

Analysis of the operation of the mass balance system and alternatives

Final Report (Task 1)



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This deliverable represents the final report for Task 1 in the context of the project ENER/C1/2010-431 "Study on the operation of the system for the biofuels and bioliquids sustainability scheme".

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Foreword

Utrecht, 30 November 2012

The EU Renewable Energy Directive (RED) and Fuel Quality Directive (FQD) introduce the world's first legislative mandatory criteria to ensure the carbon and sustainability of biofuels. The biofuels industry has experienced a steep learning curve, with one of the key challenges being to establish a mass balance chain of custody for all parties in the supply chain which ensures that the fuel supplier is able to demonstrate that the biofuel they supply was made from feedstock at the other end of the chain that complies with the RED sustainability criteria. Significant steps forward have been taken by the industry as a whole, but a growing body of experience is beginning to highlight where improvements could be made.

This report provides input to the European Commission to report to the European Parliament and the Council on the operation of the mass balance systems and on the potential for allowing for other chain of custody approaches.

The authors are grateful to all the experts who provided input for this report through interviews and through lively and constructive debate during the workshop.

The authors would also like to thank DG ENER of the European Commission for enabling us to undertake the project. The RED and FQD are the first laws internationally to contain binding sustainability criteria for biofuels. The sustainability criteria are the first step, but transmitting the information through the supply chain in a robust and efficient way is crucial to understanding the impacts of the policy and in ensuring the credibility of the industry.

Summary

The EU Renewable Energy Directive (RED) requires the European Commission to report to the European Parliament and the Council in 2010 and 2012 on the operation of the mass balance and on the potential for allowing for other chain of custody approaches.

The RED introduces the world's first legislative mandatory criteria for carbon and sustainability. The Commission's 2010 report on mass balance was prepared at a time when there was little practical experience as yet with the implementation of the mass balance system. This report provides input to the European Commission for their second report, specifically addressing the following aspects:

- An inventory of experiences with the operation of the mass balance since the transposition of the RED and an evaluation of the operation of the current mass balance approach;
- An evaluation of the advantages and disadvantages of allowing alternative chain of custody approaches, focussing on book and claim (also referred to as a tradable certificate system) and physical segregation.

The findings in this report are based on interviews with market parties and an expert workshop in which individual findings could be validated and debated. The main issues with current mass balance system identified during this project are:

1. Differences in Member State implementation;
2. Differences between mass balance systems of Voluntary Schemes;
3. Flexible feedstock reporting;
4. Potential threats to the integrity of the chain of custody.

Regarding allowing alternative chain of custody approaches, overall stakeholders contacted during the interviews and expert workshop indicated a preference to maintain the current mass balance system. Their specific reasons vary, but include:

- Prevention of confusion in the market;
- No fundamental complaints with mass balance;
- Considered a fair compromise between administrative burden and effectiveness;
- Investment to establish mass balance system already made and perceived high costs of switching;
- Moving to book and claim would risk removing impact of EU legislation.

The Commission's effort should be focused on ensuring a common understanding between all Member States and market actors of what is required in the current mass balance system and on smoothing out any issues with the operation of the current mass balance system. Key recommendations, described in more detail in this report are:

1. Harmonise system boundaries and the level at which the mass balance system should operate in Member States;

2. Harmonise rules on measurements and reporting on biofuels to reduce administrative burden for economic operators with activities in more than one EU Member State;
3. All Member States should require the same information to be reported;
4. Monitor different rules in different voluntary schemes and encourage cooperation;
5. Clarify and strengthen rules on chain of custody auditing;
6. Require proportionate feedstock reporting when commodities are traded as single feedstocks;
7. Investigate and monitor concerns about integrity;
8. Investigate possibility of a hybrid chain of custody approach.

Reading guide

This report starts with an introduction of the mass balance approaches and presents the alternative chain of custody approaches (Chapter 1). The report continues with a high level overview of the main biofuels consumed in Europe, distinguishing between the feedstock types and investigating how much of the feedstock markets are certified by recognised schemes (Chapter 2). The next chapter evaluates the operation of the mass balance to date and includes an inventory of existing mass balance systems and experiences since the transposition of the RED (Chapter 3). Following this, the report investigates alternative chain of custody approaches (including physical segregation and book and claim) and evaluates them on their integrity, effectiveness and administrative burden (Chapter 4). The final chapter presents the conclusions and recommendations (Chapter 5).

The appendices provide further background information on the different chain of custody approaches, a list of experts interviewed and workshop participants, background information on proportionate feedstock reporting, and an overview of key characteristics of existing mass balance systems operated by EC-recognised schemes.

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1 Introduction

1.1 The RED and the mass balance

The Renewable Energy Directive (RED) (2009/28/EC) requires economic operators that supply biofuels and bioliquids to the market to show that the sustainability criteria set out in Article 17(2) to (5) are fulfilled. The sustainability criteria relate to greenhouse gas savings, land with high biodiversity value and land with high carbon stock. In order to do this, economic operators will report or submit data to Member States to demonstrate that their biofuels and bioliquids are compliant with the requirements of the RED¹.

The method by which a connection is made between information or claims concerning raw materials or intermediate products and claims concerning final products is known as the chain of custody. For the purpose of demonstrating compliance with the sustainability requirements, economic operators are currently required to use a mass balance chain of custody (Article 18(1)). The chain of custody normally includes all the stages from the feedstock cultivation up until the obligated economic operator or release of the fuels for consumption.

The RED requires the European Commission to report to the European Parliament and the Council in 2010 and 2012 on the operation of the mass balance and on the potential for allowing for other chain of custody models (Article 18(2)). The assessment shall take into account the need to maintain the integrity and effectiveness (i.e. the ability to deliver greenhouse gas and biodiversity benefits²) while avoiding imposing an unreasonable burden on industry. This report provides input to the Commission for that evaluation as input for their second report, specifically on the following aspects:

- An inventory of experiences with the operation of the mass balance since the transposition of the RED and an evaluation of the operation of the mass balance approach;
- An evaluation of the advantages and disadvantages of allowing alternative chain of custody approaches, focussing on book and claim (also referred to as a tradable certificate system) and physical segregation.

The 2010 report by the Commission³ was mainly based on desk-based analysis as there was little experience with the mass balance under the RED. Neither within Member State governments nor within voluntary schemes for certification of biofuel feedstocks, which were all at an early stage of development with little experience of practical implementation. Since the transposition of the RED (5 December 2010), Member States have had to develop guidelines to implement the mass balance

¹ The Fuel Quality Directive (FQD) (2009/30/EC) contains the same sustainability requirements as the RED and the requirement to use a mass balance system.

² This is also the perspective taken by the Commission in its previous Communication on the mass balance (see footnote 3) and its Impact Assessment accompanying the RED in 2008.

³ Published 31 Jan 2011

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SEC:2011:0129:FIN:EN:PDF>

approach under the RED, and economic operators have had to adapt the way they administer their supply chains to ensure that they are in compliance with the RED. Therefore, since the 2010 report, valuable additional information could be gathered in the form of experiences from Member States and economic operators. In addition, the recognition of the first twelve voluntary schemes⁴ has given a boost to the development of voluntary schemes for certification of biofuels and has stimulated the use of certified mass balance systems. As such, there is now a developing body of experience within voluntary schemes in operating RED-compliant chain of custody systems.

1.2 Alternative chain of custody approaches

In general, four different chain of custody approaches can be distinguished:

1. Identity preservation (or track-and-trace);
2. Physical segregation (or bulk commodity);
3. Mass balance; and
4. Book and claim.

The approach laid down in the RED is the mass balance approach. The mass balance requires a physical link between all stages (as opposed to book and claim where after feedstock production the sustainability claim and the raw material are traded separately from each other). However, the mass balance approach does allow sustainable and other raw materials to be physically mixed (as opposed to physical segregation or identity preservation approaches), as long as the sum of all consignments taken out of the mixture has the same sizes for each of the sets of sustainability characteristics that went into the mixture (taking relevant conversion factors into account⁵).

Appendix A provides a short description of each approach with a summary of their main characteristics. Chapter 4 compares the current mass balance with two possible alternative approaches; book and claim and physical segregation.

1.3 Methodology

Our approach for this report consists of three main elements: interviews, expert workshop and desk-study.

Interviews

We started with collecting experiences with the mass balance during the first year since the transposition of the RED using interviews. This provided input to the analysis of the operation of the current mass balance approach, but also provided insight into the need and/or desires for allowing alternative chain of custody approaches. Appendix B provides an overview of experts interviewed,

⁴ As per 7 September 2012, see also section 2.3 and Appendix E.

⁵ Conversion factors refer to the amount of output produced per unit of input. These should be the same as those used in the GHG calculation methodology of the RED unless actual values are used.

including economic operators (e.g. international oil companies, biofuel producers, and commodity traders), verifiers and voluntary schemes.

Expert workshop

The findings of the interviews were presented during a workshop in London on 8 May 2012. The participants were consulted to gather inputs from different perspectives for the analysis during the desk-study. For instance, on the benefits and disadvantages (in terms of administrative burden, integrity and effectiveness) of alternative chain of custody approaches. Appendix C includes a list of workshop participants.

Desk-study

During the desk-study, the information collected through the interviews and expert workshop was combined with other sources of information. For instance, we have compiled an overview of how the EC-recognised voluntary schemes have arranged key aspects of their mass balance system and what other chain of custody approaches are used. In addition, we assembled an overview of the main biofuel feedstock markets and the shares of the biofuel sector in these markets, and also an indication of the share of the markets that are certified against the EC-recognised voluntary schemes. This enables an analysis of the influence of the size of (commodity) markets on integrity and effectiveness to be made.

All this information is used to evaluate the mass balance and alternative chain of custody approaches (book and claim and physical segregation) on:

1. Administrative costs;
2. Reliability, accuracy and fraud resistance (integrity); and
3. Effectiveness.

2 Biofuel feedstock markets and certification

This chapter provides a high level overview of the main biofuels consumed in Europe distinguishing between the feedstock types. It provides perspective on which part of global feedstock production goes to EU biofuels and explores how much of the global feedstock markets are certified by recognised schemes.

The insights from the overview of the main biofuel feedstock markets and the shares of the EU biofuel sector in these markets will be used to analyse the influence of the size of (commodity) markets and their certification shares on integrity and effectiveness in Chapter 4.

2.1 Overview of biofuel feedstocks consumed in EU

In order to gain insight in the origin of feedstock for EU biofuels, we have studied the international trade for several feedstocks⁶. Feedstock types considered in the trade analysis are: rapeseed, soybean, palm oil for biodiesel and wheat, maize, sugar beet and sugar cane for bioethanol. These are traded on a large scale internationally. Other feedstocks that are less significant in the current overall biofuels feedstock profile such as barley, rye, triticale and wine for bioethanol and sunflower, tallow and used cooking oil (UCO) for biodiesel are categorised as 'other' feedstocks.

The origin of feedstock of EU-consumed biodiesel in 2009 and 2010 is given in Table 1, including a specification of European production and the three most important feedstock supplying Third countries.

Table 1: EU biodiesel consumption differentiated by feedstock and main feedstock regions (2009-2010). Source: Ecofys (forthcoming), based on Eurostat, 2010; Ecofys analysis based on Eurostat, 2009.

Feedstock	2009 (ktoe)		2010 (ktoe)	
Rapeseed	EU	3,763	EU	3,878
	Ukraine	265	Ukraine	251
	Canada	177	Canada	212
	Australia	137	Russia	80
	Other	194	Other	109
	Total	4,536	Total	4,530
Soybeans	EU	92	EU	86
	Argentina	744	Argentina	1191
	Brazil	670	Brazil	416
	USA	278	USA	221
	Other	115	Other	302
	Total	1,899	Total	2,216

⁶ For a detailed study of biofuels consumed in Europe and their impacts, see also Ecofys (forthcoming) 'Renewable energy progress and biofuels sustainability'.

Feedstock	2009 (ktoe)		2010 (ktoe)	
Palm oil	EU	43 ⁷	EU	4 ⁷
	Indonesia	561	Indonesia	774
	Malaysia	159	Malaysia	189
	Ivory Coast	8	Thailand	7
	Other	4	Other	3
	Total	775	Total	976
Others ⁸	All	1,881	All	1,870

Logically, countries that are important biodiesel suppliers to the EU market play an important role in this table. The most important feedstock is rapeseed originating from the EU, followed by Argentinean soy - both in the biodiesel imported from Argentina as well as in EU produced biodiesel. Indonesian and Malaysian palm oil are exported as biodiesel by those countries to the EU, but also play an important role in the EU biodiesel production. Soybean from Brazil and USA are converted in the EU to biodiesel. Significant rapeseed imports from Canada and Ukraine show up in EU produced biodiesel.

The origin of feedstock of EU consumed bioethanol in 2009 and 2010, is given in Table 2, including a specification of European feedstock production and the three most important feedstock supplying Third countries.

Table 2: EU bioethanol consumption differentiated by feedstock and main feedstock regions (2009-2010). Source: Ecofys (forthcoming), based on Eurostat, 2010; Ecofys analysis based on Eurostat, 2009

Feedstock	2009 (ktoe)		2010 (ktoe)	
Wheat	EU	840	EU	581
	Ukraine	10	Switzerland	25
	Canada	3	Ukraine	6
	USA	1	Mozambique	4
	Other	2	Other	8
	Total	856	Total	623
Maize	EU	326	EU	344
	USA	19	USA	122
	Ukraine	5	Brazil	8
	Serbia	4	Ukraine	7
	Other	2	Other	9
	Total	356	Total	490
Sugar beet	EU	447	EU	733
	Other	1	Other	2
	Total	448	Total	735

⁷ EU was not the ultimate origin of this feedstock; this quantity of palm oil is attributed to come from the EU due to the methodology used, which tracked feedstock trade two import/export transactions back.

⁸ Sunflower, tallow and RVO.

Feedstock	2009 (ktoe)		2010 (ktoe)	
Sugar cane	EU	64 ⁷	EU	0
	Brazil	269	Brazil	234
	Guatemala	33	Peru	26
	Pakistan	20	Bolivia	20
	Other	98	Other	56
	Total	484	Total	336
Others ⁹	All	100	All	262

The origin of feedstock of EU consumed ethanol in 2010 stems from a broader range of countries, compared with biodiesel feedstock, although about 80% stems from within the EU itself. EU produced ethanol is mainly produced from EU produced feedstock, only small shares of wheat and maize originate from Switzerland, Ukraine and a few other countries. Sugar cane and maize play a role via the bioethanol supplying countries Brazil and the USA respectively.

2.2 World feedstock production

In this section, an overview is given for EU feedstock consumption for both biodiesel and bioethanol versus world production in 2010. World feedstock production data is extracted from Faostat while EU biofuels consumption is taken from Eurostat. The EU feedstock consumption for biodiesel versus total world production of that feedstock is shown in Table 3.

Table 3: EU feedstock consumption for biodiesel versus world production in 2010. Source: Ecofys (forthcoming), based on Eurostat, 2010

Feedstock	EU consumption for biodiesel (ktonne)	World production (ktonne)	Percentage EU/World
Rapeseed	5,090	59,071	8.62%
Soybeans	2,490	261,578	0.95%
Palm oil	1,097	45,097	2.43%

Among all biodiesel feedstocks, rapeseed has the largest share in EU biodiesel consumption: 8.6% of rapeseed produced in the world in 2010 was consumed in EU as biodiesel. The percentages of palm oil and soybeans were much lower, but not insignificant; 2.4% and 1% respectively. Table 4 shows the EU feedstock consumption for bioethanol versus world production.

⁹ Barley, rye, triticale, wine and other grains.

Table 4: EU feedstock consumption for bioethanol versus world production in 2010. Source: Ecofys (forthcoming), based on Eurostat, 2010

Feedstock	EU consumption for bioethanol (ktonne)	World production (ktonne)	Percentage EU/World
Wheat	988	65,0881	0.15%
Maize	777	844,405	0.09%
Sugar beet	1,167	228,452	0.51%
Sugar cane	534	1,685,445	0.00%

Contrary to biodiesel, the EU consumed bioethanol has very small shares in world production. Only 0.5% of sugar beet, 0.15% of wheat and 0.09% of maize produced in the world is consumed as bioethanol in the EU.

2.3 Certified production world wide

Ideally, we would like to know how much of the EU biofuel feedstock is certified against which certification scheme to further analyse the potential effects of changing the mass balance approach or allowing alternatives. Unfortunately, this data is not readily available. In addition, there is limited data available about the shares of global certified feedstock production (both for biofuels and other applications). However, even when exact data would be available on how much of a feedstock globally is certified this would not automatically reveal how much of EU biofuel feedstock is certified and against which schemes. For instance, feedstock producers may not necessarily know when they produce the feedstock whether its final use will be food or fuel. In addition, raw material for EU biofuels may also be sourced from regional or local markets (which in turn could have much higher or lower shares of certification when compared to global production) where certain regional certification schemes might dominate. For example, the Red Tractor farm assurance scheme dominates in the UK. Logically it might be expected that a higher proportion of EU biofuel feedstocks is certified than total feedstocks in other regions of the world, as the RED provides a direct stimulus for such certification.

In order to provide input for the analysis in Chapter 4, Table 5 provides an overview of how much the EC-recognised schemes and RSPO¹⁰ have certified in terms of area and production¹¹. Note however that plantations and farms can be certified against multiple schemes. Examples are known for palm oil plantations that have both RSPO and ISCC certification. The table does not correct for this.

¹⁰ At the time of writing the RSPO scheme was not yet recognised by the EC. RSPO was included in the overview as it is a relatively long established scheme, compared to the other voluntary schemes listed, and the scheme offers four different options for the chain of custody system, including book and claim. On 23 November 2012, the EC published a Decision to recognise a specific RED version of the scheme, "RSPO RED", which does not allow the book and claim option.

¹¹ At the time of writing, the Commission has recognised twelve schemes. The last four schemes were accepted by the Commission at a later stage, and were not taken into account for this study.

Table 5: Overview of certified production by voluntary schemes

Voluntary scheme	Certified area (ha)	Estimation of certified production (tonne)
2BSvs	Not available ¹²	Not available
Abengoa's RED Bioenergy Sustainability Assurance	139,000 ¹³	636,000 corn 214,000 barley
Bonsucro EU	342,098	22,178,581 sugarcane ¹⁴
Ensus	Not applicable ¹⁵	Not applicable ¹⁶
Greenery Brazilian Bioethanol Verification Programme	Small ¹⁷	Small
ISCC	Not available ¹⁸	Not available
RSB	0 ¹⁹	0
RSPO ²⁰	1,302,998	6,017,193 palm oil ²¹
RTRS ²²	173,526	476,543 soy

¹² 2BSvs does not gather information on certified area or volumes (Personal communication 2BSvs, September 2012).

¹³ In June 2012 a total of 1,700 farmers were certified covering 66,000 ha of corn and 73,000 ha of barley (Personal communication Abengoa, September 2012).

¹⁴ In total 14 mills are certified. Resulting in 1,429,689 tonne sugar and 958,634 tonne ethanol (Personal communication Bonsucro, March 2012).

¹⁵ The Ensus scheme does not certify land, but instead relies on other EC-recognised farm assurance schemes to demonstrate compliance with the land criteria (e.g. Red Tractor).

¹⁶ The Ensus scheme is currently only applied to the Ensus One bioethanol plant, which has an annual bioethanol production capacity of max 400 million litres of bioethanol (www.ensusgroup.com/news.php?id=16, 10 September 2012).

¹⁷ The Greenery Verification Programme was not applied in 2011 (Personal communication Greenery, March 2012).

¹⁸ ISCC does not gather information on certified area or volumes (Personal communication ISCC, September 2012). This might in part be explained by the role of first-gathering points in the ISCC system.

¹⁹ Source: <http://rsbservices.org/wordpress/certificates>, 1 September 2012. In February 2012, the first biofuel producer was RSB certified; No feedstock production has been certified to date.

²⁰ As per 1 July 2012 (http://www.rspo.org/en/key_statistics, 1 September 2012).

²¹ Amount of FFB certified is 29,349,738, which provides 6,017,193 tonne of palm oil and 1,468,694 tonne palm kernel.

²² 2011/2012 data. Source: <http://responsiblesoy.org>.

2.4 Size of the EU biofuel feedstock consumption compared to worldwide production

Combined with the previous sections, this section provides an indication of how much certified feedstock is available worldwide compared to the size of the EU biofuel market per feedstock. The amount of certified rapeseed, wheat, maize and sugar beet are not available. The results for soybeans and palm oil are shown in Table 6. Table 7 contains the result for sugar cane.

Note that data on certified amounts are as recent as possible, while production and EU biofuel consumption data are from 2010.

Table 6 Comparison of the biodiesel feedstock going to EU biofuel sector compared to worldwide certified production

Feedstock	Percentage of global production to EU	Percentage certified globally	Ratio
Rapeseed	8.6%	Not available	-
Soybeans	1.0%	0.2% ²³	1 : ~0.2
Palm oil	2.4%	13% ²⁴	1: ~5.4

Table 7 Comparison of the bioethanol feedstock going to EU biofuel sector compared to worldwide certified production

Feedstock	Percentage of global production to EU	Percentage certified globally	Ratio
Wheat	0.15%	Not available	-
Maize	0.09%	Not available	-
Sugar beet	0.51%	Not available	-
Sugar cane	0.03%	1.3% ²⁵	1 : 43

Table 6 shows that there is approximately 5 times less RTRS certified soybeans available compared to the EU soy biodiesel consumption in 2010. The reverse is true for palm oil: approximately 5 times more certified palm oil is currently available compared to EU palm oil biodiesel consumption in 2010. In case of sugarcane, we notice that over 40 times more certified sugarcane is available compared to EU sugarcane bioethanol consumption in 2010.

²³ Based on RTRS only.

²⁴ Based on RSPO only.

²⁵ Based on Bonsucro only.

3 Operation of the mass balance

This chapter evaluates the operation of the current mass balance approach. It contains an overview of how the EC-recognised voluntary schemes have arranged key aspects of their mass balance systems and includes an inventory of experiences since the transposition of the RED.

3.1 Overview of existing mass balance systems

In case a voluntary scheme is recognised by the Commission, economic operators can use the mass balance system to demonstrate compliance with (part of) the requirements of the RED. To date, the Commission has recognised thirteen schemes²⁶:

1. ISCC-EU (International Sustainability and Carbon Certification)
2. Bonsucro EU
3. RTRS EU RED (Round Table on Responsible Soy EU RED)
4. RSB EU RED (Roundtable of Sustainable Biofuels EU RED)
5. 2BSvs (Biomass Biofuels voluntary scheme)
6. RBSA (Abengoa RED Bioenergy Sustainability Assurance)
7. Greenergy (Greenergy Brazilian Bioethanol verification programme)
8. Ensus voluntary scheme under RED for Ensus bioethanol production
9. Red Tractor (Red Tractor Farm Assurance Combinable Crops & Sugar Beet Scheme)
10. SQC (Scottish Quality Farm Assured Combinable Crops (SQC) scheme)
11. Red Cert
12. NTA 8080
13. RSPO RED (Roundtable on Sustainable Palm Oil RED)

Appendix E presents the key characteristics of the existing mass balance systems of the first seven voluntary schemes recognised by the European Commission, as well as the Roundtable on Sustainable Palm Oil and the Forest Stewardship Council²⁷. The last 6 schemes were accepted by the Commission at a later stage, and were not taken into account for this study.

All EC-recognised voluntary schemes use a RED-compliant mass balance. All these schemes set rules for economic operators with regard to record keeping and documentation and procedures for identification of inputs and outputs. All require that the certified volume out is not greater than the

²⁶ As per 30 November 2012, see also

http://ec.europa.eu/energy/renewables/biofuels/sustainability_schemes_en.htm.

²⁷ RSPO and FSC are included as they operate relatively long-established chain of custody systems, and allow comparison with other important (non-biofuel) schemes. Note that the main RSPO scheme analysed in Appendix E allows four different chain of custody options, including book and claim, whereas the RSPO RED scheme recently recognised by the Commission does not allow the book and claim option.

certified volume in at each step in the supply chain. All require that the mass balance is ensured at the level of a geographical site in the supply chain. However, the schemes also operate certain aspects of the mass balance in different ways. This can be due to a design choice which is defined by the European Commission, such as ensuring a balance in the mass balance system continuous in time or only requiring that the balance is ensured at discrete intervals in time (e.g. every three months). The differences can in part be explained by the different backgrounds and developments of the schemes, but also for some differences because the guidance from the Commission on the mass balance system in its Communication on voluntary schemes and default values in the EU biofuels and bioliquids sustainability scheme (2010/C 160/01) does not define all details.

The following observations can be made when looking at the existing mass balance systems of the first seven recognised voluntary schemes:

Methods for prevention of double-claiming

Voluntary schemes use different methods for preventing double-claiming stimulated by the Commission. Although the RED does not specify how schemes should deal with this, all schemes recognised require economic operators to put in place information systems able to keep track of the inputs and outputs to ensure the integrity of claims made under the scheme.

In the input to the previous evaluation of the mass balance, using central registries was identified as a good practice guideline to prevent fraud with double selling/claiming (Ecofys, 2010). Central registries keep track of each issued certificate in the supply chain. RSPO has such a central registry, operated by Utz Certified²⁸. However, we currently don't see this being adopted by other schemes. They are relying mostly on unique identification (tracking) numbers, and sometimes on internal registries (ISCC, 2BSvs, Abengoa).

Timeframes

The recognised schemes apply either of two options (and sometimes both); a mass balance operated continuous in time or over a maximum period of time (varying between one and three months). However, different time frames over which the mass balance system operates between voluntary schemes, increases complexity for economic operators who are participants in multiple schemes.

Dealing with carry-over

When a site of an economic operator in the supply chain received more certified material than it sold in the timeframe of the mass balance (maximum 3 months for recognised schemes), some schemes provide the possibility of carrying over the claims to the next period. The Commission does not set explicit requirements on this in the RED or Communications. Schemes vary both in their approach to carry over, and also in how explicitly they define their approach. Some schemes explicitly require that sustainability data (claims) can only be carried over to the next period if the site has a corresponding amount of physical feedstock in stock (e.g. ISCC-EU). Some companies reported that this causes

²⁸ Although to date RSPO has not been recognised by the Commission, it is included in the analysis because as one of the major multi-stakeholder certification schemes it serves different sectors in addition to the biofuel sector and has some interesting elements (e.g. central registry, allows different chain of custody approaches).

difficulties in the supply chain and unnecessary transport movements of material to be able to comply, which increases both costs of compliance and GHG emissions from transport. (The latter was particularly identified as an issue in Member States where the only means of demonstrating compliance is via a voluntary scheme. As the coverage of many voluntary schemes is still developing, economic operators report that they experience difficulties today in sourcing certified biofuel consistently all year round. The rules which aim to limit mass balance timeframes and to limit carry-over can compound to make this situation more difficult.) Other schemes (e.g. 2BSvs) appear to require a continuous mass balance approach, but do allow carry over.

Chain of custody auditing

Most schemes require all actors in the chain of custody to be audited before they can start producing or trading certified material. The Communication on voluntary schemes (2010/C 160/01) recommends that “[The mass balance is] The method by which a connection is made between information or claims concerning raw material or intermediate products and claims concerning final products is known as the chain of custody. The chain of custody would normally include all the stages from the feedstock production up until the release of the fuels for consumption.”

However, the last possible step of re-blending (for example from a 7% biofuel blend to 2%) is only required to be audited by Bonsucro and ISCC (with RSB having the point under discussion). Transport steps and traders in the supply chain are treated differently in different schemes and are not always required to be audited, for example if they do not take legal or physical ownership of a material. Again, this is also something where the Commission does not set requirements and schemes are not always explicit.

Differences have also emerged between which actors in the supply chain are required to be audited when the raw material is a waste or residue²⁹. For agricultural feedstocks, it is clear that the chain of custody starts at the farm, with all farms being required to be audited by voluntary schemes (unless a group certification approach is taken, at which point it is permitted to audit a sample of farms). However for wastes and residues different approaches are currently being taken, with ISCC currently defining the “first gathering point” for wastes as the “first melting point”. Aggregators of the raw material prior to this point are not required to be audited. The Communication on voluntary schemes (2010/C 160/01) is not explicit on the chain of custody for wastes or residues, but it is clear that if a voluntary scheme allows a certain consignment to be exempt from compliance with the land-related criteria on the grounds that it is from a waste or (non-agricultural) residue, the scheme needs to provide an audited guarantee that the raw material was the waste or residue it is described to be, and the “feedstock production” stage in this case should be the point at which the waste or residue is produced.

²⁹ Note that voluntary schemes certify wastes and residues for the purposes of whether or not they are exempt from the land-related sustainability criteria and the GHG calculation; it is the responsibility of Member States to judge whether or not a particular raw material can be double counted towards the renewable transport target.

One supply chain with chain of custody systems from different schemes

The schemes apply different approaches to the situation where multiple voluntary schemes are used within one supply chain. For instance, when material certified by scheme "A" goes through a supply chain with the first part of the supply chain being scheme "A" chain of custody certified and the last part chain of custody certified by scheme "B". The Commission only permits schemes to recognise other schemes that are recognised by the EC for the purposes of the RED, and in addition only the same version and scope of a scheme that is already recognised by the Commission. Some schemes do not allow any claims to be made unless all actors in the supply chain are chain of custody certified to that one scheme, where others allow material certified originally by other EC-recognised schemes to be sold under its own name (e.g. soy certified to RTRS-EU is permitted to be sold as ISCC-EU certified soy biodiesel if it passes through actors in the supply chain that are chain of custody certified to either RTRS-EU or ISCC-EU. The reverse is however not permitted). There is clearly also a financial implication for parties in the middle of the supply chain, who may find themselves having to be audited multiple times for the chains of custody of multiple voluntary schemes. One interviewee indicated that they had undergone six chain of custody audits in one year.

As long as the practice of "re-labelling" claims only occurs between EC-recognised schemes, there is no risk for compliance with the RED mandatory criteria. However, schemes do differ in the sustainability criteria they cover beyond the RED mandatory criteria. Such "re-labelling" of claims between schemes does cloud the picture for certified material coming into Europe. We are not specifically aware of claims being made that imply a greater level of sustainability than was covered by the original scheme, but this is a risk that should be monitored. The greater immediate concern is a risk to the take-up of schemes that do not allow "re-labelling" of claims and that have a broader coverage of sustainability criteria as they are less able to take advantage of the flexibility that comes from working with other schemes due to the risk of undermining their claims, and their added value is lost if the broader sustainability coverage that was originally certified can not be claimed for the final biofuel.

Operation of alternative chain of custody approaches

Due to the requirement to apply a mass balance approach, the newer certification systems that have been developed specifically to meet the RED requirements do not offer a book and claim option for the chain of custody (other chain of custody approaches which are stricter than mass balance, i.e. physical segregation and identity preservation, are allowed under the RED). Only a few of the recognised schemes actually explicitly offer more stringent chain of custody options (RSB and RSPO²⁸ allow for identity preserved and segregation, ISCC allows for physical segregation). Only RSPO also has an operational book and claim system. Although RSPO's aim is to move to physical sourcing of RSPO certified palm oil, it allows book and claim for reasons of flexibility. Some companies, for instance, use the book and claim system to source RSPO palm oil from day one or they use it to complement the amount of certified material from physical sourcing to meet their company targets.

3.2 Inventory of experiences with mass balance

The interviews and the expert workshop revealed four key issues with the current mass balance approach since the transposition of the RED:

- 1. Differences in Member State implementation and requirements to the mass balance** - differences exist in how Member States have explained the mass balance and implemented requirements. (Note also that relatively few Member States give specific mass balance guidance within their national system, and fewer give any more detail than is given by the Commission in the RED and Communications, so detailed operational differences as described for the voluntary schemes in section 3.1 are also likely to be seen between Member States.) One example of a difference seen between Member States is the level at which the mass balance needs to be operated. A mass balance can be applied at different levels (e.g. the balance can be monitored at a site level or company level). The Communication on voluntary schemes (2010/C 160/01) recommends the mass balance to be operated at site level. Certain Member States, however, are applying the mass balance at a country level. This requires economic operators that operate in several Member States to administer different mass balance systems. In addition, a mass balance at a country level will create more flexibility for economic operators compared to a mass balance at site level. Another example is the timeframe over which the mass balance must be operated, with Member States that have in place a maximum mass balance period of between three to twelve months.
- 2. Differences between mass balance systems of voluntary schemes** - see section 3.1.
- 3. Flexible feedstock reporting** - The Commission Communication on voluntary schemes and default values in the EU biofuels and bioliquids sustainability scheme (2010/C 160/01) allows flexible allocation of all sustainability data to outgoing consignments of material (as long as the "sets of sustainability characteristics" – i.e. the combination of feedstock, country of origin, GHG value etc – remain together). This is a natural consequence of the way the RED mass balance is currently defined – as long as a certain "set of sustainability characteristics" was in the mixture, that set can be freely and flexibly allocated to outgoing consignments from that mixture. However some stakeholders felt that feedstock information should be allocated proportionately to outgoing consignments – i.e. the *administrative* feedstock mix of outgoing consignments should match the *physical* feedstock mix. It was felt that flexible allocation of feedstock information could lead to a risk of leakage of "less desirable" feedstocks that are physically used within the EU biofuels mix not being reported within the EU. See Appendix D for further background on 'proportionate feedstock reporting' and 'flexible feedstock reporting'.

Note that this is typically more of an issue for biodiesel than bioethanol. Current bioethanol is a more homogeneous product both in terms of meeting technical specifications and in terms of feedstocks having a similar sustainability risk profile. Whereas, biodiesel is usually required to be *physically* composed of a blend of different feedstocks to meet the technical specifications. Those feedstocks more often have different sustainability risk profiles. Therefore the situation does occur in the biodiesel market that a certain physical feedstock mix is driven by the combination of economics, technical specifications and sustainability. Some stakeholders therefore felt that the biofuel feedstocks *reported* should be representative of the biofuel feedstocks physically used.

It was also acknowledged during discussions that the need to require proportionate feedstock reporting would typically be lower once the finished biofuel is produced and is traded. During the earlier parts of the supply chain where commodities are traded as single feedstocks, it would be odd if those feedstocks were sold with feedstock information that did not match the physical product. This is also the part of the chain where commodities may be stored on a single site, but sold into both the EU biofuels market and other sectors or geographies. However once a product is a blended biofuel in Europe, the likelihood is that it will all be reported somewhere in the EU biofuels market, so there is less chance to bias the information reported. At this later stage in the supply chain where final blended biofuels are traded, it may also be administratively burdensome to require the feedstock mix reported to exactly match the actual physical mix.

4. **Potential threats to integrity of the chain of custody** – The previous section indicated that voluntary schemes are taking measures to prevent double claiming within their schemes. A concern that has risen from the interviews and workshop, however, relates to fear of possible fraud in the case of double certification (e.g. a plantation is certified against two different schemes, but typically auditors of one scheme only check for one scheme and cannot check documentation of the other). Workshop participants report that there are cases of farms or plantations being audited against more than one voluntary scheme. There are no reports of double claiming actually happening today, but a concern was raised that it is not the norm for an auditor of one voluntary scheme to be allowed access to records which relate to another voluntary scheme, so theoretically double claiming could be missed by an auditor. This has, however, subsequently been picked up by the voluntary schemes in an ongoing dialogue to find a common approach to requiring auditors to check all records to ensure that this situation does not occur.

Companies also indicated that an initial challenge with implementation of the mass balance relates to the overall understanding of suppliers and policy makers of the mass balance concept and procedures in the supply chain. This has to a certain extent already been overcome and will resolve itself over time as lessons are learned and supply chains get accustomed with it. The voluntary schemes recognised to date have also initiated a dialogue to learn from each other and identify and tackle issues in the implementation that arise due to differences in interpretation.

4 Alternative chain of custody approaches

This chapter evaluates alternative chain of custody approaches (including physical segregation and book and claim) on their integrity, effectiveness and administrative burden.

4.1 Analysis of alternatives

In comparing the operation of the current mass balance approach with book and claim and physical segregation as alternative chain of custody approaches, the following three criteria are used:

1. Integrity: related to the risk of fraud associated with the type of chain of custody and the claims that can be made;
2. Effectiveness: the ability of the chain of custody to deliver greenhouse gas and biodiversity benefits (under the assumption that the system works properly without fraud);
3. Administrative costs and burden for economic operators.

The identity preservation approach is not included in this evaluation because of the nature of products in the biofuel supply chain (mainly bulk commodities) and the significant additional costs and complexities it would bring compared to the other approaches.

4.2 Integrity

In assessing the integrity of the different chain of custody options, we distinguish:

- The risk of fraud or error associated with the type of chain of custody
- Type of claim that can be made

The table below shows how the different approaches score on the aspects.

Table 8: Integrity of alternative chain of custody approaches

Chain of custody approach	Resistance to fraud or error	Claim that can be made
Physical segregation	All parties involved in the supply chain need to be checked. If an operator also handles non-certified material, "contamination" needs to be prevented. In case a supply chain only handles certified material, low risk of fraud.	The biofuel physically consists of 100% certified product. Claims will reflect physical feedstocks.

Chain of custody approach	Resistance to fraud or error	Claim that can be made
Current mass balance ³⁰	All parties involved in the supply chain need to be checked. Measures need to be in place to prevent double claiming (e.g. central registry). Potential for additional complexity if flexible allocation of feedstock information through the chain means that the administrative data a company holds does not necessarily reflect the feedstock composition of the physical stock.	For the volume of biofuels for which claims are made at the end of the <i>supply chain</i> , sufficient certified material has been added to the <i>supply chain</i> , taking into account relevant conversion factors ³¹ .
Book and claim	Smaller number of actors in the supply chain that need to be checked. In case a certification scheme also runs other chain of custody options systems or in case of double certification, measures need to be in place to prevent double selling.	For the volume of biofuels for which claims are made, sufficient certified material has been produced somewhere, taking into account relevant conversion factors.

Each of the chain of custody approaches has their own attention points with respect to resistance to fraud or error. With the proper systems implemented and audited, they all have good resistance to fraud or error. For a mass balance system, a central registry significantly reduces the risk of double selling or claiming, since all certificates and owners of certificates are registered in a central database. This is currently not in place with the recognised schemes (see also section 3.1), although the need to avoid such risks is on the radar of the voluntary schemes and solutions such as central registries or working together between schemes more is being considered by a number of them.

The claims that can be made with the different types of chain of custody approaches differ significantly. Note that in both a book and claim system and a mass balance system there is no guarantee that the final product physically contains the actual certified material. In the case of the mass balance there is a physical link with the supply chain.

There is a general interest in the origin of biofuels and the feedstock types they are produced from. In addition, the Fuel Quality Directive requires that sustainability characteristics of biofuels reported by economic operators include information on the country of origin of the feedstock (FQD Article 7a). Also, from a sustainability perspective the European Community might be interested in the actual origin and/or feedstock that biofuels are produced from. However, the mass balance approach in

³⁰ A mass balance is not a strictly defined concept that can be run in different ways (see also Appendix A). For the evaluation we use a mass balance approach according to the guidance from the Commission on the mass balance system in its Communication on voluntary schemes and default values in the EU biofuels and bioliquids sustainability scheme (2010/C 160/01). This entails a mass balance approach operated at site-level and with flexible feedstock reporting.

³¹ Note that final products do not necessarily physically contain certified material. It could also physically contain a different feedstock from what is claimed due to flexible feedstock reporting.

general, and specifically the current EU mass balance approach in which full flexibility is allowed for the assignment of sustainability data to outgoing consignments from a mixture, EU biofuels will not necessarily contain the same mix of feedstocks and sources as reported.

4.3 Effectiveness

The Annex to the Impact Assessment of the Commission³² already indicated that in assessing effectiveness it is important to note that the purpose of the sustainability scheme is to increase sustainability. This is only likely to happen if the scheme induces economic operators to behave differently than they way in which they would have behaved in the absence of the scheme. We assume a relationship between demand and supply, in this case the size of feedstock markets relevant for biofuels, the share of the feedstock production that meets the RED GHG and land use requirements and the shares of the biofuel sector in these markets (i.e. how much of the material is going to the biofuel market compared to other markets, such as the food or chemical sector).

Chapter 2 explored the main biofuels consumed in Europe and the feedstocks they are made from. It showed that there is limited information available on how much of global production is certified. The ratio of global production certified to global production going to EU biofuels differs per feedstock. Nevertheless, given the globally large number of producers of agricultural commodities who already fulfil the RED mandatory sustainability criteria³³ and that would be able to obtain certificates that could be sold to European biofuel producers – while continuing to sell their physical products in the (predominantly non-European) markets they currently serve - it is unlikely that a book and claim approach would drive additional sustainable production. In addition, the absence of involvement with the supply chain prevents engagement of final economic operators with the upstream supply chain. Although it would reward (anonymous) producers who are producing to higher sustainability standards already, it does not stimulate final economic operators to take responsibility for their physical supply chains.

To a lesser extent, this could also be the case under a mass balance system if it were operated at a (international) company or country level, instead of at a site level as currently recommended by the Commission. In cases where there is sufficient RED-compliant supply of a feedstock that far exceeds demand for that feedstock for biofuels in a country, a country level mass balance would begin to resemble characteristics of a book and claim system.

In all three systems, sustainable production is rewarded. Also a book and claim system serves the purpose of rewarding sustainable biomass production. After all, for each sustainability certificate claimed at the end of the supply chain, one unit of sustainable biomass has been added to the

³² Document accompanying the Package of Implementation measures for the EU's objectives on climate change and renewable energy for 2020 (SEC(2008) 85 VOL. II).

³³ Basically, most land already in use as of January 2008, which is a large part of our agricultural base.

market. However, it is unlikely book and claim induces economic operators to behave differently than the way in which they would have behaved in the absence of the system.

The table below compares the effectiveness of potential alternatives to the current mass balance system.

Table 9: Effectiveness of alternative chain of custody approaches

Chain of custody approach	Effectiveness (i.e. ability to deliver greenhouse gas and biodiversity benefits)
Physical segregation	High. Where operators process both certified and non-certified material, there is even an incentive to switch completely to certified material to avoid the cost of having segregated logistical infrastructure.
Current mass balance ³⁰	Higher than book and claim, lower than physical segregation. In situations where there is a lot of mixing of large quantities and supply chains supply different markets, the RED compliant material might be allocated to EU biofuels, while the non-RED compliant material goes to other sectors or countries.
Book and claim	With abundant supply of potentially RED-compliant material, it is unlikely that the demand for biofuel through a book and claim approach will lead to additional GHG and biodiversity benefits because of the increased flexibility to supply RED-compliant certificates to the supply chains that demand them without the physical link to the material used in that supply chain.

4.4 Administrative burden

Costs associated with the chain of custody consist of i) initially setting up and maintaining the system by voluntary schemes (e.g. design of the system and setting up a trading platform, but also costs of avoiding fraud), ii) costs on the side of economic operators (e.g. administrative costs, like collecting data from suppliers and record keeping) and iii) costs for verification.

The interviews revealed that although operational costs of a book and claim approach are believed to be lower, the initial set up costs are higher and the cost of currently switching would therefore be high. In addition, the investment costs required to set up a RED-compliant mass balance system are largely already made. Costs of switching to another chain of custody approach would consist of changing economic operators' administrations, introducing another system in the supply chain and training suppliers to work with this, and setting up (and maintaining) electronic trading platforms (for voluntary schemes).

Total cost for the supply chain as a whole is lower for book and claim than for mass balance, because mass balance requires all parties in the supply chain to maintain an administrative system and be audited. In a book and claim system only one point in the supply chain needs to be verified (where

the certificate is generated and sold), but verifiers indicated the audit in a book and claim system takes more effort to check (compared to an audit for mass balance or physical segregation). In addition it is not clear how *actual value* GHG calculations would be dealt with in the case of a book and claim system - if the certificate is traded directly between the feedstock producer and the biofuel supplier, additional efforts would be required to collect the actual GHG data from the parties in between in the physical supply chain.

Costs of physical segregation are considered higher than mass balance and book and claim, due to ensuring physical segregation of materials in operations. Note in integrated supply chains where suppliers are delivering only certified material to EU biofuel supply chains, however, the cost of physical segregation are considered similar to mass balance, because no additional investments are required to build additional segregated storage capacity and logistics (and in both cases all parties in the supply chain need to be audited).

5 Conclusion and recommendations

This chapter provides key conclusions from our analysis, as well as recommendations to the European Commission to improve the operation of the chain of custody systems for biofuels and bioliquids under the RED, based on experiences to-date. Recommendations cover both adjustments to the current mass balance system and alternative chain of custody approaches.

5.1 Conclusions

Adjustments to the current mass balance approach

The RED introduces the world's first legislative mandatory criteria for carbon and sustainability. Economic operators in the biofuel supply chain have experienced a steep learning curve, with one of the key challenges being to establish a mass balance chain of custody for all parties in the supply chain which ensures that the fuel supplier is able to demonstrate that the biofuel they supply was made from feedstock that complies with the RED sustainability criteria. Significant steps forward have been taken by the industry as a whole, but a growing body of experience is beginning to highlight where improvements could be made.

The main issues with current mass balance system identified during this project are:

1. Differences in Member State implementation;
2. Differences between mass balance systems of Voluntary Schemes;
3. Flexible feedstock reporting;
4. Potential threats to integrity of the chain of custody.

Differences are identified both in the implementation of the mass balance system at the Member State level, and also between voluntary schemes. Member State differences are seen, for example, in the level at which the mass balance needs to be operated, though this is recommended to be site level in EC Communication 2010/C 160/01. Between EC-recognised voluntary schemes, the differences relate to details of the mass balance that are not defined by the Commission. It should be noted that relatively few Member States give specific mass balance guidance within their national system, and fewer give any more detail than is given by the Commission in the RED and Communications, so such detailed operational differences are also likely to be seen between Member States, although it has not been identified at this stage. Companies and voluntary schemes in general reported that they are not happy with such differences and a majority interviewed expressed a preference for more guidance from the Commission on issues that have not been defined centrally to-date. Some also expressed a preference for the Commission to set firm rules on mass balance, rather than guidance, to strengthen harmonisation between systems and schemes. However, there is an open question to what extent such operational differences should be minimised by the Commission, or to what extent the Commission wishes to leave some details open to allow the market to adopt solutions that are optimal for the specific feedstock or country. Strictly defining details that are not appropriate for all parts of the current and future biofuels market may risk doing more harm than

good. However, the Commission should at least monitor the differences between schemes to ensure that the differences do not lead to loopholes in the legislation that lead to a 'race to the bottom'.

Both Member States and voluntary schemes have formal and informal initiatives in which they work together to identify issues that arise in implementation and to aid mutual understanding and potentially harmonisation. Member States work together through the Commission's formal Concerted Action group on biofuels, attended by Member State policy makers, and through REFUREC (Renewable Fuels Regulators Club) initiated by a group of public officials responsible for administering the national systems.

Some concern was expressed that allowing feedstock information to be allocated flexibly within the mass balance system could lead to higher risk feedstocks that are physically used within EU biofuel markets being selectively reported outside EU biofuel markets. At this stage there is little objective evidence of this practice occurring, but the risk could remain as long as feedstock information is allowed to be flexibly allocated to outgoing consignments at all stages of the supply chain. Incentives to report specific feedstocks, such as double or quadruple counting for wastes and residues, or in the future if possible feedstock-specific approaches to indirect land-use change (ILUC) were to be introduced, this could strengthen the incentive to selectively report certain feedstocks within the EU.

During the preparation of the Commission's 2010 report on the operation of the chain of custody, a key perceived threat to the integrity of the chain of custody was due to the ability of participants to claim more sustainable biofuel than was added to the market. This "double-claiming" risk is one taken seriously by voluntary schemes, to the extent that the key concern now is more from the possibility of fraud from double certification, rather than double claiming within one voluntary scheme. This could occur, for example, if a farm or plantation was certified to more than one voluntary scheme and if this was not picked up during an audit. There are no reports of double claiming actually happening today, but a concern was raised that it is not the norm for an auditor of one voluntary scheme to be allowed access to records which relate to another voluntary scheme, so theoretically double claiming could be missed by an auditor. This has, however, subsequently been picked up by the voluntary schemes in an ongoing dialogue to find a common approach to requiring auditors to check all records to mitigate these risk, alongside a broader dialogue to learn from each other and identify and tackle issues that arise during implementation of the voluntary schemes.

Alternative chain of custody systems

Overall stakeholders contacted during the interviews and expert workshop indicated a preference to maintain the current mass balance system. Their specific reasons vary, but include:

- Prevention of confusion in the market;
- No fundamental complaints with mass balance;
- Considered a fair compromise between administrative burden and effectiveness;
- Investment to establish mass balance system already made and perceived high costs of switching;
- Moving to book and claim would risk removing impact of EU legislation.

Commission effort should instead be focused on ensuring a common understanding between all Member States and market actors of what is required in the current mass balance system and on smoothing out any issues with the operation of the current mass balance system. Some economic operators indicated that they would like the Commission to keep the option of a book and claim system open to allow more flexibility for economic operators, but none saw a need to introduce such a system today.

5.2 Recommendations

The recommendations formulated during this project relate mainly to improving the operation of the current mass balance, due to differences between Member States implementation and details of voluntary schemes.

1. Harmonise system boundaries and the level of the mass balance in Member States

Currently, some Member States apply different definitions of the level at which the mass balance should be operated. This means that economic operators with activities in different Member States have to operate different systems for different countries. The Commission should encourage Member States to take a consistent approach on this.

2. Harmonise rules on measurements and reporting on biofuels

Different rules are applied in different Member States on how biofuels should be reported (e.g. at a certain volume, with certain energy content and at different temperatures etc). This leads to increased administrative burden for companies operating in more than one EU country, and discrepancies in volumes. For economic operators (and for policy makers' insight in the European market) it would be helpful to define a consistent approach.

Documentation reported to most Member States has to be done in the local language. Stakeholders suggested that allowing English would facilitate reporting for international economic operators and better exchange of information between Member States.

3. All Member States should require the same information to be report

At the moment each Member State defines the information that has to be reported and in what format. During interviews and the expert workshop, economic operators indicated a preference for consistent reporting. In general stakeholders did not object to reporting detailed information and suggested that it matters more that what is requested in different Member States is consistent than how much information is asked for. The Netherlands was currently considered to request the most complete reporting. Some voluntary schemes also require different levels of information to be collected and communicated through the supply chain. Stakeholders indicated that if the voluntary scheme does not communicate the information, it is difficult for them to report it to a Member State. Voluntary schemes should therefore be encouraged to communicate the information required by Member States. For example, ISCC EU recently added country of origin to their transaction

certificate, as this is a requirement from several Member States, but does not include the NUTS2 region, which is a requirement from some Member States.

4. Monitor different rules in different voluntary schemes and encourage cooperation

The Commission should monitor the differences between voluntary schemes to ensure that the differences do not lead to loopholes in the legislation that lead to a 'race to the bottom' (for example rules on allowing carry-over of certificates and 're-labelling' of outgoing consignments). It will be difficult for more ambitious voluntary schemes going well beyond the RED mandatory criteria to recognise other schemes that have significant differences in sustainability principles and criteria. Also in relation to the issue of double certification, cooperation between schemes to prevent this should be encouraged. During the project some suggested that harmonisation could be encouraged through CEN 16240.

5. Clarify and strengthen rules on Chain of Custody auditing

The Commission should encourage consistency between voluntary schemes on which stages of the supply chain are required to have a chain of custody audit. This has been identified as a particular issue for wastes and residues, for which different approaches are currently being taken for where in the supply chain the chain of custody checks need to start. If a voluntary scheme allows a certain consignment to be exempt from compliance with the land-related criteria on the grounds that it is from a waste or (non-agricultural) residue, the scheme should be required to provide an audited guarantee that the raw material was the feedstock it is described to be, and therefore the chain of custody should start at the point the feedstock is "produced".

6. Require proportionate feedstock reporting when commodities are traded as single feedstocks

Concern was raised that flexible allocation of feedstock information to outgoing consignments at all stages of the supply chain could lead to the data on biofuel feedstocks reported in the EU not being representative of the feedstocks being physically used within the EU. However it is also noted that it would be administratively burdensome, and also not necessary to require the proportions of feedstock reported to be exactly in line with the physical feedstock mix for the parts of the chain where the finished biofuel is traded. The Commission should clarify that, at least during the parts of the supply chain where commodities are traded as single feedstocks, the feedstock information reported should be consistent with the physical product. (This is in line with the wording of the Directive, but not necessarily the way the mass balance has been interpreted in practice.) Interviews suggested that many biodiesel producers are already operating proportionate feedstock reporting, but fuel suppliers and traders are making more use of flexibility that flexible feedstock reporting provides. Requiring proportionate feedstock reporting, at least in the early stages of the biofuel supply chain, will better reflect biofuel consumption in Europe.

7. Investigate and monitor concerns about integrity

The key integrity concern raised by stakeholders relates to the *possibility* of fraud if a farm or plantation is certified to more than one voluntary scheme. Although there is no evidence to suggest that fraud is taking place in this way today, Member States and the Commission should be aware of and should closely monitor this risk. A central database/registry for different feedstocks and

voluntary schemes could provide a solution. Also connecting registries of Member States would increase transparency.

8. Investigate possibility of a hybrid chain of custody approach

Because of Member States' legislations, the place of the duty excise point in the supply chain differs in some Member States. Several Member State governments try to accommodate common practices in the fuel markets, like fuel swaps and trading under temporary suspension of excise duties, while transposing the renewable energy transport target and the biofuels (and bioliquids) sustainability scheme under the RED (e.g. allowing mass balance to be operated at a country level or allowing physically decoupled trading of claims). If the Commission decides to keep the book and claim option open, it would be worthwhile to investigate the possibility and impacts of allowing some sort of hybrid chain of custody. For instance, whereby a mass balance approach is used in the beginning of the supply chain where single feedstocks are produced and traded, while book and claim could be allowed from the point in the supply chain at which the product becomes a biofuel destined for the European market.

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Appendix A – Overview of different chain of custody approaches

Identity preservation

A identity preservation approach (also referred to as track-and-trace) delivers consignment physically containing 100% certified products from an identifiable source.

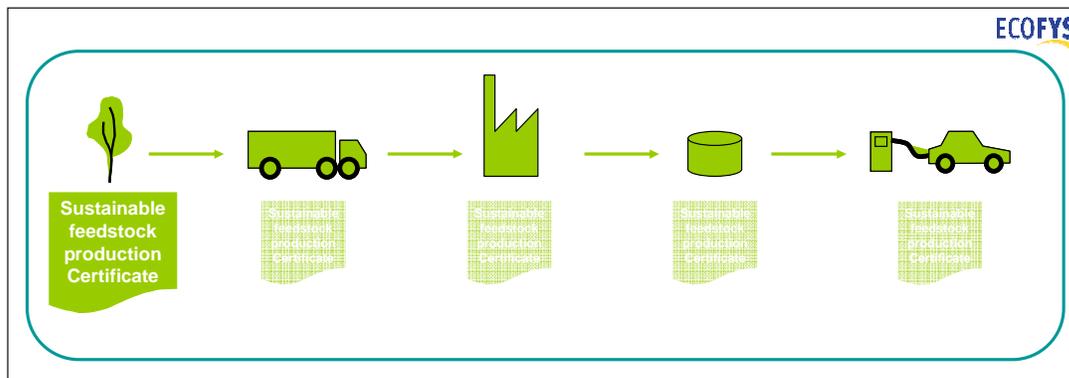


Figure A - 1 Illustration of identity preservation (also referred to as track-and-trace)

Characteristics:

- Certified products are physically segregated from non-certified products throughout the supply chain, while the system also provides traceability back to the origin of the product;
- Delivers consignments physically containing 100% certified products from a uniquely identifiable source (identity preservation);
- Less common for commodities. Some commodity certification systems offer some level of traceability (e.g. to a country or region), but will generally not be able to trace products back to an individual farm or plantation.

Possible claim:

- All EU biofuels physically contain 100% certified material from identifiable sources.

Physical segregation

A physical segregation approach (also referred to as bulk commodity) also delivers consignment physically containing 100% certified products. Compared to the identity preservation approach, however, the exact origins of the material in the consignment can not be traced.

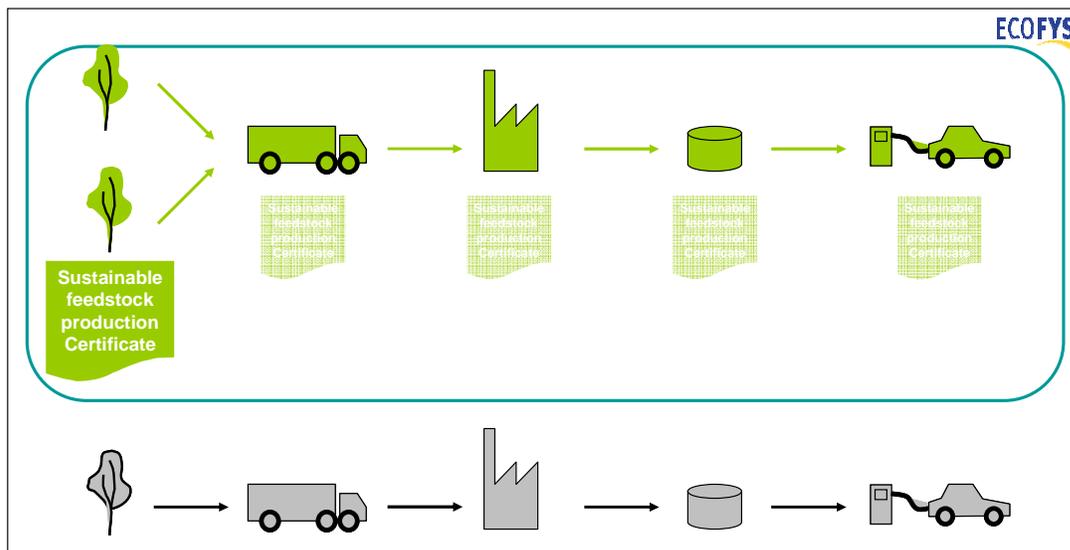


Figure A - 2 Illustration of physical segregation (also referred to as bulk commodity)

Characteristics:

- Certified products are physically segregated from non-certified products throughout the supply chain (either in time or place), while the approach does not aim to provide traceability back to the origin of the product;
- Delivers consignments physically containing 100% certified products;
- Consignments can contain products from a variety of certified sources.

Possible claim:

- All EU biofuels physically contain 100% certified material from certified sources.

Mass balance

The mass balance approach is not a strictly defined concept and can be run in different ways. In a mass balance system physical mixing of certified and non-certified products is permitted. We distinguish two variations of the mass balance system; the percentage based claims mass balance and the quantity credit mass balance system.

Percentage based claims mass balance

In the percentage based claims mass balance approach, actors in the supply chain keep track of the proportion of certified products in the mixture. For each consignment of final product at the end of the supply chain (e.g. biofuels) it can be claimed that it contains X percent certified material, depending on the mixing of certified and non-certified products that took place at various stages of the supply chain.

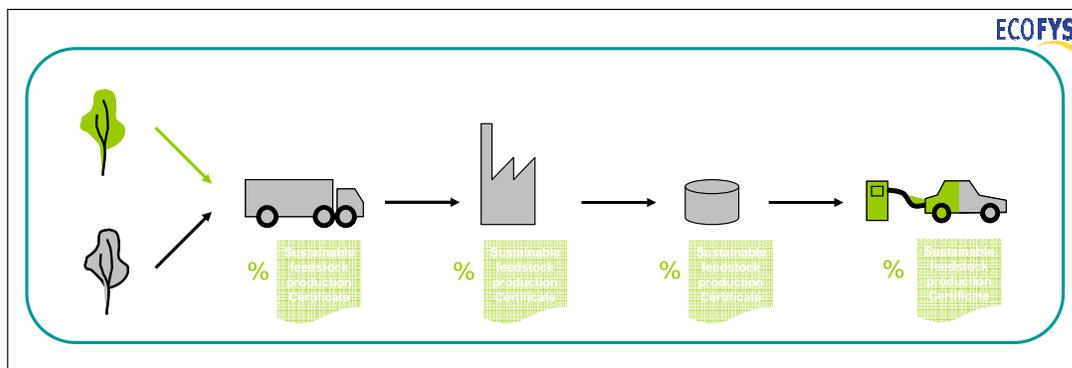


Figure A - 3 Illustration of percentage based mass balance

The percentage based claims mass balance does not match very well with the approach under the RED as it provides only partially compliant biofuels (which would lead to the other non-compliant part of the biofuel not counting towards the target). It is included here for reasons of completeness.

Quantity credit mass balance

In the quantity credit mass balance, each actor in the supply chain keeps track of the amount of product with certain sustainability characteristics it sources and sells. At the end of the supply chain a proportion of final products will be claimed as from 'completely' certified material, equal to the amount of certified material added to the supply chain, taking into account relevant conversion factors.

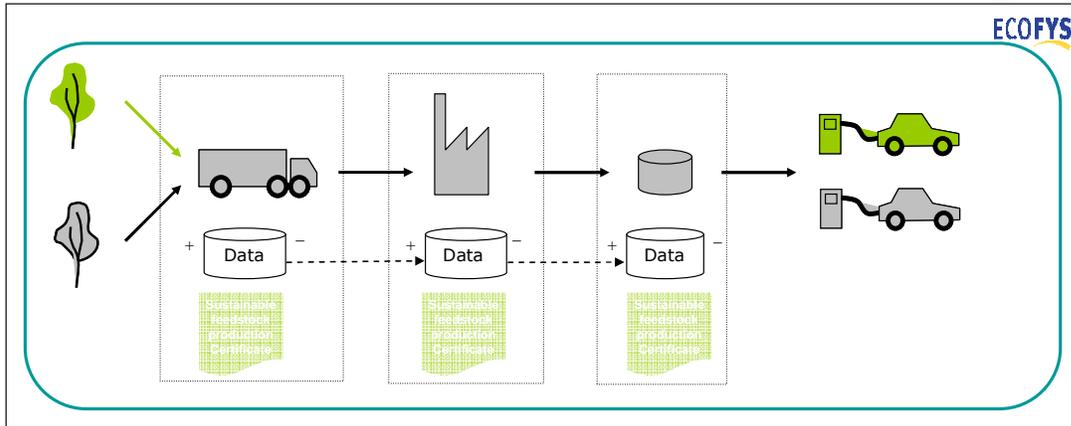


Figure A - 4 Illustration of quantity credit mass balance

Characteristics:

- Products with different sustainability characteristics can be physically mixed, but are kept administratively segregated;
- Ensures that for the volume of biofuels for which claims are made at the end of the supply chain, sufficient certified material has been added to the supply chain, taking into account relevant conversion factors
- Physical product and sustainability information are coupled when they are traded between parties. There cannot be trade in sustainability information between parties without trading physical products between the same two parties (as is possible in a book and claim system);
- Each actor in the supply chain keeps track of the amount of product with certain sustainability characteristics it sources and sells, in which each company can never sell more certified products than it sourced, taking into account relevant conversion factors.

The way a mass balance system is defined further depends on how the following aspects are arranged:

- Scope of the mass balance system
- Mass balance with or without traceable transport
- Level at which the mass balance system is run
- Transfer of sustainability information between different feedstock derived products
- Aggregation of multiple consignments
- Timeframe over which the mass balance is run
- Proportionate feedstock reporting
- Validity of claims (banking and forward allocation)

The Communication from the Commission on voluntary schemes and default values in the EU biofuels and bioliquids sustainability scheme (2010/C 160/01) contains further guidance on the mass balance chain of custody and the above aspects

Possible claim under the current mass balance:

- EU biofuels come from supply chains to which an amount of certified feedstock has been added that equals the amount needed to produce these biofuels

- Note that with a credit based mass balance system, EU biofuels do not necessarily physically contain 100% certified material
- Note that due to flexible feedstock allocation EU biofuels do not necessarily contain the reported feedstocks.

Book and claim

A book and claim approach enables certificate trading decoupled from the physical trade.

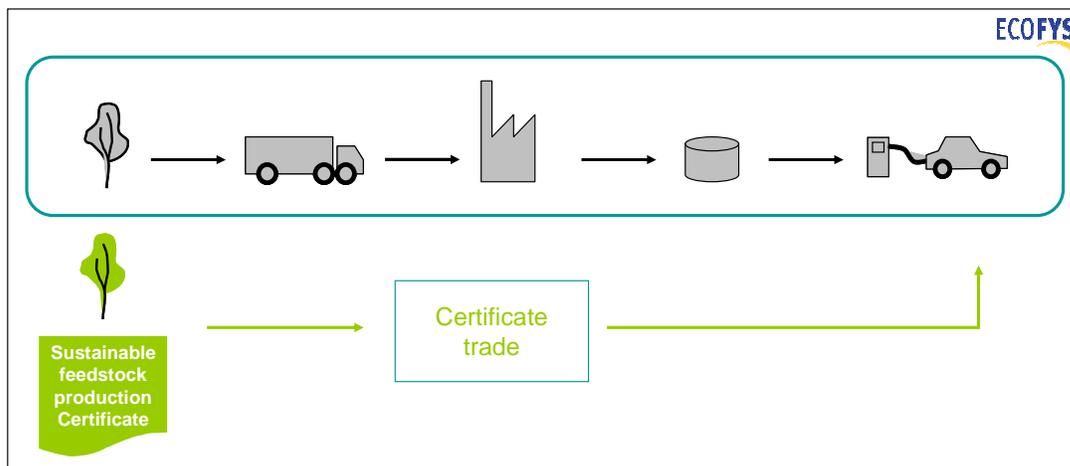


Figure A - 5 Illustration of book and claim

Characteristics:

- Trade in physical products is completely decoupled from the trade in sustainability certificates;
- For the volume of biofuels for which claims are made in the market, sufficient certified material has been added to the market, taking into account relevant conversion factors.

Possible claim:

- EU biofuels support the production of certified sustainable material. An amount of certified feedstock has been produced that equals the amount needed to produce the EU biofuels.

A key difference with a mass balance system is that it can only be claimed that the sustainable feedstock has been added to the overall market. It cannot be claimed that sustainable feedstock has been added to the biofuel supply chain.

Appendix B – List of interviews

This Appendix contains a list of experts interviewed for this study.

Organisation type	Organisation	Name
Economic operator	ADM	Martin Kropp
Economic operator	BioMCN	Eelco Dekker
Economic operator	BP	Sandra Schwimbersky
Economic operator	Neste Oil	Tiina Tuominen
Economic operator	IOI Loders Croklaan	Martijn Schneider
Economic operator	SIPEF	Paul Nellens
Industry association	OVID (Verband der Ölsaatenverarbeitenden Industrie in Deutschland / German Oilseeds processing industry)	Petra Sprick
Verifier	Control Union	Alien ten Kleij
Verifier	Ernst & Young	Andrew Britton
Verifier	SGS	David Glenister
Voluntary schemes	Abengoa	Jesús López López and Reyes Barrado Sanchez
Voluntary schemes	Greenergy	Patrick Lynch
Voluntary schemes	ISCC	Andreas Feige
Voluntary schemes	RTRS	Agustin Macotena

Appendix C – Workshop participants

This Appendix contains a list of participating experts in the *'Workshop on the operation of the mass balance system for biofuels and the potential for allowing other chain of custody systems'* which took place in London on May 8, 2012.

Organisation type	Organisation	Name
Economic operator	BioMCN	Heleen Koopal
Economic operator	BP	Sandra Schwimbersky
Economic operator	Shell	Michelle Morton
Economic operator	EPure	Gloria Gaupmann
Economic operator	SIPEF	Paul Nellens
Verifier	Ernst & Young	Andrew Britton and Natalie Wilkinson
Voluntary schemes	Abengoa	Reyes Barrado Sanchez
Voluntary schemes	Bonsucro	Nicolas Viart
Voluntary schemes	ISEAL	Amy Jackson
Other	GIZ	Martina Gaebler
Consortium	Ecofys	Sacha Alberici, Jasper van de Staaij, Gemma Toop
Consortium	Utz Certified	Joost Sprakel

Appendix D – Proportionate feedstock reporting

This Appendix provides an example of the concept of 'proportionate feedstock reporting' in situations where different feedstock types are mixed.

In passing sustainability information through the supply chain, it could be permitted to use a mass balance approach that freely allocates sustainability characteristics to outgoing consignments within a feedstock type (e.g. oil palm). However, when proportionate feedstock reporting is applied, information on feedstock type must be representative of the actual feedstock mix of the mixture from which the consignment was drawn. The following concrete example illustrates this further:

Example: Company A sources biodiesel which contains a mixture of PME and RME. It sells half of this for consumption in the EU and the other half is exported to the US. Can Company A sell the biodiesel for consumption in the EU with only RME data or do the sustainability characteristics of each outgoing consignment need to be representative of the actual feedstock mix?

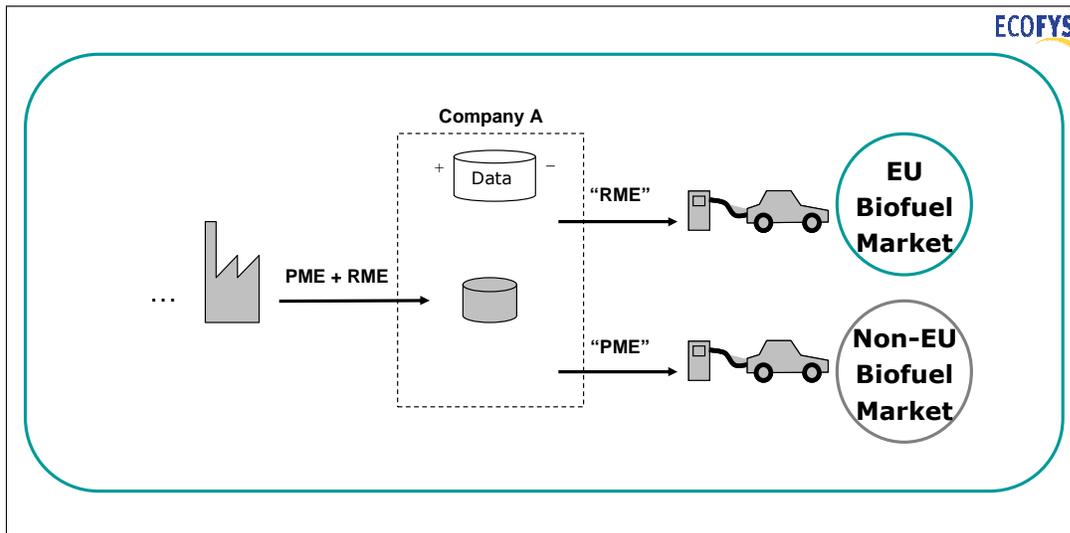


Figure D - 1 Example of flexible feedstock reporting

Options

1. Reporting representative feedstock information is called 'proportionate feedstock reporting';
2. If parties allocate only data from a selection of feedstock types in the mixture (e.g. only RME data) to an outgoing consignment which contains more feedstock types than the selection (e.g. both RME and PME), this is called 'flexible feedstock reporting'.

The Commission Communication on voluntary schemes and default values in the EU biofuels and bioliquids sustainability scheme (2010/C 160/01) allows flexible feedstock allocation (option 2 above).

Pros and Cons

- Reduced administrative burden: Allowing flexible feedstock reporting reduces the efforts companies have to take to ensure that they can demonstrate that all their biofuels are sustainable, if they supply different markets;
- Unequal competition:
 - A global operating company has a competitive advantage over a party that operates only in the EU, as the global party would have the flexibility to sell whichever feedstock mix they wish onto the EU market. Less desirable feedstock mixes could be sold, on paper at least, to markets outside the EU without a reporting requirement;
 - There may be an economic advantage to using a certain feedstock. Palm oil for example has commonly been cheaper than rapeseed oil (but has less favourable FAME characteristics). If palm oil would be perceived to have a more negative risk profile than rapeseed oil, it seems undesirable that a party would be able to enjoy the economic benefit of using palm oil in its physical fuel mix while not having to address the negative sustainability risk profile of reporting palm oil;
- Sustainable feedstock can not compensate for unsustainable feedstock: In line with the above, if using a certain feedstock in the mix offers economic benefits over other types of feedstock, it is likely that producers will actually use it (within the limitations of meeting the fuel quality standard). The reality therefore would be that EU biodiesel demand drives production of a certain feedstock. Stakeholders would want to see this reflected by sustainable feedstock production and not by sustainable production of another feedstock type;
- Credibility: If certain feedstock mixtures are physically used under the RED, it may be perceived as misleading to report different types of feedstock or feedstock mixes.

Note that the question of proportionate feedstock reporting is typically more of an issue for biodiesel than bioethanol. Current bioethanol is a more homogeneous product both in terms of meeting the technical specifications and in terms of feedstocks having a similar sustainability risk profile. Whereas, biodiesel is usually required to be *physically* composed of a blend of different feedstocks to meet the technical specifications. Those feedstocks more often have different sustainability risk profiles. Therefore the situation does occur in the biodiesel market that a certain physical feedstock mix is driven by the combination of economics, technical specifications and sustainability. Some stakeholders felt that the biofuel feedstocks *reported* should be representative of the biofuel feedstocks physically used.

Appendix E – Overview of recognised mass balance systems

This Appendix presents a comparison of key characteristics of existing mass balance systems. It investigates the mass balance systems and alternative systems of seven of the existing mass balance systems recognised by the Commission³⁴, as well as RSPO and FSC.

When a voluntary scheme is recognised by the Commission, economic operators can use the mass balance system in order to demonstrate compliance with (part of) the requirements of the RED. This Appendix includes:

Recognised by the Commission

1. ISCC-EU (International Sustainability and Carbon Certification)
2. Bonsucro EU
3. RTRS EU RED (Round Table on Responsible Soy EU RED)
4. RSB EU RED (Roundtable of Sustainable Biofuels EU RED)
5. 2BSvs (Biomass Biofuels voluntary scheme)
6. RBSA (Abengoa RED Bioenergy Sustainability Assurance)
7. Greenergy (Greenergy Brazilian Bioethanol verification programme)

Other

8. RSPO (Roundtable on Sustainable Palm Oil)
9. FSC (Forest Stewardship Council)

RSPO and FSC are included as they are relatively long established, when compared to some of the recognised voluntary schemes, and to allow comparison with other important (non-biofuel) schemes. (Note that the main RSPO scheme analysed here allows four different chain of custody options, including book and claim, whereas the RSPO RED scheme most recently recognised by the Commission does not allow the book and claim option.)

³⁴ Ensus was included in the analysis, but is excluded from this overview as it is a company scheme specifically focussed on UK feedstock for the part of the supply chain from farm gate to Ensus gate. By 30 November 2012 a total of thirteen schemes have been recognised by the Commission, but the later schemes are not included in this overview.

Table 10: Key characteristics existing mass balance systems

Scheme	2BSvs	Bonsucro EU	Greenergy	ISCC EU	Abengoa	RSB EU	RTRS EU	RSPO	FSC
Prevention of double counting/claiming	YES. Through requirement for detailed internal data management and monitoring systems (principle 0) Use of internal registry.	YES – through unique ID number	YES – through the invoice (a biofuel sustainability declaration) and/or through a unique reference number	YES - through unique ID, risk analysis and random checks. Internal Registry is maintained through ISCC webpage	YES – through use of internal code and internal registry	YES - “unique identification of the product [...] unmistakable and unambiguous differentiation from all other products...”	YES-through use of an internal accounting system	YES - through a web-based Transaction Registration System (Central Registry operated by Utz)	NO centralised system.
Timeframe over which the system operates (from assessments)	Continuous	One month	2 options: (1) Periodic inventories with maximum period of 3 months ; or (2) Continuous inventories	3 months	3 months	Continuous	2 options: (1) continuous or (2) fixed inventory of 3 months (with 12 months permitted only in the first year of certification).	Continuous	Inventory period of 12 months, although exceptions are possible
Extent of supply chain covered	Entire supply chain	Entire supply chain	Entire supply chain	Entire supply chain	2 options (to conversion unit or to final economic operator) ¹	Entire supply chain	Entire supply chain	Entire supply chain	Entire supply chain
Supply chain audits	YES ²	YES	YES	YES	YES	YES	YES	YES	YES
Chain of custody certification	YES	YES	YES	YES	YES	YES	YES	YES	YES

1- The two options are (i) from agricultural production units until biofuel conversion unit (ii) from agricultural production units until final economic operator.

2- No audits required for transportation, blending and re-blending (NL Agency, 2012)

Table 11: Alternative chain of custody approaches

Scheme	2BSvs	Bonsucro EU	Greenenergy	ISCC EU	Abengoa	RSB EU	RTRS EU	RSPO	FSC
Does the scheme allow other COC	NO	NO	NO	ISCC allows physical segregation (2 options) ¹ .	NO	YES, Identity preservation and physical segregation	YES, physical segregation also possible	YES, identity preservations, physical segregation and book and claim	YES, physical segregation and mass balance (2 options) ²

1- The two ISCC physical segregation options are (1) Physical segregation of all batches; (2) Physical segregation of sustainable and non sustainable batches.

2 – The two FSC mass balance options are (1) percentage-based and (2) volume credit.

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