



**CiViTAS**  
Cleaner and better transport in cities

**ELAN**

BRNO • GENT • LJUBLJANA • PORTO • ZAGREB

## Report on the results of this measure

### ELAN Deliverable No.1.8 - D1

**Project acronym:** ELAN  
**Project full title:** Mobilising citizens for vital cities

**Grant Agreement No.:** ELAN TREN/FP7TR/218954/"ELAN"

**Workpackage:** Alternative fuels and clean vehicles  
**Measure:** 1.8-GEN Extended biodiesel production  
**Author:** Tom Anthonis  
**Co-authors:** Begga Van Cauwenberge,  
Sophie Gillaerts



THE CIVITAS INITIATIVE  
IS CO-FINANCED BY THE  
EUROPEAN UNION

Final Version

30.03.2012

ELAN deliverable no.	1.8 – D1
Date / Version	Final version / 30.03.2012
Dissemination level	Project level
Work Package	WP1 Alternative fuels and clean vehicles
Author(s)	Tom Anthonis
Co-author(s)	Begga Van Cauwenberge, Sophie Gillaerts
File Name	1.8 - D1 - Reports on the results of this measure.pdf

## Keywords

### General

x	CIVITAS	
x	ELAN Project	

### Work package links

x	WP1 Alternative fuels & clean vehicles		WP7 Energy-efficient freight logistics
	WP2 Collective transport & intermodal integration		WP8 Transport telematics
	WP3 Demand management		WP9 Project coordination
	WP4 Influencing travel behaviour		WP10 Project management
	WP5 Safety, security & health		WP11 Research and Technological Development
	WP6 Innovative mobility services		WP12 Impact and process evaluation
			WP13 Dissemination, citizens' engagement, training and knowledge transfer

## Document history

Date	Person	Action	Status <sup>1</sup>	Circulation <sup>2</sup>
26.03.2012	Tom Anthonis	Draft version	draft	SC
29.03.2012	Tom Anthonis	2 <sup>nd</sup> draft version	draft	PM
30.03.2012	Marcel Braun	Proof-reading of 2 <sup>nd</sup> draft version	final	PC

<sup>1</sup> Status: Draft, Final, Approved, Submitted

<sup>2</sup> Circulation: PC = Project Coordinator; PM = Project Manager; SC = Site Coordinators; EM = Evaluation Manager; DM = Dissemination Manager; SEM = Site Evaluation Managers; SDM = Site Dissemination Managers; SCo = Scientific Coordinator, P = partners, ML = Measure Leaders

# **CONTENT**

- 1. Introduction ..... 4**
- 2. 1.8-GEN Extended biodiesel production ..... 4**
  - 2.1. OBJECTIVES ..... 4
  - 2.2. INNOVATIVE ASPECTS ..... 5
  - 2.3. SITUATION BEFORE CIVITAS-ELAN ..... 5
- 3. Measure implementation ..... 6**
  - 3.1. FORUM OF POTENTIAL BIO DIESEL USERS ..... 6
  - 3.2. POLICY ..... 6
  - 3.3. LEGAL ASPECT ..... 7
  - 3.4. FINANCIAL (TAX) ASPECT ..... 7
  - 3.5. TECHNICAL ASPECT OF THE ENGINES ..... 8
  - 3.6. B30 DISTRIBUTION CIRCUIT ..... 8
- 4. Measure evaluation ..... 9**
  - 4.1. INFLUENCE OF THIS MEASURE ON OTHER MEASURES ..... 9
  - 4.2. IMPACTS AND INDICATORS ..... 9
  - 4.3. PROCESS EVALUATION ..... 10
- 5. Lessons learned ..... 10**
- 6. Barriers and drivers ..... 11**
  - 6.1. BARRIERS ..... 11
  - 6.2. DRIVERS ..... 11
- 7. Conclusions ..... 12**

# 1. Introduction

According to the Description of Work “the objective of this measure is to stimulate the implementation of biodiesel use (B30) in the surroundings of Gent. The aim within this project is to implement the use of B30, a mixture of diesel and 30% Fatty Acid Methyl Esters (FAME) in captive fleets of public organisations, e.g. postal services. In addition, a (separate) circuit of pumps will have to be installed to provide this B30. It is estimated that when at least 4 public organisations will increase their biodiesel fleet, a minimum of 1.200.500 litres of bio diesel per month will be required.”

Now almost at the end we see that in reality it is hard to implement this measure, due to some problems we faced. The most important one is the lack of a legal framework of the financial aspects of the use of biofuels. This makes that no price can be fixed for a high blend B30 biofuel. No price comparison can be made with the existing fuels, so it is hard to predict budgets and costs involved in this measure.

Secondly, with a good preparation and some precaution any car can drive on the B30 bio diesel blend. In some cases only small changes to the car have to be made, but even then the perception that B30 biofuel can harm the engine remains an important hurdle to take.

Taking into account also the perception on the sustainability of biofuel and especially the debate on food versus fuel it is clear that a lot of doubts concerning implementation arise.

The fact of strong reforms at De Lijn with a total requirement of cutting costs by 60 million euros and with no real sight on the costs inflicted by introducing biofuels, no clear technical warranty by the bus constructor, they decided no to introduce B30 now. The City of Ghent alone is too small to implement this measure on its own.

The report below gives an overview of the measure, the evaluation of each step and some valuable lessons learned during this process.

## 2. 1.8-GEN Extended biodiesel production

### 2.1. Objectives

The objectives of this measure are:

#### High level / longer term:

- To increase air quality within the city of Ghent by reducing CO<sub>2</sub> and other pollutant emissions of the (semi)public vehicle fleet.
- Reduce dependence on fossil fuels

#### Integrated Package (Strategic) level:

- To reduce the emissions of the (semi)public vehicle fleet, to contribute to a shift towards clean public fleets. This will be achieved by reducing (fossil) fuel consumption and cleaning up vehicle fleets through:
  - Replacing old vehicles by (more) clean vehicles.
  - Implementing new techniques (hybrid, electric, CNG vehicles).
  - Implementation of B30 (30% mix of bio diesel with standard diesel) in (semi)public vehicle fleet.
  - Optimising the energy consumption on trams.

#### Measure level:

- To reduce CO<sub>2</sub> and other pollutant emissions by stimulating the implementation B30 in the surroundings of Ghent by captive fleets of public organizations.

- To increase in the share of bio diesel by stimulating the installation a (separate) circuit of pumps providing B30.
- Reduce dependence on fossil fuels.

The final aim is to reduce dependence on fossil fuels and to increase the share of bio diesel in compliance with EU legislation which will also increase air quality.

This can be reached by removing following barriers to introduce B30 in the (semi)public fleet:

- Reducing the costs of bio diesel: By extending the current law on the tax exemption for diesel mixtures containing 5% bio diesel to tax exemption for mixtures containing a higher percentage of bio diesel (e.g. B30) as now the cost of bio diesel is higher than the cost of standard diesel.
- Collecting technical guarantees from car manufacturers for the use of B30 to managers of the (semi)public fleet.
- Stimulating to set up a (separate) circuit of pumps to provide B30.

## 2.2. Innovative aspects

The innovative aspects of the measures are:

**New economic instrument:** This measure aims to solve some barriers as reducing extra costs by reducing current tax exemption on bio diesel to other organizations than the public transportation organisations and to mixtures of diesel containing a percentage of FAME higher than 4,29%.

**New policy instrument:** This measure aims to solve some barriers as stimulating car manufacturers to provide the same technical guarantees for the use of B30 as for diesel vehicles and stimulating to set up a circuit of pumps to provide B30.

## 2.3. Situation before CIVITAS-ELAN

About two years ago, Ghent Bio-Energy Valley (GBEV) was initiated by Prof. Soetaert of the Department of Biochemical and Microbial Technology of Ghent University. GBEV is a Public Private Partnership between Ghent University, the port of Ghent, the City of Ghent, the Development Agency of East-Flanders and a number of private companies that are active in the field of bio-energy generation, distribution, storage and use as Oleon and Bioro which have obtained a quorum from the Belgian government to produce bio diesel. GBEV aims to support the development of sustainable bio-energy activities and resulting economic growth in the region of Ghent, Belgium. In particular, GBEV promotes the development of bio refineries in the port of Ghent for the production of bio-energy. GBEV is also a well-renowned partner in decision making processes with regard to bio fuels in Belgium. Therefore, GBEV and its public partners are well positioned to send out a bio diesel communiqué stressing the importance to change national laws, to the government and respective politicians.

In Belgium there is a tax exemption for diesel mixtures containing 4,29% bio diesel, there is no bio diesel is available at the pump because there is currently no obligation to add bio diesel to normal diesel. Belgium also fails to comply with the EU guidelines and it did not match the targets that were set for 2005.

## 3. Measure implementation

### 3.1. Forum of potential bio diesel users

To increase the distribution of bio diesel (which leads to reduction of costs and increase of support of the distributors of bio diesel), IVAGO (waste processing plant) and Bpost (postal service company) were invited to participate the bio diesel forum. Also the bio diesel producers were invited to participate the bio diesel forum.

Many workshops, telephone conferences and mailings were held to discuss the sustainable aspects of bio diesel and the technical barriers to solve.

Mid-July 2010: a comprehensive report was presented to all stakeholders and discussed in a one-to-one approach.

Study tour to the City of Amiens was organised in November 2011, as they use B30 since 1992 (see pictures below). The MLs of 1.1-COM, 1.2-GEN and 1.13-GEN were also present during this study tour.



### 3.2. Policy

Before CIVITAS the Flemish minister of Mobility, Van Brempt, decided not to implement bio diesel in captive fleet due to the discussions on the impact of bio diesel on the food market.

The Bench of Mayor and Aldermen never had taken up an open position of the integration of bio diesel in the captive fleet of the City of Ghent. Therefore a continuous effort was taken to convince the Bench of Mayor and Aldermen the City of Ghent.

The current federal policy not in favour to stimulate the use of bio diesel for several reasons: spring 2009 – all political actions were delayed due to the European and regional elections on 7 June 2009; no federal government for period of 450 days; financial crisis.

#### Actions to overcome policy barriers:

- Continuous actions were taken to convince the politicians of the Flemish government and the City of Ghent to support the bio diesel project by presenting a short presentation on the different aspects of bio fuels (technology, sustainability, legal and ethical aspects). Politicians will support the project if the sustainability of bio diesel can be guaranteed.
- October 2008/ July 2010: Prof. Soetaert contacted the cabinet of the minister of Mobility, Mrs. Van Brempt, to revoke her decision that no bio diesel will be implemented in the captive fleet of De Lijn when guarantees of the sustainability of bio diesel can be given. Restart discussion with Hilde Crevits, after the regional elections which took place on 7 June 2009.

- January 2009: The alderman Mr. Sas Van Rouveroij, who is responsible for the port and innovation in the City of Ghent, confirms that the City of Ghent intends to use B30 in their captive fleet.
- 26 October 2010: The alderman, Mr. Christophe Peeters, declares that the City of Ghent proceed with the implementation of B30
- January 2011: Positive decision from De Lijn and Flemish government to implement B30 when 2 conditions were met:
  - B30 is in compliance with sustainability criteria of the EU RE Directive
  - All buses on B30 are approved by the car manufacturer (Van Hool/DAF)
- 10 January 2012: The management of De Lijn decided not implementing bio diesel as the conditions were not met. De Lijn decided to wait on the 2<sup>nd</sup> generation of Bio diesel (use of agriculture and forest residues, used plant oil, animal fats and waste streams). De Lijn also confirmed that in the call of tender for purchase of new buses, a paragraph is added that these buses need to be B30-proof.

### **3.3. Legal aspect**

B30 is a non approved fuel yet. Europe permits only 7% incorporation of bio diesel, so Member States should also not permit more, unless they specifically permit for incorporation of more % of bio diesel. In Belgium B30 is still not officially recognised, not even at European level by the way. As long as there is no standard, there is also no official recognition possible. Alternative fuels (i.e. fuel without norm) can only be provided after a specific permission from the Government, often linked to specific conditions: on project basis with registered partners and the distribution of alternative fuels needs to be done in a closed circuit. This is the main reason why bio diesel is still not available at the public pumps in Belgium.

A special request has to be submitted for approval. The request can only be submitted on the moment the partners decide to implement B30 in their captive fleet.

Due to the political (unstable) situation in Belgium and the strict budget limitations, it will be very difficult to adapt the law.

#### **Actions to overcome legal barriers:**

- February 2009: The City of Ghent has sent a letter to the prime minister Van Rompuy and ministers Reynders, Van Quickenborne and Magnette to ask that the addition of bio fuels would be finally legally liable
- October 2009: Request for approval of use of bio fuel sent to the Federal Authority of Economy, responsible for the implementation and approval of any fuel in Belgium. (FOD Economie)
- The measure leader has personal contact and several mails and phone contacts with this Federal Authority of Economy to stimulate the approval for using bio fuel in the CIVITAS project.

### **3.4. Financial (tax) aspect**

As the price of bio diesel is higher than diesel, which does not stimulate the use of bio diesel, the measure leader tried to convince the Federal Authority of Economy to introduce tax exemption for bio diesel. The public transport company has a tax exemption for their fleet.

#### **Actions to overcome financial (tax) barriers:**

- November 2008: after contact with Mr. Van Holsbeke of the Federal Authority of Economy and of Customs and Taxes, he wants to help on the extension of the tax exemption to all bio diesel users.

- January 2009: An extensive file concerning the use of B30 and the consequences on taxes is written to get in discussion with Mr. Monseu of the cabinet of the minister of finance, Mr. Reynders.
- A working document communication letter to different politicians to extend law on tax exemption is written. But the project-specific tax exemption for B30 from the Federal Authority of Economy is still not approved.
- 9 March 2011: Official request for approval of project-specific tax exemption for B30 sent to the Federal Authority of Economy, responsible for the implementation and approval of any fuel in Belgium. (FOD Economie). Official request sent after reorganisation of the Federal Authority of Economy and after receiving official documents which described the norm of bio diesel and bio ethanol.
- Approval from Federal Authority of Economy delayed. Procedures for approval were discussed with the federal authority of Economy and of Customs and Taxes. The measure leader suggested regarding the use of B30 in CIVITAS as a test with a scientific follow up (engine compliance, exhaust, etc.) All the bio fuel used in the measures can then be free of excise...

### **3.5. Technical aspect of the engines**

Most of the car manufactures do not want to give any warranty for the use of B30.

#### **Actions to overcome technical barriers:**

- In call of tender for purchase of vehicles of the City of Ghent, vehicles need to be B30-proof.
- Car manufacturers were continuously contacted to obtain guarantees from them for the use of B30.
- The representative of the French B30 initiative, Gaël Petton of Diester, was contacted to provide information of their experiences of implementation of B30 in the fleet. This information can be useful to have insight in possible technical problems when implementing B30. A lot of time has been lost as the representative postponed his participation in the meeting in Ghent many times.
- By mail and phone, the measure leader contacted many car and truck manufacturers in Europe to collect their policy for use of any alternative fuel. All information of the manufactures and their engine guarantees are available on the German website [www.Ufop.de](http://www.Ufop.de). Also knowledge on bio fuels, maintenances and warranties were collected.

### **3.6. B30 distribution circuit**

As B30 is a non approved fuel, B30 cannot be distributed as a public available fuel. To make the use of B30 profitable for the fuel suppliers, the critical mass volume of B30 is 1.000.000 litres, taken into account the distribution by tank trucks, the storage of bio diesel (expiry date of bio diesel is 6 months),,.. But in the context of a project and with the prospect of an eventual continuation thereafter, they reduced the critical mass volume of B30 to 500.000 litres.

The second barrier of distribution circuit of B30 is the fact that B30 can only be distributed in a closed circuit with registered partners only.

#### **Actions to overcome barrier of distribution of B30:**

- The distribution can only be approved as fuel within the context of a contract between well defined partners, including the distributor of B30. These partners have to introduce a formal demand and approval for the use of B30 in captive fleet at the Federal Authority of Economy. Once approved only the partners can use B30 within a CLOSED distribution network.
- Unfortunately only De Lijn and Ivago do have an own pump circuit, there is no closed pump circuit for the City of Ghent and Bpost.



- Research on pump installation of bio diesel (installation separated pump circuit in cooperation with the involved partners (eventually a mobile refueling tank) – integration bio diesel in existing (public) pump station of Q8, Total...) is started.
- To get a critical mass volume, a coordinated request by the partners to the fuel provider is needed.
- As De Lijn decided not to continue with bio diesel implementation the critical mass volume will not be reached. For this reason, the City of Ghent cannot continue with the implementation of bio diesel.

## 4. Measure evaluation

### 4.1. Influence of this measure on other measures

The research of the implementation of bio diesel is coordinated by the measure leader of the measure 1.8-GEN „Extended bio diesel production“, namely Ghent Bio-Energy Valley (GBEV) and will be implemented in the measures 1.2-GEN Energy efficient city fleet management and 1.13-GEN Clean public transport strategies (bio diesel & emission control).

All measures of the IP 1, Promoting and enhancing the use of clean vehicles, have the same objective, namely improving air quality by reduction of emissions of the (semi)public fleet. This will be achieved by reducing fuel consumption and cleaning up the (semi)public fleet. The measures of this IP also help stimulating a sustainable market for fuels (electricity, CNG or bio diesel) as an alternative to mineral oil. The measures of this integrated package are:

- Measure 1.2-GEN: energy efficient city fleet management
- Measure 1.8-GEN: extended bio diesel production
- Measure 1.9-GEN: semi-public clean fleets
- Measure 1.10-GEN: introduction of hybrid vehicles in order to replace the existing trolley bus fleet
- Measure 1.13-GEN: clean public transport strategies (bio diesel & emission control)

### 4.2. Impacts and indicators

The expected impacts are:

- Increased use of bio diesel/ reduce dependence of fossil fuel:

The use of bio diesel will be measured on measure level. By gathering the number of bio diesel users, liters of bio diesel ordered the use of bio diesel will be evaluated. As the implementation is planned for the measures 1.2-GEN and 1.13\_GEN, the impact evaluation was planned to be described in the evaluation reports of these measures.

- Decrease in emissions:

The emissions will not be measured on measure level as it will not be possible how many km will be driven with bio diesel. This information is needed to measure the emissions.

- Improved air quality:

The air quality will not be measured on measure level. The impact of this measure will be taken into account when evaluating the air quality on city level.

**No impact evaluation is planned** for this measure as there is no implementation phase within this measure. The implementation was planned in following measures: 1.2-GEN Energy efficient city fleet

management and 1.13-GEN Clean public transport strategies. Impact evaluation was planned to be described in these measure evaluation reports.

### **4.3. Process evaluation**

Methods for process evaluation:

- A lessons learned and action plan meeting has been organised on 5 April 2011 with all partners involved in the bio diesel project, including the representative of the Federal Authority of Economy and the representative of Gbev.
- A lessons learned session has been organised with the measure leaders involved in the bio diesel project on 16 November 2012.

## **5. Lessons learned**

The main lesson learned is that it is very hard to change existing habits, even if these changes are very small and seem to have no influence on the normal logistics and the organisation. So the perception takes over the rational arguments.

Two topics have been stated from the beginning of the project onwards; still remain a struggle to resolve:

- price setting of the biofuel B30 blend
- the warranty

In a smaller extend also the concerns about the sustainability aspects of the production of biofuels caused a delay and influenced the decision making.

#### Price setting:

Up till today there is no legal framework on the excise to pay on a biofuel blend higher than legal mandatory stated in law. Only for the public transport companies in Belgium these frameworks exist, which means they do not have to pay excise on the biofuel blend.

Without this legal framework it is almost impossible to set a market price on the B30 biofuel. And without a price you can not compare to the existing prices of fossil fuels. So it is not clear if the biofuel will be more or less expensive than the fossil fuel.

#### First lesson:

It is very hard to try and introduce bio fuels without a good, clear and transparent legal framework.

#### Warranty:

Bio fuels are relatively new in comparison with fossil fuels. Even though the first engines for cars ever were meant to run on plant oil and waste residues, it seems car manufactures have forgotten this technology and history.

Relatively few public tests exist on the use of high blend B30 biofuels in car fleets. This project would have been an enormous opportunity to do such monitoring, on different types of cars in their everyday use.

Because little is known, manufacturers focus on the negative aspects and possible harm the use of biofuels can cause. With a good preparation and follow up during the transition from fossil fuel to the use of B30 biodiesel all problems can be solved and any car can drive this B30 blend.

A good follow-up of the maintenance cycle of the car engine can ensure the implementation of a more realistic maintenance scheme.

#### Second lesson:

A good preparation, with very low costs, makes it possible to let any car drive on B30 biodiesel blend.

To overcome the 'resistances' of manufacturers, implementation of a good monitoring program on the B30 biodiesel in the total change with an analysis of lubricant oil of the engine, exhaust emissions, analysis report of the B30 throughout the chain, could deliver valuable data. It would certainly help to get undisputable data and to be able to separate facts from suspicions.

#### Sustainability:

Every production site in Belgium has to be in line with the mandatory requirements of the RE Directive. All producers in Belgium meet the highest standards and are in line with several certification schemes recognized by the European Commission.

Lesson: Biofuels in Belgium meet the highest standards in sustainability.

## 6. Barriers and drivers

### 6.1. Barriers

- **Policy barrier** –The management board of De Lijn decided to stop with implementation of B30 as the conditions were not met. (Sustainability of bio diesel and guarantees from manufacturers of PT buses).
- **Policy barrier** – Politicians on Flemish level and the management board of De Lijn not convinced of the sustainability of bio diesel. On local level the politicians never had taken up an open position of the integration of bio diesel in their captive fleet.
- **Policy barrier** – The difficult political situation and financial crisis, hampered political activity during a large period (more than a year). That's why the Federal Authority of Economy cannot approve the use of bio fuels and tax exemption in Belgium.
- **Legal barrier** – B30 is a non approved fuel, this is the reason why bio diesel are not available at the pumps in Belgium.
- **Financial (tax) barrier** – As the price of bio diesel is higher than diesel, a tax exemption for bio diesel is required.
- **Technical barrier of the engines** – Unwillingness of manufactures to give guarantees for B30.
- **Barrier of distribution of B30** - As B30 is a non approved fuel; B30 can only be distributed in closed circuit when approved by the Federal Authority of Economy. The City of Ghent do not have an own fuel distribution circuit.
- **Barrier of distribution of B30** - Critical mass volume of B30 to convince the fuel distributors to provide B30 is minimum 500.000 litres per year.

### 6.2. Drivers

- **Technical driver** – The City of Ghent added in their tender for purchase a paragraph that all cars need to be B30 proof. No warranty problems occurred for the City of Ghent.

- **Policy/ legal driver** – legal obligation to add 4% bio fuels to regular diesel and gasoline in Belgium since July 1<sup>st</sup> 2009.
- **Involvement driver** – strong interest of other public organisations (IVAGO and Bpost) in the use of B30 in their fleet.
- **Policy driver** – The Bench of Mayor and Aldermen finally support the use of B30 in their captive fleet.

## 7. Conclusions

B30 Biodiesel is one of the solutions to be less dependent on fossil fuels and to help in the transition to a more environment friendly transport. B30 biofuels can reduce CO2 emissions by 60 to 80%.

In the struggle against air pollution it brings the emission of small particles down by a least 20% and the only two tests worldwide in normal daily use shows even a decrease in NO<sub>x</sub> emissions by 10%. So especially for the use in public transportation bio fuels could mean a real benefit.

Bio fuels are made of renewable resources and besides the bio fuels made out of it, out of the residues valuable products can be made which also gives an injection to the total value chain.

Due to a little lower energy content, fuel consumption could be a little bit higher, but consumption is also influenced by other factors such as route, driver, weather ...

With good preparation and taking into account some small measures at a very low cost, it is possible for every car to drive on a B30 biodiesel blend.

On the legal side a framework is very important and should exist: admission, standard setting, excise and taxes....

If one is working with different partners in one project, it is recommended that they all agree on one logistic method of bio fuel distribution.

Proven to be a good first solution in the transition towards a sustainable bio based economy, they also help in the start up and research towards more advanced biofuels.