Federal Office for Agriculture and Food

Evaluation and Progress Report 2017

Biomass Energy Sustainability Ordinance
Biofuel Sustainability Ordinance

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Contents

List of figures

List of tables

Preface

Dear Readers,

This is the eighth Evaluation and Progress Report presented by the Federal Office for Agriculture and Food (BLE) as the competent authority.

Three years after the introduction of the greenhouse gas reduction quota, the trend towards improving the savings potential of biofuels used in Germany is continuing. This is leading to a continuous change in the flow of goods within the European Union and the European Free Trade Association (EFTA), because once again more biofuels with very low emissions were used in Germany. Thus, emissions were saved at an average rate of over 81% in 2017, i.e. around 4 percentage points more than in the year before, compared with the reference value for fossil fuels.

Since the beginning of 2017, new installations, put into operation after 05.10.2015, have to prove a saving of at least 60% in the production of biofuels. They can apparently reach this minimum requirement with ease, as can a large portion of the plants put into operation before that date.

The sustainable biomass system (Nabisy) government database is still used to a large extent by economic operators who do not market their produce in Germany. In this report we therefore provide information on the use of biomass fuels and biofuels in Germany, and also on the flow of goods to other countries.

This Evaluation and Progress Report intends to inform both the interested public and experts on the development and progress of biofuels brought into circulation in Germany.

Dr. Hanns-Christoph Eiden
President of the Federal Office for Agriculture and Food

1. Introduction

1.1 General

On 5 June 2009, Directive 2009/28/EG of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of electricity from renewable sources (Renewable Energies Directive) was published in the Official Journal of the European Union. It is part of the EU climate and energy package adopted by the Council on 6 April 2009. This package consists of binding legislation to ensure that the EU achieve its climate and energy goals by 2020[1].

The directive emphasises that the control of energy consumption in Europe, as well as the increased **use of renewable energy**, together with energy savings and improved energy efficiency, are essential elements of the package of measures to reduce greenhouse gas emission and to **comply with the Kyoto Protocol, the United Nations Framework Convention on Climate Change**, and other community and international commitments which aim to reduce greenhouse gas emissions beyond 2012.

One aim of this directive is therefore to increase the proportion of energy coming from renewable sources within the EU[2], and to reduce both the dependency on fossil energy sources and greenhouse gas emissions.

At the national level, each Member State shall thus introduce measures and develop the appropriate instruments designed to achieve the goals set or national goals which go beyond those.

The use of energy from renewable sources in the **transport sector** is considered to be one of the most effective means via which the Community can also reduce its dependence on imported oil for the transport sector, where the problem is most acute, and can have an impact on the fuel market[3].

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[1] The three primordial goals of the package: Reduction of greenhouse gas emissions by 20% (as compared to levels in 1990), 20% of EU energy from renewable sources, improve energy efficiency by 20%

[2] by 2020 a minimum 10% of final energy consumption in the transport sector, Art. 3(4) Directive 2009/28/EC

[3] Recitals of Directive 2009/28/EC of the European Parliament and of the Council

In terms of biofuels and bioliquids, the Renewable Energies Directive prescribes **sustainability criteria**:

- The reduction in greenhouse gas emissions to be achieved through the use of biofuels and bioliquids must be at least 35% (at least 60% in the case of new installations),

- Biofuels and bioliquids may not be produced from raw materials obtained from high biodiversity areas,

- Biofuels and bioliquids may not be produced from raw materials obtained from high-carbon stock areas,

- Biofuels and bioliquids may not be produced from raw materials obtained from areas which were peatlands in January 2008, unless evidence is provided that the cultivation and harvest of the respective raw material does not involve drainage of previously undrained soil.

According to Commission Communication 2010/C 160/02 the sustainability criteria for biofuels and bioliquids may be implemented as follows:

1. via national systems,

2. via applying a voluntary scheme recognised by the Commission for tha purpose,
   or

3. by fulfilling the rules of a bilateral or multilateral agreement between the European Union and third parties, which was concluded by the Commission for that purpose.

Up until the deadline of 31.12.2017, the European Commission published implementing decisions for the recognition of 18 voluntary systems within the scope of the Renewable Energies Directive. In the field of sustainable biomass production, these voluntary systems are operative in addition to the certification systems (DE systems) recognised by the BLE and the national systems of other Member States, and some are again recognised after five years. Furthermore, a greenhouse gas calculation tool was recognised by the European Commission.

On 04.08.2010, the German government adopted the National Renewable Energy Action Plan. Also, on 28.09.2010, the German government published its energy concept for an environmentally friendly, reliable and affordable energy supply. Pursuant to Article 27(1) of the Renewable Energies Directive, and regarding the transposition into Member States' national law by 05.12.2010, Germany transposed the Directive by publishing both the Biomassestrom-Nachhaltigkeitsverordnung, BioSt-NachV [Biomass Energy Sustainability Ordinance, BioEn SusO], of 23.07.2009 and the Biokraftstoff-Nachhaltigkeits-Verordnung, Biokraft-NachV [Biofuel Sustainability Ordinance, BiofuelSusO], of 30.09.2009 in the Federal Law Gazette. These sustainability ordinances implement the Renewable Energies Directive and represent part of the measures included in the German National Action Plan and the Federal Energy Concept.

With Directive (EU) 2015/1513 of the European Parliament and the Council of 9th September 2015 amending Directive 98/70/EC relating to the quality of petrol and diesel fuels and amending Directive 2009/28/EC on the promotion of the use of energy from renewable sources, the European legislator established a ceiling of 7% for the share of biofuels obtained from food crops (conventional biofuels) and allowed less time to meet the sustainability criterion of minimum GHG savings, increased from an actual 35% to a future 50% (as of 2018) and to 60% for new installations (from 01.01.2017)[4].

In Germany, on 1st January 2015, the energetic biofuel quota was replaced by the greenhouse gas reduction quota. Since then, parties obliged to provide proof must ensure that the greenhouse gas emissions of the fossil petrols and fossil diesel fuels, in addition to the greenhouse gas emissions from the biofuels they bring into circulation, are reduced by a defined percentage compared to their individually calculated reference value[5]. The reduction, compared to the reference value, amounted to 3.5 percent in 2015 and 2016; it is 4 percent between 2017 and 2019 and will be 6 percent as of 2020.

As a supportive measure to the introduction of the greenhouse gas reduction quota, the BLE regularly prepares evaluations for the Commission and the voluntary systems, as well as for the national systems. The evaluation provides the respective systems with information regarding proofs of sustainability with very low emission values, as entered by their system participants in Nabisy. If the value indicated in the proof of sustainability falls short of the so-called typical value, or of a value comparable to that, by at least 10%, it appears as a “particularly low emission value” in that evaluation.The BLE data provided in this respect should not be confused with the data for this evaluation report. They support the certification systems in making their own evaluations. The Commission receives a summary of the total number of relevant proofs of sustainability in the systems it recognises individually.

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[4] Art. 17(2) Directive 2009/28/EC

[5]4 The reference value compared to which the greenhouse gas reduction has to be achieved, is calculated by multiplying the base value (83,8 g CO2eq/MJ) by the energetic quantity of fossil petrol and fossil diesel fuel brought into circulation by the obliged party, plus the energetic quantity of biofuel brought into circulation by the obliged party. The greenhouse gas emissions of fossil petrols and fossil diesel fuels are calculated by multiplying the base value by the energetic quantity of fossil petrol and fossil diesel fuel brought into circulation by the obliged party. The greenhouse gas emissions from biofuels are calculated by multiplying the greenhouse gas emissions established in the proofs recognised according to Article 14 of the Biofuel Sustainability Ordinance, in kilogram carbon dioxide equivalents per gigajoule, by the energetic quantity of biofuel brought into circulation by the obliged party.

1.2 This report

This report provides information about the use of sustainable biomass in Germany. The information on the quantities of biofuel and bioliquid are split into three sections. They are:

- Biofuels counted towards the greenhouse gas reduction quota or for which tax relief has been requested (Chapter 6).
- Biofuels which have been registered for electricity generation and supply according to the Renewable Energies Act (Chapter 7)
- Biofuels and bioliquids which supplied energy not used in Germany (Chapter 7)

The base data for the evaluation report is formed by the sustainable biomass system (Nabisy) government database. All biofuel and bioliquid quantities relevant to the German market are recorded therein.

The BLE, as the competent authority, is obliged to submit an annual progress report to the Federal Government.

1.3 Summary of important results and events of 2017

- For 113,029TJ of **biofuels** [previous year: 113,528TJ] counting towards the German greenhouse gas reduction quota, or tax relief was applied for (equivalent to 3,339 kilotonnes of biofuel). Almost 67% (75,656TJ) thereof came from source materials originating in the EU [previous year: approx. 72% (82,081TJ)].

- The source materials for all types of biofuel were predominantly waste and residue (29.4%, [previous year: 30.1%]), rapeseed (25.1%, [previous year: 28.5%]), palm oil (17.5% [previous year: 14.7%]), maize (12.7% [previous year: 8.8%]) and wheat (7% [previous year: 8.5%]).

- The largest share of biofuel – almost 71% – was accounted for by 79,955 TJ of biodiesel (FAME), [previous year: 66%, 74,517 TJ].

- The most commonly used source materials for **biodiesel production** were waste and residues, at 31,508 TJ (39.4% [previous year: 43.5%]), followed by rapeseed at 28,381 TJ (35.5% [previous year: 43.15%])

- The most commonly used source materials for **bio-ethanol production** were maize, at 14,369TJ (47.9% [previous year: 33.1%]) and wheat, 7,940TJ (26.5% [previous year: 32%]). The respective proportions of waste, residue, sugar beet and sugar cane have more than halved.

- The use of palm oil in biofuels has increased again in 2017 compared to the previous year (+17.9%).

- The overall reduction in **greenhouse gas emissions** from all biofuels (pure) amounted to approximately 81% compared to fossil fuels. This means that, by using biofuels instead of fossil fuels, around 7.7 million tonnes of CO_2 equivalent have been avoided [previous year: approximately 7.3 million].

- 31,287TJ of **bioliquids** were converted into electricity. Remuneration according to the Renewable Energies Act was applied for for feed-ins. 87% [previous year: 88%] is thick liquor from the pulp and paper industry, 10% [previous year: 12%] was vegetable oil.

- The overall reduction in **greenhouse gas emissions** from all biofuels (pure) amounted to almost 93.4% compared to fossil fuels. This means that, by using biofuels instead of fossil fuels, around 2.7 million tonnes of CO_2 equivalent have been avoided [previous year: approximately 2.7 million].

- 48,631TJ of biofuels and bioliquids whose sustainability information was registered in Nabisy were retired to the accounts of other states [previous year: approx. 53,100TJ]. The corresponding proofs of sustainability indicated significantly higher emissions in comparison to the documents submitted in Germany.

- Up until 31.12.2017, a total of 18 voluntary systems and a greenhouse gas calculation tool were recognised by the European Commission, and were likewise recognised in Germany. Of these, eight systems have now been re-recognised for another five years. The Commission's procedure for re-recognition also took into account recommendations from the Special Report 18/2016 of the European Court of Auditors.

- In the reporting year, the BLE-recognised certification bodies (25 as at 31.12.2017) undertook 3,250 certifications worldwide in the context of their recognition work. Of these, 3,116 were according to the requirements of the voluntary systems and 134 in accordance with the requirements of the two DE systems.

- Since the beginning of 2017, biofuels from plants which went into operation after 05.10.2015 are only deemed sustainable if they achieve savings of at least 60% compared to the comparative value for fossil fuels. The BLE therefore collected the commissioning date of the respective insatallation in all systems whose participants manufacture biofuels and/or bioliquids. This date is required by the Nabisy government database to verify the plausibility of the 60%- minimum saving. 41 new instalations have been notified to the BLE to date. 24 of these new installations already produce biofuels according to the aforementioned minimum conditions.

1.4 Methodology

This evaluation and progress report describes the existing processes and measures, and analyses the data available to the BLE. Circumstances relevant for implementation in Germany are also included, such as the transposition of Directive 2009/28/EC in other Member States, and the recognition of voluntary schemes by the European Commission.

The results of the analysis are presented, compared and explained from different angles.

The following accounts relate to the data communicated by economic operators to the BLE in its role as the competent authority in accordance with Art. 66 Biofuel SusO and Art. 74 BioEn SusO.

No conclusions can be drawn from the following representations as to the actual number of participants in individual voluntary systems or in national systems of other Member States.

It is mandatory for data on the sustainability of biofuels and bioliquids to be provided for the sustainable biomass system (Nabisy) government database by the economic operators, insofar as such data may be relevant for the German market. Quantities provided as a precautionary measure and which are ultimately not to be used as energy in Germany, are contained in Nabisy, without being attributed to Germany. The economic operator concerned is responsible for the correct entry of such data. The data provided are thus gathered in an organised manner and systematically documented.

This information available here should provide the basis for optimisation processes among decision-makers in politics and business.

As far as it is possible on the basis of the available data, the analysis should also check the measures for effectiveness.

Where information about the number of Nabisyusers or certifications is stated, it is important to note that economic operators have been counted more than once, in the case of the parallel use of different systems of certification and in the event that an operator is active both as a producer and as a supplier. No conclusion can therefore be drawn as to the number of companies participating in the measures.

The targets with regard to the measurement of effect are considered to be the following:

- an increase in the share of “renewable energies” in energy supply in Germany in the fuel sector and in terms of electricitygeneration from liquid biomass,
- the reduction of greenhouse gas emissions through the use of sustainable biomass, and
- the development of more efficient processes and source materials for the production of energy from biomass.

Within the scope of BioEn SusO and Biofuel SusO, the changes occurring in the relevant calendar year are analysed.

There is a concrete analysis of the following areas (amongst others)

- effectiveness of the sustainability ordinances, in relation to the objectives pursued by the Federal Government

and

- optimisation of the implementation of the requirements of the specifications of the Renewable Energies Directive.

Suitable methods were chosen for data identification, measurement and evaluation.

Those proofs of sustainability were taken into account for which counting towards the biofuel quota obligation (or tax relief) was requested in the quota year in question, as well as proofs which were registered for remuneration according to the Renewable Energies Act. This predominantly concerns partial proofs of sustainability, arising from multiple combinations or splittings along the chain, through to the final user. These proofs were identified on the basis of the usage notices issued by main customs offices and/or network operators.

The data is considered and evaluated with regard to fuel type, quantity, energy content, origin, raw materials used in production and, finally, the resulting emissions. Where graphical representations did not seem appropriate, a tabular format was chosen.

The state of affairs on 31.12.2017 is the primary focus, as well as the course the implementation of the activity took over time (per year) in relation to the initial values in the form of a statistical comparison.

In this context, the monitoring measures put in place by the BLE, and/or administrative processes, are also analysed, evaluated and optimised.

Any differences in totals reported here are due to rounding.

2. BLE Responsibilities

The BLE is the competent authority in Germany for the implementation of the sustainability criteria laid down in the Renewable Energies Directive within the scope of the sustainability ordinances.

BLE responsibilities in the field of sustainable bioenergy include

- in the **biofuels sector** - **making data** that are required to count biofuels towards the greenhouse gas reduction quota or in connection with tax relief **available** to the biofuels quota body and the main customs offices,
- in the **bioelectricity sector** - **making data** that are required for remuneration and for the renewable raw materials (NawaRo) bonus for installation operators **available** to network operators,
- in the **emissions trading sector - making data available** to the German Emissions Trading Authority (DEHST),
- **administration of data** on the sustainability of biofuels and/or bioliquidsthrough the **public web-based database Nabisy** and issuing of partial proofs of sustainability at the request of the economic operators,
- **regular evaluation of the sustainability ordinances** and the **compilation** of an annual **progress report** for the German government,
- regular compilation of **reports on particularly low emissions** of the proofs of sustainability for voluntary systems and national systems and to be notified to the EU Commission,
- **recognition and supervision of certification systems and certification bodies** pursuant to the sustainability ordinances.

In addition, and within the scope of its responsibilities pursuant to art. 74 BioEn-SusO [BioSt-NachV] and/or art. 66 Biofuel-SusO [Biokraft-NachV], the BLE regularly carries out the following measures to implement the sustainability ordinances:

- office audits of the certification bodies on a yearly basis and risk-oriented evaluation of certification bodies' audit work (witness audits),
- maintenance and expansion of the BLE website, by providing information and documents in German and English,
- maintenance and further development of a continuous system for the recognition of certification systems and bodies and to monitor compliance with legal requirements,
- maintenance and further development of the public database Nabisy for the documentation of the origins of biofuels and of proofs of sustainability; general matters concerning the documentation and plausibility of information regarding the sustainability of biofuel supplies; exchange of data with other Member States' databases,
- maintenance and expansion of the information register pursuant to Art. 66 BioEn SusO [BioSt-NachV] and/or Art. 60 Biofuel-SusO [Biokraft-NachV],
- hosting the meetings of the Advisory Council for Sustainable Bioenergy,
- holding events with certification systems, certification bodies and the industry to exchange knowledge and other information,
- presentations at informative events for multipliers such as associations, certification systems, certification bodies, German federal states' representatives and competent authorities of other Member States,
- attendance at various trade events and fairs,
- cooperation with the implementing authorities of other Member States in the REFUREC (Renewable Fuels Regulators Club) to coordinate implementation, and as an observer in relevant working groups of CA-RES (Concerted Action-Renewable Energy Sources Directive),
- training of BLE Control Service staff employed as assessors in the field of sustainable biomass production.
- training of Nabisy web application users.

3. Certification systems, voluntary systems and national systems of other Member States

The Renewable Energies Directive, and its national implementation via sustainability ordinances, require adherence to the regulations regarding the sustainability of biomass and of the biofuels and bioliquids produced thereof, by all operators along the entire value chain. The DE systems as well as voluntary systems recognised by the European Commission or national systems of other Member States *dÜ: are tasked with ensuring and monitoring this.

Organisationally speaking, certification systems must ensure the fulfilment of the requirements of the Renewable Energies Directive and of the respective national legal provisions adopted for the manufacture and supply of biomass. Their system documents contain requirements regarding the more detailed definition of requirements, proof of their fulfilment and verification of this proof.

3.1 BLE-recognised certification systems pursuant to Art. 33(1) and (2) BioEn SusO and/or Biofuel SusO

By 31.12.2017, the BLE received the following number of applications for the recognition of certification systems:

Table 1: Applications from German certification systems

Total applications by 31.12.2017	**4**
of which rejected	1
of which recognised	3
of which recognition withdrawn	1
currently recognised by the BLE ISCC System GmbH, Cologne REDcert GmbH, Bonn	**2**

For the following countries, the BLE granted the DE systems recognition in the context of their application:

- all Member States of the European Union as well as
- Egypt, Ethiopia, Argentina, Australia, Bolivia, Bosnia and Herzegovina, Brazil, Burkina Faso, Chile, China, Costa Rica, Ecuador, El Salvador, Côte d'Ivoire, Georgia, Ghana, Guatemala, Hong Kong, India, Indonesia, Israel, Cambodia, Cameroon, Canada, Kazakhstan, Kenya, Colombia, Laos, Malaysia, Madagascar, Mauritius, Mexico, Moldova, Mozambique, Nicaragua, Norway, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Russia, Serbia, Switzerland, Singapore, Sudan, Tanzania, South Africa, Republic of Korea, Thailand, Togo, Turkey, Uganda, Ukraine, Uruguay, USA, Uzbekistan, Venezuela, United Arab Emirates, Vietnam and Belarus.

3.2 Voluntary systems referred to in Art. 32(3) BioEn SusO and/or Biofuel SusO

In accordance with Article 18(4) Subparagraph 2, Sentence 1 of Directive 2009/28/EC, the European Commission may decide that voluntary national or international systems, in which standards are specified for the production of biomass products, contain accurate data for the purposes of Article 17(2). This data may be used as evidence that deliveries of biofuel correspond to the sustainability criteria of Article 17(3) to (5) of the directive. These voluntary systems shall be rocognised for a maximum of five years.

These voluntary systems are deemed to be “recognised” in Germany subject to Art. 41 BioEn SusO and/or Biofuel SusO, as long as and to the extent that they are recognised by the Commission of the European Communities. By 31.12.2017, the Commission of the European Communities has recognised/re-recognised the following 18 voluntary systems, as well as one greenhouse gas calculation tool:

Table 2: Voluntary systems (EU systems) - as at 31.12.2017

Voluntary systems	Company headquarters	recognised on	re-recognised on
2BS Association	France	10.08.2011	28.08.2016
Greenergy	Great Britain	10.08.2011	[6]
Bonsucro	Great Britain	10.08.2011	23.03.2017
ISCC System GmbH	Germany	10.08.2011	11.08.2016
Round Table on Responsible Soy Association (RTRS)	Argentina	10.08.2011	11.12.2017
Abengoa	Spain	10.08.2011	[6]
Roundtable on Sustainable Biomaterials (RSB)	Switzerland	10.08.2011	11.08.2016
ENSUS UK	Great Britain	14.05.2012	[6]
REDcert GmbH	Germany	15.08.2012	12.08.2017
NTA 8080	Netherlands	20.08.2012	[6]
Roundtable on Sustainable Palm Oil RED (RSPO)	Malaysia	13.12.2012	[6]
HVO Renewable Diesel Scheme for Verification of Compliance with the RED sustainability criteria for biofuels	Finland	30.01.2014	
KZR INiG	Poland	24.06.2014	
Red Tractor Farm Assurance Combinable Crops & Sugar Beet Scheme	Great Britain	06.08.2012	15.12.2017
Scottish Quality Farm Assured Combinable Crops Limited	Great Britain	13.08.2012	30.06.2015
Gafta Trade Assurance Scheme	Great Britain	24.06.2014	
Trade Assurance Scheme for Combinable Crops		08.10.2014	
Universal Feed Assurance Scheme		08.10.2014	
Biograce GHG calculation tool		21.06.2013	[6]

3.3 National systems of other Member States

At the organisational level, national systems of other Member States also ensure the

[6] had not been re-recognised by the time of the editorial deadline

fulfilment of the requirements according to the sustainability criteria in the Renewable Energies Directive, providing for the manufacture and supply of biomass. They govern the specification of the requirements to furnish proof of their fulfilment and regarding the control of this proof.

In 2017, Nabisy contained data from the national systems of Hungary, Slovenia, Slovakia and Austria. Companies resident in Austria are obliged to registere data on sustainability with the Austrian elNa database.

3.4 Economic operators

In the field of sustainable bioenergy, all economic operators along the entire value chain work in accordance with the specifications of a certification system, a voluntary system or of a national system of another Member State, with the exception of users (installation operators and parties obliged to provide evidence). They must comply with other national regulations in order to receive remuneration pursuant to the Renewable Energies Act, or to count towards the biofuel quota.

The following types of economic operators are to be taken into account:

Growers

are agricultural holdings and operational facilities which grow and harvest biomass.

First gathering points

are establishments and operational facilities (plants) which, for the first time and for the purpose of trading it further (e.g. in agricultural trade), take on the biomass required to produce biofuels from those holdings that grow and harvest such biomass.

Originators

are establishments or private households where waste and residue are generated.

Gatherers

establishments and operational facilities (plants) which, for the first time and for the purpose of trading them further, take on the biomass needed to produce biofuels, as biogenic waste and residue, from those holdings or private households that generate waste and residue.

Conversion operations

A distinction between two groups must be drawn in this respect:

a) Operational facilities and plants which process biomass from sustainable production or from biogenic waste or residue and supply the semi-finished products to be processed at a further level for the purpose of biofuel or bio-liquid production (e.g. at oil mills, biogas plants, fat preparation plants or other plants whose processing stage fails to reach the quality level required for the final use of the product).
b) operational facilities and plants which process the liquid or gaseous biomass up to the quality level required for final use. (e.g. oil mills, esterification plants, ethanol plant, hydrogenation plants or biogas processing plants).

Establishments along the production and supply chain which require certification within the framework of the certification systems are called “interfaces”. In this context, first gathering points and gatherers are referred to as first interfaces while conversion operations which process the biomass up to the required quality level are referred to as last interfaces.

Supplier and/or trader within the value chain

Suppliers are economic operators located between the first gathering point and the conversion operation or between the last interface and the distributor of biofuels and/or the operational facility that supplies energy generated from biofuels. Where suppliers downstream of the last interface are not subject to customs supervision, they must be participants in a German certification system or in a voluntary system approved by the EU.

Installation operator

Anyone who, irrespective of ownership, uses the installation/operational facility to generate electricity from renewable energy. The installation operators receive remuneration subject to the Renewable Energies Act for this, upon submission of the relevant proof of sustainability.

Parties obliged to provide proof

Parties obliged to provide proof are economic operators who, pursuant to Art. 37A Federal Immission Control Act and during a calendar year, shall achieve a set amount of minimum savings of greenhouse gas emissions regarding the total amount of biofuels they declared for taxation. To that effect, they may distribute sustainable biofuels. Anyone who files for tax relief for biofuels pursuant to the Energy Tax Act is also considered as a party obliged to provide proof.

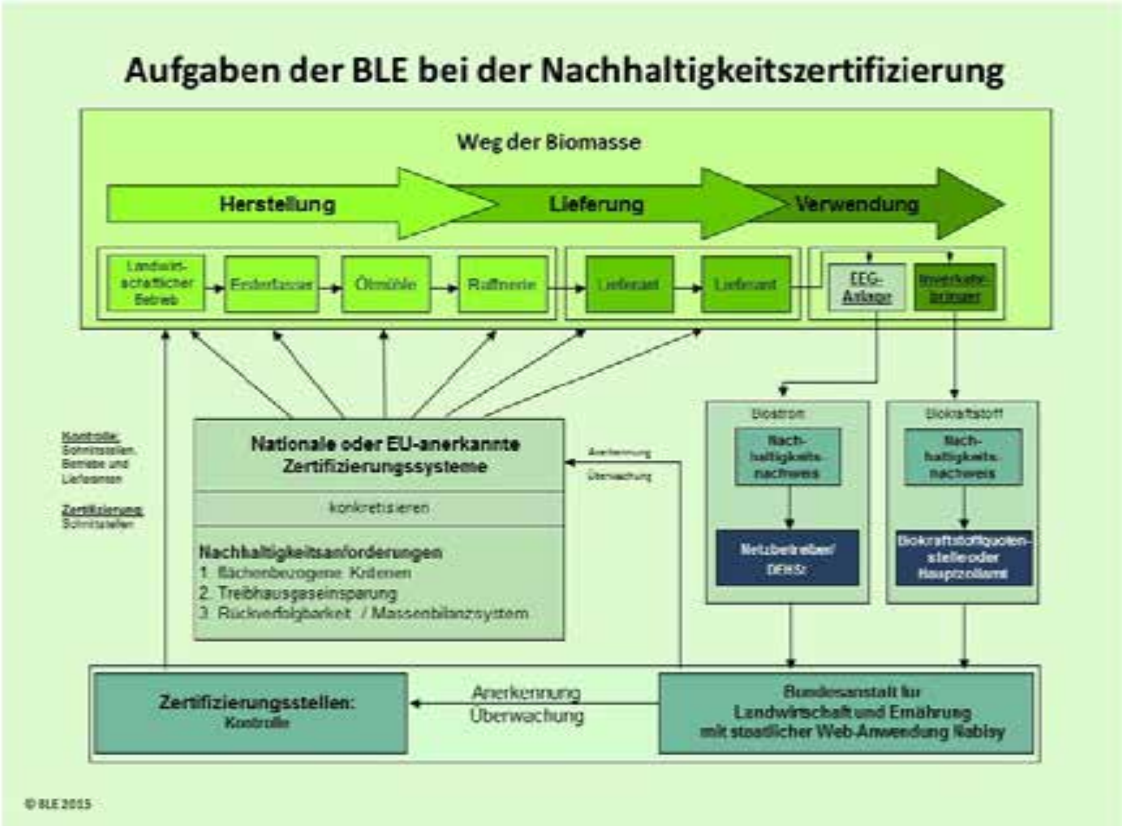

Aufgaben der BLE bei der Nachhaltigkeitszertifizierung
Weg der Biomasse
Herstellung
Lieferung
Verwendung
Landwirtschaftlicher Betrieb
Ersterfasser
Ölmühle
Raffinerie
Lieferant
Lieferant
EEG-Anlage
Inverkehrbringer
Kontrolle: Schnittstellen, Betriebe und Lieferanten
Zertifizierung: Schnittstellen
Nationale oder EU-anerkannte Zertifizierungssysteme
konkretisieren
Nachhaltigkeitsanforderungen
1. flächenbezogene Kriterien
2. Treibhausgaseinsparung
3. Rückverfolgbarkeit / Massenbilanzsystem
Anerkennung
Überwachung
Biostrom
Nachhaltigkeitsnachweis
Netzbetreiber/ DEHSt
Biokraftstoff
Nachhaltigkeitsnachweis
Biokraftstoffquotenstelle oder Hauptzollamt
Zertifizierungsstellen: Kontrolle
Anerkennung
Überwachung
Bundesanstalt für Landwirtschaft und Ernährung mit staatlicher Web-Anwendung Nabisy
© BLE 2015

Figure 1

3.4.1 System participants notified to the BLE

In the context of the sustainability ordinances, voluntary national or international systems – in addition to the certification systems recognised by the BLE – which set requirements for the manufacture of biomass products, are informally recognised by Germany, as long as and to the extent that they are recognised by the European Commission. The same is true for national systems of other Member States.

The registration of participants in BLE-recognised certification systems (DE systems) is mandatory. For voluntary and national systems, only those participants are taken into account who were notified to the BLE, because the biofuels or bioliquids they produce or trade are (or might be) relevant for the German market, and they require access to Nabisy. The majority of participants now belong to an EU-recognised voluntary system.

Up to and including 31.12.2017, there were **3,994 participants** registered with the BLE (previous year: 3,849) along the value chain, who were producing or trading biofuels and/or bioliquids.

The total is the figure for all participants notified to the BLE. If a company simultaneously fills multiple roles, such as that of manufacturer of biofuel and supplier downstream of the last interface, and/or if the company is a participant in several certification systems, they will be counted multiple times.

Fewer and fewer companies are participants in a DE system. It is assumed that the participants leaving the DE systems change to the voluntary schemes. The total number of participants increased by nearly 4%.

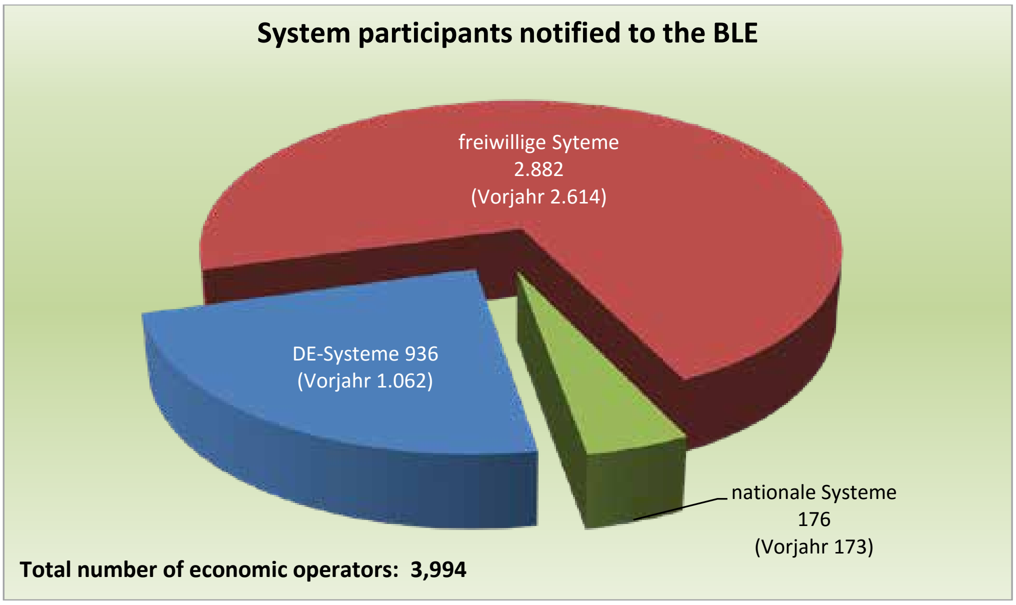


Figure 2

3.4.2 Suppliers subject to supervision by German customs offices

Where suppliers downstream of the last interface are subject to customs supervision within the meaning of Art. 17(3) Number 2 Biofuel SusO, they need not necessarily be part of a DE system or of a voluntary system recognised by the European Commission. To benefit from this exemption, the supplier's mass balance system must regularly be subjected to controls by the main customs offices for reasons of taxation pursuant to the Energy Tax Act or for the purpose of monitoring the biofuel quota obligation under the Federal Immission Control Act, and the suppliers must document in the electronic database Nabisy that they have received and forwarded the biofuels, including the respective place and date as well as information stated on the proof of sustainability.

During the application process for access to Nabisy, the BLE asks the main customs office responsible for the supplier's place of business to confirm that the applicant is indeed subject to customs supervision. Once this confirmation is provided the economic operator will obtain access to the database.

By 31.12.2017, 227 suppliers subject to customs supervision were registered in Nabisy (245 the year before).

3.4.3 Participants in national systems of other Member States

Some of the participants registered in Nabisy are part of national systems of other Member States. By 31.12.2017, a total of 176 participants (previous year: 173) in the national systems of Austria, Hungary, Slovenia and Slovakia were notified to the BLE. The relatively small number of reports does not mean that biofuels, bioliquids or their source materials from these Member States are of limited relevance for the German market (see Chapter 6.1, Figure13). It might rather be due to the fact that some Member States transposed Directive 2009/28/EC at a later date. Consequently, economic operators from other Member States who were interested at an early stage mostly joined the DE systems or the voluntary systems recognised by the European Commission.

4. Certification bodies

Certification bodies are independent natural or legal persons who issue certificates to economic operators along the supply chain and who monitor their compliance with the requirements laid down in the Renewable Energies Directive and in national legislation adopted for its implementation, as well as other requirements of the system used. Certificates certify that the specific requirements of the Renewable Energies Directive for the production of sustainable biofuels or bioliquids are met. In Germany, the BLE is responsible for the recognition and supervision of certification bodies within the scope of sustainable biomass production. This applies irrespective of whether the certification bodies become active in connection with the certification systems recognised by the BLE or with voluntary schemes, as the monitoring task of the BLE refers to all certification bodies located in Germany.

Pursuant to Art. 42 Nos. 1 and 2, as well as Art. 43 in connection with Art. 56 BioEnSusO and/or Biofuel SusO, the following number of applications for the recognition of certification bodies were lodged with the BLE by 31.12.2017:

Table 3: Applications for the recognition of certification bodies

Total number of applications (by 31.12.2017)	**51**
of which rejected	6
of which recognised on a permanent basis	**45**
of which recognition withdrawn or void due to inactivity of the certification body/ bodies	20
Number of certification bodies permanently recognised by 31.12.2017	**25**

During the application procedure, certification bodies will first obtain a provisional recognition which will allow them to start certification activities. Only after the certification body has undergone an office audit by the BLE control services can the provisional recognition be replaced by a permanent one.

Certification bodies currently recognised are listed here:
http://www.ble.de/Biomasse.

Across the globe, BLE assessors and auditors accompany the certification audits of the certification bodies where respective states have given the BLE permission to carry out these so-called "witness audits" on their territory. Audits concern controls pursuant to the prerequisites of both the DE systems and the voluntary systems. In 2017, the BLE accompanied 157 certification audits (previous year: 163) carried out by the certification bodies. 71 of these audits were carried out in Germany while the remaining 86 of them took place across the globe, in countries both within and outside of the European Union.

Table 4: Certification bodies recognised on a permanent basis

Recognised certification bodies	permanently recognised on
SGS Germany GmbH, Germany	23.08.2010
DQS CFS GmbH, Germany	23.08.2010
TÜV SÜD GmbH, Germany	23.08.2010
GUT Certifizierungsgesellschaft mbH, Germany	23.08.2010
Global-Creative-Energy GmbH, Germany	30.08.2010
Peterson Control Union Deutschland GmbH, Germany	30.08.2010
Agrizert Zertifizierungs GmbH, Germany	29.09.2010
IFTA AG, Germany	01.12.2010
DEKRA Certification GmbH, Germany	01.12.2010
ABCERT AG, Germany	09.12.2010
LACON GmbH, Germany	15.12.2010
ÖHMI Euro Cert GmbH, Germany	20.12.2010
QAL Umweltgutachter GmbH, Germany	20.12.2010
Agro Vet GmbH, Austria	21.12.2010
ASG cert GmbH, Germany	14.03.2011
Bureau Veritas Certification Germany GmbH, Germany	14.03.2011
TÜV Thüringen e. V., Germany	21.04.2011
TÜV Nord Cert GmbH, Germany	23.09.2011
proTerra GmbH, Germany	27.09.2011
Intertek Certification GmbH	13.02.2013
ELUcert GmbH, Germany	17.04.2013
SC@PE international ltd.	05.06.2014
DIN CERTCO Gesellschaft für Konformitäts-bewertung mbH	04.02.2015
SicZert Zertifizierungen GmbH	26.03.2015
Alko-Cert GmbH	03.02.2017

4.1 Global certifications under DE system requirements

In Germany, the transposition of Directive 2009/28/EC into national law provides for a compulsory certification of the so-called **interfaces**, certain economic operators along the supply chain for the production of biofuels or bioliquids. These interfaces include the first gathering points/gatherers as well as all conversion operations. In addition, assessments of conformity are carried out along the production and supply chain.

The certification bodies acting according to the requirements of the certification systems recognised by the BLE (REDcert-DE and ISCC-DE) mainly carried out certifications in Germany and within the European Union.

Whilst 2016 saw 99 certifications carried out, 35% more, i.e. 134 certifications were carried out in the reporting year.

It can be assumed from this that most of the system participants certified here are companies operating exclusively on the German market, and do not therefore necessarily require certification under the specifications of a voluntary system. However, some overseas establishments were awarded a certificate issued under DE system requirements.

The increase in certifications in the reporting year is probably due to the fact that the European Commission has imposed on the certification systems it recognises, that the combustion emissions of fossil methanol used in the esterification process be included in the GHG calculation from the 1st September 2017. With regard to the approximation of the relevant provisions in the DE systems, the BLE recommended a transition period until the end of the year.

Table 5: Number of DE certifications

Number of operations certified and recertified under DE system requirements	In 2015	In 2016	In 2017
Total	121	99	134
of which in Germany	91	76	102
within the EU, excluding Germany	29	19	24
of which in third countries	1	4	8

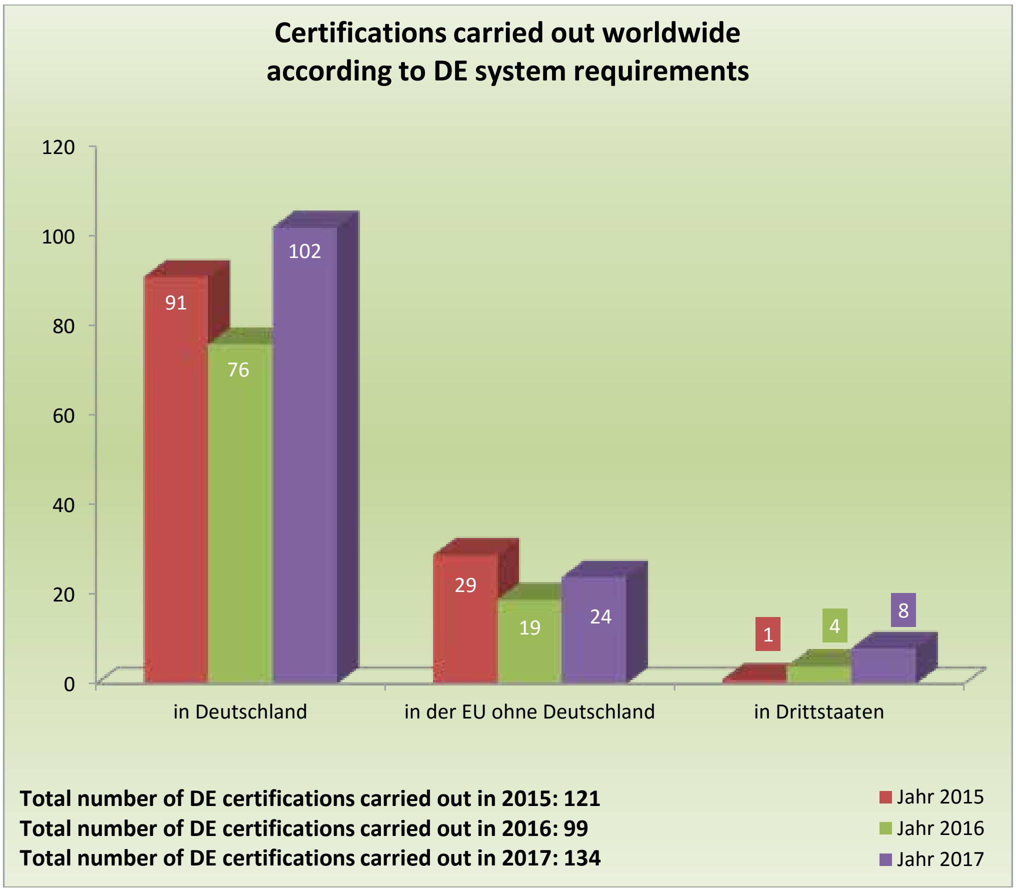


Figure 3

4.2 Certifications under voluntary system requirements

The BLE is responsible for the recognition and supervision of certification bodies based in or operating a branch in Germany, and which decide on certification there.

This is irrespective of the nature of the system (DE or voluntary) used to comply with the requirements that the company to be certificated has signed up to. The certification bodies communicate all certificates to the BLE. During the reporting year, **3,116** (previous year: 2,448) certifications and recertifications of operations according to voluntary system requirements were notified to the BLE.

5. Government database Nabisy and proofs of sustainability

5.1 Sustainable biomass system (Nabisy)

According to Commission Decision 2011/13/EU of 12th January 2011, economic operators have to submit certain kinds of information on the sustainability of every consignment of biofuels and bioliquids to the Member States, where these consignments can become relevant for the respective market.

In Germany, this is done electronically. The economic operators must enter this information into the web-based government database **Nabisy** for every supply of biofuels or bioliquids. Proofs of sustainability or partial proofs of sustainability contain the data regarding compliance with the sustainability criteria entered into Nabisy and are to be handed on along the supply chain.

During the reporting year, 2,461 (previous year: 1,859) accounts were used by economic operators. Only operators from the last interface were involved as this is where the Nabisy system commences.

Through the law on the introduction of calls for proposals for electricity from renewable energies, and on further changes to the law regarding renewable energies dated 13.10.2016 (Federal Law Gazette I, p2258) the Biomass Energy Sustainability Ordinance applied from 01.01.2017 to all liquid biomass required by the Renewable Energies Act. Plant operators who need to use **start-up, ignition or auxiliary firing** for the operation of their plant and who use liquid biomass to this effect, have needed proof of sustainability since 01.01.2017. Since October 2016, the BLE has established accounts and accesses for over a thousand affected biogas plants, upon request.

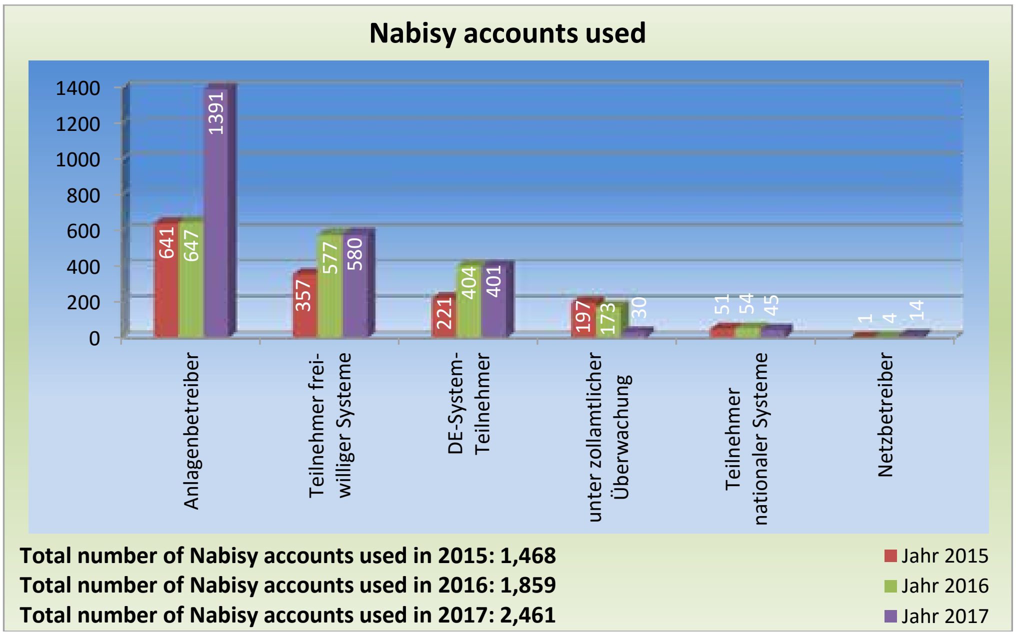


Figure 4

Depending on their function, economic operators with an account in Nabisy can create proofs of sustainability (last interfaces), can transfer, split or combine proofs of sustainability and partial proofs of sustainability (suppliers/ installation operators) and can indicate uses (network operators). Economic operators may apply to the BLE for a needs-based number of accesses to their accounts.

The largest increase in Nabisy accesses was seen in the field of installation operators. These accesses were primarily for biogas plants.

The overview below shows the number of accesses established by 31.12.2017.

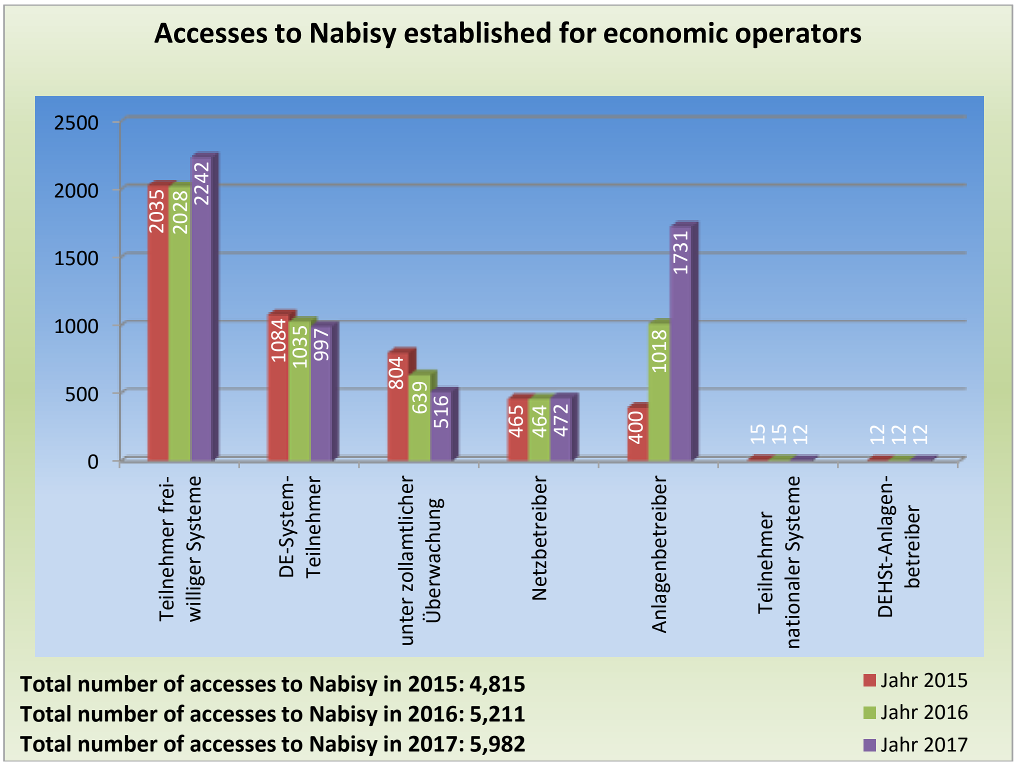


Figure 5

5.2 Proofs

Only producers of consignments of biofuel or bioliquids may issue a **proof of sustainability**. They are the so-called **last interface**. By issuing the certificate in Nabisy, they ensure that the consignment can be used on the German market. If a party downstream of the supply chain, e.g. a supplier, decides that the goods are to be used outside Germany, they shall retire the respective proof to the retirement account of the state where usage takes place.

The presentation of proofs of sustainability or partial proofs of sustainability to the customs authority is a prerequisite for biofuels to be counted towards the distributor's obligation to reduce greenhouse gas emissions. Installation operators can only claim remuneration for electricity produced from biomass and fed into the grid pursuant to the Renewable Energies Act and, where applicable, for the renewable resources bonus if they provide proofs of sustainability or partial proofs of sustainability.

Proofs of sustainability are issued by those certified economic operators who process the liquid or gaseous biomass up to the quality level required for the use as biofuel or who produce bioliquids from the biomass used (**issuing bodies**). While the sustainability ordinances refer to such economic operators as the last interface, the voluntary systems do not use this term. This report therefore generally refers to the economic operator who issues the proof of sustainability.

A proof of sustainability identifies a certain quantity of biofuel or bioliquid as being sustainable. Where biofuels and/or bioliquids are traded on to the party obliged to provide proof or to the installation operator in the supply chain, the respective quantities shall be split or combined as required.

To document this accordingly, a proof of sustainability needs to be split or combined with other proofs of sustainability. In that process, but also by simply transferring a proof to the customer, **partial proofs of sustainability** are generated.

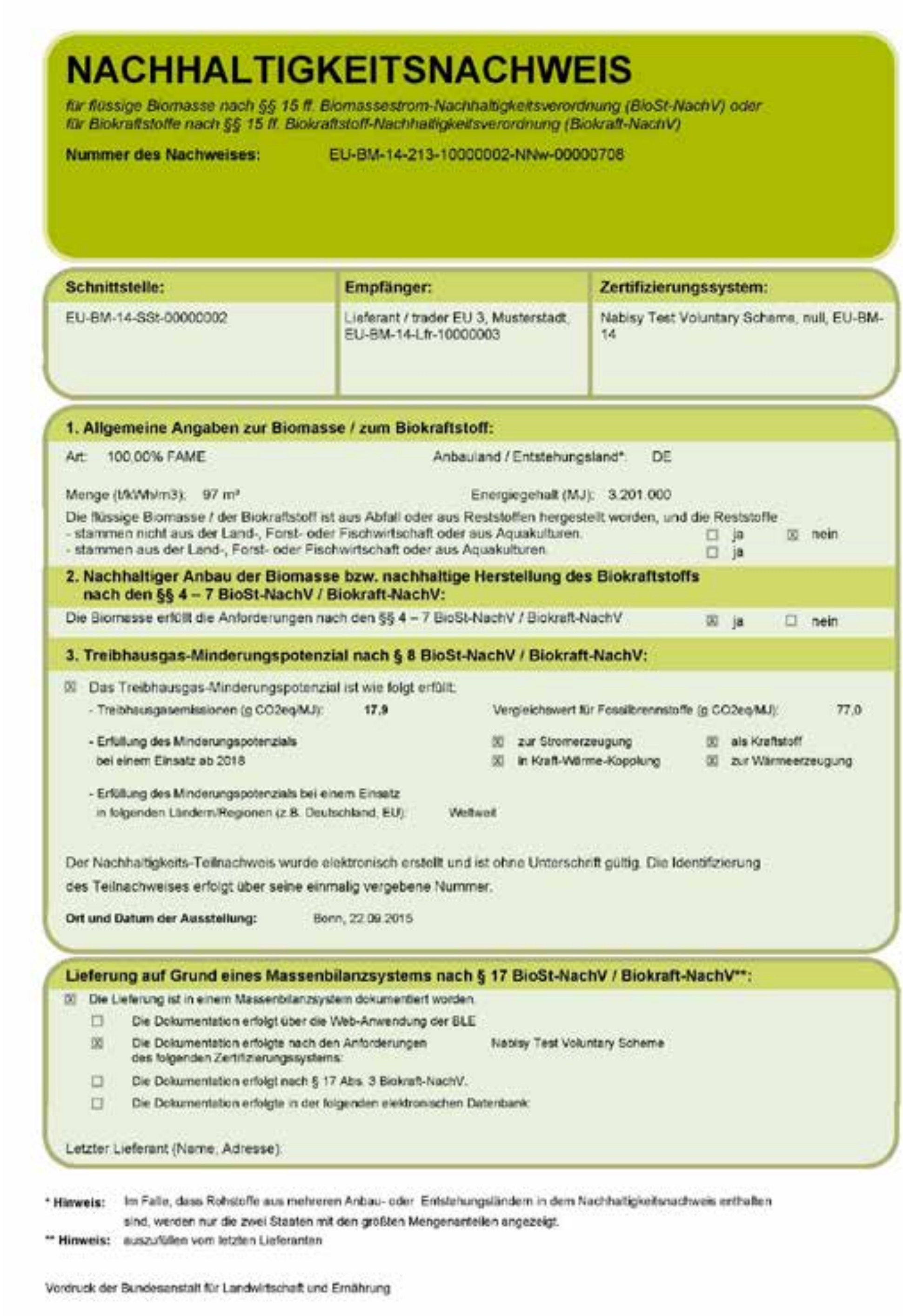
Nabisy processes proofs of sustainability (*basic proofs* to be issued by producers only) and partial proofs of sustainability (*subsequent proofs* which are generated by any kind of action carried out by suppliers: transferring, splitting, combining).

In 2017, 240 producers around the globe entered **17,220** proofs of sustainability (previous year: 16,872) into Nabisy.

Table 6: Proofs of sustainability issued

Producer location	Number of producers	Number of proofs of sustainability issued
Germany	119	9,966
European Union	81	6,717
Third countries	40	537
Total	**240**	**17,220**

Samples of a proof of sustainability (basic proof) and a partial proof of sustainability (subsequent proof) are shown below.



NACHHALTIGKEITSNACHWEIS

für flüssige Biomasse nach §§ 15 ff. Biomassestrom-Nachhaltigkeitsverordnung (BioSt-NachV) oder
für Biokraftstoffe nach §§ 15 ff. Biokraftstoff-Nachhaltigkeitsverordnung (Biokraft-NachV)

Nummer des Nachweises: EU-BM-14-213-10000002-NNw-00000708

Schnittstelle:	Empfänger:	Zertifizierungssystem:
EU-BM-14-SSt-00000002	Lieferant / trader EU 3, Musterstadt, EU-BM-14-Lfr-10000003	Nabisy Test Voluntary Scheme, null, EU-BM-14

1. Allgemeine Angaben zur Biomasse / zum Biokraftstoff:

Art: 100,00% FAME — Anbauland / Entstehungsland*: DE

Menge (t/kWh/m3): 97 m³ — Energiegehalt (MJ): 3.201.000

Die flüssige Biomasse / der Biokraftstoff ist aus Abfall oder aus Reststoffen hergestellt worden, und die Reststoffe
- stammen nicht aus der Land-, Forst- oder Fischwirtschaft oder aus Aquakulturen. ☐ ja ☒ nein
- stammen aus der Land-, Forst- oder Fischwirtschaft oder aus Aquakulturen. ☐ ja

2. Nachhaltiger Anbau der Biomasse bzw. nachhaltige Herstellung des Biokraftstoffs nach den §§ 4 – 7 BioSt-NachV / Biokraft-NachV:

Die Biomasse erfüllt die Anforderungen nach den §§ 4 – 7 BioSt-NachV / Biokraft-NachV ☒ ja ☐ nein

3. Treibhausgas-Minderungspotenzial nach § 8 BioSt-NachV / Biokraft-NachV:

☒ Das Treibhausgas-Minderungspotenzial ist wie folgt erfüllt:
- Treibhausgasemissionen (g CO2eq/MJ): **17,9** — Vergleichswert für Fossilbrennstoffe (g CO2eq/MJ): 77,0
- **Erfüllung des Minderungspotenzials bei einem Einsatz ab 2018** — ☒ zur Stromerzeugung ☒ als Kraftstoff ☒ in Kraft-Wärme-Kopplung ☒ zur Wärmeerzeugung
- **Erfüllung des Minderungspotenzials bei einem Einsatz in folgenden Ländern/Regionen (z.B. Deutschland, EU):** **Weltweit**

Der Nachhaltigkeits-Teilnachweis wurde elektronisch erstellt und ist ohne Unterschrift gültig. Die Identifizierung des Teilnachweises erfolgt über seine einmalig vergebene Nummer.

Ort und Datum der Ausstellung: Bonn, 22.09.2015

Lieferung auf Grund eines Massenbilanzsystems nach § 17 BioSt-NachV / Biokraft-NachV:**

☒ Die Lieferung ist in einem Massenbilanzsystem dokumentiert worden.
- ☐ Die Dokumentation erfolgt über die Web-Anwendung der BLE
- ☒ Die Dokumentation erfolgte nach den Anforderungen des folgenden Zertifizierungssystems: Nabisy Test Voluntary Scheme
- ☐ Die Dokumentation erfolgt nach § 17 Abs. 3 Biokraft-NachV.
- ☐ Die Dokumentation erfolgte in der folgenden elektronischen Datenbank:

Letzter Lieferant (Name, Adresse):

*** Hinweis:** Im Falle, dass Rohstoffe aus mehreren Anbau- oder Entstehungsländern in dem Nachhaltigkeitsnachweis enthalten sind, werden nur die zwei Staaten mit den größten Mengenanteilen angezeigt.
**** Hinweis:** auszufüllen vom letzten Lieferanten

Vordruck der Bundesanstalt für Landwirtschaft und Ernährung

Figure 6

Bundesanstalt für
Landwirtschaft und Ernährung

Zusatzinformation zu	**EU-BM-14-213-10000002-NNw-00000708**
Allgemeine Daten	
Ausstellungsdatum	22.09.2015
Empfänger	Lieferant / trader EU 3 Musterweg 3 10003 Musterstadt

Menge

Menge	97 m³
Energiegehalt	3.201.000 MJ

Art der Biomasse

Code / Kürzel	Attribut Annex IX*	Anteil (%)	Anbauland	ILUC
38260010-1 / Biodiesel_Raps	Conv	100,00	DE	55,00

* Hinweis: Adv - Fortschrittlich, Conv - Konventionell, - - Weder Adv noch Conv

Nicht zugeordnete Anbauländer

Treibhausgas-Minderungspotential

Treibhausgas-Emissionen	17,9 g CO2eq/MJ	inkl. mittl. Schätzwert ILUC	72,9 g CO2eq/MJ
Fossiler Vergleichswert	77,0 g CO2eq/MJ		
Möglicher Einsatz in	Weltweit		
Bonus für Wiederherstellung von Flächen	Nein		
Emissionseinsparungen durch Kohlenstoffakkumulierung	Nein		

Herkunft

Aus einer Ölmühle, die vor dem 23.01.2008 in Betrieb war	Nein
Letzter Lieferant	
Dokumentation des Lieferanten	Nach den Anforderungen des Zertifizierungssystems Nabisy Test Voluntary

Figure 7

NACHHALTIGKEITS-TEILNACHWEIS

für flüssige Biomasse nach §§ 15 ff. Biomassestrom-Nachhaltigkeitsverordnung (BioSt-NachV) oder
für Biokraftstoffe nach §§ 15 ff. Biokraftstoff-Nachhaltigkeitsverordnung (Biokraft-NachV)

Nummer des Teilnachweises: EU-BM-14-Lfr-10000007-999-12345678-NTNw-10007199
Nummer des Basis-Nachweises: EU-BM-14-213-10000002-NNw-00000837

Aussteller: BLE

Schnittstelle:	Empfänger:	Zertifizierungssystem:
EU-BM-14-SSt-00000002	Lieferant / trader EU 7, Musterstadt, EU-BM-14-Lfr-10000007	Nabisy Test Voluntary Scheme, null, EU-BM-14

1. Allgemeine Angaben zur Biomasse / zum Biokraftstoff:

Art: 100,00% Bio-Ethanol — Anbauland / Entstehungsland*: DE

Menge (t/kWh/m3): 75 m³ — Energiegehalt (MJ): 1.575.000

Die flüssige Biomasse / der Biokraftstoff ist aus Abfall oder aus Reststoffen hergestellt worden, und die Reststoffe
- stammen nicht aus der Land-, Forst- oder Fischwirtschaft oder aus Aquakulturen. ☒ ja ☐ nein
- stammen aus der Land-, Forst- oder Fischwirtschaft oder aus Aquakulturen. ☐ ja

2. Nachhaltiger Anbau der Biomasse bzw. nachhaltige Herstellung des Biokraftstoffs nach den §§ 4 – 7 BioSt-NachV / Biokraft-NachV:

Die Biomasse erfüllt die Anforderungen nach den §§ 4 – 7 BioSt-NachV / Biokraft-NachV ☐ ja ☒ nein

3. Treibhausgas-Minderungspotenzial nach § 8 BioSt-NachV / Biokraft-NachV:

☒ Das Treibhausgas-Minderungspotenzial ist wie folgt erfüllt:
- **Treibhausgasemissionen (g CO2eq/MJ): 25,1** — Vergleichswert für Fossilbrennstoffe (g CO2eq/MJ): 77,0
- Erfüllung des Minderungspotenzials bei einem Einsatz ab 2018 — ☒ zur Stromerzeugung ☒ als Kraftstoff ☒ in Kraft-Wärme-Kopplung ☒ zur Wärmeerzeugung
- Erfüllung des Minderungspotenzials bei einem Einsatz in folgenden Ländern/Regionen (z.B. Deutschland, EU): Weltweit

Der Nachhaltigkeits-Teilnachweis wurde elektronisch erstellt und ist ohne Unterschrift gültig. Die Identifizierung des Teilnachweises erfolgt über seine einmalig vergebene Nummer.

Ort und Datum der Ausstellung: Bonn, 15.01.2018

Lieferung auf Grund eines Massenbilanzsystems nach § 17 BioSt-NachV / Biokraft-NachV:**

☒ Die Lieferung ist in einem Massenbilanzsystem dokumentiert worden
- ☒ Die Dokumentation erfolgt über die elektronischen Datenbank der BLE
- ☐ Die Dokumentation erfolgte nach den Anforderungen des folgenden Zertifizierungssystems:
- ☐ Die Dokumentation erfolgt nach § 17 Abs. 3 Biokraft-NachV.
- ☐ Die Dokumentation erfolgte in der folgenden elektronischen Datenbank:

Letzter Lieferant (Name, Adresse): Lieferant / trader EU 7, Musterstadt

* **Hinweis:** Im Falle, dass Rohstoffe aus mehreren Anbau- oder Entstehungsländern in dem Nachhaltigkeitsnachweis enthalten sind, werden nur die zwei Staaten mit den größten Mengenanteilen angezeigt.
** **Hinweis:** auszufüllen vom letzten Lieferanten

Vordruck der Bundesanstalt für Landwirtschaft und Ernährung

Figure 8

Bundesanstalt für
Landwirtschaft und Ernährung

Zusatzinformation zu	**EU-BM-14-Lfr-10000007-999-12345678-NTNw-10007199**

Allgemeine Daten

Ausstellungsdatum	16.01.2018
Empfänger	Lieferant / trader EU 7 Musterweg 7 10007 Musterstadt

Menge

Menge	75 m³
Energiegehalt	1.575.000 MJ

Art der Biomasse

Code / Kürzel	Attribut Annex IX*	Anteil (%)	Anbauland	ILUC
2207-030105-02 / Bioeth_w-ww-02	Adv	100,00	DE	n. relev.

* Hinweis: Adv - Fortschrittlich, Conv - Konventionell, - - Weder Adv noch Conv

Nicht zugeordnete Anbauländer

Treibhausgas-Minderungspotential

Treibhausgas-Emissionen	25,1 g CO2eq/MJ	inkl. mittl. Schätzwert ILUC	25,1 g CO2eq/MJ
Fossiler Vergleichswert	77,0 g CO2eq/MJ		
Möglicher Einsatz in	Weltweit		
Bonus für Wiederherstellung von Flächen	Ja		
Emissionseinsparungen durch Kohlenstoffakkumulierung	Ja		

Herkunft

Aus einer Ölmühle, die vor dem 23.01.2008 in Betrieb war	Nein
Letzter Lieferant	Lieferant / trader EU 7 Musterweg 7 10007 Musterstadt DE
Dokumentation des Lieferanten	Über die Web-Anwendung der BLE

Figure 9

6. Biofuels

The following illustrates the energetic quantities (TJ) of biofuels distributed in Germany for which applications for
- counting towards the GHG reduction quota or
- a tax relief were lodged.

Data are based on the notations of the Federal Revenue Administration in Nabisy.

Please note that the information given only concerns the quantities filed and respective energy contents. The available data allow no statements as to whether all of the quantities and energy contents presented here were actually granted tax relief or were counted towards the quota obligation.

Data regarding the biofuel quota obligation and tax relief are presented together.

The diagram below gives an overview of the amounts of biofuel submitted towards the greenhouse gas reduction quota. The total amount has remained virtually constant over the three-year comparative period. The proportion of waste and residues decreased by 0.7% in comparison to the previous year.

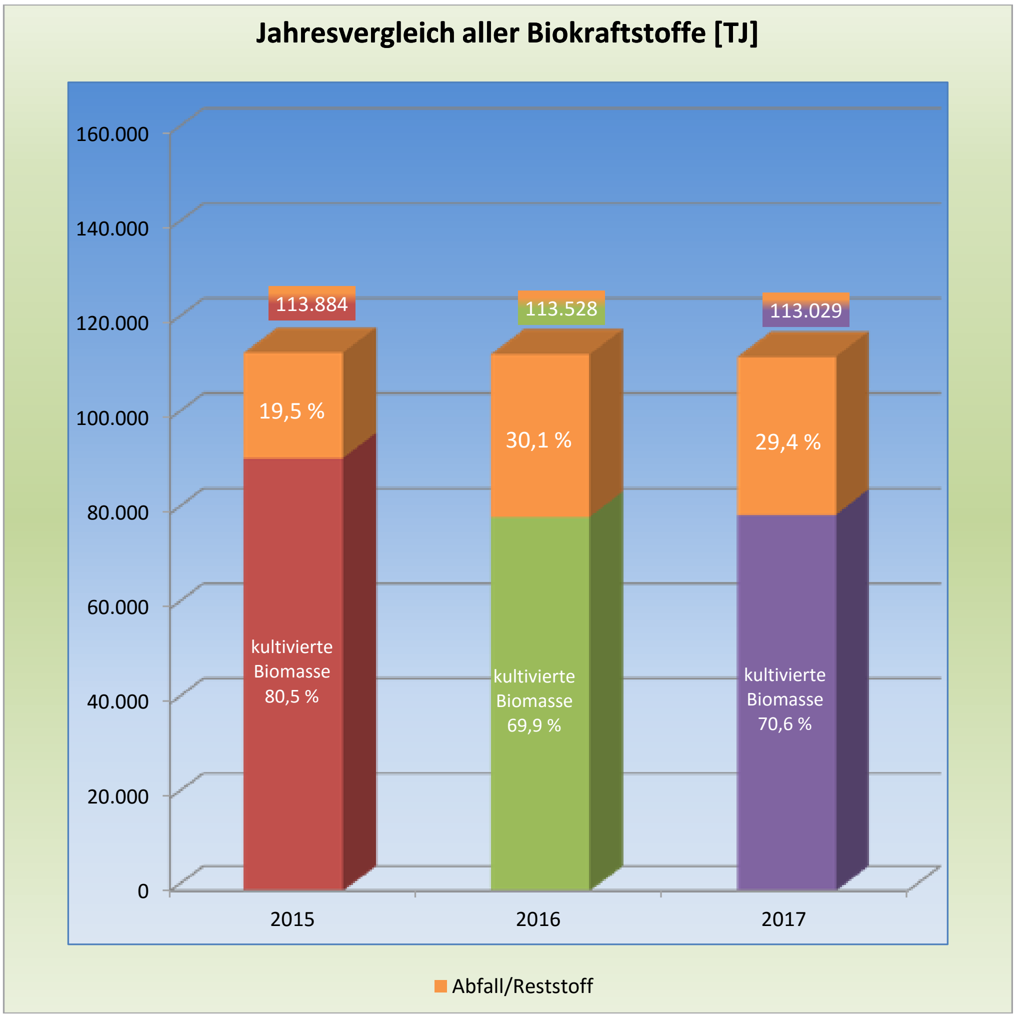


Figure 10

6.1 Origin of the source materials

Compared to the previous year, there was a clear decrease in biofuels whose source materials came from Europe and Asia. Biofuels with source materials grown or originating in Europe fell by 1.9% (previous year: -12.9%), whilst the proportion coming from Asia rose by 5.8% (previous year: +56.9%).

By contrast, the quantity of biofuels produced from source materials originating in North and South America could not continue the previous year's upwards trend. A marked decline was noted in this respect. The North American share decreased by 31% and the South American share by 46.9%.

However, the quantity coming from Central America increased by 232%. The source materials were mainly palm oils from Honduras.

The quantities from Africa and Australia remained at a similarly low level to previous years.

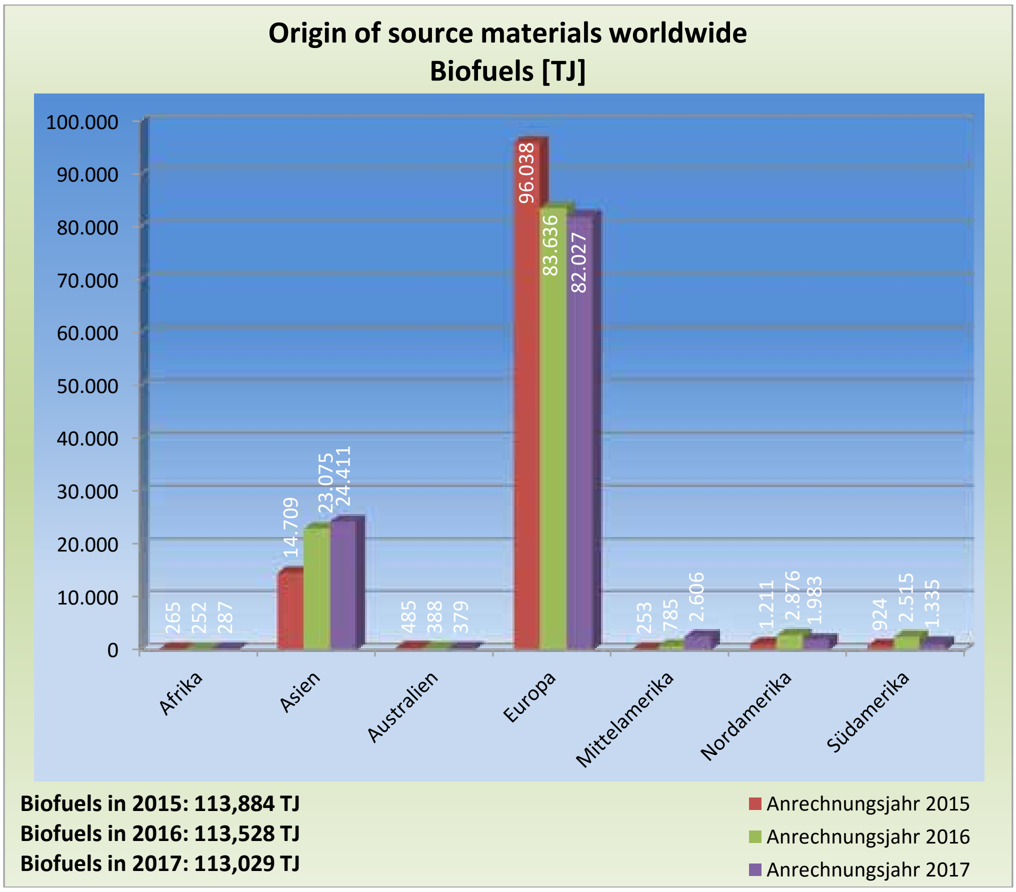


Figure11

The share of biofuels produced from source materials originating in Germany again fell significantly, by 20.8% (previous year: 25.5%). Compared to 2015, when the German share still accounted for almost half of biofuels originating in Europe, in 2017, it was around a third.

Quantities from the other Member States of the European Union continued to rise slightly.

The proportion from European third countries more than quadrupled. The majority thereof being bioethanol from maize from Ukraine (93%).

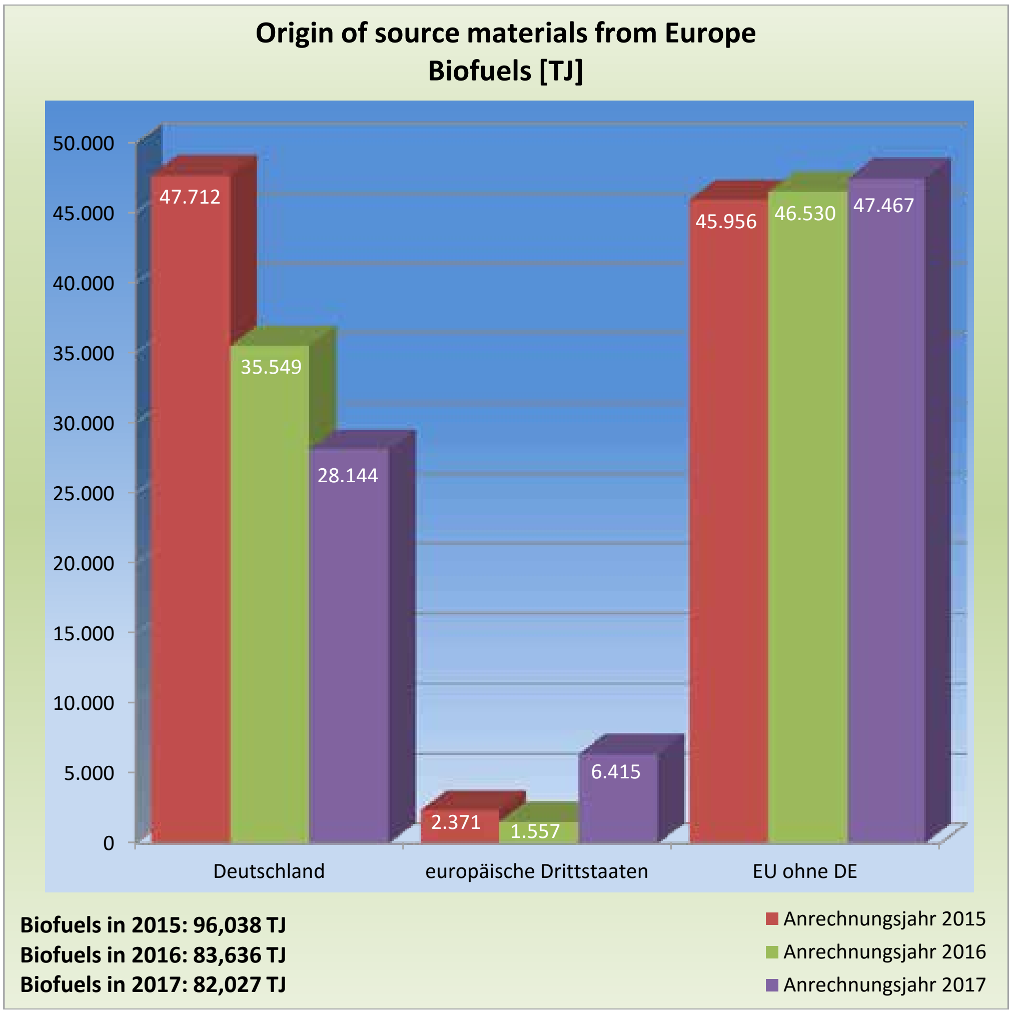


Figure 12

Overall, fewer source materials from the EU were used for the production of biofuels (-7.8%). Approximately 37% of these biofuels were made from source materials grown or generated in Germany.

11.5% of the biofuels came from Hungary, 8.8% from Poland, 7.5% from France and 6.2% from the Netherlands. The share of biofuel from Romania has increased by a factor of more than six, and the country – with 5.2% – became one of the ten largest growers of biofuels within the European Union. The largest share of biofuels originating in Romania was produced from rapeseed (73%).

Other source materials originating from the European Union came from Sweden 5%, Belgium 3.6%, Bulgaria 3.2%, the Czech Republic 3%, Austria 1.9%, and Slovakia 1.7%. The remainder (5.3%) came from thirteen countries, each of whom contributed less than 1,000 TJ.

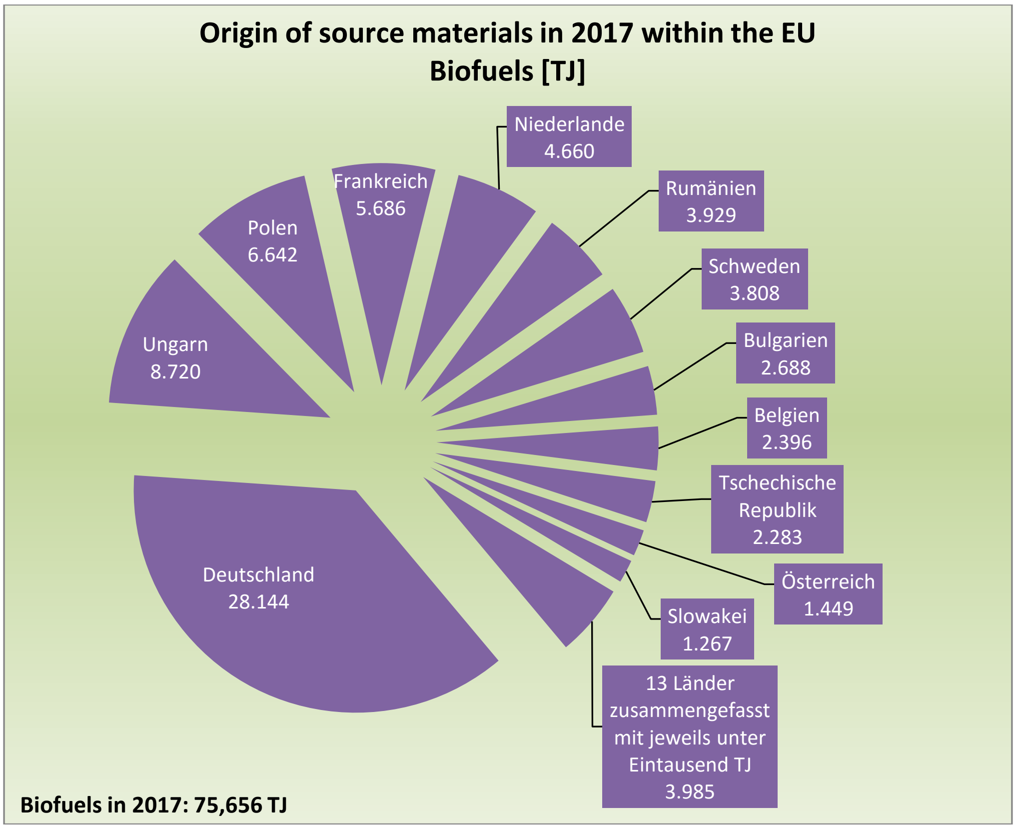


Figure13

The proportions for the thirteen countries are thus:

UK	865	Denmark	774	Spain	613	Lithuania	381
Greece	346	Italy	328	Ireland	245	Latvia	177
Finland	120	Croatia	49	Cyprus	45	Luxembourg	26
Slovenia	15						

The proportion of biofuels emanating from European third countries quadrupled in comparison with the previous year. Bioethanol manufactured from Ukrainian maize was crucial in this respect.

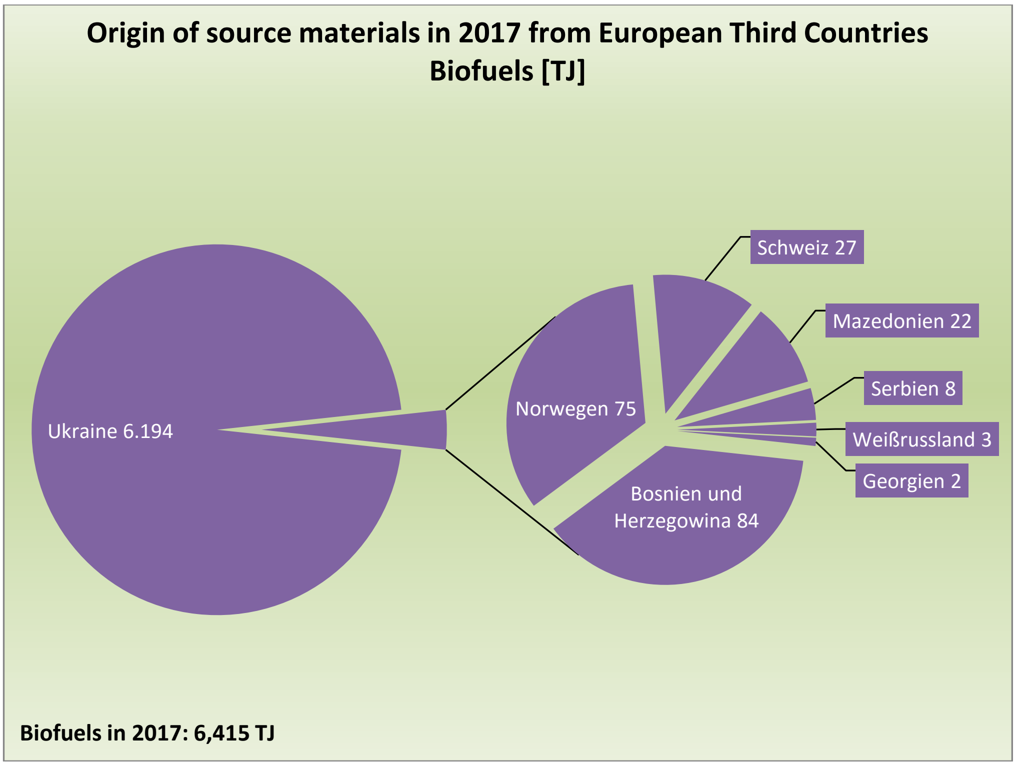


Figure 14

6.2 Source materials according to origin and type

In the reporting year, biofuels whose source materials came from **Africa** were generated exclusively from waste and residues. Despite another increase, of 13.8% this time, biofuels produced from African source materials still made up 0.25% of the total amount counted towards the total German greenhouse gas reduction quota.

They came primarily from South Africa (36.6%), Tunisia (29.3%) and Egypt (28.9%).

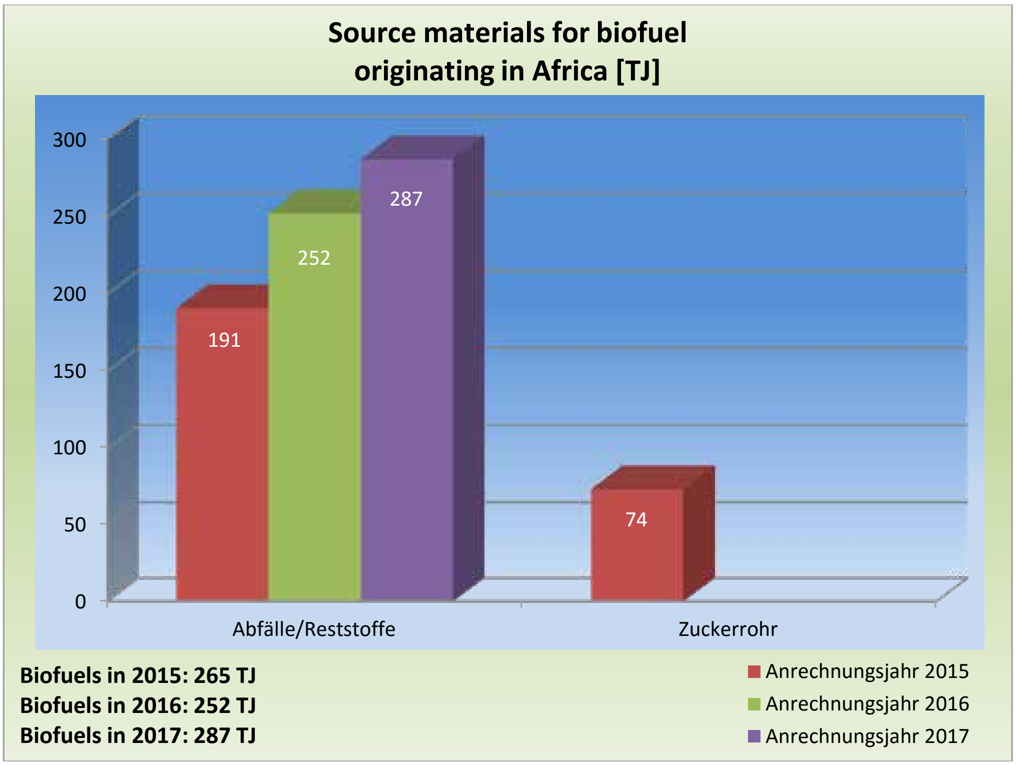


Figure15

The share of biofuels produced from source materials originating in Asia rose again, though at a significantly lower rate – by 5.8% (previous year: 56.9%).

The increase in the total results equally from a higher proportion of palm oil and of waste and residues.

95.5% of the palm oil came from Indonesia and 8.1% from Malaysia. Some materials also came from India for the first time.

The waste and residues originated in a total of 26 Asian states. They came mainly from China (39.8%), Indonesia (20.8%), Saudi Arabia (9.6%) and Malaysia (7%).

Approximately 98% of this waste and residue was used cooking oil (UCO).

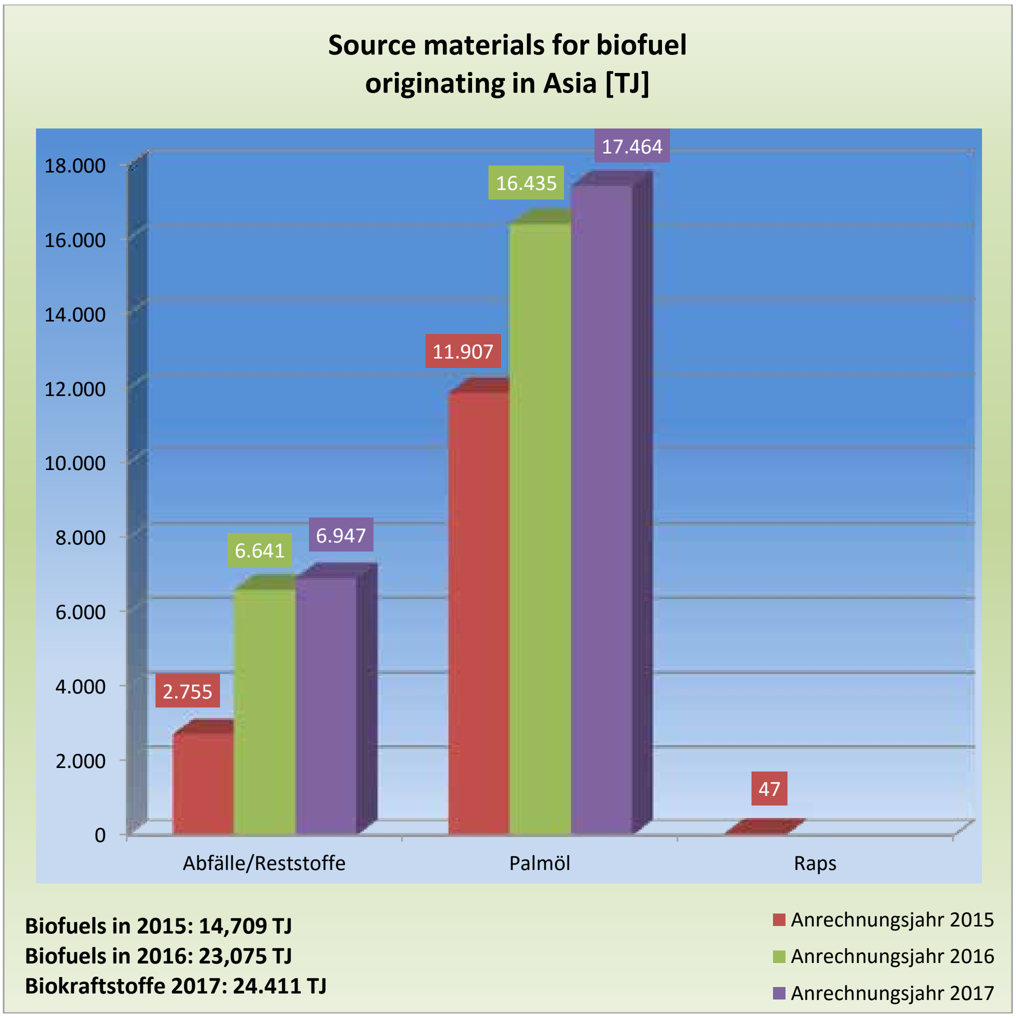


Figure16

Biofuels whose source materials came from **Australia** were generated from waste and residues. In this respect, there were only minor changes in the reporting year.

100% of the rapeseed came from Australia. Australia's share of the waste and residues was 82.6%. The remaining 17.4% of waste and residues was generated in New Zealand.

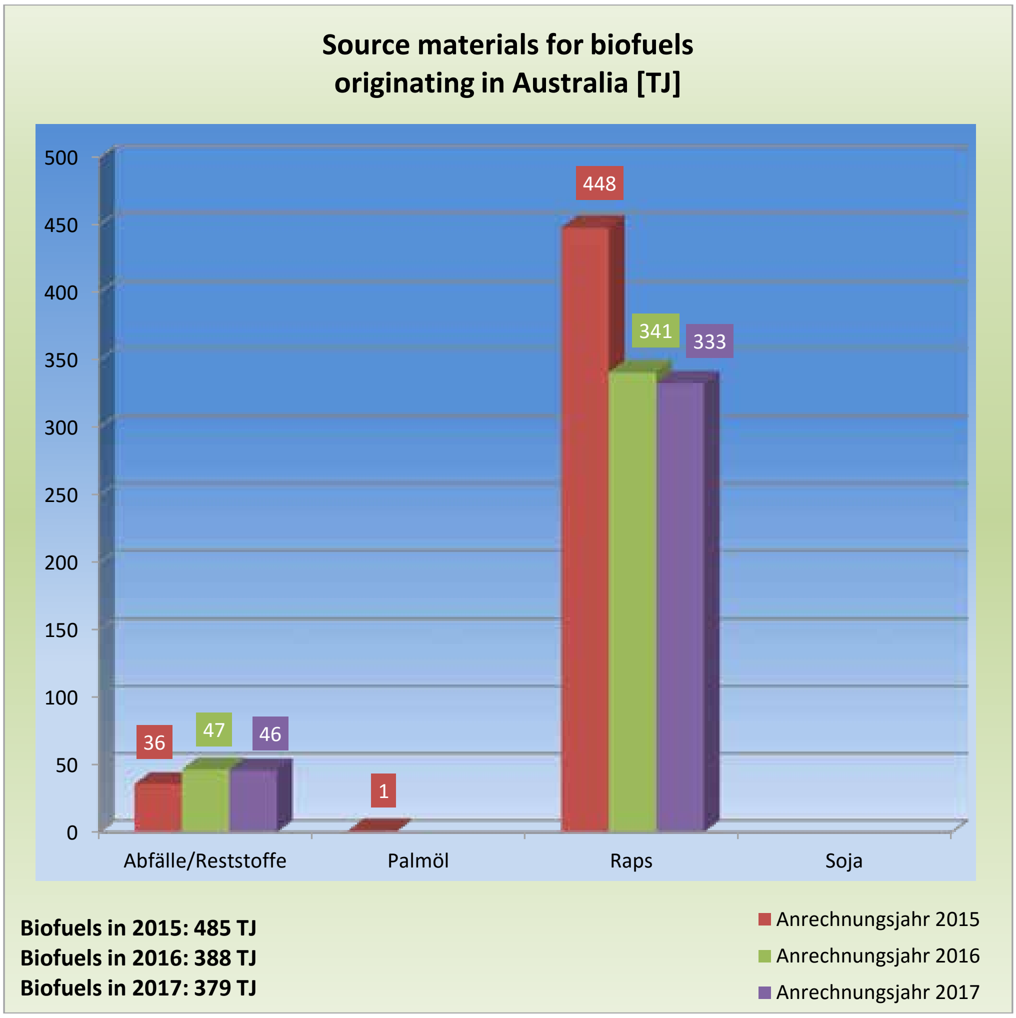


Figure17

The most prevalent source material from **Europe** was rapeseed, despite the ongoing downward trend, with a 34.2% share. 53% of this came from the Federal Republic of Germany (previous year: 66%).

The second most prevalent source material was waste and residues (28.6%), about a third of which came from Germany. The increase of the third-largest share (maize) was striking (+43.9%), constituting 17.5% of the total amount. Of the other cereals, wheat had the largest share (9.7%), followed by rye (2.8%), triticale (2.1%) and barley (2%). In terms of volume, sunflowers ranged third last with under 2%, while beet held the penultimate position with 1.1%. The lowest volume was in soya, with a 0.04% share.

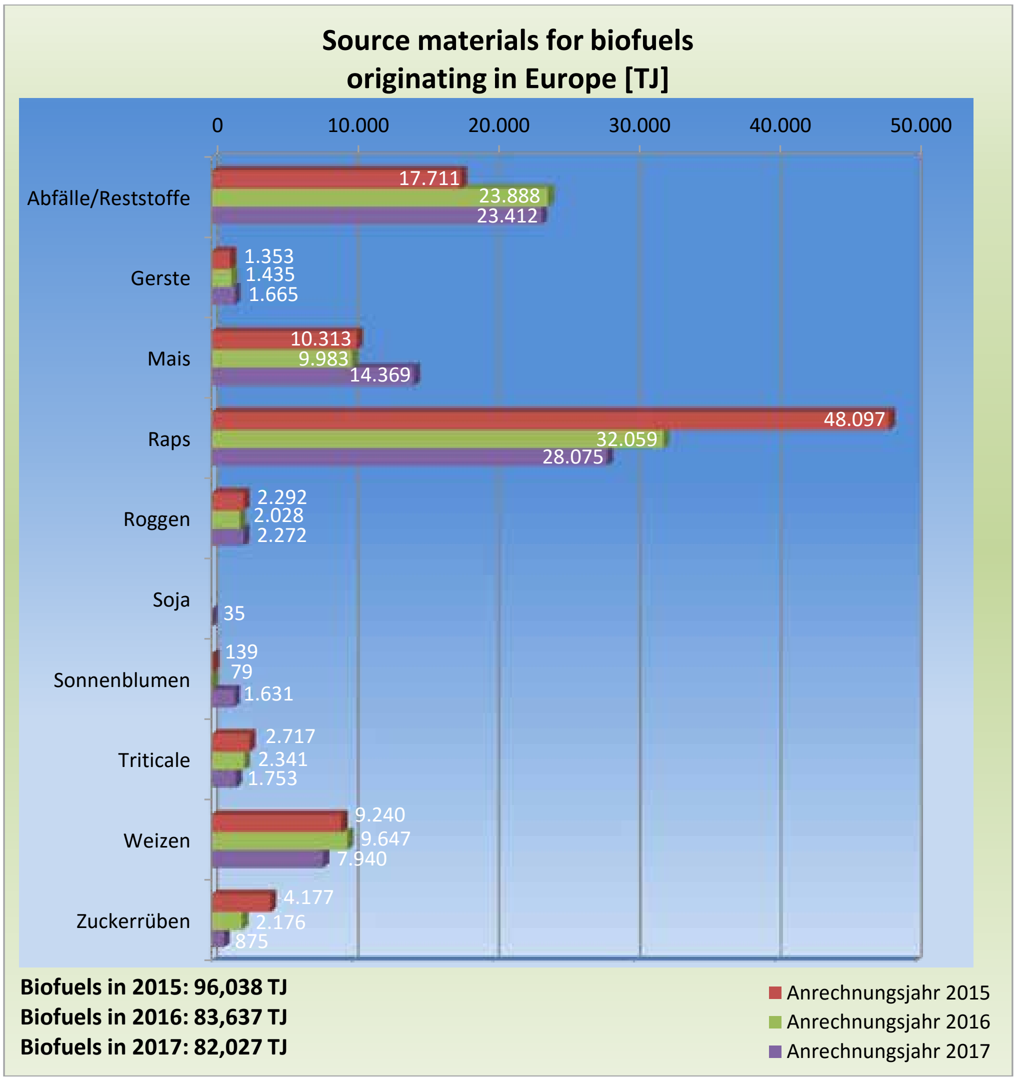


Figure18

The share of biofuels produced from source materials originating in **Germany** again fell significantly in the reporting year, by 20.8% (previous year: 25.5 %). This was mainly a result of German biofuel produced from rapeseed, volumes of which have more than halved within two years. However, rapeseed remained the most prevalent German source material, at 52.5%. The previous year's upward trend in waste and residues could not continue. A slight decline of 4% was noted in this respect. There was another significant reduction of 64.5% (previous year: 51.7 %) in the use of sugar beet.

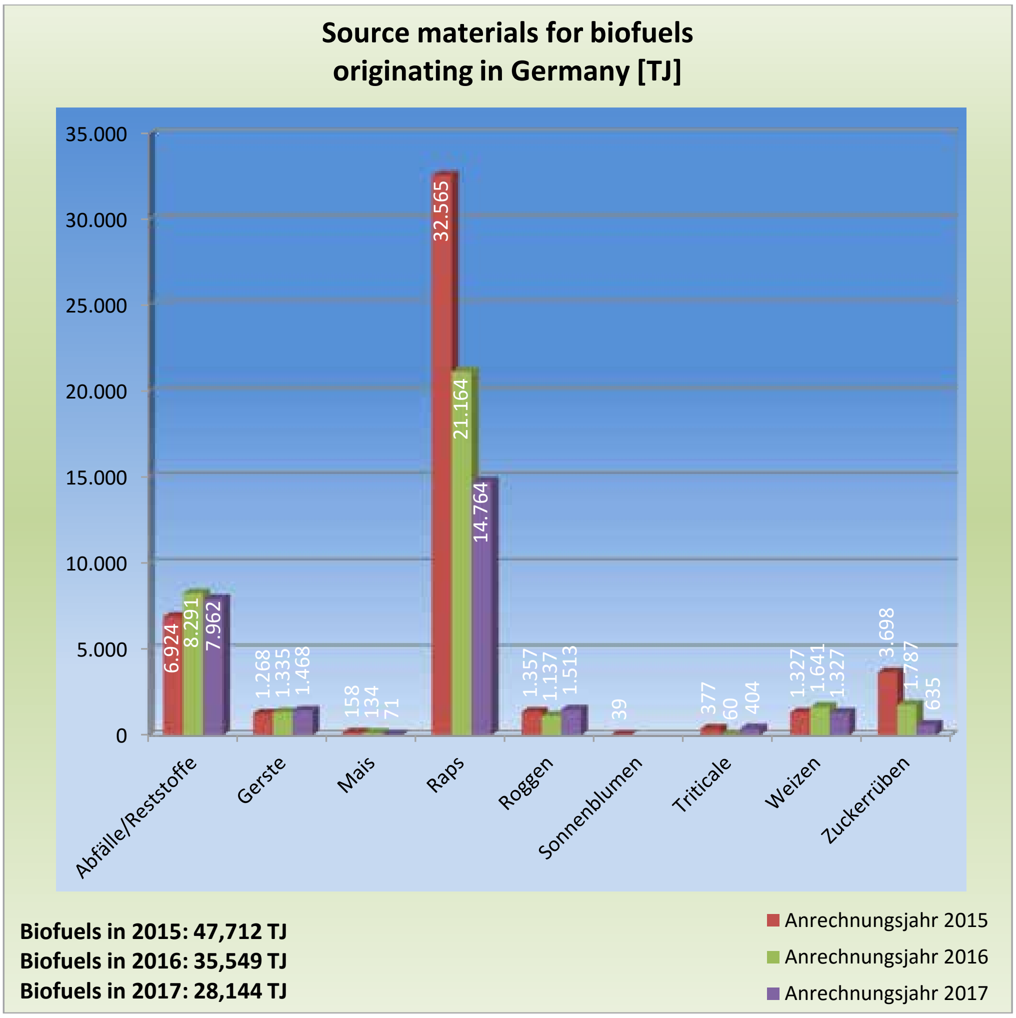


Figure19

Whereas in previous years, sugar cane was always the most significant raw material originating from Central America, it was replaced by palm oil in the reporting year. The quantity, which emanated from Honduras alone, increased more than sevenfold in the reporting year.

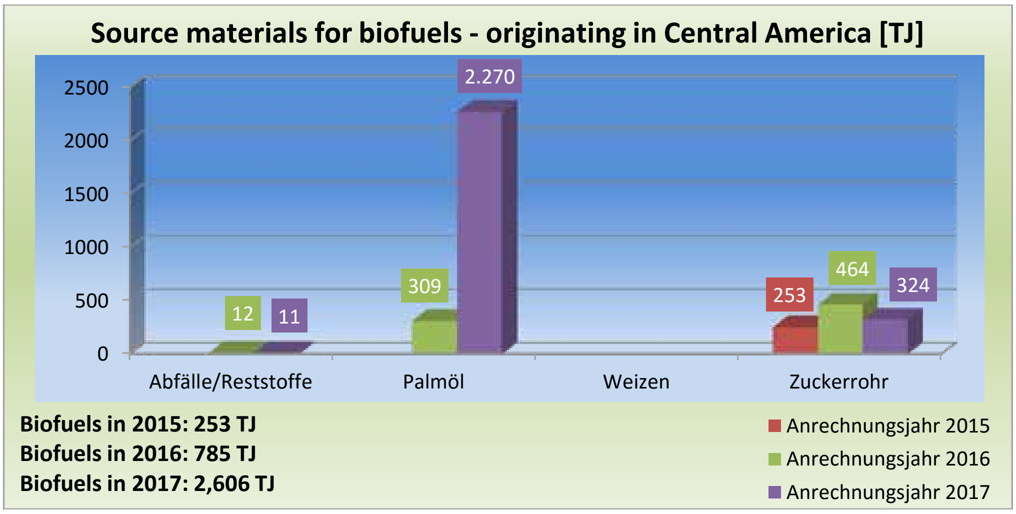


Figure20

Biofuels whose source materials came from **North America** in the reporting year were generated exclusively from waste and residues. The volume decreased by 3.1% compared to the previous year. A majority (89.3%) came from the United States. The rest came from Canada (7.5%), Puerto Rico (3%), Aruba (2%), and the Caribbean Netherlands (2%).

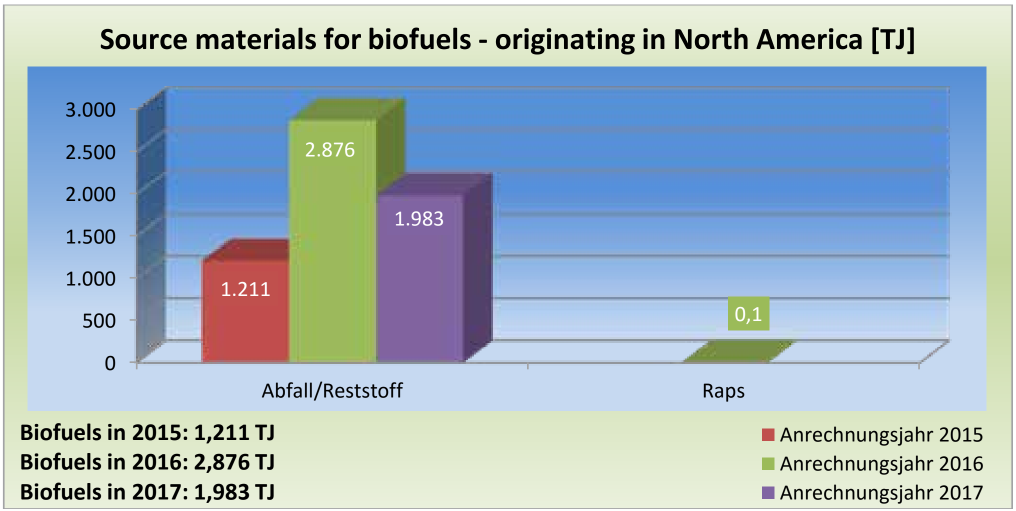


Figure21

Following the massive increase in the previous year, the quantity of biofuels from source materials originating in **South America** fell by 46.9% in the reporting year.

The use of sugar cane, which rose greatly during the previous reporting year, fell by 62.7%. A great majority of this sugar cane came from Peru (95%).

The upward trend in terms of waste and residues continued. In the reporting year, 20.3% more came from South American countries.

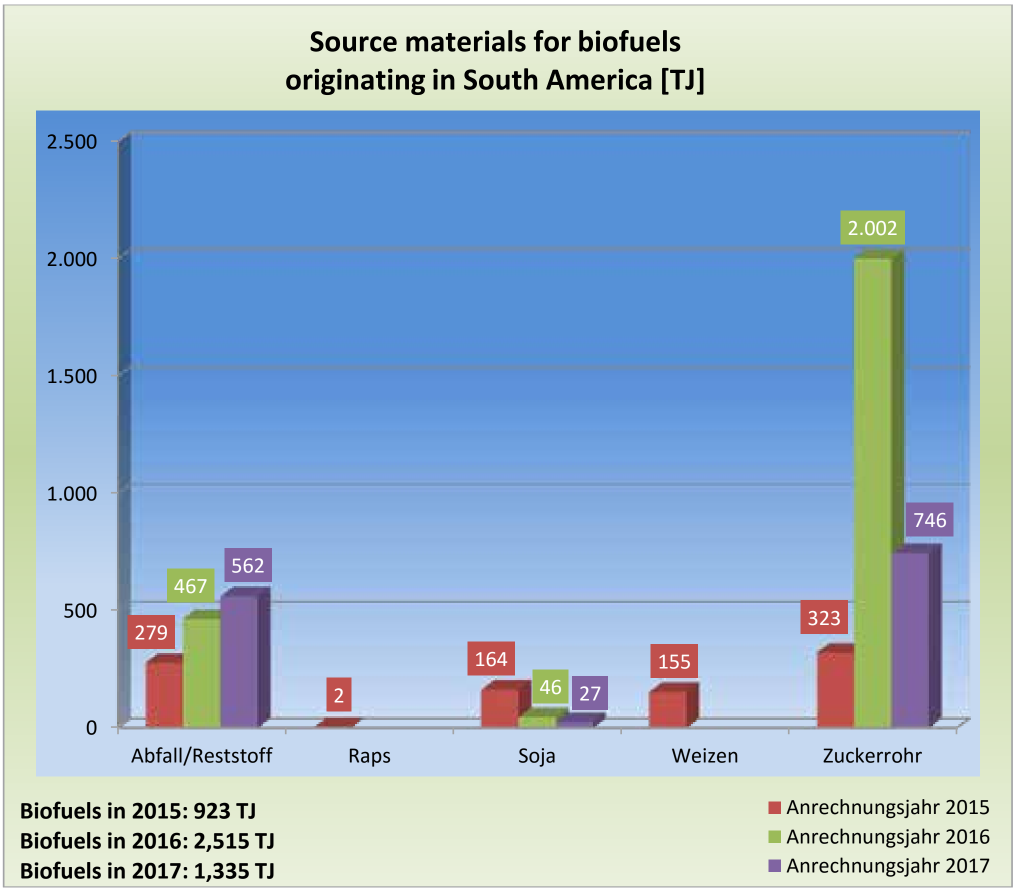


Figure22

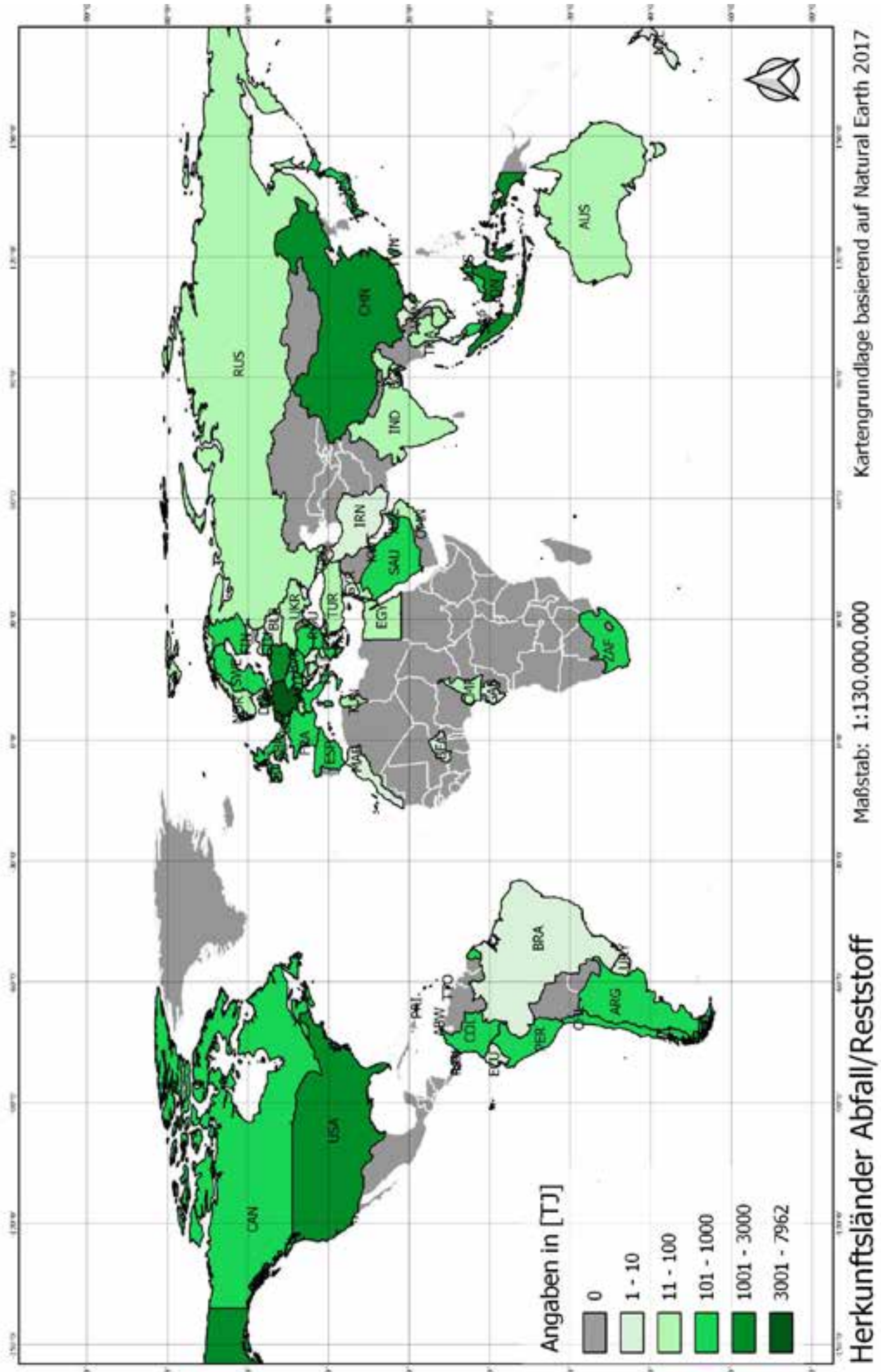
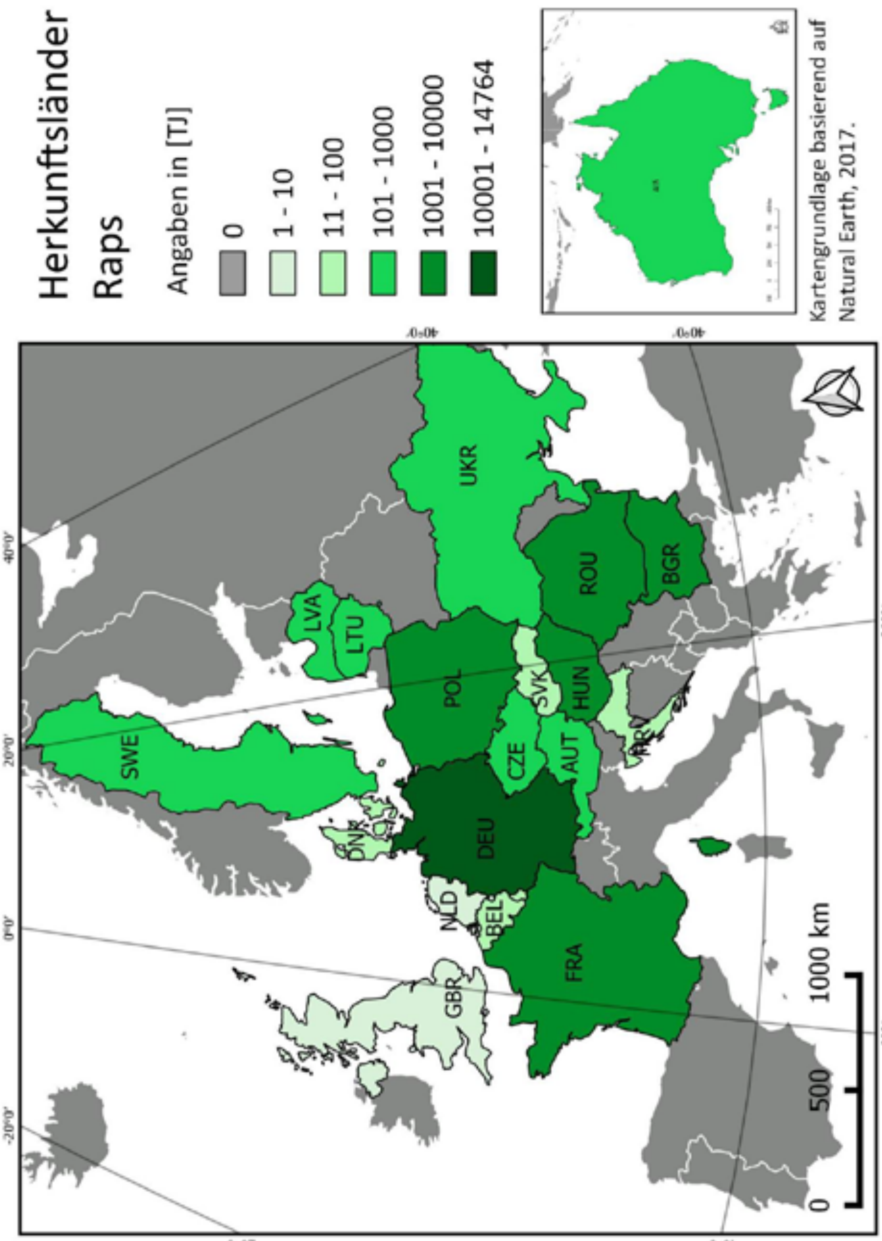


Abbildung 23



Herkunftsländer
Raps
Angaben in [TJ]
0
1 - 10
11 - 100
101 - 1000
1001 - 10000
10001 - 14764
Kartengrundlage basierend auf Natural Earth, 2017.
SWE
LVA
LTU
UKR
POL
ROU
BGR
SVK
HUN
CZE
AUT
DEU
DNK
NLD
BEL
FRA
GBR
0
500
1000 km

Figure 24

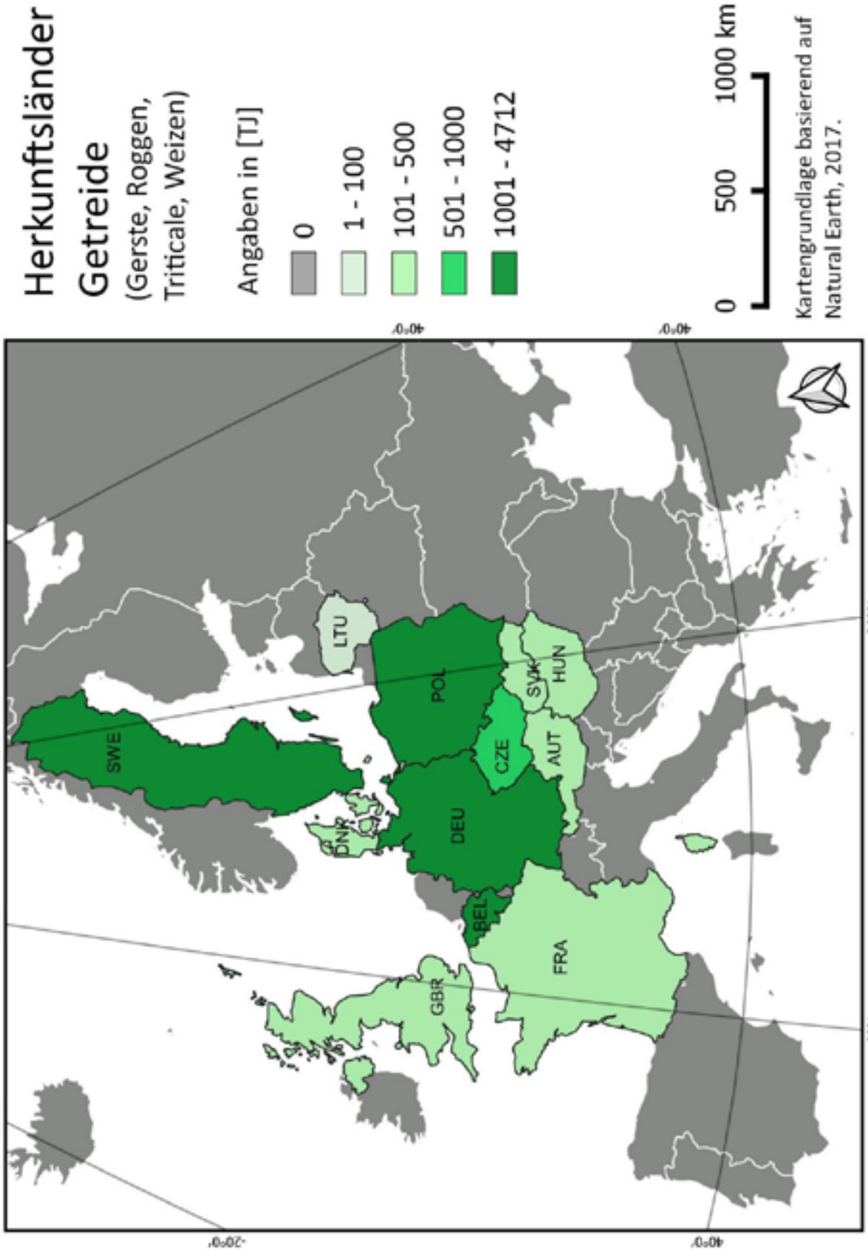

Herkunftsländer
Getreide
(Gerste, Roggen,
Triticale, Weizen)
Angaben in [TJ]
0
1 - 100
101 - 500
501 - 1000
1001 - 4712
0
500
1000 km
Kartengrundlage basierend auf
Natural Earth, 2017.
LTU
POL
SVK
HUN
SWE
CZE
AUT
DEU
DNK
BEL
FRA
GBR

Figure 25

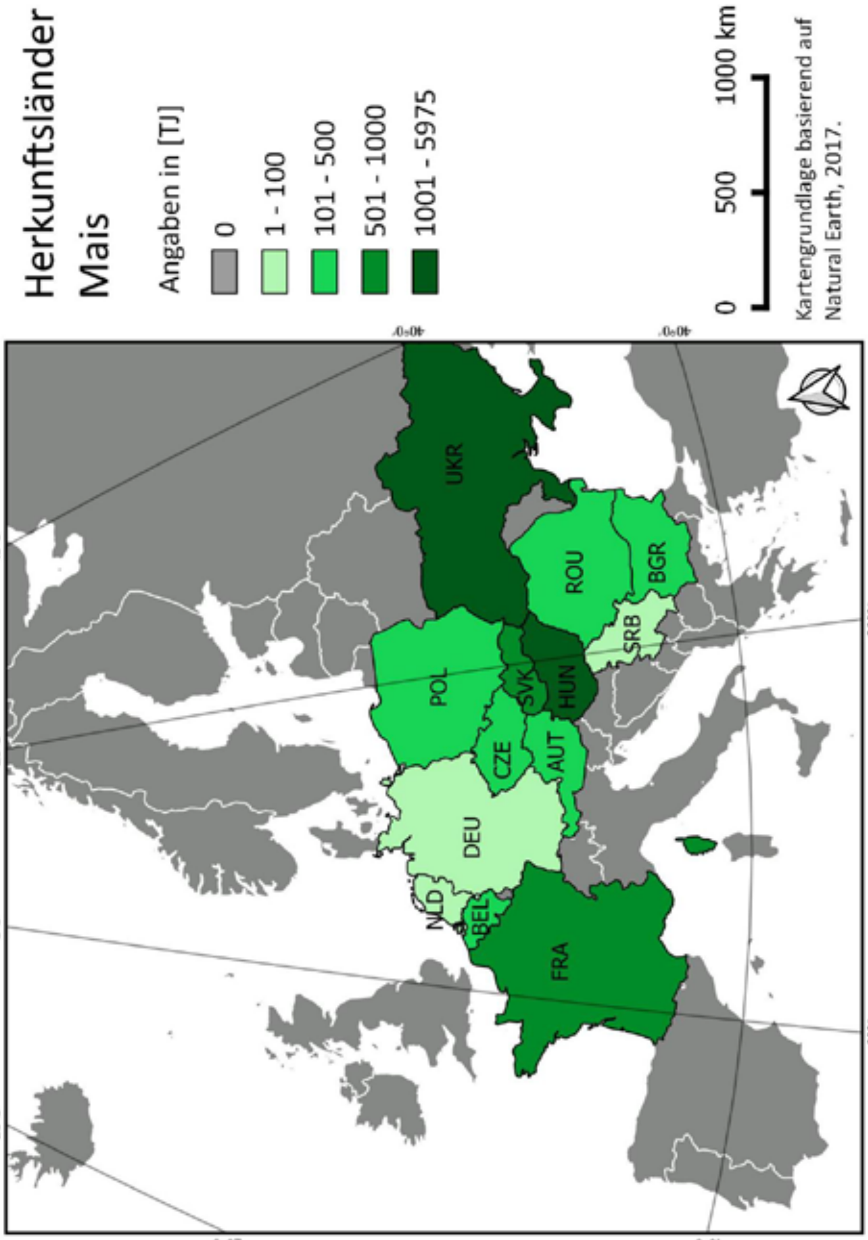

Herkunftsländer
Mais
Angaben in [TJ]
0
1 - 100
101 - 500
501 - 1000
1001 - 5975
0
500
1000 km
Kartengrundlage basierend auf
Natural Earth, 2017.
UKR
ROU
BGR
SRB
POL
SVK
HUN
CZE
AUT
DEU
NLD
BEL
FRA

Figure 26

6.3 Types of biofuel

The proportion of FAME (biodiesel) increased by 7.3% compared to the previous year. The proportion of bioethanol on the other hand decreased slightly, by 0.7%.

The most significant change was the 80% decline in hydrogenated vegetable oil (HVO).

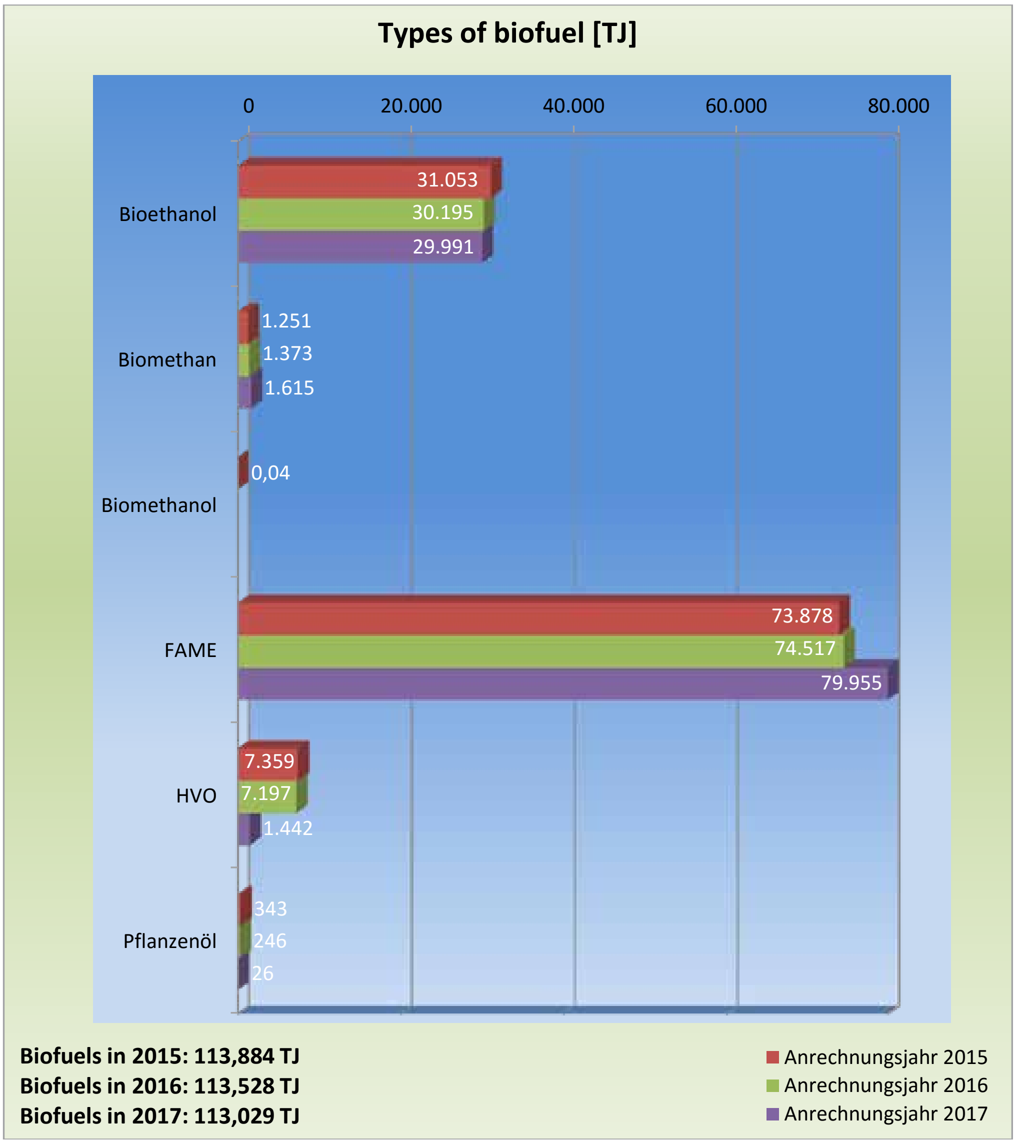


Figure27

The following diagram shows the percentages of biofuel types in 2017.

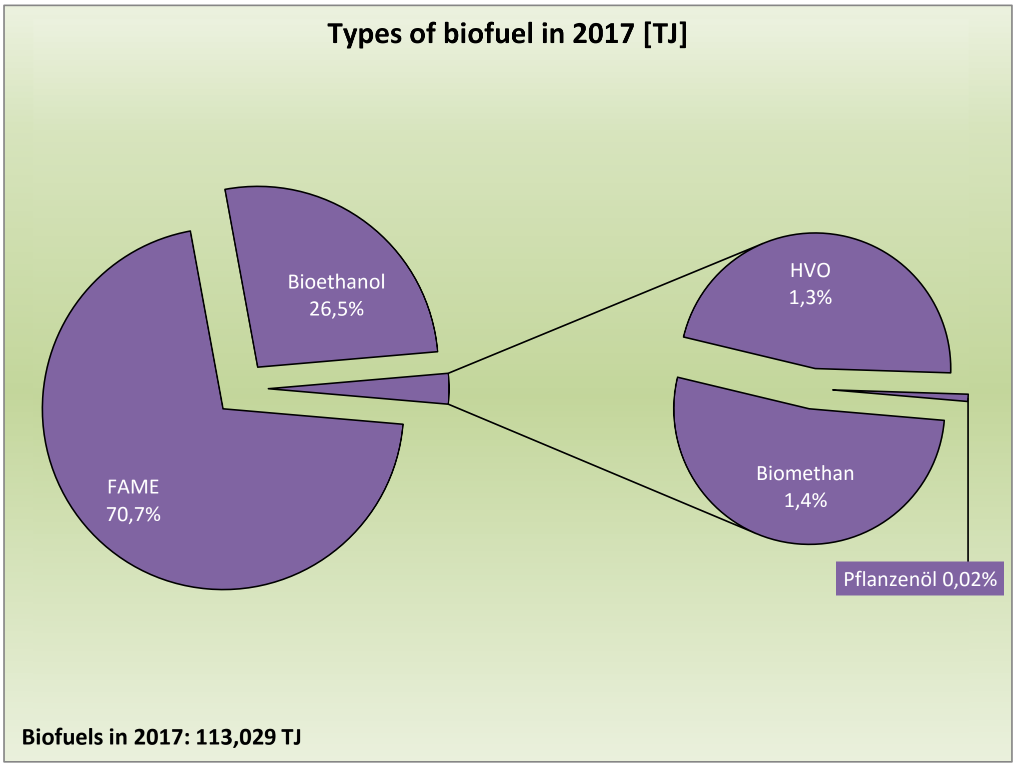


Figure 28

Less bioethanol was used in the reporting year. Maize was already used as the major source material for bioethanol production in the previous year, but increased significantly by 43.9% in the reporting year. However, the proportion of the second most significant source material, wheat, fell slightly, by 17.7%. The three other cereals – rye, triticale and barley – remained at the same level as in the previous year, when taken together. On the other hand, the reduction in sugar cane (-58,8%), sugar beet (-59,8%) and waste and residues materials (-60,7%) is striking.

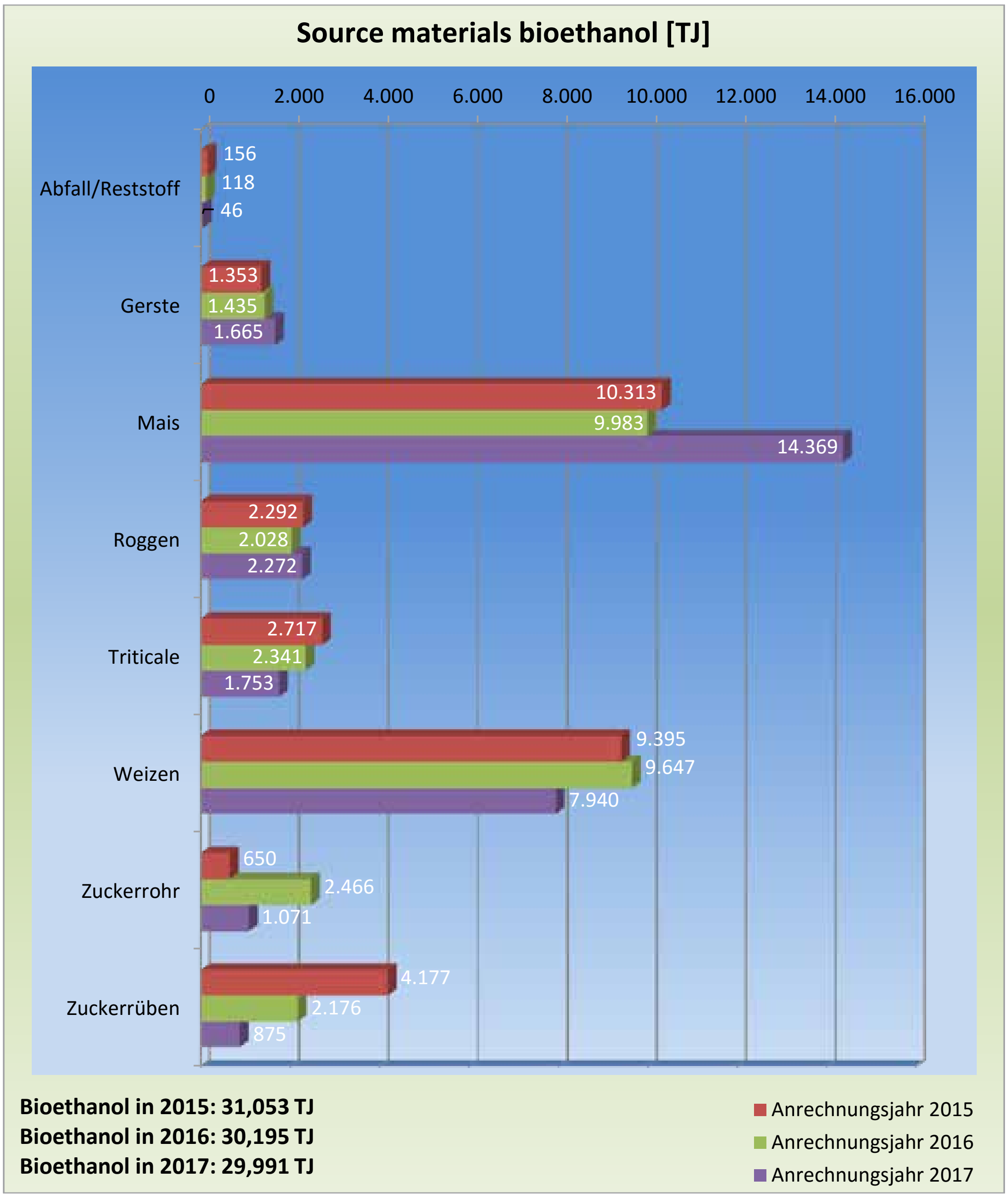


Figure29

Thanks to the ongoing reduction in the use of sugar beet, the reporting year saw rye (27.9%) become the most used **German** source material for the manufacture of **bioethanol**. This was followed by barley (27.1%) and wheat (24.5%). The proportion of sugar beet fell to just 11.7%, while the proportion of triticale recovered from the previous year's low, to 7.5% (previous year: 1 %). Maize (1.3%) played a minor role in this respect, and waste and residues almost none whatsoever (0.02‰).

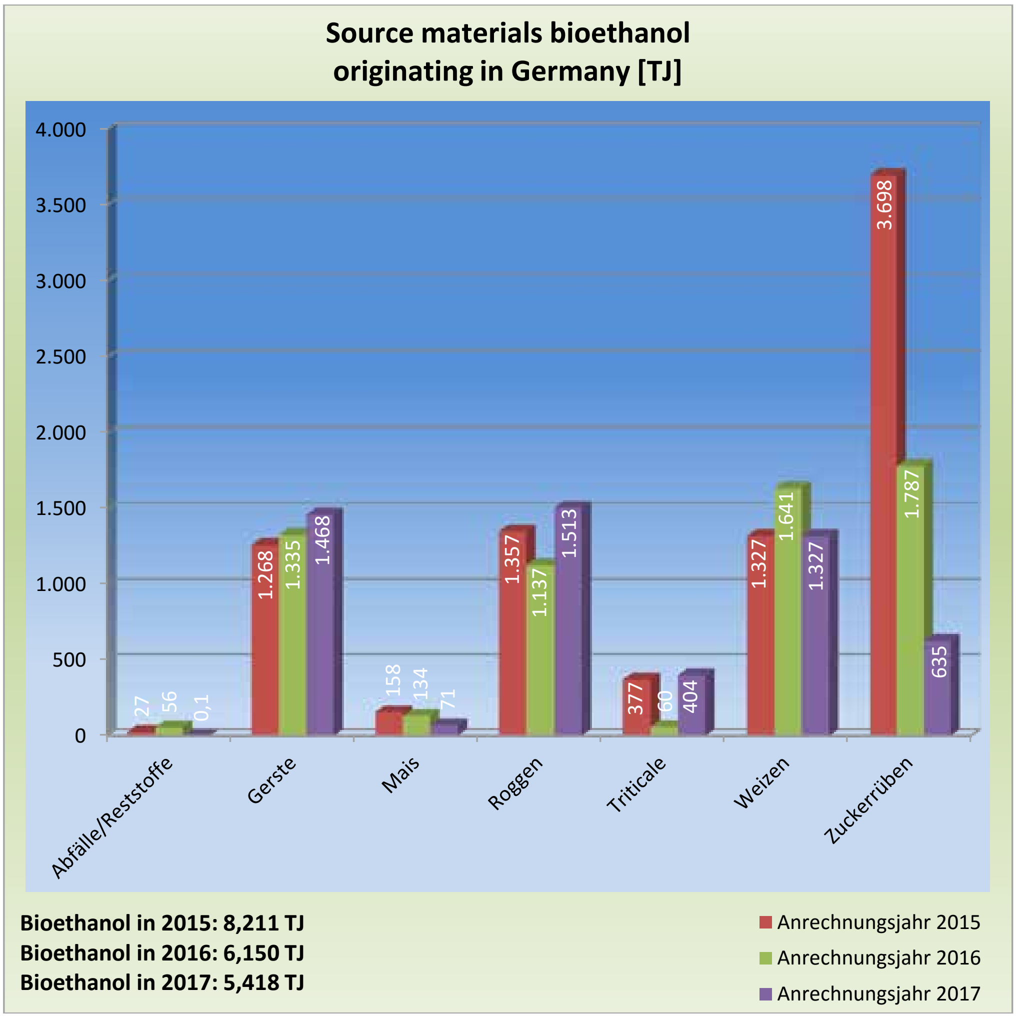


Figure30

As in the previous year, the highest proportion of **FAME (biodiesel)** came from waste and residues (-2.8%). The proportion from rapeseed declined, though it was once again the second most important source material (-11.7%). The proportion of FAME made from palm oil increased massively – by 87.2% – having already doubled its share the previous year. Sunflowers also grew in terms of their importance in the reporting year, with volumes increasing by a factor of more than twenty.

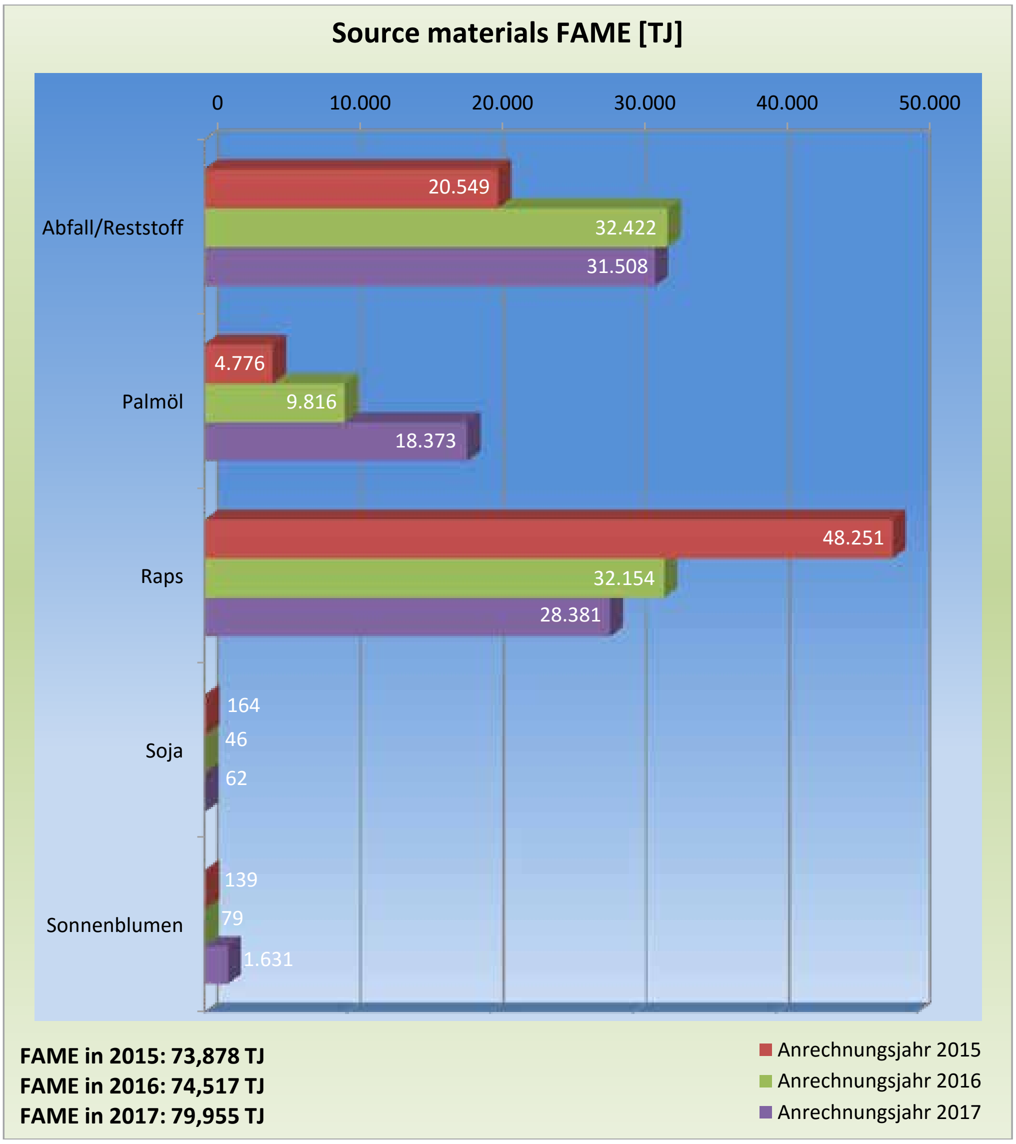


Figure31

Although the amount of rapeseed in the reporting year again declined steeply, it remained by far the most important source material for the **production of biodiesel** derived from **Germany**. Almost 70% of the biodiesel volumes were produced using this oleaginous plant, with the remainder coming from waste and residues.

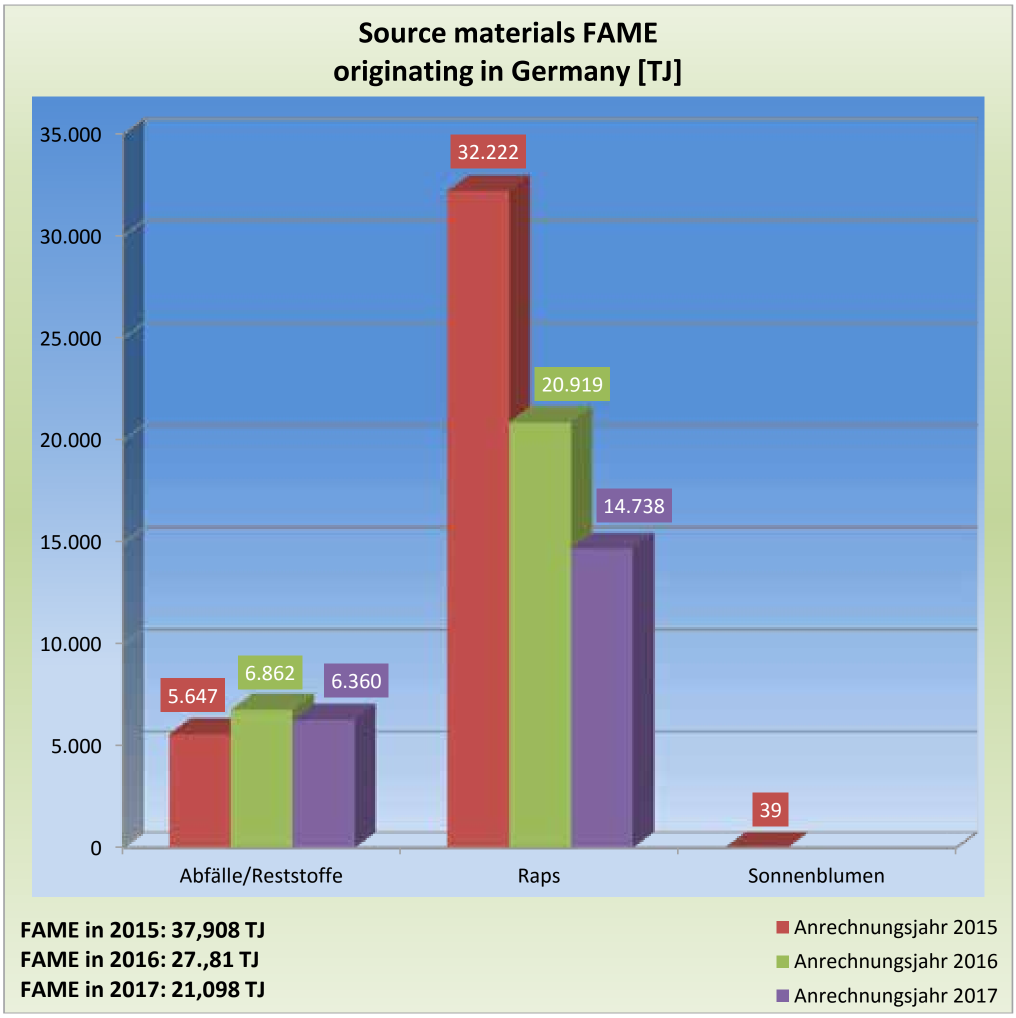


Figure32

Compared with the previous year, only about one-fifth of the hydrogenated vegetable oil (HVO) was counted towards the greenhouse gas reduction quota. The proportion of palm oil fell by 80.3%. The proportion of waste and residues also declined, by 70.3%. They consisted of effluent from the treatment of palm oil (POME) and represented 5.5 % of the total volume of HVO.

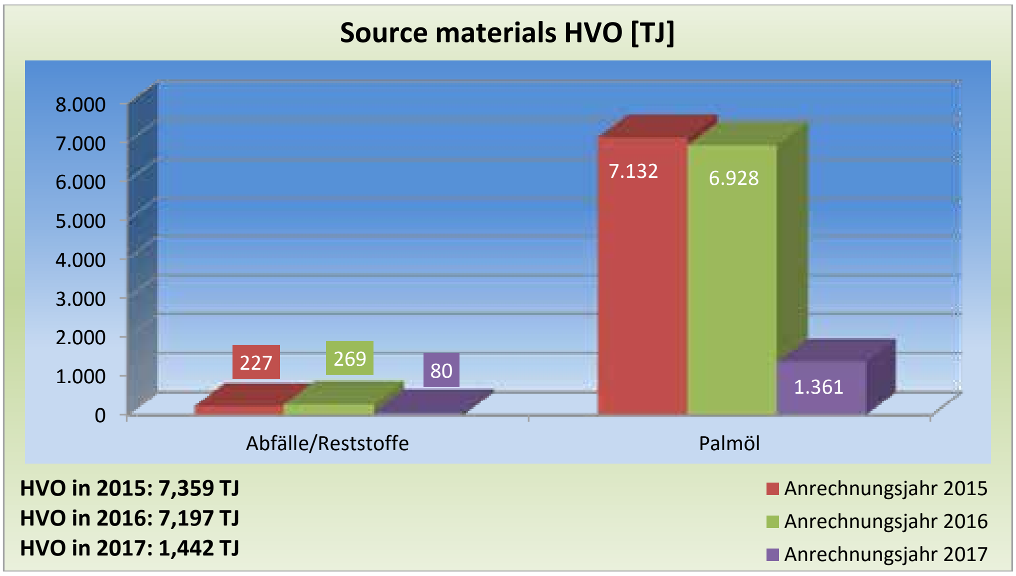


Figure33

The biomethane counted towards the German greenhouse gas reduction quota consisted solely of waste and residues. The volume increased by 17.6% compared to the previous year.

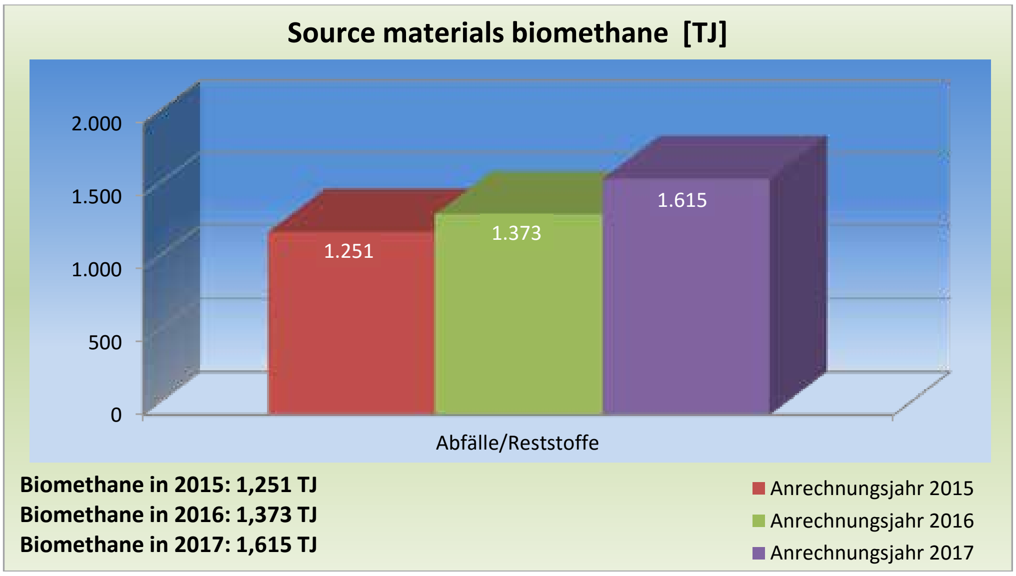


Figure34

The already low proportion of **vegetable oils** used decreased again in the reporting year, by 89.4%. It was just 0.2 ‰ of the total quota quantity filed.

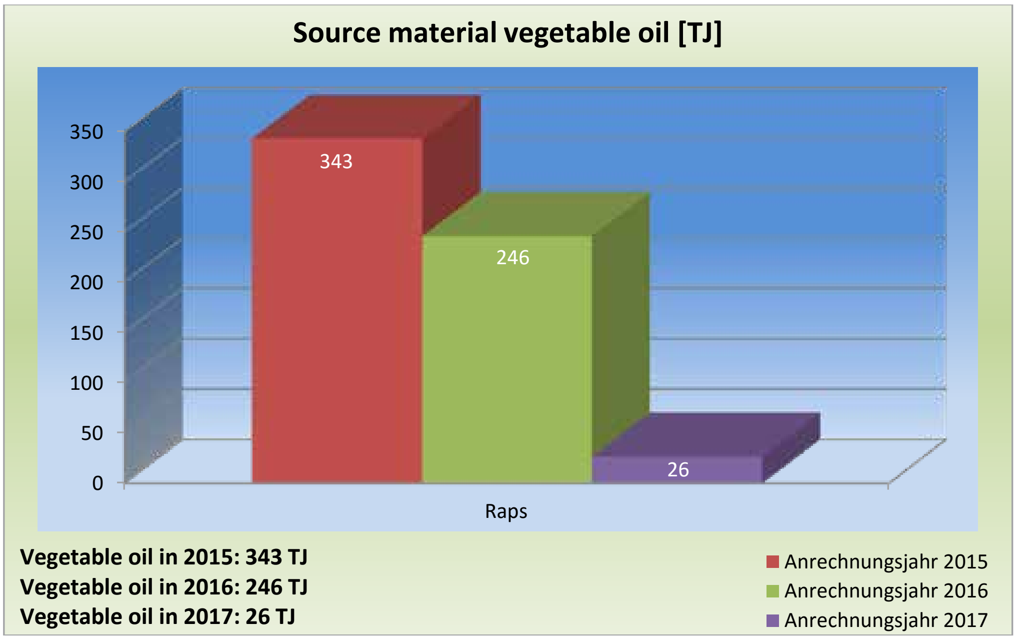


Figure35

6.4 Greenhouse gas emissions and savings

The **reduction of greenhouse gas emissions** is one of the aims to be achieved by the Renewable Energies Directive. Data regarding emissions must be stated in CO_2 equivalent on the proofs of sustainability, according to Articles 18 of both the BioEn SusO [BioSt-NachV] and/ or the Biofuel SusO [Biokraft-NachV] for each product.

The emission calculation includes the total amount of emissions generated during the entire production process for the final product. This concerns the greenhouse gases stated in the Renewable Energies Directive, namely carbon dioxide (CO2), laughing gas (N2O) and methane (CH4), expressed in CO_2 equivalent per unit of energy.

The following figures show the biofuel emissions for which an application for counting towards the biofuel quota or for tax relief was lodged.

For the calculation of the emission savings, the total amount of emissions generated during the entire biofuel production process were compared with the reference value of 83.8 g CO_{2eq}/MJ for fossil fuel, as per the Renewable Energies Directive.

The emission savings presented here are based on the comparison of **pure biofuels** and **pure fossil fuels**. A biofuel is considered sustainable, up until the reporting year, at a proven savings value of 35% (50% from 01.01.2018 onwards) compared to fossil fuel. The total savings in case of blended fuels in Germany would be calculated on the basis of the sum total of emissions from biogenic and fossil fuels.

The figure below illustrates the amount of emissions that would have been generated if, instead of a quantity of biofuels, fossil fuels had been used exclusively, **i.e. the use of biofuels saved approx. 7,700,000 tonnes of CO_2 equivalents.**

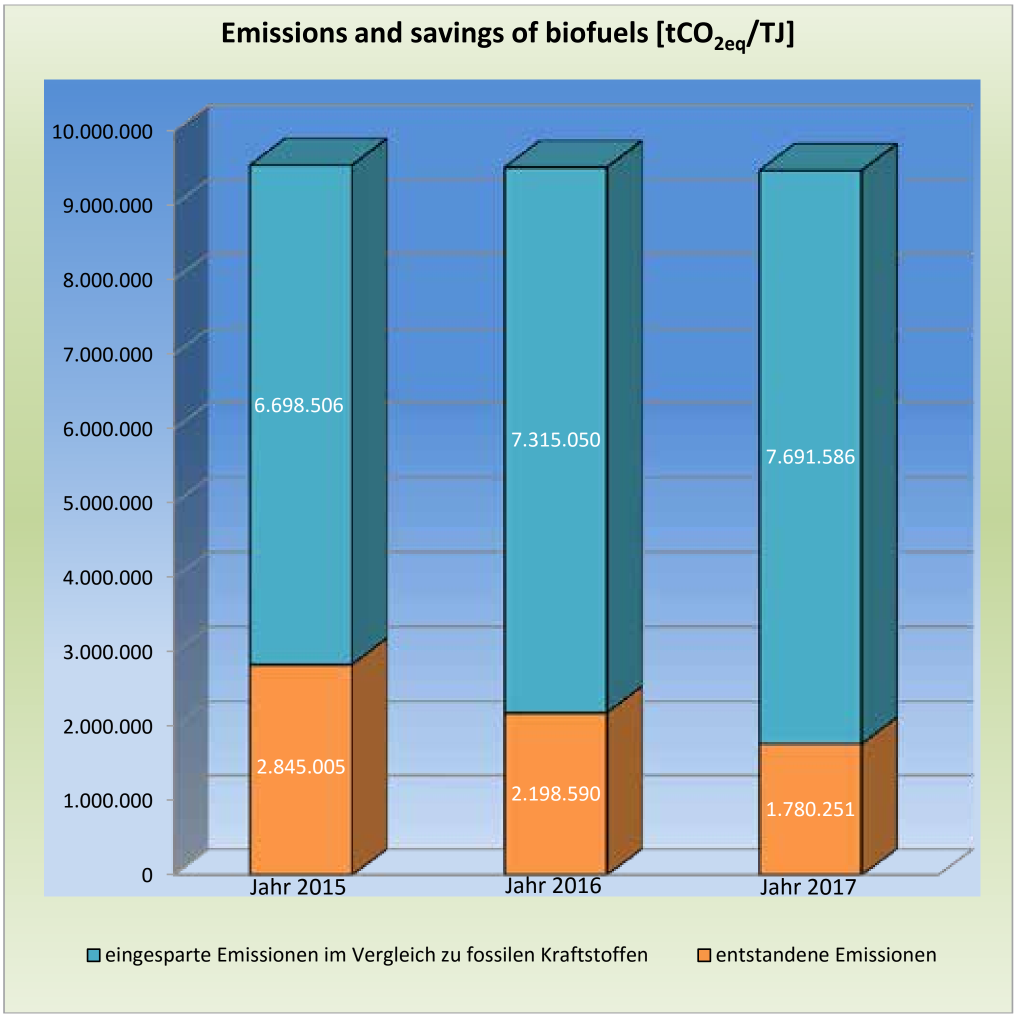


Figure 36

The biofuels marketed and certified as sustainable emit less CO_2 equivalent from one year to the next. In the reporting year, an average of 15.75 tCO_{2eq} per terajoule of biofuels were put into circulation. This was 18.7% less than in the previous year.

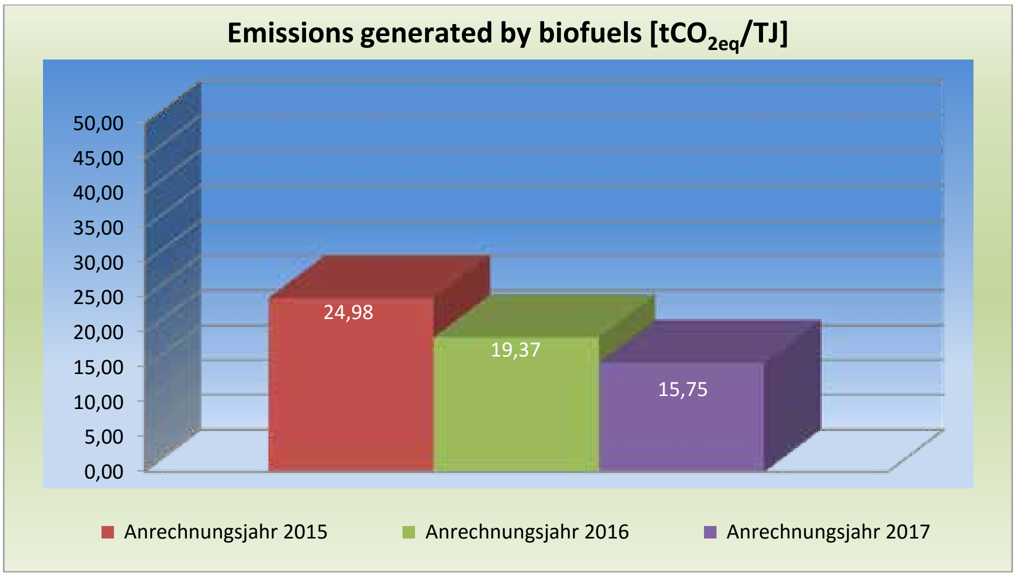


Figure37

Thus it was possible to once again better the average total emissions savings compared to fossil fuels.

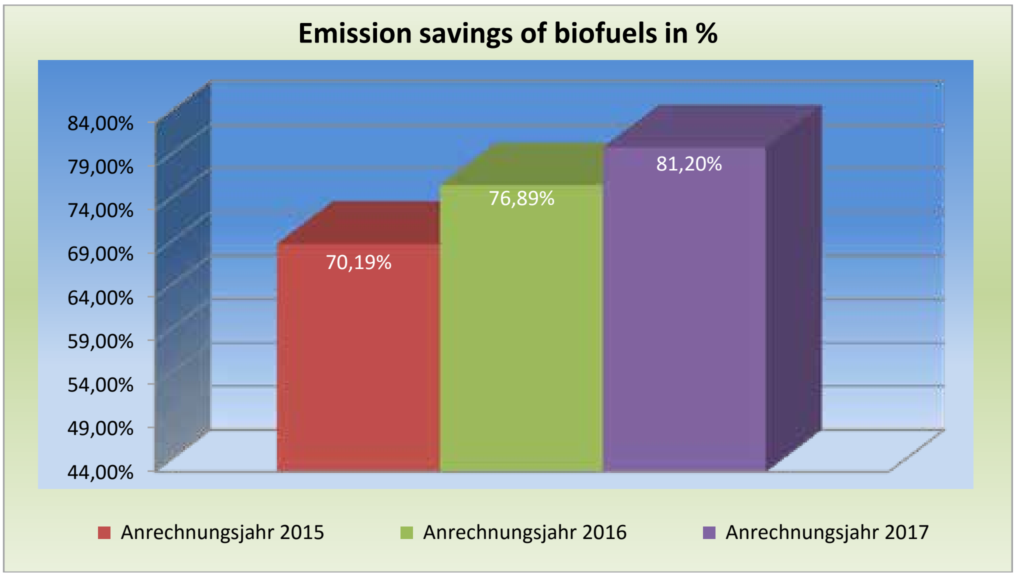


Figure38

It was once again possible to reduce the average emissions generated by all types of biofuels. The most significant improvement occurred where bioethanol is concerned, with a decrease of 29.2% compared to the previous year. Biomethane managed a new record low of 7.77 tCO_{2eq} emitted per terajoule.

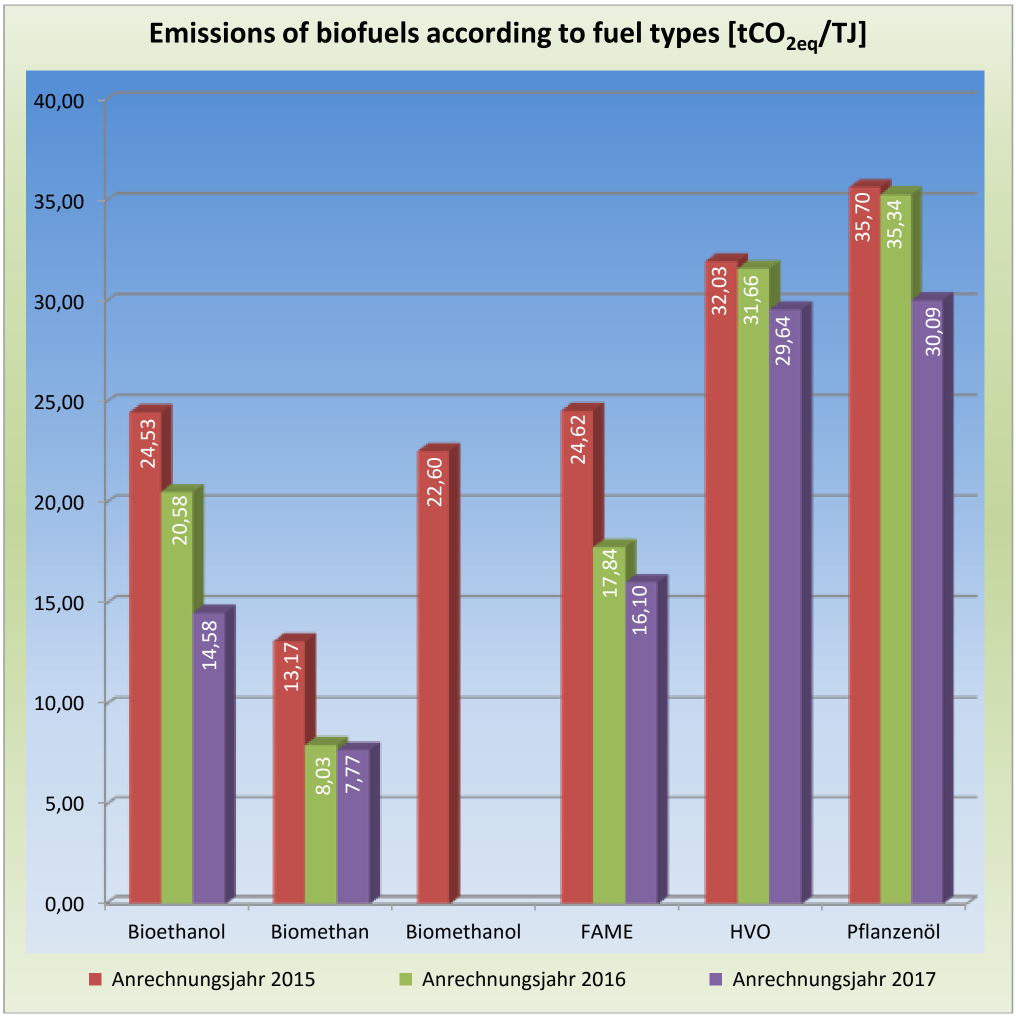


Figure39

Due to its low emission value, biomethane, with almost 91%, was the best in terms of average emission savings. Bioethanol and FAME also achieved values of over 80%. Pure and hydrogenated vegetable oils managed emission savings of under 65%.

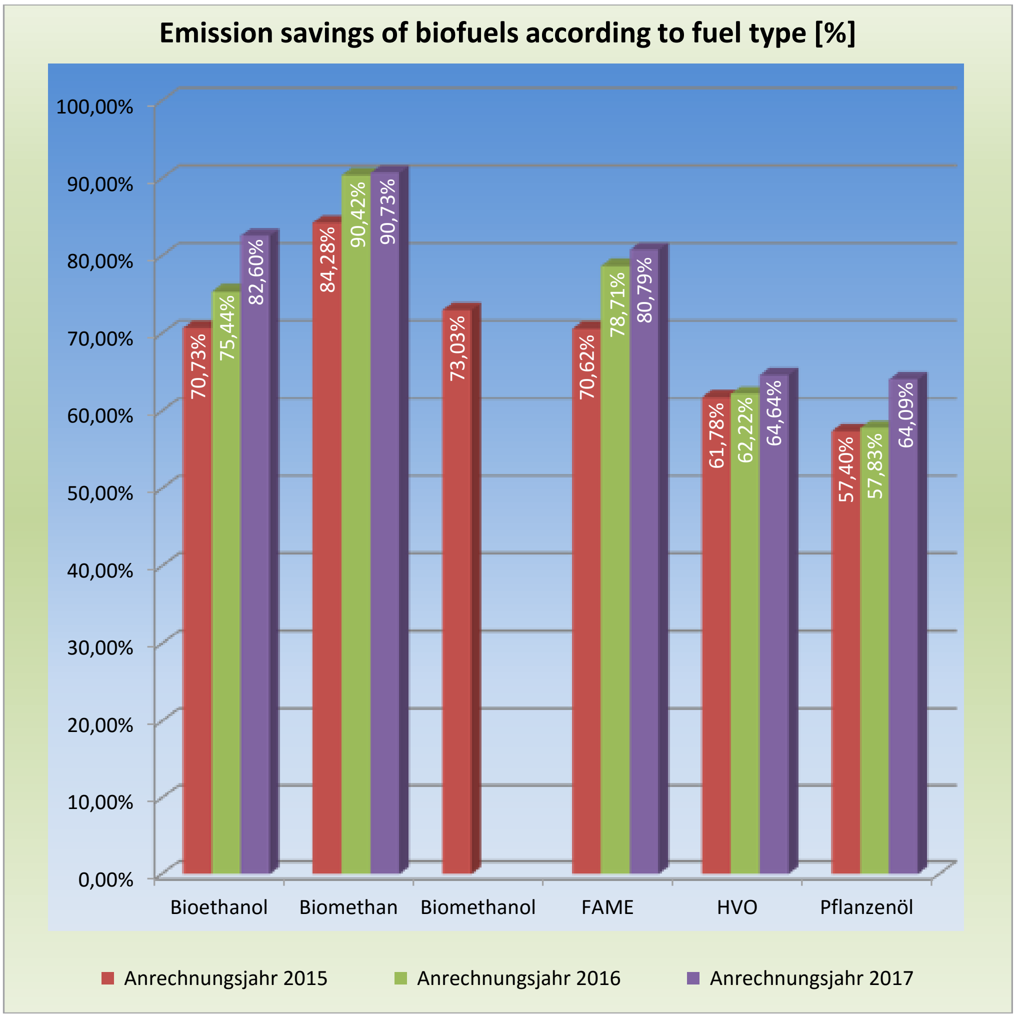


Figure40

The emission savings of bioethanol from waste and residues almost halved in the reporting year. A small quantity of 46 terajoules was decisive in this respect, largely composed of thickened sludge whose proof of sustainability was generated prior to 2015, i.e. before the greenhouse gas reduction rate was introduced. It has unusually high emission levels.

All other source materials saw an improvement in their emission balance. Maize (+10.7 percent points) and rye (+7.2 percentage points) stood out in particular.

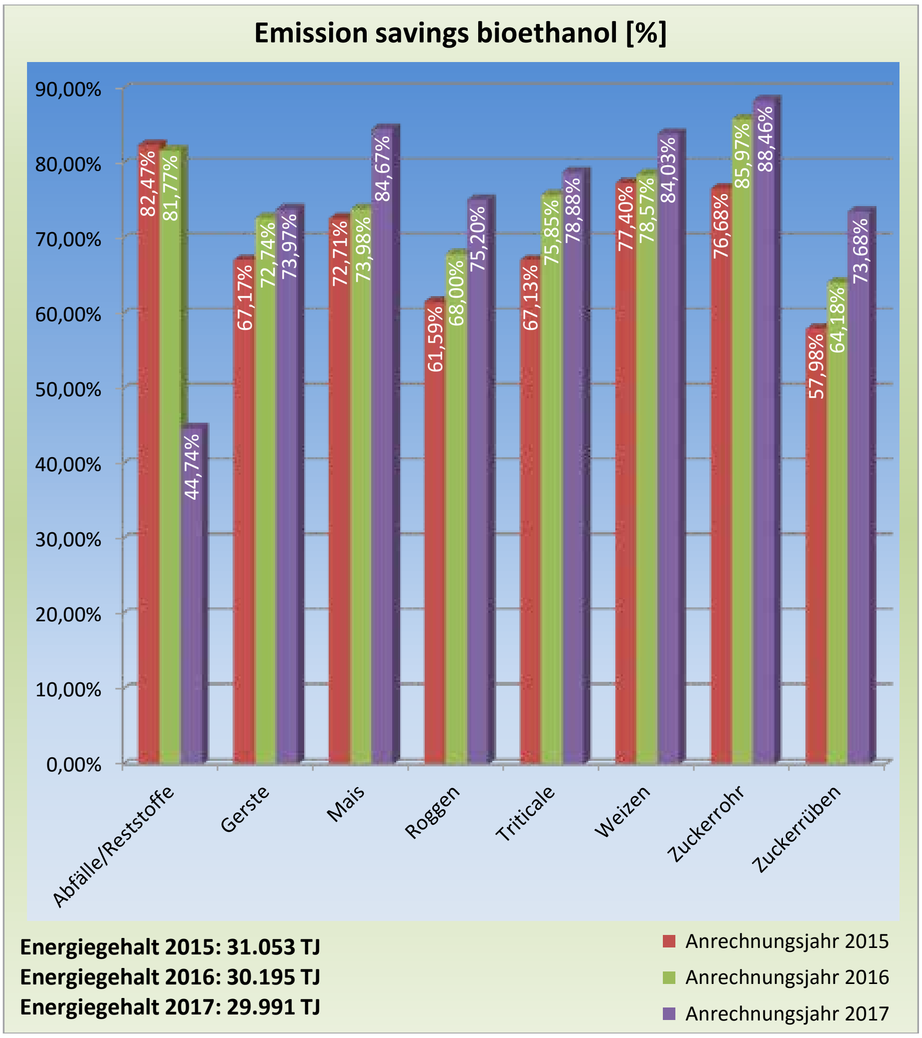


Figure 41

Five different source materials were used to produce biodiesel/FAME. Only soya and sunflower saw a deterioration in the savings, though this did not have a particularly high impact on the total savings (of 80.79%) for FAME, due to the relatively small amounts involved.

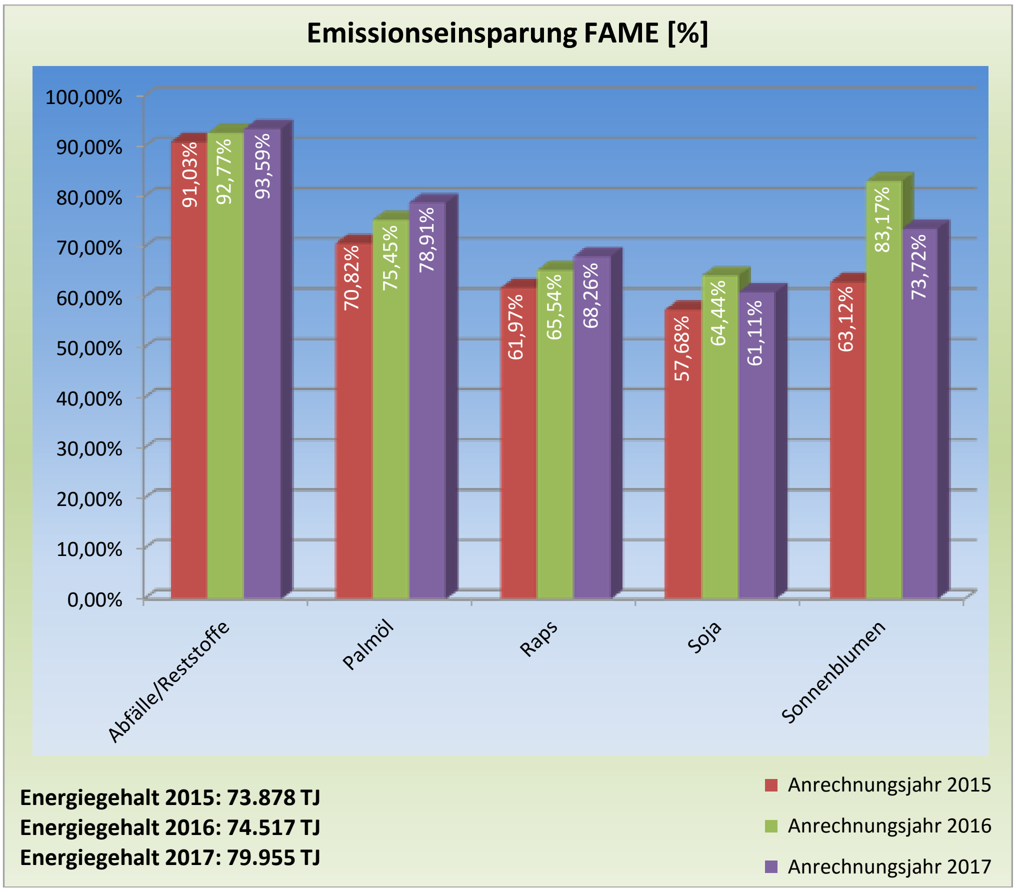


Figure42

6.5 Emission savings of individual types of biofuels according to greenhouse gas reduction level

This section contains a **tabular representation of the emission savings** for selected types of fuel, source materials and growing regions. The figure uses a percentage share of energy within the GHG reduction levels.

Table 7: Emission savings of bioethanol according to source material and GHG reduction level – shares in %

GHG savings compared to 83.8 g CO_{2eq}/MJ [%]	Waste/ residues		Barley		Maize		Rye		Triticale		Wheat		Sugar cane		Sugar beet		Total	
	In 2016 118TJ	In 2017 46TJ	In 2016 1,435TJ	In 2017 1,665	In 2016 9,983TJ	In 2017 14,369TJ	In 2016 2,028	In 2017 2,272	In 2016 2,341TJ	In 2017 1,753TJ	In 2016 9,647TJ	In 2017 7,940TJ	In 2016 2,466TJ	In 2017 1,071TJ	In 2016 2,176TJ	In 2017 875TJ	In 2016 30,195TJ	In 2017 29,991TJ
>35-40	4.88	85.71					3.15	0.09	0.90	0.25	0.01						0.30	0.15
>40-45					0.11												0.04	
>45-50								0.20				0.30				0.03		0.10
>50-55					0.11						0.01				27.57	10.51	2.03	0.31
>55-60					0.36	0.07					0.01				8.42	3.43	0.73	0.14
>60-65					17.33	0.29	16.17	3.13	0.96	2.99	2.17	0.52			33.00	22.09	9.96	1.33
>65-70			1.67	24.19	31.33	28.79	13.54	1.36	12.76	0.82	39.02	14.79			4.26	0.47	25.11	19.22
>70-75	47.19		91.35	63.99	21.96	7.00	65.89	7.85	66.25	20.65	3.29	20.31	16.37	3.34	13.10	26.17	24.68	14.97
>75-80	14.27				7.72	3.59	1.24	87.36	6.48	51.85	19.58	12.23	6.49	2.78			9.98	14.71
>80-85					3.42	2.92		0.01		15.57		4.58	9.68	12.77	0.07	0.67	1.93	4.00
>85-90		0.16			3.26	0.10					4.94	1.75	5.09	15.45	6.08	24.56	3.51	1.78
>90-95		0.08			7.01	7.98			2.87	1.95	15.37	6.68	62.37	65.66	7.50	12.08	13.08	8.40
>95-100			0.35	10.72	7.39	49.25			5.71	5.93	13.60	38.83					7.25	34.82
>100-105	33.66	14.06	6.64	1.09					4.08		2.01						1.41	0.08
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Table 8: Emission savings of bioethanol according to source material, origin and GHG reduction level – shares in %

GHG savings compared to 83.8 g CO_{2eq}/MJ [%]	Maize								Wheat					
	Germany		EU		Third countries		Total bioethanol from maize		Germany		EU		Total bioethanol from wheat	
	In 2016 134TJ	In 2017 71TJ	In 2016 8,600TJ	In 2017 8,319TJ	In 2016 1,249TJ	In 2017 5,978TJ	In 2016 9,983TJ	In 2017 14,368TJ	In 2016 1,641TJ	In 2017 1,327TJ	In 2016 8,006TJ	In 2017 6,613TJ	In 2016 9,647TJ	In 2017 7,940TJ
>35-40									0.07				0.01	
>40-45					0.87		0.11							
>45-50										1.72		0.02		0.30
>50-55			0.01		0.81		0.11				0.01		0.01	
>55-60			0.11	0.13	2.14		0.36	0.07	0.01		0.01		0.01	
>60-65			19.90	0.50	1.50		17.33	0.29	0.14	0.30	2.58	0.57	2.17	0.52
>65-70	99.81	90.62	32.97	48.94	12.73		31.33	28.79	99.67	37.91	26.58	10.15	39.02	14.79
>70-75			24.59	11.99	6.21	0.13	21.96	7.00		50.13	3.96	14.33	3.29	20.31
>75-80			8.08	5.85	6.04	0.51	7.72	3.59		7.51	23.59	13.18	19.58	12.23
>80-85			3.92	5.05	0.35		3.42	2.92				5.50		4.58
>85-90		9.38	1.32	0.09	16.97		3.26	0.10	0.12		5.92	2.10	4.94	1.75
>90-95			4.08	3.74	27.92	13.97	7.01	7.98		0.33	18.52	7.96	15.37	6.68
>95-100	0.19		5.03	23.71	24.46	85.39	7.39	49.25		2.10	16.39	46.20	13.60	38.83
>100-105											2.42		2.01	
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Table 9: Emission savings of FAME according to source material and GHG reduction level – shares in %

GHG savings compared to 83.8 g CO_{2eq}/MJ [%]	Waste/residues		Palm oil		Rapeseed		Soya		Sunflower		Total	
	In 2016 32,422TJ	In 2017 31,508TJ	In 2016 9,816TJ	In 2017 18,373TJ	In 2016 32,154TJ	In 2017 28,381TJ	In 2016 46TJ	In 2017 62TJ	In 2016 79TJ	In 2017 1,631TJ	In 2016 74,517TJ	In 2017 79,955TJ
>35-40	0.003				1.16	0.14	0.82				0.003	
>40-45					0.002							
>45-50					0.31	0.69		16.00				
>50-55			0.02		0.34	0.33	10.05	7.36	0.01	0.10		
>55-60			0.17	0.35	2.79	2.23		35.64				
>60-65		0.16	0.93	0.30	38.93	9.68	41.64					0.16
>65-70		0.14	2.38	0.15	48.16	57.05	47.49	7.10		1.74		0.14
>70-75		0.02	50.69	10.88	5.78	29.08		33.89		73.27		0.02
>75-80	0.48	0.16	35.99	50.66	1.05	0.49				24.89	0.48	0.16
>80-85	2.11	1.36	9.81	34.98	1.01	0.01			99.99		2.11	1.36
>85-90	7.67	2.75		0.31	0.26	0.02					7.67	2.75
>90-95	84.08	83.15		2.37	0.18	0.29					84.08	83.15
>95-100	5.66	12.27									5.66	12.27
>100-105												
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Table 10: Emission savings of FAME according to source material, origin and GHG reduction level – shares in %

GHG savings compared to 83.8 g CO_{2eq}/MJ [%]	Waste/residues								Rapeseed							
	Germany		EU		Third countries		Total FAME from waste/residues		Germany		EU		Third countries		Total FAME from rapeseed	
	In 2016 6,862TJ	In 2017 6,360TJ	In 2016 15,406TJ	In 2017 15,193TJ	In 2016 10,154TJ	In 2017 9,955TJ	In 2016 32,422TJ	In 2017 31,508TJ	In 2016 20,919TJ	In 2017 14,738TJ	In 2016 10,732TJ	In 2017 13,126TJ	In 2016 504TJ	In 2017 517TJ	In 2016 32,154TJ	In 2017 28,381TJ
>35-40	0.01		0.002				0.003		1.67	0.13	0.22	0.15	0.26	0.37	1.16	0.14
>40-45									0.003						0.002	
>45-50									0.34	1.32	0.28	0.003			0.31	0.69
>50-55									0.32	0.16	0.33	0.39	1.35	3.99	0.34	0.33
>55-60									2.95	1.01	2.10	2.72	10.97	24.24	2.79	2.23
>60-65				0.33				0.16	40.79	8.92	33.91	8.44	68.91	62.43	38.93	9.68
>65-70		0.39		0.13				0.14	51.54	65.47	43.79	49.54	1.08	7.31	48.16	57.05
>70-75				0.03				0.02	0.05	22.70	16.95	37.33	6.06	1.66	5.78	29.08
>75-80	1.24	0.25	0.34	0.22	0.16		0.48	0.16	1.04	0.001	0.58	1.05	11.37		1.05	0.49
>80-85	2.88	0.23	2.38	2.50	1.18	0.34	2.11	1.36	0.78		1.51	0.02			1.01	0.01
>85-90	10.81	5.21	7.71	2.71	5.50	1.24	7.67	2.75	0.24	0.01	0.31	0.03			0.26	0.02
>90-95	67.64	65.09	85.74	84.62	92.67	92.43	84.08	83.15	0.27	0.27	0.03	0.32			0.18	0.29
>95-100	17.42	28.82	3.83	9.46	0.49	5.99	5.66	12.27								
>100-105																
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Table 11: Emission savings of vegetable oil according to source material and GHG reduction level – shares in %

GHG savings compared to 83.8 g CO_{2eq}/MJ [%]	Rapeseed	
	In 2016 246TJ	In 2017 26TJ
>35-40	0.33	2.05
>40-45		
>45-50		
>50-55		
>55-60	92.50	32.90
>60-65	1.60	20.48
>65-70	1.41	10.07
>70-75	4.17	34.51
>75-80		
>80-85		
>85-90		
>90-95		
>95-100		
>100-105		
Total	**100.00**	**100.00**

Table 12: Emission savings of biomethane according to source material and GHG reduction level – shares in %

GHG savings compared to 83.8 g CO_{2eq}/MJ [%]	Waste/residues	
	In 2016 1,373TJ	In 2017 1,615TJ
>35-40		
>40-45		
>45-50		
>50-55		
>55-60		
>60-65		
>65-70		
>70-75	6.69	5.51
>75-80	0.55	0.41
>80-85	3.43	12.95
>85-90	33.59	15.09
>90-95	13.68	26.26
>95-100	42.07	39.78
>100-105		
Total	**100.00**	**100.00**

Table 13: Emission savings of waste and residues according to type and GHG reduction level – shares in %

GHG savings compared to 83.8 g CO_{2eq}/MJ [%]	Up-to-date according to 38. BImSchV Annex 1[7]									
	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 11	Used cooking oil	Other	Waste and residues Total
	In 2017 86TJ	In 2017 58TJ	In 2017 0.18TJ	In 2017 3TJ	In 2017 80TJ	In 2017 3TJ	In 2017 6TJ	In 2017 27,045TJ	In 2017 5,967TJ	In 2017 33,249TJ
>35-40									0.67	0.12
>40-45										
>45-50										
>50-55										
>55-60										
>60-65						66.95			0.80	0.15
>65-70						33.05			0.72	0.13
>70-75	100.00		5.36						0.13	0.28
>75-80							100.00		0.84	0.17
>80-85		1.59	94.64	100.00	10.30			1.59	3.41	1.94
>85-90		1.53			89.70			1.53	10.71	3.56
>90-95		87.89						87.89	47.82	80.07
>95-100		9.00						9.00	34.79	13.56
>100-105									0.11	0.02
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

[7] see Page 97, Table 30

7. Bioliquids

The total amount of bioliquids registered for electricity production and feed-in pursuant to the Renewable Energies Act decreased again in the reporting year.

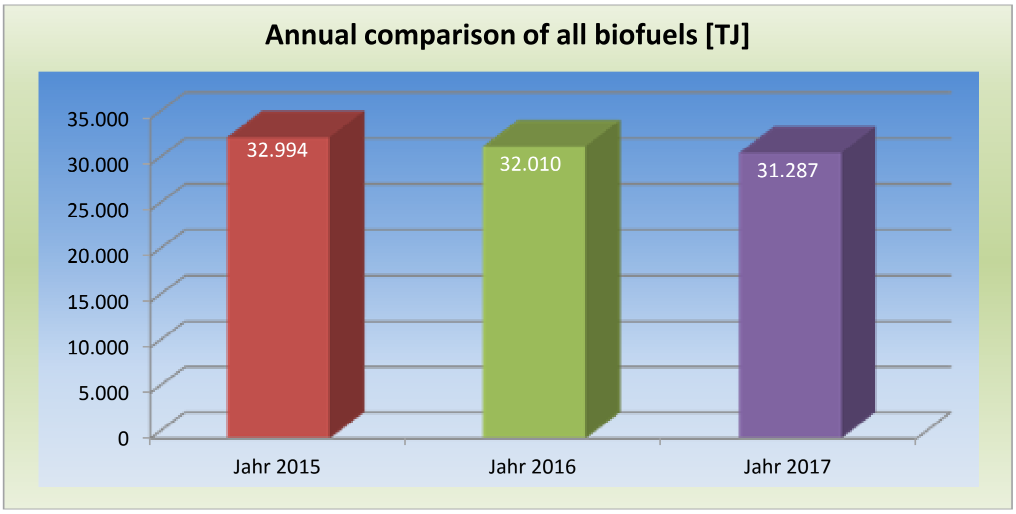


Figure43

Types of bioliquid

Bioliquids from the pulp and paper industry declined once again. A reduction also occurred in the quantity of vegetable oil used. The volumes of FAME and HVO increased strongly, yet remained at a comparatively low level.

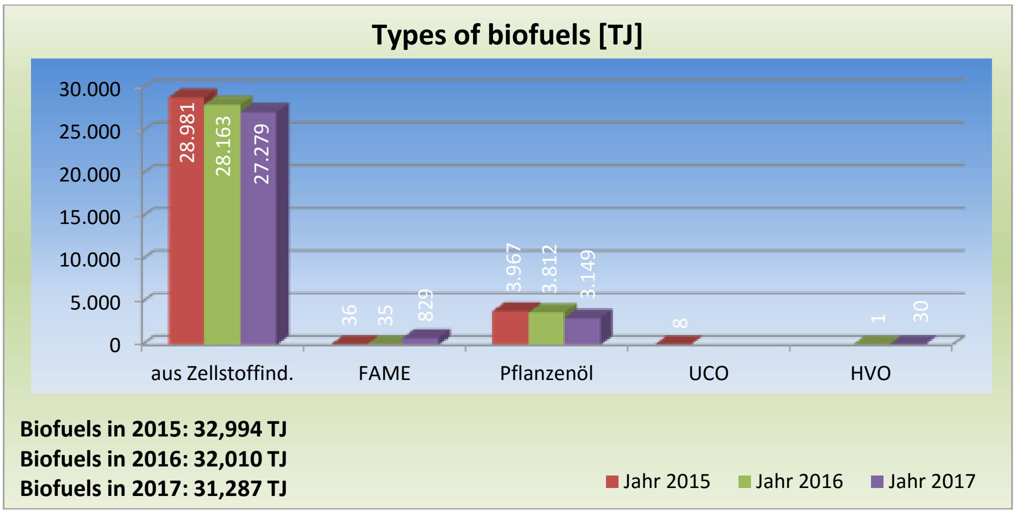


Figure44

7.2 Source materials and origins of vegetable oils used as bioliquids

In the reporting year, less palm oil was used than in the previous year (-33.2%). The quantity of rapeseed used rose by 71%.

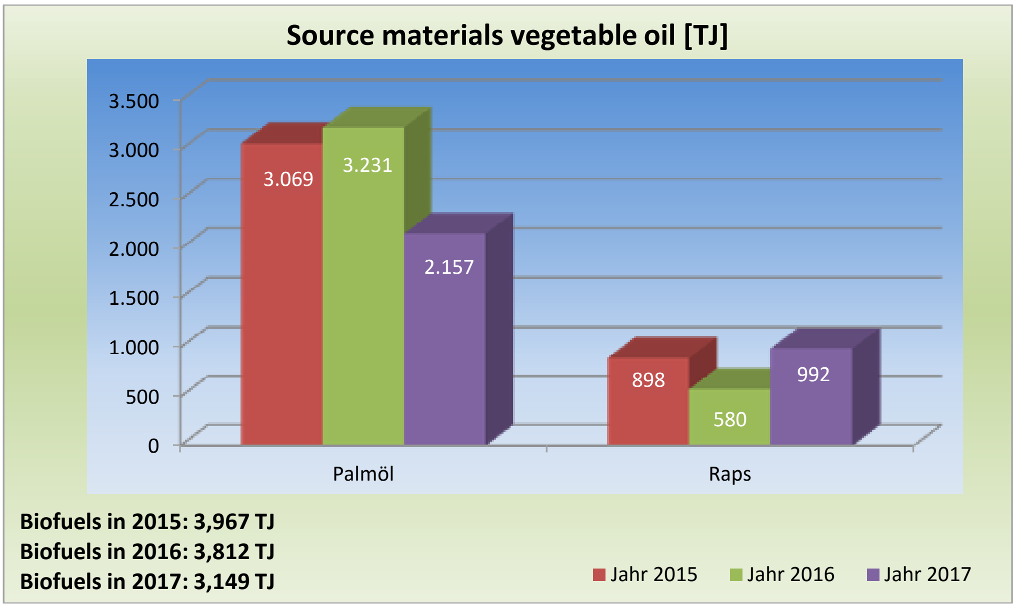


Figure45

The palm oil quantities originating from Malaysia and Indonesia decreased. The volume from Honduras more than tripled. A small amount from Colombia was received for the first time.

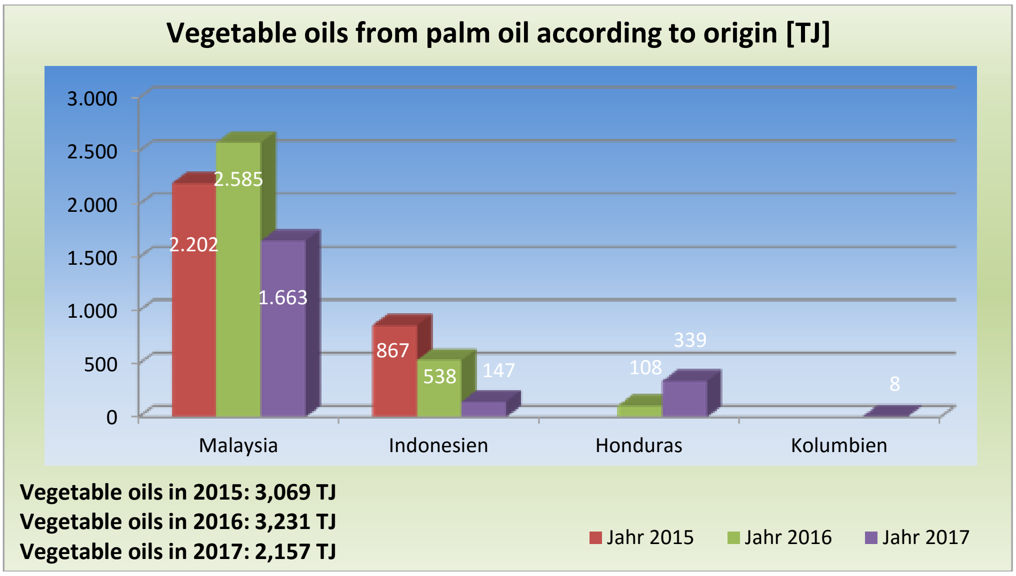


Figure46

7.3 Greenhouse gas emissions and savings

For the calculation of emission savings, the total amount of emissions generated during the production of the bioliquid were compared to the reference value of **91g CO2eq/MJ** for fossil fuels used for electricity production.

Due to the large share of thick liquor from the pulp industry, with very low emission rates, the total savings in the area of bioliquids are traditionally very high. In sum, however, more emissions were generated in the reporting year than in the previous year.

The emission savings presented here are based on the comparison of **pure bioliquids** and **pure fossil liquid fuels**. A bioliquid is considered sustainable, up until the reporting year, at a proven savings value of 35% (50% from 01.01.2018 onwards) compared to fossil liquid fuel.

The use of bioliquids for electricity/energy production allowed savings of approx. 2.7 million tonnes of CO_2 equivalents. This is because, if fossil-based liquid fuels were exclusively used for electricity/energy production instead of bioliquids, over 2.8 million tonnes of CO2 equivalent would have been generated based on the reference value of 91g CO_{2eq}/MJ.

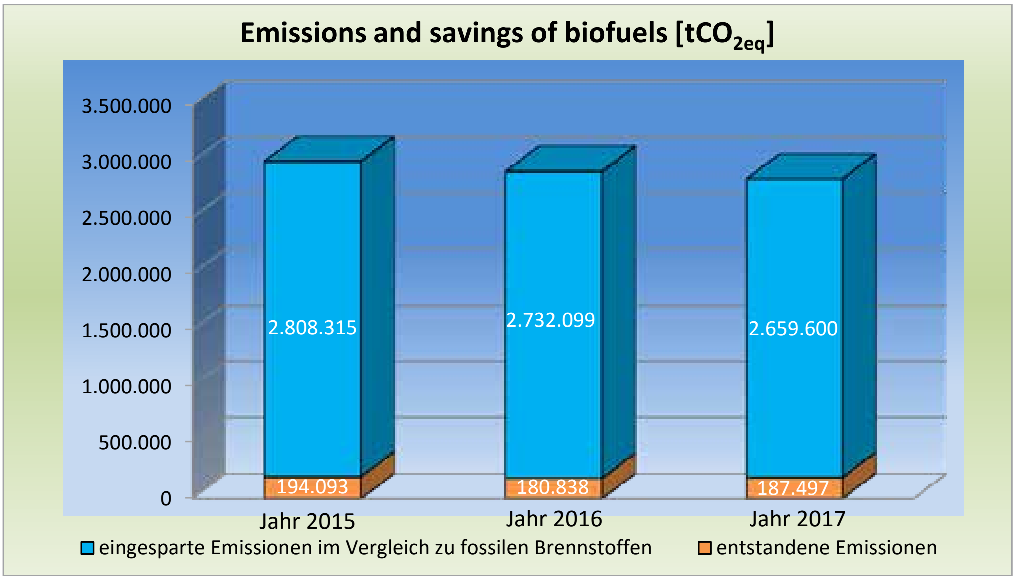


Figure 47

The average amount of CO_{2eq} increased by 6% compared to the previous year.

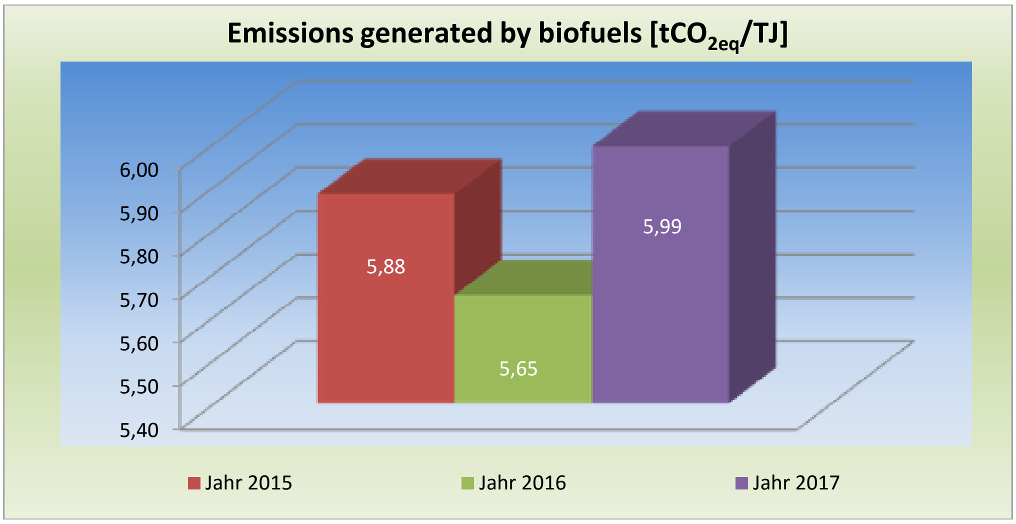


Figure48

As a result of this, lower average greenhouse gas emissions savings were recorded.

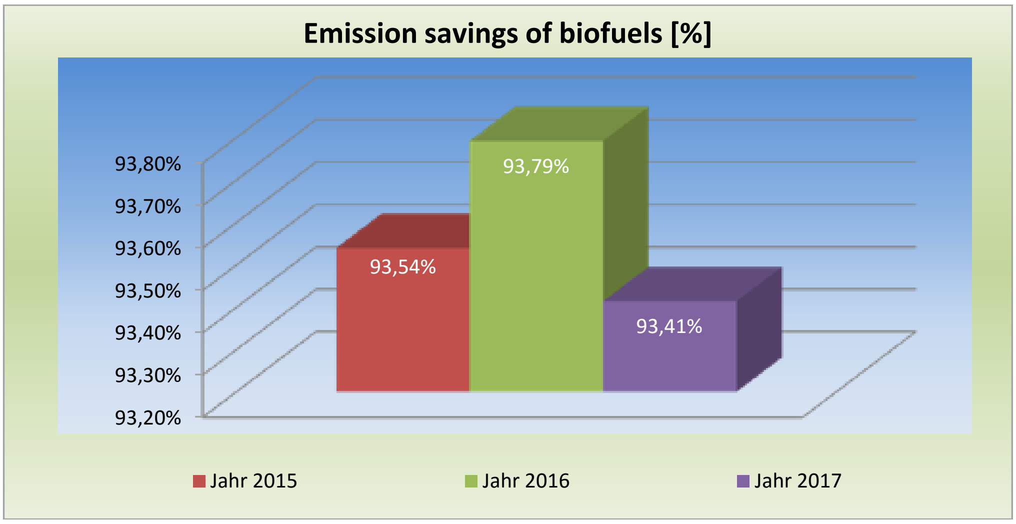


Figure49

For the bioliquids FAME and vegetable oil, a decrease in the average emissions was recorded. This value was slightly higher for bioliquids from the pulp industry.

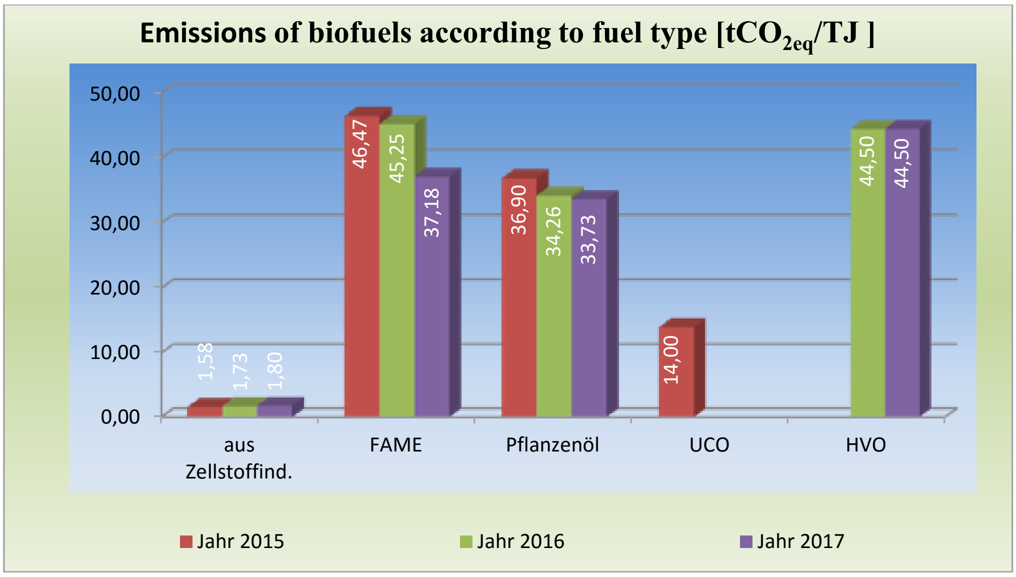


Figure50

A comparison of years reveals that using bioliquids from the pulp and paper industry can always result in savings of over 98%.

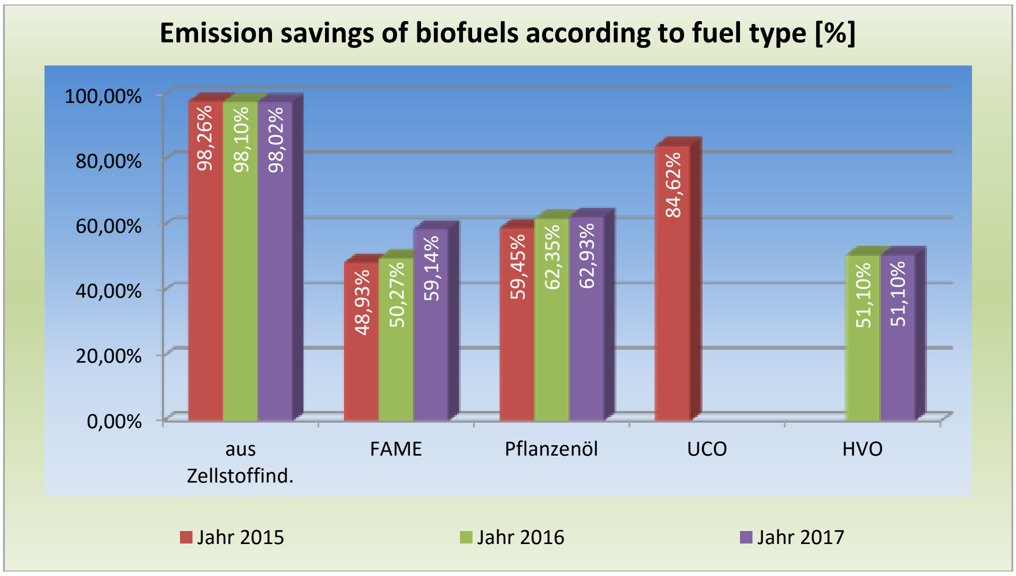


Figure51

8. Retirement accounts

So as to allow economic operators to comply with their mass-balancing regulations, retirement accounts have been set up in Nabisy for various purposes. They are:

- **Country accounts**, in the event that the goods leave Germany and the recipient is not registered in Nabisy,

- **Retirement accounts for other purposes**, e.g. for further conversion or other technical purposes.

- **Shortfall on the reporting day**, for cases where, at the end of the mass-balance period, there are no physical sustainable goods to account for the relevant proofs.

8.1 Retirement to accounts of other Member States and third countries

Biofuels and bioliquids entered in the Nabisy database and exported to other states must be retired by the economic operators to the account of the respective state. During the reporting year, **48,631 TJ** (previous year: 53,100TJ) of biofuel and bioliquid were transferred in this way to the accounts of states inside and outside the European Union.

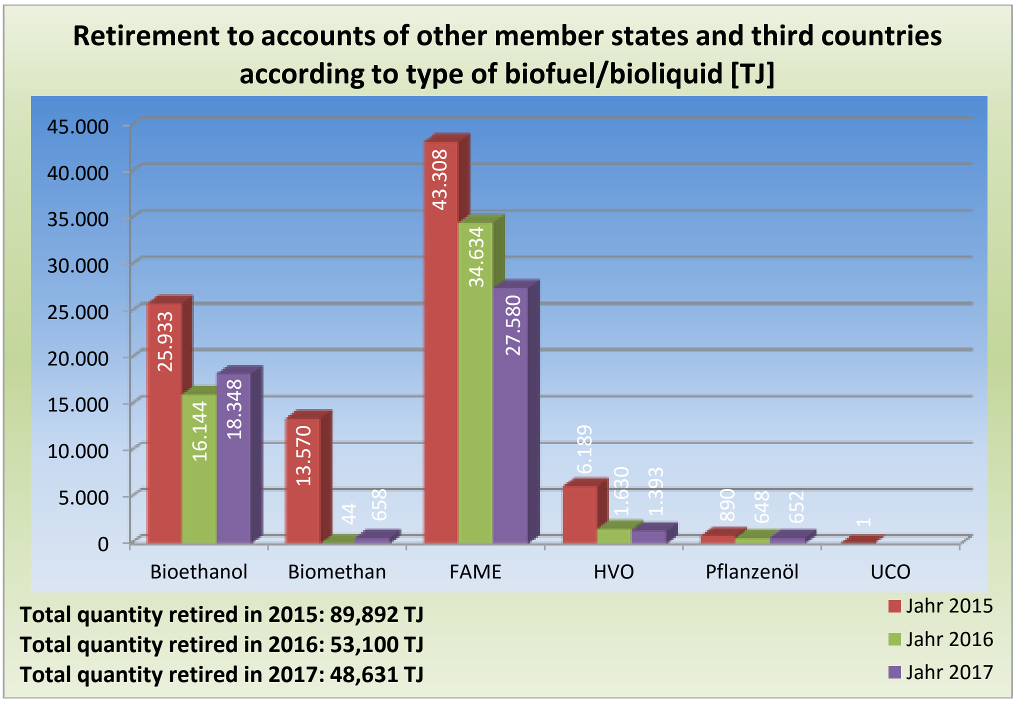


Figure52

The following figure shows only those country accounts into which over 1,000TJ were booked in at least one reference year. A complete overview of the retired amounts can be found in Table 14 on page 81.

The largest quantities of biofuels and bioliquids were retired to the accounts of France (29.9%), the Netherlands (18.4%) and Belgium (12.7%).

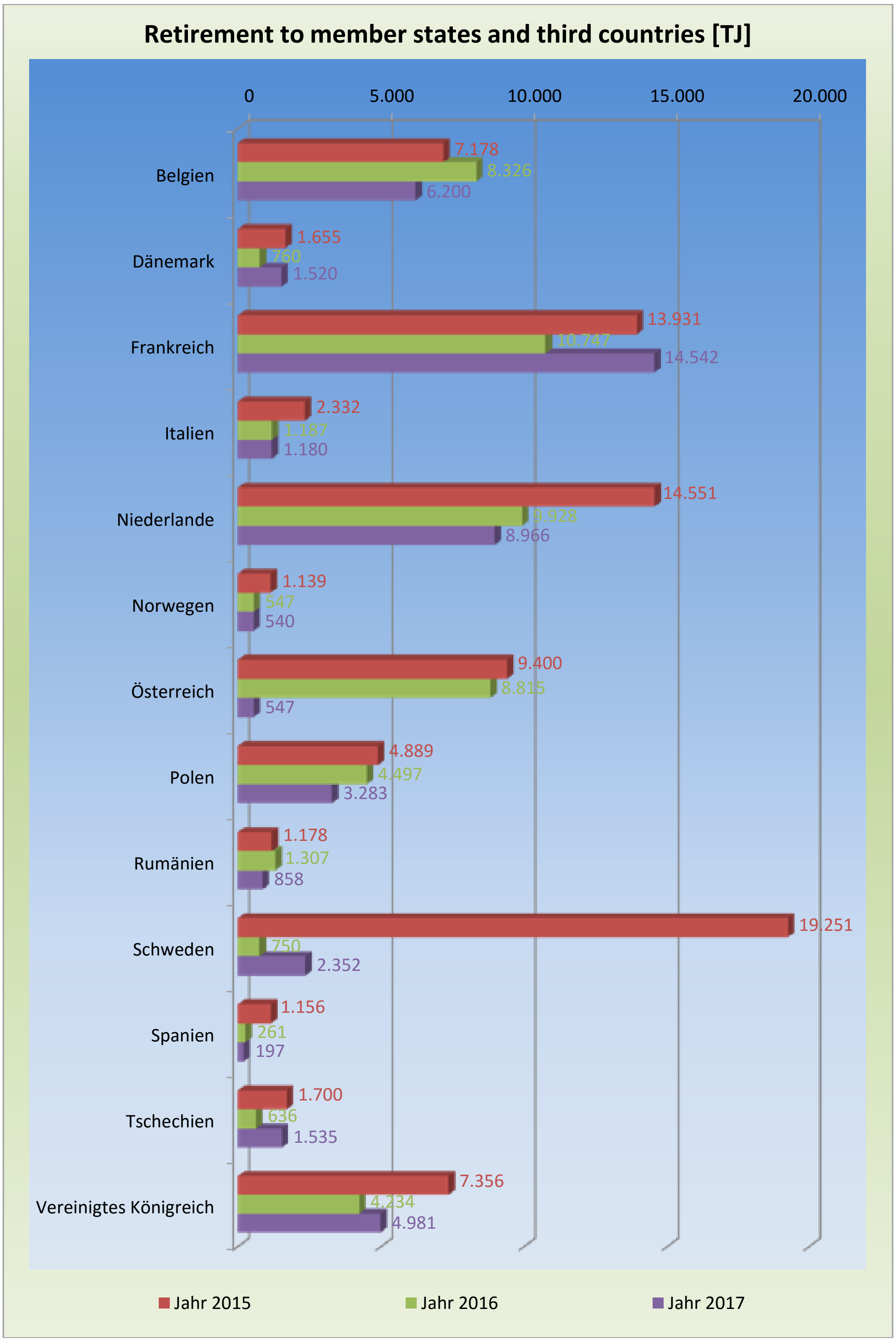

Retirement to member states and third countries [TJ]
0
5.000
10.000
15.000
20.000
Belgien
7.178
8.326
6.200
Dänemark
1.655
760
1.520
Frankreich
13.931
10.747
14.542
Italien
2.332
1.187
1.180
Niederlande
14.551
9.928
8.966
Norwegen
1.139
547
540
Österreich
9.400
8.815
547
Polen
4.889
4.497
3.283
Rumänien
1.178
1.307
858
Schweden
19.251
750
2.352
Spanien
1.156
261
197
Tschechien
1.700
636
1.535
Vereinigtes Königreich
7.356
4.234
4.981
Jahr 2015
Jahr 2016
Jahr 2017

Figure53

Table 14: 2017 retirement of biofuels or bioliquids to Member States and third countries [TJ]

	Waste/ residues	Barley	Maize	Palm oil	Rapeseed	Rye	Soya	Sun-flower	Triticale	Wheat	Sugar cane	Sugar beet	Total
Belgium	14		225	567	4,944	6	81			220	27	115	**6,200**
Bulgaria			114		0.02				1	1		3	**119**
Denmark	177	1	338		112				1	117		775	**1,520**
Estonia					172								**172**
Finland			156									59	**215**
France	463	8	632	2,749	9,109	42	654	16	25	524		319	**14,542**
Greece					1								**1**
Ireland	66									56			**121**
Italy	209		28	1	942								**1,180**
Croatia			27						3	4			**34**
Lithuania					49								**49**
Luxembourg	18		22	141	270	6		34					**491**
Malta	14												**14**
Netherlands	3,910	26	1,442	35	90	39	74		127	1,853	917	454	**8,966**
Norway	223		60		149	25			3	78	2		**540**
Austria			34	20	453		25		11	4	0.2		**547**
Poland	30	0.4	516	25	1,464	112			67	813		258	**3,283**
Romania		10	483						12	302	0.001	52	**858**
Sweden	428		651			69				894	14	296	**2,352**
Switzerland			4			8			3	7		4	**26**
Slovakia				22	103				5			26	**156**
Slovenia			62	1	63		24		8	96			**254**
Spain					197								**197**
Czech Republic	47	2	912	2	365	24			98	74		10	**1,535**
Hungary			117	5	138		3		2	5		3	**274**
United Kingdom	3,190		868			74			143	319	251	135	**4,981**
Cyprus									1			4	**5**
Overall result	**8,790**	**47**	**6,693**	**3,568**	**18,621**	**404**	**861**	**50**	**508**	**5,365**	**1,212**	**2,511**	**48,631**

8.2 Emission savings for retirements to country accounts

As in the previous year, the volumes retired to country accounts experienced worse emission reduction than the volumes filed with regard to the German greenhouse gas reduction quota. The reference value used to calculate the emission savings of the retired amounts was the value for the biofuel sector, i.e. **83.8g CO_{2eq}/MJ**.

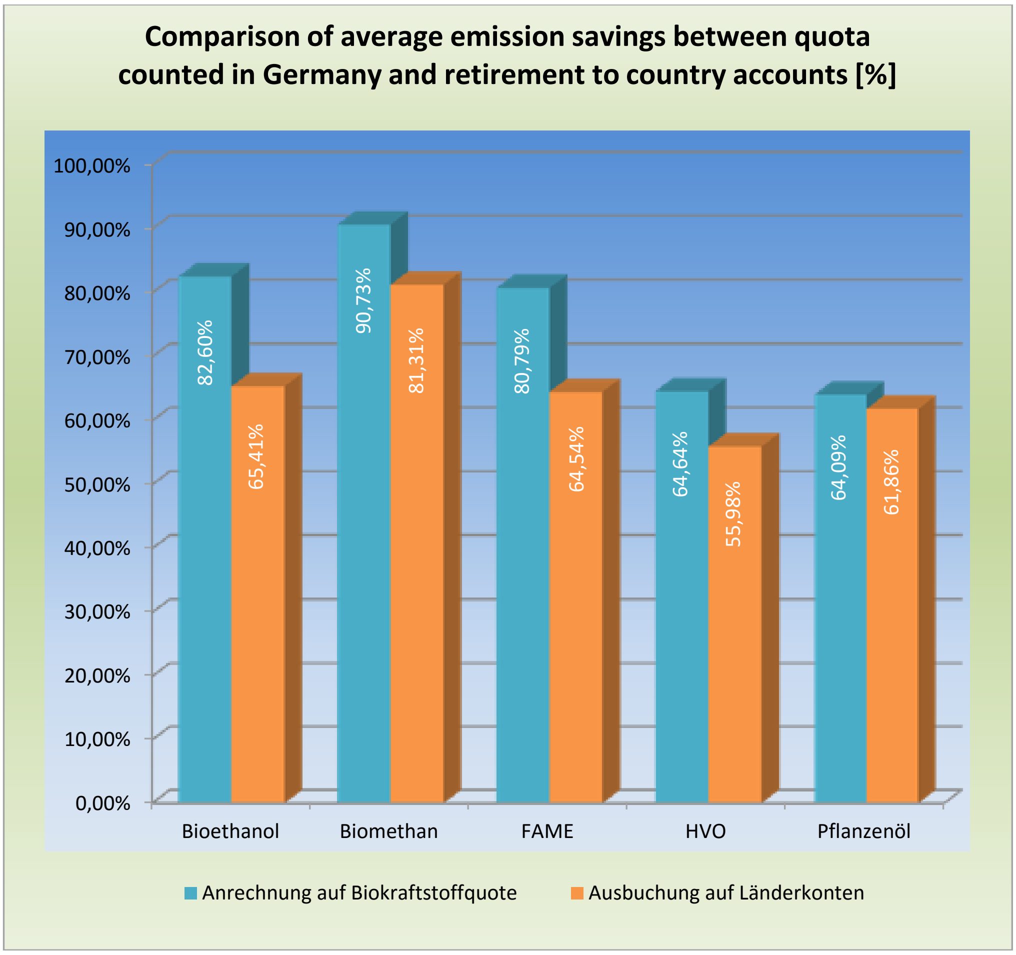


Figure54

8.3 Retirement to other accounts

In addition to retirements to country accounts, the Nabisy electronic database has other retirement options for documented quantities, which likewise see (or saw) no use for energy purposes in Germany. The following figure shows the change in three of these additional accounts.

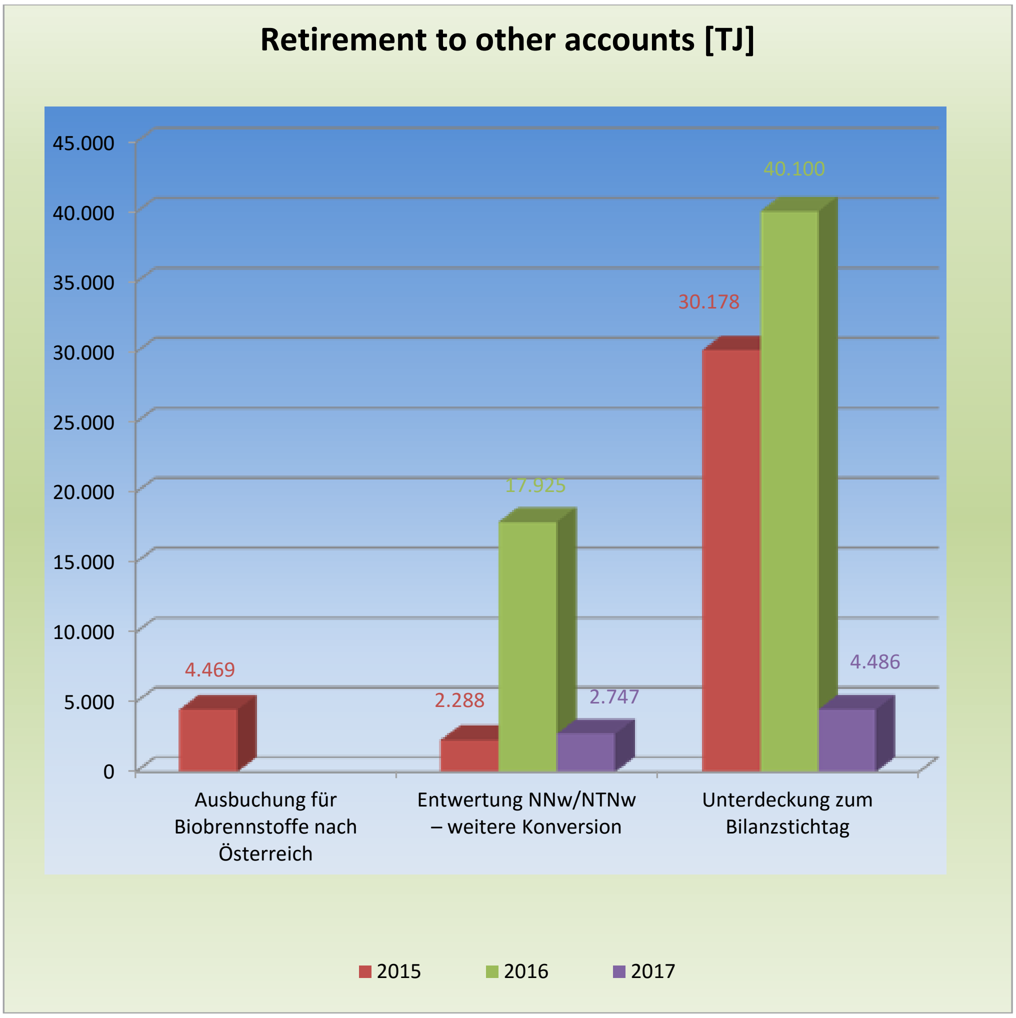


Figure 55

8.4 Counting towards the quota, Renewable Energies Act, retirement

Below, biofuels and bioliquids from **palm oil and rapeseed** in the areas of counting towards the quota (Chapter 6), remuneration under the Renewable Energies Act (Chapter 7) and of retirement (Chapter 8) are compared over a three-year period. The total quantity of palm oil again rose in the reporting year. The quantity produced from rapeseed again significantly decreased, by 20.5%.

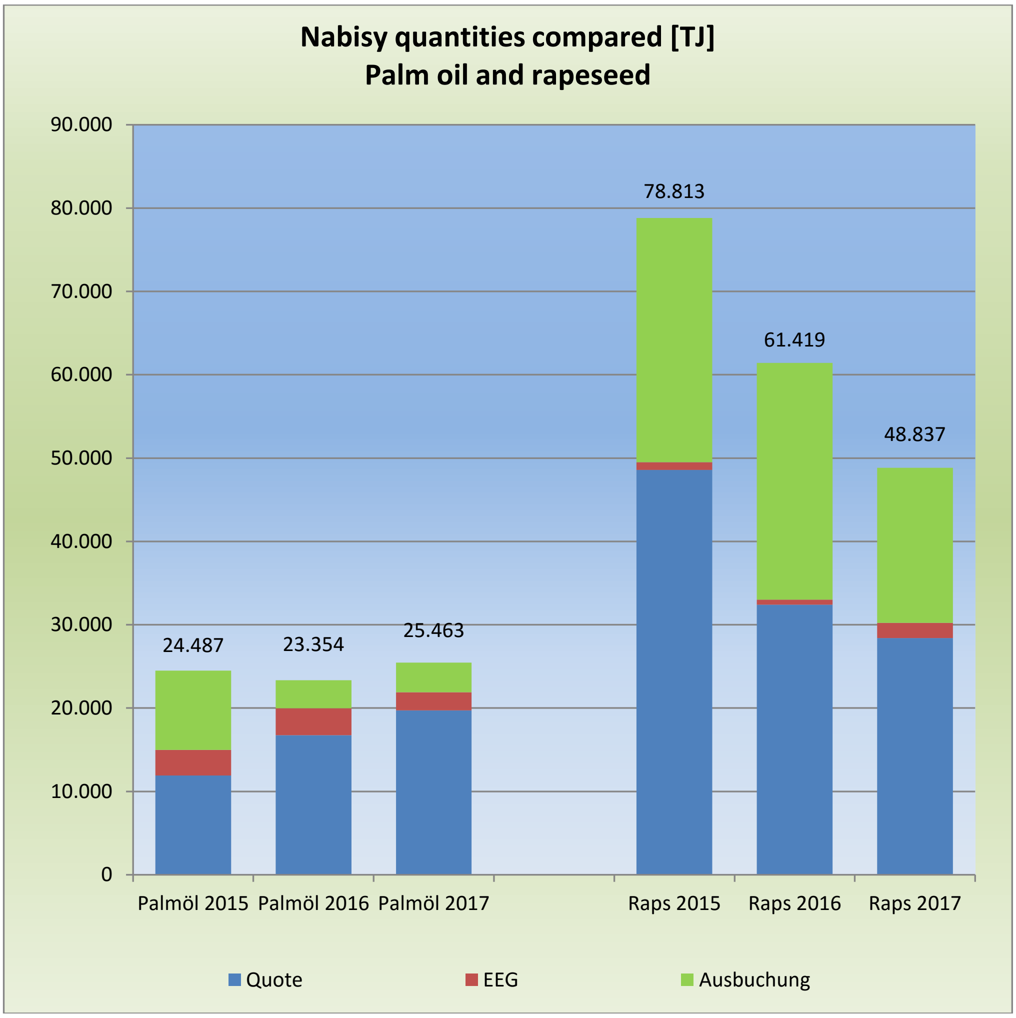


Figure 56

There was a decline in biofuels and bioliquids made of sugar cane and sugar beet . Neither of these two raw materials was used in terms of remuneration under the Renewable Energies Act.

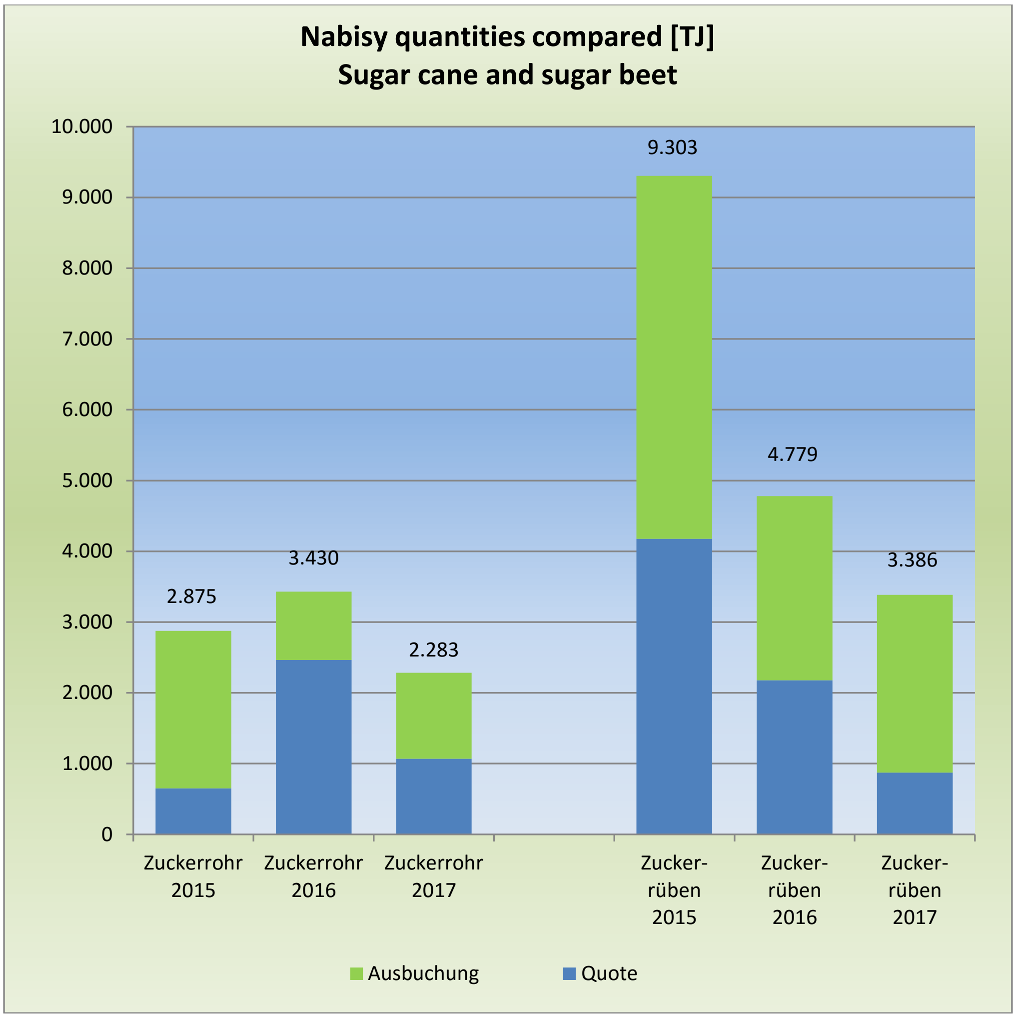


Figure 57

9. Outlook

Parties obliged to provide proof and who have brought fuels into circulation in Germany must save on greenhouse gas emissions compared to their individual reference value. The greenhouse gas reduction quota introduced in Germany in 2015 prescribes this obligation. From 2017, the prescribed quota saving is 4%. From 2020, this quota will rise to 6%.

Upon entry into force of the 37th BImSchV and the 38th BImSchV, those obliged to comply with the quota have more options to do so, compared with the previous blending with sustainable biofuels.

The annual report shows that in the third year of the greenhouse gas reduction quota, most of the biofuel types brought into circulation in Germany again achieved significantly higher average greenhouse gas savings than in the two preceding years.

The specification for the “new” plants (initially commissioned after 5.10.2015) to achieve at least 60% emission savings instead of “only” 35%, has led to no particular problems, according to the available data. The information as to whether the biofuel comes from a new or an old plant is provided by the certification authorities and systems together with the certificate data, such that the database can, on this basis, check the plausibility of whether the required minimum savings requirements have been fulfilled. Therefore, this information is omitted from the proof of sustainability itself.

In the reporting year, the Commission obliged the voluntary systems to update individual values for the calculation of greenhouse gas emissions throughout the entire value chain. The BLE plans to develop Nabisy, so as to enable a designation of these individual values to all proofs of sustainability and partial proofs of sustainability.

Quantities of goods that were dealt with via the government's Nabisy database, but were not ultimately used in Germany and were therefore retired to accounts of other Member States, again exhibit lower emission savings, given that competition for the highest savings is strongest on the German market.

In the current year (2018), biofuels are deemed to be sustainable only if they exhibit at least 50% savings (previously 35%) compared to the fossil-based reference value. In the meantime, Europe's demand for lower-emission biofuels has increased.

It remains to be seen how the reduced import duties on biofuels from Argentina and Indonesia will affect the use of vegetable oils certified as sustainable in the area of German biofuels in the coming years.

10. Background data

Table 15: Biofuels in TJ - source materials[1]

Fuel type/ quota year	Bioethanol Figure29, p. 54			Biomethane Figure34, p. 58			Bio-methanol[2]	FAME Figure31, p. 56			HVO Figure33, p. 58			Vegetable oil Figure35, p. 59		
Source material	2015	2016	2017	2015	2016	2017	2015	2015	2016	2017	2015	2016	2017	2015	2016	2017
Waste/residues	156	118	46	1,251	1,373	1,615	0.04	20,549	32,422	31,508	227	269	80			
Barley	1,353	1,435	1,665													
Maize	10,313	9,983	14,369													
Palm oil								4,776	9,816	18,373	7,132	6,928	1,361			
Rapeseed								48,251	32,154	28,381				343	246	26
Rye	2,292	2,028	2,272													
Soya								164	46	62						
Sunflower								139	79	1,631						
Triticale	2,717	2,341	1,753													
Wheat	9,395	9,647	7,940													
Sugar cane	650	2,466	1,071													
Sugar beet	4,177	2,176	875													
Total Figure27, p. 52	**31,053**	**30,195**	**29,991**	**1,251**	**1,373**	**1,615**	**0.04**	**73,878**	**74,517**	**79,955**	**7,359**	**7,197**	**1,442**	**343**	**246**	**26**

[1] Differences in sum totals are due to rounding
[2] No data for 2016 and 2017

Table 16: Biofuels in kt - source materials [1,2]

Fuel type/ quota year — Source material	Bioethanol			Biomethane			Bio-methanol[3]	FAME			HVO			Vegetable oil		
	2015	2016	2017	2015	2016	2017	2015	2015	2016	2017	2015	2016	2017	2015	2016	2017
Waste/residues	6	4	2	25	27	32	0.002	550	868	843	5	6	2			
Barley	51	54	63													
Maize	390	377	543													
Palm oil								128	263	492	164	159	31			
Rapeseed								1,291	860	759				9	7	1
Rye	87	77	86													
Soya								4	1	2						
Sunflower								4	2	44						
Triticale	103	88	66													
Wheat	355	365	300													
Sugar cane	25	93	40													
Sugar beet	158	82	33													
Total	**1,173**	**1,141**	**1,133**	**25**	**27**	**32**	**0.002**	**1,977**	**1,994**	**2,139**	**169**	**165**	**33**	**9**	**7**	**1**

[1] Differences in sum totals are due to rounding
[2] The conversion to tonnes was done on the basis of the quantities stated on the proofs
[3] No data for 2014 and 2016

Table 17: Biofuels in TJ - source materials and their origins[1]

Region/ Quota year	Africa Figure15, p. 41			Asia Figure16, p. 42			Australia Figure17, p. 43			Europe Figure18, p. 44			Central America Figure20, p. 46			North America Figure21, p. 46			South America Figure22, p. 47		
Source material	**2015**	**2016**	**2017**	**2015**	**2016**	**2017**	**2015**	**2016**	**2017**	**2015**	**2016**	**2017**	**2015**	**2016**	**2017**	**2015**	**2016**	**2017**	**2015**	**2016**	**2017**
Waste/residues	191	252	287	2,755	6,641	6,947	36	47	46	17,711	23,888	23,412		12	11	1,211	2,876	1,983	279	467	562
Barley										1,353	1,435	1,665									
Maize										10,313	9,983	14,369									
Palm oil				11,907	16,435	17,464	1							309	2,270						
Rapeseed				47			448	341	333	48,097	32,059	28,075					0.1		2		
Rye										2,292	2,028	2,272									
Soya												35							164	46	27
Sunflower										139	79	1,631									
Triticale										2,717	2,341	1,753									
Wheat										9,240	9,647	7,940							155		
Sugar cane	74												253	464	324				323	2,002	746
Sugar beet										4,177	2,176	875									
Total Figure11, p. 37	**265**	**252**	**287**	**14,709**	**23,075**	**24,411**	**485**	**388**	**379**	**96,038**	**83,636**	**82,027**	**253**	**785**	**2,606**	**1,211**	**2,876**	**1,983**	**924**	**2,515**	**1,335**

[1] Differences in sum totals are due to rounding

Table 18: Biofuels in kt - source materials and their origins[1,2]

Region/ Quota year / Source material	Africa			Asia			Australia			Europe			Central America			North America			South America		
	2015	2016	2017	2015	2016	2017	2015	2016	2017	2015	2016	2017	2015	2016	2017	2015	2016	2017	2015	2016	2017
Waste/residues	5	7	8	73	177	186	1	1	1	466	631	616		0.3	0.3	32	77	53	8	13	15
Barley										51	54	63									
Maize										390	377	543									
Palm oil				291	413	462	0.03							8	61						
Rapeseed				1			12	9	9	1,287	858	751							0.1		
Rye										87	77	86									
Soya												1							4	1	1
Sunflower										4	2	44									
Triticale										103	88	66									
Wheat										349	365	300							6		
Sugar cane	3												10	18	12				12	76	28
Sugar beet										158	82	33									
Total	8	7	8	366	590	648	13	10	10	2,894	2,534	2,503	10	26	73	32	77	53	30	90	44

[1] Differences in sum totals are due to rounding

[2] The conversion to tonnes was done on the basis of the quantities stated on the proofs

Table 19: Sum total of biofuels per source material[1]

Source material	In 2015 [TJ]	In 2016 [TJ]	In 2017 [TJ]	In 2015 [kt]	In 2016 [kt]	In 2017 [kt]
Waste/residues	22,183	34,183	33,249	586	906	879
Barley	1,353	1,435	1,665	51	54	63
Maize	10,313	9,983	14,369	390	377	543
Palm oil	11,908	16,744	19,734	291	422	523
Rapeseed	48,594	32,400	28,408	1,300	867	760
Rye	2,292	2,028	2,272	87	77	86
Soya	164	46	62	4	1	2
Sunflower	139	79	1,631	4	2	44
Triticale	2,717	2,341	1,753	103	88	66
Wheat	9,395	9,647	7,940	355	365	300
Sugar cane	650	2,466	1,071	25	93	40
Sugar beet	4,177	2,176	875	158	82	33
Total	**113,884**	**113,528**	**113,029**	**3,353**	**3,334**	**3,339**

[1] Differences in sum totals are due to rounding

Table 20: Emissions and emission savings of biofuels[1,2]

Type of biofuel	Emissions 2015 [t CO_{2eq}/TJ]	Emissions 2016 [t CO_{2eq}/TJ]	Emissions 2017 [t CO_{2eq}/TJ]	Savings 2015 [%]	Savings 2016 [%]	Savings 2017 [%]
	Figure39, p. 63 and Figure37, p. 62			Figure40, p. 64 and Figure38, p. 62		
Bioethanol	24.53	20.58	14.58	70.73	75.44	82.60
Biomethane	13.17	8.03	7.77	84.28	90.42	90.73
Biomethanol	22.6			73.03		
FAME	24.62	17.84	16.10	70.62	78.71	80.79
HVO	32.03	31.66	29.64	61.78	62.22	64.64
Vegetable oil	35.7	35.34	30.09	57.4	57.83	64.09
Weighted average value of all biofuels	**24.98**	**19.37**	**15.75**	**70.19**	**76.89**	**81.20**

Table 21: Emissions and emission savings of bioliquids[3]

Type of bioliquid	Emissions 2015 [t CO_{2eq}/TJ]	Emissions 2016 [t CO_{2eq}/TJ]	Emissions 2017 [t CO_{2eq}/TJ]	Savings 2015 [%]	Savings 2016 [%]	Savings 2017 [%]
	Figure50, p. 77 and Figure48, p. 76			Figure51, p. 77 and Figure49, p. 76		
from the pulp industry	1.58	1.73	1.80	98.26	98.1	98.02
FAME	46.47	45.25	37.18	48.93	50.27	59.14
HVO		44.5	44.50		51.1	51.10
Vegetable oil	36.9	34.26	33.73	59.45	62.35	62.93
UCO	14			84.62		
Weighted average value of all bioliquids	**5.88**	**5.65**	**5.99**	**93.54**	**93.79**	**93.41**

[1] Differences in sum totals are due to rounding
[2] Savings compared to 83.8 g CO_{2eq}/MJ as the reference value for fossil fuel
[3] Savings compared to 91 g CO_{2eq}/MJ as the reference value for fossil bioliquids for power generation

Table 22: Type of bioliquid [TJ][1]

Figure44, p. 73

Type of bioliquid	2015	2016	2017
from the pulp industry	28,981	28,163	27,279
FAME	36	35	829
HVO		1	30
Vegetable oil	3,967	3,812	3,149
UCO	8		
Overall result Figure43, p. 73	**32,994**	**32,010**	**31,287**

Table 23: Bioliquid vegetable oil – source material [TJ][1]

Figure45, p. 74

Source material	2015	2016	2017
Palm oil	3,069	3,231	2,157
Rapeseed	898	580	992
Total	**3,967**	**3,812**	**3,149**

Table 24: Vegetable oils from palm oil according to origin (bioliquid) [TJ][1]

Figure46, p. 74

Origin	2015	2016	2017
Honduras		108	339
Indonesia	867	538	147
Colombia			8
Malaysia	2,202	2,585	1,663
Overall result	**3,069**	**3,231**	**2,157**

[1] Differences in sum totals are due to rounding

Table 25: Biofuels whose source materials originated in Germany [TJ][1]

Fuel type/ quota year / Source material	Bioethanol Figure30, p. 55			Biomethane			FAME Figure32, p. 57			Vegetable oil			Total Figure19, p. 45		
	2015	2016	2017	2015	2016	2017	2015	2016	2017	2015	2016	2017	2015	2016	2017
Waste/residues	27	56	0.1	1,250	1,373	1,602	5,647	6,862	6,360				6,924	8,291	7,962
Barley	1,268	1,335	1,468										1,268	1,335	1,468
Maize	158	134	71										158	134	71
Rapeseed							32,222	20,919	14,738	343	246	26	32,565	21,164	14,764
Rye	1,357	1,137	1,513										1,357	1,137	1,513
Sunflower							39						39		
Triticale	377	60	404										377	60	404
Wheat	1,327	1,641	1,327										1,327	1,641	1,327
Sugar beet	3,698	1,787	635										3,698	1,787	635
Total	**8,211**	**6,150**	**5,418**	**1,250**	**1,373**	**1,602**	**37,908**	**27,781**	**21,098**	**343**	**246**	**26**	**47,712**	**35,549**	**28,144**

[1] Differences in sum totals are due to rounding

11. Conversion tables, abbreviations and definitions

Table 26: Conversion of energy units

Energy unit	Megajoule [MJ]	Kilowatt hour [kWh]	Terajoule [TJ]	Petajoule [PJ]
1 megajoule [MJ]	1	0.28	0.000001	0.000000001
1 kilowatt hour [kWh]	3.60	1	0.0000036	0.0000000036
1 terajoule [TJ]	1,000,000	280,000	1	0.001
1 petajoule [PJ]	1,000,000,000	280,000,000	1,000	1

Table 27: Density

Type of biofuel	Tonnes per cubic metre [t/m³]	Megajoules per kilogram [MJ/t]
Bioliquid from the pulp industry	1.32	7,000
Bioethanol	0.79	27,000
Biomethane	0.00072	50,000
Biomethanol	0.80	20,000
FAME	0.883	37,000
HVO	0.78	44,000
Vegetable oil	0.92	37,000
UCO	0.92	37,000

Table 28: Abbreviations

Abbreviation	Meaning
36. BImSchV	36th Ordinance for the implementation of the Federal Emissions Control Act (Verordnung zur Durchführung des Bundes-Immissionsschutzgesetzes) (Ordinance for the implementation of the regulations regarding biofuel quotas)
38. BImSchV	38th Ordinance for the implementation of the Federal Emissions Control Act Ordinance to establish additional regulations for green-house gas reduction for fuels
CHP	Combined heat and power plant
Biokraft-NachV/BioEn SusO	Biofuel Sustainability Ordinance
BioSt-NachV/Biofuel SusO	Biomass Electricity Sustainability Ordinance
DE system	BLE-recognised certification system pursuant to Art. 33(1) and (2) BioEn SusO and/or Biofuel SusO
EEG	Renewable Energies Act
EU system	Voluntary System pursuant to Art. 32 No. 3 Biofuel SusO and/or BioEn SusO
FAME	Fatty acid methyl ester (biodiesel)
HVO	Hydrogenated Vegetable Oils
Directive 2009/28/EC (Renewable Energies Directive)	Directive 2009/28/EC of the European Parliament and of the Council of 23rd April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC
GHG	Greenhouse gas
UCO	Used cooking oil

Table 29: Explanation of terms

Term	Meaning
Bioliquid from the pulp industry	Energy- and lignin-rich by-products of cellulose production in the paper industry https://de.wikipedia.org/wiki/Nebenprodukthttps://de.wikipedia.org/wiki/Zellulose https://de.wikipedia.org/wiki/Papier.
Bioethanol	Bioethanol is derived from renewable raw materials by distillation after alcoholic fermentation or by comparable biochemical methods
Biomethane	Biogas results from biomass fermentation as a methane-rich gas.
Biomethanol	Like BTL fuel, methanol can be produced via synthesis gas and from a wide range of biomass types. It can also be produced by converting crude glycerin.
FAME	Fatty acid methyl ester, called biodiesel, is generated during the chemical conversion of fats and oils by means of methanol.
HVO	Hydrogenated vegetable oil is converted to hydrocarbon chains by means of a chemical reaction with hydrogen in a hydrogenation plant.
Vegetable oil	Vegetable oil fuel can be produced from rapeseed or from other oil plants whereby, in contrast to biodiesel, no chemical conversion takes place.
UCO	Used cooking oils or fats can be used as pure fuels or as components of FAME.
Blending	For example, the addition of biofuels to fossil fuels (e.g. a maximum of 7% for diesel)

Table 30: Progressive biofuels

pursuant to 38th BImSchV8. BIm-SchV	pursuant to Directive 2009/28/EC
Annex 1 to Section 2(6) No. 1 of the 38th BImSchV Raw materials for the production of biofuels according to Section 2(6) No 1 Raw materials for the production of biofuels according to Section 2(6) No 1 are:	**ANNEX IX, Part A Raw materials and fuels whose contribution to the objective referred to in Article 3(4) Subparagraph 1 is doubled in terms of its energy content**
1. Algae that has been cultivated on land in basins or photobioreactors,	a) algae cultivated on land in basins or photobioreactors;
2. Biomass proportion of mixed municipal waste, but not separate household waste, to which the objectives referred to in Article 11(2a) of Directive 2008/98/EC apply,	b) biomass proportion of mixed municipal waste, but not separate household waste, to which the objectives referred to in Article 11(2a) of Directive 2008/98/EC apply,
3. Bio-waste within the meaning of Article 3(4) of Directive 2008/98/EC from private households, subject to separate collection within the meaning of Article 3(11) of Directive 2008/98/EC,	c) bio-waste within the meaning of Article 3(4) of Directive 2008/98/EC from private households, subject to separate collection within the meaning of Article 3(11) of the aforementioned Directive;
4. Biomass proportion of industrial waste which is unsuitable for use in the human or animal food chain, including material from the wholesale and retail trade, agriculture and food industry, as well as fishing and aquaculture industry; however, this does not include those raw materials listed in Part B of Annex IX of Directive 2009/28/EC,	d) biomass proportion of industrial waste which is unsuitable for use in the human or animal food chain, including material from the wholesale and retail trade, agriculture and food industry, as well as fishing and aquaculture industry, and exclusively the raw materials listed in Part B of this Annex;
5. Straw	e) straw
6. Manure and sewage sludge,	f) manure and sewage sludge;
7. Wastewater from palm oil mills and empty bunches of palm fruit	g) wastewater from palm oil mills and empty bunches of palm fruit
8. Tall oil pitch	h) tall oil pitch
9. Crude glycerol	i) crude glycerol
10. Bagasse	j) bagasse
11. Grape marc and lees	k) grape marc and lees
12. Nut shells	l) nut shells
13. Husks	m) husks
14. Cored cobs	n) cored cobs
15. Biomass proportions of waste and residues from forestry and forest-based industries, i.e. bark, pre-commerical thinnings, sawdust, wood shavings, black liquor, brown liquor, fibrous sludge, lignin and tall oil,	o) biomass proportions of waste and residues from forestry and forest-based industries, i.e. bark, branches, precommerical thinnings, leaves, needles, tree-tops, sawdust, wood shavings, black liquor, brown liquor, fibrous sludge, lignin and tall oil;
16. Other cellulose-containing non-food material and	p) other cellulose-containing non-food material within the meaning of Article 2(2s);
17. Other lignocellulose-containing material with the exception of logs for sawing and pulpwood.	q) other lignocellulose-containing material within the sense of Article 2(2r), with the exception of logs for sawing and pulpwood;

Further: Annex 1	Further: ANNEX IX, Part A
	r) liquid or gaseous renewable fuels of non-biogenic origin, used in the transport sector;
	s) capture and use of CO_2 for transportation purposes, insofar as the source of energy is renewable in accordance with Article 2(2a);
	t) bacteria, insofar as the source of energy is renewable in accordance with Article 2(2a).