Sustainability requirements for biofuels and biomass for energy in EU and US regulatory frameworks
Colofon

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This study was carried out in the framework of the Netherlands Programmes Sustainable Biomass by

Name organisation Partners for Innovation BV
Contact persons Emiel Hanekamp, Peter Vissers and Ander Paz

Although this report has been put together with the greatest possible care, NL Agency does not accept liability for possible errors.
Contact

Netherlands Programmes Sustainable Biomass

Ella Lammers and Maartje op de Coul
NL Agency
NL Energy and Climate Change
Croeselaan 15, 3521 BJ Utrecht
P.O. Box 8242, 3503 RE Utrecht
The Netherlands
Email: ella.lammers@agentschapnl.nl
Phone: +31.88.6022569
www.agentschapNL.nl/biomass

Partners for Innovation BV

Emiel Hanekamp, Ander Paz and Peter Vissers
Partners for Innovation BV
Cruquiusweg 20
1019 AT Amsterdam
The Netherlands
Email: e.hanekamp@partnersforinnovation.com
Phone: +31.20.6200511
www.partnersforinnovation.com
Guidance for the reader

This document provides organisations and projects involved in the production of biofuels and biomass for energy purposes, information on the sustainability requirements imposed by the EU and the US regulatory framework for biofuels, biomass for energy purposes and illegal wood.

This study has been carried out for NL Agency in the period November 2010 to May 2011.

In Chapter 1 ’Introduction’, the background, objective and approach of this study are presented. Chapter 2 ’Introduction to important EU and US regulatory frameworks’ provides a first introduction to the relevant legislative frameworks. Chapter 3 ’Sustainability requirements of regulatory frameworks’ explains in detail the sustainability requirements of the different frameworks. Also addressed are how these frameworks cope with indirect land-use change and biofuels from waste and residues. Chapter 4 describes the conclusions and recommendations, specifically aimed at biomass and biofuel producers.

This report expresses the opinion of the authors, and not necessarily NL Agency’s views.

The information for this report was compiled with the utmost care. Comments or suggestions on the information presented in this report are highly welcomed: please contact the authors to share your views. The authors cannot be held responsible for the consequences of any errors or mistakes in the report.
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Definitions and abbreviations

AGNL  Agentschap NL (NL Agency)

Biofuels Within the RED biofuels are defined as liquid or gaseous fuel for transport produced from biomass

Bioliquids Within the RED bioliquids are defined as - liquid fuel for energy purposes other than for transport, including electricity and heating and cooling, produced from biomass

Bg  billion US gallons

CA  California

CARB  California Air Resources Board

CO2  Carbon dioxide

CO2-eq.  Carbon dioxide equivalent

EC  European Commission

EISA  US Energy Independence and Security Act

EPA  US Environmental Protection Agency

EPAct  Energy Policy Act

EU  European Union

FLEGT  Forest Law Enforcement Governance and Trade

FQS  EU Fuel Quality Standard

US gallon 3,785 litre

GHG  Greenhouse gas

ILUC  indirect land-use change. Explanation: Biofuel feedstock may be produced on land directly converted from another status to agricultural land. The carbon emissions from such land-use change have to be included in the overall calculation of greenhouse gas emissions of the specific biofuel, in order to determine if it meets the sustainability criteria. However, if it is instead cultivated on existing agricultural land, it may then displace other crop production some of which ultimately may lead to conversion of land into agricultural land. Through this route, the extra biofuel demand can lead indirectly to land-use change, from which the term indirect land-use change is derived. This indirect effect
manifests itself through a change in demand for agricultural commodities, and their substitutes, in global markets.

LCA  Life cycle analysis
LCFS  Low Carbon Fuel Standard
MJ  Mega joule
N2O  Nitrous oxide
RED  EU Renewable Energy Directive
RFS  US Renewable Fuel Standard
US  United States of America
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Executive summary

This report provides organisations and projects involved in the production of biofuels and biomass for energy purposes, information on the sustainability requirements imposed by the regulatory framework for biofuels, biomass for energy purposes and illegal wood in the European Union (EU) and the United States of America (US).

Specifically addressed are the following regulatory frameworks:
- EU Renewable Energy Directive (RED) and Fuel Quality Directive;
- EU Timber Regulation;
- US Renewable Fuel Standard (RFS) and California Low Carbon Fuel Standard (LCFS);
- US legislation on illegal logging (Lacey Act).

For each of these regulatory frameworks, the report describes:
- the legislative framework in general;
- the sustainability requirements imposed on biofuels;
- how these frameworks cope with indirect land-use change, and;
- how the frameworks deal with biofuels from waste and residues.

A comparison of the above frameworks leads to the following conclusions:

1. **EU and US biofuel legislative frameworks are incomparable** looking at the overall structure, definitions used, sustainability requirements, reporting methodology and reporting requirements. The most important differences are related to the GHG emission reduction targets and calculation methodology.
2. **Exporting biomass or biofuels to the EU is easier than to the US** as:
   - Under the US RFS2, foreign exporters have to deal with additional administrative and reporting requirements, unlike the EU RED;
   - For exporters to the US it is unclear how to demonstrate that feedstock complies with the renewable biomass requirement;
   - In the US both federal and state regulations can be applicable (or will be), whilst in the EU only the RED is applicable;
   - The US has illegal logging legislation in place. This is not yet the case in the EU, although this will follow in March 2013.
3. **Solid biomass for energy purposes, exported to the EU and the US, is confronted with additional sustainability requirements**: the US Lacey Act already imposes additional sustainability and reporting requirements on woody biomass. In the EU the Timber and EU FLEGT Regulation will follow in March 2013.

Our recommendations to biofuel producers are:
1. When aiming to export biofuels or biomass for energy to both EU and US, it is recommended to thoroughly investigate the requirements of both legislative frameworks and their effects on the operational costs.
2. When considering exporting biomass or biofuels to the US one should carefully weigh the advantages and disadvantages.
3. Biomass and biofuel producers, using woody biomass, are recommended to investigate the relevant additional sustainability requirements.
1 Introduction

1.1 Background
The use of biomass as an energy source forms part of the transition to a sustainable energy supply system. However, the large-scale use of biomass can have negative effects on biodiversity, the position of the poor, and food supplies, as well as negative climate effects.

Regulatory developments, especially in the European Union (EU) and in the United States of America (US), have recently addressed the sustainability of biomass more prominently.

In the US and in the EU legislation for biofuels is already in force a few years and new legislation for woody biomass is in force (US), or will become in force (EU), addressing illegal logging.

Through various regulations and programmes NL Agency facilitates and stimulates projects and supplementary research in order to gain experience in the production and certification of sustainable biomass:

- The Sustainable Biomass Import programme (by order of the Ministry of Economic Affairs, Agriculture and Innovation).
- The Global Sustainable Biomass programme (by order of the Ministry of Foreign Affairs).

Biomass projects are also included in several other programmes of NL Agency, such as the Daey Ouwens Fund for small-scale renewable energy projects in developing countries (by order of the Ministry of Foreign Affairs).

The Netherlands Programmes for Sustainable Biomass bundles the knowledge from the biomass project portfolio of NL Agency and fills the knowledge gaps with supplementary research.

1.2 Objective
This document provides organisations and projects involved in the production of biofuels and biomass for energy purposes, information on the sustainability requirements imposed by the EU and US regulatory frameworks for biofuels, biomass for energy purposes and illegal wood.

Specifically addressed are the following regulatory frameworks:

- EU Timber Regulation and FLEGT Regulation
- US Renewable Fuel Standard and federal Low Carbon Fuel Standards
- US legislation on illegal logging (Lacey Act)

1.3 Project approach
The information provided in this report is based on desk research as well as on interviews and interactions with a number of EU and US stakeholders.
Introduction to important EU and US regulatory frameworks

Regulatory developments, especially in the EU and US, have recently addressed the sustainability of biomass more prominently. Biomass in relation to biofuels and illegal logging has had specific attention as the related sustainability issues are considered essential.

The development of biofuels raises issues of Food versus Fuel, Land Availability, GHG-impact, Environmental Impact and potential Indirect Land-use Change (ILUC). Also illegal logging has important sustainability issues: in economic terms, for example, illegal logging results in lost revenues and other foregone benefits. In environmental terms, illegal logging is associated with deforestation, climate change and a loss of biodiversity. In social terms, illegal logging can be linked to conflicts over land and resources, the disempowerment of local and indigenous communities, corruption and armed conflicts.

The following regulatory frameworks are considered most important and discussed hereafter:
- EU Timber Regulation and FLEGT Regulation
- US Renewable Fuel Standard and federal Low Carbon Fuel Standards
- US legislation on illegal logging (Lacey Act)

2.1 EU legislation for biofuels and biomass for energy purposes

In 2003 the EU Biofuels Directive compelled EU Member States to make all efforts to introduce biofuels to the road transport sector. According to this legislation, in 2005 some 2% of the energy-content of fossil fuels had to consist of biofuels, increasing each year to 5.75% in 2010. These percentages were indicative targets. Member States were not obliged to achieve these amounts.

In 2009 the EU introduced binding sustainability criteria for biofuels and bioliquids under the Renewable Energy Directive (RED)\(^1\) and Fuel Quality Directive (FQD)\(^2\). These criteria – being identical in RED and FQD – apply to biofuels and bioliquids both produced in the EU and imported to the EU. EU Member States are responsible for ensuring that the sustainability criteria are met by economic operators. Member States had until 31 December 2010 to transpose both Directives into national law.

In 2020, at least a 20 % share in the Community's gross final consumption of energy shall come from renewable sources. RED establishes a common framework for the promotion of energy from renewable sources. In its core it sets mandatory national targets of how much each Member State will have to contribute to the 20 % target, and it defines an extra target for the transport sector of 10 % from renewable sources, being the same for each Member State. As this special 10 % target will for the largest part be covered by biofuels, the RED sets sustainability criteria for biofuels and bioliquids. These criteria – being identical in the Fuel Quality Directive – refer to the protection of land with high

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1 Directive 2009/28/EC
2 Directive 98/70/EC as amended by Directive 2009/30/EC
ecological value, greenhouse gas emission savings, and the socio-economic impact.

The FQD also sets targets to reduce fuel’s life cycle greenhouse gas emissions. It places the responsibility of reducing greenhouse gas emissions during the life cycle of fuel on fuel suppliers:

1. From 2011 fuel suppliers will be bound to report annually to Member States on the life cycle greenhouse gas emissions per unit of fuel supplied.
2. Suppliers will have to gradually reduce fuel greenhouse gas emissions of 6% by 2020. Member States may choose to expand this reduction up to 10%. They may also choose to set the intermediate targets of 2% by 2014 and 4% by 2017.
3. Suppliers will also have to reach an additional indicative reduction target of 2% by 2020 by either supplying electric vehicles or using greenhouse gas reducing technologies (including carbon capture and storage technology).
4. Another indicative target of 2% by 2020 is to be achieved by the purchase of credits through the Clean Development Mechanism under the Kyoto Protocol. The last two targets are subject to review.

In addition the FQD aims at reducing the emission of key air pollutants released during the production and combustion of fuel and therefore sets technical specifications for the content of fuels used in road vehicles and non-road mobile machinery (including inland waterway vessels), tractors and recreational craft.

In order to reduce the administrative burden for economic operators, they can use recognised ‘voluntary certification or verification schemes’ to show compliance with the set sustainability criteria. The European Commission (EC) has established a procedure to assess whether a voluntary scheme fulfils the sustainability requirements. The EC is currently assessing a number of schemes and expects to make the results of the assessment public in the course of 2011.

For solid and gaseous biomass used in electricity, heating and cooling, there are no binding criteria at EU level. Further to the concern that increasing imports from third countries may lead to the unsustainable production of biomass, the main importing countries of biomass started to develop national sustainability requirements for bio-energy. This has led to various national and sometimes regional certification schemes (voluntary and mandatory) in the agriculture, forestry and energy sectors. In 2010 the EC has made recommendations to EU Member States on the development of these sustainability schemes. The EC will report by 31 December 2011 on whether the national schemes have sufficiently and appropriately addressed the sustainability criteria, and whether these schemes have led to barriers to trade and to the development of the bio-energy sector. It will, inter alia, consider if additional measures such as common sustainability criteria at EU level would be appropriate.

2.2 EU legislation on illegal logging

The European Union's policy to fight illegal logging and associated trade was defined back in 2003 with the Forest Law Enforcement Governance and Trade (FLEGT) Action Plan. This Action Plan has led to two key pieces of legislation:

3 Communication from the Commission (2010/C 160/01)
4 Source: report from the Commission on sustainability requirements for the use of solid and gaseous biomass sources in electricity, heating and cooling (COM(2010)11)
1. **FLEGT Regulation** adopted in 2005, allowing for the control of the entry of timber to the EU from countries entering into bilateral FLEGT Voluntary Partnership Agreements with the EU;

2. **EU Timber Regulation**, adopted in October 2010, as an overarching measure to prohibit placing of illegal timber and timber products on the internal market.

The FLEGT Action Plan aims to improve governance and reduce illegal logging by strengthening sustainable and legal forest management, improving governance and promoting trade in legally produced timber. A key element of the FLEGT Action Plan is that voluntary schemes ensure that only legally harvested timber is imported into the EU from countries agreeing to take part in this scheme. Once agreed, voluntary schemes shall include commitments and action from both parties to halt trade in illegal timber, notably with a license scheme to verify the legality of timber exported to the EU.

As of 3 March 2013, the EU Timber Regulation will prohibit the first placing of illegally produced wood products on the EU market. This Regulation is laying down the obligations of operators who place timber and timber products on the EU market.

The Regulation covers trade in timber products on the EU market and applies to both imported and domestically produced timber. The exact scope of products covered by the legislation is listed in the annex to the Regulation and covers most timber products commonly traded in the EU except for recycled products.

The Timber Regulation sets out procedures which, those trading timber within the EU, must put in place to minimise the risk of illegal timber being sold. The detailed rules are still being developed by the European Commission and Member States so things may change. In particular, the secondary legislation setting out the rules for implementation in more detail is only due to be finalized in 2012.

**2.3 US legislation for biofuels**

Growing concerns in the United States of America (US) over climate change and national energy security renewed the need to develop clean biofuels from abundant domestic biomass.

There are two major low carbon fuel policies in place in the United States: the US Renewable Fuel Standard (RFS2) and the California Low Carbon Fuel Standard (CA-LCFS). RFS2 regulates renewable fuels (biofuels) in the entire US while CA-LCFS covers both renewable and non-renewable fuels in California. Both RFS2 and CA-LCFS rely on life cycle analysis (LCA) as a tool to regulate fuels, incorporating greenhouse gas (GHG) emissions from indirect land-use change (ILUC) in their LCA framework.

In addition to CA-LCFS and RFS2, efforts are underway to establish regional low carbon fuel standards in Northeast and Mid-Atlantic States, as well as in Midwestern states.

- A consortium of eleven Northeast and Mid-Atlantic states is pursuing a low carbon fuel standard, with the intention of reducing GHG emissions from bioenergy, life cycle analysis and environmental policy.
transportation and potentially heating fuel. Governors from these states signed a Memorandum of Understanding in 2009. The states agreed to develop a framework for a low carbon fuel standard that takes economic and environmental impacts, including indirect land-use change, into account. The proposed LCFS, currently in conceptualization and design phase, with ample room for market mechanisms for achieving compliance.
- Oregon published its draft LCFS report for public comment on November 8, 2010.
- The Midwestern Governors Association (MGA), which consists of ten Midwestern states\(^9\), has begun exploring the idea of low carbon fuel policy. These regional initiatives are likely to be modeled after the California LCFS.

The RFS2 is a volumetric standard with the aim to significantly increase biofuel use in the US to 36 billion gallons (136 billion litres) by 2022. The CA-LCFS is a carbon-intensity-based, fuel neutral standard and aims to reduce GHG emissions from the transportation sector in California by 10%, or approximately 16 Million Metric Tons (MMT) CO\(_2\)-eq. per year by 2020.

Economic operators have to oblige both the federal and state legislation.

### 2.3.1 US National Renewable Fuel Standard

The 2005 Advanced Energy Initiative and the 2007 Energy Independence and Security Act (EISA) set ambitious goals for moving biofuels into the marketplace to reduce US dependence on foreign sources of energy and reduce greenhouse gas emissions from the transportation sector.

On February 3, 2010, the United States Environmental Protection Agency (EPA) finalized revisions to the National Renewable Fuel Standard\(^10\). The new rule (RFS2) is a major amendment of the original standard (RFS1) created under the Energy Policy Act of 2005 and incorporates changes mandated by the EISA of 2007. The RFS program regulations were developed in collaboration with refiners, renewable fuel producers, and many other stakeholders. The Environmental Protection Agency (EPA) is responsible for developing and implementing the RFS regulations.

RFS2 represents a hybrid approach that superimposes a performance-based standard on a set of volumetric targets. In contrast to RFS1, which was limited to gasoline, the new rule expands the RFS program to cover gasoline and diesel intended for use in highway and nonroad vehicles and engines. RFS2 classifies renewable fuels according to four nonexclusive categories, based on GHG-reduction thresholds and feedstock types, and sets volumetric requirements for each.

Each November the EPA is required to determine the amount of cellulosic biofuel that will be produced for use in transportation for the following year and may also opt to revise the volumetric requirements for advanced biofuel and renewable fuel if required.

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9  The ten states are Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Ohio, South Dakota and Wisconsin
10  2011 Renewable Fuel Standards, Federal Register / Vol. 75, No. 236, 09 December 2010
Each year, obligated parties refiners and importers of gasoline and diesel and blenders are required to meet volumetric targets for four broad categories of biofuels: (1) renewable fuels; (2) cellulosic biofuels; (3) bio-based diesels; and (4) advanced biofuels. These biofuels categories are defined based on (1) the type of feedstock used, (2) the types of land that can be used to grow and harvest the feedstock, (3) the technology used in production and (4) minimum GHG reduction thresholds.

The combination of volumetric targets, corresponding GHG-reduction threshold requirements, and incorporation of GHG emissions from indirect land-use change is expected to reduce annual GHG emissions by 138 million metric tons (MMT) CO2-eq. in 2022.

US renewable fuel producers have reporting obligations based on default values established per feedstock. For feedstock not produced in the US, producers need to comply with specific recordkeeping and reporting requirements showing that the feedstock complies with the requirements. Reporting has to oblige EPA guidelines and has to be submitted to EPA.

Renewable fuel importers who import less than 10,000 gallons (37,850 litres) of renewable fuel each year (and producers located within the US that produce less than 10,000 gallons of renewable fuel each year), are not required to meet the set volumetric targets. Such importers and producers are also exempt from all requirements of the Renewable Fuel Standard, except:
1. The registration requirements.
2. The recordkeeping requirements.
3. The reporting requirements.
4. The attest engagement requirements.

2.3.2 California Low Carbon Fuel Standard
California Governor Arnold Schwarzenegger created the California Low Carbon Fuels Standards (CA LCFS) by Executive Order on January 18, 2007.
In 2011 the California LCFS entered into compliance phase. Regulated parties, broadly defined as fuel producers and importers and including some owners of alternative fuels or alternative fuel sources, are required to reduce the carbon intensity of their fuels by an average of 1% per year until 2020.

These reductions include not only tailpipe emissions but also all other associated emissions from production, distribution and use of transport fuels within the state. Therefore, California LCFS considers the fuel’s full life cycle, also known as the "well to wheels" or "seed to wheels" efficiency of transport fuels. The standard is also aimed to reduce the state’s dependence on petroleum, create a market for clean transportation technology, and stimulate the production and use of alternative, low-carbon fuels in California.

The California Air Resources Board (CARB) is responsible for the implementation of CA-LCFS. CARB calculates current carbon intensities of various fuel pathways and sub-pathways and lists them in look-up tables.

Regulated parties are required to report quarterly and annually, via CARB’s online LCFS Reporting Tool, on the volume and carbon intensity of their obligated fuels.

2.4 US legislation for illegal logging

In the US legislation for woody biomass is in force addressing illegal logging.

As of 1 October 2010, the amended US Lacey Act is in force for all plants, including roots, seeds, parts thereof and their products — including timber, wood, and paper products. Common cultivars (except trees) and common food crops are excluded.

The purpose of the Act is to:
1. Prevent trade in illegally harvested lumber.
2. Prevent trade in wood products made from illegally harvested lumber.

Any person or company that import, export, transport, sell, receive, acquire, or purchase plants and their products in the US is affected by the Act.

The Lacey Act bans commerce in illegally sourced plants and their products. It is each company’s responsibility to exercise “due care” and understand the origin of its forest products, keeping in mind that a Lacey Act violation can occur at almost any point in a forest product supply chain.

3 Sustainability requirements of regulatory frameworks

In this chapter we specifically address the sustainability requirements of the identified regulatory frameworks:
- EU Timber Regulation
- US Renewable Fuel Standard\(^{12}\) and California Low Carbon Fuel Standard\(^{13}\)
- US legislation on illegal logging (Lacey Act)

This includes how these frameworks cope with indirect land-use change (ILUC) and with biofuels from waste and residues.


As the sustainability requirements for RED and FQD are identical they will be jointly discussed in this paragraph. The FQD technical specifications – aimed at reducing key air pollutants – will not be further addressed as they are of less importance for the biomass producers, to which the present report is directed.

3.1.1 Sustainability requirements

If biofuels are to be counted towards the renewable energy targets, they must meet certain sustainability criteria. This also applies if biofuels are to count towards the biofuel requirements and if they are to be eligible for financial support. These sustainability criteria apply to both biofuels and bioliquids.

The sustainability criteria are:
1. Minimum GHG emission savings
2. No raw materials obtained from land with high biodiversity values or land with high carbon stock or land that was peatland in 2008.
3. Raw materials cultivated in the European Community shall be obtained in accordance with the cross-compliance requirements and standards\(^{14}\).

Companies are also required to report on "appropriate and relevant information on measures taken for soil, water and air protection, the restoration of degraded land, the avoidance of excessive water consumption in areas where water is scarce and appropriate and relevant information concerning measures taken in order to take into account the impacts on: social sustainability, the availability of foodstuffs at affordable prices and land-use rights".

Minimum GHG emission savings

The greenhouse gas emission saving shall be at least 35 % from 1 January 2011. In the case of biofuels and bioliquids produced by existing installations, that were in operation on 23 January 2008, this shall apply from 1 April 2013.

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12 http://ecfr.gpoaccess.gov, TITLE 40--Protection of Environment, CHAPTER I--ENVIRONMENTAL PROTECTION AGENCY, SUBCHAPTER C--AIR PROGRAMS, PART 80--REGULATION OF FUELS AND FUEL ADDITIVES
14 Farmer's receiving Common Agricultural Policy payments or other Rural Development Scheme payments, must meet cross compliance requirements. These requirements apply across all farming activities - with the majority falling into the following key areas: record keeping, soil management, cultivation and ploughing, spraying and spreading, harvesting and post-harvesting activities, keeping livestock, maintaining landscapes and protecting habitats. Standards of good agricultural and environmental condition (GAECs) and/or Statutory Management Requirements (SMRs) apply to each key farming activity.
With effect from 1 January 2017, the greenhouse gas emission shall be at least 50 % and from 1 January 2018 that greenhouse gas emission saving shall be at least 60 % for biofuels and bioliquids produced in installations in which production started on or after 1 January 2017.

The reduction in greenhouse gas emissions must be measured throughout the entire chain, from raw materials to end-use, and compared to fossil fuels. The greenhouse gas emission saving shall be calculated in accordance with Article 19-1 of the RED and Article 7-quinquies of the FQD.

Origin of raw materials
The RED and FQD stipulate that biofuels and bioliquids shall not be made from raw materials obtained from land with high biodiversity value, namely land that had one of the following statuses in or after January 2008, whether or not the land continues to have that status:

(a) primary forest and other wooded land, namely forest and other wooded land of native species, where there is no clearly visible indication of human activity and the ecological processes are not significantly disturbed;
(b) areas designated:
   (i) by law or by the relevant competent authority for nature protection purposes; or
   (ii) for the protection of rare, threatened or endangered ecosystems or species recognised by international agreements or intergovernmental organisations;
   unless evidence is provided that the production of that raw material did not interfere with those nature protection purposes;
(c) highly biodiverse grassland that is:
   (i) natural, namely grassland that would remain grassland in the absence of human intervention and which maintains the natural species composition and ecological characteristics and processes; or
   (ii) non-natural, namely grassland that would cease to be grassland in the absence of human intervention and which is species-rich and not degraded, unless evidence is provided that the harvesting of the raw material is necessary to preserve its grassland status.

The RED and FQD stipulate also that biofuels and bioliquids 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, namely land that is covered with or saturated by water permanently or for a significant part of the year;
(b) continuously forested areas, namely land spanning more than one hectare with trees higher than five metres and a canopy cover of more than 30 %, or trees able to reach those thresholds in situ;
(c) land spanning more than one hectare with trees higher than five metres and a canopy cover of between 10 % and 30 %, or trees able to reach those thresholds in situ, unless evidence is provided that the carbon stock of the area before and after conversion is such that, when the described greenhouse gas emission calculation methodology is applied, the greenhouse gas emission reductions are fulfilled.

The above provisions shall not apply if, at the time the raw material was obtained, the land had the same status as it had in January 2008.
Biofuels and bioliquids shall not be made from raw material obtained from land that was peatland in January 2008, unless evidence is provided that the cultivation and harvesting of that raw material does not involve drainage of previously undrained soil.

Some definitions are not yet entirely available, such as the definition of highly biodiverse grassland, and shall become available on the EC transparency platform after adoption through the EC Comitology process.

### 3.1.2 Indirect Land-Use Change

There are currently no requirements in the RED and the FQD (further referred to as ‘the Directives’) that oblige companies to take ILUC into consideration. However the Directives both contain provisions on monitoring and limiting the possible ILUC effects, and also give the Commission the task to further explore the issue, in order to establish the most appropriate mechanism for minimising ILUC.

The Directives require the Commission to report to the European Parliament and to the Council by 31 December 2010, reviewing the impact of indirect land-use change on greenhouse gas emissions and addressing ways to minimise that impact. If appropriate, the report should be accompanied by a proposal, based on the best available scientific evidence, containing a concrete methodology for emissions from carbon stock changes caused by indirect land-use change.

On 22nd December 2010 the report to the European Parliament and to the Council has been published. The Commission basically indicates that it will continue work on ILUC and refers to its impact assessment of several policy options, which shall be published not later than July 2011. More details about the conclusions of this EC report are presented in the following text block.

Figure 2 Preliminary conclusions: European Commission (2010). Report COM(2010) 811 final of 22 December 2010 on indirect land-use change related to biofuels and bioliquids

As far as indirect land-use change is concerned, based on the work carried out to date, the Commission believes it is possible to draw a number of conclusions. The Commission recognises that a number of deficiencies and uncertainties associated with the modelling, which is required to estimate the impacts, remain to be addressed, which could significantly impact on the results of the analytical work carried out to date. Therefore, the Commission will continue to conduct work in this area in order to ensure that policy decisions are based on the best available science and to meet its future reporting obligations on this matter.

However, the Commission acknowledges that indirect land-use change can have an impact on greenhouse gas emissions savings associated with biofuels, which could reduce their contribution to the policy goals, under certain circumstances in the absence of intervention. As such, the Commission considers that, if action is required, indirect land-use change should be addressed under a precautionary approach.

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15 The requirement in the Renewable Energy Directive also applies to bioliquids. As such, references to biofuels in this report will also apply to bioliquids where appropriate.


The discussion on how to deal with ILUC is vivid and still ongoing. We refer to a recent study for the European Parliament\(^{18}\) stating that ‘the Commission report is rather brief and should be seen as an interim product only as it does not address several issues’. It also concludes that ILUC is a significant contributor to GHG emissions from biofuels, and can be taken into account based on the current scientific knowledge:

“Overall, the EC models give clear evidence that \textbf{ILUC is a significant contributor to GHG emissions from biofuels}, and underline that there are several options to reduce ILUC effects. With regard to the ILUC factor, the study also reflects other relevant scientific work, and, based on the assessment of the EC studies and this additional work, concludes that the current scientific knowledge allows deriving a valid quantitative approximation for GHG emissions from ILUC effects which can be differentiated for various biofuels.”

3.1.3 Waste and residues

The Directives treat biofuels and bioliquids from waste and residues somewhat differently than other biomass feedstocks.

Biofuels and bioliquids produced from waste and residues, other than agricultural, aquaculture, fisheries and forestry residues, only need to fulfil the GHG sustainability criteria. Calculating the GHG impact is made much easier as many typical and default values for biofuels and bioliquids from waste and residues are already provided for in the Annexes (V for RED and IV for FQD) of the Directives. The Directive also mentions several co-products (points 16, 17 and 18 of part C ‘Methodology’ of the Annexes) of which the energy content (for calculation purposes) is set at zero, and thus these should not be included in the calculations.

Another advantage of biofuels and bioliquids from waste and residues (as well as from non-food cellulosic material and ligno-cellulosic material) is that the contribution made by these biofuels shall be considered to be twice that made by other biofuels (the double counting rule\(^{19}\)).

Legal certainty for operators calls for a precise and unambiguous definition of products to be considered as waste, residues and by-products (or residues) from agricultural, aquaculture, fisheries and forestry, under the RED, and ideally a comprehensive list of those. This will enable operators to know whether their biofuels will count double towards the EU targets and whether GHG emissions from

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19 Not all countries have implemented this rule.
biofuels can or cannot be allocated to a specific product within the production chain. Such precise and unambiguous definition is not yet available.

3.2 EU Timber Regulation
As the rules for implementation of the EU Timber Regulation are still being developed by the European Commission and EU Member States, it is not yet possible to provide exact details on the (sustainability) requirements put on economic operators. In particular, the secondary legislation setting out the rules for implementation in more detail is only due to be finalized in 2012. The latest information on the EU Timber Regulation can be found at http://ec.europa.eu/environment/forests/timber_regulation.htm.

The following information is based on currently available information from the text of the EU Timber Regulation and other publicly available information, especially Proforest in the United Kingdom20.

The regulation applies to two types of organisations within the EU timber supply chain. The bulk of the requirements apply to whoever first places the timber product on the EU market (further referred to as operators). In addition there are also requirements for traceability for other participants (traders) in the supply chain prior to sale to the final consumer. In this report we will only address the requirements for operators, as this report is addressed to biomass producers and not to traders.

Requirements for operators: It is prohibited to place timber (including forest residues) on the EU market if it was illegally harvested. Anyone placing timber or timber products onto the EU market for the first time must implement a due diligence system to mitigate the risk that the timber was illegally harvested.

The regulation sets out the basic components of the due diligence system which must be in place. This will be further elaborated by secondary legislation being developed by the European Commission due to be finalised by June 2012. The due diligence system consists of three main components:

1. Information: There are specific requirements for the type of information which must be available including information on the product and supplier, the country where the timber was harvested and information on compliance with applicable forestry legislation in the country of harvest. It is important to note that the operator does not have to have all this information directly, but needs to have ready access to it in order to make a risk assessment.

2. Risk assessment procedure: Each operator is required to have a risk assessment procedure which takes into account the information collected about the product and also relevant risk criteria. Risk criteria include indicators of high risk such as prevalence of illegal harvesting in the country of harvest or long and complex supply chains, as well as indicators of low risk such as certification or credible verification of legality.

3. Risk mitigation procedures: If the risk assessment indicates that there is some risk of a product containing illegally harvested timber, risk mitigation procedures must be put in place. The regulation does not provide much guidance on what these should be but does indicate that they should be adequate and proportionate and might involve requesting further information.

20 http://www.proforest.net; Part 1 of the EU timber regulation briefing notes, April 1, 2011
### 3.3 US RFS2

#### 3.3.1 Sustainability requirements

The sustainability requirements in RFS2 set restrictions on:
- the GHG emissions of renewable fuels;
- the types of feedstock used;
- the types of land that can be used to grow and harvest the feedstocks.

The last two are combined in one “renewable biomass” requirement.

Every 3 years, EPA shall assess and report to Congress on the impacts of the RFS2 requirements on:

1. Environmental issues, including air quality, effects on hypoxia, pesticides, sediment, nutrient and pathogen levels in waters, acreage and function of waters, and soil environmental quality.
2. Resource conservation issues, including soil conservation, water availability, and ecosystem health and biodiversity, including impacts on forests, grasslands, and wetlands.
3. The growth and use of cultivated invasive or noxious plants and their impacts on the environment and agriculture.

EPA will use existing, non RFS2, policies and legislative frameworks to mitigate possible impacts.

#### GHG reduction thresholds

A significant aspect of the RFS2 program is the requirement that the lifecycle GHG emissions of a qualifying renewable fuel must be less than the lifecycle GHG emissions of the 2005 baseline average gasoline or diesel fuel that it replaces. Four different levels of reductions are required for the four different renewable fuel standards. These lifecycle performance improvement thresholds are listed in the table below:

*Figure 3  Lifecycle GHG Thresholds Specified in EISA (Percent reduction from 2005)*

<table>
<thead>
<tr>
<th>Fuel</th>
<th>Reduction*</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renewable fuel**</td>
<td>20%</td>
<td>Fuel produced from renewable biomass and that is used to replace or reduce the quantity of fossil fuel present in a transportation fuel.***</td>
</tr>
<tr>
<td>Advanced biofuel</td>
<td>50%</td>
<td>Renewable fuel other than ethanol derived from corn starch.</td>
</tr>
<tr>
<td>Biomass-based diesel</td>
<td>50%</td>
<td>A transportation fuel, transportation fuel additive, heating oil, or jet fuel, meeting the definition of either biodiesel or non-ester renewable diesel and registered as a motor vehicle fuel or fuel additive under the Federal Regulation. Renewable fuel that is co-processed with petroleum is not a biomass-based diesel.</td>
</tr>
<tr>
<td>Cellulosic biofuel</td>
<td>60%</td>
<td>Renewable fuel derived from any renewable cellulose, hemicelluloses, or lignin.</td>
</tr>
</tbody>
</table>

*Source: EPA Finalizes 2011 Renewable Fuel Standards, November 2010, EPA-420-F-10-056*

*from displaced gasoline / diesel (2005 baseline)*

**The 20% criterion generally applies to renewable fuel from new facilities that commenced construction after December 19, 2007.***

***Transportation fuel includes gasoline, diesel, heating fuel, and jet fuel. It can also include electricity, natural gas, and propane if it can be determined that the source of the fuel is renewable and the fuel is used for transportation.
Compliance with each GHG threshold requires a comprehensive evaluation of renewable fuels, as well as the baseline for gasoline and diesel, on the basis of their lifecycle emissions. As mandated by EISA, the greenhouse gas emissions assessments must evaluate the aggregate quantity of greenhouse gas emissions (including direct emissions and significant indirect emissions such as significant emissions from land use changes) related to the full lifecycle, including all stages of fuel and feedstock production, distribution and use by the ultimate consumer.

Greenhouse gas savings have been established by EPA for different types of biofuels (called 'specific fuel pathways') through consequential lifecycle assessment in order to determine whether they meet the relevant threshold (a type of biofuel either meets the threshold or it does not; economic operators do not have an alternative of showing evidence for any actual emissions).

Some ‘existing’ installations are exempted from the minimum 20% GHG reduction requirement for general renewable fuel. These facilities, as well as the fuel produced by them, are referred to as "grandfathered". The grandfathering provisions apply equally to facilities inside and outside the RFS program area (inside and outside the US).

It is important to note, however, that grandfathered facilities and fuels are only exempt from the minimum 20% GHG reduction requirement and are otherwise fully subject to RFS2 requirements. For example, fuel produced by grandfathered facilities does not qualify as renewable fuel under RFS2 unless it is produced from renewable biomass. Also, fuel from grandfathered facilities cannot qualify as advanced biofuel, cellulosic biofuel, or biomass-based diesel unless it is produced through a pathway that EPA has determined will result in an appropriate level of GHG reduction (50% or 60%).

Grandfathering for existing installations applies until 2022.

**Renewable biomass**

The definition of the term “renewable biomass” limits the types of biomass as well as the types of land from which the biomass may be harvested. The definition generally applies restrictions to two feedstock sectors: the agricultural sector (planted crops and crop residues) and the non-agricultural sector (planted trees and tree residues, animal waste material and by-products, slash and pre-commercial thinnings). These definitions affect feedstock use for production of compliant renewable fuels.

Renewable biomass means each of the following (including any incidental, de minimis contaminants that are impractical to remove and are related to customary feedstock production and transport):

1. Planted crops and crop residues harvested from existing agricultural land cleared or cultivated prior to December 19, 2007 and that was non-forested and either actively managed or fallow on December 19, 2007.
2. Planted trees and tree residues from a tree plantation located on non-federal land (including land belonging to an Indian tribe or an Indian individual that is held in trust by the US or subject to a restriction against alienation imposed by the US) that was cleared at any time prior to December 19, 2007 and actively managed on December 19, 2007.
3. Animal waste material and animal by-products.
4. Slash and pre-commercial thinnings from non-federal forestland (including forestland belonging to an Indian tribe or an Indian individual, that are held in trust by the United States or subject to a restriction against alienation imposed by the United States) that is not ecologically sensitive forestland.
5. Biomass (organic matter that is available on a renewable or recurring basis) obtained from the immediate vicinity of buildings and other areas regularly occupied by people, or of public infrastructure, in an area at risk of wildfire.

6. Algae.

7. Separated yard waste or food waste, including recycled cooking and trap grease, and separated municipal solid waste.

In the RFS2 rule, EPA included details applicable to renewable fuel producers which are necessary to implement the renewable biomass requirement. For foreign feedstocks, renewable fuel producers need to comply with specific recordkeeping and reporting requirements for their individual facilities by collecting and maintaining appropriate records from their feedstock suppliers that their feedstocks comply with the renewable biomass requirement.

For agriculturally-based feedstocks produced in the U.S., renewable fuel producers will be in compliance based on EPA’s aggregate compliance determination. EPA will monitor agricultural land data yearly and should the baseline level of approved agricultural land be exceeded, the individual recordkeeping and reporting requirements imposed on the non-agricultural sector would then be required. The program also provides an option for a similar, future aggregate determination for renewable fuel produced from foreign-based agricultural feedstocks, if the source region can provide sufficient data to support an effective aggregate analysis and monitoring program. Otherwise, foreign producers must verify using one of the approaches applied in the non-agricultural sector.

For both domestic and foreign non-agricultural sector feedstocks, renewable fuel producers can comply with specific recordkeeping and reporting requirements for their individual facilities by collecting and maintaining appropriate records from their feedstock suppliers that their feedstocks comply with the renewable biomass requirement. Producers may also, as an alternative to these individual recordkeeping and reporting requirements, opt to form a consortium to fund an independent third party to conduct annual renewable biomass quality-assurance surveys, based on a plan approved by EPA.

3.3.2 Indirect Land-Use Change

US EPA includes quantitative ILUC values in their regulations as the GHG analysis includes emissions from (indirect) land-use change.

To calculate the lifecycle GHG emissions of various fuels, EPA utilized models that take into account energy and emissions inputs for fuel and feedstock production, distribution, and use, as well as economic models that predict changes in agricultural markets and as a result national and international land-use change. In developing this analysis, EPA employed a collaborative, transparent, and science-based approach. Through technical outreach, the peer review process, and the public comment period, EPA received and reviewed a significant amount of data, studies, and information on their proposed lifecycle analysis approach. As a result EPA incorporated a number of new, updated, and peer-reviewed data sources in their final rulemaking analysis, including better satellite data for tracking land use changes and improved assessments of N2O impacts from agriculture.

While EPA is using its current lifecycle assessments to inform regulatory determinations in the final rule, they also recognize that as the state of scientific knowledge continues to evolve in this area, the lifecycle GHG assessments for a
variety of fuel pathways will continue to be enhanced. Therefore EPA is committing
to further reassessing these determinations and lifecycle estimates. As part of this
ongoing effort, they will ask for the expert advice of the National Academy of
Sciences, as well as other experts, and incorporate their advice and any updated
information EPA receives into a new assessment of the lifecycle GHG emissions
performance of the biofuels being evaluated in the final rule. EPA will request that
the National Academy of Sciences evaluate the approach taken in this rule, the
underlying science of lifecycle assessment, and in particular indirect land use
change, and make recommendations for subsequent lifecycle GHG assessments on
this subject. This new assessment could result in new determinations of threshold
compliance compared to those included in this rule. These would apply to future
production from plants that are constructed after each subsequent rule
incorporating a revised lifecycle assessment methodology.

3.3.3 Waste and residues
Waste and residues are directly included in the definitions of ‘renewable biomass’
and as such not treated different from other biomass feedstocks.

3.4 California LCFS
3.4.1 Sustainability requirements
At this moment the CA LCFS only includes a requirement for carbon intensity.
Regulated parties, broadly defined as fuel producers and importers, are required
to reduce the carbon intensity of their fuels by an average of 1% per year until
2020. Carbon intensity reductions are relative to a baseline of 95.86 g CO2 eq./MJ for
gasoline and 94.71 g CO2 eq./MJ for diesel, the average carbon intensity of the
2006 California crude mix. The California Air Resources Board (CARB) calculates current carbon intensities of
various fuel pathways and sub-pathways. The carbon intensity is calculated taking
the direct and indirect GHG emissions associated with each of the steps in the full
fuel cycle of a transportation fuel (also referred to as the "well-to-wheels" for fossil
fuels, or "seed or field-to-wheels" for biofuels). Depending on the circumstances,
GHG emissions from each step can include carbon dioxide (CO2), methane, nitrous
oxide (N2O), and other GHG contributors.
To be able to calculate the net reduction in carbon intensity, GHG emissions are
adjusted for vehicle efficiency using the energy economy ratios. As an example, an
electric power train is rated as 3 times more efficient than a conventional gasoline
engine.

CARB aims to develop sustainability provisions and compliance framework for the
LCFS to ensure that it does not create adverse environmental, societal, and
economic impacts. Currently (April 2011) the CARB LCFS Sustainability Expert
Workgroup is reviewing various sustainability standards, including the Roundtable
on Sustainable Biofuels, and assessing the local factors and conditions required to
develop appropriate sustainability provisions. The group will also make a
recommendation on how to incorporate sustainability provisions in the LCFS,
either as regulations within the LCFS or as policy guiding the LCFS. With regard to
compliance framework, the group will explore the possibility of benchmarking or
using existing standards for compliance including chain of custody verification and
reporting requirements. It is expected the LCFS Sustainability Expert Workgroup will report on these sustainability provisions by December 2011.

3.4.2 *Indirect Land-Use Change*
CA LCFS includes ILUC in their regulations. Lifecycle greenhouse gas emissions for all fuels within the scope of the CA LCFS need to be known for the legislation to function. Greenhouse gas emission factors have been developed for the various fuel pathways including (indirect) land-use change emissions.

The current greenhouse gas emission factors are based on the best currently available empirical data but averaged over extensive geographical areas. CARB has recently decided to re-evaluate its ILUC factors, taking into account the recommendations of the Expert Workgroup that CARB put in place to consider possible approaches to improving its land use change estimates.

3.4.3 *Waste and residues*
Waste and residues are not treated differently in CA LCFS, than other biomass feedstocks. Like the RFS2, the CA LCFS includes fuel pathways including waste and residues.

3.5 *US legislation on illegal logging (Lacey Act)*
To address illegal logging and other illegal plant trade, the (amended) Lacey Act does three main things:
1. Prohibits all trade in plants and plant products — including furniture, paper, and lumber — that are illegally sourced from any US state or foreign country;
2. Requires importers to declare the country of origin of harvest and species name of all plants contained in their products; and;
3. Establishes penalties for violations of the law, including forfeiture of goods and vessels, fines, and jail time.

There are two components to a violation of the Lacey Act:
1. A plant must be taken, harvested, possessed, transported, sold, or exported in violation of a relevant underlying law in any foreign country or in the United States. This constitutes an *illegally sourced plant*.
2. A person or company must trade this illegally sourced plant in US interstate or foreign commerce — in the act’s words, one must “import, export, transport, sell, receive, acquire, or purchase”. It is only this second transaction that triggers a violation of the Lacey Act.

"Illegally sourced" is defined by the content of a sovereign nation’s own laws or for the US any US state, territory, or tribal government, as well.

Companies are obliged to declare any import that falls under the Lacey Act declaration requirement. Even if a shipment is exempt from the Declaration Requirement – the Lacey Act is still in force and companies need to ascertain themselves they are not trading illegally sourced plants. It is each company’s responsibility to exercise "due care" and understand the origin of its forest products, keeping in mind that a Lacey Act violation can occur at almost any point in a forest product supply chain.

The Lacey Act is a fact-based rather than a document-based statute. If imported products turn out to be of illegal origin de facto, this fact will override any statement or document to the contrary.
4 Conclusions and recommendations for biofuel producers

This chapter presents conclusions and recommendations, specifically aimed at biomass and biofuel producers.

4.1 EU and US biofuel legislative frameworks are incomparable

The EU and US biofuel legislative frameworks are incomparable looking at the overall structure, definitions used, sustainability requirements, reporting methodology and reporting requirements. The most important differences (for biofuel producers) can be found in the GHG emission reduction requirements, the GHG emission reduction calculation methodology and the way ILUC is incorporated.

⇒ When aiming to export biofuels or biomass for energy to both EU and US, it is recommended to thoroughly investigate the requirements of both legislative frameworks and their effects on the operational costs.

4.2 Exporting biomass and biofuels to the EU seems easier than to the US

When comparing the EU and US legislative frameworks for biofuels and biomass, it seems more difficult to export to the US than to the EU, because:

- Under US RFS2, exporters to the US have to deal with additional administrative and reporting requirements, beyond the requirements applicable to US companies. This is not the case in the EU: the EU RED is based on third party certification or verification, with the same requirements for both EU and non-EU companies.

- For exporters to the US, a consortium based approach (a consortium funds an independent third party to conduct annual renewable biomass quality-assurance surveys) seems the only possibility to be able to show their feedstock comply with the renewable biomass requirement. This requires significant investments in time and money. The plan to execute the surveys needs to be approved by US EPA.

- Exporters to the US may have to deal with both federal (RFS2) and state regulations, like CA-LCFS, both with their own dynamics and requirements. This is lesser the case in the EU: the EU RED is applicable in the entire EU; certified biofuel can hence be sold in all EU countries with only national reporting requirements. This currently only applies to biofuels as for solid biomass an EU framework is under consideration whilst some EU countries have introduced national schemes.

- The US has illegal logging legislation in place. This is not yet the case in the EU, although this will follow in March 2013.

⇒ When considering exporting biomass and biofuels to the US one should carefully weigh the advantage of revenues in this market against the additional total costs for being in compliance.

4.3 Solid biomass for energy purposes, exported to the EU and the US, is confronted with additional sustainability requirements

The US Lacey Act already imposes additional sustainability requirements on woody biomass; the EU Timber and EU FLEGT Regulation will follow in March 2013. In
both continents the chain of custody needs to be controlled more strictly and there are additional reporting requirements. In the EU, currently there are no binding sustainability criteria for solid biomass but these are still under consideration and may be introduced after 2011.

⇒ Biomass and biofuel producers, using woody biomass, are recommended to investigate the additional requirements already imposed on them (US Lacey Act) and that will be imposed on them (EU Timber and FLEGT Regulation and possible legislation for solid biomass for energy purposes).
Annex A: References

Bibliographic references


EC (2010a): Communication from the Commission (2010/C 160/01) on the established procedure to assess whether a voluntary scheme fulfils the set sustainability requirements


**Personal communications**


This is a publication of:

NL Agency
NL Energy and Climate Change
Croeselaan 15
Postbus 8242 | 3503 RE Utrecht
The Netherlands
T: +31 (o) 88 662 24 58
www.agentschap.nl/biomass

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