

**DRAFT**

**CEN Workshop Business Plan**

**CEN Workshop 56 “Vegetable liquid fuel from virgin (non-) food oils for use in heavy duty diesel engines” - VegOil**

**DRAFT Business Plan (version 3)**

**Source: NEN – Biofuel Cities project and 2ndVegOil project**

**Status: Draft for generation of external comments**

**1 Background to the CEN Workshop**

Worldwide, energy policy makers are increasingly keen to move away from petroleum-based fuels to more diverse and renewable sources of energy for reasons of environmental protection, energy security and continued economic development. As an alternative for diesel fuel many countries use fatty acid methyl ester (FAME) as a biologically based alternative. With this "biodiesel" good experience has been observed and it has resulted in many specification standards, of which EN 14214 (now in its third revision) is the best example. It is a specification fit for all type of diesel engines, where especially the demands of light-duty, Euro V engines scrutinize the biological product.

Usual (FAME) biodiesel products are produced via a four-step process:

1. growing oil-containing seeds, mainly from eatable crops like rapeseed, palm, soy or sunflower;
2. pressing of the seeds into vegetable oils;
3. conversion via an esterification process with methanol into FAME and glycerol;
4. optimization of FAME product via additives.

From an environmental perspective, it would be beneficial to refrain from using the much optimised EN 14214 quality in less demanding (heavy duty) or even adapted engines. For this the industrialised esterification process (that also includes transport to facilities) could be by-passed by using optimised vegetable oils. The presently most used pure plant oil for transport is rapeseed oil. For this even a German pre-standard DIN V 51605, has been published. However, rapeseed is not the optimal economic crop to be cultivated organically, thus not allowing fully sustainable fuel production for every location in Europe.

From a socio-economic perspective, it would also be an option to set-up local production of vegetable liquid fuel and thus diminishing the amount of transport to de-centralised factories and increasing local employment. Press-mills and after-treatment equipment need less investment. The fuel specification should thus be independent from the feedstock grown at specific locations (e.g. rapeseed, sunflower, soy bean, jatropha).

In general, virgin vegetable oils cannot be used in the existing, highly demanding diesel engines. Adapted and optimized engines are necessary, mainly of the heavy duty type. These engines may also be able to run on a variety of diesel type fuels and are also called multi-fuel diesel engines.

Until now, pure vegetable oil has never been adapted to existing diesel engines (except through trans-esterification to biodiesel), but always the engine has been adapted to the

fuel. With a specification that sets specific quality requirements to the oil, its use may well be guaranteed for heavy-duty engines. In ultimo, one could even think of two classes: for regular diesel and for adapted engines.

Since pure vegetable oil is rather an innovative fuel in terms of its use and optimization steps to be taken, as first step a CWA should be developed that addresses the 100 % fuel. In addition, its use is (and shall be) not European wide, although it will be used in many countries. Next, consideration has to be given to specifications for adaptations of engines. With a CWA, clearance for engines and engine development will be much easier.

## **2 Workshop Proposers**

This proposal originates from work done under the projects Biofuels Cities<sup>1</sup> and 2ndVegOil<sup>2</sup>. The proposers consist of the following organizations, also partners in 2ndVegOil:

- Vereinigte Werkstätten für Pflanzenöltechnologie (VWP) in Germany
- John Deere Werke Mannheim in Germany
- Waldland Vermarktungsgesellschaft in Austria
- Fédération Régionale des CUMA Rhône-Alpes in France

## **3 Market Environment**

The majority of the engine and equipment manufacturers does not support the use of pure vegetable oils like rapeseed oil, palm oil and soybean oil. The most fundamental argument against pure vegetable oil is that its high viscosity and low cetane number make it unsuitable for use in existing and future common internal combustion engines. However, many vehicles can run smoothly on pure vegetable oil once some vehicle modifications are undertaken. This may even lead to so-called flexible diesel fuel vehicles.

When used in non-modified light-duty diesel engines, pure vegetable oil not only leads to engine damages. Particularly in advanced engines equipped to EURO IV or V requirements it leads to unacceptably high emissions. Especially, particulate emissions at cold starting are exceptionally high, while at most other operating ranges pure vegetable oil shows advantages compared to conventional diesel or regular biodiesel (FAME).

Heavy-duty diesel engines, although the emission requirements for EURO 5 or 6 become more stringent, can more easily match ambitious emission levels than cars in urban transport. In comparison, in the US where the diesel fleet is mainly heavy duty, a less stringent FAME quality is applied without problems. For tractors, buses and off-road vehicles optimised vegetable oil can thus be a solution towards alternative fuels. This is especially interesting for (agricultural) fleet owners and for public authorities that wish to lower their greenhouse gas emissions. The amount of vehicles and thus the total fuel capacity in Europe will be low, but the impact can be large.

The actual market is hard to describe, but the usual producers of heavy-duty engines (Mann, Deutz, John Deere, etc.) have shown interest. Next, suppliers of vegetable oil, oil seeds, oil mills and agricultural communities would form the supply side. These are mainly active on a local scale, but that would also be the advantage of the product as

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<sup>1</sup> Co-ordination Action Biofuel Cities European Partnership (CAB-CEP) under the sixth Framework Programme (FP6) of the European Commission, DG TREN.

<sup>2</sup> Demonstration of 2nd Generation Vegetable Oil Fuels in Advanced Engines (2ndVegOil) under the seventh Framework Programme (FP7) of the European Commission, DG TREN.

such. Furthermore, the users need to be identified from local or regional fleet owners, both in the agricultural and city area.

The objectives of pure vegetable oil specifications are achieving less emission, expanding the market that is local nowadays, decreasing dependence of energy supply, and improving social economic situation of rural communities. The specification should support vehicle warranties, easier engine adaptation and improved vegetable oil treatment. It will also be a useful tool for developing countries outside Europe where different types of vegetable oil are used for both agricultural machinery and local power generation.

#### **4 Objectives of the CEN Workshop**

It is proposed to develop a specification for liquid fuel from virgin oils (mainly of vegetable origin) that are optimized in terms of base product and pressing process. The fuels are intended for (adapted) heavy duty or multi-fuel diesel engines and can be produced, treated and used locally without large investments. The idea is to specify several classes for at least two different emission requirements, also applying outside Europe, and where applicable two classes for fuels with different additive packages that may also be used in captive fleets.

At its 2009 plenary meeting, the European fuel specification drafting committee, CEN/TC 19, agreed that there was no need for a European wide EN standard and that the industry can apply a CWA as a tool to develop a specification.

The specification should be based on DIN V 51605, but improved and made feed-stock independent. The objectives of pure vegetable oil specifications are achieving less emission, expanding the market that is local nowadays, decreasing dependence of energy supply, and improving social economic situation of rural communities. Virgin vegetable oil use as engine fuel has potential for the most comprehensive ecologic, economic and social benefits of all biofuels.

The CWA will be usable on a voluntary basis for engine clearance, fuel acceptance and where necessary fuelling station allowance, supporting both local regulations and international trade. In the longer term, further work in this area, including moves towards a more formal standard, will depend on whether vegetable liquid fuel and the adapted engines become available as a general automotive concept. The Workshop will in this respect maintain close contact with CEN/TC 19 "*Gaseous and liquid fuels, lubricants and related products of petroleum, synthetic and biological origin*".

#### **5 CEN Workshop Work Programme**

A detailed specification on the basis of DIN V 51605 and EN 14214, plus input from the 2ndVegoil project will form the basis of workshop discussions. Preparation work for this meeting has been done by the Workshop proposers (see Clause 2).

After the Kick-Off meeting, interested parties are invited to officially register as participants on acceptance of the agreed Business Plan and the participation fee.

Some three to four further meetings are envisaged after each two/three months, at which additional technical data will be discussed and a final text drafted. As various test work has been done already in the field and in the mentioned project, no extensive laboratory testing is foreseen as all needed test methods are applicable and already standardized. This text will be formalised and a public commenting period of two months

is envisaged<sup>3</sup>. The generated comments will be discussed and the registered participants be asked to approve the final text at the last Workshop Plenary meeting after a year from the start of the project.

Checking the text to the CEN drafting rules and publication will be done by the Secretariat in co-ordination with the Chairman.

The CWA will be first published in English only. Publication will be after a maximum of fifteen months.

## **6 CEN Workshop Structure and Resource Requirements**

The Chairman will work on a voluntary basis. Mr. Georg Gruber of VWP, who is also participating in the DIN V 51605 revision process, is proposed as chairman.

NEN, the Dutch CEN Member, provides the WS Secretariat. NEN also holds the CEN/TC 19 Secretariat, hence being a direct contact to the relevant experts for further questions or dissemination of the WS results. The Secretariat will support the Workshop by organizing meetings (in collaboration with the CEN Management Centre for the Kick-Off meeting), distributing documents, writing minutes and organising document editing.

All communication, apart from the meetings, is to be done via e-mail and teleconferencing.

The expected resources required for the Workshop would be:

- Chair: 20 man-days
- Secretariat: 32 man-days;
- Participants: 12 -15 man-days each (apart from travelling);

## **7 External Liaisons**

The Workshop will operate in liaison with CEN/TC 19 and the Secretary will assure this. The European Producer of Plant Oil Association (EPPOA) has already expressed intentions to contribute to the Workshop.

In addition, as DIN V 51605 is also being revised the process should take advantage of the development in Germany. It should not compete with this development and closely liaise with DIN-FAM on this.

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<sup>3</sup> At the kick-off meeting an eventual 60 days comment phase will be decided upon based on the effective participation, i.e. sufficient broad **stakeholder** representation.

## 8 Contact Points

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