Madrid/ Brussels 28th October 2010

Contribution from NGVA Europe to the European Commission's Public Consultation on indirect land use change and biofuels

NGVA Europe is the only association representing the interests of the European NGV (Natural Gas Vehicles) industry in relation to the use of natural gas (both gaseous and liquid) and biomethane in transport. Information on our organization and its activities can be found at www.ngvaeurope.eu.

1) Do you consider that the analytical work referred to above, and/or other analytical work in this field, provides a good basis for determining how significant indirect land use change resulting from the production of biofuels is?

After having evaluated the analytical work provided for this public consultation, NGVA Europe would like to recommend the European Commission to consider a more balanced position concerning the different options that can contribute to achieving the global environmental goals of the European Union. In this respect, biomethane should be considered as an alternative to other liquid biofuels, considering the following factors (see Annex I for a more detailed analysis):

- Among all biofuels, biomethane offers the best results in terms of energy production potential and land efficiency, and it is also the only renewable fuel candidate which could be efficiently produced from several different sources: gasification of forest residues or specially cultivated lignocellulosic matter, or anaerobic digestion of all other types of biowaste, biomass grown on set-aside-land, or biomass grown in a marine environment.
- Additionally, we have to keep in mind that biomethane is the only biofuel in which the composition of the renewable fuel is the same as in the gas coming from wells. This characteristic allows biomethane to be mixed with natural gas at any percentage and without any problem for the vehicle engines, allowing for higher blends and therefore, higher substitution ratios.

2) On the basis of the available evidence, do you think that EU action is needed to address indirect land use change?

It seems obvious that the global environmental goals proposed for the European Union will lead to a significant growth in biofuel production that may lead to a higher agricultural production in the EU, and which is also likely to trigger indirect land use changes worldwide. We therefore believe that EU action is needed, in order to alleviate these potential negative effects.

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The use of crops for production of biofuels has been questioned in recent years (the food vs fuels debate), and this discussion will continue. The classification of the land used to grow the crops has an influence. When comparing the energy efficiency of different biofuels based on crops, the relevant comparison basis is the fuel energy content per hectare of land used, not the yield per tonne of feedstock used.

If one looks at the default values for CO_2 avoidance listed in the directive on renewable fuels and energy, the principles used differ from those used in the Concawe/Eucar/JRC well-to-wheels study (e.g. ignoring avoidance of greenhouse gas emissions which result from collection and processing of manure). One might also argue about the principles concerning calculations of CO_2 savings. Should for land use based feedstock the calculation base be the savings achieved per mass of feedstock used, or per hectare of land? The differences are huge. NGVA Europe favours area efficiency – i.e. the potential for net fossil fuel substitution per hectare of land used to grow the biofuel feedstock.

3) If action is to be taken, and if it is to have the effect of encouraging greater use of some categories of biofuel and/or less use of other categories of biofuel than would otherwise be the case, it would be necessary to identify these categories of biofuel on the basis of the analytical work. As such, do you think it is possible to draw sufficiently reliable conclusions on whether indirect land use change impacts of biofuels vary according to:

- feedstock type?
- geographical location?
- land management?

NGVA Europe's position is clearly in favour of encouraging biomethane, since it can be produced from any type of cultivated feedstock and would usually provide higher energy yields per hectare of land than any competing biofuel, as it can be deduced from Annex I. This also means that using the feedstock for biomethane production you would replace more fossil fuels than with other alternatives. This in turn, all other things being equal, means that the choice of biomethane will maximize CO_2 emission reductions. An additional benefit is that the residuals from biomethane production can be used to substitute artificial fertiliser, thus reducing the need of fertiliser and consequently achieving additional CO_2 savings, and also avoiding eutrophication.

4) Based on your responses to the above questions, what course of action do you think appropriate?

Based on the rationale given for the above questions, NGVA Europe suggestion aims at taking action by encouraging greater use of biomethane. The following recommendations should be taken into account:

- Set up a Renewable Energy Feed-in Tariff (REFIT) to support biomethane fed directly into the natural gas grid. The new tariff could be in line with the support structure used in Germany but not providing higher support for electricity generation than for production of pure biomethane of a quality fit for injection into the NG grid (in line with the European Parliament vote in the spring of 2008).

- Implement regulatory conditions to allow biomethane producers to inject biomethane directly into the gas grid Europe-wide and adopt suitable standards that will regulate the quality of biomethane that may be injected into the gas grid. Such standards will deal with gas specifications such as chemical composition and energy content.
- Implement new support structures for agriculture to provide an incentive for farmers to produce feedstock for biomethane production.
- Align renewable energy and waste management policies to deliver certainty around feedstock supply over the life of the biomethane plant.
- More funding for research, development and demonstration of renewable gas technologies, building upon the existing expertise in biotechnology and information technology.

Annex I

Fact Sheet: Biomethane production potential in the EU-27 + EFTA countries, compared with other biofuels

Main data for this Fact Sheet was taken from the NGVA Europe's Position Paper "Biomethane", prepared by Mattias Svensson. All the references used for this paper are indicated at the end of this document.

Note about units:
1 EJ (exaJoule) = 10^{18} Joule; 1 PJ (petaJoule) = 10^{15} Joule; 1 EJ ~ 24 Mtoe

BIOMETHANE PRODUCTION POTENTIAL

Some basic data at world level:

- Current global energy utilization in 2007 amounted to 347 exajoules (EJ, corresponding to 8.286 Mtoe, or 96,4 petawatthours, PWh) (*IEA 2009*).
- Theoretical energy potential of the global annual primary production of biomatter is enormous, 4.500 exajoules (EJ)
- Out of the 2.900EJ theoretically harvestable biomass, approximately a tenth is considered technically available on a sustainable basis, 270EJ (75PWh) (*WEA 2000*)
- Other research indicates an upper limit of 1.135EJ in 2050 for a sustainable global bioenergy production not interfering with the supply of food crops (*Ladanai and Vinterbäck 2009*)

European level

- It is reported that the sustainable primary biomass potential, waste streams included, will increase from 8 EJ (2,2PWh) in 2010 to 12EJ (3,3PWh) in 2030 (*EEA 2006*).
- Higher total estimations are also reported, for example a technical potential of biomass of 17EJ (4,7PWh) for EU-27 (*Ericsson and Nilsson 2009*).
- **A large share of this may come from agriculture, increasing from 2EJ (547TWh) in 2010 to 5,9EJ (1,6PWh) in 2030 (*EEA 2007*).**
- **With a conservative land utilization (5% of the arable land), estimations on the biogas potential of energy crops from anaerobic digestion in EU-27 show yields ranging between 0,9 to 2,7EJ (252–758TWh) with harvest yields of 10–30 tonnes dry solids per hectare (*Holm-Nielsen 2008*).** This value is coherent with the previous estimation of 2 EJ for 2010.
- A coarse estimate for the 500 million inhabitants of EU-27 indicates a biogas potential of 68TWh (0,24EJ) from wastewater sludge. In agriculture, animal manure represents a very large biogas potential. Estimates for EU-27 show a theoretical potential of 205TWh (0,72EJ) (*Holm-Nielsen 2008*). Summing up, as much as 453TWh (1,6EJ), not including landfills, could come

annually from waste streams.
Energy crops could optimistically add to that figure up to 1.500TWh (5,4EJ), depending on share of arable land and crop yields.

- Most European countries have extensive grid coverage, enabling a large share of the biomethane potential of Europe to be realized through injection schemes. A German biomethane injection study (*Thrän et al. 2007*) shows that the biomethane potential of anaerobic digestion and thermal gasification from residual products and a sustainable production of energy crops in the vicinity of the European gas grid (EU-28) may in 2020 be in the range of 2.000–3.500TWh (7–12,4EJ).
  If including the potential of the CIS countries, the potential increase to 4.000–6.000TWh (14,1–21,2EJ), large enough to cover the current EU-28 natural gas utilization.

Additional data from other sources, confirming the estimates

Other studies (Möglichkeiten einer europäischen Biogaseinspeisunfsstrategie. Institut für Energetik und Umwelt, Leipzig, 2007 and Biomethane in the transport sector. An appraisal of the forgotten option. Max Ahman, 2009) estimate for the EU 27 the biomethane potential to be approx. 5,47–8,9EJ (131–214Mtoe) in 2020. The given numbers can be taken as a theoretical maximum reference based on available biomass resources in Europe (energy crops, ligneous waste, wet biomass without urban waste, etc.). Taking into account current infrastructure conditions and different biomethane interests in the various European countries, reaching 10% of the mentioned total biomethane potential is feasible for the EU 27 and EFTA countries in 2020. This potential includes biomethane produced though biological and the thermo chemical conversion process.

This figure of 5,47–8,9EJ in 2020 is quite well aligned with the other previously indicated forecast of 8EJ in 2010 to 12EJ in 2030 (*EEA 2006*).

COMPARISON WITH OTHER BIOFUELS

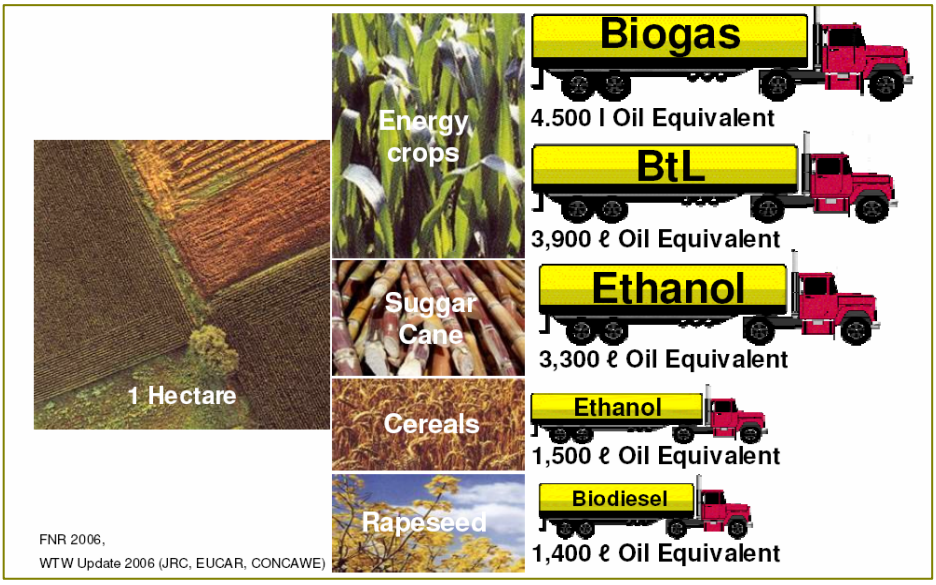
The production of other (liquid) biofuels is based only in crops, and its land surface efficiency is clearly lower than in the case of biogas. See illustrations below.

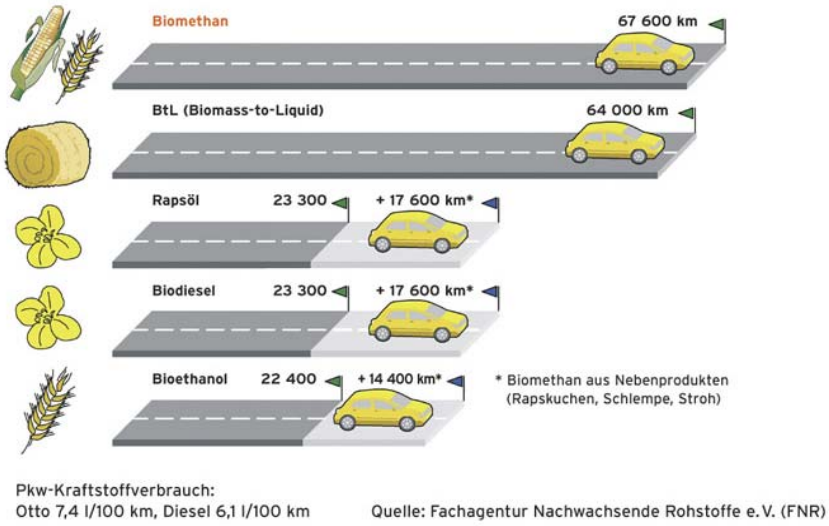
The efficiency of the land devoted to ethanol production, as an average of cereals and sugar cane crops, would be 2.400 litre of oil equivalent per hectare. In the same conditions the biogas production reaches 4.500 litre of oil equivalent, which is roughly double.

If we apply this 53% land efficiency of bioethanol against biogas production, both coming from crops, the total 1.500 TWh (5,4EJ=130Mtoe) estimated potential for biogas, would be reduced to some 800 TWh (2,9EJ= 70Mtoe) in the case of ethanol.

If we now take the global estimation of 2.750 TWh (9,9EJ=238Mtoe) (as an average between 2.000 and 3.500 TWh), this quantity is made out of 1.500 TWh (5,4 EJ=130Mtoe) coming from crops plus another 1.250TWh (4,5EJ=1.108Mtoe) coming from other sources: sewage, manure, landfills, etc.

If we choose bioethanol instead of biogas we would loose the potential of the waste, sewages, etc (1.250TWh, 4,5EJ=108Mtoe) and we would also reduce the efficiency of the crops by 47%. In other words we would obtain 800TWh (2,9EJ=70Mtoe) instead of 2.750TWh (9,9EJ=238Mtoe).





CONCLUSIONS

It is clear that among all biofuels, biogas/biomethane **offers the best results in terms of energy production potential and land efficiency**, and it is also the only one able to be efficiently produced from several different sources.

Additionally we have to keep in mind that **biomethane is the only biofuel in which the composition of the renewable fuel is the same as in the gas coming from well**. This characteristic allows biomethane to be mixed with natural gas at any percentage and without any problem for the vehicle engines.

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