



FINAL REPORT

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Study on Impacts of Application of the Vignette Systems to Private Vehicles

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Notice: the views expressed in this report are those of the authors, not necessarily those of the European Commission.

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EXECUTIVE SUMMARY

Background

Seven EU Member States have private vehicle vignette systems. The policy objective for such systems is to provide a means to charge foreign vehicles for access to national highway networks, as well as charging national motorists without the introduction of a tolling system. Vignette systems have the advantage of being easy to understand, imposing low compliance costs on motorists and not requiring extensive road side or in vehicle infrastructure to be implemented.

The European Commission engaged Booz & Company to provide support in preparing an Interpretative Communication on road infrastructure charges levied on private vehicles, to provide guidance to Member States on the application of the principles of non-discrimination and proportionality. To that end, this study has analysed the shortcomings of existing vignette systems, undertaken an impact analysis of those shortcomings, developed a methodology for determining price reductions between vignette types, and analysed whether complementary measures can be incorporated into vignette systems to target environmental objectives.

Shortcomings of existing private vehicle vignette systems

Existing Member States adopt a variety of practices for the pricing, operation and enforcement of their private vehicle vignette systems. The key shortcomings of existing systems are as follows:

- Product pricing that is disproportionately higher for shorter term vignette products compared to annual vignette products, effectively meaning short term network users pay much higher on a per day basis than long term users;
- A lack of products suitable for transit or other short term users of the vignette charged network (e.g. a 10 day product being the shortest available for a less than one day transit trip);
- Enforcement practices that take a hardline approach, which appears to particularly target foreign users by including confiscation of identity documents until fines are paid and focusing on border areas;
- Poor quality signage to inform motorists in advance of any risk of enforcement action of the need to buy vignettes and options for doing so;
- Lack of options for buying vignettes (including no options to purchase remotely).

The most serious is the disproportionate pricing of short term products. On a per day basis, the price of the shortest term products varies between 3.7 and 8.2 higher than that of the annual products, depending on the Member State (see Table 1 below). No Member State currently justifies its pricing relativities on any objective basis. The effect of relatively highly priced short term products is to discriminate against short term users. As foreign visitors to Member States are far more likely to buy short term products than nationals of those Member States (who are more likely to be regular users, so requiring longer term products), they are more likely to be affected by this practice.

Average Daily Price (EUR ¹)	Austria	Bulgaria	Czech R.	Hungary	Romania	Slovakia	Slovenia
Shortest term vignette ²	0.79	0.71	1.00	1.46	0.43	1.00	2.14
Longest term vignette ³	0.21	0.09	0.13	0.39	0.08	0.14	0.26
Ratio between shortest and longest product	3.8	7.9	7.7	3.7	5.4	7.1	8.2

Table 1: Average Daily Prices for Short Term vs. Long Term Vignettes⁴

Impact assessment

In order to assess the impacts of these shortcomings, two scenarios were developed and assessed following the Impact Assessment Guidelines of the European Commission. The scenarios are:

- A “poor practice” scenario;
- A “best practice” scenario.

The “poor practice” scenario was based upon a hypothetical Member State adopting all identified shortcomings of current vignette systems. It was based on the hypothesis that if the European Commission does nothing about these shortcomings, some Member States will regard these to be acceptable and will take various steps to maximise revenue and minimise costs, particularly targeting short term users.

The “best practice” scenario was based upon a hypothetical Member State adopting all of the best practices of a good vignette system. It was based on the hypothesis that if the European Commission does take action to guide Member States, they will choose to adopt those practices, such as adopting more proportionate pricing and provide good signage and information in all relevant languages.

Neither scenario represents any particular Member States. The table below outlines the different characteristics of the two scenarios:

Characteristic	Poor practice	Best practice
Pricing and availability of short term products	€24 for 10 days	€2 for 1 day
Enforcement	Vehicles stopped by Police near border areas for checked, issued with instant fines [which they are required to pay in cash or face having their passport confiscated].	Concentrated on areas with poor compliance; use technology so only non-compliant motorists are stopped.

¹ Currency conversions as of 31 October 2011.

² Duration varies from 4 days to 10 days depending on country

³ For all States studied, the longest term vignette was of a year’s duration

⁴ Currency conversion means rounding affects some of these calculations.

Information	No additional signage to warn vehicles are approaching the vignette charged network. Little information provided in other languages.	Clear signage in advance of vignette network in multiple languages outlining options to buy vignette by various means.
Convenience	Vignettes only available at a small range of retail outlets during normal shop opening hours.	Vignettes available through multiple outlets, including purchases online or by phone using multiple payment means.

Table 2 : Characteristics of Best Practice and Poor Practice

Surveys were sent to Member States with private vehicle vignette systems and several Member States bordering those with such systems, as well as major motoring organisations in the UK, Germany, France and Italy. Most of those surveyed had not responded after two months. Of those that did respond, none indicated any significant impacts from the introduction of private vehicle vignettes. As a result, the impact assessment was based on qualitative comparative analysis.

Of the impacts considered, the issue with the greatest negative impact is the disproportionate pricing of short term vignette products. As foreign users of vignette systems are much more likely to buy such products compared to longer term products, relatively high prices for such products are likely to particularly affect such users as a form of discrimination. Although each of the shortcomings identified, individually, do not have a high impact, if a Member State adopts a consistently “poor practice” approach as described in that scenario, it is likely to collectively deter and discourage private vehicle usage of its vignette charged network from occasional users, including those from other Member States.

The groups of users most affected by a Member State adopting the “poor practice” approach to private vehicle vignettes are irregular users. As foreign users are most likely to be such users, it is also likely that the impacts will fall proportionately greater on such users.

However, the overall impact of any single Member State adopting the “poor practice” approach will vary depending on the location and size of that Member State. A Member State in central Europe with considerable transit traffic across strategic TEN-T corridors will create a far greater impact on the free movement of people and goods across the EU by adopting the “poor practice” approaches, compared to a geographical peripheral state with low transit traffic. Furthermore, if a series of Member States across central Europe decided that it was appropriate to adopt some of the “poor practice” approaches, particularly proportionately high prices for short term products with hard-line approaches to enforcement, it may create an informal “barrier to free movement of people and goods” as driving across the EU may be considered to be expensive or inconvenient. This would not only affect leisure and business trips by private vehicle, but also hinder trade in goods and services facilitated by such vehicles, such as small scale businesses (e.g. specialist trades).

The overall impact could then be quite serious, as it would interfere with the operation of the single market, as well as present barriers to the free movement of people, in spite of the EU Treaty and the Schengen Agreement (both of which were intended to remove such barriers). As the “poor practice” scenario would not significantly impact national uses of the private vehicle vignettes, it is a reasonable conclusion that the negative impacts would unduly affect nationals from elsewhere in the EU more than those of the Member State concerned.

In conclusion, the negative impacts of Member States consistently adopting the “poor practice” approach are considerable. Although, consistently adopting “best practice” may not have a significant positive effect (mainly by reducing the risk of diversion onto any parallel uncharged roads), it would appear that there could be some justification for EU action to help ensure Member States do not adopt poor practices and are encouraged to take a more proportionate approach to pricing and enforcement. By addressing the most important shortcomings of private vehicle vignette systems, the risk of such systems being operated in a manner that presents a barrier to the free movement of people and goods, and free trade in goods and services, would be reduced.

Approach to calculation of vignette price differentials

It is possible to conceptually separate out at least two components of a vignette price in order to establish how proportionality can be determined in the overall prices:

- Administrative costs (the costs of operating the vignette systems);
- Usage related factor (a proxy for the amount of road use of the average user of each vignette product).

With regard to administrative costs, which include the cost of production, provision of user information and actual distribution and sale of the vignettes, there is not a clear relationship between the duration of the vignette and the costs associated with it. While some factors which increase cost, such as the need to provide information in multiple languages, may apply more to short term users, the overall effect is unlikely to be sufficiently significant to warrant anything other than a flat rate per transaction, which is the approach adopted here.

Benchmarking the appropriate level of administrative cost has proven difficult given the scarcity of data and the fact that each Member State calculates this cost in a different way, for example, some include enforcement costs and others do not.

Data obtained from a range of transaction based road charging systems from different countries, updated to 2011 values in Euros indicates a very wide range of costs per transaction of between € 0.06 and € 2.54. For the purposes of this exercise, we assume a reasonable transaction cost would be around € 1.00, based on the systems operating in Hungary and Romania which both have electronic vignette systems and whose cost per transaction is calculated at € 1.08 and € 0.81 respectively.

Usage factors

Once the administrative costs have been allocated to vignette products, factors to reflect usage of the network should be derived from survey data. Ideally, such data would provide information on the distance travelled by the purchasers of each vignette product. This would enable the pricing to reflect proportionality between network usage of each customer category. However, if such data is not available, other information could be used to proxy this. Member States were requested to supply data on usage of their motorway networks by frequency and distance. This data enables assumptions to be made as to the types of users by frequency buying short, medium and long term vignette products. The only Member State with this data was the UK (from the Highways Agency (England)).

The methodology used to calculate proportional pricing can be summarised as follows:

1. Collect data on average distance per trip segmented by how frequently the motorist uses the road network;

2. Use the data as a basis for input assumptions of average distances and quantity of trips for a frequent and infrequent user of the network; this should give input assumptions for purchasers of each vignette period;
3. Calculate the total average distance for each vignette period by multiplying the assumed quantity of trips to the average trip distance;
4. For each vignette period, derive the total vignette distance as a proportion of the longest term distance (i.e. the annual vignette total distance); and
5. Take the annual vignette price that has been set by the Member State and subtract the assumed flat administrative cost. Then, multiply this by the relevant period distance ratio to get the period vignette price.

The data obtained from England, indicates that a reasonable ratio of price per day between annual and weekly products is between 3 and 4 including administrative costs. As a result, a hypothetical annual vignette price of €100 should result in a weekly price of around €5.50-€8.00, which is between 3 and 4 times the price per day of the annual product. However, a Member State that has higher distances for short term trips may have a ratio of up to 5 times that of the annual product.

This level has been developed with respect to the data sourced to date. If a Member State can supply alternative data on its own trip patterns then this may justify a level above a ratio of 5.

Linking environmental policies to vignettes

Whilst it is possible that adding an environmental discount scheme to a private vehicle vignette system may make a modest contribution to changes in vehicle ownership patterns (particularly for vehicles registered in the Member State applying the discount), there are considerable administrative complexities in ensuring motorists and retailers correctly identify whether their vehicles are eligible for such a discount. In addition, having such a discount would add a further layer of complexity to enforcement, which may not easily be able to distinguish between a vehicle genuinely eligible for such a discount and one that is not. The exception to this may be with electric vehicles, which are small in number and range of makes and models, so could conceivably be made to be readily identifiable for such a discount. However, the degree to which any such scheme would impact on ownership and usage patterns is likely to be very low.

As such, it is preferable that consideration of environmental discounts for vignettes be undertaken by Member States alongside all other measures that they may use to promote the ownership and usage of environmentally friendly vehicles, as other measures (e.g. subsidies, tax credits, discounts on registration fees or parking privileges) may be more effective in addressing environmental concerns.

1. INTRODUCTION

1.1 VIGNETTE SYSTEMS

Vignettes are time-based charges based on increments of at least one day, to enable access to a road network within a defined territory. Vignettes are considered to be “user charges” according to Directive 1999/62/EC rather than tolls because they relate to a specified charge being paid for the right to use the relevant infrastructure for a given period of time.⁵ By contrast, tolls are charged for specific chargeable events (e.g. distance or crossing a particular point on a network). Vignette periods can range from one day to one year.

While many EU Member States have vignette systems for heavy goods vehicles, seven EU Member States have vignette systems for private vehicles (Austria, Bulgaria, Czech Republic, Hungary, Romania, Slovak Republic and Slovenia), with another having announced its intention to introduce such a system (Belgium).

Directive 1999/62/EC governs how European Union (EU) Member States set and apply road user charges and tolls for heavy goods vehicles. This includes vignettes for heavy goods vehicles. However, no Directive exists to govern how Member States set and apply vignettes for private vehicles. Nevertheless, Member States are still required to be compliant with the EU Treaty and EU law generally in their application and operation of vignette systems. For example, private vehicle vignette systems should be applied in a non-discriminatory way, so that foreign visitor and transit traffic is treated equivalent to that of domestic traffic.

While no Member States offer vignette products that explicitly differentiate between foreign and national users (i.e. charges are identical regardless of purchaser’s country of origin), it is possible to discriminate in a *de-facto* way according to whether foreign users are treated in an equitable manner.

For example, as most foreign users are likely to be using a national road network for a short period of time, particularly in transit, a Member State may be acting discriminatorily if it does not have vignette products to meet the needs of such users. This is on the basis that in most Member States, it is reasonably expected that many domestic users would typically buy annual vignettes. In addition, the pricing differentials between short time period and longer time period vignette products may mean that, on a per day basis, the shorter term product is significantly more expensive than a longer term product. Whilst this may, to some extent, be justified based on various objective factors related to usage and administrative costs, it could also be a non-transparent way of recovering disproportionate amounts of revenue from foreign motorists.

A previous study by Booz & Company⁶ outlined that there were several limitations with how Member States currently operate and manage private vehicle vignette systems. This includes Member States either not offering products suitable for short term visitors or transiting motorists or charging disproportionately expensive prices for short term vignettes. In addition, some Member States did not seem to provide adequate clear information in languages of bordering Member States, so that motorists from outside the country concerned could understand the vignette requirements and how to pay. Together with potential lack of payment outlets and concerns over enforcement practices, the overall

⁵ Directive 1999/62/EC Article 2(c)

⁶ “Assessment of Vignette Systems for Private Vehicles applied in Member States”, Booz & Company, 14 December 2010

impression is that vignette systems can be designed and operated in a way that can be discriminatory to foreign motorists.

1.2 OBJECTIVES OF THE STUDY

The European Commission has engaged Booz & Company to provide support in preparing an *Interpretative Communication on road infrastructure charges levied on private vehicles*. The purpose of the proposed *Interpretative Communication* is to provide guidance to Member States in respect of the principles of non-discrimination and proportionality, as well as to promote vignette systems that are user-friendly and contribute towards the EU's environmental policy goals.

This study consists of four tasks:

- Analyse the problems/shortcomings of existing vignette systems;
- Undertake impact analysis of the problems/shortcomings of existing vignette systems;
- Develop a methodology for determining price reductions between vignette types;
- Analyse possible complementary measures for environmental objectives.

2. VIGNETTES IN THE EUROPEAN UNION

2.1 INTRODUCTION

Heavy goods vehicle vignettes are regulated by the EU through Directive 1999/62/EC (also known as the “Eurovignette Directive”). However, there is no equivalent European legal framework to govern private vehicle vignettes. The primary reason for this is to respect the principle of subsidiarity whereby Member States are entitled to institute their own taxation policies. Because the movements of heavy goods vehicles are directly linked with the core purpose and principles of the European Union regarding free trade and the free movement of goods among EU Member States, it was seen as appropriate and necessary to ensure that Member States did not use tolls or road user charges on trucks as a way of penalising competition from other Member States. The primary concern was that road freight operators must be able to operate on a “level playing field” in competition for the road freight market, and that Member States must not impose informal barriers on the trade in goods themselves by making cross border freight movements more expensive through taxation, compared to freight movements within a Member State. Similar imperatives do not apply to private vehicles.

However, the core principle of non-discrimination does apply regardless. The EU remains interested in ensuring that Member States do not discriminate against citizens or residents of other Member States in their travels. This is to support the free movement of EU citizens between EU Member States, and is one of the fundamental tenets of the EU Treaty.

2.2 SUMMARY DESCRIPTION OF PRIVATE VEHICLE VIGNETTE SYSTEMS

Of the seven Member States with vignette systems, two operate electronic vignettes, whilst the other five have sticker/paper based vignette systems. Electronic vignettes do not require a vignette to be attached to the vehicle windscreen, and are correlated to the vehicle number plate. As a result, they are very easy and convenient to purchase through online and phone outlets, rather than needing to divert a journey to a retail outlet.

Most Member States with vignettes apply them only to motorways and major highways, although Romania and Bulgaria also apply them to the entire national road network.

The available minimum vignette periods range from 4 days (Hungary) to 10 days (Austria and the Czech Republic). All of the Member States offer an annual vignette as a maximum period available. The minimum prices range from the equivalent of 3 to 15 Euros. The maximum prices range from 28 to 142.40 Euros.

If vignette products are divided by the number of days for which they provide access to a network, the ratio between the longest and shortest term products varies considerably between Member States. The smallest difference is in Hungary, where the average daily price for a four day vignette is only 3.3 times that of a long term vignette. The largest is in Slovenia, where the average daily price for a one week vignette is 8.2x that of an annual.

Sales outlets for vignettes vary from country to country. All have retail outlets (shops) where vignettes can be bought “over the counter” with cash in Euro and the local currency (if not Euro). Most Member States also have payment outlets that accept credit and debit cards some have a very wide range of contracted outlets. Member States with electronic vignettes offer online and SMS payment outlets, to pay by credit card or SMS.

Vignettes are relatively easy to understand once motorists know that they need to pay them. However, levels of information provided vary. Some have extensive signage to remind motorists of the need to buy vignettes when entering the charged network; some provide leaflets and online information in multiple languages. Others have more limited signage and information in only two languages (typically the national language and English).

Enforcement of vignette systems is typically undertaken by Police forces which issue instant fines. Some Member States apply a surcharge to fines not paid instantly, and a few will confiscate driving licences or passports for non-payment of fines. One Member State reportedly has high levels of non-compliance from its nationals, but focuses its enforcement effort at border crossings, indicating discriminatory practices in enforcement.

2.3 PROBLEMS AND SHORTCOMINGS OF EXISTING SYSTEMS

The key problems of private vehicle vignette systems in the EU arise from:

- Product pricing;
- Product types;
- Enforcement practices;
- Availability of information;
- Convenience;
- Lack of incentives to use vehicles with lower environmental impacts.

Product prices

It seems obvious that vignettes for longer periods should cost more, as the motorist is buying more access to the network. However, as with other transport products which involve pre purchase of access (e.g. public transport passes), longer period products tend to come at a relative discount compared to buying consecutive shorter period products. This incentivises a minimal number of transactions for the most frequent users and reduces the administrative cost to the system. As a result, when dividing a pass by a unit of time to allow access, it would appear that the shorter period products cost more. Table 3 below shows the current prices for vignette products across the Member States. It illustrates that the range of products and the prices for the shortest period vignette vary considerably.

Vignette Duration	Austria	Bulgaria	Czech R.	Hungary	Romania	Slovakia	Slovenia
4 days				5.90 ⁷			
Week		5.00			3.00	7.00	15.00
10 days	7.90		10.00	9.80			
Month		13.00	14.00	16.00	7.00	14.00	30.00
2 months	23.00						
3 months					13.00		
Annual	76.20	34.00	48.00	142.20	28.00	50.00	95.00

Table 3: Price Schedules of the Seven Vignette Systems (EUR)

⁷ Does not include any summer surcharge

For vignettes, a useful comparison of relative cost can be made by dividing a vignette by the number of days that it permits access to the charged network. Table 4 demonstrates the differences in equivalent daily prices between the shortest and longest term products offered by Member States on that basis and illustrates how short term products could be seen as a form of de-facto discrimination, since it is understood that most foreign purchasers are likely to choose short term products, whereas most purchasers of the annual products are likely to be nationals.

Average Daily Price (EUR ⁸)	Austria	Bulgaria	Czech R.	Hungary	Romania	Slovakia	Slovenia
Shortest term vignette ⁹	0.79	0.71	1.00	1.46	0.43	1.00	2.14
Longest term vignette ¹⁰	0.21	0.09	0.13	0.39	0.08	0.14	0.26
Ratio between shortest and longest product	3.8	7.9	7.7	3.7	5.4	7.1	8.2

Table 4: Average Daily Prices for Short Term vs. Long Term Vignettes¹¹

For example, in Hungary the cheapest vignette costs 5.9 euros for four days, whilst the most expensive is 142.40 euros for a year. On a per day basis the four day vignette costs 1.46 Euros per day, and the annual product costs 0.39 Euros per day. As a result, the four day product costs around 3.7 times that of the annual product. Other Member States have far wider discrepancies between the prices of their short and long term products. In Slovenia, the shortest product is a one week vignette costing €15, whereas the annual vignette costs €95. On a per day basis, the one week vignette costs €2.14 per day, whereas the annual vignette costs €0.26 per day. The one week product therefore costs 8.2x that of the annual product.

There are arguments for why such a price difference might be justified and these require further investigation in each case. A difference in the equivalent daily price could be justified on the basis of usage since an annual vignette user is not likely to use the vignette for many of the days it can be used, compared to a one week user. The price per day of actual usage for the annual user will therefore be higher than the prices calculated in Table 2 and analysis of the network use of annual users would help assess actual equivalent daily prices more accurately. Discrepancies between short and long term products could also be justified on the basis of administrative costs since an annual user will generally take less time to pay for a vignette and undertake queries, compared to an irregular one week user.

Product types

As a vignette is the pre-purchase of access time to use a network, motorists can reasonably expect that a range of vignette products would be available to suit different periods of road use. All Member States offer annual vignettes, which best suit frequent users of the network, who are most likely to be nationals of the country issuing the vignettes. All offer a 1 or 2 month product, for those using the network for such a period (e.g. extended business use or leisure trip). However, the shortest term products range from 4 days to 10 days. While a 10 day product may suit a vacation in the country concerned, a transit trip (simply

⁸ Currency conversions as of 31 October 2011.

⁹ Duration varies from 4 days to 10 days depending on country

¹⁰ For all States studied, the longest term vignette was of a year's duration

¹¹ Currency conversion means rounding affects some of these calculations.

crossing the country to reach another) may only require one day of access. No Member State currently offers a one day vignette for private vehicles.

This is unsurprising as the primary reason for introducing vignette systems is to charge transit traffic for the use of the country's network. Those Member States that offer 10 days as the shortest available product incentivise extended leisure and business trips to those countries, but also disincentivise short trips by imposing a relatively high fixed cost on a short trip.

Enforcement practices

All vignette systems need to have a robust compliance and enforcement policy, to ensure confidence in the system from those who comply with it. Such a policy should first promote information so that law-abiding road users can be aware of the need to buy vignettes and how to do so. Secondly, it should target efforts at finding evaders at the times and places where they are most likely to be found. Finally, when caught, evaders should be treated proportionate to other traffic offences, with a similar degree of seriousness in the country concerned. However, evidence to date indicates that some Member States adopt two general practices that are likely to create negative impacts and could be seen as discriminatory.

Some Member States appear to focus enforcement on roads adjacent to border crossings. In itself, there is some logic to this, as non-compliance is likely to be higher among motorists from other countries. However, in the case of one Member State, non-compliance among nationals was very high, indicating that the vignette was not robustly enforced against national motorists compared to foreign motorists. The net effect is that foreign motorists either comply or pay fines for non-compliance, whereas national motorists often evade without consequence. The vignette becomes, in practice, a charge on foreign motorists.

A second practice is the use of relatively severe punishments and practices when a non-compliant motorist is apprehended. Two Member States reported demanding instant fines or requiring the confiscation of a driving licence or other identity document (e.g. passport). While it is unclear if nationals are treated similarly or whether other traffic offences are enforced in the same way, relatively severe enforcement policies can discourage foreign motorists from using a Member State's road network, particularly where poor information or limited payment options may make compliance difficult.

Information

Motorists need to be aware of the legal requirement to buy a vignette before they drive on roads where it is charged. They can then choose whether to pay the vignette and use the charged network, to use a different route, or to not take the trip as they had planned. While it is relatively easy to provide such information on websites, there should also be leaflets available at retail outlets for vignettes and, most importantly, signs provided before motorists enter roads that are subject to a vignette. Such signs would provide ample opportunity to avoid driving on the vignette road network before having an opportunity to buy a vignette. The signs should also, at least, be in the language not only of the Member State levying the vignette, but that of the bordering Member State, so that most motorists carrying out the trip can easily understand what is required of them. Some Member States do not provide adequate signage and it is reported by some motorists and motoring groups that they are unaware when crossing a border that there is a requirement to pay a vignette. In addition, if information is not provided in the primary languages of neighbouring Member States, it is also possible that motorists may not discover they are required to buy a vignette.

Where signage is limited, motorists may only know of the requirement to purchase a vignette if they are stopped by Police. They may then face fines when they were honestly unaware of the need to buy a vignette, because they do not exist in many Member States. This lack of information can mean that a disproportionate number of foreign and transit users face enforcement action.

Convenience

The purchase of a vignette requires a motorist to take time to undertake the transaction itself and a range of payment options ensures a convenient process for the motorist. The availability of retail outlets within and outside Member States to buy vignettes, and the payment options available ranges considerably across Member States.

This is particularly an issue for Member States that only offer sticker/paper vignettes, where a physical retail transaction (or delivery by post) is required. Greater use of electronic vignettes (as used in Hungary and Romania) would greatly simplify this and allow more motorists to make simple transactions by telephone or on the internet. Electronic vignettes could make the possibility of multi-country vignettes more feasible and a HGV Eurovignette is already offered as an electronic product.

In Member States where the process of buying vignettes is not convenient, there is a higher likelihood of non-compliance and motorists facing enforcement action. Motorists may also be left with few options to enable them to comply if no outlets are open on days or at times when a motorist may drive, or if retail outlets are not easily identifiable or signposted.

Lack of incentives to use vehicles with lower environmental impact







European transport policy documents, such as the Transport White Paper, call upon Member States to consider taking steps, including the use of pricing tools, to reduce congestion and environmental externalities. However, with the exception of one Member State, none appear to have done so for private vehicles. The sole example is the use of a summer surcharge on the shortest term vignette product in Hungary. The purpose of this surcharge is to reflect higher levels of congestion over that 3 month period. No Member State differentiates charges based on environmental impacts of vehicles, which is (in part) reflective of the potential complexity of doing so for cars. Given that the heavy vehicle Eurovignette does differentiate prices by EURO engine rating, it is notable that private car vignettes are not currently able to contribute towards environmental policy objectives.


Conclusion

The previous report on vignettes¹² undertook detailed analysis of all of the private vehicle vignette systems against specific economic, social and technical criteria. Such criteria included consideration of European Transport Policy objectives, such as having a transparent and proportionate approach to setting prices, convenience and ease of information for users, proportionate approach to enforceability, and the use of technology to improve the economic, social and environmental contribution of the system to policy objectives. In summary, it would appear that many of the problems and limitations of existing private vehicle vignette systems are more likely to affect foreign users than national users of the schemes. The conclusion of the analysis is contained in Table 5 below.





¹² http://ec.europa.eu/transport/road/studies/doc/2010_12-assessment-vignette-systems-private-vehicles.pdf

Table 5: Summary Assessment of Vignette Systems

	Overall	Key Points
Austria		<p>Reasonable price proportionality</p> <p>No products well suited to occasional users</p> <p>Adequate information in all relevant languages</p> <p>Adequate enforcement procedures</p> <p>Adequate range of purchase methods available</p>
Bulgaria		<p>Poor price proportionality</p> <p>No products well suited to occasional users</p> <p>Lack of information in all relevant languages</p> <p>Unknown enforcement procedures</p> <p>Limited range of purchase methods available</p>
Czech Republic		<p>Poor price proportionality</p> <p>No products well suited to occasional users</p> <p>Adequate information in all relevant languages</p> <p>Disproportionate enforcement procedures</p> <p>Adequate range of purchase methods available</p>
Hungary		<p>Reasonable price proportionality (except for summer surcharge)</p> <p>Products adequate for occasional users</p> <p>Lack of information in all relevant languages</p> <p>Reasonably targeted enforcement procedures</p> <p>Good range of purchase methods available</p> <p>Electronic vignette system adds convenience</p>
Romania		<p>Poor price proportionality</p> <p>No products well suited to occasional users</p> <p>Lack of information in all relevant languages</p> <p>Poor transparency for local vignettes</p> <p>Unknown enforcement procedures</p> <p>Good range of purchase methods available</p> <p>Electronic vignette system adds convenience</p>
Slovakia		<p>Poor price proportionality</p> <p>No products well suited to occasional users</p> <p>Lack of information in all relevant languages</p> <p>Disproportionate enforcement procedures</p> <p>Adequate range of purchase methods available</p>

Slovenia		<p>Poor price proportionality</p> <p>No products well suited to occasional users</p> <p>Lack of information in all relevant languages</p> <p>Disproportionate enforcement procedures</p> <p>Adequate range of purchase methods available</p>
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Key:

-  Does not meet EC requirements and principles
-  Partially meets EC requirements and principles
-  Generally meets EC requirements and principles
-  Fully meets EC requirements and principles

3. ANALYSIS OF IMPACTS OF EXISTING VIGNETTE SYSTEMS

3.1 PURPOSE OF IMPACT ANALYSIS

Impact Assessment in the context of European Commission policy development is a process of assessment of “the potential economic, social and environmental consequences” that any new initiatives may have.¹³ Impact Assessment is carried out *ex. ante* of a new initiative, as part of the process to determine the possible consequences and outcomes of a proposal. The Impact Assessment Guidelines have been developed in this context, so that the assessment can inform the decision making processes of the EU and if approved, provides part of the justification for the action taken.

In this study there is no new initiative to be assessed so, rather than a full Impact Assessment, an impact analysis has been undertaken. This considers the impacts of the identified problems and limitations of private vehicle vignettes systems described in Chapter 2.

3.2 METHODOLOGY TO UNDERTAKE IMPACT ANALYSIS

There is no specific proposal being considered in this study, so an alternative approach has been adopted to enable an impact analysis to be undertaken.

Two scenarios have been developed to provide a framework within which the impacts of the issues identified in Chapter 2 can be considered. The basis for these scenarios is described below.

Hypothesis for impact analysis scenarios

Two scenarios have been developed for the impact analysis. These are:

- A Poor Practice scenario;
- A Best Practice scenario:

It was decided not to include a “do nothing” or “status quo” scenario because it is assumed that “do nothing” is represented by the “Poor Practice” scenario. Under that scenario it is assumed that the European Commission decides *not* to take any regulatory steps (including recommendations through an “Interpretative Communication”) to promote or require Member States to improve policies regarding private vehicle vignettes. The result of that policy decision is assumed to be that Member States will increasingly adopt a range of practices to maximise their own revenue and minimise costs. This includes steps that may mean, *de facto*, that foreign users are discriminated against and are treated differently from national users of the vignette systems. The “Poor Practice” scenario is based on Member States adopting sub-standard practices (as described in Chapter 2) to the greatest practicable extent. In addition, in this scenario, Member States would act in a revenue maximising, cost minimising way.¹⁴ The scenario also contains the assumption that the

¹³ European Commission Impact Assessment Website accessed 25/11/11, http://ec.europa.eu/governance/impact/index_en.htm

¹⁴ This is an assumption for comparative purposes only. No Member State has asserted that it would act accordingly.

existing Member States with private vehicle vignettes retain them, creating a wider impact across Europe.¹⁵

By contrast, it is assumed that if the European Commission takes regulatory action to guide or require Member States to take active steps to ensure their private vignette systems treat all users equivalently, that best practice policies for such systems are adopted across the board. The “Best Practice” scenario assumes that Member States with vignette systems adopt the best practice policies and operating practices applied in some Member States and presented in Booz & Company’s previous report on vignette systems.¹⁶

These two scenarios allow a comparison to be made to ascertain the impacts of moving from the poor practice to one that resembles best practice.¹⁷ This provides a basis for assessing whether EU intervention of some sort is worthwhile.

Scenario 1 – “Poor Practice”

In this scenario, the hypothetical Member State has as its shortest product a 10 day vignette (it also offers a one month and an annual vignette). That vignette is priced at a daily rate that equates to almost nine times the price equivalent for the annual product as seen in Table 6. This table uses price per day comparison to demonstrate the ratio between the products to determine the relative cost per day of access purchased. No transparent justification is given for the prices charged. As such, this represents a Member State that has products that are not well suited to transit users with relatively high prices for shorter term products.

Product period	Product price (€)	Price per day (€)	Ratio of per day product with annual product
Annual	100	0.27	1
1 Month	40	1.32 ¹⁸	4.9
10 days	24	2.40	8.9

Table 6: Scenario 1 pricing

In this scenario, enforcement of the vignette system is concentrated on roads near the borders of the Member State (with relatively lower enforcement in towns). The hypothetical Member State has empowered its Police to have the right to stop vehicles to inspect the vignette, issue instant fines or confiscate identity documents (e.g. passport, driving licence) until the fine is paid at a local Police Station. The fine is equivalent to twice the purchase price of an annual vignette. This represents a hardline approach to enforcement that particularly targets foreign users.

In this hypothetical scenario, signage about the need to purchase a vignette is of poor quality and sparse, with no additional signage on approaches to the vignette network, including at national borders. Many motorists report not having noticed signs when they are stopped by Police. Signage that does exist is only in the language of the Member State concerned. Other information sources are online and in leaflet form, but are almost entirely in the language of the Member State. A call centre number only operates in the language of the Member State. As a result, foreign users in particular may not even realise they need to purchase a vignette,

¹⁵ It can be assumed here also that this scenario has not included any steps by the European Commission to encourage better practices.

¹⁶ “Assessment of Vignette Systems for Private Vehicles applied in Member States”, Booz & Company, 14 December 2010.

¹⁷ *Ibid* pp. 94-105.

¹⁸ A month is assumed to have the average 30.4 days, so the price per day is calculated based on a year.

and if they are aware of the need to do so, may not know how to go about making the actual purchase.

Only one retail outlet is available near each border crossing points and these outlets have irregular opening hours. Other outlets are limited to major population centres. Payment options are limited, with payment only accepted in the local currency and not all outlets accepting credit or debit cards. There is no option to purchase online or by phone on the day of travel, as any such purchase option involves postal delivery of the vignette.

The result of this scenario is that foreign motorists see driving into or transiting the Member State as being both expensive and it being inconvenient due to the necessity of purchasing a vignette. In addition, the experience of some is to initially be unaware of the need to buy a vignette and, as a result, face relatively tough enforcement action that proves to be a deterrent to driving into the Member State in future.

Scenario 2 – “Best Practice”

In this scenario, the hypothetical Member State models a combination of “best practice” policies that help ensure a reasonable standard of customer service for all users, and that foreign users are not discriminated against.

The shortest term product in this scenario is a one day vignette, and it also offers a one week vignette, one month and annual vignette. The weekly vignette is priced at a daily rate that equates to between 3 to 4 times the price equivalent for the annual product *including* a transparent administrative cost of, for example, €1 per transaction.¹⁹ The one day vignette is priced at a daily rate of 3 to 4 times the price equivalent for the annual product *plus* the €1 administrative cost. Motorists can purchase multiple vignettes at once to match their travel periods (e.g. purchase a one week and a one day vignette for an eight day travel period). The pricing is justified through a transparent cost allocation methodology to allocate administrative costs and relative weightings of usage to each product category in order to set prices. This effectively means that there is a wide range of product options suitable for occasional users, including foreign users. Table 7 below outlines the relative prices, and uses price per day comparisons to demonstrate the relative price per day.

Product period	Product price (€)	Price per day (€)	Per day ratio with annual product
Annual	100	0.27	1
1 Month	18	0.59 ²⁰	2.2
1 Week	6	0.86	3.2
1 Day	2	2	7.4

Table 7: Scenario 2 pricing

The vignette system is fully electronic, meaning that a vignette need not be physically acquired, but is a record of the vehicle’s number plate with pre-purchased access. Enforcement is carried out through screening vehicles electronically. Vehicle number plates are matched against records of purchased vignettes. Vehicles can be enforced directly by

¹⁹ See chapter 4 for full exploration of the administrative cost and a reasonable ratio between annual and daily vignette prices based on the likely higher level of daily use made of the vignette by daily pass holders versus annual pass holders.

²⁰ This calculation is based upon the average length of a month at 30.4 days.

sending a fine to the registered owner (typically only practicable for cars registered in the country issuing the fine), or by Police identifying vehicles that are on a “grey list” (having had their number plates identified as belonging to vehicles without a valid vignette) and stopping only suspected violators. Fines are issued for such violations, and are proportionate to the offence (e.g. lower fines for being only one day beyond a vignette expiry period). Tougher measures are only imposed on repeat offenders.

Signage about the vignette requirements is located at every entry point onto the charged network, with signage at borders in the main languages of all neighbouring countries. Signage advises how to purchase the vignette, and retail outlets for payment are clearly signposted and open long hours (and able to take multiple payment options). Website, call centre and retail staff all have comprehensive information provided in the main languages of the neighbouring countries.

Impact analysis process

The analysis has been structured through the four stages depicted in Figure 1 below.



Figure 1 – Process for Impact Analysis

Identification of problems is presented in Chapter 2.

Impacts are the immediate practical effects of the identified problems. An example of this could be effects on traffic volumes.

Consequences are the implications of the impacts. For example, reductions in traffic volumes could be due to disproportionate pricing of occasional users leading to possible discrimination against foreign users. Another example being that Police stopping traffic near borders to check for the presence of vignettes could be seen as an obstacle to the free movement of persons.

Distributinal analysis identifies the groups of people impacted by the problems. For example, there may be negative impacts on motorists who are occasional users of the network, but positive impacts for regular network users and those living adjacent to the network (because of reduced congestion, emissions and noise).

The impacts, consequences and distributinal analysis have been considered in an integrated way, so that it is clear what the overall net impacts are of each of the identified problems. This has enabled the problems to be ranked in order of seriousness.

Surveys

The approach taken for the impact analysis is based on a combination of desktop research and input from questionnaires sent to stakeholders.

The stakeholder groups are:

- Member States with vignette systems: Member States have been asked what complaints or issues have been raised regarding their systems and whether they see vignette

systems as having an impact on the levels and types of trips undertaken on the charged network, including trips undertaken by foreign motorists. In addition, data was requested on traffic levels on the network before and after the introduction of vignettes (and before and after any increases in prices), violation rates and any split between foreign and domestic violations of vignette systems.

- Member States that border States with vignette systems: Member States that do not have vignette systems, but which border those that do may have experienced impacts from neighbouring Member States introducing or operating private vehicle vignette systems. Information about any concerns raised with Member States was requested, as was data on traffic flows and whether the vignette systems may have affected traffic volumes.
- Motoring Organisations: As representative bodies of motorists, some motoring organisations have already lobbied and complained about the vignette systems in some Member States. Information about issues raised by motorists has been requested to help inform the analysis.

The information collected from the questionnaires and desktop research has been analysed and input into the analysis structure.²¹

Surveys were sent to Member States with private vehicle vignette systems and several Member States bordering those with such systems, as well as major motoring organisations in the UK, Germany, France and Italy. Most of those surveyed had not responded after two months. Of those that did respond, none indicated any significant impacts from the introduction of private vehicle vignettes. Given the low response, it would appear that at the individual Member State level there is no serious concern about the impact of private vehicle vignette systems. However, this does not mean that there is not a risk of greater impact on a wider EU basis if the shortcomings already identified become more commonplace.

3.3 TYPES OF IMPACTS AND CONSEQUENCES

Types of impacts

The shortcomings of vignette systems identified in Chapter 2 are likely to have both direct and indirect impacts.

Direct impacts are those experienced by users of the vignette network (and those travelling with them) and by the Member States responsible for the systems. Indirect impacts are those experienced by those who interact with the users.

The direct impacts on users come primarily from the economic effects of prices and the cost of time involved in interacting with the vignette system. Other economic and social impacts arise from users being exposed to the enforcement process.

Direct impacts on Member States relate to net revenues derived from vignettes (and so are economic). These impacts are driven by the product/price structure, the operating costs (of providing information and payment options) and the revenue derived from enforcement (and the associated costs).

²¹ To date responses have only been received from four stakeholders..

Indirect economic and environmental impacts may be experienced by users of the non-vignette network, businesses reliant on customers that travel by car on the vignette network, public transport operators and residents of locations adjacent to road networks (both charged and uncharged). These impacts arise from changes in demand for use of the vignette network. There may also be further indirect economic impacts on those employed by businesses reliant on vignette network users, and consequential net government revenues over the longer term, because of suppression of trips (and revenue from tourist and business trips), although this is difficult to ascertain.

Indirect social impacts are less easily identifiable, but come from negative social perceptions generated by the operation of a vignette system that is unclear, inconvenient, highly priced and enforced rigorously. If these impacts particularly fall upon occasional users, and most foreign users are in that category, the likelihood is that foreign users will perceive the vignette system has been designed to at best, ignore their needs or at worse, penalise and target them. This could risk perpetuating any old prejudices or lack of trust towards neighbouring Member States and their nationalities. This is not likely to promote the spirit and objectives of the EU in terms of generating a wider sense of European citizenship.

Existing environmental impacts of vignettes

The environmental impacts of private car use are well acknowledged. There are a range of impacts including noise, contribution to water runoff²² from roads, noxious air pollution and climate change. In the context of this study, it is presumed that neither noise nor contribution to water runoff can be practically addressed through a variation to a vignette system, so these are not considered here. However, both noxious air pollution (emissions that are harmful to human and other life) and climate change are more closely related. This is because there is a direct correlation to engine type, engine design, fuel use and those externalities. The costs of those externalities across the EU are considerable.

The EU's Handbook with estimates of external costs includes a range of average environmental (air pollution excluding climate change) costs for private cars ranging from €0.001/vkm to €0.027/vkm²³ depending on the size of vehicle engine, fuel type and engine emission rating. That means that the impacts of the average vehicle can vary considerably. For motorway/interurban road usage the range is smaller (€0.001/vkm to €0.019/vkm) but still a noticeable difference.

For climate change, the estimated contribution from private cars in the EU is around 12% of all carbon dioxide emissions.²⁴ Combined with air pollution, and given the dominance of the private car as a transport mode across the EU, it can be seen that it is the most significant contribution from the transport sector of emissions.

Vignettes, as a form of road user charging, require motorists to prepay access to the roads that are charged and so are likely to have an effect on demand. Consequently, this will have an effect on the environmental impacts of car use on the vignette networks.

The degree of impact on demand will be dependent on:

- Price of the vignette products;
- Frequency of intended use of the network;

²² This consists of brake, radiator, air conditioning fluids, and wear and tear from tyres and brakes that is deposited on road surfaces.

²³ Table 15, Handbook on estimation of external costs in the transport sector, CE Delft, 2008.

²⁴ 2007, Communication from the Commission to the Council and the European Parliament 6 Results of the review of the Community Strategy to reduce CO₂ emissions from passenger cars and light-commercial vehicles {SEC(2007) 60} {SEC(2007) 61}

- Duration of use of network;
- Availability of alternative modes or routes suitable for the trip.

A user who uses the network frequently over a year may regard the vignette price (assumed to be an annual vignette) to be part of the fixed cost of owning a car, and so does not perceive there to be a marginal cost in driving more frequently. However, an occasional user seeking to make a single return trip on one occasion, for perhaps a day in each direction, is likely to see the price of the vignette needed as a factor in deciding to undertake the trip at all, or use an alternative mode or route. The more frequent the user and the longer the duration of intended usage, the less likely the price of the vignette will have much effect on demand. Given foreign visitors on leisure trips are likely to be infrequent users, it is those users that are more likely to be dissuaded from driving on the vignette network by a high price for a short term vignette product.

In terms of environmental impact, the net effect is assumed to be positive if the price of a vignette discourages some motorists from undertaking trips by car, simply because with less car usage there is less pollution. A similar effect is assumed if the trip proceeds but is undertaken using more environmentally friendly modes (e.g. rail or bus, but not air).

However, the effect is more likely to be negative if motorists choose to drive on alternative routes not subject to the vignette. Given all Member States with private car vignettes apply them, at the very least, to motorway networks, vignettes effectively price motorway trips more highly than non-motorway trips (if the total price of the vignette is divided by time or distance spent on the motorway network, relative to other roads).

If there is significant diversion onto alternative routes, these are assumed to be inferior to the vignette network, in that the travel times will be longer, distances longer and with more interruptions to smooth traffic flow. This results in higher fuel consumption and so higher levels of pollutants and greenhouse gases being emitted for the same trip.

In addition, as motorways and trunk roads typically bypass built up areas, the use of alternative routes is likely to mean more traffic transiting towns or villages. The public health effects of air pollution are significant higher in built up areas where pedestrians, cyclists and others are directly exposed to air pollution from road vehicles passing in close proximity in high densities. As such, not only may diversion of traffic onto other routes increase overall emissions, it may increase the exposure to harmful pollutants such as particulates and nitrous oxide.

As such, it is likely that relatively high prices for short term vignette products, where suitable parallel uncharged routes exist, may create a negative environmental impact if the reduction in overall traffic on the network is offset by an increase in traffic on the uncharged network.

Affected groups

The main group affected by the issues identified in Chapter 2 is likely to be occasional users. Occasional users are more likely to be impacted because existing vignette products and product prices do not appear to create particular problems for regular users, who are more likely to purchase the longest period products. Regular users are more likely to be aware of vignette requirements and to be familiar with the language of the country in question, so are less affected by poor quality information. However, inconvenient payment options impact on all users of the system, if it requires a user to undertake a “special trip” to purchase the vignette.

It is a reasonable assumption that foreign users of a vignette system are more likely to be occasional users than regular users. As a result, if occasional usage of the vignette network is discouraged due to price, time and convenience issues, it is likely to reduce cross-border business and short-term leisure trips (e.g. shopping, visiting relatives/friends). As a whole, this may slow growth of cross border markets and social activities within the EU. The effect of this will be seen in reducing the opportunities for retail and leisure businesses, especially in border regions, to access customers from neighbouring Member States. However, unless there is a sizeable population close to a border, and land use development on the other side of the border that may generate such trips (the obvious example is Vienna's proximity to Bratislava), this may not be a substantial issue.

In respect of the impact of hard-line enforcement practices, no evidence has been found that enforcement practices towards nationals of countries with private vehicle vignettes are disproportionately harsh, or that it is difficult or inconvenient to purchase vignettes for motorists who reside in those countries. Concerns expressed publicly so far indicate that the greatest impacts of those limitations are upon foreign users.

Positive impacts

Vignettes, as a pricing tool (albeit less usage related than tolls), have an impact on travel demand and so have an impact on congestion and reducing the environmental impacts of private car traffic. As vignettes add a price to accessing a road network, they are likely to have an effect upon choices as to whether to drive or not. Occasional users are more likely to be discretionary in their use of the network since regular users must choose to prepay for a year of access, and after the vignette has been bought they need not reconsider whether or not to drive. As such, although the impact on road use is likely to be low, a vignette system that targets occasional users and discourages their use of the road network (as the users most likely to have elastic demand) could be seen to be consistent with the objectives of transport policy outlined in the White Paper on Transport around tackling congestion and the environmental impacts of road transport use.

3.4 IMPACT OF SCENARIO 1

Under the "Poor Practice" scenario, whilst regular users are able to adequately interact with the system on an annual or monthly basis, occasional users face significant barriers to purchasing vignettes or in being able to access information about the need to have a vignette at all. Assuming the Member State seeks to recover a target amount of revenue, it focuses on recovering a higher proportion of that revenue from occasional users than from regular users in proportion to the number of days each user accesses the network.

Occasional users have to choose a product that is valid for 10 days even if they are undertaking a 2-3 hour transit trip across the country, and they have to pay a high price that is almost nine times greater than that paid by regular users to use the network for that day. As most foreign users are likely to be occasional users, this could constitute discrimination against foreign users of the network. In effect, in this scenario the Member State has designed a price/product schedule for vignettes that disproportionately targets occasional users to raise revenue, which in itself appears to discriminate against foreign users.

Beyond the price and products offered, some motorists will be unaware of the need to purchase a vignette or be aware, but unable to get adequate information about where to buy the vignette. Motorists unaware of the need to purchase a vignette (because of poor signage or lack of information in foreign languages) inadvertently risk a fine by travelling without

one. If stopped, they face a considerable delay in travel and cost in having to pay a fine. This may include a significant diversion in travel by needing to go to a Police station to pay a fine. This process in total may deter future travel, incentivise usage of other roads or modes, and promote negative impressions of the Member State that has issued the fine. This has a negative economic and social impact on users.

Given the relatively high cost and unsuitability of the short term vignette (a 10 day product for a 1 day trip), some occasional motorists will choose not to travel on the vignette network. This change in behaviour results in either a shift in route (to use other roads less suited for long distance travel, increasing congestion on those routes and externalities experienced by those living along them), a shift in mode (generating revenue for the bus or rail operator) or in not undertaking the trip at all. In the latter case, this will negatively affect businesses and people who the motorist (and companions) would have interacted with. All of these changes in behaviour could reduce congestion on the vignette charged network at times of heaviest usage, but unless the network is regularly congested the net benefit of this (in time and vehicle operating cost savings) is likely to be minimal.

Many occasional users may not be aware of the vignette before planning the trip, but those that are may be encouraged to consider other mode or route options, where available, if the vignette is expensive. One report indicated a 10% diversion of traffic onto parallel routes in Hungary when tolls and vignettes were introduced in the 1990s, although Hungary's vignette network is small and has good alternative parallel routes.²⁵ The likelihood of diversion will be dependent on the quality of alternatives, and could be mitigated by expanding the scope of a vignette network to include all main roads.

Under this "Poor Practice" scenario, a Member State focuses on having relatively high vignette prices for short term products (which are unlikely to be used by nationals as much as foreigners), and have an enforcement strategy focused on issuing fines to vehicles near the borders. This means that motorists either:

- Pay the high vignette prices, but face occasional stops by Police enforcement units;
- Deliberately evade the high vignette prices, but pay fines occasionally that more than recover the vignette revenue;
- Inadvertently fail to pay (or are unable to pay because of insufficient options) the high vignette prices, and pay a fine.

The result for a particular Member State will be dependent on the elasticity of demand of motorists to accessing the vignette network, if it is low (as observations appear to suggest), then there will be higher revenues from both vignette purchasers and fines from violators.

In summary, under the "Poor Practice" scenario, the greatest impact on motorists appears to be economic, due to high prices and a high probability of incurring a fine due to an enforcement system focused on targeting motorists at the borders, poor information and limited options to pay. This is most likely to impact occasional users, with foreign users more likely to be affected as they are unlikely to be able to hold the system accountable through the political or legal system, given language barriers and familiarity.

The impacts on the Member State are likely to be positive as far as direct financial impacts are concerned, but in the longer term this may be eroded as businesses within the Member

²⁵ http://www.eltis.org/index.php?id=13&study_id=2013

State that rely heavily on occasional users travelling on the charged network see a lessening in demand. The net economic impact is uncertain.

The impacts on other users of the charged network will be positive, as there is likely to be a modest reduction in overall traffic levels, although any diversion to parallel uncharged roads will have a negative economic and environmental impact on the users of that network.

The impacts on residents adjacent to the uncharged network are likely to be negative, due to greater noise and pollution from slightly increased traffic, although some businesses (e.g. service stations, convenience stores, food outlets) may have some small benefits.

In summary, under this scenario, irregular users face disproportionately high prices and need to pre-purchase for relatively long periods to be able to access the network at all. Whilst regular users are likely to purchase annual vignettes and understand their legal requirement to do so, a significant proportion of occasional users are unaware of the need to purchase a vignette. A combination of ignorance of the need to buy a vignette, and deliberate evasion due to high price and inconvenience results in as many as 40% of occasional users failing to purchase vignettes.²⁶ The vast majority of all vehicles apprehended by the Police for non-payment are foreign users, because of the focus on enforcement at border areas.

Table 8 below outlines the summary impacts of Scenario 1 compared to the status quo (i.e. a mix of good and poor practices by Member States which are moving toward more user friendly products).

²⁶ This reflects the survey of ADAC members who use the Slovenian motorway system. FIA Umfrage Slowenien-Vignette 2009 mehrsprachig March 2009.

Affected group	Economic impact	Social impact	Environmental impact	Overall impact	Comment
Regular vignette users	+	0	+	++	Slightly less congestion and emission exposure
Irregular vignette users	--	-	-	----	Higher prices, delays, poor experience, emission exposure
Users of non-vignette network	-	0	-	--	Slightly more congestion and emission exposure
Member States	+	-	+	+	Higher revenue from pricing and cheaper opex, poorer reputation, lower emissions
Businesses reliant on vignette users	--	-	+	--	Less business, fewer potential employees
Business on non-vignette network	+	0	0	+	Slightly more business
Residents on vignette network	0	0	+	+	Slightly lower emission and noise exposure
Residents on non-vignette network	-	0	-	--	Slightly higher congestion, emission and noise exposure

Table 8: Impacts of Scenario 1

Legend	
+++++ or -----	Extreme impact
++++ or ----	Major impact
+++ or ---	Moderate impact
++ or --	Minor impact
+ or -	Negligible impact
0	No discernible impact

3.5 IMPACT OF SCENARIO 2

Under the “Best Practice” scenario, both regular and irregular users have products that are designed and priced to meet their needs. As pricing is a proportionate reflection of average usage of purchasers of the different products, it is not discriminatory. By having a single day product, users are more likely to consider single day leisure or business trips across borders encouraging cross border trading, commuting, commercial or social trips. This has a positive economic impact on users and the businesses supported by their patronage.

Enforcement is visible, but targeted at times and locations where non-compliance is known to be relatively high. As the system is electronic, it allows Police to only stop vehicles which are identified as not having a valid vignette, minimising disruption and not creating an obstacle to the free movement of people. Fines are proportionate relative to other traffic offences and are a sufficient deterrent to ensure high levels of compliance by both national and foreign users. The social impact of enforcement is minor, as the provision of clear information and opportunities to purchase vignettes has ensured that most users consider the system to be fair in providing adequate opportunity to comply. National users who violate are easily caught by using the number plate to identify them, and to access name and address details of the owner so a fine can be sent by post. Foreign users who violate are issued fines to be paid within a set period. If either a national or a foreign user violates

repeatedly, and fails to pay fines, then both face appropriate action to stop and require fine payment, or face vehicle confiscation.

As a result, no group is subject to discriminatory enforcement practices. This has a positive social impact over time by removing a potential source of fear and complaint about enforcement practices.

As the system is easy to understand and convenient to interact with, very little time is taken to undertake transactions to purchase vignettes providing economic and social benefits.

For the Member State, the ease of use and high compliance rate ensures steady revenues as users are not deterred by the experience of the vignette system, and will only factor in the price. The presence of a single day product makes transit trips and single day leisure trips for retail or social visits more cost effective, increasing demand. Operation of an electronic vignette system helps to reduce costs through retail outlets as a growing proportion of users purchase vignettes online. Whilst some new costs are added (by having to manually read a small proportion of number plates which are not automatically read by the Automatic Number Plate Recognition system), the better targeting of enforcement means that Police are able to capture more evaders (and therefore collect more fine revenue) or to be deployed onto other tasks. Overall net revenue effects are likely to be mixed, as it will be dependent on whether the lower revenues from cheaper products sold to those undertaking inelastic trips are offset by demand generated. In addition, whilst providing a wide range of payment and information sources in different languages adds to operating costs, these may be offset by a reduction in queries and contact with outlets or call centres. The operation of an electronic vignette system that encourages more automated vignette sales and eliminates production of paper vignettes will further offset any increases in operating costs through improved efficiency and reduced transaction costs over time.

For businesses reliant on customers using the vignette network, the impacts may be positive as lower prices and greater convenience increases demand for short trips.

For residents of localities along parallel uncharged networks, the effect is also positive because this scenario minimises traffic along those routes. However, the net effect on emissions may be to increase them, as the greater ease of making trips may increase net traffic on the charged network, because there is a lower level of trip suppression and mode shift compared to the "Poor Practice" scenario. The presence of a discount for vehicles of lower environmental impact is likely to have a negligible effect on this, but may promote greater ownership and usage of such vehicles over the longer term. The net effect of this will be dependent on how vignette prices evolve, how fuel prices change and the level of discount.

Table 9 below outlines the summary impacts of Scenario 2, compared to Scenario 1.

Affected group	Economic impact	Social impact	Environmental impact	Overall impact	Comment
Regular vignette users	0	0	0	0	Higher traffic offset by greater convenience and environmental discount
Irregular vignette users	+	+	0	++	Lower prices, better service, greater utility, offset by traffic
Users of non-vignette network	+	0	+	++	Slightly less congestion and emission exposure
Member States	+	+	0	++	Higher revenue from demand and lower opex from technology, better reputation
Businesses reliant on vignette users	++	0	0	++	More business, more potential employees
Business on non-vignette network	-	0	0	-	Minor reduction in business from lack of diverted traffic
Residents on vignette network	0	0	-	-	Higher emission and noise exposure offset by environmental discount
Residents on non-vignette network	++	0	+	+++	Lower congestion, emission and noise exposure

Table 9: Impacts of Scenario 2

3.6 SUMMARY OF IMPACTS

The primary policy reason for the introduction of private vehicle vignettes is to enable a Member State to recover revenue from foreign private vehicle users for use of the national highway network. They offer advantages over the usual options adopted by Member States to raise revenue from road vehicles, namely motor vehicle licence fees and fuel taxes. National vehicle licence fees are only levied against vehicles usually resident (and registered) in that Member State so are not levied on foreign vehicles. Whilst all vehicles purchasing fuel within a Member State pay fuel taxes, foreign motorists are still able to undertake trips to and from that Member State without necessarily purchasing any fuel at all. This affects smaller Member States and those with extensive transit traffic in particular, as they are easy to cross without the necessity of a fuel purchase.

As a result, it is possible that a Member State, without a vignette system (or tolls), can have substantial private vehicle traffic from foreign countries, without receiving any revenue for the use of its network. A vignette system addresses this, by making it a requirement of all vehicles using a national highway network, regardless of country of origin, to pay to use the network. A vignette system imposes a price on foreign motorists to use the national highway system that would otherwise not exist. This is not, in itself, discriminatory as long as it applies evenly to motorists from the Member State itself as well as foreign motorists.

This study does not consider the impacts of introducing vignette systems in themselves, but does address the impacts of Member States adopting best and worst practices in how they implement them.

As can be seen in Table 10 below, the highest negative impact comes from the disproportionate pricing of short term vignette products. Disproportionately high prices for occasional users are more likely to impact foreign users and so present a prima facie case of possible discrimination by a Member State against citizens of other Member States.

Beyond discrimination, higher prices can also incentivise use of other routes, which increases travel time, fuel consumption for users, emissions and noise creating economic, social and environmental costs.

There are some positive impacts of higher prices, as they may also have a modest impact on congestion and emissions on the vignette charged network. Higher prices can incentivise mode shift, which may have slightly positive economic and environmental impacts, but they can also suppress trips altogether which will have a considerable negative economic (and social) impact on the user and businesses patronised by the user on the trip.

Congestion charging in cities has successfully encouraged a shift to public transport and some trip suppression. However, the patterns for intercity and international car usage have different characteristics, as trips have a longer duration, and involve greater planning and commitment than city commuting or short business or leisure trips. It is unlikely that vignettes could promote mode shift in the way that tolls do since vignettes involve prepaying unlimited amounts of road use over a fixed time period. This encourages any motorists that have paid them to maximise their utility from the vignette. As most regular users would purchase an annual vignette, this would be unlikely to incentivise mode shift for any specific trip. As a result, it is expected that the impact of higher priced vignettes on congestion is likely to be negligible.

The lack of suitable short term vignette products is expected to have a lower impact than price, as occasional users are less likely to be affected by only being able to buy a short term product for 10 days if it is proportionately priced. The key consequence of such a product is that it may have an incremental impact to discourage transit trips or short visits.. It is more likely that the negative impacts of a disproportionately high priced shorter term product will be exacerbated if that product is for a relatively long period (and still disproportionate).

Poor enforcement practices may also have an additional negative impact similar in scale to that of price. The reason being that the way that vignettes may be enforced could be seen as presenting as obstacle to the free movement of persons. Enforcement practices that involve randomly stopping vehicles to check for vignettes and for violators to pay instant fines or be required to drive to a Police station, can create a significant disruption to a trip. Furthermore, if enforcement particularly targets border areas and vehicles with foreign number plates, it can be seen as being discriminatory.

Poor signage at border areas may be seen as part of this, as it can be considered negligent to not inform motorists adequately of the legal requirement to buy a vignette, yet enforce it against people who were reasonably unaware of the requirement. Enforcement policies that do not encourage compliance nor provide adequate opportunities for motorists to do so could be seen as disproportionately emphasising capturing violators over promoting compliance by users.

Beyond the effect on compliance, poor quality information and a lack of payment outlets is a nuisance and inconvenience for users. However, the impacts of these are relatively low to users as they essentially reflect poor quality of service, which creates delays in the process of choosing a vignette product and finding an outlet to purchase it from. To any Member States implementing the “poor practice” scenario, many of the shortcomings are likely to be

moderately positive as much car traffic is inelastic; having higher prices will see greater revenues, as will taking a hard line approach to enforcement and enforcement revenues (particularly targeting foreign motorists, minimising the political cost of targeting national users). By minimising customer service levels, operating costs can be reduced as well. However, in the long term, it is likely that reduced cross border traffic due to the high price of short term vignettes will have mildly negative economic impacts by reducing trade in goods and services sold by businesses catering for people who otherwise would have undertaken those trips. In short, whilst there may be net revenue benefits from undertaking the “poor practice” scenario, these are offset by the wider impacts on the single market, as what are essentially discriminatory practices affect the free movement of people and goods, and so trade in goods and services.

It is unlikely that adopting the “poor practice” scenario would have more than a negligible effect on net externalities (as reductions in overall car traffic will reduce pollution in noise), depending on whether the vignette network is paralleled by an adequate alternative uncharged network. If it is, then there may be an increase as diversion onto parallel routes increases overall pollution levels and exposure to pollution. Yet the only way for there to be a net positive impact on externalities would be to suppress traffic overall. At that point, as neither congestion nor pollution are being effectively targeted, but rather bluntly affected by all vehicles being charged, it is difficult to see how the reduced externalities offset the significant barriers to movement of people and goods that the “poor practice” scenario represents.

If a single Member State, with low volumes of transit traffic, adopted the “poor practice” scenario, the impact on citizens of other Member States is likely to be low, relative to the impact on nationals of that Member State. The effect will be to reduce traffic to and from the Member State adopting that scenario. However, a different effect would arise if such a Member State was located centrally with key TEN-T transit routes crossing its territory. That impact would be to divert transit traffic within the EU into neighbouring states, or to suppress the movement of people and goods by private vehicles between the states located adjacent to the Member State imposing the vignette. This could be seen as presenting a barrier to the free movement of people and goods, and the efficient operation of the single market.

Furthermore, the potential impacts of many Member States, particularly those in central Europe, all adopting a “poor practice” approach to private vehicle vignettes, are likely to be more significant. The effect of this would be to discourage short visits and transit trips by private vehicle across a wide swathe of Europe. Private motorists would be discouraged from driving across borders that previously had been effectively abolished through the Schengen Agreement because price, inconvenience and hardline enforcement imposed barriers to ease of travel across Member States.

Whilst this may have a small positive effect on externalities arising from road traffic, the wider economic and social impacts would appear to be contrary to the objectives of the EU Treaty. Besides interfering with the free movement of people by private vehicle for leisure purposes, it would also interfere with free trade in goods and services. Small businesses that use private vehicles to ship products (e.g. crafts) or to facilitate provision of services (e.g. plumbing, electricians, education) would be hindered in the trade of such goods and services.

In conclusion, none of the shortcomings of private car vignette systems that have been identified at present have a serious impact in themselves if implemented by a single Member State. However, the potential exists for a significant impact if several Member

States adopt “poor practices”, creating a series of Member States that are hindering the free flow of people and goods by private vehicle. The policies creating the potentially greatest impacts would be the use of disproportionately high pricing for shorter term products along with a lack of suitable short term products. A secondary concern would be if enforcement practices, in combination with poor standards of signage at approaches to the vignette charged network, were used to specifically target foreign violators of vignette systems rather than target violations more generally.

This could mean a more serious trend develops over time for a new “barrier” to develop across Member States with private vehicle vignettes that means, despite the EU Treaty and Schengen Agreement, private vehicle transport of people and goods (and the businesses facilitated by those vehicles) is hindered by the price and inconvenience of vignette systems. This cumulative effect, particularly if it arises from Member States which are transit countries within the EU, could create new divisions in the EU and undermine efforts for closer economic, commercial and social integration and interaction within the EU.

3.7 CONCLUSION

The shortcomings with the greatest impacts are those related to price and to lack of products for short term use of the network.

This is followed by the adoption of enforcement practices that appear disproportionate and discriminatory towards foreign users of the vignette network.

The key economic impacts of the shortcomings are in reducing demand from users, increasing net revenue for Member States because of the higher prices for occasional users and lower operating costs of providing a low level of service to users. The economic impacts on businesses would be relatively minor, although this would reflect the dependency of those businesses on customers that are occasional users of the vignette charged network. There is likely to be an incremental reduction in congestion on the vignette charged network, but this may be offset by some diversion of traffic onto the uncharged network, which is less suitable for that traffic. This also reflects the main environmental impact, which will be to reduce emissions from traffic due to trip suppression, but increase emissions from the proportion of traffic that diverts onto the uncharged network. In any case, the net impact is likely to be negligible.

There are two key social impacts arising from the shortcomings. By reducing demand for cross border trips, there will be less leisure, employment and general social trips, so as to reduce the level of social interaction and activity by citizens. Another concern may be that adopting practices that may be seen as discriminatory, particularly enforcement practices that appear disproportionate, citizens may believe they are being targeted because they are foreign.

However, whilst the impacts of isolated practices in themselves may be low, the scale of impacts increases according to several factors.

Each of the poor practices individually adds to an experience that is more likely to be negative for foreign users compared to national users. This is because poor price proportionality particularly impacts on short term users, and foreign users are mostly likely to be in this category. In addition, issues around enforcement, convenience and availability of information are likely to disproportionately affect foreign users. A Member State that consistently models poor practices is, in effect, discriminately targeting foreign motorists with its vignette system, reducing the free movement of people and goods, and free trade in

goods and services with neighbouring Member States. The impact of this is likely to be considerable for those individuals and businesses that use private vehicles for commercial and social purposes in the Member State concerned.

However, the risk of negative impacts can go beyond a Member State adopting those practices. There is a risk that if the EU does not take any steps to encourage, promote or require Member States to address the most serious shortcomings of private vehicle vignette systems, that Member States see private vehicle vignettes as potential sources of additional revenue from foreign users. As the poor practices are likely to be seen to generate additional revenue and reduce operating costs, they may become more widespread. The potential impacts of this are likely to be greater if the Member States adopting those practices are centrally located with relatively high levels of transit traffic. As some Member States may see transit traffic as contributing little (as a car passing through a country may do little more than use the road, and perhaps make a small retail purchase at a service station on the road), it may be seen as easy to structure vignette systems to target such traffic. The more Member States who adopt this approach, the more serious the impacts will be. It is possible to envisage that if a series of Member States across central Europe adopt private vehicle vignettes and such practices, that it will be a significant barrier to the single market, including both the free movement of people and goods, and the development of cross border trade in goods and services (e.g. professional services).

Problem/limitation	Impacts	Consequences	Affected groups	Conclusion
Disproportionate pricing of short term products	<p>Discourages occasional usage of vignette network.</p> <p>Encourages choice of alternative routes (non-vignette network), modes and destinations, and trip suppression.</p>	<p>Possible discrimination of occasional users.</p> <p>Higher environmental impacts if non-vignette route usage increases</p> <p>Lower environmental impacts and congestion if alternative mode usage increases.</p> <p>Reduced economic activity in Member State setting vignette prices due to trip suppression or change of destination for foreign origin traffic.</p> <p>Reduced economic activity in countries to where Member State provides most efficient transit route.</p>	<p>Transit users, foreign visitors to Member State, national motorists who rarely use network significantly negatively affected.</p> <p>Residents of localities along alternative route mildly negatively affected.</p> <p>Users of vignette route mildly positively affected.</p> <p>Public transport providers mildly positively affected.</p> <p>Tourism businesses and other services used by foreign visitors (arriving by car) in Member State and in countries accessed by transiting Member State.</p> <p>Member States</p>	<p>Medium negative impact on occasional users.</p> <p>Low positive impact on users of vignette network.</p> <p>Unknown environmental impact (depends on network charged and condition of alternative).</p> <p>Mixed negative impact on tourism businesses and services used by foreign visitors. Low negative impact on countries accessed by transiting Member State.</p> <p>Moderate positive impact on revenues of Member State</p>
Product types not suitable for short term users	<p>Discourages occasional users of vignette network, reducing demand of use of that network</p> <p>Encourages choice of alternative routes (non-vignette network), modes and destinations, and trip</p>	<p>Possible discrimination of occasional users, particularly impacting cross-border trips into the Member State, transit users and local motorists who rarely use network.</p> <p>Higher environmental</p>	<p>Transit users, foreign visitors to Member State, national motorists who rarely use network significantly negatively affected.</p> <p>Residents of localities along alternative route</p>	<p>Low negative impact on occasional users.</p> <p>Low positive impact on users of vignette network.</p> <p>Unknown environmental impact (depends on network charged and</p>

	<p>suppression.</p> <p>May encourage visitor trips to be longer.</p>	<p>impacts if non-vignette route usage increases</p> <p>Lower environmental impacts and congestion if alternative mode usage increases.</p> <p>Reduced economic activity in Member State setting vignette prices due to trip suppression or change of destination for foreign origin traffic.</p> <p>Reduced economic activity in countries to where Member State provides most efficient transit route.</p>	<p>mildly negatively affected.</p> <p>Users of vignette route mildly positively affected.</p> <p>Public transport providers mildly positively affected.</p> <p>Tourism businesses and other services used by foreign visitors (arriving by car) in Member State and in countries accessed by transiting Member State</p> <p>Governments of Member States operating vignettes.</p>	<p>condition of alternative).</p> <p>Mixed negative impact on tourism businesses and services used by foreign visitors. Low negative impact on countries accessed by transiting Member State.</p> <p>Moderate positive effect on revenues of Member State operating the vignette.</p>
<p>Enforcement practices that are disproportionately harsh and emphasis apprehending violators over promoting compliance.</p>	<p>Discourages occasional users of vignette network, especially those unfamiliar with system, reducing demand for that network.</p> <p>Encourages choice of alternative modes and destinations.</p> <p>Encourages trip suppression.</p> <p>Promotes complaints or negative image of Member State to foreigners.</p>	<p>Possible discrimination of non-national users.</p> <p>Creates obstacles to free movement of persons and goods.</p> <p>Creates obstacles to free flow of traffic.</p> <p>Promotes attitudes of discrimination on the basis of nationality</p>	<p>All users of vignette network, particularly occasional foreign users that are unfamiliar with languages used.</p>	<p>Conclusion low to medium negative impact on foreign users of vignette system.</p> <p>Low negative impact on businesses in the Member States used by visitors.</p> <p>Moderate positive impact on net enforcement revenues of Member State.</p>
<p>Poor availability of information, including</p>	<p>Increases the cost (in time) of occasional trips,</p>	<p>Possible discrimination of</p>	<p>Occasional users of the vignette network,</p>	<p>Low negative impact on occasional users of</p>

<p>inadequate signage in languages of neighbouring Member States</p>	<p>discouraging such trips by car.</p> <p>Encourages purchases of the wrong product.</p> <p>Encourages choice of alternative modes and destinations.</p> <p>Encourages likelihood of violations of vignette law due to ignorance.</p>	<p>non-national users.</p> <p>Creates obstacles to free movement of persons and goods.</p> <p>Promotes attitudes of discrimination on the basis of nationality.</p>	<p>particularly users from foreign countries.</p>	<p>vignette systems, particularly foreign users.</p> <p>Low positive impact on revenues and operating costs of vignette system and net enforcement revenues.</p>
<p>Lack of convenient options to purchase vignettes especially in advance of using the vignette charged network</p>	<p>Increases the cost (in time) of occasional trips, discouraging such trips by car.</p> <p>Increases incentives to buy longer term products due to cost in time of regular purchases.</p> <p>Encourages choice of alternative modes and destinations.</p>	<p>Creates obstacles to free movement of persons and goods.</p> <p>Higher environmental impacts if non-vignette route usage increases</p> <p>Lower environmental impacts and congestion if alternative mode usage increases.</p>	<p>All purchasers of vignettes.</p>	<p>Low negative impact on regular purchasers.</p> <p>Low positive impact on operating costs of vignette system.</p>

Table 10: Impact analysis

4. APPROACH TO CALCULATION OF VIGNETTE PRICE DIFFERENTIALS

4.1 INTRODUCTION

The key issue around some existing private vignette systems is the setting of prices for various vignette products. Whilst the principle of subsidiarity gives Member States full discretion as to how much or how little revenue they wish to raise from private vehicle vignettes, how they distribute the pricing to raise that revenue raises issues about whether prices are set proportionately between users.

4.2 PROPORTIONALITY ISSUE

The previous Booz & Company report highlighted the issue of proportionality between regular and irregular users of the vignette system according to the prices of the different products each type of user was most likely to use. Proportionality in this context primarily means that prices of different vignette products should objectively reflect defined differences between the interactions of those purchasing those products. This can mean allocation of expected revenue targets, allocation of costs or a reflection of usage of the network that is charged. The wide variations in equivalent per day prices of short term and long term products (as illustrated in Table 3 and Table 4) indicate that some systems are less proportionate than others. This is measured by the per day price of access for short term usage products (e.g. one week) being higher than the equivalent period of access purchased for long term usage products (such as the annual vignette).

All Member States that were previously surveyed indicated that vignette prices are politically determined. Member States are, of course, within their rights to set private vehicle vignettes as they see fit and need not provide an objective justification for the prices. However, that does not mean that they can ignore the principle of proportionality, as it has implications for whether or not a vignette system can be seen to be effectively discriminatory against foreign users. The link being that if short term vignette prices are disproportionately high against long term vignette prices (on a per day basis), this effectively discriminates against those users who primarily buy the short term products. In the case of private car vignettes, foreign users are more likely to buy short term products than long term products.

4.3 PROPOSED APPROACH FOR ASSESSING PROPORTIONALITY

It is possible to conceptually separate out at least two components of a vignette price in order to establish how proportionality can be determined in the overall prices.

The first is the administrative costs of operating the vignette system and processing each transaction, which also includes the cost of production, provision of user information, actual distribution and sale of the vignettes and enforcement. It is obvious that a vignette system must at least generate sufficient revenue to cover these costs. If different user groups impose different costs, it is reasonable and efficient to allocate administrative costs according to that.

The second is a factor to reflect relative levels of usage of the vignette charged road network. As the EU refers to vignettes as “user charges”²⁷, it is reasonable to treat the prices as a form of proxy for usage based on the average amount of road use over the period of different vignettes. This would also be compatible with the longer term objectives of EU transport policy to promote distance based charging of road use.

Whilst longer period vignettes reflect greater total usage, it is not a linear relationship. A purchaser of a four day vignette may be more likely to use the vignette for most of those days than an annual vignette purchaser (who would be less likely to use the relevant network every day or even most days of the year).

Thus, the approach taken here is to calculate proportionality considering the vignette price as a combination of administrative costs and a usage based factor. These two separate cost components are considered in turn to arrive at a general model of good practice in price proportionality

4.4 ADMINISTRATIVE COST COMPONENT OF PRICE PROPORTIONALITY

Background

It is reasonable for the seller of a product or service to vary the price of the product according to the costs involved in handling the customers of that product. This is one component in the pricing strategies of business, particularly if administrative costs are relatively significant compared to the costs of the service offered.

In the context of vignettes it is important to distinguish between the service offered by the vignette (access to a road network) and the production, sales and handling of the vignette itself. Both contribute to the cost of a vignette. In other sectors, some of these costs may be disaggregated and charged directly to the user according to their choice of interaction with the service. For example, some low cost airlines charge fees for bookings made by phone and bookings made using credit cards, both to recover those costs directly (encouraging usage of lower cost options) and to generate surplus revenue from customers who do not have a reasonable alternative.

In the context of vignettes, where there is little effective competition²⁸ it is assumed that administrative costs should be recovered on an economically justifiable basis, rather than be used as a proxy for generating a surplus. As Member States are entitled to charge whatever they wish for private car vignettes, this is where surplus revenue can reasonably be generated.

The production and sale of vignettes may have different costs which can reflect various factors such as:

- Sophistication of vignette sticker design (e.g. hologram on high value vignettes to deter counterfeiting);
- Relative costs of sales outlets and payment options used by different purchasers (e.g. counter sales using credit cards compared to online sales via direct debit);

²⁷ Article 2(c) in Directive 1999/62.

²⁸ The parallel road network and the rail network are likely to be competitive alternatives for only a small proportion of users.

- Allocation of non-sales related costs of supplying information and handling queries and complaints (e.g. time taken by call centres, counter staff and volume of information to be supplied for sales of products to occasional users).

A simple assumption is that all administrative costs could be allocated on a flat rate basis to every vignette sold. This would be an average reflection of the costs of undertaking the sale and producing the vignette, and also allocate non-sale related costs to all users equally. While it is theoretically possible to allocate such costs on a more differential basis, it may not be possible to disaggregate relationships between products sold, sales outlets used and payment options used. In addition, electronic vignette systems may have significantly lower transaction costs related to sales, compared to common costs regarding enforcement (e.g. checking number plates against records of sales).

A robust basis for allocating administrative costs has been developed to test whether a methodology can be applied to reasonably allocate administrative costs on a basis other than a flat rate per transaction charge. In addition, data on administrative costs from vignette, road pricing and other systems has been sourced to help provide some benchmarking as to how high such costs might be thought reasonable.

Methodology

In order to develop an approach to allocating administrative costs, the various cost components of such costs have been disaggregated and analysed according to cost allocation assumptions used in cost models and studies previously considered. This has provided a basis for conclusions as to whether and how administrative costs might be allocated between vignette products. The key test is whether it is reasonable to allocate costs to purchasers of a specific vignette product.

If not, then such costs are most fairly allocated on a flat basis divided across all vignette products. Such an approach does mean that purchasers of short term products are paying a higher proportion of administrative costs on a “per day of access” basis than those of long term products. However, given each purchase of a vignette creates administrative costs, this approach is reasonable. Once a user has purchased a vignette, there is likely to be no further interaction with the vignette system operator (or retailer) until the next purchase of a vignette, and so no marginal cost is created.

Cost components

Administrative costs can be split into three categories:

- Fixed Costs (costs which do not vary regardless of the number of vignettes sold or interactions by the public with the system);
- Marginal Common Costs (costs which vary according to interactions by the public with the system, but not attributable to the sale of a vignette);
- Per Transaction Marginal Costs (costs directly attributable to the sale of a vignette).

Allocation of cost components

Fixed costs

Fixed costs include all of the back office functions including management, human resources, accounts, reporting, telecommunications, electricity and signage. As these costs are not

reasonably attributable to any group of users, the efficient approach is to divide these costs evenly to each vignette sold.

Marginal common costs

Marginal common costs include all of the costs attributable to enforcement (including Police patrols, enforcement investigations, issuance and collection of fines, legal action), publication of user information, responding to queries and complaints (e.g. through call centres or email).

Enforcement costs are typically recovered by tolling and other road charging systems through the revenues from fines. At one extreme, London's congestion charging scheme was generating a third of its total revenues from enforcement at one point, but more commonly enforcement revenues (setting aside that they may not be directly available to fund the vignette system) are more than sufficient to cover such costs. If not, such costs are best allocated on a per transaction basis, as it is unreasonable to allocate such costs to a greater or lesser extent to any particular product category.

Other common marginal costs are more complex to allocate. The production of publications may reasonably be shared among all users. However, for costs surrounding interaction with users through queries and complaints, it may be less easy to attribute such costs to specific product categories. It is unclear what relationship can be established between making queries and purchasing a vignette beyond allocating such costs on a per transaction basis. For example, a price increase across all products may generate more queries from purchasers of annual vignettes (who may face a higher nominal increase in price) than from others, in particular because news about increases is likely to only be reported widely within the Member State (where most annual purchasers are likely to be located).

Foreign language call centres and customer management are obviously more likely to be accessed by foreign users. As foreign users are themselves more likely to be occasional users, it is theoretically efficient to attribute more of those costs to products according to the proportion of foreign purchasers of those products. Yet if a Member State has high domestic sales of occasional user products (e.g. Hungary), this reduces the efficiency of allocating those costs specifically to the short term products as it will be allocating the costs disproportionately to occasional users more generally. Without further detailed information about the extent of those costs as a proportion of total administrative costs, and the proportion of short term products purchased by foreign users, it would not appear appropriate to allocate these costs on a different basis other than a flat amount per transaction.

Per transaction marginal costs

Per transaction marginal costs at first, appear to be the easiest to disaggregate between products because the costs themselves are largely dependent upon the purchasing practices of customers.

The only cost component in this category which is not related to customer behaviour is the practice of some Member States to issue complex holographic vignettes for annual products, in order to reduce the risk of production of counterfeit annual vignettes. These costs are a significant multiple higher than standard multi-colour stickers (estimated as a factor of 10, but dependent highly on volumes and location of production). For Member States which use such production techniques for only some products, it is reasonable to add that premium onto the administrative costs of the relevant products.

A more widely applicable set of costs are those related to the payment outlet and payment options used. These are likely to be the costs that are most variable within the administrative costs of the operator. The range of prices possible for a transaction can be considerable depending upon those choices. One confidential cost model report for a road pricing scheme indicated that this range could be between 5% of the total transaction value (as a retail outlet and a credit card vendor together may charge this much to cover their own costs) to as low as € 0.12 for a direct debit transaction organised online. These costs are likely to vary depending on the national financial market, competition and volumes. The range of potential vignette purchase options could be as follows:

- Online internet banking/direct debit;
- Online debit card payment;
- Online payment site payment (e.g. PayPal);
- Online credit card payment;
- SMS account payment;
- Call centre automated debit card payment;
- Call centre automated credit card payment;
- Call centre manual debit card payment;
- Call centre manual credit card payment;
- Retail debit card payment;
- Retail credit card payment;
- Retail cash payment in country of vignette;
- Retail cash payment in foreign currency.

In all cases other than retail, if there is no electronic vignette, the vignette itself must be sent by post, which may add another €0.26 on average to the vignette.

All of these options can create different costs. The cheapest payment option is online via internet banking, the most expensive may be cash or some credit cards. The cheapest payment outlet will be online, the most expensive retail. This level of complication makes it difficult to attribute certain payment options to certain vignette products.

In some commercial sectors and jurisdictions it is normal to have surcharges for payment of some services by different means. For example, some low cost airlines choose to impose surcharges for paying by credit card and/or by purchasing tickets by phone, as do some toll road operators. Call centre transactions may be charged by establishing premium rate phone numbers which charge callers, incentivising use of other options, but raising revenue to pay for the service. If a vignette operator was able to do this, in a transparent way, then this would not be an issue incorporated in the price of vignettes. However, at present no Member State imposes surcharges or variable prices according to how customers pay.

In the absence of such a transparent approach, there does not appear to be a robust approach to assuming specific purchase patterns to those buying different vignette products. It may be likely that in some Member States foreign purchasers of short term products may be more likely to use lower cost payment options than nationals from those Member States. This is because although purchasers of long term vignette products are more regular users of the

highway network, they are essentially *less* regular users of the vignette system in that they may only purchase a vignette once a year. A short term vignette product purchaser may be more likely, on average, to buy a vignette more than once a year.

The purchasing patterns of nationals buying annual vignettes may be more likely to involve cash transactions in retail outlets (particularly for paper vignettes) than those of foreigners buying 1 week vignettes in advance.

As a result, no general rule can easily be applied to these costs across Europe, indicating that if a Member State does not add specific charges to reflect variations in transaction costs, then such costs can really only be fairly allocated on a flat fee basis to every vignette sale in the absence of countervailing evidence.

Benchmarking administrative costs is difficult because of these variations, but we have obtained data from a range of transaction based road charging systems from different countries, updated to 2011 values in Euros. This indicates a very wide range of costs per transaction of between € 0.06 and € 2.54. As Hungary's cost is € 1.08 and Romania's is € 0.81, and both have electronic vignette systems, it is presumed for the purposes of this exercise that a reasonable transaction cost would be € 1.00 for a Member State with a GDP per capita (PPP) of around €12,000-15,000. Member States with higher costs may have higher transaction charges, as may those with lower transaction volumes, so this figure should not be treated as any sort of cap or benchmark for regulatory purposes.

Effect of electronic vignettes

The appearance of electronic vignettes changes the profile of operating costs of such systems. By eliminating the production of a paper vignette, sales can be undertaken remotely without the need for a customer to collect a physical vignette or have it delivered by post. It encourages the sale by online means, which reduces the marginal costs of the transaction to the payment charges involved in the credit/debit card or online payment option used. It also makes it easy to sell vignettes in multiple languages and currencies.

Whilst electronic vignettes still require signage and other fixed costs, they promote lower overall costs and greater convenience for most users. They also allow for enforcement to be more effectively targeted by allowing instant remote identification of vehicles with and without vignettes, as they use number plate recognition technology to target enforcement.

The encouragement of electronic vignettes is likely to produce benefits for users, efficiencies in operating costs and the longer term potential for multi-country vignette products to be developed.

4.5 CONCLUSION

In the absence of a detailed cost allocation methodology based on data linking user practice to particular products, there is insufficient theoretical basis to allocate administrative costs of vignettes between different products on a basis other than at a flat rate per transaction.

There is a credible link between information and call centres provided in foreign languages and the likelihood that such users purchase short term vignette products more than other products, which would imply that short term vignette users may impose higher administrative costs in this respect. However, unless a large proportion of sales of short term products are attributable to foreign users, this would not be significant enough in itself

to justify a general rule regarding short term vignette products compared to long term products.

A flat rate of administrative costs per transaction would mean that short-term product buyers would pay a higher proportion of their vignette price on administration costs compared to long term product buyers. As most administrative costs are related to the interaction of users with the system, this appears to be reasonable in the absence of a more detailed cost allocation methodology that can attribute costs to products rather than users.

4.6 PRICES PROPORTIONALITY BASED ON RELATIVE USAGE LEVELS

Background

Vignettes are a form of road user charging that charge access to a network, rather than reflecting actual usage. A way of reflecting this in the price is to treat access as a proxy for the average level of usage of vehicles over the time periods for the products concerned.

For example, a purchaser of an annual vignette who is a commuter may use the vignette as often as 500 times a year, for relatively short trips, if using a motorway for the commute (twice a day 250 times a year). However, a purchaser of an annual vignette for regular leisure trips may use the network for far fewer trips than the commuter, but for longer distances. Conversely, a purchaser of a short term vignette who is only transiting to another country may have to buy two such vignettes for usage of a few hours across the breadth of that country. Another may buy a short term vignette and drive every day covering a large section of the road network on a business trip or vacation.

As such, if data were available on typical driving patterns on the charged network, by frequency of use, it would provide evidence for some proxies for how much the network is used by purchasers of different vignette durations. That could then provide a basis for weighing vignette prices based on average usage. It could not accurately reflect such distance or even number of trips (only a true distance based tolling system would do that), but it would provide an objective basis for calculating price relativities between vignette products.

Options for establishing usage factors

The selection of usage factors to establish price proportionality is only intended to provide a sound basis for setting the relationships between vignette prices. It is not intended to form the basis for a comprehensive price setting methodology based on usage, as vignettes are not intended to be road pricing instruments.

There are three possible bases to proxy usage:

1. Time spent on the network;
2. Frequency of use of the network;
3. Frequency and distance travelled on the network.

There is no reliable measure currently available to record the actual time that a vignette user spends on the vignette network (and no survey information about time used). To get accurate information about time spent on the network would require the use of sophisticated measurement equipment (e.g. GNSS systems) either designed for that purpose

(which would effectively enable a form of road pricing to be introduced instead) or through accessing such data from the presence of smartphones and related technologies (which raises issues of privacy). Given that such information is not available, and the use of technological options to provide that information would be too expensive and complicated for a vignette system, this option was not considered further.

Use of measurement of frequency of network use in itself, would mean that vignette proportionalities would reflect the number of assumed trips over the period of the vignette. For example, if the average purchaser of a one-week vignette took three return trips in that period, and the average purchaser of an annual vignette took 156 return trips in that period, then a price per trip could be established and divided by the expected number of trips per period. This approach appears to have the advantage of simplicity.

However, this approach has a significant disadvantage as it is unlikely to fairly represent usage proportionately, because of the tendency in some Member States for users of short term vignettes to use them for average longer distance trips than those used by annual vignette users. More frequent users are more likely to take a higher number of short distance trips. This hypothesis has been supported by the data collected from one EU Member State for average distance travelled by frequency as seen in Figure 8 below.

As a result, the third option – frequency and distance travelled – is considered to be the most appropriate approach for linking vignette pricing to usage levels. This recognises that longer trips are more likely to be less frequently undertaken than shorter trips.

Basis for this approach

We have taken as our example, the pricing and products in Bulgaria.

Figure 2 shows why users of Bulgaria’s vignette charged network making more than a certain frequency of trip are better-off purchasing the annual vignette at current prices. The price of the "daily" shortest term vignette is approximately one-seventh of the "daily" longest term vignette. If a motorist expects annual usage of the network to be more than this ratio (that is more than 6.8 times a year on separate weeks), a saving is made in purchasing the annual product.

	Vignette price (€)	Quantity of period passes to total the annual
Week	5.0	6.8
Month	13.0	2.6
Annual	34.0	1.0

Figure 2- Current Vignette Price (€) Example- Bulgaria

An implication of the pricing approach is that very infrequent travellers may be quite heavily penalised relative to more frequent travellers. For example if somebody only wishes to travel once in a certain week, that person will have to pay €5 for this one trip (if this is a transit traveller it will be only half of the journey and the motorist will have to buy another vignette if there is a return leg more than a week later). On the other hand, somebody that travels 5 times a week, 50 weeks of the year will only pay €34 for 250 trips (€0.136 per round trip). That means that the infrequent user is paying over 35 times as much as a frequent user on a per trip basis (and if a transit traveller, potentially 70 times as much).

4.7 METHODOLOGY FOR DETERMINING USAGE FACTORS

The key principle behind this methodology is to establish the average distance travelled for users of each type of vignette product on offer. Although information on annual distance travelled by annual vignette purchasers could be derived by statistics on total motorway distance travelled by nationally registered vehicles, this in itself is insufficient to determine usage for all products. As it is the shortest term vignette products that create the proportionality issue, data on the average distance travelled by those users is required to develop a proxy for what the charge should be based on distance over the days of the vignette.

However, no Member States have such data as no surveys appear to have been undertaken of the average distance travelled by vignette users. If Member States *did* undertake such surveys, for a reasonable sample of users of all vignette products, it would provide a fair basis to establish the usage component of vignette prices.

In the absence of such data, the methodology below has been used based on information from one Member State on the average distance travelled per trip on the motorway network, by frequency of trip. This data enables assumptions to be made about what sort of vignette products frequent, infrequent and occasional users would purchase (based purely on time) and then establish broadly the ratios between those products based on the total distance travelled.

The methodology used to calculate proportional pricing can be summarised as follows:

1. **Use available sources to collect data on average distance per trip segmented by how frequently the motorist uses the road network.** To establish the reasonableness of price proportionality of vignette products, the data should only involve usage of the network similar to that subject to the vignette.

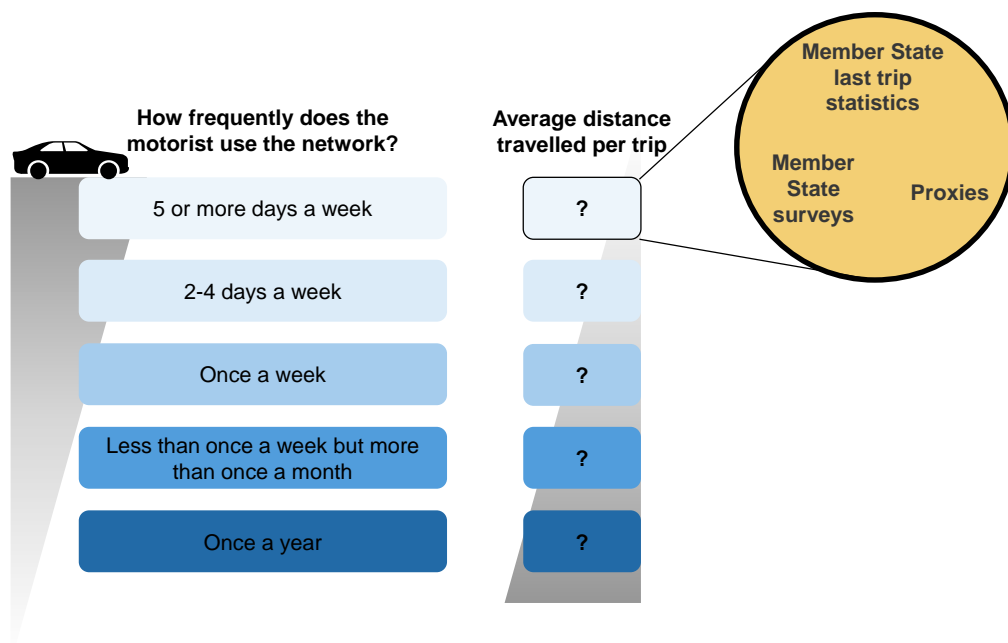


Figure 3 - Depiction of frequency and distance

2. **Use the distance and frequency data collected to create input assumptions,** i.e. allocate an average distance and quantity of trip number for each vignette period E.g. if the Member State wants to determine a proportional price for a week long vignette,

use data collected in Step 1 (average distance per trip by frequency) to form an input assumption on the average distance travelled per trip by a motorist who purchases the week vignette, and the quantity of return trips that they may make.

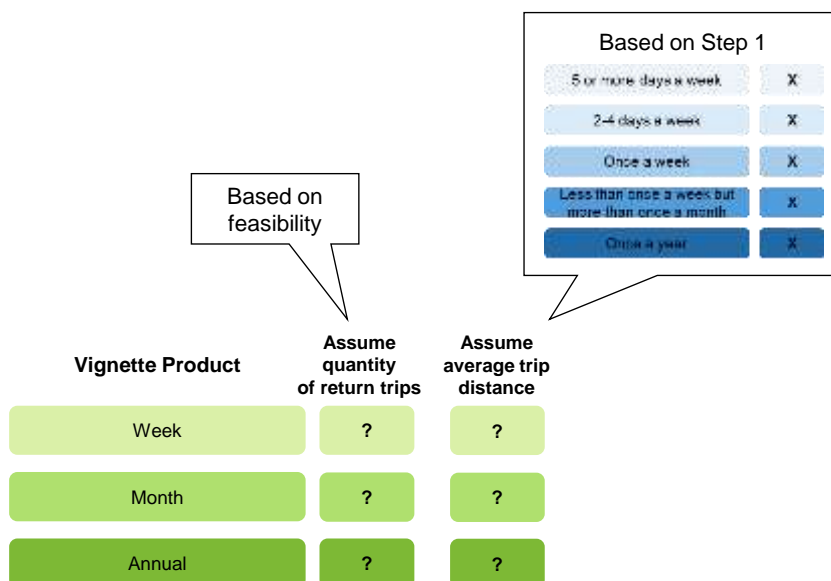


Figure 4 : Vignette products linked to trip frequency

3. Calculate the total average distance for each vignette period by multiplying the quantity of trips with the average trip length.

E.g. To calculate the total approximate distance of a week vignette, multiply the average distance to the quantity of trips, assumed for a motorist purchasing the week vignette (in Step 2).

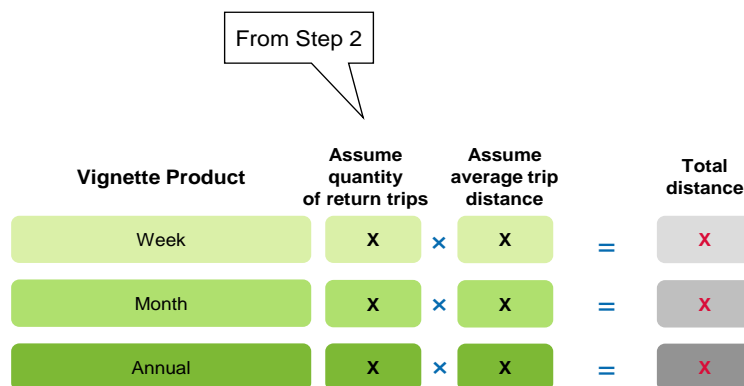


Figure 5 : Calculation of average distance travelled by product

4. Derive the total vignette distance as a proportion of the longest product period distance (the annual vignette total distance) for each vignette period.

E.g. The distance proportion for the week vignette, will be the calculated total distance of the week long vignette divided by the total distance of the annual vignette (derived in Step 3)

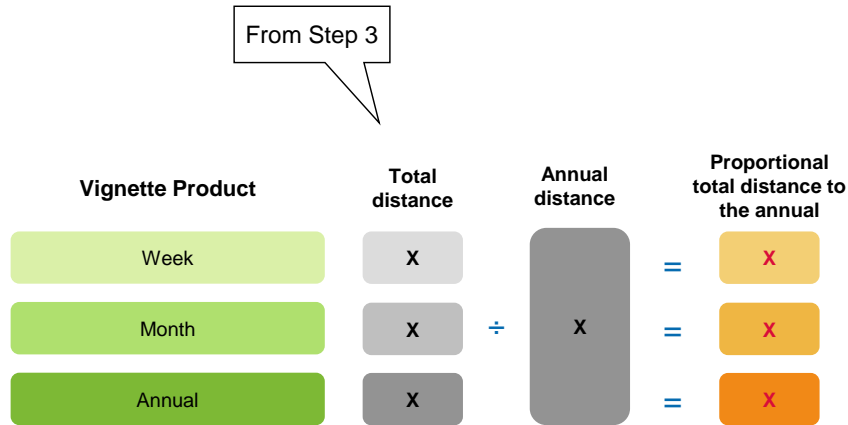


Figure 6 : Vignette product proportional distance to annual

- Take the annual vignette price that has been set by the Member State and subtract the assumed flat administrative cost. Multiply the remainder (the usage factor) by the relevant period distance ratio to get the period vignette price.

It is assumed that the Member State has allocated administrative costs evenly across all products (unless there is a transparent justification for different ones). It is also assumed that the price of the annual vignette is set by the Member State.

To calculate proportional pricing for each vignette product, multiply the annual price to the distance ratio (derived in Step 4).

E.g. The price of the week vignette would be the distance ratio of the week vignette multiplied by the price of the annual vignette.

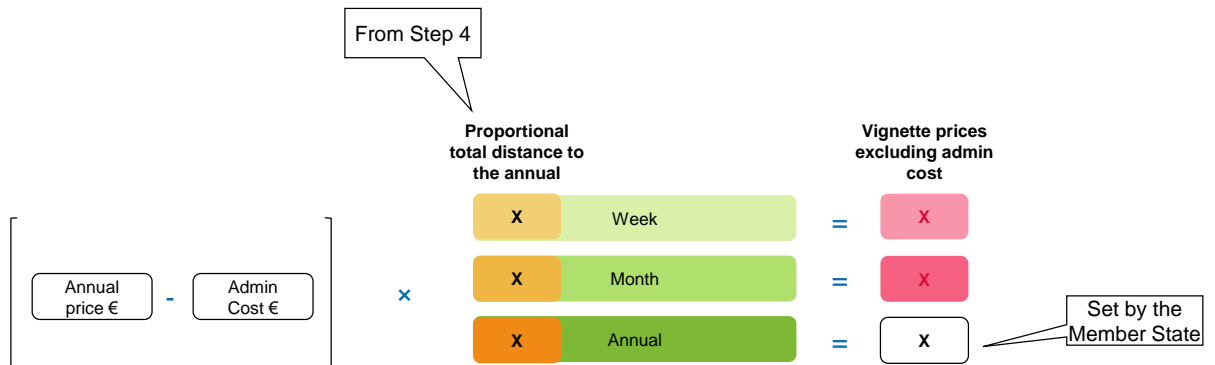


Figure 7 : Calculation of vignette prices with usage factor

4.8 WORKED EXAMPLE

Data source

Booz & Company sent surveys to Member States (both those with vignette systems and major Member States without) requesting data around average distances travelled by frequency of motorway and trunk road use. No Member States has been able to provide such data.²⁹

²⁹ Several Member States were contacted by telephone to seek clarification as to whether the data exists and it does not for those Member States.

The only data found is from England, from the Highways Agency (HA). It presents last trip statistics of motorists using the motorway and trunk road network in England, and excludes all other road types. It provides data on the average distance travelled by frequency, of motorists using the motorway network in England

Frequency	Average km/ trip
5 or more days a week	43
2-4 days a week	50
Once a week	37
Less than once a week but more than once a month	82
Once a month	93
Less than once a month	161
Once a year	246

Source: Highways Agency Note National Road User's Satisfaction Survey Annual Report 2010/11. http://www.highways.gov.uk/roads/documents/2011_05_NRUSS_Annual_Report_2010_11.pdf Note that the once a year trip length is based on a consultants assumption that this is equivalent to the length of people on holiday may make (no data was available for the once/twice a year frequency).

Figure 8 : Average km by Frequency of Motorists using the England Motorway and Trunk Road Network³⁰

Whilst it is understood that motorway and trunk road usage in England is not necessarily representative of its equivalent in vignette Member States, it nonetheless provided data points for average distance travelled by frequency using motorways and trunk roads only. For our worked example, distances were reduced by approximately 25% because relative to the vignette member states, England has:

- a longer motorway and trunk road network (so irregular trips may be more likely to be longer than in other Member States);
- a higher GDP per capita (so all trips may be more likely to be longer because higher incomes reduce the relative cost of a trip, including regular commuting trips compared to income),
- and no vignette system (vignette systems are assumed to have a small impact on demand).

This indicates that less frequent travellers travel for longer distances per trip, so that some mark up may be justified, on these grounds.

The methodology described above indicates that the vignette price should be the sum of the administrative cost of the vignette system operations and usage of the motorway network based on distance travelled.

In order to calculate this, the number of return trips was assumed for a range of sample product periods.

Figure 9 is the assumed quantity of trips that the holder of vignette type makes and the average km per trip. To derive Figure 9, it was assumed that:

³⁰ Source: Highways Agency (England), United Kingdom.

- The longer the vignette duration, the less frequently the motorist uses it (by time); and
- The more frequent the usage, the shorter the trip (by distance).

Vignette price by duration (€)	Trips in period assumption	Km per trip
Annual	156.0	32.2
Month	13.0	56.4
Week	3.0	109.5

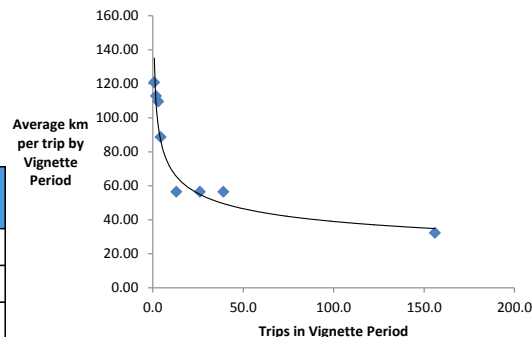


Figure 9- Average Trip and Distance Assumptions

Using these input assumptions (trips in each period and average kms per trip), average total km was derived for each period. Each distance total was calculated as a factor of the annual km total. Therefore, when a Member State sets the price of its annual vignette, the relevant period distance ratio is multiplied to generate a cost by period.

Worked example

In this hypothetical case, a Member State has priced its annual vignette at €100 (inclusive of an administration cost of €1 which is also allocated evenly across all other vignette products). The assumptions outlined above are used to suggest a proportional price for the 1 Week and 1 Month vignette products.

Input assumptions are approximated for the quantity of trips by duration and average km, as described in Figure 9.

For each product type (annual, monthly and weekly), an assumed total distance travelled is calculated and then the proportion of the monthly and weekly total distance, for each product purchasing group, to the annual figure is also calculated. This is done by multiplying the assumed trips in each period by the assumed km per trip.

Each total km by period is divided by the annual total km to obtain a km proportion relative to the annual, i.e.

Total km = km per trip * trips in period

Km ratio to the annual = Total km of vignette by duration / Total km of annual

Annual

Total km = 32.2 * 156 = 5,023 km (derived from Figure 9)

Km ratio to the annual = 5,023 / 5,023 = 1

Month

Total km = 56.4 * 13 = 733km (derived from Figure 9)

Km ratio to the annual = 733 / 5,023 = 0.144

Week

Total km = 109.5 * 3 = 328 km (derived from Figure 9)

Km ratio to the annual = 328 / 5,023 = 0.065

	Km per period	Ratio
Week	328	0.065
Month	733	0.144
Annual	5,023	1.000

Figure 10- Assumed Period Km and Ratios to the Annual

For each vignette product, the relevant distance ratio is multiplied to the annual vignette price *less the administration cost*. Then the administration cost (assumed to be €1) is added onto each vignette to derive prices (Figure 11).

Annual

99³¹ * 1.000 = €99

Plus administration cost = €100

Month

99 * 0.144 = €14.4

Plus administration cost = €15.4

Week

99 * 0.065 = €6.5

Plus administration cost = €7.5

	Price	Without Administration Costs		With Administration Costs	
		Cost per day	Ratio of cost per day	Cost per day	Ratio of cost per day
Week	7.5	0.92	3.4	1.07	3.9
Month	15.4	0.48	1.7	0.51	1.9
Annual	100.0	0.27	1	0.27	1

Figure 11- Vignette Prices (Worked Example)

This can be compared to our earlier Bulgarian example where the annual price was €34 (Figure 6)

³¹ 99 is the assumed rate of the annual product excluding the €1 administrative cost.

Vignette price by duration (€)	Bulgarian Vignette	Booz Vignette (Controlled)
Week	5.0	3.2
Month	13.0	5.8
Annual	34.0	34.0

Figure 12- Current Vignette Price (€) Example- Bulgaria

If the distances per trip, by frequency, as adjusted for England are assumed to be reasonably applicable to Bulgaria, it would suggest that weekly and monthly vignette prices in Bulgaria are relatively expensive.

4.9 ALTERNATIVE SCENARIOS

A key area of doubt remains in relation to the weekly product. This is likely to be purchased by many infrequent users with very long trips. It might be more appropriate to move these into a daily product, and then recalculate the weekly product (under the assumption that trip length is also closer to the monthly and annual data).

If for the case of the worked example, the presence of a daily vignette saw a weekly vignette purchased more by short term higher frequency users of the network and the day vignette was purchased by the very infrequent users, the change in average km would cause a reduction in the price of the week and an increase in the price of the day product.

Distance per trip for the weekly user could be assumed as being a similar average km as the annual and month vignette user, and the daily vignette purchased by the very infrequent user, would assume the 'once a year' holiday average distance (Figure 8). This has been obtained from the England Highway Agency data, where the 'holiday' average is taken.

Km distance	Previous average distance per trip	Adjusted average distance per trip
Day	120	246
Week	109	64

Figure 13- Adjusted Average Km per Trip

Therefore, the total distance for each period adjusts with the weekly distance revised lower.

Total distance = average distance per trip * quantity of trips

Total day distance = $246^{32} * 0.5 = 123$ km. (It is assumed that a day vignette holder will a very infrequent user of the network and will be making long distance trips. Therefore, it is assumed that the number of return trips is less than one, with the motorist transiting (creating an assumption of 0.5))

Total week distance = $64^{32} * 3^{33} = 192$ km

Ratio of total distance for each period as a proportion of the annual = total distance for the period / annual distance

Day distance ratio = $123 / 5,023^{34} = 0.0245$

³² From Figure 13.

³³ From Figure 9.

Week distance ratio = $192 / 5,023 = 0.0382$

	Km per period	Ratio
Day	123	0.0245
Week	192	0.0382

Figure 14- Assumed Period Km and Ratios to the Annual

For Bulgaria, the price of the week vignette would theoretically reduce by 28%. The price calculations for the day and week vignettes are as follows:

Price of vignette = (Vignette period ratio * price of the annual vignette) + admin cost

Day = $(0.0245 * 33) + 1 = 1.8$

Week = $(0.0382 * 33) + 1 = 2.3$

4.10 CONCLUSION

The recommended approach for establishing a ratio between annual and short term vignette prices is to allocate administrative costs at a flat rate per transaction across all vignette products and then apply assumptions of average total distance of network used by each vignette product user group. Data sourced so far suggests that a ratio of between 3 and 4 is reasonable for a Member State. However, if additional data can be sourced about the distance/frequency patterns of vignette users in Member States, this would enable variations on this assumption to be considered.

³⁴ From Figure 10

5. MEETING ENVIRONMENTAL OBJECTIVES

5.1 EU TRANSPORT POLICY CONTEXT

For two decades the EU has adopted a consistent policy programme to support reducing the environmental impacts of transport use across Europe. The 1992 Transport White Paper was the start of the EU taking a more active role in advancing environmental objectives within the context of a European wide transport policy.

In 2001, the EC published its White Paper, *European Transport Policy for 2010: Time to Decide*, which acknowledged the role of transport policy in meeting environmental policy goals through measures such as:

- Adopting a policy on effective charging for transport (to encourage use of more environmentally friendly modes or less congested routes);
- Putting research and technology at the service of clean, efficient transport; and
- Developing medium and long-term environmental objectives for a sustainable transport system.

This formed a building block upon which the environmental dimensions of transport policy were explored further. The report *“Keep Europe moving - Sustainable mobility for our continent - Mid-term review of the European Commission’s 2001 Transport White paper”* considered how the EU was responded to the White Paper.

It noted that *“Environmental pressures have increased substantially and significant health and environmental problems will persist in the future, for example, in the field of air pollution. The promotion of a high level of protection and improvement of the quality of the environment is therefore necessary.”* It estimated that the environmental cost of transport is equivalent to 1.1% of GDP³⁵. It said that *“All modes must become more environmentally friendly, safe and energy efficient”* and that policy makers *“will need to examine how smart forms of charging can help to optimise transport patterns and thus create win-win situations for... the wider society (through the reduction of negative effects such as air pollution).”*³⁶

This reinforced a policy view that road charging could contribute towards addressing the environmental impacts of road transport.

In 2008, the *“Greening Transport”* package included the *“Strategy for the Internalisation of External Costs”*. Part of that Strategy includes the objective of *“encouraging more sustainable car use”*, with one option considered being to restructure existing taxes of private cars to take CO2 emissions into account. Whilst vignettes are not mentioned, there is an obvious parallel with the intent contained in that strategy.

Ultimately, this culminated in the 2011 Transport White Paper, which established a 60% greenhouse gas emission reduction target with a range of goals including two goals relevant for this study:

³⁵ Final report. *Environmental costs cover air pollution, noise and global warming costs. UNification of accounts and marginal costs for Transport Efficiency. 5th Framework – Transport RTD. November 2003.*

³⁶ *Keep Europe moving - Sustainable mobility for our continent - Mid-term review of the European Commission’s 2001 Transport White paper p.18.*

- (1) Halve the use of ‘conventionally-fuelled’ cars in urban transport by 2030; phase them out in cities by 2050; achieve essentially CO₂-free city logistics in major urban centres by 2030
- (2) Move towards full application of “user pays” and “polluter pays” principles and private sector engagement to eliminate distortions, including harmful subsidies, generate revenues and ensure financing for future transport investments

Such ambitious goals will require support at the Member State level in terms of complementary policies. These two goals in themselves can be complementary, in that the promotion of “polluter pays” principles can help incentivise use of cars that have lower CO₂ emissions, and cars not powered by fossil fuels.

Related to this is the Community Strategy to reduce CO₂ emissions from passenger cars and light-commercial vehicles. This culminated in Regulation (EC) n° 443/2009 which set emission performance standards for new passenger cars. Of course, whilst this applies to new cars, it will take some time for the impacts of this to be noticeable as the car vehicle fleet may take 15-20 years to “turnover” the existing stock of vehicles, depending on the relative incomes and policies of different Member States.

The existing environmental impacts of private vehicle vignettes were summarised in Chapter 3. The remainder of this chapter provides an assessment as to whether private vehicle vignettes could be used to support EU environmental policy objectives.

Vignettes and environmental Policy

Private vehicle vignette systems as they currently operate do not directly apply the “polluter pays” principle in any form. In fact, those that use the network more frequently over extended periods are more likely to pay less per vehicle kilometre driven and time spent on the network, than those who use it occasionally over short periods, as is seen in the relative price differences. It is clear that, compared with toll systems that charge actual usage, whether based on distance or frequency of usage of a road, vignette systems are “second best” options as they allow road users to “pre-purchase access” to a network, rather than be charged for actual usage. As such, vignettes cannot efficiently or effectively target specific road use behaviour (e.g. driving at congested times on congested roads), compared to tolls (e.g. congestion charging or distance charging that varies according to vehicle emissions ratings) or indeed fuel tax (which charges more for less efficient vehicles). The use of charging mechanisms to promote environmental policy objectives is not unusual among EU Member States. Urban access restriction zones have been established in cities in Italy and Germany for this purpose, whilst London has established a Low Emission Zone for heavy vehicles that imposes high charges for vehicles that are not above a minimum EURO engine rating.

Many Member States charge annual vehicle licencing fees which use various environmental factors to incentivise ownership of more vehicles with lower environmental impacts. This may include specifications of CO₂ emissions ratings, EURO rating or engine size. Others offer subsidies for alternative fuels and alternatively fuelled vehicles, whilst some impose taxes on higher emission vehicles.

Vignettes have some similarities to such taxes and fees, as they are paid once by the vehicle owner, and are a legal requirement to access the road network that the vignette applies to. As such, it is conceivable that a similar discount scheme could apply to vignettes.

5.2 POSSIBLE COMPLEMENTARY MEASURES FOR VIGNETTE SYSTEMS TO SUPPORT ENVIRONMENTAL POLICY OBJECTIVES

Consideration of discount for vehicles with lower environmental impacts

In the context of road charging, the Eurovignette Directive (1999/62) includes in Article 10(b) first indent a requirement to vary tolls by EURO emission class (for heavy vehicles), and Annex II also indicates that vignettes for heavy vehicles should have maximum charges that provide discounts for vehicles with higher EURO engine ratings. More recent decisions to amend the Directive to accommodate a greater range of options for environmental charging indicate the EU's commitment to using road charging as a means of promoting environmental policy objectives.

Given these factors, it may appear that the logical policy option for private car vignettes would be for Member States to follow what is now adopted for heavy vehicles in offering discounts (or in the case of some vehicles with zero emissions exemptions) for vehicles with lower environmental impacts.

However, as access to a car is typically fixed (usually because the decision to own a car involves a multitude of factors), the presence or otherwise of a discount for certain types of vehicles for vignette usage will not change usage patterns. If a discount existed, it may have a minor effect on ownership decisions for those users buying the longest period vignettes (i.e. mostly nationals of the country issuing the vignette). In any case, it is difficult to envisage that a discount (which even if 50% for the most expensive annual vignette currently offered would be a saving of less than €80) could make a material difference to ownership decisions.

However, if such a discount was introduced more widely, in the context of an increase in the Member States with vignettes it may have a modest effect. If a motorist notices not only a discount on national vignettes but also in driving to other Member States, it may be perceived as more advantageous, particularly if the motorist drives regularly to another Member State which offers a sizeable proportionate discount (e.g. 30%). It is likely to be greater if future price increases were concentrated on the more polluting vehicles, widening the discount and creating more value for the motorist.

Practical considerations in implementing an environmental discount

For a discount to be implemented there would need to be an objective basis to classify vehicles as being "environmentally friendly". Although EURO emission standard ratings exist for private vehicles for noxious emissions, it does not include CO₂. Whilst some Member States do record CO₂ emission design standards for makes and models of private vehicles, this is not recognised across the EU. As such, there is not a common standard easily applicable across private vehicles in the EU.

Even if one standard did exist (for example, the EURO engine ratings were applied), it would require motorists to know what engine rating their vehicles had, for the retail outlet of the vignette to also know, and for that to be verified. Many motorists are unlikely to know their engine rating. Similarly, it would be difficult for a retail outlet (especially one online or by phone) to be able to identify such a rating and especially verify it, for a specific vehicle. To do so would require, at the very least, a database of all possible car makes, models and years, and for motorists to prove that the vehicle the vignette is purchased for, is the make, model and year that is claimed. Such a system would be extensive and expensive for retailers to interrogate, and still open to fraud.

The risks of not having a system to identify and verify a vehicle's environmental rating are that motorists would be incentivised to commit fraud, or for the discount to be rarely available because of the difficulty of proving the environmental rating of a vehicle.

In the future, it may be viable to use a device, such as a tolling on board unit or tag, to provide ready identification of vehicle engine ratings. However, given the presence of such a device assumes a tolling system is in place, it is likely that a vignette system is not also in operation on the same roads.

Many motorists will be unaware of their vehicle EURO or CO2 classification, so will not be aware of what product they should buy. Others may know it, but there is obviously a price incentive to fraudulently purchase the cheapest product if the vignette purchase process does not verify whether the vignette matches the vehicle type.

Some Member States have motor vehicle licensing databases that already contain this data matched to number plates. This typically reflects their own national vehicle registration system that may offer discounts for vehicles with lower environmental impacts. The system means that when a vehicle is first registered in the country, static vehicle data is entered into the database to match vehicle number plate with year, make and model of car, along with emissions rating. Typically, each make and model by year has a rating, so a database of that information makes it easy to determine the vehicle emission rating. When a vehicle is first registered, the number plate matches such details. It would be relatively simple for a vignette system to access such data when a sale is undertaken (in London this is done to determine eligibility for such a discount for the congestion charge scheme) so that motorists are automatically charged the correct rate for the environmental rating of the specific vehicle.

However, Member States need access to a database to match make/models and year to emissions rating so this calculation can be undertaken. Vehicle licensing systems exist primarily as a means to register the identity of a vehicle for traffic and general law enforcement purposes. It is not necessarily technically difficult to include static vehicle data, such as the EURO rating, in such databases, but it may be expensive and take some time to add this. If a Member State does not have such a database, then the only way to verify the environmental rating of a vehicle at the time of a vignette purchase would be by inspection or by the vehicle owner producing evidence of the vehicle's environmental rating. This is likely to be excessively onerous, imposing administrative costs on the system and compliance costs on the motorist rendering the discount expensive to operate.

Although one key barrier to introducing such a discount is for Member States to be able to match vehicles registered in their own countries to data on environmental ratings, a bigger concern is being to match those of vehicles from other Member States.

Even if a Member State can easily and automatically determine the environmental rating (and therefore the price) of a car registered in its own country, it will not have access to similar data for vehicles from other countries. Member States do not have ready access to the national vehicle licensing databases of other Member States which contain the data to match number plates (which are universally typically easy to "read" electronically and manually) to makes and models (which may not be immediately obvious in all cases) and EURO engine ratings. Member States already have difficulties with cross-border enforcement of vignettes, tolls, parking and other traffic fines for that reason. Adding the dimension of environmental rating to vignettes will present a similar difficulty.

One option for Member States that already have this information for vehicles registered in their own state, is to ask for make/model and year of car as part of the vignette purchase process, so that such details can be matched against environmental rating data (as such information is almost always common across countries) to determine an environmental rating for that vehicle for that purchase. For example, a brand new hybrid vehicle may match as having a high environmental rating and have a high discount, whereas a five year old vehicle may have a low discount and a large 20 year old vehicle may have no discount at all.

Yet a Police stop would need to include the remote interrogation of a database to check the make/model and year of the foreign vehicle stopped to determine its EURO engine rating. Clearly, without a Police stop, the capabilities of Automatic Number Plate Recognition technology to identify a vehicle that has erroneously purchased a "EURO 5" vignette but should have bought a "EURO 0" one are limited, as it would require careful identification of the vehicle by sight. Regardless, the issuance of a ticket remains difficult for foreign vehicles, as the Member State would typically not have access to ownership details or have the powers to enforce its vignettes in the territory of another Member State.

It would be even more difficult with electronic vignettes. As electronic vignettes are primarily enforced using automatic number plate detection correlated against the database of valid vignettes, it tends to only be those vehicles identified as non-compliant that may be stopped.

As a result, an electronic vignette that incorporates an environmental discount would need to include:

- Access to a database to match vehicle make/model and year to environmental ratings; and
- Require vignette purchasers to identify their vehicle for that purpose (national purchasers may already have that contained matched to vehicle licence numbers).

As there remain issues with cross-border enforcement of vignettes (and other traffic regulations) anyway, the introduction of a discount for vignettes based on environmental ratings would add to that complication. This is unlikely to be easily resolved until there is regular cross-border access to national vehicle registration data, standards for common vehicle registration data that include environmental ratings and the legal ability to issue infringement notices in other Member States (or with their agreement).

It is possible for Member States to issue vignette products with environmental discounts, but this would involve trade-offs between ease of use, operating costs (in managing a complicating factor in the transaction) and enforcement. The likely benefits of such a discount will be small, and perhaps more concentrated among nationals of the Member State (as it will provide a greater discount, in value, to those users on average than others) than visitors.

One remaining option for such a discount is to apply it only to vehicles easily identifiable with the highest environmental rating, namely electric vehicles. As these comprise a very low number of makes and models (and relatively small numbers of vehicles) it may be possible to provide an EU wide system to allow an electric vehicle discount to be practical. This could be linked to the specific infrastructure requirements of such vehicles (e.g. charging points) or the presence of unique identification data (e.g. licenses). As the growth of such vehicles is going to be partly dependent on the growth of infrastructure for recharging, this option may be worthy of some investigation.

5.3 CONCLUSION

The introduction of a discount for vehicles with a lower environmental impact would likely have a very small impact on vehicle ownership, particularly for vehicles registered in the Member State offering the discount. If vignette systems for private cars become more commonplace, there may be benefits in promoting discounts for vehicles with lower environmental impacts. If motorists perceive that there are financial benefits in having such vehicles, across the EU (in that it benefits them in driving across Member States), the incremental effects of those discounts may be more noticeable.

However, with the possible exception of electrically powered vehicles (or others with highly distinct and easily identifiable characteristics), it is likely to prove administratively and financially burdensome to require such a discount scheme for environmentally friendly private vehicles based on EURO engine ratings or CO₂ emissions measurements. As such, it may be worthwhile for Member States to consider whether electric vehicle incentive schemes could be usefully applied to private vehicle vignette systems as well.

APPENDIX 1

Questions for Member States with Vignette Systems

Note: The following questions relate to charging of *private vehicles only*. The charging of vehicles over 3.5 tonnes is outside the scope of this questionnaire. Please provide answers that relate to the vignette for private vehicles only. If an answer refers to a combination of the HGV and private vehicle vignettes, please make this clear.

Questions:	Answers:
Purpose of vignette charging	
1. What was the objective of introducing a Vignette for private vehicles?	
2. Why was a Vignette chosen rather than tolls, increased fuel taxation or other revenue sources? Please give advantages and disadvantages seen in choosing vignettes?	
Compliance	
3. What steps are taken to ensure compliance of Domestic road users with the vignette system?	
4. What steps are taken to ensure compliance of Foreign road users with the vignette system?	
Price and cost	
5. What methodology was used to determine the relative price levels of the different vignette products? Please provide calculations.	
6. What is the average trip distance of users on your motorway network? Please provide data on average trip distance by user type if possible (e.g. business, commuter, leisure)	
7. What is the average frequency of road use for users of your motorway network? Please provide data on average frequency by user type if possible (e.g. business, commuter, leisure, domestic vs. foreign)	
8. What differences are there in administrative costs between the longest and shortest period vignette products? Please provide details (e.g. on transaction basis, costs of production, costs of retail outlets/payment)	

options, basis for allocating costs between vignette products)	
Impact	
9. Did the introduction of the Vignette have any impact on traffic volumes? Please provide data on private car traffic flows on roads covered by the Vignette	
10. Did the introduction of the Vignette have any impact on traffic volumes on roads adjacent to country borders? Have increases in vignette prices had any impact on such traffic volumes? Please provide data on pre-Vignette and post-Vignette traffic volumes on these roads and data on traffic volumes before and after increases in vignette prices.	
11. Did the introduction of the Vignette reduce car ownership levels? Please provide data on car ownership levels before and after the introduction of the vignette.	
12. Did the introduction of the Vignette reduce congestion? Please provide data on levels of congestion on vignette charged roads before and after the introduction of the vignette	
13. What is the average trip distance by frequency of road use for users of your motorway network? Please provide data on how frequent users may travel distances above/below certain distances.	
14. What has been the public reaction to the introduction of the Vignette? What have been the main concerns raised about the system?	
15. Are there any plans for changes/improvements to the following aspects of the vignette system: Availability of information Payment outlets/options Enforcement practices Products (time periods) and prices	