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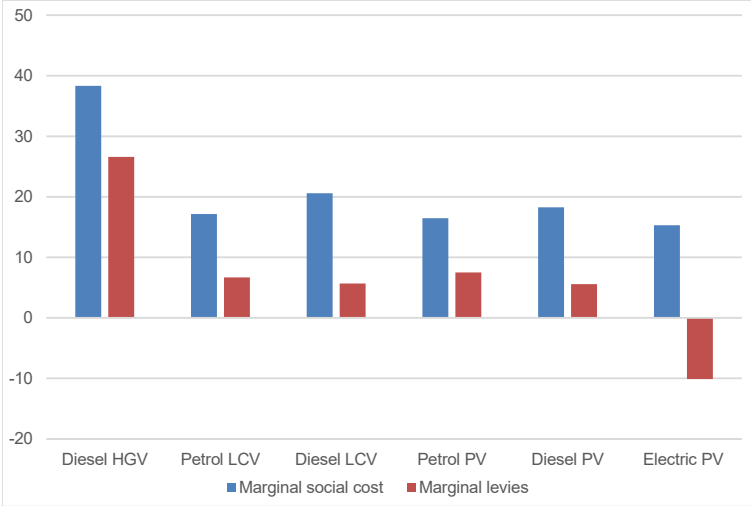
Do road users pay a fair price for their journeys?

Antoine Bergerot, Gabriel Comolet, Thomas Salez

- Road users create costs for other users (wear and tear to roads, congestion, accidents) and for the community as a whole (air pollution, greenhouse gas emissions, noise). Economic theory posits that road users should ideally pay the costs – known as externalities – which are generated for the community by their decision to drive. The levies paid by users are essentially taxes on fuel and tolls. When these levies account for less than the externalities, there is excessive road traffic compared to the ideal situation.
- In 2015, levies only covered, on average, one third of traffic-related externalities. This under-charging relates to the vast majority of the vehicles and environments that were studied. It is especially pronounced in urban areas where costs connected with traffic jams and air pollution are higher. Diesel vehicles have a worse profile than petrol vehicles as they emit more pollutants and are subject to lighter taxation.
- Levies only exceed externalities on toll motorways and for petrol vehicles in rural settings. In very sparsely-populated areas, costs relating to traffic jams and air pollution are significantly lower than in urban areas. This means that petrol vehicles (but not diesel ones) are able to cover their externalities.
- Heightened coverage of road traffic externalities, particularly in high density urban areas and on trunk roads (routes nationales) where cost coverage is markedly low, would bring down the substantial social costs due to congestion and pollution.

Average marginal external costs and levies by type of vehicle (in €$_{2015}$/vehicle-km)



Source: Figures from the General Commission for Sustainable Development (CGDD)/DG Trésor calculations.
Abreviations: HGV = heavy goods vehicle; LCV = light commercial vehicle; PV = passenger vehicle.
How to read this chart: For petrol passenger vehicles, externalities are €16.5/km on average whilst levies are an average of €7.0/km.

1. Coverage of road transport externalities

1.1 Ideal level of journeys and users' choices

The cost for the community or *total social cost* of the use of transport infrastructure is the total of two components: the overall cost of use borne by users (when purchasing the vehicle or fuel, paying for repairs or time wasted in traffic jams) plus external costs (externalities) that they cause for the community (CO_2 emissions, traffic jams, air pollution, noise, accidents). As a rule, road users only factor in the cost of use that they bear directly when deciding to use a means of transport; they do not automatically consider the externalities created for the community by their journey which can lead to higher traffic levels than are ideal for society.

Individually speaking, an additional journey is desirable if its usefulness for the user is equal to the social cost it generates. Conversely, it would be preferable if the journey did not take place. This means that the ideal level of journeys and their ideal breakdown by means of transport are reached when the marginal social usefulness of an additional journey is equal to its marginal social cost.

So that users do factor in the damage they cause (externalities), specific charging would have to be introduced. In an ideal world, the exact marginal social cost would be charged to users, who would take account of all costs and benefits when deciding to use a means of transport. Otherwise, an alternative option would be to minimise the gap between externalities related to journeys and specific levies. Next, the paper will also focus on the coverage rate for these externalities, meaning the ratio between levies and externalities. This rate measures the proportion of externalities covered by levies.

This ideal charging system for external costs should specifically target each externality. This would call for measures such as carbon pricing to cover CO_2 emissions or taxes on noise levels. As a result, charging would be finely tuned, for instance, to reflect the fact that the effect of noise pollution from traffic is not the same during the day as it is in the middle of the night. Similarly, healthcare costs connected with air pollution are much higher in urban areas than in rural environments as there are more local populations. Nevertheless, the external costs related to CO_2 emissions are only dictated by the volume emitted and not by the place or time. In practice, it is not easy to introduce new tax bases and adjust rates.

1.2 Scope for comparison between externalities and levies

This paper will aim to compare marginal externalities with marginal levies for each kilometre of additional journeys. When it is hard to estimate the marginal value relating to an additional kilometre, the average value is used as an approximation (for instance, for noise).

For 2015, we have externality and levy figures for four road networks (concession motorways, trunk, secondary (*départementales*) and municipal (*communales*) roads) and five geographical areas, defined on the basis of their population density (see Table 1): high density urban (density over 4,500 inhabitants/km², for instance, Nancy), dense urban (density between 1,500 inhabitants/km² and 4,500 inhabitants/km², for instance, Bastia), urban (density between 450 inhabitants/km² and 1,500 inhabitants/km², for instance, Quimper), diffuse urban (density between 37 inhabitants/km² and 450 inhabitants/km², for instance, Narbonne) and inter-urban (density less than 37 inhabitants/km², rural area).

Five categories of vehicles are reviewed (passenger vehicles,[1] light commercial vehicles, heavy goods vehicles,[2] buses and coaches) with different engine types, including diesel and petrol (62% diesel and 38% petrol in the passenger vehicle fleet in 2015), as well as several alternative engine types (electric, compressed natural gas (CNG) and liquefied petroleum gas (LPG)), giving a total of 13 separate vehicles.[3]

(1) Vehicle designed to transport passengers for which the gross vehicle weight rating (GVWR) is less than 3.5 tonnes.
(2) Light commercial vehicles are designed to transport goods and have a GVWR of less than 3.5 tonnes. Those with a GVWR of more than 3.5 tonnes are heavy goods vehicles.
(3) The number of areas and engine types studied has been increased compared to a previous paper which covered 2009. Q. Roquigny (2012), "*Bilan coûts-recettes de la circulation routière*", *DG Trésor working document* and "*Les comptes des transports en 2011, Tome 2 - Dossiers d'analyse économique des politiques publiques des transports*", Sustainable Development Economics, Evaluation and Integration Department, 2013.

Table 1: Breakdown of traffic (vehicles-km) by network and by area

Trafics (share in %)	High density urban	Dense urban	Urban	Diffuse urban	Inter-urban	Total
Motorways	0	0	1	10	3	14
Non-concession trunk roads	2	3	4	11	2	23
Secondary roads	2	3	6	25	8	43
Municipal roads	3	2	2	8	5	20
Total	7	9	13	53	18	100

Source: Figures from the General Commission for Sustainable Development (CGDD)/DG Trésor calculations.
How to read this table: 43% of total traffic is on the secondary road network and 53% of total traffic is in diffuse urban areas. Journeys on secondary roads in diffuse urban areas account for 25% of traffic.

Box 1: Assessing the cost to society of greenhouse gas emissions

The marginal costs relating to vehicles' CO_2 emissions (see Table 2) are calculated by taking the average consumption per kilometre of vehicles registered in France, carbon emissions by volume of consumed fuel – including upstream emissions connected with fuel production – and the shadow price of carbon for 2015[a], namely €42_{2015}/tCO_2.

Table 2: Fuel consumption and carbon externality by category of vehicle

Vehicle and fuel	GHG emissions in kg CO_2/l	Fuel consumption in l/100 km	Carbon externality costs (€c_{2015}/veh*km)
Diesel HGV	3.17	34.5	4.59
Diesel LCV	3.17	8.9	1.19
Petrol LCV	2.79	8.0	0.94
Diesel PV	3.17	6.2	0.82
Petrol PV	2.79	7.4	0.87

Source: Figures from the General Commission for Sustainable Development (CGDD)/DG Trésor calculations.
Abbreviations: HGV = heavy goods vehicle; LCV = light commercial vehicle; PV = passenger vehicle.
Note: A diesel PV consumes 6.2 l for 100 km and each litre consumed emits 3.17 kg CO_2. It therefore emits 19.6 kg CO_2 for 100 km or 0,196 kg CO_2 per km, which, with a carbon price of €42_{2015}/tCO_2, gives a carbon externality value of €0,82 c_{2015}/km.

a. The trajectory of the shadow price of carbon, now called "the value for climate action", was updated in 2019 to take account, inter alia, of the bolstering of France's climate-related goals (target of carbon neutrality in 2050). See *La valeur tutélaire du carbone*. Report from the commission chaired by Alain Quinet, Strategic Analysis Centre, 2009 and *La valeur de l'action pour le climat*. Report from the commission chaired by Alain Quinet, France Stratégie 2019.

Six external costs of traffic are evaluated: wear and tear to roads, congestion (time wasted by all other users due to an additional vehicle being driven on a given route),[4] greenhouse gas emissions (based on average emissions and the shadow price of carbon, see Box 1), road accidents, noise and air pollution.[5]

Among the seven specific levies on road users, three are directly proportional to the number of kilometres covered: motorway tolls, the domestic tax on the consumption of energy products (TICPE) and VAT on this TICPE. The other four levies are not proportional to the number of kilometres covered by the vehicle: the tax on insurance policies, the axle tax on HGVs, the tax on company cars and taxes on registration (registration certificate (*carte grise*), ecological tax (*malus automobile*), as well as purchasing incentives such as the ecological bonus and the car-scrapping bonus (*prime à la conversion*) which are deemed to be negative levies and are taken into account in this respect).

(4) The cost is calculated from the shadow prices of the reference time: for instance, €18.3/h for business-related journeys, €10.5/h for home/workplace journeys and €7.1/h for other journeys (shopping, healthcare, visits, leisure, tourism).
(5) Taking reference values for noise pollution (from E. Quinet's 2013 report and calculated from the average costs to which a 6% marginality coefficient is applied) and air pollution (from the same report, contingent on the vehicle's features as regards pollutant emissions and the population density of the area being driven through). The cost connected with road accidents is based on monetarising accident-related damage (using reference values) and on assumptions of (i) the assessment of the proportion of the risk of accidents that is not factored in by road users, and (ii) the determination of this risk's elasticity in relation to traffic levels.

2. Do levies on road journeys cover their externalities?

2.1 On average, externalities are very far from being covered

On average, all the categories of vehicles under review are subject to marginal levies which are less than the externalities relating to their journeys (see Table 3). However, the gap between average levies and externalities varies depending on the area (from high density urban to rural), the network (motorways, trunk roads, secondary roads and municipal roads) and the vehicles under review. It is an average of €12.5c/km for all vehicles but €12.2c/km for diesel heavy goods vehicles, €9c/km for petrol passenger vehicles and €12.7c/km for diesel passenger vehicles. Similarly, when the coverage rate is 36% on average for all vehicles, it may vary significantly depending on the vehicle with 68% for diesel heavy goods vehicles, 45% for petrol passenger vehicles and 30% for diesel passenger vehicles.

Table 3: Average marginal costs and levies for diesel HGVs and LCVs, and petrol and diesel PVs (in €$_{2015}$)

All areas and all networks	External costs (in €c/veh–km)					Levies (in €c/vh–km)			Difference (in €c/veh–km) (1)–(2)	Coverage rate (2)/(1)
	Total (1)	o.w. cong.	o.w. CO_2	o.w. poll.	o.w. accid.	Total (2)	o.w. tolls	o.w. TICPE		
Total	19.5	11.3	1.1	3.0	2.9	7.0	1.6	4.6	–12.5	36%
Diesel HGV	38.3	10.3	4.6	12.3	4.6	26.1	10.2	14.9	–12.2	68%
Diesel LCV	20.6	12.4	1.2	4.3	1.3	5.7	0.9	4.3	–14.9	28%
Petrol PV	16.5	11.1	0.9	0.7	3.1	7.5	1.1	5.6	–9.0	45%
Diesel PV	18.3	11.0	0.8	2.6	3.1	5.6	1.3	3.6	–12.17	30%

Source: Figures from the General Commission for Sustainable Development (CGDD)/DG Trésor calculations.
Abbreviations: HGV = heavy goods vehicle; LCV = light commercial vehicle; PV = passenger vehicle.
Note: The non-displayed external costs represent road use and noise pollution externalities. Non-displayed levies relate to the tax on insurance policies, the axle tax, the tax on company cars and taxes on registration (registration certificate, ecological bonus/tax, car-scrapping bonus).

For all vehicles, according to the model and reference values of the various externalities, those which are the most significant are congestion (58%), air pollution (15%) and accidents (also 15%). Wear and tear to roads and greenhouse gas emissions are thought to account for 6% each, with the cost related to noise pollution being limited (0.3%). Whilst the costs of congestion and accidents are hardly dependent on engine type, in 2015,[6] the costs of air pollution caused by diesel vehicles were around three to four times higher than those caused by petrol vehicles, and this is not offset by their lower greenhouse gas emissions.

Levies are mainly comprised of the TICPE (70% of the total) and motorway tolls (24%).[7] The TICPE per kilometre covered, which is levied on diesel passenger vehicles, is 35% lower than that levied on petrol passenger vehicles for two reasons: in 2015, the TICPE tariff on diesel was much lower than the tariff on petrol (€48 against €63/hl),[8] and diesel engines consume less fuel per kilometre covered than petrol engines (6.16 l/100 km vs 7.42 l/100 km).[9]

2.2 Clear differences depending on the area driven through and road network used

In high density urban areas, all categories of vehicles are significantly under-charged, which points to extremely high congestion and pollution costs for society (see Table 4). This means that the average coverage rate is only 8% (the figure for diesel vehicles is half that for petrol ones) and the difference between levies and externalities shows a substantial gap (€40.1c/km for petrol vehicles and €54.7c/km for diesel vehicles).

(6) The most-recent diesel vehicles – in particular since the entry into force of the Euro 6 standard in September 2015 – which are equipped with catalytic converters and particulate filters generate pollution costs that are much lower than the costs set out here, and which are representative of the entire fleet in circulation in 2015.
(7) 28% of HGV traffic is on concession motorways compared with 14% for passenger vehicles.
(8) The tax gap between diesel and petrol has narrowed since: in 2021, the rates are €59.40/hl for diesel and €68.28/hl for petrol (Unleaded 95-E10).
(9) The TICPE is a tax paid on a litre of petrol: it does not necessarily reflect the various externalities of fuel for kilometres covered (more fuel may be needed to cover a kilometre without this generating more emissions).

The high density urban area is representative of the average of municipalities in which the population density is 6,750 inhabitants/km² on average. In the most high density urban areas – for instance, in Paris where population density is 21,000 inhabitants/km² – the costs presented and, in particular, those for pollution, should be much higher,[10] whereas levies can be expected to be unchanged and this widens the gap even further. In addition, a number of costs that are not factored into this analysis could be non- negligible in urban areas. These include the cost of vehicle traffic occupying public areas and parking.

Table 4: Marginal costs and levies in high density urban areas for all networks and for diesel HGVs, diesel LCVs and petrol and diesel PVs (In €$_{2015}$)

High density urban areas, all networks	External costs (in €c/veh–km)				Levies (in €c/vh–km)			Difference (in €c/veh–km) (1)–(2)	Coverage rate (2)/(1)
	Total (1)	o.w. cong.	o.w. CO_2	o.w. poll.	Total (2)	o.w. tolls	o.w. TICPE		
Total	63.8	39.0	1.0	18.2	5.4	0.0	4.6	–58.5	8%
Diesel HGV	274.1	99.1	4.6	148.1	16.3	0.4	14.9	–257.8	6%
Diesel LCV	72.2	40.9	1.2	26.7	4.9	0.0	4.3	–67.3	7%
Petrol PV	46.5	36.6	0.9	3.6	6.4	0.0	5.6	–40.1	14%
Diesel PV	59.0	36.5	0.8	16.2	4.3	0.0	3.6	–54.7	7%

Source: Figures from the General Commission for Sustainable Development (CGDD)/DG Trésor calculations..
Abbreviations: HGV = heavy goods vehicle; LCV = light commercial vehicle; PV = passenger vehicle.

On the national road network (concession or non-concession), on which 37% of journeys take place, there is a substantial difference between the non-concession trunk road network (RRN-NC), which is significantly under-charged with externalities which are on average €17.2c/km higher than levies and an average coverage rate of around 25%, and concession motorways, for which, conversely, externalities are on average €7c/km less than levies and average charging accounts for 170% of externalities[11] (see Table 5).

The gap between networks is especially pronounced for HGVs for which the collection rate is six times less on the RRN-NC than on concession motorways. This creates an excessive knock-on effect to the non-concession network. The gap is even wider for HGVs using the RRN-NC which fill up with fuel in countries bordering France where taxes on fuel are lower (Luxembourg, Belgium or Spain).

Table 5: Marginal costs and levies on the concession and non-concession national road network for all environments (in €$_{2015}$)

All environments	External costs (in €c/veh–km)				Levies (in €c/vh–km)			Difference (in €c/veh–km) (1)–(2)	Coverage rate (2)/(1)
	Total (1)	o.w. cong.	o.w. CO_2	o.w. poll.	Total (2)	o.w. tolls	o.w. TICPE		
Concession motorways	**10.0**	**3.8**	**1.3**	**1.9**	**17.0**	**11.3**	**5.2**	**7**	**170%**
Diesel HGV	21.4	2.4	4.6	7.6	47.6	31.7	14.9	26.2	222%
Diesel PV	8.4	3.9	0.8	1.2	13.0	8.7	3.6	4.6	155%
Non-concession trunk road network	**22.5**	**14.7**	**1.2**	**4.2**	**5.3**	**–**	**4.8**	**–17.2**	**23%**
Diesel HGV	46.1	17.8	4.6	16.7	15.9	–	14.9	–30.2	35%
Diesel PV	20.1	13.9	0.8	3.4	4.3	–	3.6	–15.8	21%

Source: Figures from the General Commission for Sustainable Development (CGDD)/DG Trésor calculations.
Abbreviations: HGV = heavy goods vehicle; LCV = light commercial vehicle; PV = passenger vehicle.

(10) The cost of pollution related to fine particulates (primary pollutants) is proportional to population density and is thus three times higher in Paris than in the reference high density urban area. Source: *Valorisation de la pollution atmosphérique dans le calcul socioéconomique*, General Commission for Strategy and Planning, February 2014.

(11) This significant over-charging of journeys on the concession network only applies to all environments on average (the majority of journeys on this network are in diffuse urban (70%) and inter-urban (23%) areas). This finding is not always valid in urban areas (less than 10% of journeys on the concession network).

2.3 Vehicles with alternative engine types[12]

Passenger vehicles with liquefied petroleum gas (LPG) and compressed natural gas (CNG) engines have very low coverage rates, around 15% to 30% (see Table 6), except on concession motorways due to tolls. In absolute terms, the difference between levies and externalities for these vehicles is the same as for the diesel vehicle fleet: approximately –15 €c_{2015}/km on non-toll roads. These vehicles generate fewer externalities – in particular air pollution – but are subject to fuel levies which are ten times less per kilometre covered than those on petrol vehicles. That being so, they do contribute just as much to congestion and wear and tear to roads as other passenger vehicles.

On average, electric passenger vehicles are subject to negative net levies as the subsidies to which they gave entitlement in 2015 (ecological bonus and the car-scrapping bonus) were higher than the levies to which they were subject. In absolute terms, the difference for these vehicles is greater than for diesel vehicles (–25 €c_{2015}/km vs –13 €c_{2015}/km), although they cause less pollution and CO_2 emission externalities. The gap between the difference calculated for diesel vehicles and that for electric ones is still around the same in 2021. Recent increases in subsidies for purchasing electric vehicles have a similar impact on their difference figures as that arising, for diesel vehicles, from changes to the shadow price of carbon.[13]

Nevertheless, factoring purchasing subsidies into this difference between costs and levies is only intended to be an illustration and a comparison with internal combustion vehicles should be made with caution. The aim of these subsidies is not to address the overall pricing of traffic costs but to offset the additional internal cost of electric vehicles compared to internal combustion ones. Lastly, this analysis of costs and benefits for subsidies is static and does not take account of the positive momentum generated by schemes to help with purchasing clean vehicles which enables mainstreamed manufacturing of electrified vehicles and, over time, a reduction of their unit cost and, thereby, future support requirements. A full socio-economic review of acquisition subsidies, including their positive impact, could therefore give a sense of proportion to the previous findings.

Table 6: Marginal costs and levies for diesel PVs and alternative engine types, for all environments (in €$_{2015}$/veh–km)

All environments and all networks	External costs				Levies			Difference (in €c/veh–km) (1)–(2)	Coverage rate
	Total (1)	o.w. cong.	o.w. CO_2	o.w. poll.	Total (2)	o.w. reg. certs.	o.w. TICPE		
Electric PV	15.4	11.5	0.0	0.0	–10.1	–11.0	0.7	–25.4	–66%
LPG PV	15.0	10.2	0.8	0.2	5.0	0.4	0.8	–10	30%
CNG PV	15.8	11.0	0.7	0.2	2.4	0.4	0.3	–13	15%
Diesel PV	18.3	11	0.8	2.6	5.6	0.4	3.6	–12.7	30%

Source: Figures from the General Commission for Sustainable Development (CGDD)/ DG Trésor calculations. For electric vehicles, the figure appearing in the TICPE column corresponds to taxes on electricity.
Abbreviation: PV = passenger vehicle.

(12) In 2015, the number of kilometres covered by passenger vehicles with alternative engine types was very limited: 0.2% of kilometres covered by electric vehicles, 0.1% by LPG vehicles and 0.02% by CNG vehicles. These proportions have increased since then and are slated to rise sharply in the coming years. The Mobility Reform Act of 24 December 2019 provides for a five-fold increase in the number of electric vehicles sold between 2017 and 2022. This target had almost been achieved in 2020 as the number of electric vehicles sold had multiplied by 4.4 (from 25,000 sales in 2017 to 111,000 in 2020).

(13) The difference for diesel would fall from –13 €c/km to –13.5 €c/km and that for electric vehicles would rise from –26 €c/km to –25 €c/km by updating data to take account of higher subsidies for purchasing vehicles (ecological and car-scrapping bonuses). In addition, the fast-tracking of the trajectory of the shadow price of carbon, now called "the value for climate action", was updated in 2019 and rose from €42 in 2015 to €101_{2015} in 2021.

3. How can the socio-economic outcome of road transport be improved?

Further measures could be considered to reduce the externalities of road transport and to enable them to be better factored in by road users. To boost acceptance of the solutions put forward below, a proportion of the revenue could be used for fixed redistributions[14] to the poorest and most-affected populations. It could also be earmarked for the development of alternative means of travel: public transport, carpooling or carsharing, and activities such as walking and cycling.

3.1 The reduction of road traffic externalities

Better factoring in of externalities will firstly involve reducing the latter. Standards and incentive schemes have already enabled pollutant and greenhouse gas emissions to be cut.

At European level, Euro standards[15] set caps on pollutant emissions for new vehicles and have been progressively bolstered. As from 2020, manufacturers have had to achieve an average level of 95 g CO_2/km on their sales within the EU, or face financial penalties.[16] Compared to the 2021 fleet, for which average emissions are around 130 g CO_2/km, bringing the entire fleet down to 95 g CO_2/km would cut externalities by 0.3 €c/km. At national level, a number of measures consolidate incentives to purchase cleaner vehicles: (i) the car-scrapping bonus, which will concern almost one million vehicles during President Macron's five-year term, (ii) the ecological bonus, which was increased as part of the automotive support plan in 2020, and (iii) the ecological tax, the bracket of which was tightened on 1 January 2021 (and which is set to be supplemented by a component assessed on the weight of the vehicle as from 2022) on the basis of recommendations from the Citizens' Climate Convention.

The paper's conclusions regarding high density urban areas (see Table 4) show that externalities are especially high for very polluting vehicles (particularly diesel ones) in densely-populated towns and cities. It is therefore imperative to limit circulation of these vehicles in urban areas. In this respect, the Mobility Reform Act fosters the setting up of low-emission zones (ZFE).

3.2 Charging more in line with externalities

Adjustments to charging would also improve the factoring in of external costs and bring us closer to the socio-economic ideal.

Partial convergence of taxes on diesel and petrol between 2014 and 2018, or the 2020 increase of 2€c in the TICPE tariff for the carriage of goods by road have contributed to this. The higher externalities caused by diesel vehicles, which are subject to lower levies than petrol ones, warrant the continued convergence of diesel and petrol taxes.

A number of neighbouring countries have lower taxes on fuel compared to France and this encourages users to fill up abroad. This applies especially to HGVs which are subject to international competition and which consume six times more fuel per kilometre than passenger vehicles that are able to cross France on a full tank. Heightened harmonisation of fuel taxes at European level, as part of the revision of the 2003 Energy Taxation Directive, would provide improved coverage of the externalities of the carriage of goods by road. Following the recommendations from the Citizens' Climate Convention, it is also planned to gradually phase out the TICPE tax break for HGVs between now and 2030 (with the unveiling of a plan by 2023). This change should go hand-in-hand with support for the energy transition of the road transport sector.

Lastly, in high density urban areas, the very low coverage rates (of around 10%, see Table 4) could be improved by allowing major urban centres[17] to introduce urban charging schemes, with the resulting revenue enabling other taxes to be lowered. This solution has been successfully rolled out in a number of countries.[18] In practice, the three-year trial period provided for in the Act should be extended and, ideally,

(14) The fixed nature of the redistribution is essential to maintain the incentive sent by the price signal.
(15) Regulation (EC) No 715/2007 of the European Parliament and of the Council of 20 June 2007 on type approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information.
(16) Regulation (EU) 2019/631 of the European Parliament and of the Council of 17 April 2019 setting CO_2 emission performance standards for new passenger cars and for new light commercial vehicles, and repealing Regulations (EC) No 443/2009 and (EU) No 510/2011.
(17) Over 300,000 inhabitants so that socio-economic benefits are high enough to justify the investment and operating costs.
(18) C. Gostner (2018), "*Péages urbains : quels enseignements tirer des expériences étrangères ?*", *DG Trésor working document* no. 2018/1.

charges should be adjusted to take account of the variability of externalities according to location (routes congested or not), time (night/day) and vehicle category (heavy goods vehicles, light commercial vehicles, passenger vehicles, petrol/diesel engines, etc.).[19]

In smaller towns,[20] municipalities could be encouraged – as they have been entitled to since 1 January 2018 – to raise parking rates and adjust them based on the vehicle's engine type, the time of day and the general scale of congestion in the relevant area. Revenue from these urban charging schemes and parking fees could enable tax cuts to be made elsewhere or be used to fund alternatives to individual vehicle use in these areas.

(19) C. Gostner (2018), "Lessons from foreign urban charging schemes", *Trésor-Economics* no. 224.
(20) This option could also represent a secondary solution in relation to introducing urban charging schemes in major towns and cities.

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(01 44 87 18 51)
tresor-eco@dgtresor.gouv.fr

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