



Commissioner Violeta BULC

**Meeting with Mr [REDACTED] and
Advanced Biofuels CEOs**

Date 25/02/2016 16-17h
BERL 08/60

Member of Cabinet responsible: [REDACTED]
DG participant: [REDACTED] MOVE [REDACTED] tel: [REDACTED]

INTRODUCTION

SCENE SETTER

Former Prime Minister of Denmark and NATO Secretary General [REDACTED] considers the EU strong dependence on foreign oil as a risk for the EU economy, energy security and security in general. He sees the EU own production of alternative energy – including biofuels - as an option the EU has long neglected, particularly compared to other world regions.¹

Mr [REDACTED] will be accompanied by CEOs of industry companies representing a group of advanced biofuel producers (Leaders of Sustainable Biofuels – LSB). The Chairman of the LSB [REDACTED] and several companies are participating as Members in the Sub-Group on Advanced Biofuels (SGAB) of the Sustainable Transport Forum (STF) launched by the Commission in July 2015.

The EU biofuel industry considers that advanced biofuels must play a key role in achieving EU's 2030 climate policy goals and asks the EU to:

- Create a stable and consistent 2030 framework for investments in the advanced biofuels sector,
- Set a binding - or at least an indicative - target for advanced biofuels up to 2030.

OBJECTIVES

- They would like to get your support for the promotion of advanced biofuels in the Commission's strategy for decarbonisation of transport. Confirm that biofuels remain an option and that the Communication will contain a section on alternative energies used in transport (electricity + fuels).
- Enquire about technology and market perspectives, in particular how they view the future of advanced biofuels (production and use).
- Inform about the foreseen timetable for the Transport Decarbonisation Communication and the proposals on Effort Sharing Decision and the Renewable Energy package. Look forward to their input in the consultation phase.

¹ Position of [REDACTED] of 26 January 2016 is available here:
<http://www.project-syndicate.org/commentary/biofuels-alternative-to-foreign-oil-by-anders-fogh-rasmussen-2016-01>

SPEAKING POINTS

➤ State your position regarding biofuels

- Transport is vital for the EU economy and it must develop within a more sustainable path.
- A gradual replacement of oil by alternative fuels is necessary to break this dependence and contribute to improving the security of Europe's energy supply.
- Biofuels will also be an essential part of achieving the 40% target of greenhouse gas reduction. Additionally, the advanced biofuels sector offers jobs and growth.
- Biofuels can be particularly useful to lower emissions from hybrid vehicles (the non-electric part). Moreover, advanced liquid biofuels are the only low-CO₂ option for substituting kerosene in aviation.
- Decarbonising transport requires a gradual transformation of the entire transport system within an integrated approach. We must look at the different options; what they contribute to decarbonising transport and in the most cost-effective manner.
- To bridge the gap² between the production cost of advanced biofuels and those of petrol or diesel, the EU is providing support to research and innovation and to projects aiming to bring advanced biofuels to the market under the Horizon 2020 and NER 300 programmes.
- The support to advanced biofuel industry would not infringe the state aid provisions in force under the condition that the aid per unit of energy "*does not exceed the difference between the total levelised costs of producing energy from the*

² The average production cost of advanced biofuels was approximately 110 €/Mwh and the cost of petrol/diesel was 50 €/Mwh

*particular technology in question and the market price of the form of energy concerned"*³;

➤ **Inform about Commission's work**

- We are now assessing the policy options for reaching our agreed 2030 goals. Creating a sound legislative framework is essential for creating investor certainty.
- Commission will adopt a Transport Decarbonisation Strategy in summer 2016, together with the Effort Sharing Decision.
- The strategy has three pillars: energy efficiency of vehicles and vessels, alternative energies, and better organisation of transport. It will cover all modes and looks at all benefits from decarbonisation: CO2 reduction, air pollution, energy security, and competitiveness.
- There will be no separate action plan for alternative fuels adopted with the Communication.
- In the area of alternative fuels + electricity, work is on-going on several initiatives:
 - Fuel price comparison at refuelling stations;
 - Fuel labelling – to ensure compatibility of alternative fuels and vehicles;
 - A possible revision of the Clean Vehicles Directive – to better promote the use of alternative energies in public fleets;
 - And finally, biofuels will be part of the National Policy Frameworks to be submitted by Member States in line

³ Art 131 (a) of the Guidelines on State Aid for environmental protection and energy 2014-2020 (2014/C 200/01)

with the Directive on deployment of alternative fuels infrastructure.

- Before the end of the year, the Commission will adopt a Renewable Energy Package. This package should also include a proposal on Bioenergy Sustainability. It is premature to define the policy options the Commission will consider in this regard. These two initiatives are under the responsibility of my colleague – Commissioner Miguel Arias Cañete.

➤ **Enquire about technology and market perspective**

- What do you consider to be the main factors hampering the development of biofuels?
- I look forward to your views and contributions in the stakeholder consultation process for these initiatives.

DEFENSIVE POINTS

The lack of a stable EU policy framework prevents investment on biofuels

- The biofuel sector was affected by sustainability concerns raised already back in 2009. Therefore, the ILUC (Indirect Land Used Change) -Directive was a very important step forward for improving the investment framework.
- European Council conclusions of October 2014 do not foresee new legally binding targets at national level for renewable energy or in any other sub-sector after 2020.
- However, transport sector is fully covered by 2030 GHG reduction and renewable energy targets.
- Commission's 2016 initiatives including the Renewable Energy package will provide more clarity for industry in longer-term perspective going beyond 2020.
- Advanced biofuels can contribute to EU policy objectives by addressing CO2 emissions, energy security and competitiveness. They will therefore be taken into consideration alongside all other policy options.

How is the Commission supporting advanced biofuels?

- ILUC Directive of October 2015 mitigates indirect land use change effectively while providing a transition to advanced biofuels. The cap on 1st generation biofuels and the indicative sub-target for advanced biofuels are important signals to the industry that investments should go to *advanced* biofuels.
- Financial support for advanced biofuels in Europe becoming significant. Starting in 2013, NER300 funding programme (for innovative low-carbon energy industrial-scale demonstration projects) helped to finance 23 projects, 8 out of which involved bioenergy or biofuels.
- Projects on advanced biofuels and bioenergy received a funding of €82.7 million under the 2014-2015 Horizon 2020. The similar is expected in 2016 and 2017.
- State aid at certain extent and EIB loans are other tools that can be used

BACKGROUND INFORMATION

(1) What types of advanced biofuels are there?

The following describes in general terms some of the main types of advanced biofuels being developed in Europe and globally.

Two main technologies are:

1. Petrol/ Bioethanol

Cellulosic ethanol (2G) can be produced by hydrolysis and fermentation of lignocellulosic agricultural wastes such as straw or corn stover or from energy grasses or other energy crops. The end product is the same as conventional bioethanol, which is typically blended with gasoline.

2. Synthetic diesel / Renewable Diesel

Synthetic diesel fuels (drop-in fuels) are fully fungible and can be blended into fossil diesel at any blending ratio, or can be used neat as clean burning hydrocarbon on all existing or future diesel fuels. BtL (biomass to Liquid) and HVO (Hydrotreated Vegetable Oil), blending up to 50% with conventional jet fuel, have been approved for their use in aviation.

Synthetic diesel/ Renewable diesel are:

- Biomass to Liquid (BtL)(2G)is generally produced via gasification (heating in partial presence of oxygen to produce carbon monoxide and hydrogen). Feedstocks include woody residues or wastes or energy crops. Gasification is followed by conditioning and then fuel synthesis via Fischer Tropsch or the "methanol-to-gasoline" process. BtL is used in diesel engines. It has also been approved as an aviation fuel.
- Hydrotreated Vegetable Oils (HVO) (2G)/ Hydroprocessed Esters and Fatty Acids (HEFA) do not have the detrimental effects of ester-type biodiesel fuels, such as increased NO_x emission, deposit formation, storage stability problems, more rapid aging of engine oil or poor cold properties. HVOs are straight-chain paraffinic hydrocarbons that are free of aromatics, oxygen and sulfur and have high cetane numbers. They are also approved for use as aviation fuels. The aim is to produce HVOs from sustainable feedstocks.
- Algae biofuels (3G) may be produced from macro algae (seaweeds) and microalgae via a range of technologies. A number of projects and pilot plants are now identifying the best types of algae to use and the best production technologies. Algae biofuels have attracted great interest as they do not compete with food crops for land use, but the technology is not yet as mature as that for some other advanced biofuels.

Terminology:

- First-generation liquid biofuels refer to ethanol from e.g. sugar or starch rich crops, biodiesel (FAME) from vegetable oils, and pure vegetable oil. The production of these fuels is based on traditional chemistry such as fermentation

and esterification and other well-established processes that in essence are quite mature.

- Second-generation liquid biofuels encompass a broad range of biofuels produced from feedstock that is not used as food or feed, e.g. lignocellulosic materials (like short rotation forestry or coppice), the organic part of municipal solid and liquid waste, forest and agricultural residues.
- Third-generation liquid biofuels generally include biofuel production routes, which are at the earlier stages of research and development or are significantly far from commercialisation (e.g. biofuels from algae, hydrogen from biomass, etc.) or synthetic methane where first pilots exist.

(2) State of the industry. Challenges and opportunities

With the current policies, the production of advanced biofuel is not expected to be significant and lower than anticipated in the RED directive, reaching 2.3 Mtoe (approximately 1.5 percentage point with double counting in 2020). It appears that the current incentives are not enough to spur the desired level of investment in advanced 2nd generation biofuels.

Reduction or exemptions from fuel taxes for biofuels, as allowed by the Energy Taxation Directive, have been a key instrument in supporting biofuels in many countries. The ILUC directive sets an indicative 0.5% target for advanced biofuels as a reference for national targets which will be set by EU countries in 2017. Italy has already established binding targets for advanced biofuels: 0.6% in 2018, 0.8% in 2020 and 1% in 2022.

The production of biofuels involves economic activity and employment all along the supply chain, in agriculture, logistics and at in the biofuels production facilities. The expected employment related to biofuels in EU in 2020 could be around 400,000 jobs in total if appropriate policies are implemented to promote advanced biofuels.

Production technologies for second generation of biofuels are more complex and expensive than for first-generation biofuels, but they are considered to be more sustainable providing land-use change does not occur. At the same time, second-generation biofuel production costs are more stable compared with first-generation biofuels owing to a much lower dependency on the feedstock price.

The specific investment costs for second-generation plants will come down if more of them are made, or if their scale is increased. However, it is debatable whether, or when, costs will become comparable with those of first-generation biofuels, let alone fossil fuels.

It is often stated that second-generation biofuels can only be 'economic' if there are valuable chemical by-products: the 'biorefinery' concept. There are indeed many possibilities for co-producing complex organic chemicals; the challenge is to find ones with a large enough potential market to support a large-scale plant

Biofuel production from algae (third generation) is presently at the research and development stage, and uncertainty surrounds the economics of future commercial-scale algal production.

Advanced biofuels installed capacity is currently negligible and limited to a few pilot plants except the Crecestino plant in Italy which is the world's first commercial cellulosic ethanol plant in the world, produces 75 million litres of cellulosic ethanol per year from agricultural waste.

In Finland, NESTE OIL is the main producer of HVO. This company has two operational plants, one in Porvoo Finland (90 Kilotons/year), and one in Rotterdam (800 Kilotons/year). HVO can be blended into diesel, the current fleet can accept up to 30% while staying within the formal fuel specification. HVO can also be used to produce bio-kerosene.

Regarding the use of advanced biofuels in aviation, British Airways plan to use 600,000 tonnes of waste to produce over 50,000 tonnes of biojet fuel and 50,000 tonnes of biodiesel annually, creating up to 1,200 jobs. Production is due to start in 2017.

Lufthansa has carried out a series of over 1,000 flights between Hamburg and Frankfurt with an A321, with one engine powered by a 50% HEFA biofuel blend and the other one with conventional jet fuel, allowing a direct comparison between both fuels and showing no negative impact of biofuels over the 6 months trial period.

.(3) How can advanced biofuels help achieve the 2030 energy and climate objectives as far as the decarbonisation of transport is concerned

The Renewable Energy Directive and the Fuel Quality Directive require a GHG emission saving of 35% (rising to 50% in January 2017, and to 60% in January 2018 for installations in which production started from 2017 onwards). The ILUC directive establishes a GHG saving of 60% for new installations from the adoption of the Directive (October 2015). These emissions refer to direct GHG emissions and ILUC emissions are not considered. The Directives include a methodology for calculating this saving ('actual value') as well as 'default values'.

Advanced biofuels (second- and third-generation biofuels), such as those made from wastes and algae, lead to high GHG savings with a low risk of causing indirect land-use change. If they do not originate from dedicated energy crops grown on cropland, they do not compete directly for agricultural land for the food and feed markets, in contrast to first-generation biofuels. Advanced biofuels could raise GHG saving higher than 80%. Therefore, the use of high blends of advanced biofuels with petrol or diesel could enable a large decarbonisation of vehicles running with internal combustion engines.

The Biofuel industry considers that at least 4% target for advanced biofuels is necessary to achieve the 30% GHG reduction in the non-ETS sector. (To achieve the 4% target of advanced biofuels, it will be necessary to build 50-60 advanced lignocellulosic bioethanol plants and 50-60 advanced biodiesel plants with a total investment **of €10 billions**). Although the cost of advanced biofuels is higher than the price of oil, the investments allocated to the production of advanced biofuels will benefit the European economy, which is not the case of the oil imports

(4) The type of measures that can encourage deployment and market uptake for advanced biofuels technologies that is ready:

- The role of innovation and financing (incl. EU support received so far e.g. FP7/Horizon 2020, EBI loans, Joint Undertaking for hydrogen and fuel cells, NER300, etc)
- The importance of market driven instruments (i.e. binding targets)

The main drivers to promote advanced biofuels have been the Research and Innovation programmes (FP7 and Horizon 2020) and the NER 300 programme. The former is funded under the research and innovation budget and the latter under the emission allowances of the EU emissions trading system (EU ETS).

Starting in 2013, the NER300 funding programme for innovative low-carbon energy has made a significant contribution to financing industrial-scale demonstration projects. Approximately **900 M€** have been allocated to 13 bioenergy projects. The European Bioenergy Industrial Initiative (EIBI) monitors the progress of biofuels technology development and coordinates some of the funding possibilities for technology implementation in the EU.

One billion euros is the estimated EU budget that could be devoted to bioenergy projects under the FP7 and Horizon 2020 programmes for Research and Innovation. Under the calls launched under the 2014-2015 Horizon 2020 Programme, projects on advanced biofuels and bioenergy were financed for an amount of €82.7 million; similar efforts are expected in 2016 and 2017

The establishment of a binding target of 10% of the renewable energy in transport by 2020 under the Renewable Energy Directive and a reduction of the GHG intensity of the fuels by 6% by 2020 under the Fuel Quality Directive have been the main drivers to promote 1st generation biofuels.

As the 2030 Climate and Energy policy framework does not establish new targets for renewable energy or the greenhouse gas intensity of fuels used in the transport sector or any other sub-sector after 2020, the revised Renewable Energy Directive is unlikely to impose binding targets for advanced biofuels. However, the industry is expecting a stable framework with indicative targets to encourage investments.

(5) Biofuels in the world

After a period of rapid growth, biofuel production and consumption in the United States, the European Union and Brazil appear to be shifting gears.

In the United States, the design shortcomings of previous biofuel mandates have become manifest, leading to policy reviews that have introduced uncertainty in the market.

Nevertheless, the Commercial Aviation Alternative Fuels Initiative (CAAFI) is actively studying and supporting the deployment of alternative jet-fuels for commercial flights.

The US navy is embarked on an ambitious programme to secure 50% of its energy from alternative sources from 2020, including advanced biofuels.

In Brazil, the ethanol industry's economic situation is worsening, partly due to inflation-targeted gasoline price regulations that undermine ethanol economics.

Policy support is burgeoning in non-OECD countries, notably oil-importing economies in Southeast Asia and Africa that subsidise fuel consumption, where rising domestic biofuel production promises a valuable option to lowering fuel import bills.

Global biofuel production is seen reaching 139 billion litres in 2020. With a less optimistic outlook for the United States and Brazil, world ethanol output is now forecast to reach 104 billion L in 2020. By contrast, expectations of biodiesel production have been revised marginally upwards. World biodiesel production is expected to edge up to 33 billion L, as stronger growth in non-OECD countries.

Meanwhile, the advanced biofuels industry faces headwinds, but capacity is expanding. Operating capacity reached almost 2 billion L in 2013, and could reach 4 billion L in 2020, if projects under development come on line as planned. Growth however is slower than projected. A number of companies have cancelled or postponed projects as they struggle to secure investments in light of an increasingly uncertain policy framework in the two key markets, the European Union and the United States. Developments in advanced biofuels also continue to remain limited to these two regions.

(7) Effort Sharing Decision and LULUCF (land use, land use change and forestry)

The main policy architecture to implement binding EU climate targets is comprised of the EU Emissions Trading System (ETS), which includes a cap for the EU-wide greenhouse gas (GHG) emissions of the sectors covered, and a set of legally binding country specific targets for the emissions of sectors not covered by the EU ETS in the so-called Effort Sharing Decision (ESD).

The Effort Sharing Decision establishes binding annual greenhouse gas emission targets for Member States for the period 2013–2020. These targets concern emissions from most sectors not included in the EU Emissions Trading System, such as transport (except aviation and international maritime shipping), buildings, agriculture and waste.

The European Council in its October 2014 conclusions on the non-ETS sectors, mandated to put forward a policy to include Land Use, Land Use Change and Forestry (LULUCF) in the EU's 2030 greenhouse gas mitigation framework.

The Commission plans to adopt this summer a proposal for Effort Sharing Decision⁴ and the integration of the Land Use, Land-Use Change and Forestry sector (LULUCF) into the 2030 climate framework. The new proposal will affect the way emissions and removals from agriculture, forestry and other land uses are taken into account in GHG commitments.

To achieve the overall reduction target of at least 40%, emissions from sectors outside the EU ETS would need to be cut by 30% below the 2005 level and emissions from the ETS sectors by 43%. The current framework of the non-ETS without land use, land use change and forestry (LULUCF) emissions is implemented through the Effort Sharing Decision (Decision 406/2009/EC).

⁴ Each Member State shall, by 2020, limit its greenhouse gas emissions at least by the percentage set for that Member State in Annex II to this Decision (No 406/2009/EC) compared to its emissions in 2005.

Land use, land-use change and forestry (LULUCF) is defined by the United Nations Climate Change Secretariat as "A greenhouse gas inventory sector that covers emissions and removals of greenhouse gases resulting from direct human-induced land use, land-use change and forestry activities"

At present, CO₂ emissions and removals from LULUCF are regulated through the EU's international legal obligations under the Kyoto Protocol. Emissions and removals related to LULUCF activities are monitored as prescribed by Decision 529/2013/EU.

(8) Leaders of Sustainable Biofuels (LSB) position

Advanced biofuels can play a key role in achieving EU's 2030 climate policy goals. In order to unlock this potential and secure necessary investments, LSB calls on the EU decision makers to:

- Create a stable and consistent 2030 framework for investments in the advanced biofuels sector.
- Continue the FQD with specific GHG emissions reduction targets beyond 2020.
- Set a binding, ambitious and realistic target for advanced biofuels up to 2030 with a clear trajectory.

"If we do not invest in advanced biofuels and scale-up in time then Europe will face a gap to achieve the 27% RES target in 2030 in a cost-efficient way".

EU is a world leader in advanced biofuels technologies today. In the scenario outlined by the "Wasted" report, advanced biofuels will bring 15 bill € revenues to rural economy and up to 300,000 new jobs by 2030.

Advanced biofuels from wastes and residues can deliver between 85% and 95% of GHG emissions savings (RED default values). Advanced biofuels has significant low ILUC potential and no competition with food and feed production. Wastes and residues have the potential to supply 16 % of road transport fuel in 2030.

(9) Overall biofuels production and use

Biofuels are currently the most important type of alternative fuels, with a projected share of 4.4 % (in energy terms without multiple accounting) in 2014, being 5.4% the projected share of renewable energy in transport in 2014 (Eurostat preliminary data). In this context, **achieving the 10% target is challenging but remains feasible**. Contribution of non-food/feed biofuels (mostly waste based fuels) was about 1% in energy terms in 2014 (1.9% if double counted).

In 2012, overall, about 75% of all biofuels consumed in the EU were produced within the Union. Domestic biodiesel production accounted for 79% of the total consumption in the EU, domestic production accounted for the 71% of the ethanol consumed.

Altogether, about 62% of the feedstock of biodiesel and 79% of the bioethanol consumed in the EU originated from the EU.

The production of biofuels involves economic activity and employment all along the supply chain, in agriculture, logistics and at in the biofuels production facilities. In 2013, the employment related to biofuels in EU reached around 99,000 jobs and it reach by 2020 around 400,000 jobs in total.

Reduction or exemptions from fuel taxes for biofuels have been a key instrument in supporting biofuels in many countries. However, most subsidies for 1st generation biofuels are disappearing. Annual incorporation obligations have been adopted by most Member States.

The most common approach is to label a biofuel as a 'first-generation biofuel' when the feedstock is an agriculture crop used for production of food and feed. Second-generation biofuels are generally understood as fuels produced from a wide array of different feedstock, ranging from lignocellulosic feedstock to municipal solid wastes. Finally, third generation biofuels are related to algal biomass but can also to some extent be linked to the use of CO₂ as feedstock. Second and third generation biofuels produced from non-food feedstock are also referred to as advanced biofuels as long as the raw materials are processed in the right manner.

(10) Biofuels EU Legislation

In 2003, the European Union introduced an indicative target for biofuels and other renewable energy sources in so called "Biofuels Directive", i.e. the achievement of a 5.75% share of renewable energy in the EU's transport sector by 2010.

In 2009, as part of the 2020 climate and energy strategy, the Renewable Energy Directive increased that target to 10%, to be reached by 2020. At the same time, an amendment to the Fuel Quality Directive introduced a mandatory obligation put on the road transport fuel suppliers of a 6% reduction by 2020, in the greenhouse gas (GHG) intensity of fuels used in road transport and non-road mobile machinery. Both Directives were amended by the ILUC Directive⁵ adopted by the European Council and the Parliament in September 2015.

Main points of the ILUC⁶ directive:

- First-generation biofuels (from crops grown on agricultural land) are limited to a cap of 7% of final energy consumption in transport by 2020.
- Biofuels from new installations emit at least 60% less greenhouse gases than fossil fuels
- Indirect land-use change (ILUC) related emissions of biofuels consumed in the EU are included in the reporting requirements of road transport fuel suppliers, the Member States and the Commission.

⁵ Directive(EU) 2015/1513

⁶ Indirect Land Use Change (ILUC) relates to the unintended release of carbon emissions due to the use of existing cropland for biofuel production and the resulting displacement of food (or other) production to new arable land.

- By April 2016, the Member States have to set an indicative target at national level with a reference value of 0.5% for **advanced biofuels**⁷ which they "shall endeavour to achieve", as a percentage of the energy derived from renewable sources in all forms of transport by 2020. Under certain preconditions the Member States can set a lower level.

⁷ Advanced biofuels, such as those made from wastes and algae, provide high greenhouse gas emission savings with a low risk of causing indirect land-use change, and do not compete directly for agricultural land for the food and feed markets (EU Directive 2015/1513, of the European Parliament and of the Council of 9 September 2015 amending Directive 98/70/EC relating to the quality of petrol and diesel fuels and amending Directive 2009/28/EC on the promotion of the use of energy from renewable sources, pp L239/2 point (7)).

ANNEXES

CV of [REDACTED]

[REDACTED]

Other Participants

The CEOs listed here below accompany Mr [REDACTED] and are part of the group "Leaders of Sustainable Biofuels –LSB" The LSB is a group composed of advanced biofuel producers:.

[REDACTED], CEO, Novozymes

[REDACTED] CEO, UPM

[REDACTED] CEO, M&G Chemicals

[REDACTED] Leaders of Sustainable Biofuels (LSB

[REDACTED], CEO, EnergoChemica

[REDACTED] CEO Dupont ,

[REDACTED], Novozymes

[REDACTED] Novozymes