European perspectives on a new fiscal framework for transport

Book Section

14. European perspectives on a new fiscal framework for transport

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14.1 The Purposes of Taxation

In all developed economies, taxation measures serve a mix of the following purposes:

A) To raise general government revenue
B) To pay for specific collective goods and services
C) As an instrument of economic policy
D) As an instrument of other policy areas

Category (A) has existed for thousands of years, with tax funding goods and services that are collectively consumed, such as defence and policing, together with transfer payments, public debt servicing and the whole range of other state expenditure. Category (B) is where a tax is hypothecated (dedicated) to a particular purpose. This often takes the form of a charge rather than a tax (e.g. a road toll). However, in many countries, road transport taxation was initially introduced specifically to fund improvements to the road infrastructure, with the revenue being ring fenced for that purpose. In most instances, such taxes soon merged into (A), which is the longest-established rationale for taxation. As such, transport taxation has evolved to be one of a range of tax measures that fund general state expenditure. There is now no reason for transport taxation being related to transport expenditure any more than the tax on alcoholic drinks might be compared to funding drink related healthcare.

The third rationale (C) emerged in the wake of Keynesian economics after the Second World War and, informed by various economic philosophies, has been with us ever since. The fourth rationale (D), that the design and implementation of taxation measures should serve other policy aims is a recent and only tentatively established purpose of taxation, which includes the use of fiscal instruments for environmental policy.

There are three key issues that arise with adapting taxes to address environmental goals:

- The environmental tax measures may be counteracted by other tax instruments for general income raising and economic policy which have negative environmental impacts (e.g a small tax concession for fuel economy will be overwhelmed by a large concession on, say, large-engined cars to promote economic development).

- Measures designed to fulfil general income raising and economic policy may be difficult to adapt to address environmental policy concerns. There is a design issue here in that traditional measures such as taxation on income, expenditure and wealth are not the sort of thing that can actually influence environmental performance. To do this, tax needs to charged on environmental impacts. This key design issue is behind the concept of *Ecological Taxation Reform* – that tax should be on environmental impact and not wealth or income[1].

- Individuals and corporations respond differently to fiscal incentives. For example, individuals are less disposed than corporations to pay higher capital costs for vehicles that have lower running costs (e.g. energy efficient and cleaner fuel technologies). This chapter largely focusses upon tax measures affecting individuals. There are others that primarily impact organisations.

Finally there is the crucial point that the way central (and also local) government revenue is collected can only exert a partial influence. In particular, how that revenue is spent is crucial. For example, if reducing taxation on cleaner vehicles is insufficient to influence car purchasers, then using revenue to provide grants would be needed – as indeed has featured in the UK with grants from the Energy Savings Trust through the *Powershift* programme (Hinnells and Potter, 2001).

[1] The concept of ETR was developed by German and Dutch authors in the late 1980s. See von Weizsäcker, et al. (1992) and Whitelegg (1992).

Recognising the limits of fiscal measures is as important as identifying their potential. How they can fit with and support other policies (regulation, standards, procurement and subsidy) is thus an important issue.

14.2 Fiscal Measures to Promote Cleaner Cars

14.2.1 The range of measures

The above context needs to be understood as we examine how transport taxation measures have been adapted to promote cleaner vehicles.

Within the European Union (EU), the role of the taxation system in managing transport demand has been the subject of a number of policy development reports. Typical of these is the European Council of Ministers of Transport report *'Internalising the Social Costs of Transport'* (ECMT, 1997), which advocates a synergistic mix of taxation and charging instruments, including a number of local targeted mechanisms, such as road pricing. Broadly the view is taken that a carefully designed mix of various economic instruments (see Table 14.1) and regulations is needed to achieve political acceptance and practicality.

Table 14.1: Vehicle, Fuel and Traffic Market-Based Incentives

Vehicle	Tradeable permits Differential vehicle taxation Tax allowance for new vehicle
Fuel	Differential fuel taxation to promote cleaner fuels
Emissions	Carbon taxation Emission fees
Traffic	Fuel taxes Congestion charges Parking charges Subsidies for less polluting modes

Source: ECMT, 1997

In exploring the role of taxation, this chapter adopts a slightly different typology that categorises tax measures at points in the life cycle use of cars. There are:

- Tax on the initial purchase of a vehicle
- Annual registration tax
- Tax on the use of vehicles (fuel, roadspace and company cars)

14.2.2 Purchase

Measures on car purchase are crucial to determining the composition and fuel efficiency of a nation's car stock. The standard purchase taxation measure in EU states is Value Added Tax (VAT), with the rate for cars being at between 15% and 25% (Vanden Branden et al, 2000 - see Table 14.2). With a standard rate for all cars, VAT exerts no influence upon purchasing decisions. The only exception is a longstanding differential rate in Italy, where VAT is charged at 19% on cars with an engine capacity of less than 2,000cc (2,500cc for diesels), and at 38% above this threshold.

Table 14.2: VAT rates on cars in the EU

Member State	VAT rate
Austria	20.0
Belgium	21.0
Denmark	25.0
Finland	22.0
France	20.6
Germany	16.0
Greece	18.0
Ireland	21.0
Italy	19.0 / 38.0
Luxembourg	15.0
Netherlands	17.5
Portugal	17.0
Spain	16.0
Sweden	25.0
United Kingdom	17.5

Source: Vanden Branden et al, 2000

In addition to VAT, most EU countries have a specific car purchase or registration tax. In Belgium it is graded finely according to the power of the car, and in Finland there is a reduction for low emission vehicles. A notable example is the Netherlands, which has a car purchase tax is 45.2%. This may seem high (although at 105% Denmark's is higher), but there are counterbalancing tax reductions on this – of €1540 for petrol and LPG cars, €580 for diesel cars and other allowances for cleaner vehicles. The net effect is that this fixed tax reduction cuts the tax charge significantly for smaller and more fuel-efficient cars and raises the price of larger and less fuel-efficient vehicles.

Germany has no car purchase tax (and VAT is only 16%). In the UK, until, 1991, there was a Car Purchase Tax of 10% on five-sixths of the list price value of a new car. This was reduced to 5% in 1991 and abolished altogether in 1992. It was replaced by the UK policy for higher fuel duty, whereby up to 2000, fuel duties rose higher than the rate of inflation.

In June 2004, France announced proposals to reform of their car registration tax into a 'feebate' scheme. Under this measure, cars that emit over 180g/km of CO_2 or diesels without a particulates filter will face a surcharge of €1 500 - €3 500, whereas cars that emit under 140g/km of CO_2 and diesels with particulate filters will receive a rebate of €200 to €700 (Henley 2004). Cars emitting between 140 and 180g/km of CO_2 will be liable to neither a surcharge nor rebate.

Table 14.3: Registration (or other purchase) Taxes in EU states

Member State	Type of tax	Basis of charge
Austria	Fuel consumption tax	Value and fuel consumption
Belgium	Registration tax "tax de mise en circulation"	Fiscal horsepower
Denmark	Registration tax	Retail price: 105% of first DKr 50 800, 180% of balance
Finland	Registration tax	Value of vehicle: 100% of value minus FM 4 600
France	Registration tax	Fiscal horsepower: FF 95-195 per fiscal horsepower
Germany	None	
Greece	Special consumption tax Registration tax	Combination of value and cylinder capacity Taxable value
Italy	Registration tax	Fiscal horsepower
Ireland	Registration tax	Retail value and cylinder capacity
Netherlands	Registration tax	Net list price
Portugal	Vehicle tax	Cylinder capacity
Spain	Registration tax	Market price
Sweden	Sales tax	Environmental classification of vehicle
United Kingdom	None	

Source: Vanden Branden et al, 2000

Given these different purchase tax measures, it is interesting to make a comparison between the UK, the Netherlands and Italy. Table 14.4 shows the long term trend in actual on-road car fuel economy in a number of developed countries. This is a better indicator than the often quoted test figures on new car fuel economy. A key observation is that the average car fuel economy in Italy, Denmark and the Netherlands is better than the UK (by 11%, 15%and 25% respectively). Furthermore, since the 1970s, there has been little change in actual fuel economy in the UK, with the Netherlands has registered a 15% improvement and 20% for Italy.

Table 14.4: On-road fuel economy of cars 1970 and 1998 (litres per 100 Km)
(gasoline or equivalent)

	1970	**1998**	**% improvement**
UK	9.6	9.1*	5.2
France	8.5	8.4*	1.2
Germany (West)	10.2	9.2*	9.8
Italy	8.5	6.8	14.7
Denmark	9.0	7.7*	16.9
Netherlands	9.5	8.1	14.7
Norway	10.3	8.9	13.6
Sweden	10.4	9.4	9.6
Finland	9.6	8.4*	12.5
Japan	10.8	11.5	-2.8
Australia	12.3	11.1*	6.4
USA	17.8	11.8	33.7

****1995 figures***

Source of data: Schipper and Marier-Lilliu (1999) and Schipper, Unander and Marier-Lilliu (2000).

With the UK, Italy and the Netherlands being comparable economies, and the UK and Netherlands having similar fuel prices, other explanations are needed for the notably better environmental performance of Dutch and Italian cars. The Dutch car purchase tax and the Italian VAT measures appear to play an important role. It is notable that Denmark, which also has a graded purchase tax for cars, is another country that registers good fuel economy. It appears that purchase measures can be very powerful.

The European Commission has tentatively examined the idea of whether goods with an Ecolabel could qualify for a lower level of VAT. An alternative might be to adapt the Italian system to vary VAT by the environmental performance of cars. This would not just provide a cost reduction for cleaner cars, but combine it with a cost penalty for purchasing 'environmentally dirtier' cars. However, there are political difficulties as the main trend is for VAT harmonisation. Furthermore, the effectiveness of a VAT measure would be reduced due to the effects of company car purchases (see below), as companies can reclaim VAT. Overall, there is a strong case for a dedicated purchase tax, separate from VAT, varied by a car's environmental performance (as is used in the Netherlands and proposed in France).

14.2.3 Annual Registration ('Circulation')

All EU countries have a graded annual registration (or 'circulation') tax which entitles owners to drive a car on the public highway. In the USA and some other countries this takes the form of a 'number plate' tax. This longstanding tax is often varied by engine size or power of a car, but some nations have implemented an eco-reform to this tax. In Denmark the tax varies with fuel consumption, whereas Germany links the tax liability directly to the Euro emission standards, with the least polluting car paying only 20% of the rate of the most polluting car. However, the overall level of the tax is so low (only about €50 per car), that its impact on car choice is negligible.

Until 1999, the UK was unique in Europe in having a fixed-rate annual registration tax. In 1999 a lower rate was introduced for cars under 1,100cc. This was £100 (€140) compared to £155 (€220) for the standard rate. From 1 July 2001 this is extended to all cars of up to 1,549cc. For cars registered from 2001 the UK adopted a CO_2 emission-based system in four bands (A-D), with the charge varying from £100 - £160 (€140 - €230). Alternative fuel cars are evaluated on the same bands, but have a slightly lower charge of between £90 - £150 (€130 - €220). In 2003 two further bands were added for very low CO_2 emission vehicles (Table 14.5), with the charge range widened to £55 - £165 (€81 - €243)

Table 14.5: UK Vehicle Excise Duty (Circulation) Tax Rates (£ and €), 2003

Band	CO_2 (g/km)	Diesel	Petrol	Alternative Fuels
			£	
AAA	Up to 100	75 (€110)	65 (€96)	55 (€81)
AA	101 to 120	85 (€125)	75 (€110)	65 (€96)
A	121 to 150	115 (€170)	105 (€155)	95 (€140)
B	151 to 165	135 (€199)	125 (€184)	115 (€170)
C	166 to 185	155 (€228)	145 (€213)	135 (€199)
D	Over 185	165 (€243)	160 (€235)	155 (€228)

Source: UK Inland Revenue

Annual circulation taxes have proved to be readily amenable to eco-reforms, with even the traditional engine-size method indirectly providing an incentive for more fuel efficient vehicles. However, if the tax is at a low rate (as in Germany) any effect will be insignificant.

14.2.4 Taxes on vehicle use

Although motor fuels in the EU are subject to varying rates of VAT, additional road fuel duties make up the main tax on vehicle use. In Europe, tax on fuel is high by international standards, particularly when compared to North America. Northern European countries tend to have higher fuel taxes than southern EU members (Table 14.6).

Table 14.6: Tax on Unleaded Petrol in selected EU states, 2001

	Retail Price per litre	Tax as % of retail price
UK	€1.19	76
Belgium	€0.98	67
Denmark	€0.98	68
Germany	€0.99	72
Greece	€0.73	55
Finland	€1.08	68
Italy	€1.02	66
Netherlands	€1.12	69
Spain	€0.80	59
Sweden	€0.99	68

Source: *Transport Statistics Great Britain,* UK Department for Transport 2002.

Tax on fuel is the main fiscal measure on use. In many EU states there are lower tax rates for cleaner 'alternative' fuels and some Scandinavian countries have introduced CO_2 tax as well as fuel duty. In Belgium there is no road fuel duty on LPG and Natural Gas. In Denmark, LPG is taxed at a very low rate (6% of that of unleaded petrol), but they have a CO_2 tax as well as excise duty on road fuels. Finland also has a CO_2 tax. In the Netherlands three different types of tax apply to fuel: the excise duty, an environmental tax[2], and a tax on the stock to finance emergency stockpiles. Germany taxes LPG and natural gas, but at a lower rate than for petrol and diesel.

As noted previously, in the UK following the abolition of car purchase tax, there was a policy to raise fuel duties (the' Fuel Duty Escalator'). This began under the Conservative government's 1993 Budget and was justified at the time as a major contribution by the government towards the reduction of carbon dioxide emissions. Within this general policy of raising fuel tax there has have also been measures to favour cleaner road transport fuels, particularly to provide a duty differential between gaseous fuels (CNG and LPG) and petrol and diesel. This differential was retained when, following blockages of oil refineries by lorry drivers and farmers in 2000, petrol and diesel duty was cut and the Fuel Duty Escalator policy abandoned.

Taxes and charges on using roadspace include bridge/tunnel tolls, road tolls and cordon/congestion charging in city centres. Bridge and tunnel tolls are commonplace, but road tolls (usually only for motorways) are used in seven EU states (Austria, France, Germany, Greece, Italy, Portugal and Spain) and also in Norway. In general these are not related to the environmental performance of a vehicle, but they could be. City centre congestion charging is one of the new car tax measures specifically designed to manage traffic and address environmental aims. It has been introduced in three Norwegian cities

[2] This is an energy and carbon dioxide tax where the rates are based on carbon (50%) and energy (50%) content.

(albeit mainly to fund transport infrastructure rather than manage traffic, see Ieromonachou, 2004) and recently in Durham and London in the UK. The London scheme includes an exemption for cleaner fuel vehicles and has led to an increase in their purchase and use.

14.2.5 Company Cars

In some countries cars are purchased by companies for their staff as 'income-in-kind' rather than for employees who need vehicles to undertake their work duties. In some cases such company cars constitute the majority of new car purchases and hence are the main determinate of the car fleet. In the UK, over half of all new cars are purchased by companies and not individuals. Finland also has a high proportion of new cars purchase by companies, at about 40%. What type of car is purchased has come to be strongly influenced by the tax treatment of the 'benefit in kind' to the individual employee who is allocated a company car. In general, the company car effect has stimulated the purchase of more powerful and less fuel-efficient cars (Vanden Branden et al, 2000; Hinnells and Potter 2001), which has a major effect upon the fuel economy of the whole of the UK car stock. Gradually reforms have cut down this negative effect, but it is still present.

The treatment of company car benefits varies significantly across EU member states (Vanden Branden et al 2000). In Greece the benefit is entirely untaxed, and also effectively so in Portugal. Other EU member countries largely tax the benefit of a company car as a proportion of the car's value, although in some countries this is very low. In Germany it is 12% of the car's value per annum, in Spain 15%, the Netherlands 20-24%, Denmark 25% and Ireland 30%.

In the UK, a major reform in company car taxation took effect from 2002. Up until then tax was 35% of the car's value per annum, with discounts for high business travel. This was estimated to be approximate parity to income as cash (which suggests that most EU states do not value company car benefits at realistic levels). From 2002 the tax charge on company cars was modified to weight the percentage of the car's price according to the level of the car's carbon dioxide (CO_2) emissions. The charge builds up from 15 per cent of the car's price, for cars emitting 165 grams per kilometre (g/km) CO_2, in 1 per cent steps for every additional 5g/km over 165g/km. The maximum charge is on 35 per cent of the car's price. Diesel cars not meeting Euro IV emissions standards incur an additional charge of 3%, up to the 35 per cent ceiling. There are further reductions for company cars using cleaner fuels and technologies. Bi-fuel cars (gas/petrol) and hybrid-electric cars receive a 1% and 2% discount respectively, plus a further 1% discount for every 20 g/km below the minimum percentage level. Cars solely powered by electricity (battery-electrics and fuel cell cars) are charged at 9% of their list price. In addition, from 2002 discounts for high business mileage were abolished together with age-related discounts, which had provided an incentive to drive further and to use older, more polluting cars.

This reform has affected the use and type of cars within the UK company car fleet. The number of business miles has reduced by over 300 million miles per year and the average CO_2 emissions of new company cars decreased from 196 g/km in 1999 to 182 g/km in 2002, only the first year of the new system (Inland Revenue 2004). The overall effect has been to reduce the emissions of carbon from the company car fleet (by around 0.5% of *all* CO_2 emissions from road transport in UK). However, the company car tax reform has not stimulated demand for cleaner fuelled cars by the company car sector, nor have they encouraged car manufacturers to develop new low-emission designs, which was also an objective of the reform.

It should also be noted that, as companies can reclaim VAT, any VAT mechanism to encourage cleaner cars would not be effective for company purchases. But there is another way. A neglected side of company car taxation is how they are treated for corporate taxation. It would be possible to vary the extent to which expenditure on company cars counts for calculating profits (and hence taxation) by the environmental performance of the car. As this is being done in several countries for personal taxation of the car's user, then applying the same method to company tax would appear to be a relatively straightforward measure that would usefully reinforce the use of cleaner company cars. A relatively minor tax reform in the UK is that cleaner car technologies qualify for enhanced capital tax allowances.

14.3 Eco-reform or Eco-transformation?

14.3.1 The purchase cost problem

Despite some evidence that the eco-reforms to car taxation have promoted a degree of useful change, the effects to date have been relatively marginal. The reason appears to be the deeply entrenched fact that the market simply does not view fuel economy or low-environmental impact cars as an important issue. In particular, engine design and other fuel *efficiency* improvements have been used mainly to improve the performance of cars rather than their fuel economy. Furthermore, the power of cars has

increased; in 1980, the average power of new cars sold in the UK was 55 kW; by 1995 it had risen to 68 kW. The average power of German cars has risen a little above the UK figures to 70 kW in 1995. By way of contrast, in Italy average power has risen from 43 kW in 1980 to 55 kW in 1995. The power of Australian and USA cars is almost twice this level, having risen to over 100 kW by 1995 (Schipper and Marie-Lilliu, 1999). The fashion for four-wheel drive cars and 'Sports Utility Vehicles' is also pushing up the power of cars and worsening fuel consumption; these vehicles average little better than 12–14 litres per 100 km. Added to this, what developments there have been in alternative fuel cars have not been combined with improvements in fuel economy. Petrol gas guzzlers have been replaced by LPG gas guzzlers.

Associated with this behaviour in car purchase is cheap fuel. In real terms the price of petrol and diesel remains lower than it was 20 or 30 years ago. These big structural changes overwhelm the relatively small eco-reforms. Tax reforms to date seem unlikely to make a substantial change and certainly do not create enough of a difference to promote radical new clean technologies.

One structural problem is cost. The basic situation is that the cleaner the car is, the more it costs to buy, and adjustments to the existing tax system can only go so far. If you cannot cut the cost by tax concessions, then using tax revenues to subsidise the more radical technologies needs to come into play. This is a strategy that the UK Energy Savings Trust have used to 'kick start' the market for a number of energy saving technologies such as compact fluorescent lightbulbs and condensing gas boilers. The idea was to get the market developed to a point where the subsidies could be removed. In 1996 this approach was adopted for clean fuel vehicles with the launch of the *TransportAction PowerShift* programme.

PowerShift can offers grant support to help with the purchase of vehicles running on natural gas (CNG and LNG), liquefied petroleum gas (LPG) and electricity (including hybrids). PowerShift has a budget of £30m from 2001-4. The key assumption behind the Powershift programme is that a temporary subsidy programme can allow the market to mature to the point that the cleaner technologies can effectively compete. It is a good strategy to adopt to carve out an initial market presence. Hopefully once the marginal cleaner technologies get established (like particulate traps on diesels, and LPG/CNG engines), they can be left to their own devises and the subsidies concentrated on the next generation of cleaner technologies (e.g. hybrids) and then moved again to concentrate on fuel cell vehicles. The problem with this approach is if there is more than a transitional problem and a subsidy is needed on a permanent basis. If so, unless cheap 'dirty' cars are regulated out of existence, a subsidy will always be needed.

The need for a permanent cleaner car subsidy is a distinct possibility, and brings us to the nub of the problem regarding the cost structure of cleaner vehicles. They have, and it appears will always have, higher initial purchase costs than conventional vehicles. They do tend to have lower running costs, particularly if their fuel is taxed less than for petrol and diesel. But to what extent are people and companies pay more in capital costs for lower running costs? There is a big difference here between individuals and companies. Companies generally take a life cycle costing approach, and as such trading off capital and revenue costs to minimise the overall annualised cost is normal practice. Even so companies are not buying many cleaner technology cars (even given the sort of company car tax concessions that have been provided in the UK. Individuals are even less inclined to pay up front for cleaner vehicles. For individuals, the initial purchase price is crucial, and people are very reluctant to pay anything at all in purchase cost for reduced running costs. Furthermore, if they are to sell a car after a two or three years (as is normal for private new car purchasers), even quite substantially lower running costs will only pay for a modest increase in the purchase price.

This suggests that far more attention should be paid to fiscal measures that result in the initial price of the car being varied by its environmental performance. A more radical option is whether the way we pay for cars should not be split into capital and running costs, but that both of these are rolled into a leasing charge. Thus the higher capital and lower running costs would be automatically balanced out. The prospect of eliminating private car ownership is not politically realistic, except for niche applications (like 'car clubs').

14.3.2 Changing the basis of vehicle taxation

There do appear to be limitations as to the policy effectiveness of reforming vehicle taxation within the existing taxation regime. Useful effects seem achievable and could be developed further – but it seems that these are insufficient to address the major environmental, congestion and transport problems that we face today. It is not that ecotax reforms are failing to work. It is that more is needed. Furthermore there are a further series of issues that are gradually building up a case for the more radical approach.

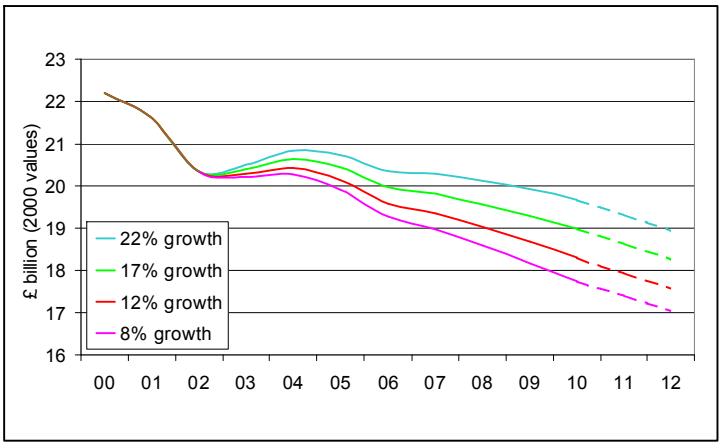
This is one of not simply reforming the transport taxation regime, but changing the basis of vehicle taxation altogether.

The first stimulus stems from the fact that the above discussion has concentrated upon greening the car as a vehicle. Once the focus shifts to the *car-based transport system*, a greater need for change becomes very apparent. Numerous studies (summarised in Potter, Enoch and Fergusson 2001) have indicated that unless measures are put in place to manage the growth in road vehicle use, the increase in the number and distances travelled by car will largely counterbalance the improvements from vehicle design.

Secondly there is a significant consequence of stimulating cleaner cars. This that it will produce a diversity of transport fuels, which will become administratively more difficult to tax. How does one enforce that gas or electricity is taxed at one rate for domestic use and at a much higher rate for road transport use? This is linked into possibly the most politically important stimuli. As governments give tax incentives for greener cars and fuel they are starting to lose revenue from the car sector.

This combination of factors is the focus for a project undertaken by this chapter's authors[3] for the UK Economic and Social Research Council (ESRC) under its Environment and Human Behaviour programme. Entitled *Transport Taxation for Sustainable Mobility*, the project has included an estimate of the effect upon tax revenue of the UK's existing policies to clean up cars. Incentives to promote cleaner fuels and general road fuel duty tax cuts, have reduced road fuel tax revenue by 13% since 2000 (Department for Transport, 2003). However, the full range of UK incentives to green vehicles and car fuels are set to cut government taxation revenues even further. As shown in Figure 14.1, estimates made by Graham Parkhurst for this project indicate, depending on traffic growth, government revenues from car taxation are set to drop by up to a fifth in ten years (see Parkhurst, 2002 and 2004 for details). To this will need to be added losses from parallel actions in the road freight sector.

Figure 14.1: Effect of existing policies on UK car tax revenues, 2000-2012



The projected decline in revenue varies according to different traffic growth assumptions
Source: Parkhurst 2004

And this is not all. Lane and Potter estimates that further tax losses will be incurred as further new fuels emerge. Zero fuel tax would need to be maintained on hydrogen for fuel cell cars to be an economic reality (Lane and Potter, 2003). This would produce a £100m tax loss by 2012 if fuel cell cars take a 10% share of new car sales, but if they were to be 10% of the car fleet, the tax loss would rise to £750m.

With an emphasis shifting to price signals within the existing tax regime to favour cleaner vehicles, the basic function of taxation – to generate government revenue – has started to be undermined. Tax revenues from cars and fuels has started to drop, and is set to dramatically decline with the level of tax incentives that will be needed to stimulate the market for radically cleaner low carbon technologies of hybrids and hydrogen fuel cell cars. There is therefore a growing and seemingly intractable problem of personal mobility and the environment. Because car ownership is such a central feature of our lives it is becoming accepted wisdom that it would be political suicide for any government to raise vehicle or fuel taxation to a level that will produce significant behavioural change. Added to this the level of tax

3 Together with Barry Ubbels of Amsterdam's Free University, Marcus Enoch of Loughborough University and James Warren at the OU. For details and the project report see http://design.open.ac.uk/potter.htm

concessions needed for the adoption of cleaner car technologies (which alone will not deliver sustainable mobility) will result in a large drop in tax revenues.

The question therefore arises as to whether a different form of road vehicle taxation would be more appropriate to 21st century environmental, transport and fiscal needs than the 20th century regime of taxing road vehicle purchase, ownership and the fuel that the vehicles use. In a number of countries this has already been recognised for freight transport, with Germany, Austria, New Zealand and Switzerland using distance/weight based systems to replace circulation taxes. The UK is due to introduce a GPS-based distance charging system for heavy goods vehicles in 2008, including a differential change for motorways and other roads. In the UK a number of studies have advocated generalised road user charging as the basis of a new road user taxation regime. These include a report by the UK Commission for Integrated Transport *Paying for Road Use*, which suggested a charging scheme balanced by a 21 per cent cut in fuel duties and circulation tax (Dodgson et al, 2002). This report was shortly followed by the Independent Transport Commission's report, *Transport Pricing* (Glaister and Graham 2003), which showed how taxes on road use would produce substantial user benefits and significant cuts to congestion. An earlier study in the Netherlands has explored the car use and environmental impacts of replacing car purchase, annual, and fuel taxes with four variations of a fiscally neutral kilometre charge (Ubbels, B. Rietveld, P and Peeters, P.M , 2002). Simply redistributing fixed taxes to a kilometre charge resulted in a modelled reduction in car traffic for the four alternative charging systems of between 18 per cent and 35 per cent compared with the 'business as usual' base case. Their results suggest that a different tax regime would be more effective in stimulating behavioural change than reforms to existing car taxation measures. Additionally, this study indicated that growing frontier effects in the EU were reducing the effectiveness of traditional car taxation measures.

In the UK, the concept of a generalised road user charge was supported by the House of Commons Transport Select Committee and, in July 2004, UK Transport Secretary, Alistair Darling, announced that replacing road fuel duty and vehicle excise duty (VED) with some form of widespread road user charging was now envisaged (Department for Transport, 2004). This is seen as a key policy tool to deal with transport 'pressures over the next 20-30 years'. Tax regime change is thus rapidly moving up the political agenda as the successor to the eco-reform of existing tax measures.

The UK is far from alone is considering the eventual replacement of its car and fuel taxation regime. The State of Oregon in the USA is in the process of developing a 'Road User Fee' for introduction in 2007. Neighbouring states are also interested in using the system. The main motivation for Oregon's action is the decline in fuel tax revenues. This scheme will also use a novel 'opt-in' charging method. When motorists call at filling stations, if an on-board distance-charging unit is detected, fuel tax is substituted by a distance charge (Oregon Department of Transport, 2003). The Oregon example shows that the replacement of the current car taxation regime has long-term structural causes, with a tax regime change towards a car road user charge occurring, or being seriously considered, in societies as contrasting as a rural state in the USA, the Netherlands, Switzerland and the UK.

However, in developing of a new road user charging taxation regime, amongst all the concern of maintaining income and addressing traffic congestion, there is a danger of losing the environmental reforms that have been built into existing taxation measures. If congestion is the only criteria for varying a kilometre charge, and a new clean fuel car faces the same congestion charge as a large gas guzzler, what incentive will there be for going green? This need not be so. The *Transport Taxation Futures* research (Potter et al 2004) showed that it would be a relatively simple matter to have banded kilometre rates according to a car's environmental performance. The move towards a new car taxation regime based on road user charges could be an effective eco-reform as well.

14.4 Conclusions

A number of changes in the framework of car taxation have resulted in some useful environmental gains. However, these changes are limited because the transport tax system has been designed to produce a substantial income from internal-combustion-engine vehicles in an easily administered form. A major restructuring of transport taxation is required to fully address a different goal – that of stimulating improvements to environmental performance. A number of reforms have taken place to existing taxation measures and useful lessons can be learned from how these have worked in practice. But in addition to reforming the existing car taxation regime, there are now signs that some nations are moving towards the creation of a new tax regime based upon generalised road user charging. Such a system is now seen by several European countries and some USA states as the transport taxation regime for the 21st century.

Tax regime change is emerging onto the transport policy agenda as a vital long-term strategy. Largely by default, transport policy-makers are coming to realise that road taxation regime change is inevitable if traffic and congestion management is to be a reality. The way we taxed vehicles and fuel in the 20th century is simply not appropriate for the transport challenges we face today. However, a key issue is to ensure that this new tax structure takes fully into account the environmental impacts of transport.

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