Measure title: **Support for clean fuels and introduction of clean public and private fleets in Burgos**

City: **Burgos** *Project:* **Caravel** *Measure number:* **05.02**

A Introduction

A1 Objectives

The measure outlines a transitional strategy to develop and implement clean modes of transport in both the public and the private sector.

- **Objective 1 :** To develop a transitional strategy so that 45% of the municipal fleet can consume clean fuels in the future;
- **Objective 2 :** Increase storage capacity and supply of natural gas for clean transport;
- **Objective 3 :** Purchase 8 natural gas vehicles to obtain a total fleet of 18 natural gas vehicles (thereby duplicating the GNG fleet in Burgos) and 1 CNG car for enforcement of parking regulations (vehicle for the control and regulation of parking)
- **Objective 4:** Consume 5% of bio-fuels for current diesel fleet working towards a fleet of bio diesel vehicles (progressively sharing bio-combustibles). Introduce 2 new diesel buses to test bio diesel fuels and transfer results to use them in other public vehicles;
- **Objective 5:** Achieve a higher share of private clean vehicles using natural gas and bio diesel, including private buses used for business and school transport, goods delivery vehicles and taxis;
- **Objective 6:** Reinforce and adapt training programmes for transport professionals with respect to the new requirements of the clean vehicles.

A2 Description

The proposal of the City of Burgos focused on the use of CNG in public buses and bio diesel in both public and private vehicle fleets in the city.
The strategy of the city consisted in promoting the consumption of clean fuels among citizens, which lead to improve air quality and reduced the dependence of the city on conventional fuels. Great emphasis was placed on encouraging citizens to use bio diesel as an ordinary fuel. Above all, the strategy aimed at completing the bio diesel cycle, which began with the collection of oil from domestic, commercial and industrial sources and ends with the consumption of bio diesel in the private and public fleets of the city (vans, buses, cars and lorries). It intended to introduce bio diesel refuelling in public bus stations and other petrol stations in the city, through the negotiation of agreements with manufacturers and suppliers.
At the core of this measure was designed the implementation and the operational activity of the central depot for public buses. Architectural plans were drawn up guided by the framework of the research activities and the development of an exhaustive plan of action to construct associated infrastructure and ensured its successful exploitation by public and private CNG and bio diesel fleets. The resources needed to build the public bus parking and service station infrastructure will be finance exclusively by the Council.

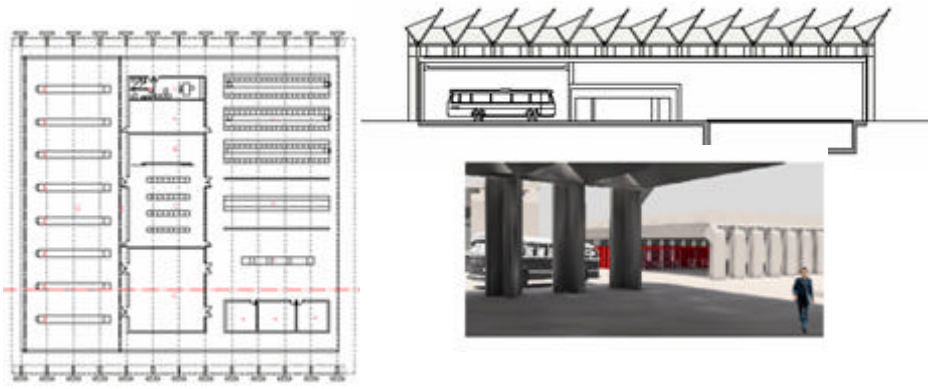


Image 1: Details of the technical project of new buses station

The new depot used to house council vehicles will be constructed with a view to the eventual expansion of a quality service into the peripheries of the city, with a central natural gas service area for all private collective transport services (buses, taxis, delivery vehicles, etc.). A bio diesel station to supply this clean fuel will be built. The new depot to house council vehicles that will provide under cover parking space for buses will be located close to Burgos city, in an industrial zone on land that already belongs to the Council.

Until the new depot is operative, certain activities were put in place in the old station to facilitate the use of bio diesel and GNG in new buses. These consisted of bio diesel testing in the new buses and checks and comparisons with the older vehicles running on bio diesel. Testing was done over a period of several months until bio diesel has been introduced in all vehicles, following checks on the viability of this fuel in public vehicles. CNG buses were accommodated in old parking facilities up until the new depot is constructed.

B Measure implementation

B1 Innovative aspects

From the conceptual point of view, the most important innovative aspect is the design of a unitary and comprehensive approach to the problem of supplying new clean fuels (CNG and bio diesel) for public and private vehicles that are delivering a public service in the city, which up until the present has only existed in a few public buses. This includes the following innovative aspects of the measure are:

- **New conceptual approach:** Introduction of the bio diesel strategy in Burgos. Though a configuration the new approach to use the biodiesel since that it was manufactured to use in the public and private vehicles and also the collected of used cooking oil.
- **Use of new technology/ITS:** The public fleet is composed by clean vehicles (CNG Buses and Bio diesel vehicles). This vehicles used the Euro IV, include the transference to Euro V though urea system in the buses with diesel technology. Also, they are equipped with the last available technology to favour the integration of information system and comfortable of the citizens.

Image 2: Presentation of new buses (with CNG and biodiesel fuels)

- **New organisational arrangements or relationships:** the development of specific tools and procedures to manage the use of bio diesel by all public fleet of the Council of Burgos.
- **New physical infrastructure solutions:** Clean fuels foresee the equipment of the new buses (especially for CNG and bio diesel) and new system for control consumptions and emissions, project study for new infrastructures (new public buses station) and general preparation.

Image 3: New equipment for testing biodiesel in the buses and introduction the biodiesel in all municipality fleet

B2 Situation before CIVITAS

The city of Burgos possessed 59 public buses, of which only 10 run on natural gas. In addition, 10% of the fleet using conventional fuels were 20 years old, with the result that their pollution levels and fuel consumption were very high. The rest of the vehicles run on diesel fuel, and not all of them were adapted to the needs of passengers such as accessibility, comfort and safety. Only 13% were adapted to serve the needs of disabled passengers.

Regarding private collective transport, the greatest share was taken up by company and school transport; private buses mainly use conventional diesel fuels and had a maximum age of 12 years. Taxis in Burgos number 189, had an average age of 10 years, and used butane gas and diesel. Taxis moved throughout the city and very frequently along routes in sensitive zones of the urban centre. There were approximately 3,500 delivery vehicles running on conventional fuels, which moved throughout the city and particularly within the more commercial and sensitive city centre. 434 public service vehicles were used for cleaning, public works and other services. Their range of movement covers the whole municipality, including sensitive areas and they run on diesel with only one vehicle in the whole fleet using natural gas.

The capacity of depots to house public vehicles in Burgos was severely constrained and no new parking spaces were available for new vehicles. This was a serious obstacle to the modernisation of the public transport services as additional buses cannot be bought due to the particularly harsh winter conditions in the city which did not allow vehicles to be parked in the open air.

The depots needed rapid natural gas refuelling systems. Currently, manual fuelling systems which run overnight were used for 10 buses, though this was inadequate for larger numbers as would require the implementation of further safety systems. There were no fuelling systems for other collective transport vehicles.

In the year 2000, an agreement was reached between the Council and the company supplying CNG gas over the old bus station. It involved an undertaking on the part of the Council to buy at least 40 CNG buses within four years. Due to safety concerns over the gas distribution system in the old bus depot and limited refuelling capacity that was unable to supply gas to more than 10 buses, the agreement was rescinded and only 10 (of the foreseen 40) CNG buses were finally purchased. It was not possible to purchase the remaining 30 CNG buses plus nine additional ones to convert the entire fleet to CNG fuel. The new Council aimed at following the same plan and intended to purchase additional CNG buses. It was to double the size of the current CNG fleet. To ensure high levels of safety and quality fuelling services, a new strategy was adopted that foresees the construction of a new depot with modern, high capacity CNG fuelling infrastructure that did not operate at maximum capacity when it comes on line. As the replacement of the entire fleet with CNG vehicles was not a feasible option over the next four years, Burgos Council was decided to introduce bio diesel to substitute conventional diesel to reduce pollution rates. To date, there was no in-house experience of supplying bio diesel to the local buses. However, activities using bio diesel was started in Burgos: for over two years, private companies were collecting used cooking oil (the use of cooking oil is very common in Burgos/Spain and it was collected from domestic users at various points e.g. in supermarket – the aim was to increase the 6 existing domestic collection points to about 20 - and from commercial users by a collection service). The used oil was brought to recycling plants that transformed it into to bio diesel. Currently, there were plants in Tarragona, Bilbao and Navarra and there was every likelihood that new ones will be built as this was a high-growth area of the economy. Burgos Council was starting to develop campaigns to stimulate the collection of oil and it was a good moment to start to introduce bio diesel in public vehicles. The consumption of bio fuel was expected to rise progressively in line with rates of bio diesel production. Engines did not need to be changed to use bio fuel, instead conventional diesel may be mixed with bio fuel and as a result the use of bio fuel was expected to increase.

B3 Actual implementation of the measure

The measure was implemented in the following stages:

Stage 1: Scheme design *(from February 1st, 2005 – to December 18th, 2006)* – The stage included the definition of the technical project to build the fuelling station and include a new garage for public buses, the design the new bio-diesel strategy for

supplying this clean fuel to the vehicles and plan bio-diesel stations and progressive rate of supplying bio-diesel to vehicles. With this first part, many meetings with different providers and companies of the energy sector were organized.

Stage 2: Implementation of the scheme *(from March 1st, 2006 – to November 30th, 2008)* – The stage included the implementation of the scheme for the introduction of bio diesel and CNG in the public buses and other vehicles of the Council. The most important actions carried on during this stage are the following:

- Implementation of an infrastructure for the storage and distribution of natural gas and bio-diesel
- Implementation of mechanisms to collect used oil from the citizens and a system to supply bio-diesel from the specific plants that are producing it.
- Renovation of the existing vehicles and acquisition of new urban buses running on natural gas/bio-diesel.
- Stimulation of the renovation and/or promotion of the integration of bio-diesel in a mixed fuel for existing private buses, especially school and company buses
- Promotion of the integration of bio-diesel in a mixed fuel for private vehicles (taxis, delivery vehicles etc.)

Stage 3: Personnel training *(from May 15th, 2006 – to November 30th, 2008)* – The stage included training activities to employees who has to maintenance and management concerning new CNG or bio-diesel buses

Stage 4: Promotion *(from April 15th, 2005 – to November 30th, 2008)* – Educational campaigns and marketing to promote the clean fuels and to change citizens behaviour. The users of these campaigns were the general public and car drivers.

Image 4: Stickers in the buses to promotion the biodiesel

Image 5: Presentations of the biodiesel use in the buses and presentation the acquisition of new buses

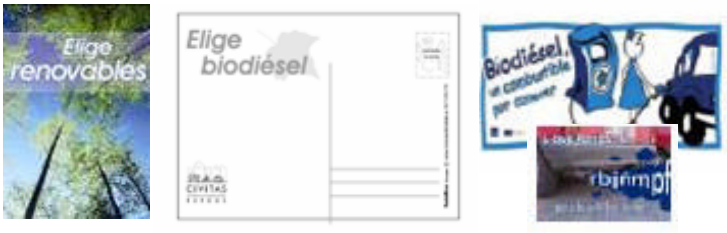


Image 6: Postal and posters to promotion the use of biodiesel

Stage 5: Evaluation of the activities *(from February 1st, 2005 – to December 31st, 2008)* – All the evaluation activities were performed according to the evaluation plan.

B4 Deviations from the original plan

No problems have been arisen during the implementation. All foreseen activities are running well. Some of them are completed and some in progress.

B5 Inter-relationships with other measures

The measure is related to other measures as follows:

- **Measure 8.2.** – **Clean high mobility services in Burgos –** Incorporation of New public buses with new fuels as bio diesel and CNG. Burgos has introduced 8 new CNG buses, 29 new buses with bio diesel, and the old fleet of buses with diesel has incorporated bio diesel. These new buses helped to the strategy of the Transport Department to increase the quality of service offered to the citizens due to the new buses were cleaner, more comfortable and guarantee the times of arrive to the bus stops, moreover to incorporate the last technology in equipment.
- **Measure 11.2 - Sustainable mobility marketing in Burgos.** – Several campaigns have been developed to aware the citizens to new fuels and the new vehicles with new fuels.

C Evaluation – methodology and results

C1 Measurement methodology

C1.1 Impacts and Indicators

The evaluation of this measure consists in the monitoring, all over the duration of the project, of the development of the level of this service and of its use. Many quantitative and qualitative parameters (derived from direct market analysis, customer satisfaction reports and surveys) have been used to give an exhaustive view of the success of the actions
The evaluation has been taken place with a strong interrelation with similar activities under development at a national and international level by Instituto Tecnológico de Castilla y León (ITCL) partner.

5.2 SUPPORT FOR CLEAN FUELS AND INTRODUCTION OF CLEAN PUBLIC AND PRIVATE FLEETS IN BURGOS						
Evaluation Category	**Nº**	**Indicator**	**Units**	**Source of data**	**Methodology for indicator construction (survey, modeling, etc)**	**Baseline date**
Energy	4	Fuel Mix	MJ	Council statistics Vehicles consider Consumption data of fuels	Calculated	2004
Energy	3	Vehicle fuel efficiency	MJ/vkm	Vehicles consider Consumption data of fuels	Calculated	2005
Energy	NM	Energy efficiency	MJ/passenger-km	Energy of vehicles Passenger PT Km	Calculated	2005
Environment	8	CO_2 emission	g/vkm	Vehicles consider	Measured	2005
Environment	10	NOx emission	g/vkm	Vehicles consider	Measured	2005
Environment	11	Small particulate emissions	g/vkm	Vehicles consider	Measured	2005
Transport	NM	Number of vehicles introduce	Nº Vehicles	Vehicles consider	Measured	2004
Society	GI	Awareness of public to initiative	%	Questionnaires	Measured/ Calculated	July 2007
Society	GI	Evaluation of private vehicles	%	Questionnaires	Measured/ Calculated	July 2007

Detailed description of the indicator methodologies:

Indicator	Methodology for indicator construction	
	Definition	**Methods of Measurement**
3. Vehicle fuel efficiency	Fuel uses per vehicle km, per vehicle type (average). In CIVITAS, the indicator is used to compare vehicle fuel efficiency with and without the measures. A= B/C A= Average vehicle energy efficiency (MJ/vkm) B= Total energy consumed for the vehicle(s) (by type and fuel) considered (MJ) C= Total total vehicles-kilometres (vkm) for the service	Method of data collection: o For PT vehicles: fuel consumption by each type of vehicles and the corresponding vehicle-km is collected form service operators, by recording fuel uses vehicle-km completed during the given periods. Frequency: once a year until the end of the project. Target group: the PT vehicles
4. Fuel mix	Fuel mix is the percentage of the market share of transport fuel for each type of fuel used in a given period. (Diesel, natural gas, biodiesel…) A= B/C A= Fuel mix, or percentage for the fuel considered (%) B= Total energy consumption for the fuel considered (MJ) C= Total energy consumption for all transport vehicles (MJ)	Method of data collection: o For assessment at a service level (PT), the service operators are required to record all information about each type of fuel consumed on an annul basis. Frequency: an annual basis.
NM. Energy efficiency	Energy efficiency is the energy of PT per passenger – Km A = B/C*D A= Total Energy efficiency per passenger – Km (MJ/passenger-km) B=Total energy consumed for the vehicles considered (MJ) C= Number of passengers of PT (passengers) D= Passenger per km	Method of data collection: o For assessment at a service level (PT), the service operators are required to record all information about each type of fuel consumed, passenger, km on an annul basis. Frequency: an annual basis.
8. CO_2 emissions	CO_2 emissions are defined as the average CO_2 emissions per vehicle-100 km by vehicle and fuel types. Unit: Kg/vkm	Method: Calculated through local data Frequency: Data should be obtained once a year until end of the project
10. NO_x emissions	NO_x emission is defined as the annual average NO_x emission per vehicle-100 km by vehicle and fuel type. Unit: g/vkm	Method: Calculated through local data Frequency: Data should be obtained once a year until end of the project
11. Small particulate emission	Small particulate emission is defined as the annual average particulate matter (PM_{10} and $PM_{2,5}$) emission. Unit: g/vkm	Method: Calculated through local data Frequency: Data should be obtained once a year until end of the project
NM. Number of vehicles introduced	Number of vehicles introduced refers to the growing number of public vehicles present in the city each year Unit: number of vehicles per year	Method: These data will be provided by the council transport department. Frequency: Once a year until end of the project Target group: PT services
GI. Evaluation of private vehicles	This indicator is defined as the evaluation of the use of clean fuels in private fleets. Unit: %	Method: Questionnaires to the citizens Frequency: Data will be collected on an annual basis. Target group: Inhabitants in general, drivers of private car
13. Awareness level	This indicator is defined as the evaluation of the aware of the kind of fuel used in Public Transport. Unit: %	Method: Questionnaires to the bus users Frequency: Data will be collected on an annual basis. Target group: Users of Public Transport

C1.2 Establishing a baseline

Various tools were used to evaluate the 9 performance indicators for this measure. Further information was gathered from data sources of the Public Transport Services. The frequency

of measurement and the exact source data are defined in the section C1.1. and C2. of this document.

The baseline for the energy indicators were 2003/2004 and the data to compare the evaluation of the results were during 2005 and 2006, as it is explained in the section C2.2. The results are shown in section C2.

C1.3 Building the business-as-usual scenario

The technical progress and the emergence of new fuels means that fleets should improve urban transport in benefits and services offered to citizens.

With the emergence of alternative fuels appeared to challenge the fleet of change in part or in full their vehicles and encourage greater energy diversification. Experimenting with the performance and level of maintenance required imposed reorganize and train staff on new tasks and technical specifications of the vehicles, systems refuelling and repair them.

The quality of service offered by the fleets of transport is intimately linked to benefits built into vehicles. The user demand to improve travel in greater comfort and satisfaction imposed on the fleets of city buses as the de Burgos, averaging 20 years old to modernize and acquire vehicles compatible with new fuels with equipment incorporate greater comfort, convenience and accessibility for PT users.

Introduce new fuels was associated with a major commercial network and supply to ensure supply. Parallel to the project in the emerging environment Burgos was a complex system of local supply of biofuels, new suppliers and processors of used oil and seeds. All these provided that the new biofuels could be incorporated into the fleets of city buses and thereby serve as an example for other fleets of public and private transport.

If the project had not been conducted (do-nothing scenario), the design of new garages of public transport buses, the acquisition of new gas vehicles, to use the new biofuels and modernization of installations would have been postponed or delayed by the Council leading to the development of other priorities instead of building Public Transport a more sustainable, more energy efficient and less polluting.

.On that way, on the do nothing scenario the use of biofuels in the public sector didn't grew up to 2,000,000 litres (see table number one) saving that for more polluting fuels. In the same line, the more of 800,000 litres used by the private would never been used, contaminating the atmosphere of the city.

They would never been collected more than 900,000 litres of used oil to prepare bio diesel and this contaminant liquid would pollute.

The measure has been implemented and that is the reason of the more of 2 MJ/vehicle km, so it means 840,000,000 MJ saved in terms of saving energy.

C2 Measure results

The performance indicators for the evaluation of Measure 5.2. are divided into 4 sections: energy, environment, transport and society. Many of these indicators were evaluated using both quantitative and qualitative data collection methods. A full explanation of the indicators and how they were quantified is available in the section C1.1 and C1.2. of this document.

C2.1 Economy

N/A

C2.2 Energy

In the period of study, the number of buses were modified due to normal maintenance, removal and acquisition of new buses as it is commented in the "Table: Results of number vehicles introduced". The number of public buses used during the analysis of two indicators was around 60-63.

In the next table appears the km realized by the buses of Public Transport during the project and the consumption per type of fuel:

Table 1: Km buses routed and consumption per type of fuel and per year

Data Result	Km Buses/year				Consumption Buses/year			
	GASOIL (km)	BIODIESEL (km)	CNG (km)	**Total Km per year**	GASOIL (litres)	BIODIESEL (litres)	CNG (kw/h)	**Total Consumption per year**
2005	1.864.204	177.603	561.262	**2.603.069**	1.058.375	83.893	4.439.582	**5.581.850**
2006	-	1.944.215	688.779	**2.632.994**	-	1.079.629	5.289.822	**6.369.451**
2007	-	1.697.783	712.940	**2.410.723**	-	909.536	5.439.974	**6.349.510**
TOTAL	**1.864.204**	**3.819.601**	**1.962.981**	**7.646.786**	**1.058.375**	**2.073.058**	**15.159.378**	**18.300.811**

The consumption of different fuels used in the Public Transport (CNG, Biodiesel and Gasoil) had different along the period of study. In the 2005 appeared the gas oil and CNG as principal fuels, and the biodiesel was used only by testing in 5 vehicles of all fleet. With the total substitution of gas oil by biodiesel in 2006 had permitted to the Public Transport service and the city to value the influence of the fuels and the efficiency of these fuels in the buses.

This Table 1, will be used in the calculation of energy and environment indicator.

At following tables it is possible to consider the ratios per energy indicator:

Indicator - Fuel mix

Table 2: Results of Fuel Mix indicator

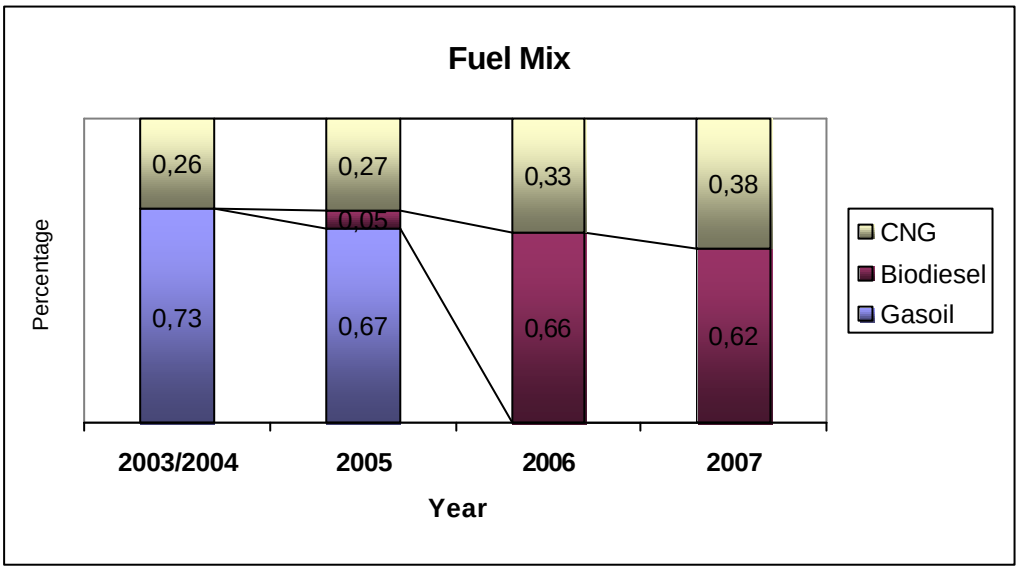
Indicator	Baseline Data 03/04	Data Result 2005	Data Result 2006	Data Result 2007
(4) **Fuel Mix** - Energy used per type of fuel, per vehicle type (GASOIL)	0,73 %	0,67 %	0%	0%
(4) **Fuel Mix** - Energy used per type of fuel, per vehicle type (BIODIESEL)	-	0,05 %	0,66 %	0,62 %
(4) **Fuel Mix** - Energy used per type of fuel, per vehicle type (CNG)	0,26 %	0,27 %	0,33 %	0,38 %

The data show as the fuel mix had evolution to better energy used per type of fuel. In the three scenarios showed with different fuels, is observed as the data with natural gas was increased according to the number of vehicles introduced and the consumption of natural gas.

The data in 2006 and 2007 for gasoil was 0% due to the gasoil wasn´t used anymore by the public fleet of the Council.

The testing activities realized in 2005 with biodiesel was a short amount of the all combustible used during this year. Only some vehicles used this biodiesel to assess if the fuel has effects in the motor of buses. After the testing period, at beginning of 2006 all buses that used gasoil began to use biodiesel and the ratios obtained by 2006 and 2007 were increased. The reduction observed from 2006 to 2007 it is due to the introduction of 27 new vehicles (Euro IV/V) more efficient and less consumption. Moreover, the oldest vehicles of the fleet were retired. The modern Public Transport Fleet could be considered as better fleet of Spain respect to fuel mix rate and energy used per type of fuel..

In the case of the CNG buses, new 8 vehicles were bought in 2006 and 2007. As result of the total CNG fleet increased, the consumption of CNG and the fuel mix rate increased respect to figures of 2004.



Graphic 1: Comparison of Fuel mix rate (%) which were considered the energy used per type of fuel and per type of vehicle

The Fuel Mix Rate of the Public Transport fleet indicates as the energy used per type of fuel and per type of vehicle was modified during the project according to the changes in the type of fuel and the new buses introduced which were more efficient energetically. It is remarkable the situation of biodiesel in 2007 when 27 new vehicles were introduced and the oldest ones was retired. The percentage of Fuel Mix was reduced 4% thanks to new buses more efficient energetically.

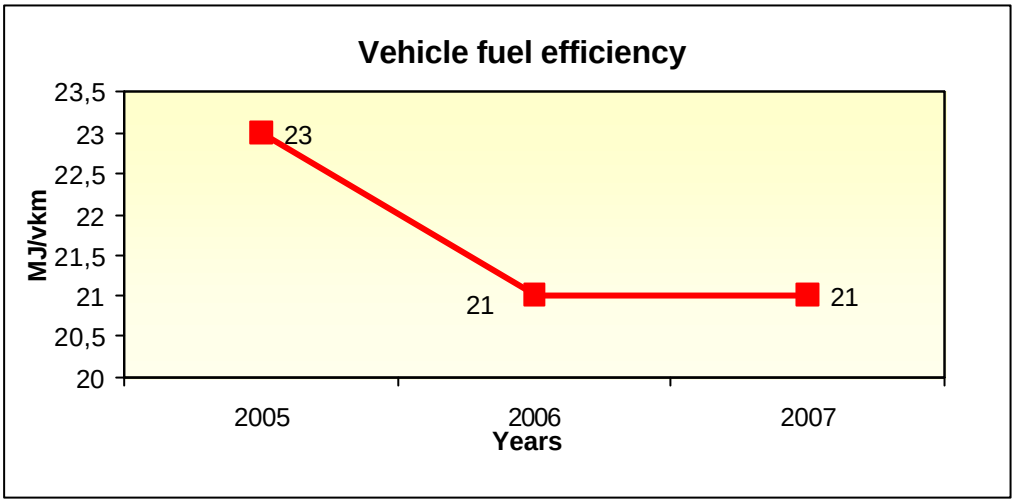
Indicator - Vehicle fuel efficiency

Table 3: Results of Vehicle fuel indicator

Indicator	Baseline Data 2005	Data Result 2006	Data Result 2007
(3) **Vehicle fuel efficiency** - Fuel used per vehicle km, per vehicle type (average)	23 MJ/vkm	21 MJ/vkm	21 MJ/vkm

There was a significant reduction in the amount of vehicle fuel efficiency since 2005 to 2006/2007. It means that the efficiency in the vehicles acquired improved the initial results.

Thanks to the use of biodiesel since 2006 and the new 8 CNG and 27 biodiesel buses, the tendency of vehicle fuel efficiency was reduced 2 MJ/vkm. The new buses are EURO IV and V. It has allowed that the efficiency of the fleet is positive and these activities of the project contribute to improve the energy efficiency in the Public Transport.



Graphic 2: Comparison of vehicle fuel efficiency rate

It means a high difference through the years in terms of efficiency in the PT in the city and gives a sense in all the efforts made by the Council to perform a public transport more sustainable. At the same time, what it means is saves of money (less fuel wasted to work) and less pollution, because they expulse less gazes to the atmosphere.

Indicator – Energy efficiency

Table 4: Results of Energy efficiency indicator

Indicator	Baseline Data 2005	Data Result 2006	Data Result 2007
(3) **Energy efficiency** - Energy used per vehicle and fuel per passenger – km,	0,75 MJ/passenger-km	0,74 MJ/passenger-km	0,66 MJ/passenger-km

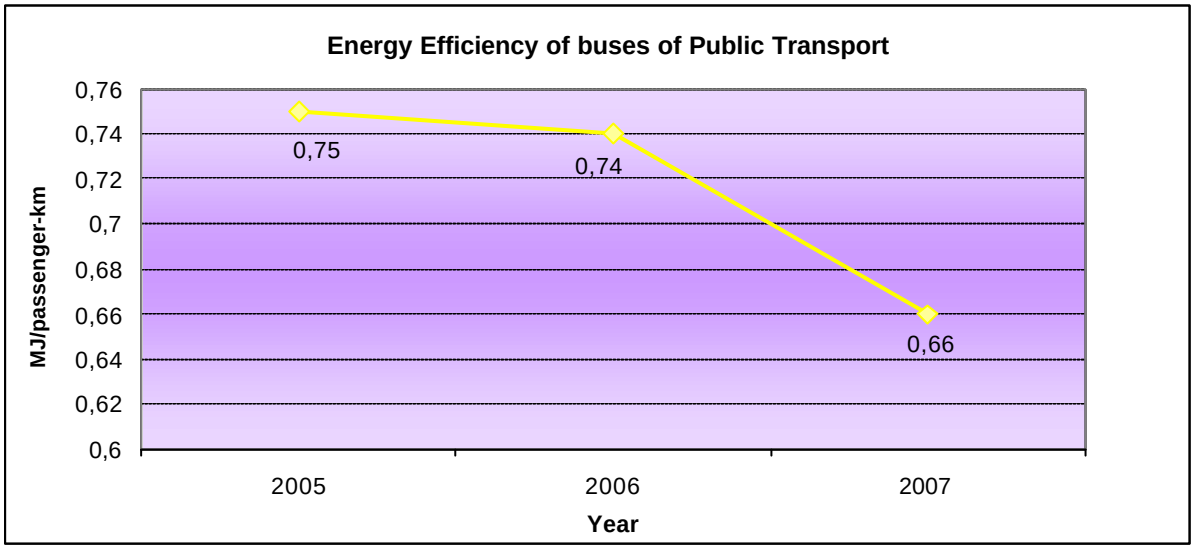
There are an important increase of the energy efficiency in 2007 respect to 2005 and 2006, about 0,08 MJ/passenger-km which is remarked that the energy consumption of the PT of Burgos has improved considerably during the Civitas period.

These results are linked to the new buses which are more efficient with EURO IV/V characteristics and the use of biodiesel and CNG.

Moreover, per passenger – km, the results are also significant, because the passenger has increased about 2,5% (to see Measure 8.2.) during Civitas period, then the values of passenger – km have suffered a important variation (from 5,45 passenger – Km in 2005 to 5,66 passenger – km in 2007) which has favoured that the Burgos Public Transport to improve the results of the energy per passenger and Km realized. As results, these buses consume less fuel and then less energy per passenger - km.

These results are so positive regarding to other Spanish fleets where their energetic efficient is 1,36 MJ/passenger-km in Valencia-PT and 0,58 MJ/passenger-km in Barcelona-PT (Source: "El consumo energético en el transporte urbano y metropolitano" – J.V. Colomer – 2006). Burgos PT has medium value regarding to these PT referring which is depending the rate of occupancy of the vehicles and the number of passenger transported.

The rate of occupancy is in some cases lesser than the media, so that is the mainly reason a big city as Barcelona has got this less rate. On this way, the efforts have been fortunately awarded with the good results, and in terms of efficiency Burgos is one of the most efficiency cities in Spain.



Graphic 3: Evolution of Energy efficiency of PT

C2.3 Environment

The emission factors to calculate the environment indicator related below were defined according to rules included in the "Compatarive study of the behaviour of different mixtures of biodiesel in heavy-duty engine Euro IV bus with respect to emissions contaminants in a action cycles real urban" year 2007 and the CNG environment indicator related below were defined according the "Study Vehicular Gas Natural as fuel for taxis" performed by Natural Gas in October 2007.

Table 5: Bulk emission factors (g/l fuel or g/Kwh)

Type of Fuel	CO2	NOx	PM(10)
Diesel	26,14 g/l fuel	0,186 g/l fuel	0,002 g/l fuel
Biodiesel (B20)	27,22 g/l fuel	0,198 g/l fuel	0,0015 g/l fuel
CNG	1,69 g/kwh fuel	0,0013 g/kwh fuel	$3,44 \times 10^{-4}$ g/kwh fuel

For the calculations of the environmental indicator, the consumption per 100 Km per vehicle was used. The data of these parameters is included in the following table:

Table 6: Fuel consumption (l/100km or Kwh/100km)			
Type of Fuel	**2005**	**2006**	**2007**
Diesel	3349 l/100km		
Biodiesel (B20)	182,82 l/100km	2827 l/100km	2488 l/100km
CNG	7910,00 Kwh/100km	3214,36 Kwh/100km	6230,11 Kwh/100km

Indicator – CO2 emission

The annual CO2 emission per vkm was calculated following the next formula:

$$CO2emission = \left(CO2EmissionFactor * FuelConsumption/100km\right)$$

The results of the formula application are included in the next table.

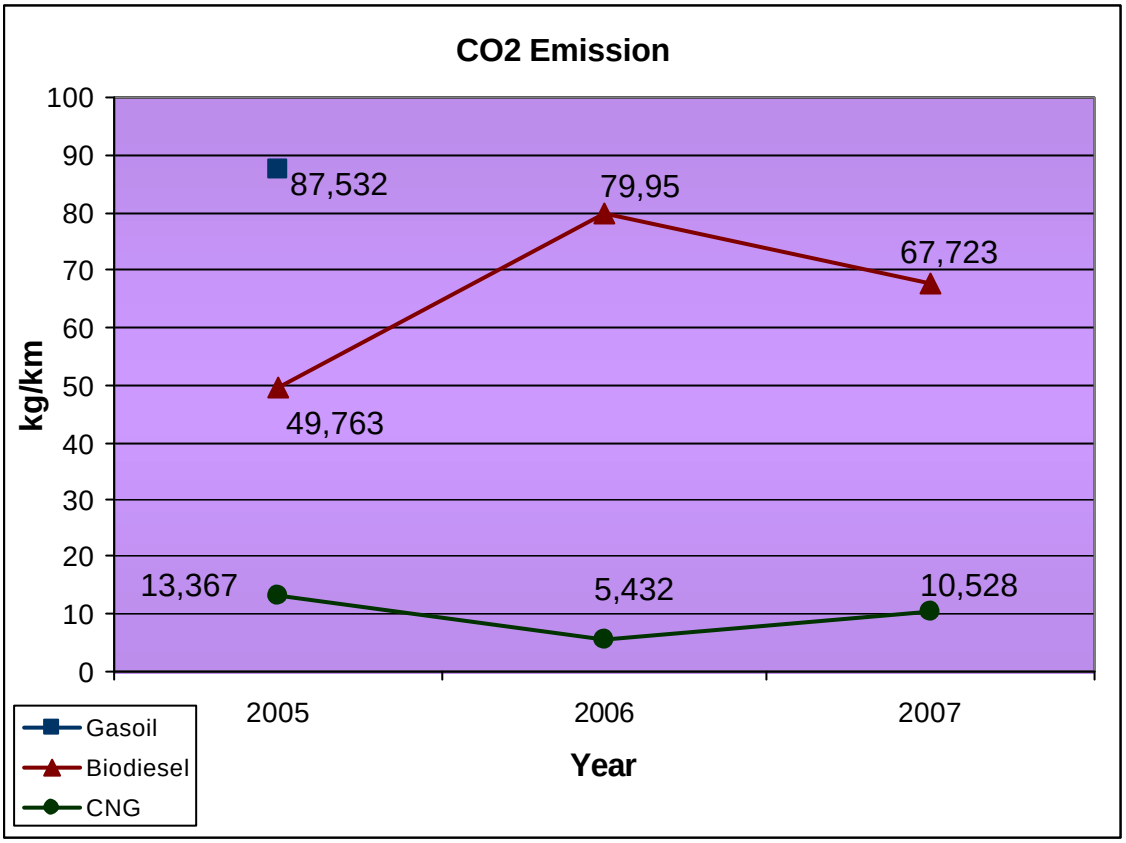
Table 7: Results of Environment indicators (I)					
Indicator	**Type of Fuel**	**Emission Factor**	**Data Result 2005**	**Data Result 2006**	**Data Result 2007**
(8) **CO2 emission** - Annual CO2 emissions per vkm	Gasoil	26,14 g/l fuel	87,53 Kg/km	-	-
	Biodiesel	27,22 g/l fuel	49,76 kg/km	76,95 Kg/km	67,72 Kg/km
	CNG	1,69 g/kwh fuel	13,36 Kg/km	5,43 Kg/km	10,52 Kg/km
		TOTAL	**150,66 Kg/km**	**82,38 Kg/km**	**78,25 Kg/km**

The results show that in 2005, the major emission was due to the gasoil, followed by Biodiesel vehicles. The rate for biodiesel is reduced, in comparison with the following years, because in 2005 was used for testing in few vehicles and the consumption and km routed was low.

The situation changed in 2006, when the gasoil wasn´t used more. The level of CO2 for biodiesel was increased due to consumption in normal conditions of operations when the consumptions and kilometres of the vehicles were supper, but 8 kg/km less than in similar conditions with gasoil, so the PT was cleaner. In the case of biodiesel, it also is remarkable the reduction of CO2 emissions in 2007 (9,227 kg/km). The consequence of this reduction was the introduction of new vehicles with EURO IV/V and the elimination the oldest vehicles of the fleet. Thanks to technological system incorporated in these new vehicles the CO2 emissions were reduced which it is contribute to the positive results of the project.

The figures of CO2 emission for CNG buses are also very positive, due to continuous reduction of emission from 2005 to 2007. It was reduced 2,839 kg/km during the study period. Again, the positive contribution can observed in the introduction of new CNG buses along 2006 and 2007 with EURO IV characteristics which has favoured the good results of the CO2 emissions. The most important reduction was in 2006 when six CNG buses with EURO IV/V (2 at the end of 2005 and 4 in the middle of 2006) were acquired with EURO IV/V respect to 2007 where only two new CNG buses were introduced. In 2007, the level of CO2

for CNG was increased due to the increase in the number of gases buses and the use of old buses without Euro IV/V (18 buses in total)



Graphic 4: Evolution of CO2 emission per type of fuel

Comparison the total CO2 emission per all fuels, vehicles and kilometres routed to the all public fleet, the emission has reduced 72,41 g/km CO2 since 2005 to 2007. One of the most important reasons to reduce the CO2 was substitution of gasoil per biodiesel and the acquisition of new vehicles more respectful with the CO2 emission.

This important result is contributed to the objectives defined by the city to reduce the local CO2 emission by the public fleets.

Indicator – NOx emission

The annual NOx emission per vkm was calculated following the next formula:

$$NOxEmission = \left(NOxEmissionFactor * FuelConsumption / 100km\right)$$

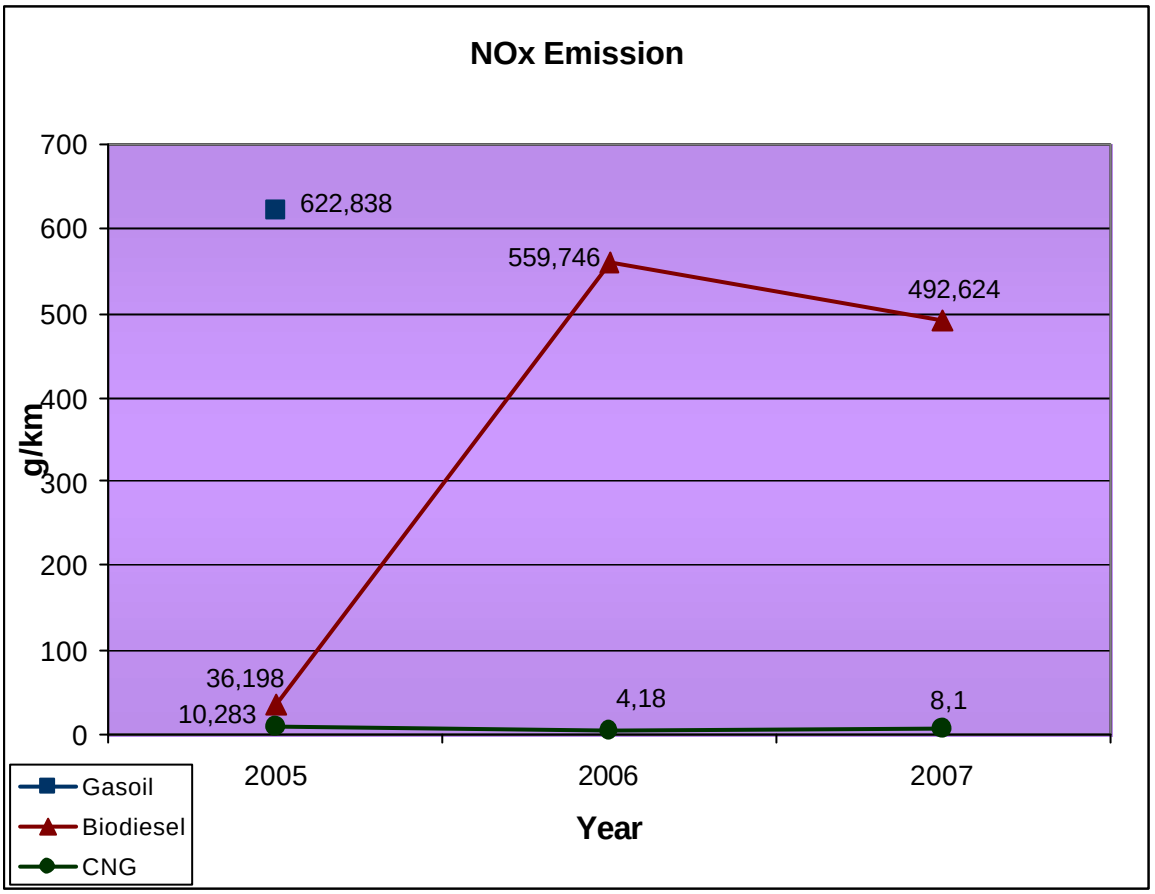
The results of the formula application are included in the next table.

Table 8: Results of Environment indicators (II)					
Indicator	**Type of Fuel**	**Emission Factor**	**Data Result 2005**	**Data Result 2006**	**Data Result 2007**
(10) **NOx emission** - Annual NOx average emissions per vkm	Gasoil	0,186 g/l fuel	622,83 g/km	-	-
	Biodiesel	0,198 g/l fuel	36,19 g/km	559,74 g/km	492,62 g/km
	CNG	0,0013 g/kwh fuel	10,28 g/km	4,18 g/km	8,10 g/km
	TOTAL		**669,48 g/km**	**563,92 g/km**	**500,72 g/km**

The results show that in 2005, the major emission was due to the gasoil, followed by Biodiesel vehicles. The rate for biodiesel is reduced, as with CO2 emissions, because in 2005 was used for testing in few vehicles and the consumption and km routed was low.

The situation changed in 2006, when the gasoil wasn't used more. The level of NOx for biodiesel was increased due to consumption in normal conditions of operations when the consumptions and kilometres of the vehicles were supper, but 63,09 g/km less than in similar conditions with gasoil. In the case of biodiesel, it also is remarkable the reduction of NOx emissions in 2007 (67,122 g/km). The consequence of this reduction was the introduction of new vehicles with EURO IV/V and the elimination the oldest vehicles of the fleet. Thanks to technological system incorporated in these new vehicles the NOx emissions were reduced which it is contribute to the positive results of the project.

The figures of NOx emission for CNG buses are also very positive, due to continuous reduction of emission from 2005 to 2007. It was reduced 2,183 g/km during the study period. Again, the positive contribution can observed in the introduction of new CNG buses along 2006 and 2007 with EURO IV characteristics which has favoured the good results of the NOx emissions. The most important reduction was in 2006 when six CNG buses (2 at the end of 2005 and 4 in the middle of 2006) were acquired respect to 2007 where only two new CNG buses were introduced. In 2007, the level of NOx for CNG was increased due to the increase in the number of gases buses and the use of old buses without Euro IV/V.



Graphic 5: Evolution of NOx emission per type of fuel

Comparison the total NOx emission per all fuels, vehicles and kilometres routed to the all public fleet, the emission has reduced 168,761 g/km NOx since 2005 to 2007. One of the most important reasons to reduce the NOx was substitution of gasoil per biodiesel and the acquisition of new vehicles more respectful with the NOx emission.

This important result is contributed to the objectives defined by the city to reduce the local NOx emission by the public fleets.

The conclusions can be explained as the other factor. In the year 2006, all the fleet changed into biodiesel, and the normal increased was performed, having, anyway, fewer emissions if the Council would continue with gasoil. The rates have changed positively from 2005 to the year 2007 concerning the emissions of CNG, perceiving a good decrease within the project timing.

Indicator – Small particulate emissions

The annual Small particulate emissions per vkm were calculated following the next formula:

$$PMEmissions = \left(PMEmissionFactor * FuelConsumption\,/100km\right)$$

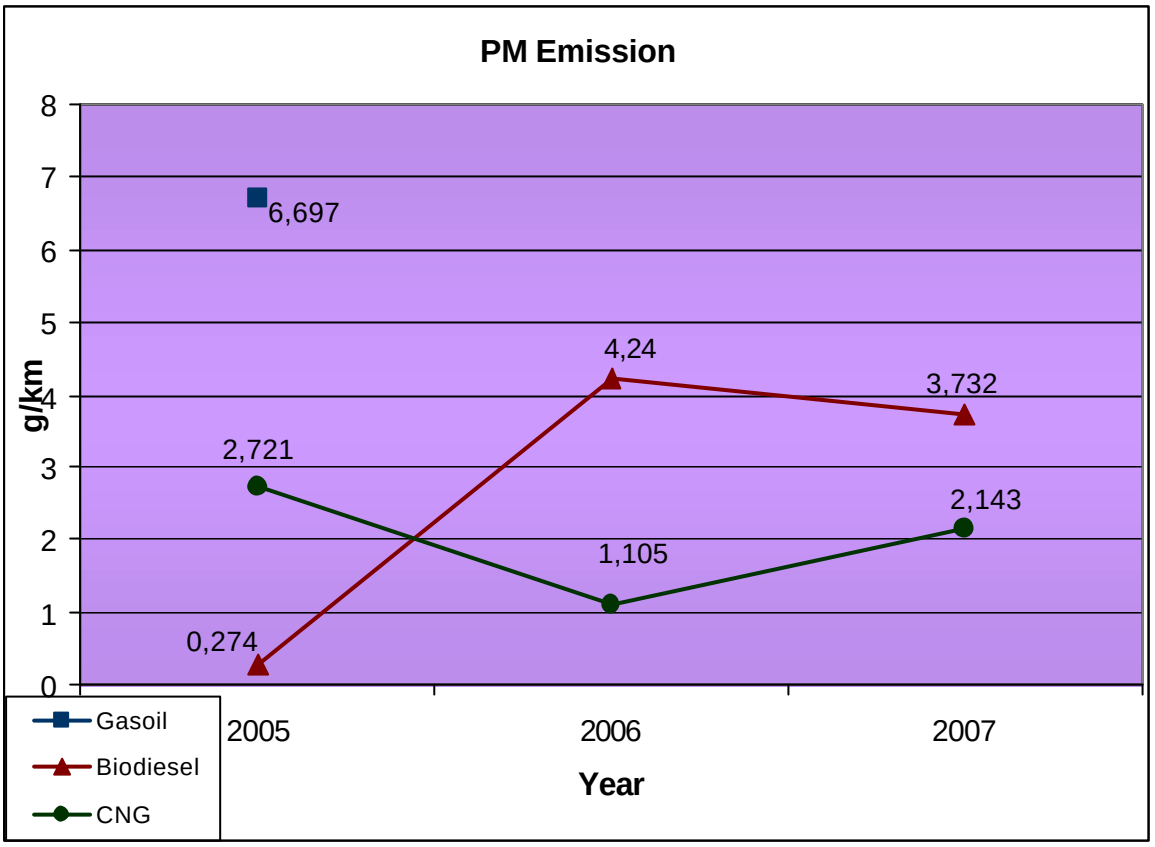
The results of the formula application are included in the next table.

Table 9: Results of Environment indicators (III)					
Indicator	**Type of Fuel**	**Emission Factor**	**Data Result 2005**	**Data Result 2006**	**Data Result 2007**
(11) **Small particulate emissions** - Annual particular matter (PM10) average emissions	Gasoil	0,002 g/l fuel	6,69 g/km	-	-
	Biodiesel	0,0015 g/l fuel	0,27 g/km	4,240 g/km	3,73 g/km
	CNG	0,000344 g/kwh fuel	2,72 g/km	1,10 g/km	2,14 g/km
	TOTAL		**9,69 g/km**	**5,35 g/km**	**5,88 g/km**

The results show that in 2005, the major emission was due to the gasoil, followed by CNG vehicles. The rate for biodiesel is reduced in comparison with the following years because in 2005 was used for testing in few vehicles and the consumption and km routed was low.

The situation changed in 2006, when the gasoil wasn't used more. The level of PM for biodiesel was increased due to consumption in normal conditions of operations when the consumptions and kilometres of the vehicles were supper, but 2,457 g/km less than in similar conditions with gasoil. In the case of biodiesel, it also is remarkable the reduction of PM emissions in 2007 (0,508 g/km). The consequence of this reduction was the introduction of new vehicles with EURO IV/V and the elimination the oldest vehicles of the fleet. Thanks to technological system incorporated in these new vehicles the PM emissions were reduced which it is contribute to the positive results of the project.

The figures of PM emission for CNG buses are also very positive, due to continuous reduction of emission from 2005 to 2007. It was reduced 0,578 g/km during the study period. Again, the positive contribution can observed in the introduction of new CNG buses along 2006 and 2007 with EURO IV characteristics which has favoured the good results of the PM emissions. The most important reduction was in 2006 when six CNG buses (2 at the end of 2005 and 4 in the middle of 2006) were acquired respect to 2007 where only two new CNG buses were introduced. In 2007, the level of PM for CNG was increased due to the increase in the number of gases buses and the use of old buses without Euro IV/V.



Graphic 6: Evolution of small particulate emission per type of fuel

Comparison the total PM emission per all fuels, vehicles and kilometres routed to the all public fleet, the emission has reduced 3,81 g/km PM since 2005 to 2007. One of the most important reasons to reduce the PM was substitution of gasoil per biodiesel and the acquisition of new vehicles more respectful with the PM emission. The emission has increased 0.53 g/km PM since 2006 to 2007 due to the increase in the number of gases buses.

Exactly the same tendency can be observed in the small particulars emissions, with the normal increase in the bio diesel as the fleet changed, getting a smaller ration than in the case of gas oil, san saving all those emission.

Good tendency also shows the indicator considering the use of CNG. The emission has decreased during the project timing.

This important result is contributed to the objectives defined by the city to reduce the local PM emission by the public fleets.

C2.4 Transport

Indicator - Number of vehicles introduced

Table 10: Results of number vehicles introduced

Indicator	Baseline Data 03/04	Data Result 2005	Data Result 2006	Data Result 2007
(NM) **Number of vehicles introduced** - Annual vehicles introduced	60 public buses	63 public buses (3 new biodiesel buses, 2 new gas buses and eliminate 5 old buses)	67 public buses (4 new gas buses)	63 public buses (27 old vehicles replace for 27 new biodiesel buses, new 2 gas buses and elimination of 6 old buses)

Table 10 includes the data result of the vehicles acquired by the Public Transport during the period of Civitas project. In 2004 there were 63 vehicles average aged 12 years old, and even getting some of them more than 20 years old. The renovation of the fleet began with three new biodiesel buses for test the biodiesel fuel and 2 new gas buses, eliminating 5 old buses.

In 2006, four new gas run buses were acquired.

And finally, in 2007, two CNG buses were acquired also 6 old buses were retired. Moreover, a tendering process was launched to acquire 27 new buses to use biodiesel fuel and 27 old buses were retired.

In total, 38 buses have been retired replacing with 30 new bio diesel buses and eight CNG buses.

C2.5 Society

Survey work took place in July of 2007 to establish the Baseline Scenario which included the **awareness** to use new fuels in public transport **and evaluation** of new fuels by the private vehicles.

The survey for **awareness level** to establish the data results of **drivers of private vehicles** to initiative and the evaluation of new fuels strategic took place between June/July of 2008. In this awareness survey, same questionnaires of 2007 survey were presented to the **drivers of private vehicles** in different areas of the city. The principal aim was understanding and awareness if the new fuels had any influence in the mobility issues of the citizens.

Table 11: Details of the relevant awareness surveys

Name of target group	Date of survey	Sample size	Purpose	Relevant question to assess
Drivers of private vehicles	July 2007	250	Awareness of specific measure	Do you know what fuels does the public transport use?
Drivers of private vehicles	June/July 2008	250		

Furthermore, a survey was launched to evaluate the private vehicles and his behaviour. In this awareness survey, same questionnaires of 2007 survey were presented to the **drivers of private vehicles** in different areas of the city. The data results were obtained in the June/July of 2008. The principal aim was assessing if the new fuels were used by the drivers of private cars.

Table 12: Details of the relevant surveys for evaluation of private vehicles

Name of target group	Date of survey	Sample size	Purpose	Relevant question to assess
Drivers of private vehicles	July 2007	250	Evaluation of use of new fuels in private vehicles	Have you used biodiesel in your private car?
Drivers of private vehicles	June/July 2008	250		

2007 Data results: 250 drivers of private vehicles completed the survey with the aim of knowing the rate of awareness regarding the kind of fuels used the public transport. 50% of the respondents were male and 50% female. The age ranges of the respondents were distributed as 4,5% (<20), 27,3% (20-30), 22,7% (31-40), 45,5% (41-65) and 0,0% (>65).

2008 Data results: In the same way, 250 drivers of private vehicles completed the survey. In this case, 62% of the respondents were male and 38% female. The age ranges of the respondents were distributed as 1,3% (<20), 23,3% (20-30), 33,3% (31-40), 38,7% (41-65) and 3,3% (>65).

Indicator - Awareness of public initiative

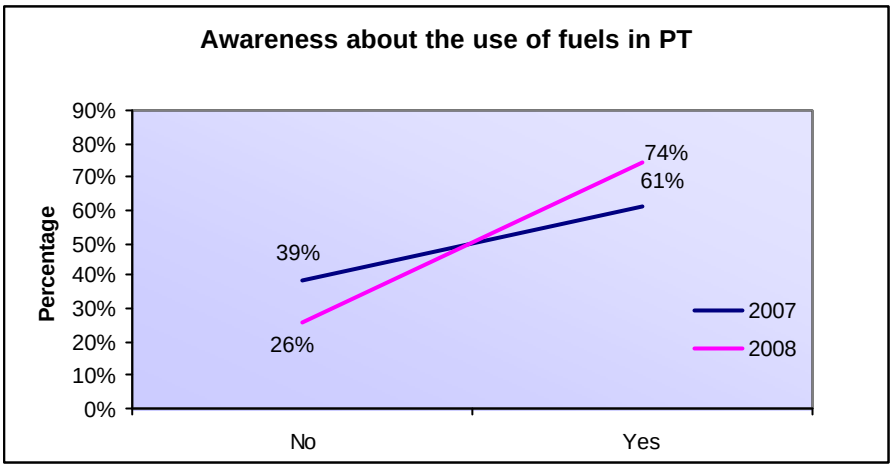
Table 13: Results of society indicators

Indicator	Relevant Question	Data Result 2007	Data Result 2008
(G) Awareness of public to initiative	Do you know what fuels does the public transport use?	NO – 39% YES – 61%	NO – 26% YES – 74%

The survey consisted on a standard questionnaire which was realized to drivers in different parts of the city. The questionnaires included different questions about the new fuels integrated in the measure. Continuations, the results of the surveys are explained:

The respondents were asked if they were aware of the kind of fuel used in Public Transport. 61% stated that they were aware of the kind of fuel, but 39% didn't have any information about the kind of fuel used in PT.

74% of the respondents stated that they were aware of the kind of fuel and only 26% didn't have any information about the kind of fuel used in PT.



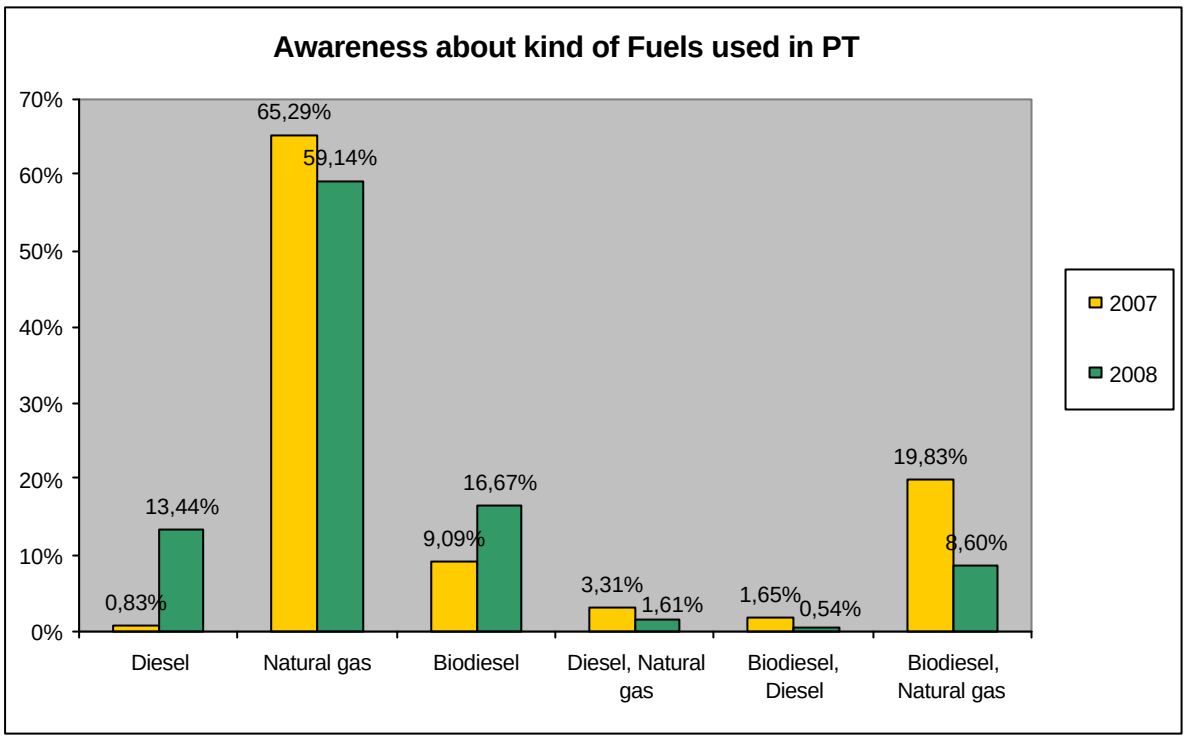
Graphic 7: Relevant awareness information of the drivers about the kind of fuels is used in PT

Comparing the data results between 2007 and 2008, there was a 13% more of awareness regarding the kind of fuel used in PT. Moreover, in the Graphic 3 there is a clear awareness of the kind of fuel in the range among 20 to 65 ages, in which the range 31- 40 ages offered the maximum answer (82%) in the 2007 and 2008 indistinctly.

Moreover in the survey, the question about the kind of fuels is using in PT were asked to the drivers of private vehicles. The following graphics show the information obtained:

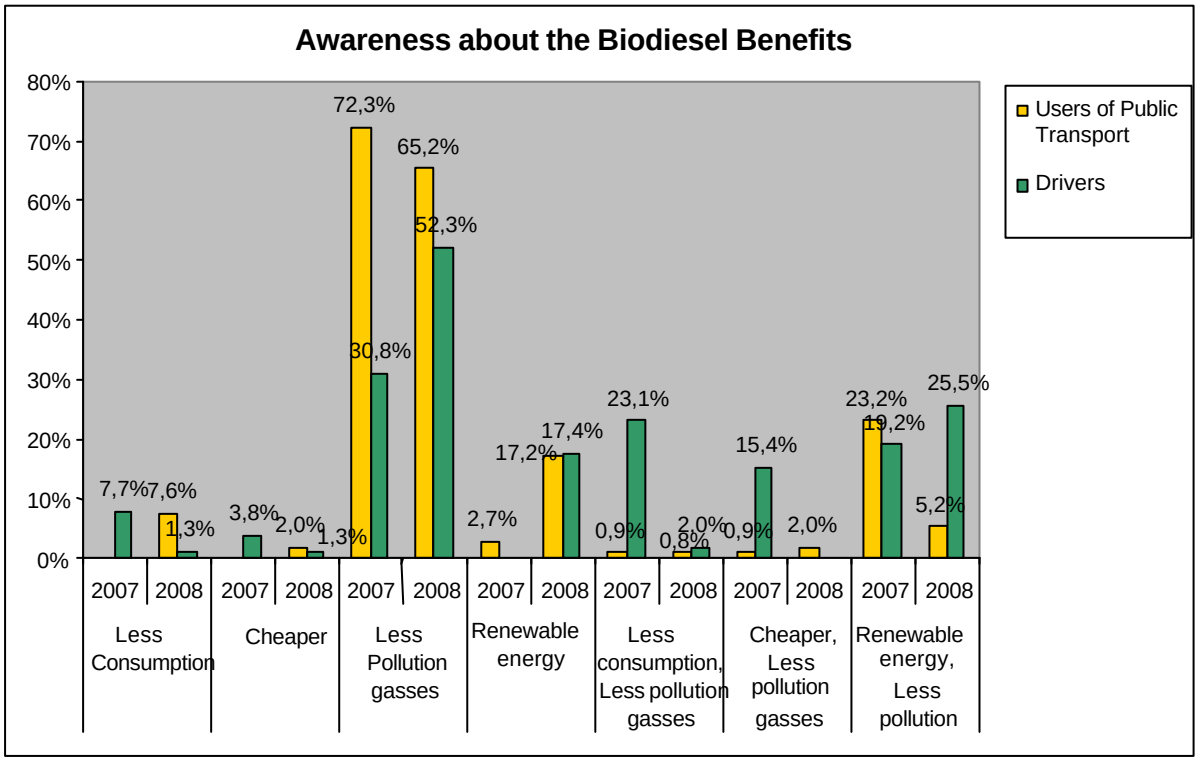
The relevance of this question has got two mainly points. Firstly, that the dissemination of the logo of bio diesel (through stickers in all the fleet, in example) and the CNG use (with big panels) has been a success because a high percentage of the citizens know what kind of fuel is used.

Secondly, in the objective concerning the use at private fuel, knowing that the buses are running with these more sustainable fuels, the citizens can trust in them (the bio diesel didn't have a good view by the citizens) as far as the Council is using them, giving a good example to follow.



Graphic 8: Relevant awareness information about fuels used in PT

65% of the respondents in 2007 and 59% in 2008 considered that the natural gas was the principal fuel used in Public Transport. The percentage of answer of 2008 was increased in 2008 (16%) respect to 2007 (9%) which consider to biodiesel as fuel used in PT. Also, important to consider the percentage of the diesel (13%) in 2008 which increased respect to 2007 (0,83%) Other respondents answered that several fuels (Diesel/ Natural Gas, Biodiesel/Diesel, Biodiesel/Natural Gas) were used in PT, however, the percentages were smaller that the ratios answered for Natural Gas, Biodiesel and Diesel as unique fuel used in PT.



Graphic 9: Relevant awareness information about the Biodiesel Benefits

One question was included in the surveys for drivers of private vehicles and users of public transport to evaluate what citizens think are the benefits of biodiesel. Some answers were introduced (less consumption, cheaper, less pollution gases, renewable energy, and the mix of them) to facilitate the answers.

Biodiesel generated less pollution gases was the main perceptions users of PT recognize , specially in 2007 (72%) while in 2008 the share was inferior 65%.Car drivers instead, thought that biodiesel generated less pollution with 52% in 2008 while in 2007 the share was of 30%),.

Other relevant results observed in the graphic 5 were the following:

- Benefit as renewable energy was consider similar for both stakeholders in 2008 (17%) respect 2007. They considered that the new fuels using in the city are based on renewable energy..
- Similar tendency was observed in the benefits as less consumption/less pollution gases and cheaper/pollution gases where was answered in more percentage in 2007 by drivers respect to 2007 and users of PT which were consider as inappreciable benefits.
- Benefits as renewable energy/less pollution were increased in 2008 (25%) by drivers respect to 2007 (19%). However, for the users of PT, the tendency was opposite, very important in 2007 (23%) respect to 2008 (5%).
- Benefits as less consumption and cheaper was consider by the users of PT and driver in ratios less than 10%.

An explanation is needed concerning some of the points changed in one year. First, is the price of the bio diesel, because in 2007 the petrol stations, as a kind of proposal to introduce the bio diesel in the citizens decided to offer it cheaper than the normal diesel. Apart from that, the increase of the price of bio diesel in 2008 pushed the bio diesel to increase the price, maintaining the same level of prices.

The less consumption question, included in some of the questions decreased notably. One of the reasons was that the use of biodiesel depends on the weather, and the year 2008 was hotter than 2007. Apart from that, the petrol stations performed a campaign promoting the cheap prices and the longest necessity to put bio diesel, and drivers realized that the consumption, in many cases, was exactly as the normal diesel.

They maintain the opinion that the bio diesel is a renewable energy and it emits less pollution than the normal diesel.

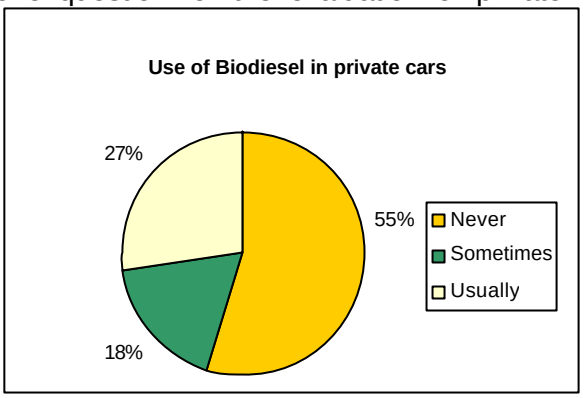
Indicator - Evaluation of private vehicles

Table 14: Results of society indicators

Indicator	Relevant Question	Data Result 2007	Data Result 2008
(G) Evaluation of private vehicles	Have you used biodiesel in your private car?	Never – 55% Sometimes – 18% Usually – 27%	Never – 74% Sometimes – 21% Usually – 5%

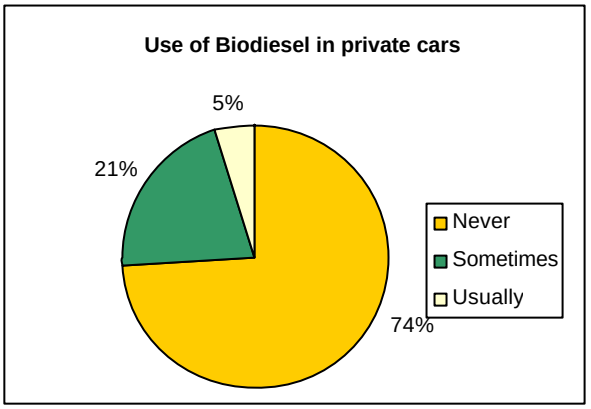
In the sections C1.1 and C1.2 there are more results about the survey. In concrete, the survey consisted on a standard questionnaire which was realized to the drivers in different parts of the city. The questionnaires included one question for the evaluation of private vehicles respect to the use of biodiesel in own cars.

The respondents were asked about the frequency of use of biodiesel in their private cars. 55% stated that they have never used biodiesel, 18% have used it sometimes while 27% usually use this kind of fuel in their own vehicles. .



Graphic 10: Percentage about the use of biodiesel in private cars 2007

74% of the respondents have never used biodiesel, 21% use it sometimes and only 5% use biodiesel regularly in their own car.



Graphic 11: Percentage about the use of biodiesel in private cars in 2008

It is clear that there was a reduction of the number of drivers that use biodiesel with regularity, 27% in 2007 respect to 5% in 2008. Moreover, the percentage of drivers that never and sometimes used biodiesel has been increased 2007 to 2008.

Some external causes have influenced in the consumption of the biodiesel by the users. The most important was the increasing of price of biodiesel respect to the gasoil in the 2007 year. The unfavourable marketing campaigns against biodiesel in the international and national news and the possible relation with the price of primary food (cereal and the news concerning the poor countries now they have to fabricate bio diesel and they dying of hungry) has created in the society an emotional alarm which is reflected in the consumption of this fuel. So that, this negative tendency was reflected in the survey by the users.

The promotional campaign performed in 2007 can be another reason as the bio diesel was even more expensive than the normal diesel in the year 2008.

The results, anyway, show a bad tendency, but perhaps in the moment the survey was performed wasn't a good moment in general with the most expensive prices of the petrol in years, giving the results of the bio diesel consumption a better view. The effort has to be focus on the promotion of this bio fuel for a long term as far as it is seen that the message hasn't been totally effective to the drivers yet.

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C3 Achievement of quantifiable targets

No.	Target	Rating
1	Purchase 8 natural gas vehicles to obtain a total fleet of 18 natural gas vehicles (thereby duplicating the GNG fleet in Burgos) and 1 CNG car for enforcement of parking regulations.	**
2	Consume 5% of bio-combustibles for current diesel fleet working towards a fleet of bio diesel vehicles (progressively sharing bio-combustibles). Introduce 2 new diesel buses to test bio diesel fuels and transfer results to use them in other public vehicles	***

NA = Not Assessed * = Not achieved ** = Achieved in full * = Exceeded**

C4 Up-scaling of results

Up-scaling of this measure is possible if some assumptions were realized:

- If the number of **biodiesel** buses were increased for the total of the fleet (63 buses respect to 45 buses) the environmental emissions for these buses will be the following:
  - CO2 emission will be 94,8 kg/km
  - NOx emission 689,66 g/km
  - Particulate emission 5,2 g/km.

- If the number of **CNG** buses were increased for the total of the fleet (63 buses respect to 18 buses) the environmental emissions for these buses will be the following:

  - CO2 emission 36,82 Kg/km,
  - NOx emission 28,35 g/km and
  - Particulate emission 16,02 g/km.

It is meaning that the emission will be improvement if the total of vehicles will be CNG buses better than diesel engineer, but the use of biodiesel regarding to gasoil will also improve the quality emission of the buses.
The marketing actions have to be improved and increase the degree of the vision that the bio fuel is better for the society.

C5 Appraisal of evaluation approach

After the evaluation of the measure, some considerations were done aiming at improving the evaluations of similar actions in the city. Some appraisals are the following:

- Calculations of the emission indicator and the selection of emission factor were important problem in the development of the evaluation activities.
- Recompilation of some data for complete the indicators were difficult to obtained of the Public Service due to the old information system available in the moment of study period.
- Better coordination among council department about the data obtained to realize evaluation before and after of the implementation and obtain right data for the progress of the traffic results.
- The surveys could realize to other targets groups with the aim to evaluate other information related to the fuels use.

C6 Summary of evaluation results

The key results are as follows:

- **Acquisition new buses for using Natural Gas and biodiesel –** Thanks to vehicles obtained by the Council and Public Transport services, the fleet of Burgos is the youngest of Spain.
- **New fuels, example for the society –** The introduction of fuels served as the example for the citizens which began to use new fuels, as the consumption in bio diesel by the private sector says in the increasing of use of more than 800,000 litres used by them..
- **Improve the energetic and environmental Public Transport –** The introduction of biodiesel and CNG in the Public Fleet has improved the ratios of the all energetic and environmental indicator. The results show as the Energy Effiency of Public Transport is reached 0,66 MJ/passenger-km and the emissions has been improved until 78,25 kg/km CO2 emission, 500,72 g/km NOx emission and 5,88 g/km particulate emission.

D Lessons learned

D1 Barriers and drivers

D1.1 Barriers

- **Barrier 1** – Substantial cost increases for major components (e.g. clean vehicles) that might paralyse the measure. To solve the possible risks, an key financial plan detailing projected costs and expenditure monitored foreseen expenditure and identify potential problems on time.
- **Barrier 2** – Failure to comply with timetable and/or quality conditions of the new infrastructure and technological systems in the bus depot and consequent delays to other measures related to the introduction of new vehicles in the city. To avoid problems, preventative actions were stipulated to define clear contractual conditions in the concession of administrative licences to redact the project for new infrastructure and provide new equipment.
- **Barrier 3 -** Dependency between different key steps in the project that might lead to delays in their implementation. Then, as prevention of hipotetical problems, a contingency plan were defined other alternative suppliers to avoid risks that might occur throughout the life of the CIVITAS project
- **Barriers 4 -** The sole supplier of fuel to local council represents an important dependency that might result in delays caused by supply problems for new fuels. In the same way of Barrier 3, a contingency plan were defined other alternative suppliers to avoid risks that might occur throughout the life of the CIVITAS project

D1.2 Drivers

- **Driver 1** – The strong political commitment to improve the quality and service of the public transport and to avoid the acquisition of buses with clean fuels.

D2 Participation of stakeholders

- **Stakeholder 1 -** Public transport users
- **Stakeholder 2** – General public: The project was destined to allow that everybody can travel in optimum conditions of safety and comfort and offered new fuels less polluted.
- **Stakeholder 3 -** Environmental/social group (NGO): The use new fuels which were less polluted satisfied to these groups. The acceptance of the measure was increased since that the biodiesel and CNG were introduced.
- **Stakeholder 4 -** Media (radio, newspaper): The media people informed about the introduction of new buses, new fuels and news of the campaigns realized and prizes obtained.

D3 Recommendations

- **Transfer of results –** It is important to transfer the results to other local authorities to exchanges experiences and to update about the criteria to use new fuels.
- **Information and awareness raising** – For the implementation of new fuels it is needed that continued campaigns are being launched. The awareness and

acceptance depend on the messages and good results offered by the Administrations.

D4 Future activities relating to the measure

The future activities will be concern to build the new garages for the Public Transports according to the project realized during Civitas Project.

New buses will be introduced in the new urban project which is transformed a part of the city where the old train was running. An important study and research effort is being to manage by the Council to introduce the most advance technology and innovative model of public transport which allows to the city to modernize their infrastructures and to offer new image for the citizens through the Public Transport. The ideas assessed to this new project has been to introduce the tram, trolebus, hydrogen buses, articulate CNG buses, electric buses or guided buses… The final solution will be decided in the few months. Later, the infrastructures will be launched to transform this part of the city in a green corridor with Clean Public Transport and non private vehicles will be included. The city is investment many budget in this issue and it has won a bet the future of the city for the next years in the launching of this project.

Moreover, new electric vehicles could be introduced in the PT lines for the Historical area with the aim to assure better conditions for the accessibility and quality of the citizens.

The Council will continue to the policy to help and impulse the introduction of new fuels in the petrol station of the city and also, it will continue to promote these fuels with the drivers of private vehicles.

The Council wants to win a bet by the transformation of new fuels in the municipality area and to close the chain of the new fuel cycle which the city has been working (collecting cooking oil, promotion, new fuels consumption and distribution) during the Civitas project. New private investment companies could introduce new treatment plants to obtain new fuels since oil seeds.