D4.3 | *Benchmark and gap analysis of C&I*

Deliverable:	*D4.3 | Benchmark and gap analysis of C&I*
Author(s):	*Johan Grope and Frank Scholwin (EBA); Kristin Sternberg (FNR)*
Version:	*Final*
Quality review:	*Attila Kovacs (EBA), Stefano Proietti, Loriana Paolucci (ISIS)*
Date:	*09/05/2016*
Grant Agreement N°:	*646533*
Starting Date:	*01-01-2015*
Duration:	*36 months*
Coordinator:	*Stefano PROIETTI, ISIS*
Tel:	*0039 063 212 655*
Fax:	*0039 063 213 049*
E-mail:	sproietti@isis-it.com

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

TABLE OF CONTENTS

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

LIST OF ABBREVIATIONS

AD	Anaerobic Digestion
AMA	Agrarmarkt Austria
BioKraftNachV	Biokraftstoff Nachhaltigkeitsverordnung (Biofuel Sustainability Ordinance)
BioKraftQuG	Biokraftstoff Quotengesetz (Biofuel Quota Act)
BLE	Bundesanstalt für Landwirtschaft und Ernährung (Agency of the Federal Ministry of Food and Agriculture)
BMCS	Biomethane Certification Scheme
C&I	Criteria & Indicators
CfDs	Contract for Difference
CNG	Compressed Natural Gas
EC	European Commission
EECS	European Energy Certification Scheme
EEG	Erneuerbare Energien Gesetz (Renewable Energy Sources Act)
EEWärmeG	Erneuerbare Energien Wärme Gesetz (Renewable Heat Act)
EnergieStG	Energiesteuergesetz (Energy Tax Act)
EU	European Union
FIT	Feed-in Tariff
FQD	Fuel Quality Directive
GGCS	Green Gas Certification Scheme
GHG	Green House Gases
GoO	Guarantee of Origin
GRDF	Gaz Réseau Distribution France (Gas grid/ public supply in France)
ICEP	Installations Classified under Environmental Protection
ILUC	Indirect Land Use Change
ISCC	International Sustainability & Carbon Certification
Nabisy	Nachhaltige Biomasse System (Sustainable Biomass System)
NFFO	Non-Fossil Fuel Obligation
RED	Renewable Energy Directive
RES	Renewable Energy Source
RGGO	Renewable Gas Guarantee of Origin
RHI	Renewable Heat Incentive
RO	Renewable Obligation

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

RTFO	Renewable Transport Fuel Obligation
SC	Sustainability Criterion/Criteria
TÜV	Technischer Überwachungsverein (Technical Inspection Association)
UK	United Kingdom

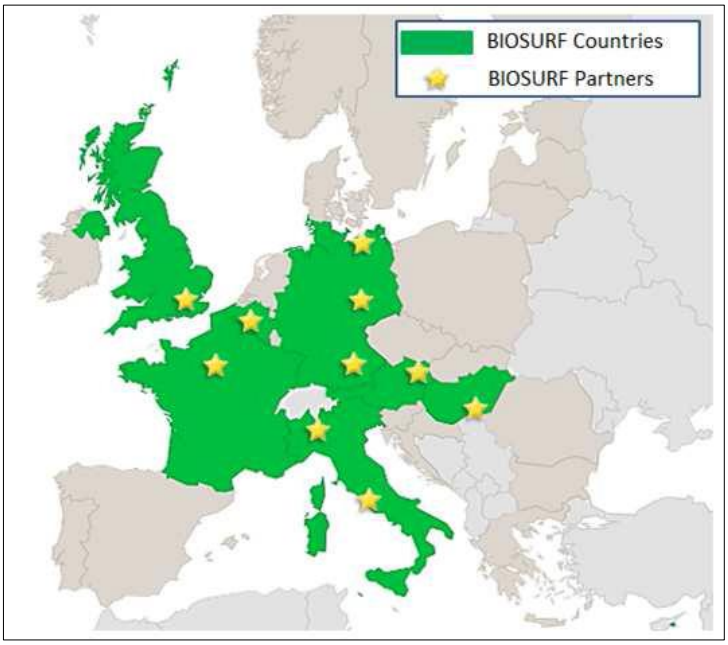
This project has received funding from the European Union's Horizon 2020 research and innovation programme.

BIOSURF IN A NUTSHELL

BIOSURF is an EU-funded project under the Horizon 2020 programme for research, technological development and demonstration.

The objective of BIOSURF (BIOmethane as SUstainable and Renewable Fuel) is to increase the production and use of biomethane (from animal waste, other waste materials and sustainable biomass), for grid injection and as transport fuel, by removing non-technical barriers and by paving the way towards a European biomethane market.

The BIOSURF consortium consists of 11 partners from 7 countries (Austria, Belgium, France, Germany, Hungary, Italy and United Kingdom), covering a large geographical area, as indicated in the figure on the left.



The intention of the project is:

- To analyse the value chain from production to use, based on territorial, physical and economic features (specified for different areas, i.e., biofuel for transport, electricity generation, heating & cooling);
- To analyse, compare and promote biomethane registering, labelling, certification and trade practices in Europe, in order to favour cooperation among the different countries and cross border markets on the basis of the partner countries involved;
- To address traceability, environmental criteria and quality standards to reduce GHG emissions and indirect land-use change (ILUC), as well as to preserve biodiversity and to assess the energy and CO2 balance;
- To identify the most prominent drivers for CO2-emissions along the value chain as an input for future optimization approaches and to exchange information and best practices all across Europe with regard to biomethane policy, regulations, support schemes and technical standards.

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

SUMMARY

The consideration of sustainability becomes an increasing key concern of policy decision-making at the national as well as at theEuropean and international level. This is especially the case for the production of biofuels. A large number of sustainability criteria and indicators exist with regard to biomethane production and use, at a European level as well as at a national level.

The sustainability criteria for biofuels and bioliquids, as specifically defined in the Renewable Energy Directive, have been transposed into national legislation by all six BIOSURF partner countries (Austria, Germany, France, Hungary, Italy, United Kingdom). These are:

- Mitigation of Green-House-Gas (GHG) emissions;
- Protection of biodiversity;
- No conversion of land with high carbon stock;
- Sustainable farm management and protection of soil, water and air quality.

The GHG emissions can either be calculated with the formula using the default values defined by the RED or by using the “BioGrace GHG calculation tool”, which is a voluntary scheme recognised by the EC.

There are a few other voluntary schemes, which have been recognised by the European Commission allowing sustainability verification of biomethane used as transport fuel like REDCert, ISCC and NTA8080. These voluntary schemes provide relevant definitions – always in reference to EU legislation - and guidelines for sustainable biofuel production and use aiming to facilitate sustainability verification by an independent body. They also define additional sustainability requirements going beyond the ones stipulated in EU legislation, for instance NTA8080, which defines additional requirements for the protection of biodiversity and the protection of soil, water and air.

At national level, additional requirements have mainly been identified concerning the use of feedstock for biomethane production. Particularly in France, limitations have been defined regarding the use of energy crops and, in Germany, regarding the use of corn and cereal grain as well as animal fats and oils. These national requirements and also other additional ones, primarily need to be respected, if biomethane is used for other purposes than for use as transport fuel, e.g. for generating electricity and heat.

Those additional requirements may in some cases lead to significant burdens for the cross border trade of biomethane across Europe. Therefore a clear separation between sustainability criteria at a national and the European level should be aimed for, based on the following rules:

- National sustainability criteria should only focus on requirements regarding plant commissioning, digestate use and biomethane utilization/conversion.
- National sustainability criteria, which are linked to the biomethane use (e.g. efficiency of biomethane conversion), should never define requirements with regard to the biomethane production (including biomass supply).
- European sustainability criteria on gaseous biomass should be mandatory for all member states (as planned for the next revision of the RED).

Another identified major burden for biomethane production, use and especially its cross border trade is the prohibition of averaging GHG emission savings in case of producing biomethane from multiple substrates with different GHG emission figures.

This project has received funding from the European Union’s Horizon 2020 research and innovation programme.

1. DESCRIPTION OF SUSTAINABILITY CERTIFICATION ON BIOMETHANE IN EUROPE

In the following, the principle of sustainability certification of biomethane in Europe and its member states as well as the most important terms in this context are described.

Principle of Sustainability Certification in Europe – using the example of Germany[1]

Figure 1 gives an overview about sustainability certification in the EU and its member states, by illustrating the case of Germany as an example.

In order to receive public support or count towards mandatory national renewable energy targets, biofuels and bioliquids used in the EU must comply with the EU's sustainability criteria [EC 2016]. The main criteria (greenhouse gas savings, protection of land with high biodiversity value and land with high carbon stock) are defined in the RED (see chapter 2.1.1). Additional rules and requirements are defined in the Fuel Quality Directive (FQD, see chapter 2.1.2), the Communication COM 2010/C 160/01 (see chapter 2.1.3) and the ILUC Directive (see chapter 2.1.4).

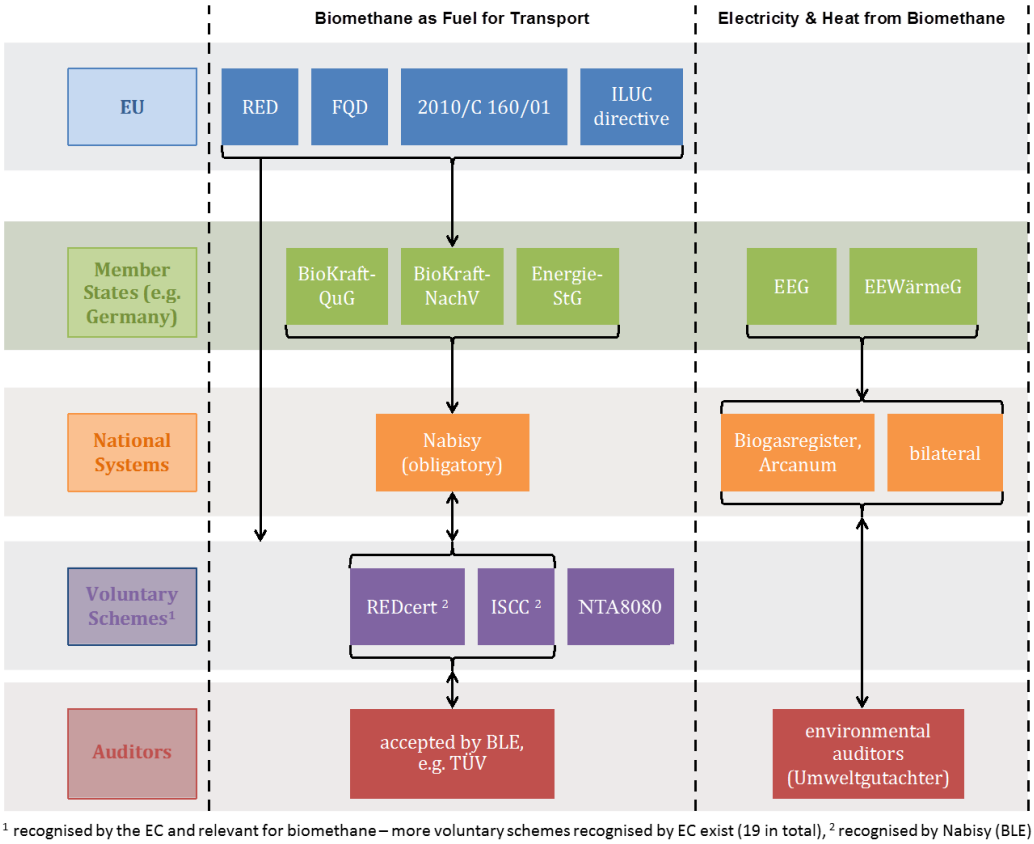


Figure 1: Different layers of the sustainability certification of biomass for energy purpose in the EU and its Member states for Germany as an example

[1] Germany has been chosen only as an example, in order to show the difference between sustainability certification as defined by the EC and its member states.

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

Member states are responsible for making sure that the sustainability criteria are met by the stakeholders when biofuels/bioliquids are taken into account for the purposes defined by the EC. In the case of Germany, the Biofuel Sustainability Ordinance (BioKraftNachV) defines the criteria and rules for sustainable biofuels and bioliquids, mainly following the definitions of the RED. These criteria and rules need to be fulfilled, when taking into account the biofuel for the biofuel quota, as defined in the Biofuel Quota Act (BioKraftQuG) or making use of a tax reduction as defined in the Energy Tax Act (EnergieStG).
These criteria and rules also apply for biomethane, if it is used as transport fuel. In the case of using biomethane for generating electricity and/or heat, the EU does not define any obligatory sustainability criteria. Nevertheless, member states may define sustainability criteria themselves as a requirement for getting subsidies for the energy produced from biomethane. In Germany several sustainability criteria need to be fulfilled for this purpose. They are defined in the Renewable Energy Sources Act (EEG) and the Renewable Heat Act (EEWärmeG).

Member states need to transpose the European sustainability requirements into national law. In order to eventually implement these stipulated sustainability requirements there is a need for a national data collection and auditing system [EC 2010]. In Germany, the relevant authority[2] has developed the database “Nachhaltiges Biomasse System” (Nabisy), which is obligatory, when taking into account the biofuel for the biofuel quota or making use of the tax reduction. In the case of using biomethane for generating electricity and/or heat and making use of the financial subsidies of the EEG and EEWärmeG, no such registry is obligatory. However, most stakeholders use existing voluntary registries, such as the “Biogasregister” operated by the German Energy Agency, as it is recognised by the German authorities as a mass balancing system and therefore facilitates the exchange of certificates (including the verification of mandatory sustainability criteria, when making use of the financial support of the EEG or the EEWärmeG), that islinked to the trade of biomethane between t stakeholders.
In addition to using a “national system”, such as Nabisy, biomethane producers can also (additionally) participate in voluntary schemes that have been recognised by the EC in order to demonstrate their compliance with the mandatory sustainability criteria . From 19 overall voluntary schemes for sustainable biomass provision, which have been recognised by the EC, three are relevant for biomethane (NTA8080, REDcert and ISCC). In Germany the national authority has only recognised REDcert and ISCC. The certification itself is being done by auditors, who have been accepted by the national authorities.

Sustainability Criteria

In general sustainability criteria specify or label important areas within the environmental, economic and social impact categories of a product and its production and use. The SC described and analysed in this report refer to the Renewable Energy Directive (RED)[3], which only address environmental impacts involved in biofuels and bioliquids production. Additional SC may address social and economic issues. They are not considered in this report. In the context of sustainability

[2] Bundesanstalt für Landwirtschaft und Ernährung (BLE), an agency of the Federal Ministry of Food and Agriculture
[3] Renewable Energy Directive (RED), number 2009/28/EC has been published on 23/04/2009 and implemented on 13/05/2009. The legal act can be found under the following link http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32009L0028

This project has received funding from the European Union’s Horizon 2020 research and innovation programme.

certification of biomethane in Europe, it is important to understand that the sustainability criteria for biofuels and bioliquids defined at a European level are also relevant for biomethane when it is used as transport fuel. However, at present these SC for gaseous biofuels, do not have to be fulfilled mandatorily by the member states.
In this report, additional sustainability criteria will be taken into account, which are relevant for biomethane production when using it for other purposes, such as generating electricity and/or heat. Some member states have defined their own SC for these cases, independent from European legislation and regulations. At a European level,

Chain of Custody

Sustainability certification needs to consider the whole production process of the biomethane. Therefore clear rules are defined on how the single steps of the overlall process and the involved stakeholder have to be taken into account for the sustainability certification process. The method by which a connection is being made between information or claims concerning raw materials or intermediate products and claims concerning final products is known as the chain of custody. The chain of custody usually includes all the stages from the feedstock production up until the release of the energy carrier for its final use.

Management Practices

The management practices of sustainability verification, as analysed in chapter 0, cover all administrative processes for verifying the defined sustainability criteria and indicators stipulated within the relevant legislation and regulations (see chapter 0) of the European Union (EU) and its member states. This includes in particular:

- existing voluntary or obligatory national systems or registries, which are used for the registration of certified biomethane and
- administrative rules defined by the national authorities with regard to the sustainability verification process, e.g. responsibilities, qualification of approved certification bodies and systems.

Voluntary Schemes

Voluntary schemes - recognised by the EC - verify compliance with the EU's biofuels sustainability criteria. They check that biofuel production did not take place on land with high biodiversity, that land with high carbon stock was not converted for biofuel production, and that the production of biofuels led to a sufficient reduction of greenhouse gas emissions as defined in the RED. Several schemes also take into account additional sustainability aspects such as soil, water, air protection and social criteria.
For the purpose of certification, independent auditors check the whole production chain from the farmer growing the feedstock up to the biofuel producer or trader.
Voluntary schemes are mostly privately run but recognised as valid by the EC. Recognitions can last for a period of five years. [EC 2016]
Besides those voluntary schemes, there exist several more voluntary schemes, which have not applied for recognition by the EC. These schemes do not aim to serve as a system for sustainability certification according to the rules defined by the EC (e.g. RED), but can be used by

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

stakeholders in order to fulfil national requirements on sustainability certification. This can be the case, if the biomethane is not used as biofuel for transport but for other purposes, e.g. generation of electricity and/or heat. Some voluntary schemes do not even serve for proofing any requirements linked to a financial support but only to certify the biomethane as a „green“ product for the free gas market.

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

2. LEGISLATION AND REGULATION ON SUSTAINABILITY CRITERIA

In the following all legislation and regulation on sustainability criteria for biomethane production, as defined by the EC and the national authorities of the six partner countries (AT, DE, FR, HU, IT, UK), will be described. This will be done by describing all requirements with regard to the provision of biomethane defined by the SC within the legislative and regulative documents (see Table 1 to Table 16). Additionally, each SC will be analysed concerning its relevance for biomethane production and use from the different raw materials as defined in Deliverable 4.1 (animal waste, other waste materials and sustainable biomass). If a SC is relevant for a certain raw material category, this category will be marked (see Table 1 to Table 16). If a SC is relevant for all of the three categories, all categories will be marked. If it does not address specific requirements regarding the raw materials of biomethane production (e.g. limit of methane emissions from the production plant), it is marked as “non-specific”.

2.1 EU legislation and regulation

The Renewable Energy Directive sets out sustainability criteria for biofuels and bioliquids. For biofuels, corresponding criteria are set out in the Fuel Quality Directive. They apply to biofuels/bioliquids produced in the EU and to imported biofuels/bioliquids. Member states are responsible for making sure that the sustainability criteria are met by stakeholders, when biofuels/bioliquids are taken into account for the purposes listed in the Renewable Energy Directive, the Fuel Quality Directive, the Community Guidelines on state aid for environmental protection and the Regulation on CO2 from passenger cars.

2.1.1. Renewable Energy Directive

The Renewable Energy Directive (RED) sets a mandatory target for renewable energy sources (RES) in overall energy consumption and in transport fuels and GHG emission reduction target (which could be achieved through the use of RES such as biomethane). It establishes sustainability criteria for biofuels and describes mass-balance system. Art. 17 sets out sustainability criteria for all biofuels and bioliquids produced or consumed in the EU to ensure that they guarantee real GHG savings and protect biodiversity.

Table 1: Sustainability Criteria defined by the Renewable Energy Directive and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
GHG savings	• Minimum of 35 % GHG emission reduction in comparison to fossil fuel; 50 % from 2017 and 60 % from 2018. • Sets the GHG emission value for the fossil comparator as 83.8 gCO2eq/MJ for transport applications • All life cycle emissions taken into account when calculating GHG savings, including emissions from cultivation, processing and transport. • Default values for GHG calculation only exist for biomethane from	x	x	x	

This project has received funding from the European Union’s Horizon 2020 research and innovation programme.

	municipal waste, liquid slurry and dry manure: ○ 23 gCO2eqMJ - organic fraction of municipal waste ○ 16 gCO2eq/MJ for biogas produced from liquid slurry ○ 15 gCO2eq/MJ for biogas produced from manure • Introduces a bonus of 29gCO2eq/MJ for biomass produced on land which was qualified as degraded by 01 January 2008 - this bonus is valid for 10 years				
Biodiversity	• Biofuels and bioliquids shall not be made from raw material obtained from land with high biodiversity value, namely land that had one of the following statuses in or after January 2008, whether or not the land continues to have that status: ○ **primary forest and other wooded land**, namely forest and other wooded land of native species, where there is no clearly visible indication of human activity and the ecological pro- cesses are not significantly disturbed; ○ areas designated: ▪ by law or by the relevant competent authority for **nature protection** purposes; or ▪ for the **protection of rare, threatened or endangered eco-systems or species** recognised by international agreements or included in lists drawn up by intergovernmental organisations or the International Union for the Conservation of Nature, […] unless evidence is provided that the production of that raw material did not interfere with those nature protection purposes; ○ **highly biodiverse grassland** that is: ▪ natural, namely grassland that would remain grassland in the absence of human intervention and which maintains the natural species composition and ecological characteristics and processes; or ▪ non-natural, namely grassland that would cease to be grassland in the absence of human intervention and which is species-rich and not degraded, unless evidence is provided that the harvesting of the raw material is necessary to preserve its grassland status. • Not to be fulfilled by biofuels produced from waste and residues (other than agricultural, aquaculture, fisheries and forestry residues).			x	
Land use	• Biofuels cannot be grown in areas converted from land with previously high carbon stock such as wetlands or forests (reference date: January 1st 2008): ○ **wetlands**, namely land that is covered with or saturated by water permanently or for a significant part of the year; ○ **continuously forested areas**, namely land spanning more than one hectare with trees higher than five metres and a canopy cover of more than 30 %, or trees able to reach those thresholds in situ; ○ land spanning more than one hectare with trees higher than five metres and a canopy cover of between 10 % and 30 %, or trees able to reach those thresholds in situ, unless evidence is provided that the carbon stock of the area before and after conversion is such that […] the conditions laid down in paragraph 2 of this Article would be fulfilled. • Not to be fulfilled by biofuels produced from waste and residues (other than agricultural, aquaculture, fisheries and forestry residues). • Biofuels and bioliquids shall not be made from raw material obtained from land that was **peatland** in January 2008, unless evidence is provided that the cultivation and harvesting of that raw material does not involve drainage of previously undrained soil.			x	
Sustainable farm management	• Requirements and standards for good agricultural and environmental conditions as defined in COUNCIL REGULATION (EC) No 73/2009 - "common rules for direct support schemes for farmers" need to be			x	

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

	fulfilled				
Protection of soil, water and air	• Regarding the Protection of soil, water and air, the RED refers to Council Regulation (EC) 73/2009, which stipulates common rules for support schemes for farmers under the common agricultural policy of the European Union (known as 'cross compliance criteria').	x	x	x	

2.1.2. Fuel Quality Directive[4]

The Fuel Quality Directive (FQD) sets environmental criteria for fossil fuel components such as petrol and diesel. It also determines the permitted level of emissions derived from fossil fuels and includes GHG emission reduction target.

The FQD obliges the member states to reduce GHG emissions related to the consumption of transport fuel by 10% by 2020.

Art. 7b sets out sustainability criteria for all biofuels produced or consumed in the EU to ensure that they guarantee real GHG savings and protects biodiversity. The sustainability criteria are the same as defined in the RED (see chapter 2.1.1)

Table 2: Sustainability Criteria defined by the Fuel Quality Directive and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
GHG savings	same as RED - see chapter 2.1.1	x	x	x	
Biodiversity	same as RED - see chapter 2.1.1			x	
Land use	same as RED - see chapter 2.1.1			x	
Sustainable farm management	same as RED - see chapter 2.1.1	x	x	x	

2.1.3. Communication COM 2010/C 160/01

The communication from the Commission on voluntary schemes and default values in the EU biofuels and bioliquids sustainability scheme (210/C 160/01) defines the possibilities for stakeholders to show that the sustainability criteria have been met (see chapter 1). Therefore, it defines voluntary schemes, which can be one option to do this. It also defines the assessment and recognition process of voluntary schemes by the EC.

In addition to the Renewable Energy Dirctive, the Communication COM 2010/C 160/01 specifies some definition with regard to land with high biodiversity and high carbon stocks (see Table 3)

[4] Fuel Quality Directive (FQD), number 2009/30/EC has been published on 23/04/2009 and implemented on 13/05/2009. The legal act can be found under the following link http://eur- lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0030

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

Table 3: Sustainability Criteria defined by the Communication COM 2010/C 160/01 and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
GHG savings	• The communication gives guidance on when the default values, defined in the RED, can be used, including when combinations of disaggregated default values and actual values can be used. • The communication clarifies that if the characteristics [of mixed consignments (e.g. certain amount of biomethane)] include different figures on greenhouse gas emissions they remain separate; these figures cannot be averaged for the purpose of showing compliance with the sustainability requirements. - no averaging of GHG emission figures of biomethane from different substrates. • The communication clarifies that the 'typical values', as defined in the RED, cannot be used by stakeholders. They can be used by member states in their biennial reporting to the Commission on progress in the promotion and use of energy from renewable source. • For the calculation of emissions from 'cultivation', the method allows for the use of averages (for a particular geographical area) as an alternative to actual values. Member states can draw up lists of such average values; they could also be incorporated in voluntary schemes that address greenhouse gas emission impact	x	x	x	
Biodiversity	• In the case of non-natural highly biodiverse grassland, an exception is possible where evidence is provided that the harvesting of the raw material is necessary to preserve the area's grassland status. In the case of nature protection areas, an exception is possible where evidence is provided that the production of raw material did not interfere with the nature protection purpose in question.			x	

Land use	• The term 'continuously forested area' as defined in the RED does not include land that is predominantly under agricultural or urban land use.
	• Land under agricultural use in this context refers to tree stands in agricultural production systems, such as fruit tree plantations, oil palm plantations and agroforestry systems when crops are grown under tree cover.
	• For biofuels/bioliquids produced from biomass grown on land that was peatland in January 2008, an exception is possible if evidence is provided that:
	  ○ the soil was completely drained in January 2008, or
	  ○ there has not been draining of the soil since January 2008.
	• This means that for peatland that was partially drained in January 2008 a subsequent deeper drainage, affecting soil that was not already fully drained, would constitute a breach of the criterion.
				x	

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

2.1.4. ILUC Directive[5]

The Directive aims to promote transition from conventional (starch-rich energy crops) biofuels (with a risk of ILUC emissions) to advanced biofuels (that deliver substantial greenhouse gas savings and low-ILUC) and encourage a greater market penetration of advanced biofuels by allowing such fuels to contribute more to the targets in the RED than conventional biofuels.

Table 4: Sustainability Criteria defined by the ILUC Directive and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
Feedstock*	• Limitation of the share of energy from biofuels produced from cereal and other starch-rich crops, sugars and oil crops and from crops grown as main crops primarily for energy purposes on agricultural land to a maximum of 7 % of the final consumption of energy in transport in the member states in 2020 for the calculation of biofuels in the numerator. • Indicative 0.5% target for advanced biofuels as a reference for national targets which will be set by EU countries in 2017 • Double Counting for biomethane from certain materials (mainly waste & ligno-celluosic/non-food cellulosic biomass)	x	x	x	

*These criteria may have a direct or an indirect influence on biomethane production and use from certain raw materials, as e.g. the double counting of biomethane from waste materials reduces the competitiveness of biomethane from energy crops.

2.2 Legislation and regulation in Austria

In Austria, the first regulatory act promoting renewable energy was published in 1999 (*ELWOG*) as a federal law and it stated that each state has to introduce targets and FITs (Feed-In Tariffs) for renewables. Having 9 different regulations on renewable energy support in 2002, Austria decided to create a direct federal law, the Green Electricity Act (*Ökostromgesetz*). The law has been amended several times over the time (the last time in 2011) and it established targets for renewable electricity and criteria for obtaining the Feed-in Tariffs by the operators. Under the Green Electricity Act the Ministry of Commerce publishes for each year Feed-in Tariffs for renewable electricity, called Green Electricity Feed in Tariff Ordinance (*Ökostromeinspeisetarifverordnung*), thanks to which it is possible to quickly react on the technical and economic development of renewable energy sector. However, the Green electricity Act of Austria sets no requirements on sustainability for feedstock used for electricity production from biogas. It only makes a differentiation between agricultural feedstock and non-agricultural feedstock for biogas production for different feed-in tariffs. In the Biomass Report 2010 the Commission recommended introducing sustainability criteria in relation to biomass used for

[5] The ILUC directive, officially called "amendments to Renewable Energy Directive (RED) and Fuel Quality Directive (FQD), number DIRECTIVE (EU) 2015/1513" has been published on 15/09/2015 and implemented on 5/10/2015. The legal act can be found under the following link http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L:2015:239:TOC

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

generating electricity, heating/cooling – similarly to biofuels. So far, this recommendation has not been implemented in Austria but the Government plans to introduce sustainability criteria into the Green Electricity Act (*Ökostromgesetz, 75/2012*) at the next time this Act will be updated.
Sustainability criteria for biomethane, double counting, and a registration requirement of biomethane fuel producers are settled under two other legislative acts: Transport Fuel Ordinance (*Kraftstoffverordnung*) and Act on agricultural raw materials for biofuels (*Landwirtschaftliche Ausgangsstoffe für Biokraftstoffe*).

2.2.1. Transport Fuel Ordinance[6]

There is no biomethane specific sustainability criteria stipulated in Austria with respect to biomethane used as vehicle fuel. The Austrian fuels regulation (*Kraftstoffverordnung, 398/2012*) refers to the RED. Additionally, there is a separate regulation on agricultural feedstock for biofuels (*Landwirtschaftliche Ausgangsstoffe für Biokraftstoffe, 250/2010*), which also mostly refers to RED.
Correspondingly, no biomethane production specific mass-balancing regulation has been introduced in the Austrian legislation. In accordance with the RED, the general rules valid for biomass used for the production of liquid biofuels are applied one-to-one in relation to biomethane used as vehicle fuel.
The produced biofuel has to be registered via the Environment Agency Austria (*Umweltbundesamt www.umweltbundesamt.at*). The registration is regulated through the fuel regulation (*Kraftstoffverordnung, 398/2012*) and can be done electronically.[7]
If biofuels come from other member states, the federal environmental agency has to recognise them, whether those certificates are also recognised by the responsible organization from the original Member State.

Table 5: Sustainability Criteria defined by the Austrian Transport Fuel Ordinance and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
GHG savings	• The requirements for LCA are written down in article 19 and directly based on the efforts of RED 2009/28/EG	x	x	x	
Biodiversity	• Refers to Act on agricultural raw materials for biofuels			x	
Land use	• Refers to Act on agricultural raw materials for biofuels			x	

[6] https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20008075
[7] http://www.umweltbundesamt.at/umweltsituation/verkehr/elna/elna_registrierung/

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

2.2.2. Act on agricultural raw materials for biofuels[8]

Table 6: Sustainability Criteria defined by the Austrian act on agricultural raw materials for biofuels and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
GHG savings	• According to RED (see chapter 2.1.1)			x	
Biodiversity	• According to RED (see chapter 2.1.1)			x	
Land use	• Excluded is biomass from areas which are protected by conservation laws besides those feedstock where the laws directly indicate the need of use of the growth (article 2) • Land used for biomass production has to fulfill the requirements of 73/2009/EU and has to be used for agricultural use since 01.01.2008 (article 2)			x	

2.3 Legislation and regulation in France

Anaerobic digestion (AD) is fully regulated by national legislation: there are specific Feed-in Tariffs for electricity and biomethane and, furthermore, AD plants are under the scope of the legislation focusing on installations classified under environmental protection (ICPE). Most French environmental laws have been revised since 2011. These amendments demonstrate a strong commitment to energy transition in France but also the increasing amount of EU legislation that has gradually been adopted by the respective national legislative framework.

To continue, three of these laws are directly focused on energy generation. All the other ones are broader legislations but do integrate clauses that are related to energy and most specifically the biomethane sector. To be noted as well, there is only one legislation that is directly concentrating on biogas. With regards to support systems that are stipulated in these legislations and which are focusing on biogas, three of them are based on tax exemptions, another one is working with Feed in Tariffs and the last one is based on subsidies given for the development of biogas installations.

Finally, four different support measures have been determined for biomethane production: two of these schemes are related to tax exemptions and the other ones are related to premiums given to the biomethane sector.

In France, at the moment, there is no separated counting of the raw material quality used for biomethane production. This is due to the fact that biomethane is not yet counted as biofuel in France. This has a direct impact on the taxation applied to biomethane, since it is not admissible to the favourable taxation applied to biofuels. Furthermore, biomethane is subject to the same taxation as fossil energy. A different tax is applied to injected biomethane (“TICGN”) and bioNGV (“TICPE”), which is nevertheless similar to the corresponding fossil fuels: natural gas and NGV. A

[8] https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20006876

This project has received funding from the European Union’s Horizon 2020 research and innovation programme.

problematic key issue in the French taxation of carbon emissions is that in this case there is no distinction made between fossil and non-fossil fuel and respective calculations count from “pump to wheel” and not from “well to wheel”.

Another main characteristic of French incentives for biomethane production is the difference in the value of the guarantee of origin recovered by the supplier depending on the final use: the supplier obtains 25% of the value of the Guarantee of Origin (GoO) after sale (75% goes to the state), or 100% in the case of using biomethane as a biofuel (bioNGV).

On the other hand, there is currently no feed-in tariff for biomethane, when it is not injected into the grid.

At present, biomethane is not included into the French biofuel production report to the European Commission, since:

a) it is not handled administratively (in the spirit of RED and FQD) as a biofuel and
b) it doesn’t represent a high volume (only 8 sites injecting presently).

GRDF (Gaz Réseau Distribution France) and the grid operators are actively working on the integration of biomethane in the calculation of achieving RED biofuel targets and also on a certificate scheme for biomethane production.

Soon an amendment of the regulation of substrates will be implemented (presumably in May 2016), which determines the general use of substrates for biogas respectively biomethane production aiming to guarantee a sustainable use of raw materials in the biogas/biomethane sector. Among others it specifies that the use of energy crops needs to be limited to 15% (in tonnage) over a year or over three years on a sliding scale (this is yet to be determined). An exception will be possible for energy crops coming from contaminated soils and which have not been put on the food market for sanitary reasons. Further, intermediate or so-called catch crops will be authorized.

•

2.3.1. Decree of November 23rd, 2011 setting conditions for the purchase of biomethane

This decree determines the requirements for receiving the feed-in-tariffs. Therefore, these criteria are theoretically also applicable to imported biomethane. It also defines the level of the feed-in-tariffs (basic tariffs and bonuses granted for the use of certain categories of feedstock). As a further stipulated obligation, the producer must sign a purchase contract with the gas supplier a connection contract and an injection contract with the gas grid operator.

Table 7: Sustainability Criteria defined by the French Decree of November 23rd 2011 setting conditions for the purchase of biomethane

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific

This project has received funding from the European Union’s Horizon 2020 research and innovation programme.

GHG savings	• The injected biomethane has to be adapted to the absorption capacity of the grid. The producer can use a flare if it is not adapted or in case of non-conformity of the quality of the gas. But the direct emission in the air is forbidden.				x

2.3.2. Decree of November 23rd 2011 setting the nature of feedstock for the production of biomethane for injection into natural gas grids

This decree defines the nature of feedstock for the production of biomethane for injection into natural gas grids. It stipulates that the national agency for sanitary security must, upon request of the ministries of the environment, health or labour, investigate the safety of the feedstock which is not listed in this decree, before biomethane produced from such feedstock is injected into the grid.

Table 8: Sustainability Criteria defined by the French Decree of November 23rd 2011 setting the nature of feedstock for the production of biomethane for injection into natural gas grids

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific

Feedstock	• The feedstock allowed for biomethane production is:
	  ○ landfill waste
	  ○ agricultural or agroindustrial matter (including energy crops, which use may be soon limited by a governemental decree - except for intermediate crops)
	  ○ biowaste and household waste
	  ○ urban sludge
	• catering waste
		x	x	x	

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

2.3.3. Decrees of November 10th 2009 (decree 1), August 12th 2010 (decree 2), November 10th 2009 (decree 3) on environmental prescriptions applicable to anaerobic digestion

These decrees determines specific requirements for the biogas production plant, concerning environmental and health issues. They are part of the French regulation on classified installations for the protection if the environment. These regulations apply to all types of anaerobic digestion, except anaerobic digestion on water treatment plants, which need to follow the legislation on water treatment. Landfills are not concerned.

Table 9: Sustainability Criteria defined by the French Decrees of November 10th 2009 (decree 1), August 12th 2010 (decree 2), November 10th 2009 (decree 3)

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
GHG savings	• These decrees set prescriptions on spreading: • The method used for spreading the digestate has to minimise air emissions of ammoniac : direct burial with drag hose spreaders or an equivalent method.				x
Biodiversity	• Units submitted to authorization (after the declaration and registration step) must undergo an impact assessment (assessment of the impact on biodiversity).			x	
Protection of soil, water and air	• Producers need to develop a preliminary study on the safety and agronomic value of the digestate (with its caracteristics : quantity, production rythm), the capacity of the soil to receive it and the techniques used to spread it. • Drafting of a spreading plan with a map showing the possible spreading zones and the zones were spreading is forbidden (according to the french legislation on nitrates). • keep a notebook on spreading for 10 years. • Spreading of digestate must occur 50 meters away from watercourses (unless there is a grass strip or hedge 10 m large on the border of the watercourse). • If water protection needs to be reinforced, the administrative authority can define additional thresholds for phosphorus and nitrogen.				x
other emissions	• Any dust, pollutant or odour must be captured, canalised and treated.				x

2.3.4. Decree of 15 February 2016 on landfills

The decree of 15 February 2016 on landfills stipulates general requirements for the use of landfills, i.e. good practises for the not permeability of the installations for instance. These requirements are part of the legislation on classified installations for the protection of the environment.

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

Table 10: Sustainability Criteria defined by the French Decree of 15 February 2016 on landfills

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
GHG savings	• in the case of biomethane production from landfill waste, the gaseous effluents from purification of the biogas have to be oxydised if there is more than 5% of methane		X		

2.4 Legislation and regulation in Germany

Germany, as one of the pioneers in promoting renewable energy resources and a leader of the biogas sector, has an extensive regulatory framework for biogas and biomethane. The Biofuel Quota Act, the Biofuel Sustainability Ordinance and the Biomass Ordinance cover sustainability of biomass. These apply only to biomethane that is used for transport purposes, which is credited for achieving the biofuel quota or a tax reduction. Additionally the Renewable Energy Act (EEG) and the Gas Network Access Ordinance (GasNZV) define some requirements regarding environmental issues of biomethane production. These requirements need to be fulfilled in order to get the subsidies for the supply of electricity from biomethane and in order to get access to the public gas network. There exist a large number of additional legislative acts, which define requirements with regard to biogas and biomethane production. These requirements - mainly regarding safety issues and all kind of emissions - need to be fulfilled in order to get permission for the construction and operation of a plant. These legislative acts as well as the ones setting the rules for the handling of digestate will not be analysed within this report, as those are not directly linked to biomethane as a product and its qualification for being transported within the gas network and getting any governmental subsidy.

2.4.1 Biofuel Quota Act[9]

The Biofuel Quota Act defines a minimum share of biofuels to be added to the amount of fossil fuels being sold as transport fuel by the obligated companies in the oil industry. Effective as of January 1st 2015, the energetic biofuel quota was changed to the GHG quota. The biofuels being used to fullfill the quota can be mixed with fossil fuels or be sold as a pure biofuel. All biofuels to be taken into account for the biofuel quota need to fulfil the sustainability criteria of the Biofuel Sustainability Ordinance (see chapter 2.4.2).

[9] BioKraftQuG: Biokraftstoffquotengesetz (Biofuel Quota Act) - Part of the Bundes-Immissionsschutzgesetzes - BImSchG (Federal Emissions Protection Act), has been published on 18/12/2006, and implemented on 01/01/2007. The legal act can be found under the following link https://www.jurion.de/Gesetze/BioKraftQuG

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

Table 11: Sustainability Criteria defined by the Ordinance for implementing the provisions of the Biofuels Quota and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
GHG savings	• The defined quota on GHG reduction for all fuel being sold by the obligated companies in the oil industry are as follows: ○ 3.0 % reduction of GHG emissions till 2015 ○ 4.5 % reduction of GHG emissions till 2017 ○ 7.0 % reduction of GHG emissions till 2016 • The default values for individual GHG emission reductions are defined within the Biofuel Sustainability Ordinance	x	x	x	
Feedstock	• Biofuels made of animal fats and oils are not accepted for the biofuel quota		x		

2.4.2 Biofuel Sustainability Ordinance[10]

The Biofuel Sustainability Ordinance defines the sustainable criteria, which biofuels need to comply, in order to be taken into account for the biofuel quota. The definition of the sustainability criteria follows the definition of the RED.

Table 12: Sustainability Criteria defined by the Biofuels Sustainability Ordinance and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
GHG savings	same as RED - see chapter 2.1.1	x	x	x	
Biodiversity	same as RED - see chapter 2.1.1			x	
Land use	same as RED - see chapter 2.1.1			x	
Sustainable farm management	same as RED - see chapter 2.1.1			x	

2.4.3 Ordinance for implementing the provisions of the Biofuels Quota[11]

The ordinance for implementing the provisions of the Biofuels Quota defines the rules with regard to the verification of the biofuels quality. This includes the definition of certain biofuels, which can

[10] BioKraft-NachV: Biokraftstoffnachhaltigkeitsverordnung (Biofuel Sustainability Ordinance), has been published on 30/09/2009, last amended 31/08/2015, and implemented on 02/11/2009, parts of it 01/01/2010. The legal act can be found under the following link: http://www.gesetze-im-internet.de/bundesrecht/biokraft-nachv/gesamt.pdf

[11] Verordnung zur Durchführung der Regelungen der Biokraftstoffquote (36. BImSchV) The legal act can be found under the following link: http://www.gesetze-im-internet.de/bimschv_36/

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

be counted twice as its energy content to the biofuel quota (double counting). Thereby the regulation follows the rules of the so-called ILUC directive of the European Commission (EC).

Table 13: Sustainability Criteria defined by the Ordinance for implementing the provisions of the Biofuels Quota and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
Feedstock	• Double Counting for biofuels from the following substrates: o waste as defined by the "Kreislaufwirtschaftgesetz" (law on lifecycle management), except used cooking fats and oils o residues (raw glycerine, tall oil pitch, wet and dry manure, oils and fats from vegetables) o cellulosic non-food material • ligno-cellulosic material	x	x	x	

2.4.4 Ordinance for a revision of the provisions regarding the biofuel quota - draft[12]

The draft of the regulation for a revision of the provisions regarding the biofuel quota defines changes within the Biofuel Quota act and the Biofuel Sustainability Ordinance. Besides others, it defines the cases, in which biomethane from animal fats and oils can and can not be taken into account for the biofuel quota. This takes into account the challenges to guarantee and to verify the absence of such materials in certain substrates for biomethane production. Note that this regulation is still under revision and could be changed until its final adoption.

Table 14: Sustainability Criteria defined by the Ordinance for a revision of the provisions regarding the biofuel quota and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
Feedstock	• Biofuels, which are purposefully produced from animal fats and oils are not accepted to fulfil the biofuel sustainability ordinance. • Biomethane from the following materials, which potentially contain of animal fats is not excluded from the biofuel sustainability ordinance: o the contamination with animal fats and oils is negligible o fats and oils which have been used for cooking in a common practice o certain waste material containing animal fats and oils - see [13]				

[12] Verordnung zur Bereinigung quotenrechtlicher Vorschriften - Referentenentwurf - not yet published
[13] Slurry from proprietorial sewage treatment, Mixtures of fats and oils from oil separators, which contain only cooking oils and fats, organic kitchen waste, cooking oils and fat, market waste

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

	• separately collected biowaste • Biomethane partly produced from substrates containing animal fats and oils (except the cases as described above) and partly containing vegetable substrates are completely excluded from the biofuel quota. • A virtual separation of the biomethane regarding the amount of substrates in order to use only the biomethane from vegetable substrates for the biofuel quota is not accepted.				

2.4.5 Renewable Energy Sources Act[14]

The Renewable Energy Sources Act (EEG) defines all tariffs and rules for electricity production from renewable energies in Germany. The EEG has been amended several times since it was first published in 2000 (last time in August 2014). Electricity from biomethane is considered under the support of electricity from biomass. The tariffs and rules are specially defined for electricity from gaseous biomass and under this also from biomethane taken from the public gas distribution system. There are several requirements concerning the sustainability of biogas and biomethane production defined in the different versions of the EEG, directly or indirectly, e.g. by tariffs depending on the requirements as for example certain substrates being used.

Table 15: Sustainability Criteria defined by the EEG and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
GHG savings	• A gas tight system which guarantees a minimum retention time of 150 days plus a gas utilization back-up system (e.g. flare) must be installed. • Methane emissions from biogas upgrading are limited to 0.5 % • Electricity used for biogas upgrading are limited to 0.5 kWh/m^3 raw biogas • Only heat from renewable sources is allowed to be used for biogas upgrading • biogas and biomethane plants digesting biowaste, must consist of a post composting system. • Storage tanks must be covered gas-tight		x		x
Feedstock	• The biomass being used must fulfil the definitions of the Ordinance on the Generation of Electricity from Biomass (see chapter 2.4.6) • A maximum of 60 % of corn can be used for biogas and biomethane production • Higher tariffs are paid for electricity from biogas/biomethane produced from certain biomass (e.g. straw, clover grass used as catch crop, manure)	x	x	x	

[14] Act on the Development of Renewable Energy Sources, has been published on 29.03.2000, last revised on 24.07.2014 and last amended: 29.06.2015 and implemented on 01.05.2000. The legal act can be found under the following link http://www.bmwi.de/English/Redaktion/Pdf/renewable-energy-sources-act-eeg-2014,property=pdf,bereich=bmwi2012,sprache=en,rwb=true.pdf

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

2.4.6 Ordinance on the Generation of Electricity from Biomass[15]

This ordinance defines what is to be understood as biomass under the above-mentioned Renewable Energy Act and which technical procedures fall within the scope of application of the Renewable Energy Act.

Table 16: Sustainability Criteria defined by the Ordinance on the Generation of Electricity from Biomass and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
Feedstock	• Besides others the ordinance defines biomass as biogas from anaerobic digestion, if the following substrates have not been used: ○ Mixed waste from households and similar waste, including extracted biomass fraction from mixed waste ○ Sludge and sediments from harbours and other waters ○ By-products from animals as defined in the ordinance about by-products from animals (EG No. 1069/2009)[16], with some exceptions • More than 10 % sewage sludge with respect to the overall biomass being used	x	x	x	

2.4.7 Act on the Promotion of Renewable Energies in Heat Sector[17]

The Act on the Promotion of Renewable Energies in Heat Sector (EEWärmeG) defines, that owners of certain categories of buildings (newly built buildings!) must cover part of their heating and cooling supply with renewable energies. One possibility to fulfil the purpose of this act is using bioenergy. The following criteria must be fulfilled for biomethane to be accepted within the EEWärmeG.

Table 17: Sustainability Criteria defined by the EEWärmeG and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific

[15] Ordinance on the Generation of Electricity from Biomass (Biomasseverordnung), has been published on 21.06.2001 and last amended on 21.07.2014. The legal act can be found under the following link http://www.gesetze-im-internet.de/bundesrecht/biomassev/gesamt.pdf

[16] The legal act can be found under the following link: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:300:0001:0033:DE:PDF

[17] Act on the Promotion of Renewable Energies in the Heat Sector EEWärmeG, has been published on 07.08.2008 and last amended: 20.10.2015, and implemented on 01.01.2009. The legal act can be found under the following link http://www.gesetze-im-internet.de/eew_rmeg/

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

GHG savings	• Methane emissions from biogas upgrading are limited to 0.2 % • Electricity used for biogas upgrading are limited to 0.5 kWh/m^3 raw biogas • Only heat from renewable sources is allowed to be used for biogas upgrading				x
Feedstock	• Biomass being used must fulfil the definitions of the Ordinance on the Generation of Electricity from Biomass (see chapter 2.4.6)	x	x	x	

2.5 Legislation and regulation in UK

Sustainability of feedstock's are included in revisions to the Renewable Heat Incentive Scheme (RHI), Renewables Obligation in England and Wales RO and in the near future for the Feed-in-Tariffs (FiTs) (see details in the following chapters). All incentives are subject to tariff digression on a regular basis, triggered by deployment under the given scheme exceeded certain fixed levels.

The Environment Agency enforces regulatory standards on biogas and biomethane plants, which use residues or wastes, this includes regulation on digestate spreading, handling of wastes, emissions and safety. The PAS110 Certification scheme is recognised by the regulatory authority, the Environment Agency and enables plants in the UK to meet the Quality Protocol and achieve end of waste status.

If fuel is not sourced from Biomass Suppliers List each participant will need to self report against both the GHG target and the land criteria. This includes all of those using non-woody biomass as well as those using biogas or biomethane for injection.

2.5.1. Renewable Heat Incentive Scheme Regulations 2011 and 2015 (Amendments)

The Renewable Heat Incentive (RHI) supports both biogas heat and biomethane and was introduced in 2011. The budget for the RHI was confirmed in Autumn 2015, and will now be in place up to 2020; the budget will be reduced in size with the intention to limit deployment under the scheme and control spend.

Sustainability regulations under the RHI came into force on 5 February 2015, with the obligation on RHI participants using biomass, biogas or producing biomethane to meet the sustainability requirements from 5 October 2015. Failure to comply will lead to sanctions, including non-payment of tariffs and, in extreme circumstances, exclusion from the Scheme.

Table 18: Sustainability Criteria defined by the Renewable Heat Incentive Scheme Regulations 2011 and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
Feedstock	• No targets or thresholds. • Applies to: biomass and biomethane • Source country of feedstock must be recorded (place of origin) and simple feedstock information, material form, type, mass, by	x	x	x	

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

	product/waste status • Reporting Format: Provide a declaration of feedstock at the point of commissioning. Can be requested to provide feedstock volumes used.				
Land use	• No targets or thresholds. • Applies to: biomass and biomethane • Focuses particularly on plant matter or fuels derived from plant matter - requires information on land use since November 2005 • Reporting Format: No clear reporting format at this stage. • Would be verified in the form of an Annual Audit under the RHI scheme.			x	

From 5th October 2015, fuels used under the RHI must meet a greenhouse gas emissions limit and specific land criteria.
The greenhouse gas lifecycle emissions target on fuels used by RHI participants must be below the emissions target of 34.8g CO2 equivalent per MJ of heat. This is equivalent to a 60% GHG savings against the EU fossil fuel average. This emissions target is not fixed and may be reduced over time.
The land criteria, which restricts the use of biomass sourced from land with high biodiversity or high carbon stock value such as primary forest, peatland or wetland is also a requirement, following the Renewable Energy Directive (RED). For biogas/biomethane, demonstrating that feedstock came from pre-existing agricultural land should be sufficient.
Waste, residues, or material wholly derived from waste (incl. animal manures and slurries), are exempt from full life cycle emissions reporting and only report on emissions from the point of collection in the case of residues, and from the point of feeding into the plant for wastes. The sustainability criteria still apply but not in the form of full life cycle assessment applied to non-waste fuels. Installations under 1MW capacity are able to use the default GHG emissions values outlined by the European Commission for biomass sustainability.

Table 19: Sustainability Criteria defined by the Renewable Heat Incentive Scheme (Amendment) Regulations 2015 and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
GHG savings	• Targets/Thresholds: To demonstrate sustainable biomass, biogas and biomethane must meet the GHG emission saving threshold. The requirement is a greenhouse gas emission limit of 34.8gCO2 per MJ of heat generated. This is a 60% GHG saving set by DECC (UK Government) against comparator, 87gCO2/MJ. In place as of 5th October 2015. • Applies to: solid biomass and biogas (all sizes but when below 1MWth a default reporting method can be used) and biomethane • Must demonstrate use of sustainable biogas, sustainable biomethane, sustainable biomass - which meets the greenhouse gas criteria and is made wholly from feedstock which is solid biomass which meets the land criteria. Exemptions to full life cycle GHG accounting for residues	x	x	x	

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

	and wastes. • Reporting Format: If over 1MWth or a biomethane installation must report using the actual value method, (no defaults) on a quarterly basis, in addition an annual sustainability audit is also required. Below 1MWth, heat installations can report using default method and are not required to be audited.				
Land use	• Applies to: solid biomass, biogas and biomethane (if fuel is not sourced from the Biomass Suppliers List). • Biomass cannot be obtained from protected sources, which means: land that is declared primary forest, land that is designated for nature protection purpose (since 2008), highly biodiverse grassland, land that at any time during since 2008 was peatland, a former continuously forested area, a former lightly forested area or a former wetland area. • Reporting Format: Can use voluntary schemes or collect evidence to demonstrate land use. Reviewed as part of the annual sustainability audit.			x	

2.5.2. Renewable Transport Fuel Obligation (Amendment Order) 2011/2012 RTFO 2015

Table 20: Sustainability Criteria defined by the Renewable Transport Fuel Obligation (Amendment Order) and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
GHG savings	• Targets/Thresholds: Voluntary carbon and sustainability targets have been in place for biofuels in the UK since 2008, but implementation of mandatory RED criteria is new. This means - biofuels must achieve at least a 35% GHG reduction up to 31 December 2016 - 54.5gCO2/MJ, with the threshold rising to 50% from 1 January 2017, 41.9g CO2/MJ. • The new Regulations in 2012 introduced a GHG reporting requirement for fuels supplied from 1 January 2013 – referring to the EU Fuel Quality Directive. • Includes mandatory sustainability criteria. Important to note - although biofuels from wastes and residues are double counted under the RED when calculating progress towards meeting renewable transport targets, in the UK they do not count twice for the purposes of meeting the UK's overall renewable energy target. • Reporting Format: Suppliers submit annual carbon reports, & sustainability reports on a monthly basis.	x	x	x	
Biodiversity	• same as RED - see chapter 2.1.1 • Reporting Format: Voluntary schemes can be used to provide evidence of compliance. From 1 October 2015 suppliers are also eligible to conduct their own RTFO Biodiversity Audits to demonstrate compliance with the biodiversity criteria.			x	
Land use	• same as RED - see chapter 2.1.1 • Reporting Format: Voluntary schemes can be used to provide evidence of compliance. From 1 October 2015 suppliers are also eligible to conduct their own RTFO Biodiversity Audits to demonstrate compliance with the biodiversity criteria.			x	
Sustainable	• same as RED - see chapter 2.1.1			x	

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

farm management					
Feedstock	• Producers/ suppliers of biofuels in the EU, who want to use default GHG emissions values must also demonstrate that feedstocks were sourced from regions where typical GHG emissions associated with their cultivation can be expected to be equal/lower to the default values used. • Reporting Format: Included when suppliers submit annual carbon & sustainability reports.			X	

2.5.3. Renewable Obligation Order 2013 - England & Wales

The Non-Fossil Fuel Obligation (NFFO) was introduced in the Electricity Act 1989, when electricity generation in the UK was privatised. The original intention was to support nuclear power generators, which were state owned but in 1990 it expanded to include the first renewable generation. In 2002 it was superseded by the Renewables Obligation in England and Wales and in different forms in Scotland (2002) and in Northern Ireland (2005). The RO is being phased out for all technologies including biogas by March 2017, after which an auction system called Contracts for Difference (CfDs) will be available for plants over 5 MWe.

Feed in Tariffs (FIT) for electricity generation were introduced in 2010 including banding for a range of smaller plants. In December 2015, The UK Government set out its intention for the scheme from 2016 to 2019. The support scheme will remain open to new applications but there are now deployment caps in place to limit growth under the scheme, for AD this is approximately 20MW of new deployment each year.

Table 21: Sustainability Criteria defined by the Renewable Obligation Order 2013 - England & Wales and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
GHG savings	• A generator which meets the post 2013 dedicated biomass station definition is required to report against a threshold of 66.7gCO2/MJelec. - which equates to a 75% saving against the fossil fuel comparator. • All other generating stations are required to report against a threshold of 79.2gCO2/MJelec. - which equates to a 70% saving against the fossil fuel comparator. • Operators using biomass are required to report sustainability information. Unless using sewage gas, landfill gas or municipal waste, or generate less than 50kW. Generating stations above 1MW using solid biomass or biogas have to proof compliance in order to receive support • Reporting requirements on the use of solid and gaseous biomass under the RO were introduced in 2009, and in 2011 these were extended forcing generators of stations over 50kW in size to report whether the biomass they had used had been sourced from a type of 'protected land' and to provide details of the GHG emissions	X	X	X	

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

	associated with its production and use • Additional sustainability provisions were introduced in the "Government Response to the consultation on proposals to enhance sustainability criteria for the use of biomass feedstocks under the Renewables Obligation" published in August 2013; these included establishment of a GHG target trajectory and a requirement for generators of 1MW and above to produce independent audit reports • Biomass derived entirely from waste are not required to report about GHG emissions • Monthly GHG reporting, supported by an Annual Sustainability Audit				
Land use	• Sustainability criteria consider the land from which the biomass is sourced as well as the life cycle greenhouse gas emissions associated with the biomass production. Where there is land use change emissions associated with this must be included within the GHG emissions calculation. • Focuses on direct land use change. No requirement to report on emissions from indirect land use change. • Soil carbon accumulation via improved agricultural management is to be recognises as a potential emission reduction via carbon accumulation. Solid biomass and biogas do not require specific auditing on this topic. • No targets or thresholds • Applies to installations using biomass from residues (from agriculture, forestry, aquaculture) and all products/co-products and over 50kW. • The criteria is derived from the RED - sets out that biomass cannot be obtained from land that was on or after January 2008: primary forest, land designated for nature protection purposes, peatland, continuously forested, lightly forested or wetland. • Reporting Format: Monthly reporting - yes/no selection.		x	x	

2.6 Legislation and regulation in Hungary

The RED has been transposed into the Hungarian National Law CXVII 2010 and into the Government Decree 167/2011 (VII: 24.). Decree 167/2011 (VIII. 24.) of the Hungarian Government, modifying Decree 343/2010 (XII. 28.) on the verification of sustainability of biofuels production, confirms that biogas upgraded to natural gas quality can be used and counted as biofuels.

Regarding sustainability criteria in energy plant cultivation for biofuel production (e.g. maize silage for biogas), the Decree of Ministry of Rural Development 42/2010. (XII. 20.) is valid, which is based on the stipulations of Directive 2009/30/EC.

The National Food Chain Safety Office is responsible for monitoring the fulfilment of sustainability requirements by biofuel producers.

In 2010 (in the Biomass Report), the Commission recommended to introduce sustainability criteria in relation to biomass used for generating electricity, heating/cooling – similarly to biofuels. In response to this recommendation, the Hungarian government issued Decree 389/2007 (XII. 23.). Article 7. § (2) of this Decree mandates the certification of sustainability of the forest biomass (Forest Management Certificate by National Food Chain Safety Office, or Forest Stewardship Council).

The Hungarian Law XXIX. (2011) about the modification of the Electricity Law (LXXXVI. 2007) corresponds to Directive 2009/28/EC, regulates the issuance of „green" certificates, respectively

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

Certificates of Origin by the Hungarian Energy Agency for confirming the volumes of electricity generated from renewable sources but does not make these Certificates of Origin conditional on meeting sustainability criteria in relation to the biomass used.
The Hungarian Law XXIX. (2011) on electricity dedicates a special section to the regulations related to different types of biogas producing installations. § 8-9 are dealing with agricultural biogas plants, § 10 contains the rules applicable to the usage of landfill gas, § 11 relates to biogas production from sewage sludge.
The Hungarian Law XI (2008) contains the regulations with respect to the injection of upgraded biogas (biomethane) into the natural gas system. According to § 3 Article 26 biomethane must meet the quality criteria set in the natural gas quality standard, otherwise the product cannot be supplied to consumers.
In summary, it can be concluded that the national legislation in Hungary concerning the production and use of biomethane does correspond to the relevant EU legislation. There are no legislative obstacles to increasing the production and use of biomethane in the country.
Nevertheless, it is to be noted that the rules and regulations regarding renewable energy are scattered in many pieces of legislation: Laws, Government Decrees, Ministerial Decrees, etc. In addition, there are declarations by the Parliament, Action Plans, Long-term Energy Strategy Papers etc. One comprehensive Renewable Energy Law would be desirable, the preparation to this Law would generate important political consultations on all related issues, such as circular economy, waste management, sustainability, long-term agricultural policy, transportation fuel supplies etc.
As concluded above, the slow pace of development of the biogas and biomethane industry in Hungary is not caused by the lack of proper legal basis. There is no broad political consensus in the country in relation to long-term energy and environmental strategies. In lack of reliable, transparent, consequent and stable support system, substantial investment activity for biomethane production cannot be expected.

2.6.1. Law CXVII. (2010) transposing RED to Hungarian legislation

This law, which transposes the RED to Hungarian legislation fully corresponds to the stipulations of the RED.

Table 22: Sustainability Criteria defined by the law CXVII. (2010) transposing RED to Hungarian Legislation and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
GHG savings	same as RED - see chapter 2.1.1	x	x	x	
Biodiversity	same as RED - see chapter 2.1.1			x	
Land use	same as RED - see chapter 2.1.1			x	
Sustainable farm management	same as RED - see chapter 2.1.1			x	

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

2.6.2. Government Decree 343/2010 on regulating the implementation of Law CXVII (2010) with reference to RED

Government Decree 343/2010 on regulating the implementation of Law CXVII (2010) with reference to RED– introduces the mandatory registration scheme operated by the nominated government body but also allows for sustainability verification by voluntary schemes (in accordance with the RED). Nevertheless, consignments with sustainability verification done by a voluntary scheme must also be registered with BÜHG.

Government Decree 343/2010 nominates the National Food Chain Safety Office (NFCSO) as the government appointed body for maintaining the GHG emission register for biofuels (called BÜHG in Hungarian). All biofuel producers and traders (but not the agricultural raw material producers) must be accepted and registered by this mandatory scheme if they want their product recognised as biofuel and, correspondingly, qualified for tax benefits.

Table 23: Sustainability Criteria defined by the Government Decree 343/2010 on regulating the implementation of Law CXVII (2010) and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
GHG savings	same as RED - see chapter 2.1.1	x	x	x	
Biodiversity	same as RED - see chapter 2.1.1			x	
Land use	same as RED - see chapter 2.1.1			x	
Sustainable farm management	same as RED - see chapter 2.1.1			x	

2.6.3. Government Decree 167/2011 on adjusting Government Decree 343/2010 with reference to RED

The Government Decree 167/2011 specifies the term "biogas" in relation to Law CXVII (2010): biogas upgraded to CNG needs to meet the fuel quality requirements (see chapter 2.1.2).

2.6.4. Decree 36/2010 (XII: 31.) NFM of the National Development Ministry regarding the rules for calculating GHG emission reduction for biofuels

The decree 36/2101 (XII 31.) sets the rules for calculating GHG emissions in full conformity with the RED.

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

2.6.5. Decree 42/2010 (XII. 20.) VM of the Ministry for rural development regarding the default areas for production of biofuel raw materials

The decree 42/2010 (XII. 20.) stipulates that arable land qualified for Single Area Payment Scheme (SAPS) is permitted for the production of raw materials for biofuels by default.

2.7 Legislation and regulations in Italy

The sustainability verification provisions of the RED and FQD were transposed into Italian national legislation by the Legislative Decree of 31 March 2011, n. 55 (published in Official Gazette February 7, 2012) and by DM 23 January 2012 establishing the "national system of certification of the sustainability of biofuels and bioliquids". This national certification system is composed of three main elements: two UNI TS and a technical regulation (RT) defined by ACCREDIA.

- UNI TS 11429 contains the rules for the qualification of stakeholders in the production chain of biofuels and bioliquids.
- UNI TS 11441 regulates for mass balance system.
- RT 31 ACCREDIA "Requirements for accreditation of Bodies issuing certificates of conformity in respect of the National System of Certification of the sustainability of biofuels and bioliquids" (was published on March 27, 2012 and is available on the website: www.accredia.en).

Subsequently, the above regulations were extended to biomethane: on Dec. 5, 2013 the joint Decree of 3 ministries (Ministry of Economic Development, Ministry of Environment and Protection of Land and Sea and Ministry of Agriculture and Forestry) was published about the “incentive system for biomethane injected into the natural gas grid". The decree:

- defines the financial incentive for biomethane,
- provides criteria for verifying the sustainability of biomethane used in transport,
- stipulates that, with regard to the incentive for the use of biodegradable fraction of municipal waste, downstream of waste collection, by-products, algae and materials of non-food origin and landfill gas a technical legislation (UNI/ TS 11567) must be drawn up to complement the national system of certification of sustainability currently valid.
- In accordance with the Decree of Dec. 5, 2013:
    - the RT 31 Technical Rules were revised by Accredia and RT 31- Rev.01 was issued on November 26, 2013, containing the requirements for accreditation of Bodies issuing certificates of conformity in respect of the National System of Certification of the sustainability of biofuels and bioliquids, and
    - UNI / TS 11567 was issued, which refers to the UNI / TS 11429 and 11441 continuing the basic approach, the scheme rules going to clarify and outline the specific legislation for the sector of biomethane.

In 2012 Italy published D.M. 06/07/2012 to modify the support scheme for biogas installations, reducing FIT and giving bonus for smaller plants as well as for utilization of sub-products, waste and animal manure.

This project has received funding from the European Union’s Horizon 2020 research and innovation programme.

2.7.1. Decree 31 March 2011, n. 55 and by DM 23 January 2012

The sustainability verification provisions of the RED and FQD were transposed into Italian national legislation by the Legislative Decree 31 March 2011, n. 55 (published in Official Gazette February 7, 2012) and by DM 23 January 2012 establishing the national system of certification of the sustainability of biofuels and bioliquids.

Table 24: Sustainability Criteria defined by the Decree 31 March 2011, n. 55 and by DM 23 January 2012 and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Explanation of Sustainability Criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
GHG savings	The Decrees specify that the sustainability criteria that has to be respected for biomethane used for transport are the same as stipulated in the Directive 2009/28 /EC (RED) and 29/30/EC (FQD)	x	x	x	
Biodiversity				x	
Land use				x	
Sustainable farm management				x	

2.7.2. DM 10/08/2014

The DM 10/08/2014 updates the conditions, criteria and rules on the implementation of release for consumption of biofuels including advanced biofuels.

Table 25: Sustainability Criteria defined by DM 10/08/2014 and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Explanation of Sustainability Criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
GHG savings	• The minimum quantity of biofuels that has to be produced: ○ 2015 = 5,0% of biofuels; ○ 2016 = 5,5% of biofuels; ○ 2017 = 6,5 % of biofuels; ○ 2018 = 7,5 % of biofuels of which 1,2 % are advanced biofuels; ○ 2019 = 9,0 % of biofuels of which 1,2 % are advanced biofuels; ○ 2020 = 10,0 % of biofuels of wich 1,6 % are advanced biofuels; ○ 2021 = 10,0 % of biofuels of which 1,6 % are advanced biofuels; ○ As off 2022 = 10,0 % of biofuels of which 2,0 % are advanced biofuels	x	x	x	

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

3. MANAGEMENT PRACTICES OF SUSTAINABILITY VERIFICATION

In the following the management practices for sustainability certification of biomethane as applied in the BIOSURF partner countries are described.

3.1 Management practices in Austria

According to the Act on agricultural raw materials for biofuels, all agricultural crops, that come from areas that have already been in agricultural use before 2008 and that haven't been declared as nature conservation sites, can be considered as being sustainable.

The production of biomass feedstock for biofuels has to be registered via AMA (Agrarmarkt Austria www.ama.at). The registration is regulated also in the Act on agricultural raw materials for biofuels. The registration can be done electronically.[18]

The Act on agricultural raw materials for biofuels also includes an article that defines the recognition of certified raw materials from other countries (article 5): in this context, the sustainability certification systems from Germany, Hungary, Slovenia and Czech Republic are recognized .The recognition of certification system is also done by the Agrarmarkt Austria.

3.2 Management practices in France

The ***Ordinance n° 2011-1105 of September 14th 2011*** (implementing directives 2009/28/EC and 2009/30/EC) determines the procedures and requirements involved in applying for a "**Guarantee of origin**" (GoO). A GoO is a certificate, which ensures that the energy is renewable. The gas suppliers sell green energy to the producers and then ask the register manager to certify the production. The GoOs are then sold to the costumers. All steps of the GoO (creation, transfer, use by end customer, deletion of GoOs by GoO manager) are recorded in the register.

GRDF is the register manager for biomethane production, while Powernext is the register manager for renewable electricity production. They have been appointed for five years.

A market of GoOs has developed in conjunction with the biomethane market.

Unlike certification for electricity production, certification for biomethane production is compatible with feed-in tariffs. Therefore, there is currently no GoO market for electricity produced from biogas (and exchange of GoOs will be forbidden within the future direct sale mechanism).

Procedure:

The biomethane certification is requested online by the gas supplier from the GoO register manager. The gas supplier declares the energy produced and injected for a certain period of time. In return, the register manager creates a number of GoOs and delivers them to the gas supplier. The number of GoOs delivered depends on the reported production (1 GoO Unit = 1 MWh of biomethane produced and injected in the network).

Each GoO has a unique identification number and is linked with the production site and its characteristics (nature of feedstock, etc.). It is then linked to the sales contract. It can only be used once: after the sale to an end consumer, the GoO is deleted. The sale to an end consumer is declared online, as well as the final use of the biomethane attached to the GoO (town gas, biofuel, etc.).

[18] http://www.ama.at/Portal.Node/ama/public?gentics.am=PCP&p.contentid=10007.131695

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

The GoO is transferrable between account holders through a sell/buy system. Each GoO has a 2-year lifespan (after 2 years it becomes obsolete and is deleted from the register).

The supplier obtains 25% of the value of the GoO after sale (75% goes to the state), or 100% in the case of recovery as a biofuel (bioNGV).

3.3 Management practices in Germany

In Germany management practices concerning sustainability certification on biomethane differ between biomethane, which is used as biofuel for transport and as biofuel for generating electricity and/or heat or cold.

3.3.1. Management practice biomethane used as biofuel for transport

If biomethane is used as biofuel for transport and is taken into account for the biofuel quota, the registration at the database **Nabisy** (Nachhaltige Biomasse System) is obligatory. Nabisy is managed by the federal office for agriculture and food (BLE - Bundesanstalt für Landwirtschaft und Ernährung) an agency of the federal ministry of food and agriculture.

All rules, including the sustainability criteria, for the certification of sustainable biomass used as transport fuel are defined in the biofuel sustainability ordinance (see chapter 2.4.2) and the ordinance for implementing the provisions of the biofuels quota (see chapter 2.4.3). The BLE defines the accepted voluntary certification systems, which a REDcert and ISCC in case of sustainability certification on Biomethane. Furthermore, the BLE defines the accepted certification bodies, such as TÜV Süd.[19] The certification bodies have to follow one of the accepted voluntary certification schemes.

The BLE also defines the rules for the documentation of the fulfilment of the sustainability criteria in detail[20]. Besides others, this includes the accepted proofs for the documentation along the whole chain of custody until its last interface, normally the user of the biomethane:

- Documents of proof from public authorities:
  - Official certification of the authority about the status quo of the area at the reference date,
  - Ordinance of environment protection including the allowed activities;
- Documents of proof from auditors, including:
  - Certificates of authorized, independent auditors and experts,
  - Analysis and interpretation of remote sensing data and maps,
  - Field visits and field samples,
  - Interviews with companies, local stakeholders countries or stakeholders,
  - The implementation of Environmental impact assessments, high conservation value assessment, high nature value assessments , key biodiversity assessments, international 's rapid assessment;
- Documents of proof from the companies:
  - Tax documents, abstracts rom land register,

[19] A list of the actually accepted certification systems and companies can be downloaded under the following link: http://www.ble.de/SharedDocs/Downloads/02_Kontrolle/05_NachhaltigeBiomasseerzeugung/Anerkennung_de.pdf?__blob=publicationFile

[20] The rules are described (only in German) under the following link: http://www.ble.de/SharedDocs/Downloads/02_Kontrolle/05_NachhaltigeBiomasseerzeugung/LeitfadenNachhaltigeBiomasseherstellung.pdf;jsessionid=F22DA725786492C9685B593E8A797028.1_cid325?__blob=publicationFile

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

- Management plans that take up certain protective aspects and describe the activities, techniques and dates of operation applied by the company in order to comply with the purposes of protection;

- Maps including:
  - Regional and local maps (e.g. land use maps, site mapping, hydrological maps, vegetation maps, cadastral information),
  - Remote sensing data,
  - International maps and data.

3.3.2. Management practice for biomethane used for generating electricity and/or heat

Biomethane, which is not being used as biofuel for transport, , needs to prove the fulfilment of certain sustainability criteria, especially when being used for renewable electricity generation and therefore receiving subsidies as defined in the Renewable Sources Energy Act (EEG -see chapter 2.4.5). or for generating heat in order to be taken into account to fulfil the requirements of the Act on the Promotion of Renewable Energies in Heat Sector (EEWärmeG - see chapter 2.4.6).

An accredited environmental auditor[21] monitors and certifies the biomethane production. The certificate can be directly handed to an end-user of the biomethane (e.g. CHP operator). Alternatively, a voluntary registry, like the "*biogasregister*", operated by the German energy agency, can be used to pass on the verified certificate between the different stakeholders. Such a registry also acts as mass balance system aiming to track the volumes of biomethane fed into and withdrawn from the gas grid This is obligatory, if the biomethane is used for electricity generation in order to receive the subsidies of the EEG. Besides the biogasregister there exist another voluntary registry, which is accepted as a mass balance system, called "*BiMaS*" (Biomethan Massenbilanz System) operated by ARCANUM Energy Systems. The registries themselves do not define any additional sustainability criteria. They also do not define the guidelines for the documentation of the sustainability certification by the environmental auditors, as e.g. TÜV. These are defined by the environmental expert committee (Umweltgutachterausschuss), which is under control of the federal ministry for the environment, nature conservation, building and nuclear safety.[22]

Several biomethane traders offer their services with regard to biomethane certification, but they do not act as auditors or certification bodies. They use the above described certification bodies, accredited environmental auditors and registries (if necessary) to handle the sustainability verification for their customers.

3.4 Management practices in UK

In the framework of the *Renewable Heat Incentive Scheme Regulations 2011* the biogas/ biomethane plant operators need to provide a declaration of feedstock at the point of commissioning. This will also show the feedstock volumes used.

[21] A list of accredited environmental auditors can be found under the following link: http://www.biogasregister.de/fileadmin/biogasregister/media/Auditoren_und_Hinweise_Gutachten/Liste_der_registrierten_Pruefunternehmen_und_Auditoren_160210.pdf The DAU (Deutsche Akkreditierungs- und Zulassungsgesellschaft für Umweltgutachter mbH is responsible for the accreditation and control of the environmental auditors.

[22] The guidelines can be downloaded under the following link: http://www.uga.de/fileadmin/user_upload/UGA-Homepage/Allgemeines/PDF-Dateien/Downloads/UGA-Aufgaben-LL_EEG.pdf

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

In the framework of the renewable *Heat Incentive Scheme (Amendment) Regulations 2015* a biogas/ biomethane plant operator can use voluntary schemes or collect evidence to demonstrate land use involved in biogas/ biomethane feedstock production. This is reviewed as part of annual sustainability audit.

Installations with a capacity of over 1MWth or biomethane installations must report using the actual value method (no default values) on a quarterly basis. In addition, an annual sustainability audit is also required. Heat installations below 1MWth can report using default values.

In the framework of *The Renewable Transport Fuel Obligation (Amendment Order) 2011/2012* suppliers submit annual carbon reports and sustainability reports on a monthly basis.

Voluntary schemes can also be used to provide evidence of compliance with the sustainability criteria. As off 1 October 2015, suppliers are also eligible to conduct their own RTFO Biodiversity Audits to demonstrate compliance with the biodiversity criteria.

According to the *Renewables Obligation Order 2013 - England & Wales,* a monthly GHG reporting should be carried out, which is supported by an annual sustainability audit.

Voluntary certification systems recognised by the European Commission (ISCC, RBSvs, NTA 8080, Abengoa, Ensus) are used to verifying the compliance with the sustainability requirements. There are no biomethane specific sustainability criteria regulations in the UK for biomethane used as vehicle fuel (for gaseous biofuel). At present, the only rules are those that already apply to liquid biofuels in accordance with the RED.

3.5 Management practices in Hungary

The Government Decree 343/2010 on regulating the implementation of Law CXVII (2010) introduces the mandatory registration scheme operated by the nominated government body but also allows for sustainability verification by voluntary schemes (in accordance with the RED). Nevertheless, consignments with sustainability verification done by a voluntary scheme must also be registered at the “BÜHG” (body appointed by the government for maintaining the GHG emission register for biofuels).

The Hungarian Law XXIX. (2011) about the modification of the Electricity Law (LXXXVI. 2007) corresponds to Directive 2009/28/EC, regulates the issuance of „green” certificates, respectively Certificates of Origin by the Hungarian Energy Agency for confirming the volumes of electricity generated from renewable sources but does not make these Certificates of Origin conditional on meeting sustainability criteria in relation to the biomass used.

ISCC is offering its sustainability documentation system (as one of the EC recognised voluntary schemes) but does not carry out verification with own staff, instead it relies on the services by Bureau Veritas - as an independent auditor.

3.6 Management practices in Italy

The RT 31- Rev.02 sets requirements for the accreditation of bodies issuing certificates of conformity in respect of the National System of Certification of the sustainability of biofuels and bioliquids.

UNI/ TS 11567 defines the qualification scheme for all organizations, here called "stakeholders", which operate in the supply chains of production of biomethane and its intermediate products in a sustainable manner, as defined by the European and national legislative framework, which

This project has received funding from the European Union’s Horizon 2020 research and innovation programme.

guarantee traceability and transparency. The stakeholders who apply the qualification scheme described in the technical specification guarantee that:

- sustainability criteria relating to land are still respected as it is possible to trace the product along the chain of custody
- the allocation of emission saving values per batch is issued in accordance with the criteria indicated in RED and FQD
- every batch is traceable

It also defines the requirements for the implementation of a traceability system that allows meeting the requirements and describes the requirements of the accounting management of the mass balance. It is applicable to both single organisations for the whole qualification of the chain of custody and can also be used for qualifying groups and more subjects at the same time in line with the legislation.

For the good management of the mass balance the operator must establish a system of traceability and operate so that the information about the sustainability characteristics and sizes of the consignments remain assigned to the mixture.

The mass balance must respect these parameters:

- to allow the raw materials with differing sustainability characteristics to be mixed,
- to make sure that the information about the sustainability characteristics and sizes of the consignments (indicated above) remain assigned to the mixture,
- to ensure that the sum of all consignments withdrawn is described as having the same sustainability characteristics, in the same quantities, as the sum of all consignments added to the mixture.

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

4. VOLUNTARY CERTIFICATION SCHEMES

There exist a large number of voluntary schemes regarding sustainability certification of biomass and biofuels production. Most of these refer to the criteria defined by the EC within the RED (see chapter 2.1.1) and have been recognised by the EC. Others have not applied for recognition by the EC, as those do not aim to serve for sustainability verification as defined by the EC. In the following, the most important voluntary schemes for sustainability certification on biomethane will be analysed.

4.1 Voluntary schemes recognised by EC

With Directive 2009/28/EC (RED), the European Union has defined sustainability requirements for bioliquids and biofuels produced from biomass. These apply for operations along the entire production, processing and supply chain. All operations engaged in the production and supply chain of biomass (for the energy sector) have to pledge themselves to comply with the defined requirements. They may use one of the voluntary schemes recognised by the EC to verify the production of the biofuels in accordance to the defined requirements. The following voluntary schemes are such types of systems and have been recognised by the EC. There exist more voluntary schemes (19 in total), which can be used for sustainability certification of bioliquids and biofuels and have been recognised by the EC, but these are not relevant or have not been practically applied for biomass production for biomethane but only for liquid biofuels as bioethanol and biodiesel[23].

4.1.1. REDcert

REDcert defines the requirements and criteria for a sustainable production of biomass, bioliquids and biofuels pursuant to the RED of the EC (see chapter 2.1.1). Most of the requirements and criteria are taken from the RED. At some points, the requirements as defined in the RED need to be defined more in detail, in order to make its validation practically feasible. The following table lists those additional requirements as defined by REDcert in addition to those already listed in chapter 2.1.1.

Table 26: Rules for the verification of sustainable biomass provision defined by REDcert and its relevance for the different raw material categories as defined in D 4.1

Sustainability criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
GHG savings	• same as RED and COM 2010/C - see chapter 2.1.1 and 2.1.3	x	x	x	
Biodiversity	• same as RED and COM 2010/C - see chapter 2.1.1 and 2.1.3, plus: • **Native tree species** are tree species that grow within their natural growing range in places and under climate conditions to which they are adjusted through their natural evolution without human intervention.			x	

[23] One scheme (Biograce) is also relevant to biomethane, but is a ,'non-typical' scheme. 'Non-typical' schemes may have different forms such as maps showing that certain geographical areas are compliant or not compliant with the criteria, calculation tools for assessment of greenhouse gas savings or regional agricultural greenhouse gas values associated with a particular feedstock. [COM 2010] Some of the other schemes could also handle biomethane but - according to the Information available - they have not been Involved with biomethane yet.

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

	• Native tree species do not include:
	  ○ tree species introduced into areas by humans, where they never would have grown without human intervention;
	  ○ tree species and/or cultivated species that would not have grown in these places or under these climate conditions without human intervention, even if these places and/or climate conditions are still within the wider geographic growing range.
	• Clearly visible indications of human activity are:
	  ○ economic use (e.g. wood harvest, forest clearance, land use change);
	  ○ heavily fragmented by infrastructure e.g. streets, power lines;
	  ○ disturbances of the natural biodiversity (e.g. significant presence of non-native plants and animal species);
	• **Areas serving purposes of nature conservation** have been designated, by law or by the competent authority, for the purposes of nature protection, and land that has been recognised by the Commission of the European Communities for the protection of rare, threatened or endangered ecosystems.
	• As long as no criteria and geographic areas with **highly biodiverse grassland** are defined by the European Commission pursuant to Article 17 (3) (c), any conversion of grassland in or after January 2008 is not allowed in the REDcert system.				

Land use	• same as RED and COM 2010/C - see chapter 2.1.1 and 2.1.3, plus:
	• **Wetlands** include, in particular, swamps, marshes or bogs, as well as other bodies of water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres.
	  ○ Covered with water means that water is visible on the surface as water surface
	  ○ The soil is 'saturated by water' if it is completely inundated with water and, as a result, moisture is present at the surface but no shallow pools form.
	  ○ This state is evident throughout the year for areas that are permanently covered by or saturated with water.
	  ○ This state is not evident throughout the entire year for areas that are covered or saturated by water for a significant part of the year. A significant part of the year means that the cover or saturation with water lasts for such a considerable part of the year that the dominant organisms have adapted to moisture or reducing conditions. This applies, in particular, to shallow water areas, coastal areas, swamps, bogs, fens and moors.
	• **Continuously forested areas** do not include land that is predominantly under agricultural or urban land use (Commission Communication No. 2010/C 160/02)
	• REDcert defines in detail the methodology of defining continuously forested areas, especially by defining the determination of the canopy cover.
	• No conversion of continuously forested areas is allowed, even if this is allowed by national regulation.
	• Short-rotation plantations are not subject to these regulations because they are classified as permanent crops and thus part of the agricultural land.
	• **Peat** itself is not considered biomass.
	• Peatland soil is soil that, when analysed up to a depth of 60 cm, exhibits organic material (peat substrate) in horizontal layers with a total thickness of at least 30 cm. The mass of the organic material is at least 20% organic carbon in the fine soil.
	• Drainage is defined as a reduction of the average annual water level due to an increased water loss or a reduced water supply as a result of
				x	

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

	human activities or installations both inside and outside of an area. • Peatland that was used for farming prior to the cut-off date may be used to grow raw material for biomass if evidence is provided that the cultivation and harvesting of this raw material does not involve drainage of previously undrained soil.				
Sustainable farm management	• same as RED and COM 2010/C - see chapter 2.1.1 and 2.1.3			x	
Protection of soil, water and air	• same as RED - see chapter 2.1.1	x	x	x	
Feedstock	• **Waste** means any substance or object, which the holder discards or intends or is required to discard. (as defined in Directive 2008/98/EC) • Raw materials that have been intentionally modified to count as waste (e.g. by adding waste material to a material that was not waste) should not be considered as qualifying. • In this context **residues** can include: ○ agricultural, aquaculture, fisheries and forestry residues, and ○ processing residues. • Agricultural, aquaculture, fisheries and forestry residues are residues that are directly produced by agriculture, fisheries, aquaculture and forestry; they do not include residues from related industries or processing. • The Annex I provides a decision tree for waste versus by-product (residue) decisions.	x	x		

In addition to the above-mentioned requirements, REDcert defines additional rules for the verification of sustainable biomass provision with regard to the production of biomethane in accordance with the German Biofuel Sustainability Ordinance. The following table lists these additional requirements and its relevance for the different raw materials as defined in deliverable 4.1.

Table 27: Additional requirements with regard to a sustainable biomass provision for the production of biomethane defined by REDcert and its relevance for the different raw material categories as defined in D 4.1

Process step	Additional requirements with regard to the provision of specifically biomethane defined by REDcert	Animal waste	Other waste materials	Sustainable biomass	Non specific
Agriculture	• Control of agricultural holding at random • Agricultural holding needs to collect and provide all relevant data (as defined in the Biofuel Sustainability Ordinance) for calculating the GHG emissions with regard to the cultivation of the biomass, because of missing default and estimated (NUTS2) values for energy crops being used for biogas production. • Alternatively the agricultural holding calculates the GHG emissions directly, according to the methodology as described in the Biofuel Sustainability Ordinance.			x	
First gathering	• In case of silage, silage losses need to be taken into account. • Different GHG values of different raw material need to be taken into	x	x	x	

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

point	account with regard to the storage and the internal accounting of the different raw materials.				
Supplier	• All suppliers, registered in the REDcert system will be controlled.				x
Last interface (biogas upgrading plant)	• Biogas plant needs to have a dosing unit including a balancing system as well as a gastight digestate storage • Used substrates need to be documented and the produced amount of biomethane needs to be measured, either at the biogas plant or the upgrading unit. • The GHG emission values of each substrate (in case of mixing substrates) cannot be balanced, as a maximum value has not been defined yet. • A calculation of GHG emissions needs to be done for every single substrate. • An allocation of the mass of each single substrate to an amount of gas being produced needs to be done by the methodology of the EEG for calculating the energy produced from each single substrate, using the specific gas yields as defined in the Biomass Ordinance (Biomasseverordnung). • Diffuse methane emissions can be taken into account by: ○ using a default value of 1 % of the biomethane produced or ○ proving lower emissions by measuring those • GHG emissions from digestate storage also need to be taken into account. • The last interface is the operator of the upgrading unit. • GHG emissions of biomethane transport (to the gas filling station) and its compression also need to be taken into account. • Methane emissions from the upgrading unit need to be considered by: ○ using a default values of 5 % for technologies working under pressure (e.g. PSA, water scrubber) and 0.1 % for technologies working at ambient pressure (e.g. amine scrubber) ○ proving lower emissions by measuring those or by guarantees of technology suppliers • conversion factor for Nabisy: 3.6 MJ/kWh	x	x	x	

4.1.2. ISCC

The certification system of sustainable biomass production of the International Sustainability & Carbon Certification (ISCC) consists of six principles with the respective criteria to be fulfilled. The criteria are categorized according to their relevance in “major musts” and “minor musts” (see ANNEX II). All “major musts” and at least 60% of the “minor musts” must be fulfilled for a successful audit.

All criteria of ISCC principle 1 (Biomass shall not be produced on land with high biodiversity value or high carbon stock (according to Article 17(3), (4) and (5) of the Renewable Energy Directive) belong to the category “major must” and must be complied with. Principles 2 to 6 cover the following topics:

- Protection of soil, water and air and the application of the Good Agricultural Practice (principle 2)
- Safe working conditions (principle 3)
- Protection of human, labour and land rights (principle 4)
- Compliance with regional and national laws as well as international treaties (principle 5)
- Good management practice (principle 6)

This project has received funding from the European Union’s Horizon 2020 research and innovation programme.

All other “major musts” of the principles 2 to 6 must be fulfilled as well. Exceptions in the principles 2 to 6 are possible under certain conditions, if producers cannot fulfil certain requirements due to the specific conditions in an individual country. Exceptions are not allowed for principle 1. At the same time, at least 60% of the minor in the principles 2 to 6 musts be fulfilled.

Within EU Member Countries, that have implemented Cross Compliance, it is only necessary to control principle 1 as principles 2 to 6 are already covered by Cross Compliance and other control systems and one can rely on existing control systems to ensure that farmers fulfil the requirements from ISCC principles 2 to 6. [ISCC 2015]

Table 28: Rules for the verification of sustainable biomass provision defined by ISCC and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
GHG savings	• same as RED - see chapter 2.1.1 and REDcert - see chapter 4.1.1	x	x	x	
Biodiversity	• same as RED - see chapter 2.1.1, REDcert - see chapter 4.1.1 and COM 2010/C - see chapter 2.1.3, plus: • According to the Commission Regulation[24], “**grassland**“ means terrestrial ecosystems dominated by herbaceous or shrub vegetation for at least 5 years continuously. The dominance of herbaceous or shrub vegetation means that their combined ground cover is larger than the canopy cover of trees. • “Natural highly biodiverse grassland” and “non natural highly biodiverse grassland” are distinguished: • “**Natural highly biodiverse grassland**” means grassland that: o would remain grassland in the absence of human intervention; and o maintains the naturals species composition and ecological characteristics and processes. • “Human intervention” means managed grazing, mowing, cutting harvesting or burning. • “**Non-natural highly biodiverse grassland**” means grassland that: o would cease to be grassland in the absence of human intervention; and o is not degraded, that is to say it is not characterised by long-term loss of biodiversity due to for instance overgrazing, mechanical damage to the vegetation, soil erosion or loss of soil quality; and o is species-rich (details, see [ISCC 2015]) • Certain geographic ranges of the European Union (as defined in the Annexes of the Council Directives 92/43/EEC, 92/43/EEC 2 and 2009/147/EC - see details in [ISCC 2015] shall always be regarded as **highly biodiverse grassland**, but highly biodiverse grassland in the European Union is not limited to these geographic ranges. • Where evidence is provided that the harvesting of the raw material is necessary to preserve the grassland status, no further evidence to show compliance with that criterion on highly biodiverse grassland has to be provided.			x	
Land use	• same as RED - see chapter 2.1.1, REDcert - see chapter 4.1.1 and COM 2010/C - see chapter 2.1.3, plus:			x	

[24] Commission Regulation (EU) No 1307/2014 of 8 December 2014 on defining the criteria and geographic ranges of highly biodiverse grassland. The regulation can be found under the following link: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R1307&from=EN

This project has received funding from the European Union’s Horizon 2020 research and innovation programme.

	• In particular all **wetlands** that have been included in the list of internationally important wetlands according to article 2, section 1 of the Convention of February 2nd 1971 on Wetlands of International Importance (Ramsar Convention on Wetlands[25]), especially as habitat for waterfowl and waders of international importance fall into this category. The application of the requirement is not restricted to the wetlands, covered by the convention, it applies to all wetlands. • **Forested areas** is land that ○ […] ○ is forest according to the respective national legal definition.				
Sustainable farm management	• same as RED - see chapter 2.1.1 and COM 2010/C - see chapter 2.1.3			x	
Protection of soil, water and air	• Only obligatory for countries that have not implemented Cross Compliance. For EU member states, this includes Bulgaria and Romania, where Cross Compliance regulations are not finally implemented yet. • The criteria addressing soil, water and air protection are described in [ISCC 2015]. An Overview is also shown in ANNEX II.	x	x	x	
Feedstock	• The definition of a product as waste, residue or as material eligible for double-counting and the request for specific verification procedures are within the responsibility of the individual EU member states. • A harmonised waste and residues product list valid for all member states does not exist. • Liquid and gaseous biofuels that are produced from waste or residues deriving from agriculture, aquaculture, fisheries and forestry must comply with the sustainability requirements laid down in Article 17 of the RED.	x	x		

4.1.3. NTA 8080

The Netherlands Technical Agreement 8080 (NTA 8080) is one of the voluntary schemes for sustainability certification, which have been recognised by the EC. In 2009, the first edition of NTA 8080 was published. The sustainability requirements in this NTA were derived from the final report "Testing framework sustainable biomass", that was drawn up by the "Sustainable production of biomass" project group[26] [NTA 2015].

The document 'Sustainably produced biomass for bioenergy and bio-based products – Part 1: Sustainability requirements' describes the requirements for sustainably produced biomass for application in bioenergy (electricity, heating, cooling, and transport fuel) and bio-based products.

It contains both requirements that have to be fulfilled when applying this NTA and guidelines that offer users of this NTA specific input for better implementation of this NTA. In order to indicate, whether a certain criteria is mandatory or not, the following verbs are used in this NTA:

- 'shall' indicates a requirement;
- 'should' indicates a recommendation;
- 'may' indicates permission;
- 'can' indicates a possibility or suitability.

In the following table all sustainability criteria, which are defined by the NTA in addition to the RED and the communication 210/C 160/01 are described. The words, indicating the relevance of each SC, as described above, are underlined.

[25] The convention can be found under the following link: http://www.ramsar.org/sites/default/files/documents/library/scan_certified_e.pdf
[26] The report can be downloaded here: http://www.globalbioenergy.org/bioenergyinfo/sort-by-date/detail/fi/c/1202/

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

Table 29: Rules for the verification of sustainable biomass provision defined by NTA 8080 and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
GHG savings	• same as RED - see chapter 2.1.1 and COM 2010/C - see chapter 2.1.3, plus: • a defined minimum of greenhouse gas emission saving relative to reference fossil fuel of 50 % already today for all plants and 60 % for those, which started operation on or after 5 October 2015 • Also defines reference greenhouse gas emissions of fossil fuels and minimum GHG savings in case of using gaseous biomass for electricity, heat or cold production as well as feed into the gas grid[27]	x	x	x	
Biodiversity	• same as RED - see chapter 2.1.1 and COM 2010/C - see chapter 2.1.3, plus: • Definition of highly biodiverse grassland: ○ 'Human intervention' means managed grazing, mowing, cutting, harvesting or burning. ○ 'Species-rich' means that the grassland is: 1. a habitat of significant importance to critically endangered, endangered or vulnerable species as classified by IUCN's Red List of Threatened Species or other lists with a similar purpose for species or habitats laid down in national legislation or recognised by a competent national authority in the country of origin of the raw material; or 2. a habitat of significant importance to endemic or restricted-range species; or 3. a habitat of significant importance to intra-species genetic diversity; or 4. a habitat of significant importance to globally significant concentrations of migratory species or congregatory species; or 5. a regionally or nationally significant or highly threatened or unique ecosystem. ○ 'Not degraded' means that it is not characterized by long-term loss of biodiversity due to for instance overgrazing, mechanical damage to the vegetation, soil erosion or loss of soil quality. ○ The following geographic ranges of the European Union are always regarded as highly biodiverse grassland: 1. habitats as listed in Annex I to Directive 92/43/EEC; 2. habitats of significant importance for animal and plant species of Union interest listed in Annexes II and IV to Directive 92/43/EEC; 3. habitats of significant importance for wild bird species listed in Annex I to Directive 2009/147/EC. • For the purpose of preserving biodiversity, the organization shall leave at least 10 % of the cultivation area of the production location, which has the highest conservation value to the landscape concerned, covered in the native vegetation, when installing a new production location that was or is converted from its natural state to agriculture on			x	

[27] The values are taken from the 'Commission staff working document' State of play on the sustainability of solid and gaseous biomass used for electricity, heating and cooling in the EU (SWD(2014) 259). The document can be downloaded under the following link: http://ec.europa.eu/energy/sites/ener/files/2014_biomass_state_of_play_.pdf

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

	or after 1 January 2008.
	• Various mandatory measures regarding restoration, preservation and strengthening of biodiversity, such as:
	  ○ Recording of type of land-use zone and the degree to which the biomass production contributes to the restoration of degraded areas
	  ○ Measures in order to:
	  1. preserve and if possible improve biodiversity,
	  2. prevent natural grounds becoming fragmented and scattered
	  3. ensure that it is prevented that the environment is disturbed by people accessing it, by the use of chemicals, and by noise
	  4. ensure that it is prevented that the environment is disturbed by invading alien species (including genetically modified crops)
	  ○ Protection of riparian vegetation zones by maintaining or crating functional buffer zones
	  ○ The use of genetically modified crops shall be indicated.				

Land use	• same as RED - see chapter 2.1.1 and COM 2010/C - see chapter 2.1.3, plus: • Prior to installing a new production location, the organization shall establish which carbon stocks in the vegetation and in the soil are lost due to the production location being installed. If the organization shall use a for this purpose established and recognised procedure in order to establish the carbon stocks, such procedure shall comply with the 'guidelines for the calculation of land carbon stocks' according to the decision of the European Commission of 10 June 2010 (Commission Decision 2010/335/EU).			x	

Protection of soil, water and air	• The organization shall take measures that are necessary in order to ensure (detailed measures, see [NTA 2015]):
	  ○ Preservation and improvement of soil quality;
	  ○ Preservation and improvement of water quality;
	  ○ no water from non-renewable sources is used;
	  ○ that the emission of harmful substances into the air is limited.
	• Additional requirements (details, see [NTA 2015]): are defined with regard to:
	  ○ Renewable [water] sources and availability of water;
	  ○ no burning as part of the installation or management;
	  ○ Waste management;
	  ○ Use of residual flows.
		x	x	x	

Competition with food and local applications of biomass	• **Local prices:** If the organization makes use of local biomass flows or natural resources (e.g. land, water and raw materials) that are essential to the basic needs of the local population, it shall monitor the local prices thereof. In the event of significant increases in prices, the organization shall demonstrate that such increases are not due to its activities.
	• **Cascading**: The use of biomass for energy should not displace its application in food and materials. Biomass should be used in the most raw materials-efficient way possible throughout its entire lifecycle. To achieve this, the organization shall provide an understanding of the efficient use of biomass (more details, see [NTA 2015]).
	• **ILUC low risk**: Within the scope of this NTA it is possible to apply 'ILUC low risk'. The organization can opt or may be required to market its biomass as 'ILUC low risk'. By opting for 'ILUC low risk', the organization shows that the biomass it uses does not result in any indirect land-use change (ILUC).
	• If the organization opts to or is required to market its biomass as 'ILUC low risk', it shall reduce the risk of ILUC in the biomass chain by choosing one or more of the following possible solutions:
	  1. growing biomass on previously unused land
	  2. additional productivity increase, on top of the trend line, by
				x	

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

	different actions (more details, see [NTA 2015]); 3. integrating existing agriculture or forestry with additional biomass production 4. use of waste and residual flows that had no other application before. • The organization shall visualize the measures taken in order to implement this solution or these solutions using the most recent version of the 'Low Indirect Impacts Biofuels' (LIIB) methodology or an analogous method. 1 January 2015 shall be kept as the reference date.			

4.2 Voluntary schemes not applied for recognition of the EC

Several voluntary schemes for sustainability certification exist, which have not applied for recognition of the EC. Most of these serve for certifying biomethane as an environmental friendly green product and are used for marketing the biomethane at the free gas market. They do not aim to fulfil the criteria of sustainability certification of biofuels and bioliquids as defined by the EC.

4.2.1. Green Gas Label (Germany)

The Green Gas Label (Grünes Gas Label) in Germany certifies biomethane as a green product, to give biomethane producers and traders the arguments for selling biomethane as an environmental friendly product. This means that the Green Gas Label is not approved by any subsidy scheme for energy production in Germany or elsewhere but can only be used as a marketing tool in the free biomethane market. The Green Gas Label gives points for a number of defined sustainability criteria as defined in the following table. The failure of meeting some criteria leads to the exclusion from the label.

Table 30: Rules for the verification of sustainable biomethane provision defined by the Grünes Gas Label and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
Feedstock	• **Crop rotation and substrates:** ○ Number of crop rotations (< 3, 3 or 4 to 5) ○ extra points for: mixed crops, clover/leguminous crops • **Organic fertilizer:** ○ < 30 %, 30 to 50 % or > 50 % organic fertilizer • **Intensity of fertilization:** ○ N-balance: > 50 kg/ha, 20 to 50 kg/ha or 0 to 20 kg/ha • **Ground coverage** • **Genetically modified organisms** (criterion for exclusion) • **Intensity of pesticides:** < 70 %, 70 to 100 %, >100 % • **Use of glyphosate** (criterion for exclusion) • **Use of domestic biofuels for transport fuel:** 50 to 100 %, < 50 % • **Conversion of grassland** (criterion for exclusion) • **ecological compensation conservation areas** • **Mix of substrates** ○ share of main substrate: < 30 %, 30 to 50 %, >50 %	x	x	x	

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

	• **organic waste and residues** • **wet and dry manure**				
Conversion of raw material and transport	• **Transport distance** ○ energy crops/manure: < 10, 10 to 20, 20 to 50, 50 to 100, > 100 km ○ organic waste and residues: < 50, 50 to 100, 100 to 200, > 200 km ○ by products: < 20, 20 to 50, 51 to100, > 100 km • **Plant capacity**: < 250, 250 to 1.250, 1.250 to 2.500, > 2.500 m^3/h biogas • **Process energy**: renewable electricity, conventional electricity • **Energy efficiency:** State of the art, + 25 %, plus 26 to 50 %, plus 51 % or more • **Special ecological, innovative, social or political component**				x
Use of biogas	• on site for combined heat and power production, with at least 60 % of the heat used or use as transport fuel • on site for combined heat and power production, with at least 30 % of the heat used or use as transport fuel • grid injection for combined heat and power production, with at least 60 % of the heat used or use as transport fuel • biogas use after grid injection (without further definition)				x

4.2.2. Biomethane Certificate Scheme (UK)

The Biomethane Certification Scheme (BMCS) is an independent certification scheme run by Green Gas Trading Limited. The BMCS provides the biomethane industry with a means of certifying and trading the "green" or "bio" value of biomethane. The certificates issued under the scheme can be traded separately from the physical commodity of gas.

The BMCS has been designed to be compliant with the European Energy Certification Scheme (EECS) standard. The BMCS certifies all the data that is required for this standard and its registry is provided by Grexel[28].

The BMCS has a sustainability factor included as part of the certification data, similar to the "carbon saved" criteria on the EECS certificate.

The BMCS cannot currently be used for Corporate Social Reporting or Carbon Reporting and are not recognised by the UK Government.

Table 31: Rules for the verification of sustainable biomethane provision defined by the Biomethane Certificate Scheme and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
GHG savings	• BMCS uses greenhouse gas methodology under the Renewable Heat Incentive support scheme. Follows the RED.	x	x	x	
Feedstock	• Quantity of feedstock • Types of feedstock used	x	x	x	

[28] see : http://www.grexel.com/home

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

4.2.3. Green Gas Certification Scheme (UK)

The Green Gas Certification Scheme (GGCS) tracks biomethane or 'green gas' through the supply chain to provide certainty for those that buy it. The GGCS is run by the Renewable Energy Association subsidiary Renewable Energy Assurance Ltd and is a way of tracking commercial transactions of biomethane. The GGCS system labels each registered kWh of biomethane with an identifier known as a Renewable Gas Guarantee of Origin (RGGO). This contains information on the technology, feedstock, when produced, where and the volume.

The RGGO cannot currently be used for Corporate Social Reporting or Carbon Reporting and are not recognised by the UK Government. There is currently no sustainability information contained on the RGGO.

4.2.4. Naturemade Biomethane (Swiss)

The swiss Naturemade certification scheme addresses all renewable energy production and use. The certification is based on a detailed life cycle assessment (LCA) with sensitivity analysis, which is not freely available. Therefore, details of the calculation methodology cannot be described in this report.

The calculation for biomethane is made using the model 'Ecoindicator' and contains elements, like the energy efficiency of the plant, the methane slip, the type of fermented substrates and their transport distances. The naturemade criteria for biomass (including biomass for biogas and biomethane production) also guarantee a considerate operation of the systems such as landscape protection and low odour and noise emissions.

Table 32: Rules for the verification of sustainable biomethane provision defined by the Swiss Naturemade certification scheme and its relevance for the different raw material categories as defined in D 4.1

Sustainability Criteria	Requirements with regard to the provision of biomethane defined by the sustainability criteria	Animal waste	Other waste materials	Sustainable biomass	Non specific
GHG savings	• The environmental impact (GHG emissions, which result from the gas production through its transport till its feeding into a grid) in case of feeding biomethane into the gas distribution system or directly to a gas station may not exceed half the environmental impact of natural gas as a fuel. • This is checked with a standardized model for AD plants (so-called 'parameter model').	x	x	x	
Biodiversity	• For the cultivation of biomass for energy production, at least the guidelines of Integrated Production (IP) must be respected.			x	
Feedstock	• The yearly input (energetically) of organic waste must be at least 66 %	x	x	x	
Other emissions	• **Odor emissions** should be as far as possible avoided. All possible measures for odor reduction have to be at the state of the art. • In agricultural biogas plants, **ammonia emissions** are controlled by a manure management system and reduced by appropriate measures (covering of manure storage and drag hoses when spreading liquid manure or by other measures such as a biofilter).				x

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

	• In the defined offgas no more than 1 % **methane** based on the methane contained in the raw gas may escape from the treatment plant at nominal operation. • When operational interruptions occur, a gas utilization (e.g. flare) must be used to prevent the gas leak.			

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

5. GAP ANALYSIS OF SUSTAINABILITY CERTIFICATION ON BIOMETHANE IN EUROPE

In the following, the main relevant sustainability criteria, as defined in the above listed schemes, and management practices will be analysed with respect to its practical feasibility of biomethane production and use from the different substrate categories and especially its cross border trade in Europe.

5.1 GHG savings

5.1.1. Overview of existing requirements regarding GHG savings

Requirements set out by EU regulation and legislation

The RED, FQD and COM 2010/C defines the rules with regard to GHG savings for biofuels (used for transport) and bioliquids. This covers mainly the following aspects:

- Minimum GHG savings of 35 % (today), 50 % from 2017 and 60 % from 2018;
- Calculation methodology, including default values for certain substrates (organic fraction of municipal waste, liquid slurry and dry manure) and the fossil fuel comparator of 83.8 g $CO_{2,eq}$/MJ, to be used for calculating GHG savings.

Furthermore, the COM 2010/C clarifies that averaging of GHG emission figures of biomethane from different substrates with different GHG emission figures is not possible.

In case of biomass cultivation the COM 2010/C clarifies, that "for the calculation of emissions from 'cultivation', the method allows the use of averages (for a particular geographical area) as an alternative to actual values. Member states can draw up lists of such average values; they could also be incorporated in voluntary schemes that address greenhouse gas emission impact. " [COM 2010]

Additional requirements

Additional requirements with regard to GHG savings or GHG emissions on biomethane production may arise in case of using biomethane for other purposes than as a transport fuel. In these cases some member states have defined specific requirements for receiving subsidies, e.g. directly for the biomethane injected into the gas network, for electricity or for heat produced from biomethane. For the BIOSURF partner countries the following requirements could be identified:

***Austria*:** none

France

In case of receiving subsidies for biomethane injected into the gas network:

- Direct emissions of biomethane into the atmosphere are forbidden; gas needs to be utilized by a back up system (e.g. a flare) in case of limited capacity in the gas grid or non conformity of gas quality. (*Decree of November 23rd 2011)*
- In case of biomethane production from landfills, the gaseous effluents from purification have to be oxidised, if they contain of more than 5 % methane. *(Decree of 15 February 2016 on landfills*)

Germany

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

a) In case of receiving subsidies for electricity and/or heat produced from biomethane - Renewable Energy Sources Act (*EEG) and Act on the Promotion of Renewable Energies in Heat Sector (EEWärmeG)*:
   - A gas tight system, which guarantees a minimum retention time of 150 days plus a gas utilization back-up system (e.g. flare), must be installed.
   - Methane emissions from biogas upgrading are limited to 0.2 %
   - Electricity used for biogas upgrading are limited to 0.5 kWh/m^3 raw biogas
   - Only heat from renewable sources is allowed to be used for biogas upgrading
   - Biogas and biomethane plants digesting biowaste, must consist of a post composting system and storage tanks must be covered gas-tight

b) Biofuel Quota Act:

Germany has implemented a GHG saving based calculation of the biofuel quota instead of energy based quota. It came into force 1 January 2015. The GHG savings can be calculated based on the methodology as defined in the RED and FQD.

UK

In case of receiving subsidies for electricity produced from biomethane - *Renewable Obligation Order 2013 - England & Wales*):

- Minimum of 70 (first operation before 2013) to 75 % (first operation in 2013 or after) GHG savings against fossil fuel comparator, for biogas/biomethane plants > 1 MW, excluding landfill gas, sewage gas or municipal waste

Hungary**:** none

Italy**:** none

Within the analysed **voluntary schemes, which have been recognised by the EC** (Redcert, ISCC and NTA 8080), only NTA 8080 defines requirements regarding GHG savings different from those as defined by EU regulation and legislation:

- Defines a minimum of GHG saving relative to reference fossil fuel of 50 % already today for all plants and 60 % for those, which started operation on or after 5 October 2015.
- Also defines reference greenhouse gas emissions of fossil fuels and minimum GHG savings in case of using gaseous biomass for electricity, heat or cold production as well as feed into the gas grid.

Voluntary schemes, which have not applied for recognition by the EC, may define very different criteria in comparison to the ones defined by the EC. With regard to GHG savings, the Naturemade Biomethane scheme from Swiss has set a minimum limit of GHG savings of 50 % in comparison to natural gas, used as fuel, whether the biomethane is directly used as fuel or injected into the gas distribution system. The calculation method cannot be compared, as the used tool for GHG calculation is not open to public.

5.1.2. Relevance of GHG saving requirements for biomethane from certain substrates

Limited availability of default values for GHG savings calculation

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

Since default values for calculating GHG savings in case of using biomethane as biofuel only exist for three categories of substrates (organic fraction of municipal waste, liquid slurry and dry manure), as indicated in the RED and the COM 2010/C 160/01, the administrative efforts for determining the GHG savings of biomethane from other substrates (e.g. energy crops) are very high. The methodologies for sustainability verification of the two voluntary schemes REDcert and ISCC make this issue very clear. For the German case the REDcert defines special rules for farmers in case of biomass production, which is used for biomethane, used as biofuel for transport (see chapter 4.1.1):

- "The agricultural holding needs to collect and provide all relevant data (as defined in the Biofuel Sustainability Ordinance) for calculating the GHG emissions with regard to the cultivation of the biomass, because of missing default and estimated (NUTS2) values for energy crops being used for biogas production.
- Alternatively the agricultural holding calculates the GHG emissions directly, according to the methodology as described in the Biofuel Sustainability Ordinance."

It has been reported by German stakeholders, that this issue limits the potential of biomethane production from other substrates then the ones, coming with default values, because of very high administrative and therefore economic efforts.

5.1.3. Limiting factors from GHG saving requirements for cross border trade of biomethane

Averaging of GHG emission figures

In accordance with the prevailing EU regulations (most importantly with COM 2010/C 160/01): in case the raw materials processed for biogas production are characterised with different figures on greenhouse gas emissions, then these figures should remain separate, i.e. cannot be averaged for the purpose of showing compliance with the sustainability requirements.

The issue makes mass balancing very complicated when we take into consideration that the necessity of mass balancing arises already at production of raw biogas – where raw materials with different qualities (GHG characteristics) are mixed (see also report on D.3.2 Proposal on cross-border biomethane administration).

The above mentioned separation could cause a very complicated situation in case of injecting the upgraded biogas (biomethane) into the natural gas grid: the total volume of biomethane produced in a given installation (and subsequently injected into the natural gas network) has to be split into as many separate consignments as the number of biogas raw materials with different GHG characteristics. For example: if the biogas plant processes 6 raw materials with different GHG characteristics in a given time period, for example in 1 month than there will be 6 consignments in that month. If the composition of raw materials would change every month, then the number of consignments with different GHG characteristics increased to 72 for that single installation for only one year. In practice the substrate composition changes daily in some plants.

It is not feasible to expect that the future European biomethane trading system can handle the above outlined situation for thousands of biomethane producing units in a cost effective and transparent manner, the administrative burden would be not acceptable for the operators. In this context, it is to be mentioned that the EU regulations allow using a single GHG number for the whole biogas production in case of mixing. However, this must be the worst (e.g. highest GHG emissions figure) number of the used substrates. This may simplify administrative issues, but it

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

does not motivate the plant operators to process substrates with low GHG emission figures. If they have one substrate (for example an energy crop) with a high GHG emission figure, this number will be applied for all biogas production.

Fossil fuel comparator

As defined in the RED, the fossil fuel comparator for calculating the GHG saving potential of biofuels, is 83.8 g $CO_{2,eq}$/MJ. This value is based on the calculation of the average emissions from fossil fuels, being used for transport fuel in the EU member states. A study, which has been derived by Ecofys and has been published in November 2014, argues to not use the average emissions as a comparator but the emissions of the fossil fuels, which the biofuels replace in the market (marginal approach) [ECOFYS 2014].

By taking the marginal approach, the fossil fuels being displaced by biofuels emit 31.7g/MJ more than the current fossil comparator (see Figure 2).

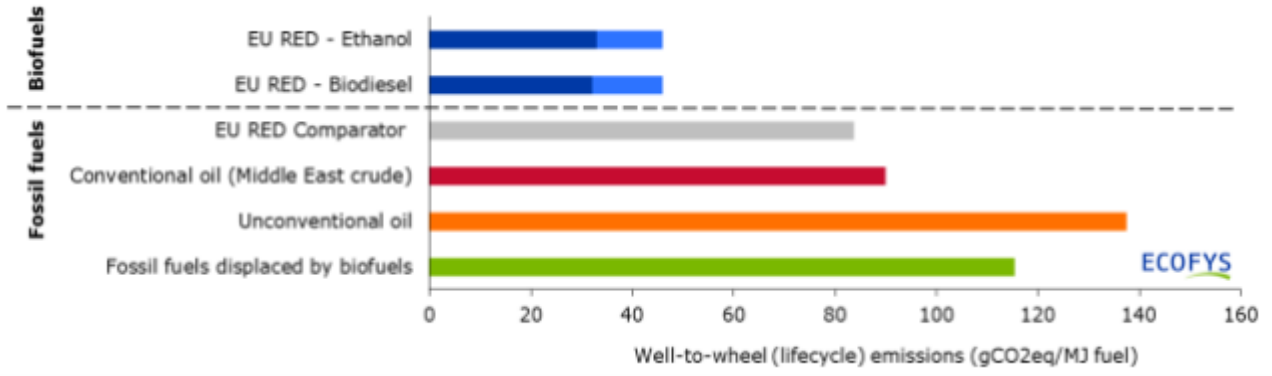


Figure 2: Comparison of well-to-wheel emissions from biofuels with fossil fuels using marginal approach. A range of EU RED typical emissions is plotted for ethanol (sugar beet 33 g/MJ, wheat 46 g/MJ) and for biodiesel (palm oil biodiesel with methane capture 32 g/MJ, rapeseed 46 g/MJ) [ECOFYS 2014]

Even if one accepts the “average” approach used by EU legislators, the fossil comparator should be adjusted upwards, said the study, on the greenhouse gas impact of marginal fossil fuel use.

Unconventional fuels have a growing share of the EU market and their carbon footprint is much higher than conventional oil. As their market share increases, so will their greenhouse gas footprint.

Unconventional oils are particularly emission heavy as they are difficult to extract and produce.

Conventional oil has a growing carbon footprint because, as larger fields are depleted, extractive efforts increase while smaller fields are taken into operation. Both up the fuel’s carbon footprint.

A logical consequence on this would be the adjustment of the fossil fuel comparator, in order to reflect the continuous shift in the fossil fuel market towards unconventional fuels, and that a fair comparison with fossil fuels should refer to the emissions of the fossil fuels being displaced, i.e. the marginal fossil fuels. [EURACTIVE 2014] and [ECOFYS 2014]

Note that changing the fossil fuel comparator would not lead to an advantage of one specific biofuel in comparison to the others. Saving GHG emissions is a competition between the different biofuels, where every biofuel has to deal with the same comparator.

In this context it can also be questioned, why it is not possible to calculate GHG savings by using biofuels with an average value, when producing biofuels from a mixture of materials with individual

This project has received funding from the European Union’s Horizon 2020 research and innovation programme.

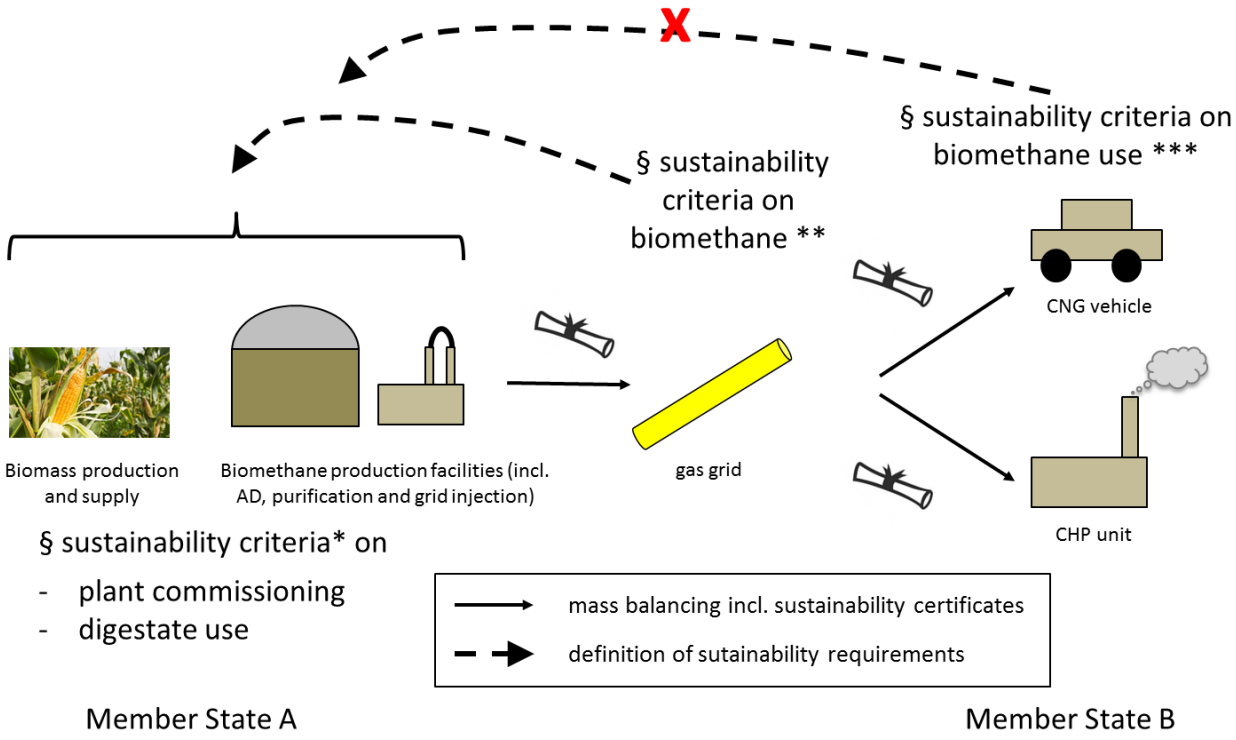
GHG figures, while an average value from fossil fuel is being used as the comparator for GHG savings calculation.

Country specific criteria

Cross border biomethane trade is getting more complicated, the more country specific criteria (in addition to the ones, defined by the EC for biofuels) regarding biomethane quality exist. This can become an insuperable hurdle, if authorities do not trust in verification procedures, which are applied in other countries in order to verify these criteria. This problem of course does only exist for sustainability criteria, which the countries define in addition to the ones defined by the EC, as the ones defined by the EC have to be accepted by every Member State through the recognised voluntary schemes.

A solution could be a strict separation between sustainability requirements for biomethane as the traded product (as defined by the EC in case of its use as biofuel) and for additional issues such as the commissioning of production plants (including upgrading and injection facilities), the conversion of biomethane into an end product (e.g. electricity and/or heat) and the treatment of digestate from the production process. Those additional issues could be defined by every Member State individually and would not have an influence on the traded product. In this context it has to be mentioned, that requirements regarding the commissioning of the production plant should be limited to those criteria, which are not already reflected by the sustainability requirements defined by the EC. For example, the criteria that the methane emissions from the upgrading unit have to be limited is already reflected in the criteria of limited GHG emissions caused by biomethane production. Therefore, additional criteria, defined on a national level, concerning biomethane production should focus on aspects, like noise, odour emissions, etc. and should never be linked to the biomethane use or the subsidies paid for it.

This project has received funding from the European Union's Horizon 2020 research and innovation programme.



* defined by Member State A, ** defined by EC, same for all Member States, *** defined by Member State B

Figure 3: Proposed separation of sustainability certification along the biomethane value chain

An existing gap with regard to this solution is the missing (mandatory) sustainability criteria for gaseous biomass (also in case of generating electricity and/or heat) for all member states. If those would exist, member states would and should not define additional sustainability criteria regarding biomethane as a traded product or rather sustainability criteria regarding biomass and biomethane production in conjunction with the use of biomethane (see Figure 3).

5.2 Biodiversity and land use change

5.2.1. Overview of existing requirements regarding biodiversity and land use change

Requirements set out by EU regulation and legislation

Same as for GHG savings, the requirements regarding biodiversity and land use change for biofuels (used for transport) and bioliquids are mainly defined by the RED, the FQD and COM 2010/C 160/01. The main requirements are:

- Biofuels and bioliquids shall not be made from raw material obtained from land with high biodiversity nor can the raw material be grown in areas converted from land with previously high carbon stock such as wetlands or forests.
- 'Land with high biodiversity' and 'wetlands and forests' are defined (see chapter 2.1.1).
- Besides others, natural and non-natural grassland are defined as land with high biodiversity, but harvesting from non-natural grassland can be excepted where evidence is provided that it is necessary to preserve the area's grassland status. The same goes for

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

nature protection areas, where evidence is provided that the production of raw material did not interfere with the nature protection purpose in question.
- In addition, biofuels shall not be made from raw material obtained from peatland.
- The requirements on biodiversity and land use change only address those areas, which have had the defined status in January 2008.
- The requirements do not have to be fulfilled from biofuels produced from waste residues.

Additional requirements

No additional requirements, defined by national regulations of the six partner countries with regard to biodiversity and land use change have been identified. All national regulations regarding these topics seem to refer to the definitions of the European legislation, mainly the ones defined in the RED.

Only the voluntary schemes recognised by the EC concretise the requirements as defined by the EC, by defining relevant categories, such as wetlands, native tree species, grassland, peatland, human intervention, species rich, etc. (see chapter 0). From the three analysed voluntary schemes NTA 8080 defines additional requirements such as:

- Leaving at least 10 % of the cultivation area of the production location, which has the highest conservation value to the landscape concerned, covered in the native vegetation;
- Recording of type of land-use zone and the degree to which the biomass production contributes to the restoration of degraded areas;
- Measures in order to:
  1. preserve and if possible improve biodiversity,
  2. prevent natural grounds becoming fragmented and scattered
  3. ensure that it is prevented that the environment is disturbed by people accessing it, by the use of chemicals, and by noise
  4. ensure that it is prevented that the environment is disturbed by invading alien species (including genetically modified crops)
- Protection of riparian vegetation zones by maintaining or creating functional buffer zones.

This may result in additional efforts for sustainability verification on biomethane, but as stakeholders may choose between the voluntary schemes accepted by EC in case of using biomethane as biofuel for transport, this does not result in a significant burden for biomethane production, trade and use in Europe. It could only be questioned, whether the definition of terms, used in the European legislation and regulation for sustainability of biofuels, should be defined by the EC, rather than by the voluntary schemes, in order to have common definitions independent from which voluntary scheme is used for the verification process. But as there have not been reported any problems with regard to this issue, this does not seem to be necessary.

5.2.2. Relevance of requirements on biodiversity and land use change for biomethane from certain substrates

All requirements on biodiversity and land use change only address biomethane produced from energy crops. There have not been reported any significant administrative burdens for verifying these criteria in practice.

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

5.2.3. Limiting factors from requirements on biodiversity and land use change for cross border trade of biomethane

Regarding the cross border trade of biomethane, it has also not been reported that these criteria cause any relevant administrative burden, which would lead to a significant limitation of biomethane trade across Europe. Considering that the so-called ILUC directive has not been adopted long time ago, not much practical experience exist regarding the handling of these requirements.

5.3 Sustainable farm management & protection of soil, water and air

5.3.1. Overview of existing requirements regarding sustainable farm management & protection of soil, water and air

Requirements set out by EU regulation and legislation

Regarding the requirements for sustainable farm management and the protection of soil, water and air, the EC refers to the standards for good agricultural and environmental conditions as defined in COUNCIL REGULATION (EC) No 73/2009 - “common rules for direct support schemes for farmers”, also known as ‘cross compliance’. These have to be fulfilled for all biofuels and bioliquids under the RED and FQD.

Additional requirements

Most partner countries do not define additional requirements regarding sustainable farm management and the protection of soil, water and air, which are directly linked to the promotion of biomethane as a product (e.g. by defining rules for receiving subsidies for biomethane or end-products like electricity and/or heat from biomethane). Such requirements on a national level mainly exist with regard to the rules on digestate treatment and use.

France:

Producers need to:

- develop a preliminary study on the safety and agronomic value of the digestate (with its characteristics: quantity, production rhythm), the capacity of the soil to receive it and the techniques used to spread it.
- Drafting of a spreading plan with a map showing the possible spreading zones and the zones were spreading is forbidden (according to the French legislation on nitrates).
- keep a notebook on spreading for 10 years.
- Spreading of digestate must occur 50 meters away from watercourses (unless there is a grass strip or hedge 10 m large on the border of the watercourse).
- If water protection needs to be reinforced, the administrative authority can define additional thresholds for phosphorus and nitrogen.

The voluntary scheme ISCC defines additional criteria addressing soil, water and air protection for those countries, where cross compliance regulations are not finally implemented yet, which are Bulgaria and Romania (see chapter 4.1.2).

NTA 8080 again defines additional requirements in comparison to the EU legislation and regulation on - the organization shall take measures that are necessary in order to ensure (detailed measures, see [NTA 2015]):

- Preservation and improvement of soil quality;
- Preservation and improvement of water quality;

This project has received funding from the European Union’s Horizon 2020 research and innovation programme.

- No water from non-renewable sources is used;
- That the emission of harmful substances into the air is limited.

Additional requirements (details, see [NTA 2015]): are defined with regard to:

- Renewable [water] sources and availability of water;
- No burning as part of the installation or management;
- Waste management;
- Use of residual flows.

5.3.2. Relevance of requirements on sustainable farm management & protection of soil, water and air for biomethane from certain substrates

There have not been reported any gaps or significant burdens for verifying these criteria in practice.

5.3.3. Limiting factors from requirements on sustainable farm management & protection of soil, water and air for cross border trade of biomethane

It has also not been reported that these criteria cause any relevant burden for cross border biomethane trade, which would lead to a significant limitation of biomethane trade across Europe.

5.4 Feedstock

5.4.1. Overview of existing requirements regarding feedstock

Requirements set out by EU regulation and legislation

Requirements regarding the feedstock for sustainable biomethane production set out by EU regulation and legislation are only defined in the co-called ILUC directive[29]:

- Limitation of the share of energy from biofuels produced from cereal and other starch-rich crops, sugars and oil crops and from crops grown as main crops primarily for energy purposes on agricultural land to a maximum of 7 % of the final consumption of energy in transport in the member states in 2020 for the calculation of biofuels in the numerator.
- Indicative 0.5% target for advanced biofuels as a reference for national targets, which will be set by EU countries in 2017
- Double Counting for biomethane from certain materials (mainly waste & ligno-celluosic/non-food cellulosic biomass)

These requirements mainly address a favoured use of advanced biofuels in order to minimize the biofuels production from non-food crops, grown primarily for energy purposes on existing agricultural land, which is used for the production of food and feed. This is intended to be addressed by the first requirement in the list above and indirectly addressed by the other requirements.

Furthermore a harmonised waste and residues product list valid for all member states does not exist. Therefore the definition of a product as waste, residue or as material eligible for double-counting and the request for specific verification procedures is within the responsibility of the individual EU member states.

[29] officially called “amendments to Renewable Energy Directive (RED) and Fuel Quality Directive (FQD), number DIRECTIVE (EU) 2015/1513”

This project has received funding from the European Union’s Horizon 2020 research and innovation programme.

Additional requirements

Additional requirements regarding the feedstock of biomethane production have been defined by some member states, when biomethane is used for other purposes than only for biofuel for transport. The following additional requirements regarding feedstock could be identified for the six partner countries:

***Austria*:** none

France

In case of receiving subsidies for biomethane injected into the gas network - *Decree of November 23rd 2011*:

The feedstock allowed for biomethane production is:

- landfill waste
- agricultural or agro industrial matter (including energy crops, which use may be soon limited by a governmental decree - except for intermediate crops)
- biowaste and household waste
- urban sludge
- catering waste

Germany

a) *Biofuel Quota Act:*
   - Biofuels made of animal fats and oils are not accepted for the biofuel quota

b) *Ordinance for implementing the provisions of the Biofuels Quota:* Double Counting for biofuels from the following substrates:
   - waste as defined by the "Kreislaufwirtschaftgesetz" (law on lifecycle management), except fats and oils used for cooking
   - residues (raw glycerine, tall oil pitch, wet and dry manure, oils and fats from vegetables)
   - cellulosic non-food material
   - ligno-cellulosic material

c) *Ordinance for a revision of the provisions regarding the biofuel quota* - ***draft:***

Biofuels, which are purposefully produced from animal fats and oils are not accepted to fulfil the biofuel sustainability ordinance.

Biomethane from the following materials, which potentially contain of animal fats, is not excluded from the biofuel sustainability ordinance:

- the contamination with animal fats and oils is negligible
- fats and oils which have been used for cooking in a common practice
- separately collected biowaste
- certain other waste material containing animal fats and oils

Biomethane partly produced from substrates containing animal fats and oils (except the cases as described above) and partly containing vegetable substrates are completely excluded from the biofuel quota.

A virtual separation of the biomethane regarding the amount of substrates in order to use only the biomethane from vegetable substrates for the biofuel quota is not accepted.

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

d) In case of receiving subsidies for electricity produced from biomethane - *Renewable Energy Sources Act (EEG)*:
- A maximum of 60 % of corn and cereal grain can be used for biogas and biomethane production
- Higher tariffs are paid for electricity from biogas/biomethane produced from certain biomass (e.g. straw, clover grass used as catch crop, manure)

***UK*:** none

***Hungary*:** none

***Italy*:** none

As there does not exist a waste and residues harmonised product list valid for all member states and therefore the definition of a product as waste or residue is within the responsibility of the individual EU member states, the EC recognised voluntary scheme REDcert gives guidance for making these definitions (see chapter 4.1.1).

The German voluntary scheme 'Green Gas Label', which has not applied for recognition by the EC, defines its own requirements regarding the feedstock for biomethane production. While most of these criteria are voluntary and lead to a higher ranking within the scheme - and therefore a better chance for marketing the biomethane on the free market - some need to be fulfilled mandatory in order to get the labelling:

- Crop rotation and substrates:
  - number of crop rotations (< 3, 3 or 4 to 5)
  - extra points for: mixed crops, clover/leguminous crops
- Ground coverage
- Genetically modified organisms (criterion for exclusion)
- Use of glyphosate (criterion for exclusion)
- Mix of substrates
  - share of main substrate: < 30 %, 30 to 50 %, >50 %
  - organic waste and residues
  - wet and dry manure

5.4.2. Relevance of feedstock requirements for biomethane from certain substrates

Limitation of biomass from agricultural land by direct or indirect measures

All requirements limiting biomethane production from biomass cultivated on agricultural land (e.g. limits defined by the ILUC directive, double counting of waste and residue based biofuels, exclusion of certain biomass as in France and Germany) may also include sustainable produced biomass, as the limitations are not directly linked to any sustainability criteria.

This may lead to an additional limitation of the biomethane production potential from this raw material category, but it is hard to estimate this limitation quantitatively.

In this context, it can be questioned, whether the measures of the ILUC directive (see chapter 5.4.1) really limit land use change and really address the problems behind indirect land use change (e.g.

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

loss of biodiversity, use of land with high carbon stock). In addition, the text of justifications in the ILUC directive points it out: “Information on the production of biofuels and bioliquids from such dedicated crops and their actual land-use change impact is limited.” [EUROPEAN PARLIAMENT 2015]

Exclusion of biofuels from animal fats and oils

The exclusion of biofuels based on animal fats and oils from counting towards the biofuel quota in Germany not only leads to a direct limitation of biomethane production and use as biofuel from the substrates containing animal fats and oils. In addition, the biomethane production for the purpose of using it as biofuel for transport is very limited due to the exclusion of all biomethane produced in a plant, which has partly used such substrates. The proper mass-balancing applied to differentiate among different substrates could close this gap.

5.4.3. Limiting factors from feedstock requirements for cross border trade of biomethane

National exclusion of certain feedstock

The exclusion of certain feedstock on a national level also complicates the cross border biomethane trade, as it leads to a much larger amount of different biomethane quality. It can also be the case, that national authorities do not accept the verification of such requirements by verification bodies in the country of biomethane origin. That is why sustainability requirements on the product biomethane with regard to the biomethane production should only be defined on a European level (see chapter 5.1.3). National sustainability requirements with regard to the production process of biomethane should be limited to the commissioning procedure of the plants and the use of the digestate. In addition, sustainability criteria only focussing on the biomethane conversion and use can be defined on a national level, but should be limited to that part of the value chain (e.g. efficiency of biomethane conversion). As mentioned before, a definition of sustainability criteria for gaseous biomass (also in case of using it for electricity and/or heat generation) on a European level, mandatory for all member states would be essential for implementing this structure od sustainability certification for biomethane.

This project has received funding from the European Union’s Horizon 2020 research and innovation programme.

BIBLIOGRAPHY

COM 2007 — Commission of the European Communities: COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT on the Interpretative Communication on waste and by-products (COM(2007) 59), Brussels, February 2007

COM 2010 — Commission of the European Communities: Communication from the Commission on voluntary schemes and default values in the EU biofuels and bioliquids sustainability scheme (2010/C 160/01, Brussels, June 2010

EC 2016 — European Commission: "Voluntary Schemes", accessible under: https://ec.europa.eu/energy/en/topics/renewable-energy/biofuels/voluntary-schemes, last access: April 8 2016

ECOFYS 2014 — Ecofys: Greenhouse gas impact of marginal fossil fuel use, Vovember 2014

EURACTIV 2014 — Eusactiv: Report: EU underestimates biofuels' greenhouse gas savings by 50%, http://www.euractiv.com/section/transport/news/report-eu-underestimates-biofuels-greenhouse-gas-savings-by-50/, last access: April 21 2016

EUROPEAN PARLIAMENT 2015 — The European Parliament and of the Council: DIRECTIVE (EU) 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, September 2015

ISCC 2015 — ISCC: ISCC 202 Sustainability Requirements for the Production of Biomass, December 2015

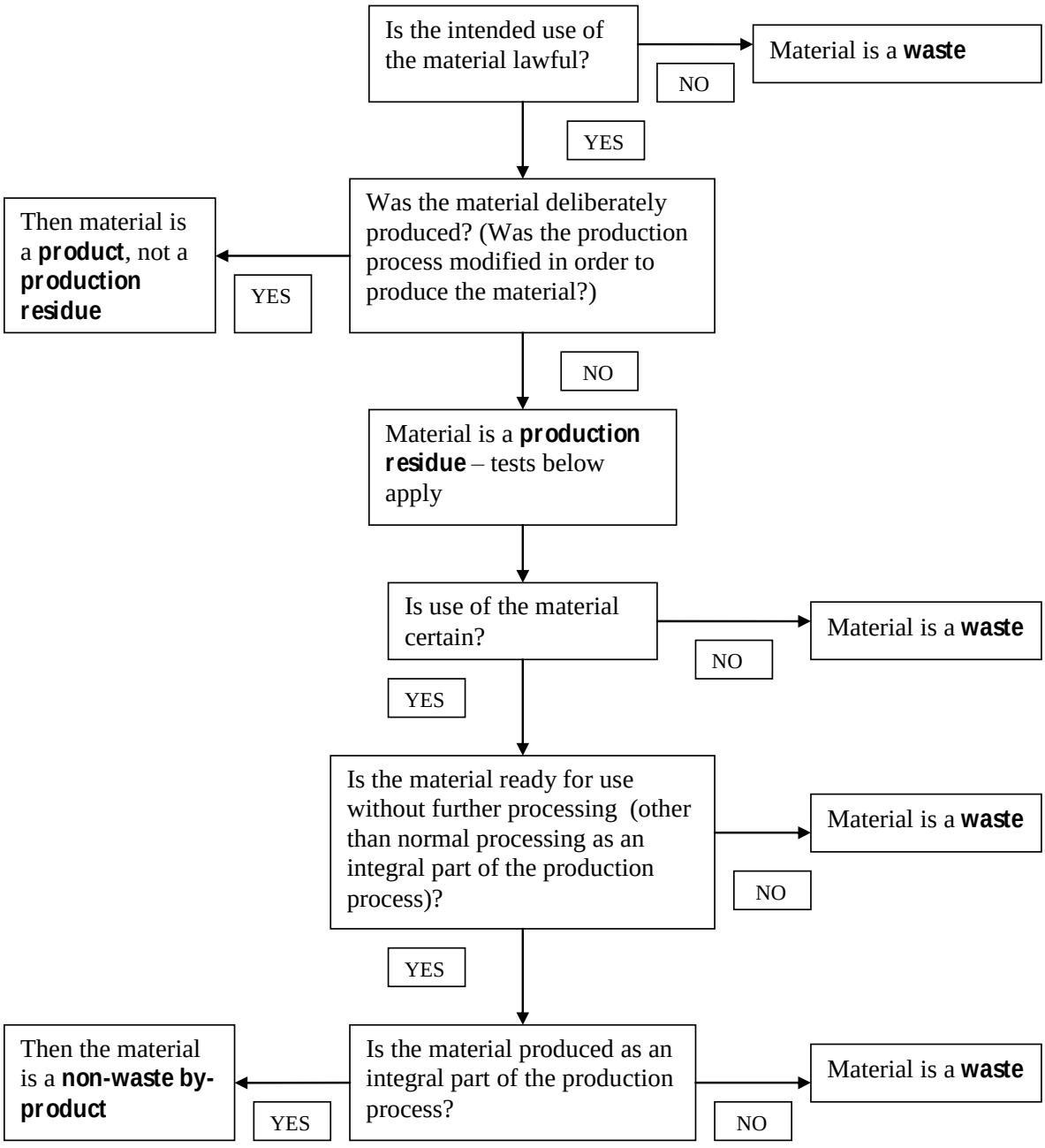
NTA 2015 — NTA: NTA 8080-1 (en) Sustainably produced biomass for bioenergy and bio-based products – Part 1: Sustainability requirements, December 2015

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

ANNEXES

Annex I: Decision tree for waste versus by-product decision

source: [COM 2007]



This project has received funding from the European Union's Horizon 2020 research and innovation programme.

Annex II: Overview of Sustainability Criteria of ISCC

source: [ISCC 2015]

Criterion number	Source	Criterion	Major Must	Minor Must
	Sustainability	The entire land of a farm/ plantation including agricultural land, pasture, forest and any other land must comply with the ISCC Standard 202 (Principle 1 – 6). Selection of fields ("cherry picking") or partial compliance with the ISCC Standard 202 is not allowed under ISCC.	X	
PRINCIPLE 1: Biomass shall not be produced on land with high biodiversity value or high carbon stock (according to Article 17(3), (4) and (5) of the Directive 2009/28/EC. HCV areas shall be protected.				
1.1	2009/28/EC	Biomass is not produced on land with high biodiversity value	X	
1.2	2009/28/EC	Biomass is not produced on highly biodiverse grassland	X	
1.3	2009/28/EC	Biomass is not produced on land with high carbon stock	X	
1.4	2009/28/EC	Biomass is not produced on land that was peatland in January 2008 or thereafter (Article 17(5) of the Directive 2009/28/EC)	X	
1.5	2009/28/EC	If land was converted after January 1, 2008, the conversion and the use should not run contrary to principle 1	X	
PRINCIPLE 2: Biomass shall be produced in an environmentally responsible way. This includes the protection of soil, water and air and the application of Good Agricultural Practices				
2.1 Environmental impact assessment and conservation				
2.1.1	2011/92/EU	Environmental impact assessment for certain actions	X	
2.1.2	Sustainability	Avoidance of damage or deterioration of habitats		X
2.1.3	(EU) 1143/2014, (EC) 2001/18, (EC) 1829/2003, (EC) 1830/2003	Cultivation of highly invasive species and genetically modified varieties	X	
2.1.4	(EC) 98/95, 2009/128/EC	Legitimacy of seed origin	X	
2.1.5	GAP	Efforts are made to reduce fossil energy consumption and thus, also lower greenhouse gas emissions		X
2.2 Natural water courses				
2.2.1	Sustainability	Natural vegetation areas around springs and natural watercourses are maintained or re-established		X
2.3 Soil conservation and avoidance of soil degradation				
2.3.1	2008/128/EC, 91/676/EEC	Conservation of soils		X
2.3.2	Cross Compliance	Field cultivation techniques used to reduce the possibility of soil erosion	X	
2.4 Soil organic matter and soil structure				
2.4.1	Cross Compliance	Soil organic matter is preserved	X	

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

Criterion number	Source	Criterion	Major Must	Minor Must
2.4.2	Cross Compliance	Organic and mineral fertilizers are of high quality and used according to nutritional requirements	X	
2.4.3	Cross Compliance	Restriction on burning	X	
2.4.4	Cross Compliance	Improve or maintain soil structure and avoid soil compaction	X	
2.4.5	2011/92/EU, 2008/98/EC	Use of wastes and agricultural by-products	X	
2.5 Ground Water and Irrigation				
2.5.1	98/391/EEC, 2009/128/EC	Mineral oil products are stored in an appropriate manner	X	
2.5.2	2000/60/EC, 1306/2013/EC	Respect existing water rights and justify the irrigation in the context of social and environmental sustainability	X	
2.5.3	Sustainability	Application of good agricultural practices to reduce water usage and to maintain and improve water quality		X
2.6 Use of Fertilizer				
2.6.1	Cross Compliance	While applying fertilizers with a considerable nitrogen content care is taken not to contaminate the surface and ground water	X	
2.6.2	Cross Compliance	Fertilizers with a considerable nitrogen contents are only applied onto absorptive soils	X	
2.6.3	Cross Compliance	Records of fertilizer application	X	
2.6.4	Cross Compliance (from 2010)	Fertilizer application machinery	X	
2.6.5	GAP	Inorganic fertilizers are stored in a covered, clean and dry area		X
2.6.6	91/676/EEC	Fertilizers are stored in an appropriate manner	X	
2.6.7	Cross Compliance	Fertilizer is used according to an input/output balance	X	
2.6.8	86/278/EEC	Restrictions on the use of sewage sludge	X	
2.7 Integrated Pest Management (IPM)				
2.7.1	2009/128/EC, 91/676/EEC	Assistance with implementation of IPM systems has been obtained through training or advice		X
2.7.2	2009/128/EC	Evidence of implementation of at least one activity that falls in the category of "Prevention"		X
2.7.3	2009/128/EC, 1107/2009/EC	Evidence of implementation of at least one activity that falls in the category of "Observation and Monitoring"		X
2.7.4	2009/128/EC	Evidence of implementation of at least one activity that falls in the category of "Intervention"		X
2.8 Use of plant protection products (PPP)				
2.8.1	1107/2009/EC,	Prohibition of chemicals	X	

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

Criterion number	Source	Criterion	Major Must	Minor Must
	2006/507/EC, 756/2010/EU, 757/2010/EU			
2.8.2	2009/128/EC, 1107/2009/EC	Staff dealing with plant protection products is competent	X	
2.8.3	Cross Compliance	Only use plant protection products that are registered in the country of use for the target crop where such official registration scheme exists	X	
2.8.4	Cross Compliance	The producer follows the label instructions	X	
2.8.5	Cross Compliance	All application equipment is calibrated	X	
2.8.6	GAP	Invoices of registered plant protection products are kept		X
2.8.7	Cross Compliance	Local restrictions on the use of plant protection products are followed	X	
2.8.8	Cross Compliance	Plant protection product applications are recorded	X	
2.8.9	Cross Compliance	Surplus application mix or tank washings are disposed of in a way not contaminating the ground water	X	
2.8.10	2009/128/EC	Application of plant protection products is done appropriately	X	
2.9 Plant Protection Product				
2.9.1	Cross Compliance / Local legislation on dangerous substances	Plant protection products are stored in accordance with local regulations in a secure, appropriate storage	X	
2.9.2	Cross Compliance	Appropriate facilities for measuring and mixing plant protection products	X	
2.9.3	Cross Compliance / GefahrstoffVO Local legislation on dangerous substances	Facilities to deal with spillage to avoid contamination of the ground water	X	
2.9.4	GAP	The product inventory is documented and readily available		X
2.9.5	Cross Compliance	All plant protection products are stored in their original package	X	
2.9.6	2009/128/EC	Liquids are not stored on shelves above powders		X
2.9.7	2009/98/EC, 2009/128/EC, 2006/118/EC	Obsolete plant protection products are securely maintained and identified and disposed of by authorized or approved channels		X
2.10 Empty Plant Protection Product Containers and Waste Disposal				
2.10.1	GAP	The reuse of empty plant protection product containers for purposes other than containing and transporting of		X

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

Criterion number	Source	Criterion	Major Must	Minor Must
		the identical product is avoided		
2.10.2	2009/98/EC	The disposal of empty plant protection product containers does occur in a manner that avoids exposure to humans and the environment		X
2.10.3	Cross Compliance / GAP	Cleaning of empty plant protection product containers prior to disposal	X	
2.10.4	KrW-/abfG Local legislation	The premises have adequate provisions for waste disposal		X
2.10.5	KrW-/abfG Local legislation	There is a farm waste management plan. Waste reduction, reuse and recycling avoids or reduces wastage and avoids the use of landfill or burning		X
PRINCIPLE 3: Safe working conditions through training and education, use of protective clothing and proper and timely assistance in the event of accidents				
3.1 Safe Working conditions				
3.1.1	Employer's Liability Insurance Association	The farm has a health, safety and hygiene policy and procedures including issues of the risk assessment		X
3.1.2	Cross Compliance / GAP	Suitable protective clothing	X	
3.1.3	ArbeitsstättenVO Local legislation on work place	Potential hazards are clearly identified by warning signs		X
3.1.4	Employer's Liability Insurance Association	There are records kept for training activities and attendees		X
3.1.5	2009/128/EG GefahrstoffVO Local legislation on dangerous substances	Certificates of competence for dangerous or complex work	X	
3.1.6	2009/128/EC	All workers received adequate health and safety training and have been instructed according to the risk assessment		X
3.1.7	98/654/EEC	Access to basic services	X	
3.2 Plant Protection Product Handling				
3.2.1	2009/128/EC, 89/391/EEC, 89/654/EEC, 2001/45/EC, 89/655/EEC, 92/58/EEC	There are accident procedure and equipment	X	
3.2.2	ArbeitsstättenVO Local legislation on work place	There are facilities to deal with accidental operator contamination		X
3.2.3	Cross Compliance / ArbeitsstättenVO	There are procedures dealing with re-entry times on the farm	X	

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

Criterion number	Source	Criterion	Major Must	Minor Must
	Local legislation on work place			
PRINCIPLE 4: Biomass production shall not violate human rights, labour rights or land rights. It shall promote responsible labour conditions and workers' health, safety and welfare and shall be based on responsible community relations				
The criteria listed here is based on internationally recognized requirements concerning social aspects (International Labour Organization, core ILO standards: ILO 29, 105, 138, 182, 87, 98, 100, 111)				
4.1		Self-declaration on good social practice regarding human rights		X
4.2		Employment conditions comply with equality principles	X	
4.3		There is no discrimination at the farm or plantation	X	
4.4		There is no indication of forced labour at the farm	X	
4.5		Workers are treated with dignity and respect		
4.6		Labour organizations and collective bargaining for negotiating working conditions	X	
4.7		The farm does pay a living wage which meets at least legal or industry minimum standards	X	
4.8		Responsible persons for workers' health, safety and good social practice		X
4.9		All negative environmental, social, economic and cultural impacts are avoided		X
4.10		Open communication of management with workers		X
4.11		There is at least one worker or a workers' council elected freely and democratically who represent the interests of the staff to the management		X
4.12		There is a complaint form and/or procedure available on the farm, where workers and affected communities can make a complaint		X
4.13		All children living on the farm have access to quality primary school education	X	
4.14		Records on all workers and employees		X
4.15		Restrictions related to hazardous activities	X	
4.16		All workers are provided with fair legal contracts		X
4.17		There is a time recording system that shows daily working time and overtime on a daily basis for all workers		X
4.18		The employment conditions of individual workers comply with legal regulations and/or collective bargaining agreements		X
4.19		Pay slips document the conformity of payment with at least legal regulations and/or collective bargaining agreements		X

This project has received funding from the European Union's Horizon 2020 research and innovation programme.

Criterion number	Source	Criterion	Major Must	Minor Must
4.20		Other forms of social benefits are offered by the employer to workers, their families and/or community		X
4.21		Mediation is available in case of a social conflict		X
4.22		Fair and transparent contract farming arrangements are in place		X
4.23		Biomass production does not impair food security		X
PRINCIPLE 5: Biomass production shall take place in compliance with all applicable regional and national laws and shall follow relevant international treaties				
5.1		The producer can prove that the land is used legitimately and that traditional land rights have been secured	X	
5.2		There is awareness of, and compliance with, all applicable regional and national laws and ratified international treaties	X	
PRINCIPLE 6: Good management practices shall be implemented				
6.1. Economic stability				
6.1.1	Cross Compliance	Basic economic documentations	X	
6.1.2	Sustainability	Business plan		X
6.1.3	Sustainability	Good relationship with customer		X
6.2	Cross Compliance	Establishment of a recording system for each unit of production	X	
6.3	Cross Compliance	Records are kept for the description of the areas in use	X	
6.4	Cross Compliance	In case of the engagement of subcontractors they must comply fully with the ISCC Standard and provide the respective documentation and information	X	

This project has received funding from the European Union's Horizon 2020 research and innovation programme.