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Comments and summary of the European Commission's proposal to modify the EU biofuel policies of 17th October 2012

Proposed changes to the

Fuel Quality Directive (98/70/EC) and Renewable Energy Directive (2009/28/EC) - COM (2012) 595 final

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Date compiled:	06.02.2013
Project number DBFZ:	3410019
Total number of pages	23

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List of abbreviations

BTL	Biomass to Liquid,
Cob	Corn cob
DBFZ	Deutsches Biomasseforschungszentrum
DDGS	Dried distillers grains with solubles
DE	Germany
RE	Renewable energies
REA	Renewable Energies Act
EFB	Empty Fruit Bunch
EC	European Community
EIPA	European Institute of Public Administration
EP	European Parliament
EU	European Union
FQD	Fuel Quality Directive
FTK	Fischer-Tropsch fuel
HVO/HEFA	Hydrotreated vegetable oil
IFPRI	International Food Policy Research Institute (IFPRI)
iLUC	Indirect land use change
KWK	Cogeneration
MMT	Methylcyclopentadienyl manganese tricarbonyl
Mtoe	one million tonnes of oil equivalent
NGVA	Natural & bio Gas Vehicle Association
NL	Netherlands
OVID	Verband der ölsaatenverarbeitenden Industrie in Deutschland e. V.
POME	Palm oil mill effluent
RED	Renewable Energy Directive
SE	Sweden
SK	Synthetic (bio-)fuels
SNG	Synthetic natural gas
GHG	Greenhouse gas
UCO	Used cooking oil
UFOP	Union zur Förderung von Oel- und Proteinpflanzen e.V.
USDA	United States Department of Agriculture
WWF	World Wide Fund For Nature

1 Introduction

The Renewables Energy Directive, promoting the use of energy from renewable sources (2009/28/EC), passed in April 2009 mandates a concrete target for the share of renewable energy sources in the transport sector. The directive stipulates that by 2020 all member states must ensure that renewable energy sources contribute a minimum of 10 % energy content of the total fuel consumption. The directive requires each member state to produce a national action plan outlining their proposals for reaching this target and present this to the European Commission. These national plans confirm that most member states primarily aim to achieve these targets with the help of biofuels such as biodiesel and bioethanol.

To support the sustainable utilisation and internationalised trade in biofuels, as well as their biogenic raw materials, the directive contains a set of criteria to be met. These sustainability criteria should be considered over the entire supply chain, beginning with the biomass cultivation and its transport, through to the production of the biofuels. It is envisaged that through the implementation of this directive there will be a gradual reduction of at least 35 % greenhouse gas emissions of biofuels in comparison to fossil fuels, with a further minimum of 50 % reduction by 2017. Moreover, additional ecological sustainability criteria will also be included in the certification process. The sustainability validations issued are a prerequisite for the share of the corresponding biofuels to fulfil the quota. These requirements apply to all nations participating economically in the European Union, as well as for all imports from third party states. The EU Commission has already approved and validated 13 certification systems; others are currently in the approval process. Furthermore, the EU Commission has committed itself to regular monitoring of the criteria, in respect to accounting for the ecological and social consequences of its biofuel policies and hence announced the further development of the sustainability criteria and certification within the framework of Directive 2009/28/EC.

Not only the issue of competing uses for land (food vs. fuel) is considered, but there is also a consideration of the possible consequences of the European biofuel policies, and whether negative leakage effects (also referred to as indirect land use changes) are brought about by the resulting additional demands for biological raw materials.

To keep the influence of these affects due to current biofuel policies as low as possible, the EU Commission has examined various options regarding the reduction of indirect land use changes as part of an assessment report. The outcome of this discussion process has resulted in a new proposal to modify the EU directives 2009/28/EC and 98/70/EG[1], which was published in October 2012. This proposal includes a series of aspects regarding the future political framework of the European biofuels sector. The essential content of the proposal is presented in this paper and is combined with potential weaknesses which have been identified to require further clarification before implementation of the proposed changes within the directives.

[1] http://ec.europa.eu/energy/renewables/biofuels/doc/biofuels/com_2012_0595_en.pdf

2 Key aspects of the proposal

The European Commission published a proposal to modify the Fuel Quality Directive (98/70/EC) (hereinafter FQD), as well as the Renewable Energy Directive (2009/28/EC) promoting the use of energy from renewable sources (hereinafter RED) on 17.10.2012. Table 1 below compares the essential changes proposed to the current regulations (current status) outlined in the two directives mentioned above.

Table 1 Summary of the substantial changes

	Current regulations	Proposed changes	Affects
Target	10% renewable energies in the transport sector 2020	Further target: 10% RE in transport, of this max. 5% biofuels from cultivated biomass	RED
		Recommendation: after 2020 only subsidisation of biofuels with low iLUC & high GHG reduction	Both
Apportionment to the target	Double counting of biofuels from waste and residual materials as well as lignocellulose	Double counting of biofuels from definite material fractions	RED
		quadruple: biofuels from definite waste and residual materials as well as non-biofuels (RE)	RED
Consideration of iLUC	Consideration of iLUC required	Reporting of the member states including iLUC factors for biofuels from cultivated biomass: Containing starch: 12 g CO_2 eq./MJ Containing sugar: 13 g CO_2 eq./MJ Containing oil: 55 g CO_2 eq./MJ	FQD, RED
		iLUC = 0, if a) Biofuel not from plants containing starch, sugar or oil b) LUC was considered	FQD, RED
	Bonus for cultivation on degraded areas	Bonus for cultivation on degraded areas omitted	FQD, RED
		Report by the Commission before 31st December 2017 concerning the effectiveness (non-food biofuels incentive) including possible legislative proposal in respect to iLUC factors from 2021	Both
System regulation	GHG reduction of 35%, 50% from 2017 and 60% from 2018 for new systems	New systems (from 07/2014): GHG reduction of 60% necessary (otherwise existing protection)	FQD, RED
Waste terminology definition	Absent	"Waste" = any material/object whose owner wishes/must dispose of it (2008/98/EC), apart from deliberate contamination	RED
Analysis and calculation methods, limits and standard values	Non-essential provisions are enacted with the help of a regulation control committee (1999/468/EC)	Change to the same provisions by the enactment of delegated legislation possible (authorisation transfer to Commission)	FQD, RED

FQD = Fuel Quality Directive (98/70/EG), RE = Renewable Energies, RED = Renewable Energy Directive (2009/28/EG), Biof. = biofuel(s), iLUC = indirect land use changes, LUC = direct land use changes

The core points of the proposed changes are:

- Restricting the apportionment (share) of biofuels from cultivated biomass aimed to meet the 2020 biofuel target of the EU. Biofuels from cultivated biomass are to contribute to attaining the 10 % objective in 2020 with a maximum capping of 5 %. After 2020 further subsidising of these biofuels should no longer be promoted.
- Increasing the share of biofuels from certain residual and waste materials to the fulfilment of national and European biofuel targets.
- The inclusion of iLUC factors, which should be taken into account by each EU member state when reporting GHG emissions. These factors originate from the so-called "IFPRI Study", commissioned by the EU and differ roughly in iLUC-GHG factors for biomasses containing starch, sugar and oil.[2]

Note: Delegated acts

As part of the submitted draft, numerous details in respect to a subsequent change are opened by delegated acts, instead of by regulatory procedures. Delegated acts essentially differ from regulatory procedures:

Regulatory procedure with scrutiny	Delegated acts
Framework; Article 5a of the comitology decision	No binding framework, individual examination
Requirement to obtain an opinion from a comitology committee	Questioning of the committee not mandatory
EP and Council do not fully have equal rights	Complete equality of EP and Council
Restricted veto rights	No restrictions on veto rights
No veto right	Veto right

Source: EIPA[3]

With the instrument of delegated acts, the European Commission has provided the option of supplementing or amending non-essential components of the basic legislation (here the directives RED and FQD). According to recital (21) of the proposal, the Commission is to perform “appropriate consultations, also on an expert level, during its preparatory work”.
The individual points of the RED and FQD affected by this regulation are outlined in Appendix A 2.

[2] Laborde, D.: Assessing the land use change consequences of European biofuel policies. European Commission, 2011
[3] EIPA: Delegated Legislation and Implementation Legislation – the New Comitology, 2011
http://hanse-office.de/files/delegierte-rechtsakte.pdf

3 Achievement of the 2020 target

3.1 Conventional biofuels

Renewable energies from conventional biofuels (i.e. from cultivated biomass containing sugar, starch or oil) is to be capped at half of the European objective for having a 10 % share of renewable energies in the transport sector by 2020. The individual national regulations are not bound to this restriction of 5 % (cf. recital (10) of the proposal).

In its Impact assessment, the Commission estimated an energy consumption in the transport sector of 312 Mtoe in 2020. The corresponding shares of renewable energies resulting from the national action plans are shown in Table 2 (green section), this is also compared with the scenario limiting conventional biofuels, to 5 % in total 10% target (grey section). This would correspond to around 11.6 Mtoe (approx. 13.1 million t or 14.9 million m³) for conventional biodiesel as well as 3.9 Mtoe (approx. 6.1 million t or 7.7 million m³) for conventional bioethanol. It is assumed that the share of renewable electricity (e.g. solar, wind, biomass) contributing to the target remains at 1.4 % for both scenarios. This then would lead to the remaining 3,6 % (out of the 5 % share) required to come from waste and residual materials (2x and 4x weighting considered).

Table 2 Renewable energies in the transport sector 2020

	Apportionment corresponding to National action plans [4]			Adaptation with limitation of conventional biofuels to 5 %		
	Share	Mtoe	Mt	Share	Mtoe	Mt
Total requirement transport sector		312.0			312.0	
Conventional biofuels	8.6 %	26.5		5 %	15.6 [5]	
of these biodiesel		19.8	22.3		11.6	13.1
of these bioethanol		6.7	10.5		3.9	6.3
Biofuels from waste and residual materials	1.5 %			3.6 %		
Electricity from renewable sources	1.4 %			1.4 %		

[4] European Commission: Staff Working Document - Impact Assessment, SWD (2012) 343 final, Brussels, 17.10.2012 http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SWD:2012:0343:FIN:EN:PDF

[5] Proportional allocation to biodiesel and bioethanol analogous to national action plans (green scenario)

Note: Electricity from renewable sources in the transport sector

The target of 10 % renewable energy in the transport sector in 2020 can also be attained with the help of electricity used in the transport sector. Rail transport has a large potential to support the renewables target in the transport sector, as outlined previously in a DBFZ study for the WWF and the Forum for Environment and Development in 2010. In 2020, 1 % and hence a tenth of the target of Germany's [7] 10 % could be attained by electricity in rail transport However, the share of electrical mobility on the road is estimated to be insignificant with 0.1 % even at 1 million vehicles.

Link to brief study:
http://www.forumue.de/fileadmin/userupload/publikationen/p_studie_10_ziel_verkehr.pdf

The requirements for 2020 outlined in Table 2 can be achieved with the existing production capacities of conventional liquid biofuels in the EU. The capacities as well as production volumes, consumption and net import in the EU are summarised for 2011 in Table 2 below.

Table 3 Conventional liquid biofuels in the EU – capacity, production, consumption and net import [8]

	Biodiesel	Bioethanol	HVO/HEFA
Production capacity	22.1 million t [820 PJ]	5.8 million m³ [155 PJ]	approx. 1 million t [42 PJ]
Production volume	8.2 million t	4.6 million m³	No data
Amount consumed	11.0 million t	5.5 million m³	No data
Net import	2.6 million t	1.7 million m³	No data

It is clear that extensive production capacities are available for conventional biofuels, which are more than sufficient to provide the energetic share of 5 % in 2020. On account of the significantly higher production capacities, the share of biodiesel in the 5 % conventional biofuels can also be higher than the assumptions in Table 2.

It is not entirely clear yet how conversion systems (both current and future) will cope with the heterogeneous raw materials defined in Appendix IX of the proposal. In general it can be estimated that for upgrading current technologies, at least one additional processing step will be necessary for the raw material preparation before conversion.

[7] with a share of 30 % electricity from renewable sources in the mix
[8] Sources: EUROPEAN BIODIESEL BOARD: http://www.ebb-eu.org/; F.O.LICHTS: World Ethanol and Biofuels Report; NesteOil: www.nesteoil.com

Potential weakness:

To what extent can existing production systems be adapted to use the "2x and 4x" categories of raw materials?

3.2 Biofuels from waste and residues

The remaining 5 % target of the RED has to then be attained with biofuels that are not produced from cultivated biomass. The European Commission has defined special raw materials for biofuels in Appendix IX of the proposal. Biofuels from these feedstocks contribute to the 10 % target four times (4x) greater (Part A) or two times (2x) greater (Part B) in relation to their energy content. This results in a real share of between 1.25 % up to 2.5 %. Fuels of renewable, but not biological origin are further apportioned to the 4x category. Electricity from renewable energy sources (RE), have their own category and can be apportioned 2.5x. This is not addressed in the current proposal of the Commission, but it is to be assumed that electricity from renewable energy sources remains outside the 5 % of conventional biofuels. Table 4 shows the weightings of the different fuels, or energy sources corresponding to their raw materials.

Table 4 Biofuel raw materials and energy sources corresponding to their weighting

Weighting	Raw material for biofuel/energy source
1x	• Cultivated biomass (containing sugar, starch or oil) • Electricity from rail transport
2x	• Used cooking oil, animal fats classified as category I and II • Non-food cellulosic material, ligno-cellulosic material except saw logs and veneer logs
4x	• Algae • Biomass fraction of mixed municipal and industrial waste • Straw, animal manure and sewage sludge, tall oil pitch, crude glycerine • Palm oil mill effluent (POME)[9] and empty palm fruit bunches (EFB), bagasse • Grape marcs and wine lees, nut shells, husks, cobs[10] • Bark, branches, leaves, sawdust and cutter shavings
	Renewable liquid or gaseous fuels of non-biological origin
2.5x	Electricity from renewable energy sources in road vehicles with electric drive

The majority of "2x and 4x" raw material categories listed in Table 4 are residual or waste materials, which have been given a special weighting by the proposal of the Commission. However, in the case of some of the listed materials, there is the possibility for contradicting the specifications for the calculation of the GHG emissions for biofuels from Appendix V of EU RED (C. Methodology 17. and 18.).

[9] Definition of Appendix IX varies between English (POME = wastewater from oil mills) and German version (free fatty acids from the production of palm oil)
[10] Definition of Appendix IX varies between English (COB) and German version (corn cob)

This becomes clear with the example of straw. When balancing e.g. ethanol from cereals or biodiesel from rapeseed, the emissions from the cultivation process of the biomass are fully added to the grain or seed according to the specifications of EU RED. This occurs with the logic of assigning the emissions to the primary "driver" of the production process causing the emissions. It is to be expected that the planned revaluation will lead to the formation of a market for some of the materials listed in Table 4 and, in perspective, these no longer have to be regarded as residual materials as defined by the RED Appendix V, but instead as secondary products in the ecological balance, according to the international eco-balance standards ISO 14040 ff. According to these standards, a so-called allocation (division of the greenhouse gas emissions) to the products and secondary products is necessary.

The potentials for weighting biofuels from the raw materials listed in Table 4 are limited by diverse factors along the supply chain. The potentials in terms of raw materials will have a large influence on biofuel production, with reduced initial potentials decreasing more for each step along the supply chain from a theoretical potential, to a technical and sustainable potential, finally through to an available economic potential (Figure 1). Straw potentials in Germany, for example, have been determined within the context of the research project "Agricultural Residual Materials for Bioenergy Provision"[11] . A very considerable incentive for the use of these raw material groups is established by the 2x or 4x weighting.

Note: Double counting

Some member states (including Germany) have already incorporated the RED and 2x weighted apportionment e.g. the used cooking oil (so-called) in national law. Significant tendencies that counteract the aim of waste avoidance are discernible here. In the current draft, considerably more extensive material flows are apportioned double or fourfold. There is a clear need for regulations, above all in the case of the material group of biomass shares from industrial waste.

In the next step, the regional distribution of the resultant raw material, as well as their transport worthiness (e.g. in respect to energy density) are of crucial significance. Some of the raw materials (e.g. POME or EFB) typically result outside the EU and can only be processed using biogas technology in the medium term. The use of these waste materials, as well the biomethane produced from these therefore, appears somewhat unlikely within the EU or in the application area of the EU RED[12] in the medium term.

The available potential of suitable raw materials is also limited by further usage options. For example, the use of waste and residual materials is also promoted in Germany on a national level within the framework of the REA [13] for electricity and heat production. One example is biomass containing

[11] ZELLER, V. Et al.: Basisinformationen für eine nachhaltige Nutzung landwirtschaftlicher Reststoffe zur Bioenergiebereitstellung, DBFZ 2011;
http://www.energetische-biomassenutzung.de/fileadmin/user_upload/Downloads/Ver%C3%B6ffentlichungen/02_Basisinformationen_Reststoffe_web.pdf
[12] Unless a legal option is established to apportion biomethane produced and used outside the EU to the target attainment in terms of the balance
[13] Renewable Energies Act

lignocellulose, which has also been proposed for non-energetic utilisation such as in bio-refineries e.g. for plastic and chemical production as outlined in the German roadmap for bio-refineries[14]. Instruments such as the 4x apportionment in the case of biofuels can have a very strong restrictive force on the increasingly coveted material flows here.

On the level of biofuel production, the existing production systems are crucial for the definite waste and residual materials. In addition, systems that have previously been used for cultivated biomass containing sugar, starch and oil can be retrofitted (upgraded) to convert the residual materials to biofuels using the more advanced technologies released to the market by 2020. The following fuel options can be realised from the above material fractions by 2020:

- Liquid fuels, especially:
  - Biodiesel/HVO from used cooking oil and animal fats
  - Bioethanol from suitable industrial waste or possibly straw
- Biomethane (via biogas) for numerous of the above raw material groups.

Conversion options for ligneous biomass (synthetic biofuels) and algae are to be expected far beyond 2020 with regards market-relevant capacities. Appendix A 1 summarises the raw materials with 2x and 4x weighting, as well as the technologies conceivable for the production of these raw materials and biofuel options.

Finally, the distribution and use of the biofuels are important limiting factors for the utilisation potential of biofuels. The existing distribution infrastructure or one that will be established will have a crucial influence on this level for example.

[14] German Federal Government 2012

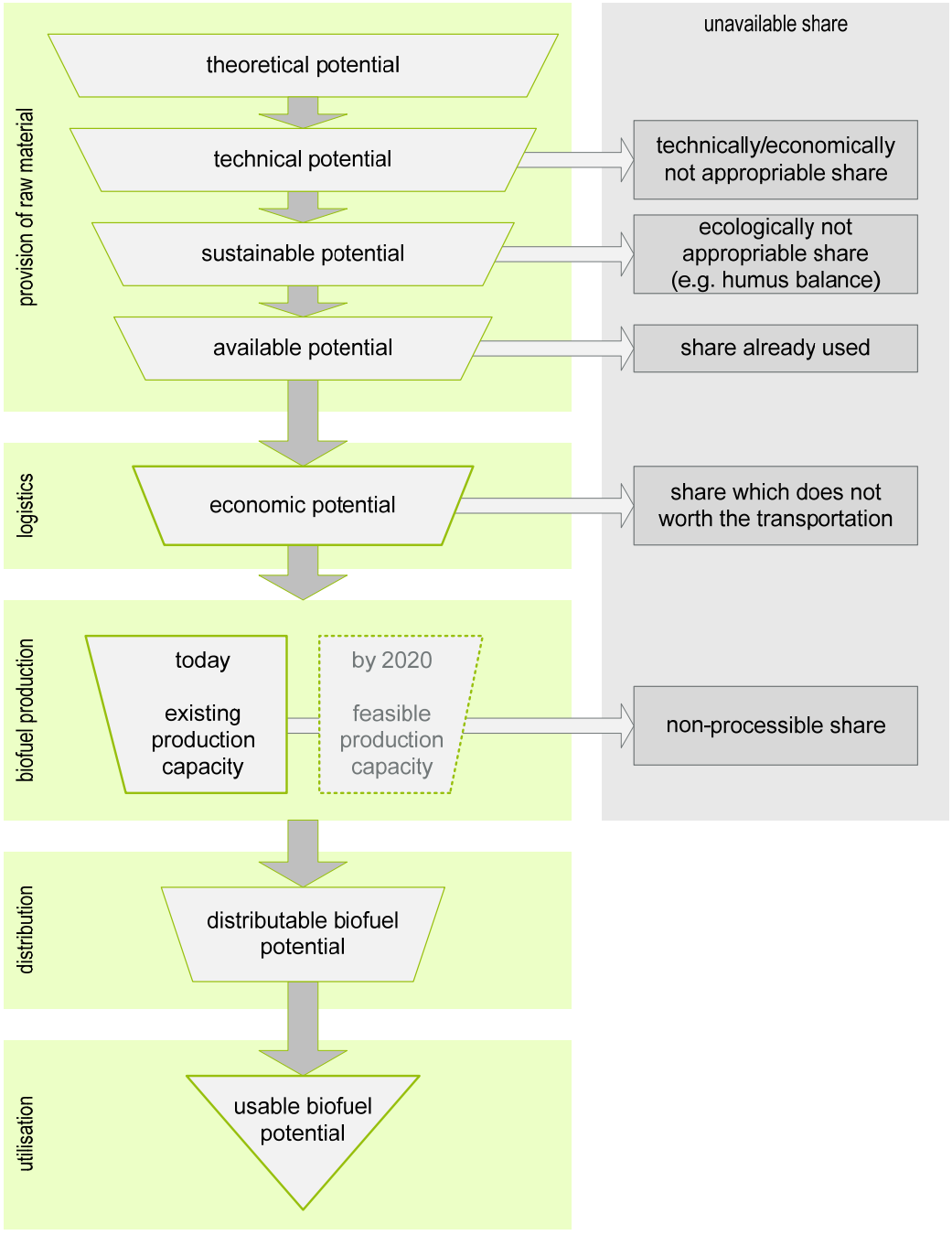


Figure 1 Development of the potential along the supply chain of biofuels

Potential weaknesses:

On what basis does the Commission support the double or fourfold category of raw materials and how do the selected factors come about?

To what extent are the raw materials of Appendix IX available in the EU and to what extent are they already reused or recycled?

Does the use of agricultural residual materials (e.g. straw) that represents an important factor for attaining soil fertility make it necessary to introduce additional sustainability criteria?

3.3 Possible effects in the biofuel sector and target attainment

The changes proposed by the European Commission could have significant consequences for the European biofuel sector if implemented. The table in Appendix A 1 summarises what biofuel options could be available in significant volumes on the market with the definite raw materials (cf. also previous section) by 2020. What preference the market has for biofuel type and volume is essentially influenced by economic aspects. This means the following are above all important besides the availability of these raw materials:

- Expenses for collection/ provision and transport
- Price hikes in the cost of raw materials linked to demand
- Investment expenses in conversion technology
  (if necessary adaption/extension of existing systems or new systems),
- Suitability of the fuel for established vehicle technology.

Used cooking oils and animal fats[15] , with 2x weighting, are expected to be the preferred initial raw materials for the production of biodiesel. Conversion technologies are available, or adaptable to suit the various raw materials in a comparatively cost effective manner. Both cooking oils and animal fats have a comparatively high energy density, which increases both their transport worthiness and also the economic potential for biofuel production. This provides the incentive for larger companies who generate such wastes to also consider biofuel production on a large scale, e.g. slaughterhouses. A market price is already developing for used cooking oils and the use of different grades of animal fats (different qualities) for biofuel production, but it is not uniformly regulated in the member states of the EU. However, in time it is predicted that there will be an in increase in control and certification.

Additionally to this, biomethane represents a promising option. The technology is widely established and biogas can be derived from numerous of the defined raw materials via anaerobic digestion. The biogas can then be supplied to the gas grid in treated form, as a natural gas substitute (e.g. Germany) or used directly as a fuel (e.g. Sweden). Significant capacities have so far been installed, with Germany having the highest installation rate and currently stands around 20 PJ (approx. 600 million Nm^3/a) installed capacity with the majority of which is supplied via renewable raw materials[16] . According to the NGVA, the annual consumption of natural gas in the transport sector in the EU (2011) to around 2.800 billion m^3 (in normal state), in other words approx. 100 PJ.

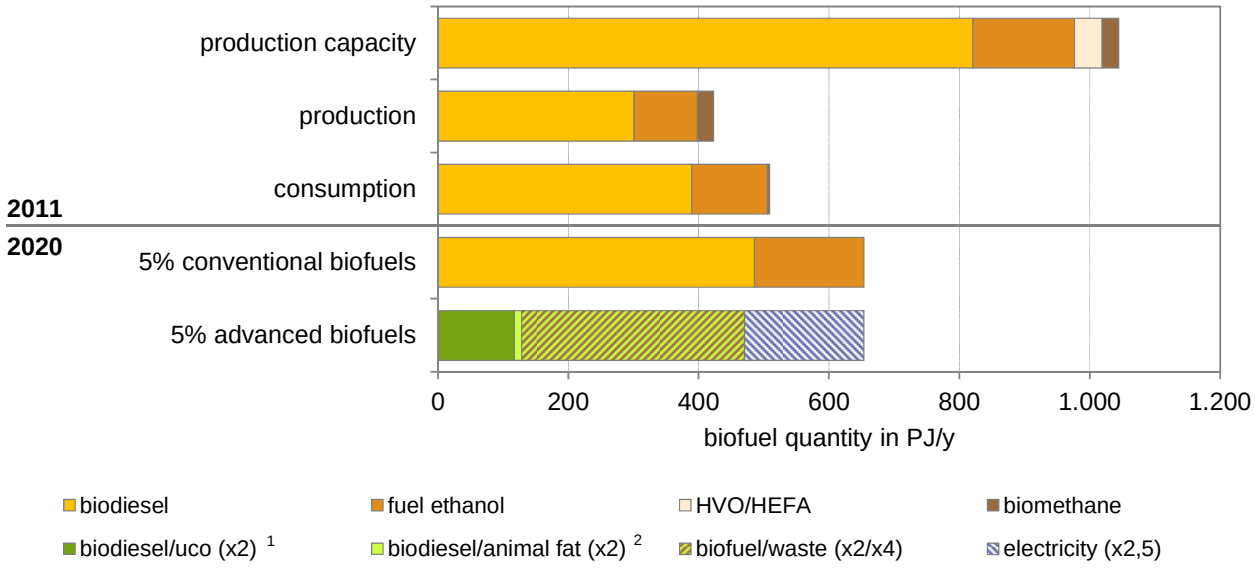
The utilisation of used cooking oil in Europe has been quantified to exceed over 1 million tonnes a year, as identified within the framework of the BioDieNet[17] 2007 study. The potential of animal fats is estimated on the basis of numbers of slaughtering in the EU. The quantities of these two biofuel options based on residual materials are shown in Figure 2. Despite the multiple incentives, a gap of 5 % or 3.6 %

[15] currently excluded in Germany under section 3 of the Biomass Ordinance (BiomasseV)
[16] Primarily corn
[17] BioDieNet: Localised production and supply of biodiesel from used cooking oils - State of the Art in Europe, 2007: http://www.vestforsk.no/filearchive/rapport12-07-biodienet_wp2_rpt_v12.pdf

(cf. Table 2) remains for biofuels from waste and residual materials. This amount of approx. 340 PJ would correspond to an amount of e.g.:

- 4 million m³ bioethanol from industrial waste containing sugar/starch (4x weighting) or
- 2.6 million m³ biodiesel from industrial waste containing fat (4x weighting) or
- 2.4 million m³ biomethane from suitable waste (4x weighting).

The corresponding raw material or biofuel amounts would possibly have to be supplied via imports. Biomethane from waste and residual materials can only presumably cover a very small part of the target.



[1] potential of uco in ES, DE, UK, PT, NL, IT, HU; BG, NO, RO (source: BioDieNet), 2x weighting
[2] potential animal fat: estimate based on number of slaughtering in EU 2011 (source: eurostat), 2x weighting

Figure 2 Possible attainment of the 10% target of the EU in 2020

The regulations in the current proposal set considerable incentives for the use of residual and waste materials for biofuel production. These can have a catalytic effect, resulting in significant increases in the demand and trade of waste materials and hence their price. This has already been the experience with the 2x weighting for used cooking oil.

A further clarification of the raw material groups belonging to multiple weightings is required. Essential material flows must be uniquely assigned and the potential for misinterpretations must be eliminated as early as possible. In addition, the regulations should be implemented uniformly and simultaneously throughout the EU[18] . Otherwise, increased international trade and transport of these raw materials or

[18] Implementation of the RED 2009 so far in 20 of 27 member states (source: Peter Jürgens, 22.01.2013 Berlin)

waste and residual materials and possibly undesired shifts in the market are to be expected, based on previous experiences.

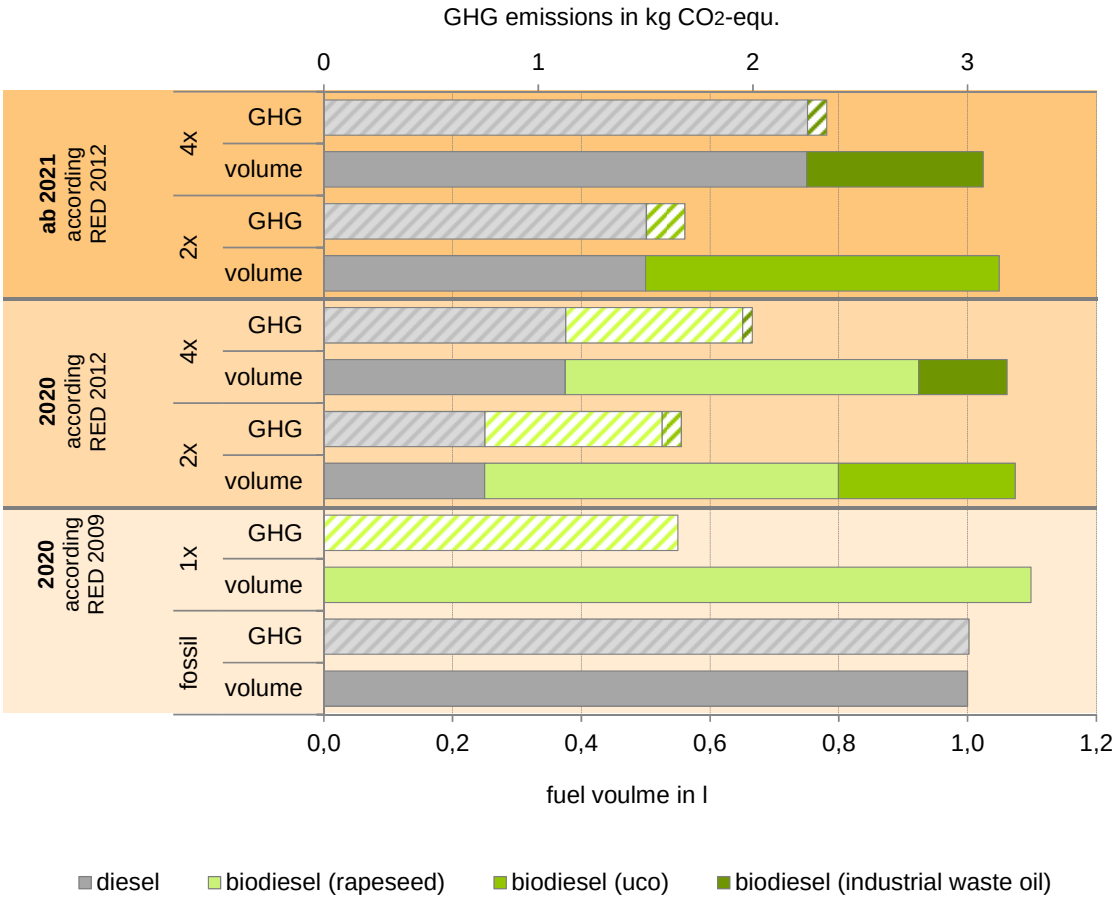
In comparison to the current target implementation, correspondingly significant amount of fossil fuels are estimated to cover the energy demand in the transport sector in 2020. The reason for this is the consideration of biofuels produced from defined feedstocks is accounted for twice or four times due to their energy content and not on an actual mass basis. Figure 3 shows the target attainment of 10 % renewable energies contributing to the transport sector's energy demand, using one litre of fossil diesel and its substitutes to provide an example.

The current substitution of one litre of fossil diesel by one litre of rapeseed biodiesel is illustrated in the lower half of the figure.

This is compared with the splitting of the target (max. 5 % biodiesel from e.g. rapeseed), as well as the pro-rata apportionment of 2x and 4x weighted biodiesel volumes. The upper part of the figure represents the attainment of the target in the case of a projection after 2020 without the apportionment of conventional biofuels.

As the real amount of biofuel decreases due to the factors, correspondingly more fossil diesel is required to cover the actual physical requirement. Above all, the total emissions also possibly rise in comparison to conventional biodiesel, here from rapeseed, when using 4x weighted biofuels. The total emissions would increase by about 20 %[19] compared with the current regulations. The GHG emissions of the biofuel options in this example are based on the typical values (2009/28/EC).

[19] Without considering the informal ILUC factor



(GHG: typical values RED 2009/28/EG, biodiesel (industrial waste oil): use of value of biodiesel (uco);
2x: e.g. biodiesel produced from used cooking oil, 4x: e.g. biodiesel produced from organic industrial waste oil)

Figure 3 Attainment of the target of 10% RE in 2020 with the example of diesel at present (1x) and corresponding to the proposal with 2x or 4x weighting of definite feedstocks (above)

The contribution of biofuels to the definite target of 10 % renewable energy in the transport sector 2020 results in a fictive target. The real share of biofuels is variable depending on the weighting of the biofuels from waste and residues. In comparison to the current regulations, the demand of fossil fuels as well as the overall GHG emissions would be higher.

Potential weaknesses:

How can the envisaged proposals concerning the 2x or 4 x apportionment deal with the principle of waste avoidance or prevent potential misuse of "waste production"?

Are the economic potentials of the proposed waste and residual materials sufficiently high for the target attainment?

Can the requirement of the FQD - a GHG emission reduction of 6 % in the transport sector - be attained with the higher share of fossil fuels?

4 Perspectives after 2020

Regulations concerning the formulation of the biofuel policies after 2020 are not included in the proposal. However, the aim is formulated such that after 2020 there are no further subsidise for any biofuels which have a high iLUC effect or low GHG reduction potential (cf. recital (6) of the change proposal). Additionally the Commission will evaluate the effect of the measures for establishing biofuels from raw materials that do not entail any area requirement and are also derived from non-food cultures by 31.12.2017. It is possible that the result of this evaluation, will lead to a legislative proposal for the inclusion of iLUC factors within the sustainability criteria from the 1st January 2021 (cf. Article 3).

Large amounts of by-products result during the production of conventional biodiesel (above all from rapeseed oil or rapeseed) and bioethanol above all from cereals). In the EU over 3 million t/a DDGS[20] , as well as over 12 million t/a rapeseed meal[21], both by-products of the biofuel production are valuable fodders. The degree of self-sufficiency within the EU for native protein feedstuffs is about 30 %[7]. The omission of biofuels, for example from rapeseed would probably result in a price fall and hence a corresponding decline in the cultivation of rapeseed in the EU, which maybe potentially accompanied by a rising need for imports of soya on the other.

Potential weaknesses:

Is there sufficient planning certainty for innovative but expensive technologies without the perspective 2020+?

Has the Commission formulated an estimation of the consequences for the possible decline in the by-products of conventional biofuel production?

[20] Secondary products of bioethanol production, source: USDA: EU Biofuels Annual 2012
[21] OVID, 2012

5 Conclusion

In principle, a long-term adaptation of the political framework with respect to the provision of subsidies and the recycling of waste and residual materials as in the case for biofuel production is indispensable.

The current proposal of the European Commission will result in essential changes in the biofuel and waste sector if implemented, however it will also result in a number of additional concerns. Besides the issues of doubt already cited, an examination of the following aspects is fundamental for understanding the potential implications of these proposed alterations. Detailed investigations are required regarding:

- Available raw material and biofuel potential over the entire supply chain for non-conventional biofuels,
- The effect of subsidy incentives in the waste sector and the control mechanisms for the avoidance of misuse,
- The reliability of political framework conditions and investment certainty for current and future production systems,
- Change of cultivation systems and possibly decrease of by-products.

Furthermore, aspects in relating to the member states national implementation of the changes are to be considered in a next step.

Need for action: Contemporary definition of the framework conditions underlying subsidy policies after 2020

Above all, innovative technologies regarding recycling of the preferred raw materials (containing lignocellulose, algae etc.) are still associated with high development expense and require high capital investments. Framework conditions reliable over the long-term are therefore invaluable for a corresponding incentive effect.

List of figures and tables

A 1 Biofuel options from residual and waste materials

Waste and residual material			Relevant biofuel options [b]	Technology availability [b]
Designation[22]	Volume potential [a]	Previous use		
2x weighting				
Used cooling oil	EU: > 1 Mt/a[23]	in Germany: fuel, cogeneration	Biodiesel (esterifcation/interesterification), HVO/HEFA (Hydrotreating)	Commercial, further utilisation or adaption of the capacities expected
animal fats classified as category I and II	Germany: approx. 140 kt in 2011 EU: > 500 kt/a	in Germany: fuel, cogeneration, oleochemistry		
Non-food cellulosic material	Refuse, e.g. paper/ cardboard, textiles	Recycling, thermal recycling	Synthetic fuels	Pilot/Demonstration stage, commercially only after 2020
ligno-cellulosic material except saw logs and veneer logs	Diverse timber waste (including sawdust)	Thermal recycling		
4x weighting				
Biomass fraction of mixed municipal waste	Germany: > 1 Mt/a mixed residential & commercial waste[24]	Cogeneration (biogas), compost	Biomethane (via biogas); Synthetic fuels	Biomethane established; SK pilot/demonstration stage, commercially only after 2020
Biomass fraction of industrial waste	Caution: Recyclable products are not deemed to be waste!	Biogas, compost, manure	Biomethane (via biogas); Bioethanol; Synthetic fuels	Biomethane & bioethanol established; SK pilot/demonstration stage, commercially only after 2020
Straw	Germany: 8 to 13 Mt/a[25]	Organic manure, fodder, litter, pellets, Biomethane (via biogas)	Biomethane (via biogas); Bioethanol; Synthetic fuels	Biomethane implemented; Bioethanol Demonstration stage, commercially before 2020; SK pilot/demonstration stage, commercially only after 2020
Animal manure and sewage sludge	Germany: > 1.9 Mt/a sewage sludge[26]	Thermal recycling, (sewage sludge), biogas (animal excrement), organic manure	Biomethane (via biogas); Synthetic fuels	Biomethane implemented; SK pilot/demonstration stage, commercially only after 2020

[22] as per Appendix IX of the proposal
[23] BioDieNet: Localised production and supply of biodiesel from used cooking oils - State of the Art in Europe, 2007
[24] DeStatis: Various waste types and quantities for 2010
[25] V. ZELLER et al.: Basisinformationen für eine nachhaltige Nutzung landwirtschaftlicher Reststoffe zur Bioenergiebereitstellung, DBFZ 2011
[26] DeStatis: Sewage sludge disposal from municipal wastewater treatment plants 2010

Waste and residual material			Relevant biofuel options [b]	Technology availability [b]
Designation[22]	Volume potential [a]	Previous use		
4x weighting				
Tall oil pitch	More relevant for Scandinavia		Synthetic fuels	Pilot/Demonstration stage, commercially only after 2020
Crude glycerine	Germany: ~ 250 kt/a	Cosmetic/ Chemical industry, fodder	Biomethane, BTL (methanol), hydrogen	Biomethane established, methanol demonstrated (plant in NL), hydrogen pilot plant
Grape marcs and wine lees	Germany: ~ 200 kt/a [27]	Partially bioethanol, grape kernel oil, manure	Biomethane (via biogas); Bioethanol	Both established
Husks			Biomethane (via biogas); Bioethanol	Not yet demonstrated for this, but realisable by 2020
Nut shells		Thermal recycling, nut shell granulate (abrasive agents)	Synthetic fuels	SK pilot/demonstration stage, commercially only after 2020
Cobs		Corn cob granulate (binding and polishing agents)	Bioethanol	Bioethanol pilot plants, commercially only after 2020
Bark, branches, leaves, sawdust and cutter shavings	Germany: ~ 680 kt/a bark and cork waste [28]	Furniture industry, thermal recycling		
Bagasse (sugar cane)	No regional raw materials	Process energy bioethanol production	Bioethanol, biomethane (via biogas), Synthetic fuels	Bioethanol: Pilot plants, Biomethane demonstrated, BTL/SNG technology centre
POME/ EFB (palm)				
Algae	Microalgae: globally in few plants, macroalgae: Globally almost unlimited	Cosmetics, foodstuffs	Numerous	HVO demonstrated in tests, all other technical benchmark, possibly commercially after 2020
Renewable liquid or gaseous fuels of non-biological origin	Difficult to quantify, amongst other things dependent on excess electricity from renewable energies		Focus on synthesis-based fuels, e.g. power-to-gas (e.g. E-SNG) or power-to-liquid (e.g. FTK)	For PtG pilot project, possibly commercially after 2020

[a] Note: Amount potentials for Germany/EU are to be evaluated in detail, here only indications
[b] SK = Synthetic fuel (via gassing & synthesis), e.g. FTK, DME, SNG, methanol; BTL – Biomass-to-liquid, DME – Dimethyl ether, FTK – Fischer-Tropsch fuel, SNG – Synthetic natural gas, HVO – Hydrotreated vegetable oil; PtG – Power to Gas

[27] Statistical Almanac concerning Nutrition, Agriculture and Forestry 2010, assumption: 20% marc
[28] DeStatis: Various waste types and quantities for 2010

A 2 Delegated acts in the proposal of the Commission

FQD	
Article 7a (5)	Procedure for the calculation of greenhouse gas emissions, their reduction and groups of providers
Article 7b (3), subparagraph 2	Criteria and geographical regions for "green land with large biological diversity"
Article 7d (5)	Change to the standard values and typical values (Appendix IV Part B & E)
Article 7d (6)	New determination of values for iLUC Introduction of new values to disaggregate levels further Introduction of new values for new biofuel raw materials Checking the categories with iLUC value zero Development of factors for raw materials from non-food material containing cellulose and material containing lignocellulose (Adaptation of Appendix V)
Article 7d (7)	Introduction of new values for further biofuel production methods
Article 8a (3)	New determination of MMT limit value (based on risk assessment, possibly reduction to zero)
Article 10 (1)	Adaptation of the permissible analysis methods (Appendices I, II and III)
RED	
Article 3 (4)	Adaptation of the list of raw materials (waste and residual materials) in Appendix IX
Article 5 (5)	Adaptation of the energy content of fuels in Appendix III
Article 17 (3) subparagraph 2	Criteria and geographical regions for "green land with large biological diversity"
Article 19 (5)	Change to the standard values and typical values (Appendix V Part B & E)
Article 19 (6)	New determination of values for iLUC Introduction of new values on further disaggregation levels Introduction of new values for new biofuel raw materials Development of factors for raw materials from non-food material containing cellulose and material containing lignocellulose (Adaptation of Appendix VIII)[29]
Article 19 (7) subparagraph 1	Introduction of new values for further biofuel production methods

[29] Note: The examination of the categories of biofuels to which a value of zero is assigned for the emissions due to iLUC, is not cited here, in contrast to the FQD