



**ADVANCEFUEL**

# **Review of existing standards and certification schemes plus set of criteria and indi- cators to be implemented**

## **D4.1**

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## *ADVANCEFUEL at a glance*

ADVANCEFUEL ([www.ADVANCEFUEL.eu](http://www.ADVANCEFUEL.eu)) aims to facilitate the commercialisation of renewable transport fuels by providing market stakeholders with new knowledge, tools, standards and recommendations to help remove barriers to their uptake. The project will look into liquid advanced biofuels – defined as liquid fuels produced from lignocellulosic feedstocks from agriculture, forestry and waste – and liquid renewable alternative fuels produced from renewable hydrogen and CO<sub>2</sub> streams.

In order to support commercial development of these fuels, the project will firstly develop a framework to monitor the current status, and future perspectives, of renewable fuels in Europe in order to better understand how to overcome barriers to their market roll-out. Following this, it will investigate individual barriers and advance new solutions for overcoming them.

The project will examine the challenges of biomass availability for second-generation biofuels, looking at non-food crops and residues, and how to improve supply chains from providers to converters. New and innovative conversion technologies will also be explored in order to see how they can be integrated into energy infrastructure.

Sustainability is a major concern for renewable fuels and ADVANCEFUEL will look at socio-economic and environmental sustainability across the entire value chain, providing sustainability criteria and policy-recommendations for ensuring that renewable fuels are truly sustainable fuels. A decision support tools will be created for policy-makers to enable a full value chain assessment of renewable fuels, as well as useful scenarios and sensitivity analysis on the future of these fuels.

Stakeholders will be addressed throughout the project to involve them in a dialogue on the future of renewable fuels and receive feedback on ADVANCEFUEL developments to ensure applicability to the end audience, validate results and ensure successful transfer and uptake of the project results. In this way, ADVANCEFUEL will contribute to the development of new transport fuel value chains that can contribute to the achievement of the EU's renewable energy targets, and reduce carbon emissions in the transport sector to 2030 and beyond.

To stay up to date with ADVANCEFUEL's stakeholder activities, sign up at: [www.ADVANCEFUEL.eu/en/stakeholders](http://www.ADVANCEFUEL.eu/en/stakeholders)



# Executive Summary

The overarching goal of the ADVANCEFUEL project is to facilitate the market roll-out of advanced liquid biofuels derived from lignocellulosic feedstocks and other liquid renewable fuels from non-biological origin (further jointly addressed as “RESfuels” in the report) in the transportation sector between 2020 and 2030, with an outlook on post-2030 impacts. This document assesses the sustainability requirements in voluntary schemes recognised by the European Commission and national initiatives used to certify sustainable biofuels used in transport. The sustainability criteria, including land and greenhouse gas emissions requirements, as established for biofuels in the Renewable Energy Directive (2009/28/EC) were used as background for the comparison of sustainability requirements in these systems. The revised sustainability requirements in the proposed Renewable Energy Directive (RED II) were also considered to anticipate how the voluntary schemes and national initiatives could be used to demonstrate sustainability compliance to the updated criteria and sectors. Of particular relevance is the use of solid biomass for advanced biofuels as well as for heat and electricity generation.

This document also summarises the consultation with stakeholders. Two sets of semi structured questionnaires on key sustainability issues such as national guidance on sustainability reporting required for economic operators had been developed. Other topics of the questionnaires included the coverage of sustainability criteria related to feedstock production and land use, methods and data collection to calculate greenhouse gas emissions, chain of custody and social & economic criteria. The questionnaires were sent to policy makers, industry representatives and bioenergy consultants for their information on the updates on national legislations for biofuels and bioenergy. In addition, stakeholders also gave opinions on the sustainability topics raised in the questionnaire as on the strengths and weaknesses of the available sustainability schemes and standards and their applicability in regard to advanced biofuels.

The document additionally includes an online survey, which aimed to further consult various stakeholders on the legislative updates in the European Member States. Furthermore, the survey helped to gather additional stakeholders’ opinions on sustainability requirements for biofuels and bioenergy. The online survey had the same objectives as the semi-structured interviews. It was open for all stakeholders with expertise on bioenergy sustainability, the questions used for the interviews were based on the questions used for the personal interviews.



It is concluded that ensuring sustainability performance of biofuels and bioenergy is a challenge at the EU level. The sustainability criteria defined in the RED I and RED II 2016 are fundamental but not strict enough to ensure a full sustainability compliance. An establishment of additional and comprehensive sustainability requirements at an EU level is important to avoid sustainability risks. These are SFM criteria, social and economic requirements. There are also three new sustainability aspects, which would enhance sustainability compliance. Those include the mutual recognition of national initiatives and voluntary schemes, the risk-based approach and the agreement on definition and measurement of sustainability criteria such as indirect land-use change, biomass cascading, social and economic aspects.

Advanced biofuels produced from solid biomass use similar feedstocks as other bioenergy sectors (heat and electricity). Furthermore, advanced biofuel plants often co-generate heat and electricity. The development of an EU wide comprehensive set of sustainability requirements that apply not only to biofuels (including advanced biofuels), but also to heat and electricity generated from biomass is therefore essential. Implementation of these sustainability requirements proves that transport biofuels and bioenergy as a whole are produced in a sustainable way, which ultimately leads to increased social acceptance of the entire sector. In the scope of the ADVANCEFUEL project, additional interviews with policy makers, industry representatives, voluntary scheme owners and bioenergy consultants will continue to be carried out. This will be completed by a dedicated workshop to discuss the assessment of existing sustainability requirements and to consider the harmonized sustainability requirements and sustainability certification for biofuels and bioenergy. Harmonisation is not always regarded as being important. It might be more relevant to have specific criteria to specific end uses or feedstock types to be effective. Harmonisation possibilities therefore will be discussed in details with various stakeholders.

In conclusion, advanced biofuels provide high GHG emission savings with a low risk of causing indirect land-use change and are less likely to compete directly for agricultural land used for the food and feed production. The promotion of advanced biofuels and deployment of advanced fuels with suitable accompanying sustainability criteria play an important role in the decarbonisation of transport and the development of low-carbon transport technologies beyond 2020.



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# Abbreviations

2BSvs	Biomass biofuel, sustainability voluntary scheme
ASEAN	Association of Southeast Asian Nations
C&S	Carbon and Sustainability
CoC	Chain of Custody
EC	European Commission
EU	European Union
FME	Forest Management Enterprise
FMU	Forest Management Unit
FQD	Fuel Quality Directive
FSC	Forest Stewardship Council
GTAS	GTAS Trade Assurance Scheme
GHG	Greenhouse gas emissions
H&C	Heating and Colling
HVO	Renewable Diesel Scheme for Verification of RED Compliance
iLUC	Indirect Land Use Change
ILO	International Labour Organisation
ISCC	International Sustainability & Carbon Certification
IUCN	International Union for Conservation of Nature
KZR INIG	KZR INIG System
MSs	Member States
REDcert	REDcert Certification System
RED I	Renewable Energy Directive
RED II 2016	Renewable Energy Directive Recast
RED II 2018	Agreement on revised RED
ROCs	Renewables Obligation Certificates
RSB	Roundtable of Sustainable Biofuels
RSPO	Roundtable on Sustainable Palm Oil
RTFO	UK Renewable Transport Fuel Obligation
RTRS	Round Table on Responsible Soy
PEFC	Programme for the Endorsement of Forest Certification
SBP	Sustainable Biomass Programme
SDE+	Dutch Stimulation of Sustainable Energy Production
SFM	Sustainable Forest Management
SQC	Scottish Quality Farm Assured Combinable Crops Scheme
TASCC	Trade Assurance Scheme for Combinable Crops
UCO	Used Cooking Oil
UFAS	Universal Feed Assurance scheme
WWF	World Wide Fund for Nature





# 1. Introduction

Given the EU wide changing policy for bioenergy and biofuels used in transport sector (EC, 2016, 2018), the overarching goal of the Horizon 2020-funded EU project ADVANCEFUEL is to facilitate the market roll-out of advanced liquid biofuels and other liquid renewable fuels (further jointly addressed as “RESfuels”) in the transport sector between 2020 and 2030. The project will provide the market stakeholders with new knowledge, tools, standards and recommendations to remove the most prominent barriers and detect development opportunities for their commercialisation.

Sustainability criteria have become an important tool to address concerns and safeguard the sustainability of biofuel along the supply chain (feedstock production, logistics, conversion and end use). The development of certification systems by various stakeholders has been stimulated in particular for biofuels as a result of verification requirements to mandatory sustainability criteria in the Renewable Energy Directive (RED I). With advanced biofuels on the edge of commercialisation, the applicability of the existing and proposed sustainability criteria and certification systems to advanced biofuels is becoming increasingly relevant.

The general objective of WP4 is to assess the current and future sustainable production of RESfuels and test its performance against sustainability criteria, certification schemes and standards to safeguard and stimulate sustainable production of RESfuels. To meet this objective, WP4 has been organised in 4 tasks with Tasks 4.1 and 4.2 focusing on sustainability standards and certification and Tasks 4.3 and 4.4 focusing on quantifying potential sustainability impacts of advanced biofuel supply chains (Figure 1). This report presents the results of Task 4.1 with a focus on the current experience of sustainability certification of biofuels. Other liquid renewable fuels that do not have biomass as feedstock basis, such as power-to-liquids, are not covered by sustainability criteria or sustainability schemes. These RESfuels are therefore excluded from the scope of this report.



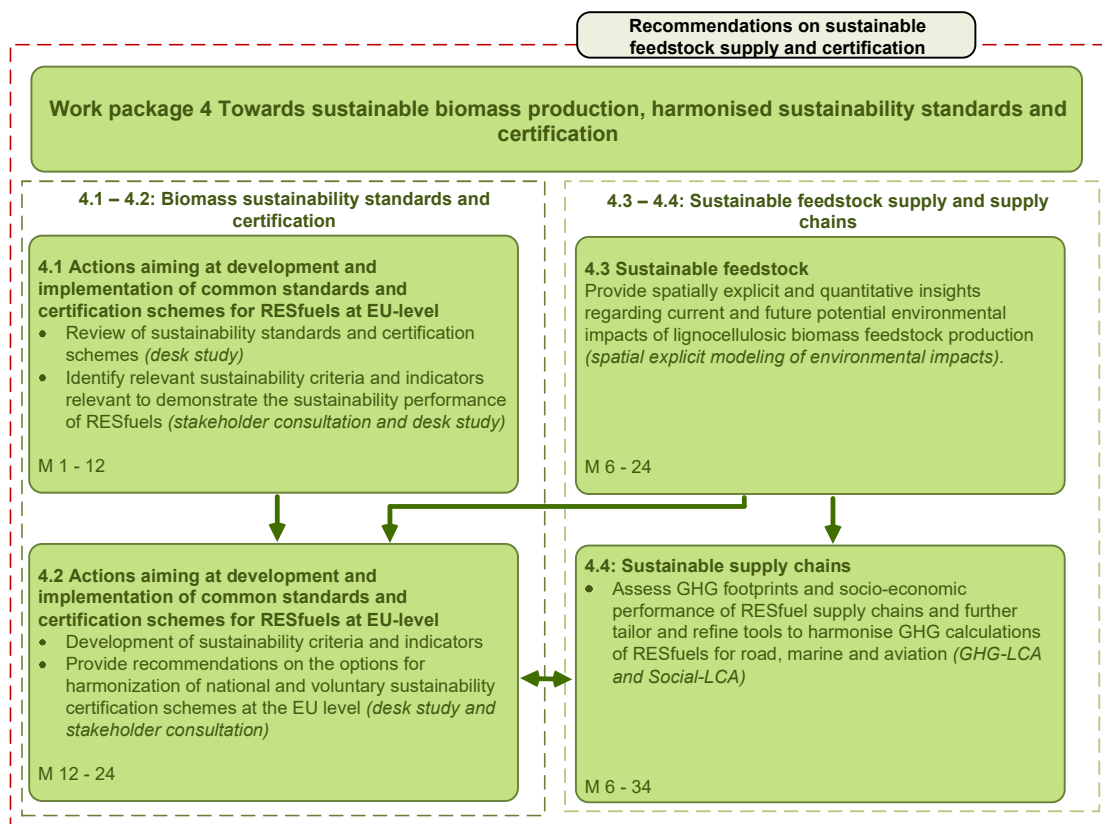


Figure 1. Overview of ADVANCEFUEL Work Package 4

The report consists of five chapters. Chapter 2 provides the policy context which is considered a background for the assessment of sustainability requirements under Work package (WP) 4.1. Chapter 3 describes the methodology used to carry out the sustainability assessment for bio-fuels and bioenergy. Chapter 4 introduces 16 voluntary schemes and national initiatives in the European Union (EU). Chapter 5 focuses on the stakeholder consultation including the online survey and the interviews with selected stakeholders. Chapter 6 presents the quantitative and qualitative comparisons of sustainability requirements in the national initiatives and voluntary schemes used for biofuels and solid biomass. The development of a dedicated set of sustainability criteria and indicators suitable to demonstrate the sustainability of RESfuel supply chains outlined in the ADVANCEFUEL project proposal will be moved to Work package 4.2 because this involves the results of both the stakeholder consultation and the outcomes of a dedicated workshop (which will be organized in the second year of the project timeline - 2019). Instead, a discussion based on the review and assessment of sustainability requirements established in the voluntary schemes and national initiatives as well as the outcomes of the initial stakeholder consultation are presented in Chapter 7.

## 2. Background and policy context

### 2.1. Bioenergy

Biomass used for energy purposes (bioenergy) has a key role in the EU renewable energy supply. By the end of the 20<sup>th</sup> century, bioenergy was still mainly used for traditional purposes (heat). The introduction of the 2001 Renewable Energy Directive (RED) (2001/77/EC) and 2003 Biofuels Directive (2003/30/EC) have initiated a shift towards the development of modern bioenergy supply in electricity and transport sectors. The adoption of the 2009 RED, called RED I, (EC, 2009b) further stimulated the development of renewable energy to mitigate greenhouse gas (GHG) emissions and aimed to improve energy supply security in the EU. With the adoption of the RED I, Member States (MSs) have agreed on binding targets towards a 20% renewable share in gross final energy consumption and 10% renewable energy share in the transport sector by 2020. The 2009 Fuel Quality Directive (EC, 2009a) requires at least 6% GHG savings in the transport sector by 2030.

So far, this has led to a more than twofold increase in final bioenergy consumption in the EU (from 55.4 Mtoe in 2000 to 112.3 Mtoe in 2015 (AEBIOM, 2017)). After a period of strong growth, consumption of liquid biofuels stagnated in 2012, mostly due to policy uncertainties. Advanced biofuels still play a minor role in the total biofuel landscape. In 2015, 2% of ethanol (0.4% of total consumption) was produced from lignocellulosic biomass (Figure 3).

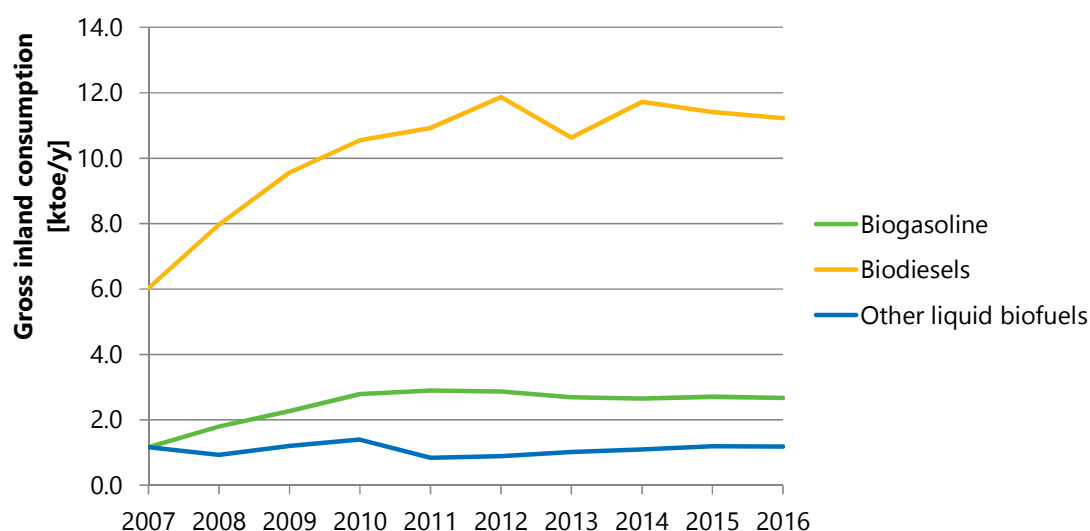


Figure 2. Development of gross inland consumption of liquid biofuels in the EU between 2007 and 2016 (EUROSTAT 2018)

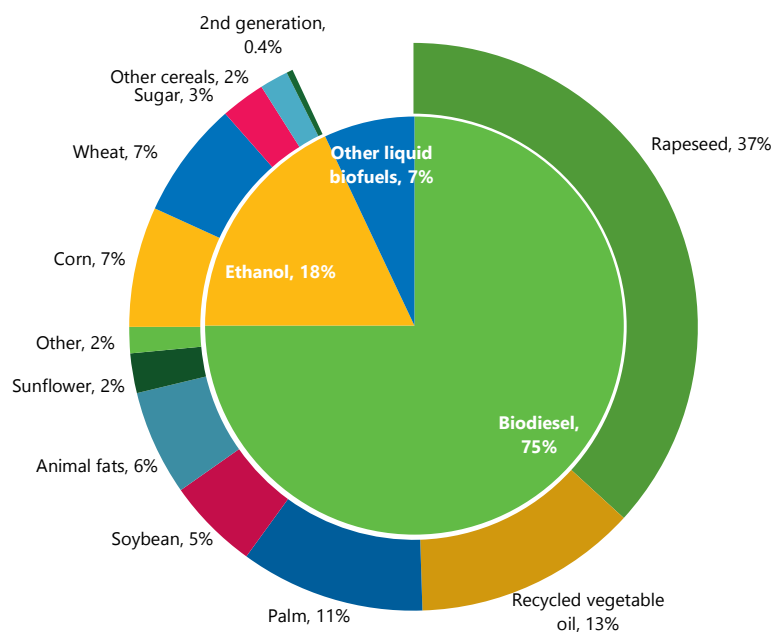


Figure 3. Gross inland consumption per type of liquid biofuel and type of feedstock in the EU in 2015 (AEBIOM 2017).

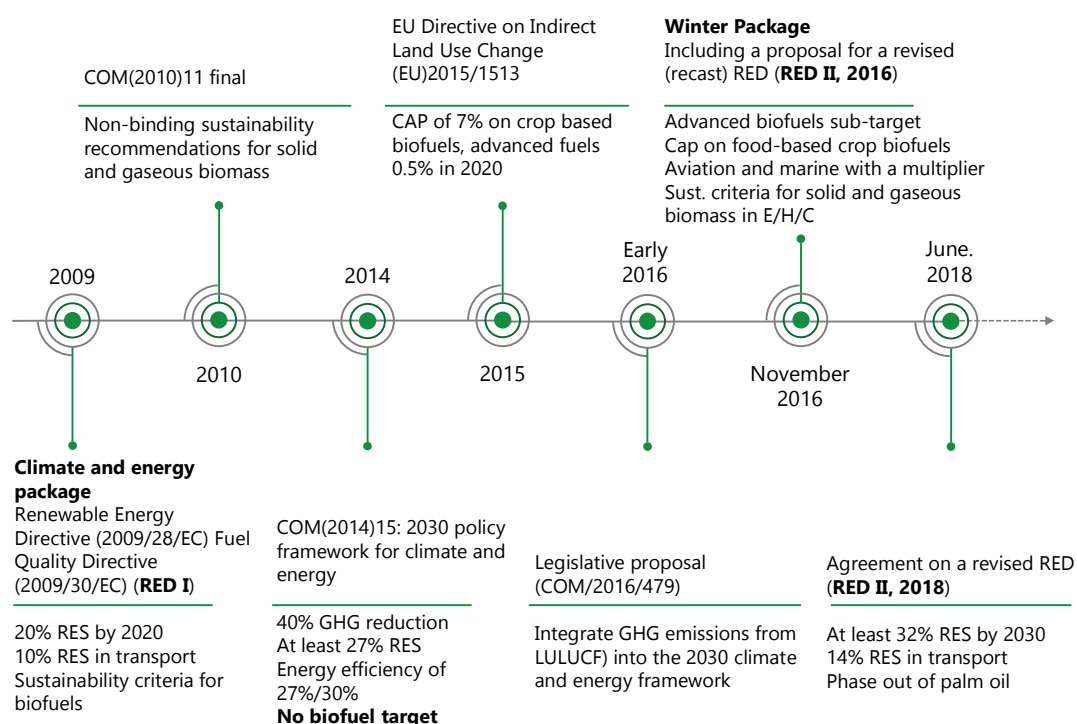
## 2.2. Development of bioenergy sustainability criteria

To ensure the sustainability performance of bioenergy, sustainability criteria have become an essential part of EU climate and energy policy development. Both the existing RED I and the Fuel Quality Directive (FQD) include sustainability requirements that apply to biofuels used in transport and bioliquids used in electricity and heat sectors in EU MSs. Demonstration of compliance to the following criteria is required in order to count towards the EU RES targets (European Parliament and Council, 2009a):

- Minimum GHG saving requirements
- Conservation of carbon stocks and peatland
- Conservation of biodiversity
- Exemption for wastes and residues

RED I promoted the development of first generations biofuels (mainly energy crops grown on agricultural land) and recognized the role of second generation biofuels (advanced fuels). However there was lack of stimulations for the development of advanced biofuels. Also solid and gaseous biomass used in electricity and heat sectors have so far been exempted from EU wide binding sustainability criteria as the EC indicated that the risks of unintended environmental impacts from solid and gaseous biomass are low whilst this can be addressed and minimized through existing or new EU measures in other fields, not

specifically the energy field. Solid biomass is so far the biggest source of renewable energy in the EU and is expected to make a key contribution to the short and long term EU renewable energy target (EC, 2014). Solid biomass imported from sourcing countries outside the EU has increased strongly in the last few years (EC, 2017) and without binding sustainability requirements, the risks of indirect land use change or non-compliance with local laws may occur.



**Figure 4.** Important milestones in EU bioenergy policy development between 2009 and 2016

In 2015, the Directive of Indirect Land Use Change (European Parliament and Council, 2015) amending the existing legislation on biofuels – in particular the RED and the FQD – was issued to limit the share of biofuels from crops grown on agricultural land; set an indicative 0.5% target for advanced biofuels as a reference for national targets; harmonise the list of feedstocks for biofuels across the EU; require that biofuels produced in new installations emit at least 60% fewer GHGs than fossil fuels as well as include a number of additional reporting obligations for the fuel providers, EU countries and the European Commission.

In 2016, the European Commission (EC) issued the proposed Renewable Energy Directive Recast (RED II 2016) which proposed increasing the renewable energy share from 20% in 2020 to 27% by 2030 as well as reinforcing the existing sustainability criteria for bioenergy (EC, 2016). The new EU sustainability criteria on bioenergy aim to continue guaranteeing the sustainability of bioenergy crops, forest biomass, waste and residues used for biofuel production in the transport sector. The RED II 2016 also indicated actions of the EU to extend the EU sustainability criteria to biomass feedstocks used in heating/cooling (H&C) and electricity.

On 14 June 2018, the European Parliament and Council reached an agreement, called RED II 2018, of 32% share of bioenergy in the final energy consumption by 2030 and European-wide sustainability criteria were adopted for solid bioenergy (AEBIOM, 2018). This approach ensures that biomass is produced sustainably, irrespective of its geographical origin, without creating unnecessary administrative burden on small installations and countries with a well-established system of forest management. RED II 2018 also indicates that bioenergy will need to meet 80% GHG emissions saving as compared to fossil fuels by 2026. For the EU transport sector, an increase from 7% by 2020 to 14% by 2030 of renewable energy in transport needs to be reached. A 3.5% target was set for advanced biofuels originating from non-food crops, e.g. wood residues and an agreement that will lead to a phase out of palm oil by 2030 will start with a freeze on existing quantities of imported palm. For the heat and power sector, a required 1.3% annual increase in the share of renewables need to be established compared with a 1% annual increase in the share of renewables in H&C in the original RED II 2016 proposal. For electricity-only installations, only best-available technology will be able to get supports.

The initial review of the RED I, RED II 2016 and RED II 2018 showed that the sustainability criteria defined at EU level respond to a number of environmental and social standards but comprehensive aspects of sustainability are not fully included.

Also at national level, sustainability requirements are already established for solid biomass including forest biomass in Belgium, Denmark, the Netherlands and the United Kingdom (Mai-Moulin *et al.*, 2017). The national sustainability requirements, although not completely aligned from one country to another, define the sustainability compliance with GHG emission reductions and land criteria including sustainable forest management (SFM) requirements. In the SFM voluntary schemes Forest Stewardship Council (FSC), Sustainable Biomass Programme (SBP) and Programme for the Endorsement of Forest Certification (PEFC), social and economic standards are established including law compliance, labour rights, land rights, local developments. Based on the EU directives, national legislation, and SFM voluntary schemes, this deliverable assessed a fundamental set of sustainability requirements used for lignocellulosic biomass originating from agriculture, forests and waste streams (the main feedstocks considered in this project, which is likely to be used in short and medium term, according to the more mature technologies defined in D3.1, (Uslu, 2018)). The assessment was based on the sustainability criteria set in RED II 2016 which are used to demonstrate compliance to sustainable biofuels and bioenergy. This deliverable also took into account the review of national initiatives for solid biomass and the SFM voluntary schemes which benchmarked the sustainability requirements for relevant feedstocks (OFGEM, 2016), (RVO, 2015a), (FSC, 2015), (PEFC, 2010) as well as assessed additional environmental, social and economic requirements to ensure that biofuels and bioenergy produced from lignocellulosic biomass are sustainable from a holistic perspective.



The GHG requirements defined in RED II 2016 and RED II 2018 for bioenergy sustainability target a GHG emissions saving of 50% before 2015, 60% after 2015 and 65% after 2021 for biofuels, biogas and bioliquids compared to fossil fuels. RED II 2016 also requires a GHG emissions saving of 70% after 2021 and 80% after 2021 for electricity, heating and cooling sectors using biomass feedstocks. Feedstocks used for bioenergy will be more diverse and originates not only from EU but also from international sourcing countries (EC, 2017). To anticipate whether the biomass feedstocks could meet the EU GHG emission requirements, three indicators were investigated including the inclusion of additional supply chains, the impacts beyond the supply chains and the inclusion of diverse feedstocks. The GHG emissions saving and land criteria are not required for biomass cultivation and harvesting of waste and residues.

Regarding the SFM requirements for forest biomass, there are a number of aspects which were relevant to be assessed. They include the legality of harvesting operations; forest generation of harvested areas; areas designated by laws for nature protection purposes including wetlands and; maintenance and improvement of long-term production capacity of forest; minimisation of negative impacts on soil quality and biodiversity. In this report, in order to make a comprehensive set of sustainability requirements, SFM criteria were divided into 4 indicators, legal and sustainable sourcing of forest biomass, conservation of ecosystem, maintenance of forest productivity, and regular SFM assessment.

The protection of soil, water and air quality were both included for agriculture and forest sectors. The recommended social and economic criteria included the worker rights, land right, human health impacts and compliance with local law and international treaties.

Figure 5 clarifies what sustainability criteria need to be considered for the biofuel supply chains of different sectors.

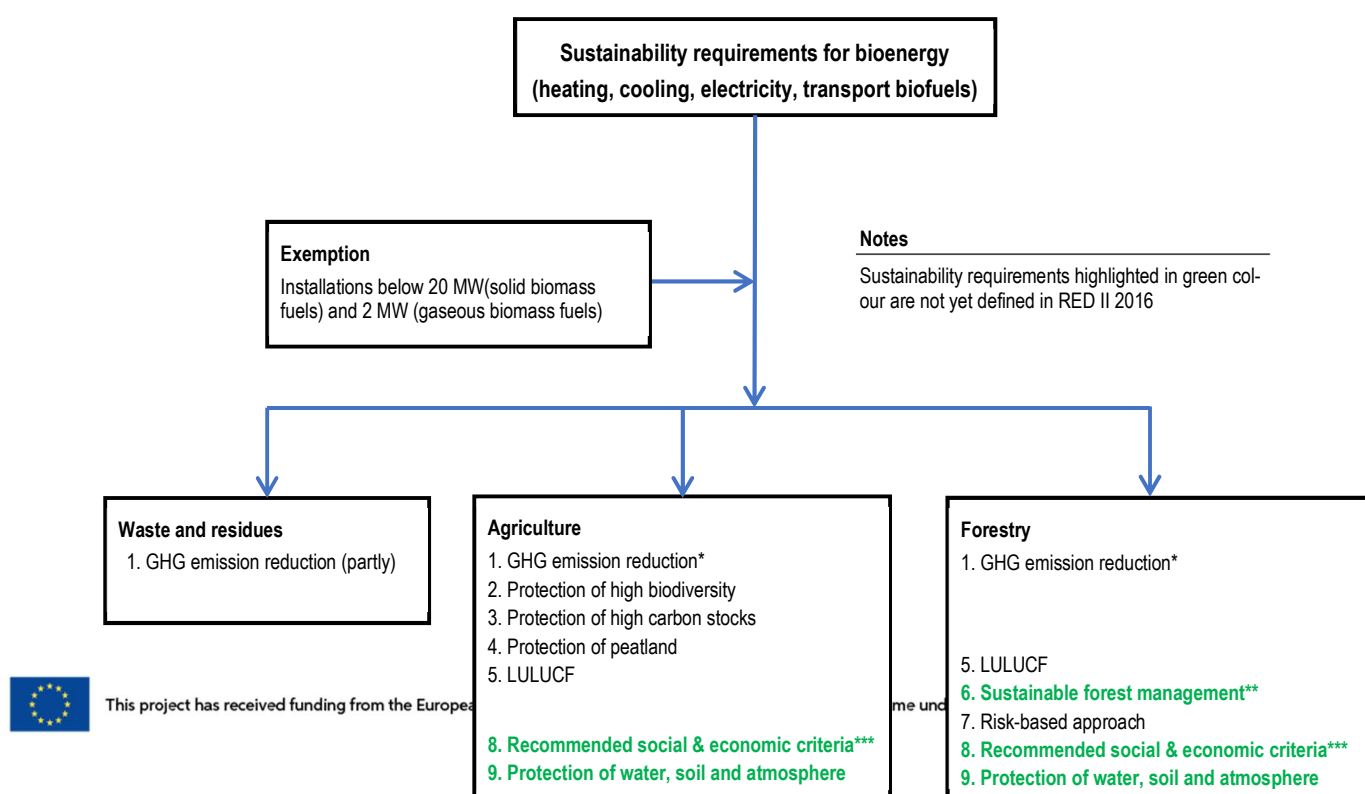


Figure 5. Sustainability requirements along the bioenergy supply chains





### 3. Method

In order to review and compare of sustainability criteria and certification schemes of lignocellulosic biomass used for bioenergy, a methodology was established which is shown on Figure 6.

The first step included the review of the EU guidance on renewable energy targets and sustainable biofuels as well as of voluntary schemes recognised by the EC to demonstrate biofuel sustainability (Step 1.1). To support the comparison between those voluntary schemes as well as to identify possibilities for a harmonisation of sustainability requirements for lignocellulosic biomass, a common structure was developed (Steps 1.2 and 1.3). This involved the investigation of the identified sustainability criteria relevant for lignocellulosic biomass as well as of the sustainability requirements that have been defined for economic operators to demonstrate their sustainability compliance. It also revealed which voluntary schemes include the most comprehensive set of sustainability requirements for biofuel types.

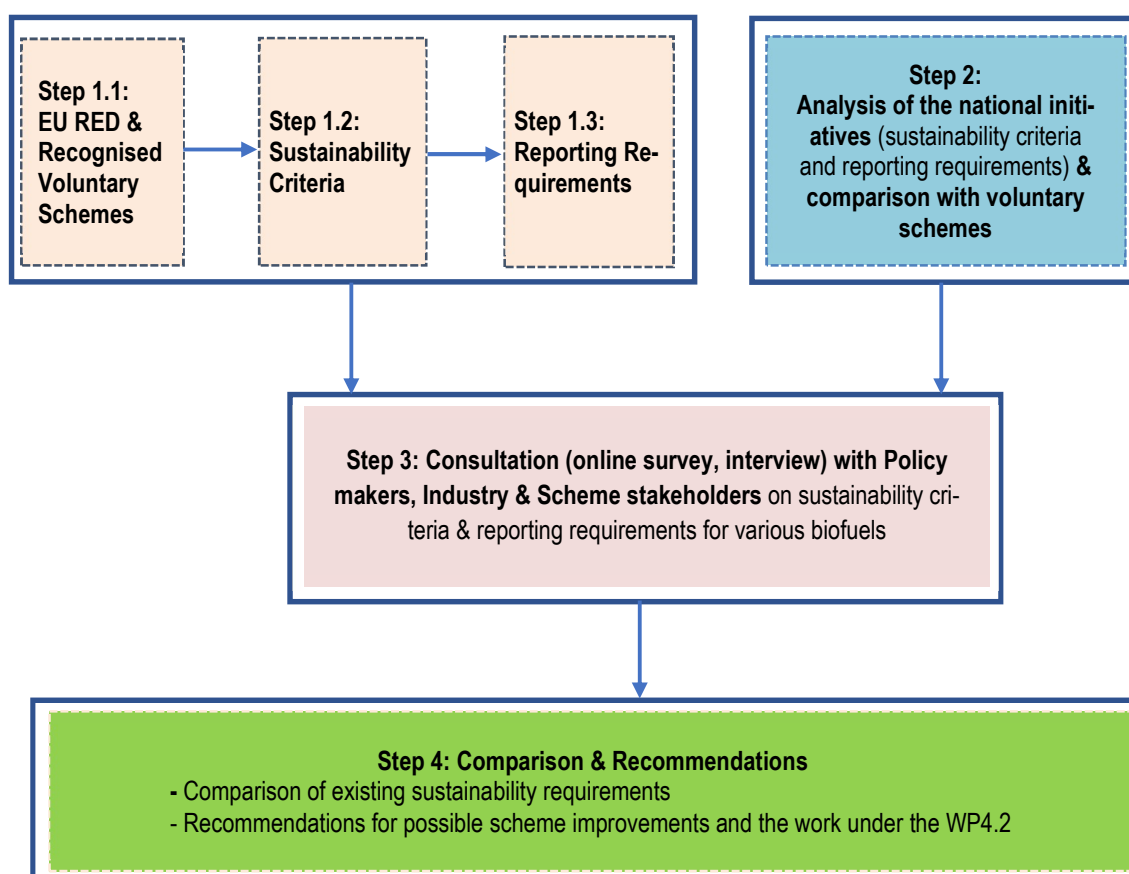


Figure 6. Method to assess sustainability requirements for biofuels

Information for the first part was mainly extracted from websites of voluntary schemes and from the EC webpage.

The second step was to review legislative establishment for biofuels in the EU MSs. This step also identified the similarities and differences of the voluntary schemes with national initiatives that have already come into effect for sustainable lignocellulosic biomass. Data sources for this part were mainly publications from governmental and public websites in the MSs countries (see Annex 1).

The third step was a consultation with stakeholders. The consultation with stakeholders was carried out via online survey and interviews on the comprehensiveness of sustainability criteria, verification and certification processes for sustainable lignocellulosic biomass defined in the national initiatives and in the voluntary schemes. Relevant questionnaires were developed and then sent to a number of selected stakeholders to investigate the changes and improvements of the sustainability frameworks. The main objective was to understand the viewpoint of industrial stakeholders and policy makers on respective legislation in MSs and at EU level as well as to understand how the voluntary schemes are perceived. The questionnaire was also published online to receive additional inputs from dedicated stakeholders.

The final step reviewed the three aforementioned parts and showed the results of comparing sustainability criteria and reporting requirements of the voluntary schemes and national initiatives for biofuels and bioenergy. This part also provided recommendations for possible improvement of those systems and the works that will be carried out in the next phase, ADVANCEFUEL's Task 4.2 "Actions aiming at harmonization of national standards and certification schemes for fuels at a EU level".



## 4. Voluntary schemes and national initiatives

### 4.1 Voluntary schemes

Voluntary schemes dedicated to biofuel sustainability are designed to certify whether biofuels comply with the EU's defined sustainability criteria. They play an important role in providing evidence of compliance with the GHG emissions savings and land criteria for biofuels, bioliquids and biomass fuels. In the communication of the European Commission to the voluntary scheme owners, the considerations below need to be taken into account (EC, 2010):

- Sustainability compliance: feedstock producers comply with the sustainability criteria
- Sustainability reporting: information on the sustainability characteristics can be traced to the origin of the feedstock
- Documentation: all information is well documented
- Audition: companies are audited before they start to participate in the scheme and retroactive audits take place regularly
- Auditors: The auditors are external and independent
- Auditors' expertise: The auditors have both the generic and specific auditing skills needed with regards to the scheme's criteria

The EC has recognised a number of voluntary schemes which must fulfil the sustainability requirements below (EC, 2016):

- **GHG emissions saving:** Renewable fuels produced in installations starting renewable fuel production on or before 5 October 2015 must achieve at least a 50% GHG emissions saving. Renewable fuels produced in installations starting renewable fuel production after 5 October 2015 must deliver at least a 60% GHG emissions saving.
- **High biodiversity value:** Biofuels may not be made from raw material obtained from land with high biodiversity value in or after January 2008.
- **High carbon stock:** Biofuels may not be made from raw material obtained from land with high carbon stock, such as forests or land that was undrained peatland, in January 2008 unless strict criteria are met.

For heating, cooling and electricity installation, only a fuel capacity equal to or exceeding 20 MW in case of solid biomass fuels and with an electrical capacity equal to or exceeding 0.5 MW in case of gaseous biomass fuels need to fulfil the sustainability requirements. However, MS may apply the sustainability and GHG emission saving criteria to installations with lower fuel capacity.



The voluntary schemes are required to report regularly on their activities. Such reports should be made public in order to increase transparency and to improve supervision by the Commission (EC, 2016). The recognised voluntary schemes are accepted in all EU MSs in order to facilitate the functioning of the internal market, evidence regarding the sustainability and GHG emission criteria of biomass used for energy. MSs should contribute towards ensuring the correct implementation of the certification principles by supervising the operation of certification bodies that are accredited by the national accreditation body and by informing the voluntary scheme owners about relevant observations (European Commission, 2016).

There are currently 16 EC recognised voluntary schemes which are used to demonstrate EU wide sustainability criteria for biofuels. They are all reviewed in this report to assess the sustainability criteria coverage and comprehensiveness as well as to investigate how these schemes would be used to certify additional sustainability criteria for advanced biofuels. In addition, two certification schemes which are established to promote SFM are also assessed to anticipate how they would be accepted to demonstrate compliance with the land criteria for forest biomass.

## 4.2 National initiatives

There are a number of national initiatives in Italy, Germany, Austria and the United Kingdom (the UK) etc., which establish sustainability requirements and directly assess sustainability reporting for transport fuel suppliers. However the UK is the only MS which provide a public and clear guidance for this mission, therefore its initiative Renewable Transport Fuel Obligation Order (RTFO) was assessed and compared with the voluntary schemes. This initiative aims to regulate biofuels used for transport and non-road mobile machinery (UK Department for Transport, 2018). The RTFO supports the UK government's policy on reducing GHG emissions from vehicles by encouraging the production of biofuels that don't damage the environment.

In order to receive RTFO certificates, the fuel suppliers need to meet the EU sustainability requirements defined in the RED I, the FQD and the Indirect Land Use Change Directive (iLUC Directive). The sustainability requirements for the RED I and FQD are identical while the implementation of the ILUC Directive from April 2018 updates the GHG thresholds in the mandatory criteria. The sustainability criteria established in the RTFO scheme are similar to the sustainability criteria required for the voluntary schemes in section 2.1.

In addition to the required sustainability criteria, one main feature of the RTFO is the chain of custody. A chain of custody must be in place between the origin of the feedstock and the UK duty point. Mass balance of carbon and sustainability (C&S) data is permitted along the supply chain. Fuel suppliers may use the voluntary schemes to prove sustainability compliance or submit sustainability proofs to the national authority.

The UK has also established a national legislation for solid and woody biomass used in heat and electricity sector namely the Renewables Obligation Certificates (ROCs). This legislation is also assessed in this report in order to provide a broad overview of



sustainability certification for all biomass feedstock types used for bioenergy production in the EU MSs. Additionally, the Dutch Stimulation of Sustainable Energy Production (SDE+) sustainability requirements for solid biomass are included for similar purpose. Those are the two systems which prove that comprehensive sustainability certification is workable at national level.



## 5. Stakeholder consultation

Given the changing EU wide legislation for bioenergy and biofuels, the stakeholder consultation was designed with the aim to receive updates on national legislations for biofuels and bioenergy as well as to identify strengths and weaknesses of the available sustainability schemes and standards and their applicability to advanced biofuels.

The consultation aimed:

- to investigate comprehensive sustainability requirements for biomass used for biofuels (including advanced biofuels, aviation biofuels and other liquid renewable fuels) in the European MSs
- to confirm the list of voluntary schemes used to demonstrate sustainability compliance with national initiatives
- to verify if there are any further updates in the certification schemes used to demonstrate compliance with current and future legislation
- to apprehend the response, viewpoints and expectation of stakeholders towards the comprehensive national and European sustainability requirements for all bioenergy sectors (biofuels, heat and electricity)

### 5.1 Stakeholder interview

In order to fulfil the objectives of the stakeholder consultation, a number of stakeholders were selected based on their position and expertise on biofuels in European MSs. The assessment of sustainability requirements for biofuels and bioenergy in the voluntary schemes and national initiatives provided a fundamental overview on the sustainability criteria and certification in the EU. A questionnaire, which was developed with the contributions of all project partners, introduced the project focuses and identified a number of key issues including national guidance and sustainability reporting required for economic operators; coverage of sustainability criteria related to feedstock production and land use, method and data collection to calculate GHG emissions; chains of custody, social and economic criteria; scheme certification and improvements; possible harmonised sustainability requirements at EU level and governance of biofuels. The questionnaire was sent to 20 policy makers, industry representatives and bioenergy consultants and there were 6 answers received from the Netherlands, Italy, Denmark, and Germany and also from a voluntary scheme representative which certifies biofuels in the whole EU. Although the number of responses was under expectation, the 6 stakeholders provided valuable information and comments on various sustainability aspects for biofuels and bioenergy.



- **Sustainability reporting and guidance for sustainability compliance:** the answers from stakeholders revealed that guidance and requirements for sustainability reporting are in principle clear and effective at national level. Updates on sustainability requirements for bio-fuels and bioenergy in the EU as well as in the MSs are provided to all related parties.
- **Usage and comprehensiveness of national initiatives and voluntary schemes:** Some countries such as the UK, Italy, Austria and Germany provide direct sustainability reporting for economic operators in addition to using sustainability certificates issued by the EC recognised voluntary schemes. Information from the stakeholders acknowledged that Roundtable of Sustainable Biofuels (RSB EU), International Sustainability and Carbon Certification (ISCC) and REDcert Certification System (REDcert) are popularly used schemes in the EU for the sustainability proofs thanks to their highly market acceptance as well as thanks to their coverage to various feedstock types and clear guidance of reporting.
- **Improvements of voluntary schemes:** Information from interviewed revealed that voluntary owners are aware of legislative guidance and changes at the EU level. The EU recognised voluntary schemes have been updated and improved following any EC updates.
- **Sustainability criteria:**
  - **Deployment and role of advanced biofuels:** In principle, the stakeholders recognised the important role of advanced biofuels in decarbonising the transport sector. Some countries such as Italy, Denmark and the Netherlands already established national plans to boost the higher share of advanced biofuels in transport, especially in the context of limitation of palm oil used in transport in the EU.
  - **Indirect land use change (iLUC):** Most of the stakeholders mentioned iLUC should be included in the binding sustainability criteria set. However iLUC definition and measurements are still being discussed in the MSs and it is not yet clear how and when iLUC would be considered as a sustainability criterion. In addition, direct land use changes (LUC) should be more on the focus as it is still complicated to apply the LUC measurement in reality.
  - **Other environmental impacts:** The interviewees agreed that in addition to the existing sustainability criteria, requirements for sustainable forest biomass use is very important but those should be kept as voluntary. It would be very challenging for the biofuel industry to prove SFM when this becomes a binding criterion.
  - **GHG emissions:** Stakeholders mostly agreed that the GHG reduction threshold and EU approach of calculation should be consistent between all EU MSs. An incorporated, more flexible tool allowing to include all different areas of the agricultural value chains for the GHG calculation would be useful. This should also happen in other sectors to create the same conditions for all businesses on the market and to further develop a

more holistic approach in guaranteeing more sustainability. Also, for the current biofuels (1st generation) a GHG saving requirement of 70% is probably very difficult to reach/achieve. For advanced fuels this should be possible. The GHG reduction threshold is certainly helpful, but insufficient to stimulate the currently still immature market.

- Social and economic aspects: According to stakeholders, land rights and abundance of child labour are very important and should be included in the sustainability requirements. The human health impacts, food security and rural development are part of good governance and do not solely involve the biofuel industry. Those should also be included and required for other sectors of the bioeconomy.
- Chain of custody: Stakeholders mentioned that while mass balance is a fundamental chain of custody, there are still some sustainability risks. It is still difficult to find the correct information in the chains for sustainability considerations. Currently, there is no concrete regulation on agricultural sector and mass balance decouple the physical claims with the sustainability claims. Also the sustainability requirements in the whole production chains should be strict and transparent.
- Harmonised sustainability requirements: To some interviewees, the current EU sustainability criteria are comprehensive, fair and as EC defined sustainability criteria at a broad level, this is doable. In principle, they mentioned that harmonised sustainability criteria are needed for all bioenergy and also other bioeconomy sectors such as novel biobased materials. In addition, the requirements for sustainable production of feedstocks for different sectors (bioenergy/ biobased chemicals/ biobased materials) could be identical. But as each sector has different end uses, we should not mixed up all the sustainability requirements for its end uses together. Otherwise, it would be complicated for translating those at the national level.

## 5.2 Online survey

The online survey was aimed to further consult various stakeholders for the legislative updates in the European MSs, also for additional stakeholders' opinions on sustainability requirements for biofuels and bioenergy. The online survey had the same objectives as with the semi-structured interviews, it is however open for all stakeholders with expertise on bioenergy sustainability, the questions used for the interviews were re-designed for easy-access responses.

There were in total 15 responses, however some stakeholders dropped out from the survey after completing a few answers, their final results were not counted. Only 7 stakeholders completed the questionnaires and therefore their contributions were considered.





- Sustainability reporting and guidance for sustainability compliance: The consultation found out that sustainability reporting are mainly proved with certificates issued by voluntary schemes. Regarding the sustainability guidance and administrative procedure for biofuel suppliers, stakeholders or skipped the response or answered that sustainability reporting and guidance is not totally good clear and effective.
- Usage and comprehensiveness of national initiatives and voluntary schemes: Information from the stakeholders revealed that RSB EU, ISCC EU and REDcert are used popularly in the EU. Regarding the comprehensiveness of sustainability criteria established in the national initiatives and voluntary schemes, RSB EU and REDcert are recognised by the stakeholders as the schemes with the most comprehensive and strict sustainability requirements for biofuels.
- Improvements of voluntary schemes: According to the stakeholders, transparency in sustainability reporting and coverage of additional supply chains for biofuels (including advanced biofuel supply chains) are very important aspects which need improvements. Additional sustainability criteria covering environmental, social and economic although needed to be considered are not as critical as for sustainability transparency.
- Sustainability criteria:
  - Deployment and role of advanced biofuels: The stakeholders indicated that at MS level, there are not yet many strategies for advanced fuels deployment or commercial deployment of process technology for advanced biofuels is not yet taking place. Therefore they do not see yet the future contributions of sustainable advanced biofuels to the national renewable energy target up to 2030. The role of the 1st generation biofuels should be enhanced and more recognised. The arguments of food competition or ILUC are not convinced and those dilemmas affect the investment confidence into the biofuel.
  - Indirect land use change (iLUC): Most of the stakeholders mentioned that iLUC is not sufficiently addressed in the RED II 2016. Also they stated the definition and methods to quantify iLUC are not yet clear and effective. In details, palm oil seemed to be the main cause of iLUC but rape seed oil also indicates a high iLUC risk raw material. Stakeholders seemed to agree with iLUC is a good sustainability indication but it is highly overestimated when it is applied only for biofuels and not for food and feed. They also noted that the current iLUC quantifications are not yet proved verifiable.
  - Environmental aspects: As forest feedstocks, waste and residues can be used for producing advanced biofuels, sustainable forest management including legal sourcing and forest productivity was considered very important sustainability criteria. The existing criteria such as carbon stocks and peat land, high biodiversity protection are supportive. In addition, ecosystem conservation and protection of water resources, air, soil were

considered important as well but clear requirements for assessing these criteria need to be well established.

- GHG emissions: Some stakeholders agreed and some stakeholders did not give their answers on whether the GHG emissions calculation methods for biofuels are effective. Neither clear answers were given for whether the current calculation tools applicable for advanced biofuels. Regarding the GHG emissions reduction threshold, there were some stakeholders agreed that it is doable to meet the blending target whilst some provided undecided answers. An integrated tool to calculate GHG emissions of both bioenergy and biofuels would enhance the transparency of using bioenergy.
- Social and economic aspects: According to the stakeholders, from the given list of social and economic criteria, the most social and economic aspects are the compliance with laws and local right, child labour, land right and rural development. Additional criteria might be the human health impacts and food security. One important note was that the RED sustainability requirements are the level-playing-field requirements for third countries to access to the EU market access to avoid sustainability risks and unfair conditions for workers.
- Data collection: In stakeholders' opinion, data collection of GHG calculation and other sustainability criteria for reporting and sustainability demonstration are unsatisfied, they are not completely verifiable.
- Chain of custody: Stakeholders generally mentioned that it is possible to separate certified biomass from non-certified feedstocks in the early stage of the supply chain following the mass balance approach but there still exist sustainability risks. In particular, the administratively separate certified biomass from non-certified products in the later stage of supply chain following the mass balance approach seemed to be uncertain according to the stakeholders. However, the stakeholders tended to agree that the mass balance approach is strict enough.
- Harmonised sustainability requirements: Regarding the fully harmonised sustainability criteria for all bioenergy, some stakeholders strongly agreed that they are needed while some argued that they are not necessary at all. Some explained that strict requirements are needed for several feedstocks such as forest biomass but waste and residues should only involve loose sustainability criteria. However, they agreed that the current sustainability criteria for biofuels set in the RED II 2016 are not completely comprehensive and strict. In addition, they also agreed that sustainability criteria should be required for other biobased sectors including biobased chemicals, biomaterials, paper, food, etc.

## 6. Comparison of sustainability requirements

The national initiatives and voluntary schemes were assessed based on the inclusion of sustainability criteria and requirements established for sustainability certification.

Feedstock production is the first and important stage of the bioenergy supply chains. Sustainable cultivation is one of the main requirements for the sustainable biofuel production. The main feedstock focus of this work package is lignocellulosic biomass that originates from agriculture and forest sectors which include waste and residues. Table 1 summarises the feedstock categories which are defined in the WP 3.1 (Uslu, 2018).

	Feedstock classification	Short name	
1	<b>Biogenic wastes</b>	<i>Biomass from roadside</i>	W1
2		<i>Organic waste from industry</i>	W2
3		<i>Biomass from landscape management</i>	W3
4		<i>Biomass fraction of mixed municipal solid waste</i>	W4
5	<b>Agriculture</b>	<i>Processing crop residues</i>	A1
6		<i>Harvesting crop residues</i>	A2
7		<i>Lignocellulosic fraction of agroforestry system &amp; SRC</i>	A3
8		<i>Grassdy energy crops</i>	A4
9		<i>Woody energy crops</i>	A5
10	<b>Forestry</b>	<i>Primary residues</i>	F1
11		<i>Processing residues</i>	F2
12		<i>Low value wood (without market)</i>	F3
13		<i>Post-consumer residues</i>	F4

Table 1. Feedstocks suitable for advanced biofuels

### 6.1 Coverage of sustainability requirements



The assessment of sustainability requirements in national initiatives and voluntary schemes acknowledged that most of the recognised voluntary schemes and the UK RTFO include all of the required sustainability criteria defined under RED I for transport biofuels. Except for the Biograce I scheme focusing only on GHG criteria, the other systems follow closely RED guidance on the establishment of sustainability criteria. The SFM voluntary schemes FSC and PEFC, which focus mainly on the sustainable management of forests, do not consider GHG criteria. However, it is worth noting that these two schemes are being in the processes of defining and possibly implement GHG criteria in the near future. There are three systems which comprise additional social and economic criteria namely the UK RTFO, ISCC and RSB. This could be explained by the fact that the RTFO is well established and provides regularly updates in considerations with the technological advancements for biofuel production whilst the two others include broad feed-stock types and take into account not only sustainability requirements for bioenergy but also for sustainable biomaterials and biochemical production.

Table 2 shows the sustainability requirement coverage under popular national initiatives and voluntary schemes used in the EU.



	Scheme	Feed-stock coverage	Exemption to waste & residues	GHG emissions	Land criteria					CoC Mass balance	Risk based approach	Social & economic requirements			
					Sustainable forest management	Carbon stock	Biodiversity protection	Protection of water resources, air & soil	iLUC			Compliance with laws & right	Land right	Human health impacts	Food price & security
1	UK - Renewable Transport Fuel Obligation	All	Y	Y		Y	Y	Y		Y		Y	Y	Y	Y
2	ISCC	All	Y	Y	Y	Y	Y	Y		Y		Y	Y	Y	
3	Bonsucro	A4	Y	Y		Y	Y	Y		Y		Y	Y	Y	
4	RTRS	A4		Y		Y	Y	Y		Y		Y	Y	Y	Y
5	RSB	All	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	
6	2BSvs	All As & Ws	Y	Y		Y	Y	Y		Y		Y		Y	
7	Red tractor	A4				Y	Y			Y					Y
8	SQC - Scottish Quality Farm Assured Combinable Crops	A4				Y	Y			Y					
9	REDcert	All	Y	Y		Y		Y		Y		Y			
10	Better Biomass	All	Y	Y		Y		Y	Y	Y		Y		Y	Y
11	RSPO	A4		Y		Y	Y			Y					
12	Biograce I	All		Y											
13	HVO Renewable Diesel Scheme	All As & Ws	Y	Y		Y	Y			Y					Y
14	Gafta Trade Assurance Scheme	A4				Y	Y			Y					
15	KZR INIG System	All As & Ws	Y	Y		Y	Y			Y					
16	Trade Assurance Scheme for Combinable Crops	A4		Y		Y	Y			Y					Y
17	Universal Feed Assurance Scheme	A4		Y		Y	Y			Y					
18	Forest Stewardship Council	Forest bio-mass			Y	Y	Y	Y		Y	Y	Y	Y	Y	
19	Programme for Endorsement of Forest Certification	Forest bio-mass			Y		Y	Y		Y	Y	Y	Y	Y	Y

Table 2. Coverage of sustainability requirements in the national and voluntary schemes



## 6.2 Qualitative assessment of sustainability requirements

### 6.2.1 Exemption to waste and residues

The RED I and RED II 2016 in principle authorize the exemption to waste and residues to comply with sustainability criteria in order to promote bioenergy produced from waste streams. The RED II 2016 further clarifies in details that biofuels, and bioliquids and biomass fuels produced from waste and residues, other than agricultural, aquaculture, fisheries and forestry residues, need only fulfil the minimum GHG emissions saving requirement. This provision shall also apply to waste and residues that are first processed into a product before being further processed into biofuels, bioliquids and biomass fuels (EC, 2016). Waste and residues are biological substances originating from agriculture including vegetal and animal substances, forestry and related industries including fisheries and aquaculture, as well as the biodegradable fraction of waste, including industrial and municipal waste of biological origin.

Waste and residues are considered to have zero life-cycle GHG emissions up to the point of collection where the waste or residues occur. Mass balance therefore considers the supply chains of waste and residues from their collection point. National initiatives such as the UK reward double sustainable certificates per unit supplied. Among voluntary schemes, Universal Feed Assurance scheme (UFAS), Trade Assurance Scheme for Combinable Crops (TASCC), GTAS, RSPO, Scottish Quality Farm Assured Combinable Crops (SQC), Red Tractor, Round Table on Responsible Soy (RTRS) do not seek to certify waste and residues as they mainly focus on specific energy crops whilst Biograce I only focuses on GHG emissions measurements. The large voluntary schemes, in contrary, follow closely RED guidance and include this exemption in their certification.

### 6.2.2 GHG emissions criteria

In view of the RED II 2016 additional requirements for GHG emissions reduction, the assessment of the GHG emissions criteria was carried out and considered three indicators which are important to anticipate how advanced biofuels and bioenergy could meet the higher GHG emissions reduction. These three indicators are the inclusion of additional feedstocks, inclusion of additional supply chains and the emission impacts of bioenergy beyond the supply chains.

UK RTFO, ISCC and RSB are the only three schemes which have developed their own calculation tools for GHG emissions. It is therefore possible to improve the tool and include additional feedstocks as well as expand the supply chains when needed. The investigation found out that these tools have considered the three indicators as new feedstocks such as wastes and residues from agricultural and forestry sectors have been added. Also various supply chains of advanced

biofuels and bio-methane have been provided to the economic operators for their considerations of biofuels reporting. Also iLUC values for land-based crop biofuels have been added. UK RTFO also requires the economic operators to report emissions from fuel depot and filling stations beyond the duty points in order to attain more insights on biofuel emission impacts.

Since several years, RSB, NTA 8080 and Bonsucro have already required higher reduction of GHG emissions compared with EU RED GHG emission thresholds. Bonsucro, RSB and NTA 8080 also require transparent emissions monitoring. RTRS has no requirements to trace GHG emissions and public reports are not required before 2017. RSPO has not provided recent updates on GHG emissions requirements and it is not yet known how the scheme prepares for the policy changes. NTA 8080, is now called Better Biomass, is currently under improvements and it is expected that the scheme will provide more comprehensive guidance on GHG emissions criteria. A number of voluntary schemes including TASC and UFAS do not seek to comply with RED GHG criteria therefore they are not recognised for these criteria.

The assessment of GHG criteria is summarised on Table 4.

### **6.2.3 Sustainable forest management**

This is an important aspect established to ensure that risks of using unsustainable forest biomass for bioenergy production are avoided. There are four significant indicators which have been established under the national schemes in the UK and the Netherlands namely legal and sustainable sourcing of forest biomass, conservation of ecosystems, maintenance of forest productivity, maintenance of health and vitality of ecosystem and regular SFM assessment. Table 6.5 presents the findings of this criterion under all voluntary and national schemes. It can be seen that most of the voluntary schemes follow and comply with RED I sustainability criteria and have not included SFM criteria in their certification, except for the UK, the Netherlands, ISCC and RSB, FSC and PEFC systems.

In the UK and the Netherlands, these four indicators have been established under the Renewables Obligation Certificates and SDE+ schemes (OFGEM, 2016), (RVO, 2015a). These indicators are also recognised by various stakeholders for their comprehensiveness and implementation. If forest biomass are used for advanced biofuels, the linkage of current national initiatives for transport biofuels with these two schemes could be doable and reduce the sustainability risks. ISCC and RSB schemes have also included the requirements for legal sourcing, ecosystem conservation and their requirements are considered strict (WWF, 2014), (IUCN Nederland, 2013). However the two schemes have not provided comprehensive assessment regarding forest productivity and regular monitoring of SFM. FSC and PEFC have been benchmarked by the UK ROCs and they partly met the compliance with those four indicators. The legal and sustainable sourcing is well established in all SFM schemes, whilst the harm minimisation to ecosystem in these SFM schemes is not included except for the biodiversity protection. Forest productivity under FSC and PEFC schemes is not fully covered as the



requirements only focus on legality and compliance with logging related laws and do not provide a guarantee of sustainable harvest levels (UK DECC, 2014a). The health and vitality of ecosystems are only partly covered as there are no adopting plans to maintain or increase the ecosystem conditions, neither solutions to deal with natural incidents or diseases.

The assessment of GHG criteria is summarised on Table 5.

#### **6.2.4 Carbon Stocks and Peatland**

Four indicators which represent the carbon stocks and peatland as defined in RED I include the conservation of wetlands, the conservation of continuously forested areas, the conservation of forested areas with 10-30% canopy cover and the conservation of peatland.

The UK RSPO category of all croplands and highly biodiverse grassland automatically complies with the RED high carbon stock and peatland criteria. For forest of 10- 30% canopy cover and grassland (and other wooded land not classified as forest) and settlement, it is required to comply with the high carbon stock and peatland criteria, but the GHG emissions of the resulting land-use change must be taken into account and the relevant GHG threshold must be met. For wetland and forest with more than 30% cover (no change in status), it is required to comply with the high carbon stock criteria and should only be reported if evidence is provided that the status of the land has not changed compared to January 2008. For undrained peatland (with no change in status), it is required to comply with the high carbon stock criteria and should only be reported if evidence is provided that the land has not been further drained. For degraded land, no detailed definition from the EC is found, therefore it is not possible to assess whether or not degraded land automatically complies with the RED sustainability requirements. It can be seen that the UK transposed the carbon stock and peatland requirements comprehensively, and it also found out the defined sustainability indicators to be further improved.

FSC stated that forests are identified to be protected due to their carbon stocks, according to the FSC Guidance for Maintaining and Enhancing Ecosystem Services. In details, it requires that management activities maintain, enhance or restore carbon storage in the forest; including through forest protection and reduced impact logging practices for carbon, as described in the FSC Guidance for Maintaining and Enhancing Ecosystem Services. Regarding peatland criteria, FSC declares that peatlands are not drained and are not converted to plantations\* or any other land use. It clarifies that areas converted from peatlands to plantation since November 1994 are not required to certify where clear proofs are provided. FSC also establishes similar requirements for wetlands, savannahs and natural grasslands.

PEFC acknowledges the role of carbon stock in managed tropical forest for climate change mitigation and an important resource for income generation, but there is not yet official requirements for carbon stocks and peatland in its general SFM standards.





ISCC requires the protection of land with high carbon stock as well as demands that biomass is not produced on land with high carbon stock and peatland. Raw material shall not be obtained from land with high carbon stock (namely land that had one of the following statuses in January 2008 and no longer has this status of wetland, continuously forested areas, and other sparsely forested areas) and peatland. It can be seen that ISCC follows closely RED I requirements for carbon stocks and peatland. However, ISCC provides a clear definition for peatland soils, that are soils with horizons of organic material (peat substrate) of a cumulative thickness of at least 30 cm at a depth of down to 60 cm. The organic matter contains at least 20 mass percent of organic carbon in the fine soil.

Bonsucro translated the RED I guidance into detailed requirements. In addition, it requires that the operator must use the default value of 24 gCO<sub>2</sub>eq/MJ fuel if the annualized emissions associated with carbon stock changes caused by land use change after January 2008 are zero. If carbon stock changes due to land use change after January 2008 are not zero, GHG emissions resulting from changes in land carbon stocks must be added to the default values from the production and use of sugarcane ethanol. Emissions from carbon stocks changes must be calculated in accordance with EU legislation and the EU guidelines for land use change emissions. Also Bonsucro provides a clear guidance for verification that compliance with the land related criteria could take many forms, including aerial photographs, satellite images, maps, land register entries/databases and site surveys.

Similarly RTRS EU RED, 2BSvs, RED Tractor, SQC, REDcert, RSPO, HVO, GTAS follow the RED I guidance for establishing its requirements. GTAS, TASC and UFAS rely on using other EC recognised voluntary schemes for this part of the chain and a summary of the land criteria is included in the GTAS scheme, but these are not intended to be directly audited against EU criteria. One additional note that RTRS EU RED provides a clear standard for wetland, land covered with or saturated by water permanently or for a significant part of the year. And when evaluating wetlands, evidences provided shall take seasonal changes into consideration, e.g. temporary drought or flood. RTRS EU RED and 2BSvs provide detailed guidance for verification which can be considered a good point to avoid sustainability risks.

With RSB, its standards regarding carbon stocks and peatland are also clear and strict. It requires a no-go areas for these standards and use the known international principle for verification such as the World Conservation Union "IUCN" Category I-IV protected areas; the wetlands of International Importance designated under the Ramsar Convention, and the World Heritage Sites designated under the UNESCO World Heritage Convention. Under RSB standards, the risks of carbon stock and peatland standards violation are nearly zero.

In the old version of Better Biomass, the cut-off date is January 2007, or earlier for the exclusion of biomass production which is stricter than RED I defined cut-off date of 1 January 2008. In addition, the definition for wetland and continuously forested areas is also clear. Better Biomass



also includes carbon stocks and peatland requirements for land spanning, and for peatlands unless evidence is provided that the cultivation and harvesting of that raw material does not involve drainage of previously undrained soil.

KZR INIG prohibits using raw materials obtained from categories of land (wetlands, continuously forested areas, weakly forested areas and peatlands) unless status of these lands has changed in comparison with their status in 1 January 2008. Requirements concerned wetlands, continuously forested areas, weakly forested areas are not applied if during the harvesting period of the raw material, the land has had the same status as it had in 1 January 2008. In the case of peatland, an exception is possible. KZR INIG System (KZR INIG) has translated the RED I guidance into strict and clear requirements.

Summarise of the carbon stock and peatland criteria is presented on Table 6.

### **6.2.5 Biodiversity**

Three indicators which represent the high biodiversity protection as defined in RED I include the conservation of primary forest and other wooded land, the conservation of protected areas and the conservation of highly biodiverse grassland.

The UK RSPO initiative takes into account the RED I sustainability criteria related to conservation of high biodiversity and also goes beyond the RED I fundamental requirements. It additionally requires that biomass production does not take place in areas of important ecosystems and species. The list of protected areas are also provided including UNESCO World Heritage Site; IUCN List of Protected Areas categories I, II, III and IV; RAMSAR sites (The Ramsar Convention on Wetlands of International Importance). It also requires that the status of rare, threatened or endangered species and high conservation value habitats, if any, shall be identified and their conservation taken into account in management plans and operations.

ISCC defines additional requirements for biodiversity protection for all types of land in considerations with IUCN sustainability requirements for biodiversity and conservation. It also requires that the stricter rule shall always be followed. If, for example, certain countries have legislation in place that allows for a certain degree of forest clearance for agricultural production which violates ISCC principles, it would not be allowed to produce biomass under the ISCC system on these areas, as this would violate ISCC principles and the requirements of the Directives.

Bonsucro establishes detailed and strict requirements for the conservation of highly biodiverse grassland and also ecosystem conservation is added. However the conservation of primary forest and other wooded land only follows the RED I requirements. RTRS EU RED requires details for biodiversity measurements at any stage of the chains, following RED guidance but also IUCN principle. Only for biodiversity in grassland, it follows RED I guidance.

RSB is considered providing the best guidance and standards of conservation for biofuel productions. It requires the sustainability compliances aligning with RED II 2016 on biodiversity protection and with all international agreements and



principles in considerations with the maintenance or enhancement of conservation values of local, regional or global importance within the potential or existing area of operation as well as of ecosystem functions and services that are directly affected by biofuel operations. It also requires that biofuel operations shall protect, restore or create buffer zones; ecological corridors shall be protected, restored or created to minimize fragmentation of habitats; biofuel operations shall prevent invasive species from invading areas outside the operation site.

2BSvs follows closely RED & international conventions on biodiversity conservation. Its scope is not broader than RED I definition but it requires a strict compliance for all types of biomass production regardless of country of origin. Also the requirements are not only applied for high biodiversity land but for all areas of biodiversity sensitivity.

RED Tractor, SQC, TASCC, UFAS follow RED I sustainability biodiversity criteria whilst RSPO, HVO and Better Biomass are currently expired and no updates are yet provided. Gafta relies on using other EC recognised voluntary schemes for this part of the chain whilst KZR complies with RED I but also takes into account related international requirements.

In RSPO and REDcert schemes, the requirements related to biodiversity is not completely covered. Conservation zones and endangered species assessment are not included. Bonsucro has detailed guidance on biodiversity assessment and habitat conservation but Bonsucro do not have requirements on endangered species. RED Tractor identified all relevant UK laws on biodiversity and conservation but invasive species are not included. And NTA 8080 does not include this criteria into its standards.

FSC and PEFC have different approaches of establishing biodiversity protection. FSC has a clear and detailed definition of biological diversity conservation. It includes the management activities to maintain, enhance or restore rare and threatened species and their habitats, as well as natural landscape-level characteristics, including forest diversity, composition and structure. It also covers the conservation area network, and conservation areas outside the management unit. In PEFC the sustainability requirements of biodiversity protection and ecosystem conservation are linked. PEFC requires that forest management planning shall aim to maintain, conserve and enhance biodiversity on ecosystem, species and genetic levels and, where appropriate, diversity at landscape level. Forest management planning, inventory and mapping of forest resources shall identify, protect and/or conserve ecologically important forest areas. Only those introduced species, provenances or varieties shall be used whose impacts on the ecosystems and on the genetic integrity of native species and local provenances have been evaluated, and if negative impacts can be avoided or minimised. Where appropriate, the practices shall also aim to maintain and restore landscape diversity. Traditional management system that have created valuable ecosystems, such as coppice, on appropriate sites shall be supported, when economically feasible. Tending and harvesting operations shall be conducted in a way that does not cause lasting damage to ecosystems. Wherever possible, practical measures shall be taken



to improve or maintain biological diversity. Standing and fallen dead wood, hollow trees, old groves and special rare tree species shall be left in quantities and distribution necessary to safeguard biological diversity, taking into account the potential effect on the health and stability of forests and on surrounding ecosystems.

Summary of the biodiversity criteria is presented on Table 7.

The colour coding is presented on Table 3 below.

Symbol	Notes
++	Indicator well established in the scheme and not yet required in RED II 2016
+	Indicator included in the scheme and not yet required in RED II 2016
++	Indicator far more comprehensive than defined in RED II 2016
+	Indicator somewhat comprehensive than defined in RED II 2016
±	Indicator defined as in RED II 2016
--	Indicator included but not comprehensive as in RED II 2016
	Indicator not included as in RED II 2016

*Table 3. Legends used for the qualitative assessment*

	Scheme	Feedstock coverage	GHG emissions criteria	Indicators		
				Inclusion of additional systems	Impacts beyond chains	Inclusion of diverse feedstocks
1	UK - Renewable Transport Fuel Obligation	All	Y	++	++	++
2	ISCC EU - International Sustainability & Carbon Certification	All	Y	++	++	++
3	Bonsucro EU	A4	Y	±	++	±
4	RTRS EU RED - Round Table on Responsible Soy EU RED	A4	Y	±	++	±
5	RSB EU - Roundtable of Sustainable Biofuels	All	Y	++	++	++
6	2BSvs - Biomass biofuel, sustainability voluntary scheme	All As & Ws	Y	±	+	±
7	Red tractor	A4		--	--	--
8	SQC - Scottish Quality Farm Assured Combinable Crops scheme	A4		--	--	--
9	REDcert EU - REDcert certification system	All	Y	±	+	±
10	Better Biomass	All	Y	±	±	±
11	RSPO RED - Roundtable on Sustainable Palm Oil	A4	Y	±	±	±
12	Biograce I	All	Y	±	±	±
13	HVO Renewable Diesel Scheme for Verification of RED Compliance for biofuels	All As & Ws	Y	±	±	±
14	Gafta Trade Assurance Scheme	A4		--	--	--
15	KZR INIG System	All As & Ws	Y	±	+	±
16	Trade Assurance Scheme for Combinable Crops	All As & Ws	Y	--	--	--
17	Universal Feed Assurance Scheme	All As & Ws	Y	--	--	--
18	Forest Stewardship Council	Forest biomass				
19	Programme for Endorsement of Forest Certification	Forest biomass				

Table 4. Qualitative assessment of GHG emissions criteria



	Scheme	Feedstock coverage	Waste & residues	SFM criteria	SFM Indicators			
					Legal & sustainable sourcing	Productivity is maintained	Ecosystem conservation	Regular assessment
1	UK - RTFO & ROCs (Renewables Obligation Certificates)	All	Y	Y	++	++	++	++
2	ISCC EU - International Sustainability & Carbon Certification	All	Y	Y	++	+	++	+
3	Bonsucro EU	A4	Y					
4	RTRS EU RED - Round Table on Responsible Soy EU RED	A4	Y					
5	RSB EU - Roundtable of Sustainable Biofuels	All	Y	Y	++	+	++	+
6	2BSvs - Biomass biofuel, sustainability voluntary scheme	All As & Ws	Y					
7	Red tractor	A4	Y					
8	SQC - Scottish Quality Farm Assured Combinable Crops scheme	A4	Y					
9	REDcert EU - REDcert certification system	All	Y					
10	Better Biomass & Dutch Verification Protocol for Sustainable Solid Biomass	All	Y	Y	++	++	++	++
11	RSPO RED - Roundtable on Sustainable Palm Oil	A4	Y					
12	Biograce I	All	Y					
13	HVO Renewable Diesel Scheme for Verification of RED Compliance for biofuels	All As & Ws	Y					
14	Gtas Trade Assurance Scheme	A4	Y					
15	KZR INIG System	All As & Ws	Y					
16	Trade Assurance Scheme for Combinable Crops	All As & Ws	Y					
17	Universal Feed Assurance Scheme	All As & Ws	Y					
18	Forest Stewardship Council	Forest biomass	Y	Y	++	+	+	+
19	Programme for Endorsement of Forest Certification	Forest biomass	Y	Y	++	+	+	+

Table 5. Qualitative assessment of SFM criteria



	Scheme	Feedstock coverage	Carbon stock and peatland requirements	Indicators			
				Conservation of wetlands	Conservation of continuously forested areas	Conservation of forested areas with 10-30% canopy cover	Conservation of peatland
1	UK - Renewable Transport Fuel Obligation	All	Y	+	+	+	±
2	ISCC EU - International Sustainability & Carbon Certification	All	Y	±	±	±	+
3	Bonsucro EU	A4	Y	+	+	+	+
4	RTRS EU RED - Round Table on Responsible Soy EU RED	A4	Y	+	±	±	±
5	RSB EU - Roundtable of Sustainable Biofuels	All	Y	++	++	++	++
6	2BSvs - Biomass biofuel, sustainability voluntary scheme	All As & Ws	Y	+	+	+	+
7	Red tractor	A4		±	±	±	±
8	SQC - Scottish Quality Farm Assured Combinable Crops scheme	A4		±	±	±	±
9	REDcert EU - REDcert certification system	All	Y	±	±	±	±
10	Better Biomass	All	Y	+	+	+	+
11	RSPO RED - Roundtable on Sustainable Palm Oil	A4	Y	±	±	±	±
12	Biograce I	All	Y				
13	HVO Renewable Diesel Scheme for Verification of RED Compliance for biofuels	All As & Ws	Y	±	±	±	±
14	Gtas Trade Assurance Scheme	A4		±	±	±	±
15	KZR INIG System	All As & Ws	Y	+	+	+	+
16	Trade Assurance Scheme for Combinable Crops	All As & Ws	Y	±	±	±	±
17	Universal Feed Assurance Scheme	All As & Ws	Y	±	±	±	±
18	Forest Stewardship Council	Forest biomass		++	++	++	++
19	Programme for Endorsement of Forest Certification	Forest biomass					

Table 6. Qualitative assessment of carbon stocks and peatland criteria



	Scheme	Feedstock coverage	Conservation of high biodiversity	Indicators		
				Conservation of primary forest and other wooded land	Conservation of protected areas	Conservation of highly biodiverse grassland
1	UK - Renewable Transport Fuel Obligation	All	γ	++	++	++
2	ISCC EU - International Sustainability & Carbon Certification	All	γ	+	+	+
3	Bonsucro EU	A4	γ	±	++	++
4	RTRS EU RED - Round Table on Responsible Soy EU RED	A4	γ	++	++	±
5	RSB EU - Roundtable of Sustainable Biofuels	All	γ	++	++	++
6	2BSvs - Biomass biofuel, sustainability voluntary scheme	All As & Ws	γ	+	+	+
7	Red tractor	A4	γ	±	±	±
8	SQC - Scottish Quality Farm Assured Combinable Crops scheme	A4	γ	±	±	±
9	REDcert EU - REDcert certification system	All	γ	±	±	±
10	Better Biomass	All	γ	±	±	±
11	RSPO RED - Roundtable on Sustainable Palm Oil	A4	γ	±	±	±
12	Biograce I	All				
13	HVO Renewable Diesel Scheme for Verification of RED Compliance for biofuels	All As & Ws	γ	±	±	±
14	Gtas Trade Assurance Scheme	A4	γ	±	±	±
15	KZR INIG System	All As & Ws	γ	+	+	+
16	Trade Assurance Scheme for Combinable Crops	All As & Ws	γ	±	±	±
17	Universal Feed Assurance Scheme	All As & Ws	γ	±	±	±
18	Forest Stewardship Council	Forest biomass	γ	+	+	+
19	Programme for Endorsement of Forest Certification	Forest biomass	γ	+	+	+

Table 7. Qualitative assessment of biodiversity protection criteria





### **6.2.6 Water, air and soil quality**

The RED II 2016 does not establish the requirements for sustainable water, air and soil quality. However they are important standards to ensure that the cultivation and harvesting of biomass feedstocks do not lead to negative impacts to the surrounding environment. Sustainable water use, good air quality and soil conservation should be taken into account in monitoring and certifying sustainable bioenergy.

The UK RTFO requires a compliance with national laws and regulations relevant to contamination and depletion of water sources; air emissions and burning practices; soil degradation and soil management. It requires that evidence need to be provided to ensure the reduction of reduce water usage and the maintenance and improvement of water quality, the prevention of water pollution; guarantee of sustainable soil management, erosion prevention and erosion control; and that no burning occurs as part of land clearing or waste disposal, except in specific situations such as described in the Association of Southeast Asian Nations (ASEAN) guidelines on zero burning or other respected good agricultural practices. The requirements are clear and comprehensive, however when national laws and regulations are not strict enough, sustainability compliance are not completely safeguarded.

FSC establishes comprehensive environmental requirements including the compliance with national and sub national laws and regulations related to the identification and/or protection of environmental values including but not limited to those relating to or affected by harvesting, acceptable levels for soil damage, use of pesticides and other chemicals, air quality, protection and restoration of water quality. Any chemicals, fertilisers and waste are not allowed to discharge to water bodies and soil as well as the management activities and strategies need to respect universal access to water, as defined in the UN resolution on the human right to water and sanitation. The usage of biological control agents complies with internationally accepted scientific protocols.

FSC requires the assessment of water bodies and consumption for the feedstock productions, domestic water needs for local communities and identifies the areas of water scarcity. Regarding soil, FSC requires that vulnerable or high risk soils are identified, including thin soils, soils with poor drainage and subject to water logging, and soils prone to compaction, erosion, instability and run-off; measures are implemented to reduce compaction, erosion and landslides; management activities maintain, enhance or restore soil fertility and stability.

PEFC states that forest management planning shall aim to maintain and enhance protective functions of forests for society, such as protection from soil erosion, protection of water resources and from adverse impacts of water such as floods or avalanches. Special care shall be given to silvicultural operations on sensitive soils and erosion-prone areas as well as in areas where operations might lead to excessive erosion of soil into watercourses. Inappropriate techniques such as deep soil tillage and use of unsuitable machinery shall be avoided in such areas.



Special care shall be given to forest management practices in forest areas with water protection functions to avoid adverse effects on the quality and quantity of water resources. Inappropriate use of chemicals or other harmful substances or inappropriate silvicultural practices influencing water quality in a harmful way shall be avoided. Construction of roads, bridges and other infrastructure shall be carried out in a manner that minimises bare soil exposure, avoids the introduction of soil into watercourses and preserves the natural level and function of water courses and river beds. Proper road drainage facilities shall be installed and maintained.

As the UK RTFO, ISCC requires the compliance with national and local laws and regulations relevant to soil degradation, soil preservation, soil management, contamination and depletion of water sources, water quality, air emissions and burning practices. Good agricultural practices shall be applied to reduce water usage and to maintain and improve water quality; to maintain and improve soil fertility, the avoidance of soil erosion and compaction; the use of best practices in fertiliser application. In addition, it defines the monitoring to ensure strict compliance with these standards. Regarding air quality, the burning of stubble or other crop residues is only allowed with the permission of a competent authority and if there are no viable alternatives Burning as part of land clearance is prohibited.

Bonsucro addresses strict compliance regarding water, air and soil sustainability in its principles. The scope of the legal assessment shall match in the scope of application of the Bonsucro standard including waste, pollution and environmental protection; water quality and extraction; energy & GHG emission; land and water title and land and water use rights ; soil protection; agricultural and processing practices (including storage, handling and application of fertilizers and agro-chemicals). The detailed indicators are however not yet clarified thoroughly and the burning and clearing land for biomass production is not included.

RTRS clarifies in that on and off-site social and environmental impacts are assessed and appropriate measures are taken to minimise and mitigate any negative impacts. It requires that pollution is minimised and production waste is managed responsibly; expansion of soil cultivation is responsible and soil quality is maintained or improved and erosion is avoided by good management practices. In addition the quality and supply of surface and groundwater is maintained or improved; natural vegetation areas around springs and along watercourses are maintained or re-established; efforts are made to reduce emissions and increase sequestration of GHG on the farm as well as no burning of crop residues, wastes except for some legal situation.

RSB establishes also strict requirements regarding water, soil and air quality. Biofuels operations shall implement practices that seek to reverse soil degradation and/or maintain soil health by implementing practices to maintain or enhance soil physical, chemical, and biological conditions. Biofuel operations shall also maintain or enhance the quality and quantity of surface and ground water resources, and respect prior formal or customary water right. It also emphasizes that air pollution emission sources from biofuel operations shall be identified, and air pollutant



emissions are minimized through an air management plan. In addition, biofuel operations shall avoid and, where possible, eliminate open-air burning of residues, wastes or by-products, or open air burning to clear the land.

2BSvs and REDcert clarifies in its principle that sustainable biofuels should not be made from raw material produced on land where soil, water and air have not been protected following the RED I guidance. But 2BSvs and REDcert lacks coherent standards for monitoring and ensuring sustainability compliance. However, from these initial indications, more comprehensive sustainability criteria could be developed from.

Better Biomass requires that in the production and processing of biomass, the soil, soil quality, air quality and water management must be retained or even improved. National regulations and laws for soil management needs to be applied for the preservation and improvement of the soil quality; the use of residual products. In the production and processing of biomass ground and surface water must not be depleted and the water quality must be maintained or improved. The reservation and improvement of water quality also needs to be applied. And there should be no burning during the installation or management. In addition, the national SDE+ sustainability criteria are established for solid biomass that are very comprehensive and could be used for the whole bioenergy sector.

Summary of the water, soil and air quality criteria is presented on Table 8

### **6.2.7 Chain of custody**

There are four indicators which can be used to assess the COC mass balance approach which are used by the EC to benchmark this requirement under voluntary schemes, namely CoC usage, double counting prevention, inventory level and periodic level.

Mass balance is a type of chain of custody which allows the physical mix of sustainable materials with different sustainability characteristics and non-sustainable materials. The information about the sustainability characteristics and the size of the batches with differing sustainability characteristics has to remain assigned to the mixture. The exact amounts and sustainability characteristics of sustainable material that leaves any element along the supply chain must be documented and must never exceed the amount of sustainable material that enters the respective element.

Under the UK RTFO, mass balance is permitted together with the bulk commodity system as they are both considered consistent. Renewable fuels derived from certain waste or residue feedstocks are awarded double the Renewable Transport Fuel Certificate (RTFCs) per litre or kilogram supplied. The UK Administrator will award double RTFCs where it believes it is appropriate to do so. Fuels that are 'double rewarded' are also worth twice as much, by energy content, when calculating progress towards the renewable transport target in the RED ('double counting'). However, they do not count twice for the purposes of meeting the UK's overall renewable energy target under the RED. The UK requires



that the mass balance approach to be operated at the level of a site that a company owns/operates, or at a more detailed level of granularity (e.g. tank level). The RED does not allow companies to operate one single mass balance (units in = units out) approach over more than one geographical location. The time frame is also more strict under the RTFO, as it is recommended that parties in the supply chain undertake a periodic inventory of site-level C&S data at least on a monthly basis and the periodic inventory of C&S data shall not be negative. Parties using a voluntary scheme recognised by the EC shall use a mass balance timeframe of that voluntary scheme (normally 3 months).

In principle, all the voluntary schemes requires periodic inventory for the mass balance system of three months as defined in RED I and II as well as an operation of system at least at the level of a site but some voluntary schemes such as RED Tractor, 2BSvs, RTRS, GTAS has a periodic inventory of 12 months. Better Biomass does not clarify the explicit periodic inventory over which the mass balance system operates. GTAS and UFAS require that where positive balances of RED compliant material exist at the end of a mass balance period records shall be maintained in order to ensure such balances can be identified and transferred to the next period. The conversion factors/ rates are required to be included in all the voluntary schemes. The double counting avoidance is also included in all the voluntary schemes to ensure that company is not simultaneously certified under more than one certification scheme for its sustainability compliance reward.

ISCC, Better Biomass, GTAS and Bonsucro, RTRS define a comprehensive guidance for the use of a mass balance system to calculate the physical mix of sustainable materials with different sustainability characteristics and non-sustainable materials at any stage of the chain. When batches with different or no sustainability are physically mixed, the respective sizes and sustainability characteristics of each batch remain assigned to the batches in the calculation for either mass balance or segregation. In addition, ISCC requires that records and documentation on traceability and mass balance and quantity bookkeeping have to be updated and fully accessible to the auditor in the audit process. Periodical boundaries define the timeframe in which the input and output of materials with specific sustainability characteristics must be balanced. Appropriate arrangements are necessary to ensure that the balance is respected. Unique identification must be by batch number, product code or other identification method and data. With Bonsucro and Bonsucro EU RED, the economic operator must define the unit of certification, including, in the case of multi-site operators, number of sites and the type of operations covered by the scope of their mass balance indicated the Bonsucro/Bonsucro EU RED Mass Balance CoC. RTRS additionally requires that where a continuous balancing system is in operation, RTRS data is valid for 24 months from the date it was first recorded in the system.

RSB also allows two types of CoC including segregation of product and mass balance of product which calculate the mixing batches of RSB EU RED certified material or EU RED certified material



and other product only at the level of one site and assign the associated product documentation for each batch of RSB EU RED certified material or EU RED certified material in the product mix to the product mix at the level of the site. It also clarifies that whenever the participating operator merges batches of certified material with different GHG emission values, the participating operator shall not average the GHG emissions savings but either assign to the entire resulting batch the GHG emissions savings of the batch with the lowest GHG emissions savings, or track the GHG values individually. RSB also requires that biofuels/bioliquids entering the EU market on or after the 1 January 2018 will have to meet the GHG emission savings threshold of 50% in order to qualify for the RSB claim "EU RED compliant Biofuel", regardless of whether the biomass/biofuels/bioliquids were produced before that date. RED Tractor follows closely RED guidance on CoC. The Red Tractor scheme requires the mass balance to make the inventory from the farm to the first intake point, therefore it is only relevant for the farm. The post-harvest declaration form that is sent with each load delivered from farm, is commonly known as a 'grain passport' document and it includes a signed, dated declaration that the load has been grown on land that meets the RED I sustainability criteria. To be recognised as originating from an assured holding the post-harvest declaration must be completed by inclusion of the relevant valid scheme membership sticker.

REDcert requires that an information and traceability system must be set up which monitors every step along the production and supply chain to ensure the continuous proof of origin for the biomass and to prevent a batch of sustainable biomass or biofuels or bioliquids from being sold more than once on the market ("multiple claiming"). In addition, the REDcert scheme requires a mass balancing system that makes it possible for the sum of all consignments withdrawn from the mixture to be described as having the same sustainability characteristics, in the same quantities, as the sum of all consignments added to the mixture.

FSC defines that the organization shall implement and maintain a CoC management system adequate to its size and complexity to ensure its continuous conformity to all applicable certification requirements, including the maintenance of complete and up-to-date records of the documents that are relevant to demonstrate the organization's conformity with all applicable certification requirements which shall be retained for a minimum period of 5 years (FSC, 2017). At a minimum, the organization shall keep records of the following documents as applicable to the certificate scope: procedures, product group lists; training records; purchase and sales documents; material accounting records; annual volume summaries; trademark approvals; records of suppliers, complaints, and outsourcing; control of non-conforming products; verification program records for reclaimed material, and records related to a due diligence program for controlled material and FSC Controlled Wood. FSC also requires that all the related parties are not allowed to directly or indirectly be involved in the illegal or violated activities in the supply chains.



In addition, FSC also provides detailed guidance and requirements for strict CoC compliance. Regarding control of FSC claims, an establishment of product groups for the control of FSC claims is provided; the transfer system provides the simplest approach for the determination of output claims by transferring the FSC claims of inputs materials directly to the output products; the percentage system allows all outputs to be sold with a percentage claim that corresponds to the proportion of claim-contributing inputs over a specified claim period; the credit system allows a proportion of outputs to be sold with a credit claim corresponding to the quantity of claim-contributing inputs and the applicable product group conversion factor(s). There are also supplementary requirements including FSC labelling requirements and outsourcing, and eligibility criteria for single, multi-sites and group CoC certification.

PEFC establishes two optional approaches for chain of custody of forest biomass. Depending on the nature of material flows and processes the organisation shall choose the appropriate method. The organisation whose certified material/products are not mixed with other material/products and/or where the certified material/products can be identified during the whole process, should use the physical separation method as the preferred option. They shall ensure that the certified material is separated or clearly identifiable at all stages of the production or trading process. The physical separation method may also apply to the certified products with various content of certified material.

With the percentage based method, the product group shall be associated with (i) a single product type or (ii) a group of products, which consist of the same or similar input material according to, for example species, sort, etc. The material entering the group of products shall have the same measurement unit or units that are transferable to the same measurement unit. The product group shall be associated with products which have been produced or manufactured by the organisation at one production site.

PEFC does not include the double counting requirements but clearly requires the identification of material at delivery (incoming level) or the identification at supplier level. This requirement is more strict than the requirement defined in RED II 2016I. The time frame of verification of material is not fixed, rather PEFC requires the management of significant risk supplies in which on-site inspection can be carried out whenever relevant.

Summary of the mass balance is presented on Table 9.

#### **6.2.8 Risk based approach**

Forest biomass used for bioenergy can be proved sustainable by certificates issued by recognised voluntary schemes. When sustainability certification is not yet available at an EU level, a risk based approach can be used for forest biomass used only in large-scale heat and power generators in accordance with the principles of sustainable forest management developed under international forest processes such as Forest Europe and are implemented through national laws or the best management practices at the forest



holding level. The risk based approach is a method to assess all forms of available evidence that indicates compliance with sustainable forest management criteria. Development of an EU wide risk based approach relies on the national laws and standards for demonstrating sustainable production of forest biomass for energy use (EC, 2016). The risk based approach is already carried out under the UK Renewable Obligations (UK Department for Transport, 2018), and in the Netherlands under the Verification Protocol (RVO, 2015b).

The UK has developed the risk-based regional approach based on the regional risk assessment of the FSC Controlled Wood and PEFC Controlled Wood and Controlled Sources as well as the work of other voluntary schemes (UK DECC, 2014a). If operators and suppliers can trace their material back to an area smaller than a region, for example a specific forest management unit (FMU), they can provide evidence for low-risk of non-compliance with the criteria for this smaller area rather than on a regional basis. Credible evidence could, for example, be relevant legislation and an assessment of its proper implementation and enforcement in this defined region (UK DECC, 2014a). In case credible evidence cannot be provided, generators and suppliers would need to implement risk mitigation activities. This might include implementing sourcing only from approved contractors; undertaking periodic forest/site visits and audits; using vertically integrated forest management operations; reducing the area from which material is harvested from to demonstrate low risk of non-compliance on a local or even forest management unit level. Alternatively, they could change their sourcing practices by avoiding sourcing from an area where low risk of non-compliance cannot be shown. During the course of the year, generators and participants must collect sufficient and credible evidence to demonstrate they comply with the Timber Standard (UK DECC, 2014b). The checklist includes the mandatory woodfuel land criteria specified in the Timber Standard, as well as an optional UK Timber Procurement Policy Category B requirement for supply chain management that requires traceability of woodfuel back to a FMU (UK Secretary of State, 2013).

There are three fundamental steps in completing the risk-based regional approach and in demonstrating that woodfuel meets the woodfuel land criteria: defining the supply base which must include all the areas from which woodfuel originates; defining the region(s) where conditions must be sufficiently homogenous to evaluate the risk of non-compliance with the woodfuel land criteria; determining the risk that woodfuel does not comply with these criteria across this entire supply base and region(s). Credible and sufficient evidence must be provided to demonstrate low risk of non-compliance for all woodfuel land criteria for the woodfuel to be considered 'legal and sustainable'. At least 70% of the mix of consignments must be 'legal and sustainable' in line with the 70/30 threshold.

The UK also benchmarked a number of SFM voluntary schemes which include risk based approach namely the FSC Controlled Wood (Company), FSC Controlled Wood (Forest Management Enterprise, FME), PEFC Controlled Sources, SBP and SFI Fiber Sourcing. In principle, most



of those voluntary schemes meet the UK requirements on setting up the regional boundary, traceability of woodfuel back to a supply base with the region, evidence of a low-risk demonstration of non-compliance as well as audit, certification and accreditation. Only within the FSC Controlled Wood (FME), the standard operates at the forest management unit not at a regional level, therefore the regional risk based approach is not applicable. The SFI Fiber Sourcing only meet partly the requirements for evidence of a low-risk demonstration of non-compliance as well as audit, certification due to unclear definition and guidance to be provided for the biomass producers.

In the Netherlands, the risk based approach can be performed by the biomass producer (with a forest management unit smaller than 500ha), or by another organisation on behalf of the biomass producer, and may cover the supply bases of several biomass producers together (RVO, 2015b). The risk based approach involves the following process steps: determination of the region; gathering of information in relation to the SFM requirements; risk assessment; establishment and regular monitoring of measures to prevent the sourcing of biomass with specified risk (mitigation measures); regular monitoring of the risk assessment and mitigation measures. The biomass producer shall gather information on identified areas that is relevant for a risk analysis with respect to the SFM requirements. The outcomes of consultations with stakeholders and experts are an important source of information for the risk analysis. As part of the information gathering exercise, the biomass producer shall document and implement effective procedures for consultation on the SFM requirements with stakeholders in specific regions. Based on the collected information, The biomass producer shall conduct a risk analysis for each identified region. The risk of non-compliance shall be assessed for each SFM criterion, using adequate risk analysis methods. The biomass producer shall conduct a review of the risk assessment and the mitigating measures at least once per year and in the event of relevant developments in the region sustainable biomass is sourced from and/or relevant changes in the information gathered for a particular region or criterion.

It is therefore concluded that the risk based approach does exist and is already implemented at the member state level. At an international level, the risk based approach is also established by the above FSM voluntary schemes.

#### **6.2.9 Social and economic aspects**

- ***Social aspects***

The social and economic criteria have not been defined and are not included in the RED I and RED II 2016I, however they are already established and implemented in a number of recognised and SFM voluntary schemes beyond RED scopes. The four indicators which are considered fundamental social criteria include workers' rights, land right, human health impacts and compliance with local law and rights. These i



The UK RTFO requires the strict compliance with national laws and regulations to avoid any impacts of biomass production to the local community. The worker right is also well protected under the RTFO including the child labour avoidance; minimum wages, good compensations, suitable working hours and working conditions to the workers. The health impacts to the workers, and local community are required to be monitored and under proper control however details under this criterion is not provided.

ISCC includes the compliance with national and local laws on working conditions in its sustainable standards. The compliance with laws and international treaties also needs to be taken into account on the human, labour, land right and any social aspects, especially with the International Labour Organisation (ILO), core ILO standards: ILO 29, 105, 138, 182, 87, 98, 100, 111. That the company should be familiar with the relevant legislation and should remain informed about changes in legislation. It requires the company to be responsible for workers' health, safety and good social practice. Also ISCC defines the legitimacy of land use. The producer should be able to prove that the land is being used legitimately and that traditional land rights have been secured. Documents must show legal ownership or lease, history of land tenure and the actual legal use of the land. The producer must identify and respect existing land rights. The rights of indigenous people must be respected. An assessment of the pollution of ground and surface water, health risks to workers and surrounding communities and an assessment of heavy metals must be conducted. The farm/plantation should not be sited in areas to store litter and waste which do not create a safety or health hazard.

Bonsucro requires the respect of human rights and labour standards as well as the compliance with ILO labour conventions governing child labour, forced labour, discrimination and freedom of association and the right to collective bargaining, minimum age and wages of workers, absence of discrimination. Absence of forced or compulsory labour are applied to all workers on the premises of the mill and farMS included in the unit of certification. It addresses the respect of right of all workers to form and join trade unions and/ or to bargain collectively and offers a safe and healthy working environment in work place operations. Bonsucro also requires that main health and safety risks are assessed and measures for mitigation of risk are implemented as well as offers a safe and healthy working environment in work place operations but does not include the health impacts of production sites to the local community.

RTRS requires an awareness of, and compliance with all applicable local and national legislation regarding child labour, forced labour, discrimination and harassment not to be engaged in or supported. This is a good but not a strong indicator as these requirements should be met rather than just purely mentioned. RTRS addresses workers' rights such as workers are adequately informed and trained for their tasks and are aware of their rights and duties; they have freedom of association and the right to collective bargaining for all workers; they receive remuneration at least equal to national legislation and sector agreement is received by all workers directly or



indirectly employed on the farm; they have fair opportunities for employments and provision of goods and services are given to the local population, irrespective of gender and race. RTRS also requires legal use rights to the lands which are clearly defined and demonstrable. It also includes that channels are available for communication and dialogue with the local community on topics related to the activities of the soy farming operation and its impacts. An effective mechanism for resolving complaints and grievances is implemented and available to local communities, employees, and traditional land users as well as negative environmental and health impacts of photosanitary products are reduced by implementation of systematic, recognised Integrated Crop Management techniques.

RSB requires biofuel operations shall comply with all applicable laws and regulations of the country in which the operations occur and with relevant international laws and agreements, in particular ILO conventions. Regarding workers' rights, workers shall enjoy freedom of association, the right to organize, and the right to collectively bargain, and do not experience slave labour or forced labour. No child labour shall occur, except on family farms and then only when work does not interfere with the child's schooling and does not put his or her health at risk. Workers shall be free of discrimination of any kind, whether in employment or opportunity, with respect to gender, wages, working conditions, and social benefits. Workers' wages and working conditions shall respect all applicable laws and international conventions, as well as all relevant collective agreements. In regions of poverty, special measures that benefit and encourage the participation of women, youth, indigenous communities and the vulnerable in biofuel operations shall be designed and implemented. RSB also requires that biofuel operations shall respect land rights and land use rights that existing land rights and land use rights, both formal and informal, shall be assessed, documented, and established. The right to use land for biofuel operations shall be established only when these rights are determined. Free, prior, and informed consent shall form the basis for all negotiated agreements for any compensation, acquisition, or voluntary relinquishment of rights by land users or owners for biofuels operations. Conditions of occupational safety and health for workers shall follow internationally recognized standards. The participating operator has a health and safety policy in place, which applies to all workers, including contractors, workers and growers. The use of technologies in biofuel operations shall seek to maximize production efficiency and social and environmental performance, and minimize the risk of damages to the environment and people. Residues, wastes and by-products from feedstock processing and biofuel production units shall be managed such that soil, water and air physical, chemical, and biological conditions are not damaged.

2BSvs defines the social sustainability that for countries that are an important source of raw material for sustainable biofuels, the 1st gathering entity should report whether the country of origin has ratified and implemented the ILO conventions although this criterion of the European Directive is not a requirement for the 1st gathering entity. REDcert includes that all countries



from which biomass is sourced must adopt and meet the minimum requirements laid down and ratified by the ILO including Freedom of association and collective bargaining rights, freedom of association and collective bargaining rights, elimination of discrimination in employment and occupation and abolition of child labour.

Better Biomass requires the production of biomass shall contribute towards the social well-being of the employees and the local population and the compliance with ILO convention including employment, labour relations, safety and health, training and education, diversity and equal opportunities, and treatment of complaints to be respected. It also addresses the human rights in consideration with the United Nation "Universal declaration of human rights" as well as the property rights to secure and respect the rights of local community.

FSC requires the related parties to comply with all applicable laws, regulations and nationally-ratified international treaties, conventions and agreements such as the legal rights to harvest, responsibilities to pay taxes and fees, the legal timber harvesting activities and the third parties' rights. FSC also addresses the maintenance and enhancement of social and economic wellbeing of workers including the principles and rights at work as defined in the ILO Declaration on Fundamental Principles and Rights. FSC promotes gender equality in employment practices, training opportunities, awarding of contracts, processes of engagement and management activities. It requires the implementation of health and safety practices to protect workers from occupational safety and health hazards. These practices shall, proportionate to scale, intensity and risk of management activities, meet or exceed the recommendations of the ILO Code of Practice on Safety and Health in Forestry Work. The rights of indigenous peoples are also included in FSC standards which identify and uphold Indigenous peoples' legal and customary rights of ownership, use and management of land, territories and resources affected by management activities.

PEFC addresses the compliance with legislation applicable to forest management issues including forest management practices; property, tenure and land-use rights for indigenous people; health, labour and safety issues; and the payment of royalties and taxes. It requires that forest management shall promote the long-term health and well-being of communities within or adjacent to the forest management area. Also property rights and land tenure arrangements shall be clearly defined, documented and established for the relevant forest areas. Legal, customary and traditional rights related to the forest land shall be clarified, recognised and respected. Additionally, forest management activities shall be conducted in recognition of the established framework of legal, customary and traditional rights such as outlined in ILO 169 and the UN Declaration on the Rights of Indigenous Peoples, which shall not be infringed upon without the free, prior and informed consent of the holders of the rights, including the provision of compensation where applicable.

- ***Food price and security***



There are only three voluntary schemes which include this criterion in its principle and standards. ISCC mentions that biomass production shall not replace staple crops or impair the local food security. In cases whereby local food prices are expected to rise as a direct effect of biomass production, the producer shall set up mitigation measures. This is not a requirement but a recommendation for biomass producers and suppliers to consider the biomass production to food price impacts.

RSB recognises that local food security is a critical issue and ensuring food security is a principle which must be complied with in regions prone to food shortages. RSB provides a framework and guidelines that support operators to assess the impact of their operation on local food security and how to implement mitigation and enhancement measures. It emphasises to carry out a risk-based screening to identify any necessary specialist assessments (a food impact assessment if operating in a region of food insecurity). REDcert addresses that as it is not possible to clearly assign the biomass area to the type of production that is ultimately used to produce biomass in accordance with Directive 2009/28/EC at the time the biomass is cultivated or harvested, the seller or processor decides whether it is used for food or animal feed or for energy production, the farmer should specify all areas generally suitable for subsequent production. This ensures that the biomass processed in a sub-sequent production step actually originates from areas that comply with the requirements of RED I. In addition, the farmer can be sure that – if the market situation allows – he can sell all of the biomass he produces in compliance with RED I.



Scheme	Water Indicators		Soil Indicators		Air Indicators	
	Water usage	Water quality	Prevention of soil erosion	Soil management (nutrient & organic matter)	Air emissions & waste management	No burning (land clearing)
UK - Renewable Transport Fuel Obligation	+	+	+	+	+	+
ISCC EU - International Sustainability & Carbon Certification	++	++	++	++	+	++
Bonsucro EU	+	+	+	+		
RTRS EU RED - Round Table on Responsible Soy EU RED	+	+	+	+	+	+
RSB EU - Roundtable of Sustainable Biofuels	++	++	++	++	+	+
2BSvs - Biomass biofuel, sustainability voluntary scheme	±	±	±	±	±	
Red tractor						
SQC - Scottish Quality Farm Assured Combinable Crops scheme						
REDcert EU - REDcert certification system	±	±	±	±	±	
Better Biomass / SDE+ sustainability criteria	++	++	++	++	++	++
RSPO RED - Roundtable on Sustainable Palm Oil						
Biograce I						
HVO Renewable Diesel Scheme for Verification of RED Compliance for biofuels						
Glas Trade Assurance Scheme						
KZR INIG System						
Trade Assurance Scheme for Combinable Crops						
Universal Feed Assurance Scheme						
Forest Stewardship Council	+	+	+	+	+	
Programme for Endorsement of Forest Certification	++	++	++	++	++	

Table 8. Qualitative assessment of water, soil and air quality criteria

	Scheme	Feedstock coverage	Chain of custody	Indicators			
				Mass balance usage	Double counting prevention	Scope level	Time frame
1	UK - Renewable Transport Fuel Obligation	All	Y	++	++	++	++
2	ISCC EU - International Sustainability & Carbon Certification	All	Y	++	±	++	±
3	Bonsucro EU	A4	Y	++	±	±	±
4	RTRS EU RED - Round Table on Responsible Soy EU RED	A4	Y	++	±	++	±
5	RSB EU - Roundtable of Sustainable Biofuels	All	Y	++	±	++	±
6	2BSvs - Biomass biofuel, sustainability voluntary scheme	All As & Ws	Y	±	±	±	±
7	Red tractor	A4		±	±	±	±
8	SQC - Scottish Quality Farm Assured Combinable Crops scheme	A4		++	±	±	++
9	REDcert EU - REDcert certification system	All	Y				
10	Better Biomass	All	Y	++	±	±	±
11	RSPO RED - Roundtable on Sustainable Palm Oil	A4	Y	±	±	±	±
12	Biograce I	All	Y				
13	HVO Renewable Diesel Scheme for Verification of RED Compliance for biofuels	All As & Ws	Y	±	±	±	±
14	Gtas Trade Assurance Scheme	A4		++	±	±	±
15	KZR INIG System	All As & Ws	Y	±	±	±	±
16	Trade Assurance Scheme for Combinable Crops	All As & Ws	Y	±	±	±	++
17	Universal Feed Assurance Scheme	All As & Ws	Y	±	±	±	++
18	Forest Stewardship Council	Forest bio-mass	Y	++	++	++	++
19	Programme for Endorsement of Forest Certification	Forest bio-mass	Y	++		++	+

Table 9. Chain of custody requirement

	Scheme	Feedstock coverage	Social criteria			Compliance with local law and international treaties	Economic criteria
			Worker rights	Land right	Human health impacts		
1	UK - Renewable Transport Fuel Obligation	All	++	++	+	+	
2	ISCC EU - International Sustainability & Carbon Certification	All	++	++	++	++	+
3	Bonsucro EU	A4	++	++	+	++	
4	RTRS EU RED - Round Table on Responsible Soy EU RED	A4	++	++	+	+	
5	RSB EU - Roundtable of Sustainable Biofuels	All	++	++	++	++	++
6	2BSvs - Biomass biofuel, sustainability voluntary scheme	All As & Ws	++			++	
7	Red tractor	A4					
8	SQC - Scottish Quality Farm Assured Combinable Crops scheme	A4					
9	REDcert EU - REDcert certification system	All	+			+	+
10	Better Biomass	All	++	++		++	
11	RSPO RED - Roundtable on Sustainable Palm Oil	A4					
12	Biograce I	All					
13	HVO Renewable Diesel Scheme for Verification of RED Compliance for biofuels	All As & Ws					
14	Gtas Trade Assurance Scheme	A4					
15	KZR INIG System	All As & Ws					
16	Trade Assurance Scheme for Combinable Crops	All As & Ws					
17	Universal Feed Assurance Scheme	All As & Ws					
18	Forest Stewardship Council	Forest biomass	++	++	++	++	
19	Programme for Endorsement of Forest Certification	Forest biomass	++	++	++	++	

Table 10. Social and economic aspects

# 7. Discussion and Conclusions

## 7.1 Discussion

Ensuring sustainability performance of biofuels and bioenergy is a challenge and the establishment of sustainability requirements is important to avoid sustainability risks. There are three aspects which would enhance sustainability compliance and are discussed below.

### 7.1.1 Mutual recognition of national initiatives and voluntary schemes

In the context of RED I and FQD, voluntary schemes are encouraged to include a clause on recognizing the potential use of other voluntary schemes for part of a supply chain. The assessment of sustainability requirements from national initiatives and the voluntary scheme also revealed that in principle, voluntary schemes recognised by the EC accept all national and voluntary schemes that are also recognised to verify the compliance with the sustainability criteria set out in Art. 17 (2) to (5) of the RED I. A number of voluntary schemes focus on certifying certain feedstocks and therefore verify certain related sustainability criteria. A number of other voluntary schemes have broader focuses on more diverse biomass feedstocks and therefore could adapt easily to the policy changes for bioenergy in the near future. Given that additional binding sustainability criteria might be needed to demonstrate sustainability compliance for current and future bioenergy, mutual and multilateral recognition of voluntary schemes continuously plays important role in facilitating sustainability compliance for land use and GHG emissions criteria.


### 7.1.2 Agreement on definition and measurement of sustainability criteria

The assessment of sustainability requirements found that there are definitions of a number of proposed sustainability criteria need to be discussed and agreed upon. Also the measurement of GHG emissions is also an important topic to be agreed at.

- iLUC

This criteria has been assessed in this report but as there are no official definition and measurement of iLUC issued at EU level, comparison of iLUC indicators were not provided. There are two voluntary schemes which have indicated the risk avoidance of iLUC. Better Biomass requires that the installation of new biomass production units must not take place in areas with a great risk of significant carbon losses from the soil, such as certain grasslands, peat areas, mangroves and wet areas (wetlands). The reference date is 1 January 2007, with the exception of those biomass flows for which a reference date already applies





from other certification systems (currently under development). Better Biomass requires a stricter reference date of January 2008 defined in RED I. RSB mentions that there are three categories of biomaterial production that are eligible for compliance with the low iLUC namely yield increase and unused or degraded land. RSB requires that economic operators must demonstrate that additional biomass has been produced through an increase in yield. Only the additional biomass (i.e. over and above what would otherwise have been produced) is eligible. Operators must also demonstrate that biomaterial was produced on land that was not previously cultivated, or was of very little agricultural value, and that value is not negatively impacted.

iLUC has also been addressed in a number of directives including Directive 2015/1513 to reduce indirect land-use change for biofuels and bioliquids as well as in the RED I and RED II 2016. The Directive 2015/1513 emphasises that low indirect land-use change-risk biofuels means biofuels, the feedstocks of which were produced within schemes, which reduce the displacement of production for purposes other than for making biofuels and which were produced in accordance with the sustainability criteria for biofuels. iLUC if happened involves the conversion of land with high carbon stock that may lead to significant GHG emissions.

- Biomass cascading


Sustainable sourcing of biomass has been implemented through the establishment of sustainability criteria for bioenergy. The environmental impacts however may go beyond the supply chains. As biomass use for bioenergy but also for other sectors such as bio-materials and biobased chemicals may raise the question of competition of use. Currently there is no official definition of biomass cascading but it can be understood as that “material use of biomass should be prioritized over energy use of biomass”. In several countries such as Belgium and Sweden, cascading is being debated as part of sustainability considerations. It is still difficult to predict how cascading use of biomass will be defined in different countries as well as how the level of this sustainability requirement is agreed but biomass cascading should be considered as one of the sustainability requirements for bioenergy.

- GHG emissions

The criteria related to GHG emissions have been assessed but the GHG emissions in particular in the conversion phase and the impacts beyond the supply chains have not been thoroughly investigated. Additional inputs are needed to assess more accurately the GHG emission impacts and this will be completed with the outcomes of the work package 4.4.

- Social and economic criteria

The social and economic criteria are very important especially in the international sourcing regions outside European Union where the compliance with European standards have not been considered. However by requiring the compliance with ILO conventions, using local




laws on rights for workers and land, environmental impact assessments of biomass cultivation and harvesting to the surrounding environment, impacts of bioenergy on food price and security, the environmental risks could be minimized. The benefits and contributions of bioenergy projects to local development could be implemented and enhanced.

### **7.1.3 Risk based approach**

With the advancement of conversion technologies, forest biomass could be used not only for heat and electricity generation but also for advanced biofuel production. With the introduction of binding sustainability criteria for heat and electricity as well as the promotion of advanced biofuel, forest biomass should be certified to ensure sustainable use for bioenergy production. When sustainability certification is not applicable at an EU level, the risk based approach, a method to assess all forms of available evidence that indicates compliance with sustainable forest management criteria, is considered a practical way to reduce risks of forest biomass exploitation. The risk based approach is already implemented at several MSs and is also established in a number of SFM voluntary schemes. The EC could use these sources of information and guidance for the development of operational guidance and compliance verification with the risk based approach in consultation with the Energy Union Governance Committee, and the Standing Forestry Committee established by Council Decision 89/367/EEC.

## **7.2 Conclusions**


It is concluded that ensuring sustainability performance of biofuels and bioenergy is a challenge at the EU level. The sustainability criteria defined in the RED I and RED II 2016 are fundamental but not strict enough to ensure a full sustainability compliance. An establishment of additional and comprehensive sustainability requirements at an EU level is important to avoid sustainability risks. The assessment of sustainability requirements for biofuels and bioenergy from national initiatives and the voluntary scheme also confirmed the need to establish additional sustainability requirements. These are SFM criteria, social and economic requirements. There are also three new sustainability aspects which would enhance sustainability compliance. Those include the mutual recognition of national initiatives and voluntary schemes, the risk based approach and the agreement on definition and measurement of sustainability criteria such as indirect land-use change, biomass cascading, social and economic aspects. The role of these sustainability aspects is already demonstrated by the implementation of those sustainability requirements for both biofuels and bioenergy at the national level as well as by the certification of those sustainability requirements in several recognised voluntary schemes.



The sustainable forest management requirements, namely legal and sustainable sourcing, ecosystem protection, maintenance of forest productivity, and regular assessment, are implemented and certified by national binding schemes or by SFM certification schemes in particular FSC, PEFC and SBP. A risk based approach could be used to reduce costs and administrative burden of SFM compliance which is currently apply only to bioenergy. The risk based approached however should be carefully designed as there may still involve some uncertainties if there is lack of transparent database for mobilised forest biomass particularly in sourcing regions outside the EU.

The social and economic criteria are also important to be established including the compliance with local laws and rights, the land right, the human health impacts and the food price and security, and they have already been defined and certified in the voluntary schemes ISCC and RSB. Similarly, additional environmental criteria such as biomass cascading, protection of water, air and soil are also crucial to enhance sustainability compliance. The iLUC risks seem to be negligible in the European Union, however iLUC impacts outside the EU are not thoroughly known. Therefore an agreement on harmonised definition and measurement of iLUC is necessary.

Advanced biofuels produced from solid biomass uses similar feedstocks to other bioenergy sectors (heat and electricity). Furthermore, advanced biofuel plants often co-generate heat and electricity. The development of an EU wide comprehensive set of sustainability requirements that apply to biofuels (including advanced biofuels), but also heat and electricity generated from biomass is therefore essential. Implementation of these sustainability requirements proves that transport biofuels and bioenergy as a whole are produced in a sustainable way which ultimately leads to increased social acceptance of the whole sector. On one hand, it will be challenging to establish strict sustainability requirements and this may impede sustainable biomass mobilization within and imports to the EU. To ensure additionally suitable sustainability requirements to be implemented at the EU level, further consultation with stakeholders is needed. In the scope of the ADVANCEFUEL project, additional interviews with policy makers, industry representations, voluntary scheme owners and bioenergy consultants will continue to be carried out. This will be completed by a dedicated workshop to discuss the report results and to consider the harmonized sustainability requirements and sustainability certification for biofuels and bioenergy. According to a number of interviewed experts, harmonisation is not always be seen important, it might be more relevant to have specific criteria to specific end uses or feedstock types to be effective. Harmonisation possibilities therefore will be discussed in details with various stakeholders. In conclusion, advanced biofuels provide high GHG emission savings with a low risk of causing indirect land-use change and are less likely to compete directly for agricultural land



used for the food and feed production. The promotion of advanced biofuels and deployment of advanced fuels with the suitable accompanying sustainability criteria play an important role in the decarbonisation of transport and the development of low-carbon transport technologies beyond 2020.

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# Annexes

## Annex 1. Data sources for assessment of voluntary schemes and national initiatives

Name	Data sources
UK - Renewable Transport Fuel Obligation	<a href="https://www.gov.uk/guidance/renewable-transport-fuels-obligation">https://www.gov.uk/guidance/renewable-transport-fuels-obligation</a>
ISCC EU - International Sustainability & Carbon Certification	<a href="https://www.iscc-system.org/process/audit-and-certification-process/iscc-system-documents/">https://www.iscc-system.org/process/audit-and-certification-process/iscc-system-documents/</a>
RSB EU - Roundtable of Sustainable Biofuels	<a href="https://rsb.org/the-rsb-standard/standard-documents/eu-red/">https://rsb.org/the-rsb-standard/standard-documents/eu-red/</a>
Bonsucro EU	
RTRS EU RED - Round Table on Responsible Soy EU RED	
2BSvs - Biomass biofuel, sustainability voluntary scheme	
Red tractor	
SQC - Scottish Quality Farm Assured Combinable Crops scheme	
REDcert EU - REDcert certification system	
Better Biomass	<a href="https://ec.europa.eu/energy/en/topics/renewable-energy/biofuels/voluntary-schemes">https://ec.europa.eu/energy/en/topics/renewable-energy/biofuels/voluntary-schemes</a>
RSPO RED - Roundtable on Sustainable Palm Oil	
Biograce I	
HVO Renewable Diesel Scheme for Verification of RED Compliance for biofuels	
Gafta Trade Assurance Scheme	
KZR INIG System	
Trade Assurance Scheme for Combinable Crops	
Universal Feed Assurance Scheme	
Forest Stewardship Council	<a href="https://ic.fsc.org/en/what-is-fsc-certification">https://ic.fsc.org/en/what-is-fsc-certification</a>
Programme for Endorsement of Forest Certification	<a href="https://www.pefc.org/standards/overview">https://www.pefc.org/standards/overview</a>

## Annex 2. Questionnaires to stakeholders

### *Questions on online survey*

The EU H2020 project ADVANCEFUEL (<http://advancefuel.eu/>) aims to facilitate the market roll-out of advanced biofuels and other liquid renewable fuels in the transportation sector between 2020 and 2030, with an outlook on post-2030 impacts. Effective sustainability frameworks, including certification, are an important tool to safeguard sustainability over the whole biofuel supply chains. The development and implementation of common standards and certification schemes for sustainable biofuels production is therefore one of the key topics of the ADVANCEFUEL project. Consultation with stakeholders is important to identify strengths and weaknesses of the available sustainability schemes and standards and their applicability to advanced biofuels.

Policy Field	Renewable Energy and Transport Biofuels
Target Groups	Academia & Consulting, Biofuel industry, Certification scheme owners & auditors, Policy makers
Period of Consultations	Four months, 01/03/2018 – 30/06/2018

Expected outcomes:

- an overview of the existing and planned legislation for all (current and new) biofuel types in the member states, showing common elements and differences, highlighting possible barriers to trade and cumbersome administration
- a report with key issues of current sustainability criteria and certification systems for biofuels and opinions on policy developments for energy and biofuels; possibilities for (future) alignment/and or harmonisation of sustainability requirements and sustainability certification schemes

#### **1. Please choose the country where you live in**

#### **2. Please select your position**

- ☐ Academia & Consulting
- ☐ Industry representative
- ☐ Voluntary scheme, owner
- ☐ Voluntary scheme, owner
- ☐ Policy maker
- ☐ Other

#### **3. SUSTAINABILITY REPORTING:**

3.1 Do biofuel suppliers report directly to the national authority regarding sustainability compliance?

- ☐ Yes
- ☐ No

3.2 Is the guidance and administrative procedure for biofuel suppliers clear and effective?



Is the guidance and administrative procedure clear and effective?

Poor

☐

Below average

☐

Average

☐

Good

☐

Excellent

☐

### 3.3 Select and rank the legislation and voluntary schemes to demonstrate compliance (ranking the legislation and voluntary schemes based on their comprehensiveness of sustainability criteria)

	<b>Scheme usage</b> <i>Popular used</i> <i>Rarely used</i> <i>Not applicable</i>	<b>Scheme comprehensiveness</b>  <i>Poor</i> <i>Below average</i> <i>Average</i> <i>Good</i> <i>Excellent</i>
UK - Renewable Transport Fuel Obligation		
ISCC EU - International Sustainability & Carbon Certification		
Bonsucro EU		
RTRS EU RED - Round Table on Responsible Soy EU RED		
RSB EU - Roundtable of Sustainable Biofuels		
2BSvs - Biomass biofuel, sustainability voluntary scheme		
Red tractor		
SQC - Scottish Quality Farm Assured Combinable Crops scheme		
REDcert EU - REDcert certification system		
Better Biomass		
RSPO RED - Roundtable on Sustainable Palm Oil		
Biograce I		
HVO Renewable Diesel Scheme for Verification of Compliance with the RED sustainability criteria for biofuels		
Gafta Trade Assurance Scheme		
KZR INIG System		
Trade Assurance Scheme for Combinable Crops		
Universal Feed Assurance Scheme		

### 3.4 Improvements of voluntary schemes

- in what aspects that voluntary schemes can improve further?*
- ☐ Additions of sustainability criteria (environmental, social and economic)
  - ☐ Transparency in sustainability reporting
  - ☐ Coverage of additional supply chains (feedstock - conversion combinations)
  - ☐ Others, please specify:

#### 4. SUSTAINABILITY CRITERIA:

##### 4.1 Deployment and role of advanced biofuels:

	Poor	Below average	Average	Good	Excellent
In your country, are there strategies for advanced fuels deployment and/ or is commercial deployment of process technology for advanced biofuels taking place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
How do you view the future contributions of sustainable advanced biofuels to the national renewable energy target up to 2030?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments/Suggestions regarding role and deployment of biofuels:

##### 4.2. Indirect land use

*Your answer if applicable:*

change (iLUC) has been raised to cause some environmental issues (e.g. expansion of agricultural and forest land for bioenergy crops causing food insecurity, deforestation and other GHG emitting land use changes etc.).

	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
In your view, is iLUC sufficiently addressed in the revised RED?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do you think the definition and methods to quantify iLUC are clear and effective?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments/Suggestions regarding iLUC requirement:

##### 4.3 Environmental aspects:

*Your answer if applicable:*

In your opinion, what are the necessary environmental sustainability criteria to be included for sustainability compliance

- ☐ Sustainable forest management
- ☐ Legal & sustainable sourcing

- ☐ Forest productivity & functioning
- ☐ Carbon stock
- ☐ Biodiversity protection
- ☐ Ecosystem conservation
- ☐ Protection of water resources, air, soil
- ☐ Biomass cascading
- ☐ Others, please specify

#### 4.4. Greenhouse gas emissions:

RED II 2016 requires at least 50% savings of greenhouse gas (GHG) emissions from biofuels compared to fossil fuels in 2017 and requires higher threshold of at least 70% for installations starting operation in 2021.

	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
Do you think the GHG emissions calculation methods for biofuels are effective?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are the calculation tools applicable for advanced biofuels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do you think the GHG emissions calculation methods for biofuels are effective?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
In your view, does a GHG threshold of 70% emissions reduction sufficient to stimulate the development of advanced bio-fuel markets?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Visioning the same feedstocks (e.g. forest biomass) which could be used for all bioenergy : do you think an incorporated tool used to calculate GHG emissions for biofuels and heat/power generation possible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments/Suggestions regarding iLUC requirement:

*Your answer if applicable:*

#### 4.5. Social and economic aspects:

In your opinion, what are the most important social aspects to be considerably included for sustainability compliance:

- ☐ Compliance with laws and local right
- ☐ Child labour
- ☐ Land right
- ☐ Human health impacts
- ☐ Food security and price
- ☐ Rural development
- ☐ Competing uses (e.g. material and energy markets)

☐ (others, please provide your recommendations)

#### 4.6. Data collection

In your opinion, data collection of GHG calculation and other sustainability criteria for reporting and sustainability demonstration are relevant and verifiable?

Very dissatisfied  
☐

Not satisfied  
☐

Neutral  
☐

Satisfied  
☐

Very satisfied  
☐

Comments/Suggestions regarding data collections: (e.g. what could still be improved for future use? )

*Your answer if applicable:*

### 5. CHAIN OF CUSTODY:

Mass balance is the only chain of custody (CoC) system currently accepted under the Renewable Energy Directive.

Is it possible separate certified biomass from non-certified feedstocks in the early stage of supply chain following the mass balance approach?

Strongly disagree  
☐

Disagree  
☐

Undecided  
☐

Agree  
☐

Strongly agree  
☐

Is it sufficient to administratively separate certified biomass from non-certified products in the later stage of supply chain following the mass balance approach?

☐

☐

☐

☐

☐

Do you think the mass balance approach is strict enough?

☐

☐

☐

☐

☐

Comments/Suggestions regarding data collections: (e.g. what could still be improved for future use? )

*Your answer if applicable:*

### 6. HARMONISED SUSTAINABILITY REQUIREMENTS:

According to you, are the fully harmonised sustainability criteria for all bioenergy needed?

Strongly disagree  
☐

Disagree  
☐

Undecided  
☐

Agree  
☐

Strongly agree  
☐

In your opinion, are the current sustainability criteria for biofuels set in the RED II 2016 are complete/ fair/ too rigid?

☐

☐

☐

☐

☐

Do you think sustainability criteria also be required for other biobased sectors (biochemicals, biomaterials, paper, food, etc.)?

☐☐☐☐☐

Comments/Suggestions regarding harmonised sustainability requirements

*Your answer if applicable:*

## **7. NATIONAL INITIATIVES AND UPDATES FOR BIOFUELS AND BIOENERGY:**

Please provide the name and website of the (national) scheme/ initiatives for bioenergy/ and or biofuels

Please clarify if there are any updates on sustainability requirements for bioenergy/ and or biofuels

*Your answer if applicable:*

*Your answer if applicable:*

We may contact you for a follow-up discussion. If you agree with us, please provide your information

First name:

Last name:

Telephone number:

Email address:

## Questionnaire to policy makers

The EU H2020 project AdvanceFuel (<http://advancefuel.eu/>) aims to facilitate the market roll-out of advanced biofuels and other liquid renewable fuels in the transportation sector between 2020 and 2030, with an outlook on post-2030 impacts. Effective sustainability frameworks, including certification, are an important tool to safeguard sustainability over the whole biofuel supply chain. The development and implementation of common standards and certification schemes for sustainable biofuels production is therefore one of the key topics of the AdvanceFuel project. Consultation with stakeholders is important to identify strengths and weaknesses of the available sustainability schemes and standards and their applicability to advanced biofuels.

**Policy Field** Renewable Energy and Transport Biofuels

**Target Groups** Policy makers

**Period of Consultations** Four months, 01/03/2018 – 30/06/2018

*Please send back your answer to Thuy Mai-Moulin ([t.p.t.mai-moulin@uu.nl](mailto:t.p.t.mai-moulin@uu.nl)) as early as you can*

**EU wide legislation<sup>1</sup> for bioenergy and biofuels is supposed to be changed. Given this changing situation, the consultation objectives are:**

- to investigate comprehensive **sustainability requirements for biomass for biofuels** (including advanced biofuels, aviation biofuels and other liquid renewable fuels) in the European member states (MSs))
- to understand the **viewPoint of policy makers on the existing national provisions** governing the sustainable production and use of feedstocks for biomass for transport ; to check whether current national initiatives are undergoing changes/updates
- to apprehend the response, viewPoints and expectation of stakeholders towards the **comprehensive national and European sustainability requirements** for all bioenergy sectors (biofuels, heat and electricity)

### Expected Outcome

- an overview of the existing and planned legislation for all possible biofuels in the MSs, showing common elements and differences, highlighting possible barriers to trade and cumbersome administration
- a workshop on the possibilities for (future) alignment/ and or harmonisation of sustainability requirements and sustainability certification schemes with the participation of policy makers and various industry
- a report with identified key issues of current policies for biofuels and opinions on on-going and future policy developments for energy and biofuels

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<sup>1</sup> The European Commission issued the Renewable Energy Directive (RED) recast proposing a higher deployment of advanced biofuels by 2030 (3.6%). The new RED is about to be published by end 2018.

- |   |  |
|---|--|
| 1. Your country                           | <b>Please choose</b>   |
| 2. Your position                          | <b>Please choose</b>   |
| 3. Your contact information if applicable |  |
| 4. National scheme                        | Please provide the name and website of the national scheme/ initiatives for bioenergy/ and or biofuels |
| 5. National updates <sup>2</sup>          | Please clarify if there are any updates on sustainability requirements for bioenergy/ and or biofuels  |

## Sustainability Reporting

### 1. Direct reporting:

- a. How does the national authority provide guidance to biofuel suppliers? By documents/ personal communication/ website information? Please indicate references for your answer.

*Your answer:*

- b. What are the most challenging aspects of sustainability reporting for biofuel suppliers that you have been aware of? Please clarify the answer in details.

*Your answer:*

2. **Level of sustainability demonstration:** Sustainable feedstock production of lignocellulosic biomass used for heat and power can be demonstrated at site level (cultivation/ production point) or to a broader extent, regional level. As similar feedstocks can be used for advanced biofuels, what demonstration level should be accepted, and why?

*Your answer:*

### 3. Reporting by sustainability certificates

<sup>2</sup> The year 2016 is considered a reference year when RED II 2016 was issued. In preparation for the changes, MSs may have strategies to anticipate changes/ to move ahead towards a more sustainable energy landscape

- a. Voluntary schemes accepted by the EC are used to demonstrate biofuel sustainability certification. Are there other schemes used in your country? Could you name those?

*Your answer:*

- b. Are, in your opinion, voluntary schemes useful or even necessary for demonstrating compliance, or would e.g. the presence of national legislation be preferred? According to you, what are the voluntary systems with most comprehensive sustainability criteria? How are ambitious those schemes regarding their certification of bioenergy at EU and international level?

*Your answer:*

4. **Scheme improvement:** In your opinions, do voluntary schemes need to be improved to facilitate (current and future) biofuel compliance and trade?

*Your answer:*

## Sustainability criteria

### *Feedstock production and land use*

1. **Deployment and role of advanced biofuels:**

In your country, are there strategies for advanced fuels deployment and/ or is commercial deployment of process technology for advanced biofuels taking place? How do you view the future contributions of sustainable advanced biofuels to the national renewable energy target?

*Your answer:*

2. **Indirect land use change (iLUC):** iLUC has been raised to cause some environmental issues (e.g. expansion of agricultural and forest land for bioenergy crops causing food insecurity, deforestation and other GHG emitting land use changes etc.). In your view, is iLUC sufficiently addressed in the revised RED? Do you think the definition and methods to quantify iLUC are clear and effective?

Your answer:



3. **Environmental aspects:** In your opinion, what are the necessary environmental sustainability criteria to be included for sustainability compliance:

- ☐ Sustainable forest management
  - ☐ Legal & sustainable sourcing
  - ☐ Forest productivity & functioning
- ☐ Carbon stock
- ☐ Biodiversity protection
- ☐ Ecosystem conservation
- ☐ Protection of water resources, air, soil
- ☐ (others, please indicate your recommendations)

Your further comments

4. **Data collection:** In your opinion, data collection requirements for the GHG calculation and other sustainability criteria demonstration are relevant and verifiable? Do you consider guidance for biofuels are clear and comprehensive? What could still be improved for future use?

*Your answer*

## GHG emissions

1. **GHG emission threshold:** RED II 2016 requires at least 50% savings of greenhouse gas (GHG) emissions from biofuels compared to fossil fuels in 2017 and requires higher threshold of at least 70% for installations starting operation in 2021.

Do you consider the GHG emissions reduction threshold achievable for meeting the blending target? In your view, does a GHG threshold of 70% emissions reduction sufficient to stimulate the development of advanced biofuel markets?

*Your answer:*

2. **Calculation tool:**

- a. Do you think the GHG emissions calculation methods for biofuels are effective? Are the calculation tools applicable for advanced biofuels?

- b. Visioning the same feedstocks (e.g. forest biomass) which could be used for all bioenergy: do you think an incorporated tool used to calculate GHG emissions for biofuels and heat/power generation possible?

*Your answer*

### *Chain of custody*

Mass balance is the only chain of custody (CoC) system currently accepted under the Renewable Energy Directive.

- Is it possible separate certified biomass from non-certified feedstocks in the early stage of supply chain following the mass balance approach?
- Is it sufficient to administratively separate certified biomass from non-certified products in the later stage of supply chain following the mass balance approach?
- Do you think the mass balance approach is strict enough?

*Your answer*

### *Social*

### *& economic aspects*

Social and economic sustainability requirements are not yet required for biofuel sustainability compliance at EU and national level.


In your opinion, what are the most important social aspects to be considerably included for sustainability compliance:

- ☐ Compliance with laws and local right
- ☐ Child labour
- ☐ Land right
- ☐ Human health impacts
- ☐ Food security and price
- ☐ Rural development
- ☐ Competing uses (e.g. material and energy markets)
- ☐ (others, please provide your recommendations)

*Your further comments*

## **Harmonised sustainability requirements**

- According to you, are the fully harmonised sustainability criteria for all bioenergy needed? In your opinion, are the current sustainability criteria for biofuels set in the Renewable Energy Directive (RED) recast are complete/ fair/ too rigid?



*Your answer:*

2. Do you think sustainability criteria also be required for other biobased sectors (bio-chemicals, biomaterials, paper, food, etc.)?

*Your answer:*

## **Governance of biofuels:**

The Governance of the Energy Union proposal aiMS to assess the progress of Member States in reaching overall renewable energy targets as well as to provide feedback for taking corrective actions in the heating, cooling and in the transport sector but without country-level binding contributions. In your opinion, would the governance system solve the sustainability concerns and offer robust and transparent tools to measure the biofuels progress at the Member States?

*Your answer:*

## Questionnaire to scheme owners, industry and consultants

The EU H2020 project AdvanceFuel (<http://advancefuel.eu/>) aims to facilitate the market roll-out of advanced biofuels and other liquid renewable fuels in the transportation sector between 2020 and 2030, with an outlook on post-2030 impacts. Effective sustainability frameworks, including certification, are an important tool to safeguard sustainability over the whole biofuel supply chain. The development and implementation of common standards and certification schemes for sustainable biofuels production is therefore one of the key topics of the AdvanceFuel project. Consultation with stakeholders is important to identify strengths and weaknesses of the available sustainability schemes and standards and their applicability to advanced biofuels.

Policy Field	Renewable Energy and Transport Biofuels
Target Groups	Biofuel industry, certification scheme owners, & auditors
Period of Consultations	Four months, 01/03/2018 – 30/06/2018

*Please send back your answer to Thuy Mai-Moulin ([t.p.t.mai-moulin@uu.nl](mailto:t.p.t.mai-moulin@uu.nl)) as early as you can*

**EU wide legislation<sup>3</sup> for bioenergy and biofuels is supposed to be changed. Given this changing situation, the consultation objectives are:**

- to investigate comprehensive **sustainability requirements for biomass for biofuels** (including advanced biofuels, aviation biofuels and other liquid renewable fuels) in the European member states (MSs))
- to confirm the **list of voluntary schemes** used to demonstrate sustainability compliance with national initiatives; to verify if there are any **further updates in the certification schemes** used to demonstrate compliance with current and future legislation
- to apprehend the response, viewpoints and expectation of stakeholders towards the **comprehensive national and European sustainability requirements** for all bioenergy sectors (biofuels, heat and electricity)

### Expected Outcome

- an overview of the existing and planned legislation for all possible biofuels in the MSs, showing common elements and differences, highlighting possible barriers to trade and cumbersome administration
- a workshop on the possibilities for (future) alignment/ and or harmonisation of sustainability requirements and sustainability certification schemes with the participation of policy makers and various industry
- a report with identified key issues of current policies for biofuels and opinions on ongoing and future policy developments for energy and biofuels

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<sup>3</sup> The European Commission issued the Renewable Energy Directive (RED) recast proposing a higher deployment of advanced biofuels by 2030 (3.6%). The new RED is about to be published by end 2018.

## General information

1. Your country **Please choose**
2. Your position **Please choose**
3. Your contact information if applicable
4. National scheme Please provide the name and website of the national scheme/ initiatives for bioenergy/ and or biofuels
5. National updates<sup>4</sup> Please clarify if there are any updates on sustainability requirements for bioenergy/ and or biofuels

## Sustainability Reporting

### 1. Direct reporting:

Do biofuel suppliers report directly to the national authority regarding sustainability compliance? Is the guidance and administrative procedure clear and effective?

*Your answer:*

### Reporting by sustainability certificates

2. **Certificate proofs:** Do biofuel suppliers also participate in certification schemes? Could you describe those? What are the most popular/ accepted certification scheme(s)? Why are they chosen? In how far does the price vary between different certification schemes?

*Your answer:*

### 3. Reporting by sustainability certificates

- a. In addition to certification schemes accepted by the EC used for biofuels and bioenergy, are there other national and/ or applicable schemes that you are aware of? Could you name those?

*Your answer:*

<sup>4</sup> The year 2016 is considered a reference year when RED II was issued. In preparation for the changes, MS may have strategies to anticipate changes/ to move ahead towards a more sustainable energy landscape

- b. Are, in your opinion, certification schemes useful or even necessary for demonstrating compliance, or would e.g. the presence of existing legislation in your opinion be sufficient? What are, in your opinion, the certification systems with most comprehensive sustainability criteria to demonstrate sustainability compliance? How ambitious those schemes are regarding their certification of bio-energy at EU and international level?
4. **Cross-border business:** Biofuel suppliers may have a number of international branches or factories. They can use voluntary schemes recognised by the EC to prove sustainability compliance in order to receive subsidies/ grants. Are you aware of a national regulator issuing sustainability certificates such as the UK Renewable Transport Fuel Obligation also recognised in other countries?  
If no, do UK biofuel suppliers need to use certificates issued by voluntary schemes if they have cross-border business?

*Your answer:*

5. **Scheme improvement:** In your opinions, do voluntary schemes need to be improved to facilitate (current and future) biofuel compliance and trade?

*Your answer:*

## Sustainability criteria

### *Feedstock production and land use*

1. **Deployment and role of advanced biofuels:**

In your country, are there strategies for advanced fuels deployment and/ or is commercial deployment of process technology for advanced biofuels taking place? How do you view the future contributions of sustainable advanced biofuels to the national renewable energy target?

*Your answer:*

2. **Indirect land use change (iLUC):** iLUC has been raised to cause some environmental issues (e.g. expansion of agricultural and forest land for bioenergy crops causing food insecurity, deforestation and other GHG emitting land use changes etc.). In your view, is iLUC sufficiently addressed in the revised RED? Do you think the definition and methods to quantify iLUC are clear and effective?

Your answer:

3. **Environmental aspects:** In your opinion, what are the necessary environmental sustainability criteria to be included for sustainability compliance:

- ☐ Sustainable forest management
  - ☐ Legal & sustainable sourcing
  - ☐ Forest productivity & functioning
- ☐ Carbon stock
- ☐ Biodiversity protection
- ☐ Ecosystem conservation
- ☐ Protection of water resources, air, soil
- ☐ (others, please indicate your recommendations)

Your further comments

4. **Data collection:** In your opinion, data collection requirements for the GHG calculation and other sustainability criteria demonstration are relevant and verifiable? Do you consider guidance for biofuels are clear and comprehensive? What could still be improved for future use?

*Your answer*

## GHG emissions

5. **GHG emission threshold:** RED II 2016 requires at least 50% savings of greenhouse gas (GHG) emissions from biofuels compared to fossil fuels in 2017 and requires higher threshold of at least 70% for installations starting operation in 2021.

Do you consider the GHG emissions reduction threshold achievable for meeting the blending target? In your view, does a GHG threshold of 70% emissions reduction sufficient to stimulate the development of advanced biofuel markets?

*Your answer:*

6. **Calculation tool:**

- c. Do you think the GHG emissions calculation methods for biofuels are effective? Are the calculation tools applicable for advanced biofuels?

- d. Do you consider the GHG emissions reduction threshold achievable for meeting the blending target?
- e. Visioning the same feedstocks (e.g. forest biomass) which could be used for all bioenergy: do you think an incorporated tool used to calculate GHG emissions for biofuels and heat/power generation possible?

*Your answer*

### *Chain of custody*

Mass balance is the only chain of custody (CoC) system currently accepted under the Renewable Energy Directive.

- d. Is it possible separate certified biomass from non-certified feedstocks in the early stage of supply chain following the mass balance approach?
- e. Is it sufficient to administratively separate certified biomass from non-certified products in the later stage of supply chain following the mass balance approach?
- f. Do you think the mass balance approach is strict enough?

*Your answer*

### *Social*

### *& economic aspects*

Social and economic sustainability requirements are not yet required for biofuel sustainability compliance at EU and national level.

In your opinion, what are the most important social aspects to be considerably included for sustainability compliance:

- ☐ Compliance with laws and local right
- ☐ Child labour
- ☐ Land right
- ☐ Human health impacts
- ☐ Food security and price
- ☐ Rural development
- ☐ Competing uses (e.g. material and energy markets)
- ☐ (others, please provide your recommendations)

*Your further comments*

## **Harmonised sustainability requirements**



1. According to you, are the fully harmonised sustainability criteria for all bioenergy needed? In your opinion, are the current sustainability criteria for biofuels set in the Renewable Energy Directive (RED) recast are complete/ fair/ too rigid?

*Your answer:*

2. Do you think sustainability criteria also be required for other biobased sectors (bio-chemicals, biomaterials, paper, food, etc.)?

*Your answer:*

## **Governance of biofuels:**

The Governance of the Energy Union proposal aims to assess the progress of Member States in reaching overall renewable energy targets as well as to provide feedback for taking corrective actions in the heating, cooling and in the transport sector but without country-level binding contributions. In your opinion, would the governance system solve the sustainability concerns and offer robust and transparent tools to measure the biofuels progress at the Member States?

*Your answer:*