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Implementation status report on 47 clean vehicles in CISTOCA fleet

Deliverable No. 1.15 – D1

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			WP8 Transport telematics
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1. Introduction

The aim of this Deliverable is to describe the implementation status of measure 1.15-ZAG Clean public vehicles within the CIVITAS-ELAN project. Within the measure new efficient vehicles were introduced as well as clean fuels to raise the share of clean fuels within CISTOCA's fleet.

The innovative aspect of this measure is the introduction of biodiesel into CISTOCA's fleet.

As a result of this measure, existing standard diesel-fuelled vehicles were gradually substituted by new vehicles running on a certain mixture of petrol diesel and biodiesel. Thus a reduction of environmental pollution by 5% was expected before the start of the implementation of the measure.

2. General information about Zagreb Holding and CISTOCA

Zagreb Holding (Zagrebački holding d.o.o.) was founded in 2007 pursuant to the Companies Act and is 100% owned by the City of Zagreb.

It consists of 18 branches which perform different activities of the former city enterprises, with a total of about 12,000 employees. Zagreb Holding is also the owner of six companies and one institution with additional 1,000 employees.

The activities of the Company can be grouped into three business areas:

- Municipal functions
- Transport functions
- Market functions

City Waste Disposal, Digital City, City Graveyards, Zagreb Markets, Water Supply and Drainage, Zagreb Roads, ZGOS, Zrinjevac and the Zagreb City Gasworks are the branches included in the area of municipal functions. Transport functions are performed by the branches ZET, one of the partners in CIVITAS-ELAN, and Zagreb parking.

The business area of market functions consists of the branches AGM, Sports Facilities Management, Vladimir Nazor, Zagreb Fair, Zagreb Bus Station, GSKG, Goods Terminals, Housing Construction, Zagreb City Gasworks – Supply, Zagreb Centre, Zagreb plakat, Zagreb Arena, City Pharmacies and Zagreb Investment Company.

The basic task of Zagreb Holding is the effective and long-term performance of municipal activities, with maximum protection of the environment and protection of the public interests of the local community. In the course of this work, particular attention is paid to continuously raising the satisfaction of beneficiaries of the Company's services and employees, which is the key to future business development.

2.1. CISTOCA

CISTOCA is the second largest branch with about 1,700 employees. As it's previously mentioned, the main activities are correlated with municipal functions and they are:

- Municipal and industrial waste collection in the City of Zagreb;
- Separate collection of reusable waste;
- Cleaning and washing of public traffic areas and
- Snow and ice removal in winter period.

CISTOCA collects waste in the City of Zagreb from 315,000 households with about 800,000 citizens, and from approximately 15,000 companies, three times a week. In the heart of the city, waste is collected every day. Approx. 300,000 tons/ year of waste is collected and transported to different facilities for recovery or disposal.

CISTOCA also separately collects different sorts of reusable waste like paper, glass, plastics and metal packaging waste, organic waste within about 5,000 containers and bins on public places and 8 recycling yards. Citizens can, free of charge, dispose about 20 different sorts of hazardous and non-hazardous waste in recycling yards.

Another activity performed by CISTOCA is regularly cleaning and washing of public traffic areas, because of hygienic, aesthetic and security reasons. With a proper maintenance, different materials like soil and sand, leaves, plastic, paper, metal and glass debris are removed and properly disposed, instead of being washed in the public sewage system and ground waters. Public traffic areas are cleaned manually and by using different sorts of special sweeping machines.

Snow and ice removal from public stairways and pedestrian areas is a season activity performed by CISTOCA, and it covers about 80% of public traffic areas in the City of Zagreb.

In order to perform those activities, CISTOCA has a large vehicle fleet with over 300 vehicles of different types: special vehicles for collection of municipal waste and bulky waste, vehicles for transport of containers, sweeping machines, personnel vehicles, etc. Hence, CISTOCA is one of the largest road transport companies in the Republic of Croatia.

For that reason, CISTOCA's every day activities have a significant influence on the noise and exhaust gas emission from the traffic sources in the City of Zagreb, and therefore on the quality of life. In 2008 CISTOCA used over 2,200,000 litres of diesel petrol, which resulted in total emission of approx. 5,757 tons of CO₂.

The CIVITAS-ELAN project contributed significantly to improving and modernising CISTOCA's business activities and gaining an environmentally friendly image as urban waste management company, as it helped to harmonise the fleet with European and national environmental standards, and to introduce alternative fuels into CISTOCA's fleet.

3. Measure objectives

The measure 1.15-ZAG Clean public vehicles is part of WP1 Alternative fuels & clean vehicles, which addresses alternative fuels and clean vehicles in a comprehensive and integrative approach. Clean vehicles should be low-polluting, energy efficient, using renewable fuels, produced in the region and silent.

The aim of the measure is to introduce energy efficient vehicles and clean fuels, and raise the share of clean fuels in the public fleet according to the main objectives:

- Replace approx. 10% of present fuel consumption of the CISTOCA fleet (waste disposal company of the City of Zagreb) with alternative fuels by introducing 47 clean biodiesel vehicles;
- Reduce particulate matters by 10% and CO₂ emission by 15% of CISTOCA fleet;
- Decrease noise emissions of the waste disposal fleet by 3 dB.

4. Introduction of new vehicles

CISTOCA introduced in total 47 new vehicles according to the project objectives and timetable. The first group of 44 new vehicles was procured by operational leasing in the period of July 2009 until October 2010, while the last 3 vehicles were purchased in August 2011.

The following table lists the vehicles procured by operational leasing:

No.	Internal no. of vehicle	No. of leasing contract	Chassis no.	Vehicle	Date of procurement
1	561	007725	ZCFA1TJ0402556562	IVECO EUROCARGO	14.8.2009
2	562	007726	ZCFA1TJ0402556563	IVECO EUROCARGO	14.8.2009
3	563	007728	ZCFA1TJ0402556565	IVECO EUROCARGO	14.8.2009
4	564	007729	ZCFA1TJ0402556566	IVECO EUROCARGO	14.8.2009
5	581	007730	ZCFA1TJ0402556559	IVECO EUROCARGO	12.8.2009
6	582	007731	ZCFA1TJ0402556560	IVECO EUROCARGO	12.8.2009
7	583	007732	ZCFA1TJ0402556561	IVECO EUROCARGO	12.8.2009
8	548	007735	ZCFA1ED1402556452	IVECO EUROCARGO	14.8.2009
9	550	007736	ZCFA1ED1402556453	IVECO EUROCARGO	31.7.2009
10	547	007737	ZCFA1ED1402556454	IVECO EUROCARGO	14.8.2009
11	546	007738	ZCFA1ED1402556455	IVECO EUROCARGO	14.8.2009
12	549	007739	ZCFA1ED1402556456	IVECO EUROCARGO	14.8.2009
13	551	007740	ZCFA1LJ0402556567	IVECO EUROCARGO	31.7.2009
14	552	007741	ZCFA1LJ0402556568	IVECO EUROCARGO	31.7.2009
15	553	007742	ZCFA1LJ0402556569	IVECO EUROCARGO	31.7.2009
16	554	007743	ZCFA1LJ0402556570	IVECO EUROCARGO	31.7.2009
17	555	007744	ZCFA1LJ0402556571	IVECO EUROCARGO	14.8.2009
18	556	007745	ZCFA1LJ0402556572	IVECO EUROCARGO	14.8.2009
19	557	007746	ZCFA1LJ0402556676	IVECO EUROCARGO	14.8.2009
20	558	007748	ZCFA1LJ0402551099	IVECO EUROCARGO	14.8.2009
21	559	007749	ZCFA1LJ0402551100	IVECO EUROCARGO	14.8.2009
22	599	007752	WJME2NTS40C225771	IVECO TRAKKER	8.9.2009
23	586	007755	ZCFA65B0402556720	IVECO EUROCARGO	14.8.2009
24	584	007756	ZCFA1JD0402556457	IVECO EUROCARGO	12.8.2009
25	585	007757	ZCFA1TJ0402556458	IVECO EUROCARGO	12.8.2009
26	565	007727	ZCFA1TJ0402556564	IVECO EUROCARGO	13.10.2009
27	590	007750	ZCFA75B0402556492	IVECO EUROCARGO	23.9.2009
28	591	008007	ZCFC65A2005797039	IVECO DAILY 65C15	21.10.2009
29	592	008008	ZCFC65A2005797038	IVECO DAILY 65C15	20.10.2009
30	593	008009	ZCFC65A2005797037	IVECO DAILY 65C15	20.10.2009
31	594	008010	ZCFC65A2005797036	IVECO DAILY 65C15	20.10.2009
32	566	008559	ZCFA75B0402567192	IVECO EUROCARGO	10.06.2010.
33	567	008564	ZCFA1TJ0402567077	IVECO EUROCARGO	30.06.2010.
34	568	008566	ZCFA1TJ0402567078	IVECO EUROCARGO	30.06.2010.
35	569	008565	ZCFA1TJ0402567079	IVECO EUROCARGO	30.06.2010.

No.	Internal no. of vehicle	No. of leasing contract	Chassis no.	Vehicle	Date of procurement
36	570	007754	ZCFC65D0005792950	IVECO DAILY 65C18	06.11.2009.
37	580	007747	ZCFA1LJ0402556677	IVECO EUROCARGO	20.10.2009
38	587	008567	ZCFA1TJ0402567072	IVECO EUROCARGO	04.08.2010.
39	588	008562	ZCFA1TJ0402567073	IVECO EUROCARGO	20.08.2010.
40	589	008563	ZCFA1TJ0402567074	IVECO EUROCARGO	20.08.2010.
41	540	008560	ZCFA1TJ0402567075	IVECO EUROCARGO	20.08.2010.
42	560	008561	ZCFA1TJ0402567076	IVECO EUROCARGO	20.08.2010.
43	142	8035	ZFA22300005690108	FIAT DOBLO	23.7.2009.
44	143	8036	ZFA22300005690178	FIAT DOBLO	23.7.2009.

The following table lists the purchased vehicles:

No.	Internal no. of vehicle	Contract number	Chassis no.	Vehicle	Date of procurement
45	541	N-252-B/10	ZCFC70A2005883592	IVECO DAILY	17.8.2011
46	595	N-252-A/10	ZCFC65A4005877476	IVECO DAILY	1.8.2011
47	596	N-252-A/10	ZCFC65A4005877477	IVECO DAILY	1.8.2011

According to the type of vehicle, CISTOCA procured:

- 25 special vehicles for collection of municipal solid waste



- 6 trucks used mainly for street cleaning activities



- 9 special vehicles for collection of bulky waste



- 4 vehicles for transport of containers



- 1 heavy duty vehicle with trailer



- 2 pick-ups



5. Introduction of biodiesel into CISTOCA's fleet

Extensive preparations for the use of biodiesel started in June 2009. CISTOCA had to consider all the elements related to the use of biodiesel regarding supply (raw materials for biodiesel production, quantities to be delivered, etc.), storage of biodiesel (impact of climate conditions, preparation of certain blends of biodiesel), use of biodiesel in CISTOCA's vehicles (impact of the use of biodiesel on CISTOCA's fleet, complement with requirements of warranty limitations posed by producers of vehicles) that might have any influence on CISTOCA's regular activities. Also, CISTOCA procured a new reservoir capacity of 2,000 litres (Amico Expert Company, Rijeka) for storage of biodiesel B100. This has allowed CISTOCA to produce different blends of biodiesel fuel for different types of vehicles and finally to achieve the measure objective of 10% of biofuels.



Special container for biodiesel

In September 2009 CISTOCA started to use B5 (mixture of biodiesel and petrol diesel containing 5% of biodiesel) in first 28 MAN vehicles, with the intention to increase the number of vehicles using B5 according to the available fuel storage space, because fuel tanks need to be cleaned before biodiesel can be used.

Unfortunately, because of some administrative problems concerning procurement, biodiesel supply was interrupted in October 2009. After two years and four public biddings biofuel supply was back on track again in July 2011. Currently, all diesel vehicles of CISTOCA's fleet run on B7. A carefully selected group of MAN vehicles (about 30) runs on B20.

6. Training of drivers and maintenance personnel

Trainings of drivers and maintenance personnel were organised in two sessions. A six months initial training course for drivers and maintenance personnel was organised at the beginning of the project, just after the arrival of the first group of new vehicles on 15 September 2009 and when biodiesel was introduced into CISTOCA's fleet.

Upon arrival of the remaining vehicles in June and August 2010, CISTOCA organised an additional training for newly employed drivers and maintenance personnel. A group of 20 newly employed drivers undertook an extensive driving training on different types of special vehicles for collection of municipal and bulky waste.

Beside these basic trainings on how to drive the new vehicles, CISTOCA organised special trainings on the following topics on 14 April 2011:

- New regulations on working shifts, regulations correlated with driving shifts and conditions and work with data recorders in road traffic
- Education on using similar tachograph devices
- Education on using digital tachograph devices

All trainings were held on CISTOCA's premises.

Furthermore, a dedicated training course for CISTOCA's maintenance personnel (10 employees) took place from 14-18 September 2009 at the Farid industrial facility in Italy.

7. Information sharing and interaction with citizens

Leaflet No. 1

Supported by ODRAZ, CISTOCA prepared promotional material (leaflet) and distributed it to households in the first six months of the project, describing the benefits of introduction of clean vehicles at start of project.

CIVITAS ELAN

Za bolji i čistiji promet u gradovima

Tijekom četiri godine 39 partnera u pet europskih gradova (Zagreb, Bimo, Gent, Porto i Ljubljana) provodi projekt Civitas Elan s ciljem poboljšanja kvalitete života građana. To podrazumjeva nova i kvalitetnija rješenja u gradskom prometu uz primjenu, poticanje i promicanje čistih i energetski učinkovitih tehnologija te ponašanje u skladu s načelima održivoga razvoja.

Na području Grada Zagreba osigurati će se:

- novi tramvaj, autobusi, vozila za odvoz otpada i čišćenje ulica koj se koriste čistim i obnovljivim izvorima energije, jedinstveni elektronski sustavi naplate karata u svim vrstama gradskoga prijevoza,
- više biciklističkih staza,
- veće sigurnosti u gradskom prijevozu,
- više javnih prostora koji služe pešacima i biciklistima,
- ekonomično i održivo korištenje energije i ostalih resursa,
- smanjenje onečišćenja zraka i buke.

Uz već aktivan doprinos i sudjelovanje u edukacijama, anketama, tribinama i ostalim javnim događajima zajedno ćemo brže ostvariti postavljene ciljeve.

Pridružite nam se!

Projekt partneri projekta Grad Zagreb: Gradski ured za strategiju razvoja i razvoj grada, Zagrebački holding - Podružnica ZET (Dobrota, Fakultet prometnih znanosti, HZ Inženjerski biro, znanost.hr) i ODRAZ - Održiv razvoj zajednice.

Eko vozni park

Civitas - Elan i Zagrebački holding d.o.o., Podružnica Cistoća

Za bolji i čistiji promet u gradovima!

U sklopu projekta Civitas - Elan, čiji je cilj poboljšanje kvalitete života u Gradu Zagrebu, provest će se sljedeće mjere:

- razvoj i primjena tehnologija koje koriste čista goriva i
- usklađivanje voznog parka Podružnice Cistoća s europskim standardima zaštite okoliša

U tu svrhu, tijekom sljedeće četiri godine, Podružnica Cistoća će uvesti 40 novih vozila na biogorivo, a očekivane koristi bi trebale biti:

- smanjenje ispuštanja onečišćujućih tvari u okoliš i
- smanjenje buke.

Ovakvim pristupom, Podružnica Cistoća u praksi djelotvorno provodi Politiku upravljanja okolišem Zagrebačkog holdinga d.o.o. koja je u skladu s načelima održivog razvoja.

civitas@cistoca.hr

CIVITAS
ZAGREB

PROJEKT ZA BOLJI I ČISTIJI PROMET U GRADOVIMA

ODRAZ
ODRŽIV RAZVOJ ZAJEDNICE

www.civitas-elan.com.hr
cistoca.hr

Leaflet No.2

In September 2009 a leaflet on biodiesel in CISTOCA was produced to inform citizens what biodiesel is and how it contributes to environmental protection. It was distributed at Zagreb's CIVITAS-ELAN info point and at various events.

Korištenje biodizela



Biodizel B5

- 5 % biodizela - ostatak eurodizel
- Nema potrebe za preinakama na vozilu
- Nema dodatne u zakretnosti motora
- Nema promjena u potrošnji

Ovakvim pristupom Podružnica Čistoća u praksi djelotvorno provodi Politiku upravljanja okolišem Zagrebačkog holdinga d.o.o., kao i Grada Zagreba koja je u skladu s našelima održivog razvoja.



Podružnica Čistoća
 Radnička cesta 82, 10000 Zagreb
 tel. 01 8148 400, e-mail: cistoća@zohod.hr, www.cistoća.hr

Čuvajmo okoliš, oblikujmo budućnost

Biodizel u "Čistoći"





Biodizel

Biodizel je energetski učinkovito obnovljivo gorivo dobiveno iz biljnih ulja (repica, sunceokret, soja i palma).

Prednosti biodizela

- Gorivo iz obnovljivih sirovina
- Pridonosi sprječavanju klimatskih promjena
- Više plamte u odnosu na dizel gorivo
- Manje toksičan od dizela
- Biološki razgradiv
- Poboļljiva mazivost
- Ne sadrži sumpor i teške metale
- Veli cetanski broj
- Mješa se s eurodizelom u svim omjerima
- Potpunije isparava (veći svećnjak krova)



Biodizel je ekološko gorivo!



Cijevi Zagrebačkog holdinga d.o.o. Podružnice Čistoća su:

- razvoj i primjena tehnologija koje koriste čista goriva i
- usklađivanje voznog parka s europskim standardima zaštite okoliša.

U svrhu ostvarenja postavljenih ciljeva, tijekom sljedeće tri godine, 10 % postojeće potrošnje eurodizela zamijenit će se biodizelom.

U prvoj fazi sva vozila će koristiti biodizel B5.

Očekivana korist je smanjenje ispuštanja onečišćujućih tvari u okoliš.



To showcase the results (e.g. the decrease of noise and air pollution) to the general public CISTOCA, again together with ODRAZ, prepared a third leaflet and conducted a survey.

Leaflet No.3

CISTOCA and ODRAZ prepared a leaflet on the achievements within the measure which was distributed to citizens during the EMAT Fair in Zagreb (27-30 September 2011), at roundtables held during the European Mobility Week on 20-21 September 2011. It is also

available at Zagreb's CIVITAS-ELAN info point and from Zagreb's local CIVITAS-ELAN website at: http://www.civitaszagreb.hr/media/15589/eko_vozni_park_letak_final.pdf.

Od 1. srpnja 2011. godine sva vozila Čistoće koriste dizelsko gorivo s određenim udjelom biodizela i to najvećim dijelom B7 (7%), a 30 vozila koristi B20 (20%).

Time je postignuto:

- smanjenje ispuštanja onečišćujućih tvari u okoliš i
- smanjenje buke.

Ovakvim pristupom, Podružnica Čistoća u praksi djelotvorno provodi Politiku upravljanja okolišem Zagrebačkog holdinga d.o.o. koja uvažava načela održivog razvoja.

Posjetite Info punkt projekta!
 Opat tramvaj Agencij Tehničkog muzeja, Savska 15
Radno vrijeme info-punkta:
 radnim danom od 11:00 - 17:00
 te subotom od 9:00 do 13:00.

Projekt CIVITAS ELAN potiče na razmišljanje i poduzimanje mjera za poboljšanje prometnih uvjeta u europskim gradovima. Uz Zagreb, u projektu sudjeluje još četiri europska grada.

Više o aktivnostima projekta možete saznati na web-stranici www.civitaszagreb.hr ili putem e-maila: civitas@distoća.hr.

Koordinator projekta: Grad Zagreb, Gradski ured za strategijsko planiranje i razvoj Grada

CIVITAS ELAN

Za bolji i čistiji Zagreb!

EKO VOZNI PARK
 Čistoća Zagreb

U sklopu projekta CIVITAS ELAN, Čistoća je obnovila vozni park s ciljem usklađivanja s europskim standardima zaštite okoliša.

ZAGREBAČKI HOLDING d.o.o. | PODRUŽNICA ČISTOĆA

Eko vozila voznog parka Čistoće sufinancirana sredstvima projekta

- Specijalne vozile za odvoz komunalnog otpada - smečar: 125 komada
- Teretne vozile - eestar: 10 komada
- Specijalne vozile za odvoz glemaznog otpada: 9 komada
- Auto pedicla: 12 komada
- Vozile za prijevoz kontejnera: 12 komada
- Kamion s prikolicom: 11 komad
- Pick-up vozilo: 12 komada

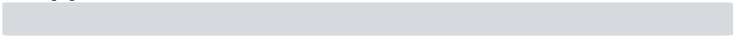


Survey

From July to October 2011 a survey on customer satisfaction was conducted through CISTOCA's (www.cistoca.hr) and Zagreb's local CIVITAS-ELAN website (www.civitaszagreb.hr). It was also conducted at Zagreb's CIVITAS-ELAN info point.

The following question was asked:

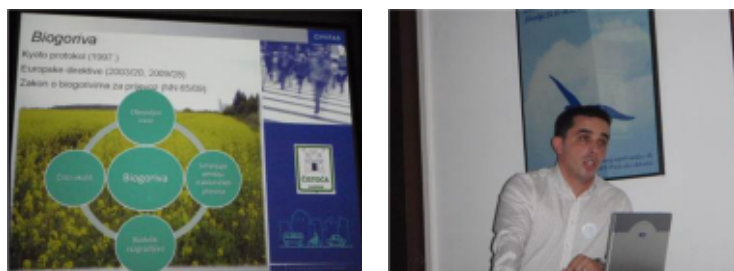
CISTOCA procured 47 new vehicles more favourable to the environment. And all the other vehicles of CISTOCA fleet use biodiesel. Do you support such attitude of CISTOCA towards the environment?

Results of the survey:

- **I support this action** – 90,95 %

- **I don't have any attitude about it** - 3,94 %

- **I do not know what this means for the environment** – 5,11 %


Presentations

A PowerPoint presentation was prepared on biodiesel in CISTOCA and presented during a roundtable held at the Technical Museum as part of the European Mobility Week in September 2009.



Also, on 11 June 2011 a presentation was held on the introduction of biofuels into CISTOCA's fleet at the Ministry of Economy.

8. Evaluation

8.1. Impact evaluation

At the beginning of the project, CISTOCA collected data on the present fleet of vehicles including fuel consumption, mileage and number of working hours of each vehicle, needed to calculate air pollution. Exhaust gas emission were calculated using mathematical models like COPERT 4. Also, measurements of noise emissions were conducted. After implementation, the same parameters were measured in order to compare before and after data.

Although the evaluation process is still underway and main evaluation activities still having to be conducted, it can already be stated that the main objectives will be achieved. Due to the fact that CISTOCA introduced 47 new vehicles into its fleet, with significantly lower fuel consumption (up to 40%), this should result in reduced emissions of CO₂, PM and other pollutants. Furthermore, the introduction of biodiesel resulted in even lower total emission of fossil CO₂ and PM. Also, according to the preliminary evaluation results, average noise emissions of the tested vehicles will be lower.

8.2. Process evaluation

During the process evaluation barriers and drivers that occurred during the implementation phase of the project were analysed.

a) Barriers

The main barrier was the lack of previous experiences with similar projects and a lack of proper analysis of CISTOCA's needs during the preparation phase because not enough person-months were allocated to CISTOCA as a leading partner of this measure, as well as oth-

er resources such as travel expenses, etc. The general opinion is that administrative activities are often experienced as a “burden”. The possible impact is a lack of ‘knowledge sharing’ among other ELAN cities as well as losing the individual motivation. CIVITAS-ELAN is a demonstration project, and exchange of ideas, knowledge and experiences among partners working on similar activities should be strongly encouraged, because only cooperation and partnership between participants can lead to progress.

b) Drivers

There are three major clusters of drivers encountered during the project:

- Good business plan which predefined the fleet modernisation process

This is a truly an important driver which enabled efficient measure implementation. One of the visible results of this planning was that the new vehicles arrived well ahead of schedule. This then, encouraged the project team to continuously push forward measure implementation, that is the modernisation of CISTOCA’s fleet.

- Early definition of project task force and concept of work

This was very important for defining the measure activities and individual responsibilities early in the project. The result was that all the activities during this reporting period were carried out according to the Description of Work and without any delays.

- Individual motivation

CISTOCA constantly encouraged the exchange of ideas among partners working on similar activities. During the PMG meeting in Bled, CISTOCA proposed that regular meetings of Measure Leaders and other participants working on similar measures should be organised as part of PMG meetings. During the meetings, partners could exchange experiences and discuss drivers and barriers. During the PMG meeting in Zagreb in January 2011 there was a good opportunity for exchange of ideas, knowledge and experiences about eco-driving, use of biodiesel and other similar issues with colleagues from Gent (GCC, UGENT), Brno (DPMB) and Ljubljana (COL).

9. Next steps

In spring 2012, CISTOCA will implement three new sweeping machines into its fleet. Furthermore, in the forthcoming period CISTOCA will try to gradually increase the percentage of biodiesel use from B7 to B10 and B20. Also, CISTOCA will consider possibilities for introduction of other alternative fuels like bioethanol.