



IEA Bioenergy
Technology Collaboration Programme

Improvement opportunities for policies and certification schemes promoting sustainable biofuels with low GHG emissions

Part 1: A review of policy frameworks

IEA Bioenergy: Task 39





Improvement opportunities for low-carbon, sustainable biofuel policies and certification schemes

Part 1: A review of policy frameworks

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IEA Bioenergy: Task 39



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Executive summary

Currently, several sustainability and greenhouse gas (GHG) requirements are implemented in policy frameworks for feedstock-to-biofuel supply chains in different regions of the world. In some of these policy frameworks (e.g., EU-RED, ICAO-CORSIA) regulation has (partially) outsourced public enforcement and monitoring compliance with these requirements through the recognition of private certification schemes, increasing their importance. Consequently, different approaches and methods for compliance and verification have evolved with the aim to demonstrate in practice the sustainability of biofuels and its GHG emission savings. However, variation in compliance and verification approaches raises questions on how they differ from each other and what this means in terms of risks, reliability, and effectiveness.

The objective of this analysis is to better understand how existing compliance and verification approaches for feedstock-to-biofuel supply chains differ, and to improve comprehension of the implications of those (regional) differences. This, to give general recommendations and perspectives for decision-makers on how to improve the robustness of compliance and verification approaches for feedstock-to-biofuel supply chains for the global biofuel market and to guarantee the sustainability of biofuels including its GHG emission savings through the supply chain.

In this report we look at a range of policy frameworks for feedstock-to-biofuel supply chains in different regions of the world, which are mainly linked to the origin of IEA T39 members. These include the following policy frameworks:

- Australia (with a focus on the States of Queensland and New South Wales)
- National policy on Biofuels in India
- The RenovaBio policy in Brazil
- The Low Carbon Fuel Standard in California (CLCFS)
- The (draft) Clean Fuel Regulations in Canada.
- The EU Renewable Energy Directive (EU RED II), and how this is further implemented in three EU Member States: Germany, Netherlands, Austria.
- The EU ETS, with a focus on reducing emissions in the aviation sector
- The ICAO CORSIA Framework (for aviation).
- The Dutch policy framework on solid biomass, as an example for implementing national sustainability requirements, and the verification and monitoring thereof.

The analysis concludes that differences exist between the selected policy frameworks on a range of issues. These issues are interrelated and a combination of- even small - differences results in differences in the level of stringency and robustness of policy frameworks on the sustainability of biofuels including its GHG emission savings. Differences between the policy frameworks are found in:

- GHG emission saving calculations
- Approaches on direct and indirect land use change and maintenance of areas with a high carbon stock and/or biodiversity
- Other land-related sustainability requirements
- The coverage of socio-economic criteria
- The categorization of feedstocks, especially of wastes and residues
- The recognition criteria for certification schemes and the conditions under which these are recognized.

- The verification and assurance requirements that are defined for certification bodies when evaluating conformance to the applicable standards
- The minimum requirements for the Chain of Custody
- The type of information required to be submitted by the economic operator at the end of the supply chain to the respective authority
- Monitoring compliance of the standards and their certification or verification bodies, and consequences of non-compliance

The report concludes that the global sustainability framework for biofuels is as strong as its weakest link, and in a sector where biofuels and its feedstock are internationally traded, there is a risk that feedstock flows move to, or are traded through countries with less enforcement or less stringent rules. Obviously, this may affect overall biofuel trade, but more importantly also the overall robustness of the system.

It is therefore crucial to further align and harmonize, where possible, definitions, sustainability criteria, GHG emission reduction requirements and GHG LCA methodologies, and related certification and verification requirements to improve the robustness of compliance for sustainable feedstock-to-biofuel supply chains for the global biofuel market. Next to that, it is important to increase the understanding how a combination of- even small - differences in GHG emission reduction requirements, and related certification and verification requirements may affect the overall robustness of policy frameworks on the sustainability of biofuels. Recommendations on the specific elements are mentioned below.

Recommendations on strengthening the GHG emission reduction requirements and sustainability criteria (CH3)

- There is room for further harmonization and standardization of LCA models to decrease the variance of input data and approaches. Next to that, coordination and alignment are key to ensure that GHG emission reductions that are created in an (international) supply chain cannot be claimed twice because system boundaries in LCA-models overlap.
- There is potential amongst the selected policy frameworks to further harmonize approaches on direct and indirect land use change and maintenance of areas with a high carbon stock and/or biodiversity.
- It is important to promote that land-related sustainability requirements become included in all selected sustainability frameworks in a harmonized way, in particular for complex issues like soil health, use of fertilizers and pesticides, water pollution and depletion and biodiversity protection.
- The coverage of socio-economic criteria is very limited in the selected policy frameworks. Establishing requirements to safeguard human rights and to ensure that feedstocks do not conflict with food production should be promoted.
- Alternatively, it can be promoted that related national policies and laws on socio-economic and land-related sustainability requirements are properly regulated in key producing countries.
- For the inclusion of social criteria, policy frameworks can build on existing developments such as on the Universal Declaration on Human Rights, or specifically for the European Union, on the upcoming Human Rights Due Diligence Regulation.

Recommendations on improving the categorization and correct identification of feedstocks (CH4)

- Stable policies, unambiguous definitions, and clear underlying guidance and decision trees are essential to promote biofuel from waste and residue streams for the longer term.

- It is key that information about feedstock is appropriately classified at the collection/gathering point, and that this information is correctly transferred through the supply chain. Harmonizing biomass category definitions between policy frameworks also helps certification schemes to be used in multiple frameworks.
- Various policy frameworks are introducing specific, more stringent, requirements to prevent modification and wrong classification of waste and residue feedstocks. Harmonization of these requirements is key.
- Uniformity on the first link in the supply chain between policy frameworks is key to prevent that feedstocks - and especially residues and waste streams - can be used and/or traded more easily in certain regions and/or countries due to less strict requirements.

Recommendations to strengthen minimum level of robustness for certification or verification schemes (CH5)

- Allowing both verification and certification to proof compliance gives flexibility in the market. The option for verification, next to certification, can especially be interesting when proof of compliance is required for new criteria that have not yet been included in (many) certification systems. The challenge is however to maintain the same level of assurance for both systems.
- Especially for frameworks recognizing multiple schemes, a clear framework with minimum requirements is crucial to avoid that schemes lower the bar: the robustness of all recognized certification schemes is at the end as strong as its weakest link. At the same time, it must be taken care of that requirements are not defined too strict and leave little room for interpretation.
- Harmonization on the recognition criteria and the conditions under which the schemes are recognized is key for those frameworks that recognize multiple schemes.
- The added value of recognizing multiple schemes is that schemes can go beyond the minimum requirements and raise the bar. It is worthwhile exploring which incentives can be built in policy frameworks to stimulate the use of 'best in class' schemes that want to further raise the bar.
- A range of modules are being developed by certification schemes to align with different requirements resulting from different policy contexts. Further transparency is needed in how clear it is for the market, authorities and auditors where those different claims stand for, and how they interact.
- Frameworks that only make use of one single scheme (e.g., LCFS or RenovaBio) can align internationally in the requirements on verification and assurance that are defined for certification and verification bodies when evaluating conformance to a standard.

Recommendations on strengthening the Chain of Custody (CoC) and transfer of information (CH6)

- It is key that policy frameworks set minimum requirement for the CoC model(s) to be used and under which conditions - harmonization amongst frameworks is key.
- The transfer of sustainability information throughout the supply chain and across countries requires a harmonised interpretation of terminologies and definitions. The ISO 22095 standard defines a framework for the CoC and can be a useful reference for further harmonization.

Recommendations to strengthen correctness and completeness of information at end of the supply chain (CH7)

- Harmonize databases to ensure and facilitate instant data transfers and harmonisation of data flows - between countries, but also for example between certification schemes and national registries.
- Harmonize reporting requirements at the end of the supply chain
- Require as proof of sustainability at the end of the supply chain not only the certificate, but also additional information on supportive data to calculate the GHG emission reduction and on sustainability data when considered useful.
- Traceability databases can help improving the robustness of information through the supply chain and allow to cross-check the correctness and completeness of the input data that are transferred throughout the supply chain.
- Consider exploring some form of public consultation in the selected policy frameworks.

Recommendations to improve the public and private supervision to monitor compliance (CH8)

- Require accreditation as a requirement in the selected policy frameworks for certification and verification bodies and - if relevant - of standards, as form of private supervision. ISO standards used for accreditation of certification bodies (e.g., ISO 17065 and equivalent) can be a useful reference for further harmonization and setting minimum requirements.
- Further improve coordination and exchange of information amongst competent authorities in Member States and other third countries on competencies of certification bodies and verifiers.
- For policy frameworks that recognize multiple schemes and allow cross-recognition, it is important to ask for insight which certificate is used in the beginning of the supply chain at the point of origin - to better understand how the schemes interact with each other.
- For policy frameworks that recognize multiple schemes, such as the EU RED II, there is a need for supervision and monitoring of certification schemes to at least be able to identify, in the worst case, evidence of infringement.
- For policy frameworks that recognize one single scheme, a policy framework should include a process cycle of monitoring and evaluation to be able to identify weak spots of the scheme and improve them.
- Enlarge transparency, public scrutiny and building up trust in society in general towards policy frameworks that include certification and verification approaches.

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1. Introduction

Emission reduction and climate mitigation are the driving force behind the production and use of biofuels. As a result, the overall sustainability and the reduced carbon intensity of the final fuel has become increasingly a priority.

Currently, several sustainability and greenhouse gas (GHG) requirements are implemented in policy frameworks for feedstock-to-biofuel supply chains in different regions of the world. In some of these policy frameworks (e.g., EU-RED, ICAO-CORSIA) regulation has (partially) outsourced public enforcement and monitoring compliance with these requirements through the recognition of private certification schemes, increasing their importance.

Consequently, different approaches and methods for compliance and verification have evolved with the aim to demonstrate in practice the sustainability of biofuels and its (reduced) carbon intensity. However, variation in compliance and verification approaches raises questions on how they differ from each other and what this means in terms of risks, reliability, and effectiveness. These unclarities make it difficult to oversee the implications of (regional) policy measures on sustainability and GHG requirements, for the global biofuel market, and how private certification schemes anticipate on this. Therefore, a better understanding of the mutual coherence is required to support decision making of companies, governments and other parties involved.

Adequately managing and monitoring the transfer of sustainability information is a well-known strategy to mitigate the likelihood of sustainability risks and their possible consequences in the supply chain. When information in the supply chain is complete and accessible, the trustfulness of sustainability performance of supply chain processes is improved because (SQ_Consult, 2020):

- Performance and processes are transparent, which makes actors in the supply chain accountable; Adequate monitoring allows actors to act when information in the supply chain is incorrect and/or (potentially) leading to a sustainability risk.
- Adequate and transparent monitoring also gives actors in the supply chain insight in the opportunities and benefits that may arise because of changing social or environmental factors.

However, when the sustainability assurance is not well organized, there is a risk for:

- Harmful environmental effects
- Policy failure
- Loss in policy support
- Risks of fraud, double claiming
- Reputational risks
- Loss of public trust in certification and other verification methods

1.1 OBJECTIVE AND APPROACH

The objective of this study is to get a better understanding of:

- How existing GHG emission reduction and sustainability requirements and their compliance and verification approaches, in selected policy frameworks for feedstock-to-biofuel supply chains are aligned or differ,

- To improve understanding of the implications of those (regional) differences in the selected policy frameworks on biofuel flows globally, and
- To give general recommendations for decision-makers (especially governments and certification schemes) on how to improve the robustness of compliance and verification approaches targeting feedstocks and the rest of the biofuels value chain, including their supply chains at global level.

Although the scope of this study is on value chains of oleochemical and lignocellulosic-based biofuels and their supply chains, the frameworks are considered in a much broader sense.

1.1.1 Approach

This study has been carried out with great support from Task 39 Members.

For this study, we have selected various policy frameworks, based on the shown interest from IEA Task 39 members and a quick assessment of key policy frameworks that should be included in the comparison.

Factsheets, based on a questionnaire, have been developed which served as means to collect the relevant information about the selected policy frameworks with great help from the Task 39 Members, who provided the data, and peer reviewed them. Where relevant, additional information has been collected.

The analysis followed based on the information received - with a focus on main differences and similarities between the selected policy frameworks on the sustainability and GHG emission reduction requirements on, and the requirements and/or methods for compliance and verification.

1.2 READERSHIP

After this introduction, chapter 2 explains which policy frameworks are included in this analysis. Chapter 3 gives then an overview on which sustainability requirements are covered in the selected frameworks. Chapter 4 explains if, and how, sustainable biofuels pathways with low GHG emissions in the supply chain. This includes a description on how certain feedstock with low emissions are promoted, categorized, and defined.

Chapter 5 gives an overview about the use of verification and certification schemes in the selected frameworks to prove compliance with the sustainability criteria; explaining which schemes recognized, and under which conditions.

After that, chapter 6 explains which requirements are included in the selected frameworks for the Chain of Custody (CoC) - including requirements on the traceability and transfer of information through the supply chain. This includes an overview which CoC models are recognized.

Chapter 7 discusses for the selected frameworks who is the responsible (government) authority and who is the obligated party i.e., the last interface in the supply chain responsible for meeting the obligations and for reporting to the respective (government) authority. Next to that, chapter 7 provides an overview what information must be submitted to the responsible authority; whether there is a database in place for registering this information; and whether this information is publicly disclosed (on aggregated level).

Following this, chapter 8 provides further information about the mandate of the respective authorities to monitor compliance with the requirements- not only for the economic operator,

but also for the certification schemes and auditors/ verifiers. This includes information about consequences of non-compliance.

Chapter 9 provides a summary of conclusions and overall recommendations.

Next to that, factsheets with information about the selected frameworks that are included in this analysis can be found in Annex 2.

2. Introducing the selected sustainability policy frameworks

This chapter introduces the sustainability policy frameworks that are included in our analysis. An overview of their overall ambition and scope is shown in

Table 1. Roughly, the sustainability policy frameworks can be divided into three main categories:

- Frameworks with (amongst others) a target for the transport sector (2.1)
- Frameworks with a target specifically for the aviation sector (2.2)
- Next to that, although with a different scope, one policy framework has been included to serve as example of an elaborated framework for biomass for energy purposes in general (see 2.3) in terms of sustainability requirements and requirements in verification and assurance.

2.1. SUSTAINABILITY POLICY FRAMEWORKS WITH A TARGET FOR THE TRANSPORT SECTOR

Ambitions have been formulated for reducing the carbon intensity of the transport sector and/or by setting targets for increasing the amount of renewable energy in the transport sector. Low Carbon Fuel Standard (LCFS) types of policies, which are currently in place in, for example, the State of California in the United States, incentivize the reduction in carbon intensity of all transportation fuels including fossil fuels and biofuels. Policies as in the EU rather mandate defined volumes or blending levels for biofuels specifically.

A carbon trading mechanism is part of some of the selected policy frameworks (e.g., LCFS, RenovaBio) with the objective to reduce, through this market mechanism, GHG emissions in a cost-effective manner.

2.1.1 Australia (Queensland/ NSW)

Australia has a National Renewables Policy. Biofuels are not included in the national policy, although there is a federal biofuels incentive scheme. The biofuels policy is left to the States. So far, only two States have biofuels mandates: Queensland and New South Wales (NSW). Although sustainability requirements for biofuels are not part of a national policy, the States of **Queensland and New South Wales (NSW)** have sustainability criteria in place for biobased petrol and biobased diesel sold under its biofuels mandate.

2.1.2 India

India has since 2018 a national Policy on biofuels. The goal of this policy is to enable the availability of biofuels in the market, thereby substantially increasing the blending percentage of ethanol in petrol and of biodiesel in diesel by 2030. The government aims at increasing the utilization of biofuels in the energy and transportation sectors of the country by promoting the production of biofuels from domestic feedstock. There is a limited set of sustainability requirements in place.

2.1.3 Brazil

In Brazil, different regulations address the sustainability of biofuels production. In this report, the focus lies on the **RenovaBio** policy, that complements national regulation. RenovaBio is the national Biofuel Policy, instituted by Law No. 13576/2017, created to serve parts of Brazil's Nationally Determined Contributions (NDCs) under the Paris Agreement. RenovaBio ambition is to reduce the overall fuels carbon footprint with about 10%. Mandatory blends include ethanol, biodiesel, biomethane, biokerosene, second-generation ethanol, among others.

Table 1: Overall ambition, scope and general characteristics of policy frameworks included in the analysis (* see for more information, chapter 3), Abbreviations: AU (Q) = Australia, Queensland,

Frame-works	Target/ ambition of the policy framework	Credit system in place	Requirements* on:		Scope framework for requirements*
			GHG emission reduction	Other sustaina-bility criteria	
AU, (Q), and NSW	Country: - On state level (volume basis): (i) Queensland: 0.5% biodiesel and 4% ethanol; (ii) New South Wales: 5% biodiesel and 6% ethanol	-	Q: ✓ NSW: ✓	Q: ✓ To some extent NSW: ✓	Biodiesel and bioethanol
India	An indicative target for 2030 (1). 20% blending of ethanol in petrol; 5% blending of biodiesel in diesel	-	-	✓ To some extent	Biodiesel and bioethanol
Brazil RenovaBio	<u>In 2021:</u> 27% blend of ethanol in gasoline; 12% of biodiesel in diesel (gradually increasing)	✓	✓	✓	Alternative fuels in general; with mandatory blends (5)
California LCFS	<u>2030 Target:</u> Reduce carbon intensity (CI) of transportation fuel pool by at least 20%	✓	✓	-	Alternative fuels including biofuels (but also CNG, hydrogen....)
Canada	The proposed Regulations will require liquid fossil fuel primary suppliers to reduce the carbon intensity of their fuels from 2016 levels to a 12 gCO ₂ e/MJ reduction in 2030. Renewable fuel content of (volume based): At least 5% for	✓ Trading credits is possible	✓	✓	Gasoline and Diesel will be considered in the CFS regulations (6)

Frame-works	Target/ ambition of the policy framework	Credit system in place	Requirements* on:		Scope framework for requirements*
			GHG emission reduction	Other sustaina-bility criteria	
	gasoline; At least 2% for diesel fuel and heating distillate oil				
EU RED II Overarching legislation set by EC (3)	CO ₂ reduction by using renewable energy: <u>2030</u> : Renewable energy target for of at least 32%; the share of renewable energy within the final consumption of energy in the transport sector was at least 14 %, which has been recently replaced by a 13% GHGs emissions' reduction target by proposed revision of RED II, as part of the Fit-for-55' package.	-	V	V	Sustainability criteria apply to biofuels, bioliquids & biomass fuels for heating, cooling, electricity, and transport
Germany	See EU RED II for Member State targets: Overall GHG reduction quota for the transport sector of 40 to 42% by 2030	-	V	V	National implementation and translation of EU RED II
Nether-lands	See EU RED II for Member State targets: The share of renewable energy within the final consumption of energy in the transport sector: 28% by 2030	V (4)	V	V	National implementation and translation of EU RED II
Austria	See EU RED II for Member State targets: For biofuels: 7% blending of biodiesel with diesel fuel; 5% bioethanol with petrol.	-	V	V	National implementation and translation of EU RED II

Frame-works	Target/ ambition of the policy framework	Credit system in place	Requirements* on:		Scope framework for requirements*
			GHG emission reduction	Other sustaina-bility criteria	
EU ETS for aviation (3)	“Cap’n’trade” mechanism: Credits can be traded within the industry to reward low-emitters and increase costs for polluters. Emissions for intra-EEA aviation in 2021 are capped at 38 million allowances and will decrease each year by linear reduction factor of 2.2% (ICAP, 2021), (EC, 2022)	V	V	V	Introduction of a gradually increased “carbon tax” to promote sustainability /green energy introduction in energy intensive sectors.
ICAO CORSIA	(i) 2% annual fuel efficiency improvement through 2050 and (ii) carbon neutral growth from 2020 onwards	-	V	V	Fossil-based Lower Carbon Aviation Fuels (LCAF) and Sustainable Aviation Fuels (SAF) - including biofuels
NL: solid biomass	Using solid biomass for renewable energy applications in a sustainable way (incl. co-firing of solid biomass in coal-fired power plants) as condition for receiving subsidy	-	V	V	Energy applications (heat and electricity, incl. co-firing)

* See also for more information: Chapter 2

- (1) Currently the ethanol blending percentage in petrol is around 2.0% and biodiesel blending percentage in diesel is less than 0.1%.
- (2) Carbon savings are expected to come from increasing the use of alternative fuels, including biofuels, compressed natural gas (CNG), hydrogen, and electricity, which all have lower carbon intensities than gasoline and diesel, in the California fuel mix.
- (3) Overarching legislation set by EC and receipt with minor changes by the various European Member States
- (4) Companies that supply renewable energy to transport in the Netherlands receive so-called Renewable Fuel Units (HBEs); these can be traded with companies that have an obligation or can be used for meeting the own obligation
- (5) RenovaBio ambition is to reduce the overall fuels carbon footprint in about 10% Compliance is for terrestrial transportation, but aviation biofuels may also generate credits. Mandatory blends: Bioethanol, biodiesel, biomethane & biokerosene
- (6) Based on the draft version of the Clean Fuel Standard.

2.1.4 California (LCFS)

The main goal of the **Low Carbon Fuel Standard in California (LCFS)** is to decarbonize the transportation sector by at least 20% by 2030 (from a 2010 baseline). The LCFS sets annual life cycle carbon intensity (CI) standards, or benchmarks, which reduce over time, for gasoline, diesel, and the fuels that replace them. Carbon savings are expected to come from the increasing use of alternative fuels, including biofuels, compressed natural gas (CNG), hydrogen or electricity, as they all have lower carbon intensities than gasoline and diesel, in the California fuel mix. The LCFS covers both renewable and non-renewable fuels and relies on a life cycle analysis to estimate the CI of transportation fuels throughout the chain.

2.1.5 Canada

In **Canada**, the **Renewable Fuel Regulations** is in place. In general, the Regulations specify blending mandates for renewable fuels into the gasoline and diesel fuel pools. They also include provisions that govern the creation of compliance units, allow trading of these units among participants and also require record-keeping and reporting to ensure compliance. Direct sustainability metrics in the regulations are linked to GHG emissions reductions sourced from sustainable supplies of renewable biomass. Canada is developing a *draft* federal **Clean Fuel Regulations (CFR)**, which is expected to come into force in December 2022 and will include additional sustainability criteria for biomass used to produce biofuels. Note that at provincial level, provinces have policies or regulations that meet or exceed the federal blending mandate.

2.1.6 Europe (EU Renewable Energy Directive, EU RED II)

The **EU Renewable Energy Directive 2018/2001/EU (EU RED II)** is the legal framework for the development of renewable energy across all sectors of the EU economy. The EU RED II sets a binding renewable energy target for the EU for 2030 of at least 32%. To mainstream the use of renewable energy in the transport sector, each Member State needs to set an obligation on fuel suppliers to ensure that the share of renewable energy within the final consumption of energy in the transport sector is at least 14 % by 2030 (minimum share).

According to the EU RED II, biofuels, bioliquids and biomass fuels (including biogas) must be produced in a sustainable manner and have a minimum GHG emissions saving. Compared to its earlier version, the updated EU REDII further strengthens the EU bioenergy sustainability criteria by, amongst others, extending the scope to cover also large-scale use of biomass and biogas in heating and cooling as well as in electricity generation¹. The EU RED II is transposed to all EU Member States, and this transposition is still ongoing.

Note that the Directive 2018/2001/EU is currently under revision, to align the Directive with the EU climate neutrality objectives for 2050. A proposal for the revision of the REDII is part of the 'Fit for 55' package released by the European Commission on 14 July 2021 that set a new objective of reaching minimum 55 % reduction in Greenhouse gas (GHG) emissions by 2030, confirmed in the recently adopted European Climate Law (REGULATION (EU) 2021/1119) of June 2021. The new proposal for revised Directive 2018/2001/EU sets a new EU target of a minimum 40 % share of RES in final energy consumption by 2030, together with new 13% GHGs emissions reduction target in the transport sector.

¹ e.g. in installations with a total rated thermal input equal to or exceeding 20MW in the case of solid biomass fuels and equal or exceeding 2MW for gaseous biomass fuels

As EU member states, the climate and transport policies from Austria, Germany and the Netherlands are guided by the European Union's policies:

2.1.7 Germany (EU Member State)

Germany (an EU Member) amended its Climate Protection Act and agreed on the national 'climate pact' to reach climate neutrality in 2045 and has a GHG reduction quota for the transport sector of 25% by 2030 compared to a baseline of 1990 (IEA Bioenergy, 2021a). This target is the instrument for both achieving the 6% target for reduction of GHG emissions of fuels used in road transport established in the EU Fuel Quality Directive (FQD) and transposing the EU RED into German national law. Biofuels can be used as one potential option for achieving the FQD and RED targets. Precondition for this contribution of (advanced) biofuels towards the targets is that the production and use of these energy carriers is in compliance with the sustainability criteria of the EU RED II. These requirements are operationalised and implemented into national German law with a specific ordinance on the sustainability of biofuels.

2.1.8 Netherlands (EU Member State)

The 2019 Climate Act sets targets to reduce GHG emissions by 49% by 2030 and by 95% by 2050 (versus 1990 levels). The core of this framework is the 2019 Climate Agreement. The Netherlands aims for a share of renewable energy within the final consumption of energy in the transport sector of 28%.

Ambitions are laid down in national legislation: The Dutch policy on 'energy for transport' (*Regelgeving energie vervoer*) aims to increase the share of renewable energy in transport and to reduce GHG emissions from transport fuels. As of January 2025, deliveries of biofuels and renewable fuels for aviation and maritime shipping are excluded from Renewable Energy Registration (Section 9.7.4 of the Act), based on the assumption that shipping and aviation will then have their own system in place.

2.1.9 Austria (EU Member State)

In **Austria** (an EU Member), the "*Kraftstoffverordnung*" is in place since 2012. This Fuel Ordinance was amended in 2018 and 2020, and is currently amended, to implement RED-II and reach the targets. In the case of biofuels, the most important measures are the blending of around 7% biodiesel with diesel fuel and around 5% bioethanol with petrol. In addition, a certain proportion of 100% biodiesel is still used for captive fleets (IEA Bioenergy, 2021)

2.2 POLICIES FOCUSING ON AVIATION

Two of the policy frameworks included in this analysis focus specifically on reducing emissions in the aviation sector, namely **the EU ETS** and the **ICAO CORSIA Framework**. Depending on the location of the departure and arrival airports, a flight may fall into one or several scopes (EU ETS and/or CORSIA) or be outside those scopes.

For Europe, the scope of CORSIA is defined in European law in the delegated act (EU) 2019/1603 and until 2023, EU airlines have to report flights to and from the EU under this Delegated Act.

2.2.1 Europe (EU ETS) for aviation

The **EU Emissions Trading System (ETS)**² works on the principle of 'cap-and-trade'. It sets an absolute limit or 'cap' on the total amount of certain GHGs that can be emitted each year by the entities covered by the system. This cap is reduced over time so that total emissions decrease. As a market-based system, the ETS ensures that emission reductions take place where it is cheapest to do so. Under the EU ETS, regulated entities buy or receive emissions allowances, which they can trade with one another as needed³. The EU ETS Regulation lays down rules for the monitoring and reporting of GHG emissions and activity data.

Under the EU-ETS, CO₂ emissions from aviation have been included in the EU emissions trading system since 2012: all airlines operating in Europe, European and non-European alike, are required to monitor, report and verify their emissions, and to surrender allowances against those emissions. They receive tradeable allowances covering a certain level of emissions from their flights per year. The scope of the EU ETS is limited to intra-EEA flights. Biofuels, bioliquids and biomass fuels used for combustion shall fulfil the sustainability and the GHG emissions saving criteria laid down in the EU RED II⁴. This is the case for the Netherlands (which is used as example country in this report), but also for other EU Member States.

2.2.2 ICAO CORSIA

ICAO-CORSIA is the sustainability framework from ICAO, who has agreed on two aspirational goals for the international aviation sector: (i) 2% annual fuel efficiency improvement through 2050 and (ii) carbon neutral growth from 2020 onwards. The CAEP Long Term Aspirational Goal Task Group explores the feasibility of a long-term global aspirational goal for international civil aviation GHG emissions reductions and the GHG saving potential of the uptake of alternative fuels, for the time horizon 2030, 2050 and 2070. There are two types of fuels which are eligible for the CORSIA framework (so-called CORSIA Eligible Fuels, or CEFs): (i) Sustainable Aviation Fuels⁵ (SAF) and (ii) fossil-based Lower Carbon Aviation Fuels (LCAF). ICAO adopted the CORSIA developed sustainability Criteria for sustainable aviation fuels (CORSIA eligible fuels), and requirements are under development for LCAF. ICAO has adopted the CORSIA methodology for calculating actual life cycle emissions values and the default life cycle emissions values that may be used by an operator to claim emissions reductions from the use of CORSIA eligible fuels and guidance for their application.

2.3. A SIDE-STEP: OTHER RELEVANT SUSTAINABILITY POLICY FRAMEWORKS

Several national legislations have established sustainability criteria, verification and reporting requirements for heat production and electricity generation using solid biomass. Sustainability criteria are for example binding in support schemes such as the UK Renewable Obligation Order for Solid Biomass (UK RO) the Dutch Stimulation of Sustainable Energy Production (SDE+), or the Belgian Green Certificates (GCs), (Mai-Moulin, 2021).

In this report, we take a closer look at the Dutch policy framework on solid biomass. Although it has a different end-use scope compared with the previous policy frameworks, this framework

² See also https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_3542

⁴ From 1 January 2023 onwards

⁵ Annex 16 Volume IV defines a CORSIA Sustainable Aviation Fuel as a renewable or waste-derived aviation fuel that meets the CORSIA Sustainability Criteria under this Volume.

has been included in the analysis because it is one of the more detailed sustainability frameworks for biomass, and therefore serves for some chapters as an example for implementing sustainability requirements, and the verification and monitoring thereof. When not relevant, this policy framework is not included in the analysis.

2.3.1 Netherlands (solid biomass for energy applications)

Companies in the Netherlands producing energy from solid biomass, and eligible to receive an SDE+ subsidy, must demonstrate annually that their solid biomass meets the legal sustainability requirements, as laid down in Regulation since 2018 as agreed upon in the Dutch Energy Agreement from 2013. The sustainability criteria apply amongst others for co-firing of biomass in coal-fired power plants, wood pellets burners for industrial purposes or for wood pellet boilers for district heating - all supported by means of an SDE+ subsidy. The sustainability criteria are included in the Regulation on 'the conformity assessment of solid biomass for energy applications. Since this year, due to implementation of EU RED II in this SDE framework, also other types of installations like biomass fermentation installations, must meet sustainability criteria. These are directly linked to the EU RED II requirements: Energy producers can supply evidence of RED compliance by using a claim of a REDII approved voluntary scheme. For some types of installations, a simplified method is supplied in a new SDE verification protocol, for instances ones that only digest manure.

3. Sustainability criteria in policy frameworks

Sustainability requirements are increasingly being incorporated into biofuels policies. Note that besides these requirements laid down in the selected policy frameworks, countries will also have their own national legislation and/or additional policies in place that include some of these sustainability aspects. RenovaBio is for example one policy in Brazil, next to other existing policies on water, soil, air, waste or agrochemicals which are not repeated in RenovaBio. Other examples of ‘additional’ policies that mitigate potential negative impacts of biofuel production are the EU Common Agricultural Policy⁶, promoting good agricultural practices, or the Best Management Practices program from the Forestry Service in the US⁷.)

⁶ See: https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cap-glance_en

⁷ <https://www.fs.fed.us/naturalresources/watershed/bmp.shtml>

Table 2 gives a general overview on which sustainability requirements are covered in the selected policy frameworks, which are further explained in the following sections:

- Criteria on GHG emission reduction/ low carbon intensity (3.1) and methodology
- Other environmental sustainability requirements (3.2)
- Socio-economic sustainability requirements (3.3)

Table 2: An overview of the requirements on GHG emission reduction and on other sustainability requirements that are included **in** the selected policy frameworks, **V** = included, - = not included in the policy itself, +/- partially or incomplete. Abbreviations: AU(Q) = Australia, Queensland, AU (NSW) = New South Wales, IND = India, BRA = Brazil, CLFS = Canadian LCFS, CAN = Canada, * Overarching legislation set by EC and receipt with minor changes by the various European Member States, ** Based on draft federal Clean Fuel Regulations (CFR), expected to come into force in December 2022

Comparison:	AU (Q)	AU (NSW)	IND	RenovaBio (BRA)	CLFS	CAN**	EU RED*	EU ETS*	ICAO CORSIA	NL solid biomass
Policy on sustainability (advanced) biofuels is in place	- (V)	V	V	V	V	V	V	V (7)	V (8)	V
Criteria on GHG emission reduction / low carbon intensity										
GHG saving / low carbon intensity	- (V) (2)	V	-	V	V	V	V	V	V	V
LUC	V	V	-	+/- (13)	V (5)	V	V	V	V	V
ILUC	-	V	-	+/- (13)	V	- (6)	V	V	V	V
Other environmental sustainability requirements as included in the policy framework: countries have additional - often robust - policies on soil, water, etc. in place										

Comparison:	AU (Q)	AU (NSW)	IND	RenovaBio (BRA)	CLFS	CAN**	EU RED*	EU ETS*	ICAO CORSIA	NL solid biomass
No production on and/or destruction of HCS areas	-	-	-	V	-	+/- (6)	V	V	V	V
Biodiversity / no production on HCV areas (1)	- (+/-) (3)	V	-	V	-	+/- (6)	V	V	+/- (9)	V
Water (1)	- (+/-) (3)	V	-	-	-	-	-		+/- (12)	V
Soil (1)	- (+/-) (3)	V	-	-	-	-	V	V	+/- (12)	V
Waste and chemicals		V	-	-	-	-	-	-	+/- (12)	V
Sustainable Forest Management (1)	-	-	-	-	-	+/- (6)	V	V	-	V

Other socio-economic requirements as included *in* the policy framework: countries have additional - often robust - policies on tenure, labour conditions, etc. in place

Comparison:	AU (Q)	AU (NSW)	IND	RenovaBio (BRA)	CLFS	CAN**	EU RED*	EU ETS*	ICAO CORSIA	NL solid biomass
Food security	-	V	-	-	-	-	-	-	+/- (12)	-
Promoting non-food crops or use marginal lands			V (4)	-	-	-	V			V (10)
Human and labour rights (1)	-	V	-	-	-	-	-	-	+/- (12)	-
Land use and user rights (1)	-	V	-	V	-	-	-	-	+/- (12)	+/- (11)

- (1) When mentioned in the biofuels policy framework as criteria for compliance. Besides, countries will have national legislation in place on for example water and soil
- (2) For Queensland: Unblended biofuels, regardless of the feedstock, to deliver greenhouse gas savings of at least 20% when compared to regular petrol or diesel.
- (3) The Regulation requires a certification under the relevant environmental sustainability standard specific to the relevant feedstock. Approval of the certification depends on sustainability measures set out in the standard in relation with any adverse impact the production of biofuel in accordance with the standard may have on biodiversity, soil and water.
- (4) The Indian approach to biofuels is based solely on non-food feedstocks to be raised on degraded or wastelands that are not suited to agriculture
- (5) Estimated amount of land conversion and associated GHG emissions are determined using the GTAP and AEZ-EF models and are added to the CI. All crop-based feedstocks have LUC values.
- (6) In the draft federal Clean Fuel Regulations (CFR), expected to come into force in December 2022.
- (7) Following the requirements from EU RED.
- (8) A 10% reduction in GHG emissions compared to petroleum-based jet fuel.
- (9) Primary forests - apart from wetlands, peatlands and lands with high carbon stock.
- (10) See ILUC requirement: land conversion due to new energy plantations does not lead to displacement of production; Agricultural residues are allowed but food crops are not allowed.
- (11) The forest manager holds the legal right to use the forest.
- (12) After 2024
- (13) To be eligible with RenovaBio, the producer must comply with Forest Code (requiring from 20 to 80% of native vegetation) + no conversion of native vegetation + agroecological zoning. This set up is to manage LUC and iLUC emissions.

3.1. REQUIREMENTS ON GHG EMISSION REDUCTION/ LOW CARBON INTENSITY

All selected policy frameworks with sustainability requirements have included a requirement to reduce the carbon intensity through increased energy efficiency and CO₂-reduction, see also [Table 3](#). This is expressed in % of GHG savings compared to a reference value (see EU RED II, ICAO) or by setting limits in carbon intensity (LCFS, Canada). As in the case of LCFS, RenovaBio and the EU RED II, requirements increase over time.

It is important to realize that the calculated GHG emission reductions are used in different ways, depending on the policy framework: For ICAO, the emission reduction is the unit of calculation in CORSIA; for the EU RED II, the emission reduction is a criterion for being able to count your biofuel (renewable energy) towards the target while for LCFS the calculated carbon reduction is linked to buying or selling carbon credits.

*Table 3: Requirements to reduce GHG emissions in the selected national policy frameworks, * Overarching legislation set by EC and receipt with minor changes by the various European Member States*

Frame-works	GHG emission reduction requirement	Unit
Australia, Queensland	Unblended biofuels, regardless of the feedstock, deliver GHG savings of at least 20% when compared to equivalent, i.e., regular petrol or diesel	% GHG savings for CO _{2eq} /MJ (1)
Australia, NWS	Biofuel blends shall have on average 50% lower lifecycle GHG emissions relative to the fossil fuel baseline. Each biofuel in the blend shall have lower lifecycle GHG emissions than the fossil fuel baseline.	Unit: g CO _{2e} /MJ-fuel
India	-	
Brazil RenovaBio	ANP set an aggregated 2021 target for reducing GHG emissions at 24.86 mt of CO ₂ eq. Fuel distributors also have individual targets. The RenovaBio certificate informs on GHG savings per litre of biofuels by biofuel type and by economic operator to calculate sales of GHG reduction from the individual biofuel producer. The obligated party is the fuel distributor that must purchase credits (in year t) according to their emissions (in t-1).	GHG savings per litre of biofuels compared to fossil reference
CLCFS	The LCFS sets annual carbon intensity (CI) standards, which reduce over time.	CI: g CO ₂ eq. / MJ energy provided by that fuel.

Frame-works	GHG emission reduction requirement	Unit
Canada	Each regulated fuel will have a carbon intensity (CI) limit, with CI limits based on Canadian averages and applicable across the country. Primary suppliers have to determine the total volumes of liquid fuels they produce or import in a year, the annual CI limits on all such fuels on a company-wide basis and the actual CI of all of their fuels (4).	CI: g CO ₂ eq. / MJ energy provided by that fuel.
EU RED II*	<p>To count towards the target, the GHG emissions savings from the use of biofuels, bioliquids and biomass fuels shall be:</p> <ul style="list-style-type: none"> • At least 50 % for biofuels, biogas consumed in the transport sector, and bioliquids produced in installations in operation on or before 5 October 2015 • At least 60 % for biofuels, biogas consumed in the transport sector, and bioliquids produced in installations starting operation from 6 October 2015 until 31 December 2020 • At least 65 % for biofuels, biogas consumed in the transport sector, and bioliquids produced in installations starting operation from 1 January 2021 • At least 70 % for electricity, heating and cooling production from biomass fuels used in installations starting operation from 1 January 2021 until 31 December 2025, and 80 % for installations starting operation from 1 January 2026. <p>Savings are calculated based on EU (fossil) reference values for transport, heat or electricity (g CO₂ eq. / MJ)</p> <p>The Fit for 55' package maintained the GHG reduction eligibility thresholds of RED II, while integrating a new 70% GHG reduction threshold for RCFs/RFNBOs.</p>	% GHG savings
EU ETS for aviation*	Following the EU RED II The IF' methodology regulates the GHGs emissions savings promoted by the IF' funded projects (2)	
ICAO CORSIA	CORSIA eligible fuel: net GHG emissions reductions of at least 10% compared to the baseline life cycle emissions values for aviation fuel on a life cycle basis (g CO ₂ eq/MJ).	% GHG reduction
NL: solid biomass for co-firing & electricity	The reduction in CO ₂ -eq emissions is calculated to be a minimum of 70% per year on average based on the EU reference value. The average emissions shall have a maximum of 56g CO ₂ -eq/MJ for electricity and 24g CO ₂ -eq/MJ for heat. No consignment of biomass shall result in emissions above 74g CO ₂ -eq/MJ for electricity and 32g CO ₂ -eq/MJ for heat.	% GHG reduction & maximum of emissions in gram CO ₂ -eq/MJ

(1) Following ISO Standard or the RSB GHG Calculation Methodology, (RSB, 2017)

(2) IF is the funding programme powered by the ETS mechanism. See here the methodology' document:

(3) https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/innovfund/wp-call/call-annex_c_innovfund-lsc-2020-two-stage_en.pdf

(4) Based on draft federal Clean Fuel Regulations, expected to come into force in December 2022

3.1.1 LCA methodologies and models

The medium and long-term benefits of bioenergy depend on the reduction of GHG emissions promoted using biofuels in substitution to their fossil counterparts. This can be quantitatively determined through a Life Cycle Analysis (LCA) methodology. Next to that, standardized GHG calculators based on LCA models are being developed, see also [3.1.1.1 LCA models and methodologies: need for alignment](#)

Although LCA models are well-accepted, varying results are still observed. Differences in the inputs used for biomass production, logistics, and conversion systems can for example lead to different outputs in calculated GHG emissions for similar biofuel pathways. Other important factors for divergences among LCA models largely discussed in the literature are for example differences in allocation procedures (Dias de Souza, 2021).

Error! Reference source not found. shows for example the breakdown of calculated GHG emissions of advanced / second generation (2G) ethanol production pathways based on lignocellulosic biomass based on the use of four biomass and four LCA models considered. The calculated outputs for net climate impact for 2G ethanol production in each LCA model varied significantly. In general, these differences can be justified by different input values and emissions factors (Dias de Souza, 2021).

Figure 1: Breakdown of GHG emissions of 2G ethanol production pathways for the four biomass and four LCA models considered (Dias de Souza, 2021): GREET (Used in US), GHGenius (Canada), VSB (Brazil, initially developed by LNBR/CNPEM to assess the sugarcane production chain)

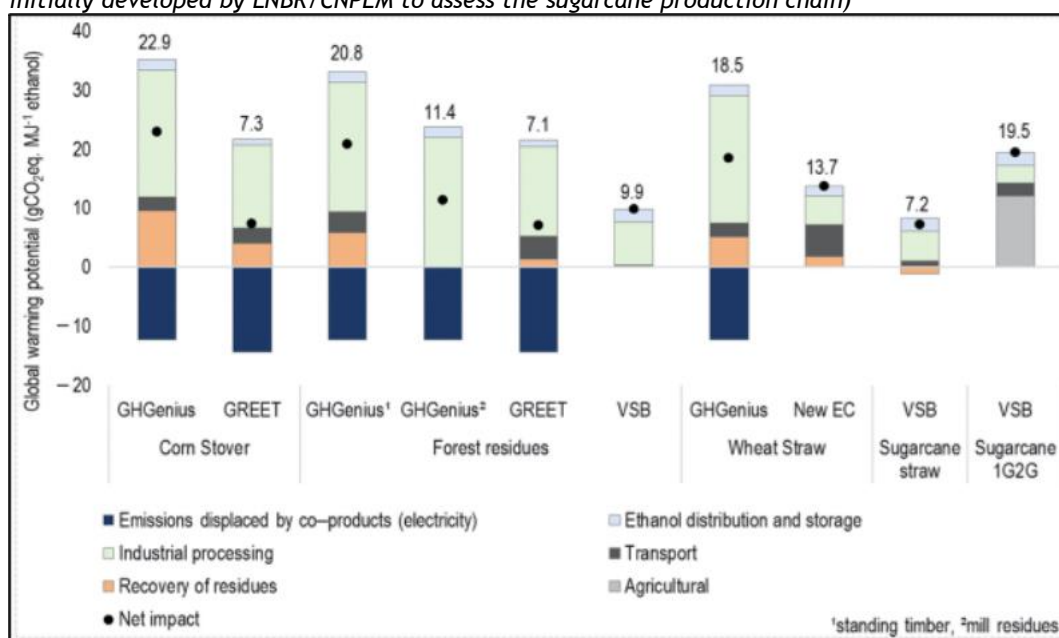


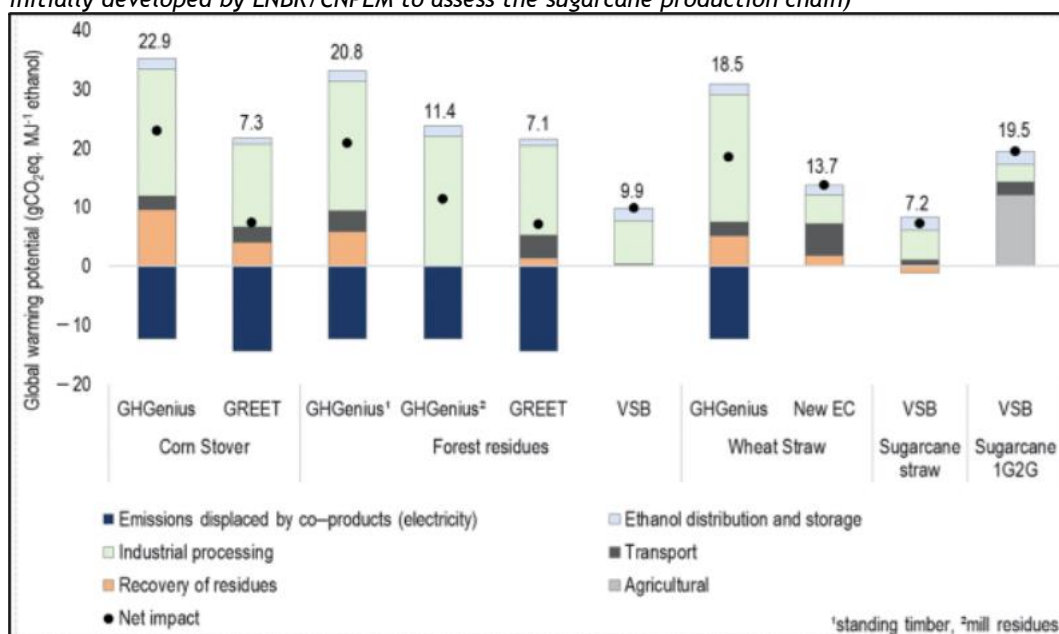
Table 4.

3.1.1.1 LCA models and methodologies: need for alignment

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*Table 4: Methodological approach and LCA models used in the selected policy frameworks to assess the (reduction of) GHG emissions, * Overarching legislation set by EC and receipt with minor changes by the various European Member States*

Selected framework	Methodology reference	Default and actual values used	LCA model (s) used
Australia, Queensland	LCA assessment (8) complying with both of the following standards: (A) ISO 14040:2006 and ISO 14044:2006; or (B) For biofuel that is appropriately RSB certified: RSB lifecycle methodology (1)	The RSB Methodology requires that operators enter data relevant to their operations. Default values of material and energy usage are not employed; rather, operator-specific values are required (2)	
Australia, NSW	Lifecycle GHG emissions of biofuel shall be calculated using the RSB lifecycle GHG emission calculation methodology (9).	The Participating Operator shall report the lifecycle GHG emissions of the feedstock or biofuel using the RSB GHG Calculation Methodology (RSB-STD-01-003-01).	
India	-	-	-
Brazil RenovaBio	All biofuels' emissions from cradle to grave are considered and the program is technology "agnostic".	Conservative default values can be adopted in Renovacalc. When using actual observed values, a public consultation should be done, exposing producer data on inputs, yield and productivity (Nogueira, 2019).	The calculator "RenovaCalc": Based on LCA well to wheel (12), which measures the carbon intensity of biofuels (in g CO ₂ eq./MJ) and compares it to its fossil fuel equivalent
CLCFS	CI takes into account the GHG emissions associated with all of the steps of producing,	All transportation fuels need a CI score CFS, and the fuel type dictates which process is used to determine that CI:	Two models are used to calculate the direct effects: the CA-GREET - based on

Selected framework	Methodology reference	Default and actual values used	LCA model (s) used
	transporting, and consuming a fuel—also known as a complete life cycle of that fuel.	(i) Lookup Table pathways (predetermined), (ii) the Tier 1 pathway application process (4) and the (iii) Tier 2 application process, designed for innovative, next-generation pathways	Well to wheel (12) - and OPGEE models. To calculate the indirect effects: the GTAP and AEZ-EF model.
Canada	Based on LCA, Approach boundaries: Attributional LCA Well-to-wheels (12)	The proposed Regulations would require the use of either the Fuel LCA Model to calculate facility-specific CI values using facility specific data, or the use of disaggregated default values (11)	ECCC (5) is developing a new Fuel LCA Modelling Tool.
EU RED II*	The EU's RED II provides calculation rules for liquid biofuels in Annex V and for solid and gaseous biomass for power and heat production in Annex VI. Approach boundaries: Attributional LCA Well-to-wheels (12)	Producers have the option to either use default GHG intensity values provided in RED II or to calculate actual values for their respective production pathways. The prescribed default values are conservative.	No standard tool
EU ETS for aviation*	Following the EU RED II For IF' projects: Calculation of GHG emission avoidance (10)	Also for IF 'methodology: Reference to default values EU RED II	
ICAO CORSIA	Based on an LCA (6), (7)	An Aeroplane Operator may use an actual value if a fuel producer can demonstrate lower core life cycle emissions compared to the default values or if a fuel producer has defined a new pathway that does not have a default	-

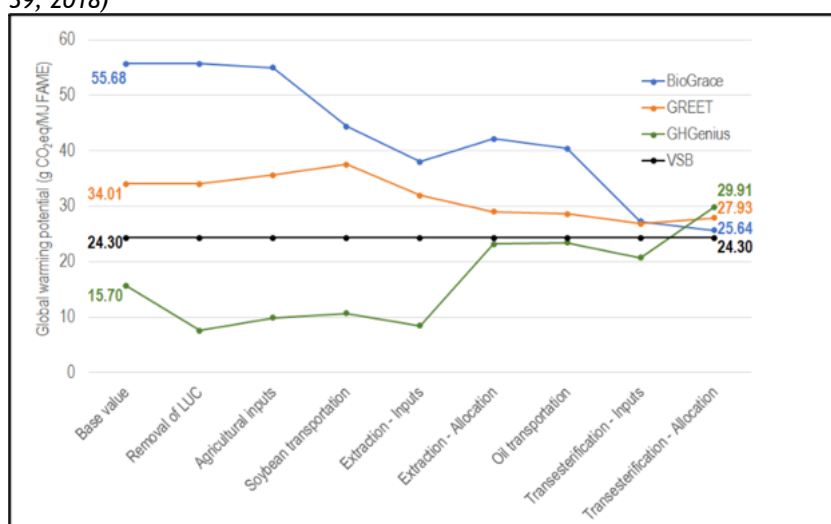
Selected framework	Methodology reference	Default and actual values used	LCA model (s) used
		value (7).	
NL: solid biomass	The calculated maximum CO ₂ -eq emission levels are based on the most recent EC publication on sustainability criteria for biomass and the reference values provided for fossil fuels.	Based on default values in REDII Annex VI or using calculated values, or a combination thereof (RVO, 2020a).	Emission reductions shall be calculated using BioGrace-II (RVO, 2020a).

- (1) RSB lifecycle methodology means the RSB lifecycle GHG emission calculation methodology under the RSB global standard. See: RSB reference code: RSB-STD-01-003-01
- (2) There are, however, default emission factors (such as the carbon intensity associated with materials and energy production).
- (3) CA-GREET: California GHGs, Regulated Emissions, and Energy Use in Transportation; OPGEE model: Oil Production GHG Emissions Estimator; GTAP: the Global Trade Analysis Project model; AEZ-EF model: Agro-Ecological Zone Emissions model
- (4) The Tier 1 application process is for the most common low carbon fuels, and applicants use a Simplified CI Calculator to determine their site-specific fuel production and transport emissions.
- (5) ECCC: Environment and Climate Change Canada
- (6) Based on the following stages: (1) production at source (2) conditioning at source, (3) feedstock processing and extraction; (4) feedstock transportation to processing and fuel production facilities (5) feedstock-to-fuel conversion processes; (6) fuel transportation and distribution to the blend point; and (7) fuel combustion in an aircraft engine.
- (7) See ICAO Document: CORSIA Methodology for Calculating Actual Life Cycle Emissions Values, March 2021
- (8) The system boundary is from cradle (fossil fuel feedstock extraction and biofuel feedstock production, respectively, for fossil fuels and biofuels) up to, but not including use of the fuel in an engine.
- (9) This methodology incorporates methodological elements and input data from authoritative sources; is based on sound and accepted Science; is updated periodically as new data become available; has system boundaries from Well to Wheel; includes GHG emissions from land use change, including, but not limited to above-and below- ground carbon stock changes; and incentivizes the use of co-products, residues, and waste in such a way that the lifecycle GHG emissions of the biofuel are reduced.
- (10) See methodology document for IF' projects: See here the methodology' document: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/innovfund/wp-call/call-annex_c_innovfund-lsc-2020-two-stage_en.pdf
- (11) Based on draft federal Clean Fuel Regulations, expected to come into force in December 2022
- (12) See also for more information, the publication from (Dias de Souza, 2021).

The reports from (IEA Task 39, 2019), (IEA Task 39, 2018) and Dias de Souza (2021) show that with harmonization procedures, amongst others carried for the pathways soybean FAME, corn stover ethanol and forest residues ethanol, it is possible to align the results issued by the models through a series of steps considering only few parameters, see also [Figure 2](#).

In this context, identifying the main differences and commonalities in methodological structures, calculation procedures and assumptions of different LCA models are desired to demonstrate the possibility of obtaining homogeneous results for similar production chains (IEA Task 39, 2019).

Figure 2: Harmonization of soybean FAME production emissions for four selected LCA models (IEA Task 39, 2018)



3.1.1.2 LCA methodologies: clear system boundaries to avoid double counting

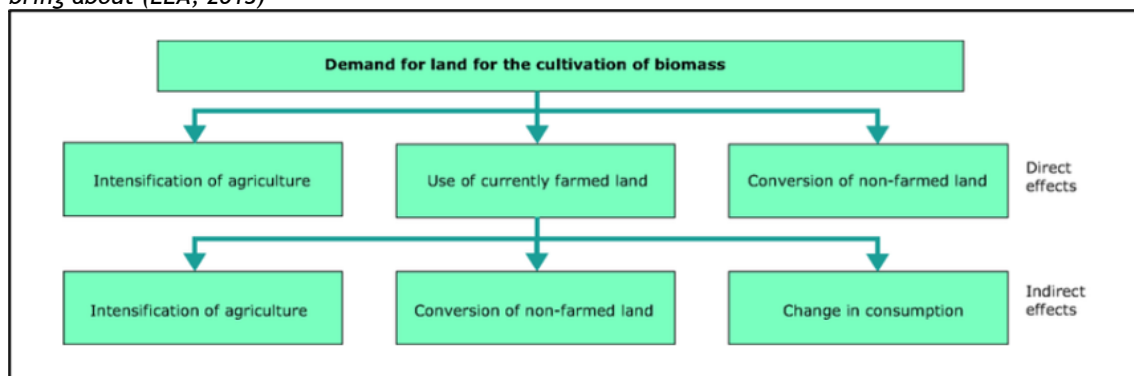
Policies and programs to decarbonize the transport and energy sector are being established worldwide. They make use and rely on LCA methodologies and models. It is important that emission reductions that are created in an (international) supply chain, or within a country, cannot be claimed twice because system boundaries in LCA models, and/or in programs or policy frameworks overlap.

This risk for double claiming currently exists, for example, when GHG emission reductions that occur through process improvements in, for example, a refinery, are included in both the ICAO calculations used for claiming lower emission in the CORSIA-system, and as well as in the national country targets (as ETC, but also the NDCs) to save energy. A similar risk for double counting exists because of accounting the emissions of fertilizers to both the biofuel under the LCA methodology of CORSIA, as well as to the national GHG inventories.

3.1.2. Approaches on (Indirect) Land Use Change

Concerns around land use change (LUC) relate to possible additional GHG emissions when terrestrial carbon storage is disturbed and released as CO₂. Two types of land use change can be considered: direct and indirect, see also [2](#).

Figure 3: The schema shows a simplified chain of effects that use of land for bioenergy production can bring about (EEA, 2013)



- **Direct LUC** occurs when a new biofuel crop is established and displaces a prior crop that was cultivated on that land. Thus, a direct link can be established between biofuel production and the LUC (Scarlat, 2019). Direct land use change is measurable and can be observed in the field or through satellite images.
- **Indirect LUC** is associated with the displacement of an existing agricultural activity to another place, which then again may result in land use change in that place. ILUC is often difficult to assess due to the uncertainties involved, particularly at the international level. ILUC is not measurable in the field, and estimations are therefore based on modelling.
- **Induced land use change (iLUC)** includes both direct and indirect land use change, as the two cannot be distinguished given the complexity of the market-mediated responses (Zhao, 2021).

Table 5 shows how the different policies have incorporated criteria related to direct and indirect land use change in their frameworks and in their LCA analysis, and how the frameworks deal with the GHG emissions from wastes and residues.

3.1.2.1 Emissions from wastes and residue

By-products differ from co-products. GHG emissions are generally divided between the fuel or its intermediate product and the co-products in proportion to their energy content (lower heating value). One exception is the framework of Queensland, which uses the Lifecycle Assessment methodology from the RSB Global Standard. In this case, GHG emissions are divided in proportion to their economic value (Note that RSB EU RED certification allocates co-products based on energy content), (RSB, 2017).

In general, wastes and residue streams are assumed to incur zero emissions up to the process of collection/point of origin. The appropriate classification of feedstocks is thus important as certain categories result in zero emissions in the LCA analysis (see also chapter 4).

3.1.2.2 Direct Land Use Change

GHG emissions from direct LUC have been included in LCA studies, and is considered in most international approaches (Scarlat, 2019)

One exception is the RenovaBio, where emissions or removals from LUC are not accounted due to scientific uncertainty. Compliance with eligibility criteria (such as e.g., compliance with the Brazilian Forest Code) aim to assure that land use emissions are small or negative.

*Table 5: Overview table on how different policies have incorporated criteria related to direct and indirect land use change in their frameworks and in their LCA analysis, and how is dealt with the emissions from wastes and residues, * Overarching legislation set by EC and receipt with minor changes by the various European Member States*

Framework	Emission residues/ waste	Criteria included on LUC	Criteria included on ILUC
Australia, Queensland	Emissions of residues and waste are zero until the point of collection. GHG emissions co-products divided in proportion to their economic value (1), (2).	Direct LUC: Tier 1 Land Use types in IPCC 2006 are used (2)	-
Australia, NSW	The treatment of co-products, residues, and waste in biofuel GHG accounting perspective is specified in the RSB GHG Calculation Methodology.	LUC: Tier 1 Land Use types in IPCC 2006 are used.	-
India		-	-
Brazil RenovaBio	Emissions of residues and waste are zero at the point of collection. All emissions after collection are considered. Allocation of emissions co-products based on energy content (LHV).	Emissions/reductions on LUC and ILUC are not accounted due to scientific uncertainty. Compliance with eligibility criteria (e.g., exclusion HCV areas) assure that land use emissions are small or negative (8).	Emissions/reductions on LUC and ILUC are not accounted due to scientific uncertainty. Compliance with eligibility criteria (e.g., exclusion HCV areas) assure that land use emissions are small or negative (8).
CLCFS	Emissions of residues and waste are zero at the point of collection. All emissions after collection are considered.	The carbon intensity (CI) includes the “direct” effects of producing and using the fuel.	The CI also includes the “indirect” effects that are associated with crop-based biofuels.

Framework	Emission residues/ waste	Criteria included on LUC	Criteria included on ILUC
Canada (9)	Wastes and residues have zero life cycle GHG emissions up to the process of collection of those materials (10).	Tbd: The inclusion of indirect land use change in the Fuel LCA Model is not part of the Fuel LCA model at the moment (9)	For agricultural feedstock (including primary residues), the criteria will amongst others include: the portion of a biofuel comprised of feedstocks at high risk of ILUC will not count towards credit creation under the CFR (9).
EU RED II*	Wastes and residues have zero life cycle GHG emissions up to the process of collection of those materials. Allocation of emissions co-products based on energy content (Lower Heating Value, LHV)	Included: Annualised emissions from carbon stock changes caused by land-use change. Next to that, HCS areas are excluded (8)	(a) Limit the share of biofuels, bioliquids and biomass fuels produced from food and feed crops (b) The share of high ILUC-risk biofuels, bioliquids or biomass fuels produced from food and feed crops shall gradually decrease to 0% in 2030 (c) A Delegated Regulation sets out criteria for certification of low indirect LUC-risk biofuels, bioliquids and biomass fuels (4)
EU ETS for aviation*	See EU RED II	See EU RED II	See EU RED II
ICAO CORSIA	Waste, residue, and by-product feedstocks are assumed to incur zero emissions during the feedstock production step of the lifecycle. Emissions generated during the collection, recovery, extraction, and processing of these wastes, residues, and by-products shall be included (6). Energy allocation to assign emissions to all co-products (based on LHV), (6)	In the event of land use conversion after 1 January 2008, as defined based on IPCC land categories, direct land use change (DLUC) emissions shall be calculated. If DLUC GHG emissions exceed the default induced land use change (ILUC) value, the DLUC value shall replace the default ILUC value (e.g., if there is a conversion between IPCC land use categories after the cut-off date, then DLUC is addressed).	If the feedstock is not a waste, residue, or by-product, or does not have “low risk” for land use change, then a default core LCA value and an ILUC value needs to be added (6) <ul style="list-style-type: none"> During the CORSIA pilot phase, negative ILUC values will be provisionally allowed to obtain a negative LSf (5) Aeroplane Operators may choose to capture the benefits of utilizing LUC-risk mitigation

Framework	Emission residues/ waste	Criteria included on LUC	Criteria included on ILUC
		Exclusion HCS areas (8)	practices, to avoid ILUC emissions as part of an accepted fuel sustainability certification process; the operator shall provide proof of documentation for this (6)
NL: solid biomass	Following the GHG methodology of EU RED	Following the GHG methodology of EU RED: Includes LUC. Next to that, exclusion of HCS areas (8), e.g., biomass is not sourced from wood plantations that were created by means of conversion of natural forests after 31 December 1997, with various exemptions noted (7)	(a) Biomass production does not result in ILUC: Biomass sourced from bioenergy plantation systems that were planted after 1 January 2008 have a demonstrably low ILUC risk (b) Agricultural residues are allowed but crops are not allowed.

- (1) GHG emissions divided between the fuel or its intermediate product and the co- products in proportion to their economic value
- (2) Following RSB Lifecycle Assessment methodology (global Standard)
- (3) See ICAO Document: CORSIA Methodology for Calculating Actual Life Cycle Emissions Values, March 2021
- (4) Commission Delegated Regulation (EU) 2019/807 of 13 March 2019 supplementing Directive (EU) 2018/2001: as regards the determination of high indirect land-use change-risk feedstock for which a significant expansion of the production area into land with high carbon stock is observed and the certification of low indirect land-use change-risk biofuels, bioliquids and biomass fuels
- (5) CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels, March 2021
- (6) CORSIA document - CORSIA methodology for calculating Actual Life Cycle Emissions, March 2021
- (7) Exemptions noted: unless the forest manager is not directly or indirectly responsible for the conversion. Also: biomass originating from wood plantations that were created after 1997 by means of conversion of degraded natural forests or degraded land is exempt from this requirement on condition that it is ecologically and economically justified to do so and that the forest manager is not directly or indirectly responsible for the degradation.
- (8) Exclusion HCS areas: see also section 3.3
- (9) Based on draft federal Clean Fuel Regulations, expected to come into force in December 2022
- (10) See table on disaggregated default values: Zero emissions for waste cooking oil biodiesel in the processing step “cultivation”, see: <https://www.canada.ca/en/environment-climate-change/services/managing-pollution/energy-production/fuel-regulations/clean-fuel-standard/regulatory-approach.html>

3.1.2.3 Indirect Land Use Change

Concerns around indirect land use change (ILUC) have resulted in the development of criteria to mitigate the risk for ILUC in some of the policy frameworks (e.g., LCFS, EU RED II, ICAO CORSIA). Other frameworks have not included criteria to mitigate ILUC (e.g., Queensland).

For those policy frameworks that have included ILUC, approaches differ:

- The EU RED II aims to mitigate ILUC by (i) limiting the share of biofuels, bioliquids and biomass fuels produced from food and feed crops and by (ii) reducing the share of high ILUC-risk biofuels, bioliquids or biomass fuels produced to 0% in 2030. Provisional estimated standardized indirect LUC emissions (in g CO₂_{eq}/MJ) have defined which feedstocks are considered to have a high ILUC-risk. The ILUC factors in the EU RED II are not added to the GHG emissions of the LCA-analysis but are used separately, as a kind of traffic light principle: high ILUC biofuels may (increasingly) only be used to limited extent.
- In the frameworks of ICAO-CORSIA and LCFS, the “indirect” effects are translated in a default “ILUC” value that must be included as emission factor in the LCA-analysis. There is no prohibition or traffic light principle for biofuels feedstock with a high risk for ILUC, but the resulting high GHG emissions should demotivate their use.
 - In the case of ICAO-CORSIA, this default value can be both positive and negative (at least in this phase). For example: The ILUC LCA value for Fisher Tropsch from the US produced from Miscanthus is -5.2, while HEFA produced from soybean oil from the USA is 24.5.
 - In the case of LCFS, iLUC (the sum of direct and induced land use change) is calculated but there is no further restriction if a particular crop comes from deforested areas, for example (see 3.2).
- In the frameworks of ICAO-CORSIA, EU RED II and the Dutch framework for solid biomass, operators can or have to demonstrate a low ILUC-risk (through certification, which is to be realized through certain mitigation practices, (e.g., improved land management practices).
- Although RenovaBio does not account for direct and indirect LUC emissions in the LCA calculation, it does have strategies (the so-called eligibility criteria) in place to mitigate LUC emissions.
- The Dutch framework for solid biomass is the only framework that looks at the potential risk from ILUC, that can be created by woody bioenergy plantation systems.

3.3 OTHER ENVIRONMENTAL CRITERIA

Next to realizing a reduction of GHG emissions promoted by the use of biofuels in substitution to their fossil counterparts, other environmental criteria are also included in policy frameworks to ensure that their feedstocks are sustainably produced, and negative impacts are avoided.

3.3.1 No production on areas with high carbon stock (HCS) and high biodiversity value, and maintenance of biodiversity

The requirement not to produce biomass on lands with high carbon stocks (HCS) is very much linked to the requirements on GHG reduction, as it aims to ensure that substantial GHG emissions due the conversion of lands with high carbon stocks for feedstock destined for biofuel production are avoided.

The requirement not to produce biomass on lands with a high biodiversity value is to avoid biodiversity destruction due to conversion of land. Next to that, criteria can be in place to ensure that biodiversity is maintained on-site on lands where feedstock is used for bioenergy or biofuel production.

Most policy frameworks recognize the importance to include requirements to maintain areas with a high carbon stock and/or biodiversity.

The EU REDII prohibits for example growing potential biofuel feedstocks in areas that already contain high carbon stocks (i.e., wetlands or forests) or have high biodiversity (e.g., primary forests or grasslands). Canada is developing its draft federal Clean Fuel Regulations that will include additional sustainability criteria for biomass and will include a Land Use and Biodiversity (LUB) criteria section.

Substantial differences can be observed between the policy frameworks see also

Table 6:

Feedstock scope: In the case of EU RED II, the exclusion of lands with a high biodiversity value or from lands with high carbon stock applies only to agricultural biomass. under ICAO-CORSIA, this requirement applies to all feedstocks that fall within the scope of the framework, while the requirements only apply to forest biomass in the case of the Dutch framework for solid biomass. Also, the EU RED II requires that agricultural residues must come from fields that comply with the land and GHG criteria, but this is not the case for all policy frameworks and/or sometimes unclear. More clarity is required whether land-based sustainability requirements also apply to agricultural and forest residues.

Scope of ecosystems included: First, there is a difference in the preciseness of the definitions included. While RenovaBio refers to natural vegetation in general, the EU RED II provides precise definitions on which ecosystems are included. Second, and because of that, there is a difference in which ecosystems fall under the scope, and for which criteria. For example: Both EU RED II and ICAO-CORSIA refer to primary forests. However, ICAO-CORSIA covers 'primary forests' to maintain carbon stocks while the EU RED II refers to 'primary forests and other wooded land' to maintain areas with a high biodiversity value.

The requirement to maintain on-site biodiversity during feedstock production and/or harvesting is so far limited to biomass from forests. Expectedly, ICAO-CORSIA will include a biodiversity requirement for all feedstock from 2024 onwards.

Table 6: Overview of requirements included in policy frameworks on HCV and HCS areas, and on maintaining biodiversity on-site, * Overarching legislation set by EC and receipt with minor changes by the various European Member States, Abbreviation: AU (Q) = Australia, Queensland

Frame-works	No production on:		Explanation	Other requirements to maintain biodiversity (on-site)
	HCS areas	HCV areas		
AU (Q)		+/- (1)		+/- (1)
Australia NSW	-	V	Where conservation values of local, regional, or global importance have been identified. Participating Operators shall carry out a specialized impact assessment in accordance with the Conservation Impact Assessment (Guidelines (RSB-GUI-01-007-01).	V
India	-	-		-
Brazil Renova-Bio	V	V	Natural vegetation; alignment with Forest Code (2)	-
CLFS	-	-		-
Canada (13)	+/-	+/-	For agricultural feedstock and residues: no production on land with HCV / HCS status (cut-off date 2020). For all feedstock: no production on protected land (3), (4), (13)	-
EU RED II*	V	V	<u>Agricultural biomass</u> : not from raw material obtained from land with a high biodiversity value or from land with high carbon stock including peatlands (cut-off date 2008), (5), (6), (7). <u>Forest biomass</u> : ensure harvesting is carried out maintaining biodiversity and carbon sinks are maintained (8), (9)	V (forest biomass)
EU ETS for aviation*	V	V	See EU RED II	V (forest biomass)

Frame-works	No production on:		Explanation	Other requirements to maintain biodiversity (on-site)
	HCS areas	HCV areas		
ICAO CORSIA	V	+/- from 2024 onwards (10)	CORSIA eligible fuel will not be made from biomass obtained from land converted after 1 January 2008 that was primary forest, wetlands, or peat lands and/or contributes to degradation of the <u>carbon stock</u> in primary forests, wetlands, or peat lands as these lands all have high carbon stocks.	+/- from 2024 onwards (10)
NL: solid biomass	V	-	No destruction of carbon sinks (cut-off date 2008) (11), biodiversity is maintained and where possible enhanced (12).	V (forest biomass)

- (1) The Regulation of Queensland > Approval of the certification depends on the sustainability measures set out in the standard in relation with any adverse impact the production of biofuel in accordance with the standard may have on biodiversity, soil and water.
- (2) RenovaBio still establishes that, to be eligible, the biomass processed in the plants cannot come from the areas where there has been suppression of native vegetation. Biofuel producers must demonstrate that biomass was produced in accordance with Brazilian environmental legislation. RenovaBio requires amongst others the following criteria at the farm level: Demonstration of compliance with the Brazilian Forest Code and demonstration of protection of natural vegetation. For palm oil, it must also demonstrate compliance with agroecological zoning.
- (3) Based on draft federal Clean Fuel Regulations: For agricultural feedstock (including primary residues), the DRAFT CFR criteria include a.o. raw material used in the production of biofuels may not come from land that has the status of high biodiversity land or high carbon stock land on or after January 1, 2020.
- (4) Based on draft federal Clean Fuel Regulations: For all feedstock: the DRAFT CFR criteria include a.o. raw material used in the production of a biofuel may not come from land that has the status of protected area on or after January 1, 2020
- (5) For agricultural biomass > shall not be made from raw material obtained from land with a high biodiversity value; land that had one of the following statuses in or after January 2008...[...]: (a) primary forest and other wooded land...[...]; (b) highly biodiverse forest and other wooded land...[...].(c) areas designated: by law or by the relevant competent authority for nature protection; or ...[...]. recognized by international agreements or included in lists drawn up by intergovernmental organisations....[...].(d) highly biodiverse grassland ...
- (6) Art. 29: For agricultural biomass > shall not be made from raw material obtained from land with high-carbon stock, namely land that had one of the following statuses in January 2008 and no longer has that status: (a) wetlands...[...]; (b) continuously forested areas, ..[...].(c) land spanning more than one hectare with trees higher than five metres and a canopy cover of between 10 % and 30....[...]
- (7) Art. 29: Agricultural biomass > shall not be made from raw material obtained from land that was peatland in January 2008, unless evidence is provided that the cultivation and harvesting of that raw material does not involve drainage of previously undrained soil.
- (8) For forest biomass > the country in which forest biomass was harvested has national or sub-national laws applicable in the area of harvest as well as monitoring and enforcement systems in place - or alternatively management systems are in place - to ensure amongst others ..[...]. (iii) areas designated by international or national law or by the relevant competent authority for nature protection purposes..[...]. are protected; (iv) that harvesting is carried out considering maintenance of soil quality and biodiversity..[...]
- (9) Art. 29 > forest biomass ..[...]. 1 shall meet the following land-use, land-use change and forestry (LULUCF) criteria...[...]. to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term
- (10) Principle: Production of CORSIA SAF should maintain biodiversity, ecosystem value and ecosystem services. Three underlying criteria related to: (i) Not be made from biomass obtained from areas that, due to their biodiversity, conservation value, or ecosystem services, are protected (ii) low invasive-risk feedstock will be selected and (iii) Operational practices will be implemented to avoid adverse effects on areas that, due to their biodiversity, conservation value, or ecosystem services, are protected

- (11) Principle 3: Production of raw biomass does not result in the destruction of carbon sink (cut-off date 2008), i.e.: peatland; no conversion from a wetland to an alternative, dryer ecosystem. Biomass is not sourced from wood plantations that were created by means of conversion of natural forests after 31 December 1997, unless the forest manager is not directly or indirectly responsible for the conversion (with exceptions mentioned)
- (12) Sites with a high conservation value and representative areas of the forest types that are found in the forest management unit have been identified and are protected and where possible enhanced; Measures have been taken to protect endangered plant and animal species ..[...]; The conversion of forests within the forest management unit to other forms of land use, including wood plantations, is not permitted unless...[...]... In the case of wood plantations, there is a preference for native species, and a relevant percentage of the wood plantation area must be able to revert to natural forest at a later stage; Exploitation of non-timber forest products, including products from hunting and fishing, is regulated, monitored and controlled ..[...]
- (13) Based on draft federal Clean Fuel Regulations, expected to come into force in December 2022

3.3.2 Requirements on water and soil, waste and agrochemicals

The overview in [Table 7](#) shows that other environmental land-based requirements, next to maintenance of carbon stocks or biodiversity protection, are only to limited extent included in the policy frameworks.

An exception is the Dutch framework for solid biomass, which covers a wide range of environmental requirements. Note that these requirements only apply to forest biomass (including primary residues) and are considered to be part of sustainable forest management. ICAO-CORSIA has the ambition to include criteria on water, soil, waste, and agrochemicals in its framework from 2024 onwards.

*Table 7: Overview of requirements included in policy frameworks on water, soil, waste and on the use of agrochemicals, * Overarching legislation set by EC and receipt with minor changes by the various European Member States*

Selected frameworks	Requirements on:			
	Soil	Water	Waste	Agrochemicals
Australia, Queensland	+/- (1)	+/- (1)		
Australia, NSW	V (8)	V (9)	V (10)	V (11)
India	-	-	-	-
Brazil RenovaBio	-	-	-	-
CLCFS	-	-	-	-

Selected frameworks	Requirements on:			
	Soil	Water	Waste	Agrochemicals
Canada (12)	-	-	-	
EU RED II*	V (2)	-	-	-
EU ETS for aviation*	V	-	-	-
ICAO CORSIA	+/- after 2024 (3)	+/- after 2024 (3)	+/- after 2024 (3)	+/- after 2024 (3)
NL: solid biomass	V (4)	V (5)	V (6)	V (7)

- (1) The Regulation of Queensland > Approval of the certification depends on the sustainability measures set out in the standard in relation with any adverse impact the production of biofuel in accordance with the standard may have on biodiversity, soil and water.
- (2) For residues from agricultural land: operators or national authorities have monitoring or management plans in place to address the impacts on soil quality and soil carbon; For forest biomass: harvesting is carried out considering maintenance of soil quality.
- (3) Principles: Production of CORSIA SAFs should maintain or enhance soil health; Production of CORSIA SAF should maintain or enhance water quality and availability; Production of CORSIA SAF should promote responsible management of waste and use of chemicals.
- (4) For agricultural residues and residues from nature and landscape management: Soil quality shall be maintained and where possible improved. As part of Sustainable Forest Management (SFM): The soil quality of the forest management unit is maintained and if necessary improved, with special attention to coasts, riverbanks, erosion-sensitive areas and sloping landscapes.
- (5) As part of SFM: The water balance and quality of both groundwater and surface water in the forest management unit (FMU) and downstream (outside the FMU) shall be at least maintained and where necessary improved.
- (6) As part of SFM: The accumulation of inorganic waste and litter is prevented, or such waste and litter is collected, stored in approved areas and disposed of responsibly.
- (7) As part of SFM: The use of chemicals is only permitted if ecological processes and the optimal deployment of sustainable alternatives prove insufficient. Pesticides classified as type 1A and 1B by the WHO and chlorinated hydrocarbons are not permitted.
- (8) NWS: Soil erosion shall be minimized through the design of the feedstock production site and use of sustainable practices in order to enhance soil physical health on a watershed scale. Impacts on soil should be assessed through the Soil Impact Assessment (RSB-GUI-01-008-01).
- (9) NWS: Biofuel operations shall include a water management plan which aims to use water efficiently and to maintain or enhance the quality of the water resources that are used for biofuel operations. Water Assessment (RSB-GUI-01-009-01).
- (10) NSW: A waste and by-product management plan shall exist such that wastes, and by-products are handled and/or disposed of in appropriate containers to prevent any environmental contamination and damage to human health.
- (11) NSW: None of the chemicals recorded in the WHO's 1a and 1b lists shall be used. The use of chemicals recorded in Annex III of the Rotterdam Convention and in the Stockholm Convention on Persistent Organic Pollutants (POPs) shall be listed (type and annual volume used) and a plan to phase out any such chemical over the three years following certification shall be set.
- (12) Based on draft federal Clean Fuel Regulations, expected to come into force in December 2022

3.3.3 Requirements on sustainable forest management (SFM)

Requirements on sustainable forest management (SFM) obviously only apply to forest biomass. There are only three frameworks have included specific criteria on SFM: Canada (under development), the EU RED II and the Dutch framework for solid biomass.

As can be seen in [Table 8](#), requirement on SFM differ. Whereas the Dutch framework for solid biomass includes for example criteria on how SFM is to be achieved through a management system (which is a requirement to have), and how such a system should look like. Under the EU RED II, SFM can be demonstrated through compliance with in-country policy frameworks and, alternatively when this is not in place, through a management system - without further describing in detail how such a system should look like.

*Table 8: Overview on Sustainable Forest Management (SFM) requirements included in the policy frameworks, * Overarching legislation set by EC and receipt with minor changes by the various European Member States, Abbreviation: AU (Q) = Australia Queensland*

Frame-work	Coverage	Explanation
AU (Q)	-	
AU -NSW	-	
India	-	
Brazil RenovaBio	-	
CLCFS	-	
Canada (4)	+/-	Proposed LUC criteria for forest feedstock: forest biomass used to produce biofuels must meet a set of sub-criteria to ensure it is harvested in a country/area where sustainable forest management is practiced.
EU RED II*	V	Legality of harvesting operations; (i) forest regeneration of harvested areas; (ii) designated areas are protected; (iii) harvesting is carried out considering maintenance of soil quality and biodiversity with the aim of minimising negative impacts; and (iv) that harvesting maintains or improves the long-term production capacity of the forest (1) LULUCF: carbon stocks and sinks levels in the forest are maintained, or strengthened (2)

Frame-work	Coverage	Explanation
EU ETS for aviation*	V	See EU RED II
ICAO CORSIA	-	
NL: solid biomass	V	The use of biomass does not result in long-term carbon debt (3) Criteria on SFM: (i) Relevant international, national, regional and local laws and regulations are complied with; (ii) Biodiversity is maintained and where possible enhanced; (iii) The regulating effect and the quality, health and vitality of the forest are maintained and where possible enhanced; (iv) The production capacity for wood products and relevant non-timber forest products is maintained to safeguard the future of forests; SFM is achieved through a management system.

- (1) For forest biomass > the country in which forest biomass was harvested has national or sub-national laws applicable in the area of harvest as well as monitoring and enforcement systems in place - or alternatively management systems are in place to ensure: (i) the legality of harvesting operations; (ii) forest regeneration of harvested areas; (iii) areas designated by international or national law or by the relevant competent authority for nature protection purposes, including in wetlands and peatlands, are protected; (iv) that harvesting is carried out considering maintenance of soil quality and biodiversity with the aim of minimising negative impacts; and (v) that harvesting maintains or improves the long-term production capacity of the forest
- (2) Art. 29 > forest biomass ..[.]. 1 shall meet the following land-use, land-use change and forestry (LULUCF) criteria...[.]. to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term
- (3) The use of biomass does not result in long-term carbon debt, i.e., retaining or increasing carbon sinks for the medium or long term; biomass is not sourced from stumps unless ...[...].; On average, less than half the volume of annual round wood harvest from forests is processed as biomass for energy generation
- (4) Based on draft federal Clean Fuel Regulations, expected to come into force in December 2022

3.4 SOCIO-ECONOMIC CRITERIA

The coverage of socio-economic criteria is very limited in the selected policy frameworks, as shown in

Table 9. The Indian policy framework, as well as the EU RED II and ICAO CORSIA, have included requirements to ensure food security and/or to promote the production of non-food crops - possibly on degraded or marginal lands. How these criteria are formulated differs, however, substantially between the policy frameworks. In the case of India, the ambition to promote non-food crops is not formulated as a requirement for the economic operator, but as an ambition set on country level.

Other socio-economic requirements are only included to limited extent: if included, they mostly related to land and tenure rights. ICAO-CORSIA is the only framework with the ambition to include criteria on human and labour rights, land use rights, water rights and on local and social development from 2024 onwards.

*Table 9: Overview on socio-economic requirements included in the policy frameworks, Abbreviations: AU (Q) = Australia, Queensland, AU (NSW) = Australia NSW, * Overarching legislation set by EC and receipt with minor changes by the various European Member States.*

Frame-works	Requirement on (enhancing) food security	Promoting non-food crops / production on marginal lands	Other socio-economic requirements
AU (Q)		-	-
AU, NSW	V (6)		V (Land use and land use rights), (7)
India	-	V (1)	-
Brazil RenovaBio	-	-	V (8)
CLCFS	-	-	-
Canada (9)	-	-	-
EU RED II*	-	V (2)	-
EU ETS for aviation*		V (2), see EU RED	
ICAO CORSIA	+/- after 2024 (3)		+/- after 2024 (4): Human and labour rights; Land use rights and land use; Water use rights; Local and social development
NL: solid biomass		-	+/- To some extent (5): Compliance with local laws and regulations, including legal right to use the forest and anti-corruption

(1) The Indian approach to biofuels is based solely on non-food feedstocks to be raised on degraded or wastelands that are not suited to agriculture, thus avoiding a possible conflict of fuel vs. food security. Farmers have been encouraged to grow a variety of different biomass crops including oilseeds on their marginal lands.

- (2) No requirements on supply chain level: Article 26: Specific rules for biofuels, bioliquids and biomass fuels produced from food and feed crops. A bonus of 29 g CO₂eq/MJ shall be attributed if evidence is provided that the land is severely degraded land (Annex).
 - (3) Principle: Production of CORSIA SAF should promote food security in food insecure regions.
 - (4) Principles: (i) Production of CORSIA SAF should: (i) respect human and labour rights; (ii) land rights and land use rights including indigenous and/or customary rights; (iii) respect prior formal or customary water use rights; (iv) contribute to social and economic development in regions of poverty
 - (5) As part of SFM: Principle 6: Relevant international, national, regional and local laws and regulations are complied with; C6.1 The forest manager holds the legal right to use the forest; complies with all obligations to pay taxes and royalties and with anti-corruption legislation
 - (6) NSW: Biofuel operations shall assess risks to food security in the region and locality and shall mitigate any negative impacts that result from biofuel operations. Where the screening exercise of the RSB impact assessment process reveals a direct impact on food security in food insecure regions, Participating Operators shall conduct a food security assessment in accordance with the RSB Food Security Assessment Guidelines (RSB-GUI-01-006-01)
 - (7) Land use rights: Where the screening exercise of the RSB impact assessment process reveals a negative impact to existing land rights and land use rights by biofuel operations, the Participating Operator shall conduct a Land Rights Assessment (RSB-GUI-01-012-01).
 - (8) RenovaBio requires the GIS boundaries of the property and their “legal status”. If the property is overlapping with indigenous lands, the status is cancelled, and the property is ineligible to RenovaBio
 - (9) Based on draft federal Clean Fuel Regulations, expected to come into force in December 2022
-

3.5 SUMMARY OF OBSERVATIONS

- The use of different LCA tools, and differences in input data and allocation steps, may result in differences in GHG emission outputs at different steps of the Chain of Custody (SQ_Consult, 2020). There is room for further harmonization and standardization of LCA-models to decrease the variance of input data and approaches (IEA Task 39, 2019). The development and uptake of ISO Standards can play a role here.
- Coordination and alignment are key to ensure that GHG emission reductions that are created in an (international) supply chain cannot be claimed twice because system boundaries in LCA-models and/or in programs or national policy frameworks overlap. One way to better avoid the risk for double claiming between policy frameworks is to improve the harmonization, connections and (public) insight into databases that register these emissions, see also chapter 7.
- When included approaches on mitigating ILUC differ and there is potential to further harmonize them
- As wastes and residues are considered to have zero emissions up to the process of collection, the appropriate categorization of these feedstocks, versus the categorization of co-products, is essential to come to a correct output of the LCA-analysis. Next to that, it is important to clarify and harmonize in and between policy frameworks which environmental requirements apply to residues from agriculture and forestry.
- Most policy frameworks recognize the importance to include requirements to maintain areas with a high carbon stock and/or biodiversity. Substantial differences can, however, be observed between the policy frameworks, i.e., in feedstock scope, scope of ecosystems included and in how far on-site biodiversity maintenance is included.
- Other environmental requirements, such as water, soil, waste, or the use of agrochemicals, are only to limited extent included in the policy frameworks. These requirements may be needed in jurisdictions where the environmental regulation is weak. If those topics are already addressed by existing regulation, they become more irrelevant (and potentially costly) to include in policies and in third party verification process.
- Only three frameworks have included specific criteria on SFM - Canada (under development), the EU RED II and the Dutch framework for solid biomass - and their requirements on SFM differ.
- Coverage of socio-economic criteria is very limited in the selected policy frameworks.

4. Promoting biofuel pathways with low GHG emissions in the supply chain, from low emission feedstock

The selected policy frameworks have addressed sustainability concerns by introducing specific mandates for more sustainable biofuels pathways with low GHG emissions in the supply chain, as well as providing direct financial incentives for promoting them (see 4.1).

Next to that, the categorization, and definitions of feedstock (see 4.2) are also of importance for addressing sustainability concerns because specific feedstock categories may need to comply with certain sustainability requirements (or not) or may be linked to certain incentives.

4.1 PROMOTING AND DEFINING BIOFUELS WITH LOW GHG EMISSIONS IN THE SUPPLY CHAIN

The food versus fuel debate mobilised the scientific community, governments and NGOs and led to studies on the carbon intensity of various types of liquid biofuels. Studies now consider the lifecycle emissions of the supply chains and emissions due to LUC and ILUC caused by growing feedstock for biofuels. Consequently, regulators in large biofuel markets reset their biofuels targets, blending mandates and support policies considering fuel distinctions by feedstock and associated carbon intensities.

This discussion brought forward the need to develop biofuels, with low to no emissions due to land use change (IRENA, 2019), and to incentivize the use of biofuels that can deliver the largest carbon benefits.

Error! Reference source not found. shows that there are policy frameworks that focus on incentivizing low carbon fuels, which include biofuels and/ or policies that promote so-called advanced biofuels, with low to no emissions due to (i)LUC specifically. A key characteristic for these biofuels is that they are derived non-food feedstocks, such as dedicated energy crops (e.g., Miscanthus), agricultural residues, forest residues and other waste materials.

Low-carbon (liquid) fuels (LCLF) can be defined as sustainable (liquid fuels) from non-petroleum origin, with no or very limited net CO₂ emissions during their production and use compared to fossil-based fuels (EURACTIV, 2020). These include biofuels (the focus of this study) but also alternative fuels such as hydrogen⁸. A Low Carbon Fuel Standard (LCFS) is a market-based incentive program intended to reduce the carbon intensity of transportation fuels.

Advanced biofuels are also referred to as **second- and third-generation biofuels**. Second-generation biofuels may be derived from waste and agricultural residues or non-food crops (such as miscanthus). Third-generation biofuels generally refer to biofuel production routes which are further away from commercialisation (for instance biofuels from algae or hydrogen from biomass). The definition for 'advanced biofuels' from IEA Bioenergy Task 39 is shown in **Error! Reference source not found.**

⁸ Note that although some of the policy frameworks in this study include a broader range of alternative fuels, the focus of this study is on biofuels.

Box 1: Definition of advanced biofuels as used by IEA Bioenergy Task 39 (IEA Task 39, 2021).

Advanced biofuels use pre-commercial technologies using non-food crops, agricultural and forest residues. These materials are composed of 3 primary building blocks: cellulose, hemicellulose or lignin. Advanced biofuels can either be blended with petroleum-based fuels, combusted in existing internal combustion engines, and distributed through existing infrastructure or is dedicated for the use in slightly adapted vehicles with internal combustion engines (e.g., vehicles for DME). Advanced fuels can be produced from waste materials, stalks of wheat and corn, wood and dedicated energy crops. Many advanced biofuels are under development including cellulosic ethanol, biomethanol, DMF, Bio-DME, Fischer-Tropsch diesel, mixed alcohols and wood diesel. Some of these fuels are still in the early stages of development and can include algal biofuels and hydrogen from biomass.

Error! Reference source not found. shows if, and how, the selected policy frameworks have included a definition or description for low carbon fuels or for advanced biofuels:

- Several countries have a more general system in place aiming to reduce the carbon intensity from fuels. such as the LCSFS (California). Biofuel pathways with lower GHG emissions are part of this.
- Other policy frameworks/systems focus on achieving a certain volume of biofuels. Policy frameworks in India and in Europe (the EU RED II) promote advanced biofuels, based on a specific definition and rewarding especially the type of feedstock, which all have low to minimal impact on land use (change).

Table 10: Overview if policy frameworks have included a definition or description for low carbon fuels or for advanced biofuels. **V** = included, - = not included in the policy, +/- partially included. AU (Q) = Australia, Queensland and NSW, * Overarching legislation set by EC and receipt with minor changes by the various European Member States.

Comparison:	The policy framework promotes low carbon fuels	The policy framework includes a definition for advanced biofuels
AU (Q and NSW)	-	-
India	-	V
Brazil RenovaBio	V	-
CLFS	V	+/- (2)

Comparison:	The policy framework promotes low carbon fuels	The policy framework includes a definition for advanced biofuels
Canada	V	-
EU RED II*		
EU ETS for aviation*		-
ICAO CORSIA		-
NL Solid biomass		n.a. (1)

(1) Different scope

(2) The US Renewable Fuel Standard (on country level) has a definition. Although there is no specific definition, the CLFS does promote certain biofuel pathways with low GHG emissions in the value chain.

4.1.1. Australia (Queensland)

Australia supports the development of advanced biofuels through research and development grants (IEA Task 39, 2021a), but a definition for advanced biofuels in policy is missing.

4.1.2 India

India categorises biofuels into various categories⁹ to enable extension of appropriate financial and fiscal incentives under each category (IEA Bioenergy, 2021). India also has a definition on 'advanced biofuels' in its policy and they are defined as fuels which are:

- produced from lignocellulosic feedstocks (i.e., agricultural and forestry residues, e.g., rice & wheat straw/corn cobs & stover/bagasse, woody biomass), non-food crops (i.e., grasses, algae), or industrial waste and residue streams,
- having low CO₂ emission or high GHG reduction and do not compete with food crops for land use. Fuels such as Second Generation (2G) Ethanol, Drop-in fuels, algae based 3G biofuels, bio-CNG, bio-methanol, Di Methyl Ether (DME) derived from bio-methanol, biohydrogen, drop in fuels with MSW as the source / feedstock material will qualify as "Advanced Biofuels".

4.1.3 Brazil RenovaBio

⁹ "Basic Biofuels" viz. First Generation (1G) bioethanol & biodiesel and "Advanced Biofuels" - Second Generation (2G) ethanol, Municipal Solid Waste (MSW) to drop-in fuels, Third Generation (3G) biofuels, bio-CNG etc.

RenovaBio recognizes that different biofuels contribute differently to GHG emissions reductions, and those produced with a lower carbon intensity (relative to liquid fossil fuel) will generate more decarbonization credits (CBIO) per volume unit. Therefore, the more efficient and sustainable the individual production, the more CBIOs can be issued. For this reason, RenovaBio does not include a separate definition on advanced biofuels.

4.1.4 California LCFS

Although there is no specific definition in place on advanced biofuels in the policy framework (although there is one on country level), the Californian LCFS does support the development of advanced biofuels by valuing them higher than conventional biofuels in trading mechanisms (IEA Bioenergy, 2021). The LCFS applies to different types of transportation fuels and their pathways. The California Air Resources Board (CARB) adds over time new ways to generate carbon credits, one of these being by using alternative (lower CI) jet fuel.

4.1.5 Canada

In Canada, the term ‘advanced biofuels’ is not included in the current federal Renewable Fuel Regulations. There are no sub-categories of low carbon fuels. As long as the fuel meets the definition and criteria of being a low carbon fuel it is eligible; biofuels with lower GHG emissions are promoted through their advantage in carbon intensity value, compared to conventional pathways.

4.1.6. EU RED II and Member States

The EU RED II encourages the deployment of advanced biofuels, by setting a target for use of renewable energy in the transport sector and limiting the number of biofuels and bioliquids produced from cereal and other starch-rich crops, sugars and oil crops. The EU RED II requires that the contribution of advanced biofuels and biogas produced from the feedstock listed in Part A of Annex IX as a share of final consumption of energy in the transport sector shall be at least 0,2 % in 2022, at least 1 % in 2025 and at least 3,5 % in 2030.

‘Advanced biofuels’ are defined in RED II as ‘biofuels that are produced from the feedstock listed in Part A of Annex IX’. Feedstock that can be processed only with advanced technologies are in Part A of Annex IX. Feedstock that can be processed into biofuels, or biogas for transport, with mature technologies are in Part B of Annex IX. The Commission can adopt delegated acts to amend the list of feedstocks set out in Annex IX by adding, but not removing, feedstock.

As Member States transpose the EU RED II into their national policies, Germany, Austria and Netherlands follow the same definition for advanced biofuels.

4.1.7 EU ETS

There are currently no targets or restrictions on types of biofuels used under the EU ETS. Biofuels must have a biological origin and must meet the sustainability criteria of the REDII if applicable.

4.1.8. ICAO CORSIA

The term ‘advanced biofuels’ is at this moment not relevant in CORSIA or CORSIA (EU). Under ICAO CORSIA, Sustainable Aviation Fuels (SAF) are defined as ‘a renewable or waste-derived

aviation fuel that meets the CORSIA Sustainability Criteria under this Volume', without further specification to advanced biofuels.

4.2 CATEGORIZING AND DEFINING FEEDSTOCKS TO PROMOTE BIOFUEL PATHWAYS WITH LOW GHG EMISSIONS

The categorization and definitions of feedstock are of importance because feedstock categories are often linked to certain sustainability requirements.

Table 5 shows for example that in most policy frameworks, wastes and residues are considered to have zero life cycle GHG emissions up to the process of collection of those materials. Another example is the Dutch framework for solid biomass, where secondary forest residues do not need to comply with the requirements on sustainable forest management, while primary forest residues do.

Second, feedstock categories are also often linked to certain incentives. For example, under the EU RED II, advanced biofuels and biogas for transport produced from feedstocks listed in Annex IX (such as bagasse, UCO or biomass from municipal solid waste) may be considered to be twice their energy content in their contribution towards the minimum shares of renewable energy in the transport sector.

Error! Reference source not found. gives an overview of the categories and types of feedstocks acknowledged in the selected policy frameworks as feedstocks for biofuel pathways with lower GHG emissions, i.e., for advanced biofuels and - if applicable - exclusion of certain feedstocks on forehand. The following observations can be made for the categorization of these feedstocks:

- First, there are differences in how specific the feedstock categories are defined. India has for example the category 'industrial waste and residue streams' without further specification, while the EU RED II gives more specific types of industrial waste and residue streams, including the category 'biomass fraction of industrial waste not fit for use in the food or feed chain'.
- Within the EU, the Netherlands has further specified the category 'biomass fraction of industrial waste not fit for use in the food or feed chain'. This more specific list is based on a case-by-case assessment and depends on several elements: is it produced intentionally, or the process optimized to increase its yield, what is its market value compared to the main product, can it be used for other applications (food/feed, etc).
- Also, **Error! Reference source not found.** shows that there are differences in how specific feedstocks are conceived and incentivized (or not). For example:
 - UCO and animal fats are acknowledged under the LCFS as 'specified source' feedstocks in a fuel pathway associated with lower emissions. To be eligible for a reduced CI, the applicant needs to meet certain requirement, including on CoC evidence.
 - Under the EU RED II, the use of UCO and animal fats¹⁰ for the production of biofuels and biogas for transport may be considered to be twice their energy content but has a limit in its use for the economic operator on annual basis.
 - To address the risk of fraud, the proposed CFR Regulations in Canada have decided not to include a "waste multiplier" to create additional incentives for the use of waste feedstock.

4.2.1 Classification of residue, co-product or waste

Promoting residues and waste flows under the various policy frameworks requires clarity about which feedstock materials are classified as such. Especially the definition and classification of feedstock materials as residues or waste are important because they are allocated zero emissions up to the process of collection/point of origin in the GHG analysis and can benefit from certain incentives.

Error! Reference source not found. shows that the inclusion of certain feedstock flows consists mainly out of lists that are included (e.g., as annex) in the different policy frameworks. For example, under the EU RED II, the list in annex IX A can only be extended (no feedstocks can be removed from

¹⁰ Animal fats classified as categories 1 and 2 in accordance with Regulation (EC) No 1069/2009

the lists). The same feedstock can thus be categorized differently in different policy frameworks.

Table 11: An overview of the categories and types of feedstocks acknowledged in the selected policy frameworks for the production of advanced biofuels or as feedstocks in a fuel pathway associated with lower emissions, and - if applicable - exclusion of certain feedstocks on forehand. * Abbreviations: AU (Q, NSW) = Australia, Queensland and NSW, * Overarching legislation set by EC and receipt with minor changes by the various European Member States.

Selected frameworks	Categories and types of feedstocks included to produce advanced and/or low carbon fuels	Exclusion of certain feedstocks on forehand
AU, Q, NSW*	-	-
India	See definition: Biomass: * <u>Agricultural and forestry residues</u> : e.g., rice & wheat straw/corn cobs and stover/bagasse, woody biomass); * <u>Non-food crops</u> : i.e., grasses, algae; * <u>Waste and industrial residue streams</u> : not further defined	No food and feed crops; Ethanol production from damaged food grains is allowed.
Brazil RenovaBio		
CLCFS	The CLCFS refers to pathways with a "Specified Source Feedstock (1). To be eligible for a reduced CI, a series of requirements must be met by the applicant, including on CoC evidence. Specified source feedstock include: <u>Agriculture and forestry residues</u> : - <u>Non-food crops</u> : - <u>Waste and industrial residue streams</u> : Used cooking oil, animal fats, fish oil, yellow grease, distiller's corn oil, distiller's sorghum oil, brown grease, and other fats/oils/greases that are the non-primary products of commercial or industrial processes for food, fuel or other consumer products, which are used as feedstocks in pathways for biodiesel, renewable diesel, alternative jet fuel, and co-processed refinery products. (Alternative) residues and waste streams are evaluated on a case-by-case basis.	-
Canada	-	-

Selected frameworks	Categories and types of feedstocks included to produce advanced and/or low carbon fuels	Exclusion of certain feedstocks on forehand
EU RED II*	<p>See Annex IX, Part A: Feedstocks for the production of biogas for transport and advanced biofuels: <u>Agriculture and forestry residues</u>: (e) straw; (l) nut shells; (m) husks; (n) cobs; (f) animal manure; (o) biomass fraction of wastes and residues from forestry, (bark, branches, pre- commercial thinning, leaves, needles, tree tops); <u>Non-food crops</u>: a) algae; (p) Other non-food cellulosic material <u>Waste and industrial residue streams</u>: (b) biomass fraction of mixed municipal waste; c) biowaste; d) biomass fraction of industrial waste not fit for use in the food or feed chain; (f) ... sewage sludge; q) other ligno-cellulosic material except saw logs and veneer logs; g) palm oil mill effluent and empty palm fruit bunches; (h) tall oil pitch; (i) crude glycerine; (j) bagasse; (k) grape marcs and wine lees; (o) biomass fraction of wastes and residues from forest-based industries, (...saw dust, cutter shavings, black liquor, brown liquor, fibre sludge, lignin and tall oil). (2) Annex IX, Part B: Feedstocks where the minimum share ...[..].. shall be limited and considered to be twice their energy content: UCO, animal fats cat. 1 and 2</p>	Phasing out food and feed crops
<i>Austria</i>	See EU RED II	See EU RED II
<i>Germany</i>	See EU RED II	See EU RED II
<i>Netherlands</i>	See EU RED II. See EU RED II with 2 additions: (a) For the broad EU category ‘biomass fraction of industrial waste not fit for use in the food or feed chain’, a more specific list of feedstocks is laid down in national Regulation (3) (b) For receiving national subsidy for advanced biofuels, the use of straw as feedstock is only allowed for bioLNG digestion and not for biofuels	See EU RED II
EU ETS for aviation*	See EU RED II	See EU RED II

Selected frameworks	Categories and types of feedstocks included to produce advanced and/or low carbon fuels	Exclusion of certain feedstocks on forehand
ICAO CORSIA	No further incentive - but there is a positive list that includes feedstocks that have been classified as by-product, wastes and residues (4).	No exclusions
NL: solid biomass	n.a.	Food & feed crops excluded

- (1) In order to be eligible for a reduced CI that reflects the lower emissions or credit associated with the use of a waste, residue, by-product or similar material as feedstock in a fuel pathway, fuel pathway applicants must meet a series of requirements to be eligible for that.
- (2) Annex Part B. Feedstocks for the production of biofuels and biogas for transport, the contribution of which towards the minimum share established in the first subparagraph of Article 25(1) shall be limited and may be considered to be twice their energy content: (a) Used cooking oil; (b) Animal fats classified as categories 1 and 2 in accordance with Regulation (EC) No 1069/2009.
- (3) Being: Waste/residues from processing of alcohol; Wastewater from slaughterhouses; Renewable component of end-of-life tyres; Cashew Nut Shell Liquid (CNSL); Spent bleaching earth; Bio-waste from trade, services and companies; Starch slurry (low grade); Brown grease/grease trap fat; Sugar beet residues; Food and feed products unfit for human and animal consumption, i.e., food waste and feed waste. Added in 2022 regulation: Ethanol used in the cleaning/extraction of blood plasma; Residue of FAME end distillation, see Appendix 5, belonging to article 14.3 in Regulation: <https://wetten.overheid.nl/BWBR0041050/2021-01-01#Bijlage1>
- (4) CO_{2e} emissions shall not be allocated to waste, residues and by-products that result from the CEF supply chain of interest. See: ICAO document - CORSIA Methodology for Calculating Actual Life Cycle Emissions Values

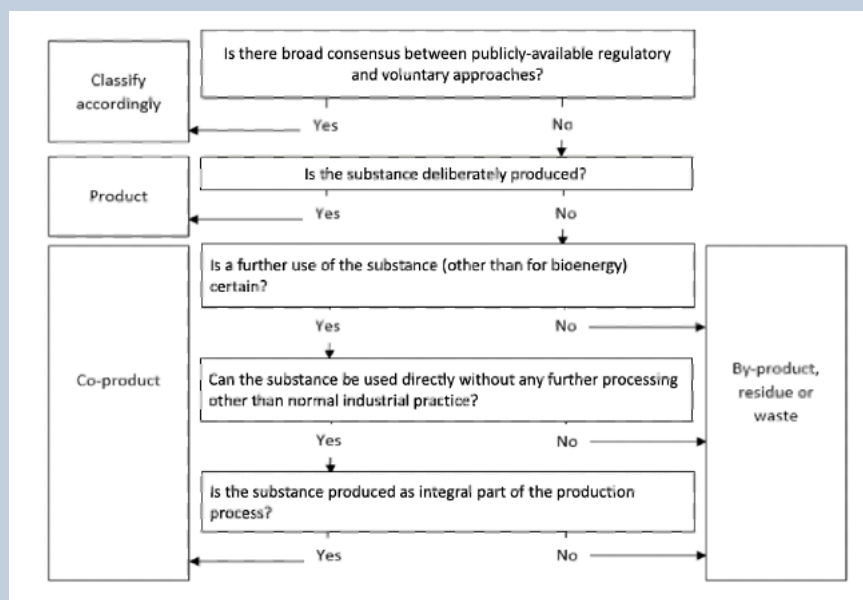
The example of the EU RED II also shows that more specific criteria and feedstock definitions - for example on 'biomass fraction of industrial waste not fit for use in the food or feed chain' are missing. This leads to a lack of clarity and/or to further interpretation of the relevant category by Member States.

In addition, there are no clear decision trees and criteria for why certain flows are removed from the lists or have or will be placed on them. The consequence of this is that feedstock flows can appear on lists - and fall out again - without the market being able to anticipate this.

Box 2: Guidance for inclusion of additional materials in positive list (ICAO, 2019)

(ICAO, 2019) describes and categorizes the various feedstock categories as follows:

- Primary and co-products are the main products of a production process. These products have significant economic value and elastic supply, (i.e., there is evidence that there is a causal link between feedstock prices and the quantity of feedstock being produced).
- By-products are secondary products with inelastic supply and economic value.
- Wastes are materials with inelastic supply and no economic value. A waste is any substance or object which the holder discards or intends or is required to discard. Raw materials or substances that have been intentionally modified or contaminated to meet this definition are not covered by this definition.
- Residues are secondary materials with inelastic supply and little economic value.



A stable policy, unambiguous and harmonized definitions - also between policy frameworks -, and clear underlying guidance and decision trees are essential to promote biofuel from waste and residue streams for the longer term. An example of such a decision tree is shown in Error! Reference source not found. and developed by (ICAO, 2019).

4.2.2 Labelling of feedstock materials and appropriate classification in the field

In the report from (SQ_Consult, 2020), concerns are raised about the labelling of feedstock materials and how to prove that information about feedstock is appropriately classified at the collection/gathering point; and that this information is correctly transferred through the supply chain. Examples mentioned are the appropriate classification of sawdust (or other woody) processing residues as secondary feedstock and that no virgin forest material, wrongfully processed into sawdust, has been purposely mixed with residues at the collection point. Similar concerns exist for the risk for modification of UCO.

For this reason, various policy frameworks have introduced specific, more stringent, measures to prevent modification and wrong classification of feedstock materials. Examples are:

- Additional proof/ attestation: Under the CLCFS¹¹, the applicant must submit as one of the requirements a letter with amongst others the following attestation: “No products, co-products, by-products, or wastes undergo additional processing, such as drying, distillation, or clean-up, once they leave the production facility, except as explicitly included in the pathway life cycle analysis and pathway CI”. The EU RED II mentions that “The auditing shall verify that the systems used by economic operators are accurate, reliable, and protected against fraud, including verification ensuring that materials are not intentionally modified or discarded so that the consignment or part thereof could become a waste or residue.
- More stringent auditing/ verification requirements: The EU RED II mentions in article 30 that the “auditing shall verify that the systems used by economic operators are accurate, reliable and protected against fraud, including verification ensuring that materials are not intentionally modified or discarded so that the consignment or part thereof could become a waste or residue”. The draft Implementing Regulation from the EU RED II on rules to verify sustainability and GHG emissions saving criteria and low ILUC-risk criteria sets additional requirements for the auditing of waste and residues (see article 13), (EC, 2021).
- Level of traceability and supply chain coverage: Under ICAO CORSIA (ICAO, 2019), in the case of waste or residue feedstocks, the material must be traced back to the first gathering point while, in the case of by-products, the material should be traced back to the point of origin. Note that the draft EU RED II Implementing Regulation¹² proposes that for waste and residues the whole supply chain shall be covered starting from its origin, i.e., the economic operator where the waste or residue material arises - so requirements differ.

4.3 SUMMARY OF OBSERVATIONS

- Policy frameworks such as the LCSFS promote low carbon fuels to reduce the carbon intensity in transportation fuels. Promoting certain biofuel pathways that result in lower GHG emissions, are part of this. Other policy frameworks (e.g., in India and in Europe) promote advanced biofuels, based on a specific definition and rewarding especially certain feedstock categories that have low to minimal impact on land use (change), such as residues or waste.
- The categorization and definitions of feedstock, both within and among policy frameworks, are of importance because feedstock categories are often linked to certain sustainability requirements, and/or to certain incentives. For example, secondary residues and waste are considered to have zero GHG emissions up to the collection of those materials. Thus, the GHG profile for a given feedstock could be very different depending on whether it is classified as co-product or residue.

¹¹ See: § 95488.8. Fuel Pathway Application Requirements Applying to All Classifications.

¹² draft Implementing Regulation from the EU RED II on rules to verify sustainability and GHG emissions saving criteria and low ILUC-risk criteria

- The analysis shows that the inclusion of certain feedstock flows consists often out of lists that are included (as annex) in the different policy frameworks.
- There are differences amongst the various policy frameworks in how specific the categories are defined, and in how specific feedstocks are conceived and incentivized. Broad definitions can lead to lack of clarity about which materials are considered, for example, industrial waste.
- Clear decision trees and criteria for why certain flows are placed or removed from the lists are missing. An exception is the guidance provided by (ICAO, 2019).
- A stable policy, unambiguous and harmonized definitions -both within and among policy frameworks - clear underlying criteria and decision trees are essential to promote biofuel from waste and residue streams for the longer term.
- Next to that, it is key that information about feedstock is appropriately classified at the collection point/point of origin, and that this information is correctly transferred through the supply chain. Various policy frameworks are introducing specific, more stringent, requirements to prevent modification and wrong classification of waste and residue feedstocks. Harmonization of these requirements is, however, key.

5. Use of verification and certification schemes to prove compliance

Chapters 3 and 4 show that policy frameworks incentivize certain feedstocks and have included sustainability criteria and GHG emission reduction requirements to promote the sustainability of biofuels. A second important element of a policy framework is to ensure that these requirements are indeed complied with, and that there is robust evidence to prove this.

5.1 CERTIFICATION AND/OR VERIFICATION TO PROVE COMPLIANCE UNDER THE POLICY FRAMEWORKS

To prove compliance of sustainability requirements, policy frameworks can make use of certification or verification - or a combination of both. Both options include an independent valuation performed by an objective (independent) third-party.

- **Certification:** One widely used approach for establishing credibility is through international recognized voluntary certification systems. Once an economic operator is certified against a defined set of principles and criteria, the products from a farm or processing unit are considered “sustainable” (Stickler, 2018).
- **Verification:** is an assessment and validation of compliance of a specific product or system, performance, and/or actions relative to a stated commitment, standard, or target. It utilises monitoring data and other information sources as input to the verification process (AFI, 2019). Verification is a process for evaluating a statement of historical data and information to determine if the statement is materially correct and conforms to criteria (CFR, 2021).

Note that both countries and organizations can set up their own verification protocol.

An essential difference between certification and verification is that certification demonstrates compliance “before the fact” and verification “after the fact”. With certification, a product or company gets certified and, until the next audit proves otherwise, the product may be claimed and sold as sustainable (product certification) or the company may sell its products as sustainable (sustainability claim on company level).

With verification, sustainable products are delivered to the company, and the company needs to verify during or after delivery that the products are indeed compliant with the sustainability requirements of the sustainability framework. Compared with certification, there is limited room for improving identified non-compliances while still delivering.

Next to that, policy frameworks can also refer to national standard initiatives:

- **National standard or schemes** are described by the EU as legal framework or standard set by countries for verification or certification that economic operators comply with the sustainability criteria (ECA, 2016)

There is variation in the terminology for ‘national standards or schemes’ between countries. For example, the LCFS is a national standard for California based on verification. The Dutch sustainability criteria for solid biomass are laid down in national regulation and can be considered as an umbrella national standard, against which voluntary standards (privately organised certification schemes) are benchmarked. As alternative, economic operators can make use of a national verification protocol. The EU RED II has its own definition of “national scheme” and EU Member States may set up national schemes to prove compliance with the GHG emission reduction and sustainability requirements of the EU RED II.

Table 12: Use of certification and/or verification to proof compliance under the policy frameworks, *V* = included, - = not included in the policy, +/- partially or incomplete, * A scheme or standard, that is embedded in a policy framework of a country as means to proof compliance with sustainability criteria for (amongst others) biofuels, AU (Q) = Australia Queensland, AU, NSW = Australia, NSW, IND = India, BRA = Brazil, AUS = Austria, GER = Germany, NL = Netherlands, ** These countries are EU Member States, *** Overarching legislation set by EC and receipt with minor changes by the various European Member States.

Comparison:	AU (Q)	AU, NSW	IND	BRA	CLFS	CAN	EU RED II ***	AUS **	GER **	NL **	EU ETS ***	ICAO CORSIA	NL solid biomass
(Voluntary) certification scheme	- (V)	V	-	V	-	V (2)	V (3)	V (3)	V (3)	V (3)	V (3)	V	V
> Geographic (country) scope defined	-	-	-	-	-	tbd (2)	V	V	V	V	V	-	V
> For which feedstock defined	- (V)	V	-	V	-	tbd (2)	V	V	V	V	V	-	V
> CoC coverage		-	-	V	-	tbd (2)	V	V	V	V	V	-	V
Verification Protocol	-	-	-		V	V (2)	-	-	-	V (5)	+/- (7)	-	V
National scheme/standard*	- (V)	-	-	V	V		V	V	- (4)	- (4)	-	-	V (6)

Comparison:	AU (Q)	AU, NSW	IN D	BRA	CLFS	CAN	EU RED II ***	AUS **	GER **	NL**	EU ETS ***	ICAO CORSIA	NL solid biomass
	(1)												

- (1) biofuel produced from sugar cane is appropriately certified if— (a) at least 30% of the sugar cane is accredited sugar cane or (b) certified.
- (2) Based on draft federal Clean Fuel Regulations, expected to come into force in December 2022
- (3) Under development.
- (4) The EU RED II indicates the scheme scope: (i) type of feedstock(s); (ii) type of fuel(s); (iii) geographic coverage and (iv) chain of custody coverage.
- (5) No national scheme for biofuels applies in Germany or the Netherlands
- (6) The Netherlands has a separate verification protocol for the double counting of biofuels
- (7) The ADBE Assessment protocol is an umbrella standard and voluntary schemes are benchmarked against its criteria. <https://adviescommissiedbe.nl> Next to that, there is a Verification protocol for verifying the criteria as laid down in the Dutch Regulation on the Conformity Assessment of Solid Biomass for Energy Applications
- (8) Strictly speaking the EU-ETS MRV allows a verification protocol when certification is 'unavailable'. Because the EU-ETS MRV is a delegated act, it is at this moment still unclear if Member States can decide to block this option.
- (9) Geographic scope is not defined per se, while noting that Renovabio will not certify any biofuels produced in land that was deforested after 2018.

As Error! Reference source not found. shows, policy frameworks recognize certification or verification, or both, as proof of compliance against the GHG emission reduction requirements and sustainability criteria. In some cases, these recognized schemes or standards can be considered a national scheme as they are embedded in a policy framework of the country as (single) means to prove compliance with sustainability criteria for (amongst others) biofuels.

For example, the EU RED II recognises both voluntary certification schemes and national schemes. Voluntary schemes are recognized when they demonstrate compliance with the sustainability criteria for biofuels, or part of the criteria (partial compliance).

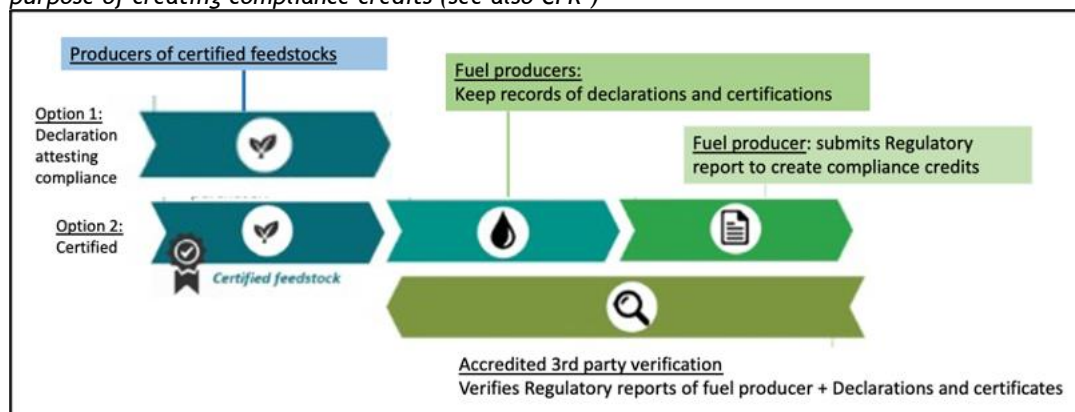
In California, the LCFS can be considered a national standard. It is a third-party verification program, providing an independent, and documented process for evaluation of reported data against the LCFS regulatory requirements and methods for calculation.

Most national biofuel policies that recognize voluntary certification schemes specify to which geographic scope and feedstock they apply, and whether the chain of custody is, or can be, covered or not. This is, however, not the case for Queensland.

There are also examples of policy frameworks that recognize a combination of certification and verification within the supply chain (see Error! Reference source not found.):

The Canada Renewable Fuel Regulation (CFR) has for example developed draft requirements for validation, certification or verification for its key elements¹³. Fuel producers have 2 options: they can have (i) a verified Declaration from non-certified feedstock or (ii) a Declaration from certified feedstock to produce low-carbon intensity fuel for the purpose of creating compliance credits. For both options, an accredited third-party verification body verifies the fuel producer's required regulatory reports. See also Error! Reference source not found..

Figure 4: Fuel producers use certified or non-certified feedstock to produce low-carbon intensity fuel for the purpose of creating compliance credits (see also CFR⁹)

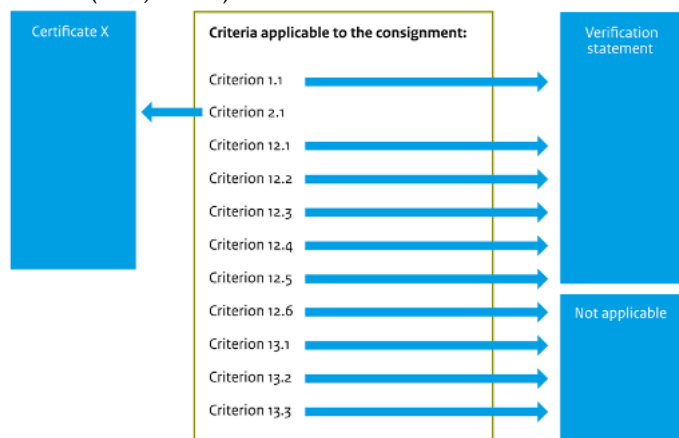


Another example: The Dutch policy on solid biomass also allows for the combined use of both certification and verification for one biomass consignment to demonstrate that the biomass used comes from sustainable sources. Economic operators can make use of the following combinations (RVO, 2020a), see also Error! Reference source not found.:

¹³ First version of the Method for Validation, Verification and Certification - CFR, see: https://publications.gc.ca/collections/collection_2020/eccc/En4-419-4-2020-eng.pdf

- An approved certification scheme, recognized by the government of the Netherlands¹⁴
- A combination of several approved certification schemes, which are individually only partially recognized for the applicable criteria
- A combination of one or more approved certification schemes and additional verification
- Verification only, according to the Verification protocol (RVO, 2020a).

Figure 5: The combination of the scope of the certificates and verification statements present covers all the requirements for the biomass consignment. Here an example for a consignment of biomass from agricultural residues (RVO, 2020a).



5.2 RECOGNIZED CERTIFICATION SCHEMES

Various policy frameworks recognize approved voluntary certification schemes as proof of compliance for meeting sustainability requirements. **Error! Reference source not found.** gives an overview of which voluntary certification schemes are recognized by the different policy frameworks.

Note that at the time of writing, the European Commission has so far not recognised voluntary schemes under the Recast Renewable Energy Directive (EU) 2018/2001 but has received applications for recognition. Some schemes already received a preliminary positive assessment.

Based on **Error! Reference source not found.**, the following observations can be made:

- Under the EU RED II, the draft Regulation setting specific criteria for the eligibility of national and voluntary schemes is currently under development (EC, 2021). In April 2022, the Commission has formally recognized 13 voluntary schemes. In addition, the Commission received an application of 5 voluntary and national certification schemes of which three have received a technical assessment (EC, 2022a). The number of schemes to be approved underlines the importance of a clear framework with minimum requirements to avoid that many schemes with different requirements appear on the market.
- Different requirements in policy frameworks (also due to different scopes) have resulted in the development of specific modules under certification schemes, so to be able to adapt to the specific requirements laid down in policy requirements. One key example here is ISCC.
- Although forest biomass can be used for advanced biofuels, there are only a limited number of approved SFM schemes recognized under the various policy frameworks.

¹⁴ See also: <https://adviescommissiedbe.nl>

Table 13: Overview of which voluntary certification schemes are recognized - for those policy frameworks that make use of voluntary certification schemes and national standards (India, CLFS and Brazil are not shown in this overview) -AU (Q) = Australia Queensland, AU NSW = Australia, NSW, IND = India, BRA = Brazil, AUS = Austria, GER = Germany, NL = Netherlands, * These countries are EU Member States, **Overarching legislation set by EC and receipt with minor changes by the various European Member States.

Scope	AU (Q)	AU, NSW	CAN	EU RED II** (5)	AUS*	GER and NL*	EU ETS **	ICAO CORSIA (8)	NL solid biomass (9)
ISCC	V (2) ISCC EU, ISCC Plus			V Formally recognized: ISCC EU	V See EU	V See EU	V See EU	V ISCC CORSIA, ISCC CORSIA Plus	V ISCC Solid biomass NL
RSB	V	V		V Formally recognized: RSB EU RED	V See EU	V See EU	V See EU	V RSB: CORSIA eligible only RSB CORSIA	-
Bonsu-cro	-			V Formally recognized: Bonsucro EU	V See EU	V See EU	V See EU	-	V
RSPO	V (1)			-				-	-
RTRS				V Formally recognized: RTRS EU RED	V See EU	V See EU	V See EU	-	-

Scope	AU (Q)	AU, NSW	CAN	EU RED II** (5)	AUS*	GER and NL*	EU ETS **	ICAO CORSIA (8)	NL solid biomass (9)
SFM schemes	-		? (4)	✓ <i>Applications received: PEFCs</i>				-	ATFS, GGL, SFI
* FSC	-		? (4)	-				-	✓ FSC Int. V5.2 (12) FSC US
* SBP	-			✓ <i>Positive assessment (7)</i>	✓ See EU	✓ See EU	✓ See EU	-	✓
Better Biomass	-			✓ <i>Formally recognized:</i>	✓ See EU	✓ See EU	✓ See EU	-	✓
Other schemes	<i>Eligible schemes</i>	✓ NSW: ISO 13065: 2015 (11)		✓ (6) <i>Formally recognized:</i> 2BSvs, KZR INiG, REDcert, Red Tractor, SQC, TASCC, UFAS, and SURE. <i>Positive assessment:</i> AACs, SSAP EU (7)	✓ See EU	✓ See EU	✓ See EU	-	

Scope	AU (Q)	AU, NSW	CAN	EU RED II** (5)	AUS*	GER and NL*	EU ETS **	ICAO CORSIA (8)	NL solid biomass (9)
National Standard	V (3)			V Applications received: Austrian Agricultural Certification Scheme (AACS) Positive assessment U.S. Soybean Sustainability Assurance Protocol EU (SSAP EU) (7)	V (10)	-	-		

(1) The RSPO standard or a superseded version of the RSPO standard; or an equivalent standard for the RSPO standard

(2) For sugar cane and other biofuels: the International Sustainability and Carbon Certification system in accordance with— (A) the ISCC EU standard or the ISCC PLUS standard; or (B) a superseded version of the ISCC EU standard or the ISCC PLUS standard; or (ii) the RSB global standard or a superseded version of the RSB global standard; or (iii) an equivalent standard for a sustainability standard

(3) Accredited sugar cane means sugar cane produced by a person accredited under the ‘Smartcane Best Management Practices (BMP)’ program administered by the Queensland Cane Growers Organisation Ltd ACN 089 992 969.

(4) Still under development, although the third-party forest certification schemes in Canada, namely FSC, SFI, CSA and PEFC may be considered. The draft federal Clean Fuel Regulations are expected to come into force in December 2022

(5) Based on 21-04-2022 (EC, 2022a)

(6) AACS = Austrian Agricultural Certification Scheme, SQC = Scottish Quality Farm Assured Combinable Crops SQC, TASCC = Trade Assurance Scheme for Combinable Crops, UFAS = Universal Feed Assurance Scheme, SURE = Sustainable Resources (SURE) voluntary scheme, KZR INiG = a Polish biomass and biofuels certification scheme

(7) The draft decision, regarding AACS, SSAP EU and SPB, will be subject to a vote of the RED II Committee soon, after the standard internal consultation process of the legal texts is completed, (EC, 2022).

(8) Based on a 2-Tier approach,

(9) Based on 15-11-2021, see: <https://www.adviescommissiedbe.nl/cms/view/fc2ff86b-db58-4a5a-b402-c8287bcf1527/adviezen/3e6fd405-b653-47d2-be64-75b09f5fdd83>

(10) For Austria: Agrarmarkt Austria (AMA); three national systems are recognised on the basis of bilateral agreements (Slovenian, Slovakian and Italian).

(11) ISO 13065:2015 Sustainability criteria for bioenergy. Note that this Standard is not freely available.

(12) Exclusively FSC international standards based on FSC P&C V5.2. This drastically limits the usable scope for FSC international.

5.3 RECOGNITION OF SCHEMES: REQUIREMENTS ON SUSTAINABILITY CRITERIA, CHAIN OF CUSTODY (COC) AND CROSS-COMPLIANCE

Various policy frameworks (e.g., EU RED II or ICAO CORSIA) make use of certification schemes as means to prove compliance against the sustainability requirements (see chapter 5.2). In this case, policy frameworks have developed:

1. A set of criteria that a scheme must fulfil to get recognition and
2. Certain conditions under which the scheme is recognized.

Error! Reference source not found. gives an overview of these recognition criteria and the conditions under which schemes are recognized, and various observations can be made:

- There are differences amongst policy frameworks for what time period schemes are recognized, ranging from a period to 5 years, to 'undefined' to 'no end-date'. Next to that, approaches in the recognition procedures differ when schemes make changes in their standard documents, and especially those related to auditing procedures. Under the EU RED II, schemes may adopt their procedures but must notify substantial changes that might affect the recognition of the scheme¹⁵. Under the Dutch framework for 'solid biomass', there is a continuous "re-approval" of the scheme, each time a scheme has a new scheme document that is relevant to the approval.
- All selected policy frameworks have as requirement that the certification scheme covers the sustainability criteria that are laid down in the policy framework. The Dutch framework on solid biomass also has scheme governance requirements, and a precondition is that these criteria are met: If not, the sustainability criteria are not even assessed.
- Note that certification schemes can also include criteria in their standards which are stricter than the criteria laid down in the national biofuel policies and/or include additional criteria. Examples are social criteria or criteria adapted to local conditions, and criteria to promote best agricultural practices. They may also take into account additional sustainability aspects such as soil, water and air protection (ECA, 2016).
- Conditions for cross-compliance differ. The EU RED II is, with its Implementing Regulation, the only framework that is to be explicit that Member States shall not refuse recognition of recognised *national* schemes, and that certification schemes shall, where part of the supply chain relies on other schemes, accept evidence of other schemes to the extent of the scope of their recognition (EC, 2021). In the assessment protocol, schemes are encouraged (so not obliged) to include a clause on recognising the potential use of other schemes (for part of a supply chain). Most other policy frameworks have no formal requirement on this. However, if two approved certification schemes recognize each other, this is likely not precluded - under the conditions of the policy.

¹⁵ See also draft Implementing Regulation, article 17.8. Voluntary schemes shall notify the Commission without delay, about all substantial changes to the content of the scheme that might affect the basis for the recognition of the scheme. Such changes may include any of the following....[...].... (EC, 2021)

Table 14: A summarized overview of recognition criteria and conditions under which the schemes are recognized for those policies that make use of voluntary certification schemes. **NOTE:** India, Brazil and CLFS are not included in this overview because these policy frameworks recognize none or only one (certification) standard. Abbreviations: AU: Q & NSW = Australia Queensland and NSW, CoC = Chain of Custody, *Overarching legislation set by EC and receipt with minor changes by the various European Member States.

Scope	AU: Q & NSW	CAN	EU RED II*	EU ETS*	ICAO CORSIA	NL solid biomass
Recognition period	Undefined (1)	5 years	5 years (8)	5 years	5 years and with change of phase (10)	No end-date, re-approval if scheme change (7)
Cross-compliance possible	Q: Probably yes (2), NSW: n.a	Probably yes (2)	Yes (11)	See EU RED II	Probably yes (2)	Probably yes (2)
Conditions for cross-compliance	- NSW: n.a.	Transparency on use other schemes & from one scheme to other (2), (3)	Only recognize schemes in EU RED II scope (4) Transparency on use other schemes	See EU RED II	Transparency on use other schemes (5)	Transparency on claim at origin (6)
Recognition criteria on: Sustainability criteria	V	V	V	V	V	V (9)
Recognition	-	-	V	V	V	V

Scope	AU: Q & NSW	CAN	EU RED II*	EU ETS*	ICAO CORSIA	NL solid biomass
criteria on: CoC						
> Within CoC: Time frame defined	-	-	V	V	V	V
> Within CoC: Operate on level of site	-	-	V	V	V	V

- (1) Queensland: This division provides for the chief executive (environment) to approve a standard as an equivalent standard for a sustainability standard, In: Liquid Fuel Supply Regulation 2016.
- (2) Certification schemes are not required to recognize each other. No formal requirements have been outlined regarding cross-compliance. However, if two approved certification schemes recognize each other, this is likely not precluded - under the conditions of the policy. Based on draft federal Clean Fuel Regulations, expected to come into force in December 2022
- (3) For Canada: Transparency: The names of any other eligible CFR-LUBCS that the subject CFR-LUB CS recognizes within its CFR-LUB certification program. Transfer from one scheme to another: Prior to recertifying a feedstock producer that was previously found to be in non-conformity with any other CFR-LUB CS, the certification body will be required to bring this to the attention of the CS. Based on draft federal Clean Fuel Regulations, expected to come into force in December 2022
- (4) EU RED II: In case part of the chain relies on other voluntary schemes, schemes may only recognise voluntary schemes that are recognised by the Commission in the context of the Directive 2018/2001. Schemes may only recognise the scope of the voluntary scheme that the EC recognises in this context. Where the scope of schemes differs, schemes may choose to differentiate the claims based on the scope of the voluntary scheme they are recognising, e.g. Other EC-recognised voluntary schemes could lead to a "RED compliant" claim.
- (5) Table 1: The names of any other eligible SCS that the subject SCS recognizes within its CORSIA certification programme. Table 2: SCS requires all economic operators to declare the names of all SCS under which they are and/or were certified and make available to the auditors all information relevant to those certifications. In: CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes.
- (6) The information on what scheme has been used to certify SFM at the origin needs to be available at the end of the chain.
- (7) For the schemes, it's "once approved, always approved". However, there is continuous "re-approval" each time schemes have a new scheme document that is relevant to the approval. Otherwise, the approval is no longer valid.
- (8) Schemes may adopt their verification procedures but must notify changes that might be relevant to the Commission, such as changes in auditing procedures
- (9) Firstly, there is an assessment of the scheme governance requirements: It is a first condition that these are met. If not, an assessment of the sustainability criteria is not even considered.
- (10) Requirement to review the SCSs at a minimum once every five years. Next to that, the voluntary schemes will need to be reapproved for the Voluntary Phase of CORSIA (which starts in 2024) as the sustainability criteria will change. If criteria change again for the Mandatory Phase (or requirements change at any time in between) a re-approval would be needed as well.
- (11) Article 8: Recognition of other voluntary schemes: Where part of the supply chain relies on other voluntary schemes, they shall accept evidence of voluntary schemes recognised in accordance with Article 30(4) of Directive (EU) 2018/2001, only to the extent of the scope of their recognition. Article 9: Voluntary schemes shall not refuse recognition of recognised national schemes as regards the verification of compliance with the sustainability and GHG emissions saving criteria...[...].

- Most policy frameworks do require- often as part of the auditing requirements (see 5.4) transparency when an economic operator is certified by multiple schemes and/or has changed from one scheme to the other. The Dutch framework on ‘solid biomass’ is the most advanced on this and requires that the information on what scheme has been used to certify SFM at the origin needs to be available at the end of the chain.
- Some certification schemes may (only) be used for the Chain of Custody (CoC). Requirements for certification schemes on the CoC are included in frameworks such as the EU RED II but are for example not at all included in the policy frameworks from Queensland (Australia) and Canada.

5.4 ASSURANCE AND VERIFICATION REQUIREMENTS FOR THE APPROVAL OF SCHEMES

A Conformity Assessment Body (CAB) is a body responsible for performing the conformity assessment. These can have the role of certifier or auditor for one or more certification schemes, and/or they can have a role as verifier.

A **certification body (certifier or auditor)** is an independent organisation that evaluates the conformance of companies to the requirements of the applicable standards from one or more certification schemes. Certification bodies are usually accredited by an **accreditation**¹⁶ body, either at a national level or at an international level. **Verifiers** also provide verification services for entities, for example subject to the LCFS regulation, must also meet specific requirements including accreditation.

Error! Reference source not found. shows for a limited number of selected policy frameworks a summarized overview of a set of verification and assurance requirements that certification schemes must meet for approval. These also include requirements that certification schemes have for the certifiers/ auditors that evaluate the conformance to their applicable standards.

The analysis is based on the following frameworks and documents:

- EU RED II: Updated assessment protocol (EC, 2021a) and, where applicable, draft Implementation Regulation (consultation version) on rules to verify sustainability and GHG emission saving criteria including ILUC criteria (EC, 2021)
- Dutch framework on solid biomass: Assessment protocol from 2020, version 2.5 (ADBE, 2020), the Dutch Verification protocol (RVO, 2020a) and the Decree on conformity of solid biomass for energy applications
- ICAO CORSIA: Eligibility Framework and Requirements for Sustainability Certification Schemes (ICAO_CORSIA, 2019a)
- Canada, CFR: draft version Method for validation, verification, and certification Clean Fuel Regulations (CFR, 2021)

The more detailed table can be found in **Annex 2.**

¹⁶ Accreditation is the process of evaluating and approving certification bodies to function under the scheme rules.

Table 15: summarized overview of a set of verification and assurance requirements that voluntary certification schemes must meet for approval, including requirements that certification schemes have for the certifiers/ auditors (CBs) that evaluate the conformance to their applicable standards. NL Solid biomass = Dutch framework on solid biomass, CFR = Canadian CFR, CBs = certification bodies

Scope	EU RED II	NL solid	CORSIA	CFR (draft)
Requirements on scheme owner	V			_V
Proven need for existence scheme		V		.
<u>Documentation management and record keeping for scheme, economic operator, and CBs</u>				
For scheme	V	V	V	V
For economic operators	V	V	V	
For Certification bodies (CBs)	V	V (1)		V
<u>Scheme development and internal monitoring</u>				
Scheme development: risk management plan			V	V
Internal monitoring, procedures, internal system review / non-compliance	V	V	V	V
Stakeholder involvement	V	V	V	V
Scheme expertise on sustainability		V		
<u>Approaches on auditing and verification (for certification bodies)</u>				
Criteria risk-based approach (incl. limit to use)		V		

Scope	EU RED II	NL solid	CORSIA	CFR (draft)
Audit should include a risk analysis	V	V (1)	V	V
Initial audits	V		V	V
Surveillance/ retrospective audits	V			V
Remote audits		V (1)	V	V
Validity certificate and conditions for use			V	V
Certificate issuance	V	V (1)	V	V
Transfer from one SCS to another	V		V	V
Establishing a level of assurance	V	V (1)	V	V
<u>Group certification</u>				
Group is led and supervised by entity	V	V		
Criteria on Homogeneity	V		V	V
Minimum sample of auditing	V		V	V
No self-declarations	V		V	
<u>Requirements for auditor and certification bodies</u>				

Scope	EU RED II	NL solid	CORSIA	CFR (draft)
Auditor competencies	V	V (1)	V	V
Accreditation of CBs and auditing standards	V	V (1)	V	V
Outsourcing				V
<u>Transparency</u>				
Transparency of scheme (and its documentation)	V	V	V	V
Transparency on other scheme participation	V	V (1)	V	
<u>Specific auditing requirements for GHG, mass balance and waste and residues</u>				
Related to auditing of waste and residues	V			
Related to auditing of: GHG emission calculations	V		V	
Related to auditing of mass balance systems	V			
<u>Complaint procedure</u>				
Complaint procedure	V	V	V	V
<u>Requirements for certification schemes to facilitate their supervision of operation of CBs and operators</u>				
Schemes have procedures in place to facilitate supervision of the operation of CBs and operators	V			

Scope	EU RED II	NL solid	CORSIA	CFR (draft)
Reporting by schemes to facilitate supervision (2)	V		V	V

(1) Mentioned in the Verification protocol, but not mentioned in the ADBE assessment protocol

In the comparison, we looked for **the EU RED II** at both the Assessment protocol and the draft Implementation Regulation (consultation version). This may give a bit of a distorted picture, as it is still unclear which criteria will ultimately be included in the draft Implementation Regulation at the point of writing.

There is a difference in the **Dutch policy framework on solid biomass** between certification and verification on how requirements on auditing are included.

- For certification, during the scheme approval based on the ADBE testing protocol, it is examined how schemes are managed based on the scheme governance criteria. Next to that, certification bodies must be officially recognized by the Minister of Economic Affairs and Climate Policy, as laid down in the Decree 'Conformity Assessment of Solid Biomass for Energy Applications' (RVO, 2021).
- For both verification and certification, accreditation must guarantee the credibility and working methods of the certification bodies and is therefore a requirement for recognition; and more specifically national Accreditation (in the country where this certification body is located), affiliated with the International Accreditation Forum (IAF) or the International Laboratory Accreditation Cooperation (ILAC) or (as with many CBs) an equivalent alternative such as the ASI.
- Next to accreditation, the Verification Protocol does include additional requirements for conformity assessment bodies, including auditor competences.

When looking at verification and assurance requirements that are selected for this comparison, **Error! Reference source not found.** also shows that the *devil is in the details*. Differences in requirements can for example be observed in including or not (further including) criteria on:

- Not allowing self-declarations for group auditing
- Requiring similar accreditation and audit requirements when activities are outsourced
- Transparency on other scheme participation
- Validity of the certificate
- Requirements on (the limited use) a risk based (sourcing area) approach

Although these are small differences, they can (together) end up in easier requirements, and/or a broader interpretation in the requirements related to verification and assurance of certification bodies. Next to that, it is also important to realize that these requirements are fully missing in some of the policy frameworks, such as Queensland (Australia).

5. 5 SUMMARY OF OBSERVATIONS

Policy frameworks make use of certification or verification to prove compliance with the sustainability criteria. In some cases, the recognized schemes or standards can be considered

a national scheme as they are embedded in a policy framework of a country or State as (single) means to prove compliance with sustainability criteria for (amongst others) biofuels.

There are also examples of policy frameworks that recognize a combination of certification and verification within on supply chain, or to be used for one consignment. This approach gives flexibility in the market as it allows economic operators to use (alternative) schemes when new criteria are developed. The option for verification, next to certification, can especially be interesting when proof of compliance is required for new criteria that have not yet been included in (many) certification systems. The downside is that allowing for both certification and verification may add to complexity and may make it more challenging to keep one minimum level of assurance within the framework.

Under the EU RED II, a large range of certification schemes are (to be) approved. This underlines the importance of a clear framework with minimum requirements to avoid that many schemes with different requirements appear on the market.

Schemes adapt to new or additional policy requirements. Different requirements in policy frameworks (also due to their different scopes) have resulted in the development of specific modules under certification schemes, with different claims, so to be able to adapt to specific policy requirements. It is important to understand what these different claims and requirements in one scheme represent, both for government authorities and for auditors, as each may hold a different weight and have different levels of meaning. Transparency is therefore key. At the same time, it must be taken care of that requirements are not defined too strictly or narrow, so that the translation of these to verifying impact on the ground becomes unworkable.

Various policy frameworks make use of multiple voluntary certification schemes to prove compliance with the sustainability criteria. There are differences amongst the policy frameworks on the recognition criteria and the conditions under which these schemes are recognized.

All policy frameworks have as requirement that the certification scheme covers the sustainability criteria that are laid down in the policy framework. Conditions for cross-compliance, however, differ and requirements for the Chain of Custody (CoC) are included in some frameworks (such as the EU RED II) but missing in others (e.g., Queensland or Canada).

For only a limited number of selected policy frameworks, there is an analysis on the similarities and differences in verification and assurance requirements that certification schemes must meet for approval. These also include requirements that certification schemes have for the certifiers/ auditors that evaluate the conformance to their applicable standards.

Note that, although not included in this analysis, also verifiers that provide verification services for entities must meet specific requirements. The Dutch policy framework on solid biomass learns also that there can be differences in how, and to what detail, requirements for auditors for certification or verification are laid down in one single policy framework.

This analysis shows that differences exist and that the *devil is in the details*. Differences in requirements can for example be observed in including or not (further including) criteria on (not) allowing self-declarations for group auditing or on transparency when an operator also participates in another scheme. Although these are small differences, they can (together) end up in easier requirements, and/or a broader interpretation in the requirements related to

verification and assurance of certification.

Next to that, it is also important to realize that these requirements are fully missing in some of the policy frameworks, such as Queensland (Australia).

Note that certification schemes can also apply criteria which are stricter than the criteria laid down in the national policy frameworks and additional criteria. Examples are social criteria or criteria adapted to local conditions, and criteria to promote best agricultural practices. They may also take into account additional sustainability aspects such as soil, water and air protection (ECA, 2016).

The fact that schemes can include more or stricter requirements in their standards does not mean that this is per definition happening. Schemes can also 'make use' of lower requirements or the partial or complete lack of requirements, and lower the bar, which can affect the assurance and reliability of the sustainability of biofuels through certification. Policy frameworks have a role to play in setting the bar by defining the (minimum) legal level of requirements for a scheme to be recognized.

6. Requirements on Chain of Custody (CoC) and the traceability and transfer of information through the supply chain

Sustainability risks apply to different parts in the supply chain and incidences can occur at any step of the supply chain, regardless location. Mitigating sustainability risks require that the overall quality of chain management is as homogeneous as possible everywhere. This is essential to cross-check information through the supply chain and also helps to create a level playing field for suppliers, also across different sectors other than bioenergy (SQ_Consult, 2020). This chapter analyses the requirements on the chain of custody (CoC) and on the traceability and transfer of information through the supply chain.

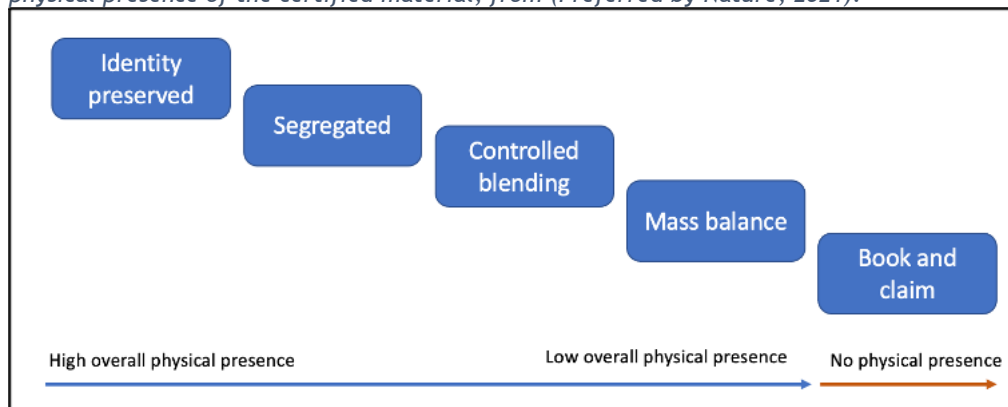
A **chain of custody (CoC) system** includes measures that define the responsibility for the custody of materials and products when these are transferred from one organisation to another within the relevant supply chain. Its purpose is to ensure that specified characteristics (e.g., that the product is certified) are indeed the ones that are actually delivered in the output (Preferred by Nature, 2021).

Traceability and chain of custody are not synonymous. **Traceability** is defined as the ability to trace the history or location of a product. It delivers the ability to follow the movement of a product and its components through specified stages of production, processing, and distribution (Preferred by Nature, 2021).

6.1 THE USE OF CHAIN OF CUSTODY (COC) MODELS

There are different types of CoC that have different levels of assurance of the material's actual physical presence in the end-product (see also [Error! Reference source not found.](#)).

Figure 6: illustration of the different CoC models in terms of their ability to preserve the original physical presence of the certified material, from (Preferred by Nature, 2021).



Most certification schemes make use of one or more different types of CoC models. The following Chain of Custody models can be distinguished (Preferred by Nature, 2021):

- **The identity preserved model** is a CoC model, in which the inputs originate from a single source. In this model, the material or product is kept physically separated throughout the supply chain and the certification status is maintained throughout the supply chain.

Materials or products are clearly identifiable throughout the supply chain as originating from the single source (Preferred by Nature, 2021).

- In the **segregated or transfer model**, the specified characteristics of a product are maintained, throughout the supply chain. Inputs from different sources that are all certified by the same scheme may be mixed (Preferred by Nature, 2021).
- The **controlled blending model** is a chain of custody model in which certified materials or products are mixed with non-certified materials or product, but **often with a set of criteria such as Controlled Sources**. This results in a known proportion of the certified material in all parts of the final output. That means that the end user will know the percentage of certified material in each product with that specific certification claim. **This model applies a percentage-based calculation** (Preferred by Nature, 2021).
- In the **mass balance model** certified materials or products are mixed with non-certified materials or products, resulting in a claim on a part of the output that must be proportional to the amount of certified input. The calculation of volumes may be percentage based or managed in a credit system. In this model the end- user may buy a product with no certified material (Preferred by Nature, 2021).
- The **‘book and claim’ model (B&C)** is an alternative CoC model in which the administrative record flow is not connected to the physical flow of materials or products throughout the supply chain. After production of certified material, the information on specified characteristics within the supply chain is decoupled from the actual material. Credits are issued when materials or products enter the market. The credits can then be traded and sold independently of the physical delivery of certified materials (Preferred by Nature, 2021).

Error! Reference source not found. shows if the policy frameworks include requirements on which Chain of Custody model is allowed, and if yes, which models are allowed: For most selected policy frameworks, the mass balance CoC model is required as minimum for the Chain of Custody; as physical segregation is considered a stricter model than mass balance, this model will in those cases also be allowed.

As mass balance has a weaker link with the original physical presence of the sustainable biomass, physical controls are more complicated and controls on administrative records become of even higher importance.

Table 16: Overview whether selected policy frameworks include requirements on which CoC model is allowed, and if yes, which models; * as physical segregation is a stricter model than mass balance, this model will also be allowed), B&C = book and claim, MB = mass balance, SEG = Segregated, *Overarching legislation set by EC and receipt with minor changes by the various European Member States.

Selected framework	There is a requirement on CoC model(s)	Chain of Custody model (s) allowed			Additional comments
		B&C	MB	SEG	
Australia, Queensland, NSW	N.A. -				
India	N.A.				
Brazil RenovaBio	V		V (1)	V (2)	Currently, only transfers without mixing are allowed along the chain of custody. Certifiable feedstock needs to be segregated from non-certifiable feedstock along the value chain. Mixing is only allowed in the biofuel production process unit at the biofuel plant - and only when a proportionality calculation is applied.
CLCFS	V		V (3)	V (3)	Mass balance is only allowed when specifications and physical characteristics of batches are the same.
Canada (5)	V		V (5)	Not yet defined (5)	The draft document on “Method for validation, verification and certification” refers to mass balance for mixed feedstocks at each facility

Selected framework	There is a requirement on CoC model(s)	Chain of Custody model (s) allowed			Additional comments
		B&C	MB	SEG	
EU RED II*	V		V	V*	Economic operators are required to use a mass balance system on site (production location) level for reporting for each consignment. The physical presence of (at least some) biomass in every delivery is a requirement (4). Physical segregation is also allowed.
EU ETS for aviation*	V		V	V*	See EU RED II
ICAO CORSIA	V		V	V*	Sustainability Certification Schemes require economic operators to use a mass balance system
NL: solid biomass	V		V	V*	Mixing (based on tonnes) with controlled biomass (as further defined) only for categories 1 and 2: woody biomass from forest management units

- 1) RenovaBio: Mass balance only within biofuel facilities
- 2) RenovaBio: Segregation required in the value chain until the biofuel plant
- 3) Only mass balance when specifications and physical characteristics are the same, e.g., mass balance can be used further in the supply chain when combining biodiesel batching. Batches from UCO and vegetable oil can for example not be combined, and require physical segregation
- 4) While some Member States have a less strict supervision, the Netherlands therefore require that the biocontent is demonstrated at the size of the booking (within uncertainty margins and not necessarily by analysis).
- 5) Based on draft federal Clean Fuel Regulations, expected to come into force in December 2022

6.1.1 CoC models and dealing with increased complexities of advanced biofuels: biomethane

A key source of renewable energy is biomethane. Most often, biogas produced is upgraded to biomethane (of natural gas quality) and is then injected into the existing natural gas grid. Biomethane Guarantees of Origin (GOs) are issued for biomethane injected into the grid and can be used to prove the renewable character of the natural gas. GOs are based on a book and claim CoC model. For the contribution to the national renewable energy production the amount of biogas is accounted in the country of injection. Specific rules for allocation to sectors based on information provided by national authorities based on a sector specific obligation are under discussion. Practical this means that countries could get the possibility to allocate injected biogas to the transport sector based on biogas injection and gas delivery to transport in and out of a connected grid.

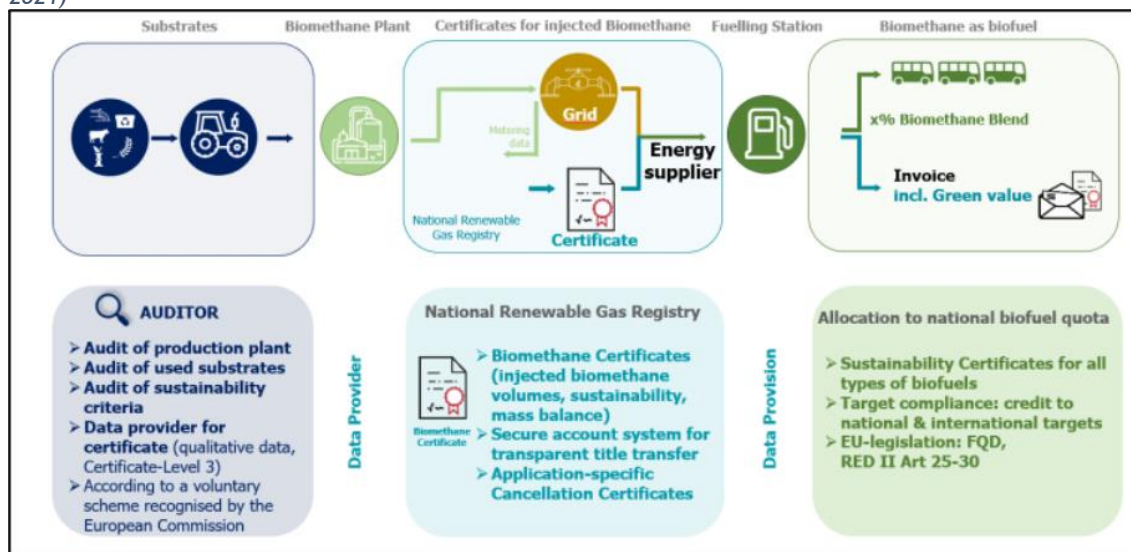
Since European gas grids are becoming more integrated, this requires in case of cross-border trade a need to ensure proper accounting of renewable energy as well as avoiding double incentives resulting from support schemes in different Member States.

To deal with this complexity, amongst others the ERGaR RED MB certification scheme is being developed¹⁷ - dealing exclusively with biomethane consignments destined for export and not counted in the country of production to meet national biofuel quota targets. Since it is impossible to track biomethane injected into the natural gas pipelines in a physical sense, the full chain of custody (from raw material supplies to end-user) is covered by ERGaR RED MB in two stages (ERGaR, 2021), see also **Error! Reference source not found.:**

- The first part of the CoC starts with the raw material supplies and covers production up to injection into the natural gas grid. This part is documented by the established sustainability verification procedures defined in the EU RED II and the resulting document is attached to the electronic dataset of the ERGaR Proof of Origin.
- The second part of the CoC covers pipeline transportation from the point of grid injection until the withdrawal by the end-user. This part is administered by the ERGaR RED MB voluntary scheme, applying mass balancing methodology for biomethane injected into the natural gas grid.

¹⁷ ERGaR seeks recognition as a voluntary scheme under the Renewable Energy Directive, see chapter 5.

Figure 7: Chain of Custody: Biomethane in the transport sector according to ERGaR RED MB (ERGaR, 2021)



6.1.2 Allocation rules for the Chain of Custody (CoC) - and specific for mass balance

The Chain of Custody is a difficult concept, and it is open to many different forms of interpretation. These different interpretations may lead to risks that result in a non-reliable Chain of Custody (CoC) or to the loss of crucial sustainability information. Some of the potential risks mentioned by (CE Delft, 2020), (RVO, 2020) are:

- In the case of physical consignments to foreign recipients, there is a bigger risk that the same amount of biomass is delivered twice on paper. This risk arises when physical consignments to foreign entities are not included in the mass balance. For that reason, the links in the CoC should ensure that all physical consignments to recipients in the country itself and abroad are registered on the same mass balance.
- If an economic operator is certified by multiple certification schemes, there is a risk that the amounts of physically delivered biomass are duplicated. An auditor from scheme 1 can give a statement for country X, but it is difficult to cross-check (and avoid) that an auditor from scheme 2 will come along at another time and prepare a statement for export to country Y for the same consignment.
- The physical properties and composition of biomass feedstocks and biofuels may be altered through blending and splitting. However, the overall mass balance, which reflects the balance of in- and outgoing materials on an aggregated level, is described in the administrative documents. This makes it difficult to get an overview of the actual physical streams.
- An operator may have multiple storage sites, and this requires that preferably requirements are in place that mass balance is applied per location.
- Clearly, complex trade chains, and an increase in blending and multiple outputs throughout advanced biofuel supply chains may add complexity to allocation rules. This complexity will increase the risk of information about input and output volumes are incomplete or not correct (SQ_Consult, 2020).

To prevent these risks, including the risks for double claims, policy frameworks can set up rules that lay down minimum requirements for a CoC system and/or, when relevant, place these requirements in the assessment criteria for approval of certification schemes, see also **Error!**

Reference source not found. The analysis in Error! Reference source not found. looks at which minimum requirements are set for using the mass balance CoC model for the selected policy frameworks. Differences exist in these minimum requirements, including:

- To what extent minimum requirements for the mass balance CoC model are integrated in the selected policy framework. While some policy frameworks have not included any minimum requirements, other frameworks (e.g., EU RED II, ICAO CORSIA, or the Dutch framework on solid biomass) have relatively detailed requirements.
- Not including any minimum requirements clearly opens the door for interpretation and may lead to some of the risks mentioned by (CE Delft, 2020), (RVO, 2020) such as using the mass balance for multiple storage sites instead on-site level.
- Especially for those frameworks that recognize multiple certification schemes, this may also lead to interpretation on how mass balance rules will be include in the different scheme standards.
- For those frameworks that have included minimum requirements for the mass balance CoC model, there are still opportunities to further harmonize the minimum requirements as details may still show differences amongst frameworks. An example of this is shown in Error! Reference source not found.

Box 3: Description on the minimum requirement for defining the appropriate time frame when using the mass balance CoC, as formulated by EU RED II, ICAO CORSIA, and the Dutch framework on solid biomass

EU RED II - draft Implementation Regulation (EC, 2021): “The appropriate period of time for achieving the mass balance shall be 12 months for producers of agricultural biomass and forest biomass and first gathering points sourcing only agricultural biomass and forest biomass, and 3 months for all other economic operators. The start and end of the period shall be aligned with the calendar year or, where applicable, the four quarters of the calendar year. As an alternative to the calendar year, economic operators may also use the economic year that they use for bookkeeping purposes, provided that the choice is clearly indicated and applied consistently. At the end of the mass balance period, the sustainability data carried forward should be equivalent to the physical stock in the container, processing or logistical facility, transmission and distribution infrastructure or site...”

ICAO CORSIA: “SCS requires the economic operator to monitor the balance of material withdrawn from and added to the mass balance system. SCS requires economic operators to specify a timeframe over which they will ensure that the mass balance is respected. The operator ensures that the balance is achieved over an appropriate period of time no longer than three months. A deficit is not allowed at the end of the period. At the end of the reporting period, a positive balance can be forwarded to the next reporting period as long as an equivalent physical stock is available”

Dutch Framework on solid biomass: The organisation defines a period with a maximum of a year, during which incoming and outgoing consignments are measured, and shall report the results.

Table 17: Overview of minimum requirements for a CoC system (here **only for the mass balance!**) and/or, when relevant, as part of the assessment criteria for approval of certification schemes **V**: As laid down in a selection of Regulations or policy frameworks itself. **V** As laid down in the assessment criteria for approval of certification schemes. BRA = Brazil, *Overarching legislation set by EC and receipt with minor changes by the various European Member States. **Note:** Frameworks from Australia and India are excluded from this comparison as they do not have CoC requirements. The Canadian framework is excluded because sufficient information is not available/ known yet in the Draft Regulation.

Minimum requirements, specifically for mass balance - As laid down in the policy framework	BRA (15)	CLFS (15)	EU RED II*	EU ETS*	ICAO CORSIA	NL solid
System shall ensure that each consignment is counted only once	V	V	V (2)	V (2)	V (5, 6)	-
Product claim must be linked correctly to the feedstock quantities claimed.	V	V (11)	-	-	V (5)	V (14)
Internal management: A system for documenting the mass balance is in place	V	V	V (1)	V (1)	V (5)	V (8)
Information about sustainability characteristics and sizes of the physical quantity (batches) remains assigned to the mixture.	V (10)	V (11)	V	V	V (5)	V
The sum of all consignments (with the same sustainability characteristics) withdrawn from the mixture is the sum of all consignments added to it	V (10)	V	V	V	V (5)	-
Mass balance for each legal entity (when more legal entities on one site)	V(10)	V	V (3)	V (3)	V (5)	V (9)
Mass balance at a site level	V	V	V (1,4)	V (1,4)	V (5, 7)	V (9)

Minimum requirements, specifically for mass balance - As laid down in the policy framework	BRA (15)	CLFS (15)	EU RED II*	EU ETS*	ICAO CORSIA	NL solid
Timeframe defined - with no deficit at the end of this period		V	V (1)	V (1)		V (9)
Requirements on conversion factor (s) of production: (12)	V(10)	V	V	V	-	V (9)
Requirements on adjustment and mixing of consignments with different energy content (13)	V	V	V	V	-	-

(1) See EU Assessment protocol https://ec.europa.eu/energy/sites/default/files/assessment_protocol_template_redii_final.pdf

(2) (Art. 30.1):the mass balance system shall ensure that each consignment is counted only once for the purposes of calculating the gross final consumption of energy from renewable sources

(3) If more than one legal entity operates on a site, then each legal entity is required to operate its own mass balance.

(4) The mass balance system shall operate at a level where consignments could normally be in contact, such as in a container, processing or logistical facility, transmission and distribution infrastructure or site (defined as a geographical location with precise boundaries within which products can be mixed).

(5) See: CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes, November 2019 - Table: Traceability requirements set by SCS on Economic Operators

(6) SCS requires the economic operator to assign a unique reference/identification number to each batch of certified product sold

(7) SCS requires economic operators to operate the mass balance system at a site level

(8) C12.1 Each link in the CoC bears final responsibility and has a quality management system in place that provides safeguards for compliance with the requirements of the chain of custody system.

(9) Mass balance at site level: Assessment protocol: C12.5: Each link in the chain of custody applies a mass balance in case of mixing or splitting of materials with different sustainability characteristics. For the mixing the following applies: The method shall be applied at least at the level of a location; The organisation defines a period with a maximum of a year, during which incoming and outgoing consignments are measured, and shall report the results' All sustainability characteristics of mixed biomass output can be traced back to the characteristics and quantities of the incoming consignments, taking account of the applicable conversion factors. In Verification Protocol: a negative balance is not allowed. CoC criteria apply only to entities with legal ownership.

(10) The mixing is only allowed at the production of biofuel at the biofuel plant - thus at site and at producer level. Observed conversion factors are also applied.

(11) See for example for specified sourcing feedstock: Fuel pathway applicants using specified source feedstocks must maintain either (...or (2) information from material balance or energy balance systems that control and record the assignment of input characteristics to output quantities at relevant points along the feedstock supply chain between the point of origin and the fuel production facility. Chain- of-custody evidence is used to demonstrate proper characterization and accurate quantity.

(12) representing the ratio between the mass of the output that is intended for production and the mass of the raw material entering the process

(13) Allows consignments of raw material with differing energy content to be mixed for the purposes of further processing, provided that size of consignments is adjusted according to energy content

(14) A requirement for the annual Declaration of Conformity for receiving the SDE+ subsidy (as described in the Verification Protocol)

(15) This framework does not recognize multiple certification schemes.

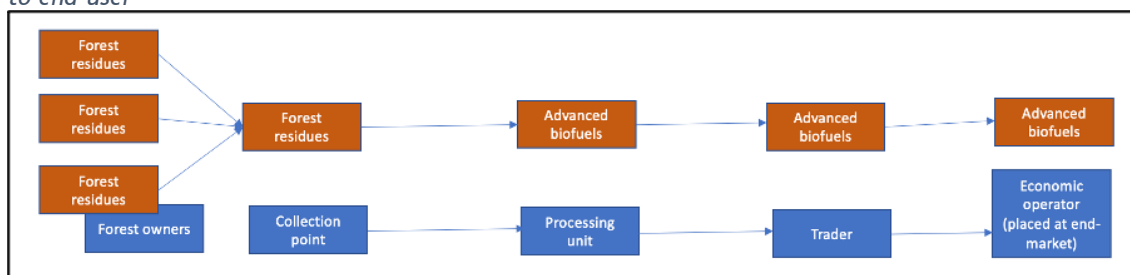
6.2 TRACEABILITY AND TRANSFER OF INFORMATION THROUGHOUT THE SUPPLY CHAIN

Information about GHG emissions and sustainability characteristics of the consignment(s) is transferred through the supply chain. At the first link in the chain, information on the origin of the biomass needs to be present to allow the category and corresponding sustainability requirements to be determined.

As shown by the example in Error! Reference source not found., the first link in the supply chain can be (RVO, 2020a):

- The point of Origin (PoO): i.e., the economic operator where the biomass occurs or is generated, or;
- The first collection point (FCP): First gathering points that trade, distribute or further process the collected biomass

Figure 8: Example of a supply chain for (in this case) primary forest residues from first point of origin to end-user



Whether the point of origin or the FCP is the first link in the supply chain that is subject to verification may differ, depending on the feedstock category. Error! Reference source not found. shows the first link in the supply chain subject to verification or certification for biomass originating from primary forest residues and for agricultural residues. Determining the first link in the supply chain by the selected policy framework seems to generally depend on two key factors:

- The level of (perceived) risk for fraud or double counting and/or;
- The economic and practical feasibility of tracing the biomass back to the first point of origin. For example, in the case of UCO or other waste streams, this can be complex, time-consuming and/or expensive.

The analysis from Error! Reference source not found. learns that some policy frameworks have not well defined which first link in the supply chain is subject to certification or verification. An example of this is the EU RED II for agricultural residues. Also, policy frameworks are not always clear about which requirements apply to the first defined link in the supply chain: traceability of origin and information back to this point and/or also the requirement of certification/ verification of this information back to this point.

Table 18: First link in the supply chain subject to verification or certification - here presented for primary forest residues (e.g. branches) and for agricultural residues (e.g. straw). PoO = point of origin, FGP = First Gathering Point., *Overarching legislation set by EC and receipt with minor changes by the various European Member States, ** The frameworks of Australia (Queensland), Australia (NSW) and India are not included in this overview because of lack of information.

Framework	Primary forest residues		Primary agricultural residues		More info
	PoO	FGP	PoO	FGP	
Brazil RenovaBio	V		V		
CLCFS	V (risk-based)	V	V		For specified sourcing feedstock: record collection at PoO (1) Typically verified at point of collection with use of professional judgement and risk assessment to select some CoC records to trace to PoO.
Canada (6)	?	?	?	?	Not yet defined
EU RED II*		V	V		<u>For primary forest residues:</u> First or second party auditing up to the FGP of the forest biomass. Information on forest sourcing area level (2) <u>For primary agricultural residues:</u> Clear reference is missing - in practice PoO but e.g., sample based (3)
EU ETS for aviation*		V			See EU RED II
ICAO CORSIA	V		V		<u>Primary forest residues:</u> Forest management Unit (FMU) (4) <u>Primary agricultural residues:</u> Field level: first collection point (4)
NL: solid biomass for co-firing & electricity	V			V	<u>Primary forest residues:</u> 3 rd party auditing: Forest management Unit (FMU) (4) <u>Primary agricultural residues:</u> 3 rd party auditing: First collection point (FCP) (4)

- (1) For specified sourcing feedstock: information from material balance or energy balance systems that control and record the assignment of input characteristics to output quantities at relevant points along the feedstock supply chain between the point of origin and the fuel production facility.
- (2) The first- or second-party auditing may be used up to the first gathering point of the forest biomass. The information is to be gathered on forest sourcing area level. 'Sourcing area' means the geographically defined area from which the forest biomass feedstock is sourced, from which reliable and independent information is available and where conditions are sufficiently homogeneous to evaluate the risk of the sustainability and legality characteristics of the forest biomass
- (3) No clear reference is made for agricultural biomass. In practice: ISCC uses a sampling method (onsite); Better Biomass is done with desktop research. If this deviates, a physical visit is still possible (Evers, 2022).
- (4) For forest or agricultural residues, the first collection point would be the point of production itself (field or forest). Group auditing is a possibility
- (5) One or more forest stands containing natural forest, planted forest or other types of forest that are managed as a single unit
- (6) The federal Clean Fuel Regulations is expected to come into force in December 2022

For primary forest residues, there is general agreement that the first point in the supply chain is the forest - but there are different interpretations on its geographical scope, ranging from forest management unit (e.g., Dutch framework on solid biomass) to forest sourcing area (EU RED II). As a result, different requirements exist between selected policy frameworks, also for residue and waste streams (see also chapter 4), as shown in **Error! Reference source not found..**

Box 4: Requirement on first link in the supply chain for waste and residues, as defined by EU RED II, ICAO CORSIA and the Dutch framework on solid biomass

The draft **Implementing Regulation from the EU RED II** (EC, 2021) mentions in Article 13, on the auditing of waste and residues that: "The whole supply chain shall be covered starting from its origin, that is to say, the economic operator where the waste or residue material arises. All economic operators shall be audited individually. However, group auditing approaches may be carried out at the origin of the supply chain, for example, restaurants."

Meanwhile the **ICAO CORSIA Framework** (ICAO_CORSIA, 2019a) mentions that "In the case of waste or residue feedstocks (following the definition from ICAO CORSIA), the material can be traced back to the first gathering point. In the case of by-products (following the definition from ICAO CORSIA), the material can be traced back to the point of origin".

For the Dutch framework of solid biomass (RVO, 2020a), the point where the requirements apply is the first collection points for market parties that collect category residual flows from nature and landscape management, agricultural residues and processing residue and waste streams - directly from or receive them from the points of origin.

The example from the 'Repurpose Used Cooking Oil' (RUCO) platform in India shows that a government agency can also promote the traceability of a feedstock flow - independent from the policy framework of (advanced) biofuels, see **Error! Reference source not found..**

Box 5: India and Registry Points of Origin for UCO

In India, the Points of Origin from UCO need to be registered. This check of verification does not mean an additional certification (as it is verification). As part of its EEE (Education, Enforcement and Ecosystem) strategy to divert UCO from the food value chain and curb current illegal practices, the Food Safety and Standards Authority of India (FSSAI) has launched the 'Repurpose Used Cooking Oil' (RUCO) platform. RUCO is a technology platform that gives 100% traceable UCO based biodiesel to oil marketing companies. The RUCO initiative currently rolls in eight states (FSSAI, 2020). Accessibility and completeness of information is herewith improved, especially when also publicly accessible for other actors to use it. This means that auditors and certification schemes can check this information to improve their sampling audits (FSSAI, 2020), (SQ Consult, 2020)

6.3 SUMMARY OF OBSERVATIONS

Mitigating sustainability risks require that the overall quality of chain management is as homogeneous as possible everywhere. For most selected policy frameworks, the mass balance CoC model is required as minimum for the CoC. As the mass balance has a weaker link with the original physical presence of the sustainable biomass, controls on administrative records become of even higher importance.

Complex trade chains, and an increase in blending and multiple outputs throughout advanced biofuel supply chains, adds complexity to the CoC models to be used and its allocation rules, as is shown by the case of biomethane. This risk will further increase with the development of renewable fuels that are physically indistinguishable from fossil fuels

The CoC is open to many different forms of interpretation, which may lead to risks that result in a non-reliable CoC or to the loss of crucial sustainability information. To prevent these risks, policy frameworks can set up rules that lay down minimum requirements for a CoC system and/or, when relevant, place these requirements in the assessment criteria for approval of certification schemes.

The analysis shows that there are differences between the selected policy frameworks on the minimum requirements for using the mass balance CoC model. While some policy frameworks have not included any, other frameworks have relatively detailed requirements. Not including any minimum requirement clearly opens the door for interpretation and may lead to risks, such as using the mass balance on multiple storage sites instead on a site level. For those frameworks that do have minimum requirements for the use of the mass balance CoC model, there are still opportunities for further harmonization as details differ. The ISO 22095 standard defines a framework for the CoC and can be a useful reference for further harmonization.

Next to that, it should be recognized that the use and recognition of multiple certification schemes among but also within policy frameworks, operating side by side, enlarges the risk for fraud in the CoC as it is more complicated for an auditor to check on the risk whether a statement for the same consignment is also prepared for another scheme by another auditor.

Information about GHG emissions and sustainability characteristics of the consignment(s) is transferred through the supply chain. At the first link in the chain, information on the origin of the biomass needs to be present to determine the feedstock category and corresponding sustainability and GHG requirements. Harmonizing biomass category definitions between policy frameworks helps certification schemes to be used in multiple frameworks

The choice of whether the first link in the supply chain to get certified is the point of origin or the First Gathering point for a certain feedstock category seems to generally depend on (i) level of (perceived) risk for fraud or double counting and/or (ii) the economic and practical feasibility of tracing the biomass back to the first point of origin.

The analysis shows that some policy frameworks have not well defined which first link in the supply chain is subject to certification or verification. Also, policy frameworks are not always clear whether the requirement about the first link in the supply chain refers to the requirement to be able to trace back the information to this point and/or also to the requirement of certification/ verification of this point.

For primary forest residues, there is general agreement that the first point in the supply chain is the forest - but there are different interpretations on its geographical scope, ranging from forest management unit to forest sourcing area. Different requirements on the first link of the supply chain for certification also exist for waste and residues for the selected policy frameworks. Clear definitions and monitoring from the first point in the value chain from where the emissions must be included are important as it determines the outcome of the calculated GHG emission reduction at the end of the chain, and its reliability.

Uniformity between policy frameworks in this regard is key to prevent that feedstocks - and especially residues and waste streams - can be used and/or traded more easily in certain regions and/or countries due to less strict certification or verification requirements. Next to that, the transfer of sustainability information throughout the supply chain and across countries requires a harmonised interpretation of terminologies and definitions.

7. Proving compliance at the end of the supply chain: information requirements for the obligated party

For most selected policy frameworks, biofuels must comply with GHG emission reduction and certain sustainability requirements (see chapter 3). To prove compliance with these requirements throughout the supply chain, policy frameworks make use of certification or verification - or a combination of both (see chapter 5).

Information about the GHG emissions and sustainability characteristics of the consignment(s) is transferred through the supply chain (see chapter 6), to the last interface in the supply chain responsible for meeting the obligations and for reporting to the respective (government) authority. This chapter discusses for the selected policy frameworks:

1. The responsible (government) authority
2. The obligated party
3. The information submitted at the end of the supply chain by the obligated party to the responsible authority
4. The presence of a database for registration of this information and the level of public disclosure and consultation

7.1 THE RESPONSIBLE (GOVERNMENT) AUTHORITY

Error! Reference source not found. gives an overview of the government authority that is responsible for implementing and monitoring the policy framework, including the sustainability and/or GHG emission reduction requirements of biofuels. Amongst the selected frameworks, EU-RED II, EU-ETS and ICAO-CORSIA are interregional umbrella frameworks. This means that regarding monitoring and supervision, there are two levels: on interregional level and on Member State level.

*Table 19: overview of the government authority that is responsible for implementing and monitoring the policy framework, including the sustainability of biofuels. *Overarching legislation set by EC and receipt with minor changes by the various European Member States.*

Selected frameworks	Responsible government authority
AU, Queensland & NSW	Q: The chief executive (environment) in State of Queensland (to approve the certification schemes) NSW: The Secretary of the Department of Finance, Services and Innovation and the Minister for Fair Trading are responsible for the Regulation.
India	For high level coordination and policy development: National Biofuel Coordination Committee (NBCC).
Brazil RenovaBio	The National Agency of Petroleum, Gas and Biofuels (ANP) is the controlling authority
CLCFS	The California Air Resources Board (CARB)

Selected frameworks	Responsible government authority
Canada	Environment and Climate Change Canada (ECCC)
EU RED II*	(a) European Commission; (b) EU Member States transpose the EU RED II to national law and are responsible for the reliability of data and for an adequate standard of independent auditing of information by economic operators (Art. 30.3)
Germany	The Federal Office of Agriculture and Food (BLE)
Netherlands	The Dutch Emissions Authority (NEa)
Austria	The Federal Environment Agency (UBA Umweltbundesamt),
EU ETS for aviation*	(a) European Commission through a Delegated Act (EU-ETS MRV, with reference to EU RED II) (b) The Delegated Act is directly applicable on EU Member State level. The Dutch Emissions Authority (NEa) is responsible for enforcing the delegated act in Dutch legislation.
ICAO CORSIA	(a) ICAO; (b) States (countries) are the obligated party reporting CORSIA eligible fuel use to ICAO.
NL: solid biomass	The Netherlands Enterprise Agency (RVO) - first order of supervision The Dutch Emissions Authority (NEa) - 2 nd order supervision

7.2 OBLIGATED PARTY RESPONSIBLE FOR REPORTING AND MEETING THE OBLIGATIONS

The obligated party is the party responsible for meeting the obligations and the last interface in the biofuel supply chain responsible for reporting to the respective (government) authority. **Error! Reference source not found.** shows the obligated parties (last interfaces) for the selected policy frameworks.

Generally, two types of governance structures can be observed:

First, the credit-based policy frameworks (LCFS California, RenovaBio Brazil and CFR Canada) have two types of obligated parties, which are different but strongly related to each other as there is:

- The obligation of the producer or importer of the liquid fuel, who must reduce its carbon intensity and/or buy credits and
- The biofuel producer or applicant that provides the credits.

As in the case of LCFS California, an entity may have multiple roles, as is also shown in **Error!**

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The second category of policy frameworks is based on a target or obligation that needs to be met, and the obligated party is in this case the economic operator that brings biofuels on the market.

Figure 9: Classification of entities subject to LCFS Regulation in California (CARB, 2021)

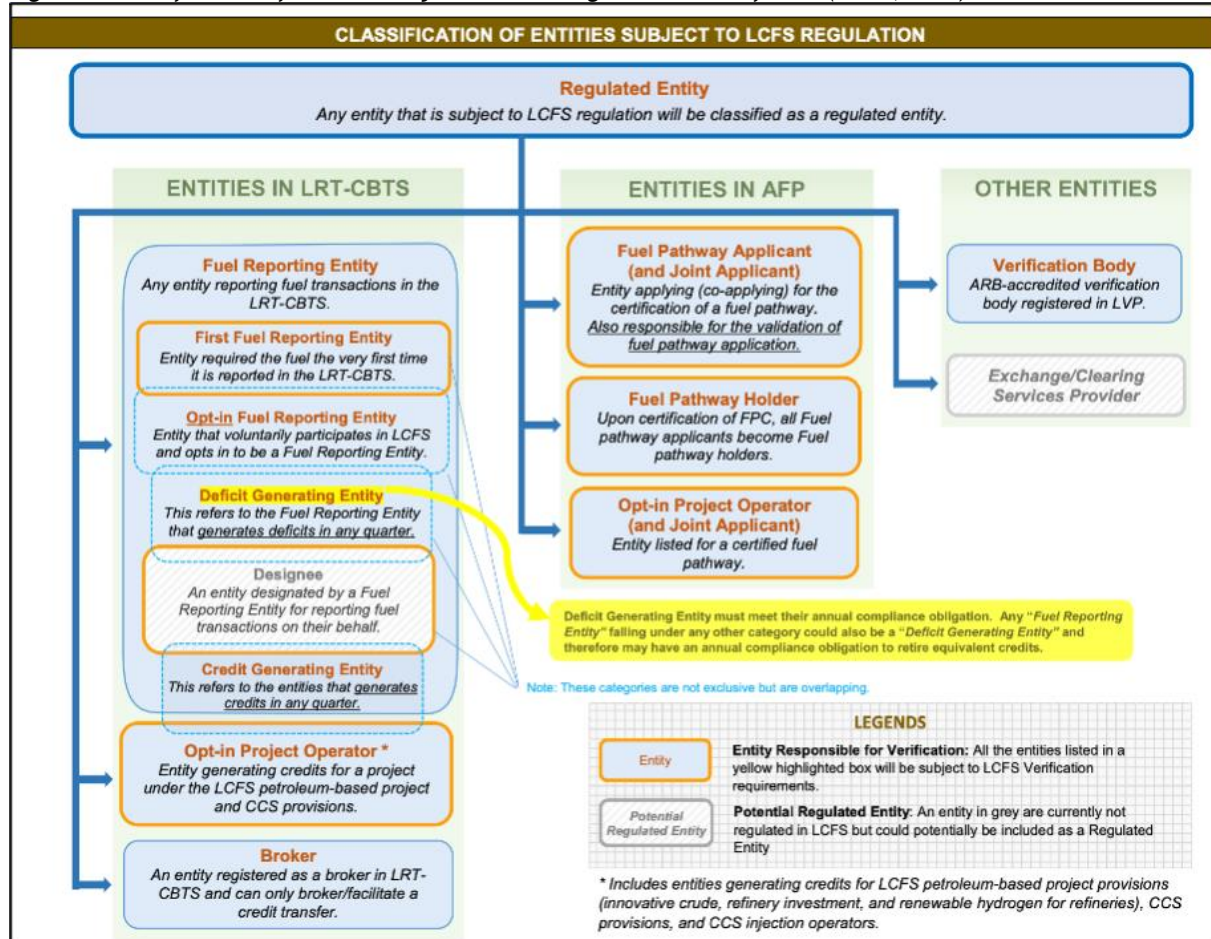


Table 20: Overview of the obligated parties (last interfaces) for the selected policy frameworks, *Overarching legislation set by EC and receipt with minor changes by the various European Member States.

Frameworks	Obligated party (last interface)
Australia (Queensland)	Certain fuel retailers (1) and Wholesalers for the sale of sustainable biobased petrol and sustainable biobased diesel
Australia, NSW	Volume fuel retailer (9) and Fuel wholesaler (10)
India	N.A.
Brazil RenovaBio	Authorized biofuel producers (and importers): they are allowed to apply for a certification to be able to issue Decarbonization Credit (CBIOS) (2) Fuel distributors: they can buy the CBIOS
CLCFS	Fuel reporting entities: The so-called ‘first fuel reporting entity’ is the entity responsible for initiating reporting within the LRT-CBTS. For liquid fuels, this is the producer or importer of the liquid fuel (7). All fuel pathway applicants become fuel pathway holders once their carbon intensity (CI) is certified to gain credits; they must annually demonstrate that the pathway remains valid (4).
Canada	Primary suppliers: The Clean Fuel Regulation (CFR) requires those who produce and import liquid fossil fuels in Canada to reduce the carbon intensity of the liquid fossil fuels they produce and import annually. Registered creators: Persons who are not primary suppliers can voluntarily participate in the CFR by carrying out emission reduction projects that create CFR credits they can sell to primary suppliers.
EU RED II*	The economic operator: Four types of economic operators are recognized: (i) A producer established in the EU; (ii) an importer where the producer is not established in the Union; (iii) an authorised representative who has written mandate from the producer designating the authorised representative; (iv) a fulfilment service provider established in the EU where there is no producer, importer or authorised representative established in the Union (5)
Germany	The economic operator who brings certified biofuels on the German market (3). Traders after the last interface can receive (and split) proofs of sustainability in the Nabisy Registry.
Netherlands	Economic operator: The end fuel supplier is the obligated party. This is the company doing the end delivery to transport.
Austria	Companies, which bring the biofuels for the transport sector to the market (paying tax). Next to that: all economic operators dealing with sustainable biofuels must be registered in the database. Among those are producers, traders, importers etc., see also (8).

Frameworks	Obligated party (last interface)
EU ETS for aviation*	For aviation specifically: The aircraft operator meeting the following criteria: Operating flights of more than 10.000t CO ₂ / year on intra and extra EU flights (not domestic) (6)
ICAO CORSIA	States (countries) are the obligated party reporting CORSIA eligible fuel use to ICAO. The States receive information from the aeroplane operators (airlines) that are assigned to their State. The aeroplane operators have the right to audit the certification and access detailed data from the economic operators, which include feedstock producers, processing facilities, and traders.
NL: solid biomass	The end-user of the bio feedstocks (the energy producer)

- (1) Fuel retailers who: (i) own or operate 10 or more standard service stations, or (ii) sell more than a threshold amount of petrol fuel in a calendar quarter at any one of their service stations.
- (2) CBIOs = decarbonization credit
- (3) In most cases, these are biofuel producers which sell their product to traders or those companies in Germany that are obliged to fulfil the GHG quota in the transport sector.
- (4) An entity may have multiple roles: such as an alternative liquid fuel producer may be a Fuel Pathway applicant, but because this entity also reports and generates credits, they are a fuel reporting entity as well (4).
- (5) Defined in Article 3 and 4 and Commission notice: Guidelines for economic operators and market surveillance authorities on the practical implementation of Regulation (EU) 2019/1020 on market surveillance and compliance of products (2021/C 100/01) > Manufacturer: 'any natural or legal person who manufactures a product or has a product designed or manufactured and markets that product under its name or trademark'. Importer: 'any natural or legal person established within the Union who places a product from a third country on the Union market'. An authorised representative to perform the tasks on the manufacturer's behalf: 'any natural or legal person established within the Union who has received a written mandate from a manufacturer to act on its behalf in relation to specified tasks with regard to the manufacturer's obligations under the relevant Union harmonisation legislation'.
- (6) The EU-ETS Delegated Act (2019/1603) does not refer to biofuels but does state that the EU-ETS MRV articles are applicable to this scope of flights: EU-ETS MRV articles: EU-ETS Monitoring and Reporting act (2018/2066) and verification and accreditation Act (2018/2067). The Delegated Act refers to the implementation of CORSIA in the EU.
- (7) See: Cal. Code Regs. Tit. 17, § 95483 - Fuel Reporting Entities, <https://www.law.cornell.edu/regulations/california/17-CCR-Sec-95483>
- (8) According to the Fuel Ordinance, the following economic operators must register with the Federal Environment Agency tool eNa - the electronic sustainability system for biofuels: (i) sustainable biofuels producer; (ii) (Energy) traders and importers of sustainable biofuels; (iii) storage operators; (iv) distributors of sustainable biofuels and (v) electricity suppliers whose contribution of electricity from renewable energy sources is to be counted towards the targets
- (9) Volume fuel retailer: (a) a person who operates or controls the operation of a volume fuel service station (whether or not the person also operates or controls the operation of any other service station and whether or not the person is also a fuel wholesaler), or (b) a person who operates or controls the operation of 20 or more service stations, none of which are volume fuel service stations
- (10) Fuel wholesaler: a person who engages in the blending of ethanol/ biodiesel with petrol/ diesel fuel (whether or not in New South Wales) to produce petrol-ethanol / biodiesel blend and who is engaged in the business of selling the blend for resale.

7.3 TYPE OF SUBMITTED INFORMATION AT THE END OF THE SUPPLY CHAIN BY THE OBLIGATED PARTY TO THE RESPECTIVE AUTHORITY

The obligated party that is responsible for meeting the obligations (see **Error! Reference source not found.**) is also responsible to report this information to the respective (government) authority. **Error! Reference source not found.** gives an overview of the type of information that is submitted for a selection of items by the obligated party at the end of the supply chain to the respective authority.

In general, there is a requirement that information about the origin, volume or mass, feedstock category, proof of compliance with the sustainability criteria and the GHG emission reduction requirement is reported to the respective authority.

It is important to realize that compliance with the sustainability criteria is in various frameworks (such as the EU RED II) proven by the submission of a Proof of Sustainability (PoS) per batch, which is received by the obligated party at the end of the supply chain. This PoS does provide information to the responsible authority that the location was indeed certified, and by which scheme, but does not provide further information about sustainability characteristics than obliged, or possible risks identified.

There are some differences in what type of information is required amongst the different policy frameworks. This is shown by the information requirement about origin. Brazil RenovaBio requires for example information about the coordinates of the farm, while the EU RED II requires the obligated party to submit to the competent authority information about the country of origin.

Next to that, some policy frameworks request for other additional information than indicated in **Error! Reference source not found.** Some examples are:

- Brazil RenovaBio: Identification of the feedstock producer
- California LCFS: Information about the fuel and feedstock production technology; transport modes and distances; fuel production operations
- ICAO CORSIA, on state level: Information about the production year, type of fuel and the conversion process of CEF batch production

Also, to support the correctness of the GHG reduction calculations, frameworks such as ICAO CORSIA or LCFS ask for more information about the conversion process and associated technology, compared with for example the EU RED II. Under the EU RED II, Member States can demand more additional information, to support the correctness and completeness of the required data.

7.3.1 Differences in information transfer and reported information to the national authority

It is important to realize that there are differences between which information is transferred through the supply chain (see chapter 6), and which information is at the end of the supply chain reported to the respective authority. For example:

- In the case of the EU RED II, certificates are transferred through the supply chain. The competent authority receives the PoS showing by which certification scheme the batch was certified.
- Economic operators in the supply chain have to keep records and supplemental documentation (e.g., transactions, invoices, etc.) which should be sufficient to allow for verification and/or certification.

Clearly, the reliability of the data submitted to the respective authority is largely determined by the quality and completeness of the input data that are transferred throughout the supply chain, from the point of origin onwards. This is especially of relevance for the GHG information that is required from all economic operators along the supply chain to be able to calculate the final GHG emission factors or reduction by the economic operator at the end of the supply chain.

Table 21: Overview of information submitted at the end of the supply chain by the obligated party to the respective authority for a selection of items (PoS = Proof of Sustainability), **V** = included. Abbreviations: (AU) Q = Australia, Queensland, AU, NSW = Australia, NSW, *Overarching legislation set by EC and receipt with minor changes by the various European Member States.

Frame- work	Origin (included & info)		Feedstock (included & info)		Sustainability criteria (included & info)		GHG emission reduction (included & info)		Mass	Other*
AU, Q	?		?		V	Certificate	V	A GHG assessment	V	
AU, NSW	?		?		V	Certificate (11)	V		V (11)	
India	-		-		-		-		-	
Brazil RenovaBio	V	Origin, coordinates farm	V	Feedstock type	V	Proof of eligibility criteria	V	Info to calculate footprint	V	V
CLCFS	V	Depending on level of aggregation: can be on global level, or on country/ regional level	V	Linked to the biofuel pathway	-		V	The carbon intensity	V	V (14)
Canada (8)	V	Level of detail: to be determined (8)	V		V	Confirmation (can be through certificate)	V	Information supporting GHG calculation	V	V

Frame-work	Origin (included & info)		Feedstock (included & info)		Sustainability criteria (included & info)		GHG emission reduction (included & info)		Mass	Other*
EU RED II*	V	Country of origin	V	Feedstock type	V	Through certificate/ claim	V	GHG emission reduction; data on emissions full life cycle	V	
Nether-lands	V	Country (1)	V		V	Through PoS including certificate (1)	V	Emission factors + energy content in some cases (9)	V (13)	
Germany	V	Country (2)	V	Based on list NABISY (3)	V	Through PoS including certificate (4)	V	+ energy content	V	
Austria	V	Type, quantity, harvest year and country of origin (7)	V	Feedstock category (7)	V	Through certificate/ claim + date of issue (PoS) (7)	V	GHG emissions + energy content + emissions carbon stock change (7)	V	V
EU ETS for aviation*	V	Equal to EU RED II requirements	V	Equal to EU RED II requirements	V	Through certificate/ claim (6)	V	GHG emission reduction (10) + rules around credit exchange (12)	V	
ICAO CORSIA	V	End-result supply chain info is aggregated to State level	V	State level: Type of feedstock (5).	V	Information about sustainability scheme used (5)	V	Total emission reduction claimed per State (5)	V	V

Frame-work	Origin (included & info)		Feedstock (included & info)		Sustainability criteria (included & info)		GHG emission reduction (included & info)		Mass	Other*
NL: solid biomass	V		V		V	Through certificate or verification statement	V		V	

- (1) Netherlands: The obligated party submits a Proof of sustainability' (PoS), which has information about the: (i) name of the feedstock(s), (ii) country of origin, (iii) GHG emission and (iv) sustainability certificate used at the delivery.
- (2) Germany: Information about the country of origin is passed through the supply chain. The last interface reports about the country of origin to the national authority BLE via NABISY
- (3) There is a list, published by BLE, in which 337 feedstocks are listed and related to a biomass code and further information. To issue a proof of sustainability in Nabisy, only feedstock from this list can be used
- (4) Sustainability declarations in Nabisy (are issued for each consignment traded. Last interfaces need to provide information to the national authority BLE by creating a "proof of sustainability" in NABISY. This includes mass, energy content, GHG emissions, country of cultivation, biomass-code.
- (5) The feedstock and fuel must match the default value table. Annually as part of the submission to the CORSIA Central Registry, the State must submit information on: Production year of CEF; producer of the CEF, Batch numbers, total mass of each batch; type of fuel, feedstock and conversion process of CEF batch production; total mass of neat CEF being claimed by all airlines to the State and total emissions reduction claimed from CEF. There is a separate annual reporting process specified in the CORSIA Eligibility Framework and Requirements for SCS.
- (6) For the Netherlands: 'Regeling handel in emissierechten' Article 26. Use of biofuel: If an aircraft operator uses biofuel, it shall provide evidence to the board of the emissions authority that the sustainability of the biofuel has been demonstrated by: a. a sustainability system recognized by the European Commission or b. a national system accepted by the Netherlands or another Member State. 2 The proof also includes the quantity of biofuel delivered and the batch to which the biofuel relates.
- (7) Sustainability certificates shall contain at least some levels of information. The Federal Environment Agency knows which certificate is used. The voluntary schemes publish the certificates on their respective websites. This information is checked, when new companies register at eNa.
- (8) The federal Clean Fuel Regulations is expected to come into force in December 2022
- (9) Regarding booked biofuels, volumes are submitted and by multiplying with the default calorific value from the RED, energy content is calculated by the registry. For some biofuels for which no default value exists (mainly marine biofuels and until 2022 also bionaphta) batch specific calorific values also need to be submitted by the operators. Energy content of attached double counting certificates is also submitted in the registry.
- (10) Biofuels that meet the EU RED II sustainability and GHG emission reduction requirements may be registered as 'zero emissions'
- (11) The records must include a record of each sale of petrol (including petrol-ethanol blend) or diesel fuel (including biodiesel blend) including details of any relevant certification
- (12) Should maintain the same regulation/credit exchange within EU-27 Member States
- (13) For mass balance: the biocontent is demonstrated at the size of the booking (within uncertainty margins and not necessarily by analysis)
- (14) Information about the fuel and feedstock production technology; transport modes and distances; fuel production operations

7.3.2 Additional reporting requirements defined in selected umbrella policy frameworks

As also shown in **Error! Reference source not found.**, policy frameworks such as EU RED II or ICAO CORSIA, but also EU ETS for aviation, are interregional umbrella frameworks although objectives differ¹⁸. Both the EU RED II and ICAO CORSIA operate on two levels regarding monitoring and supervision: on interregional level and on Member State level. Both frameworks not only receive information from the obligated party but also from other parties, so there are additional reporting requirements, see also **Error! Reference source not found.**, i.e., from:

- Voluntary schemes to the overarching authority and
- Member States to the overarching authority.

Table 22: Additional reporting requirements and information flows in selected umbrella policy frameworks

Selected frameworks	From certification schemes to overarching authority	From Member states to overarching authority
EU RED II, also applicable for EU Member States	The Commission requires that each recognized voluntary scheme submits annually a report to the Commission	Member States shall submit information about the geographic origin and feedstock type of biofuel in aggregated form (Art. 30.3).
ICAO CORSIA	The Certification Scheme (SCS) must provide information/data relevant to GHG reductions to the national authority if requested. ICAO also receives an annual report from the SCSs with detailed data requirements (1).	The States receive information from the aeroplane operators that are assigned to their State. State authorities (such as the NEa in the Netherlands) submit this information to ICAO annually. The airlines have up to three years to claim the emissions reductions.

1) See: Reporting requirements for SCS Annual Report to ICAO (CORSIA, 2022)

If the information is detailed enough, these information flows from both economic operators, certification schemes and Member States ideally allows for the cross-checking of data, so batches can be compared.

7.4 PRESENCE OF A NATIONAL DATABASE FOR REGISTRATION AND LEVEL OF PUBLIC DISCLOSURE AND CONSULTATION

Most countries with a reporting requirement to the respective authority also have some form of database in place, or in development, where this information can be registered. In **Error! Reference source not found.**, an overview is given about the presence of a database for registering information, and the level of public disclosure about this information in the selected policy frameworks.

¹⁸ The EU RED II is for example an overarching regulation that sets the RES / GHGs emissions targets (REDII) while the EU ETS promotes a carbon market uptake, based on a debits/credits exchange system that creates funding for sustainable projects

Table 23: Overview about the presence of a database for registering information, and the level of public disclosure about this information in the selected policy frameworks, *Overarching legislation set by EC and receipt with minor changes by the various European Member States.

Frame-works	(National) database	Transparency and public disclosure of:		
		Database	Yearly reporting/ progress reports	Info about verification/ certification process
Australia , Queensl and	V Fuel sell register	-	-	V Some information on website
Australia , NSW	V Register (14)			V Some information on website (15)
India	-	-	-	-
Brazil Renova-Bio	V Information is put in a database hosted on the ANP website.	V Information provided is disclosed to the public through the database.	-	V Information about the certification process is available on website. Each certification firm will make public the data for 30 days for public comment.
CLCFS	V LCFS Data Management System (4)	V Consolidated information through dashboard (5)	-	V Some information on the website
Canada	V Under development (6)	-	-	V Some info on the website
EU RED II*	V Union Database under development	-	V Aggregated reporting (8)	V Aggregated reporting + requirement that schemes ensure that certain information is

Frame-works	(National) database	Transparency and public disclosure of:		
		Database	Yearly reporting/ progress reports	Info about verification/ certification process
				made publicly available (9)
Austria	V National monitoring system, called elNa	V Company names published (12)	V Yearly biofuels report <i>Biokraftstoffbericht</i> (13)	V Organized at EU level. The national scheme AACCS is also publishing information
Nether-lands	V Database called the Register <i>Energie voor Vervoer</i> : REV (1)	- The database is not publicly available	V Yearly report for 'Energy Transport' (2)	- Organized at EU level
Germany	V The Nabisy system: The national registry for biofuels.	The database is not publicly available. Users can register and access certain information (18)	V BLE publishes a yearly report (10)	Completely based on RED II. BLE supervises the certification schemes and monitors activities. Some information is available on the website.
EU ETS for aviation*	V Union Registry (16) and reference to Union database (17)	-	- Not now (11)	V Based on EU RED II
ICAO CORSIA	V The CORSIA Central Registry (CCR): States submit data related to CORSIA and for ICAO	V Consolidated information from the CCR is made public on the ICAO CORSIA website		V There is a requirement that SCS schemes ensure that certain information is made publicly available on a website.
NL: solid biomass	V Registration and	-	-	V Website with approval

Frame-works	(National) database	Transparency and public disclosure of:		
		Database	Yearly reporting/ progress reports	Info about verification/ certification process
	information per subsidy recipient			procedure, assessments, and list of approved schemes and CBs (3)

- (1) In this register, the obligated party books its fuel delivery for transport in the Netherlands
- (2) Companies that supply fuels for the market have an obligation to deliver an annually increasing share of renewable energy and need to reduce the GHG s emissions of their delivered fuels. The NEa publishes an annual report on the progress of these two obligations on national level.
- (3) On the ADBE website there is public information on certification scheme approval procedures, including stakeholder consultation. On the RVO website there is a list of approved schemes and CBs and the verification protocol can be downloaded with detailed information on the verification process, see a.o.: <https://www.adviescommissiedbe.nl>
- (4) The Alternative Fuels Portal (AFP) and the LCFS Credit Banking and Transfer System (LRT-CBTS) are two of the modules that make up the LCFS database management system. The management system also includes a Verification module.
- (5) The LCFS Data Dashboard web page is created to display the current and historical LCFS program data. Some of the information found in the Data Dashboard are: (i) Volume of fuels and credits generated under the LCFS; (ii) compliance curve and the percent reduction in carbon intensity to date; (iii) credit volumes transacted and the average credit prices per month under the LCFS.
- (6) The federal Clean Fuel Regulations is expected to come into force in December 2022. Environment Climate Change Canada is developing an online registration, reporting and credit transaction system. Any report or notice that is required under the Clean Fuel Standard must be submitted electronically through the online system
- (7) EU RED II: A Union database should be put in place to ensure transparency and traceability of renewable fuels.
- (8) Information about geographic origin and feedstock type per fuel supplier must be made available to consumers on the websites of operators, suppliers or the relevant competent authorities and shall be updated on an annual basis. The Commission shall publish that information on the e-reporting platform in summary or how appropriate.
- (9) The voluntary schemes shall publish a list of their certification bodies used for independent auditing. The Commission shall make the reports drawn up by the voluntary schemes available, in an aggregated form or in full if appropriate, on the e-reporting platform.
- (10) Aggregated report has information about amounts of biofuels, GHG-emissions, countries of origins etc.
- (11) Aggregated information about biomass use in the EU-ETS may be made available by the commission.
- (12) The Federal Environment Agency only publishes the registered companies with company name, contact details of the company and registration number. The proof of sustainability is not published.
- (13) Data is derived from eIa, anonymized and published
- (14) The Regulation mentions: The Secretary is to publish, on the Department's website, a register containing the names and contact details of persons who are registered as volume fuel retailers
- (15) For Info about verification/ certification process, there is information available on the Department of Fair Trading website
- (16) The Union Registry serves to guarantee accurate accounting for all allowances issued under the EU emissions trading system (EU ETS), see: https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets/union-registry_en
- (17) The EU-ETS MRV refers to the union database under development as a manner in which sustainability evidence can be provided
- (18) E.g., information regarding their own audits and certificate information.

7.4.1 EU: national databases and development of Union database

Within the EU, databases are developed on Member State level. To avoid double counting, it is crucial that the transfer of the proof of sustainability of a batch of biofuel is correctly transferred from one country database to the other in case of international trade.

For example, in the case of the German database, which is called 'Nabisy', the seller must transfer the proof of sustainability and/ or the partial proof of sustainability to the account established for the respective member state. In the case of Germany and Austria, the competent authorities of the respective member states have facilitated the exchange of information through an electronic

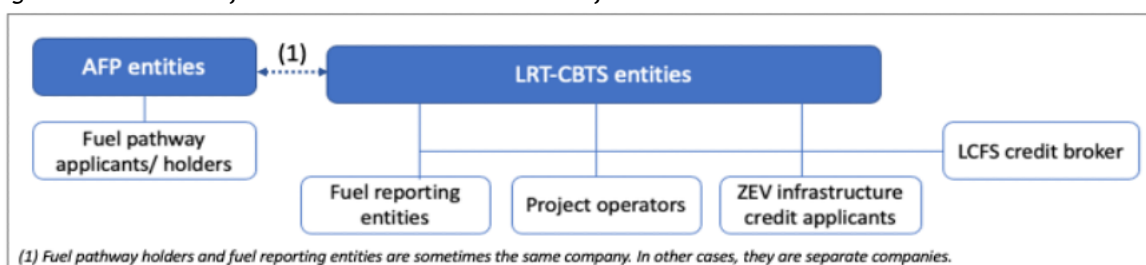
interface between the Nabisy database in Germany and the eINA database in Austria¹⁹ (Austria, 2019), but this exchange does not exist between all national registries within the EU.

To ensure and facilitate instant data transfers and harmonisation of data flows, the EU RED II mentions that a Union database should be put in place to ensure transparency and traceability of renewable fuels. While Member States should be allowed to continue to use or establish national databases, those national databases should be linked to the Union database.

7.4.2 Module and database development in credit-based frameworks, such as LCFS

In the case of a low-carbon credit system such as in Canada or in California, the reported information about the low-carbon fuel is connected with other modules. In California, this means that the so-called Alternative Fuels Portal (AFP) and the LCFS Credit Banking and Transfer System (LRT-CBTS) are two of the modules that make up the LCFS database management system, see also **Error! Reference source not found.** The management system also includes a Verification module, which provides access to participant data for LCFS-accredited Verification Bodies.

Figure 10: Overview of modules and entities in the Californian LCFS²⁰



7.4.3 Transparency and level of public disclosure

Most countries make information about the reported information publicly available, in some form. This can include:

- Information in consolidated form, based on information from the database. In the case of LCFS, there is for example a dashboard.
- Alternatively, through public reporting, often on an annual basis, based on consolidated information.
- Next to that, the respective government authorities do generally provide information about the certification and/or verification requirements on their website or have included a requirement that schemes ensure that certain information is made publicly available.

Public consultation

Public consultation during the approval phase, or during process of certification or verification, is not common. There are only two policy frameworks that have integrated a form of public consultation in their policy framework:

- During the process of RenovaBio certification of the biofuel producer, there is a period for public comments.

¹⁹ The designation 'BLE' concerns quantities of biofuels imported by Austria under the nabisy system and transferred via the electronic interface Nabisy - eINA. This evidence is collective evidence in the Nabisy system which indicates several certification systems for a single biofuel. In such cases, information in the eINA system cannot be clearly attributed to specific biofuels and is therefore presented with the designation BLE.

²⁰ Adapted from: <https://ww2.arb.ca.gov/sites/default/files/2020-09/basics-notes.pdf>

- For the Dutch framework for solid biomass, stakeholders are asked for input during the process of approval of certification schemes. Directly after the ADBE commission²¹, the Commission that gives advice to the Ministry for approval of a scheme, receives a request for approval, it allows stakeholders to submit external input via the commissions' website. In this way the commission collects information on how the certification scheme operates in practice.

7.5 SUMMARY OF OBSERVATIONS

Credit-based policy frameworks (e.g., LCFS Canada) have two types of obligated parties: the one buying credits and the other providing them. In the case of policy frameworks based on a target (e.g., EU RED II), the obligated party is the economic operator that brings biofuels on the market.

The obligated party at the end of the supply chain submits information to the respective authority to proof compliance. In general, this includes information about the origin, volume or mass, feedstock category, proof of compliance with the sustainability criteria and the GHG emission reduction requirement. There are, however, differences amongst the different policy frameworks in the detail and type of information that is required. This is for example shown by the differences in requested information required about origin. Also, to be able to check the correctness of the GHG emission calculations, frameworks such as ICAO CORSIA or LCFS also ask for additional information about the conversion process and associated technology.

Compliance with the GHG emission reduction and sustainability requirements is in most cases proven by mentioning the certificate on a PoS (since the certificate itself is not transferred in the chain), which is received by the obligated party at the end of the supply chain. The certificate does not provide further information for the responsible authority about sustainability characteristics and possible risks identified.

Although objectives differ, EU RED II, EU ETS and ICAO CORSIA are interregional umbrella frameworks. This means that there is monitoring and supervision on interregional level and on Member State level. Next to reporting requirements for the economic operator, both frameworks have reporting requirements for other actors. If the information is detailed enough, these information flows from both economic operators, certification schemes and Member States ideally allow for cross-checking of data.

Most countries with a reporting requirement to the respective authority have some form of database in place where this information can be registered. To ensure and facilitate instant data transfers and harmonisation of data flows, the EU RED II plans to put a Union database in place to ensure transparency and traceability of renewable fuels. In the case of a low-carbon credit system, such as in Canada or in California, the reported information about the low-carbon fuel is connected with other modules to ensure transfer of credits amongst different entities.

The reliability of the data submitted to the authority is largely determined by the quality of the input data that are transferred throughout the supply chain.

Note that the databases from the respective authorities register the data received from the obligated party at the end of the supply chain. They do not link the information through the supply chain. Traceability databases can help improving the robustness of information through the supply chain and allow to cross-check the correctness and completeness of the input data that are transferred

²¹ See: <https://www.adviescommissiedbe.nl>

throughout the supply chain.

Most countries make information about the reported data publicly available, often in consolidated form, e.g., through a database or through public reporting. Next to that, the respective government authorities do generally provide information about the certification and/or verification requirements, or request certification schemes to do so.

Public consultation is not common and only RenovaBio from Brazil and the Dutch framework on solid biomass have included some form of public consultation in their frameworks.

8. Monitoring compliance and consequences of non-compliance

Effective monitoring, including compliance and enforcement is essential for meeting the objectives that are set in a policy framework. Monitoring compliance ensures that the data received are complete and correct, and that the economic operator(s) is indeed complying with the obligations.

Also, effective monitoring can identify any areas of non-compliance or weak spots in a policy framework and can therefore be a useful tool to improve the performance and impact of a policy framework. This chapter discusses:

- The mandate of the respective authorities to monitor compliance of the economic operator (8.1)
- Consequences of non-compliance for the economic operator (8.2)
- The mandate of the respective authorities to monitor compliance of certification schemes and auditors/ verifiers (8.3)
- Consequences of non-compliance for certification schemes and auditors/ verifiers (8.4)

8.1 MONITORING COMPLIANCE OF ECONOMIC OPERATORS: CHECKING CORRECTNESS AND COMPLETENESS OF INFORMATION

Respective authorities receive information from their last interface (see chapter 7) with amongst other information about the country of origin. Error! Reference source not found. gives an overview of the responsibilities of the respective authorities to monitor compliance of the economic operator through checking the correctness and completeness of the received information and shows whether their mandate goes beyond the country border and further in the value chain when doing inspections, or not.

Error! Reference source not found. shows that there are generally three steps when monitoring compliance:

- The Cross-check of information that is registered in in the database. The German database Nabisy makes for example use of a traffic light system, where possible data errors are flagged.
- Next, there can be additional and mostly administrative checks to:
 - identify incorrect entries and data errors that were flagged from the database
 - have additional random sampling
- And next, there can be on-site inspections

On-site inspections at economic operators are less common and/or whether inspections take place on-site or mostly administratively is not always that clearly defined. In Germany, as part of the sample of certification projects to be reviewed, BLE could choose a specific operator to conduct an on-site check, for example when there is concern for a risk for fraud for some reasons.

8.1.1 Mandate and scope for monitoring

Next to that, authorities have a certain mandate for which scope (geographically, which data or operators) they are allowed to do inspections and (administrative) checks:

In or beyond the country border: In California, the competent authority can do, when needed, investigations beyond the State border, In for example Austria and the Netherlands, the scope for monitoring is however limited to the country itself. This means that inspections can only be done within the country border. For some other countries, this mandate is less clearly defined.

Table 24: Responsibility of respective authorities to monitor compliance of the economic operator through correctness and completeness of information, and mandate to go beyond border and further in the value chain, Q = Queensland, NSW = New South Wales, *Overarching legislation set by EC and receipt with minor changes by the various European Member States.

Selected frameworks	Controlling the correctness and completeness of information	Mandate:	
		To which point in value chain	In or beyond borders
Australia, Q	DNMRE has the responsibility to maintain the fuel sell register. Also: Inspections	Not further defined	Not further defined
Australia, NSW	The enforcement is the responsibility of the Secretary who can appoint people within the Department as investigators to retrieve the information from the obligated party.	The correctness is checked at the end point of the value chain: the volume fuel retailer or fuel wholesaler.	Beyond the borders of NSW (the regulation specifies “whether or not in New South Wales”)
India	n.a.	n.a.	
Brazil RenovaBio	A full certification (including 3rd part audit) is required every 3 years. Annual evaluations at least self-assessment) are also necessary. <u>Cross-check database:</u> ANP performs a final checking before a certification is issued. <u>On-site checks:</u> ANP staff also performs checks during the inspection process. <u>Additional administrative checks:</u> Reports can be required by national authority at any time.	ANP can check correctness of all information in any step along the supply chain.	RenovaBio does not further define whether the controls should be within (or also outside) the Brazilian border. Renovabio does require that imported biofuels comply to Renovabio rules.
California	<u>Cross-check database:</u> Fuel pathway holders and applicants must maintain records (e.g.,	If needed, until point of origin:	Beyond border: No limitation

Selected frameworks	Controlling the correctness and completeness of information	Mandate:	
		To which point in value chain	In or beyond borders
LCFS	delivery records, invoices) to allow for verification: Cross-check input database. <u>Additional administrative checks:</u> Based on a risk-based approach. <u>On-site visits:</u> Next to the verifiers, CARB can do on-site visits as well to do further investigation.	Any person falling under the jurisdiction of the law (1).	for verification and/or if further investigation is needed
Canada	To be determined (7). <u>Additional administrative checks:</u> ECCC could ask for the report generated by the auditor.	ECCC could ask for the report generated by the auditor.	To be determined (7)
EU RED II*	Economic operators make available to the relevant Member State, upon request, the data that were used to develop the information. Member states shall require economic operators to arrange for an adequate standard of independent auditing. At the request of a Member State, which may be based on the request of an economic operator, the Commission shall, based on available evidence, examine whether the sustainability and GHG emissions saving criteria ...[..]. have been met.	Organized on Member State (MS) level: Economic operators submit information to the MS; MSs are responsible for supervision on CBs	Organized on Member State (MS) level: Economic operators submit information to the MS; MSs are responsible for supervision on CBs
Germany	See EU RED II <u>Cross-check database:</u> In case of GHG emissions reported, there is a “traffic light system” which informs about “unusual” results (e.g., GHG mitigation values). If reported emissions exceed the threshold, the GHG calculation might be re-assessed. <u>Additional administrative checks:</u> Operators are indirectly checked in the annual CB audit. <u>On-site checks:</u> As part of the sample of certification projects to be reviewed, BLE could choose a specific operator (e.g., when fraudulence is supposed for some reasons).	There is no limitation of certain points in the value chain	In Germany and other countries (in case of international value chains)

Selected frameworks	Controlling the correctness and completeness of information	Mandate:	
		To which point in value chain	In or beyond borders
Netherlands	<p>See EU RED II</p> <p><u>Cross-check database:</u> The information in the database is compared with the proofs of sustainability and mass balance documentation of the fuel supplier.</p> <p><u>Additional administrative checks:</u> Whether the delivered fuels contain biofuel with the registered specifications may be checked by more administrative checks (stock and pumping data, invoices etc) and sampling and analysis (e.g., C14)</p> <p><u>On-site checks:</u> From 2022 onwards</p>	From 2022 onwards, checks will be performed also at companies in the upstream supply chain within the Netherlands.	From 2022, further checks within the Dutch borders can be performed; this is a strategy currently in progress. The Verification protocol allows verifiers to do on-site inspections anywhere in the world (6)
Austria	<p>See EU RED II</p> <p><u>Cross-check database:</u> The eINA system has internal verification mechanisms that automatically verify the plausibility of the data entered before it generates a sustainability certificate (4).</p> <p><u>Additional administrative checks:</u> Ongoing checks of the database are carried out in order to be able to identify incorrect entries at an early stage.</p> <p><u>On-site checks:</u> A check of the data entered by the market participants is also carried out by on-site inspections (5).</p> <p><u>Sample inspections national standard</u> Sample inspections can be done also for farmers in the case of cross-compliance checks from AACs.</p>	Generally, the Federal Environment Agency checks back until the first gathering point (traders, producers, distributors).	on-site inspections are only in Austria
EU ETS for aviation*	<p>The EU-ETS verifier checks if there are sufficient proofs of sustainability for the amount of tanked biofuel. If there are incorrect or insufficient evidence, then the verifier will flag this in his verification report (or not provide a positive EU-ETS verification statement).</p> <p><u>Additional (administrative) checks:</u> The NEa will in this case investigate further and take appropriate action. Additionally, inspectors may choose to perform inspections at the airline and check the sustainability evidence directly.</p>	Not have the authority to go back in the supply chain	The implementing act will be applicable in the EU-ETS and follow implementation EU RED II: The EU-ETS MRV refer to Art. 30 for compliance.

Selected frameworks	Controlling the correctness and completeness of information	Mandate:	
		To which point in value chain	In or beyond borders
ICAO CORSIA	<p><u>Cross-check database:</u> The CORSIA Central Registry (CCR) is used for States to submit information. The CCR data will be cross checked with information submitted by the SCSs to ensure that appropriate batches and GHG values are claimed. States and purchasers (aeroplane operators or their designated representative) have audit rights to production records for CORSIA Eligible Fuels (CEF) they purchase to verify the CEF (2).</p> <p><u>Additional administrative checks:</u> ICAO can also request additional information from the SCSs.</p>	Limited to the respective States; purchasers and States may elect to independently audit production records of the CORSIA eligible fuel producer to provide further assurance.	Focused on audits of the economic operators that are being certified (may go beyond borders)
NL: solid biomass for co-firing & electricity	<p><u>Administrative checks:</u> Check on certification claims and verification statements per consignment. The final yearly report of the energy producer (end-user) is also verified by an appointed certification body.</p>	At the very least they have insight in the previous market operator that delivered the consignment to the energy producer.	To some extent. The controlling authority NEa only has a mandate in the Netherlands.

- (1) See § 95493 on Jurisdiction: Including the fuel reporting entity and any person to whom the obligation to generate credits or deficits has been transferred directly or indirectly or any fuel pathway or project applicant
- (2) CORSIA Annex 16 Vol IV says: Note: The quality control assurances of CORSIA eligible fuel producers include declarations and/or process certifications, with periodic audits by verifiers, purchasers, or trusted entities. The process certifications, including the sustainability credentials, provide assurance that the CORSIA eligible fuel producer has established business processes to prevent double counting, and the periodic audits verify that the producer is following their established procedures. Purchasers and States may elect to independently audit the production records of the CORSIA eligible fuel producer in order to provide further assurance.
- (3) EU RED: Reliable information regarding the compliance with the GHG emissions savings thresholds set in... and with the sustainability and GHG emissions saving criteria laid down in Article 29(2) to (7) and (10), and that economic operators make available to the relevant Member State, upon request, the data that were used to develop the information.
- (4) Austria: A registration at eNa is only possible with a voluntary scheme certificate. These certificates are public and are checked from the Federal Environment Agency. The eNa database is providing the data for the substitution obligation and mass balances for counting to the target. For each trade with biofuels a proof of sustainability from the eNa system is required. Biofuels without proof of sustainability cannot be counted to the target. There are reporting obligations for distributors. Incorrect or missing data can be detected if the mass balance is not correct.
- (5) Austria: On-site checks are carried out by experts from the Federal Environment Agency. There are on-site controls (only in Austria) at least every three years at each distributor. Big biofuel producers and importers are checked every year. There are also annual checks at companies with issues in the past. There are about 60 to 80 companies in total in Austria. Checked are certificates, trades, GHG emission calculations, requests regarding feedstocks, storage, etc.
- (6) See: https://english.rvo.nl/sites/default/files/2013/12/Rapport_Verificatie_dubbeltelling_betere_biobrandstoffen_Achtergrondrapport_bij_verificatieprotocol_en_proefverificaties_GAVE-09-03.pdf
- (7) The federal Clean Fuel Regulations is expected to come into force in December 2022.

Mandate to go back in the supply chain or to limited extent: And much related to this: the scope for monitoring can be limited to economic operator at the end of the supply chain, or authorities may have the mandate to do inspections (further) back in the supply chain - until the point of origin.

As **Error! Reference source not found.** shows, the mandate to cross-check the information is for some countries limited to the country and/or to the previous market operator. This basically means that respective authorities are reliant on actors earlier in the supply chain to go back to the point of origin.

This limitation is especially of relevance for countries and policy frameworks where biomass is traded internationally (beyond borders), as in this case authorities likely only have insight in the previous market operator that delivered the consignment to the biofuel producer.

The exercise of tracing back sustainability information can also be challenging for economic operators. This is more doable for verification or certification schemes operating through the full supply chain, but complexity grows when multiple schemes are used in the supply chain, see also **Error! Reference source not found..**

Box 6: The exercise of tracing back sustainability and GHG information through the supply chain

Economic operators have, in practice, often only the information that they receive from the previous economic actor in the supply chain. This requires therefore the full cooperation from all previous actors in the supply chain. This is a very complex task and time consuming. For economic operators, some of the data sharing can possibly be blocked by basic rules of competition (sharing of providers info). Clearly the complexity increases when the number of interactions (e.g., between buyers-sellers) and number of processed outputs increase (SQ Consult, 2020).

The exercise of tracing back the sustainability and GHG information is more doable for certification schemes (in particular ISCC because of their large share of the market), as long as feedstock/products in all steps of the chain are certified by their own scheme. Complexity grows when multiple schemes are used in the supply chains; in such case, the economic operator in the Netherlands may receive an ISCC certificate although, because of cross-acceptance, another scheme (for example REDCert) is used at the beginning of the supply chain (SQ Consult, 2020). This information is not visible for the economic operator, nor for the national authority.

8.2 CONSEQUENCES OF NON-COMPLIANCE FOR THE ECONOMIC OPERATOR

‘Compliance’ means following legislation and obtaining the right approvals or permissions. It also means conducting activities in accordance with any conditions or regulatory requirements. A government can use a range of tools to promote compliance, such as providing education and assistance, or conducting inspections (see 8.1), (DNRME, 2019)

A respective authority, however, also addresses non-compliance using enforcement tools to sanction non-compliant economic operators and deter them from being non-compliant in the future (DNRME, 2019).

Table 25: Overview of the consequences of non-compliance in case information submitted by the economic operator operates non-compliant and/or its data are incomplete and/or incorrect, Q = Queensland, NSW = New South Wales, *Overarching legislation set by EC and receipt with minor changes by the various European Member States.

Frame-work	Invalid proof for credit, subsidy, etc	Loss of certificate	Penalty, fine, sanction	Further explanation: Cases of non-compliance of the economic operator
Australia (Q)	V	V	V	In case of non-conformities of economic operators under a scheme, the certificate is suspended. Compliance and enforcement tools: (i) education and assistance, (ii) letter to fuel seller, (iii) warning, (iv) prosecution, (v) cancellation or exemption.
Australia (NSW)		V	V	Offence—failure to register, furnish returns or keep records for primary wholesalers, volume fuel retailers and other operators of service stations
India	n.a.	n.a.	n.a.	N.A.
Brazil RenovaBio	V	V	V	Based on certification scheme procedures: If incorrect information from economic operator is identified before the certificate is issued, the verification body must inform that the certification is in non-compliance and the product is not certified. In certain situations, operators can receive a fine.
CLCFS	V	n.a.	V	If any basis for invalidation ..[..].. occurred, in addition to taking any enforcement action > suspend, restrict, modify, or revoke an LRT-CBTS account; modify or delete a Certified CI; restrict, suspend, or invalidate credits; or recalculate the deficits in an LRT-CBTS account. Possibility for penalties is also mentioned (1)
Canada	V	V		Two scenarios are possible. These are: (i) created with erroneous data and the organization or third-party verifier finds

Frame-work	Invalid proof for credit, subsidy, etc	Loss of certificate	Penalty, fine, sanction	Further explanation: Cases of non-compliance of the economic operator
(5)				the error; and (ii) An organization did not create credits for an eligible action due to unintentional omission of information. ECCC may suspend credits in the event that compliance verification or enforcement activities leads to suspicion that credits may be invalid.
EU RED II*	V (Further investigation)	V		In case of major and critical non-conformities, the economic operator shall not be issued a certificate. In the case of minor non-conformities, the issue shall be solved, and a re-certification audit planned (4). At the request of a Member State, which may be based on the request of an economic operator, the Commission shall, on the basis of available evidence, examine whether the sustainability and GHG emissions saving criteria ..[..]..have been met. The Commission shall decide whether the Member State concerned may either: (i) take into account biofuels to the target or (ii) require further evidence, see Art. 30.10.
Germany	V	V	V	If information is missing > not generating a proof of sustainability. Other issues: National authority might inform the respective certification body. Consequence: losing certificate. Additionally, further sanctions are possible under national law, e.g., in case of fraud, etc.
Netherlands	V	V	V	If information is missing > not generating a proof of sustainability. The NEa may delete created Renewable energy units (so-called HBEs) from the companies account, and may also impose further sanctions (fines) if needed
Austria	V	V	V	If information is missing > the eIna system is not generating a proof of sustainability. If there are issues at an on-site control the companies are blocked for some time or completely: The company is not listed at eIna anymore. In the worst case the proof of sustainability is retroactively devaluated, which can lead to compensation payments if the target is not fulfilled.

Frame-work	Invalid proof for credit, subsidy, etc	Loss of certificate	Penalty, fine, sanction	Further explanation: Cases of non-compliance of the economic operator
				In addition, there are sanctions from the national standard AACs: notification obligation (2)
EU ETS for aviation*	V	V	V	If information is missing > not receiving a Proof of Sustainability (similar to EU RED II). Non-compliance would mean that the fuel would be treated as fossil and would not receive a 0-emission value in the EU-ETS report. Additional fines could be applied in such cases.
ICAO CORSIA	V	V		Based on certification scheme procedures: Each SCS should have documented procedures for addressing when a certified economic operator is found to not comply with the certification requirements (3) Consequence: losing certificate - and therefore not meeting the ICAO commitments
NL: solid biomass	V	V		Based on certification scheme procedures: economic operator may lose certificate Ultimately: may result in not receiving subsidy over that specific consignment.

(1) LCFS: § 95495. Authority to Suspend, Revoke, Modify, or Invalidate.

(2) Austria AACs: If a registered farmer who has sold agricultural raw materials as sustainable receives a sanction for non-compliance with a relevant provision, he shall immediately notify the buyer of the goods. The reason for this notification obligation of the registered farmer is the possibility of immediate reallocation of the goods concerned for the buyer.

(3) ICAO CORSIA requires that SCS schemes have in place: (i) Procedures for withdrawing or suspending certificates and the circumstances under which this occurs; (ii) procedures to ensure that any non-conformities that do not lead to immediate withdrawal or suspension of the certificate are corrected and (iii) SCS makes these procedures available to economic operators.

(4) According to the draft Implementing Regulation Article 4 under consultation (EC, 2021), non-conformities identified during an audit shall be classified as critical, major and minor. In the case of critical and major non-conformities, economic operators applying for certification shall not be issued a certificate. In the case of minor non-conformities, voluntary schemes may define the time period for their resolution, not exceeding 12 months from their notification and the date of next surveillance or re-certification audit

(5) The federal Clean Fuel Regulations is expected to come into force in December 2022.

Error! Reference source not found. gives an overview of the consequences of non-compliance in case information submitted by the economic operator is incomplete and/or incorrect. There are generally three types of consequences analysed in this study:

- For policy frameworks using certification schemes as proof of compliance: loss of certificate: In the case of non-compliance, the scheme owner suspends the certificate from the economic operator and the operator can no longer meet the sustainability requirements. The draft Implementing Regulation from the EC RED II (under consultation) mentions for example that the economic operator is not issued a certificate when there is a major or critical non-conformity, which includes for example repeated and systematic problems, or aspects that alone, or in combination with further non-conformities, may result in a fundamental system failure.
- All selected policy frameworks have as tool for non-compliance the loss of proof for receiving a credit, claim, subsidy or being able to count towards a target.
- For some of the selected policy frameworks, and in case of serious impact or consequences of non-compliance, there are also additional sanctions such as fines or penalties

The type of enforcement tool used also depends on the consequences of non-compliance. For example, in making decisions about what is the most appropriate enforcement tool to use, the State of Queensland (DNRME, 2019) takes into account factors such as:

- The seriousness or impact of the breach (that has been committed)
- The culpability of the alleged offender
- Any previous compliance and/or enforcement actions taken against the fuel seller, including the fuel seller's reasons for non-compliance and any actions taken by the fuel seller to remedy non-compliance.

Therefore, in the case of the State of Queensland, enforcement tools range from a warning to a prosecution - based and depending on the three factors above. (DNRME, 2019)

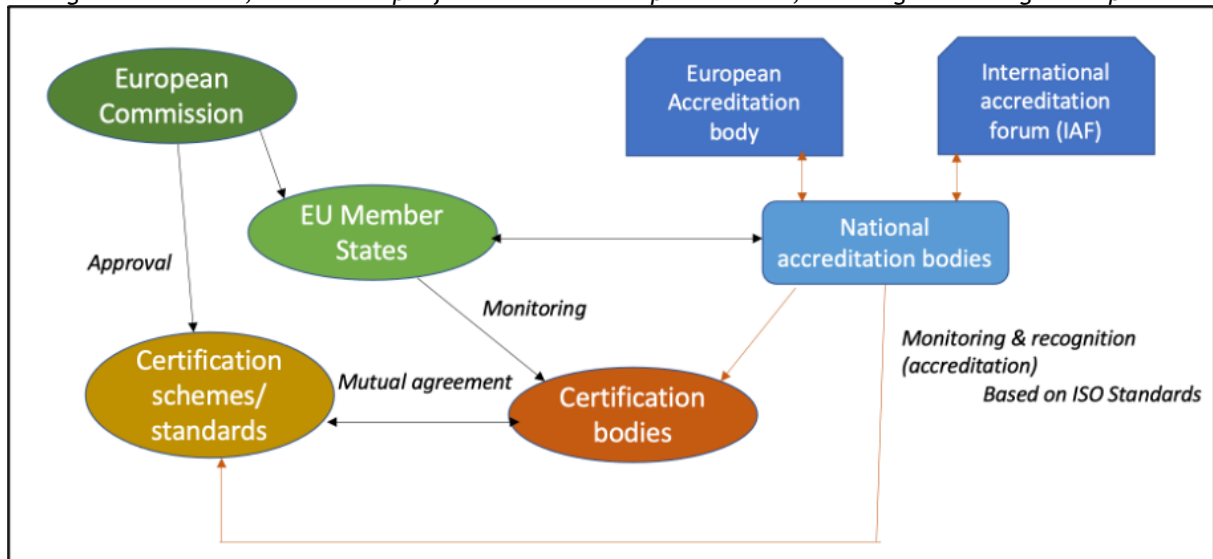
8.3 MONITORING COMPLIANCE OF CERTIFICATION STANDARDS AND AUDITORS/ VERIFIERS

The quality of the auditor or verifier is critical to effectively control the compliance of the economic operator. This largely depends on his level of competency and his independence. Ultimately, he is the one who must judge if the information is correct and complete.

Monitoring compliance of standards and certification and verification bodies takes place through public and private supervision, or through a combination of it, as is also shown in **Error! Reference source not found.** as example for the European context:

- Public supervision: Monitoring by the respective authorities
- (Private) supervision: The quality of standards, certification bodies and verification bodies is also supervised and monitored through accreditation bodies
In the case of California (CLCFS), CARB - as responsible authority - also has the authority to directly accredit individual verifiers and verification bodies,

Figure 11: Governance framework of public and private supervision through the respective authorities and through accreditation, in this example focused on the European context, including monitoring and supervision.



Note that accreditation CAN be a requirement in the selected policy frameworks for recognition of certification and verification bodies and of standards, but this does not have to be the case (see chapter 5). (Requiring) accreditation is quite common practice for certification and verification bodies but less common for standards, see also 8.3.1 and 8.3.3.

8.3.1 Accreditation

Accreditation bodies accredit conformity-assessment bodies (i.e., certification and verification bodies) to demonstrate that they are competent and can be relied on to issue certifications to organizations. In the case of CLFCS, both verifiers and verification bodies (VBs) are accredited. The advantage of individual accreditation is that the performance of individuals can be tracked, also when they move to another verification body. At the same time, it is important to keep in mind that the VB remains ultimately responsible for the performance and accreditation of their verifiers (Lawver, 2021).

Also, standards can be accredited. One example is the accreditation of American national standards by the American National Standards Institute (ANSI).

Each member state of the European Union has a national accreditation body.

To ensure that Accreditation Bodies operate at a high standard of competence and that they apply the standards in a consistent and equivalent manner, they work with a harmonized structure of accreditation: The requirements for accreditation are laid down in various international ISO standards. The draft Implementing Regulation from the EU RED II requires for example the following: certification schemes require that the certification bodies operating on behalf of their scheme are accredited to either ISO standard 17021 or 17065. Next to that, certification schemes shall ensure that certification bodies conduct audits, and select and appoint the audit team, in accordance with ISO 19011 or the equivalent and shall be accredited to ISO 17065 or equivalent and to ISO 14065 or equivalent where it performs audits on actual GHG values (EC, 2021).

Table 26: Overview of mandate to monitor the competency of verifiers and certification bodies (CBs) and its auditors by respective authorities (next to accreditation as private supervision tool). Abbreviations: AU (Q) = Australia (Queensland), AU (NSW) = Australia, NSW, *Overarching legislation set by EC and receipt with minor changes by the various European Member States.

Frame-works	Monitoring competence of auditors and verifiers	Geographical scope	To which point in value chain
AU, Q	No mentioning of accreditation and/or supervision	Not further defined	Not further defined
AU, NSW	No mentioning of accreditation and/or supervision	Not further defined	Not further defined
India	n.a.	n.a.	n.a.
Brazil Renova-Bio	<u>Supervision national authorities:</u> ANP has the obligation to oversee at any part of the production chain the correctness of the process, including the competence of auditors.	In practice, this is national production	Any part of the value chain
CLCFS	<u>Supervision authorities:</u> Verifiers have a record keeping obligation: The documentation must amongst others allow for a transparent review of how verification reached its conclusion in the validation or verification statement, including independent review. CARB can also do on-site inspections. <u>Requirement of accreditation:</u> Both the individual verifiers, as the verification body need to be accredited	Inside and beyond the border	Any part of the value chain
Canada (9)	<u>Through requirement of accreditation CBs</u> There are qualifications and eligibility criteria for third parties performing verification, validation or certification under the regulations.	To be determined (9)	To be determined (9)
EU RED II*	<u>Through requirement of accreditation CBs</u> <u>Supervision by national authorities:</u> According to RED II: Competent authorities of the Member States supervise the operation of CBs that are conducting independent auditing under a voluntary scheme (4)	To be determined (8): Supervision in country but exchange and cooperation promoted.	Any part of the value chain
Germany	<u>Through requirement of accreditation CBs</u> <u>Supervision national authorities:</u> BLE is	Inside and outside Germany (5)	No limitation of certain points in the

Frame-works	Monitoring competence of auditors and verifiers	Geographical scope	To which point in value chain
	monitoring the recognized certification bodies (1). Auditors working for BLE are attending audits of recognized CBs in Germany and other countries. Monitoring the competency of auditors by the BLE is done in the following two ways: (i) the surveillance audits of recognized CBs (2); (ii) Audits of recognized CBs are accompanied by BLE-auditors.		value chain
Nether-lands	<u>Through requirement of accreditation CBs</u> <u>Supervision national authorities:</u> From 2022 onwards, also the work performed by CBs operator for recognized schemes under the EU RED II is under supervision of NEa. Auditors doing work on verification under the Dutch legislation (double counting, booking) are under the scope of supervision. Note that the Netherlands has a separate verification protocol for the double counting of biofuels.	To be decided (8): Likely CBs with HQ in NL working inside and outside Dutch border (5, 8) For verification protocol: beyond the Dutch border	In the full supply chain within the defined geographical scope
Austria	<u>Through requirement of accreditation CBs</u> <u>Supervision national authorities:</u> If the Federal Environment Agency is noticing incorrect data or issues during on-site controls, there is consultation with the voluntary scheme.	To be decided (8): At this moment, on-site inspections inside Austria (5)	Generally: checks until the first gathering point (every biofuels producer is checked, even when biofuels are exported)
EU ETS for aviation*	<u>Through requirement of accreditation CBs</u>	Under discussion	Under discussion
ICAO CORSIA	<u>Through requirement of accreditation CBs</u> The SCS scheme is responsible for monitoring the competency of auditors to execute CEF certification throughout the supply chain. Accreditation is a requirement (3)	Member States that have opted into the Pilot Phase (for now).	Supply chain: Economic operators including e.g., feedstock producers, or traders
NL: solid biomass	<u>Through requirement of accreditation CBs (worldwide)</u> <u>Supervision national authorities</u> The NEa is the public supervisor for both the certifying and verifying CBs. CBs that perform verification activities with the Verification Protocol are privately supervised by the RvA (<i>Raad voor Accreditatie</i>)	Supervision: worldwide, with intervention being limited to withdrawal by the Minister of the recognition to operate as certifying and verifying CB	Includes all private supervision in the chain of woody biomass (6)

- (1) BLE: Yearly surveillance audits are conducted in which certification projects are evaluated incl. the review of all required information.
- (2) BLE Surveillance audits: This includes a review of the audit report. Moreover, the CB should have a process to authorize auditors. This includes evidence of relevant qualification and experiences.
- (3) See the CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes
- (4) Also: CBs shall submit, upon request of competent authorities, relevant information necessary to supervise the operation, including the exact date, time and location of audits. Where Member States find issues of non-conformity, they shall inform the voluntary scheme
- (5) Further cooperation amongst EU Member States to be established
- (6) I.e.: woody biomass delivered & consumed by Dutch energy suppliers who receive subsidy for their consumption.
- (7) Only verifiers accredited by CARB can provide verification services for entities subject to the LCFS regulation. Accredited verifiers and verification bodies are issued an Executive Order recognizing accreditation by CARB for a period of three years, after which both verifiers and verification bodies must apply to be reaccredited (CARB, 2019)
- (8) See draft Implementing Regulation (EC, 2021) See Article 17: Supervision by the Member States and the Commission.
- (9) The federal Clean Fuel Regulations is expected to come into force in December 2022.

To ensure that Accreditation Bodies operate at a high standard of competence, they are also member of the International Accreditation Forum, and/or another umbrella association. The International Accreditation Forum (IAF) is the worldwide association of accreditation bodies. The American National Standards Institute²² (ANSI) is for example a member of AFI, as well as the Dutch Accreditation Council RVA²³. Next to that, there is in Europe the recognition and multilateral agreement from the European Accreditation Body (EA).

8.3.2 Public supervision by the respective authorities of auditors and verifiers

Next to accreditation (see 8.3.1), the respective authorities in most of the frameworks also have a mandate to monitor the competency of verifiers and auditors, as shown in **Error! Reference source not found.**

For monitoring the competence of verifiers and auditors (see also 8.1), some respective authorities have a mandate that limits the scope for inspection to their country (see e.g., Austria or the Netherlands), although there are approaches to move around this and to extend the mandate beyond the country border, as is shown by the mandate of BLE to do surveillance audits or to accompany them in Germany and beyond. The Dutch Verification protocol on ‘Double counting biofuels’ also allows for doing inspections beyond the border.

To strengthen the public supervision on certification bodies beyond the border, the ‘*draft* Implementing Regulation on rules to verify sustainability and GHG emission saving criteria ..’ from the European Commission (EC, 2021) aims to strengthen coordination and exchange of information on the supervision and competences of certification bodies amongst Member States and other third countries²⁴.

²² <https://www.ansi.org>

²³ www.rva.nl

²⁴ Article 17.2: Member States shall exchange information and share best practices on how to supervise the operation of the certification bodies in the context of a formal cooperation framework. Where certification bodies carry out the certification of raw materials, biofuels, bioliquids, biomass or other fuels in more than one Member State, the Member States concerned shall set up a common framework to supervise such certification bodies, including appointing one Member State as lead audit supervisor. 17.3: The lead audit supervisor shall be responsible, in cooperation with the other Member States concerned, for consolidating and sharing information about the outcome of the supervision of the certification bodies. 17.4: Member States shall to the extent possible establish cooperation frameworks with third countries for the supervision of certification bodies auditing in their territories, where relevant, in order to ensure the same level of information flow and the application of audit supervision standards to certification bodies operating in third countries.

Table 27: Overview of mandate, as part of public supervision, to monitor the quality and functioning of certification and verification schemes (next to accreditation as private supervision tool), *Overarching legislation set by EC and receipt with minor changes by the various European Member States.

Selected frameworks	Monitoring competence of certification schemes	Insight in which schemes are used throughout the supply chain (in case of cross-compliance)
Australia, Queensland	No mentioning of accreditation and/or supervision	Unknown
Australia, NSW	No mentioning of accreditation and/or supervision	
India	n.a.	n.a.
Brazil RenovaBio	ANP has the obligation to oversee the correctness of the verification process.	n.a. (No other schemes recognized)
CLCFS	Continual improvement process: Executive officer oversees the correctness of the verification process.	n.a. (No other schemes recognized)
Canada (2)	ECCC has the authority to ensure that certification schemes have the capacity (the right criteria and indicators) to verify the sustainability of feedstocks according to its criteria. To be further determined.	To be determined (2)
EU RED II*	Requirement that voluntary schemes, including those already recognised by the Commission, report regularly on their activities. According to the RED II: In case of concerns that a voluntary scheme does not operate in accordance with the standards of reliability, transparency and independent auditing, the Commission can investigate the matter and take appropriate action.	Not at this moment. Regulation is still under development.
* Germany	See EU RED II. Schemes are required to report on their activities annually. If the BLE identifies non-compliances at schemes, they might inform the commission.	No, based on the information available in NABISY, the national authority BLE is only aware of the certification scheme applied by the last interface.
*	See EU RED II	No, there is only insight in the

Selected frameworks	Monitoring competence of certification schemes	Insight in which schemes are used throughout the supply chain (in case of cross-compliance)
Netherlands		scheme that is used at the end of the supply chain
* Austria	See EU RED II. According to RED, a collaboration with voluntary schemes is required, but there is no controlling authority. In RED-II governance organisations must check voluntary schemes. There can be witness audits at companies with issues in the past.	The Federal Environment Agency primarily checks certificates for biofuels, but it can also check certificates for feedstocks. Voluntary schemes can be regional or dedicated to specific feedstocks - it is usual to have different voluntary schemes throughout the whole supply chain.
EU ETS for aviation	See EU RED II.	
ICAO CORSIA	States and purchasers (aeroplane operators or their designated representative) have audit rights to production records for CEF they purchase to verify the CEF. ICAO can also request additional information from the SCSs.	The reporting of batches certified by individual certification schemes are reported annually. It is a requirement that all certifications are publicly published. Cross-compliance is not an option at the moment.
NL: solid biomass	Not the main focus - but as the NEa monitors the functioning of the system of private supervision this would also include the functioning of the certification scheme based on signals received from the field.	information of the first claim must be available at the end of the COC, so that is clear what scheme covered the criteria at the point of origin, and to make sure that that scheme was indeed approved at that moment (1)

(1) For example: if SBP is used through the CoC but SFM was certified by FSC, then you have insight that this is an FSC-SBP combination

(2) The federal Clean Fuel Regulations is expected to come into force in December 2022.

8.3.3 Public supervision of the quality of verification and certification schemes

Next to the supervision of auditors and verifiers by the respective authorities, some of the selected policy frameworks also have a mandate to monitor the competency of certification and verification schemes. When a policy framework recognizes only one scheme (see e.g., LCFS in California), the authority oversees the correct implementation of the verification process of this respective scheme.

When a policy framework recognizes multiple schemes (as under the EU RED II), the authority has, or should have, the mandate to oversee the correct implementation of the processes of various schemes,

and how they interact with each other.

Error! Reference source not found. shows that under the EU RED II, possible non-compliances at schemes might be notified to the Commission. there is, however, no authority on Member State level that actively oversees the correct implementation of the schemes - as if for example the case under the policy frameworks with one scheme, such as RenovaBio or LCFS. Within Europe, supervision of schemes is organized at EU level. The Commission has, however, no obligation under the EU RED to (actively) monitor voluntary certification schemes.

Next to that, there is no to limited insight in how the schemes interact with each other, and whether there is a risk that weaker schemes are used in the beginning of the supply chain, as authorities are only aware of the certification scheme applied by the last interface. An exception for this is the Dutch framework on solid biomass.

8.4 CONSEQUENCES OF NON-COMPLIANCE FOR AUDITORS, VERIFIERS AND CERTIFICATION SCHEMES

Both public and private supervision use enforcement tools to sanction non-compliant certification and verification bodies, and the approved certification schemes to deter them from being non-compliant in the future.

In the case of **private supervision**, a consequence of non-compliance means that accreditation can be lost. When accreditation is also a requirement in the policy framework, the loss of accreditation has as direct consequence for accredited certification and verification bodies and standards that recognition is lost.

*Table 28: Overview of the consequences from public supervision in case of found non-compliances for certification or verification bodies and/or voluntary certification schemes. *If accredited: losing accreditation under private supervision, **Overarching legislation set by EC and receipt with minor changes by the various European Member States.*

Selected frameworks	Consequences of non-compliance for:	
	Certification bodies (CBs) and verification bodies*	Voluntary certification schemes (VCS)*
Australia (Queensland)	Not defined: The schemes themselves may take measures	Not defined
Australia, NSW	Not defined: The schemes themselves may take measures	Not defined

Selected frameworks	Consequences of non-compliance for:	
	Certification bodies (CBs) and verification bodies*	Voluntary certification schemes (VCS)*
India	N.A.	n.a.
Brazil RenovaBio	Sanctions according to Brazilian law. Sanctions include (but are not limited to) losing recognition.	N.A. (only one scheme)
CLCFS	First, individual verifiers may receive a lower status [3] or lose their recognition. Second, verification bodies may receive a lower status or lose their recognition.	N.A. (only one scheme)
Canada	If the authority ECCC considers the auditor insufficient, then another auditor should be hired.	The scheme could not be used to comply with the CFR sustainability criteria and/or would likely be required to meet additionally CFR sustainability requirements to be considered sufficient.
EU RED II**	<i>Inform the certification scheme:</i> According to the RED II: Where Member States find issues of non-conformity, they shall inform the voluntary scheme without delay.	In case of concerns that a certification scheme does not operate in accordance with the standards of reliability, transparency and independent auditing, the Commission can investigate the matter and take appropriate action.
Germany	Potential consequences are: * <i>Inform the certification scheme:</i> the scheme is informed and might take measures to investigate the case and potentially file restrictions against the involved parties. The respective certificates will become invalid. * <i>Additional action:</i> in cases of fraud, there might be additional investigations from the local authorities, leading to the withdraw of approval or recognition of certification schemes and bodies.	See left BLE would inform the EC in case of severe shortcomings of the certification schemes

Selected frameworks	Consequences of non-compliance for:	
	Certification bodies (CBs) and verification bodies*	Voluntary certification schemes (VCS)*
Netherlands	<p>* <i>Accreditation body informed</i>: For supervision on CBs (for which the Netherlands performs supervision) and verifiers working under accreditation the accreditation body will be informed in case of findings.</p> <p>* <i>Additional action</i>: In case of serious findings, sanctions (fines) may be imposed.</p> <p>* <i>Inform the certification scheme</i>: For 2022 onwards findings regarding the work performed by CBs will be passed on to the sustainability schemes in line with RED2.</p>	See EU RED II. No regulation on Member State level on what would be done by NEa.
Austria	<p>Through national authority:</p> <p>* <i>Inform the certification scheme</i>: If the authority is noticing incorrect data or issues during on-site controls the VCS is consulted (1).</p> <p>* <i>Additional action</i>: There may be a time limit for solving issues. If issues continue, the company can be blocked.</p>	With RED-II came the opportunity to report to the commission if a certification is insufficient.
EU ETS for aviation**	See EU RED II	See EU RED II
ICAO CORSIA	* <i>Through certification scheme</i> : For This is addressed by the certification scheme; each scheme that is approved must have measures in place to address non-compliance	CORSIA approved VCS are monitored on an ongoing basis and will need to be re-approved for each phase of CORSIA. Ultimate consequence: no re-approval
NL: solid biomass ...	* <i>Through certification scheme</i> : Action by scheme and accreditation body. Ultimately: losing recognition of the certification body by the Dutch minister	(2)

- (1) Whereas certification schemes check single companies, the Federal Environment Agency is checking the whole supply chain (biofuels).
- (2) The Ministry cannot reverse a decision for an approval of a certification scheme. However, as soon as scheme updates apply for re- approval, the Minister could decide not to approve this scheme any longer
- (3) Moving to a lower status means for example that the verifier loses its status to do field pathway or industry verification and/or requires more supervision.

Error! Reference source not found. shows the consequences from *public supervision* in case of found non-compliances for certification or verification bodies and/or certification schemes.

For certification or verification bodies, the consequence is that recognition is lost directly or

indirectly (through the loss of accreditation)- through the certification scheme. In the case of serious findings, additional sanctions (such as fines) may be imposed, as is shown by the policy framework in the Netherlands.

For certification or verification schemes, a difference can be made between policy frameworks making use of only one scheme (as e.g., LCFS or RenovaBio), and policy frameworks recognizing multiple schemes (as the EU RED II):

- When a policy framework only makes use of one scheme, the scheme may be continuously improved over time when weak spots or unclarities are identified. In the case of CLCFS, the first steps are to develop case by case guidance so companies and verifiers can follow this published guidance, and verifiers can be trained accordingly. When there is an update, this guidance is integrated into the Regulation update (Lawver, 2021).
- In the case of the EU RED II, the Commission argues in the report from ECA (2016) that the withdrawal of recognition of a scheme is the only control tool available for cases with evidence that the scheme's certification rules, and requirements have been seriously infringed. The lack of monitoring makes, however, it very unlikely that the EC could obtain sufficient evidence of infringement (ECA, 2016).

8.5 MAIN OBSERVATIONS

There are generally three forms to stepwise monitor compliance of the economic operator: (i) Cross-checking information filled in in the database; (ii) additional, mostly administrative, checks and (iii) on-site inspections. On-site inspections at economic operators are less common and/or not always that clearly defined.

The mandate of countries to cross-check the information from the economic operator is under various frameworks limited to the country and/or to the previous market operator. This basically means that respective authorities are reliant on actors earlier in the supply chain to go back to the point of origin, and/or on the cooperation of certification / verification bodies, and/or on other authorities. This limitation is especially of relevance for countries and policy frameworks where biomass is traded internationally (beyond borders).

There are generally three types of consequences of non-compliance in case information submitted by the economic operator is incomplete and/or incorrect, being: (i) loss of certificate (when applicable); (ii) loss of proof for receiving a credit, claim, subsidy or being able to count towards a target and (iii) in case of serious impact or consequences of non-compliance, additional sanctions such as fines or penalties.

Monitoring compliance of standards and certification and verification bodies takes place through both public and private supervision (i.e., through accreditation). Accreditation CAN be mentioned in a requirement in the selected policy frameworks as a requirement for recognition of verification and certification bodies (see for example the EU RED II) and verification bodies and of standards, but this does not have to be the case. In the case of CLCFS, the respective authority (i.e., CARB) has the mandate to directly accredit individual verifiers and verification bodies.

The quality of the auditor or verifier is critical to effectively control the compliance of the economic operator. This largely depends on his level of competency and his independence. Through public supervision, the respective authorities have a mandate to monitor the competency of verifiers and auditors. The scope for inspection is for some authorities limited to their country, although there are approaches to extend the mandate beyond the border. To strengthen public supervision on certification bodies beyond the border, the European Commission aims to improve coordination and exchange of information amongst Member States and other third countries.

Respective authorities also have a mandate to monitor the certification and verification schemes, that are operating and are recognized within the scope of the policy framework. Under the EU RED II, there is no authority on Member State level that actively oversees the correct implementation of the schemes. - as is for example the case for some policy frameworks such as RenovaBio or LCFS. For the analysed European frameworks that operate under the EU RED II, supervision of schemes is organized at EU level. The Commission has, however, no obligation under the EU RED II to (actively) monitor certification schemes. Next to that, there is no to limited insight in how the schemes interact with each other, and whether there is a risk that weaker schemes are used in the beginning of the supply chain, as authorities are only aware of the certification scheme applied by the last interface. An exception for this is the Dutch framework on solid biomass.

Both public and private supervision (i.e., accreditation) use enforcement tools to sanction non-compliant certification and verification bodies, and certification schemes. A consequence of non-compliance under private supervisions means that accreditation can be lost. In the case of public supervision, the consequence is that recognition by the selected policy framework is lost - directly or indirectly, through the certification scheme. In case of serious findings, additional sanctions (such as fines) may be imposed.

Consequences of non-compliance for certification or verification schemes differ depending on if one or multiple schemes are recognized by a policy framework. When a policy framework makes use of one single scheme, the scheme may be further improved when weak spots are identified. Ideally, this process cycle of monitoring, evaluation and improvement is embedded in the policy framework itself.

In the case of the EU RED II, the withdrawal of recognition of a scheme is the control tool available for cases with evidence that the scheme's certification rules, and requirements have been seriously infringed. However, the lack of monitoring makes it unlikely that the EC could obtain sufficient evidence of infringement.

9. Summary of conclusions and recommendations

The objective of this analysis was to better understand how existing compliance and verification approaches for feedstock-to-biofuel supply chains differ and to improve comprehension of the implications of those (regional) differences on biofuel flows globally. This, to give general recommendations and perspectives for decision-makers on how to improve the robustness of compliance and verification approaches for feedstock-to-biofuel supply chains for the global biofuel market and to guarantee the sustainability of biofuels including their low carbon intensity through the supply chain.

9.1 GENERAL OBSERVATIONS

It should be recognized that there are generally two categories of policy frameworks that aim to promote the use and guarantee the sustainability of biofuels. The first category is based on a carbon trading mechanism (e.g., LCFS, Renovabio), working often with a single scheme (except for Canada), with the objective to reduce, through this market mechanism, GHG emissions of fuels used in the transport sector in a cost-effective manner. Policies as EU RED II in the EU rather mandate defined volumes or blending levels and recognize multiple certification schemes to prove compliance with the sustainability and GHG emission reduction requirements of biofuels. Due to structural differences in the governance set-up between these two categories of approaches (and some policy frameworks fall in between), there will always be differences in compliance and verification approaches.

The analysis learns that differences exist between the selected policy frameworks on a range of issues, including the requirements on the GHG emission reduction and sustainability criteria, the categorization of feedstocks, the requirements on transfer of information and the chain of custody and on the verification and assurance requirements, including the approval of certification schemes. These issues are interrelated and a combination of- even small - differences -results in differences in the level of stringency and robustness of policy frameworks on the sustainability of biofuels.

The global sustainability framework for biofuels is as strong as its weakest link, and in a sector where biofuels and its feedstock are internationally traded, there is a risk that feedstock flows move to, or are traded through countries with less enforcement or less stringent rules. Obviously, this may affect overall biofuel trade, but more importantly also the overall robustness of the system.

9.1.1 General recommendations

- Align and harmonize where possible definitions (especially on wastes and residues), sustainability criteria, GHG emission reduction requirements and GHG LCA methodologies, and related certification and verification requirements to improve the robustness of compliance for sustainable feedstock-to-biofuel supply chains for the global biofuel market.
- Increase the understanding how a combination of- even small - differences in GHG emission reduction requirements, and related certification and verification requirements may affect the overall robustness of policy frameworks on the sustainability of biofuels.

9.2 FINDINGS ON GHG EMISSION REDUCTION REQUIREMENTS AND SUSTAINABILITY CRITERIA

Currently, several sustainability and greenhouse gas (GHG) emission reduction requirements are implemented in policy frameworks for feedstock-to-biofuel supply chains in different regions of the world. All selected policy frameworks with sustainability requirements have included a requirement to reduce the carbon intensity. The use of different LCA tools (with well to wheel boundaries) may, however, result in differences in the allocations made at different steps of the Chain of Custody.

Furthermore, amongst the selected policy frameworks, approaches on mitigating direct and indirect land use change differ. Although most frameworks recognize the importance to include requirements to maintain areas with a high carbon stock and/or biodiversity to mitigate land use change, substantial differences can be observed on e.g., the scope of ecosystems included. Approaches to mitigate ILUC (e.g., default ILUC factor in GHG calculation, proving low ILUC risk, etc.) differ substantially, if included in the selected frameworks. Other environmental requirements, such as on water or soil, are only to limited extent included in the policy frameworks and only three frameworks have included specific criteria on sustainable forest management (SFM). Coverage of socio-economic criteria is very limited in the selected policy frameworks.

Of course, sustainability requirements (e.g., on soil, or water) are also embedded in related legislative frameworks and policies and national authorities can rely on their own policies when the feedstock and biofuel is produced in their own country but less when the feedstock and/or biofuel comes from abroad. Therefore, especially when biofuels are traded internationally, and feedstock is imported, it is key that this kind of sustainability criteria are also covered in biofuels policies to ensure that minimum requirements are fulfilled independent of the country of production.

9.2.1 Recommendations on strengthening the GHG emission reduction requirements and sustainability criteria

- There is room for further harmonization and standardization of LCA models to decrease the variance of input data and approaches. Next to that, coordination and alignment are key to ensure that GHG emission reductions that are created in an (international) supply chain cannot be claimed twice because system boundaries in LCA-models overlap.
- There is potential amongst the selected policy frameworks to further harmonize approaches on direct and indirect land use change and maintenance of areas with a high carbon stock and/or biodiversity.
- It is important to promote that land-related sustainability requirements become included in all selected sustainability frameworks in a harmonized way, in particular for complex issues like soil health, use of fertilizers and pesticides, water pollution and depletion and biodiversity protection.
- The coverage of socio-economic criteria is very limited in the selected policy frameworks and establishing requirements to safeguard human rights (e.g., tenure rights, labour rights) and to ensure that feedstocks do not conflict with food production (e.g., by incentivizing the use of degraded or marginal lands) should also be explored.
- Alternatively, it can be promoted that related national policies and laws on socio-economic and land-related sustainability requirements are properly regulated in key producing countries.

- For the inclusion of social criteria, policy frameworks can build on existing developments such as on the Universal Declaration on Human Rights, or specifically for the European Union, on the upcoming Human Rights Due Diligence Regulation.

9.3 FINDINGS ON CATEGORIZATION OF FEEDSTOCKS

The appropriate categorization and definitions of feedstock are essential because feedstock categories are often linked to meeting compliance with certain sustainability requirements (or not), and/or to certain incentives. This is especially true for the categorization of wastes and residues, which are for example considered to have zero emissions in the LCA analysis up to the point of collection/gathering. Next to that, various policy frameworks (in India or in Europe) promote advanced biofuels, based on a specific definition and rewarding especially the type of feedstocks, which have a low to minimal impact on land use (change), such as residues or waste.

The analysis learns that there are differences amongst the various policy frameworks in how specific the feedstock categories are defined. Broad definitions can, however, lead to lack of clarity about which materials are considered, for example, industrial waste. Clear criteria why certain feedstocks are placed or removed from certain feedstock lists are also missing. Unambiguities and lack of harmonization can lead to undesirable incentives of certain feedstock flows towards countries with preferential policy frameworks.

9.3.1 Recommendations on improving the categorization and correct identification of feedstocks

- Stable policies, unambiguous definitions, and clear underlying guidance and decision trees are essential to promote biofuel from waste and residue streams for the longer term.
- It is key that information about feedstock is appropriately classified at the collection/gathering point, and that this information is correctly transferred through the supply chain. Harmonizing biomass category definitions between policy frameworks also helps certification schemes to be used in multiple frameworks
- Various policy frameworks are introducing specific, more stringent, requirements to prevent modification and wrong classification of waste and residue feedstocks. Harmonization of these requirements is, however, key.
- Uniformity on the first link in the supply chain between policy frameworks is key to prevent that feedstocks - and especially residues and waste streams - can be used and/or traded more easily in certain regions and/or countries due to less strict requirements.

9.4 FINDINGS ON THE USE OF CERTIFICATION OR VERIFICATION SCHEMES

Frameworks make use of certification or verification to prove compliance with the GHG emission reduction and sustainability criteria. Several policy frameworks (e.g., EU-RED, ICAO-CORSIA) regulation has (partially) outsourced public responsibility for monitoring compliance with these requirements, increasing the importance of private certification schemes. Other frameworks only make use of one single scheme, such as the public standard of the LCFS.

Various policy frameworks make use of multiple certification schemes to prove compliance with the sustainability criteria. The analysis learns that there are differences amongst the policy frameworks on the recognition criteria and the conditions under which the schemes are recognized. Especially conditions for cross-compliance and for the Chain of Custody (CoC) differ or are missing for some.

The analysis has looked for only a limited number of selected policy frameworks to the similarities and differences in verification and assurance requirements that are defined for certification bodies when evaluating conformance to the applicable standards. Differences exist and the devil is in the details. Next to that, it is important to realize that these requirements are fully missing in some of the policy frameworks, leaving room for interpretation and/or leading to the risk of weak assurance requirements.

Of course, certification schemes can also apply criteria which are stricter than the criteria laid down in the policy frameworks and have additional criteria, e.g., social criteria or promoting best agricultural practices. Schemes can, however, also ‘make use’ of lower certain requirements and/or not or only partially address some requirements, when not required by the policy framework or when only vaguely described. This can affect the assurance and reliability of the sustainability of biofuels through certification.

Schemes adapt to new or additional policy requirements, as is shown by the different certification modules that are being developed. It is important to understand what these different claims and requirements in one scheme represent, both for government authorities and for auditors, as each may hold a different weight and have different levels of meaning.

9.4.1 Recommendations to strengthen minimum level of robustness for certification or verification schemes

- Allowing both verification and certification to proof compliance gives flexibility in the market. The option for verification, next to certification, can especially be interesting when proof of compliance is required for new criteria that have not yet been included in (many) certification systems. The challenge is however to maintain the same level of assurance for both systems.
- Especially for frameworks recognizing multiple schemes, a clear framework with minimum requirements is crucial to avoid that schemes ‘make use’ of lower requirements and lower the bar: the robustness of all recognized certification schemes is at the end as strong as its weakest link. At the same time, it must be taken care of that requirements are not defined too strict and leave little room for interpretation.
- Harmonization on the recognition criteria and the conditions under which the schemes are recognized is key for those frameworks that recognize multiple schemes.
- The added value of recognizing multiple schemes is that schemes can also go beyond the minimum requirements and raise the bar. It is worthwhile exploring which incentives can be built in policy frameworks to stimulate the use of those ‘best in class’ schemes that want to further raise the bar.
- This is confirmed by the range of modules that are being developed by certification schemes to align with different requirements resulting from different policy contexts. Further insight and transparency are needed in how clear it is for the market, authorities and auditors where those different claims stand for, and how they interact.
- Frameworks that only make use of one single scheme (e.g., LCFS or RenovaBio) can align in for example the requirements on verification and assurance requirements that are defined for certification bodies when evaluating conformance to a standard.

9.5 FINDINGS ON CHAIN OF CUSTODY AND TRANSFER OF INFORMATION

For most selected policy frameworks, the mass balance model is required as minimum for the Chain of Custody (CoC). Complex trade chains, and an increase in blending and multiple outputs throughout advanced biofuel supply chains, adds complexity to the CoC and the transfer and control of information. These risks will increase even more with the development of renewable

fuels that are physically indistinguishable from fossil fuels

Policy frameworks can set up minimum requirements for a CoC system and/or, when relevant, place these requirements in the assessment criteria for approval of certification schemes. The analysis shows that there are differences in those minimum requirements; while some policy frameworks have not included any, other frameworks have relatively detailed requirements. Not including any minimum requirement clearly opens the door for interpretation and may lead to risks that result in a non-reliable CoC or to the loss of crucial sustainability information.

In the CoC, it should be acknowledged that the use and recognition of multiple certification schemes, operating side by side, enlarges the risk for fraud as it is more complicated for an auditor to cross-check that a statement for another scheme is prepared by another auditor, for the same consignment. This risk is reduced when a policy framework only recognizes one scheme.

The analysis showed that some policy frameworks have not well defined which first link in the supply chain is subject to certification or verification. Different requirements on the first link of the supply chain exist for waste and residues for the selected policy frameworks, including for primary forest residues.

9.5.1 Recommendations on strengthening the Chain of Custody and transfer of information

- It is key that policy frameworks set minimum requirement for the Chain of Custody model(s) to be used and under which conditions - harmonization amongst frameworks is key.
- The transfer of sustainability information throughout the supply chain and across countries requires a harmonised interpretation of terminologies and definitions. The ISO 22095 standard defines a framework for the CoC and can be a useful reference for further harmonization.

9.6 FINDINGS ON PROVING COMPLIANCE AT THE END OF THE SUPPLY CHAIN BY THE ECONOMIC OPERATOR

In general, there is a requirement that information about the origin, volume or mass, feedstock category, proof of compliance with the sustainability criteria and the GHG emission reduction requirements is submitted to the respective authorities. There are also some differences in what type of information is required amongst the different policy frameworks, for example shown by differences in information required about origin. Frameworks such as ICAO CORSIA or LCFS ask also additional information about the conversion process and associated technology.

Most countries make information about the reported information publicly available, often in consolidated form.

Of course, the reliability of the data submitted to the authority is largely determined by the quality of the input data that are transferred throughout the supply chain. Economic operators in the supply chain must keep records and supplemental documentation sufficient to allow for verification and/or certification. When a batch is sold, the certificates are transferred from the beginning of the supply chain to the obligated party at the end of the supply chain, next to information about for example GHG emissions or origin. The certificate does not provide information about possible risks identified. Compliance with the GHG emission reduction and sustainability criteria is in various frameworks proven by the submission of a Proof of Sustainability (PoS) to the respective authority. This PoS shows y which certification scheme

the batch was certified.

9.6.1 Recommendations to strengthen correctness and completeness of information at end of the supply chain

- Harmonize databases (as is started in the European Union) to ensure and facilitate instant data transfers and harmonisation of data flows - between countries, but also for example between certification schemes and national registries.
- Harmonize reporting requirements at the end of the supply chain
- Require as proof of sustainability at the end of the supply chain not only the certificate, but also additional information on supportive data to calculate the GHG emission reduction and on sustainability data when considered useful.
- Traceability databases can help improving the robustness of information through the supply chain and allow to cross-check the correctness and completeness of the input data that are transferred throughout the supply chain.
- Consider exploring some form of public consultation in the selected policy frameworks.

9.7 FINDINGS ON MONITORING COMPLIANCE

The mandate for a public/ national authority to monitor compliance of the economic operator and to cross-check the information is in various frameworks limited to the country borders and/or to the previous market operator. This basically means that respective authorities are reliant on actors earlier in the supply chain to go back to the point of origin, and/or on the cooperation of certification / verification bodies, and/or on other authorities. This limitation is especially of relevance for countries and policy frameworks where biomass is traded internationally (beyond borders).

Monitoring compliance of standards and certification and verification bodies takes place through a combination of both public and private supervision. A form of private supervision is accreditation. In the case of CLCFS, the respective authority (i.e., CARB) has the mandate to directly accredit individual verifiers and verification bodies. A consequence of non-compliance means that accreditation can be suspended or even be lost.

The quality of the auditor or verifier is critical to effectively control the compliance of the economic operator. When monitoring the competency of verifiers and auditors, the scope for inspection is for some authorities limited to their country, although there are approaches to extend the mandate beyond the border. To strengthen public supervision on certification bodies beyond the border, the European Commission aims to improve coordination and exchange of information amongst Member States and other third countries. One of the consequences of non-compliance for certification and verification bodies is that recognition by the selected policy framework may be lost.

Respective authorities also have a mandate to monitor the competency of certification and verification schemes. Under the EU RED II, there is no authority on Member State level that actively oversees the correct implementation of those schemes that are recognized within the scope of their policy framework - as if for example the case for some policy frameworks such as RenovaBio or LCFS. Within Europe, supervision of schemes is organized at EU level for the EU RED II. The Commission has, however, no obligation under the EU RED II to (actively) monitor voluntary schemes. Next to that, there is no limited insight in how the schemes interact with each other.

Consequences of non-compliance for certification or verification schemes differ depending on

if one or multiple schemes are recognized by a policy framework. When a policy framework makes use of one single scheme, the scheme may be further improved when weak spots are identified. In the case of the EU RED II, the withdrawal of recognition of a scheme is the control tool available for cases with evidence that the scheme's certification rules, and requirements have been seriously infringed.

9.7.1 Recommendations to improve the public and private supervision to monitor compliance

- Require accreditation as a requirement in the selected policy frameworks for certification and verification bodies and - if relevant - of standards, as form of private supervision. ISO standards used for accreditation of certification bodies (e.g., ISO 17065 and equivalent) can be a useful reference for further harmonization and setting minimum requirements.
- Further improve coordination and exchange of information amongst competent authorities in Member States and other third countries on competencies of certification bodies and verifiers.
- For policy frameworks that recognize multiple schemes and allow cross-recognition, it is important to ask for insight which certificate is used in the beginning of the supply chain at the point of origin - to better understand how the schemes interact with each other.
- For policy frameworks that recognize multiple schemes, such as the EU RED II, there is a need for supervision and monitoring of certification schemes to at least be able to identify, in the worst case, evidence of infringement.
- For policy frameworks that recognize one single scheme, a policy framework should include a process cycle of monitoring and evaluation to be able to identify weak spots of the scheme and improve them
- Enlarge transparency, public scrutiny and building up trust in society in general towards policy frameworks that include certification and verification approaches

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Annex 1: Factsheets of policy frameworks

As part of this study, Factsheets have been developed which served as means to collect the relevant information about the selected policy frameworks with great help from the Task 39 Members, who provided the data, and peer reviewed them.

Data for filling in the factsheets are obtained from different resources, including best available expert knowledge, publicly available reports, and websites. Relevant literature sources are mentioned at the end of this factsheet. The Factsheets were filled in the period from September 2021-January 2022. The aim of the Factsheets is to present the key characteristics of the policy framework; It does not pretend to be fully complete, nor does it pretend to capture all the details and insights.

Factsheets from the following policy frameworks can be found in this annex ([with hyperlink](#)):

- [Australia: specifically referring to States of Queensland and New South Wales](#)
- [Canada Clean Fuel Regulations](#)
- [EU ETS for aviation](#)
- [EU RED II](#)
- [Austria](#)
- [Germany](#)
- [Netherlands](#)
- [ICAO CORSIA](#)
- [India](#)
- [Brazil RenovaBio](#)
- [California Low Carbon Fuel Standard](#)
- [Netherlands: solid biomass for energy applications](#)

TOPICS AND QUESTIONS ANSWERED IN THE FACTSHEETS

The factsheets provide information about the following topics and questions:

General information:

1. Is there a policy on the sustainability of (advanced) biofuels in your country? If yes, which one?
2. Is there a definition for 'advanced biofuels' under this policy? If yes, which one?
3. Which feedstock categories fall under the scope of 'advanced biofuels'?

Requirements on GHG emission reduction and sustainability

4. What GHG emission reduction and sustainability requirements are included in the policy, and to which feedstock-to-biofuel chains do they apply? List in particular the requirements for:
 - Forest: forest residues to ethanol via gasification
 - Agriculture: ethanol production from cereal straw

Proofing compliance: information required

5. Who is the obligated party to report and proof compliance of the sustainability and GHG emission of (advanced) biofuels and at what interval?
6. What information is required/ needs to be reported about sustainability and GHG emission (reduction) by the obligated party?
7. What information is required about origin?
8. What criteria are used to categorize and define feedstock?

9. What information needs to be reported about the type of feedstock used?

Proofing compliance: Verification methods required/ allowed

10. Is it possible to make use of certification systems to proof compliance? If yes, which schemes are recognized (so far)?

11. Is it possible to use a national standard to proof compliance?

The approval and monitoring procedures for certification standards (only relevant when they can be used to proof compliance)

12. Which authority decides which certification systems and/or national standards can be used?

13. Which criteria are used to approve a certification system and/or national standard?

14. Are there minimum requirements around 3rd party auditing, intervals of verification or accreditation? And if yes, which ones?

15. Is cross-compliance possible? And if yes, on which conditions?

Traceability and transfer of information

16. Which chain of custody systems (e.g., mass balance, book and claim) are allowed to link information to the biomass feedstock?

17. When mixing of different consignments of biomass is allowed: what are the rules of allocation (e.g., based on energy content, mass)?

18. What is the first point in the supply chain to which the information should be traced back for:

- Forestry: forest residues
- Agriculture: straw from cereals

Monitoring compliance: the governance structure

19. Which (controlling) authority receives the required sustainability and GHG information from the economic operator?

20. How does the (controlling) authority register this information? Is there a database?

21. How does the (controlling) authority checks the correctness of the information they receive?

22. Is this information also publicly available, and if yes, which information?

23. Does the controlling authority (or another governance organization) have the authority to go back in the supply chain, to check the correctness of the information? and if yes,

- i. to which point in the value chain?
- ii. which information can be checked?

24. In case information submitted by the economic operator is incomplete and/or incorrect: what are the consequences of non-compliance?

Monitoring compliance of certification systems

25. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the auditors? and if yes,

- a) to which point in the value chain?
- b) what is the scope of their monitoring?

26. In case verification by the auditor is considered insufficient, what are the consequences?

27. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the certification schemes? If yes, how?

28. Does the controlling authority (or another governance organization) have insight if one certification scheme is used throughout the full supply chain, or multiple (in case of cross-compliance)

29. In case verification and monitoring by the certification scheme is considered insufficient, what are the consequences?

Other

30. Where do you see most risks in information transfer (completeness, correctness) between economic operators in the supply chain for advanced biofuel supply chains?
31. Where do you see most risks in information transfer and monitoring of the sustainability and GHG emission requirements in advanced biofuel supply chains between countries?
32. Where do you see opportunities for improvement to harmonize and strengthen policy frameworks to monitor the sustainability and GHG emission requirements of advanced biofuel supply chains?
33. Other remarks

AUSTRALIA - QUEENSLAND/ NEW SOUTH WALES FRAMEWORK

Data for fulling in this factsheet are obtained from different resources, including best available expert knowledge, publicly available reports, and websites. Relevant literature sources are mentioned at the end of this factsheet (footnotes are included). The Factsheets were filled in the period from September 2021-January 2022. The aim of the Factsheets is to present the key characteristics of the policy framework; It does not pretend to be fully complete, nor does it pretend to capture all the details and insights.

A. General information	
1. Is there a policy on the sustainability of (advanced) biofuels in your country? If yes, which one?	<p>No:</p> <p>Biofuels are currently not included in any National Renewables Policy in Australia and whilst there is a federal biofuels incentive scheme, there is no federal biofuels policy. The biofuels policy is left to the States, with no consideration on the sustainability of the biofuel.</p> <p>So far, only two states have biofuels mandates, Queensland and New South Wales (NSW). The biofuels mandates in Queensland are 0.5% biodiesel and 4% ethanol, and 5% biodiesel and 6% ethanol (volume basis) in NSW.</p>
2. Is there a definition for 'advanced biofuels' under this policy? If yes, which one?	NA
3. Which feedstock categories fall under the scope of 'advanced biofuels'?	NA
A1. Requirements on GHG emission reduction and sustainability	
4. What GHG emission reduction and sustainability requirements are included in the policy, and to which feedstock-to-biofuel chains do they apply? List in particular the requirements for:	<p>There is no existing policy, therefore, no sustainability and/or GHG reduction requirements on supply chain level. Both the States of Queensland and NSW have GHG emission reduction and sustainability requirements in place though.</p> <p>For NSW specifically:</p> <p>Biofuel blends shall have on average 50% lower lifecycle greenhouse gas emissions relative to the fossil fuel baseline. Each biofuel in the blend shall have lower lifecycle GHG emissions than the fossil fuel baseline. Lifecycle GHG emissions of biofuel shall be calculated using the RSB lifecycle GHG emission calculation methodology.</p> <p>The treatment of co-products, residues and waste in biofuel GHG accounting perspective is specified in the RSB GHG Calculation Methodology (RSB-STD-01-003-01).</p> <p>In relation to biodiversity: Where conservation values of local, regional, or global importance have been identified, Participating Operators shall carry out a specialized impact assessment in accordance with the Conservation Impact Assessment (Guidelines (RSB-GUI-01-007-01). There are also requirements on soil, water, waste and agrochemicals, following the RSB Guidelines.</p> <p>In relation to food security: Biofuel operations shall assess risks to food security in the region and locality and shall mitigate any negative impacts that result from biofuel operations. Where the screening exercise of the RSB impact assessment process reveals a direct impact on food security in food insecure regions, Participating Operators shall conduct a food security assessment in accordance with the RSB Food Security Assessment Guidelines (RSB-GUI-01-006-01)</p> <p>IN relation to socio-economic requirements and land use rights: Where the screening exercise of the RSB impact assessment process reveals a negative impact to existing land rights and land use rights by biofuel operations, the Participating Operator shall conduct a Land Rights Assessment (RSB-GUI-01-012-01).</p> <p>For Queensland specifically:</p> <p>Queensland has a requirement that biofuels demonstrate a GHG saving of at least 30% (RSB are used to certify).</p> <p><u>Liquid Fuel Supply Regulation 2016 Queensland (schedule 1, Part 1):</u></p> <p>Biobased petrol and biobased diesel sold under the biofuels mandate must meet the</p>

	<p>sustainability criteria for biofuels.</p> <p>The criteria are prescribed and outlined in the Liquid Fuel Supply Regulation 2016 and the Liquid Fuels Supply Act 1984. The sustainability criteria are:</p> <ul style="list-style-type: none"> • a greenhouse gas assessment that requires unblended biofuels, regardless of the feedstock, to deliver greenhouse gas savings of at least 20% when compared to regular petrol or diesel • a certification under the relevant environmental sustainability standard specific to the relevant feedstock. <p><u>About the greenhouse gas criterion:</u></p> <p>Whether biofuel meets the GHG reduction criterion mentioned in subsection (1) must be worked out using— a) a lifecycle assessment complying with both of the following standards— (i)ISO 14040:2006; (ii)ISO 14044:2006; or (b)for biofuel mentioned in section 5 that is appropriately certified under section 5(2)(b)—the RSB lifecycle methodology.</p> <p>In this section— relevant equivalent fuel means— (a)for biobased petrol—regular petrol; or (b)for biobased diesel—diesel. RSB lifecycle methodology means the RSB lifecycle GHG emission calculation methodology under the RSB global standard.</p> <p><u>Part 2 Sustainability criteria</u></p> <p><u>Biofuel produced from palm oil</u></p> <p>(1) Biofuel produced from palm oil (whether or not in combination with another source) must— (a) be appropriately certified; and (b)comply with the greenhouse gas criterion.</p> <p>(2) For subsection (1), biofuel produced from palm oil is appropriately certified if, when the biofuel is produced, each supply chain entity for the biofuel is certified under— (a) the RSPO standard or a superseded version of the RSPO standard; or (b)an equivalent standard for the RSPO standard.</p> <p><u>Biofuel produced from sugar cane</u></p> <p>(1) Biofuel produced from sugar cane (whether or not in combination with another source) must— (a) be appropriately certified; and (b)comply with the greenhouse gas criterion.</p> <p>(2) For subsection (1), biofuel produced from sugar cane is appropriately certified if— (a) at least 30% of the sugar cane is accredited sugar cane; or (b)when the biofuel is produced, the facility at which the biofuel is produced, or each supply chain entity for the biofuel, is certified under— (i)the International Sustainability and Carbon Certification system in accordance with— (A)the ISCC EU standard or the ISCC PLUS standard; or (B)a superseded version of the ISCC EU standard or the ISCC PLUS standard; or (ii)the RSB global standard or a superseded version of the RSB global standard; or (iii)an equivalent standard for a sustainability standard.</p> <p>Accredited sugar cane means sugar cane produced by a person accredited under the ‘Smartcane Best Management Practices (BMP)’ program administered by the Queensland Cane Growers Organisation Ltd ACN 089 992 969.</p> <p><u>Biofuel produced from only waste</u></p> <p>Biofuel produced from only waste must comply with the greenhouse gas criterion.</p> <p><u>Other biofuel</u></p> <p>(1) Biofuel not otherwise mentioned in this part must— (a)be appropriately certified; and (b)comply with the greenhouse gas criterion.</p> <p>(2)For subsection (1), biofuel is appropriately certified if, when the biofuel is produced, the facility at which the biofuel is produced, or each supply chain entity for the biofuel, is certified under— (a)the International Sustainability and Carbon Certification system in accordance with— (i)the ISCC EU standard or the ISCC PLUS standard; or (ii)a superseded version of the ISCC EU standard or the ISCC PLUS standard; or (b)the RSB global standard or a superseded version of the RSB global standard; or (c)an equivalent standard for a sustainability standard.</p>
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B. Proofing compliance: Information required

5. Who is the obligated party to report and proof compliance of the sustainability and GHG emission of	<p><u>For Queensland specifically:</u></p> <p>See reference 2: Sections 35B and 35C of the Amendment Act place minimum requirements on certain fuel retailers and wholesalers for the sale of sustainable biobased petrol and sustainable biobased diesel, respectively (the sustainable biofuel requirement).</p> <p>Section 5 of the Amendment Act defines sustainable biobased petrol and sustainable biobased diesel by reference to sustainability criteria prescribed by regulation. Importantly,</p>
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(advanced) biofuels and at what interval?	<p>fuel sellers and wholesalers who are liable under the mandate will be required to demonstrate that the biofuel component of the fuel being sold has been produced in compliance with the sustainability criteria as specified in this regulation.</p> <p>Section 35A provides that the biofuels mandate will only apply to fuel retailers who:</p> <ul style="list-style-type: none"> own or operate 10 or more standard service stations, or sell more than a threshold amount of petrol fuel in a calendar quarter at any one of their service stations. <p>Under section 35A (5), the default threshold amount is 250,000 litres. However, this can be varied by regulation</p> <p><u>For NSW specifically:</u></p> <p>The standard prescribed for the definition of biofuel sustainability standard in section 3 (1) of the Act continues to be such a standard for ethanol or biodiesel sold at a service station of a volume fuel retailer who was a volume fuel seller under the Act as then in force.</p> <p>Each of the following is a class of fuel wholesalers included in the definition of primary wholesaler:</p> <p>(a) a person who engages in the blending of ethanol with petrol (whether or not in New South Wales) to produce petrol-ethanol blend and who is engaged in the business of selling the blend for resale,</p> <p>(b) a person who engages in the blending of biodiesel with diesel fuel (whether or not in New South Wales) to produce biodiesel blend and who is engaged in the business of selling the blend for resale.</p>
1. What information is required about origin?	<p><u>For NSW specifically:</u></p> <p>Records:</p> <p>For the purposes of section 12 (2) of the Act, the records must include a record of each sale of petrol (including petrol-ethanol blend) or diesel fuel (including biodiesel blend) by the person showing—</p> <p>(a) the volume of petrol or diesel fuel sold, and</p> <p>(b) whether the petrol sold was or was not petrol-ethanol blend, and</p> <p>(c) whether the diesel fuel sold was or was not biodiesel blend, and</p> <p>(d) in the case of a sale of petrol-ethanol blend—the amount of ethanol in the petrol-ethanol blend, and</p> <p>(e) in the case of a sale of biodiesel blend—the amount of biodiesel in the biodiesel blend, and</p> <p>(f) whether the petrol-ethanol blend or biodiesel blend sold complies with a biofuel sustainability standard, including details of any relevant certification.</p>
2. What criteria are used to categorize and define feedstock?	NA
9. What information needs to be reported about the type of feedstock used?	NA

C. Proofing compliance: Verification methods required/ allowed

10. Is it possible to make use of certification systems to proof compliance? If yes, which schemes are recognized (so far)?	<p>NA on national level</p> <p><u>For NSW specifically:</u></p> <p>Using the RSB certification scheme</p> <p>Article 5: Each of the following is a standard prescribed for the definition of biofuel sustainability standard ...[...]....</p> <ul style="list-style-type: none"> RSB Principles & Criteria for Sustainable Biofuel Production (Version 2.1), published by the Roundtable on Sustainable Biomaterials in March 2011, ISO 13065:2015 Sustainability criteria for bioenergy. <p>Until 1 January 2018, the standard that was, immediately before the commencement of this</p>
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	<p>clause, the standard prescribed for the definition of biofuel sustainability standard in section 3 (1) of the Act continues to be such a standard for ethanol or biodiesel sold at a service station of a volume fuel retailer who was a volume fuel seller under the Act as then in force.</p> <p><u>For Queensland specifically:</u></p> <ul style="list-style-type: none"> • biofuel produced from palm oil is appropriately certified if, when the biofuel is produced, each supply chain entity for the biofuel is certified under— (a)the RSPO standard or a superseded version of the RSPO standard; or (b)an equivalent standard for the RSPO standard. • biofuel produced from sugar cane is appropriately certified if the biofuel is produced, or each supply chain entity for the biofuel, is certified under— (i)the International Sustainability and Carbon Certification system in accordance with— (A)the ISCC EU standard or the ISCC PLUS standard; or (B)a superseded version of the ISCC EU standard or the ISCC PLUS standard; or (ii)the RSB global standard or a superseded version of the RSB global standard; or (iii)an equivalent standard for a sustainability standard. • “Other” biofuel is appropriately certified if, when the biofuel is produced, the facility at which the biofuel is produced, or each supply chain entity for the biofuel, is certified under— (a)the International Sustainability and Carbon Certification system in accordance with— (i)the ISCC EU standard or the ISCC PLUS standard; or (ii)a superseded version of the ISCC EU standard or the ISCC PLUS standard; or (b)the RSB global standard or a superseded version of the RSB global standard; or (c)an equivalent standard for a sustainability standard.
11. Is it possible to use a national standard to proof compliance?	<p>NA</p> <p><u>For Queensland specifically:</u></p> <p>For sugarcane: biofuel produced from sugar cane is appropriately certified if at least 30% of the sugar cane is accredited; accredited sugar cane means sugar cane produced by a person accredited under the ‘Smartcane Best Management Practices (BMP)’ program administered by the Queensland Cane Growers Organisation Ltd ACN 089 992 969</p>
C1. The approval and monitoring procedures for certification standards (<i>Only relevant when they can be used to proof compliance</i>)	
12. Which authority decides which certification systems and/or national standards can be used?	<p>Currently there is no national standard for advanced biofuels. There are no national renewable fuels targets, with only the States of New South Wales (NSW) and Queensland having any mandates on biodiesel and ethanol.</p> <p><u>For Queensland specifically:</u></p> <p>Queensland has a requirement that biofuels demonstrate a GHG saving of at least 30% (RSB are used to certify).</p> <p><u>Queensland:</u></p> <p>Division 2 - Equivalent standards:</p> <p>6. Purpose of division: This division provides for the chief executive (environment) to approve a standard as an equivalent standard for a sustainability standard.</p> <p><u>Queensland:</u></p> <p>Division 2 - Equivalent standards: 7 <i>When chief executive (environment) may approve standard</i></p> <p>(1) The chief executive (environment) may approve a standard as an equivalent standard for a sustainability standard if the chief executive (environment) is satisfied the standard provides for sustainability measures that are at least equivalent to the sustainability standard..[...]....</p> <p>(Chief executive (environment) reasonably considers necessary to decide the application.</p> <p>9. <i>Deciding application:</i></p> <p>(2) In deciding whether to approve the standard, the chief executive (environment) must have regard to—</p> <ul style="list-style-type: none"> • (a)the sustainability measures set out in the standard compared to the sustainability measures set out in the sustainability standard; and • (b)any adverse impact the production of biofuel in accordance with the standard may have on—(i)biodiversity, ecosystems and areas of high conservation value; or; (ii)surface and ground water quality, including, for example, from nutrient or sediment runoff; or (iii)soil quality, including, for example, from soil degradation; and • (c)anything else the chief executive (environment) considers relevant.

13. Which criteria are used to approve a certification system and/or national standard?	<p><u>For Queensland specifically:</u></p> <p><u>Division 2 - Equivalent standards - 7 When chief executive (environment) may approve standard</u></p> <p>(1) The chief executive (environment) may approve a standard as an equivalent standard for a sustainability standard if the chief executive (environment) is satisfied the standard provides for sustainability measures that are at least equivalent to the sustainability standard...[...]....(chief executive (environment) reasonably considers necessary to decide the application.</p> <p><u>9 Deciding application</u></p> <p>(2) In deciding whether to approve the standard, the chief executive (environment) must have regard to—</p> <p>(a)the sustainability measures set out in the standard compared to the sustainability measures set out in the sustainability standard; and</p> <p>(b)any adverse impact the production of biofuel in accordance with the standard may have on—</p> <p>(i)biodiversity, ecosystems and areas of high conservation value; or</p> <p>(ii)surface and ground water quality, including, for example, from nutrient or sediment runoff; or (iii)soil quality, including, for example, from soil degradation; and</p> <p>(c)anything else the chief executive (environment) considers relevant.</p>
14. Are there minimum requirements around 3rd party auditing, intervals of verification or accreditation? And if yes, which ones?	No
15. Is cross-compliance possible? And if yes, on which conditions?	Not mentioned

D. Traceability and transfer of information

16. Which chain of custody systems (e.g., mass balance, book and claim) are allowed to link information to the biomass feedstock?	NA
17. When mixing of different consignments of biomass is allowed: what are the rules of allocation (e.g., based on energy content, mass)?	NA
18. What is the first point in the supply chain to which the information should be traced back for: <ul style="list-style-type: none"> • <u>Forestry</u>: forest residues • <u>Agriculture</u>: straw from cereals 	NA

E. Monitoring compliance: the governance structure

19. Which (controlling) authority receives the required sustainability and GHG information from the economic operator (see A)?	<p><u>For NSW specifically:</u></p> <p>The 'Secretary'</p> <p><u>For Queensland specifically:</u></p> <p>DNRME has the responsibility for administering the Act including the development and maintenance of the fuel seller register (3)</p>
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20. How does the (controlling) authority register this information? Is there a database?	<u>For Queensland specifically:</u> DNRME has the responsibility for administering the Act including the development and maintenance of the fuel seller register (3)
21. How does the (controlling) authority checks the correctness of the information they receive?	<u>For Queensland specifically:</u> See (3): there is a fuel register. The report also refers to inspections.
22. Is this information also publicly available, and if yes, which information?	
23. Does the controlling authority (or another governance organization) have the authority to go back in the supply chain, to check the correctness of the information? and if yes, <ul style="list-style-type: none"> • to which point in the value chain? • which information can be checked? 	
24. In case information submitted by the economic operator is incomplete and/or incorrect: what are the consequences of non-compliance?	<u>For Queensland specifically:</u> Compliance and enforcement tools: (i) education and assistance, (ii) letter to fuel seller, (iii) warning, (iv) prosecution, (v) cancellation or exemption (3) <u>For NSW specifically:</u> Offence—failure to register, furnish returns or keep records for primary wholesalers, volume fuel retailers and other operators of service stations
E1. Monitoring compliance of certification standards <i>(Only relevant when they can be used to proof compliance)</i>	
25. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the auditors? and if yes, <ul style="list-style-type: none"> • to which point in the value chain? • what is the scope of their monitoring? 	-
26. In case verification by the auditor is considered insufficient, what are the consequences?	-
27. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the certification schemes? If yes, how?	-
28. Does the controlling authority (or another governance organization) have insight if one certification scheme is used throughout the full supply chain, or multiple (in case of cross-compliance)	-
29. In case verification and monitoring by the certification scheme is considered insufficient, what are the consequences?	
F. Other (optional)	
30. Where do you see most risks in information transfer (completeness, correctness) between economic operators in the supply chain for advanced biofuel supply chains?	-
31. Where do you see most risks in information transfer and monitoring of the sustainability and GHG emission requirements in advanced biofuel supply chains between countries?	-

<p>32. Where do you see opportunities for improvement to harmonize and strengthen policy frameworks to monitor the sustainability and GHG emission requirements of advanced biofuel supply chains?</p>	<p>Federally Australia has not had fuels incorporated in any national “renewable” targets, which have been exclusively renewable electricity targets. Two states have implemented bio-fuel mandates but these are not enforced and so are ineffective.</p> <p>At the last election the current federal government made a commitment to fund a “bio-energy road map” which has been completed and is awaiting release, it is anticipated that this will be released either as part of the governments “Technology not Taxes” plans for COP26 or as part of the next federal election campaign which is envisaged will commence either at the end of 2021 or early 2022. Bioenergy Australia is advocating a whole of government approach to help develop the industry across, Defence, Agriculture, Energy, Industry and Science & Technology portfolios as there is undoubtedly significant unrealised potential for Australia in the biofuels, energy and materials markets.</p>
<p>33. Other remarks</p>	<p>Currently Australia has no national renewable fuels targets, with only the States of New South Wales (NSW) and Queensland having any mandates. Unfortunately, NSW mandate is ineffectual as the Government grants the liable party (fuel distributors) exemptions due to a supposed lack of supply although many biofuel plants have been idled due to lack of demand.</p>

Relevant sources

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- (2) Liquid Fuel Supply Regulation 2016, Explanatory notes for SL 2016 No. 203 made under the Liquid Fuel Supply Act 1984 <https://www.legislation.qld.gov.au/view/html/published.exp/sl-2016-0203>
- (3) Biofuels Compliance and Enforcement Strategy Requiring fuel seller compliance with Part 5A of the Liquid Fuel Supply Act 1984 ENE/2019/4767 Version 2.0, Last Reviewed 9/04/2019, see: https://www.resources.qld.gov.au/?ver=2.00&a=109113%3Apolicy_registry%2Fbiofuels-compliance-enforcement-strategy.pdf
- (4) NSW Regulation, Biofuels Regulation (No 2) 2016, see also: <https://legislation.nsw.gov.au/view/whole/html/2021-07-01/sl-2016-0654>

CANADA RENEWABLE FUEL REGULATION (CFR)

Data for filling in this factsheet are obtained from different resources, including best available expert knowledge, publicly available reports, and websites. Relevant literature sources are mentioned at the end of this factsheet (footnotes are included). The Factsheets were filled in the period from September 2021-January 2022. The aim of the Factsheets is to present the key characteristics of the policy framework; It does not pretend to be fully complete, nor does it pretend to capture all the details and insights.

Important note: The Clean Fuel Regulations is expected to come out in December 2022, and input is thus provided based on draft versions.

A1. General information	
1. Is there a policy on the sustainability of (advanced) biofuels in your country? If yes, which one?	<p>- Canada's current Renewable Fuel Regulations [1] can be found at the Canadian Environmental Protection Act (CEPA) Registry.</p> <p>These regulations require fuel producers and importers to have an average renewable fuel content of at least 5% based on the volume of gasoline that they produce or import into Canada and of at least 2% based on the volume of diesel fuel and heating distillate oil that they produce or import into Canada. The regulations include provisions that govern the creation of compliance units, allow trading of these units among participants and also require record-keeping and reporting to ensure compliance [2].</p> <p>In general, the regulations specify blending mandates for renewable fuels into the gasoline and diesel fuel pools.</p> <p>Gasoline and Diesel considered in the CFS regulations based on the latest released draft of CFS. The CFR will not apply to liquid fuels used as industrial feedstocks or that are exported, used in a refinery or an upgrader or in certain remote communities²⁵ (1).</p> <p>Direct sustainability metrics in the regulations are linked to GHG emissions reductions sourced from sustainable supplies of renewable biomass. Canada is developing a draft federal Clean Fuel Regulations (CFR) [3] (expected to come into force in December 2022) that will include additional sustainability criteria for biomass used to produce biofuels covered under the draft regulations Land Use and Biodiversity (LUB) criteria section. (For more see articles 32-61 of the draft regulations linked above).</p> <p>Proposed LUB criteria: Only biofuels made from biomass feedstock that adhere to the LUB criteria would be eligible for compliance credit creation. These criteria apply to feedstock regardless of geographic origin. The criteria do not apply to feedstock that is not biomass (e.g., fuel made from direct air capture) or that is designated "low-concern biomass feedstock" (e.g., municipal solid waste). The LUB criteria are separated into requirements specifically for forest feedstock, those specific for agricultural feedstock, and those that apply to all feedstocks.</p> <p>- At the provincial level, provinces have policies or regulations that meet or exceed the federal blending mandate. British Columbia's Low Carbon Fuel Standard is using Life Cycle Assessment (LCA) and Carbon Intensity (CI) to assess the sustainability of renewable fuel pathways to displace gasoline and diesel fuels and there is no specific notion of advanced biofuels in this policy.</p>
2. Is there a definition for 'advanced biofuels' under this policy? If yes, which one?	<p>No the term is not included in the current federal <u>Renewable Fuel Regulations</u>. There are not sub-categories of low carbon fuels. As long as the fuel meets the definition and criteria of being a low carbon fuel it is eligible.</p>
3. Which feedstock categories fall under the scope of 'advanced biofuels'?	<p><u>Advanced biofuels are not strictly defined under the FR.</u> As long as the fuel meets the definition and criteria of being a low carbon fuel it is eligible.</p> <p>In the draft CFR, there is a list of several categories of forest and agricultural biomass defined in the LUB criteria.</p> <p>For the purpose of section 32 and subject to subsection (2) and sections 35 to 44, a</p>

²⁵ See: <https://www.nortonrosefulbright.com/en/knowledge/publications/c2617e4b/canada-announces-clean-fuel-regulations>

	<p>quantity of a feedstock is eligible if the feedstock:</p> <p>(1) For the purpose of section 32 and subject to subsection (2) and sections 35 to 44, a quantity of a feedstock is eligible if the feedstock</p> <ul style="list-style-type: none"> • (a) is not derived from biomass. • (b) is sourced from any of the following: <ul style="list-style-type: none"> ○ (i) animal materials, including manure, ○ (ii) used animal litter or bedding, ○ (iii) used or inedible organics from a residential area, a retail store, restaurant, a caterer or a food processing plant, ○ <u>Etc. This list is to be further determined.</u> • (c) is not sourced from a material or source referred to in paragraph (b) and is sourced from agriculture or forest biomass.
A2. Requirements on GHG emission reduction and sustainability	
<p>4. What GHG emission reduction and sustainability requirements are included in the policy, and to which feedstock-to-biofuel chains do they apply? List in particular the requirements for:</p> <ul style="list-style-type: none"> • <u>Forest</u>: forest residues to ethanol via gasification • <u>Agriculture</u>: ethanol production from cereal straw 	<ul style="list-style-type: none"> • GHG emission reduction and sustainability requirements are included in the draft CFR. <p>Each regulated fuel will have a CI limit expressed in grams of carbon-dioxide equivalent emitted per amount of energy, or “gCO₂e/MJ,” with CI limits based on Canadian averages and applicable across the country ⁽¹⁾.</p> <ul style="list-style-type: none"> • Primary suppliers will have to determine the total volumes of liquid fuels they produce or import in a year, the annual CI limits on all such fuels on a company-wide basis and the actual CI of all of their fuels. If the actual CI of a primary supplier’s fuels on an annual basis is above the CI limits set by the CFR, then they will have to bring themselves into compliance ⁽¹⁾. • The proposed Regulations will require liquid fossil fuel primary suppliers (producers and importers) to <u>reduce the carbon intensity</u> of their fuels used in Canada from 2016 levels by 2.4 gCO₂e/MJ in 2022 (on annual basis) increasing to a 12 gCO₂e/MJ reduction in 2030. This represents a decrease of about 13% below 2016 levels in the carbon intensity of liquid fuels used in Canada by 2030. • Gasoline and diesel must also be supplemented with minimum biofuels content ⁽¹⁾. <p>Canada is developing a draft federal <u>Clean Fuel Regulations (CFR)</u> (expected to come into force in December 2022) that will include additional sustainability criteria for biomass:</p> <p><u>For agricultural feedstock (including primary residues), the criteria include:</u></p> <ul style="list-style-type: none"> • the portion of a biofuel comprised of feedstocks at high risk of indirect land-use change will not count towards credit creation under the CFR. • raw material used in the production of biofuels may not come from land that has the status of high biodiversity land or high carbon stock land on or after January 1, 2020; and • raw material used in the production of a biofuel may not come from land that has the status of protected area on or after January 1, 2020. <p><u>For forest feedstock, the criteria include:</u></p> <ul style="list-style-type: none"> • forest biomass used to produce biofuels must meet a set of sub-criteria to ensure it is harvested in a country/area where sustainable forest management is practiced; and • raw material used in the production of biofuel may not come from land that has the status of protected area on or after a defined cut-off date (to be determined). • the regulations defines sustainability criteria for biofuels and their feedstocks, related to land-use change - including indirect land-use change - and land management practices. The portion of a fuel made from feedstocks associated with land-use changes that do not meet the criteria will not count for credit creation under the CFS regulations. <p>Forest feedstock is defined as: All forest products and residues so long as they meet regional sustainability criteria and the CFR LUB criteria</p>
B. Proofing compliance: Information required	
<p>5. Who is the obligated party to report and proof</p>	<p>The obligations of a fossil fuel producer and a biofuel producer are different.</p> <p>(a) The CFR will require those <u>who produce and import liquid fossil fuels</u> in Canada to reduce the carbon intensity of the liquid fossil fuels they produce and import annually.</p>

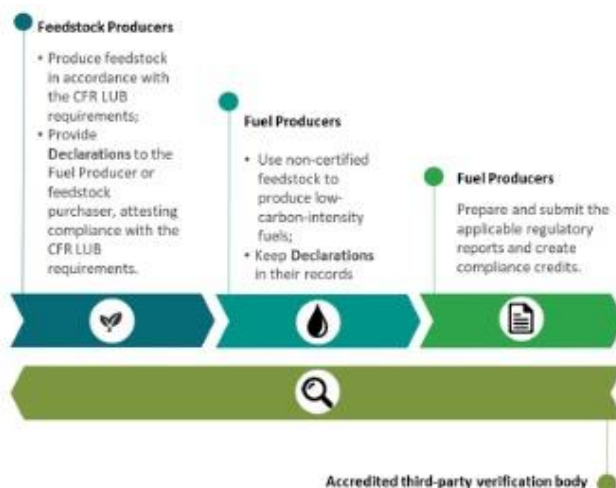
<p>compliance of the sustainability and GHG emission of (advanced) biofuels and at what interval?</p>	<p>These parties will be referred to as “<u>primary suppliers</u>”. Primary suppliers who produce or import less than 400 m³ of liquid fossil fuel will not be subject to the regulations.</p> <p>Primary suppliers that operate refineries or upgraders in Canada will be required to submit <u>annually</u> operating data and characteristics of the crude oil they used. Submission deadline: November 30th of the following compliance period</p> <p>Primary suppliers with a CI above the CFR’s CI will have to annually retire credits to achieve compliance. Credits can be created four ways: undertaking actions to reduce a fuel’s lifecycle emissions, blending lower CI fuels into existing fuel products, switching to fuels with a lower CI, or paying into a CFR-recognized compliance fund (for up to 10% of the compliance obligation) [1]</p> <p>(b) Persons who are not primary suppliers can voluntarily participate in the CFR by carrying out emission reduction projects that create CFR credits they can sell to primary suppliers. They are called “registered creators.” [1] low carbon fuel producers must report their carbon credits on a quarterly basis (ss.117(1))</p>
<p>6. What information is required/ needs to be reported about sustainability and GHG emission (reduction) by the obligated party?</p>	<p>Low carbon intensity fuel suppliers must have a Content of Declaration and be able to submit it to ECCC for verification and validation. e.g., An ethanol producer must acquire this information from their wheat supplier and send it to ECCC to confirm it meets the LUB criteria and claim credits for their ethanol.</p> <p>Content of declaration - <u>harvester</u> (article 50 (1))</p> <ul style="list-style-type: none"> a) their <u>name</u> and civic address b) the name of the individual who made the declaration on behalf of the person, and, if any, their telephone number and email address c) the <u>geographical boundaries of the area</u> where the feedstock referred to in the declaration was harvested. d) whether any part of the area referred to in paragraph (c) is on land referred to in subsection 35(1) and, if so, confirmation that they have a record of the Minister’s authorization under subsection 35(2) e) if the <u>quantity of the feedstock</u> is sold, the name of the person to which the quantity is sold and the geographic location of that person f) the <u>type of the feedstock</u> g) the <u>amount of the feedstock referred to in the declaration that is sold or used by the person that harvests it to produce low carbon</u> intensity fuel, measured in kilograms for solid feedstock or in cubic metres for liquid or gaseous feedstock. h) in the case of an eligible feedstock that is a crop, crop by-product, crop residue or short-rotation woody biomass crop and that was mixed with a feedstock that was cultivated or harvested in an area referred to in section 38, a confirmation that they retain the calculations that demonstrate the quantity of each feedstock in the mixture. i) a confirmation that the feedstock satisfies the requirements of section 35 or that it is from a region and of a class that is the subject of a decision made under section 42. j) a confirmation that the feedstock satisfies the requirements of paragraph 36(a), or that it is from a region and of a class that is the subject of a decision made under subsection 43(1). k) a confirmation that the feedstock satisfies the requirements of paragraph 36(b), or that it is from a region and of a class that is the subject of a decision made under subsection 43(2). l) if the feedstock is a crop, crop by-product, crop residue or short-rotation woody biomass crop, a confirmation that it was not cultivated on land referred to in subsection 38 or that it was cultivated in a country referred to in subsection 39(1) or 40(1). m) if the feedstock is sourced from forest biomass <ul style="list-style-type: none"> a. (i) a confirmation that it satisfies the requirements of paragraph 41(1)(a), or that it is from a region and of a class that is the subject of a decision made under subsection 44(1), b. (ii) a confirmation that it satisfies the requirements of paragraph 41(1)(b), or that it is from a region and of a class that is the subject of a decision made under subsection 44(2),

	<ul style="list-style-type: none"> c. (iii) a confirmation that it satisfies the requirements of subparagraph 41(1)(c)(i), or that it is from a region and of a class that is the subject of a decision made under subsection 44(3), d. (iv) a confirmation that it satisfies the requirements of subparagraph 41(1)(c)(ii), or that it is from a region and of a class that is the subject of a decision made under subsection 44(4), e. (v) a confirmation that it satisfies the requirements of subparagraph 41(1)(c)(iii), or that it is from a region and of a class that is the subject of a decision made under subsection 44(5), and f. (vi) a confirmation that it satisfies the requirements of paragraph 41(1)(d), or that it is from a region and of a class that is the subject of a decision made under subsection 44(6) <ul style="list-style-type: none"> n) in the case of a quantity of a feedstock that is a crop, crop by-product, crop residue or short-rotation woody biomass crop, a confirmation that it satisfies the requirements of section 37 o) the unique identifier for the declaration that they use for their internal accounting purposes p) a confirmation that, since they made their previous declaration, there have been no changes with respect to paragraphs (a) to (f) and (i) to (n) or, if such changes occurred, that any supporting documents are retained q) the date the declaration is made; and r) the signature of the individual who made the declaration. <p><u>Producer Records (Article 51 (1))</u></p> <ul style="list-style-type: none"> a) delivery records, contracts and invoices with respect to each quantity of the feedstock that is brought to one of their facilities b) for each quantity of the feedstock that is referred to in subparagraph 33(1)(b)(iii) and (iv), delivery records, contracts and invoices that describe the original location where the feedstock was first used c) the sales records for all low carbon intensity fuel that was made from all or a portion of a quantity of the eligible feedstock d) a copy of the declaration made under paragraph 49(2)(a) by the person that possessed each portion of a quantity of the eligible feedstock immediately before them. e) any information used to perform the calculations set out in subsection 32(1) and 34(2), the evidence that supports that information and the results of those calculations. f) if applicable, evidence that the Minister authorizes the use of the feedstock under subsection 35(2); and g) if applicable, a <u>copy of any certification that has been issued with respect to the feedstock under subsection 61(1).</u>
7. What information is required about origin?	The type of each feedstock used to produce the fuel and the region where each of those feedstocks were extracted or cultivated;
8. What criteria are used to categorize and define feedstock?	Refer to section A1 (3) above. Crops and forestry products are the only feedstocks explicitly categorized in the CFR, as they pertain to the LUB criteria. Other [low risk] feedstocks, like MSW, are not subject to the LUB and therefore are not defined or categorized
9. What information needs to be reported about the type of feedstock used	Please see answer to Qs 6 and 7 For the purpose of sections 42 to 45, the classes of the feedstock are crops, crop residue, short-rotation woody biomass crops and forest biomass.
C. Proofing compliance: Verification methods required/ allowed	
10. Is it possible to make use of certification systems to proof compliance? If	The CFR has draft requirements for <u>validation, certification or verification</u> [4] for the key elements supporting the reporting of information, creation of credits, carbon intensity values and trading system. These requirements are in line with similar programs, such as the United States Renewable Fuel Standard 2, California's Low Carbon Fuel Standard and the European Union's Renewable Energy Directive II

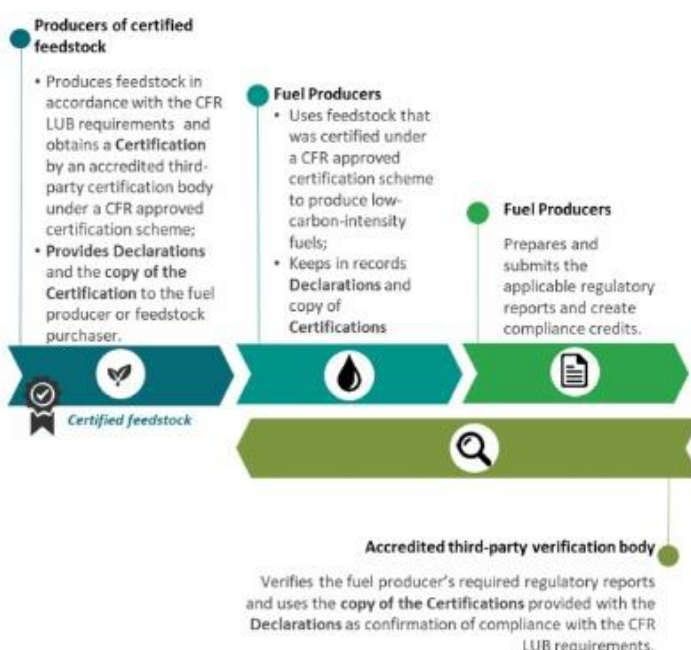
yes, which schemes are recognized (so far)?

The document has been written for Validation, Verification and Certification Bodies and their validators, verifiers and auditors working with the Clean Fuel Regulations; and lays out the regulatory requirements and guidance in their implementation.

Scenario 1: Fuel producers use non-certified feedstock to produce low-carbon intensity fuel for the purpose of creating compliance credits



Scenario 2: Fuel producers use certified feedstock to produce low-carbon intensity fuel for the purpose of creating compliance credits



No mention of specific certification schemes yet although the third-party forest certification schemes in Canada, namely FSC, SFI, CSA and PEFC are currently being reviewed and may be considered. One option is to utilize existing certification schemes on a criterion-by-criterion basis.

11. Is it possible to use a national standard to proof compliance?

Yes, that is the plan in the CFR

C1. The approval and monitoring procedures for certification standards (*only relevant when they can be used to proof compliance*)

12. Which authority decides which certification systems and/or national standards can be used?	Environment and Climate Change Canada, the department of the Government of Canada responsible for coordinating environmental policies and programs, as well as preserving and enhancing the natural environment and renewable resources
13. Which criteria are used to approve a certification system and/or national standard?	Work is underway to develop the verification, validation and certification requirements. The CFR will set out the qualifications and eligibility criteria for third parties performing verification, validation or certification under the regulations. These include technical competencies, official accreditations and independence requirements. <i>See draft requirements (under revision): "To be approved by ECCC as a Clean Fuel Regulations - Land Use and Biodiversity Certification Scheme(CFR-LUB CS), the certification scheme submitting an application must meet all the requirements specified in Tables 17 (section 53) and 18 (sections 54 to 61)"</i>
14. Are there minimum requirements around 3rd party auditing, intervals of verification or accreditation?	Yes, The CFR has a section on "Qualifications and eligibility of third-parties performing verification, validation and certification"
15. Is cross-compliance possible? And if yes, on which conditions?	If third-party forest certification schemes are accepted as means of compliance, their "chain-of-custody" certification could be used to demonstrate "cross-compliance" (conditions set out in each certification scheme)

D. Traceability and transfer of information

16. Which chain of custody systems (e.g., mass balance, book and claim) are allowed to link information to the biomass feedstock?	Draft document on "Method for validation, verification and certification" Table 16 - 1: Records to be Kept by Each Validation and/or Verification <ul style="list-style-type: none"> For Applications for approval of carbon-intensity determination, Carbon-Intensity Pathway Reports, Mandatory Credit Creation Reports from emission reduction projects, Quarterly Credit Creation Reports from supply of low-carbon-intensity fuel, and Fossil fuel production report, as applicable: Types and quantities of feedstock, whether they are harvested or imported, <u>including a mass balance for mixed feedstock at each facility, and the Province and point of entry</u>, Types and quantities of fuel, whether they are produced or imported, including a mass balance for mixed fuels at each facility, and the Province and point of entry.....
17. When mixing of different consignments of biomass is allowed: what are the rules of allocation (e.g., based on energy content, mass)?	Ss. 83(1) Multiple feedstocks <ul style="list-style-type: none"> -A low carbon intensity fuel that is produced using more than one type of feedstock is treated as if it were multiple fuels, each with a volume that is equal to the proportion of the low carbon intensity fuel that is produced with each type of feedstock. The proportion of the low carbon intensity fuel that is produced with each feedstock must be determined in accordance with the Fuel LCA Model Methodology.
18. What is the first point in the supply chain to which the information should be traced back for:	The feedstock production/harvesting site (e.g., farmland, forest land)

- Forestry: forest residues
- Agriculture: straw from cereals

E. Monitoring compliance: the governance structure

19. Which (controlling) authority receives the required sustainability and GHG information from the economic operator (see A)?	Environment and Climate Change Canada (ECCC)
20. How does the (controlling) authority register this information? Is there a database?	<p>Environment Climate Change Canada is developing an online registration, reporting and credit transaction system. Any report or notice that is required under the Clean Fuel Standard must be submitted electronically through the online system²⁶.</p> <p>To support the Standard: Such information is collected and built in the Fuel Lifecycle Assessment Modelling Tool, being developed by Environment and Climate Change Canada. The objective of the Fuel Lifecycle Assessment Modelling Tool is to provide a robust, user friendly and transparent modelling tool to calculate carbon intensities of fuels used in Canada ⁽²⁾</p>
21. How does the (controlling) authority checks the correctness of the information they receive?	<p>The Clean Fuel Standard will have requirements for validation, certification or verification for the key elements supporting the reporting of information, creation of credits, carbon intensity values and trading system (2)</p> <p>Through third-party verification/audits and certification. Certification schemes need to apply to ECCC to be approved under the CFR. Once this is done, feedstock that is certified is considered compliant with the LUB criteria.</p>
22. Is this information also publicly available, and if yes, which information?	<p>The Validation or Verification Body must make publicly available the fact that they are accredited to offer ECCC's Clean Fuel Regulations (CFR) validation or verification services.</p> <p>The Validation or Verification Body must make the following information available to stakeholders upon request, including:</p> <ul style="list-style-type: none"> • Process for evaluating compliance with the CFR requirements. • Procedure for granting, maintaining, refusing and withdrawing CFR validation or verification. • Process for resolution of grievances. • Personnel and committee members responsible for overall performance of its activities; policy matters; validation or verification decisions; and resolution of grievances, • Any active, unresolved, and resolved grievances related to the CFR validation or verification. <p>Each CFR- Land Use and Biodiversity Certification Scheme will ensure the following information is made publicly available and kept up to date:</p> <ul style="list-style-type: none"> • CFR-LUB certification scheme CS documentation is translated in the applicable languages of the countries and regions where the CFR-LUB CS operates. • The list of feedstock producers that are certified under its CFR-LUB certification program, including the start and expiry dates of each certificate, and those who no longer participate. • Information on the withdrawal or suspension of certificates must be published immediately after the decision has been made. • The latest version of the CFR- LUB certification program requirements.

²⁶ <https://www.canada.ca/en/environment-climate-change/services/managing-pollution/energy-production/fuel-regulations/clean-fuel-standard/regulatory-approach.html#toc9>

	<ul style="list-style-type: none"> • The list of certification bodies that are permitted to conduct audits within the CFR- LUB certification program, as well as any certification bodies that are no longer permitted to conduct audits within the program and those that are temporarily suspended. • Publication of contact details for the CFR-LUB certification program (i.e., contact person, telephone number, email address and correspondence address). <p>The names of any other eligible CFR-LUB CS that the subject CFR-LUB CS recognizes within its CFR-LUB certification program.</p>
<p>23. Does the controlling authority (or another governance organization) have the authority to go back in the supply chain, to check the correctness of the information? and if yes,</p> <ul style="list-style-type: none"> • to which point in the value chain? • which information can be checked? 	<p>Certification systems that may be leveraged to assess the sustainability of feedstocks (i.e. Forest Stewardship Council, Sustainable Forest Initiative, Canadian Standards Association, PEFC) under the CFS can assess the sustainability of the entire supply chain if the companies from collection point to economic operators are “chain-of-custody” certified. This would include, harvesting, processing, transportation and production/-end use. ECCC could ask for the report generated by the auditor.</p>
<p>24. In case information submitted by the economic operator is incomplete and/or incorrect: what are the consequences of non-compliance?</p>	<p>The process for correcting errors in credit creation will depend on how the error was made and who noticed it. Two scenarios are possible and will lead to different requirements. These are:</p> <ul style="list-style-type: none"> • Credits are created with erroneous data and the organization or third-party verifier finds the error; and • An organization did not create credits for an eligible action due to unintentional omission of information. <p>Environment Climate Change Canada may suspend credits in the event that compliance verification or enforcement activities leads to suspicion that credits may be invalid [2]. The Minister may suspend compliance credits that have been deposited in a registered creator’s account if the Minister as reason to believe that a report submitted in accordance with subsection 103(1) or 104(1) contains an error that resulted in the deposit of excess compliance credits in that account.</p> <p>When the Minister suspends compliance credits in accordance with subsection (1) and the first time the Minister suspends compliance credits in accordance with subsection (2) with respect to a suspected error, the Minister must send a written notice to the registered creator that includes</p> <ul style="list-style-type: none"> (a) the report in which there is reason to believe an error exists (b) the item of Schedule 8 that relates to the suspected error and the nature of the suspected error (c) the number of compliance credits that may have been created in error (d) the account into which the compliance credits that may have been created were deposited (e) the number of compliance credits that are suspended in accordance with subsection (1); (f) the number of equivalent compliance credits that are suspended in accordance with subsection (2), and the year those compliance credits were created; and (g) an indication that the Minister will suspend additional equivalent compliance credits until the number of compliance credits that are suspended is equal to the number of compliance credits that may have been created in error. <p>If an additional review by the Minister confirms that the report referred to in subsection 152(1) does not contain an error that resulted in the deposit of excess compliance credits, the Minister must lift the suspension of the compliance credits.</p>

For more see articles 149-156 of the CFR.

E1. Monitoring compliance of certification standards (Only relevant when they can be used to proof compliance)

<p>25. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the auditors? and if yes,</p> <ul style="list-style-type: none"> to which point in the value chain? what is the scope of their monitoring? 	<p>Yes, the CFR will set out the qualifications and eligibility criteria for third parties performing verification, validation or certification under the regulations. To be accredited to perform verification, validation or certification for the Clean Fuel Standard,</p> <p>a third-party must:</p> <ul style="list-style-type: none"> be an organization (rather than an individual); be accredited by the Standard Council of Canada or by the American National Standards Institute to all of the following standards: <ul style="list-style-type: none"> ISO 14065: 2013 Greenhouse gases - <i>Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition</i> ISO 14066: 2012 Greenhouse gases - <i>Competence requirements for greenhouse gas validation teams and verification teams</i> ISO 14064-3: 2019 Greenhouse gases - Part 3: <i>Specification with guidance for the validation and verification of greenhouse gas assertions</i>; and 52 ISO 14064-2: 2019 Greenhouse gases - Part 2: <i>Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements</i> ISO 14040:2006 Environmental Management - <i>Lifecycle Assessment - Principles and Framework</i> demonstrate that they have the skills and experience to address the subject matter and conduct the validation and/or verification have technical competence in the applicable technical area(s) described in Annex VII and is accredited to the applicable technical area; and have a qualified independent reviewer - the independent reviewer must have the following skills and experience: <ul style="list-style-type: none"> familiarity with the quality control procedures of the validation and/or verification body experience in conducting validations or verifications an understanding of the technical area <p>an understanding of the requirements of an independent reviewer; and, an understanding of the documentation requirements for the reviewer's role including documentation of discrepancies and their resolution.</p>
<p>26. In case verification by the auditor is considered insufficient, what are the consequences?</p>	<p>It depends on who considers the verification insufficient. If it is ECCC, then another auditor can be hired.</p>
<p>27. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the certification schemes? If yes, how?</p>	<p>Accreditation bodies (such as ANSI and ASI) ensure that certification schemes meet their criteria and monitor the competencies of auditors that verify a scheme that they have accredited.</p> <p>ECCC has the authority to ensure that certification schemes have the capacity (the right criteria and indicators) to verify the sustainability of feedstocks according to its criteria.</p>
<p>28. Does the controlling authority (or another governance organization) have</p>	<p>Not certain yet which schemes will be accepted. Leveraging existing sustainable certification schemes (e.g., Forest Stewardship Council, Sustainable Forest Initiative, Canadian Standards Association-PEFC) that certify sustainable forest harvesting and corresponding supply chains will reduce the administrative burden for biofuel producers.</p> <p>In terms of forest certification, usually forest certification schemes do not recognize</p>

insight if one certification scheme is used throughout the full supply chain, or multiple (in case of cross-compliance)	feedstock that are certified by another scheme. However, several companies and mills are certified to 2 or more certification schemes.
29. In case verification and monitoring by the certification scheme is considered insufficient, what are the consequences?	The certification scheme could not be used to comply with the CFR sustainability criteria or would likely be required to meet additionally CFR sustainability requirements to be considered sufficient.

F. Other (optional)

30. Where do you see most risks in information transfer (completeness, correctness) between economic operators in the supply chain for advanced biofuel supply chains?	
31. Where do you see most risks in information transfer and monitoring of the sustainability and GHG emission requirements in advanced biofuel supply chains between countries?	If economic operators are certified by recognized forest certification schemes, the risk of losing information is very low. If not, it will depend on the length of the supply chain.
32. Where do you see opportunities for improvement to harmonize and strengthen policy frameworks to monitor the sustainability and GHG emission requirements of advanced biofuel supply chains?	There are opportunities to leverage current provincial/territorial forest management laws, regulations and sustainable forest management practices as well as third-party forest certification schemes already used to assess and certify sustainable forest management practices and chain-of-custody (value chains). This would reduce administrative burden for businesses (economic operators) and support a more efficient adjustment to the CFS when it comes into force.
33. Other remarks	-

Relevant sources

1. Renewable Fuel Regulations, <https://laws-lois.justice.gc.ca/eng/regulations/SOR-2010-189/index.html>
2. <https://www.canada.ca/en/environment-climate-change/services/managing-pollution/energy-production/fuel-regulations/renewable.html>
3. Clean Fuel Regulations, <https://gazette.gc.ca/rp-pr/p1/2020/2020-12-19/html/reg2-eng.html>
4. Method for validation, verification and certification CFR, https://publications.gc.ca/collections/collection_2020/eccc/En4-419-4-2020-eng.pdf

EU ETS FOR AVIATION (WITH NETHERLANDS AS SPECIFIC EXAMPLE)

Data for filling in this factsheet were mainly obtained from different resources, including best available expert knowledge, publicly available reports, and websites. Relevant literature sources are mentioned at the end of this factsheet. The Factsheets were filled in the period from September 2021-January 2022. The aim of the Factsheets is to present the key characteristics of the policy framework; It does not pretend to be fully complete, nor does it pretend to capture all the details and insights.

A1. General information	
1. Is there a policy on the sustainability of (advanced) biofuels in your country? If yes, which one?	<p><u>Answers in this survey relate to the implementation of CORSIA in EU member states (referred to as CORSIA (EU))</u></p> <p>COMMISSION IMPLEMENTING REGULATION (EU) 2018/2066 of 19 December 2018 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council and amending Commission Regulation (EU) No 601/2012</p> <p>This Regulation lays down rules for the monitoring and reporting of greenhouse gas emissions and activity data pursuant to Directive 2003/87/EC in the trading period of the Union emissions trading system commencing on 1 January 2021 and subsequent trading periods.</p> <p><u>Scope:</u> In light of the adoption of a Resolution by the 2016 ICAO Assembly on the global measure, the EU has decided to maintain the geographic scope of the EU ETS limited to intra-EEA flights from 2017 onwards. The EU ETS for aviation will be subject to a new review in the light of the international developments related to the operationalisation of CORSIA.</p> <p>CO₂ emissions from aviation have been included in the EU emissions trading system since 2012. Under the EU ETS, all airlines operating in Europe, European and non-European alike, are required to monitor, report and verify their emissions, and to surrender allowances against those emissions. They receive tradeable allowances covering a certain level of emissions from their flights per year.</p> <p>https://ec.europa.eu/clima/eu-action/transport-emissions/reducing-emissions-aviation_en</p> <p>Subsection 5: Treatment of biomass. Article 38: Biomass source Streams</p> <p>For the purpose of this paragraph, Article 38(5) shall apply.</p> <p>5. Where reference is made to this paragraph, biofuels, bioliquids and biomass fuels used for combustion shall fulfil the sustainability and the greenhouse gas emissions saving criteria laid down in paragraphs 2 to 7 and 10 of Article 29 of Directive (EU) 2018/2001.</p> <p>However, biofuels, bioliquids and biomass fuels produced from waste and residues, other than agricultural, aquaculture, fisheries and forestry residues are required to fulfil only the criteria laid down in Article 29(10) of Directive (EU) 2018/2001. This subparagraph shall also apply to waste and residues that are first processed into a product before being further processed into biofuels, bioliquids and biomass fuels.</p> <p>Electricity, heating and cooling produced from municipal solid waste shall not be subject to the criteria laid down in Article 29(10) of Directive (EU) 2018/2001.</p> <p>The criteria laid down in paragraphs 2 to 7 and 10 of Article 29 of Directive (EU) 2018/2001 shall apply irrespective of the geographical origin of the biomass.</p> <p>Article 29(10) of Directive (EU) 2018/2001 shall apply to an installation as defined in Article 3(e) of Directive 2003/87/EC.</p> <p>The compliance with the criteria laid down in paragraphs 2 to 7 and 10 of Article 29 of Directive (EU) 2018/2001 shall be assessed in accordance with Articles 30 and 31(1) of that Directive.</p> <p>Where the biomass used for combustion does not comply with this paragraph, its carbon content shall be considered as fossil carbon.</p>
2. Is there a definition for 'advanced biofuels' under	<p>These terms are at this moment not relevant in the EU-ETS, CORSIA or CORSIA (EU). There are currently no targets or restrictions on types of biofuels. Biofuels must have a biological origin and must meet the sustainability criteria of article</p>

this policy? If yes, which one?	29 of the REDII if applicable (i.e., if not from waste).
3. Which feedstock categories fall under the scope of 'advanced biofuels'?	n/a

A2. Requirements on GHG emission reduction and sustainability

4. What GHG emission reduction and sustainability requirements are included in the policy, and to which feedstock-to-biofuel chains do they apply? in particular the requirements for: <ul style="list-style-type: none"> • <u>Forest</u>: forest residues to ethanol via gasification • <u>Agriculture</u>: ethanol production from cereal straw 	<p>The REDII criteria in article 29 paragraphs 2 to 7 and 10 are applicable to biofuels used in the EU-ETS and CORSIA (EU). The assessment of these criteria must be done in accordance with articles 30 and 31(1) of the REDII directive.</p> <p>This is defined in the EU-ETS MRV article 38(5) (see appendix). There is no link to the CORSIA sustainability requirements. This articles applicability to aircraft operators is defined in article 54 (4) of the MRV (see appendix).</p>
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B. Proofing compliance: Information required

5. Who is the obligated party to report and proof compliance of the sustainability and GHG emission of (advanced) biofuels and at what interval?	<p>The aircraft operator. This relates to aircraft operators meeting the following criteria:</p> <ul style="list-style-type: none"> - Operating flights of more than 10.000t CO2 per year on intra and extra EU flights (but not domestic). <p>This is described in EU-ETS delegated act (2019/1603). The DA describes only the requirement for these airlines to monitor and report flights as described in article 2 of that act (approximating the ICAO CORSIA scope with minor differences).</p> <p>The act does not reference biofuels in anyway. The act does however state that the EU-ETS Monitoring and Reporting act (2018/2066) and verification and accreditation act (2018/2067) are applicable to this scope of flights (art. 3 & 4). The Delegated Act refers to the implementation of CORSIA in the EU.</p>
6. What information is required/ needs to be reported about sustainability and GHG emission (reduction) by the obligated party?	<p>GHG reduction compared to fossil Jet A1 in the yearly EU-ETS emissions report.</p> <p><i>'Regeling handel in emissierechten'</i> Article 26. Use of biofuel</p> <p>1 If an aircraft operator uses biofuel, it shall provide evidence to the board of the emissions authority that the sustainability of the biofuel has been demonstrated by:</p> <ul style="list-style-type: none"> a. a sustainability system recognized by the European Commission or b. a national system accepted by the Netherlands or another Member State. <p>2 The proof also includes the quantity of biofuel delivered and the batch to which the biofuel relates.</p>
7. What information is required about origin?	Information as defined by REDII
8. What criteria are used to categorize and define feedstock?	Criteria as defined by REDII. There is no link to the CORSIA sustainability criteria.
9. What information needs to be reported about the type of feedstock used?	Information as defined by REDII

C. Proofing compliance: Verification methods required/ allowed

10. Is it possible to make use of certification systems to proof compliance? If yes, which schemes are recognized (so far)?	<p>Yes, voluntary schemes approved by the EU commission. The list of schemes that have requested approval and been provided with preliminary approval are found here:</p> <p>Voluntary schemes Energy (europa.eu)</p> <p>Strictly speaking the EU-ETS MRV allows a verification protocol when</p>
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	certification is 'unavailable'. Because the EU-ETS MRV is a delegated act, it is at this moment still unclear if Member States can decide to block this option.
11. Is it possible to use a national standard to proof compliance?	Airlines reporting to the Netherlands for their EU-ETS obligations may use either a voluntary schemes approved by the commission, or a national scheme approved by The Netherlands or by another member state. The Netherlands has not approved a national scheme at this time. This is defined in the Netherlands in the <i>Regeling handel in emissie rechten article 26</i>
C1. The approval and monitoring procedures for certification standards (<i>only relevant when they can be used to proof compliance</i>)	
12. Which authority decides which certification systems and/or national standards can be used?	In the Netherlands: The Ministries EZK/lenW & the Dutch Emissions Authority (NeA) in so far as the EU-ETS and REDII directives allow for this.
13. Which criteria are used to approve a certification system and/or national standard?	REDII from 1 January 2022
14. Are there minimum requirements around 3rd party auditing, intervals of verification or accreditation? And if yes, which ones?	REDII from 1 January 2022
15. Is cross-compliance possible? And if yes, on which conditions?	

D. Traceability and transfer of information

16. Which chain of custody systems (e.g., mass balance, book and claim) are allowed to link information to the biomass feedstock?	<p>The EU-ETS MRV allows a book and claims system for aircraft operators, see article 54 in the appendix. All batches of biofuel claimed must have sustainability evidence.</p> <p>Due to typical administrative and practical procedures at aerodromes, it is difficult to ascertain to which aircraft a batch of fuel is physically uplifted. Since aviation fuels are uniform in technical specifications, it is therefore appropriate to allow a monitoring approach for biofuel uplifts based on purchase data, provided that the relevant requirements laid down in Articles 29, 30 and 31 of Directive (EU) 2018/2001 are complied with.</p> <p>EU-ETS MRV (2018/2066).</p> <p>Article 54: Specific provisions for biomass for aircraft operators.</p> <p>'Article 54 Specific provisions for biofuels</p> <ol style="list-style-type: none"> 1. For mixed fuels, the aircraft operator may either assume the absence of biofuel and apply a default fossil fraction of 100 %, or determine a biofuel fraction in accordance with paragraphs 2 or 3. 2. Where biofuels are physically mixed with fossil fuels and delivered to the aircraft in physically identifiable batches, the aircraft operator may carry out analyses in accordance with Articles 32 to 35 to determine the biomass fraction, on the basis of a relevant standard and the analytical methods set out in those Articles, provided that the use of that standard and those analytical methods is approved by the competent authority. Where the aircraft operator provides evidence to the competent authority that such analyses would incur unreasonable costs or are technically not feasible, the aircraft operator may base the estimation of the biofuel content on a mass balance of fossil fuels and biofuels purchased. 3. Where purchased biofuel batches are not physically delivered to a specific aircraft, the aircraft operator shall not use analyses to determine the biomass fraction of the fuels used. <p>The aircraft operator may determine the biomass fraction using purchase records of biofuel of equivalent energy content, provided that the aircraft operator</p>
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	<p>provides evidence to the satisfaction of the competent authority that there is no double counting of the same biofuel quantity, in particular that the biofuel purchased is not claimed to be used by anyone else.</p> <p>For the purpose of demonstrating compliance with the requirements referred to in the second subparagraph, the operator may use the data recorded in the Union database set up in accordance with Article 28(2) of Directive (EU) 2018/2001.</p> <p>4. The emission factor of biofuel shall be zero.</p> <p>For the purpose of this paragraph, Article 38(5) shall apply to combustion of biofuel by aircraft operators.’;</p>
17. When mixing of different consignments of biomass is allowed: what are the rules of allocation (e.g., based on energy content, mass)?	REDII from 1 January 2022
18. What is the first point in the supply chain to which the information should be traced back for: <ul style="list-style-type: none"> • <u>Forestry</u>: forest residues • <u>Agriculture</u>: straw from cereals 	REDII from 1 January 2022

E. Monitoring compliance: the governance structure

19. Which (controlling) authority receives the required sustainability and GHG information from the economic operator (see A)?	In the Netherlands: The NEa receives the information in the form of the combined EU-ETS-CORSIA emissions report.
20. How does the (controlling) authority register this information? Is there a database?	<p>In the Netherlands: Emissions reports are stored in NEa databases. Next to that:</p> <ul style="list-style-type: none"> • The Union Registry serves to guarantee accurate accounting for all allowances issued under the EU emissions trading system (EU ETS), see: https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets/union-registry_en • The EU-ETS MRV refers to the union database under development as a manner in which sustainability evidence can be provided
21. How does the (controlling) authority checks the correctness of the information they receive?	<p>The EU-ETS verifier checks that there are sufficient proofs of sustainability for the amount of tanked biofuel. If there are incorrect or insufficient evidence, then the verifier will flag this in his verification report (or not provide a positive EU-ETS verification statement). In the Netherlands: The NEa will in this case investigate further and take appropriate action.</p> <p>Additionally, inspectors may choose to perform inspections at the airline and check the sustainability evidence directly.</p>
22. Is this information also publicly available, and if yes, which information?	In the Netherlands: Aggregated information about biomass use in the EU-ETS may be made available by the commission. At this time the NEa does not actively publish information about biomass use in the NL EU-ETS.
23. Does the controlling authority (or another governance organization) have the authority to go back in the supply chain, to check the correctness of the information? and if yes, <ul style="list-style-type: none"> • to which point in the value chain? • which information can be checked? 	No

24. In case information submitted by the economic operator is incomplete and/or incorrect: what are the consequences of non-compliance?	Non-compliance would mean that the emission would be treated as fossil and would not receive a 0-emission value in the EU-ETS report. Additional fines could be applied in such cases.
E1. Monitoring compliance of certification standards <i>(Only relevant when they can be used to proof compliance)</i>	
25. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the auditors? and if yes, • to which point in the value chain? • what is the scope of their monitoring?	-
26. In case verification by the auditor is considered insufficient, what are the consequences?	-
27. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the certification schemes? If yes, how?	-
28. Does the controlling authority (or another governance organization) have insight if one certification scheme is used throughout the full supply chain, or multiple (in case of cross-compliance)	-
29. In case verification and monitoring by the certification scheme is considered insufficient, what are the consequences?	-
F. Other (optional)	
30. Where do you see most risks in information transfer (completeness, correctness) between economic operators in the supply chain for advanced biofuel supply chains?	-
31. Where do you see most risks in information transfer and monitoring of the sustainability and GHG emission requirements in advanced biofuel supply chains between countries?	-
32. Where do you see opportunities for improvement to harmonize and strengthen policy frameworks to monitor the sustainability and GHG emission requirements of advanced biofuel supply chains?	-
33. Other remarks	-
Relevant sources	
<ul style="list-style-type: none"> Regeling handel in emissie rechten: luchtvaartactiviteiten, https://wetten.overheid.nl/BWBR0032413/2021-01-01 Monitoring, reporting and verification of EU ETS emissions, see: https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets/monitoring-reporting-and-verification-eu-ets-emissions_en 	

THE EU RENEWABLE ENERGY DIRECTIVE (EU RED II)

Data for filling in this factsheet were mainly obtained from different resources, including best available expert knowledge, publicly available reports, and websites. Relevant literature sources are mentioned at the end of this factsheet. The Factsheets were filled in the period from September 2021-January 2022. The aim of the Factsheets is to present the key characteristics of the policy framework; It does not pretend to be fully complete, nor does it pretend to capture all the details and insights.

Note: IN the EU' Member States, the implementation of RED II Directive (EU) 2018/2001 at national level is very recent. Here we report a specific document for the EU that differs from the specific regulation for each MS (regarding the implementation of RED II at national level).

A1. General information	
1. Is there a policy on the sustainability of (advanced) biofuels in your country? If yes, which one?	<p>In order to mainstream the use of renewable energy in the transport sector, each Member State shall set an obligation on fuel suppliers to ensure that the share of renewable energy within the final consumption of energy in the transport sector is at least 14 % by 2030 (minimum share) in accordance with an indicative trajectory set by the Member State ...(...) - (Art. 25)</p> <p>In the EU RED II encourages the deployment of advanced biofuels, by setting a target for use of renewable energy in the transport sector and limiting the amount of biofuels and bioliquids produced from cereal and other starch-rich crops, sugars and oil crops.</p> <p>RED II sets an obligation to require fuel suppliers to ensure a minimum share of advanced biofuels and biogas, as a way to encourage continuous development of advanced biofuels fuels. The contribution of advanced biofuels and biogas shall be at least 0.2 % in 2022, at least 1 % in 2025 and at least 3.5 % in 2030.</p> <p>For the purpose of demonstrating compliance with the minimum shares mentioned in art. 25:</p> <ul style="list-style-type: none"> (a) the share of biofuels and biogas for transport produced from the feedstock listed in Annex IX may be considered to be twice its energy content (b) the share of renewable electricity shall be considered to be four times its energy content when supplied to road vehicles and may be considered to be 1,5 times its energy content when supplied to rail transport <p>Except for fuels produced from food and feed crops, the share of fuels supplied in the aviation and maritime sectors shall be considered to be 1,2 times their energy content</p>
2. Is there a definition for 'advanced biofuels' under this policy? If yes, which one?	<p>'Advanced biofuels' are defined in RED II as 'biofuels that are produced from the feedstock listed in Part A of Annex IX'. RED II includes a list of feedstocks in Annex IX Part A that can be used for the production of advanced biofuels. The Commission shall review, every two years, the list of feedstock set out in Parts A and B of Annex IX with a view to adding feedstock.</p> <p>The Commission can adopt delegated acts to amend the list of feedstock set out in Parts A and B of Annex IX by adding, but not removing, feedstock. Feedstock that can be processed only with advanced technologies shall be added to Part A of Annex IX. Feedstock that can be processed into biofuels, or biogas for transport, with mature technologies shall be added to Part B of Annex IX.</p>
3. Which feedstock categories fall under the scope of 'advanced biofuels'?	<p>Feedstocks for the production of biogas for transport and advanced biofuels: (a) algae; (b) biomass fraction of mixed municipal waste; (c) biowaste; (d) biomass fraction of industrial waste not fit for use in the food or feed chain; (e) straw; (f) animal manure and sewage sludge; (g) palm oil mill effluent and empty palm fruit bunches; (h) tall oil pitch; (i) crude glycerine; (j) bagasse; (k) grape marcs and wine lees; (l) nut shells; (m) husks; (n) cobs; (o) biomass fraction of wastes and residues from forestry and forest-based industries, (bark, branches, pre-commercial thinning, leaves, needles, tree tops, saw dust, cutter shavings, black liquor, brown liquor, fibre sludge, lignin and tall oil); (p) other non-food cellulosic material; (q) other ligno-cellulosic material except saw logs and veneer logs.</p>
A2. Requirements on GHG emission reduction and sustainability	
4. What GHG emission reduction and	<p>The greenhouse gas emission savings from the use of biofuels, bioliquids and biomass fuels (not only for advanced biofuels) (REDII Art 29):</p> <ul style="list-style-type: none"> (a) at least 50 % for biofuels, biogas consumed in the transport sector, and bioliquids

<p>sustainability requirements are included in the policy, and to which feedstock-to-biofuel chains do they apply? List in particular the requirements for:</p> <ul style="list-style-type: none"> • <u>Forest</u>: forest residues to ethanol via gasification • <u>Agriculture</u>: ethanol production from cereal straw 	<p>produced in installations in operation on or before 5 October 2015</p> <p>(b) at least 60 % for biofuels, biogas consumed in the transport sector, and bioliquids produced in installations starting operation from 6 October 2015 until 31 December 2020</p> <p>(c) at least 65 % for biofuels, biogas consumed in the transport sector, and bioliquids produced in installations starting operation from 1 January 2021</p> <p>Sustainability requirements (REDII Art 29)</p> <p>Biofuels, bioliquids and biomass fuels produced from waste and residues, other than agricultural, aquaculture, fisheries and forestry residues, are required to fulfil only the greenhouse gas emissions saving criteria.</p> <p>Biofuels, bioliquids and biomass fuels produced from forest biomass shall meet the following criteria:</p> <p>(a) the country has national or sub-national laws in place or (b) management systems are in place ensuring:</p> <ul style="list-style-type: none"> i. legality of harvesting operations ii. forest regeneration of harvested areas iii. areas designated for nature protection purposes iv. harvesting is carried out with the aim of minimising negative impacts on soil quality and biodiversity; and v. harvesting maintains the long-term production capacity of the forest <p>Biofuels, bioliquids and biomass fuels produced from forest biomass shall meet the following land-use, land-use change and forestry (LULUCF) criteria:</p> <p>(a) the country</p> <ul style="list-style-type: none"> (i) is a Party to the Paris Agreement (ii) has submitted a NDC to UNFCCC, covering emissions and removals from agriculture, forestry and land use; or (iii) has national or sub-national laws in place to conserve and enhance carbon stocks and sinks, and providing evidence that reported LULUCF-sector emissions do not exceed removals <p>(b) management systems are in place to ensure that carbon stocks and sinks levels in the forest are maintained or strengthened over the long term.</p> <p>Biofuels, bioliquids and biomass fuels produced from agricultural biomass shall not be made from raw material obtained from land with a high biodiversity value, (on January 2008):</p> <ul style="list-style-type: none"> (a) primary forest and other wooded land (b) highly biodiverse forest and other wooded land (c) areas designated: for nature protection purposes; or (ii) for the protection of rare, threatened or endangered ecosystems or species (d) highly biodiverse grassland <p>Biofuels, bioliquids and biomass fuels produced from agricultural biomass shall not be made from raw material obtained from land with high-carbon stock (on January 2008):</p> <ul style="list-style-type: none"> (a) wetlands (b) continuously forested areas <p>I land spanning more than one hectare and a canopy cover of between 10 % and 30 %.</p> <p>Biofuels, bioliquids and biomass fuels produced from agricultural biomass shall not be made from raw material obtained from land that was peatland in January 2008</p>
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B. Proofing compliance: Information required

<p>5. Who is the obligated party to report and proof compliance of the sustainability and GHG emission of (advanced) biofuels and at what interval?</p>	<p>Economic operators are required to show that the sustainability and greenhouse gas emissions saving criteria of biofuels, bioliquids and biomass fuels, or other fuels (Article 29) have been fulfilled.</p> <p>The information about the geographic origin and feedstock type of biofuels, bioliquids and biomass fuels per fuel supplier shall be made available to consumers on the websites of operators, suppliers or the relevant competent authorities and shall be updated on an annual basis. Each voluntary scheme shall submit annually by 30 April a report to the Commission covering each of the points set out in Annex IX to Regulation (EU) 2018/1999 for the preceding calendar year (Article 30).</p> <p>Economic operators have to arrange for an adequate standard of independent auditing. The</p>
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	first-, or second-party auditing, may be used to verify that the systems used by economic operators are accurate, reliable and protected against fraud, enabling verification of the data.
6. What information is required/ needs to be reported about sustainability and GHG emission (reduction) by the obligated party?	<p>Economic operators have to provide information on the sustainability characteristics of those fuels, including their life-cycle greenhouse gas emissions, starting from their point of production to the fuel supplier.</p> <p>Where an economic operator provides evidence or data obtained in accordance with a scheme (i.e., a certificate), a Member State shall not require the supplier to provide further evidence of compliance with the sustainability and greenhouse gas emissions saving criteria.</p> <p>The regulation that will allow to the current voluntary schemes to apply for their eligibility as “certified schemes” is currently under development.</p> <p><i>This is the draft Implementing Regulation on rules to verify sustainability and greenhouse gas emissions savings criteria and low indirect land-use change-risk criteria (under consultation)</i></p>
7. What information is required about origin?	<p>Information about the geographic origin and feedstock type of biofuels, bioliquids and biomass fuels per fuel supplier shall be made available on annual basis.</p> <p>The obligations shall apply to all domestic or imported biofuels, bioliquids, biomass fuels, renewable liquid and gaseous transport fuels of non-biological origin, or recycled carbon fuels. Economic operators may provide the required evidence directly at sourcing area level.</p>
8. What criteria are used to categorize and define feedstock?	<p>RED II’ obligations are already reported. Categories are defined within Annex IX.</p> <p>An obligation on Member States to require fuel suppliers to ensure a minimum share of advanced biofuels and certain biogases, produced from feedstock listed in Annex IX of REDII. Definitions provided:</p> <ul style="list-style-type: none"> • ‘Agricultural biomass’ means biomass produced from agriculture • ‘Forest biomass’ means biomass produced from forestry • ‘biowaste’ means biowaste as defined in point (4) of Article 3 of Directive 2008/98/EC • food and feed crops’ means starch-rich crops, sugar crops or oil crops produced on agricultural land as a main crop excluding residues, waste or lignocellulosic material and intermediate crops, such as catch crops and cover crops, provided that the use of such intermediate crops does not trigger demand for additional land • ‘residue’ means a substance that is not the end product(s) that a production process directly seeks to produce; it is not a primary aim of the production process, and the process has not been deliberately modified to produce it • ‘Agricultural, aquaculture, fisheries and forestry residues’ means residues that are directly generated by agriculture, aquaculture, fisheries and forestry and that do not include residues from related industries or processing
9. What information needs to be reported about the type of feedstock used?	Voluntary schemes must ensure that feedstock producers comply with the sustainability criteria, information on the sustainability characteristics can be traced to the origin of the feedstock and all information is well documented along the supply chain.

C. Proofing compliance: Verification methods required/ allowed

10. Is it possible to make use of certification systems to proof compliance? If yes, which schemes are recognized (so far)?	<p>Yes - The Commission may decide that voluntary national or international schemes setting standards for the production of biofuels, bioliquids or biomass fuels, or other fuels that are eligible. The Commission has so far not recognized voluntary schemes under the RED II, <u>but The Commission has received applications for the recognition of voluntary schemes.</u></p> <p>Commission shall adopt implementing acts specifying detailed implementing rules, including adequate standards of reliability, transparency and independent auditing and require all voluntary schemes to apply those standards.</p> <p>A focus on the upcoming IA is reported in section E.1.</p>
11. Is it possible to use a national standard to	Yes - According to RED II, Member States may set up national schemes where compliance with the sustainability and greenhouse gas emissions saving criteria laid down is verified throughout the entire chain of custody. The Commission may decide whether such a

proof compliance?	national scheme complies with the conditions laid down in RED II.
C1. The approval and monitoring procedures for certification standard (<i>only relevant when they can be used to proof compliance</i>)	
12. Which authority decides which certification systems and/or national standards can be used?	<p>According to RED II, Member States may set up national schemes where compliance with the sustainability and greenhouse gas emissions saving criteria laid down is verified throughout the entire chain of custody. The Commission may decide whether such a national scheme complies with the conditions laid down in RED II.</p> <p>The Commission may decide that voluntary national or international schemes setting standards provide accurate data on greenhouse gas emission savings or demonstrate that consignments of biofuels, bioliquids or biomass fuels comply with the sustainability criteria.</p>
13. Which criteria are used to approve a certification system and/or national standard?	<p>The Commission shall adopt implementing acts specifying detailed implementing rules, including adequate standards of reliability, transparency and independent auditing and require all voluntary schemes to apply those standards.</p> <p><i>This is the draft Implementing Regulation on rules to verify sustainability and greenhouse gas emissions savings criteria and low indirect land-use change-risk criteria (under consultation)</i></p>
14. Are there minimum requirements around 3rd party auditing, intervals of verification or accreditation?	<p>Voluntary schemes must ensure that feedstock producers comply with the sustainability criteria, information on the sustainability characteristics can be traced to the origin of the feedstock and all information is well documented along the supply chain.</p> <p>The auditing shall verify that the systems used by economic operators are accurate, reliable and protected against fraud, including verification ensuring that materials are not intentionally modified or discarded so that the consignment or part thereof could become a waste or residue. It shall evaluate the frequency and methodology of sampling and the robustness of the data.</p> <p>The voluntary schemes shall publish (at least annually) a list of their certification bodies used for independent auditing, indicating for each certification body by which entity or national public authority it was recognized, and which entity or national public authority is monitoring it.</p> <p>Certification bodies shall submit, upon the request of competent authorities, all relevant information necessary to supervise the operation, including the exact date, time, and location of audits.</p>
15. Is cross-compliance possible? And if yes, on which conditions?	<p>The Commission assesses national schemes in order to facilitate mutual bilateral and multilateral recognition of schemes for verification of compliance with the sustainability and greenhouse gas emissions saving criteria. These schemes assessed by the Commissions cannot refuse mutual recognition with that Member State's scheme.</p>

D. Traceability and transfer of information

16. Which chain of custody systems (e.g., mass balance, book and claim) are allowed to link information to the biomass feedstock?	<p>Economic operators are required to use a <u>mass balance system</u> for reporting for each consignment, including data on the size of the consignment and related sustainability and greenhouse gas emissions saving characteristics.</p>
17. When mixing of different consignments of biomass is allowed: what are the rules of allocation (e.g.,	<p>Economic operators are to use a mass balance system which requires information about the sustainability and greenhouse gas emissions saving characteristics and sizes of the consignments.</p> <p>Economic operators must use a mass balance system which:</p> <ul style="list-style-type: none"> (a) allows consignments of raw material or fuels with differing sustainability and greenhouse gas emissions saving characteristics to be mixed for instance in a container, processing or logistical facility, transmission and distribution infrastructure or site (b) allows consignments of raw material with differing energy content to be mixed for the

based on energy content, mass)?	<p>purposes of further processing, provided that the size of consignments is adjusted <u>according to their energy content</u></p> <p>(c) requires information about the sustainability and GHG emissions saving characteristics and sizes of the consignments referred to in point (a) to remain assigned to the mixture; and</p> <p>(d) provides 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 and requires that this balance be achieved over an appropriate period of time.</p> <p>Where a consignment is processed, information on the sustainability and greenhouse gas emissions saving characteristics of the consignment shall be adjusted and assigned to the output in accordance with the following rules:</p> <p>* when the processing of a consignment of raw material yields only one output that is intended for the production of biofuels, bioliquids or biomass fuels, renewable liquid and gaseous transport fuels of non-biological origin, or recycled carbon fuels, the size of the consignment and the related quantities of sustainability and greenhouse gas emissions saving characteristics shall be adjusted applying a conversion factor representing the ratio between the mass of the output that is intended for such production and the mass of the raw material entering the process;</p> <p>when the processing of a consignment of raw material yields more than one output that is intended for the production of biofuels, bioliquids or biomass fuels, renewable liquid and gaseous transport fuels of non-biological origin, or recycled carbon fuels, for each output a separate conversion factor shall be applied, and a separate mass balance shall be used.</p>
<p>18. What is the first point in the supply chain to which the information should be traced back for:</p> <ul style="list-style-type: none"> • <u>Forestry</u>: forest residues • <u>Agriculture</u>: straw from cereals 	<p>For forest residues: The first- or second-party auditing may be used up to the first gathering point of the forest biomass. The information is to be gathered on forest sourcing area level.</p> <p><i>‘sourcing area’ means the geographically defined area from which the forest biomass feedstock is sourced, from which reliable and independent information is available and where conditions are sufficiently homogeneous to evaluate the risk of the sustainability and legality characteristics of the forest biomass</i></p> <p>No clear reference is made for agricultural biomass.</p>

E. Monitoring compliance: the governance structure

19. Which (controlling) authority receives the required sustainability and GHG information from the economic operator (see A)?	As explained later (section E.1), the Commission receives the sustainability performances of biofuels/advanced biofuels/alternative fuels from the economic operators by means of a mechanism of voluntary schemes (regulation under development), or certified standards according to the national criteria set by RED II. Member States shall submit to the Commission, in aggregated form, the information they receive/ collect.
20. How does the (controlling) authority register this information? Is there a database?	<p>Economic operators have to provide information on the sustainability characteristics of those fuels, including their life-cycle greenhouse gas emissions, starting from their point of production to the fuel supplier and on the transactions made.</p> <p>Where an economic operator provides evidence or data obtained in accordance with a scheme (i.e., a certificate), a Member State shall not require the supplier to provide further evidence of compliance with the sustainability and greenhouse gas emissions saving criteria.</p> <p>The information should be inserted into a national database that is linked to the Union database to enable the tracing of liquid and gaseous transport fuels.</p>
21. How does the (controlling) authority checks the correctness of the information they receive?	<p>RED II reports the sustainability criteria which must be met by the advanced biofuels produced by the operators. The mechanism has been already explained.</p> <p>The Commission shall adopt implementing acts specifying detailed rules, including adequate standards of reliability, transparency and independent auditing and require all voluntary schemes to apply those standards.</p> <p>At the request of a Member State, which may be based on the request of an economic operator, the Commission shall, on the basis of all available evidence, examine</p>

	whether the sustainability and GHG emissions saving criteria in relation to a source of biofuels, bioliquids and biomass fuels, and the GHG savings thresholds have been met.
22. Is this information also publicly available, and if yes, which information?	<p>Annex V and VI report a list of default/typical values of the GHGs intensity calculated for different production pathways. The operators can use those values if they are operating the plants as the same way of the standard cases, otherwise, they must provide their own calculations.</p> <p>Information about the geographic origin and feedstock type per fuel supplier must be made available to consumers on the websites of operators, suppliers or the relevant competent authorities and shall be updated on an annual basis.</p> <p>The voluntary schemes shall publish a list of their certification bodies used for independent auditing, indicating for each certification body.</p>
23. Does the controlling authority (or another governance organization) have the authority to go back in the supply chain, to check the correctness of the information? and if yes, <ul style="list-style-type: none"> to which point in the value chain? which information can be checked? 	<p>The mechanism is still under development. See next section.</p> <p>RED II mentions the following:</p> <p>At the request of a Member State, which may be based on the request of an economic operator, the Commission shall, on the basis of all available evidence, examine whether the sustainability and GHG emissions saving criteria in relation to a source of biofuels, bioliquids and biomass fuels, and the GHG savings thresholds have been met.</p> <p>In case of concerns that a voluntary scheme does not operate in accordance with the standards of reliability, transparency and independent auditing, the Commission can investigate the matter and take appropriate action.</p>
24. In case information submitted by the economic operator is incomplete and/or incorrect: what are the consequences of non-compliance?	<p>See point nr. 29 for the certification schemes. RED II also mentions the following:</p> <p>Within six months of receipt of a request (of further investigation) and in accordance with the examination procedure, the Commission shall, by means of implementing acts, decide whether the Member State concerned may either:</p> <ul style="list-style-type: none"> take into account biofuels, bioliquids, biomass fuels and other fuels that are eligible for counting towards the numerator ...[...]...; or (c) by way of derogation from paragraph 9 of this Article, require suppliers of the source of biofuels, bioliquids, biomass fuels and other fuels that are eligible for counting towards the numerator ..[...]... to provide further evidence of compliance with those sustainability and greenhouse gas emissions saving criteria and those greenhouse gas emissions savings thresholds.
E1. Monitoring compliance of certification standards (<i>Only relevant when they can be used to proof compliance</i>)	
25. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the auditors? and if yes, <ul style="list-style-type: none"> to which point in the value chain? what is the scope of their monitoring? 	<p>In EU, a draft of the next regulation (in the form of an Implementing Act) on rules to verify sustainability and greenhouse gas emissions saving criteria and low indirect land-use change-risk criteria have been released in July 2021 for public consultation. <u>The final IA will be released soon.</u> The document establishes a procedure to recognize whether biofuels, biomass fuels, bioliquids, renewable gaseous and liquid transport fuels of non-biological origin and recycled carbon fuels comply with the requirements of RED II Directive (EU) 2018/2001. The mechanism works with the use of voluntary schemes, which have to be first approved by EC. The recognition of the schemes by the Commission is not a pre-requisite for certification. EU countries may accept evidence from voluntary schemes that are not recognised if they provide the required assurances.</p> <p>Further info:</p> <p>https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12723-Sustainable-biofuels-bioliquids-and-biomass-fuels-voluntary-schemes-implementing-rules_en</p> <p>https://ec.europa.eu/energy/topics/renewable-energy/biofuels/voluntary-schemes_en</p> <p>According to the RED II: Competent authorities of the Member States shall supervise the operation of certification bodies that are conducting independent auditing under a voluntary scheme. Certification bodies shall submit, upon the request of competent authorities, all relevant information necessary to supervise the operation, including the exact date, time and location of audits. Where Member States find issues of non-</p>

	conformity, they shall inform the voluntary scheme without delay.
26. In case verification by the auditor is considered insufficient, what are the consequences?	See point nr. 29. According to the RED II: Where Member States find issues of non-conformity, they shall inform the voluntary scheme without delay.
27. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the certification schemes? If yes, how?	As first, voluntary schemes must be first approved by EC, which is the controlling authority. Afterwards, they can operate and act together with certification bodies to provide certification services for raw materials or fuels, by carrying out audits of economic operators and issuing certificates. Voluntary scheme's certification system considers the certification bodies performing audits which are accredited to ISO 7065 or equivalent and to ISO 14065 or equivalent where it performs audits on actual GHG values. According to the RED II: In case of concerns that a voluntary scheme does not operate in accordance with the standards of reliability, transparency and independent auditing, the Commission can investigate the matter and take appropriate action.
28. Does the controlling authority (or another governance organization) have insight if one certification scheme is used throughout the full supply chain, or multiple (in case of cross-compliance)	Not at this moment. Regulation is still under development.
29. In case verification and monitoring by the certification scheme is considered insufficient, what are the consequences?	In case of non-conformities of economic operators under a scheme, the certificates may be suspended. For each type of non-conformity, there shall be a transparent set of rules and procedures to ensure timely enforcement of corrective measures and sanctions, including suspensions, where appropriate. In case of concerns that a voluntary scheme does not operate in accordance with the standards of reliability, transparency and independent auditing, the Commission can investigate the matter and take appropriate action.

F. Other (optional)

30. Where do you see most risks in information transfer (completeness, correctness) between economic operators in the supply chain for advanced biofuel supply chains?	The methodology for GHGi is not correctly applied and the GHGi calculations of advanced/conventional biofuels may not be correctly carried out. We consider that it would be good if the Commission checked some of the GHG calculations companies submit for their biofuels, to check to see if the calculations of GHGi for biofuels are being done the proper way. The problem is the Commission leaves it to the Voluntary Schemes to check this (but do they really follow exactly the methodology proposed by the Commission, how do we know?) And as the RED probably moves towards a GHG emissions reduction from transport, this is going to be more and more crucial). In the EU' Member States, RED II had to be transposed to national level (deadline 30 June 2021) and the implementation of RED II at national level is very recent. Here we report a specific document for EU that differs from the specific regulation for each MS (regarding the reception of RED II at national level). There is a high risk that different MS can call different biofuel types advanced or not.
31. Where do you see most risks in information transfer and monitoring of the sustainability and GHG emission requirements in	Normal biofuels may be sold as advanced biofuels.

advanced biofuel supply chains between countries?	
32. Where do you see opportunities for improvement to harmonize and strengthen policy frameworks to monitor the sustainability and GHG emission requirements of advanced biofuel supply chains?	Maybe random checks of biofuel certifications could help to ensure quality. In any case a continuous checking of the actual GHG calculations by the Commission is a key-issue.
33. Other remarks	

Relevant sources

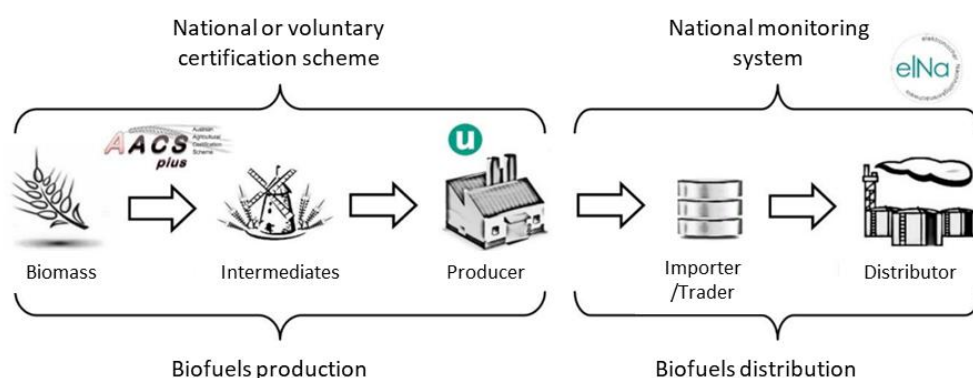
- The EU RED II, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.328.01.0082.01.ENG&toc=OJ:L:2018:328:TOC
- Draft Commission Implementing Regulation on rules to verify sustainability and greenhouse gas emissions savings criteria and low indirect land-use change-risk criteria https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12723-Sustainable-biofuels-bioliquids-and-biomass-fuels-voluntary-schemes-implementing-rules_en

AUSTRIA- KRAFTSTOFFVERORDNUNG

Data for filling in this factsheet were mainly obtained from different resources, including best available expert knowledge, publicly available reports, and websites. Relevant literature sources are mentioned at the end of this factsheet. The Factsheets were filled in the period from September 2021-January 2022. The aim of the Factsheets is to present the key characteristics of the policy framework; It does not pretend to be fully complete, nor does it pretend to capture all the details and insights.

A1. General information	
1. Is there a policy on the sustainability of (advanced) biofuels in your country? If yes, which one?	<p>Yes, the “<u>Kraftstoffverordnung</u>” from 2012. This Fuel Ordinance was amended in 2018 and 2020.</p> <p>The Kraftstoffverordnung is currently amended, in order to implement RED-II. However, this process is delayed and there is no official timeline available.</p>
2. Is there a definition for ‘advanced biofuels’ under this policy? If yes, which one?	<p>Yes, advanced biofuels mean biofuels produced from feedstocks or fuels listed in Part A of Annex XIII of the Kraftstoffverordnung (see answer to question 3)</p>
3. Which feedstock categories fall under the scope of ‘advanced biofuels’?	<ul style="list-style-type: none"> • Algae, if cultivated on land in tanks or photobioreactors • Biomass fraction of mixed municipal waste, but not separated household waste, to which recycling targets apply • Bio-waste from private households which is subject to separate collection • Biomass fraction of industrial waste unsuitable for use in the food or feed chain, including material from wholesale and retail trade, agro-food industry and fisheries and aquaculture industry, excluding used cooking oil and animal fats • Straw • Manure and sewage sludge • Wastewater from palm oil mills and empty palm fruit bunches • Tall oil pitch • Crude glycerine • Bagasse • Grape marc and wine lees • Nut shells • Pods • De-husked corn cobs • Biomass fractions of waste and residues from forestry and forest-based industries, i.e. bark, twigs, pre-commercial thinnings, leaves, needles, tree tops, sawdust, sawdust, black liquor, brown liquor, fibre sludge, lignin and tall oil; • Other non-food cellulosic materials • Other lignocellulosic materials with the exception of sawn timber and veneer logs • Liquid or gaseous renewable fuels of non-biogenic origin used in the transport sector • Capture and use of CO₂ for transport purposes, provided that the energy source is renewable • Bacteria, provided that the energy source is renewable
A2. Requirements on GHG emission reduction and sustainability	
4. What GHG emission reduction and sustainability requirements are included in the policy, and to which feedstock-to-biofuel chains do they apply?	<p>For biofuels produced in installations that started operation after 5 October 2015, a life cycle greenhouse gas emission reduction rate of at least 60% compared to the reference value shall apply. For biofuels produced in installations that were operational on or before 5 October 2015, a life-cycle greenhouse gas emission reduction rate of at least 50% compared to the reference value shall be met.</p> <p><u>Forest:</u></p> <p>The use of forestry feedstock for the production of sustainable biofuels is subject to compliance with forestry feedstock legislation: <u>The Fuel Ordinance had no demand for regulating forestry feedstocks so far.</u> Therefore, there is currently no separate legislation</p>

<p>List in particular the requirements for:</p> <ul style="list-style-type: none"> • Forest: forest residues to ethanol via gasification • Agriculture: ethanol production from cereal straw 	<p>on forestry feedstock available. This is planned for the next amendment.</p> <p>Ethanol production from waste wood (process unspecified): Typical value for GHG emissions 17 g/MJ CO₂-equ., standard value 22 g/MJ CO₂-equ. Typical value for GHG emissions reduction 80%, standard value 74%</p> <p>Ethanol production from cultured wood (process unspecified): Typical value for GHG emissions 20 g/MJ CO₂-equ., standard value 25 g/MJ CO₂-equ. Typical value for GHG emissions reduction 76%, standard value 70%</p> <p>Agriculture:</p> <p>If agricultural feedstocks used for the production of biofuels are produced domestically and designated as "sustainable", they have to originate from land which is cultivated by farmers and were already in agricultural use before 1st January 2008. They mustn't originate from areas which are protected under the nature conservation provisions. (Legislation on agricultural feedstocks for biofuels and bioliquids)</p> <p>Ethanol production from cereal straw: Typical value for GHG emissions 11 g/MJ CO₂-equ., standard value 13 g/MJ CO₂-equ. Typical value for GHG emissions reduction 87%, standard value 85%</p>
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B. Proofing compliance: Information required	
<p>5. Who is the obligated party to report and proof compliance of the sustainability and GHG emission of (advanced) biofuels and at what interval?</p>	<p>Companies, which bring the biofuels to the marked (paying tax) are often (but not necessarily) also those, having obligations against the fuel ordinance.</p> <p>All economic operators dealing with sustainable biofuels have to be registered in the database. Among those are producers, traders, importers etc. According to the Fuel Ordinance, the following economic operators must register with the Federal Environment Agency tool eNa - the electronic sustainability system for biofuels:</p> <ul style="list-style-type: none"> • Sustainable biofuels producer • (Energy) traders and importers of sustainable biofuels • Storage operators • Distributors of sustainable biofuels • Electricity suppliers whose contribution of electricity from renewable energy sources is to be counted towards the targets <p>Companies subject to the obligation to register are companies that put fuels or other energy sources for use in the transport sector into free circulation under excise law for the first time in the territory of Austria or use them except in the fuel tank of the vehicle. This includes, in particular, companies subject to substitution obligations.</p> <p>A report is prepared once a year from the eNa system for the companies, subject to the substitution obligation (§20 notification, see answer to question E20).</p> <p>The deadline for preparation is 1 May of the year following the reporting year. The report covers both the sustainably biogenic fuel <u>quantities</u> and renewable energy sources that can be counted towards the targets of the Fuel Ordinance, as well as the fossil and non-sustainably biogenic fuels that were placed on the market by your company in the reporting year.</p>
<p>6. What information is required/ needs to be reported</p>	<p>Information required depends if trader, producer etc. The Federal Environment Agency know which certificate is used; The voluntary schemes publish the certificates on their respective websites. This information is checked, when known companies register at eNa. Sustainability certificates shall contain at least the following information (see below).</p>

about sustainability and GHG emission (reduction) by the obligated party?	<ul style="list-style-type: none"> • The <u>name and address</u> of the issuing company producing biofuels • An indication of whether the installation in question was commissioned up to and including 5 October 2015 or thereafter • The <u>date of issue</u> • A <u>number clearly identifying the certificate</u> • The registration number issued by the Umweltbundesamt GmbH (Federal Environment Agency) or details of the <u>inspection body</u> which has confirmed the sustainability certificate and/or details of a voluntary scheme • <u>Feedstock category</u> • The <u>quantity and type of biofuels</u> to which the sustainability certificate relates • <u>A confirmation of compliance</u> with the provisions of this Regulation • <u>The type, quantity, year of harvest and countries of cultivation</u> or origin of the raw materials used • The <u>life-cycle greenhouse gas emissions</u> in grams of CO₂ equivalent per megajoule of biofuel (g CO₂eq/MJ) in the form of a default value or an actual value (disaggregated values for transport, conversion etc.) • For biofuels not listed in Annex IX, the <u>energy content</u> in megajoules • The name and address of the purchaser of the biofuels • <u>Emissions from carbon stock changes due to land-use change</u> • Information on whether a <u>credit</u> has been claimed in the calculation of greenhouse gas emissions • Information on whether the above credit has been claimed for emission savings due to accumulation of carbon in the soil as a result of better agricultural management practices • In the case of biofuel creditability: information on the <u>type, quantity and countries of origin of the feedstocks used</u>; and confirmation of registration with the Federal Environment Agency (Umweltbundesamt GmbH) <p>Producer of biofuels must calculate and check GHG emissions by the voluntary scheme. The Federal Environment Agency is checking the published voluntary schemes on the respective websites. These voluntary schemes are mandatory in order to register at the eINA system.</p>
7. What information is required about origin?	The type, quantity, year of harvest and countries of cultivation or origin of the raw materials used.
8. What criteria are used to categorize and define feedstock?	<p>Categories are based on RED-II. The term "Industrial waste unsuitable for use in food or feed" from RED-II is unclear. There were several requests with a case-to-case decision. If a feedstock was declared as advanced feedstock or residue than only for a certain amount and time to avoid price increase and fraudulent use.</p> <p>Most important criteria for categorization are market price and intended use.</p> <p>Definitions according to the Kraftstoffverordnung:</p> <p>"<u>Residual substance from processing</u>" means a substance that is not a final product and the production of which is directly sought by the production process; it is not the primary objective of the production process, and the process has not been intentionally modified to produce it;</p> <p>"<u>Residues from agriculture, aquaculture, fisheries and forestry</u>" means residues directly generated by agriculture, aquaculture, fisheries and forestry; it does not include residues from related industries or processing;</p>
9. What information needs to be reported about the type of feedstock used?	eINA provides a drop-down list with about 80 feedstocks. When a company is registered, only listed feedstocks can be chosen. If a company want to add another feedstock, they have to make a request. Classification whether advanced or not is a matter for each country.

C. Proofing compliance: Verification methods required/ allowed

10. Is it possible to make use of certification systems to proof compliance? If	<p>Yes. Voluntary schemes: ZBSvs, AACS, BLE/Nabisy, ISCC DE, ISCC EU, Red Cert, Red Cert EU, Slovakian National System (certification systems of the quantities placed on the market in 2019)</p> <p>In addition to the international systems approved by the European Commission,</p>
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yes, which schemes are recognized (so far)?	<p>three national systems are recognised on the basis of bilateral agreements (Slovenian, Slovakian and Italian).</p> <p>Regardless of which certification system/voluntary scheme biofuel producers are certified with, the companies must enter certain data into the eINa web application. A voluntary scheme is mandatory for using eINa.</p> <p>The eINa system generates so-called sustainability certificates (proof of sustainability) from this data, which are linked to the sustainable biofuels. Each trade needs a proof of sustainability POS from the eINa system - therefore a voluntary scheme and a registration at the eINa system is required by each party beginning at the first gathering point.</p> <p>The sale of sustainable biofuels must always be accompanied by a transaction of the corresponding proof from the seller to the buyer. Therefore, all biofuel traders and stockholders must also use the eINa system.</p>
11. Is it possible to use a national standard to proof compliance?	<p>Yes. According to the Austrian implementation, <u>Agrarmarkt Austria</u> (AMA) is the competent certification body for businesses in the chain from the cultivation of agricultural raw materials to their processing into semi-finished or intermediate products. The Federal Environment Agency is responsible from the biofuel production sites to the marketing of the fuels. With the <u>Austrian Agricultural Certification Scheme</u> (AACS), AMA also offers a voluntary certification system for the certification of raw materials and feedstocks in accordance with the RED.</p> <p>As of 1 July 2021, the implementation of RED II for the promotion of the use of energy from renewable sources is in force. The AMA has applied for the <u>re-recognition of the national AACS system</u> in accordance with RED II to the European Commission and submitted the relevant documents. This is currently still in the recognition process, which can only be finally concluded once the necessary implementing acts have been adopted and published by the EC.</p>
C1. The approval and monitoring procedures for certification standards (<i>only relevant when they can be used to proof compliance</i>)	
12. Which authority decides which certification systems and/or national standards can be used?	The Federal Environment Agency (Umweltbundesamt) approves all voluntary schemes from the EU. Additionally, there are bilateral agreements with three countries in a way that the respective systems are well known and are treated equally to the eINa system.
13. Which criteria are used to approve a certification system and/or national standard?	The voluntary schemes are approved at EU level. National standards are not replacing voluntary schemes, but represent an additional control, in other form. A voluntary scheme is required for a registration at eINa, that mean the minimum requirements must be met. AACS is a voluntary scheme approved by the Commission and only used and controlled in Austria, but it is not a national standard. ACCS only covers agricultural feedstocks.
14. Are there minimum requirements around 3rd party auditing, intervals of verification or accreditation? And if yes, which ones?	Certification bodies need approval by the voluntary schemes. There are no specific requirements from Austria. The database eINa extends independent control with state control. The Federal Environment Agency in Austria is in charge of e.g. emission trading system, waste registration, national monitoring, external environmental control for the Federal Minister, and it also acts as 3rd party auditor.
15. Is cross-compliance possible? And if yes, on which conditions?	Voluntary schemes are mutually recognised - rejection by Federal Environment Agency only in case of non-compliance.
D. Traceability and transfer of information	
16. Which chain of custody systems (e.g., mass balance, book and claim) are allowed to link information to the biomass feedstock?	<p>Companies producing or trading in biofuels to be counted towards the targets shall be required to ensure full verification of compliance with the sustainability criteria through the use of a <u>mass balance system</u>. The mass balance system shall contain the following information in particular:</p> <ul style="list-style-type: none"> • Clear information on the allocation of purchased feedstocks or traded and sold biofuels to sellers and buyers, respectively, which allows for a clear identification of buyers and sellers • Date of purchase and sale of biofuels or feedstocks for biofuel production • Data on the type and quantity, the year of harvest and the countries of cultivation of the feedstocks

	<ul style="list-style-type: none"> Information on the sustainability of the biomass used A value for the greenhouse gas reduction potential of the biofuel produced, traded or used <p>In the case of the use of default values, a clear description of the feedstock used</p>
17. When mixing of different consignments of biomass is allowed: what are the rules of allocation (e.g., based on energy content, mass)?	<p>Biofuels produced with different sustainability characteristics, and which are to count towards the targets may only be blended if the records by means of a <u>mass balance system</u> ensure in a traceable manner that the sum of all biofuels taken out of the blend has the same sustainability characteristics in the same quantities as the sum of all biofuels added to the blend.</p> <p>The GHG reduction rate of a blend of biofuels shall be calculated as the weighted average of the respective greenhouse gas reduction rates of the individual biofuels.</p> <p>Mass balance in means of a concept also covers energy balance, conversion factors, etc.</p>
18. What is the first point in the supply chain to which the information should be traced back for: <ul style="list-style-type: none"> <u>Forestry</u>: forest residues <u>Agriculture</u>: straw from cereals 	<p>The first point of the supply chain is always the first gathering point. Farmers do not need a certification from a voluntary scheme.</p>

E. Monitoring compliance: the governance structure

19. Which (controlling) authority receives the required sustainability and GHG information from the economic operator (see A)?	Federal Environment Agency
20. How does the (controlling) authority register this information? Is there a database?	<p>eINa - the electronic sustainability system for biofuels</p> <p>The Federal Environment Agency carries out checks on the sustainability of biofuels. <u>Starting from the biofuel production site or the import</u>, up to the point of marketing or export of the goods.</p> <p>Sustainability certificates, which are issued by means of the IT application eINa, certify compliance with the sustainability criteria for the quantity of biofuel produced and/or sold in Austria. Furthermore, in the course of the control, the data of the <u>§20 notification</u> is checked, which serves as the basis for the substitution target calculation, the GHG reduction target (2020) and as confirmation for the Federal Ministry.</p> <p><u>§20 notification</u></p> <p>Businesses that have issued or passed on sustainability certificates in the current calendar year shall submit an annual report to the Federal Ministry, which shall contain the following information in particular:</p> <ul style="list-style-type: none"> Proof of the quantities of all liquid and gaseous fossil fuels or biofuels and energy sources for use in the transport sector that were released for free circulation, used or traded for the first time in the territory of Austria, stating the origin and place of purchase; broken down by <ul style="list-style-type: none"> the quantities that meet the sustainability criteria and the quantities that do not meet the sustainability criteria the quantities produced from the raw materials listed. If different raw materials are used, the notifiers shall indicate the quantity of the final product for each input material produced in the reporting year in the corresponding processing plants. A record of the quantities of all other renewable fuels for use in motor vehicles released for consumption or used, indicating the type and quantity of fuels; A record of all quantities of fuel processed together, with details of the nature and quantity of each raw material and the place and time of manufacture of the final product;

	<ul style="list-style-type: none"> ○ Proof that the renewable energy to be credited towards the target meets the sustainability criteria, as well as a tabular list of the individual sustainability certificates and the data contained therein for the biofuels first released for free circulation under excise duty law in the Federal territory or released for free circulation under excise duty law in the Federal territory or used; and <p>the level of the life cycle greenhouse gas emissions of biofuels calculated in accordance with the guidelines of the Austrian Fuel Ordinance and the greenhouse gas intensity of each individual fuel and energy carrier placed on the market or used for free circulation under excise duty law for use in the transport sector per unit of energy and the specific total value, in accordance with the respective shares of the total quantity in the respective reporting year. The calculation results shall be reported including the provisional mean values of the estimated emissions due to indirect land use changes from biofuels.</p>
21. How does the (controlling) authority checks the correctness of the information they receive?	<p>The eINA system has internal verification mechanisms that automatically verify the plausibility of the data entered before it generates a sustainability certificate.</p> <p>A check of the data entered by the market participants is also carried out by on-site inspections (only in Austria), which are carried out by experts from the Federal Environment Agency. In addition, ongoing checks of the database are carried out in order to be able to identify incorrect entries at an early stage.</p> <p>Generally, the Federal Environment Agency checks back until the first gathering point (traders, producers, distributors). There are on-site controls (only in Austria) at least every three years at each distributor. Big biofuel producers and importers are checked every year. There are also annual checks at companies with issues in the past. There are about 60 to 80 companies in total in Austria. Checked are certificates, trades, GHG emission calculations, requests regarding feedstocks, storage, etc.</p> <p>Sample inspections can be done also by farmers in the case of cross-compliance checks from AACCS.</p> <p>A registration at eINA is only possible with a voluntary scheme certificate. These certificates are public and are checked from the Federal Environment Agency. The eINA database is providing the data for the substitution obligation and mass balances for counting to the target. For each trade with biofuels a proof of sustainability from the eINA system is required. Biofuels without proof of sustainability cannot be counted to the target. There are reporting obligations for distributors. Incorrect or missing data can be detected if the mass balance is not correct.</p>
22. Is this information also publicly available, and if yes, which information?	<p>The Federal Environment Agency only publishes the registered companies with company name, contact details of the company and registration number. The proof of sustainability is not published.</p> <p>The scheme AACCS is publishing registered companies, with registration number, company name and address, date of registration, type of registration and date until the registration is valid on their website (such as the other voluntary schemes).</p>
23. Does the controlling authority (or another governance organization) have the authority to go back in the supply chain, to check the correctness of the information? and if yes, <ul style="list-style-type: none"> • to which point in the value chain? • which information can be checked? 	<p>The Federal Minister for Climate Protection, Environment, Energy, Mobility, Innovation and Technology is entitled to monitor compliance with the provisions of the Fuel Ordinance.</p> <p>In doing so, it may, with due regard to the principles of economy, efficiency and expediency, avail itself of the services of the Federal Environment Agency, which shall act within the framework of the Environmental Control Act, its assigned tasks.</p> <p>On-site controls are only done in Austria. First point is the first gathering point.</p> <p>The substitution and reporting officers to be inspected shall provide the information necessary for the inspection activity, allow inspection of the records, provide printouts, copies or data records free of charge upon request and allow access to the premises. The monitoring activities shall be carried out in an appropriate manner during operating hours.</p>
24. In case information submitted by the economic operator is incomplete and/or incorrect: what are the	<p>If information is missing the eINA system is not generating a proof of sustainability. If there are issues at an on-site control the companies are blocked for some time or completely. The company is then not listed at eINA anymore. In the worst case the proof of sustainability is retroactively devaluated, which can lead to compensation payments if the target is not fulfilled.</p> <p><u>Sanction from AACCS:</u> If a registered farmer who has sold agricultural raw materials as sustainable receives a sanction for non-compliance with a relevant provision, he shall</p>

consequences of non-compliance?	immediately notify the buyer of the goods. The reason for this notification obligation of the registered farmer is the possibility of immediate reallocation of the goods concerned for the buyer.
E1. Monitoring compliance of certification standards (<i>Only relevant when they can be used to proof compliance</i>)	
25. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the auditors? and if yes, <ul style="list-style-type: none"> • to which point in the value chain? • what is the scope of their monitoring? 	<p>The Federal Environment Agency is not providing certificates, but proof of sustainability. It is mainly collecting data regarding mass balance, achieving the target, check correctness of data (including sustainability compliance).</p> <p>If the Federal Environment Agency is noticing incorrect data or issues during on-site controls, there is consultation with the voluntary scheme.</p> <p>Witness audits are foreseen once the RED II is transposed to national law.</p>
26. In case verification by the auditor is considered insufficient, what are the consequences?	<p>If the Federal Environment Agency is noticing incorrect data or issues during on-site controls the voluntary scheme is consulted. There may be a time limit for solving issues. If issues continue the company can be blocked. Repeated severe deficiencies may result in changes to the system.</p> <p>There is exchange between parties implementing RED-II and voluntary schemes on EU-level (e.g., REFUREC).</p>
27. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the certification schemes? If yes, how?	<p>According to RED, a collaboration with voluntary schemes is required, but there is no controlling authority. In RED-II governance organisations must check voluntary schemes. There can be witness audits at companies with issues in the past.</p>
28. Does the controlling authority (or another governance organization) have insight if one certification scheme is used throughout the full supply chain, or multiple (in case of cross-compliance)	<p>The Federal Environment Agency primarily checks certificates for biofuels, but it can also check certificates for feedstocks.</p> <p>Voluntary schemes can be regional or dedicated to specific feedstocks - it is usual to have different voluntary schemes throughout the whole supply chain.</p>
29. In case verification and monitoring by the certification scheme is considered insufficient, what are the consequences?	<p>Whereas voluntary schemes check single companies, the Federal Environment Agency is checking the whole supply chain (biofuels). With RED-II came the opportunity to report to the commission if a certification is insufficient.</p>
F. Other (optional)	
30. Where do you see most risks in information transfer (completeness, correctness) between economic operators in the supply chain for advanced biofuel supply chains?	
31. Where do you see most risks in information transfer and monitoring of the	

sustainability and GHG emission requirements in advanced biofuel supply chains between countries?	
32. Where do you see opportunities for improvement to harmonize and strengthen policy frameworks to monitor the sustainability and GHG emission requirements of advanced biofuel supply chains?	
33. Other remarks	<p>Issues:</p> <ul style="list-style-type: none"> • Different classification regarding advanced feedstocks in different Member States leads to difficulties. • If a feedstock is considered as waste and resulting as advanced, the value is increasing, and the feedstock is not a waste anymore → misleading definition • Before classifying a waste/advanced feedstock, the historic application and the historic amount in comparison to the current amount must be monitored to avoid fraud. → A feedstock should only be considered as waste/advanced when it was really not used in the past. • A modern integrated biofuels production plant has disadvantages compared to older plants, which have on-site by-products/waste which can be considered as waste and therefore advanced. An incentive is created to generate more waste → Same dynamic as for UCO • Waste Management Act - So far companies have to report all generated waste, which they wanted to avoid. There was no mechanism to check if waste is really waste. Until now there was no advantage to declare a raw material as waste. This has now changed. The Federal Environment Agency can judge if a waste is really a waste (historic application and amount), whereas a voluntary scheme cannot.

Relevant sources

The Kraftstoffverordnung:

<https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20008075>

Federal Environment Agency: <https://www.umweltbundesamt.at/en/>

Biokraftstoffbericht <https://www.bmk.gv.at/themen/energie/energieversorgung/biomasse/alternative-kraftstoffe/biokraftstoffbericht.html>

FRAMEWORK ON (ADVANCED) BIOFUELS: GERMANY

Data for filling in this factsheet were mainly obtained from different resources, including best available expert knowledge, publicly available reports, and websites. Relevant literature sources are mentioned at the end of this factsheet. The Factsheets were filled in the period from September 2021-January 2022. The aim of the Factsheets is to present the key characteristics of the policy framework; It does not pretend to be fully complete, nor does it pretend to capture all the details and insights.

A1. General information	
1. Is there a policy on the sustainability of (advanced) biofuels in your country? If yes, which one?	<p>Yes. Germany has a GHG reduction quota for the transport sector. This quota is the instrument for the implementation of the fuel quality directive and the renewable energy directive into German national law.</p> <p>42% is the official target for GHG reduction in the sector. The GHG quota is one of the measures to support this goal. The quota target is 25% in 2030.</p> <p>Biofuels can be used as one potential option to achieve these reduction targets. Furthermore, there is a specific sub-target for the contribution of advanced biofuels towards the overall quota target.</p> <p>Precondition for this contribution of (advanced) biofuels towards the quota targets is that the production and use of these energy carriers is in compliance with the sustainability criteria of the RED (II). These requirements are operationalised and implemented into national law with a specific ordinance on the sustainability of biofuels.</p>
2. Is there a definition for 'advanced biofuels' under this policy? If yes, which one?	Yes, the definition follows Annex IX, Part A of the RED II
3. Which feedstock categories fall under the scope of 'advanced biofuels'?	See above
A2. Requirements on GHG emission reduction and sustainability	
<p>4. What GHG emission reduction and sustainability requirements are included in the policy, and to which feedstock-to-biofuel chains do they apply? List in particular the requirements for:</p> <ul style="list-style-type: none"> • <u>Forest</u>: forest residues to ethanol via gasification • <u>Agriculture</u>: ethanol production from cereal straw 	<p>The German legislation for the implementation of the RED II is not completely finalised yet. However, it is expected that general sustainability requirements and GHG thresholds will be translated 1:1 from the RED II into German national law.</p> <p>As for forestry residues and agricultural residues, there is yet no clear guidance on how to implement the "new" sustainability criteria into practice and with which methodologies and tools the actual verification (for example on the development of soil organic matter, etc.) can be organised.</p> <p>Germany is waiting for the respective implementing act to further define those elements. Until then, there is no specific requirement when using these residues, besides those that are implemented in existing national legislation of producing countries (including Germany) for agriculture (e.g., "good agricultural practices") or forest management.</p>
B. Proofing compliance: Information required	
5. Who is the obligated party to report and proof compliance of the sustainability and GHG emission of (advanced) biofuels and at what interval?	<p>The economic operator who wishes to bring certified biofuels on the German market. In most cases, these are biofuel producers which then sell their product to traders or those companies that are obliged to fulfil the GHG quota in the transport sector (e.g., mineral oil companies). However, those companies would only buy the biofuels in case they have the respective certificates. The certification period is usually one year.</p> <p>Sustainability declarations in Nabisys (the national German biofuel registry) are issued for each consignment traded.</p>
6. What information is required/ needs to be reported about sustainability and GHG	As for GHG emissions, a calculation according the RED II methodology has to be provided, usually in advance to the audit appointment, to the certification body. During the audit, the auditor will check the correctness of the actual values used for the calculations (e.g., electricity consumed, amount of harvested biomass,

emission (reduction) by the obligated party?	amount of produced products, etc.) Last interfaces need to provide information to the national authority BLE by creating a “proof of sustainability” (database entry) in NABISY. This includes mass, energy content, GHG emissions, country of biomass cultivation, biomass-code (see 8.)
7. What information is required about origin?	For cultivated biomass, biomass producers have to be certified. That means, that downstream processors will buy sustainable material with related certificates. As for residues, the first supply chain element that has to be certified is the one collecting the residues and bringing it to the market. They have to show, where this biomass is coming from and, in the future, that these residues have been supplied in compliance with the new sustainability criteria for forestry and agricultural residues. Information about the country of origin is passed through the supply chain. The last interface reports about the country of origin to the national authority BLE via NABISY.
8. What criteria are used to categorize and define feedstock? (See figure 1 for further explanation)	There is a list, published by BLE, in which 337 feedstocks are listed and related to a biomass code and further information. To issue a proof of sustainability in Nabisy (see 20), only feedstock from this list can be used (1). The list includes the following categories: type of biofuel, waste and residues from agriculture, Annex IX part a/b, advanced/conventional biofuel,
9. What information needs to be reported about the type of feedstock used?	The biomass code (see 8)

C. Proofing compliance: Verification methods required/allowed

10. Is it possible to make use of certification systems to proof compliance? If yes, which schemes are recognized (so far)?	Yes. The schemes that can be used are those that are approved and recognised by the EC. See: https://ec.europa.eu/energy/topics/renewable-energy/biofuels/voluntary-schemes_en
11. Is it possible to use a national standard to proof compliance?	No. There is no national certification scheme in Germany.

C1. The approval and monitoring procedures for certification standards (*only relevant when they can be used to proof compliance*)

12. Which authority decides which certification systems and/or national standards can be used?	Under the RED I, the Federal Office for Agriculture and Food (BLE) published a list with recognized certification schemes. As the EU Commission has not finally recognized certification schemes in October 2021, BLE as national authority, recognizes proofs of sustainability from schemes which applied for recognition of commission. This can be understood as transitional agreement
13. Which criteria are used to approve a certification system and/or national standard?	See 12. Those are the criteria used by the Commission.
14. Are there minimum requirements around 3rd party auditing, intervals of verification or accreditation? And if yes, which ones?	It is expected that the requirements given by RED II will be valid on the national level as well. Some requirements will also be defined by the still upcoming implementing regulation, which will be valid in all EU member states.
15. Is cross-compliance possible? And if yes, on which conditions?	yes, depending on the specifications of the systems (cross-compliance has to be defined by the systems).

D. Traceability and transfer of information

16. Which chain of custody systems (e.g., mass balance, book and claim) are	Usually, everything is based on mass balancing (as mentioned in the
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allowed to link information to the biomass feedstock?	RED II); physical segregation is also allowed. A big topic right now is the potential future development of biomethane trade. Increasing trade activities, involving natural gas grid infrastructures, might require including also book and claim systems for biomethane being distributed through the natural gas grid. GOOs are being managed by the national Biogas registry.
17. When mixing of different consignments of biomass is allowed: what are the rules of allocation (e.g., based on energy content, mass)?	Allocation of sustainability characteristics to a consignment can be done based on mass
18. What is the first point in the supply chain to which the information should be traced back for: <ul style="list-style-type: none"> • <u>Forestry</u>: forest residues • <u>Agriculture</u>: straw from cereals 	The point of collection of the biomass

E. Monitoring compliance: the governance structure

19. Which (controlling) authority receives the required sustainability and GHG information from the economic operator (see A)?	The BLE (our national authority, supervising the whole certification processes) operates a database system or registry (Nabisy) in which information is inserted by economic operators which put biofuels on the market (last interfaces). Traders after the last interface can receive (and also split) proofs of sustainability.
20. How does the (controlling) authority register this information? Is there a database?	yes, the Nabisy system. The national registry for biofuels.
21. How does the (controlling) authority checks the correctness of the information they receive?	In case of GHG emissions reported, there is a “traffic light system” which informs about “unusual” results (e.g. GHG mitigation values). If reported emissions exceed the threshold, the GHG calculation might be re-assessed.
22. Is this information also publicly available, and if yes, which information?	The database is not publicly available. BLE publishes a yearly report in which amounts of biofuels, GHG-emissions, countries of origins etc. are reported. For 2019 the report can be found here: https://www.ble.de/SharedDocs/Downloads/EN/Climate-Energy/EvaluationAndProgressReports2019.pdf?__blob=publicationFile&v=2
23. Does the controlling authority (or another governance organization) have the authority to go back in the supply chain, to check the correctness of the information? and if yes, <ul style="list-style-type: none"> • to which point in the value chain? • which information can be checked? 	BLE is monitoring the recognized certification bodies. Yearly surveillance audits are conducted in which certification projects are evaluated including the review of all required information. Moreover, auditors working for BLE are attending audits of recognized certification bodies in Germany and other countries. Operators are indirectly checked in the annual CB audit. As part of the sample of certification projects to be reviewed, BLE could choose a specific operator (e.g., when fraudulence is supposed for some reasons).
24. In case information submitted by the economic operator is incomplete and/or incorrect: what are the consequences of non-compliance?	National authority might inform the respective certification body.

E1. Monitoring compliance of certification standards (*Only relevant when they can be used to proof compliance*)

25. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the auditors? and if yes, <ul style="list-style-type: none"> • to which point in the value chain? • what is the scope of their monitoring? 	To our knowledge a monitoring of the competency of auditors by the BLE is done in the following two ways: <ul style="list-style-type: none"> - Within the surveillance audits of recognized certification bodies, samples of certification projects are assessed. This includes a review of the audit report. Moreover, the CB should have a process to authorize auditors. This includes evidence of relevant qualification and experiences.
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	Audits of recognized certification bodies are accompanied by BLE-auditors. There is no limitation of certain points in the value chain: it can be inside and outside Germany
26. In case verification by the auditor is considered insufficient, what are the consequences?	<p>Potential consequences are:</p> <p>Certification scheme is informed and might take measures to investigate the case and potentially file restrictions against the involved parties.</p> <p>The respective certificates will become invalid.</p> <p>In cases of fraud, there might be additional investigations from the local authorities, leading to the withdraw of approval or recognition of certification schemes and bodies.</p>
27. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the certification schemes? If yes, how?	Certification schemes are monitored by the EU-Commission. Schemes are required to report on their activities annually. If the BLE identifies non-compliances, they might inform the commission.
28. Does the controlling authority (or another governance organization) have insight if one certification scheme is used throughout the full supply chain, or multiple (in case of cross-compliance)	No, based on the information available in NABISY, the national authority BLE is only aware of the certification scheme applied by the last interface.
29. In case verification and monitoring by the certification scheme is considered insufficient, what are the consequences?	see 25. BLE would inform EC in case of sever shortcomings of the certification schemes.

F. Other (optional)

30. Where do you see most risks in information transfer (completeness, correctness) between economic operators in the supply chain for advanced biofuel supply chains?	
31. Where do you see most risks in information transfer and monitoring of the sustainability and GHG emission requirements in advanced biofuel supply chains between countries?	<p>National databases are eventually not compatible with each other. There is no database which can be used in the entire EU.</p> <p>Furthermore, approaches for the collection of information and the general assessment of sustainability criteria might differ between certification schemes, hindering the general comparability of data collected across the EU.</p>
32. Where do you see opportunities for improvement to harmonize and strengthen policy frameworks to monitor the sustainability and GHG emission requirements of advanced biofuel supply chains?	<p>More harmonised sustainability criteria, and the national implementation of them, in all EU MS would not only ease the trade between countries, but also enable a harmonized monitoring.</p> <p>Harmonisation of minimum requirements regarding the qualification of auditors and also the auditor support by certification schemes.</p>
33. Other remarks	

Relevant sources

The list of feedstock that can be included in Nabisy:

https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwj17P7voj0AhWWR_EDHTsMCbkQFnoECBMQAw&url=https%3A%2F%2Fwww.ble.de%2FSharedDocs%2FDownloads%2FDE%2FKlima-Energie%2FNachhaltige-Biomasseherstellung%2FNabisy%2FBiomassecodeliste.xlsx%3F__blob%3DpublicationFile%26v%3D7&usg=AOvVaw0r5GEt2rec2JeUq4LzOXu

BRAZIL RENOVABIO FRAMEWORK

Data for filling in this factsheet were mainly obtained from different resources, including best available expert knowledge, publicly available reports, and websites. Relevant literature sources are mentioned at the end of this factsheet. The Factsheets were filled in the period from September 2021-January 2022. The aim of the Factsheets is to present the key characteristics of the policy framework; It does not pretend to be fully complete, nor does it pretend to capture all the details and insights.

A1. General information

1. Is there a policy on the sustainability of (advanced) biofuels in your country? If yes, which one?

Brazil's current standards require a 27% blend of ethanol in gasoline, and gradually require an increase in biodiesel blends. In July 2021, The Brazilian government raised the mandatory blend of biodiesel into diesel to 12%

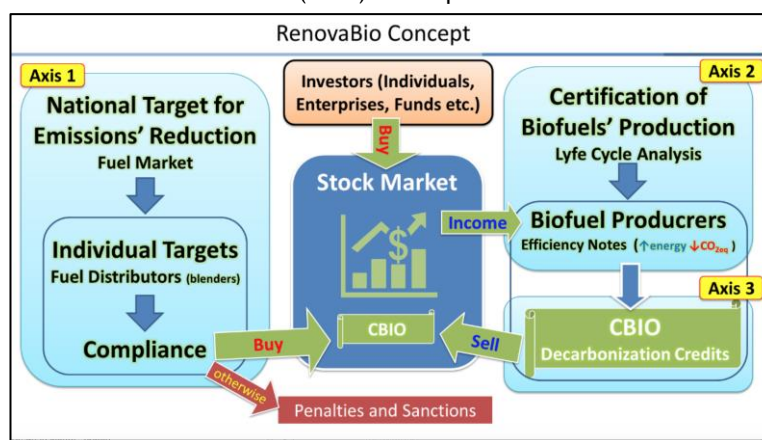
In Brazil, different regulations address the sustainability of biofuels production. Biofuel production plants and agricultural producers must comply with a comprehensive and detailed set of regulations (at federal, state and municipal level) covering aspects of environmental impacts, land use, social, economic, working conditions among others.

For this project, we focus on the **RenovaBio program**, which is a voluntary certification scheme, that complements national regulation with a focus on GHG emissions. The RenovaBio program traces the production from farms to final use of fuel.

RenovaBio includes ethanol, biodiesel, biomethane, biokerosene, second-generation ethanol, among others. The policy also serves to improve the country's energy security [1].

RenovaBio is composed of three strategic axes [2]:

- (i) annually the Government establishes national decarbonization targets for ten years, which are unfolded into mandatory individual targets for fuel distributors, proportional to their shares in the fossil fuel market.
- (ii) biofuel producers voluntarily certify their production and receive, as a result, energy-environmental sufficiency scores.
- (iii) These notes are multiplied by the volume of biofuel traded, resulting in the decarbonization credit (CBIO) that a producer can commercialize.



GHG emissions and allows for the sale and trade of decarbonization credits (CBios). Each CBio represents one metric ton of carbon saved through the utilization of biofuels versus fossil fuels [3].

2. Is there a definition for 'advanced biofuels' under this policy? If yes, which one?

RenovaBio recognizes that different biofuels contribute differently to GHG emissions reduction, and those produced with lower carbon intensity (relative to liquid fossil fuel) will generate more CBIO per volume unit. Therefore, the more efficient and sustainable the individual production, the more CBIOs can be issued (2).

For this reason, RenovaBio does not include a separate definition on advanced biofuels. RenovaBio certifies biofuels production mills that can prove to reduce GHG emissions related to fossil fuels counterparts and comply with eligibility criteria (beyond national regulation for other sustainability characteristics).

Other criteria for the definition of advanced biofuels have been examined (i.e., non-food/feed crops) and our understanding is that such definition goes beyond scientific defensibility. The following biofuel pathways are considered in the policy:

- Ethanol: sugarcane juice, 2G, corn (or combination of feedstock);

	<ul style="list-style-type: none"> • Biodiesel • Biomethane • Synthesized Alternative fuels (alternative KAV, gasoline, and diesel) from the soy-HEFA process. <p>There is a process to include new pathways upon demonstration of economic and environmental potential.</p>
3. Which feedstock categories fall under the scope of 'advanced biofuels'?	<p>There is no definition of Advanced Biofuels. It works through a Life Cycle Analysis (see question 2). RenovaBio certifies biofuels that:</p> <ol style="list-style-type: none"> (1) Reduces GHG emissions (LCA analysis). (2) Complies to eligibility criteria (natural land conversion not allowed, compliance with forest code and agroecological zoning) <p>So far, the detailed GHG accountability already plays the role to distinguish advanced and non-advanced biofuels.</p>

A2. Requirements on GHG emission reduction and sustainability

4. What GHG emission reduction and sustainability requirements are included in the policy, and to which feedstock-to-biofuel chains do they apply? List in particular the requirements for:	<p><i>GHG emission reduction requirements</i></p> <p>Emissions reduction by using biofuels instead of fossil counterparts are the basis of the RenovaBio program. All biofuels' emissions from cradle to grave are considered and the program is technology "agnostic".</p> <p>The calculator "RenovaCalc", a tool based on the life cycle analysis, measures the carbon intensity of biofuels (in g CO₂ eq./MJ) and compares it to its fossil fuel equivalent, generating the "Energy & Environment Efficiency Score" [2].</p> <p>Emissions/reductions on land use change are <u>not accounted</u> due to scientific uncertainty. Eligibility criteria compliance assure that land use emissions are small or negative.</p> <p>Emissions of residues are zero at the point of collection. All emissions after collection are considered.</p> <p><i>Other sustainability requirements</i></p> <p>RenovaBio still establishes that, to be eligible, the biomass processed in the plants cannot come from the areas where there has been suppression of native vegetation and must comply with agroecological zoning. Additionally, biofuels producers must also demonstrate that biomass was produced in accordance with Brazilian environmental legislation, as demonstrated by the regularity in the Rural Environmental Registry (CAR) ⁽²⁾.</p> <p>For biofuels produced in Brazil, RenovaBio requires therefore the following eligibility criteria at the farm level:</p> <ul style="list-style-type: none"> • Traceability of feedstock and supporting information • Demonstration of compliance with the Brazilian Forest Code • Demonstration of protection of natural vegetation • In the case of palm oil, it must also demonstrate of compliance with the agroecological zoning. <p>National authority is working with interested parties to work on a definition for the same protection level in other countries.</p>
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B. Proofing compliance: Information required

5. Who is the obligated party to report and proof compliance of the sustainability and GHG emission of (advanced) biofuels and at what interval?	<p>A Distributer is the obligated party to retire CBIOS.</p> <p>As mandated by Resolution #8 of the National Council for Energy Policy, ANP set the aggregate 2021 target for reducing greenhouse gas emissions at 24.86 mt of CO₂ equivalent. ANP also established the initial 2021 individual targets that must be met by fuel distributors [2].</p> <p>Biofuel producers provide the CBIOS. The biofuel producer is responsible for providing all information and supporting evidence for the certification. A full certification process (including 3rd part inspection) is required every three years. Annual verification (without 3rd part inspection) is required. ANP expects that approximately 60 percent of Brazil's biofuels plants (or 246 plants) will be certified to issue CBios by mid-2021 [3].</p> <p>Additional checks are adopted to verify volumes of biofuels. Emissions reductions certificated (Cbios) must be placed by banks and traded using the national banking system.</p>
6. What information is	<p>Only authorized biofuel producers (and importers) are allowed to apply for a certification to be able to issue CBIOS. They all must provide individual information that allows to</p>

required/ needs to be reported about sustainability and GHG emission (reduction) by the obligated party?	<p>calculate carbon footprint, put in the calculator, and share of eligible volumes of:</p> <ul style="list-style-type: none"> • Feedstock input levels • Processing input level efficiencies • Fuel transport modal • Final use emissions are built in the calculator <p>(See also “question 7”)</p>
7. What information is required about origin?	<p>For agriculturally based feedstock produced in Brazil:</p> <ul style="list-style-type: none"> • GIS limits of the farm • Identification of feedstock producer • no conversion of natural vegetation with cut-off date of 2018 (natural vegetation includes forests and other natural lands). <p>The origin of residues must also be provided.</p> <p>Propose grown biomass need to comply with eligibility criteria, as any other biomass. Additional definition of forest residues (based on local regulation) is available on the regulation. So far, no mill has requested to convert forest residues into liquid biofuels.</p>
8. What criteria are used to categorize and define feedstock?	<p>The only categorization is whether feedstock is residue or not.</p> <p>The list includes residues from agricultural, forestry, industrial, processing, and “other”. A list of residues is provided in the official regulation (art. 3.2 of resolution 758/2018) [1].</p>
9. What information needs to be reported about the type of feedstock used?	<p>All feedstocks must be reported from biofuel producer in the certification process:</p> <ul style="list-style-type: none"> • Feedstock type <p>Carbon footprint</p>

C. Proofing compliance: Verification methods required/ allowed

10. Is it possible to make use of certification systems to proof compliance? If yes, which schemes are recognized (so far)?	RenovaBio does not make use of voluntary certification schemes (so far).
11. Is it possible to use a national standard to proof compliance?	RenovaBio has its own certification. No other certification is currently recognized.
C1. The approval and monitoring procedures for certification standards (<i>only relevant when they can be used to proof compliance</i>)	
12. Which authority decides which certification systems and/or national standards can be used?	<p>The National Agency of Petroleum, Gas and Biofuels (ANP) is responsible for the specific regulation. ANP could recognize other certification schemes as part of the RenovaBio certification process if sufficient information regarding compatibility is presented by the certification owner.</p> <p>However, recognition has not been required yet.</p>
13. Which criteria are used to approve a certification system and/or national standard?	There is no specific regulation on this topic.
14. Are there minimum requirements around 3rd party auditing, intervals of verification or accreditation? And if yes, which ones?	<p>Yes. The program requires 3rd part independent inspection and provides minimum requirements for auditors. Then the auditing results are available under public consultation, and final revision from the national authority before a certificate is issued.</p> <p>There are detailed requirements and restrictions for a certification company to be recognized by RenovaBio. The firm that conducts the inspection must be accredited as a Greenhouse Gas Validation and Verification Body (OVV). There are also mandatory requirements on how to conduct the inspection, see [3].</p>

	<p>A full certification (including 3rd part audit) is required every 3 years. Annual evaluations at least self-assessment) is also necessary, and reports can be required by national authority at any time. are required.</p> <p>A new full certification is required if carbon footprint or eligibility changes more than 10%.</p>
15. Is cross-compliance possible ²⁷ ? And if yes, on which conditions?	<p>Currently no.</p> <p>A single certification must be conducted for the entire value chain.</p>

D. Traceability and transfer of information

16. Which chain of custody systems (e.g., mass balance, book and claim) are allowed to link information to the biomass feedstock?	<p>Currently, certifiable feedstock needs to be segregated from non-certifiable feedstock along the value chain. Currently, only transfers without mixing is allowed along the chain of custody.</p> <p>Mass balance is allowed within the biofuel facilities in the biofuel production process and only when a (mass based) proportionality calculation is applied.</p> <p>The agency is currently working (in collaboration with the Brazilian Energy Program, funded by UK Foreign, Commonwealth & Development Office) on improving its chain of custody system. Chain of custody systems will allow mixing feedstock along the value chain (mass balance of more restrict model), following ISO 22095/2020 recommendations.</p>
17. When mixing of different consignments of biomass is allowed: what are the rules of allocation (e.g., based on energy content, mass)?	<p>The mixing is only allowed at the production of biofuel at the biofuel plant. Observed conversion factors are also applied.</p> <p>When only one feedstock type is used to produce biofuels (but only part of this feedstock is certified), the share of certified/noncertified biofuels is directly proportional to the share of certified feedstock in total feedstock that has been processed.</p>
18. What is the first point in the supply chain to which the information should be traced back for: <ul style="list-style-type: none"> • <u>Forestry</u>: forest residues • <u>Agriculture</u>: straw from cereals 	<p>Primary forest residues: Forest management Unit (FMU)</p> <p>Primary agricultural residues: Field level: first collection point</p>

E. Monitoring compliance: the governance structure

19. Which (controlling) authority receives the required sustainability and GHG information from the economic operator (see A)?	<p>The National Agency of Petroleum, Gas and Biofuels (ANP) is the controlling authority that oversees the certification process.</p>
20. How does the (controlling) authority register this information? Is there a database?	<p>ANP issues a certificate informing GHG savings per litre of biofuels by biofuel type and by economic operator.</p> <p>The abovementioned information, as well as information of the certification process is disclosed to public in a database hosted in the ANP website.</p>
21. How does the (controlling) authority checks the correctness of the information they receive?	<p>The economic operator must prepare the data and supporting evidence and request for a 3rd part inspection. This is communicated to the ANP.</p> <p>If the inspection firm is satisfied that the economic operator (e.g., the company) has provided sufficient and correct information based on credible evidence, the certification proposal is posted for public comments for a period no shorter than 30 days.</p>

²⁷ i.e. system X (used in the beginning of the supply chain) is accepted by system B (used at the end of the supply chain)

	<p>Once all comments from the public comment period are addressed, the VB prepares its final report and sends it to ANP. Once the company is certified, it will use the “Cbio emission factor” (gCO₂avoided per litre) for the incoming biofuels production.</p> <p>ANP performs a final complete checking before a certification is issued. ANP staff also performs checks during the inspection process.</p> <p>ANP also verifies the quality of services of the inspection firms, including on-site visits during audit.</p>
22. Is this information also publicly available, and if yes, which information?	<p>Yes.</p> <p>All information of the certification process is available to the general public. However, some restrictions are applied for specific information, e.g. Information that is confidential business information. For example, the general public has access to aggregate agricultural inputs and all industrial efficiencies. However, the mill reserves the right to restrict the disaggregated information at farm level.</p>
23. Does the controlling authority (or another governance organization) have the authority to go back in the supply chain, to check the correctness of the information? and if yes, <ul style="list-style-type: none"> • to which point in the value chain? • which information can be checked? 	<p>Yes.</p> <p>ANP can check correctness of all information in any step along the supply chain. Note that most is produced nationally in Brazil.</p>
24. In case information submitted by the economic operator is incomplete and/or incorrect: what are the consequences of non-compliance?	<p>If incorrect information from OE is identified before the certificate is issued (i.e. by the VB), the VB must inform that the certification is in non-compliance and the product is not certified.</p>
E1. Monitoring compliance of certification standards (<i>Only relevant when they can be used to proof compliance</i>)	
25. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the auditors? and if yes, <ul style="list-style-type: none"> • to which point in the value chain? • what is the scope of their monitoring? 	<p>ANP has the obligation to oversee at any part of the production chain the correctness of the process, including the competence of auditors.</p>
26. In case verification by the auditor is considered insufficient, what are the consequences?	<p>RenovaBio recognizes approximately 10 companies to certify plants aiming to issue CBios. The companies are Green Domus, SGS, Instituto Totum, Fundacao Vanzolini, KPMG, Benri, Verifit, Intertek, ABNT, and PricewaterhouseCoopers (PwC) [3].</p> <p>ANP can apply sanctions according to Brazilian law. Sanctions include (but are not limited to) losing recognition.</p>
27. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the certification schemes? If yes, how?	<p>No other certification scheme is recognized by RenovaBio.</p>
28. Does the controlling authority (or another governance organization) have insight if one certification scheme is used throughout the full supply chain, or multiple (in case of cross-compliance)?	<p>No other certification scheme is recognized by RenovaBio.</p>
29. In case verification and monitoring by the certification scheme is considered insufficient, what are the consequences?	<p>No other certification scheme is recognized by RenovaBio.</p>

F. Other (optional)

30. Where do you see most risks in information transfer (completeness, correctness) between economic operators in the supply chain for advanced biofuel supply chains?	<p>Most risk is related to inadequate classification of advanced biofuels, particularly if it does not deliver relevant GHG emissions.</p> <p>It may be a risk to assume that a certain pathway is better than another, whereas the production patterns within the same pathway may be quite different depending on the way it is produced (at facility level, farm level, etc).</p>
31. Where do you see most risks in information transfer and monitoring of the sustainability and GHG emission requirements in advanced biofuel supply chains between countries?	-
32. Where do you see opportunities for improvement to harmonize and strengthen policy frameworks to monitor the sustainability and GHG emission requirements of advanced biofuel supply chains?	There is a great need to align understanding on advanced biofuels classification.

Relevant sources

See also link to footnotes in text:

1. See: <https://www.sugarcane.org/sustainability-the-brazilian-experience/renovabio/>
2. Source: <https://www.gov.br/mme/pt-br/assuntos/secretarias/petroleo-gas-natural-e-biocombustiveis/renovabio-1/renovabio-ingles>
3. USDA (2021), Implementation of RenovaBio - Brazil's National Biofuels Policy, GAIN Agricultural Information Network, February 25,2021

POLICY FRAMEWORK ON (ADVANCED) BIOFUELS: INDIA

Data for filling in this factsheet were mainly obtained from different resources, including best available expert knowledge, publicly available reports, and websites. Relevant literature sources are mentioned at the end of this factsheet. The Factsheets were filled in the period from September 2021-January 2022. The aim of the Factsheets is to present the key characteristics of the policy framework; It does not pretend to be fully complete, nor does it pretend to capture all the details and insights.

A1. General information	
1. Is there a policy on the sustainability of (advanced) biofuels in your country? If yes, which one?	Yes, India's 2018 National Policy on Biofuels: The Goal of the Policy is to enable availability of biofuels in the market thereby increasing its blending percentage. Currently the ethanol blending percentage in petrol is around 2.0% and biodiesel blending percentage in diesel is less than 0.1%. An indicative target of 20% blending of ethanol in petrol and 5% blending of biodiesel in diesel is proposed by 2030. Aviation Biofuels/ Biojets are covered in the National policy on Biofuels.
2. Is there a definition for 'advanced biofuels' under this policy? If yes, which one?	In general: 'Biofuels' are defined as 'fuels produced from <i>renewable resources</i> and used in place of or in blend with, diesel, petrol or other fossil fuels for transport, stationary, portable and other applications'. Renewable sources are defined as 'the biodegradable fraction of products, wastes and residues from agriculture, forestry, tree-based oil other non-edible oils and related industries as well as the biodegradable fraction of industrial and municipal wastes.' 'Advanced biofuels' are defined as Fuels which are: (i) produced from lignocellulosic feedstocks (i.e. agricultural and forestry residues, e.g. rice & wheat straw/corn cobs & stover/bagasse, woody biomass), non-food crops (i.e. grasses, algae), or industrial waste and residue streams, (2) having low CO ₂ emission or high GHG reduction and do not compete with food crops for land use. Fuels such as Second Generation (2G) Ethanol, Drop-in fuels, algae based 3G biofuels, bio-CNG, bio-methanol, Di Methyl Ether (DME) derived from bio-methanol, biohydrogen, drop in fuels with MSW as the source / feedstock material will qualify as "Advanced Biofuels". Note that the Policy categorises biofuels as "Basic Biofuels" viz. First Generation (1G) bioethanol & biodiesel and "Advanced Biofuels" - Second Generation (2G) ethanol, Municipal Solid Waste (MSW) to drop-in fuels, Third Generation (3G) biofuels, bio-CNG etc. to enable extension of appropriate financial and fiscal incentives under each category.
3. Which feedstock categories fall under the scope of 'advanced biofuels'?	See question 2: Biomass (agricultural and forestry residues, e.g., rice & wheat straw/corn cobs & stover/bagasse, woody biomass), non-food crops (i.e., grasses, algae), industrial waste and residue streams
A2. Requirements on GHG emission reduction and sustainability	
4. What GHG emission reduction and sustainability requirements are included in the policy, and to which feedstock-to-biofuel chains do they apply? List in particular the requirements for: <ul style="list-style-type: none"> • <u>Forest</u>: forest residues to ethanol via gasification • <u>Agriculture</u>: ethanol production from cereal straw 	The energy strategy of country aims to chart the way forward to meet the Government's recent ambitious announcements in the energy domain such as electrification of all census villages by 2019, 24x7 electricity & 175 GW of renewable energy capacity by 2022, reduction in energy emissions intensity by 33%-35% by 2030 and share of non-fossil fuel-based capacity in the electricity mix is aimed at above 40% by 2030. GHG reduction There are no specific GHG reduction requirements for biofuels. There are no market-based policies in India such as Low Carbon Fuel Standard, Carbon tax and Emissions Trading (cap-and-trade) to encourage the production and use of biofuels. Domestic production Biofuel imports are banned but import of feedstock for producing biodiesel is permitted to the extent necessary >> 6.0 IMPORT & EXPORT OF BIOFUELS <ul style="list-style-type: none"> • 6.1 Indigenous production of biofuels would be encouraged by a set of practical and judicious incentives. The Policy emphasizes development of domestic Biofuel

	<p>Industry and Feedstock. Allowing import will adversely affect domestic biofuels and hence import of biofuels will not be allowed.</p> <ul style="list-style-type: none"> • 6.2 The policy encourages augmenting indigenous feedstock supplies for biofuel production utilizing the wastelands for feedstock generation. However, depending upon availability of domestic feedstock and blending requirement, import of feedstock for production of bio diesel would be permitted to the extent necessary. Feedstock import requirements will be decided by the National Biofuel Coordination Committee proposed under this Policy. • 6.3 As the domestic biofuels availability is much lower than the Country's requirement, export of biofuels will not be allowed. <p>Waste, residues and production on degraded lands or wastelands</p> <p>Renewable sources are defined as 'the biodegradable fraction of products, wastes and residues from agriculture, forestry, tree-based oil other non-edible oils and related industries as well as the biodegradable fraction of industrial and municipal wastes.</p> <p>The Indian approach to biofuels is based solely on non-food feedstocks to be raised on degraded or wastelands that are not suited to agriculture, thus avoiding a possible conflict of fuel vs. food security. Farmers have been encouraged to grow a variety of different biomass crops including oilseeds on their marginal lands as inter-crops, and as a second crop wherever only one crop is historically cultivated under rain-fed conditions.</p> <p>5.3: The policy will also allow production of ethanol from damaged food grains like wheat, broken rice etc. which are unfit for human consumption.</p>
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B. Proofing compliance: Information required

5. Who is the obligated party to report and proof compliance of the sustainability and GHG emission of (advanced) biofuels and at what interval?	<p>National Biofuel Coordination Committee (NBCC) headed by the Minister, Petroleum and Natural Gas and representatives of concerned Ministries would be the Members of this Committee. Given the role of different agencies and ministries in the biofuel program, the role of NBCC is to provide high level coordination, policy guidance and review on different aspects of biofuel development, promotion and utilization.</p> <p>The Committee would meet periodically to provide overall coordination, effective end-to-end implementation and monitoring of Biofuel programmes</p> <p>This Committee has NOT a responsibility on monitoring compliance of the sustainability of biofuels</p> <p>A Role of States: 7.3 State Governments would also be required to decide on land use for plantation of non-edible oilseed bearing plants or other feedstocks of biofuels and on allotment of Government wasteland, degraded land for raising such plantations. Creation of necessary infrastructure would also have to be facilitated to support biofuel projects across the entire value chain.</p>
6. What information is required/ needs to be reported about sustainability and GHG emission (reduction) by the obligated party?	There is no reporting mechanism
7. What information is required about origin?	NA
8. What criteria are used to categorize and define feedstock?	<p>5.2 Feedstock availability and its development:</p> <p>Potential domestic raw materials for production of biofuels in the Country are,</p> <ul style="list-style-type: none"> • For Ethanol Production: B-Molasses, Sugarcane juice, biomass in form of grasses, agriculture residues (Rice straw, cotton stalk, corn cobs, saw dust, bagasse etc.) , sugar containing materials like sugar beet, sweet sorghum, etc. and starch containing materials such as corn, cassava, rotten potatoes etc., Damaged food grains like wheat, broken rice etc. which are unfit for human consumption, Food grains during surplus

	<p>phase. Algal feedstock and cultivation of sea weeds can also be a potential feedstock for ethanol production</p> <ul style="list-style-type: none"> • For Biodiesel Production: Non- edible Oilseeds, Used Cooking Oil (UCO), Animal tallow, Acid Oil, Algal feedstock etc. <p>For Advanced Biofuels” Biomass, MSW, Industrial waste, Plastic waste etc.</p>
9. What information needs to be reported about the type of feedstock used?	NA

C. Proofing compliance: Verification methods required/ allowed

10. Is it possible to make use of certification systems to proof compliance? If yes, which schemes are recognized (so far)?	The biofuels policy does not make use of sustainability standards and/or certification schemes.
11. Is it possible to use a national standard to proof compliance?	NA

C1. The approval and monitoring procedures for certification standards *(Only relevant when they can be used to proof compliance)*

12. Which authority decides which certification systems and/or national standards can be used?	<p>The biofuels policy does not make use of sustainability standards and/or certification schemes.</p> <p>Development of test methods, procedures and protocols will be priorities along with introduction of standards and certification for different biofuels and end use applications. The Bureau of Indian Standards (BIS) has already evolved standards for bioethanol, and biodiesel for standalone and blended form applications. Development of specifications for higher blending levels are underway. It further says that opportunities will be explored to generate carbon credits for the savings on CO2 emissions on the account of biofuel feedstock generation and use of biofuels, in pure or blended form.</p>
13. Which criteria are used to approve a certification system and/or national standard?	NA
14. Are there minimum requirements around 3rd party auditing, intervals of verification or accreditation? And if yes, which ones?	NA
15. Is cross-compliance possible? And if yes, on which conditions?	NA

D. Traceability and transfer of information

16. Which chain of custody systems (e.g., mass balance, book and claim) are allowed to link information to the biomass feedstock?	<p>RUCO: Registry of Points of Origin in India</p> <p>There is an example of a registry in India where the Points of Origin need to be registered. This check of verification does not mean an additional certification (as it is verification). As part of its EEE (Education, Enforcement and Ecosystem) strategy to divert UCO from the food value chain and curb current illegal practices, the Food Safety and Standards Authority of India (FSSAI) has launched the 'Repurpose Used Cooking Oil' (RUCO) platform. RUCO is a technology platform that gives 100 percent traceable UCO based biodiesel to oil marketing companies. The RUCO initiative currently rolls in eight states (FSSAI, 2020). Accessibility and completeness of information is herewith improved, especially when also publicly accessible for other actors to use it. This means that auditors and certification schemes can check this information to improve their sampling audits, and other parties, such as local NGO's, to monitor sustainability implementation and progress, and - if needed - inform organisations in consuming countries in case of higher risk.</p>
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17. When mixing of different consignments of biomass is allowed: what are the rules of allocation (e.g., based on energy content, mass)?	NA
18. What is the first point in the supply chain to which the information should be traced back for: <ul style="list-style-type: none"> • <u>Forestry</u>: forest residues • <u>Agriculture</u>: straw from cereals 	NA

E. Monitoring compliance: the governance structure

19. Which (controlling) authority receives the required sustainability and GHG information from the economic operator (see A)?	NA
20. How does the (controlling) authority register this information? Is there a database?	NA
21. How does the (controlling) authority checks the correctness of the information they receive?	NA
22. Is this information also publicly available, and if yes, which information?	NA
23. Does the controlling authority (or another governance organization) have the authority to go back in the supply chain, to check the correctness of the information? and if yes, <ul style="list-style-type: none"> • to which point in the value chain? • which information can be checked? 	NA
24. In case information submitted by the economic operator is incomplete and/or incorrect: what are the consequences of non-compliance?	NA

E1. Monitoring compliance of certification standards *(Only relevant when they can be used to proof compliance)*

25. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the auditors? and if yes, <ul style="list-style-type: none"> • to which point in the value chain? • what is the scope of their monitoring? 	NA
26. In case verification by the auditor is considered insufficient, what are the consequences?	NA
27. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the certification schemes? If yes, how?	NA
28. Does the controlling authority (or another governance organization) have insight if one certification scheme is used throughout the full supply chain, or multiple (in case of cross-compliance)	NA
29. In case verification and monitoring by the certification scheme is considered insufficient, what are the consequences?	NA

F. Other (optional)

30. Where do you see most risks in information transfer (completeness, correctness) between economic operators in the supply chain for advanced biofuel supply chains?	-
31. Where do you see most risks in information transfer and monitoring of the sustainability and GHG emission requirements in advanced biofuel supply chains between countries?	-

32. Where do you see opportunities for improvement to harmonize and strengthen policy frameworks to monitor the sustainability and GHG emission requirements of advanced biofuel supply chains?	
33. Other remarks	-

Relevant sources

Information about the RUCO points of origin: Available at: https://fssai.gov.in/ruco/file/ruco_booklet.pdf

CALIFORNIA LOW CARBON FUEL STANDARD - CLCFS

Data for filling in this factsheet were mainly obtained from different resources, including best available expert knowledge, publicly available reports, and websites. Relevant literature sources are mentioned at the end of this factsheet. The Factsheets were filled in the period from September 2021-January 2022. The aim of the Factsheets is to present the key characteristics of the policy framework; It does not pretend to be fully complete, nor does it pretend to capture all the details and insights.

A1. General information	
1. Is there a policy on the sustainability of (advanced) biofuels in your country? If yes, which one?	<p>Yes</p> <p>The main goal of the California Low Carbon Fuel Standard (CLCFS) is to decarbonize the transportation sector by at least 10% by 2020 (from a 2010 baseline) by using low-carbon alternative fuels such as ethanol, biojet and biodiesel as well as cleaner burning fossil fuels such as CNG and LNG [1]</p> <p>LCFS is part of a portfolio of GHG policies > California's LCFS works with three other programs to reduce transportation GHG emissions (i.e., its Cap-and-Trade Program, Advanced Clean Car Program, and SB 375 legislation) [1]</p> <p>The LCFS is designed to reduce GHG emissions in the transportation sector. <u>Goal:</u> Reduce carbon intensity (CI) of transportation fuel pool by at least 20% by 2030 [2]</p> <p>Carbon savings are expected to come from increasing the use of alternative fuels, including biofuels, compressed natural gas (CNG), hydrogen, and electricity, which all have lower carbon intensities than gasoline and diesel, in the California fuel mix. The CLCFS covers both renewable and non-renewable fuels in California and relies on life cycle analysis to estimate the carbon intensity of transportation fuels [4].</p>
2. Is there a definition for 'advanced biofuels' under this policy? If yes, which one?	<p>The types of transportation fuels to which the LCFS applies include (§ 95482) include amongst others [3]:</p> <ul style="list-style-type: none"> • (4) Bio-CNG, bio-LNG, or bio-L-CNG. • (7) A fuel blend containing greater than 10 percent ethanol by volume. • (8) A fuel blend containing biomass-based diesel. • (11) Alternative Jet Fuel <p>(b) Opt-In Fuels. ...[... A fuel provider for an alternative fuel listed below may generate LCFS credits for that fuel only by electing to opt into the LCFS as an opt-in fuel ...](2) Bio-CNG; (3) Bio-LNG; (4) Bio-L-CNG; (5) Alternative Jet Fuel;</p> <p>CARB has also added additional crediting mechanisms, i.e., new ways to generate credits, one of these being by using alternative (lower CI) jet fuel.</p> <p>The LCFS regulation has some exemptions and does for example not apply to an alternative fuel that is not a biomass-based fuel or is supplied in California with an aggregated quantity of less than 420 million MJ/year [2]</p> <p><u>There is no definition for advanced biofuels</u></p>
3. Which feedstock categories fall under the scope of 'advanced biofuels'?	<p>On US level, there is a definition for advanced biofuels under the Renewable Fuels Standard (RFS): Advanced biofuel is: renewable fuel, other than corn starch ethanol, with lifecycle greenhouse gas emissions of at least 50% less than lifecycle greenhouse gas emissions from its gasoline or diesel counterpart [5].</p> <p><u>Within the California LCFS, There is no specific definition for advanced biofuels</u></p> <p><u>Pathways Utilizing a Specified Source Feedstock</u> [3]. In order to be eligible for a reduced CI that reflects the lower emissions or credit associated with the use of a waste, residue, by-product or similar material as feedstock in a fuel pathway, fuel pathway applicants must meet the following requirements.</p> <p>(A) Specified source feedstocks include:</p> <p><i>Used cooking oil, animal fats, fish oil, yellow grease, distiller's corn oil, distiller's sorghum oil, brown grease, and other fats/oils/greases that are the non-primary products of commercial or industrial processes for food, fuel or other consumer products, which are used as feedstocks in pathways for biodiesel, renewable diesel, alternative jet fuel, and co-processed refinery products;</i></p> <p>2. Biomethane supplied using book-and-claim accounting ... and is claimed as feedstock in pathways for bio-CNG, bio-LNG, bio-L-CNG, and hydrogen via steam methane reformation;</p>

3. Any feedstock whose supplier applies for separate CARB recognition using site-specific CI data; and
4. Other feedstocks designated as specified source at the time of pathway review and prior to certification.

A2. Requirements on GHG emission reduction and sustainability

4. What GHG emission reduction and sustainability requirements are included in the policy, and to which feedstock-to-biofuel chains do they apply? List in particular the requirements for:

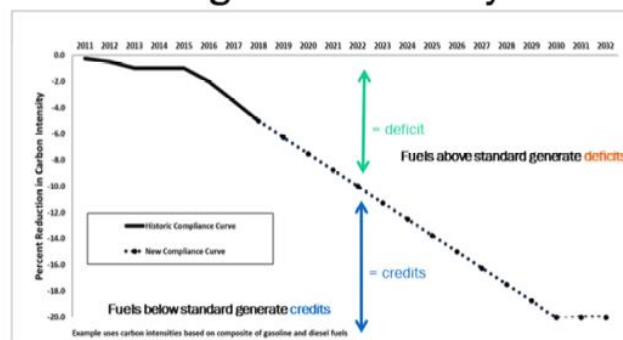
- Forest: forest residues to ethanol via gasification
- Agriculture: ethanol production from cereal straw

The LCFS sets **annual carbon intensity (CI) standards**, or benchmarks, which reduce over time, for gasoline, diesel, and the fuels that replace them. Carbon intensity is expressed in grams of carbon dioxide equivalent per megajoule of energy provided by that fuel. CI takes into account the GHG emissions associated with all of the steps of producing, transporting, and consuming a fuel—also known as a complete life cycle of that fuel. The LCFS lets the market determine which mix of fuels will be used to reach the program targets [2]

Fuels and fuel blendstocks introduced into the California fuel system that have a CI higher than the benchmark generate deficits. Similarly, fuels and fuel blendstocks with CIs below the benchmark generate credits. Annual compliance is achieved when a regulated party uses credits to match its deficits. [2]

Credits and deficits are calculated using the carbon intensity benchmarks for gasoline and diesel fuel in each calendar year. Since conventional jet fuel is not subject to the LCFS regulation and does not generate deficits, these carbon intensity benchmarks are used specifically to calculate credits from alternative jet fuel [2]

Declining Carbon Intensity Curve



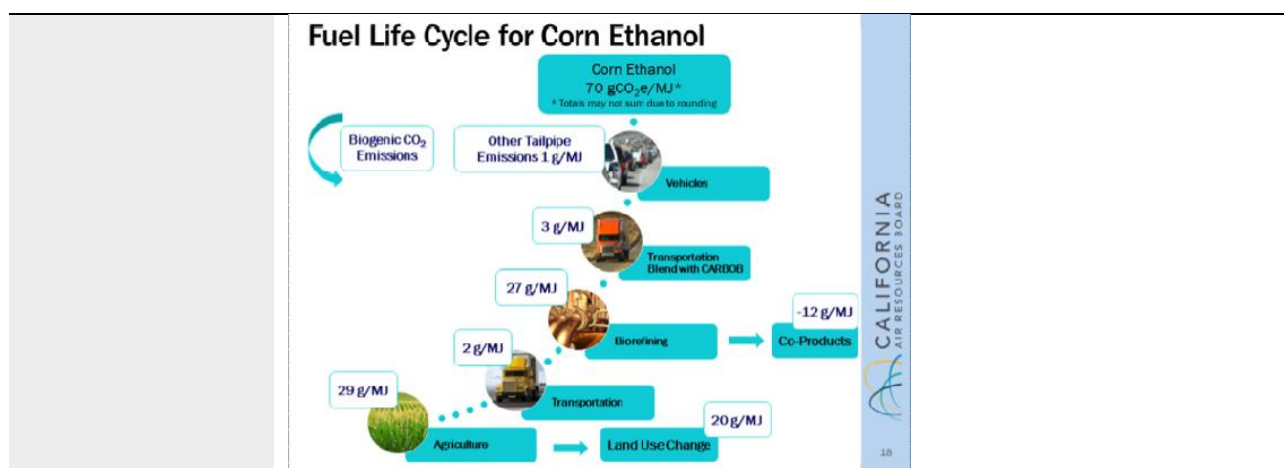
Program continues with a 20% CI target post 2030

There are three ways to generate credits in the LCFS: fuel pathways, projects, and capacity- based crediting [2]

- Under fuel pathway-based crediting, all transportation fuels need a carbon intensity score to participate in the LCFS, and the fuel type dictates which process is used to determine that CI;
- Under project-based crediting, projects include actions to reduce GHG emissions in the petroleum supply chain, and also CCS using Direct Air Capture.
- Finally, the 2018 amendments added a new crediting mechanism to the LCFS which is designed to support the deployment of zero emission vehicle infrastructure

Life cycle analysis [2]

- The CI includes the **“direct” effects of producing and using the fuel, as well as “indirect” effects that are primarily associated with crop-based biofuels.**
- Two models are used to calculate the direct effects, which are the California GHGs, Regulated Emissions, and Energy Use in Transportation (CA-GREET) and Oil Production Greenhouse gas Emissions Estimator (OPGEE) models.
- To calculate the indirect effects, the Global Trade Analysis Project (GTAP) model was updated, and the Agro-Ecological Zone Emissions Factor (AEZ-EF) model was created to supplement GTAP’s estimates of GHG emissions from various types of land conversions.
- Contributing substantially to the impacts associated with corn (and other crops) used to produce biofuels is the phenomenon called **land use change, or LUC**. The estimated amount of land conversion and associated GHG emissions are determined using the GTAP and AEZ-EF models and are added to the CI of corn ethanol. All crop-based feedstocks have LUC values. See the example



B. Proofing compliance: Information required

5. Who is the obligated party to report and proof compliance of the sustainability and GHG emission of (advanced) biofuels and at what interval?

§ 95483: **Fuel reporting entities:** The first fuel reporting entity is responsible for initiating reporting within the LRT-CBTS for a given amount of fuel and, by default, also holds the status as initial credit or deficit generator for the reported fuel quantity [3].

Entity requirements and responsibilities are defined by the role each entity plays. An entity may have multiple roles in the LCFS, such as an alternative liquid fuel producer may be a Fuel Pathway applicant, but because this entity also reports and generates credits, they are a fuel reporting entity as well [2].

All fuel pathway applicants become fuel pathway holders once their CI is certified; they must annually demonstrate that the pathway remains valid [2].

6. What information is required/ needs to be reported about sustainability and GHG emission (reduction) by the obligated party?

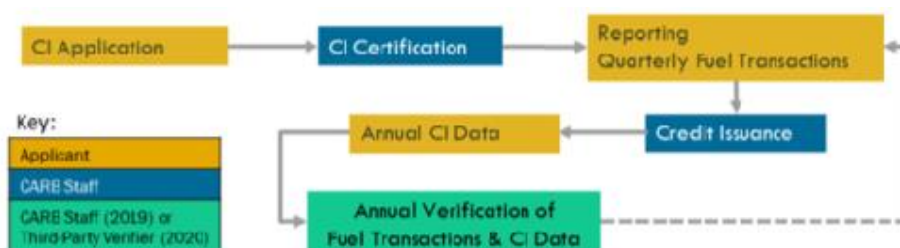
Under fuel pathway-based crediting, Providers of low carbon fuels used in California transportation generate credits by obtaining a certified CI and reporting transaction quantities on a quarterly basis [2]

A regulated entity's annual compliance obligation is met when the regulated entity demonstrates via its annual report that it possessed and has retired a number of credits from its credit account that is equal to its compliance obligation [2].

All transportation fuels need a carbon intensity score to participate in the LCFS, and the fuel type dictates which process is used to determine that CI [2].

- Lookup Table pathways have CI scores that are predetermined by CARB using industry-wide average inputs, or conservative assumptions.
- The Tier 1 pathway application process is for the most common low carbon fuels, and applicants use a Simplified CI Calculator to determine their site-specific fuel production and transport emissions. Under Tier 1, most emissions from feedstock production are based on standard inputs, but the calculators have some flexibility to accommodate user-defined process energy inputs.
- The Tier 2 application process is designed for innovative, next-generation pathways, which may use unique feedstocks. Tier 2 fuels include Alternative jet fuel, and any other pathway that is not eligible to use the Lookup Table or Tier 1 process.

The diagram shows the basic process for credit generation.



The LCFS Regulation also includes requirements for data accuracy and meter calibration § 95488.8. Fuel Pathway Application Requirements Applying to All Classifications.

	<p>(a) Requirements for Attestation Letter. Each fuel pathway application must include a fuel pathway applicant attestation letter. The attestation letter must attest to the veracity of the information in the application packet ...[...]... <u>The fuel pathway applicant attestation letter must make the following specific attestations [3]:</u></p> <p>(1) No products, co-products, by-products, or wastes undergo additional processing, such as drying, distillation, or clean-up, once they leave the production facility, except as explicitly included in the pathway life cycle analysis and pathway CI.</p> <p>(2) All data and information supplied is true and accurate in all areas, including, but not limited to the following:</p> <p>(A) Feedstocks used to produce the fuel</p> <p>(B) Fuel and feedstock production technology</p> <p>(C) Regions in which feedstocks and finished fuel are produced</p> <p>(D) Modes used to transport feedstocks and finished fuel and the transport distances involved</p> <p>(E) Types and amounts of thermal and electrical energy consumed in both feedstock and finished fuel production</p> <p>(F) Full life cycle carbon intensity, which must be no higher than the carbon intensity specified in the Lookup Table, or Tier 1 or Tier 2 application; and</p> <p>Fuel production operations.</p>
7. What information is required about origin?	<p>Depending on pathway - on aggregated level or on more detailed level</p> <p><u>§ 95488.5. Lookup Table Fuel Pathway Application Requirements and Certification Process.</u></p> <p>(a) Applicability. A fuel reporting entity may use a Lookup Table pathway if the Lookup Table (Table 7-1 in section 95488.5(e)) contains a fuel pathway that closely corresponds to the actual physical fuel production pathways used to produce the fuel in question [3]</p> <ul style="list-style-type: none"> - Feedstocks used to produce the fuel - Fuel and feedstock production technology - Regions in which feedstocks and finished fuel are produce. - The modes used to transport feedstocks and finished fuel and the transport distances involved - The types and amounts of thermal and electrical energy consumed in both feedstock and finished fuel production. <p>The CI of the fuel pathway applicant's product must be lower than or equal to the Lookup Table pathway CI.</p>
8. What criteria are used to categorize and define feedstock?	
9. What information needs to be reported about the type of feedstock used?	

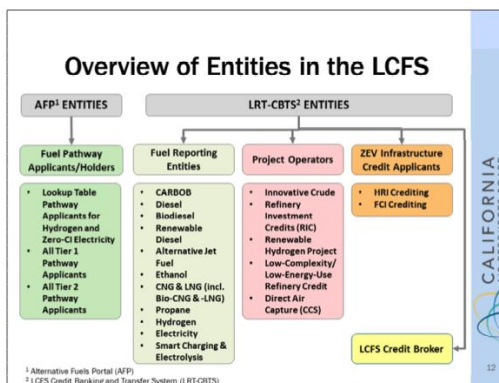
C. Proofing compliance: Verification methods required/ allowed

10. Is it possible to make use of certification systems to proof compliance? If yes, which schemes are recognized (so far)?	<p><u>No, there is a third-party verification</u></p> <p>Credits are calculated relative to the annual CI benchmark and undergo verification post credit generation [2]</p> <p>A system for third-party verification is needed to ensure accuracy of reported greenhouse gas data [2]</p> <p>The verification program is based on ISO 14064-3 and 14065. It also provides a systematic, independent, and documented process for evaluation of reported data against the LCFS regulatory requirements and methods for calculation. <u>Entities required to contract for LCFS verification</u> are amongst others alternative liquid fuel producers ad importers and all fuel pathway holders with site-specific CI data [2]</p>
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11. Is it possible to use a national standard to proof compliance?	NA There is a verification program [2]
C1. The approval and monitoring procedures for certification standards (<i>Only relevant when they can be used to proof compliance</i>)	
12. Which authority decides which certification systems and/or national standards can be used?	N.A. The California Air Resources Board (CARB) is the responsible organization in California to implement and monitor LCFS [2]
13. Which criteria are used to approve a certification system and/or national standard?	<u>For the verification program (NOT certification!):</u> The verification program is based on ISO 14064-3 and 14065 [2]
14. Are there minimum requirements around 3rd party auditing, intervals of verification or accreditation, And if yes, which ones?	<u>For the verification program (NOT certification!):</u> Beginning in 2019, verifiers will apply for CARB accreditation and take required training and exam(s). CARB will publish on the LCFS website the list of verification bodies and verifiers accredited to perform LCFS verification services [2] <u>(d) Verification Outcomes.</u> Each entity responsible for obtaining a validation or verification statement under this subarticle must obtain third-party verification services from a verification body that meets the <u>requirements specified in section 95502</u> [3]. <u>§ 95501. Requirements for Validation and Verification Services.</u> Validation and verification services must be performed by verification bodies accredited by the Executive Officer; in addition, such services must meet the following requirements - includes e.g., sampling plan... [3] <u>§ 95502. Accreditation Requirements for Verification Bodies, Lead Verifiers, and Verifiers.</u> Verification bodies, lead verifiers, and non-lead verifiers that will provide verification services (including validation services) under this subarticle must become accredited through fulfilling the accreditation requirements set forth in..... [3] <u>§ 95503. Conflict of Interest Requirements for Verification Bodies and Verifiers</u>
15. Is cross-compliance possible? And if yes, on which conditions?	NA
D. Traceability and transfer of information	
16. Which chain of custody systems (e.g., mass balance, book and claim) are allowed to link information to the biomass feedstock?	Mass balance is only allowed when specifications and physical characteristics of batches are the same. <u>Pathways Utilizing a Specified Source Feedstock</u> [3]. In order to be eligible for a reduced CI that reflects the lower emissions or credit associated with the use of a waste, residue, by-product or similar material as feedstock in a fuel pathway, fuel pathway applicants must meet the following requirements...[....] (B) Chain-of-custody Evidence. Fuel pathway applicants using specified source feedstocks must maintain either (1) delivery records that show shipments of feedstock type and quantity directly from the point of origin to the fuel production facility, or (2) <u>information from material balance or energy balance systems that control and record the assignment of input characteristics to output quantities at relevant points along the feedstock supply chain between the point of origin and the fuel production facility.</u> Chain- of-custody evidence is used to demonstrate proper characterization and accurate quantity. <u>Chain-of-custody evidence must be provided to the verifier and to CARB upon request.</u> Joint Applicants may assume responsibility for different portions of the chain-of-custody evidence, but each such entity must meet the following requirements to be eligible for a pathway that utilizes a specified source feedstock:

	<p>1. Maintain records of the type and quantity of feedstock obtained from each supplier...[...];</p> <p>2. Maintain records used for material balance and energy balance calculations.</p> <p>3. Ensure CARB staff and verifier access to audit feedstock suppliers to demonstrate proper accounting of attributes and conformance with certified CI data.</p> <p>(C) Feedstock Transfer Documents.</p>
17. When mixing of different consignments of biomass is allowed: what are the rules of allocation (e.g., based on energy content, mass)?	Requirements on adjustment and mixing of consignments with different energy content
18. What is the first point in the supply chain to which the information should be traced back for: <ul style="list-style-type: none"> • <u>Forestry</u>: forest residues • <u>Agriculture</u>: straw from cereals 	Typically verified at point of collection with use of professional judgement and risk assessment to select some CoC records to trace to PoO.

E. Monitoring compliance: the governance structure

19. Which (controlling) authority receives the required sustainability and GHG information from the economic operator (see A)?	California Air Resources Board (CARB)
20. How does the (controlling) authority register this information? Is there a database?	<p>The <u>Alternative Fuels Portal (AFP)</u> and the <u>LCFS Credit Banking and Transfer System (LRT-CBTS)</u> are two of the modules that make up the <u>LCFS database management system</u>. The management system also includes a Verification module, which provides access to participant data for LCFS-accredited Verification Bodies [2].</p> <p>§ 95483.2. LCFS Data Management System: (a) Alternative Fuel Portal (AFP) supports fuel pathway applications, certifications, and verifications. It also handles the registration of fuel production facilities and opt-in projects [3].</p> <p>The <u>AFP</u> facilitates the application process to obtain a certified CI score. Applicants for Tier 1 and Tier 2 pathways, which rely on site-specific data, use this portal to submit their CI calculator and supplemental information [2].</p>  <p>The diagram, titled 'Overview of Entities in the LCFS', shows the structure of the system. It is divided into two main categories: 'AFP¹ ENTITIES' and 'LRT-CBTS² ENTITIES'. Under 'AFP ENTITIES', there is a box for 'Fuel Pathway Applicants/Holders' which includes 'Lookup Table Pathway Applicants for Hydrogen and Zero-CI Electricity', 'All Tier 1 Pathway Applicants', and 'All Tier 2 Pathway Applicants'. Under 'LRT-CBTS ENTITIES', there are three boxes: 'Fuel Reporting Entities' (including CARBOB, Diesel, Biodiesel, Renewable Diesel, Alternative Jet Fuel, Ethanol, CNG & LNG (incl. Bio-CNG & -LNG), Propane, Hydrogen, Electricity, and Smart Charging & Electrolysis); 'Project Operators' (including Innovative Crude, Refinery Investment Credits (RIC), Renewable Hydrogen Project, Low-Complexity/Low-Energy-Use Refinery Credit, and Direct Air Capture (CCS)); and 'ZEV Infrastructure Credit Applicants' (including HRI Crediting and FCI Crediting). A 'LCFS Credit Broker' box is shown at the bottom right, connected to the 'Project Operators' and 'ZEV Infrastructure Credit Applicants' boxes. A vertical bar on the right side of the diagram is labeled 'CALIFORNIA AIR RESOURCES BOARD'. Footnotes at the bottom indicate: ¹ Alternative Fuels Portal (AFP) and ² LCFS Credit Banking and Transfer System (LRT-CBTS).</p>
21. How does the (controlling) authority checks the correctness of the information they receive?	<p><u>§ 95491.1. Recordkeeping and Auditing.</u></p> <p>....(2) Record Retention for Fuel Pathway Holders and Applicants. Fuel pathway holders and applicants must maintain all records relied upon in producing fuel pathway applications and annual Fuel Pathway Reports. The retained documents, including CI input source data and supplemental documentation, must be sufficient to allow for verification of each CI calculation [3]</p> <p><u>§ 95492. Enforcement Protocols.</u></p>

	<p>... the Executive Officer may enter into an enforceable written protocol with any person to identify conditions under which the person may lawfully meet the recordkeeping, reporting, or demonstration of requirements under this subarticle. The Executive Officer may only enter into such a protocol if he or she reasonably determines that the provisions in the protocol are necessary [3]</p> <p>Also on-site visits</p>
22. Is this information also publicly available, and if yes, which information?	<p>The <u>LCFS Data Dashboard web page</u> is created to display the current and historical LCFS program data. Some of the information found in the Data Dashboard are the following [2]:</p> <ul style="list-style-type: none"> • Volume of fuels and credits generated under the LCFS • Compliance curve and the percent reduction in carbon intensity to date • Credit volumes transacted and the average credit prices per month under the LCFS. <p>see http://www.arb.ca.gov/fuels/lcfs/dashboard/dashboard.htm</p>
23. Does the controlling authority (or another governance organization) have the authority to go back in the supply chain, to check the correctness of the information? and if yes, <ul style="list-style-type: none"> • to which point in the value chain? • which information can be checked? 	<p>If needed for further investigation, CARBO can do (risk-based) checks back to the point of origin.</p> <p><u>§ 95493. Jurisdiction.</u></p> <p>(a) The following persons are subject to the jurisdiction of the State of California, including the administrative authority of CARB and the jurisdiction of the Superior Courts of the State of California, irrespective of whether the person has registered as a fuel reporting entity in the LRT-CBTS: (1) any person who, pursuant to section 95483 or 95483.1, is the <u>fuel reporting entity</u>; (2) <u>any person to whom the obligation to generate credits or deficits has been transferred directly or indirectly (including the reporting party)</u>; (3) <u>any verifier</u>; (4) <u>any project operator</u>; and (5) <u>any fuel pathway or project applicant</u>.</p> <p>(b) Any of the following actions shall conclusively establish a person's consent to be subject to the jurisdiction of the State of California, including the administrative authority of CARB and the jurisdiction of the Superior Courts of the State of California:...[...].... [3]</p>
24. In case information submitted by the economic operator is incomplete and/or incorrect: what are the consequences of non-compliance?	<p><u>§ 95494. Violations.</u></p> <p>(a) CARB may seek penalties and injunctive relief for any violation of this subarticle pursuant to Health and Safety Code section 38580 and Chapter 1.5 of Part 5 of Division 26 [3]</p> <p><u>§ 95495. Authority to Suspend, Revoke, Modify, or Invalidate.</u></p> <p>(a) If the Executive Officer determines that any basis for invalidation set forth in subsection (b)(1) below occurred, in addition to taking any enforcement action, he or she may: suspend, restrict, modify, or revoke an LRT-CBTS account; modify or delete a Certified CI; restrict, suspend, or invalidate credits; or recalculate the deficits in an LRT-CBTS account [3].</p>
E1. Monitoring compliance of certification standard <i>(Only relevant when they can be used to proof compliance)</i>	
25. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the auditors? and if yes, <ul style="list-style-type: none"> • to which point in the value chain? • what is the scope of their monitoring? 	<p><u>In this case the competency of the verifiers</u></p> <p><u>§ 95491.1. Recordkeeping and Auditing.</u></p> <p>(3) Record Retention for Verification Bodies. The verification body providing verification services pursuant to this sub article must retain the following [3]:</p> <p>(A) The sampling plan ... for a period of no less than ten years following the submission of each validation or verification statement. <u>The sampling plan must be made available to the Executive Officer upon request.</u></p> <p>(B) All material received, reviewed, or generated to render a validation or verification statement for an entity required to validate and verify under LCFS. The documentation must allow for a transparent review of how a verification reached its conclusion in the validation or verification statement, including independent review.</p> <p><u>Accreditation</u></p> <p>Only verifiers accredited by CARB can provide verification services for entities subject to the LCFS regulation. Accredited verifiers and verification bodies are issued an Executive Order recognizing accreditation by CARB for a period of</p>

	three years, after which both verifiers and verification bodies must apply to be reaccredited [6].
26. In case verification by the auditor is considered insufficient, what are the consequences?	<u>In this case the competency of the verifiers</u> Accreditation can be lost
27. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the certification schemes? If yes, how?	NA CARB does monitor the performance of the verification scheme
28. Does the controlling authority (or another governance organization) have insight if one certification scheme is used throughout the full supply chain, or multiple (in case of cross-compliance)	NA
29. In case verification and monitoring by the certification scheme is considered insufficient, what are the consequences?	NA

F. Other (optional)

30. Where do you see most risks in information transfer (completeness, correctness) between economic operators in the supply chain for advanced biofuel supply chains?	-
31. Where do you see most risks in information transfer and monitoring of the sustainability and GHG emission requirements in advanced biofuel supply chains between countries?	-
32. Where do you see opportunities for improvement to harmonize and strengthen policy frameworks to monitor the sustainability and GHG emission requirements of advanced biofuel supply chains?	-
33. Other remarks	-

Relevant sources

1. IEA Bioenergy report (2021), Implementation Agendas: 2020-2021 Update Compare and Contrast Transport Biofuels Policies
2. LCFS Basics, see: <https://ww2.arb.ca.gov/sites/default/files/2020-09/basics-notes.pdf>
3. Unofficial electronic version of the Low Carbon Fuel Standard Regulation
https://ww2.arb.ca.gov/sites/default/files/2020-07/2020_lcfs_fro_oal-approved_unofficial_06302020.pdf
4. <https://www.transportpolicy.net/standard/california-fuels-low-carbon-fuel-standard/>
5. The Renewable Fuel Standard (RFS): An Overview, Updated January 31, 2022. See: <https://sgp.fas.org/crs/misc/R43325.pdf>
6. <https://ww2.arb.ca.gov/resources/fact-sheets/accreditation-requirements-third-party-verifiers-californias-low-carbon-fuel>

NETHERLANDS - POLICY ON ENERGY FOR TRANSPORT (BIOFUELS)

Data for filling in this factsheet were mainly obtained from different resources, including best available expert knowledge, publicly available reports, and websites. Relevant literature sources are mentioned at the end of this factsheet. The Factsheets were filled in the period from September 2021-January 2022. The aim of the Factsheets is to present the key characteristics of the policy framework; It does not pretend to be fully complete, nor does it pretend to capture all the details and insights.

A1. General information	
1. Is there a policy on the sustainability of (advanced) biofuels in your country? If yes, which one?	Policy on 'energy for transport' (<i>regelgeving energie vervoer</i>), introducing the system of annual obligation and reduction obligation in which a tradable unit (HBE) plays an essential role for compliance Objective: The share of renewable energy within the final consumption of energy in the transport sector: 28% by 2030 ²⁸
2. Is there a definition for 'advanced biofuels' under this policy? If yes, which one?	Biofuels produced from RED Annex IXa feedstocks
3. Which feedstock categories fall under the scope of 'advanced biofuels'?	Annex IXa (RED). For the broad sub d of this annex, a national list of underlying feedstocks is laid down in Annex 5 of the regulation energy transport (<i>regeling energie vervoer</i>): wetten.nl - Regeling - Regeling energie vervoer - BWBR0041050 (overheid.nl) , being: <ul style="list-style-type: none"> Waste/residues from processing of alcohol Wastewater from slaughterhouses Renewable component of end-of-life tyres Cashew Nut Shell Liquid (CNSL) Spent bleaching earth Bio-waste from trade, services and companies Starch slurry (low grade) Brown grease/grease trap fat Sugar beet residues Food and feed products unfit for human and animal consumption, i.e. food waste and feed waste Added in 2022 regulation: <ul style="list-style-type: none"> Ethanol used in the cleaning/extraction of blood plasma Residue of FAME end distillation
A2. Requirements on GHG emission reduction and sustainability	
4. What GHG emission reduction and sustainability requirements are included in the policy, and to which feedstock-to-biofuel chains do they apply? List in particular the requirements for: <ul style="list-style-type: none"> <u>Forest</u>: forest residues to ethanol via gasification <u>Agriculture</u>: ethanol production from cereal straw 	General RED requirements, i.e., certification under one of the EU recognized voluntary schemes. No additional requirements.
B. Proofing compliance: Information required	
5. Who is the obligated party to report and proof compliance of	The end fuel supplier is the obligated party. This is the company doing the end delivery to transport. The end fuel supplier must be certified under a recognized voluntary scheme and deliver its biofuel/blend from a certified location for which he

²⁸ See: [Staatsblad 2021, 619](https://staatsblad.2021.619) | [Overheid.nl](https://overheid.nl) > Officiële bekendmakingen (officielebekendmakingen.nl)

the sustainability and GHG emission of (advanced) biofuels and at what interval?	holds/manages the mass balance for sustainability.
6. What information is required/ needs to be reported about sustainability and GHG emission (reduction) by the obligated party?	The information on the proof of sustainability, as issued to NEa by the end fuel supplier. It regards the general RED sustainability characteristics: feedstock, country of origin of the feedstock, energy content, GHG value. Furthermore, the fuel supplier must demonstrate that he is certified and that he manages the mass balance for sustainable biofuels for the locations from which the delivery took place.
7. What information is required about origin?	Country of origin of the feedstock
8. What criteria are used to categorize and define feedstock?	Feedstocks are not all necessarily categorized as waste, residue, co-product or product. Annex IX-a is considered to be advanced. For the national list, filling in sub d of Annex IXa (see Q A1.3), the discussion how to categorize the feedstock is relevant. This is not translated in legal criteria, case by case assessment is required. Whether a feedstock can be considered as a waste depends on several elements: is it produced intentionally or the process optimized to increase its yield, what is its market value compared to the main product, can it be used for other applications (food/feed, oleochemical industry, etc).
9. What information needs to be reported about the type of feedstock used?	Name only. But for new feedstocks more information is needed on the questions under 8, before the feedstock is allowed to be booked. The type of feedstock is currently fully substantiated on the basis of the PoS and the double counting statement. The auditor and verifier ensure correct feedstock labelling; this may also soon be done by the inspectors within national borders. on-modification is in itself checked under the voluntary scheme. Waste cannot be labelled a waste if it were produced on purpose.

C. Proofing compliance: Verification methods required/ allowed

10. Is it possible to make use of certification systems to proof compliance? If yes, which schemes are recognized (so far)?	For sustainability, certification under a recognized voluntary scheme is mandatory. Only the EU recognized schemes can be applied, no national scheme for biofuels apply in the Netherlands.
11. Is it possible to use a national standard to proof compliance?	No. For sustainability, an EU voluntary scheme must be applied

C1. The approval and monitoring procedures for certification standards *(Only relevant when they can be used to proof compliance)*

12. Which authority decides which certification systems and/or national standards can be used?	Refer to answer on C10: The European Commission decides
13. Which criteria are used to approve a certification system and/or national standard?	Refer to answer on C10: RED2
14. Are there minimum requirements around 3rd party auditing, intervals of verification or accreditation? And if yes, which ones?	Refer to answer on C10: RED2
15. Is cross-compliance possible? And if yes, on which conditions?	Refer to answer on C10: RED2

D. Traceability and transfer of information

16. Which chain of custody systems (e.g., mass balance, book and claim) are allowed to link information to the biomass feedstock?	Mass balance for liquid biofuels. Mass balance is strictly limited to biofuels, fossil fuels and fossil components of blends cannot be part of the mass balance and therefore never be accompanied by a proof of sustainability. Guarantees of origin for gaseous biofuels (CNG and from 2022 also intended for methanol and LNG under specific criteria)
17. When mixing of different consignments of biomass is allowed: what are the rules of allocation (e.g., based on energy content, mass)?	No national rules for mixing of biomass. For biofuels, the rules as used by the voluntary schemes apply. It is allowed to allocate sustainability characteristics as allowed by the voluntary schemes. Sustainability characteristics may not be allocated to fossil fuels, as also applied by voluntary schemes.
18. What is the first point in the supply chain to which the information should be traced back for: <ul style="list-style-type: none"> • <u>Forestry</u>: forest residues • <u>Agriculture</u>: straw from cereals 	There are no national additional requirements on this item. The Netherlands follows the approach applied by the voluntary schemes. There are no national additional requirements on this item. The Netherlands follows the approach applied by the voluntary schemes. Note that for receiving national subsidy for advanced biofuels, the use of straw as feedstock is only allowed for bioLNG digestion § 3.4.10. Geavanceerde hernieuwbare brandstof, Artikel 81. https://wetten.overheid.nl/BWBR0045389/2021-10-01 For Forest residues: The first- or second-party auditing may be used up to the first gathering point of the forest biomass (RED2) 'Sourcing area' means the geographically defined area from which the forest biomass feedstock is sourced, from which reliable and independent information is available and where conditions are sufficiently homogeneous to evaluate the risk of the sustainability and legality characteristics of the forest biomass (RED2)

E. Monitoring compliance: the governance structure

19. Which (controlling) authority receives the required sustainability and GHG information from the economic operator (see A)?	NEa, Dutch Emissions Authority
20. How does the (controlling) authority register this information? Is there a database?	A database called the Register Energie voor Vervoer (REV): In this register, the obligated party books its fuel delivery for transport in the Netherlands, referring to the so-called 'proof of sustainability' (PoS), which has information about the: (i) name of the feedstock(s), (ii) country of origin, (iii) GHG emission and (iv) sustainability certificate used at the delivery. The items are entered in the database.
21. How does the (controlling) authority checks the correctness of the information they receive?	The information in the database is compared with the proofs of sustainability and mass balance documentation of the fuel supplier. Whether the delivered fuels contain biofuel with the registered specifications may be checked by more administrative checks (stock and pumping data, invoices etc) and sampling and analysis (e.g., C14) From 2022 onwards, checks will be performed also at companies in the upstream supply chain within the Netherlands.
22. Is this information also publicly available, and if yes, which information?	No Companies that supply fuels for the Dutch transport market have an obligation to deliver an annually increasing share of renewable energy, rising to 16.4% in 2020. These companies also need to reduce the greenhouse gas emissions of their delivered fuels with 6% in 2020. The NEa publishes an annual report on the progress of these two obligations on a national level
23. Does the controlling authority (or another governance organization) have the authority to go back in the	From 2022, further checks within the Dutch borders can be performed, any relevant information; this is a strategy currently in progress. Furthermore, more checks will be performed on the certification bodies,

supply chain, to check the correctness of the information? and if yes, • to which point in the value chain? • which information can be checked?	to be worked out.
24. In case information submitted by the economic operator is incomplete and/or incorrect: what are the consequences of non-compliance?	NEa may delete created HBEs from the companies account, and in addition may also impose further sanctions (fines).
E1. Monitoring compliance of certification standards <i>(Only relevant when they can be used to proof compliance)</i>	
25. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the auditors? and if yes, • to which point in the value chain? • what is the scope of their monitoring?	Currently not for certifying auditors, but auditors doing work on verification under the Dutch legislation (double counting, booking) are under the scope of supervision. Note that the Netherlands has a separate verification protocol for the double counting of biofuels The work performed by certification bodies is under supervision of NEa since 2022 onwards.
26. In case verification by the auditor is considered insufficient, what are the consequences?	Currently for auditors doing verification work any significant findings are passed on to the accreditation body. In case of serious findings, sanctions (fines) may be imposed. Findings regarding the work performed by certification bodies will be passed on to the sustainability schemes in line with RED2 since 2022 onwards.
27. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the certification schemes? If yes, how?	Not yet
28. Does the controlling authority (or another governance organization) have insight if one certification scheme is used throughout the full supply chain, or multiple (in case of cross-compliance)	No
29. In case verification and monitoring by the certification scheme is considered insufficient, what are the consequences?	No actual experience so far, no regulation on what would be done by NEa.
F. Other (optional)	
30. Where do you see most risks in information transfer (completeness, correctness) between economic operators in the supply chain for advanced biofuel supply chains?	Most risks are in incorrect passing on of sustainability information as no link exists between mass balances of economic operators in the supply chain. Advanced biofuels may be created on purpose. Auditors have limited mandate to cross check with information from other 'shackles' in the supply chain. Only in case operators acts at supplier and receiver in the supply chain, auditors are able to do some cross checks. Auditing is also more procedural by nature than focussing on truth finding. The known fraud cases have shown that it's rather easy to commit fraud while being subject to audits. Public supervision offers far more possibilities to (cross) check actual data. Even though this will also never fully prevent fraud of course.
31. Where do you see most risks in information transfer and monitoring of the sustainability and GHG emission requirements in advanced	Countries with less regulation and less monitoring may be vulnerable to incorrect sustainability information which is then passed on further down the supply chain.

biofuel supply chains between countries?	
32. Where do you see opportunities for improvement to harmonize and strengthen policy frameworks to monitor the sustainability and GHG emission requirements of advanced biofuel supply chains?	Harmonized feedstock definitions, database of biofuel characterises and volumes (e.g., based on block chain technology), easy access to data from the supply chain (tracing back the upstream supply chain)

Relevant sources

- Besluit energie Vervoer, <https://wetten.overheid.nl/BWBR0040922/2022-01-01>
- Regeling energie Vervoer, [wetten.nl - Regeling - Regeling energie vervoer - BWBR0041050 \(overheid.nl\)](https://wetten.nl/Regeling-Regeling-energie-vervoer-BWBR0041050-overheid.nl)

ICAO - CORSIA FRAMEWORK

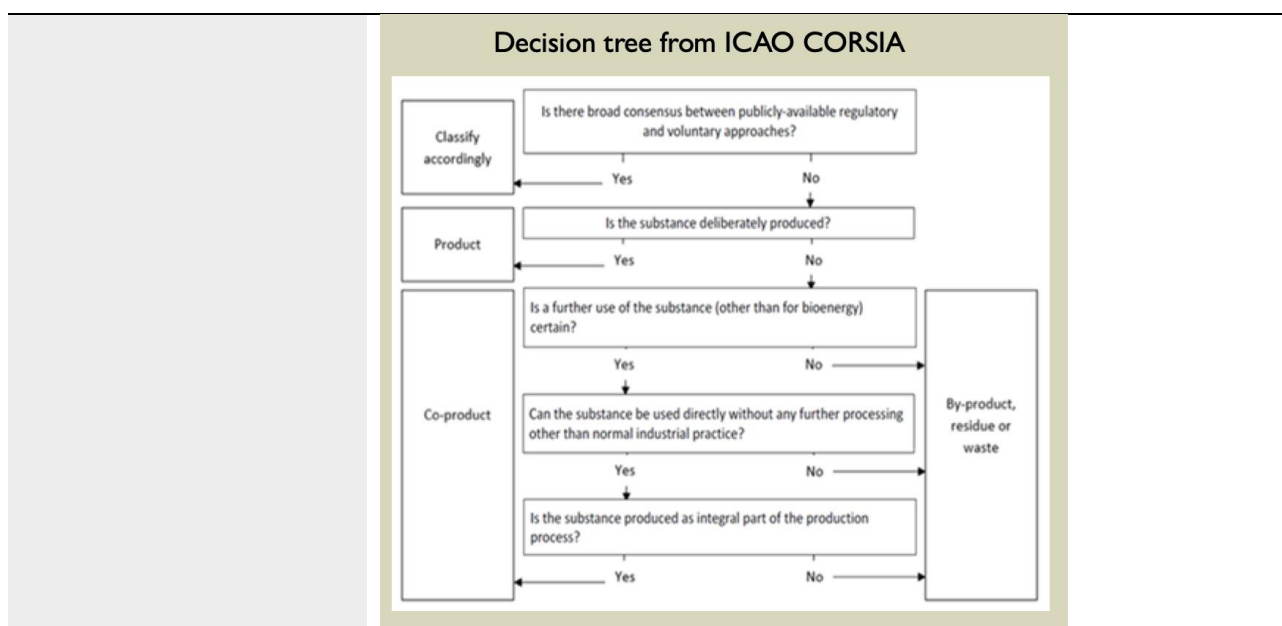
Data for filling in this factsheet were mainly obtained from different resources, including best available expert knowledge, publicly available reports, and websites. Relevant literature sources are mentioned at the end of this factsheet. The Factsheets were filled in the period from September 2021-January 2022. The aim of the Factsheets is to present the key characteristics of the policy framework; It does not pretend to be fully complete, nor does it pretend to capture all the details and insights.

A1. General information	
1. Is there a policy on the sustainability of (advanced) biofuels in your country? If yes, which one?	<p>ICAO has agreed on two aspirational goals for the international aviation sector:</p> <ul style="list-style-type: none"> • 2% annual fuel efficiency improvement through 2050 • Carbon neutral growth from 2020 onwards (CNG 2020) <p>ICAO has identified the following areas that can contribute to the attainment of the global aspirational goals:</p> <ul style="list-style-type: none"> • Aircraft related technology and standards • Improved air traffic management and operational improvements • Development and deployment of sustainable aviation fuel • CORSIA <p>ICAO is also working on a “Long Term Aspirational Goal” that is targeted to be finalized in 2022: https://www.icao.int/environmental-protection/Pages/LTAG.aspx</p> <p>CORSIA is a global market-based measure designed to offset international aviation CO2 emissions to stabilize the levels of such emissions from 2020 onwards (CNG2020).</p> <p>Offsetting of CO2 emissions will be achieved through the acquisition and cancelation of emissions units from the global carbon market by aeroplane operators. CORSIA Eligible Fuels (SAF and LCAF) can be used to reduce this offsetting obligation.</p>
2. Is there a definition for ‘advanced biofuels’ under this policy? If yes, which one?	<p>There are two types of CORSIA Eligible Fuels (CEF) - (i) Sustainable Aviation Fuels (SAF) and (ii) fossil-based Lower Carbon Aviation Fuels (LCAF). SAF is defined as: “CORSIA sustainable aviation fuel. A renewable or waste-derived aviation fuel that meets the CORSIA Sustainability Criteria under this Volume.” (“This Volume” refers to Standards and Recommended Practices (SARP) Annex 16 (Environmental Protection), Vol IV (CORSIA))</p>
3. Which feedstock categories fall under the scope of ‘advanced biofuels’?	<p>Renewable or waste feedstocks (evolving list) - default LCA values (so currently allowable feedstocks) are here.</p> <p>Default values are specified by the fuel conversion process (e.g., alcohol/ ethanol to jet fuel or Fisher-Tropsch) and by the fuel feedstock and region. This includes for example forestry and agricultural residues, UCO, miscanthus, poplar. Also, sugar beet (from EU) or sugar cane (from Brazil) or corn grain (from the US) on this list.</p>
A2. Requirements on GHG emission reduction and sustainability	
4. What GHG emission reduction and sustainability requirements are included in the policy, and to which feedstock-to-biofuel chains do they apply? List in particular the requirements for:	<p>The current sustainability requirements for all CEF for the pilot phase (2021-2023) of CORSIA are here. The current list includes:</p> <ol style="list-style-type: none"> 1) A 10% reduction in GHG emissions compared to petroleum-based jet fuel. 2) Restrictions on conversion (after 1 Jan 2008) or degradation of carbon stock of primary forest, wetlands, peatlands > CORSIA eligible fuel shall not be made from biomass obtained from land converted after 1 January 2008 that was primary forest, wetlands, or peat lands and/or contributes to degradation of the carbon stock in primary forests, wetlands, or peat lands as these lands all have high carbon stocks. 3) In the event of land use conversion after 1 January 2008, as defined based on IPCC land categories, direct land use change (DLUC) emissions shall be calculated. If DLUC greenhouse gas emissions exceed the default induced land use change (ILUC) value, the DLUC value shall replace the default ILUC value (e.g., if there is a conversion between IPCC land use categories after the cut-off date, then DLUC is addressed). <p>A set of expanded sustainability criteria addressing water quality/use, soil, air quality, conservation, wastes and chemicals, and social and economic themes were provisionally approved in November 2021 pending approval of guidance material and would be implemented in the Voluntary Phase (2024-2026) and thereafter. There are no separate requirements for the two pathways listed in the question.</p>

	<p>The system boundary of the core LCA value calculation shall include the full supply chain of CEF production and use. As such, emissions associated with the following life cycle stages of the CEF supply chain must be accounted for: (1) production at source (e.g., feedstock cultivation); (2) conditioning at source (e.g., feedstock harvesting, collection, and recovery); (3) feedstock processing and extraction; (4) feedstock transportation to processing and fuel production facilities; (5) feedstock-to-fuel conversion processes; (6) fuel transportation and distribution to the blend point; and (7) fuel combustion in an aircraft engine.</p>
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B. Proofing compliance: Information required

5. Who is the obligated party to report and proof compliance of the sustainability and GHG emission of (advanced) biofuels and at what interval?	<p>States (countries) are the obligated party reporting CORSIA eligible fuel use to ICAO. The States receive information from the aeroplane operators (airlines) that are assigned to their State. States submit this information to ICAO annually. However, fuels that are purchased in one year do not need to be claimed for emissions reductions in that year - the airlines have up to three years to claim the emissions reductions.</p> <p>(ICAO MEMBER STATES participating IN CORSIA need to ensure that their aeroplane operators comply with the CORSIA offsetting requirements every three years, in addition to annual CO₂ MRV). So far, 192 States agreed to it originally, and the current commitments to be engaged in the pilot phase are posted here:</p> <p>https://www.icao.int/environmental-protection/CORSIA/Pages/CORSIA-News.aspx</p> <p>As of July it was 104 countries: https://www.icao.int/Newsroom/Pages/Over-100-States-now-participate-in-ICAOs-Carbon-Offsetting-and-Reduction-Scheme-for-International-Aviation-CORSIA.aspx</p>
6. What information is required/ needs to be reported about sustainability and GHG emission (reduction) by the obligated party?	<p>All CORSIA Eligible Fuels (CEF) need to be certified by a Sustainability Certification Scheme (SCS).</p> <p>Annually as part of the submission to the <u>CORSIA Central Registry</u>, the State must submit information on:</p> <ul style="list-style-type: none"> • Production year of the CEF • Producer of the CEF • Batch numbers • Total mass of each batch • Type of fuel, feedstock and conversion process of CEF batch production • Total mass of neat CEF being claimed by all airlines to the State • Total emissions reduction claimed from CEF <p>There is a separate annual reporting process specified in the CORSIA Eligibility Framework and Requirements for SCS that requires the SCS to supply information as well - which gives information about the certification scheme used. This way, Batch #'s can be compared. SCSs also publish on their website the economic operators who are certified by them.</p>
7. What information is required about origin?	<p>Certification by an SCS is required and goes to the point of initial collection (for crops/forestry products this would be at the field, whereas for wastes it would be at the first collection point after waste is produced. Thus:</p> <ul style="list-style-type: none"> • Primary forest residues: on forest level (Forest management unit) • Secondary (sawmill residues): First collection point • UCO: First collection point • Straw (primary agricultural residues): Farm level
8. What criteria are used to categorize and define feedstock?	<p>The CORSIA decision-tree already <u>included below</u></p>



9. What information needs to be reported about the type of feedstock used?

Feedstocks must be provided for each batch of fuel and are certified per answer to #7. The feedstock and fuel must match the default value table in the ICAO Document “[CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels](#).”

See also: <https://www.icao.int/environmental-protection/CORSIA/Documents/ICAO%20document%2006%20-%20Default%20Life%20Cycle%20Emissions%20-%20March%202021.pdf>

C. Proofing compliance: Verification methods required/ allowed

10. Is it possible to make use of certification systems to proof compliance? If yes, which schemes are recognized (so far)?

Yes. Thus far RSB and ISCC are approved/recognized. The current list can always be found [here](#).

Both RSB and ISCC have two “tiers” of CORSIA certification - one that only applies the currently approved sustainability criteria, and one that is more comprehensive/has more criteria. Their materials are public at:

RSB: <https://www.icao.int/environmental-protection/CORSIA/Pages/CORSIA-SCS-evaluation-RSB.aspx>

ISCC: <https://www.icao.int/environmental-protection/CORSIA/Pages/CORSIA-SCS-evaluation-ISCC.aspx>

[For example: ISCC CORSIA and ISCC CORSIA PLUS](#)

[For RSB: CORSIA eligibility only \(non-RSB\) and RSB CORSIA](#)

11. Is it possible to use a national standard to proof compliance?

No national standards are currently approved; they are not precluded from being approved if they apply through the [ICAO SCS application process](#).

C1. The approval and monitoring procedures for certification standards *(Only relevant when they can be used to proof compliance)*

12. Which authority decides which certification systems and/or national standards can be used?

ICAO has a task group called the Sustainability Certification Scheme Evaluation Group (SCSEG) that screens applicant SCSs for compliance with the [CORSIA Eligibility Framework](#) and recommends their inclusion to ICAO Council.

There is a requirement to review the SCSs at a minimum once every five years according to the SCSEG terms of reference. Next to that, the SCSs will need to be reapproved for the Voluntary Phase of CORSIA (which starts in 2024) as the sustainability criteria will change. If criteria change again for the Mandatory Phase (or requirements change at any time in between), a re-approval would be needed as well.

13. Which criteria are used to approve a certification

See the [CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes](#) The requirements are put in tables and include the following

<p>system and/or national standard?</p>	<p>themes (further outlines in criteria):</p> <p>Table 1: Requirements for SCS:</p> <ul style="list-style-type: none"> • Documentation management • Audit competencies • SCS Group auditing requirements (where applicable) • Non-compliance with certification requirements • Monitoring and system review • Transparency • Annual reports • Risk management plan • Accreditation of certification bodies • Stakeholder engagement (SCS has a process for incorporating stakeholder input relevant to the CORSIA sustainability criteria and adequate to the scope and scale of the operation) • Complaint procedure • Transparency on Greenhouse Gas (GHG) reporting and accounting <p>Table 2. General requirements set by SCS on Economic Operators</p> <ul style="list-style-type: none"> • Documentation management • Transparency on other SCS participation by economic operators • CORSIA certification requirements: SCS requires the economic operator to demonstrate and document that it satisfies all CORSIA requirements specific to the economic operator stated herein (further specified) <p>Traceability requirements set by SCS on Economic Operators</p> <ul style="list-style-type: none"> • Traceability: mass balance • Traceability: Mass balance system documentation • Traceability: Mass balance level of operation • Traceability: Mass balance timeframe <p>Table 4. Information Transmission requirements set by SCS on Economic Operators</p> <ul style="list-style-type: none"> • Transmission of information in the supply chain <p>Table 5. Requirements set by SCS on Certification Bodies</p> <ul style="list-style-type: none"> • Accreditation and auditing standards • Audits • Transfer from one SCS to another • Certificate issuance • Group auditing (where applicable) • Auditor competencies • Establishment of a level of assurance <p>Referenced ISO standards:</p> <ul style="list-style-type: none"> • ISO/IEC 17065 Conformity assessment – Requirements for bodies certifying products, processes and services • ISO 19011 Guidelines for auditing management systems • ISO 14064-3 Specification with guidance for the validation and verification of greenhouse gas assertions ISO/IEC 17011 Conformity assessment – Requirements for accreditation bodies accrediting conformity assessment bodies
<p>14. Are there minimum requirements around 3rd party auditing, intervals of verification or accreditation?</p>	<p>See the CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes</p> <ul style="list-style-type: none"> • See Table 1: Requirements for SCS • See Table 5. Requirements set by SCS on Certification Bodies <p>For example:</p> <ul style="list-style-type: none"> • Initial audits should be performed on-site. • SCS may permit remote audits by the certification body under the following conditions:...[...].
<p>15. Is cross-compliance possible? And if yes, on which conditions?</p>	<p>ICAO-approved SCSs are not required to recognize each other. No formal requirements have been outlined regarding cross-compliance; however, if two approved SCSs recognize each other, I don't believe this is precluded (but this is not an official interpretation).</p> <p>Table 2.2: Transparency on other SCS participation by economic operators: SCS</p>

	<p>requires all economic operators to declare the names of all SCS under which they are and/or were certified and make available to the auditors all information relevant to those certifications.</p> <p>Table 5.3: Transfer from one SCS to another: Prior to re-certification of an economic operator that was previously found to be in major non-conformity with any other SCS, the certification body will be required to bring this to the attention of the SCS.</p>
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D. Traceability and transfer of information

16. Which chain of custody systems (e.g., mass balance, book and claim) are allowed to link information to the biomass feedstock?	Mass balance (See the CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes)
17. When mixing of different consignments of biomass is allowed: what are the rules of allocation (e.g., based on energy content, mass)?	<p>Mass balance (See the CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes)</p> <p>SCS requires economic operators to use a mass balance system that:</p> <ol style="list-style-type: none"> Allows batches of sustainable materials with differing sustainability characteristics to be mixed. Requires information about the sustainability characteristics and sizes of the physical quantity (batches) referred to in point (a) to remain assigned to the mixture. Provides 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. Demonstrates that the product claims are linked correctly to the feedstock quantities claimed. <p>Overall management of feedstocks/fuels is required via mass balance. When talking specifically about allocation of greenhouse gases within an LCA for a given fuel, that's allocated by energy content.</p>
18. What is the first point in the supply chain to which the information should be traced back for: <ul style="list-style-type: none"> • <u>Forestry</u>: forest residues • <u>Agriculture</u>: straw from cereals 	<p>For forest or agricultural residues, the first collection point would be the point of production itself (field or forest), and therefore sustainability information would be traced back to this point.</p> <p>Group auditing is allowed for smallholder landowners in some circumstances (see the Eligibility Framework for details) but without group auditing it would be the individual forestry unit.</p>

E. Monitoring compliance: the governance structure

19. Which (controlling) authority receives the required sustainability and GHG information from the economic operator (see A)?	<p>The SCS certification body and its auditors are the ones who receive information directly from the economic operator and certify the fuel under the SCS's scheme. Economic operator. Economic operators include feedstock producers, processing facilities, and traders.</p> <ul style="list-style-type: none"> • The aeroplane operators have the right to audit the certification and access detailed data from the economic operator²⁹. • The aeroplane operators report this information to the States, who report the information to ICAO. • The SCS must also provide information/data relevant to GHG reductions to the national authority if requested. <p>ICAO also receives an annual report from the SCSs regarding the economic operators who have been certified.</p>
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²⁹ The aeroplane operators' right to audit the detailed data is in ICAO Annex 16, Vol IV. The CORSIA Eligibility Framework for SCSs states in definitions that: Economic operator. Economic operators include feedstock producers, processing facilities, and traders.

<p>20. How does the (controlling) authority register this information? Is there a database?</p>	<p>The SCSs all have public websites on which certifications are posted This is also a requirement: SCS ensures that the following information is made publicly available on a website:</p> <ul style="list-style-type: none"> • The list of economic operators that are certified under its CORSIA certification programme...[...]. • The latest version of SCS CORSIA certification programme requirements. • The list of certification bodies that are permitted to conduct audits within the CORSIA certification programme, as well as any certification bodies that are no longer permitted to conduct audits ..[...]. • Publication of contact details for the SCS CORSIA certification programme ...[...]. • The names of any other eligible SCS that the subject SCS recognizes within its CORSIA certification programme <p>The CORSIA Central Registry (CCR) is used for States to submit information related to CORSIA and for ICAO To perform calculations and compile information related to CORSIA implementation and transparency.</p>
<p>21. How does the (controlling) authority checks the correctness of the information they receive?</p>	<p>The CCR data will be cross checked with information submitted by the SCSs to ensure that appropriate batches and GHG values are claimed.</p>
<p>22. Is this information also publicly available, and if yes, which information?</p>	<p>Consolidated information from CCR will be published on the ICAO CORSIA website and can be found here.</p>
<p>23. Does the controlling authority (or another governance organization) have the authority to go back in the supply chain, to check the correctness of the information? and if yes,</p> <ul style="list-style-type: none"> • to which point in the value chain? • which information can be checked? 	<p>* Limited to States in which the fuel is being claimed: “Purchasers and States may elect to independently audit the production records of the CORSIA eligible fuel producer in order to provide further assurance.</p> <p>* Possible to go back in the supply chain:</p> <p>States and purchasers (aeroplane operators or their designated representative) have audit rights to production records for CORSIA Eligible Fuels (CEF) they purchase to verify the CEF.</p> <p>Annex 16 Vol IV says: Note.— The quality control assurances of CORSIA eligible fuel producers include declarations and/or process certifications, with periodic audits by verifiers, purchasers, or trusted entities. The process certifications, including the sustainability credentials, provide assurance that the CORSIA eligible fuel producer has established business processes to prevent double counting, and the periodic audits verify that the producer is following their established procedures.</p>
<p>24. In case information submitted by the economic operator is incomplete and/or incorrect: what are the consequences of non-compliance?</p>	<p>This is addressed by the SCS. Each SCS that is approved must have measures in place to address non-compliance (See the CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes)</p> <p>SCS has documented procedures for addressing when a certified economic operator is found to not comply with the certification requirements. This includes:</p> <ul style="list-style-type: none"> o Procedures for withdrawing or suspending certificates and the circumstances under which this occurs. o Procedures to ensure that any non-conformities that do not lead to immediate withdrawal or suspension of the certificate are corrected. <ul style="list-style-type: none"> • SCS makes these procedures available to economic operators.
<p>E1. Monitoring compliance of certification standards (<i>Only relevant when they can be used to proof compliance</i>)</p>	
<p>25. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the auditors? and if yes,</p> <ul style="list-style-type: none"> • to which point in the value chain? 	<p>The SCS is responsible for monitoring the competency of auditors to execute CEF certification throughout the supply chain (See the CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes)</p>

• what is the scope of their monitoring?	
26. In case verification by the auditor is considered insufficient, what are the consequences?	This is addressed by the SCS. Each SCS that is approved must have measures in place to address non-compliance (See the CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes)
27. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the certification schemes? If yes, how?	Yes, States and purchasers (aeroplane operators or their designated representative) have audit rights to production records for CEF they purchase to verify the CEF. ICAO can also request additional information from the SCSs. Note that the CORSIA requirements also require from certification schemes to have a complaint procedure in place so to be able to handle complaints. E.g.: “CS has procedures in place for responding to requests for information from the Committee on Aviation Environmental Protection (CAEP) Sustainability Certification Schemes Evaluation Group (SCSEG)”.
28. Does the controlling authority (or another governance organization) have insight if one certification scheme is used throughout the full supply chain, or multiple (in case of cross-compliance)	This would be evident from the reporting of batches certified by individual SCSs which will be reported annually.
29. In case verification and monitoring by the certification scheme is considered insufficient, what are the consequences?	CORSIA approved SCSs are monitored on an ongoing basis and will need to be re-approved for each phase of CORSIA (i.e., the Pilot Phase (2021-23), the Voluntary Phase (2024-26), and the Mandatory Phase (2027-35)).

F. Other (optional)

30. Where do you see most risks in information transfer (completeness, correctness) between economic operators in the supply chain for advanced biofuel supply chains?	The biggest challenges are likely to be related to the use of commodity crops (e.g., corn) in which rarely is the raw material/crop tracked from the field through collection point to downstream destinations.
31. Where do you see most risks in information transfer and monitoring of the sustainability and GHG emission requirements in advanced biofuel supply chains between countries?	Some stakeholders have expressed concern that there will be confusion about the counting of CEF toward State obligations under CORSIA versus under the Nationally Determined Contribution to emissions reductions under UNFCCC. There is ongoing work to minimize this risk. SCSs are required under the CORSIA Eligibility Framework to provide information to national authorities as requested, and much of the information related to GHG emissions reductions related to CEF will be publicly available and can be cross-checked.
32. Where do you see opportunities for improvement to harmonize and strengthen policy frameworks to monitor the sustainability and GHG emission requirements of advanced biofuel supply chains?	-

Relevant sources

The ICAO CORSIA Implementation Element “CORSIA eligible fuels” is reflected in five ICAO documents referenced in Annex 16, Volume IV, see:

<https://www.icao.int/environmental-protection/CORSIA/Pages/CORSIA-Eligible-Fuels.aspx>

NETHERLANDS - FRAMEWORK ON SOLID BIOMASS

Data for filling in this factsheet were mainly obtained from different resources, including best available expert knowledge, publicly available reports, and websites. Relevant literature sources are mentioned at the end of this factsheet. The Factsheets were filled in the period from September 2021-January 2022. The aim of the Factsheets is to present the key characteristics of the policy framework; It does not pretend to be fully complete, nor does it pretend to capture all the details and insights.

A1. General information	
1. Is there a policy on the sustainability of (advanced) biofuels solid biomass in your country? If yes, which one?	<ul style="list-style-type: none"> Besluit conformiteitsbeoordeling vaste biomassa voor energietoepassingen (<i>Decree on the Conformity assessment of solid biomass for energy applications</i>) Regeling conformiteitsbeoordeling vaste biomassa voor energietoepassingen (<i>Regulation on the Conformity assessment of solid biomass for energy applications</i>)
2. Is there a definition for 'advanced biofuels' under this policy? If yes, which one?	n.a. for this legislative frame
3. Which feedstock categories fall under the scope of 'advanced biofuels'?	n.a. for this legislative frame
A2. Requirements on GHG emission reduction and sustainability	
<p>4. What GHG emission reduction and sustainability requirements are included in the policy, and to which feedstock-to-biofuel chains do they apply? List in particular the requirements for:</p> <ul style="list-style-type: none"> Forest: forest residues to ethanol via gasification Agriculture: ethanol production from cereal straw 	<p>For all types of biomass (forest and agricultural (residues)) there is the GHG-saving criterion for electricity and heat as end-use:</p> <p>The reduction in CO₂-eq emissions is calculated to be a minimum of 70% per year on average based on the EU reference value. The average emissions shall have a maximum:</p> <ul style="list-style-type: none"> of 56g CO₂-eq/MJ for electricity and 24g CO₂-eq/MJ for heat. No consignment of biomass shall result in emissions above 74g CO₂-eq/MJ for electricity and 32g CO₂-eq/MJ for heat. <p>The calculated maximum CO₂-eq emission levels are based on the most recent European Commission publication on sustainability criteria for biomass and the reference values provided for fossil fuels.</p> <p>Furthermore, there are many sustainability requirements (principles and underlying criteria) for forest biomass and biomass from agricultural biomass, which are further explained in the Verification Protocol. They concern sustainable forest management, land use change and soil sustainability. Different sustainability requirements apply to different biomass categories.</p> <ul style="list-style-type: none"> P1: The use of biomass shall lead to a substantial reduction in greenhouse gas emissions calculated across the entire chain in comparison to the use of fossil fuels. P2: Soil quality shall be maintained and where possible improved. P 3: Production of raw biomass does not result in the destruction of carbon sinks. P 4: The use of biomass does not result in long-term carbon debt. P 5: Biomass production does not result in Indirect Land Use Change (ILUC). P 6: Relevant international, national, regional and local legislation and All regulations are complied with. P 7: Biodiversity is maintained and where possible enhanced. P 8: The regulating effect and the quality, health and vitality of the forest are maintained and where possible enhanced. P 9: The production capacity for wood products and relevant non-timber forest products is maintained in order to safeguard the future of the forests. P 10: Sustainable forest management is achieved through a management system.

	<ul style="list-style-type: none"> • P11*: Forest management by a group or regional association offers sufficient safeguards for sustainable forest management. • P 12: A chain of custody system is in place for the biomass, covering the entire chain from the first actor to the energy producer, that links the source to the material used in the product or product group and provides the greenhouse gas emission data of each individual link. • P13: In case of a group management system for the Chain of Custody, the same requirements shall apply to the group as a whole as to individual businesses. <p><i>* The requirements under P11 and P13 are only relevant if group certification is applied by the forest owner or forest manager (P11) or in the Chain of Custody (P13).</i></p>
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B. Proofing compliance: Information required

5. Who is the obligated party to report and proof compliance of the sustainability and GHG emission of (advanced) biofuels and at what interval?	The end-user (energy producer) has to report to the Netherlands Enterprise Agency (RVO) on their proofs of compliance in order to get subsidy, every calendar year.
6. What information is required/ needs to be reported about sustainability and GHG emission (reduction) by the obligated party?	<ul style="list-style-type: none"> • All economic operators in the value chain provide CO2-eq values to the consignment they put in the value chain. It is the end-user (energy producer) who has to verify the 70% reduction value at the end of the value chain, based on the emissions over 1 calendar year. The designated GHG-value calculator is BioGrace II. • For sustainability requirements there is an obligation for the Forest Management Unit (FMU) to demonstrate sustainability on forest management, and all economic operators following the FMU should be able to provide this proof of sustainability, either a certification claim or verification statement. • The sustainability requirements that need to be complied with depends on the biomass category. For example: Category 4 (agricultural residues) only needs to comply with principle 1, 2 and 12
7. What information is required about origin?	<p>Depends on the biomass category, but for biomass directly from the forest there is information required on sustainable forest management from the FMU including the country of origin where the biomass is harvested and/or where the waste or residue stream is created.</p> <p>For agricultural residues there is information required about the soil quality of the origin.</p>
8. What criteria are used to categorize and define feedstock?	<p>There are 5 biomass categories:</p> <ul style="list-style-type: none"> • Category 1: Woody biomass from Forest Management Units (FMU) This includes branches, tops, trees and primary felling residues sourced directly from forests. This shall also include unused wood that has the same composition as wood growing in the forest and that has not been mixed with or contaminated by foreign materials or substances. • Category 2: Woody biomass from small Forest Management Units (FMU <500 hectares) This includes branches, tops, trees and primary felling residues sourced directly from forests of less than 500 ha. This shall also include unused wood that has the same composition as wood growing in the forest and that has not been mixed with or contaminated by foreign materials or substances. Category 2 biomass is distinguished from Category 1 biomass based on the size of the forest management units. Biomass from FMUs smaller than 500 hectares can also be submitted as Category 1 biomass, in which case the sustainability criteria for Category 1 biomass shall apply. • Category 3: Residues from nature and landscape management: These are biomass residues (branches, tops, trees) produced in the course of managing urban and rural green spaces and nature areas, other than forests designated for the preservation, restoration or enhancement of specific natural, recreational or aesthetic functions.

	<p>These also include biomass residues produced during routine maintenance of public green spaces and parks.</p> <ul style="list-style-type: none"> • Category 4: Agricultural residues: This concerns biomass consisting of residues obtained directly from agricultural business. Short rotation crops are excluded, with the exception of the residues thereof. • Category 5: Biogenic residues and waste flows: These are waste flows and residues from the agro-food and timber industry (secondary residual flows) and tertiary residual flows such as waste wood.
9. What information needs to be reported about the type of feedstock used?	<p>Either a verification statement or (approved) certification claim that defines the biomass category.</p> <p>Each category specifies what kind of material can be used for it. For example, criterion 7.1 excludes trees that have high conservation values, you can find most in the information on this in the guidance document https://english.rvo.nl/sites/default/files/2020/01/Guidance%20on%20the%20classification%20of%20biomass.pdf</p>

C. Proofing compliance: Verification methods required/ allowed

10. Is it possible to make use of certification systems to proof compliance? If yes, which schemes are recognized (so far)?	<p>To demonstrate that the biomass used comes from sustainable sources, various combinations are possible:</p> <ul style="list-style-type: none"> • an approved certification scheme
11. Is it possible to use a national standard to proof compliance?	<p>Instead of using voluntary certification (which must be approved by the Dutch Minister), economic operators can also use the Verification Protocol, which is developed by the Netherlands to provide an alternative.</p> <p>Next to that, verification is also required when the end-user (the energy operator) submits its annual conformity statement</p>
C1. The approval and monitoring procedures for certification standards (<i>Only relevant when they can be used to proof compliance</i>)	
12. Which authority decides which certification systems and/or national standards can be used?	The Netherlands Enterprise Agency, in name of the Ministry of Economic Affairs and Climate Policy. The approval follows after analyses and advice by the independent <u>ADBE</u> advisory committee.
13. Which criteria are used to approve a certification system and/or national standard?	<p>The ADBE has an assessment protocol for voluntary schemes</p> <p>All the sustainability criteria for the biomass categories that are under approval.</p> <p>All the 8 management criteria that concern scheme management.</p> <p>An example of the ADBE analysis of these sustainability and management criteria can be found <u>here</u>.</p>
14. Are there minimum requirements around 3rd party auditing, intervals of verification or accreditation? And if yes, which ones?	<p>Yes, third party auditing should start from the FMU if biomass is sourced directly from forest (category 1 and 2). Other categories third party starts at first gathering point.</p> <p>The management criteria also have requirements around conformity assessment bodies.</p> <p>For the approval of certification bodies for the verification protocol and conformity assessment: Accreditation by National Accreditation (IAF or ILAC) is necessary for CBs, or something of equivalent value (for example ASI).</p> <p>Other requirements for CBs for verification can be found in chapter 9 of our <u>Verification Protocol</u>.</p>
15. Is cross-compliance possible? And if yes, on which conditions?	<p>The information on what scheme has been used to certify SFM at the origin needs to be available at the end of the chain. So, for example: FSC can for example enter in a SBP supply chain, Energy producers get an SBP claim, but the data accompanying the claim also shows FSC, so we know that it's correctly applied.</p>

D. Traceability and transfer of information

16. Which chain of custody systems (e.g., mass balance, book and claim) are allowed to link information to the biomass feedstock?	Only mass balance.
17. When mixing of different consignments of biomass is allowed: what are the rules of allocation (e.g., based on energy content, mass)?	<p>Consignments are only allowed to be physically mixed, except if all sustainability aspects are identical (same GHG values, certification claim etc.)</p> <p>When being mixed with other consignments category 1 and 2 consignments only complying with the requirements 1.1, 3.1, 3.2, 3.3, 4.1, 4.2, 4.3, 5, 7.1 and 7.3 are distinguished as controlled biomass on a mass balance. For controlled biomass, the biomass producer is the first link in the chain of custody and the source is the forest management unit or a defined supply area. Controlled biomass needs to be distinguished on the mass balance from the other biomass.</p>
18. What is the first point in the supply chain to which the information should be traced back for: <ul style="list-style-type: none"> • <u>Forestry</u>: forest residues • <u>Agriculture</u>: straw from cereals 	The forest management unit is the first point in the supply chain where traceability begins for primary materials (branches and felling residues etc.) from forestry. If it's secondary or tertiary residues the first gathering point is the start of the compliance value chain. Agriculture residues compliance starts also at the first gathering point.

E. Monitoring compliance: the governance structure

19. Which (controlling) authority receives the required sustainability and GHG information from the economic operator (see A)?	<p>The Netherlands Enterprise Agency (RVO) receives the information in the context of subsidy payment. The Dutch Emissions Authority (NEa) receives this information as a public supervisor on the sustainability system for SDE subsidy</p> <p>RVO and the NEa receive the information together with the conformity year statement, which is used for the subsidy The information is registered per subsidy recipient.</p>
20. How does the (controlling) authority register this information? Is there a database?	For RVO this is not (yet) publicly available.
21. How does the (controlling) authority checks the correctness of the information they receive?	Through certification claims and verification statements per consignment. The final yearly report of the energy producer (end-user) is also verified by an appointed CAB. The CAB checks the sustainability claims on the biomass at the end-user. The public authority (RVO) relies on the correctness of the conformity statement of the CAB. The NEa supervises this system
22. Is this information also publicly available, and if yes, which information?	No, not yet. Maybe through the REDII implementation it will be.
23. Does the controlling authority (or another governance organization) have the authority to go back in the supply chain, to check the correctness of the information? and if yes, <ul style="list-style-type: none"> • to which point in the value chain? • which information can be checked? 	
24. In case information submitted by the economic operator is incomplete and/or incorrect: what are the consequences of non-compliance?	That may result in not receiving subsidy over that specific consignment.

E1. Monitoring compliance of certification standards *(Only relevant when they can be used to proof compliance)*

25. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the auditors? and if yes, <ul style="list-style-type: none"> • to which point in the value chain? • what is the scope of their monitoring? 	<p>Yes. First, we require auditors/CABs throughout the entire value chain to be accredited by an accreditation body. Accreditation by National Accreditation (IAF or ILAC) is necessary for CBs, or something of equivalent value (for example ASI).</p> <p>Second monitoring on the adequate functioning of CABs/ the system of private supervision is performed by the Nea. The NEa is</p>
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	<p>the public supervisor for both the certifying and verifying CBs. The Minister recognizes these CBs for their respective roles (certification scheme or Verification Protocol), and once they are recognized the NEa becomes the public supervisor for their activities in those roles. In this regard they will contact, when necessary, the private supervisor for activities supervised on both these roles as well. CBs that perform verification activities with the Verification Protocol are privately supervised by the RvA (<i>Raad voor Accreditatie</i>) in the Netherlands.</p> <p>The scope includes all private supervision in the chain of woody biomass which is delivered and consumed by Dutch energy suppliers who receive subsidy for their consumption.</p>
26. In case verification by the auditor is considered insufficient, what are the consequences?	In that case the accreditation body and certification scheme are notified. It is for them to take action. It will depend on the seriousness of insufficiency if further action is required. Ultimate consequence might be that the recognition of the auditor is withdrawn.
27. Does the controlling authority (or another governance organization) have the authority to monitor the competency of the certification schemes? If yes, how?	<p>As the Nea monitors the functioning of the system of private supervision this would also include the functioning of the certification scheme. At first the adequacy of the scheme is assessed by the ADBE and approved by the Ministry of Economic Affairs.</p> <p>For the schemes, it's "once approved, always approved". However, we continuously need to "re-approve" the schemes each time they have a new scheme document that is relevant to the approval.</p>
28. Does the controlling authority (or another governance organization) have insight if one certification scheme is used throughout the full supply chain, or multiple (in case of cross-compliance)	<p>Endorsement of Sustainable Forest Management (SFM) claim through a CoC claim is allowed, however, at the end of the value chain the SFM claim should be known.</p> <p>For example: if SBP is used through the CoC but SFM was certified by FSC, that you have insight that this is an FSC-SBP combination. SBP has quite the sophisticated Data Transfer System, which provides the end-user with a lot of information. Schemes like GGL and Better Biomass use transaction documents for this type of information.</p>
29. In case verification and monitoring by the certification scheme is considered insufficient, what are the consequences?	<p>The Ministry cannot reverse a decision for an approval of a certification scheme version. However, the recognition of a CBI can be withdrawn</p> <p>As soon as new scheme versions are active, new approvals are needed, otherwise the approval may become invalid.</p>

F. Other (optional)

30. Where do you see most risks in information transfer (completeness, correctness) between economic operators in the supply chain for advanced biofuel supply chains?	In the correct determination of the biomass category. This takes place at the point of origin and heavily affects the amount of sustainability criteria that the biomass has to adhere to. For example, sawdust directly from the forest is category 1 biomass with the highest sustainability requirements, but sawdust from a sawmill is category 5 biomass with the lowest requirements.
31. Where do you see most risks in information transfer and monitoring of the sustainability and GHG emission requirements in advanced biofuel supply chains between countries?	As we are dealing with a scheme tailored to the Dutch requirements which is used internationally it may result in unawareness with the specific Dutch requirements in the market.
32. Where do you see opportunities for improvement to harmonize and strengthen policy frameworks to monitor the sustainability and GHG	<p>It would be extremely helpful if all EU member states would have the same sustainability requirements. That would mean that market operators can supply to all countries under the same sustainability schemes and standards.</p> <p>Right now, foresters in the U.S.A. already have to know if they</p>

emission requirements of advanced biofuel supply chains?	produce/harvest for the Netherlands, for we require different sustainability aspects then, for example, the U.K. This makes it (unnecessarily) complicated for all actors in the supply chain. Also, on a broader scale (e.g. EU) you can achieve more than on a national scale. If the EU sets a higher sustainability standard for biomass, than 27 member states have that standard, and affect all their markets worldwide.
33. Other remarks	-

Relevant sources

Verification protocol:

<https://english.rvo.nl/sites/default/files/2020/12/RVO%20Verification%20Protocol%202021.pdf>

Guidance on certification:

<https://english.rvo.nl/sites/default/files/2021/09/Guidance%20for%20the%20use%20of%20pellet%20certification%20within%20SDEplus%20March%202021.pdf>

Annex 2: Detailed overview of a set of verification and assurance requirements, including those defined for certification bodies

Detailed overview of a set of verification and assurance requirements that certification schemes must meet for approval. These also include requirements that certification schemes have for the certifiers/ auditors that evaluate the conformance to their applicable standards. The analysis is based on the following frameworks and documents:

- EU RED II: Updated assessment protocol (EC, 2021a) and, where applicable, draft Implementing Regulation on rules to verify sustainability and GHG emission saving criteria including ILUC criteria (EC, 2021)
- Dutch framework on solid biomass: Assessment protocol from 2020, version 2.5 (ADBE, 2020); the Decree on conformity of solid biomass for energy applications and the Verification Protocol for Sustainable Solid Biomass for Energy Applications (RVO, 2020a)
- ICAO CORSIA: Eligibility Framework and Requirements for Sustainability Certification Schemes (ICAO_CORSIA, 2019a)
- Canada, CFR: draft version Method for validation, verification and certification Clean Fuel Regulations (CFR, 2021)

	EU RED II: Assessment protocol & draft Implementing Regulation	Dutch framework on solid biomass (based on the ADBE assessment protocol and not on the Verification Protocol)	ICAO-CORSIA	Canada (draft) - CFR requirements
Requirements on scheme owner	<u>Draft Implementing Regulation - Art. 3: 1.</u> Voluntary schemes shall establish a governance structure to ensure that the scheme has the necessary legal and technical capacity and independence to perform its duties.			<u>Scheme owner: The scheme owner is a legal entity that develops and maintains a CFR-LUB CS in accordance with the following requirements:</u> The scheme owner takes on full responsibility for the objectives, the content and the integrity of the scheme.....The scheme owner maintains the scheme and provide guidance when required.....The scheme owner sets up a structure for the operation and management of the scheme.....[..]....
Proven need for existence scheme		Management criteria: A widely supported need exists for the scheme and for the conformity assessments that are performed based on the scheme.		.
Documentation management and record keeping for scheme, economic operators and certification bodies (CBs)				

Documentation management of scheme	<u>Draft Implementing Regulation - Article 5</u> Internal monitoring, complaints procedure and documentation management system	<u>Management criteria:</u> The methods related to the development of the scheme are documented and at least include the organisations participating in the <u>development of the scheme and the decision-making process</u> for the development of the scheme.	Table 1: Requirements for SCS: SCS has a documentation management system that addresses each of the following elements: General management system documentation for the SCS CORSIA certification programme; control of documents....	<u>Documentation management:</u> Each CFR-LUB CS must have, control, and maintain a documented management system that addresses each of the following elements:.....
<u>Documentation management & record keeping:</u> For economic operators	<u>Assessment protocol:</u> <u>Documentation management:</u> Economic operators and certification bodies must have a documentation management system & record keeping	<u>CoC:</u> Each link in the chain of custody bears final responsibility and has a <u>quality management system</u> in place that provides safeguards for compliance with the requirements of the chain of custody system.	<u>Requirement by SCS on economic operators: SCS requires that economic operators:</u> i) have an <u>auditable documentation management system</u> for the evidence related to the claims they make or rely on for certification; ii) keep records for a minimum of 5 years; and iii) accept responsibility for preparing any information related to the auditing of such evidence. <u>Requirement by SCS on economic operators: CORSIA certification requirements:</u> CS requires the economic operator to demonstrate and document that it satisfies all CORSIA requirements specific to the economic operator stated herein, including the following which form the basis for audit objectives:...[...]	
<u>Documentation management & record keeping:</u> For CBs	<u>Assessment protocol:</u> <u>Documentation management:</u> Economic operators and certification bodies must have a documentation management	<u>Verification protocol:</u> The verifying CAB shall retain appropriate records of the decisions taken and their justification on this topic		<u>Requirements set by the CFR-LUB CS on Certification Bodies: Documentation and Record Keeping</u> Certification bodies must have an Information Management System on which the records stored for each provided

	system & record keeping	(including evidence) (9.3.1).		certification shall be able to:....Records shall be kept for at least 10 years.
<u>Scheme development and internal monitoring</u>				
<u>Scheme development:</u> risk management plan			<u>Risk management plan:</u> SCS has a documented plan for addressing the risks to the integrity of the assurance system	<u>Risk Management plan:</u> CFR-LUB CS has a documented plan for identifying and Plan addressing the risks to the integrity of its assurance system.
Internal monitoring, procedures and internal system review / requirements non-compliance	<u>Assessment protocol: 7.6 Management of the audit:</u> Voluntary schemes shall have clear procedures that describe how audits are planned, conducted and reported on.....The voluntary scheme shall also describe what the implications are for critical, major and minor non-conformities identified during the audit.... <u>Assessment protocol: 7.14 Internal monitoring:</u> The voluntary scheme shall have in place a system of internal monitoring to verify compliance of economic operators with the provisions of the scheme. <u>Draft Implementing Regulation - Article 4</u> Non-conformities of economic operators under the scheme `; Voluntary schemes shall set up a comprehensive system to deal with non-conformities by economic operators. <u>Draft Implementing Regulation - Article 5:</u> Internal monitoring,	<u>Management criteria:</u> The scheme manager has a scheme version management system in place.	<u>Monitoring and system review:</u> SCS has procedures and timelines for reviewing its CORSIA certification programme; review in regular intervals	<u>Monitoring and system review:</u> Each CFR-LUB CS must have procedures and timelines in place for the review of its CFR-LUB Certification program.....The CFR-LUB CS has a process in place to take <u>stakeholders feedback into account</u> when reviewing the operation of the scheme.....The <u>review of the CFR-LUB Certification program occurs at planned intervals</u>Each CFR-LUB CS has a <u>process for managing</u> the implementation of other changes to the rules, procedures and management of the scheme.... <u>Non-compliance with certification requirements:</u> Each CFR-LUB CS must have documented procedures for addressing when a feedstock producer is found to not comply with the certification requirements...

	<p>complaints procedure and documentation management system</p> <p><u>Draft Implementing Regulation - Article 10</u></p> <p>Audit process and levels of assurance. Voluntary schemes shall establish detailed procedures setting out how audits are planned and conducted and how audit reports are drawn up.</p>			
Level of stakeholder involvement	<p><u>Draft Implementing Regulation - Art. 3.2</u> Voluntary schemes shall include to the extent possible in the governance structure and decision-making a broad range of representatives from various relevant stakeholder groups</p> <p><u>Draft Implementing Regulation - Art. 3.3</u> Voluntary schemes shall set up rules and procedures to avoid conflicts of interest in decision-making.</p>	<p><u>Management criteria:</u> The development of the scheme is transparent and participation in the process of development of the scheme is open to anyone.</p>	<p><u>Stakeholder Engagement:</u> SCS has a process for incorporating stakeholder input relevant to the CORSIA sustainability criteria and adequate to the scope and scale of the operation.</p>	<p><u>Monitoring and system review:</u> E....The CFR-LUB CS has a process in place to take <u>stakeholders feedback into account</u> when reviewing the operation of the scheme.....</p>
Scheme expertise on sustainability		<p><u>Management criteria:</u> It can be demonstrated that during the development of the scheme and as part of the scheme management expertise of the sustainability requirements covered by the scheme is applied.</p>		
<u>Approaches on auditing and verification (for certification bodies)</u>				
Criteria on risk-based approach (including limitation in		<p><u>Assessment of the Risk based approach:</u> determination of region; gathering information; Risk assessment; Risk mitigation and measures; monitoring (can</p>		

use)		only be applied to limited extent and will be phased out) <u>Verification protocol:</u> Chapter 8 on risk-based approach		
<u>Audit should include risk analysis</u>	<u>Draft Implementing Regulation - Article 10.3:</u> The audit shall include the following elements: 3.1.1.3.....an analysis of the risks which could lead to a material misstatement, based on the auditor's professional knowledge and the information submitted by the economic operator. That analysis shall take into consideration the overall risk profile of the activities	<u>Verification protocol:</u> 9.2 Planning and risk assessment, 9.2.2 strategic risk assessment	<u>Requirements set by SCS on Certification Bodies: Audits:</u> Amongst others: It is the responsibility of the certification body to define the size of the sample of mass balance or GHG data to audit in consideration of the audit risk and the required level of assurance	<u>Requirements set by the CFR-LUB CS on Certification Bodies:</u> Information regarding the validation plan should include a strategic analysis and risk assessment
<u>Initial audits</u>	<u>Assessment protocol: 7.2 Audits before participation in the voluntary scheme:</u> Voluntary schemes shall ensure that economic operators are audited prior to allowing them to participate in the scheme. The first audit of a new scheme participant shall always be on-site..... <u>Draft Implementing Regulation - Article 10 - Audit process and levels of assurance:</u> Voluntary schemes shall require that economic operators successfully pass an initial audit before allowing them to participate in the scheme.		<u>Requirements set by SCS on Certification Bodies: Audits:</u> Initial audits should be performed on-site.; SCS may permit remote audits by the certification body under the following conditions...[...]...It is the responsibility of the certification body to define the size of the sample of mass balance or GHG data to audit in consideration of the audit risk and the required level of assurance.....	<u>Requirements set by the CFR-LUB CS on Certification Bodies: Audits:</u> Initial audits should be performed on-site.....

<u>Surveillance/retrospective audits</u>	<p>Assessment protocol: 7.3 Retrospective audits: Voluntary schemes that allow a certificate term greater than one year shall ensure that an annual surveillance audit of all economic operators participating in the scheme takes place.....audit intensity should be increased depending on the level of risk.....</p> <p>Draft Implementing Regulation - - Article 10: Audit process and levels of assurance. Voluntary schemes that allow a certificate duration longer than one year shall ensure the carrying out of an annual surveillance audit of all economic operators participating in the scheme.</p>			<p>Requirements set by the CFR-LUB CS on Certification Bodies: Audits:Surveillance audits are required to ensure ongoing validity of the demonstration of fulfilment of the CS requirements in accordance with ISO/IEC 17065 or ISO/IEC 17021.....</p>
<u>Remote audits</u>		<p>Verification protocol: Chapter 9.3: Insight into the economic operator's control framework and control risks may be obtained through a desk review, but is preferably acquired on-site or through a combination of an on-site audit and a desk review.</p>	<p>Requirements set by SCS on Certification Bodies: Audits: SCS may permit remote audits by the certification body under the following conditions:....</p>	<p>Requirements set by the CFR-LUB CS on Certification Bodies: Audits:Remote audits by certification bodies may be allowed under the following conditions:....</p>
<u>Validity certificate and conditions for use</u>			<p>Requirement by SCS on economic operators: CORSIA certification requirements: CS requires the economic operator to demonstrate and document that it satisfies all CORSIA requirements specific to the economic operator stated herein, including the following which form the basis</p>	<p>Certificate and conditions of use: The validity period of certificates issued under a CFR-LUB CS does not exceed 5 years. CFR-LUB CS specifies that the requirements of ISO 17030 apply in relation to the ownership, use and control of certificates.....</p>

			for audit objectives:...[...]	
<u>Certificate issuance</u>	<u>Draft Implementing Regulation - Article 10: 6. Voluntary schemes shall only certify economic operators where they comply with all the following requirements:.....</u>	<u>Verification protocol: Chapter 9.5: Conclusion and reporting:</u> “... In the final phase of the verification process, the auditor will discuss with the economic operator any corrections/adjustments (including time frame) that may be necessary in order to issue a statement....”	<u>Requirements set by SCS on Certification Bodies - Certificate issuance:</u> The SCS requires that certification bodies issue a certificate to an economic operator only after a positive certification decision is reached confirming that the requirements of the SCS CORSIA certification programme have been satisfied.	<u>Requirements set by the CFR-LUB CS on Certification Bodies: Certificate Issuance:</u> Certification bodies must make certification decisions in accordance with the standard ISO 17065 or with ISO 17021-1 depending on the standard used for the audit. Certification bodies must issue a certificate to a client that unambiguously identifies the feedstock to which it applies, only after a positive certification decision is reached confirming that the requirements of the CFR-LUB certification program have been satisfied.....
<u>Transfer from one SCS to another</u>	<u>Assessment protocol: 7.7 Transparency on other voluntary scheme participation by economic operators:</u> Prior to re-certification of an economic operator that was previously found to be in non-conformity with this requirement, or any other aspect of the mandatory sustainability criteria, the auditor should be required to bring this to the attention of the voluntary scheme under which the operator is in the process of re- certification		<u>Requirements set by SCS on Certification Bodies: Transfer from one SCS to another:</u> Prior to re-certification of an economic operator that was previously found to be in major non-conformity with any other SCS, the certification body will be required to bring this to the attention of the SCS.	<u>Transfer from one CFR-LUB CS to another:</u> Prior to recertifying a feedstock producer that was previously found to be in non-conformity with any other CFR-LUB CS, the certification body will be required to bring this to the attention of the CS.
<u>Establishing a level of assurance</u>	<u>Assessment protocol:</u> <u>Establishment of at least a “limited assurance level” when conducting audits</u> <u>Draft Implementing Regulation - Article 10 Audit process and</u>	<u>Verification protocol: Chapter 9 on verification: Verification plan and assurance level</u>	<u>Requirements set by SCS on Certification Bodies: Establishment of a level of assurance:</u> SCS requires the certification body to conduct all audits to a “reasonable	<u>Establishment of a level of assurance:</u> The certification body must conduct audits at “a reasonable level of assurance”.....

	levels of assurance		assurance level”.	
<u>Group certification</u>				
<u>Group certification:</u> Group is a led and supervised by entity	<u>Draft Implementing Regulation - Article 12</u> Group auditing: Economic operators included in a group audit shall designate a group manager. First gathering points, other than producer organisations and cooperatives, may also act as group managers, representing the economic operators included in the group audit.	Principle 11: Forest management by a group or regional association offers sufficient safeguards for sustainable forest management 11.1 A group or regional association is led and supervised by an independent legal entity. 11.2 A group or regional association meets the requirements of sustainable forest management (requirements 6.1 through 10.5). The separate forest management activities of the individual members of the group or regional association shall also meet these requirements if applicable for the management of the forest concerned.		
<u>Group certification:</u> Homogeneity	<u>Assessment protocol:</u> Group auditing for compliance with the scheme's land-related criteria is only acceptable when the areas concerned are near each other (e.g. in same administrative region) and have similar characteristics, such as climatic conditions. <u>Draft Implementing Regulation - Article 12</u> Group auditing: Voluntary schemes may perform		<u>Requirements set by SCS on Certification Bodies -Group auditing (where applicable):</u> Group auditing of economic operators by the certification body is permitted under the following conditions:...[...] ○ When confirming compliance with the CORSIA sustainability criteria when the areas concerned are near each other and have similar	<u>Requirements set by the CFR-LUB CS on Certification Bodies:</u> Group auditing of feedstock producers by certification bodies is only possible for homogenous groups, and under the following conditions:..... <u>CS Group auditing requirements (where applicable):</u> Where the CFR-LUB CS permits group auditing, certification bodies must meet, as a minimum, the following requirements: CFR-Group management: group certification is only possible for homogenous groups

	group auditing only in the following cases: (a) for producers of raw material, in particular smallholder farmers, producer organisations and cooperatives; (b) for compliance with the scheme's land-related criteria, where the areas concerned are in proximity and have similar characteristics, such as climatic conditions; (c) for the purpose of calculating GHG savings, where the units have similar production systems and types of crops.		characteristics.----	
<u>Group auditing: minimum sample of auditing</u>	<p><u>Assessment protocol: 7.4 Group auditing</u> (OPTIONAL - only relevant when group auditing is applied): As a minimum, a sample of the square root of the number of group members (or 10% whichever is higher) shall be audited individually annually and increased depending on the level of risk</p> <p><u>Draft Implementing Regulation - Article 12</u></p> <p>Group auditing: A sample consisting of a number of group members equivalent to the square root of the total number of group members shall be audited individually at least once a year.</p>		<p><u>Requirements set by SCS on Certification Bodies -Group auditing (where applicable):</u> Group auditing of economic operators by the certification body is permitted under the following conditions:...[...][...]</p> <ul style="list-style-type: none"> o A sample of at least the square root of the number of group members is audited individually annually or, for wastes and residues, using a risk- based sampling approach providing the same level of assurance.... 	<p><u>Requirements set by the CFR-LUB CS on Certification Bodies: Group auditing:</u>under the following conditions:....Risk-based sampling of units within a group audi tshall be determined in order to: ensure a reasonable level of assurance or a confidence level of 98% when using statistical sampling, ...all material sites are addressed annually, ...over a five-year period, have audited (including a site visit) every material site in the group;....</p> <p><u>CS Group auditing requirements (where applicable):</u> Where the CFR-LUB CS permits group auditing, certification bodies must meet, as a minimum, the following requirements:</p> <ul style="list-style-type: none"> o Risk based sampling of units o Materiality thresholds must be applied to determine non-compliance o Process and conditions to join a group are clearly established.
<u>Group auditing: no self-declarations</u>	<p><u>Draft Implementing Regulation - Article 12:</u> Self-declarations from economic operators shall not be considered to be sufficient evidence. Audits of the group manager shall always be</p>		<p><u>Requirements set by SCS on Certification Bodies -Group auditing (where applicable):</u> Group auditing of economic operators by the certification body is permitted under the</p>	

	conducted on-site.		following conditions:...[...]... Self-declarations from economic operators are not accepted by the certification body as sufficient evidence to replace audits supporting a group claim.	
<u>Requirements for auditor and certification bodies</u>				
<u>Auditor competencies</u>	<p><u>Assessment protocol: Auditor competencies:</u> The certification body office performing the audit shall be accredited to ISO 17021 or 17065. Accreditation shall be to the scope of the RED recast, or alternatively to the specific scope of the voluntary scheme (as applicable). The certification body shall have a process for selecting and appointing the audit team set out in ISO 19011, taking into account the competence needed to achieve the objectives of the audit. The audit team shall have the appropriate specific skills necessary.....etc.</p> <p><u>Draft Implementing Regulation - Article 11: Auditor competence</u></p>	<p><u>Verification Protocol: 10.2</u> Competence requirements for auditors: (1) general requirements, (2) Conducting a risk analysis, (3) Auditing Sustainable Forest Management (4) Auditing the Chain of Custody and GHG information</p>	<p><u>Requirements set by SCS on Certification Bodies Auditor competencies:</u> SCS requires that certification bodies appoint competent auditor(s), in accordance with the process set out in ISO 19011; The auditor(s) as a whole, and the independent reviewer, demonstrates knowledge and appropriate necessary skills to conduct audits under the CORSIA eligible fuels framework, in accordance with the audit scope.....</p>	<p><u>Audit competencies:</u> The CFR-LUB CS documentation describes in sufficient detail the specific audit competencies requirements and how it ensures that the requirements related to auditors' competencies (see Table 18, Requirement 6) are met.</p> <p><u>Requirements set by the CFR-LUB CS on Certification Bodies: Auditor competencies:</u> Certification bodies must appoint competent auditors in accordance with the process set out in the standard ISO 19011 - Guidelines for auditing management systems.....The auditor(s) as a whole, demonstrate knowledge and appropriate necessary skills to conduct audits under the CFR- LUB CS....</p>

<u>Accreditation of certification bodies and auditing standards</u>	<p><u>Assessment protocol: 7.12</u> Accreditation of certification bodies. Accreditation of certification bodies can take a number of approaches: o Accreditation by bodies referred to in Article 4 of Regulation (EC) No 765/2008; or o Accreditation by bodies having a bilateral agreement with the European Cooperation for Accreditation; or o Accreditation by a national accreditation body affiliated to the International Accreditation Forum (IAF); or Accreditation by an accreditation body complying with ISO 17011. This can be demonstrated through compliance with the ISEAL Compliance Requirements for Accreditation Members.</p>	<p><u>Verification protocol:</u> Conformity Assessment Bodies conducting verifications under the Regulation using this protocol are required to hold accreditation from the Dutch Accreditation Council (RVA) for ISO/IEC 17065, "Conformity assessment - Requirements for bodies certifying products, processes and services", for the scope of this protocol. Decree on solid biomass: 2.4: ...recognition for an activity based on an accreditation or a supporting document</p>	<p><u>Accreditation of certification bodies:</u> SCS uses an accreditation body complying with ISO 17011 to ensure that certification body requirements listed herein are implemented by the certification bodies. <u>Requirements set by SCS on Certification Bodies:</u> <u>Accreditation and Auditing Standards:</u> SCS requires certification bodies to be accredited to ISO standard 17065 by an accreditation body operating in compliance with ISO 17011....[...].</p>	<p><u>Requirements set by the CFR-LUB CS on Certification Bodies:</u> <u>Accreditation and Auditing Standards:</u> ...FR-LUB CS requires certification bodies to be <u>accredited by an ECCC approved accreditation body</u>. CFR-LUB CS requires certification bodies to be accredited to ISO/IEC 17065 - Conformity assessment -- Requirements for bodies certifying products, processes and services within the scope of agriculture, forest, land use and biodiversity.....CFR-LUB CS requires that <u>certification bodies conduct audits in accordance with:</u> o The standard ISO/IEC 17065- Conformity assessment -- Requirements for bodies certifying products, processes and services; or the standard ISO/IEC 17021-1 Conformity assessment – Requirements for bodies providing audit and certification of management systems – Part 1: Requirements; and o The standard ISO 19011- Guidelines for auditing management systems.</p>
<u>Outsourcing</u>				<p><u>Outsourcing:</u> Outsourced resources must meet the same legal, accreditation and audit requirements as the certification bodies....</p>
<u>Transparency of the scheme (and its documentation)</u>	<p><u>Assessment protocol: 7.15</u> <u>Transparency: voluntary schemes shall make available information that is relevant for the operation of the system or for transparency purposes.</u> This includes in particular: Information on the governance structure of the voluntary schemes, list of economic operators...The latest version of scheme documents including the guidelines for audits..... <u>Draft Implementing Regulation -</u></p>	<p><u>Management criteria:</u> The scheme is publicly available or accessible under fair, reasonable and non-discriminatory conditions.</p>	<p><u>Transparency:</u> SCS ensures that the following information is made publicly available on a website:....list economic operators, recognized certification bodies.....</p>	<p><u>Transparency:</u> Each CFR-LUB CS ensures that <u>the following information is made publicly available and maintained up-to-date (on a website):</u>... documentation is translated in the applicable languages...list of feedstock producers....Information on the withdrawal or suspension of certificates...</p>

	Article 6: Publication of information by voluntary schemes			
Transparency on other scheme participation	<u>Assessment protocol: 7.7 Transparency on other voluntary scheme participation by economic operators</u> <u>Draft Implementing Regulation - Article 7: Change of scheme by economic operators</u>	Verification protocol: 2.6.5: it should still be clear how the forest was certified, even if the other links in the chain have transferred the biomass consignment under another approved scheme certificate that changed the name of the claim on the biomass.	<u>Requirement by SCS on economic operators: SCS requires all economic operators to declare the names of all SCS under which they are and/or were certified</u> and make available to the auditors all information relevant to those certifications.	
<u>Specific auditing requirements for GHG, mass balance and waste and residues</u>				
<u>Specific aspects related to auditing of: waste and residues</u>	<u>Assessment protocol: 7.8 Specific aspects relevant for wastes and residues</u> (OPTIONAL - only relevant when wastes and residues are within scope). For example: All economic operators need to be audited individually. Group auditing approaches can only be considered at the origin of the chain of custody (e.g. restaurants)..requirement 7.4..... <u>Draft Implementing Regulation - Article 13: Auditing of waste and residues</u> <u>Draft Implementing Regulation - Article 21: Specific rules for waste and residues</u>			

<p><u>Specific aspects related to auditing of:</u> GHG emission calculations</p>	<p><u>Assessment protocol: 7.9 Specific aspects relevant for audits of actual GHG emission calculations</u> (OPTIONAL - only relevant when actual GHG emission calculations are within scope): Voluntary schemes shall provide to the European Commission timely access to actual GHG calculations certified under their voluntary scheme, upon request...and others....</p> <p><u>Draft Implementing Regulation - Article 14: Auditing of actual GHG emission calculations</u></p> <p><u>Draft Implementing Regulation - Article 20: Determining the GHG emissions of biofuels, biomass fuels and bioliquids</u></p>		<p><u>Transparency on Greenhouse Gas (GHG) reporting and accounting:</u> SCS will provide any information required by the relevant national authority related to GHG reporting.</p>	
<p><u>Specific aspects related to auditing of:</u> mass balance systems</p>	<p><u>Assessment protocol: 7.10 Specific aspects relevant for audits of mass balance systems:</u> The voluntary scheme shall ensure that economic operators make available to auditors all mass balance data in advance of the planned audit.....Specific requirements for auditor</p> <p><u>Draft Implementing Regulation - Article 15</u></p> <p>Audits of mass balance systems</p> <p><u>Draft Implementing Regulation - Article 18</u></p> <p>Traceability and Union database</p> <p><u>Draft Implementing Regulation - Article 19</u></p> <p>Implementation of the mass balance system</p>			

<u>Complaint procedure</u>	<u>Assessment protocol: 7.13 Complaint procedure:</u>Voluntary schemes are also required to set out the process for dealing with complaints made by third parties against economic operators and certification bodies.	<u>Management criteria:</u> The scheme manager has enforced effective procedures for <u>handling complaints and appeal</u> . Appeal is treated by persons that are not directly involved in the development and the management of the document.	<u>Complaint procedure:</u> SCS has a documented complaints procedure to respond to complaints received from clients, the public and other stakeholders about its CORSIA certification programme and fraud or potential fraud. (further defined)	<u>Complaint procedure:</u> CFR-LUB CS has and maintains a documented complaints procedure to respond to complaints received from clients.....
Requirements for certification schemes to facilitate their supervision of operation of certification bodies and operators				
Schemes have procedures in place to facilitate supervision of the operation of certification bodies and operators	<u>Assessment protocol: 8.1</u> Supervision of operation of certification bodies (Article 30(9): Voluntary schemes must ensure via certification procedures as well as contractual arrangements with participating operators and certification bodies that Member States can supervise the operation of certification bodies as set out under Article 30(9) of the Directive. 8.2 Support for the Commission in fulfilling its duties set out in Article 30(8) and Article 30(10). <u>Draft Implementing Regulation - Article 17</u> Supervision by the Member States and the Commission			
<u>(Annual) reporting by schemes to facilitate supervision</u>	<u>Assessment protocol: 8.3</u> Annual reports		<u>Annual reports:</u> Recognized SCS submits annually a report to ICAO that includes relevant information.	<u>Reporting:</u> Approved CFR-LUB CS must submit annually a report to ECCC that includes relevant information concerning the operation of the scheme.....



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