in GB 2007* found a very similar amount of underpayment: £6billion. The conclusions of this research are still relevant because it is able to use the MDS Transmodal GB Freight Model used by the DfT. It analyses flows in detail by region and shows where there would be demand for more rail freight services in line with Government policy. In line with our analysis of the external costs of HGVs it uses the DfT mode shift benefits values.

ii) Transport & Environment Research April 2016 which also found that HGVs across the EU were only internalising around 30 per cent of their costs .³¹

iii) Earlier studies by MTRU available from Campaign for Better Transport including:

- February 2015 addendum to MTRU 2014 report, calculating the impact of the DfT’s revised MSB external cost values on HGV track cost calculations
- MTRU research relating to HGV charging- *Lorry road user charging A way forward for the UK* October 2010

³¹ Transport&Environment: Are Trucks Taking Their Toll? II External Costs of trucks and the review of the Eurovignette Directive (April 2016)

Appendix 2 - European distance based charging case studies

- A. German Maut
- B. Austrian Maut
- C. Swiss distance-related heavy vehicle fee

A) German Maut: demonstrating a positive impact on logistics efficiency

Distance based systems on the Continent have incentivised improved efficiency and reduced the number of lorries driving around completely empty (empty running).

The German Maut reduced empty running from around 30 to 19 per cent over a seven year period to 2008 according to operator T- Systems.³² Since 2008 empty running reduced another 1 per cent to around 18 per cent, whereas, in the UK, empty running has been increasing and was 30 per cent in 2016 (up from 29 per cent the previous year). By contrast, under Maut, rail freight increased by 7 per cent and fully loaded trucks increased by 2 per cent.

Since the introduction of the LKW Maut in Germany, distances per tonne entered a stable state and started to decline after the onset of the world economic crisis in 2009. It is impossible to separate the impact of the financial crisis and the impact of tolls on this decline. However, if you compare the distances in Germany with France and Italy then you can see that it seems that there is an impact of tolls on distances travelled, and on logistics efficiency. Furthermore the introduction of the LKW Maut has contributed to further decreasing the share of empty headings in Germany by 1 to 2 per cent.

The detailed analysis on the logistics sector by BAG 2005 and 2006 found a further decline in empty running in the long distance transport business after toll introduction. In the past years the share of loaded vehicle kilometres to total vehicle kilometres rose by around one per cent per annum immediately after the LKW Maut introduction. In addition the Maut seems to have an impact on the utilisation of loaded trucks in long distance haulage. First assessments indicated an increase of even 2.1 per cent to 82.1 per cent by weight, (> 90 per cent in long distance haulage, around 65 per cent in regional trucking) BAG 2005. In the first half of 2006 efficiency could be further increased to 91 per cent in long distance haulage. All figures by weight. UK is around 60 per cent average according to FTA.

The German Government has been using revenue from tolls to provide discounts for hauliers to purchase less polluting trucks, ie, euro V and VI. Smaller companies get a bigger subsidy so the revenues are used to support SMEs when buying new trucks.

Maut provides a package of financial support given to German operators. This did not include fuel duty rebates. The basic structure is:

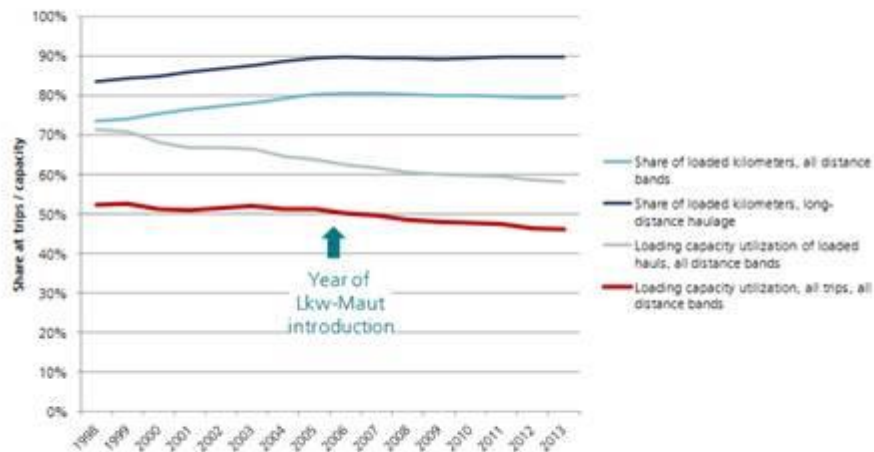
Maximum per company = 33,000 euros for 3 years. Within which the maximum per year per measure is:

- For vehicles 2000 euros
- For individual employees 800 euros
- For efficiency initiatives 1,400 euros

³² T-Systems: Toll Collect fact sheet.

Thus in year one a haulier with 10 vehicles could spend 10,000 on general vehicle improvements, 14,000 on fitting streamline or computer based return load systems and 8000 on driver training. While assisting all small and medium hauliers, those with up to 20 vehicles are most likely to benefit.

Figure 9: Share of loaded headings and load capacity utilization by German hauliers



Source: Fraunhofer ISI with data from BGL e.V. and KBA

Impacts of tolls on consumer prices

Tolls can be beneficial to society without placing unbearable financial burden on freight transport and have not had a noticeable impact on consumer prices.

In Germany the price of operating a trucks is around 1 euro per vehicle-km including driver, vehicles and fuel. The toll is approximately 10 per cent of these costs. Hauliers can pass on the majority of tolls for loaded trips to shippers and forwarders, the resulting costs increase remaining with the trucking business is 2 per cent to 5 per cent.

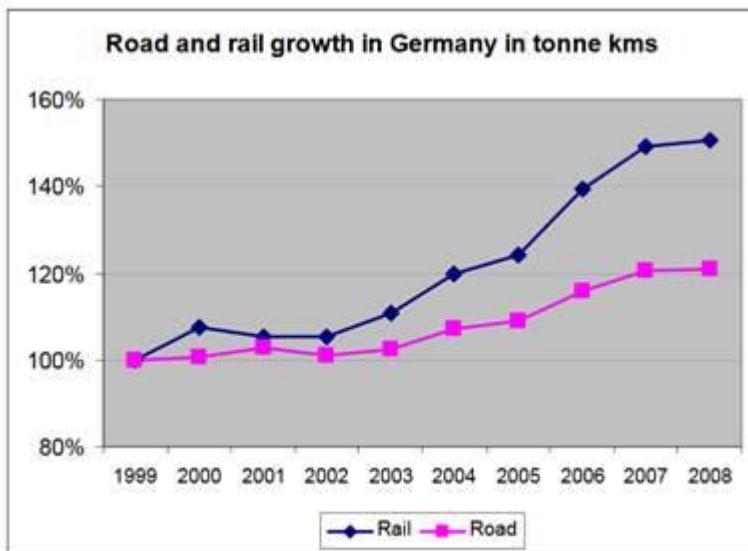
Tolls reducing external costs

German system supports the purchase of cleaner trucks euro V & VI. Between 2005-2009 euro V and IV rose from 2 to 62 per cent.

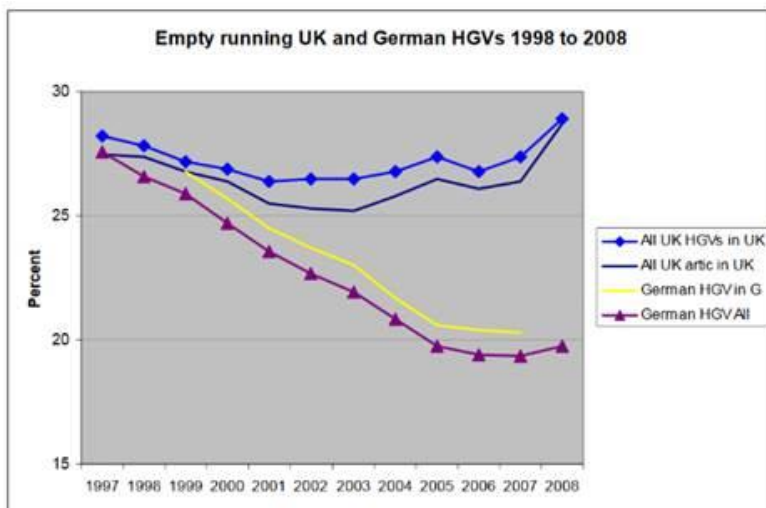
Tolls have reduced tonne kilometres in Germany because of better loading rates. The German Government has been using revenue from tolls to provide discounts for hauliers to purchase less polluting trucks. Smaller companies get a bigger subsidy so the revenues are used to support SMEs when buying new trucks.

Analysis shows that in Germany an abolition of the LKW Maut in its current form would led to an increase in the external costs of transport by 21.5 to 29 billion euros annually. This shows that the toll has had a positive impact on reducing the air pollution caused by road transport. ³³

³³ Fraunhofer: Economic impact of introducing road charging for Heavy Goods Vehicles (November 2016)



Source: BAG Yearbook



Source: BAG Jahrebericht (Annual Report) 2005 and 2008
CSRG UK 2007 and 2008

B) Austrian Maut

In 2004, a mileage-dependent truck toll was introduced for vehicles over 3.5 tonnes maximum permissible gross weight on Austrian motorways and expressways. The amount of the toll is determined by the emission class and the number of axles of the vehicle. This has proved to be an effective incentive for the purchase of clean trucks as well as providing an effective and fair financing instrument for major road maintenance.

The introduction of the charge per km for trucks had reduced the percentage of empty vehicles in Austria from 21,1 per cent in 1999 to 15,7 per cent in 2004. At the same time the average load grew 0,6 Ton to 14,7T. ³⁴

³⁴ VCÖ-Factsheet 2013-16 - Lkw-Maut in Österreich ausweiten (2016)

C) Swiss distance-related heavy vehicle fee

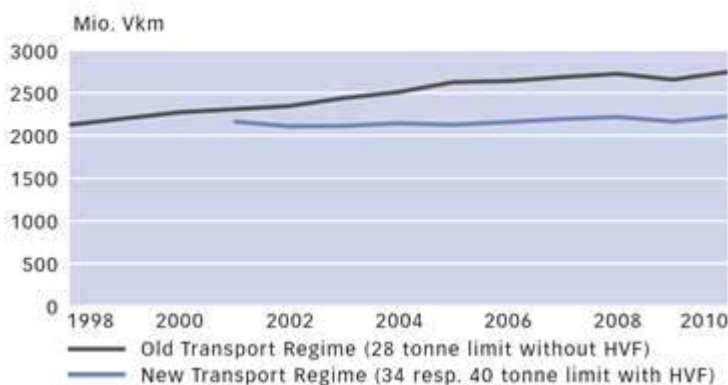
Switzerland introduced a distance based system in 2001, combined with an increase in maximum vehicle gross weight from 28 to 40 tonnes. This distance-related heavy vehicle fee (HVF) replaces the previous flat-rate heavy vehicle fee.³⁵

The switch to a distance-related fee system was aimed at limiting the increase in heavy vehicles on the road, encouraging the shipment of freight by rail and relieving the strain on the environment, and has led to increased efficiency.

Between 2001 and 2005 the number of kilometers travelled by heavy goods traffic decreased by 6.4 per cent whereas the goods transported measure in tonne per km, increased by 16.4 per cent. Since then the numbers of kilometers travelled has increased again.

However, as the graph below shows, this figure would have been much higher had the old regime continued. In specific terms there were 19.4 per cent fewer kilometers travelled, see graph. A separate study found that 30 per cent of the kilometers saved were due to the distance based charging, with around 70 per cent being due to the increase in weight limits.

Change in kilometre performance in road freight transport under the old and new transport regimes



The Swiss scheme also demonstrated significant environmental benefits, with a 10 per cent reduction in particulate emissions and 14 per cent nitrogen oxides and 6 per cent reduction in CO₂ emissions.

The impact on prices has remained low because of the improved efficiency. There was virtually not diverted traffic onto regional roads because the main roads allow hauliers to reduce mileage.

End of appendices

³⁵ Swiss Confederation Federal Office for Spatial Development: Distance-related heavy vehicle fee (HVF)