

## FRENCH NATIONAL HEAVY GOOD VEHICLE ECO TAX

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### Abstract

The pay-per-kilometre trucks tax (eco-tax) is a key measure of a French governmental initiative for greenhouse gas savings. It consists in charging, through electronic toll collection (ETC) techniques, trucks travelling on the public road network. It aims at being an incentive for a better use of the roads, and to collect new resources for transport infrastructure development, in an inter-modal strategy. The tax rate per km will depend on trucks' categories and EURO emission classes. The expected gross revenue is planned to exceed 1 billion €/year. Free-flow ETC techniques will be used to collect the required data for truck identification and tax computation. The taxable road network will be split into pricing sections. Post-payment will be available for subscribers and down-payment for non-subscribers. Every truck will have to be equipped with an on-board equipment (OBE). The government will set up an enforcement system to avoid offence or violation of the tax-payers, including automatic controls operated by a private partner and customs' fines.

**Keywords:** Road Pricing, Eco-tax, Heavy Vehicles, Electronic Toll Collection.

### Résumé

L'éco-taxe kilométrique poids lourds est une mesure phare du Grenelle de l'Environnement décidée par le gouvernement français. Elle consiste à collecter un péage par un système électronique (ETC) auprès des poids lourds circulant sur le réseau routier national. C'est une incitation à un meilleur usage des routes et une nouvelle source de revenu pour développer les infrastructures de transport dans une stratégie inter-modale. Le taux kilométrique dépendra des catégories et classes d'émission EURO des poids lourds. Les recettes prévues dépassent 1 milliard d'euros/an. Des techniques ETC sous circulation seront utilisées pour recueillir les données nécessaires, identifier les poids lourds et calculer le montant de la taxe. Le réseau ainsi tarifé sera découpé en sections de péage. Le paiement différé sera proposé aux abonnés et le paiement immédiat aux autres. Chaque poids lourd devra être muni d'un équipement embarqué (OBE). Le gouvernement mettra en place un système de contrôle pour éviter les fraudes ou non-paiements, comprenant un contrôle automatique par un opérateur privé et l'application d'amendes douanières.

**Mots clefs:** Tarification routière, éco-taxe, poids lourds, péage électronique.

## **1. Project overview**

### **1.1 Project objectives**

In compliance with the conclusions of the nation-wide government-initiated forum *Grenelle de l'environnement*, the French government set up the national eco-tax on heavy good vehicle (HGV). It consists in charging HGVs, using modern techniques, for the use of certain roads. Charged roads are currently free of charge state network and local network likely to receive significant traffic shift..

The objectives of this tax are:

to reduce the environmental impacts of the road freight transport, by influencing the shippers' choices,

to rationalize road transport operations over medium and short distances (e.g. to reduce the number of empty trips, to increase the transported load, to improve the traffic share between conceded and non-conceded networks, and to optimize the good production processes in order to decrease the transport volume),

to collect resources to finance new infrastructures required for to implement a sustainable transport policy, in a multimodal perspective.

The revenue collected on the national road network will be allocated to the French Financing Agency for Infrastructure (AFITF), whereas the revenue collected on the local network will be allocated to the territorial authorities managing the taxed roads.

This project is developed within the European legal and technical frame of the Eurovignette Directive, which specifies the calculation modes of the maximum rates and modulation parameters, and the Interoperability Directive, which specifies a European Electronic Toll Service (EETS) ensuring interoperability of all the European electronic toll systems. Three technologies are proposed by the Interoperability Directive:

Global Navigation Satellite System (GNSS);

mobile communication with respect to the GSM-GPRS standard;

dedicated short range communication (DSRC) at 5.8 GHz.

### **1.2 Principles of the national heavy goods vehicle eco tax**

#### ***Taxable network***

The national HGV eco-tax applies on all State owned free motorways and highways located in mainland France, but the toll motorways and roads, and routes with a low HGV volume (less than 800 trucks/day in both directions).

The territorial authorities' roads which are expected to be affected by a high traffic shift from the toll motorways, or from roads subjected to the national HGV eco-tax or to similar toll or tax system in neighbouring countries, can also be eligible to this eco-tax. These roads will be defined by a Council of State decree, advised by the local authority deliberative assemblies.

The choice of eco-tax eligible local roads relies on detailed traffic studies conducted by the State. A particular emphasis was put on the following criteria:

modelling all traffic, including local and short distance trucking,

modelling various vehicle types, differentiating loaded and unloaded vehicles,

traffic assignment based on real cost without any “shadow” variable, and cost calculation to assess economic impacts. A 3D network model with ramps and a detailed fuel consumption model was used, evaluation of the number of vehicles to be equipped with On Board Equipment (OBE).

The total length of the HGV eco-tax eligible network tax is between 10,000 and 15,000 kilometres (Fig. 1). This network will evolve over time to take into account temporary deviations, new routes and unexpected traffic changes.



**Figure 1-** Road network eligible to the national HGV eco-tax in 2012

### ***Tax liable Users***

The HGV eco-tax applies to commercial good vehicles, with or without trailer, with a maximum permitted gross weight above 3.5 tons, in compliance with the Eurovignette Directive. To be consistent with the German highway toll system, the experimental tax in Alsace is applied above 12 tons.

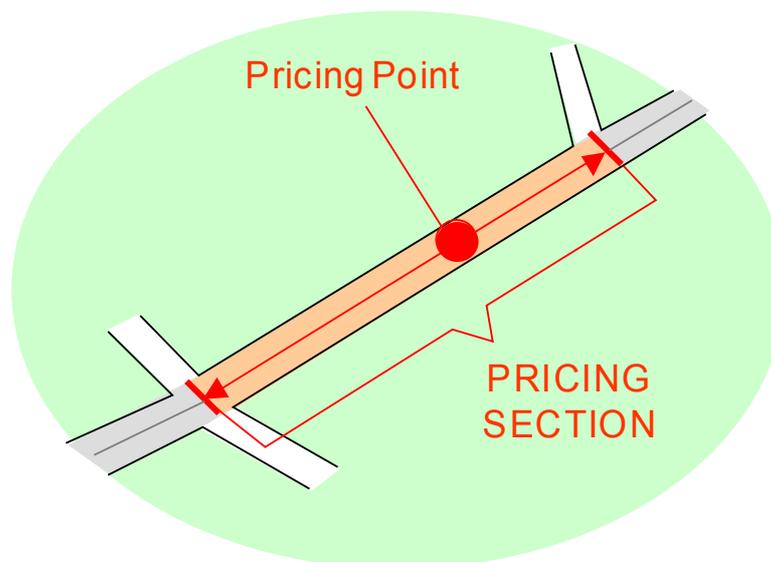
For the first year of operation, the estimated number of vehicles subjected to the eco-tax is about 800,000, of which 600,000 registered in France. The annual traffic volume on the taxable network is estimated at 10 billion trucks.kilometres.

The vehicles eligible to the HGV eco-tax will require on-board electronic equipment (OBE), which will be mandatory for all vehicles registered in France, as soon as the eco-tax becomes effective. The OBE will be required for vehicles registered abroad, only when they drive on the taxable network. It was decided not to use any declaration means to cope with the taxable network topology and future possible evolution.

### ***Charging principles***

The HGV eco-tax and the Alsace experimental tax will be calculated according to the travelled distance. This distance will be calculated by adding up the length of pre-determined toll (pricing) sections, whatever the precision of the location technologies. Therefore, the taxable network is divided into toll sections, delimited by charging (pricing) points (Fig. 2). Crossing a charging point generates the eco-tax and the Alsace experimental tax fee. The charging points are located between intersections. If such intersections are very close each to another, leading to very short toll sections, these adjacent sections can be merged by a State's initiative, to keep the collection cost at a reasonable level. The average length of these toll sections will be 4 to 5 kilometres.

The toll sections and charging points will be defined by a common agreement between the Departments of Transport and of Finances.



**Figure 2 – Toll (pricing) section and points**

### ***Charging Amount and Adjustment***

The Eurovignette Directive requires that the national HGV eco-tax and the Alsace experimental tax are based on the recovering of infrastructure costs. Thus, the net revenue of these taxes cannot exceed the total cost of construction, operation, servicing and development of the taxable network.

The kilometric rate will depend on the number of axles, the maximum permitted gross weight (*Poids Total en Charge Autorisé*, PTAC, or *Poids Total Roulant Autorisé*, PTRA, including tow), and the EURO emission class, to encourage the use of less polluting vehicles. In the future, this kilometric rate can be adjusted according to the traffic density and congestion of each pricing section, which can be defined by a pre-established schedule.

By the law, a 25% eco-tax reduction may be applied in the regions including the most outlying districts of France regarding distance from European area. The list of these districts will be established by a Council of State decree. Other tax reductions can be proposed to the subscribers, related to the management savings generated for subscribers compared to non-subscribers, with a maximum of 13 % as stated by the Eurovignette Directive.

The kilometric rate and all the reduction rules will be yearly decided by a common agreement between the Departments of Transport and of Finances.

### **1.3 Outsourcing Scope**

The State will entrust the future partnership contract holder to finance, design, implement, operate, service and maintain the HGV eco-tax collection and enforcement system.

### **1.4 Main Functions of the System**

Three major functions of the proposed system were identified:

collection of the required data for the amount calculation, the announcement, the recovery and the payment to the State, of the HGV eco-tax and the Alsace experimental tax, enforcement of the HGV eco-tax and the Alsace experimental tax by automatic and non automatic means, including the detection and treatment of non compliances; training, assistance and information :

- a) to the subscribers and non-subscribers liable for tax (information and assistance) ;
- b) to the State officers involved in the system (training and assistance).

#### ***Collection***

The system should allow detection of each charging point crossing by an eco-tax eligible vehicle, with automatic identification. The amount of the HGV eco-tax will be calculated by multiplying the estimated distance travelled by the vehicle – adding the toll section lengths which correspond to the crossed charging points –, by the applied kilometric rate – according to the vehicle category and its EURO emission class -.

The system will distinguish two payment operating methods, depending on whether or not the vehicle owner or operator subscribed to an electronic toll system service:

post-payment for those having subscribed to a contract with a registered authorized electronic toll system company. They will pay the due amount to this company periodically and after having used the taxable roads;

down payment for the non-subscribers, who should make a deposit and a prior down payment from which the tax amount will be deduced. This down payment should be paid when collecting the OBE in order to maintain a sufficient balance.

The gross total annual amount of the eco-tax to be collected is estimated at 1.1 billion euros at the beginning.

#### ***Enforcement***

The enforcement system will be able to detect vehicles which do not comply with the conditions of the HGV eco-tax or the Alsace experimental tax, identifying and charging penalties upon them. The enforcement system relies on the following means:

The automatic enforcement system allows a very large number of checks on the taxable network:

- (i) Fixed automatic enforcement systems on the heavily trafficked routes or on dedicated areas. The initial number of fixed automatic systems is estimated between 200 and 300;
- (ii) Moveable automatic enforcement, to complete the fixed devices mostly on the other routes. The initial number of moveable systems is estimated between 100 and 200.

The non automatic enforcement facilities which complete the automatic systems:

- (i) to perform controls on specific or parking areas, along the taxable network and on the conceded network;
- (ii) to perform post-controls by companies.

In case of non-payment (or partial payment) of the due eco-tax, the offender is liable to both : the real tax amount if known , of a lump sum tax if not, a fine of up to 750 €.

### ***Training, Information and Assistance***

A permanent service of information and assistance to the users will be organized. Training and assistance will also be provided to the State officers in charge of the HGV eco-tax and the Alsace experimental tax enforcement, and to the officers who will implement the interface of State systems with contractor systems.

### **1.5 Interoperability**

The choice of the enforcement and data collection technology is left to bidders, provided that the system complies with the requirements of the Interoperability Directive and the regulatory measures on the technology processes to be used for road electronic toll system.

The OBE available for the tax collection should be technically able to operate with the existing HGV electronic toll system of the conceded road network (TIS-PL). Furthermore, it is wished that this OBE and the enforcement system also operate with the HGV devices for electronic toll systems of other European countries. On the other hand, the OBE delivered to non-subscribers should not be useable in other systems or for other services, either because it does not have the necessary functions or they are neutralized.

### **1.6 Other services**

Any data collected for the HGV eco-tax or the Alsace experimental tax cannot be used by anyone for commercial purposes.

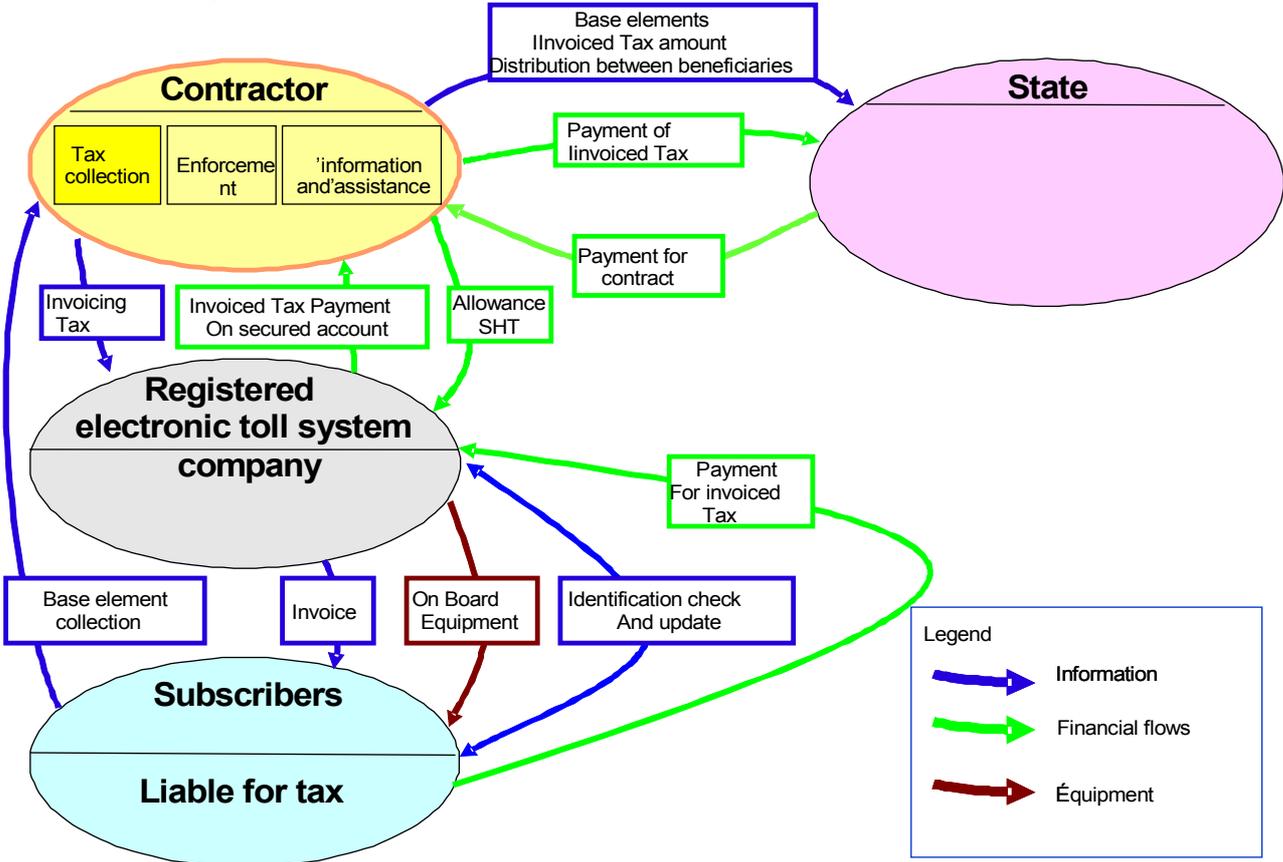
The electronic toll system companies can offer complementary services to their subscribers, within conditions to be defined during the dialogue. Getting the necessary authorizations for the distribution of these services will be entirely under their responsibility, e.g. the procedures relative to data protection and to the respect of personal freedom. These activities should not interfere with the payment of the HGV eco-tax and of the Alsace experimental tax, neither on the technical side (the system performances should not in any case be modified), nor on the accounting side (different calculation of tax and commercial services) or contracting (no users' obligation to subscribe for an additional commercial service).

**2. Actors Roles and Architecture of the whole System**

**2.1 Organization for the Collection System**

The tasks entrusted to the contractor will cover the data collection to assess the HGV eco-tax and the Alsace experimental tax amount, to ensure their payment and their collection, but the compulsory payment which remains exclusively on the State.

*Subscribers liable for tax*



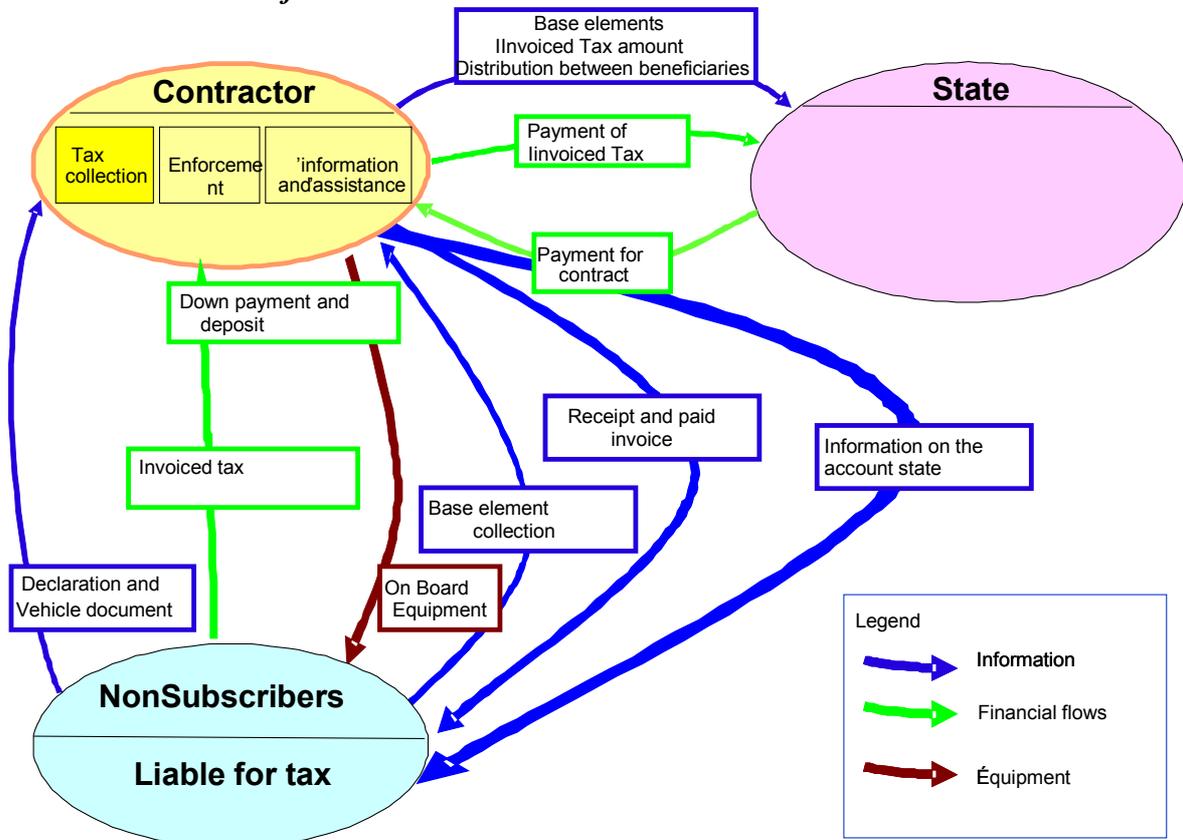
**Figure 3 - Organization of the collection for subscribers liable for tax**

The collection of the HGV eco-tax from the subscribers will be ensured by the electronic toll system companies, registered by the State and contracting with the main contractor (Fig. 3). These companies will be responsible for the supply of OBE, invoicing and fee collection.

The responsibility share between the registered electronic toll system companies and the contractor, as well as the relevant financial conditions, will be settled by a standard contract. The contractor should contract with any electronic toll system companies duly registered according to the terms of a standard contract, the content of which will be determined during the competitive dialogue. The proposed obligations of the contractor concerning guarantees, penalties and bonuses in the partnership contract can be passed on to the registered electronic toll system companies via the standard contract. This contract will also contain a financial revenue formula for services provided by the registered electronic toll system companies which can be adjusted through variable parameters, to be defined during the competitive

dialogue. It can reflect obligations of the partnership contract relative to the activity of the registered electronic toll system companies.

**Non-subscribers liable for tax**



**Figure 4 - Organization of the tax collection from non-subscribers liable for tax**

The tax collection from the non-subscribers will be ensured by the contractor, who will make available the OBE, against a security deposit for its hire, and a down payment as pre-payment (Fig. 4). This service should allow users which do not wish to subscribe or do not have sufficient guarantees for the subscription, to have OBE and to supply their down payment at any moment (specific distribution network open 24h/day, 365 days/year) without excessive formalities (OBE installed by the driver). The OBE should be fitted with a device (indicator light or other) informing the user about his account balance. The crossing of a charging point with an insufficient balance is considered as a violation.

**2.2 Enforcement System Architecture**

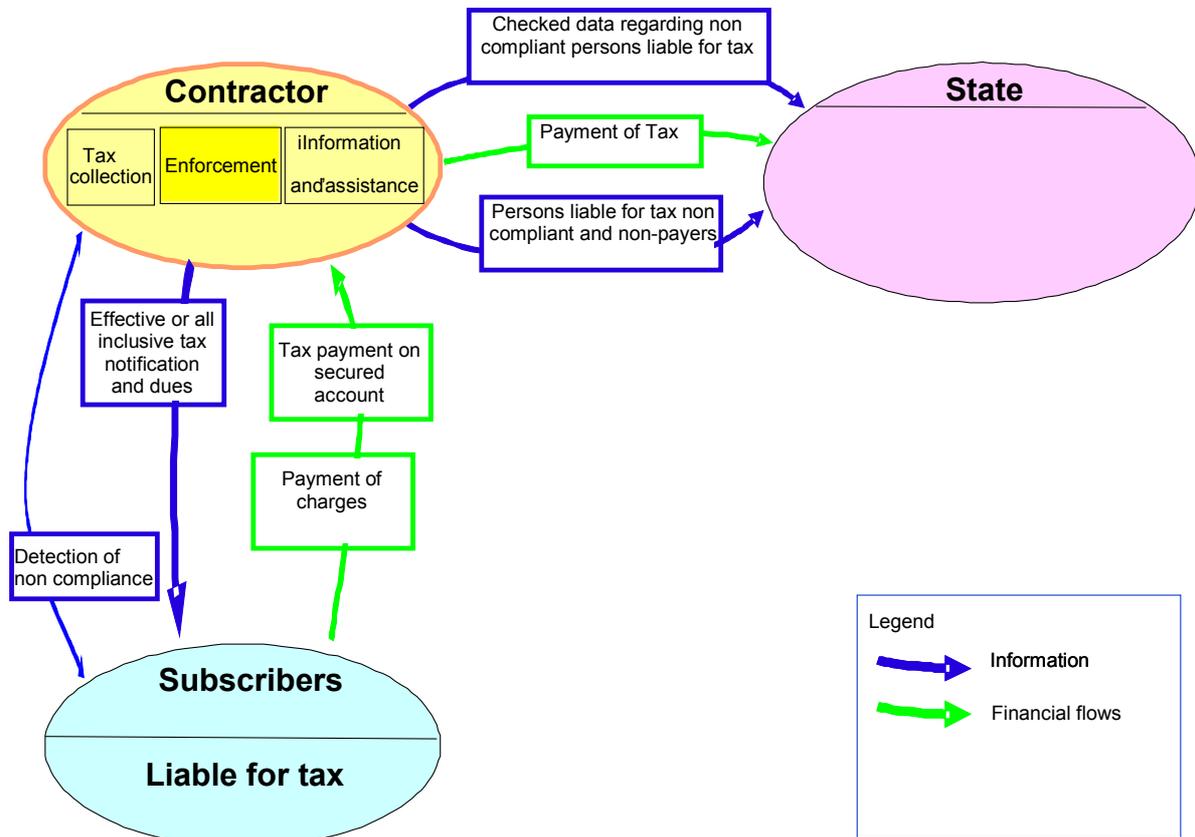
**Automatic enforcement**

The automatic enforcement system will be implemented and operated by the contractor. The system should allow checking the legal situation of persons liable for tax concerning the national heavy goods vehicle eco-tax and the Alsace experimental tax:

- the vehicle has an OBE,
- the OBE is operational,
- the liable for tax non-subscriber balance is not negative,
- the liable for tax subscriber does not appear on a black list,
- the declared Euro class and category in the OBE of the recorded vehicle are correct,

- the vehicle registration is as declared and recorded in the OBE.

The law authorizes the contractor to record any detected non compliance by an accredited automatic enforcement device, and to collect the evaded tax (if necessary, by debiting a lump sum amount). The compulsory payment of the evaded tax and application of the fine are the prerogative mission of the State, which does not enter within the scope of the mission entrusted to the contractor.



**Figure 5 - Organization of the automatic enforcement**

### ***Non automatic enforcement***

On road and in company enforcement is a State prerogative mission. Non automatic controls will be mainly performed on specific or parking areas, using tools supplied by the contractor. They can also be conducted ex post in companies. The contractor will only supply and maintain these tools to allow the State bodies to perform those controls, and in particular portable interrogation devices for the following systems:

- the OBE,
- the automatic enforcement system of the contractor;
- the anomalies and non compliances management systems.

The OBE should, in addition, be equipped with a device (light indicator or any other) allowing verification, without specific material, its correct operation as well as the situation of the person liable for tax with respect to the payment of the national heavy goods vehicle eco-tax or the Alsace experimental tax.

The enforcement officers are entitled to record non compliances, to apply and collect fines. The customs' officers are also entitled to collect taxes. If necessary, these officers can immobilize any vehicle until the payment of the sum occurs.

### **3. Other measures**

#### **3.1 Type Approval Procedure for the OBE and the automatic Enforcement Devices**

In order to meet the legal obligations relative to the observations performed by an automatic equipment, a type approval procedure of the OBE and the automatic enforcement devices, integrated in the collection and control chains, will be implemented. This procedure intends to guarantee that the required data are correctly collected and recorded in the central system.

This type approval therefore concerns the data collection process and the automatic enforcement devices. It includes the OBE, its data reading system, and the data recording modules in the central system.

#### **3.2 Registration Procedure of the electronic Toll System Companies**

The electronic toll system companies can offer to the customers an electronic toll system subscription only after having been registered by the State. This registration procedure will be defined by a regulatory text, of which the finalizing comes under State responsibility.

The purpose of this registration is to ensure that the electronic toll system company offers sufficient financial and professional guarantees, concerning the design of the HGV eco-tax and the Alsace experimental tax, and has the appropriate equipments to ensure this mission. Before delivering the service to its subscribers, the registered electronic toll system company should also have accredited its equipment, show its entire compatibility with that of the contractor and sign a standard contract with the contractor.

### **4. Next steps**

The next main step will be the choice of the contractor and of the technology. As previously explained, both GNSS and DSRC based technology are possible. The other main issue is the interoperability. The French project will be the first to bear at such a high level this issue. The existing frame (TIS-PL) must be an advantage, but the ambition of this project goes far beyond, with the need for open, comprehensive and fair regulation.

#### **References**

- MEEDDM (2009), "Partnership contract concerning the national HGV eco-tax and the Alsace experimental tax – Project presentation note", Ministry of Ecology, Energy, Sustainable development and Regional development.
- [http://www.transports.developpement-durable.gouv.fr/IMG/pdf/Notice\\_English\\_cle585dbf.pdf](http://www.transports.developpement-durable.gouv.fr/IMG/pdf/Notice_English_cle585dbf.pdf)
- Quoy, O & Walter, F. (2005) LKW-MAUT Impact on Alsacian Motorways, Direction Régionale de l'Équipement Alsace - Louis Pasteur University, Strasbourg.
- <http://etcproceedings.org/paper/lkw-maut-impact-on-alsatian-motorways>
- Walter, F. (2005), "Politique européenne de taxation des poids lourds pour l'utilisation de certaines infrastructures", Louis Pasteur University, Strasbourg.

- Krebs, P., and Balmer, U. (2004), “Fair and efficient : The Distance-related Heavy Vehicle Fee (HVF) in Switzerland”, Department of the Environment, Transport, Energy and Communications.
- <http://www.are.admin.ch/themen/verkehr/00250/00461/index.html?lang=en>
- Netherlands (2001), “Pay per kilometre”, Progress report.
- [http://www.imprint-eu.org/public/Papers/IMPRINT\\_Teule.pdf](http://www.imprint-eu.org/public/Papers/IMPRINT_Teule.pdf)