Federal Office
for Agriculture and Food

Evaluation and Progress Report 2018

Biomass Energy Sustainability Ordinance
Biofuel Sustainability Ordinance

Published by
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Editorial content as of: **October 2019**
Database excerpt as of: **May 2019**

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Preface

Dear Reader,

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

For the first time since the greenhouse gas reduction obligation was introduced (in 2015), the total amount of biofuels used in Germany increased to over 120,000 terajoules in the 2018 quota year. Waste and residues account for more than a third of the raw materials used for producing biofuels during the reporting year.

Please note that a change was made to the reference quantity for determining emission savings in the reporting year; until the 2017 quota year, a uniform reference value for fossil fuels (83.8 g CO_2eq/MJ) was used for calculating the emission savings of all types of biofuels. This reference value applied uniformly to all further calculations: that is, first of all, the question whether a biofuel is sustainable at all; then the question as to the level of the quota applied to an individual obliged party; and finally, the question whether or not obliged parties have met their quotas. With effect from the 2018 quota year, the 38th Ordinance for the implementation of the *Bundes-Immissionsschutzgesetz* [Federal Emissions Control Act] (38th *BImSchV*) provides both a new base value (94.1 g CO_2eq/MJ) and new individual reference values for petrol (93.3 g CO_2eq/MJ) and diesel fuels (95.1 g CO_2eq/MJ). These individual reference values must be applied by the biofuels quota office in calculating whether the obliged parties have met their individual Greenhouse Gas Reduction Quotas.

We were thus faced with the decision which reference value to use for the diagrams and tables in our report, specifically in **Section 6.4, 'Emission Savings'**. What was decisive here is that the data pool in our public *Nabisy* database is primarily intended to provide the biofuels quota office with the required data which it can and must use to answer the question of whether an individual obliged party has met its Greenhouse Gas Reduction Quota. For this reason, this report uses the individual values for the each type of fossil fuel in determining the emission savings of each type of biofuel. This necessarily creates a break in the time line of emission savings illustrated in this report. The quantity of emissions to be attributed to biofuels is unaffected by this.

This Evaluation and Progress Report is intended to inform both the interested public and experts on the development of biofuels put on the market 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/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources (Renewable Energy Directive) was published in the Official Journal of the European Union. It forms part of the EU climate and energy package adopted by the Council on 6 April 2009. This package consists of binding legislation intended to ensure that the EU meets its climate and energy targets by 2020[1].

The directive emphasises that the control of energy consumption in Europe and the increased **use of energy from renewable sources**, together with energy savings and increased energy efficiency, constitute important parts of the package of measures needed to reduce greenhouse gas emissions and **comply with the Kyoto Protocol to the United Nations Framework Convention on Climate Change**, and with further Community and international greenhouse gas emission reduction commitments beyond 2012.

The aims of this Directive thus include: the increase the share of energy from renewable sources within the EU[2] and the reduction of both dependence on fossil energy sources and greenhouse gas emissions.

At the national level, each member state is thus to take measures and develop the appropriate instruments for achieving the targets set or any national targets beyond these.

The use of energy from renewable sources in the **transport sector** is considered one of the most effective tools by which the Community can reduce its dependence on imported oil in the transport sector, in which the problem of energy supply security is most acute, and influence the fuel market for transport.[3]

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[1] The three most important targets in the package are: Reduction of greenhouse gas emissions by 20% (compared to 1990 levels), 20% of energy in the EU to be from renewable sources, improving energy efficiency by 20%.

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

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

The Renewable Energy Directive prescribes **sustainability criteria** for biofuels and bioliquids:

- The greenhouse gas emission saving from the use of biofuels and bioliquids shall be at least 50% (at least 60% in the case of new installations),[4]
- Biofuels and bioliquids shall not be made from raw material obtained from land with high biodiversity value,
- Biofuels and bioliquids shall not be made from raw material obtained from land with high carbon stock,
- Biofuels and bioliquids shall not be made from raw material obtained from land that was peatland in January 2008, unless evidence is provided that the cultivation and harvesting of that raw material does not involve drainage of previously undrained soil.

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

1. By national systems;
2. By using a voluntary scheme that the Commission has recognised for the purpose;
   or
3. In accordance with the terms of bilateral or multilateral agreement concluded by the European Union with third countries which the Commission has recognised for the purpose.

As of 31 December 2018, the European Commission has published implementing decisions for recognising 14 voluntary schemes within the scope of the Renewable Energy Directive. These voluntary schemes have been operative alongside the BLE-recognised certification systems (DE systems) and national systems of other member states in the area of sustainable biomass production. Some have been recognised again after five years. In addition, a greenhouse gas calculation tool has been recognised by the European Commission.

On 4 August 2010, the German government adopted the National Renewable Energy Action Plan. Additionally, on 28 September 2010, it published its energy policy for an environmentally friendly, reliable and affordable energy supply. The transposition of the Renewable Energy Directive into national law by member states by 5 December 2010, as required by Article 27(1) of the Directive, was done in Germany by the publication of the *Biomassestrom- Nachhaltigkeitsverordnung (BioSt-NachV)* [Biomass Electricity Sustainability

[4] The emissions of biofuels and bioliquids are calculated following the method according to point (b) or (c) of Article 19(1) in connection with Annex V of Directive 2009/28/EC, which corresponds to Sect. 8(2) in connection with Annex 1 of the *Biokraft-NachV*. Once the upstream chain has communicated its own emissions, the calculation is made by the certified biofuel manufacturers and entered in the sustainability certificate. The fossil reference value for the question whether a biofuel is sustainable remains 83.3 g CO_2eq/MJ.

Ordinance] of 23 July 2009 and of the *Biokraftstoff-Nachhaltigkeitsverordnung (Biokraft-NachV)* [Biofuel Sustainability Ordinance] of 30 September 2009 in the Federal Law Gazette. These sustainability ordinances implement the Renewable Energy Directive and represent part of the measures of the National Action Plan and the energy policy of the German government.
In Directive (EU) 2015/1513 of the European Parliament and of the Council of 9 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, European legislators introduced a ceiling of 7% for the share of biofuels produced from food crops (conventional biofuels) and reduced the time allowed for meeting the sustainability criterion of minimum emission savings of currently 50% and of 60% for new installations (since 1 January 2017).[5]

In Germany, the biofuel quota for energy was replaced by the Greenhouse Gas Reduction Quota on 1 January 2015. Since then, obliged parties have been required to ensure that the greenhouse gas emissions of the fossil petrol and diesel fuels they put on the market plus the greenhouse gas emissions of the biofuels they put on the market are reduced by a defined percentage as against their respective individually calculated reference value.[6] The required reduction as against the reference value has been 4% since 2017 and will be 6% from 2020.

As a measure accompanying the introduction of the Greenhouse Gas Reduction Quota, the BLE regularly prepares evaluations for the Commission and the voluntary schemes as well as the national schemes. The evaluations provide the scheme concerned with information on Proofs of Sustainability with particularly low emission values, as entered in Nabisy by participants of the scheme. If the emission value stated on the certificate is at least 10% below the so-called typical value or a comparable value, it is indicated in the evaluation as a ‘particularly low emission value’. The data provided by the BLE here should not be confused with the data used in this evaluation report. By providing these data, the BLE assists certification schemes in their own evaluations. The Commission receives a summary of the total number of relevant Proofs of Sustainability in each of the schemes recognised by it.

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

[6] The reference value as against which a greenhouse gas reduction must be made is calculated by multiplying the base value (since 2018: 94.1 g CO_2eq/MJ) by the energy quantity of fossil petrol and diesel fuels put on the market by the obliged party plus the energy quantity of the biofuel put on the market by the obliged party. The greenhouse gas emissions of fossil petrol and diesel fuels are calculated by multiplying the base value by the energy quantity of the fossil petrol and diesel fuels put on the market by the obliged party. The greenhouse gas emissions of biofuels are calculated by multiplying the greenhouse gas emissions shown in certificates acceptable under Sect. 14 of the *Biokraftstoff-Nachhaltigkeitsverordnung*, in kilogram carbon dioxide equivalents per gigajoule, by the energy quantity of the biofuel put on the market by the obliged party.

1.2 This report

This report provides information on the use of sustainable biomass in Germany during the 2018 calendar year. Details on the quantities of biofuels and bioliquids are split into three sections. These are:

- Biofuels counting towards the Greenhouse Gas Reduction Quota (Chapter 6);
- Bioliquids registered for electricity generation and supply under the *EEG* [Renewable Energy Act] (Chapter 7);
- Biofuels and bioliquids not destined for energy use in Germany (Chapter 8).

The data used for the evaluation report are provided by our sustainable biomass system government database (*Nabisy*). It is a record of all biofuel and bioliquid quantities relevant to the German market. This begins by the certified manufacturers of biofuels entering the data required for producing a sustainability certificate. After that, the biofuel is generally traded a number of times, with all economic operators along the trade chain also requiring certification and a *Nabisy* account in order to receive or transfer the certificate, now referred to as a partial sustainability certificate. The process is similar to online banking.

As the competent authority, the BLE is required to submit an annual progress report to the federal government.

1.3 Summary of important results and events in 2018

- 120,066 TJ of **biofuels** [previous year: 113,029 TJ] were the subject of applications for counting towards the German Greenhouse Gas Reduction Quota (corresponding to 3,538 kilotonnes of biofuel). Of these, just under 61% (73,172 TJ) were made from source materials from within the EU [previous year: just under 67% (75,656 TJ)].

- The source materials for all types of biofuels were mostly waste and residues (35.8% [previous year: 29.4%]), rapeseed (20.9% [previous year: 25.1%]), palm oil (15.7% [previous year: 17.5%]), maize (12.9% [previous year: 12.7%]), and wheat (7.2% [previous year: 7%]).

- Biodiesel (FAME) accounted for the largest share of biofuel – about 72% or 86,663 TJ [previous year: 71%, 79,955 TJ].

- The most commonly used source materials for **biodiesel production** were waste and residues at 41,144 TJ (47.5% [previous year: 39.4%]), followed by rapeseed at 25,105 TJ (29% [previous year: 35.5%])

- The most commonly used source materials for **bioethanol production** were maize at 15,484 TJ (50.3% [previous year: 47.9%]) and wheat at 8,622 TJ (28% [previous year: 26.5%]).

- The use of palm oil in biofuels fell in 2018 compared to the previous year (-4.2%).

- The overall reduction in **greenhouse gas emissions** for all (pure) biofuels for transport was 83.8% as against fossil fuels. This means that about 9.5M tonnes of CO_2 equivalent was avoided by the use of biofuels instead of fossil fuels.

- 30,388 TJ of **bioliquids** were converted into electricity. For feeding this electricity into the grid, remuneration under the *EEG* was applied for. 84.6% [previous year: 87.2%] was thick liquor from the pulp industry, 11.3% [previous year: 10.1%] was vegetable oils.

- The overall reduction in **greenhouse gas emissions** for all (pure) bioliquids for energy production was 92.7 % as against fossil fuels. This means that about 2.6M tonnes of CO_2 equivalent [previous year: just under 2.7M] was avoided by the use of bioliquids instead of fossil fuels.

- 73,735 TJ of the biofuels and bioliquids whose sustainability information was registered with *Nabisy* were retired to the accounts of other states [previous year: approx. 48,631 TJ]. The corresponding Proofs of Sustainability showed significantly higher emissions compared to the documents submitted in Germany.

- As of 31 December 2018, a total of 14 voluntary schemes were recognised by the European Commission and were also recognised in Germany.

- The certification bodies recognised by the BLE (23 as at 31 December 2018) undertook 3,016 certifications worldwide during the reporting year (previous year: 3,250) under their relevant recognition. Of these, 2,919 (previous year: 3,116) were made according to the requirements of the voluntary schemes and 97 (previous year: 134) according to the requirements of the two DE schemes. These certifications are subject to the BLE’s monitoring.

1.4 Methodology

This Evaluation and Progress Report describes the existing processes and measures and analyses the data available to the BLE. Also included are circumstances relevant to implementation in Germany, 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 this analysis are presented, compared and explained from different perspectives.

What follows relates to the data communicated to the BLE in its capacity as the competent authority under Sect. 66 of the *Biokraft-NachV* and/or Sect. 74 of the *BioSt-NachV* by economic operators.

No conclusions can be drawn from what follows as to the actual number of participants of individual voluntary schemes and/or national schemes of other member states.

It is mandatory for data on the sustainability of biofuels and bioliquids to be entered into the sustainable biomass systems government database (*Nabisy*) by economic operators where such data may be relevant to the German market. Quantities entered as a precautionary measure but ultimately not put to use 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 entered are thus collected in an organised manner and documented systematically.

The information presented here is intended as a basis for optimisation processes by policy-makers and economic decision-makers.

Additionally, to the extent possible given the available data, our analysis is also intended to assess the effectiveness of the measures taken.

Where information on the number of *Nabisy* users or certifications is given, it should be noted that economic operators have been counted more than once in the case of a parallel use of different certification schemes and in the event that economic operators act as both producer and supplier. No conclusion can therefore be drawn as to the number of companies participating in the measures.

Impact is measured with reference to the following targets:

- Increasing the share of 'renewable energy sources' in Germany's energy supply in the transport sector and in electricity generation from liquid biomass;
- Reducing greenhouse gas emissions by using sustainable biomass; and
- Developing more efficient processes and source materials for producing energy from biomass.

Changes in these indicators over the relevant calendar year are analysed with reference to the *BioSt-NachV* and the *Biokraft-NachV*.

More specifically, the areas of

- 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 Renewable Energy Directive

are analysed (among others).

Appropriate methods were chosen for identifying, quantifying and evaluating data.

The Proofs of Sustainability considered are those for which an application was made for counting towards the biofuel quota obligation and certificates registered for remuneration under the *EEG*. Most of these are partial Proofs of Sustainability resulting from multiple combinations and/or splits along the trade chain through to the end user. These certificates were identified by means of the where-used notices issued by the main customs offices and/or grid operators.

Data are considered and evaluated with regard to the type of fuel, its quantity, energy content, origin, raw materials used in production and finally the resulting emissions. Where graphic representations did not seem appropriate, a tabular format was chosen.

The primary focus is the state of affairs as of 31 December 2018 along with a statistical comparison of how the implementation of the measure developed over time (per year) in relation to the initial values.

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

Differences in totals in this report are due to rounding.

2 Responsibilities of the BLE

The BLE is the competent authority in Germany for the implementation of the sustainability criteria of the Renewable Energy Directive within the scope of statutory sustainability ordinances.

In the area of sustainable bioenergy, the BLE's responsibilities include:

- In the **biofuels sector – making data available** to the biofuels quota office and the main customs offices as required for counting biofuels towards the Greenhouse Gas Reduction Quota;
- In the **bioenergy sector** – **making data available** to grid operators as required for *EEG* remuneration and the renewable raw materials bonus (*NawaRo* bonus) for the operators of installations;
- In the **emissions trading sector – making data available** to the Emissions Trading Authority;
- **Administering data** on the sustainability of biofuels and/or liquid biomass in the web-based **sustainable biomass system government database (*Nabisy*)** and issuing partial Proofs of Sustainability on application by economic operators;
- Periodic **evaluation of sustainability ordinances** and **preparing** an annual **progress report** for the federal government;
- Periodic preparation of **reports on particularly low emissions** of the Proofs of Sustainability for voluntary schemes, national schemes and for transmission to the European Commission;
- **Recognising and monitoring certification schemes and certification bodies** under the sustainability ordinances.

In addition, within the scope of its responsibilities pursuant to Sect. 74 of the *BioSt-NachV* and/or Sect. 66 of the *Biokraft-NachV*, the BLE is required to carry out the following periodic measures for implementing the sustainability ordinances:

- Conducting annual office audits of the certification bodies and risk-oriented random appraisals of the certification bodies' monitoring activities (witness audits);
- Maintaining and expanding the BLE's website by providing information and documents in German and English;
- Maintaining and developing a consistent system for the recognition of certification schemes and bodies and for monitoring compliance with statutory requirements;
- Maintaining and developing the *Nabisy* government database for documenting the type and origin of biofuels and the Proofs of Sustainability, documenting and verifying information on the sustainability of biofuel supplies, exchange of data with other member states' databases;
- Maintaining and developing of the information register pursuant to Sect. 66 of the *BioSt-NachV* and/or Sect. 60 of the *Biokraft-NachV*;
- Holding meetings of the Advisory Council on Sustainable Bioenergy;
- Holding events with certification schemes, certification bodies and businesses to share and exchange knowledge and information;
- Giving talks at information events for multipliers such as associations, certification schemes, certification bodies, representatives of the German states, and competent authorities of other member states;
- Attending various specialist events and trade fairs;
- Co-operation and co-ordination of implementation with the competent authorities of other member states in REFUREC (Renewable Fuels Regulators Club) and as an observer in relevant working groups of CA-RES (Concerted Action – Renewable Energy Sources Directive);
- Training BLE Control Service staff working as auditors in the area of sustainable biomass production;
- Training *Nabisy* web application users.

3 Certification systems, voluntary schemes and national schemes of other member states

The Renewable Energy Directive and its national implementation by means of the sustainability ordinances require compliance with their provisions regarding the sustainability of biomass and the biofuels and bioliquids by all economic operators along the entire value chain. The DE schemes as well as the voluntary schemes recognised by the European Commission or national schemes of other member states are tasked with ensuring and monitoring this.

Certification schemes have organisational responsibility for ensuring compliance with the requirements of the Renewable Energy Directive, and of national legislation implementing it, for the production and supply of biomass. Their system documents include provisions giving a more detailed definition of the requirements, on how compliance with them can be proven and how such proof is to be verified.

3.1 Certification schemes recognised by the BLE under Sect. 33(1) and (2) of the *BioSt-NachV* and/or the *Biokraft-NachV*

As of 31 December 2018, the following number of applications for the recognition of certification schemes was submitted to the BLE:

Table 1: Applications for DE certification schemes

Total applications received by 31/12/2018	**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**

The BLE has given approval to DE schemes for the following countries within the scope of their applications[7]:

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

[7] This does not mean that all these countries allow the BLE to conduct on-site monitoring by means of a witness audit.

3.2 Voluntary schemes under Sect. 32(3) of the *BioSt-NachV* and/or the *Biokraft-NachV*

Pursuant to sentence 1 of paragraph 2 of Article 18(4) of Directive 2009/28/EC, the European Commission may decide that voluntary national or international schemes setting standards for the production of biomass products contain accurate data for the purposes of Article 17(2). Such data may be used to demonstrate that consignments of biofuel comply with the sustainability criteria set out in Article 17(3) to (5) of the Directive. The recognition of such voluntary schemes shall be valid for no more than five years.

Pursuant to Sect. 41 of the *BioSt-NachV* and/or *Biokraft-NachV*, such voluntary schemes are deemed recognised in Germany for as long as and to the extent that they are recognised by the European Commission. As of 31 December 2018, the European Commission had recognised or re-recognised the following 14 voluntary schemes:

Table 2: Voluntary schemes (EU schemes) as of 31/12/2018

Voluntary schemes	Company headquarters	Recognised on	Re-recognised on
2BS Association	France	10/08/2011	28/08/2016
Bonsucro	United Kingdom	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
Roundtable on Sustainable Biomaterials (RSB)	Switzerland	10/08/2011	11/08/2016
REDcert GmbH	Germany	15/08/2012	12/08/2017
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	United Kingdom	06/08/2012	15/12/2017
Scottish Quality Farm Assured Combinable Crops Limited	United Kingdom	13/08/2012	30/06/2015
Gafta Trade Assurance Scheme	United Kingdom	24/06/2014	
Trade Assurance Scheme for Combinable Crops		08/10/2014	
Universal Feed Assurance Scheme		08/10/2014	
Better Biomass		17/12/2018	

Currently recognised voluntary certification schemes are listed on the European Commission website at the following link:

https://ec.europa.eu/energy/en/topics/renewable-energy/biofuels/voluntary-schemes

3.3 National schemes of other member states

National schemes of other member states also have organisational responsibility for ensuring compliance with the requirements of the Renewable Energy Directive's sustainability criteria for the production and supply of biomass. They make provision for the requirements on how compliance with the criteria can be proven and how such proof is to be verified.

In 2018, data of the national schemes of Hungary, Slovenia, Slovakia, and Austria were available in *Nabisy*. Companies based within the territory of Austria are required to register sustainability data in the Austrian *elNa* database.

3.4 Economic operators

In the area of sustainable bioenergy, all economic operators along the entire value chain operate according to the specification of a certification scheme, a voluntary scheme or a national scheme of another member state, with the exception of users (installation operators and parties obliged to provide evidence). They must comply with other national provisions in order to receive a remuneration under the *EEG* and/or to have their product count towards the biofuel quota.

Specifically, the following types of economic operators must be considered:

Growers

Growers are agricultural holdings and establishments that grow and harvest biomass.

Primary distributors

Primary distributors are businesses and establishments (plants) which are the initial recipients of the biomass required for producing biofuels from those growing and harvesting the biomass, for the purpose of trading it further (e.g. agricultural trade).

Originators

Businesses or private homes where waste and residues are generated.

Waste collectors

Waste collectors are businesses and establishments which are the initial recipients of the biomass required for producing biofuels in the shape of biogenic waste and residues from businesses or private homes where waste and residues are generated, for the purpose of trading if further.

Conversion operations

Two groups must be distinguished here:

a) Businesses and establishments which process biomass from sustainable cultivation or biogenic waste or residues and supply the semi-finished products to a further stage of processing for the purpose of biofuel or bioliquid production (e.g. oil mills, biogas plants, fat preparation plants, or other plants whose processing stage is of insufficient quality for the final use of the product).
b) Businesses and establishments which process liquid or gaseous biomass up to the level of quality required for final use (e.g. oil mills, esterification plants,

ethanol plants, hydrogenation plants, or biogas treatment plants).

Businesses along the production and supply chain which require certification from the certification schemes are known as interfaces. In this context, primary distributors and waste collectors are referred to as the primary interface; conversion operations processing biomass up to the level of quality required for final use are the final interface.

Suppliers and/or traders within the value chain

Suppliers are economic operators between the primary distributor and the conversion operation or between the final interfaces and the distributor of biofuels and/or the plant operator that feeds electricity generated from bioliquids into the grid. Where suppliers downstream of the final interface are not subject to customs monitoring, they must participate in a DE certification scheme or an EU-recognised voluntary scheme.

Plant operators

Plant operators are economic operators that, irrespective of ownership, use plants for generating electricity from renewable energy sources and feed the electricity into the grid. The plant operators receive *EEG* remuneration from the grid operator upon submission of the relevant sustainability certificate.

Parties obliged to provide evidence

Parties obliged to provide evidence are economic operators required under the *Bundes-Immissionsschutzgesetz* [Federal Emissions Control Act] (Sect. 37a) to achieve a given minimum reduction in greenhouse gas emissions of the total amount of taxable fuel in the course of a calendar year. To that end, they may put sustainable biofuels on the market.

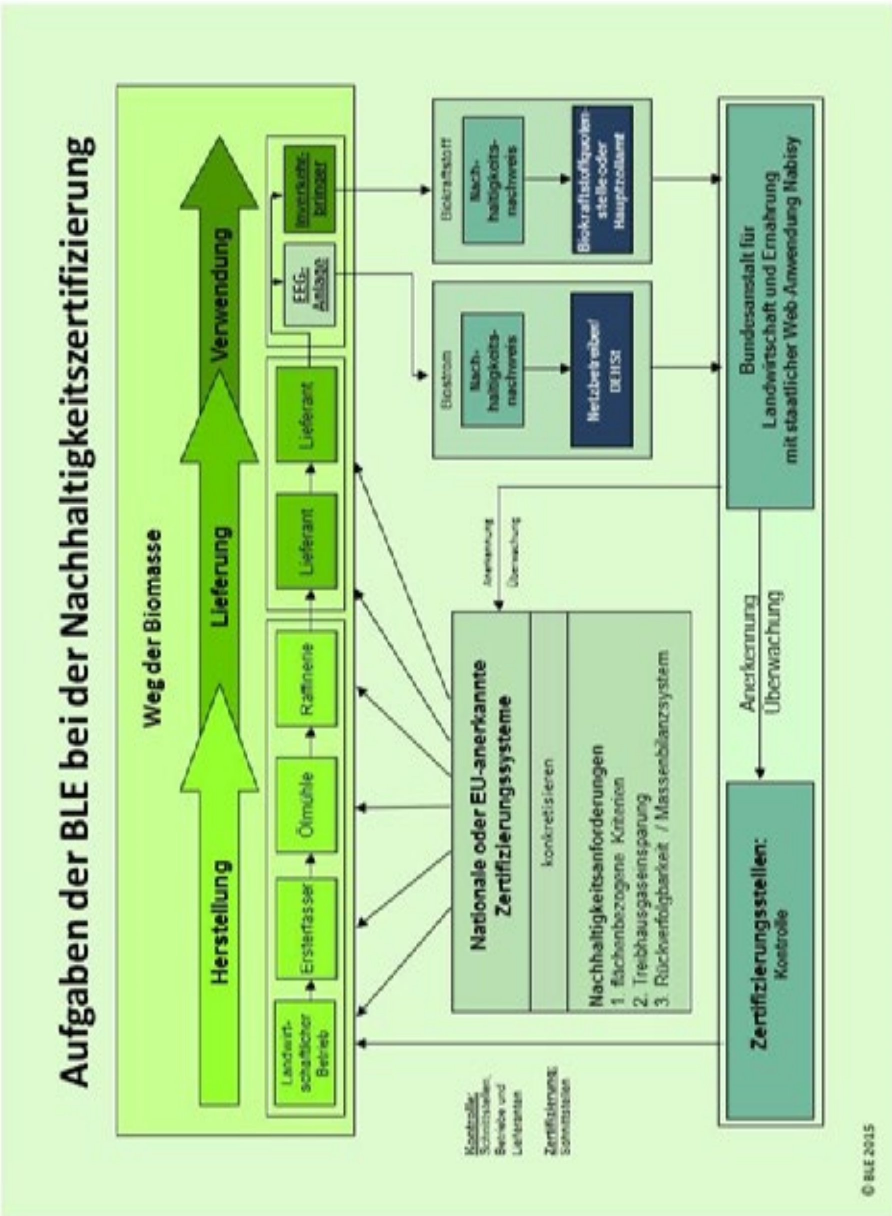
Aufgaben der BLE bei der Nachhaltigkeitszertifizierung
Weg der Biomasse
Herstellung
Lieferung
Verwendung
Landwirt-schaftlicher Betrieb
Ersterfasser
Ölmühle
Raffinerie
Lieferant
Lieferant
EEG-Anlage
Inverkehr-bringer
Biostrom
Nach-haltigkeits-nachweis
Netzbetreiber/ DEHSt
Biokraftstoff
Nach-haltigkeits-nachweis
Biokraftstoffquoten-stelle oder Hauptzollamt
Nationale oder EU-anerkannte Zertifizierungssysteme
konkretisieren
Nachhaltigkeitsanforderungen
1. flächenbezogene Kriterien
2. Treibhausgaseinsparung
3. Rückverfolgbarkeit / Massenbilanzsystem
Bundesanstalt für Landwirtschaft und Ernährung mit staatlicher Web Anwendung Nabisy
Anerkennung
Überwachung
Zertifizierungsstellen: Kontrolle
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Figure 1

3.4.1 Scheme participants reported to BLE

Alongside certification schemes recognised by the BLE, voluntary national or international schemes which set requirements for the production of biomass products are also deemed recognised by Germany under the sustainability ordinances without formalities as long as and to the extent that they are recognised by the European Commission. The same applies to national schemes of other member states.

Registration is mandatory for participants of BLE-recognised certification schemes (DE schemes). Participants in voluntary and national schemes have been taken into account only if the BLE has been notified of them because the biofuels or bioliquids produced or traded by them are or may become relevant to the German market and they require *Nabisy* access. The majority of participants now take part in an EU-recognised voluntary scheme.

As of 31 December 2018, **4,884 participants** (previous year: 3,994) along the value chain had been registered with the BLE as producers or traders of biofuels or bioliquids. The significant increase in the number of participants is a result of precautionary notifications by the schemes. The BLE is now also notified of participants not wishing to trade via *Nabisy* for the time being.

The totals represent the total number of participants of which the BLE has been notified. Where a company fills several roles at the same time, e.g. as a producer of biofuel and as a supplier downstream of the final interface, or participates in more than one certification scheme, it will be counted more than once.

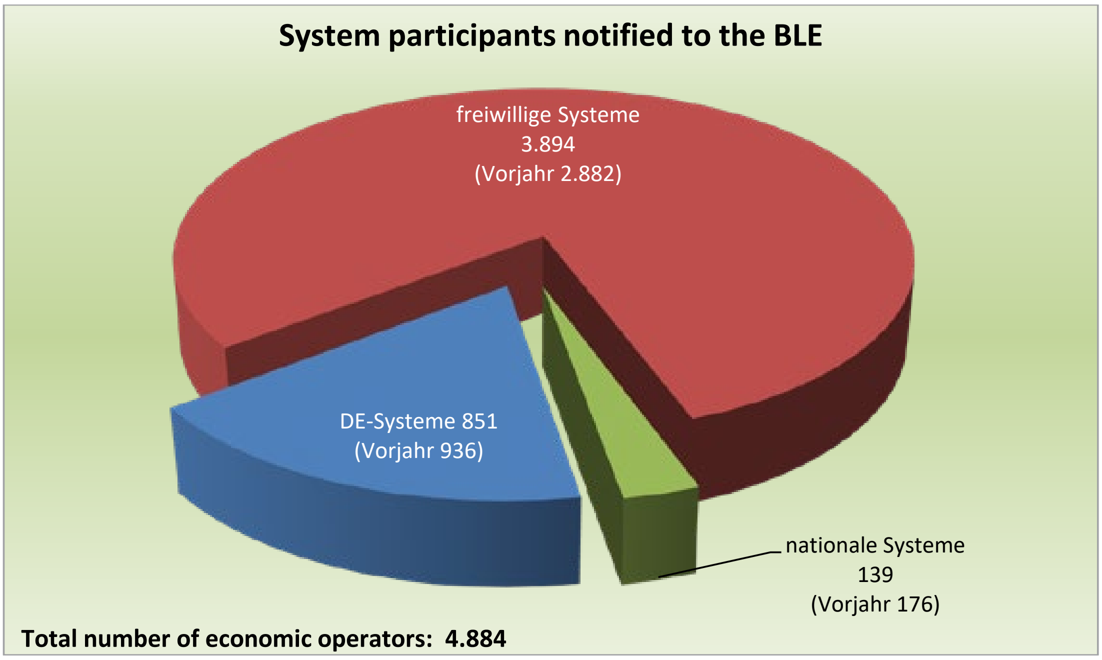


Figure 2

3.4.2 Suppliers subject to supervision by German customs offices

Where suppliers downstream of the final interface are subject to customs supervision under point (2) of Sect. 17(3) of the *Biokraft-NachV*, they need not necessarily be participants in a DE scheme or of a voluntary scheme recognised by the European Commission. To benefit from this exemption, a supplier's mass balance system must be subject to periodic audits by the main customs offices for reasons of tax supervision under the *Energiesteuergesetz* [Energy Tax Act] or the supervision of biofuel quota obligations under the *Bundes-Immissionsschutzgesetz*, and the suppliers must document the receipt and transfer of the biofuels, stating place and date and the information included in the sustainability certificate, in the *Nabisy* electronic database.

During the application process for *Nabisy* access, the BLE obtains confirmation from the main customs office responsible for the supplier's place of business that the applicant is indeed subject to customs supervision. As soon as this confirmation has been provided, the economic operator is granted access to the database.

As of 31 December 2018, 177 suppliers subject to customs supervisions (previous year: 227) were registered in *Nabisy*.

3.4.3 Participants in national schemes of other member states

Some of the participants registered in *Nabisy* participate in national schemes of other member states. By 31 December 2018, the BLE had been notified of a total of 139 (previous year: 176) participants in the national schemes of **Austria**, **Hungary**, **Slovenia**, and **Slovakia**. The relatively small number of notifications does not mean that biofuels and/or bioliquids or their source materials from other member states are of limited relevance to the German market (cf. Section 6.1, Figure 12). Rather, it may be due to the fact that some member states transposed Directive 2009/28/EC at a later date. For this reason, interested economic participants from other member states had already joined the DE schemes or the voluntary schemes recognised by the European Commission.

4 Certification bodies

Certification bodies are independent natural or legal persons that issue certificates to economic participants along the value chain and monitor compliance with the requirements of the Renewable Energy Directive and of the national legislation transposing it, as well as other requirements of the scheme used in all businesses along the value chain. Certificates certify that the specific requirements of the Renewable Energy Directive for the production of sustainable biofuels and/or bioliquids are met. In Germany, the BLE is the competent authority for recognising and monitoring certification bodies in the area of sustainable biomass production. This applies irrespective of whether the certification bodies act under DE schemes or under voluntary schemes, since the BLE's monitoring duties relate to all certification bodies having their registered office in Germany.

The following number of applications for recognition as a certification body according to Sect. 42(1) and (2) and Sect. 43 in connection with Sect. 56 of the *Biokraft-NachV* and/or *BioSt-NachV* had been received by the BLE by 31 December 2018:

Table 3: Applications for recognition as a certification body

Total applications (as of 31/12/2018)	**51**
Of which rejected	6
Of which permanently recognised	**45**
Of which recognition withdrawn or expired because of inactivity of the certification bodies	22
Number of certification bodies permanently recognised as of 31/12/2018	**23**

During the application process, certification bodies initially receive provisional recognition, which allows them to commence certification activities. Only once the offices of the certification body have undergone a successful office audit by the BLE's control services can this provisional recognition be replaced by a permanent one.

An up-to-date list of recognised certification bodies can be found at: http://www.ble.de/Biomasse.

BLE auditors conduct so-called witness audits accompanying the certification audits of the certification bodies all over the world in countries that have given permission for the BLE to conduct witness audits in their territory. These audits concern the requirements of both the DE schemes and the voluntary schemes. In 2018, the BLE accompanied 123 (previous year: 157) certification audits conducted by the certification bodies. 53 of these audits were carried out in Germany, the remaining 70 audits took place around the world in states within and outside the European Union.

Table 4: Permanently recognised certification bodies

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
Control Union Certifications Germany GmbH	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[8]	14/03/2011
TÜV Nord Cert GmbH, Germany	23/09/2011
proTerra GmbH, Germany	27/09/2011
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

[8] Recognition now expired

4.1 Worldwide certifications under DE scheme requirements

In Germany, the transposition of Directive 2009/28/EC into national law provides for compulsory certification of so-called **interfaces**, certain economic operators along the value chain of the production of biofuels and bioliquids. These include the primary distributors/waste collectors as well as all conversion operations. In addition, compliance assessments are made along the production and supply chain.

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

97 certificates according to the requirements of the DE schemes were issued in the reporting year (previous year: 134).

It can be assumed that the scheme participants certified here are mainly companies operating exclusively on the German market and therefore not necessarily requiring certification according to the requirements of a voluntary scheme. However, some overseas businesses were awarded a certificate under DE scheme requirements.

4.2 Certifications under voluntary scheme requirements

The BLE is responsible for recognising and monitoring certification bodies having their main office or a branch office in Germany and make decisions on certification there.

This is irrespective of the type of scheme used (DE or voluntary) with whose requirements the company to be certified is committed to complying. All certificates are transmitted to the BLE by the certification bodies. In the reporting year, **2,919** (previous year: 3,116) new and repeat certifications were reported for businesses certified under voluntary scheme requirements.

5 *Nabisy* government database and Proofs of Sustainability

5.1 Sustainable biomass system (*Nabisy*)

Per Commission Decision 2011/13/EU of 12 January 2011, economic operators are required to submit to member states certain types of information on the sustainability of each consignment of biofuel or bioliquid where this may become relevant to the market concerned.

In Germany, this is done electronically. For each consignment of biofuels or bioliquids, this information must be entered into the web-based ***Nabisy*** government database by economic operators. Proofs of Sustainability (PoS) and/or Partial Proofs of Sustainability (PPoS) contain the data on compliance with sustainability criteria entered into *Nabisy* and must be handed on along the supply chain.

In the reporting year, 2,317 (previous year: 2,416) accounts were active. This only concerns accounts of businesses from the final interface onwards, as that is where the *Nabisy* system sets in.

By virtue of the *Gesetz zur Einführung von Ausschreibungen für Strom aus erneuerbaren Energien und zu weiteren Änderungen des Rechts der erneuerbaren Energien* [Act introducing tenders for electricity from renewable sources and further amending the law on renewable energy] of 13 October 2016 (Federal Law Gazette I, p. 2258), the *Biomassestrom-Nachhaltigkeitsverordnung* [Biomass Electricity Sustainability Ordinance] has applied to all bioliquids with effect from 1 January 2017. With effect from 1 January 2017, plant operators requiring use of **start-up, ignition, or auxiliary firing** for the operation of their plant and using liquid biomass for this purpose have needed a PoS/PPoS. Since October 2016, the BLE has, on application, set up accounts and access for over a thousand biogas plants affected.

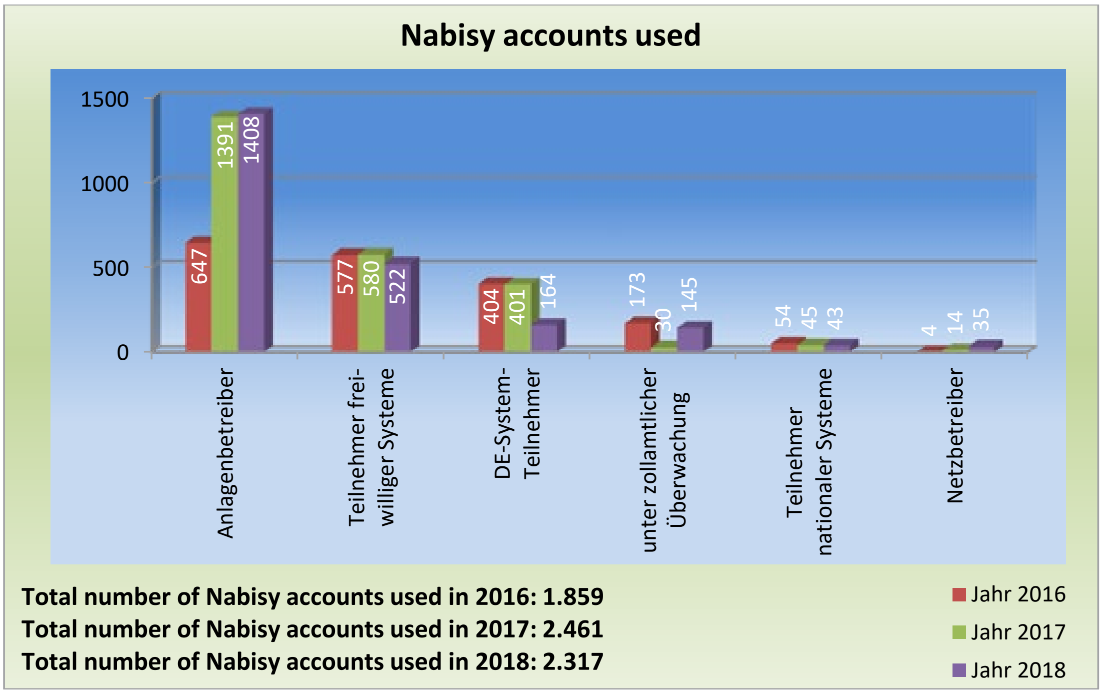


Figure 3

Depending on their function, economic operators having a *Nabisy* account are able to create PoS (final interfaces), transfer, split or combine PoS or PPoS (suppliers, plant operators) and issue where-used notices (grid operators). Economic operators have the option of applying to the BLE for a needs-based number of logins to their account.

The largest increase in *Nabisy* access granted was in the area of plant operators. Access was granted mostly for biogas plants.

The number of users with access as of 31 December 2018 is shown in the figure below.

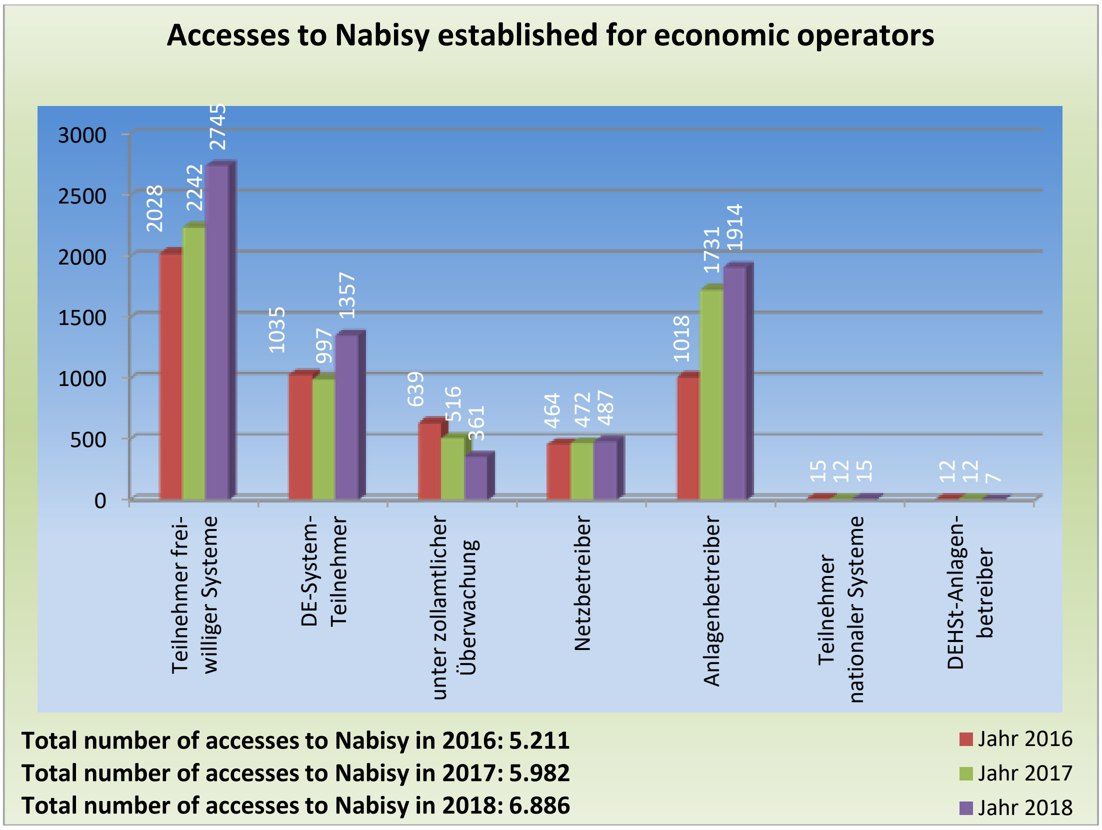


Figure 4

5.2 Proofs of Sustainability

A **Proof of Sustainability (PoS)** can only be issued by the manufacturer of a consignment of biofuel or bioliquid. The manufacturer is a so-called **‘last interface’**. By issuing the PoS in *Nabisy*, the manufacturer confirms that the consignment can be used on the German market. If a decision is made at a later stage in the value chain, e.g. by a supplier, that the product is to be used outside Germany, the relevant PoS must be retired by the party concerned to the retirement account of the state where the product is to be used.

Presentation of a PoS or a PPoS to the customs authorities is a requirement for biofuels being counted towards to the distributor's greenhouse gas reduction obligation. Plant operators can only claim remuneration under the *EEG* and, where applicable, the *NawaRo* bonus for electricity produced from biomass and fed into the grid if they provide a PoS or PPoS.

PoS are issued by those certified economic operators that process liquid or gaseous biomass up to the level of quality required for its use as a biofuel or those which manufacture bioliquids from the biomass used (**issuers**). In the sustainability ordinances, these economic operators are referred to as the last interface. This terminology is not used by the voluntary schemes. For this reason, this report makes general reference to the economic operator issuing the PoS.

A PoS identifies a certain quantity of biofuel or bioliquid as sustainable. Where biofuels and/or bioliquids are traded in the supply chain as far as the party obliged to provide evidence and/or plant operator, the quantities concerned are split or combined as needed.

To reflect this, it is necessary to split a PoS accordingly or to combine it with other PoS. In that process, as well as by transferring a PoS/PPoS to a customer's supplier account, **PPoS** are created.

Thus, *Nabisy* processes both PoS ('basic proofs'; these can only be issued by manufacturers) and PPoS ('subsequent proofs'; these are generated by any action on the part of a supplier: transferring, splitting, combining).

In 2018, **16,619** PoS (previous year: 17,220) were uploaded in Nabisy by 245 manufacturers worldwide. Twenty of these manufacturers were so-called new installations (initial commissioning after 5 October 2015) required to achieve emission savings of no less than 60% (instead of 50%). The 245 manufacturers mentioned have one or several production facilities. These are: 128 esterification plants (FAME), 100 oil mills (refined oils), 39 bioethanol plants (bioethanol), 19 biogas treatment plants (biomethane), 6 pulp mills (thick liquor), and 3 hydrogenation plants (hydrotreated oils).

Table 5: Proofs of Sustainability issued

Producers' location	Number of producers	Number of sustainability certificates issued
Germany	112	8,594
European Union	88	7,084
Third countries	45	941
Total	**245**	**16,619**

Samples of a PoS (basic proof) and of a PPoS (subsequent proof) are shown in the figures below (as of early 2019).

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*: PL

Menge: 111,221 m³ — Energiegehalt (MJ): 3.670.293

Die flüssige Biomasse / der Biokraftstoff ist aus Abfall oder aus Reststoffen hergestellt worden und die Reststoffe oder Abfälle
- 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-Minderung nach § 8 BioSt-NachV / Biokraft-NachV:

$E = e_{ec} + e_l^{**} + e_p + e_{td} + e_u - e_{sca} - e_{ccs} - e_{ccr} - e_{ee}$ (g CO2eq/MJ)

$E = 19{,}9 + \quad + 11{,}2 + 1{,}0 + 0{,}0 - \quad - \quad - \quad - \quad = 32{,}1$

** e_l beinhaltet den Bonus für die Umwandlung stark verschmutzter oder degradierter Flächen ☐ ja ☐ nein

THG-Minderung bei Verwendung

61,7% als Kraftstoff [83,8 (g CO2eq/MJ)] — 58,3% zur Wärmeerzeugung [77 (g CO2eq/MJ)]

64,7% zur Stromerzeugung [91 (g CO2eq/MJ)] — 62,2% Kraft-Wärme-Kopplung [85 (g CO2eq/MJ)]

Erfüllung der Minderung bei einem Einsatz in folgender Region (z. B. Deutschland, EU): Deutschland

Die Erstinbetriebnahme der Anlage zur Herstellung des Biokraft - oder Biobrennstoffs erfolgte nach dem 5. Oktober 2015 ☐ ja ☒ nein

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

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

Der Nachhaltigkeitsnachweis wurde elektronisch erstellt und ist ohne Unterschrift gültig.

Ort und Datum der Ausstellung: Pritzwalk OT Falkenhagen, 11.04.2019

*** Hinweis:**

Dieser Nachweis wurde in der Web-Anwendung „Nabisy" erstellt. Er ist mit einer eindeutigen ID-Nummer versehen. Die Daten zur Nachhaltigkeit des Biokraft- oder Biobrennstoffs sind in der Nabisy-Datenbank gespeichert. Die Echtheit des Nachweises kann durch zuständigen Stellen in EU-Mitgliedsstaaten und Efta-Staaten überprüft werden.

Vordruck der Bundesanstalt für Landwirtschaft und Ernährung

Figure 5

Bundesanstalt für
Landwirtschaft und Ernährung

Zusatzinformation zu **EU-BM-14-213-10000002-NNw-00000708**

Allgemeine Daten

Ausstellungsdatum	11.04.2019
Lieferdatum	31.03.2019
Empfänger	Lieferant/trader EU 3 Musterweg 3 10003 Musterstadt

Menge

Menge	111,221 m³
Energiegehalt	3.670.293 MJ

Art der Biomasse

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

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

Nicht zugeordnete Anbauländer

Zusatzinformationen zur THG Emission

Treibhausgas-Emissionen	32,1 g CO2eq/MJ	inkl. mittl. Schätzwert ILUC	87,1 g CO2eq/MJ

Figure 6

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-00000708

03/19-Musterstadt

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% FAME — Anbauland / Entstehungsland*: PL

Menge: 61,205 m³ — Energiegehalt (MJ): 2.019.765

Die flüssige Biomasse / der Biokraftstoff ist aus Abfall oder aus Reststoffen hergestellt worden und die Reststoffe oder Abfälle
- 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-Minderung nach § 8 BioSt-NachV / Biokraft-NachV:

E =	e_{ec}	+	e_l**	+	e_p	+	e_{td}	+	e_u	-	e_{sca}	-	e_{ccs}	-	e_{ccr}	-	e_{ee}	(g CO2eq/MJ)
E =	19,9	+		+	11,2	+	1,0	+	0,0	-		-		-		-	=	32,1

** e_l beinhaltet den Bonus für die Umwandlung stark verschmutzter oder degradierter Flächen ☐ ja ☐ nein

THG-Minderung bei Verwendung

61,7% als Kraftstoff [83,8 (g CO2eq/MJ)] — 58,3% zur Wärmeerzeugung [77 (g CO2eq/MJ)]

64,7% zur Stromerzeugung [91 (g CO2eq/MJ)] — 62,2% Kraft-Wärme-Kopplung [85 (g CO2eq/MJ)]

Erfüllung der Minderung bei einem Einsatz in folgender Region (z. B. Deutschland, EU): Deutschland

Die Erstinbetriebnahme der Anlage zur Herstellung des Biokraft - oder Biobrennstoffs erfolgte nach dem 5. Oktober 2015 ☐ ja ☒ nein

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.

Letzter Lieferant (Name, Adresse): Lieferant/trader EU 3, Musterstadt

Der Nachhaltigkeits-Teilnachweis wurde elektronisch erstellt und ist ohne Unterschrift gültig. **Ort und Datum der Ausstellung:** Bonn, 23.04.2019

* **Hinweis:**

Dieser Nachweis wurde in der Web-Anwendung „Nabisy" erstellt. Er ist mit einer eindeutigen ID-Nummer versehen. Die Daten zur Nachhaltigkeit des Biokraft- oder Biobrennstoffs sind in der Nabisy-Datenbank gespeichert. Die Echtheit des Nachweises kann durch zuständigen Stellen in EU-Mitgliedsstaaten und Efta-Staaten überprüft werden.

Vordruck der Bundesanstalt für Landwirtschaft und Ernährung

Figure 7

Bundesanstalt für
Landwirtschaft und Ernährung

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

Allgemeine Daten

Ausstellungsdatum	23.04.2019
Lieferdatum	31.03.2019
Empfänger	Lieferant/trader EU 7 Musterweg 7 10007 Musterstadt

Menge

Menge	61,205 m³
Energiegehalt	2.019.765 MJ

Art der Biomasse

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

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

Nicht zugeordnete Anbauländer

Zusatzinformationen zur THG Emission

Treibhausgas-Emissionen	32,1 g CO2eq/MJ	inkl. mittl. Schätzwert ILUC	87,1 g CO2eq/MJ

Figure 8

6 Biofuels

The following illustrations show what quantities of energy (in TJ) of biofuels put on the market in Germany were the subject of applications for counting towards the 2018 Greenhouse Gas Reduction Quota.

The data are based on those PoS/PPoS in Nabisy bearing where-used notices by the Federal Revenue Administration.

Please note that the information given concerns only the quantities applied for and their energy contents. No conclusions can be drawn on the basis of the available data as to whether all quantities and energy contents presented here were in fact counted towards the quota obligation.

While there had been a nearly constant total quantity of biofuels used in 2015 (113,884 TJ), 2016 and 2017, a significant increase was recorded in 2018. The proportion of waste and residues used is now more than a third of the total.

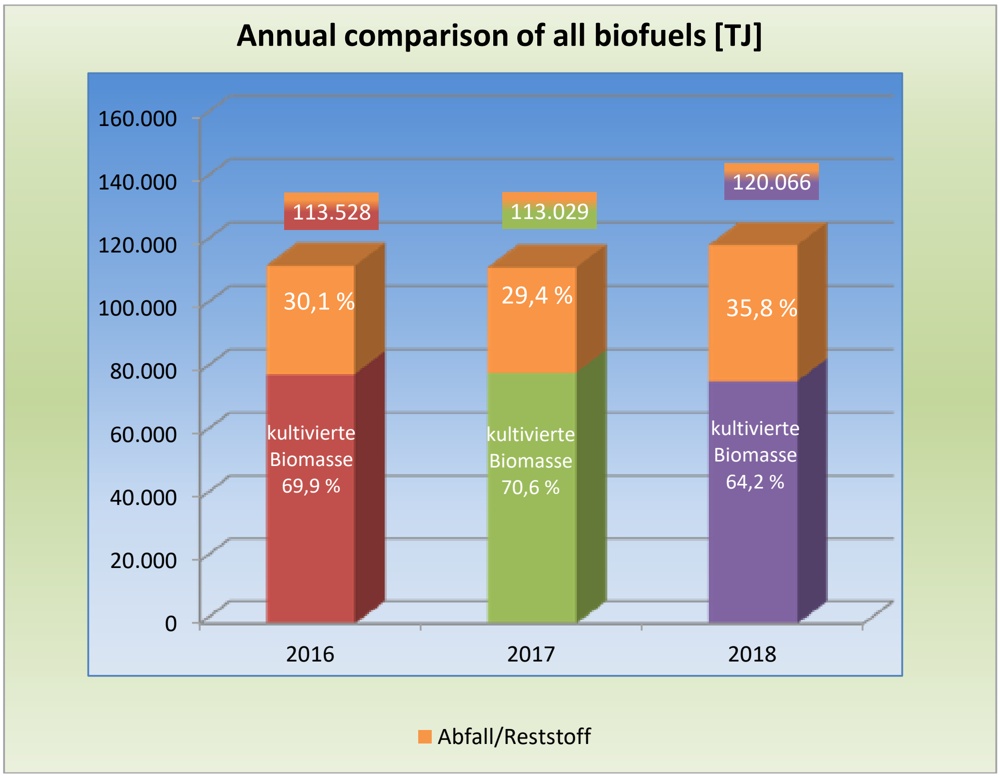


Figure 9

6.1 Origin of the source materials

The trend observed in previous years continued in the reporting year 2018. Source materials for biofuel production originating from Europe[9] are decreasing. Meanwhile, the proportion of materials from Asia increased by 23%. This increase is mostly a result of the higher proportion of waste and residues.

Notwithstanding this, the quantity originating from Europe constitutes the largest share of the total, at 67%. The Asian share was 25%.

The quantities from the five remaining continents accounted for a share of only 8% between them.

A noticeable change in the reporting year was in the source materials originating from Australia (+744%). 97% of these were rapeseed.

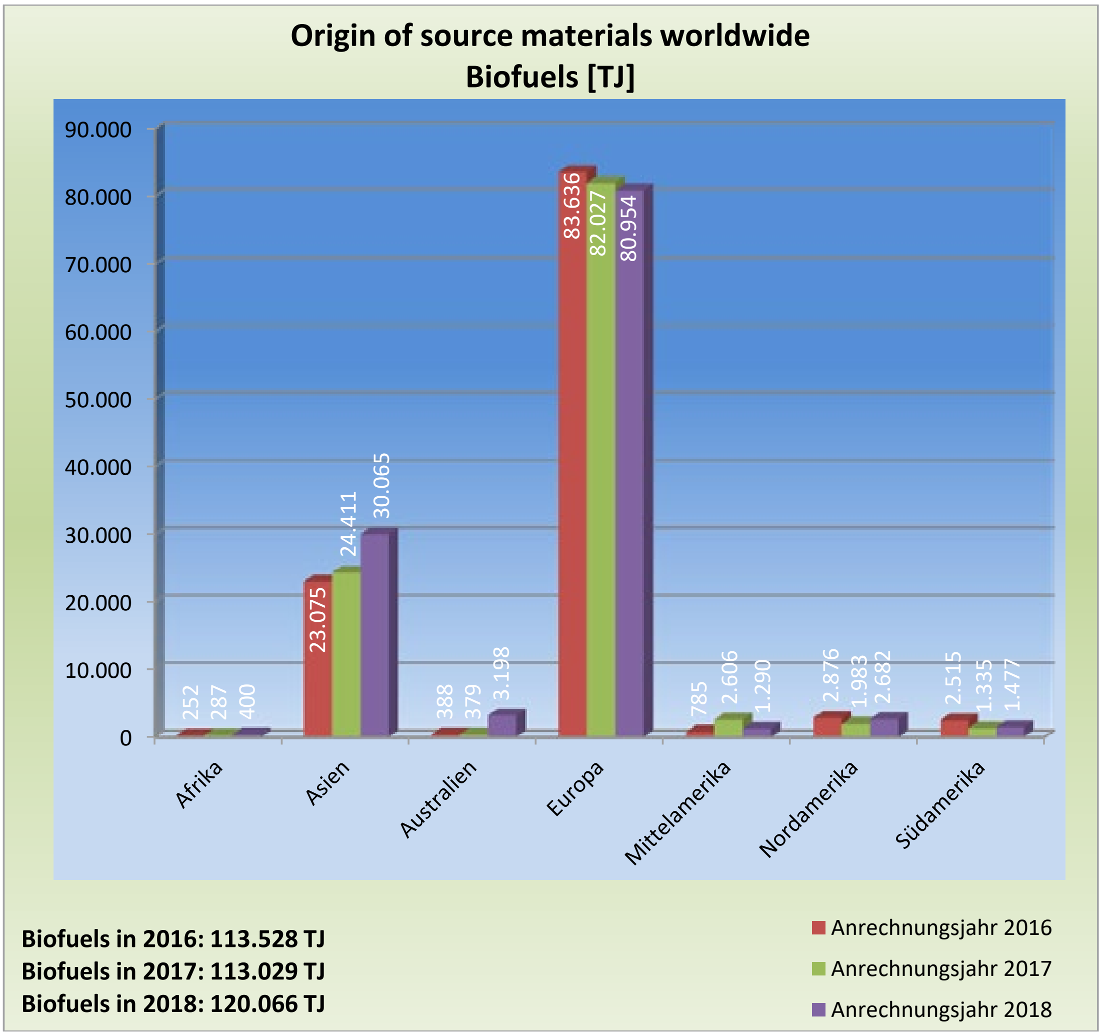


Figure 10

[9] In what follows, this refers to the continent.

The proportion of source materials originating from Germany decreased once again, but not as significantly as in the previous year (-6%; previous year: -21%).

In contrast to this, the quantity from third countries in Europe increased again (+22%). The vast majority of this quantity originated from Ukraine (97%).

A slight decrease was recorded in the quantities of source materials from other member states of the European Union.

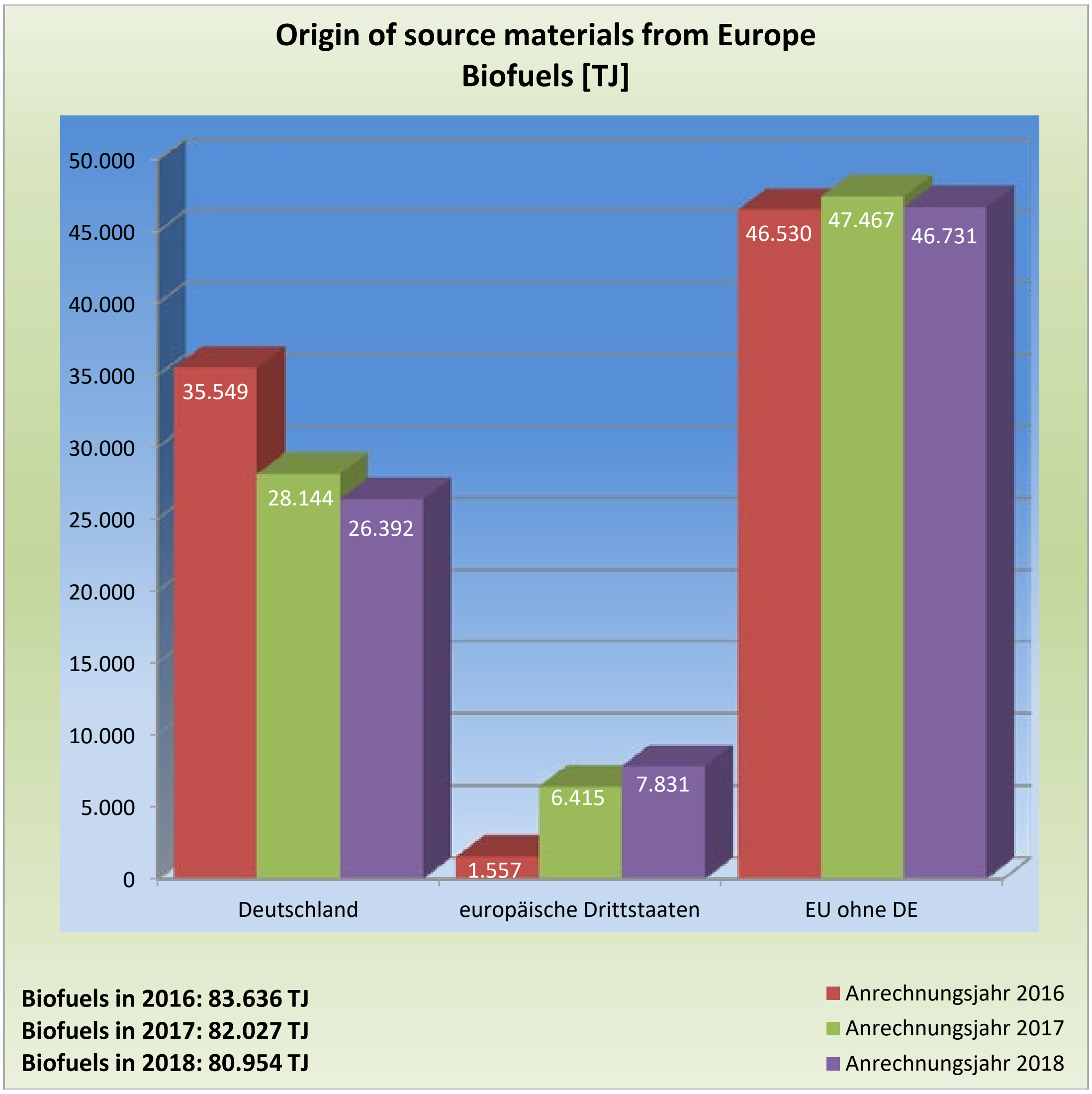


Figure 11

In the reporting year, there was again a decrease in source materials from the European Union in biofuel production (-3%). Around 36% of these biofuels were produced from source materials cultivated or generated in Germany.

9.6% of biofuel originated from Hungary, 8.8% from Poland, 7.4% from Romania, and 6% from the Netherlands.

The quantities from the fourteen countries each providing less than 1,000 TJ between them amounted to 4.2% of the total.

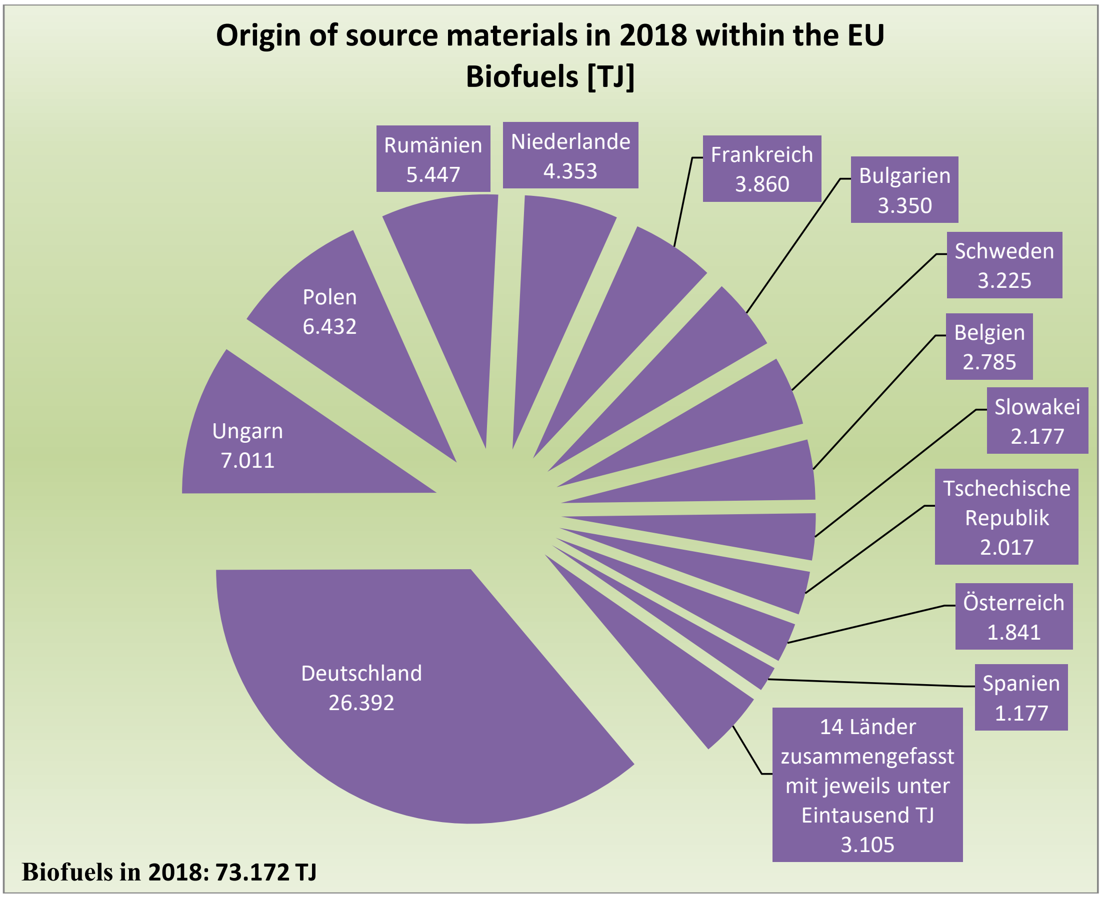


Figure 12

The shares of the fourteen aggregated countries were as follows:

Greece	704	Denmark	564	United Kingdom	441	Croatia	413
Italy	305	Lithuania	184	Finland	173	Latvia	134
Ireland	106	Cyprus	48	Slovenia	24	Luxembourg	6
Malta	3	Estonia	2				

The proportion of biofuels from source materials originating from third countries in Europe once again increased as against the previous year (+22%). This was a result of the increased quantity from Ukraine. Just under 95% of this proportion was bio-ethanol from maize.

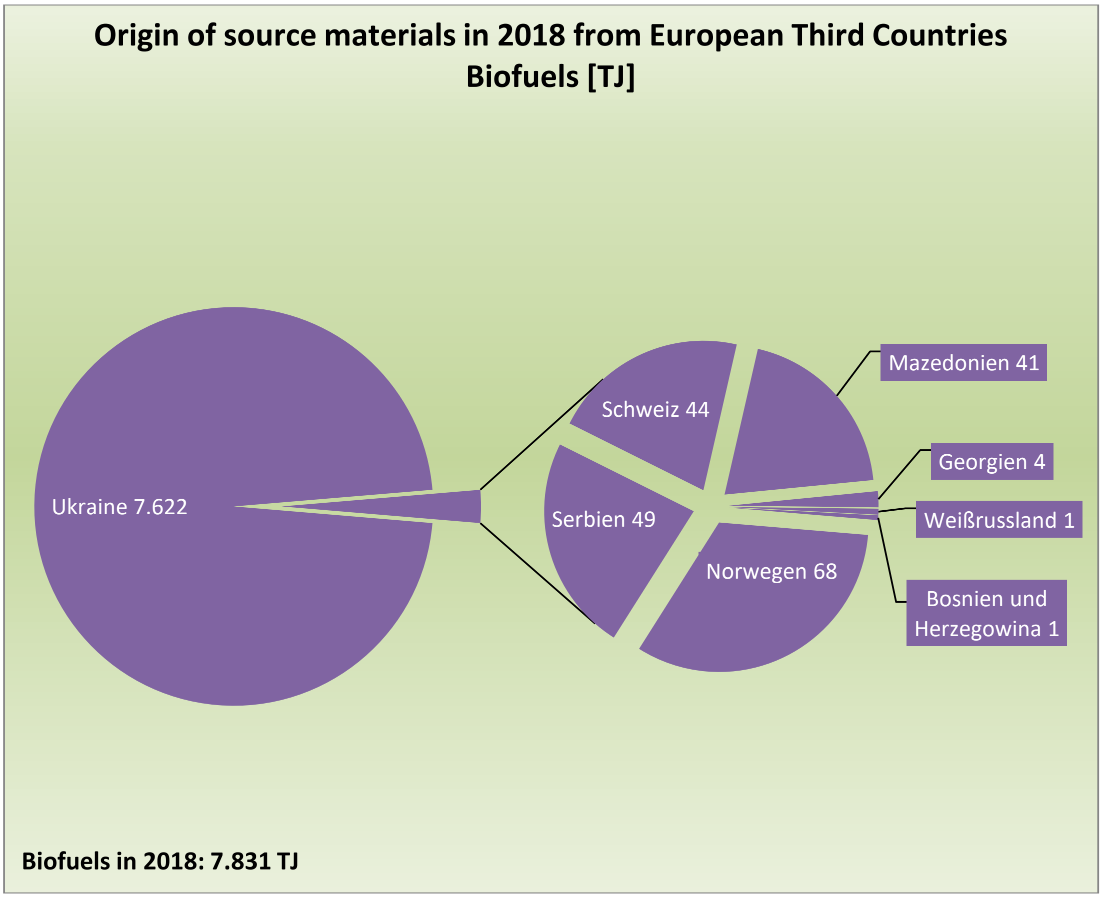


Figure 13

6.2 Source materials by origin and type

Biofuels from source materials originating from **Africa** were produced mostly from waste and residues. The upward trend here continued with an increase in quantity of 39.4%.

The most significant countries of origin were South Africa (66%), Egypt (18%), and Tunisia (11.8%).

The entire quantity of biofuel produced from maize originated from the west African Republic of Sierra Leone.

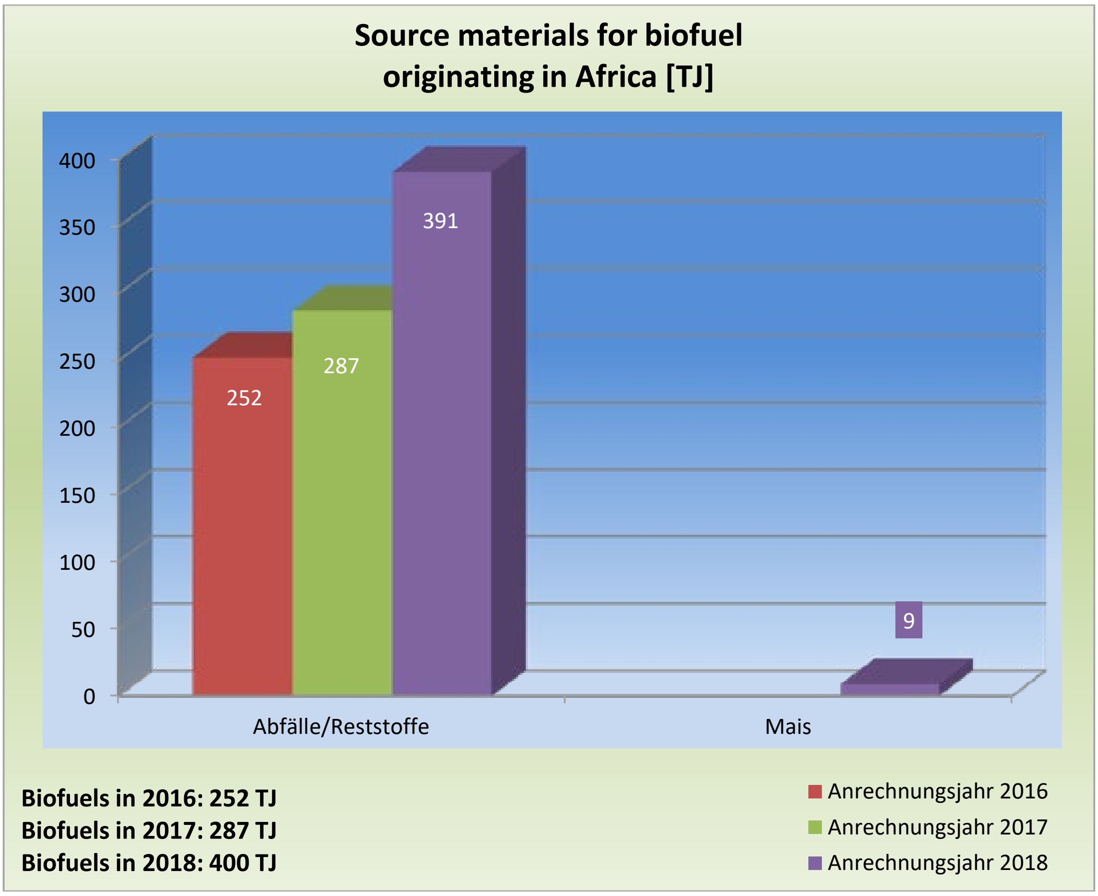


Figure 14

In the reporting year, the quantity of biofuels from source materials originating from **Asia** increased by 23%. This was mainly due to the increase in waste and residues (+75%).

96.2% of palm oil originated from Indonesia; the remaining 3.8% from Malaysia.

Waste and residues originated from a total of 25 Asian countries; mainly from China (23.9%), Indonesia (5.5%) and Malaysia (4.2%).

99.4% of this waste and residue was used cooking oils (UCO).

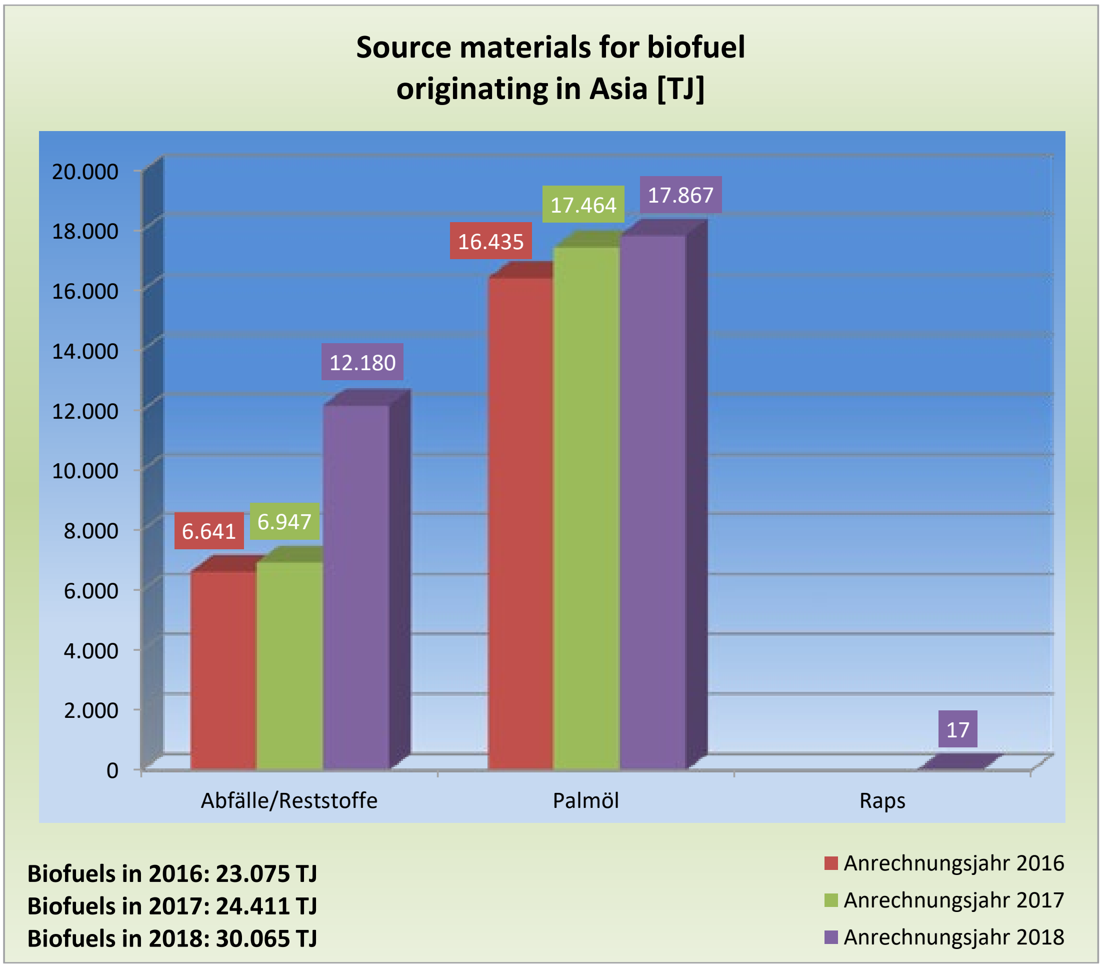


Figure 15

Biofuel from source materials originating from **Australia** were produced from rape-seed, waste and residue and soya.

A striking increase was recorded in the proportion of biofuels produced from rape-seed. This quantity increased nearly tenfold.

The quantity of biofuel produced from waste and residues nearly doubled, but was at a much lower base level.

Apart from 28.5% of waste and residues originating from New Zealand, all other quantities were cultivated or generated in the Commonwealth of Australia.

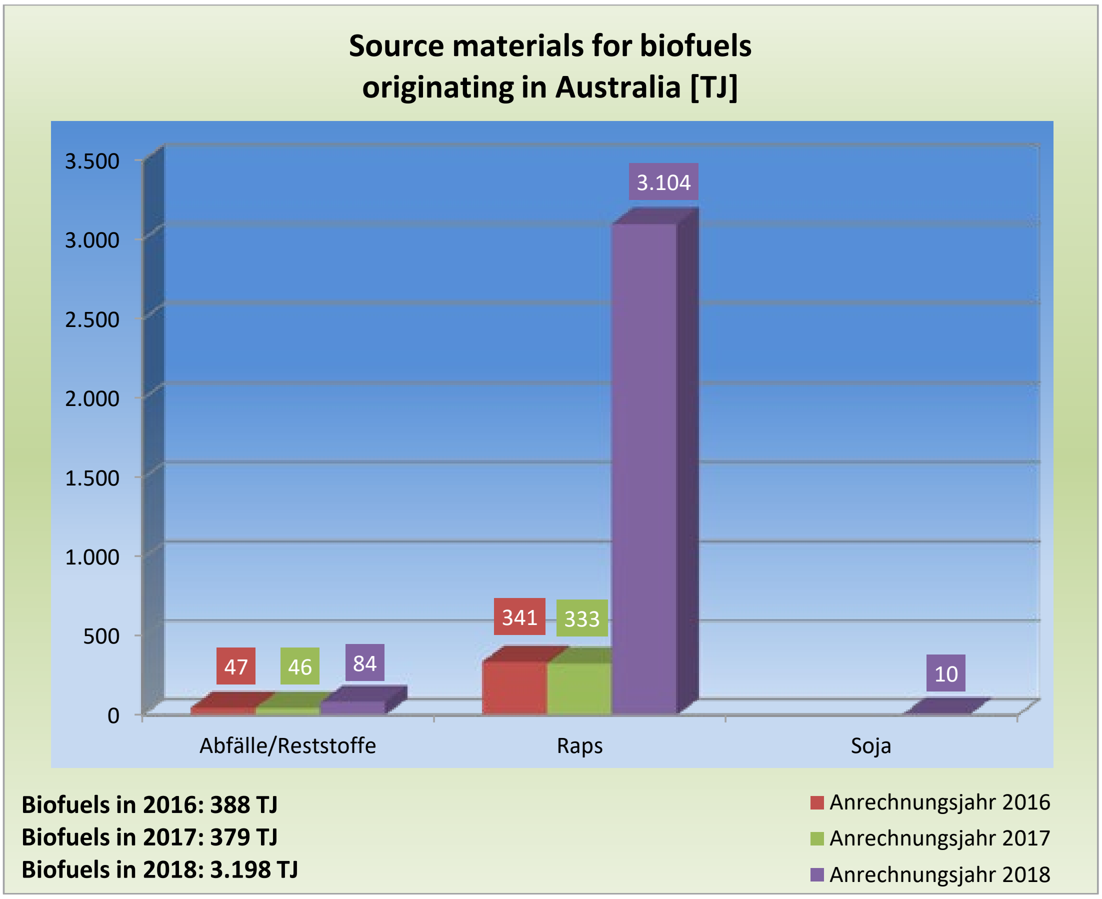


Figure 16

The most important source materials originating from **Europe** during the reporting year were waste and residues. Their proportion overtook that of rapeseed, which had previously been the most important source material in every quota year.

Waste and residues account for 33.5% of European source materials. The proportion of rapeseed in the European total is 27.2%.

The third most important source material was maize (19.1%), followed by wheat (10.7%).

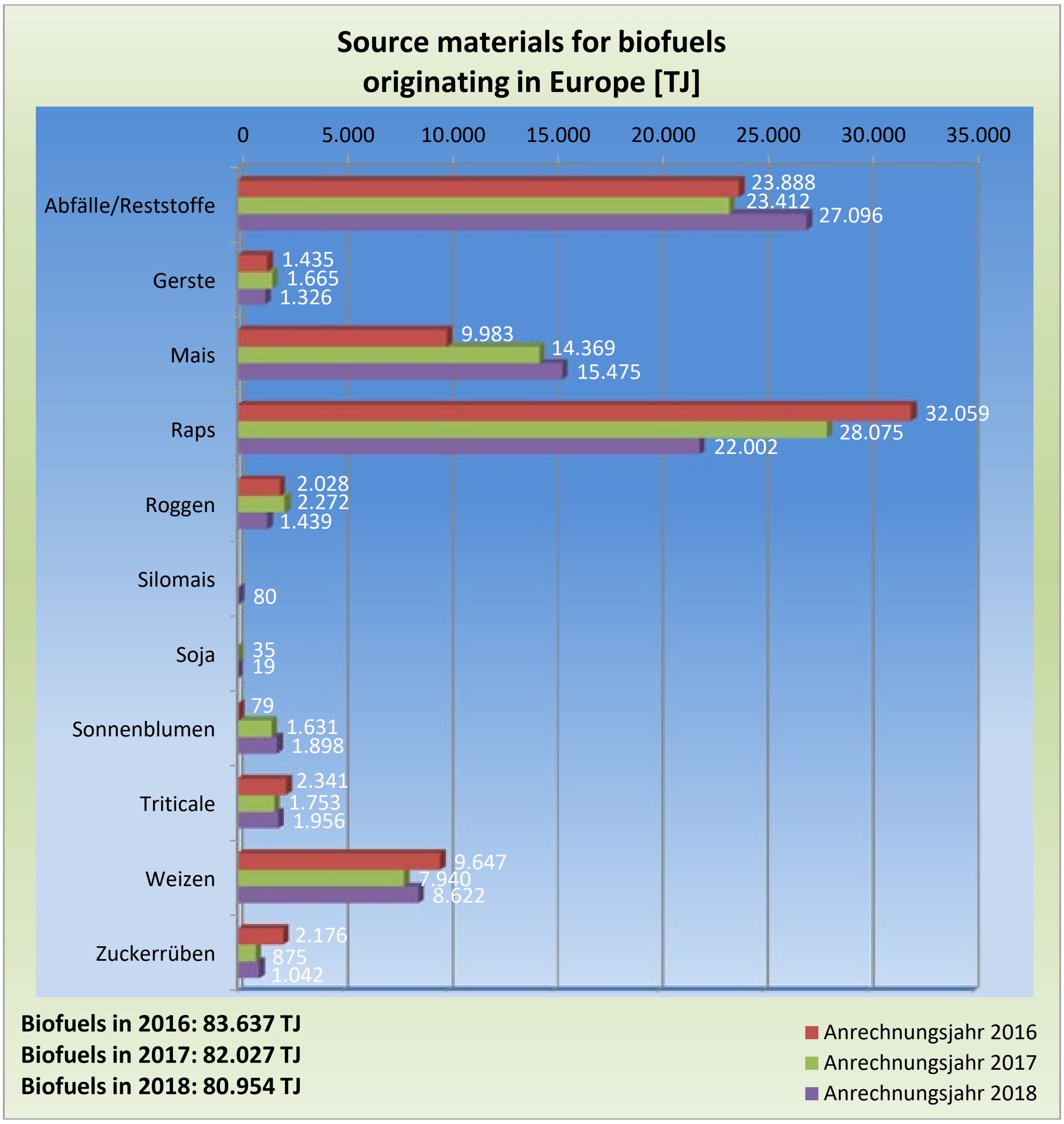


Figure 17

The quantity of biofuel from source materials originating from **Germany** once again decreased during the reporting year, by 6.2% (previous year: 20.8%). The quantity of biofuel produced from German rapeseed decreased by 17.3%. The proportion of waste and residues increased by 20.9%.

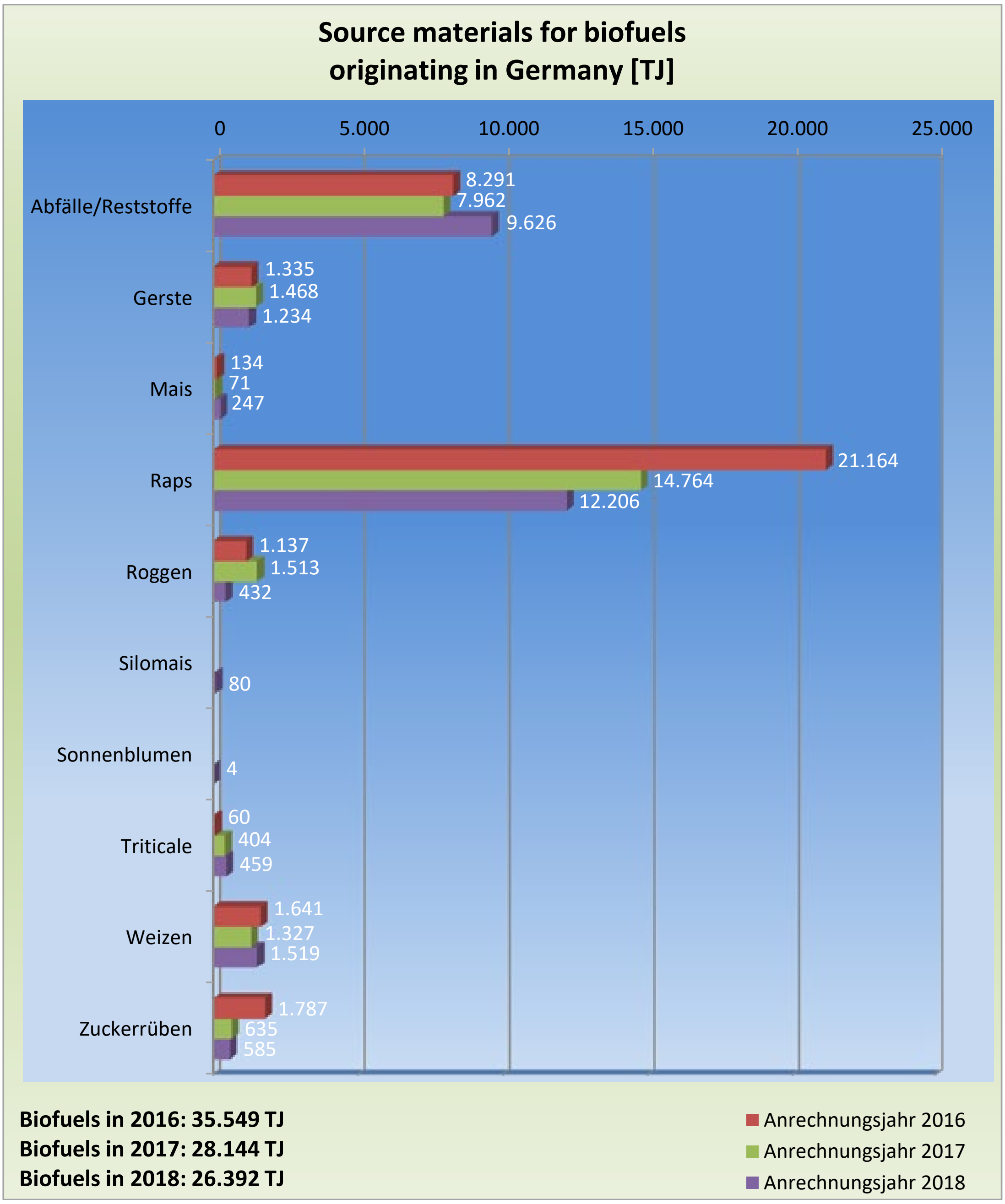


Figure 18

Compared to the previous year, the quantity of biofuel from **Central America** made from palm oil decreased by more than half.

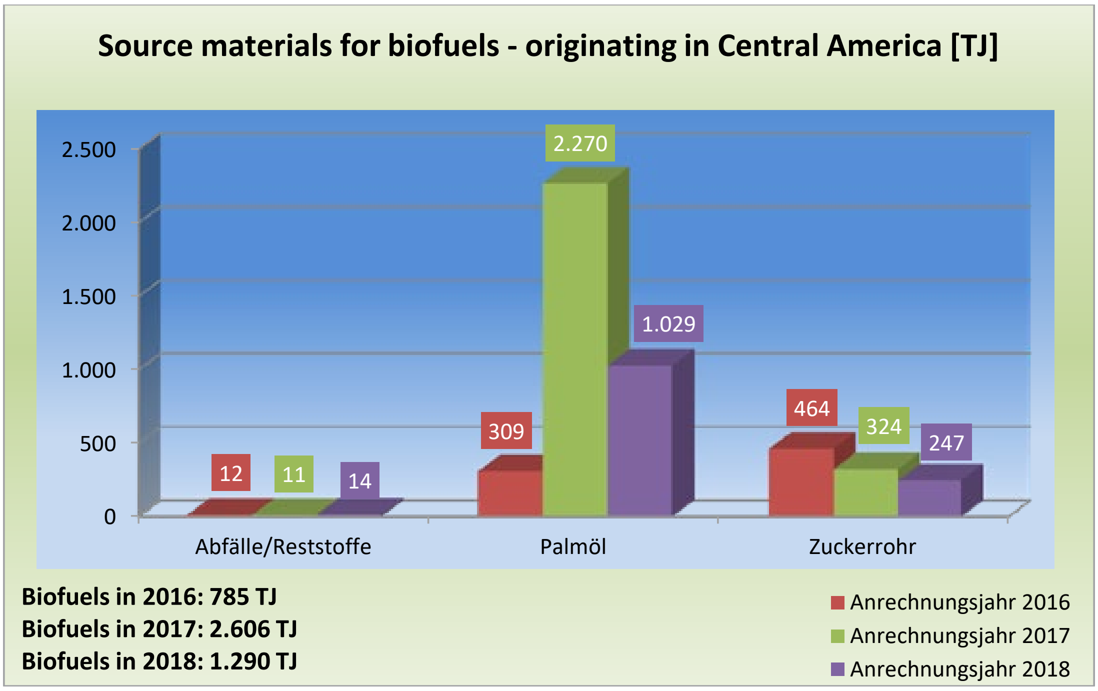


Figure 19

Biofuel from source materials from **North America** again consisted entirely of waste and residues in the reporting year. Following a decrease in the previous year, this quantity increased again by 35.2%.

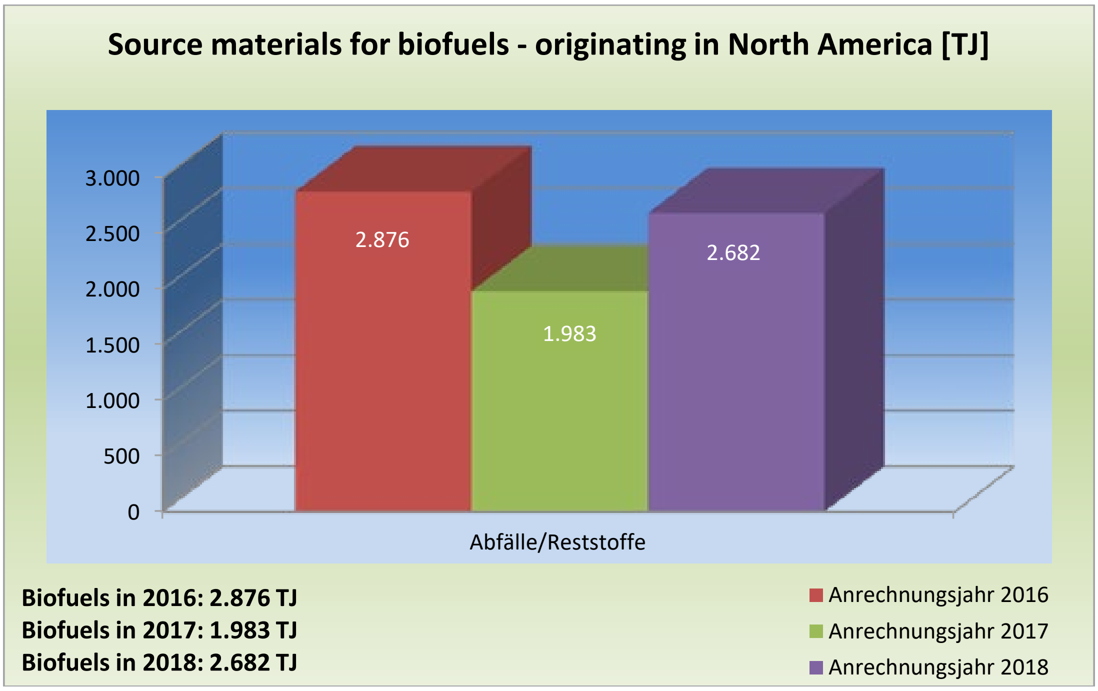


Figure 20

The quantity of biofuels from source materials originating from **South America** increased by 10.6% in the reporting year.

As in the previous year, the use of sugar cane went down, decreasing by 66.4%, while the quantity of biofuel from soya increased more than twentyfold.

New source materials added during the reporting year were Ethiopian mustard, also known as Ethiopian rape or Abyssinian mustard (*Brassica carinata*) and a small amount of palm oil.

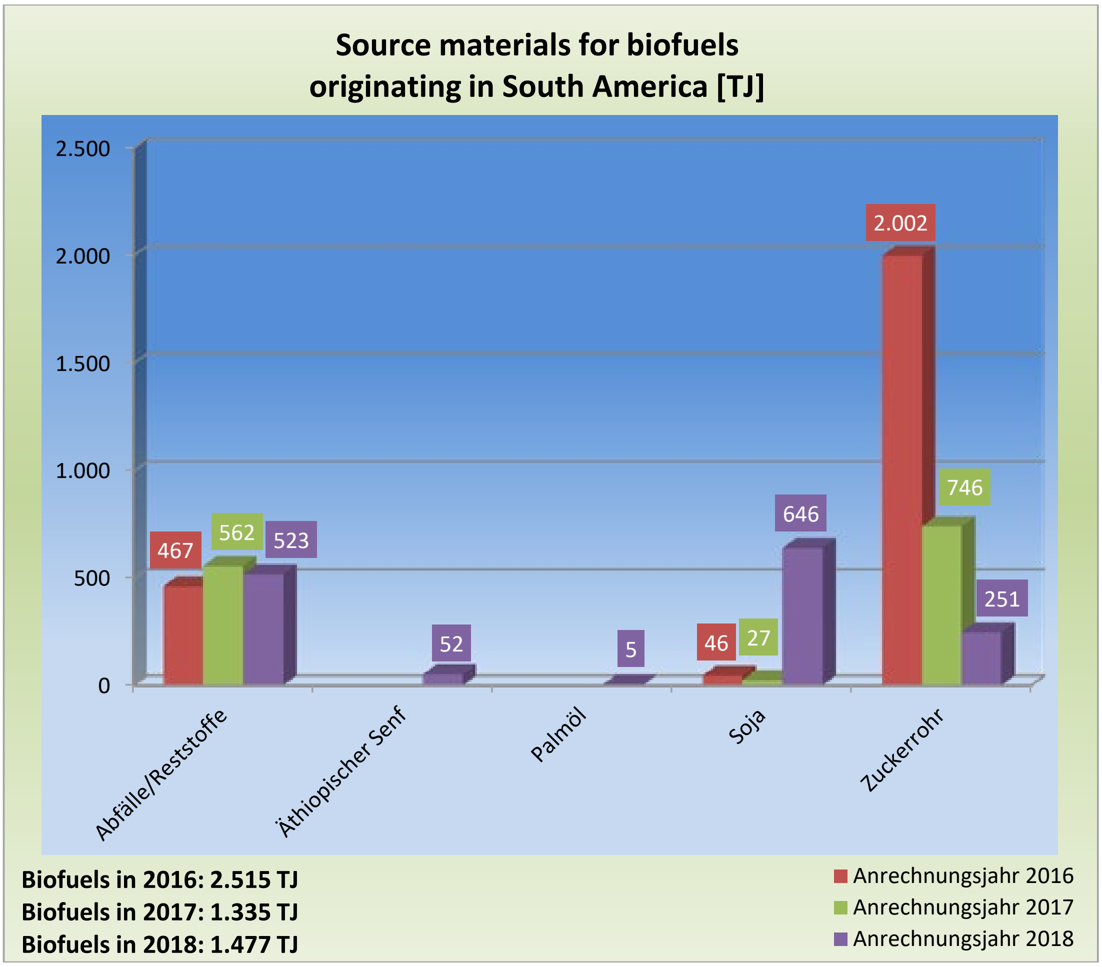
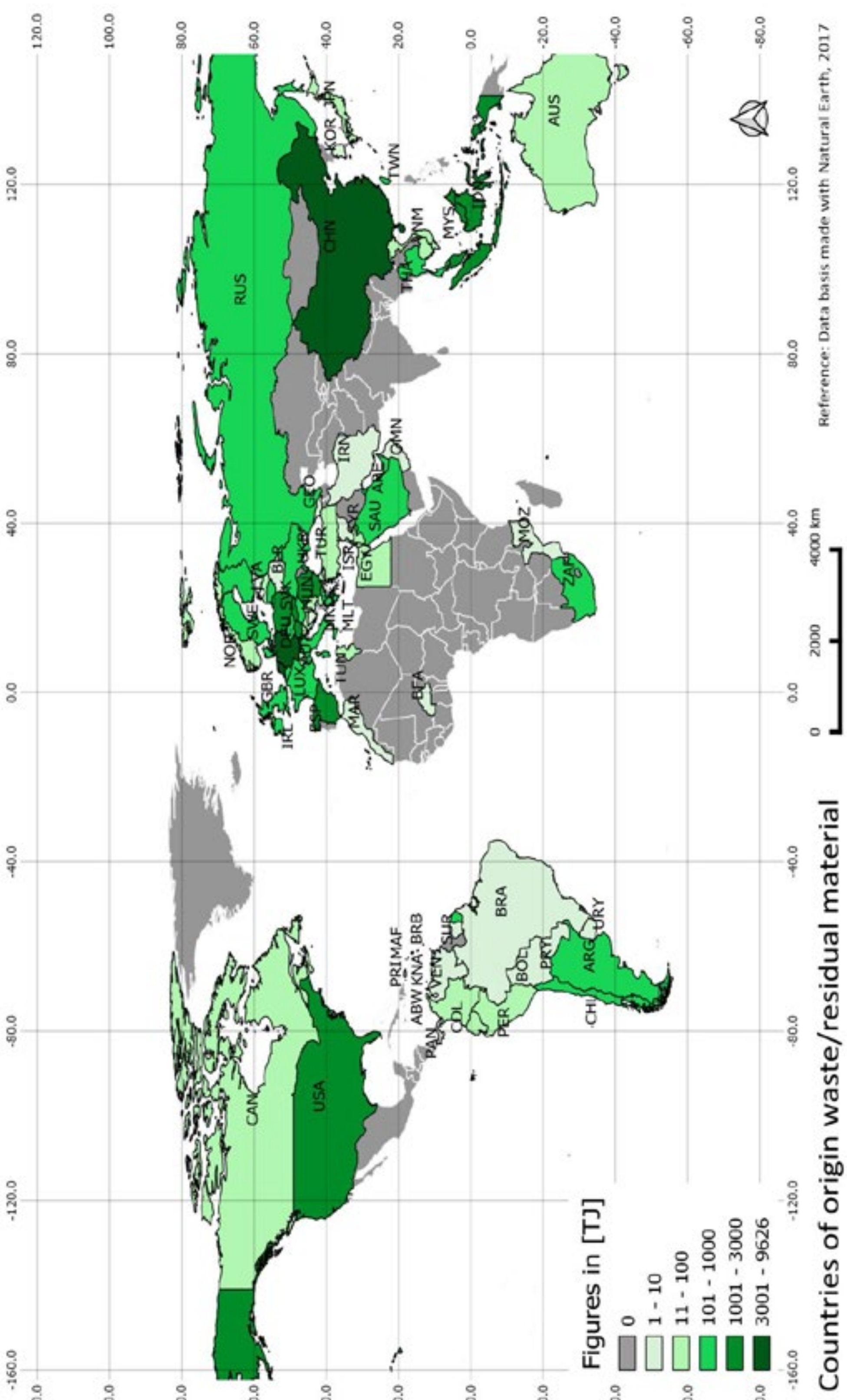


Figure 21



Countries of origin waste/residual material
Figures in [TJ]
0
1 - 10
11 - 100
101 - 1000
1001 - 3000
3001 - 9626
CAN
USA
RUS
CHN
AUS
BRA
ARG
URY
PRY
BOL
PER
COL
CHI
PAN
VEN
SUR
PRI MAF
ABW KNA BRB
IRL
GBR
ESP
NOR
SWE
MAR
TUN
MLT
EGY
ISR
SYR
TUR
GEO
IRN
OMN
SAU
ARE
MOZ
ZAF
TWN
KOR
JPN
MYS
Reference: Data basis made with Natural Earth, 2017
0
2000
4000 km

Figure 22

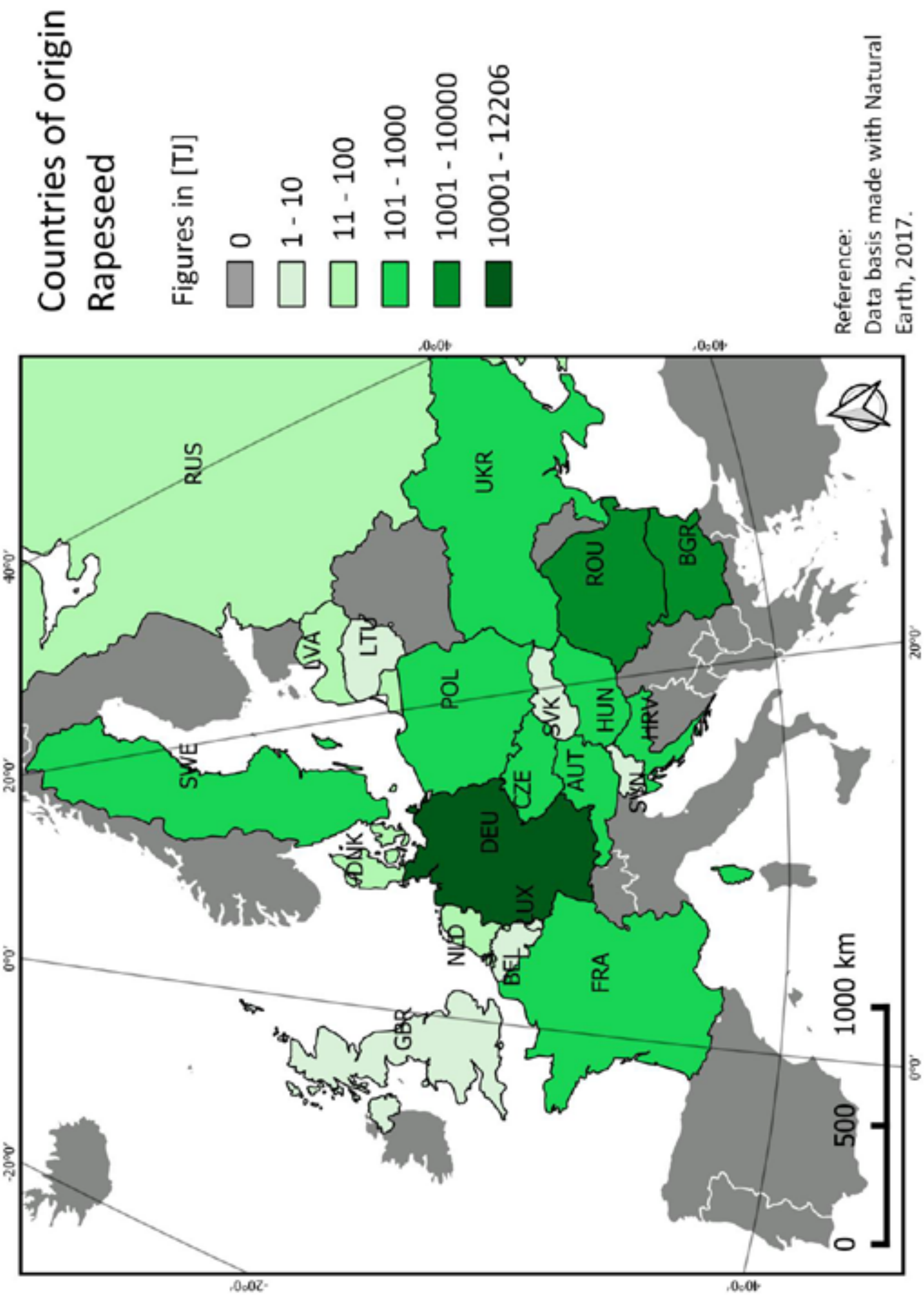
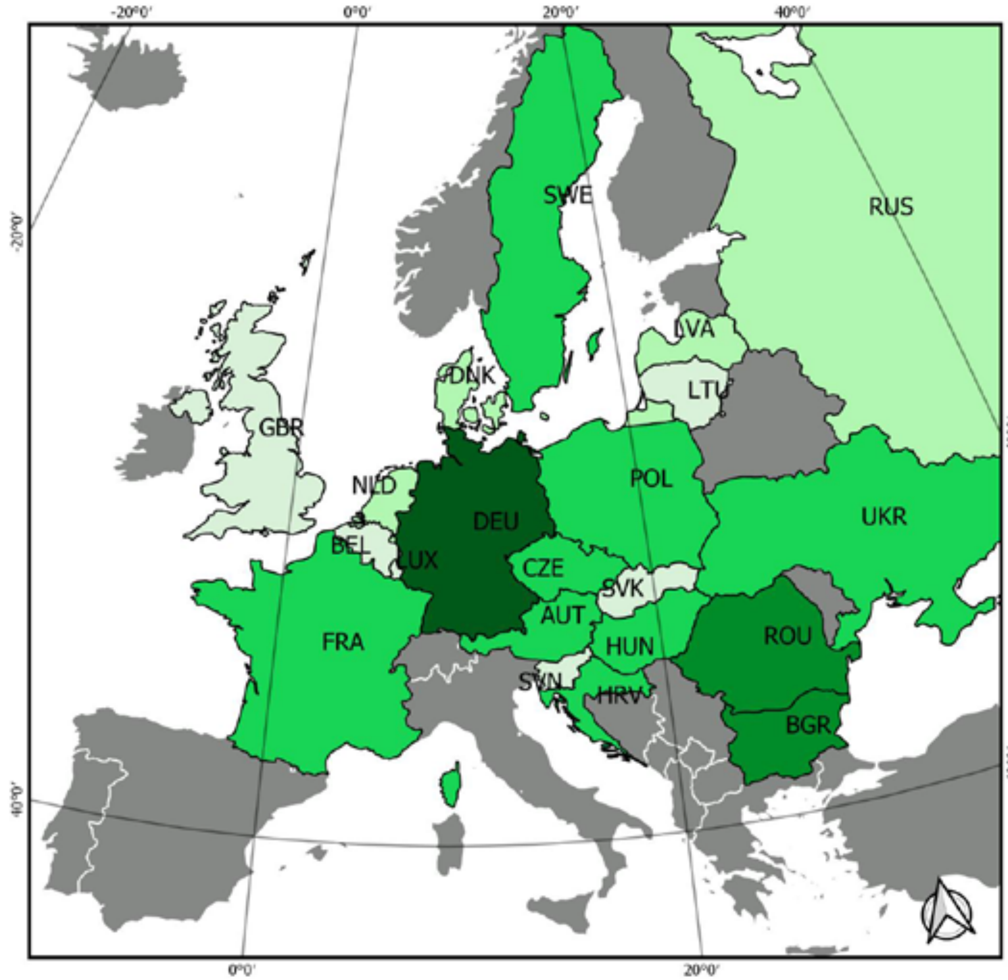

Countries of origin
Rapeseed
Figures in [TJ]
0
1 - 10
11 - 100
101 - 1000
1001 - 10000
10001 - 12206
Reference:
Data basis made with Natural
Earth, 2017.
RUS
UKR
ROU
BGR
LVA
LTU
POL
SWE
SVK
HUN
HRV
CZE
AUT
SVN
DNK
DEU
LUX
NLD
BEL
FRA
GBR
0
500
1000 km

Figure 23

Figure 24



Countries of origin
Cereal and other
starchrich crops

(Barley, rye, wheat, triticale)

Figures in [TJ]

- 0
- 1 - 100
- 101 - 500
- 501 - 1000
- 1001 - 3644

0 500 1000 km

Reference:
Data basis made with Natural Earth, 2017.

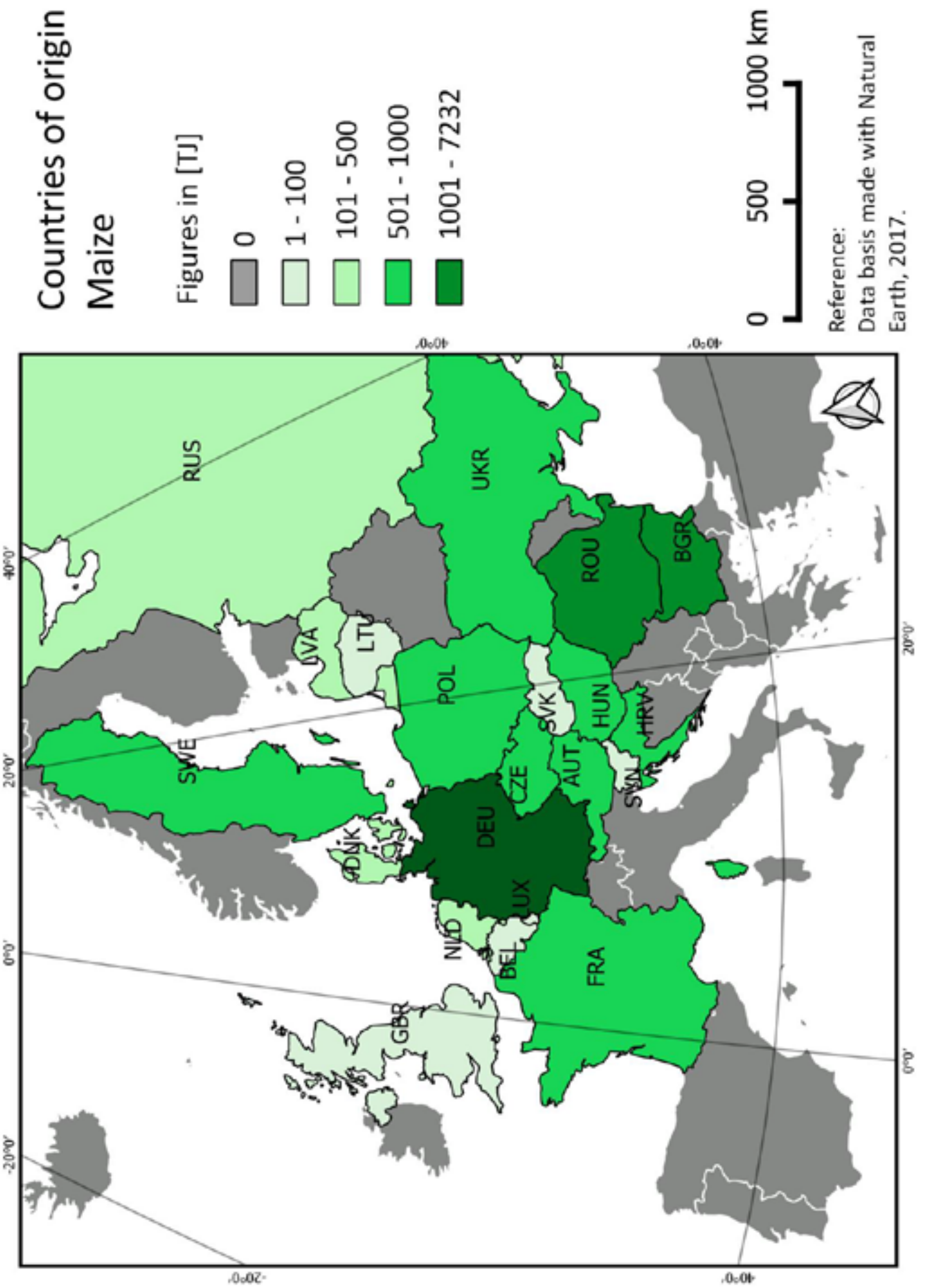

Countries of origin
Maize
Figures in [TJ]
0
1 - 100
101 - 500
501 - 1000
1001 - 7232
0
500
1000 km
Reference:
Data basis made with Natural
Earth, 2017.
RUS
UKR
ROU
BGR
LVA
LTU
POL
SVK
HUN
HRV
SWE
CZE
AUT
SVN
DEU
DNK
LUX
NLD
BEL
FRA
GBR

Figure 25

6.3 Types of biofuels

FAME (biodiesel) remains the most important type of biofuel, with an increase of 8.4% as against the previous year. The share of bioethanol also increased, but less significantly, by 2.6%.

For the first time, an application was made for a small amount of BtL (biomass to liquid) fuel Fischer-Tropsch diesel (FTD) to be counted towards the quota.

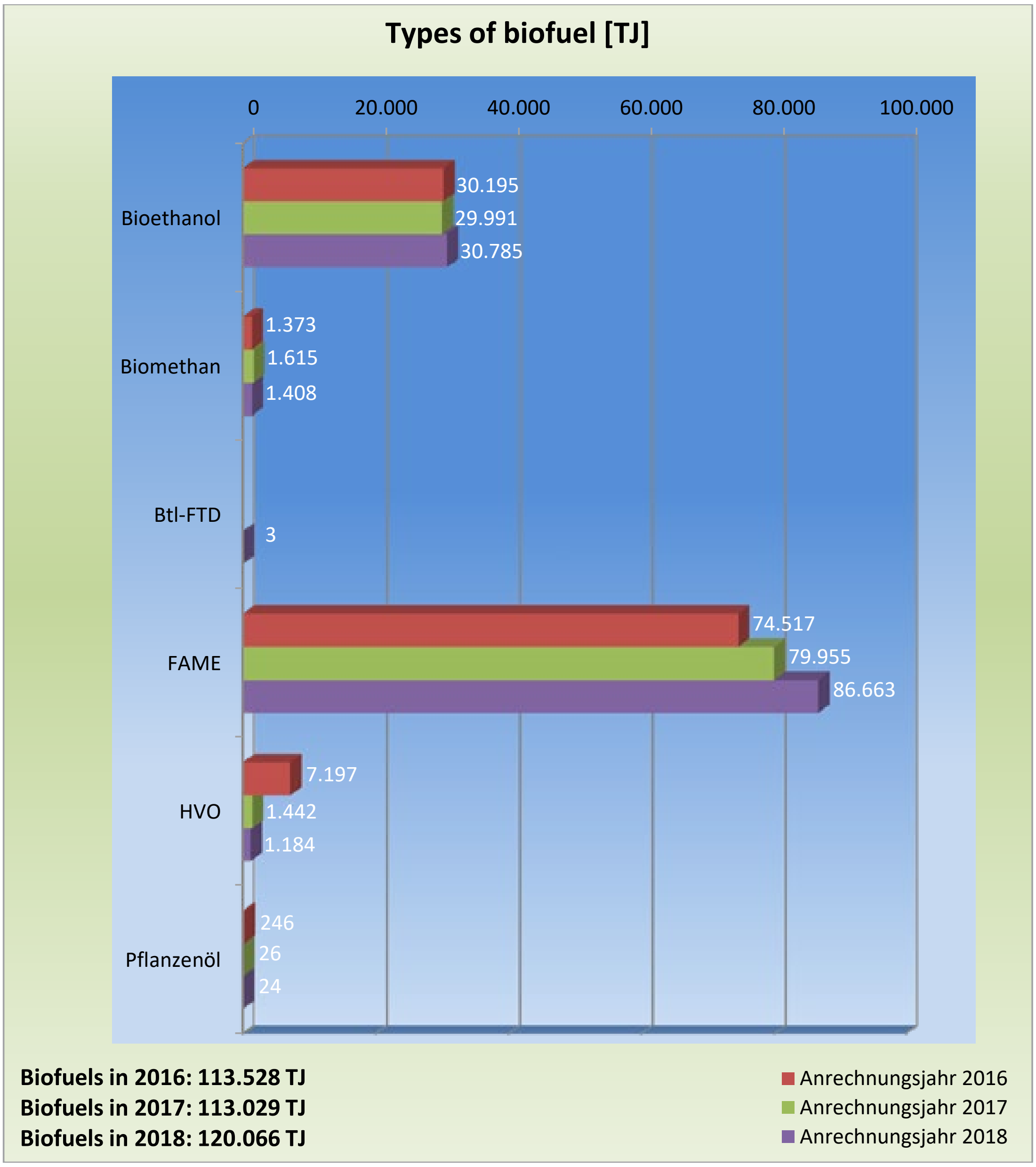


Figure 26

The following figure shows the percentages of type of biofuel in 2018.

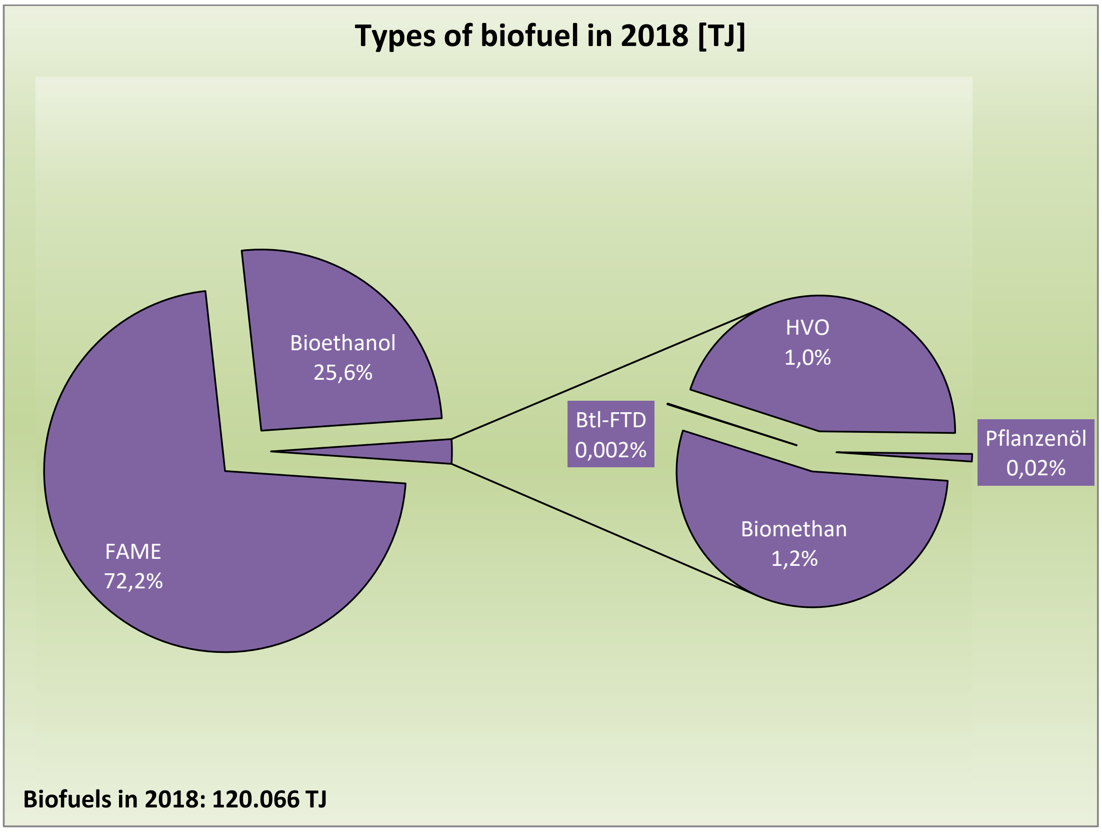


Figure 27

The quantity of **bioethanol** put to use in the reporting year increased by 2.6%. The most important source material for producing bioethanol was maize. Its quantity increased by 7.8% in the reporting year. The proportion of the second most important source material, wheat, increased by 8.6% in the reporting year, following a decrease of 17.7% in the previous year. The following changes were recorded in the proportions of other types of cereal: triticale +11.6%, rye -36.7%, and barley -20.4%. Following a low in the previous year, the proportion of sugar beet increased by 19%, while the proportion of sugar cane continued to decrease (-53.5%). Despite an almost tenfold increase of the proportion of waste and residues, they remain in last place as a source material for bioethanol.

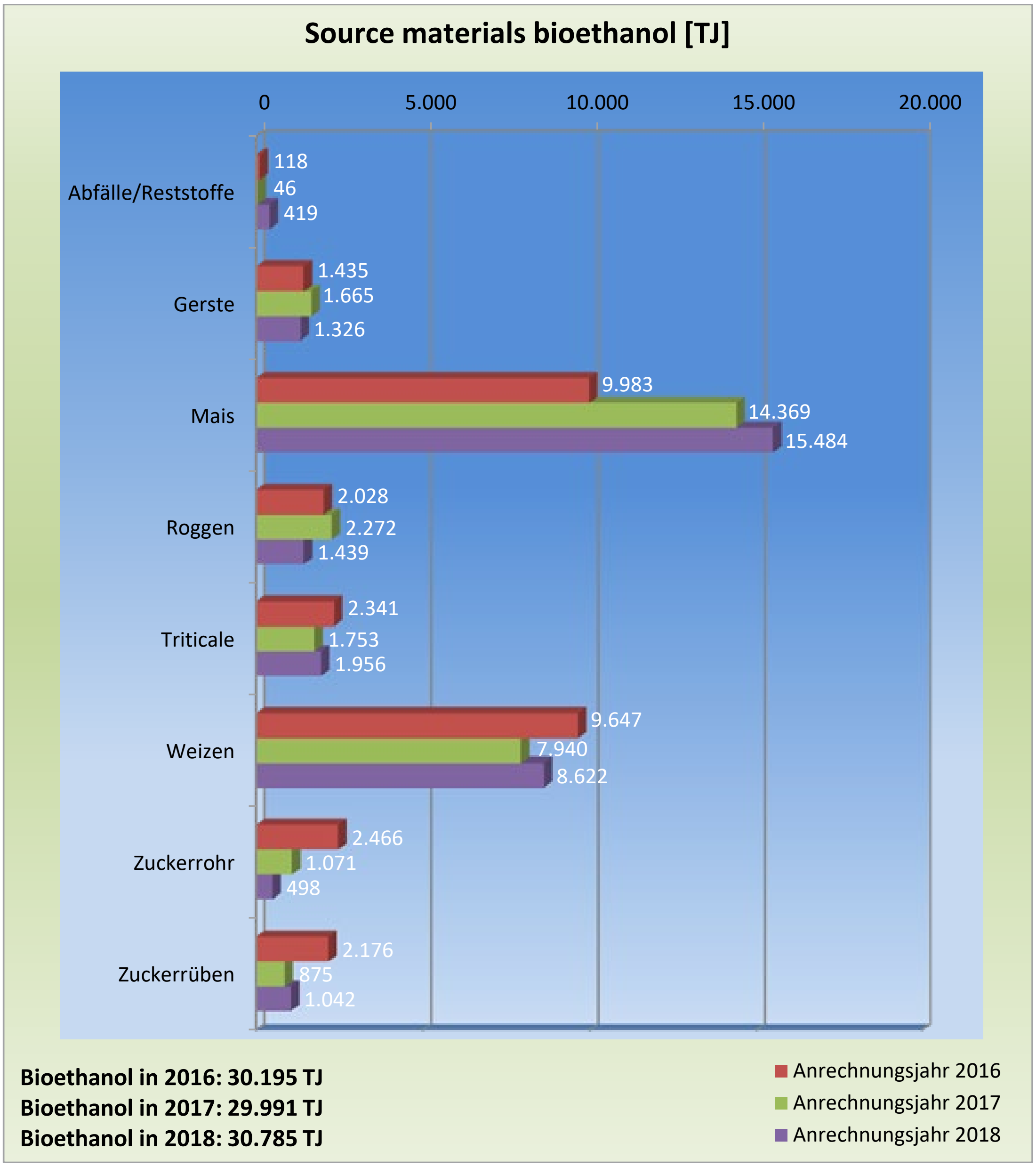


Figure 28

15% of source materials used for producing **bioethanol** originated from **Germany**. In the previous year, that proportion had been 18%. The most important source materials were wheat (33%) and barley (27%). The downward trend in the use of sugar beet seems to have been stopped. Though the proportion of sugar beet is now only 13%. The proportion of triticale grew slightly, while rye is down to less than a third of the previous year's quantity. Maize (+248%) and waste and residues (increased from nearly 0 to 124) both rose sharply.

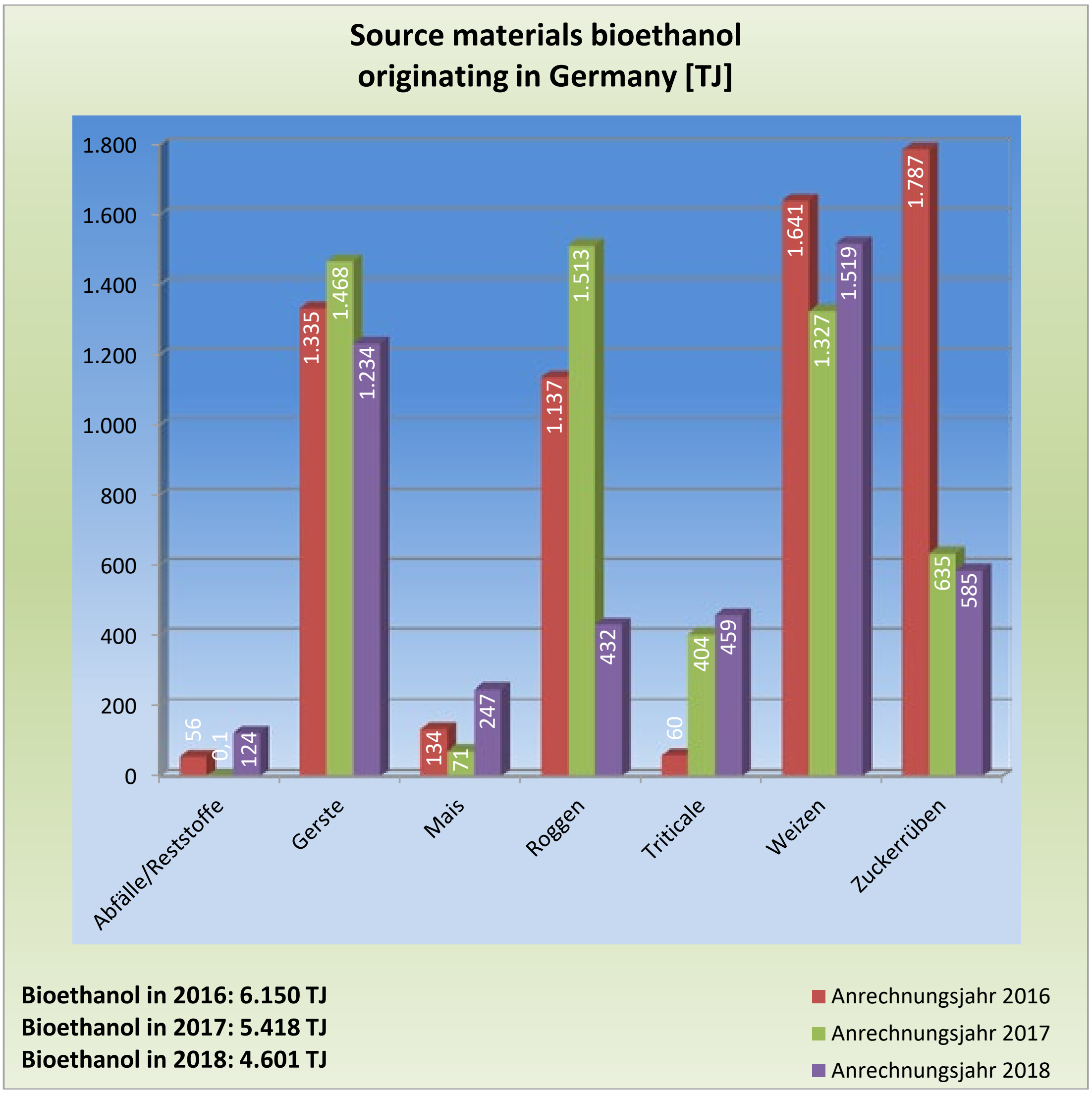


Figure 29

In the reporting year, the proportion of **FAME (biodiesel)** produced from waste and residues increased significantly (+30.6%) once again. The proportion produced from rapeseed again decreased (-11.5%) but it maintained its position as the second most important source material. The proportion of FAME from palm oil also fell, though not as significantly, by 3.2%. The proportion of sunflower increased by 16.4%. The quantity produced from soya increased more than tenfold, but accounted only for 0.8% of the total quantity of FAME. A new source material added in the reporting year was Ethiopian mustard, also known as Ethiopian rape or Abyssinian mustard (*Brassica carinata*), having a proportion of 0.6‰.

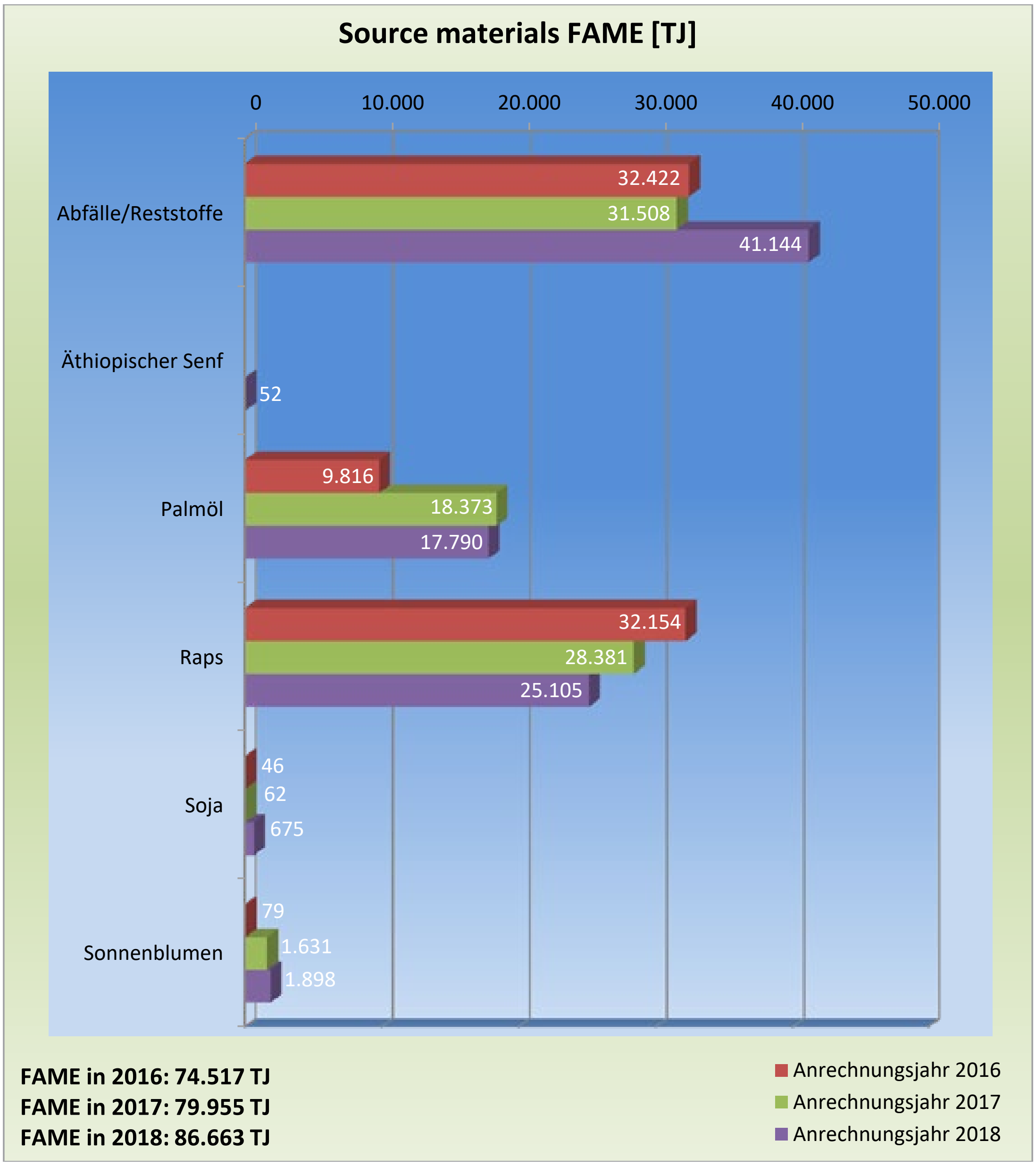


Figure 30

Rapeseed remains the most important source material for **biodiesel production** originating from **Germany**. However, the relevant quantity of biofuel decreased by 17.3% as against the previous year and so accounted for just under 60% of the total. The quantity of biofuel produced from waste and residues increased by 28.7%. Thus, its proportion of the biofuels produced from source materials originating from Germany amounted to around 40%.

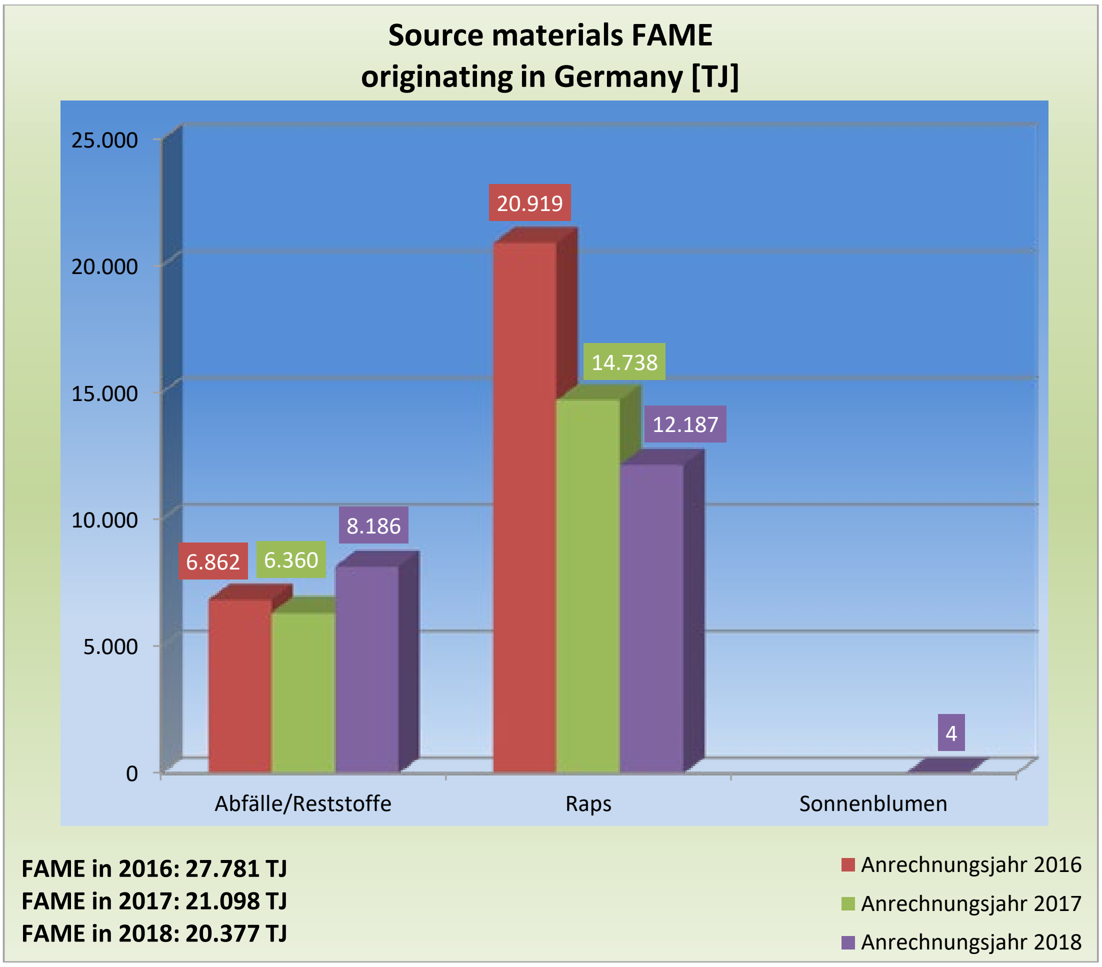


Figure 31

The reporting year saw a reduction of just under 18% in **hydrotreated vegetable oils (HVO)** counted towards the Greenhouse Gas Reduction Quota. Both the proportion of HVO produced from palm oil (-18.7%) and that of HVO produced from waste and residues (-3.8%) decreased.

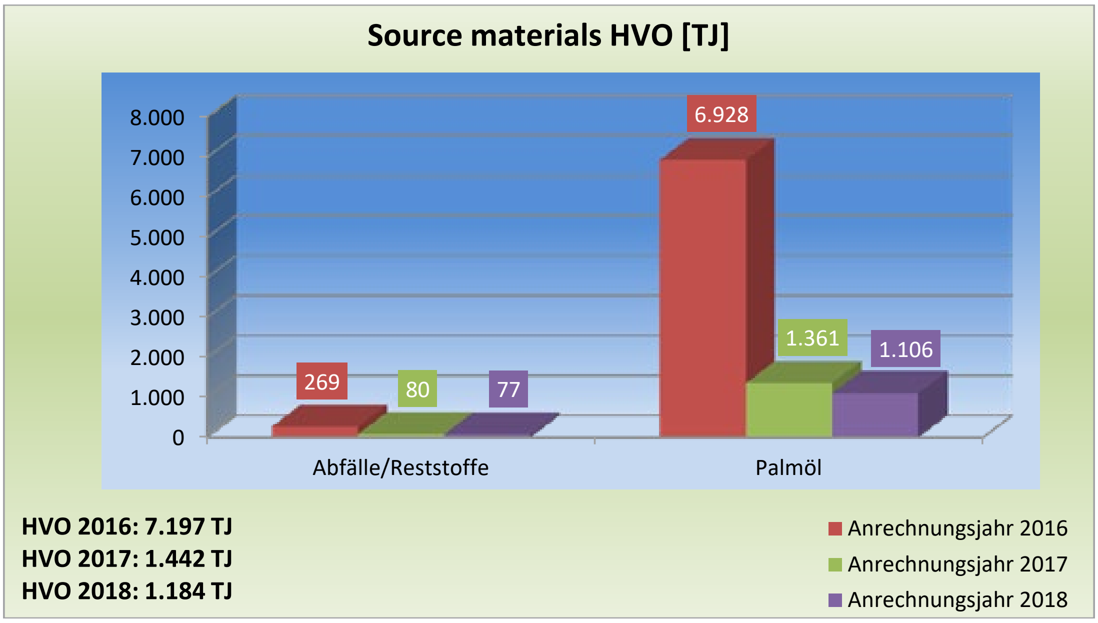


Figure 32

The amount of **biomethane** counted towards the German Greenhouse Gas Reduction Quota decreased by just under 13% compared to the previous year. A small proportion of this biofuel (5.7%) was produced from silage maize during the reporting year.

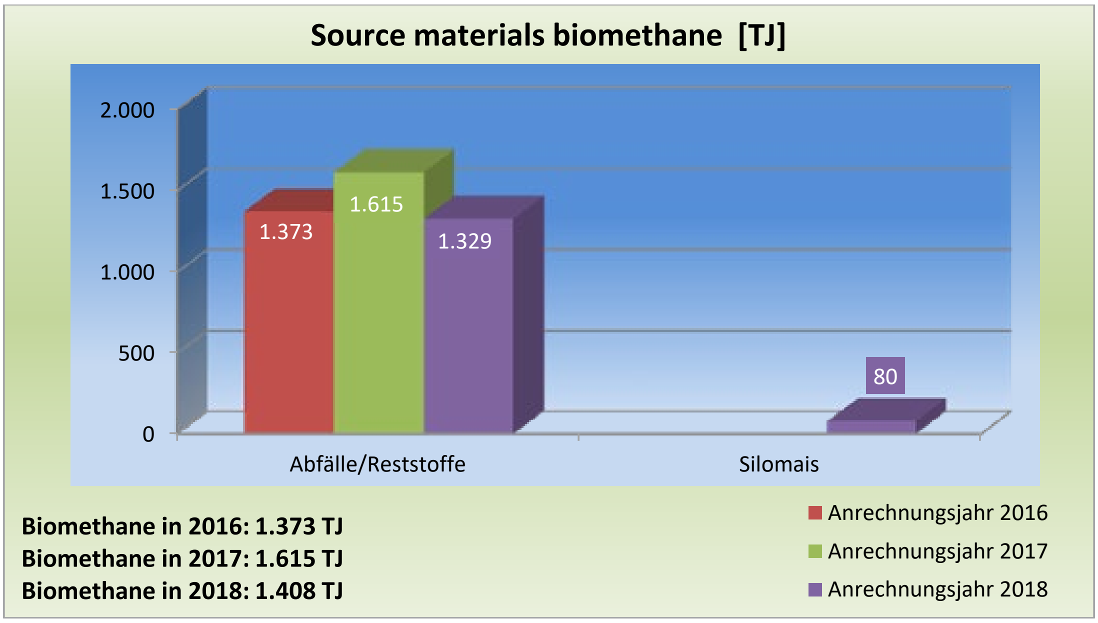


Figure 33

Vegetable oils as a biofuel remained of limited importance in the reporting year. Their share in the total quantity for 2018 is in the per thousand range.

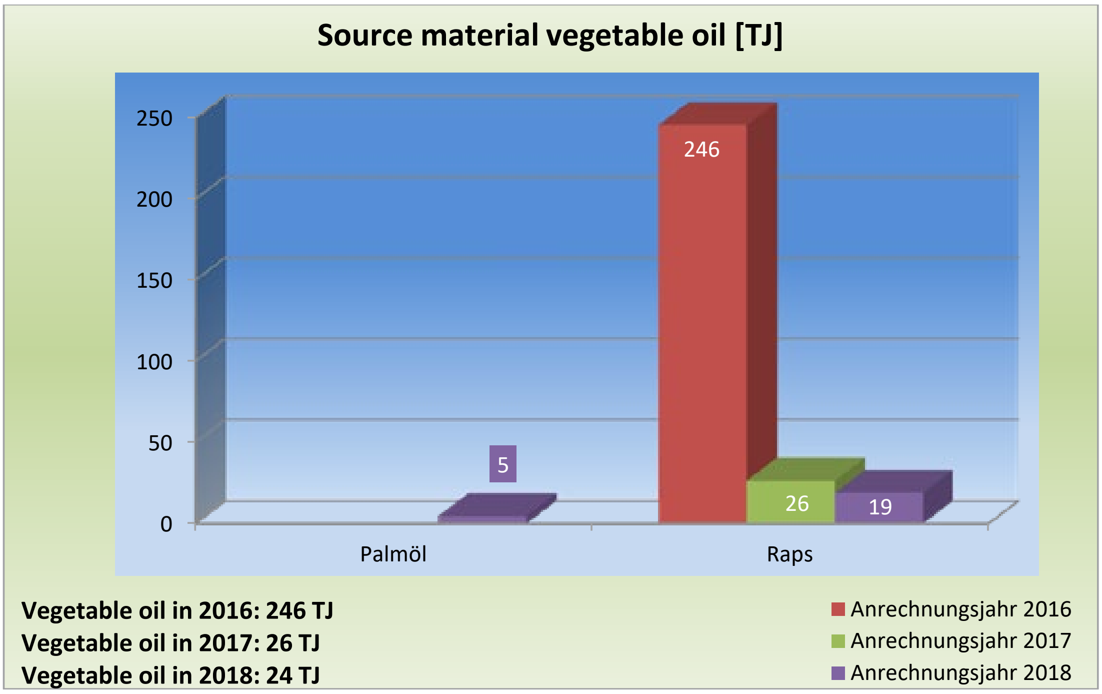


Figure 34

6.4 Greenhouse gas emissions and savings

One of the aims of the Renewable Energy Directive is the **reduction of greenhouse gas emissions**. Pursuant to Sect. 18 of the *BioSt-NachV* and/or the *Biokraft-NachV*, data regarding emissions must be stated as CO_2 equivalent on PoS for the product.

The total emissions resulting from the production process of the final product must be taken into account in calculating emissions. These are emissions of the greenhouse gases named in the Renewable Energy Directive, i.e. carbon dioxide (CO_2), nitrous oxide (N_2O), and methane (CH_4), expressed as CO_2 equivalent per energy unit. Emissions are calculated according to the prescribed method[10].

The following figures show the emissions of the biofuels for which applications were made for counting towards the biofuel quota.

In calculating the emission savings, the emissions resulting from the entire production process of the biofuel are compared to the **individual reference values for fossil fuels** according to the 38th *BImSchV*, which have been in force since the reporting year[11]:

Table 6: Fossil fuel reference values

Fuel type	Fossil fuel reference value until 2017 [g CO_2eq/MJ]	Fossil fuel reference value from 2018 [g CO_2eq/MJ]
Bioethanol	83.8	93.3
Biomethane	83.8	94.1
BtL FTD	83.8	95.1
FAME	83.8	95.1
HVO	83.8	95.1
Vegetable oil	83.8	95.1

The emission savings presented here are based on the comparison of **pure biofuels** to **pure fossil fuels**. For a biofuel to be considered sustainable, evidence of a saving of 50% as against fossil fuel has needed to be provided since the 2018 quota year. Calculating the total savings in the case of blended fuels in Germany would be done on the basis of the total emissions of from biogenic and fossil fuels.

[10] Cf. p. 8, footnote 4.

[11] Please note that a change was made to the reference quantity for determining emission savings in the reporting year; until the 2017 quota year, a uniform reference value for fossil fuels (83.8) was used for calculating the emission savings of all types of biofuels. This reference value applied uniformly to all further calculations: that is, first of all, the question whether a biofuel is sustainable at all; then the question as to the level of the quota applied to an individual obliged party; and finally, the question whether or not obliged parties have met their quotas. With effect from the 2018 quota year, the 38th Ordinance for the implementation of the *Bundes-Immissionsschutzgesetz* [Federal Emissions Control Act] (38th *BImSchV*) provides for a new base value (94.1) as well as new individual reference values (93.3 and 95.1). These individual reference values must be applied by the biofuels quota office in calculating whether the obliged parties have actually met their individual Greenhouse Gas Reduction Quotas. This provides the background for the individual fossil fuel reference values used in this report.

The figure below illustrates the amount of emissions that would have resulted if, instead of the given quantity of biofuels, only fossil fuels had been used. **This means a saving of 9.5M tonnes in CO_2 equivalent through the use of biofuels.**

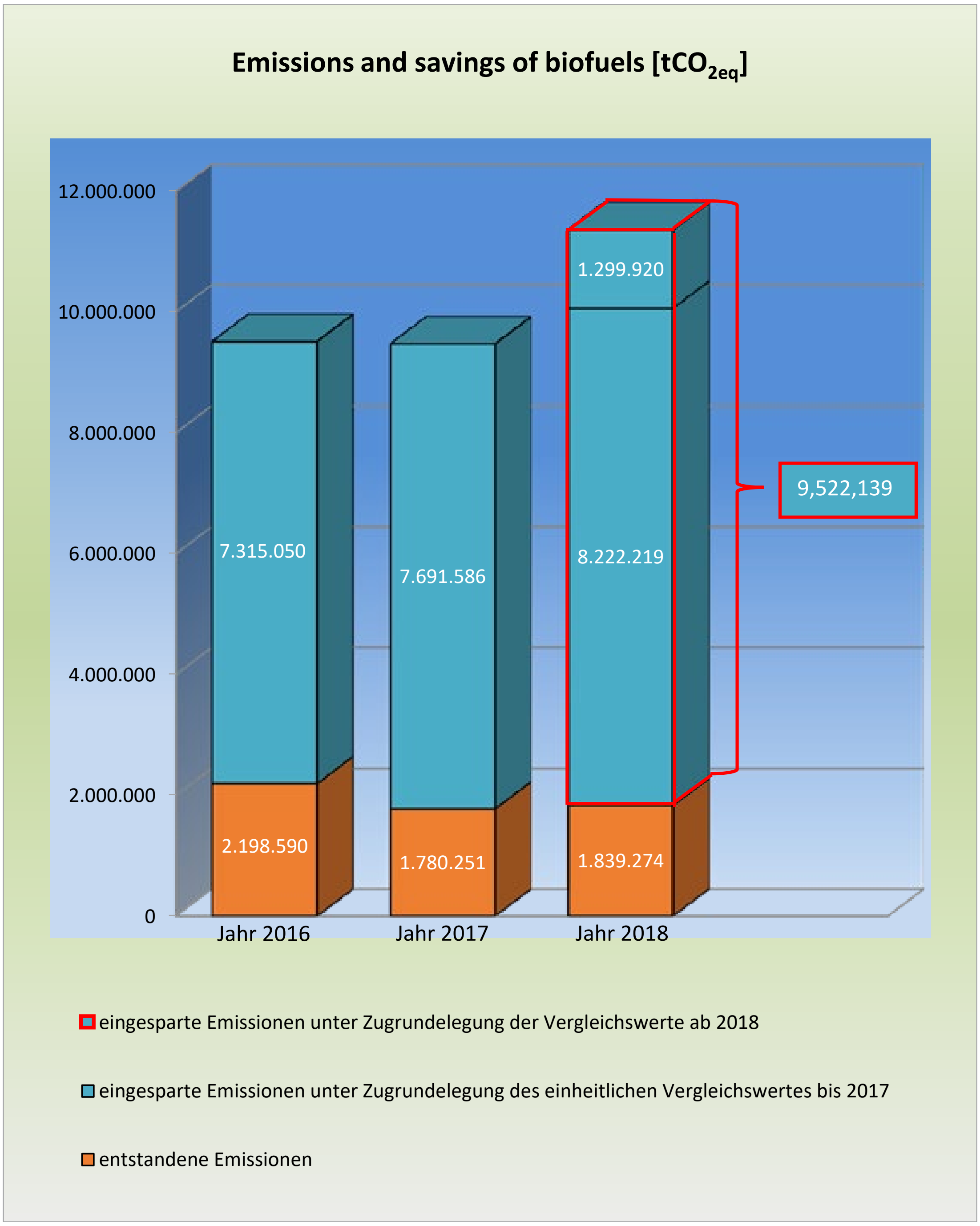


Figure 35

The biofuels put on the market and certified as sustainable emit less in CO_2 equivalent year on year. In the reporting year, the average emissions were 15.32 t CO_2eq per terajoule of biofuel put on the market.

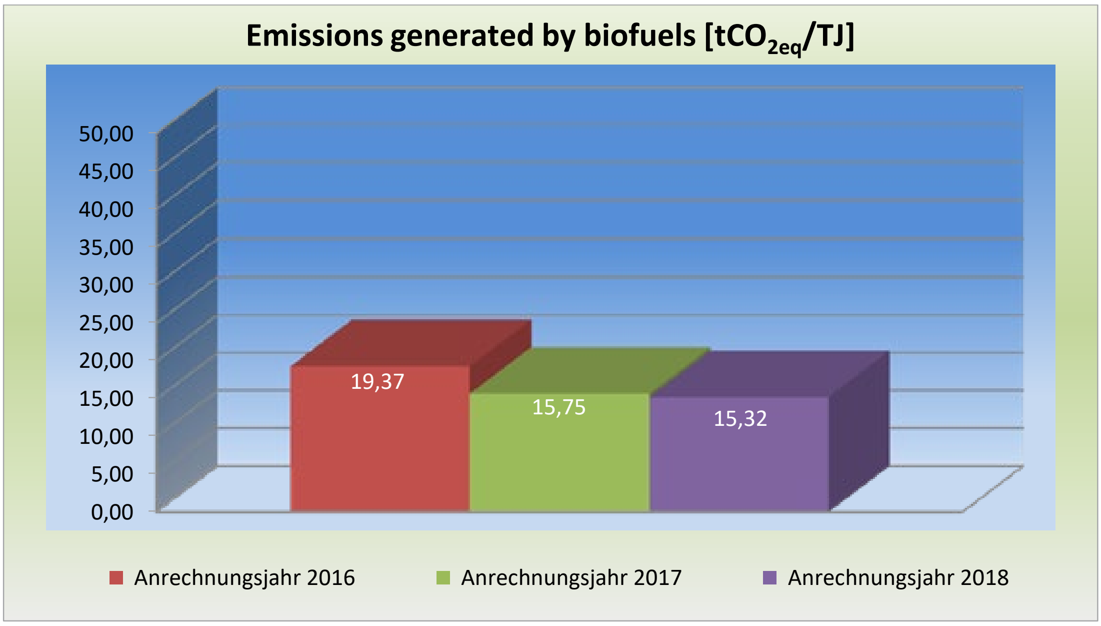


Figure 36

The average total emission savings as against fossil fuel was 83.8%.

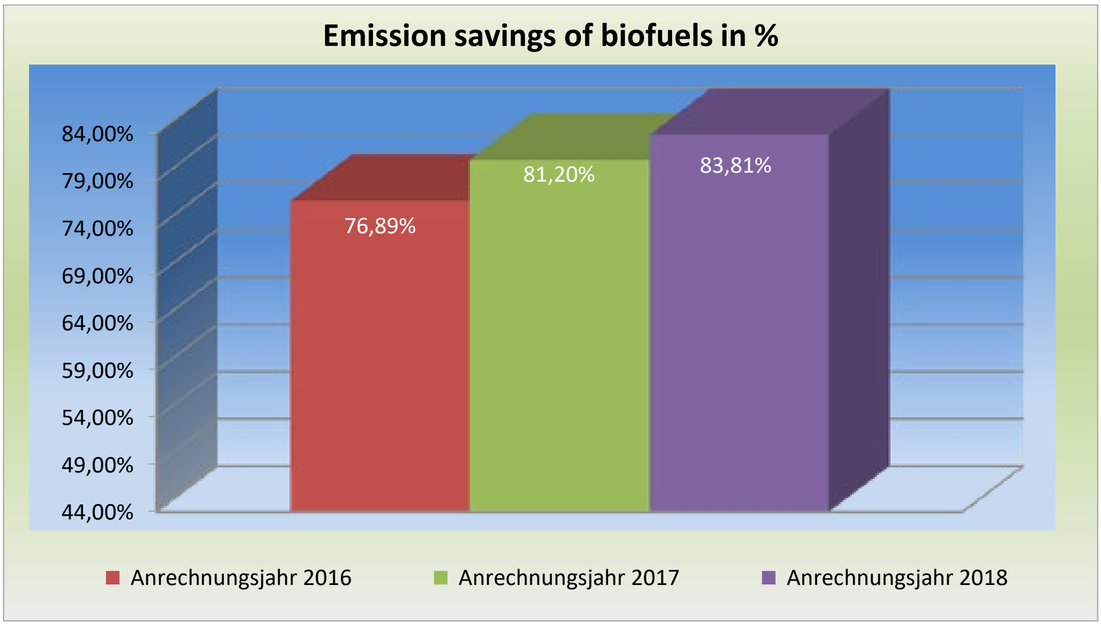


Figure 37

Among the different types of biofuels, vegetable oils had the highest average emissions: 30.18 t CO_2eq per terajoule.

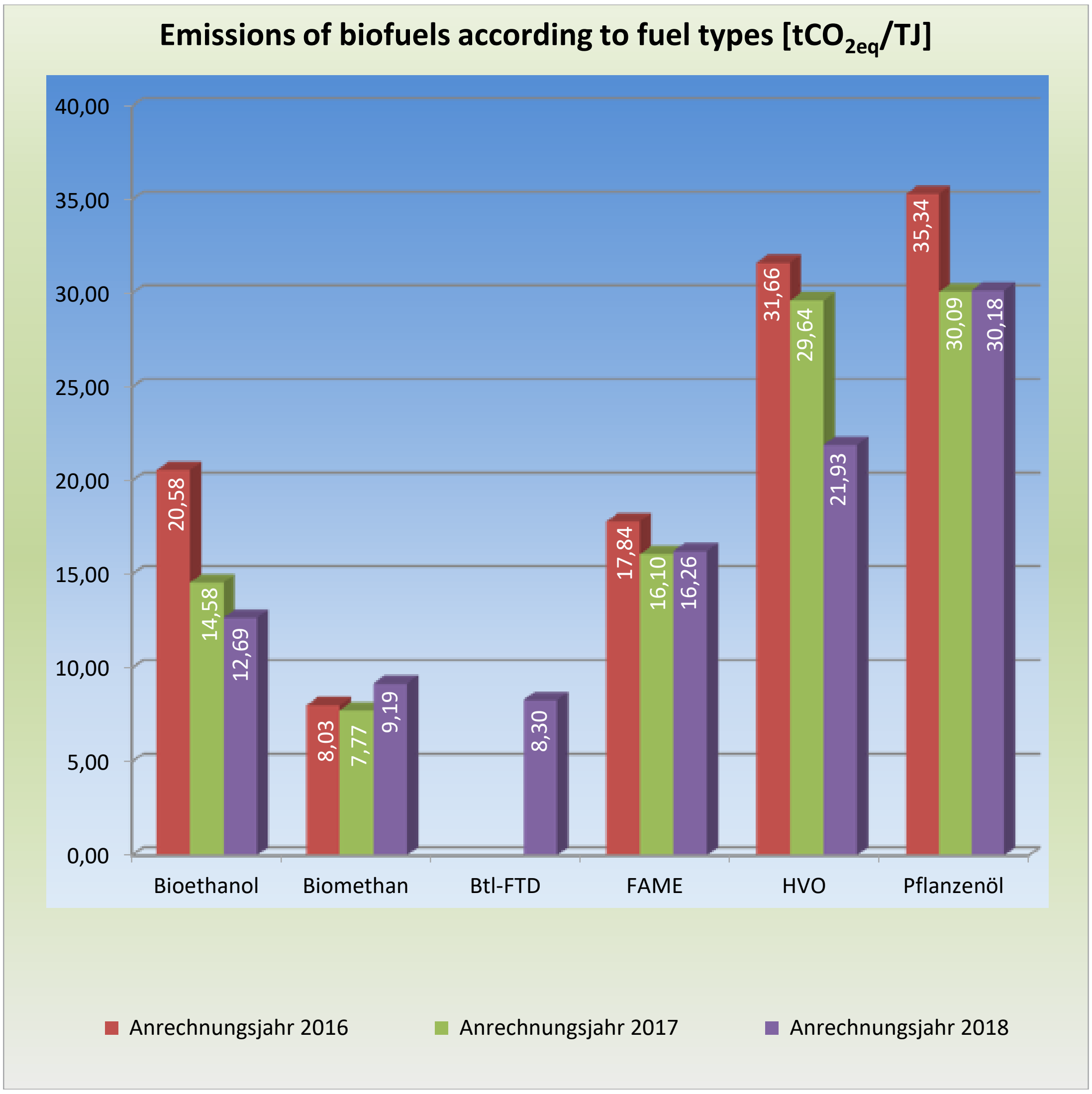


Figure 38

Due to its low emission value, the biofuel type BtL (biomass to liquid) achieved the best value in average emission savings, at around 91%. Its source material was waste wood from Tunisia.

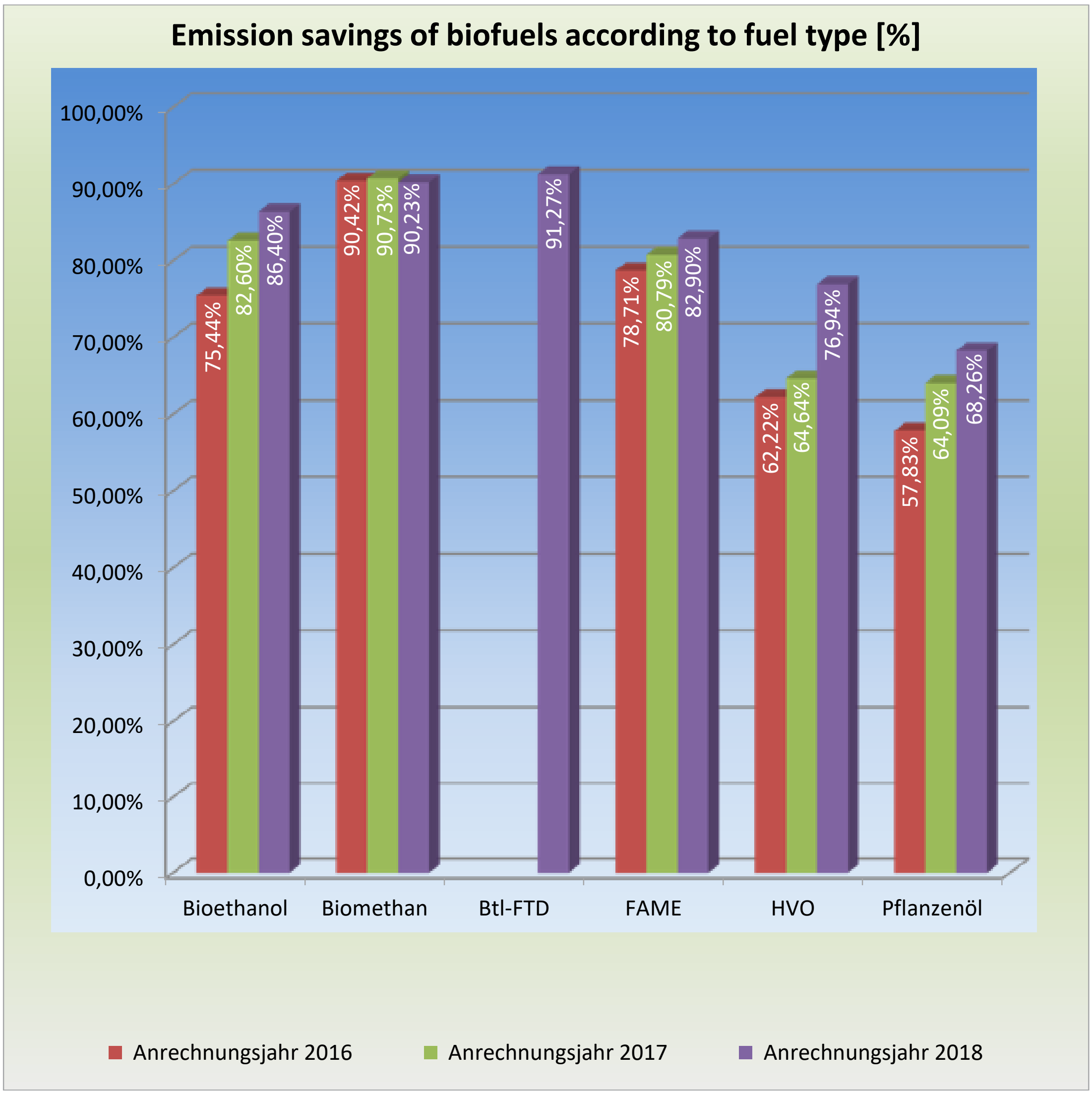


Figure 39

The emission savings from bioethanol made from waste and residues had nearly been halved in the previous year but again more than doubled in the reporting year. In all three reference years, it accounted for small, fluctuating amounts of energy. There was thus no meaningful representative average for individual years. The weighted average of all three years was 91.04%.

Bioethanol made from maize was able to score the second best average saving, at 88.62%.

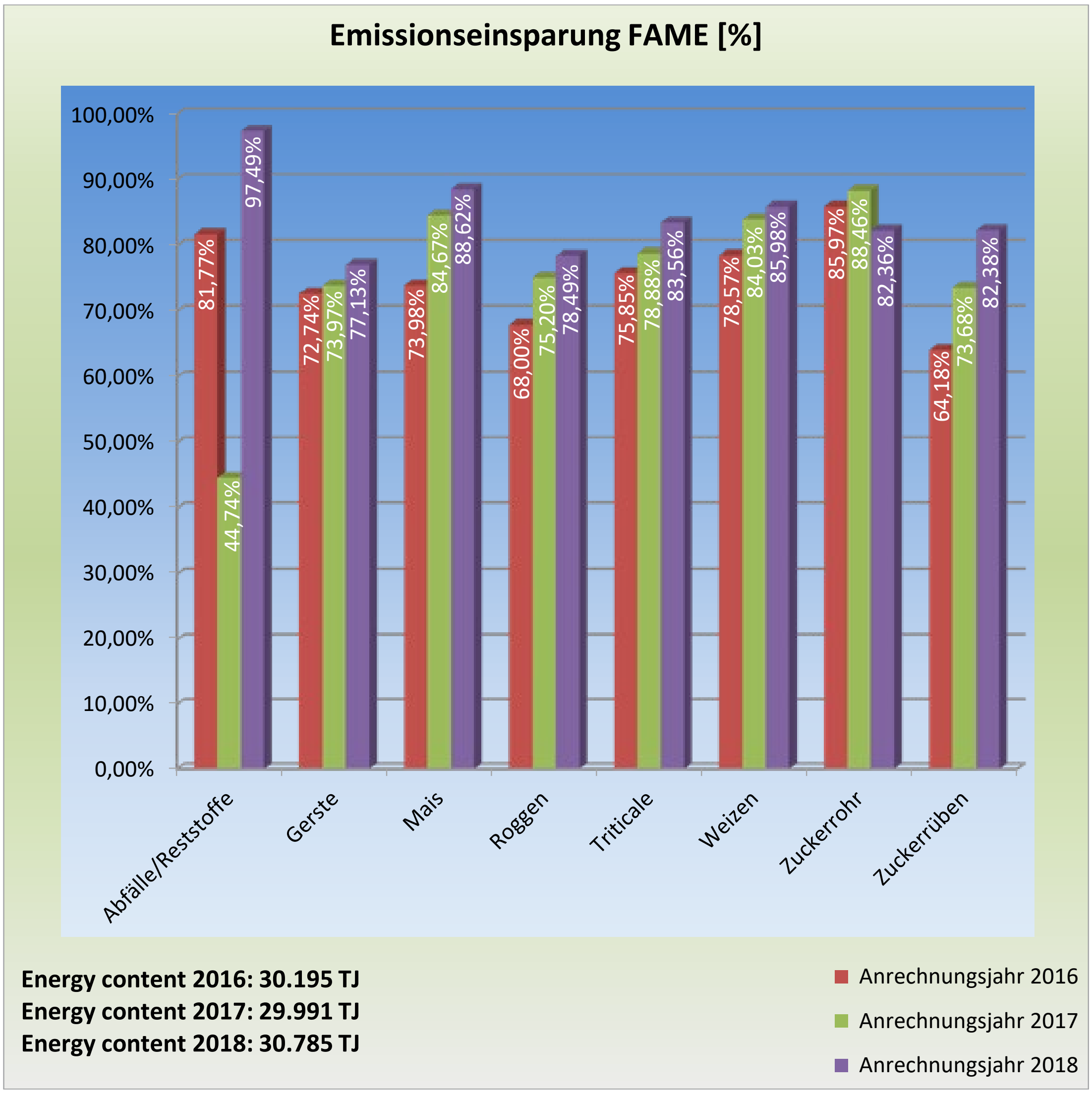
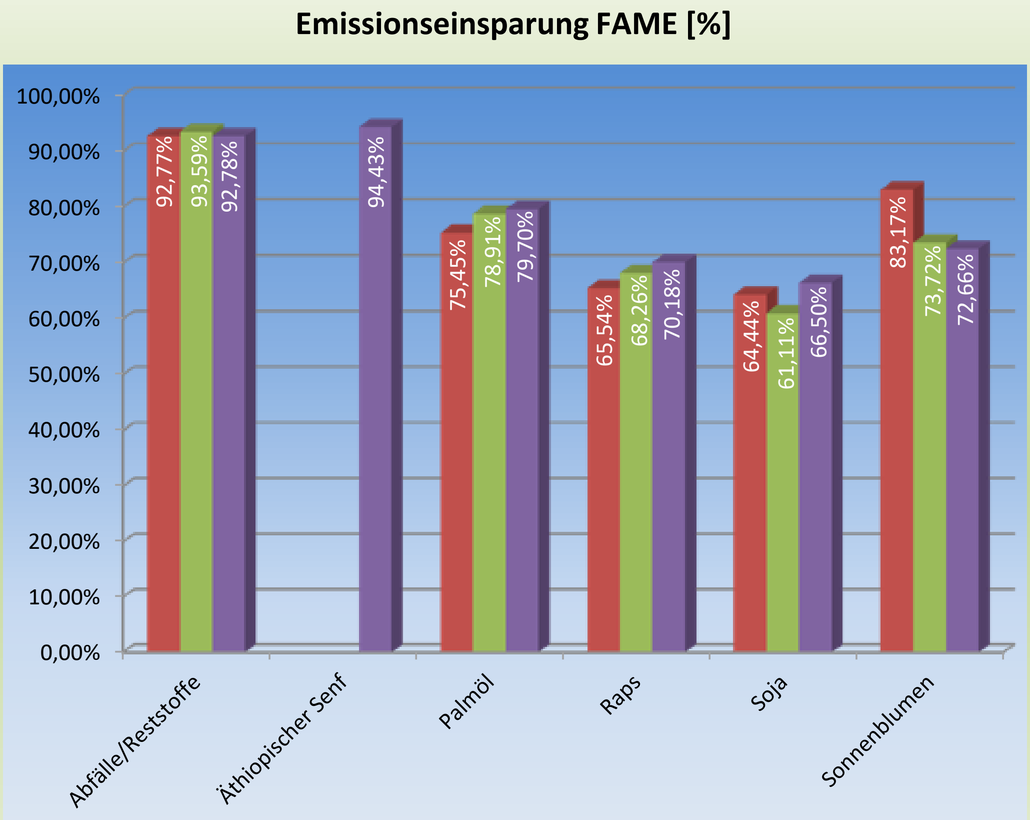


Figure 40

In the reporting year, a small quantity of Ethiopian mustard was used for producing biodiesel/FAME for the first time. This quantity originated from Uruguay and registered greater emission savings than the proportion made from waste and residues.



Energy content 2016: 74.517 TJ
Energy content 2017: 79.955 TJ
Energy content 2018: 86.663 TJ

Figure 41

6.5 Emission savings of individual types of biofuel per greenhouse gas reduction level

This section contains **tabular representations of the emission savings** for selected fuel types, source materials and cultivation regions. These are shown as a percentage of energy within GHG reduction levels.

Due to the use of individual fossil fuel reference values according to the 38th *BImSchV* from the 2018 quota year, the usual two-year comparison has been omitted from the following tables.[12]

[12] For an explanation of the change in emission savings due to a changed reference value for fossil fuels, see footnote 11.

Table 7: 2018 emission savings for bioethanol by source material and GHG reduction level – in %

GHG savings compared to reference values from 2018 [%]	Waste/ residues 419 TJ	Barley 1,326 TJ	Maize 15,484 TJ	Rye 1,439 TJ	Triticale 1,956 TJ	Wheat 8,622 TJ	Sugar cane 498 TJ	Sugar beet 1,042 TJ	Total 30,785 TJ
> 35-40									
> 40-45									
> 45-50									
> 50-55									
> 55-60			0.01	4.49	0.11	0.02		1.80	0.29
> 60-65			0.30					0.29	0.16
> 65-70			0.96	0.61	0.09	1.31		9.03	1.19
> 70-75		18.19	21.15	10.27	13.14	16.30	10.64	15.53	18.00
> 75-80		74.89	5.14	30.24	10.02	32.29	13.51		17.12
> 80-85	2.04		8.93	54.39	66.96	0.63	63.24	34.41	13.68
> 85-90			3.48		0.64	8.39		21.71	4.88
> 90-95	27.64		6.72			0.10	12.61	17.24	4.57
> 95-100	70.32	3.38	53.31		6.77	38.19			39.04
> 100-105		3.54			2.27	2.78			1.08
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Table 8: 2018 emission savings for bioethanol by source material, origin and GHG reduction level – in %

GHG savings compared to reference values from 2018 [%]	Maize				Wheat		
	Germany 247 TJ	EU 7,996 TJ	Third countries 7,240 TJ	Total bioethanol from maize 15,484 TJ	Germany 1,519 TJ	EU 7,103 TJ	Total bioethanol from wheat 8,622 TJ
> 35-40							
> 40-45							
> 45-50							
> 50-55							
> 55-60		0.02	0.00	0.01	0.00	0.03	0.02
> 60-65		0.59		0.30			
> 65-70		0.74	1.23	0.96	5.50	0.41	1.31
> 70-75	28.67	40.07	0.00	21.15	56.48	7.71	16.30
> 75-80	44.19	8.59		5.14	35.92	31.51	32.29
> 80-85	20.05	16.28	0.43	8.93		0.76	0.63
> 85-90	0.47	6.46	0.30	3.48		10.18	8.39
> 90-95		2.02	12.13	6.72		0.12	0.10
> 95-100	6.62	25.23	85.91	53.31	2.10	45.90	38.19
> 100-105						3.38	2.78
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Table 9: 2018 emission savings for FAME by source material and GHG reduction level – in %

GHG savings compared to reference values from 2018 [%]	Waste/residues 41,144 TJ	Ethiopian mustard 52 TJ	Palm oil 17,790 TJ	Rapeseed 25,105 TJ	Soya 675 TJ	Sunflower 1,898 TJ	Total 86,663 TJ
> 35-40							
> 40-45							
> 45-50							
> 50-55							
> 55-60			0.01	1.52	6.06		0.49
> 60-65			0.15	4.07	56.11		1.65
> 65-70	0.0002		2.17	34.41	10.55	8.76	10.69
> 70-75			0.63	53.05	0.29	84.76	17.36
> 75-80	0.002		46.38	6.91	26.99	6.49	11.87
> 80-85	0.14		45.86	0.04			9.49
> 85-90	8.83		4.30	0.01			5.08
> 90-95	73.02	100.00	0.51	0.002			34.83
> 95-100	18.01			0.0003			8.55
> 100-105							
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Table 10: 2018 emission savings for FAME by source material, origin and GHG reduction level – in %

GHG savings compared to reference values from 2018 [%]	Waste/residues				Rapeseed			
	Germany 8,186 TJ	EU 16,884 TJ	Third countries 16,074 TJ	Total FAME from waste/residues 41,144 TJ	Germany 12,187 TJ	EU 9,586 TJ	Third countries 3,332 TJ	Total FAME from rapeseed 25,105 TJ
> 35-40								
> 40-45								
> 45-50								
> 50-55								
> 55-60					1.66	0.85	2.93	1.52
> 60-65					4.79	3.95	1.79	4.07
> 65-70		0.001		0.0002	44.98	27.43	15.78	34.41
> 70-75					48.28	59.27	52.62	53.05
> 75-80		0.01		0.002	0.20	8.49	26.88	6.91
> 80-85	0.03	0.002	0.33	0.14	0.07	0.002		0.04
> 85-90	4.88	17.32	1.92	8.83	0.01	0.004		0.01
> 90-95	86.47	76.37	62.65	73.02		0.01		0.002
> 95-100	8.63	6.30	35.10	18.01		0.001		0.0003
> 100-105								
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Table 11: 2018 emission savings for vegetable oils by source material and GHG reduction level – in %

GHG savings compared to reference values from 2018 [%]	Palm oil 5 TJ	Rapeseed 19 TJ
> 50-55		
> 55-60		
> 60-65	100.00	28.29
> 65-70		20.01
> 70-75		51.69
> 75-80		
> 80-85		
> 85-90		
> 90-95		
> 95-100		
> 100-105		
Total	**100.00**	**100.00**

Table 12: 2018 emission savings for biomethane by source material and GHG reduction level – in %

GHG savings compared to reference values from 2018 [%]	Waste/ residues 1,329 TJ	Silage maize 80 TJ
> 50-55		
> 55-60		
> 60-65		
> 65-70		
> 70-75		
> 75-80	14.68	100.00
> 80-85	10.03	
> 85-90	2.06	
> 90-95	22.83	
> 95-100	49.46	
> 100-105	0.94	
> 105	14.68	100.00
Total	**100.00**	**100.00**

Table 13: 2018 emission savings for waste and residues by type and GHG reduction level – in %

GHG savings compared to reference values from 2018 [%]	Advanced pursuant to 38th *BImSchV*, Annex 1[13]								
	No. 3 **191 TJ**	**No. 4** **53 TJ**	**No. 7** **51 TJ**	**No. 9** **0.3 TJ**	**No. 11** **1 TJ**	**No. 16** **53 TJ**	**Used cooking oils** **35,192 TJ**	**Other** **7,429 TJ**	**Total waste and residues** **42,971 TJ**
> 35-40									
> 40-45									
> 45-50									
> 50-55									
> 55-60									
> 60-65									
> 65-70									
> 70-75									
> 75-80	100.00	1.00			25.90		0.04	0.05	0.49
> 80-85		4.53			74.10	100.00		1.90	0.46
> 85-90		0.16	23.70				9.55	4.02	8.54
> 90-95		94.31	76.30	100.00			70.70	74.59	71.01
> 95-100							19.70	19.28	19.47
> 100-105									
> 105								0.17	0.03
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

[13] See p. 97, Table 30

7 Bioliquids

The total quantity of bioliquids registered for electricity generation and supply under the EEG decreased again in the reporting year.

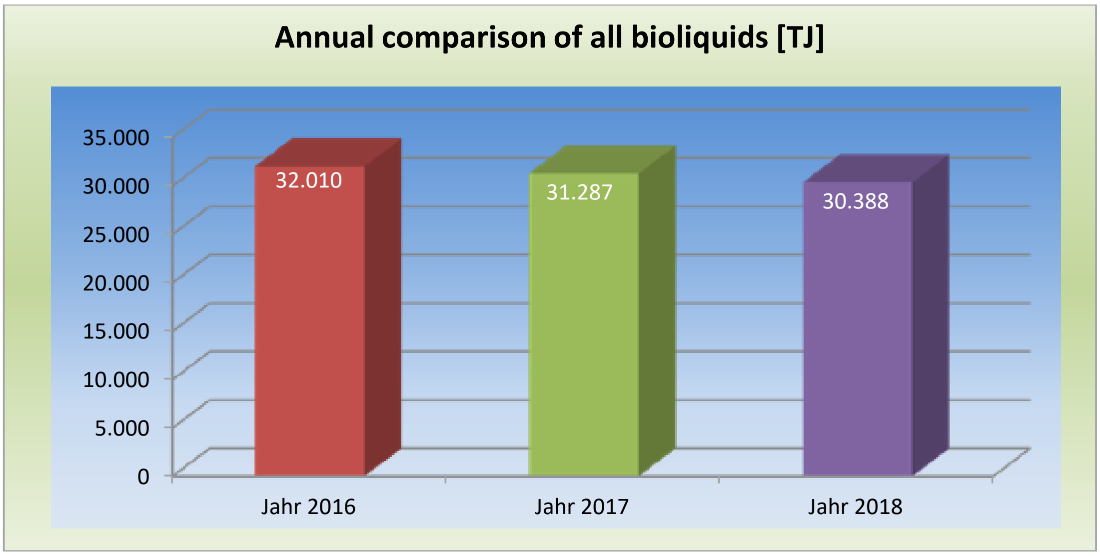


Figure 42

7.1 Type of bioliquids

Bioliquids from the pulp industry continued to decrease, while the quantity of vegetable oils increased slightly.

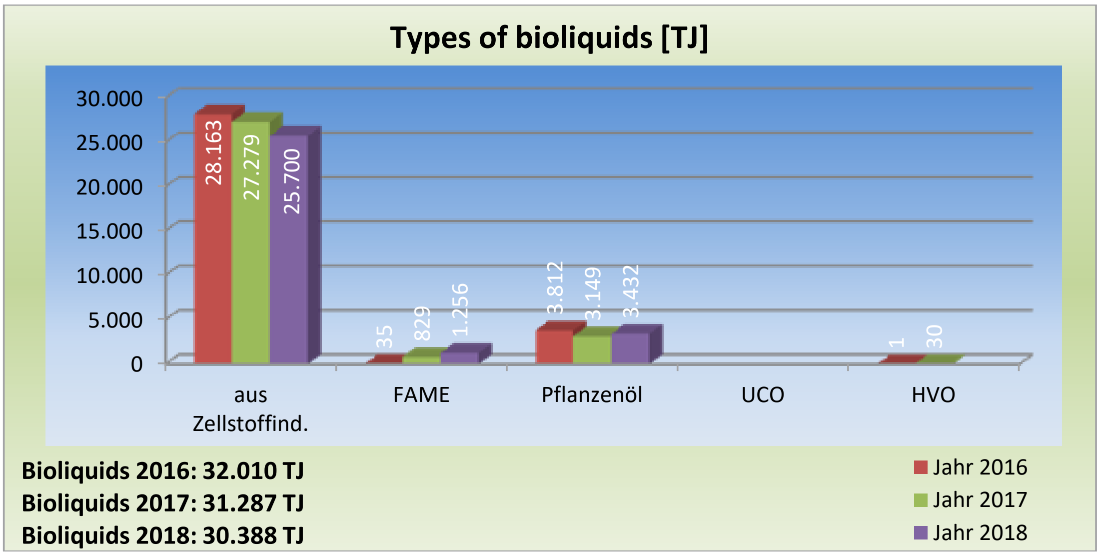


Figure 43

7.2 Source materials and origin of vegetable oils used as bioliquids

The reporting year saw a slight rise in the use of palm oil as against the previous year. The quantity of rapeseed used decreased.

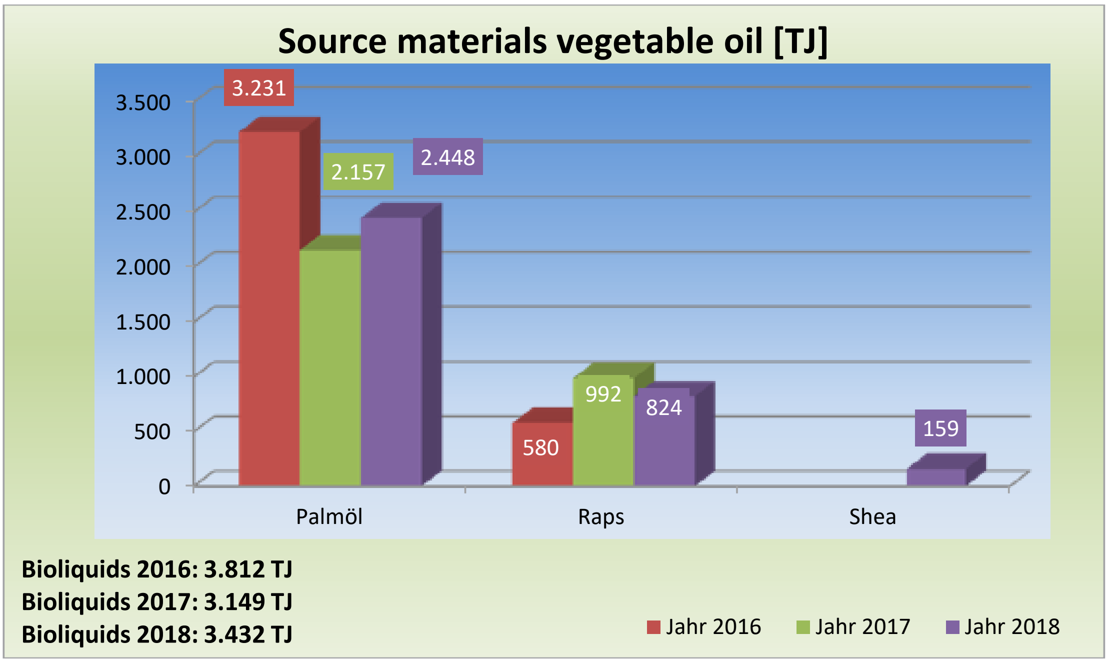


Figure 44

The quantities of palm oil originating from Malaysia decreased; though Malaysia remained the most important country of origin.

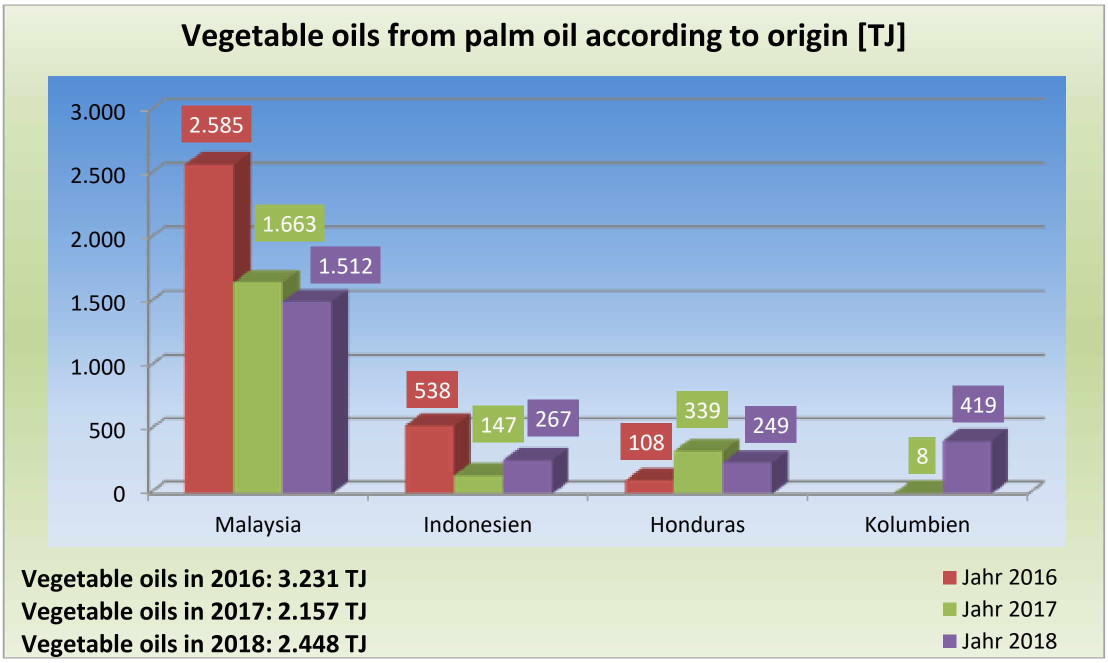


Figure 45

7.3 Greenhouse gas emissions and savings

In calculating emission savings, the total emissions resulting from the production of the bioliquid[14] were compared to the reference value of **91 g CO_2eq/MJ** for fossil fuels used for generating electricity.

Due to the high proportion of very low-emission thick liquor from the pulp industry, the overall savings in the area of bioliquids have traditionally been very high. Overall, however, somewhat higher emissions were recorded in the reporting year than in the previous year.

The emission savings presented here are based on the comparison of **pure bioliquids** to **pure fossil fuels**. For a bioliquid to be considered sustainable, evidence of a saving of 50% as against fossil fuel has needed to be provided since the 2018 quota year.

A saving of approx. 2.6M tonnes in CO2 equivalent was made through the use of bioliquids. This is because, if only fossil fuels had been used for electricity generation instead of bioliquids then, based on the fossil fuel reference value of 91 g CO_2eq/MJ, more than 2.6M tonnes in CO_2 equivalent would have been emitted.

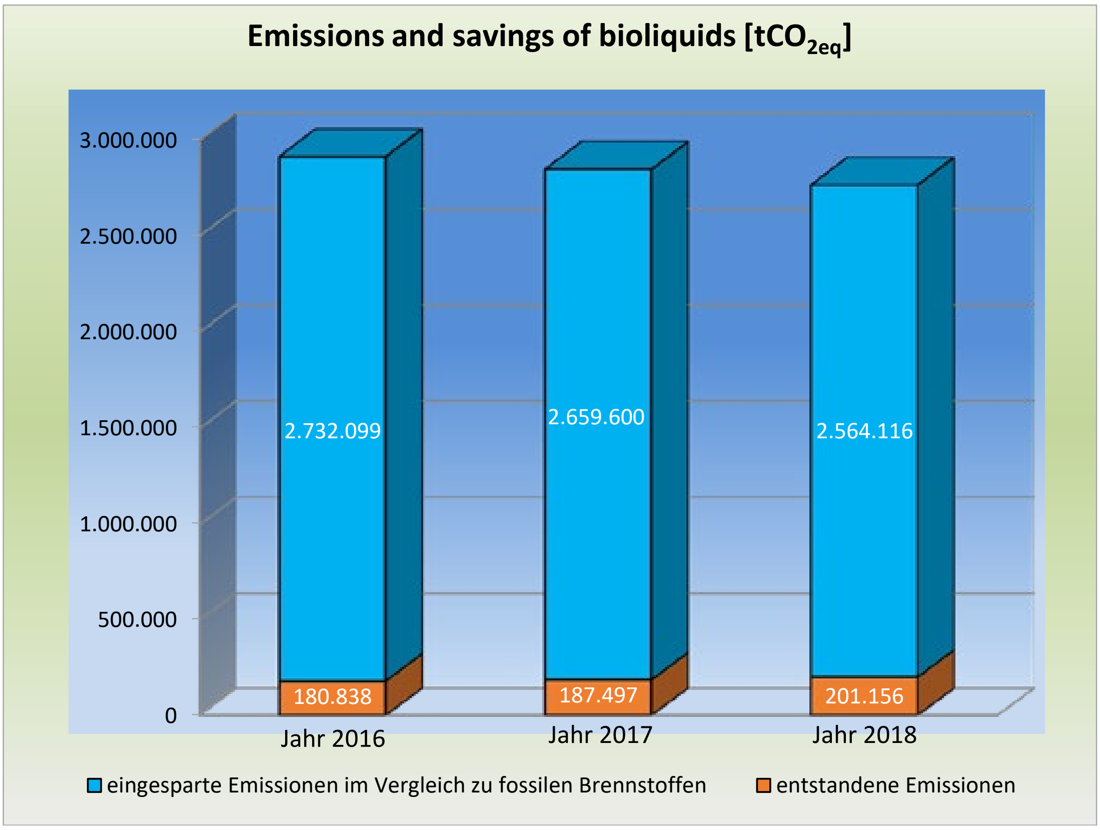


Figure 46

[14] The emissions calculation was made on the basis of the same method as for biofuels; cf. footnote 4.

The average amount of CO_2eq generated increased by 11% as against the previous year.

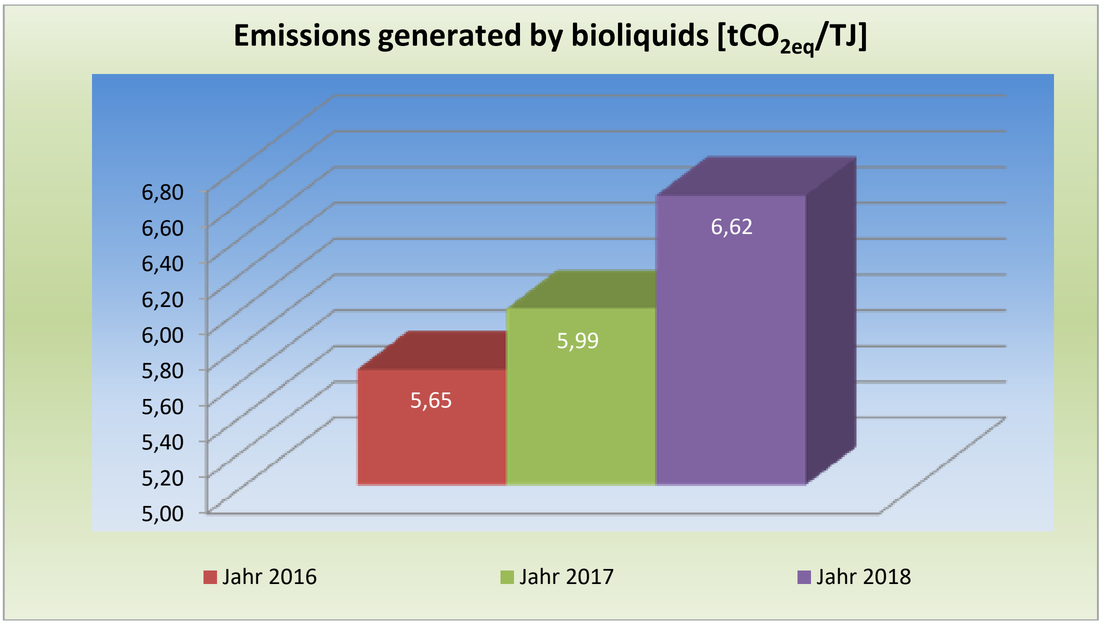


Figure 47

As a result, a lesser average saving in greenhouse gas emissions was recorded.

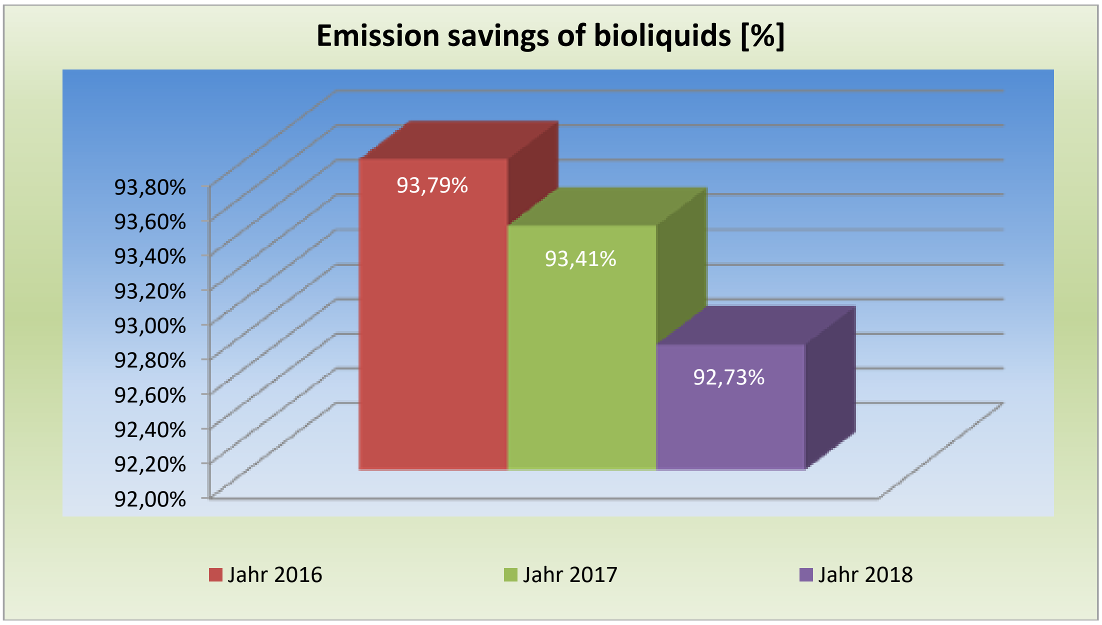


Figure 48

For FAME and vegetable oil bioliquids, a decrease in average emissions was recorded. For bioliquids from the pulp industry, this value increased slightly. Average emissions from hydrotreated oils remained constant.

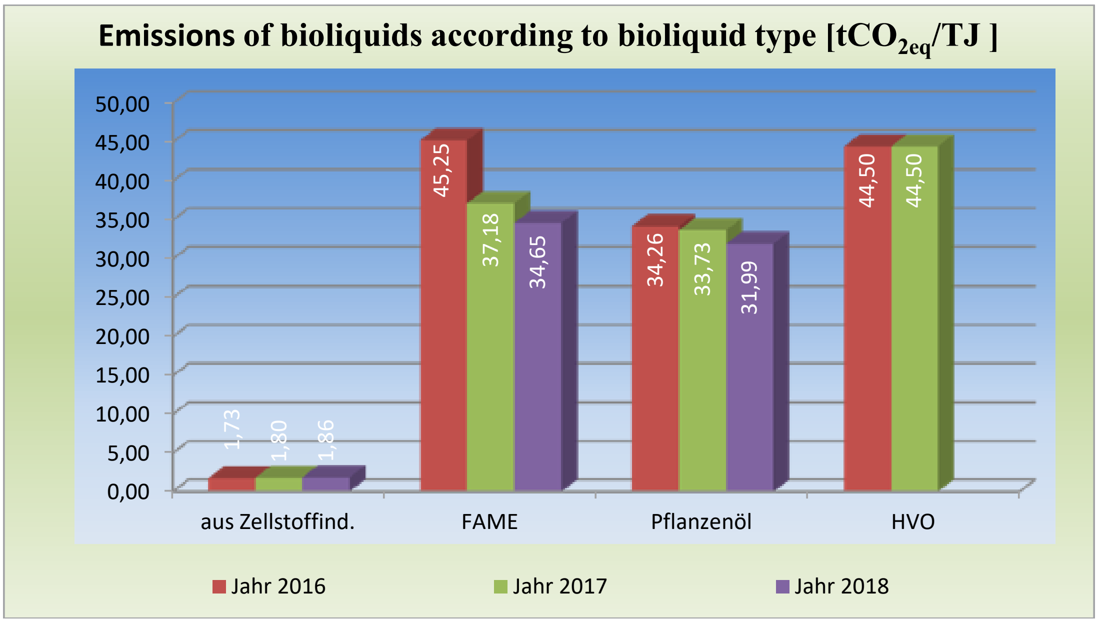


Figure 49

For the first time, bioliquids from the pulp industry achieved a saving of less than 98% in the reporting year.

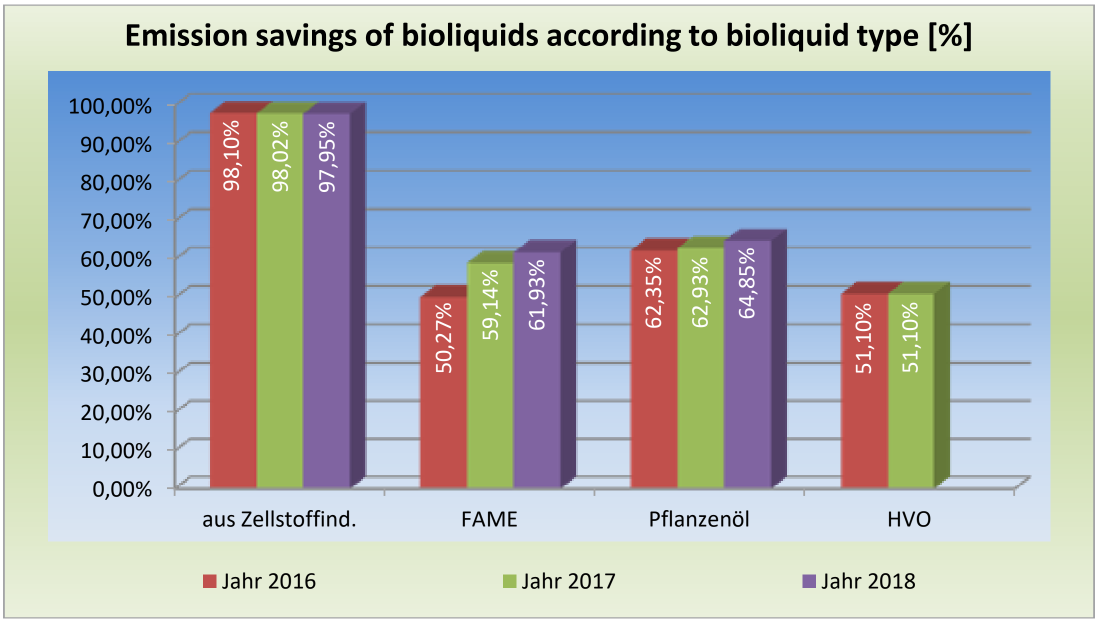


Figure 50

8 Retirement accounts

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

– **Country accounts**, in case the goods leave Germany and the recipient is not registered with *Nabisy*;

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

– **Shortfall on the reporting day**, in cases where there are no physical sustainable goods corresponding to the certificates in existence at the end of a mass-balancing period.

8.1 Retirement to accounts of other member states and third countries

Biofuels and bioliquids registered on the *Nabisy* database and exported to other countries must be retired to the account of the relevant state in *Nabisy* by the economic operators. In the reporting year, **73,735 TJ** (previous year: 48,631 TJ) of biofuels and bioliquids were transferred to the accounts of states within and outside the European Union.

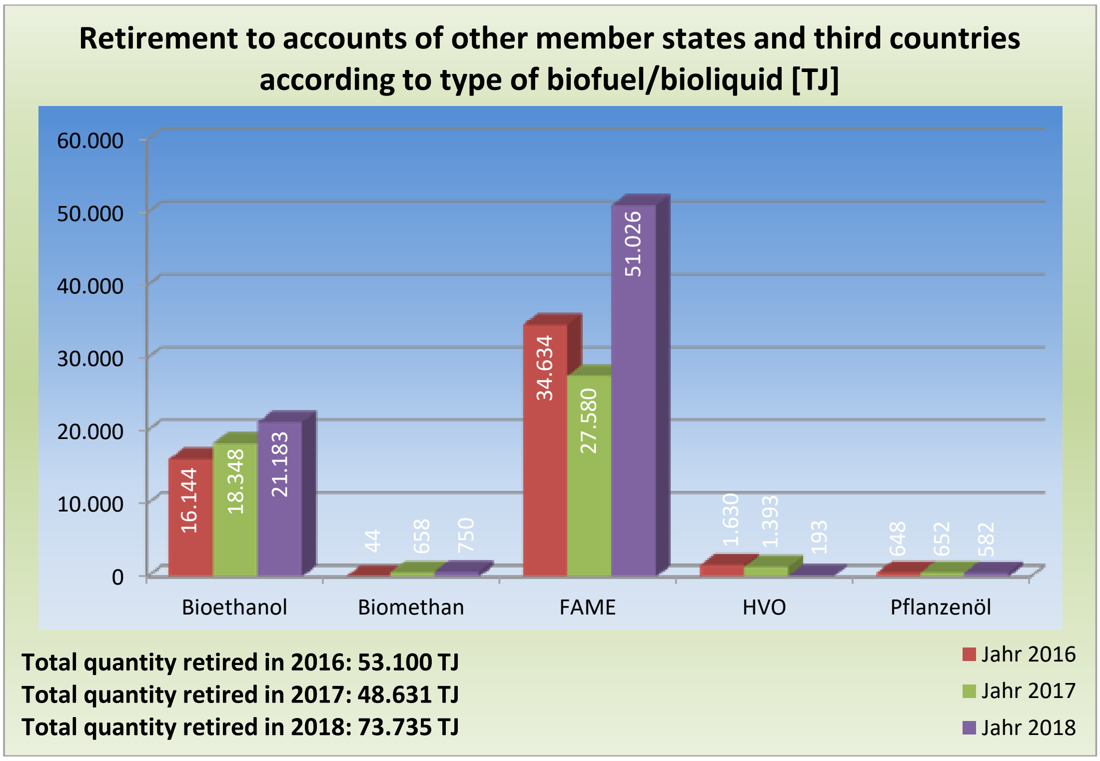


Figure 51

The following figure shows only those country accounts to which no less than 1,000 TJ were retired in at least one reference year. A complete list of the amounts retired can be found in Table 14 on page 83.

The largest amounts of biofuels and bioliquids were retired to the accounts of France (21.7%), the Netherlands (17%) and Austria (15.4%).

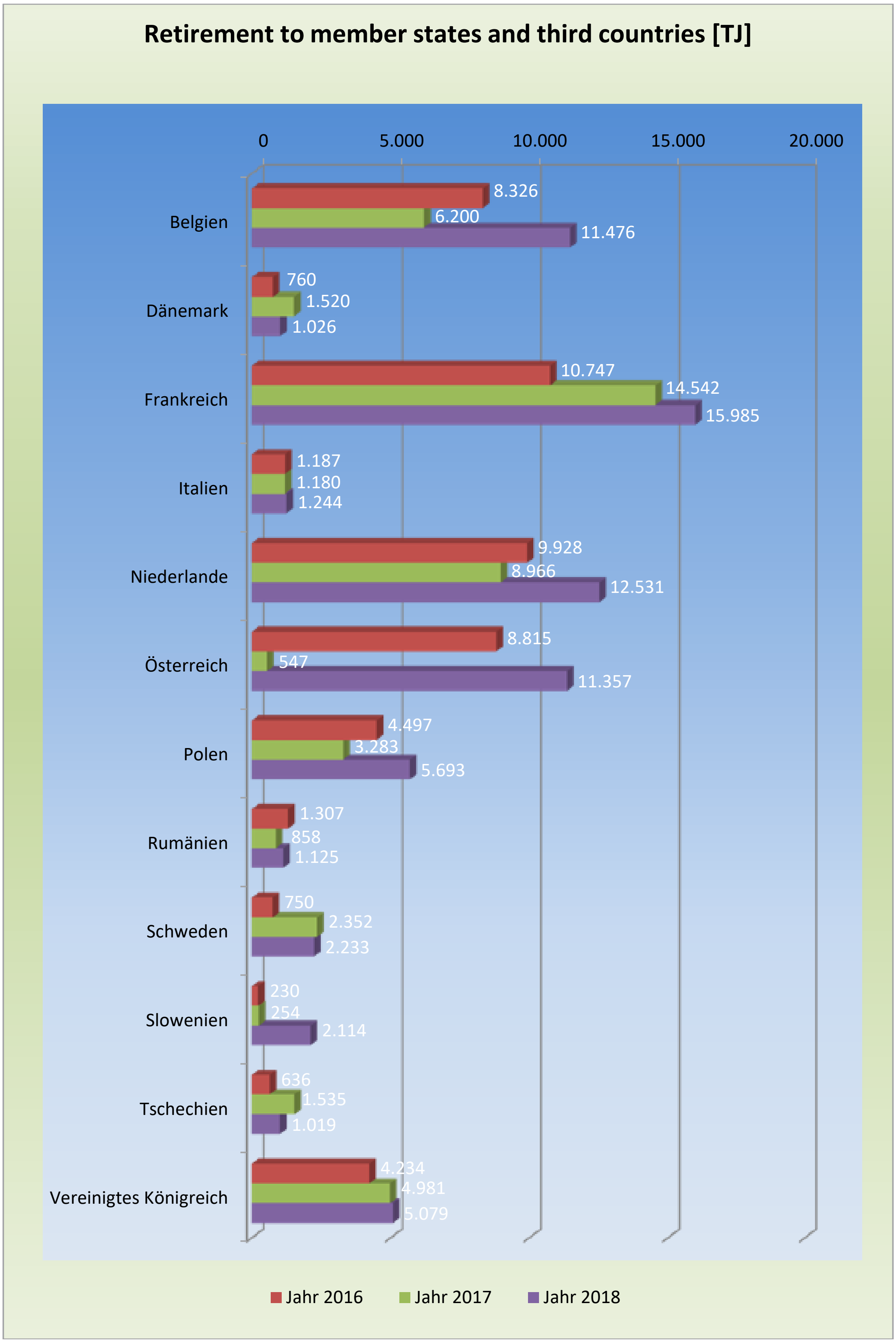

Retirement to member states and third countries [TJ]
0
5.000
10.000
15.000
20.000
Belgien
8.326
6.200
11.476
Dänemark
760
1.520
1.026
Frankreich
10.747
14.542
15.985
Italien
1.187
1.180
1.244
Niederlande
9.928
8.966
12.531
Österreich
8.815
547
11.357
Polen
4.497
3.283
5.693
Rumänien
1.307
858
1.125
Schweden
750
2.352
2.233
Slowenien
230
254
2.114
Tschechien
636
1.535
1.019
Vereinigtes Königreich
4.234
4.981
5.079
Jahr 2016
Jahr 2017
Jahr 2018

Figure 52

Table 14: Retirement of biofuels and bioliquids to member states and third countries in 2018 [TJ]

	Waste/ residues	Barley	Maize	Palm oil	Rapeseed	Rye	Soya	Sunflow-er	Triticale	Wheat	Sugar cane	Sugar beet	Total
Belgium	563		476	932	7,519	0.1	1,683	19	0.2	119	34	131	**11,476**
Bulgaria			123		82				31	27			**263**
Denmark	145		237						1	83	105	455	**1,026**
Estonia				76	69								**145**
Finland			88		111								**199**
France	801	21	2,946	261	6,193	34	2,855	98	5	1,975		795	**15,985**
Ireland										26	8		**34**
Italy	47		433		595					169		0.2	**1,244**
Croatia			27		44			1	1	2			**75**
Latvia					84								**84**
Lithuania					1	2							**3**
Luxembourg	89		49	27	437		190			5			**795**
Netherlands	6,646	18	2,148	0.1	561	23	0.2		1	2,084	634	415	**12,531**
Norway			46	68						59	1	16	**190**
Austria	203	6	440	265	9,844	91	195	55	25	168		65	**11,357**
Poland	26	69	383		4,409	100	19		40	416	17	215	**5,693**
Romania		11	987		73					54			**1,125**
Sweden	635		896		178		106			108	154	157	**2,233**
Switzerland			2			0.2			2	10		0.1	**15**
Slovakia			1		24	0.3				1			**26**
Slovenia	577		8	12	1,313		52	37	9	105			**2,114**
Spain			155		204		161			151	11	26	**709**
Czech Republic	271		77	41	494	53	0.04		29	37		17	**1,019**
Hungary	101		3		201	1	0.01	2	4	4			**315**
United Kingdom	3,178		833	10	51				10	333	361	302	**5,079**
Total	**13,280**	**124**	**10,357**	**1,692**	**32,487**	**305**	**5,261**	**211**	**159**	**5,936**	**1,325**	**2,596**	**73,735**

8.2 Emission savings in case of retirement to country accounts

As in the previous year, a lower reduction of emissions was recorded for the quantities retired to country accounts than for quantities counted towards the German Greenhouse Gas Reduction Quota. The reference values used for calculating the emission savings of the retired quantities were the fossil fuel reference values for the biofuel sector (bioethanol: 93.3 g CO_2eq/MJ; biomethane: 94.1 g CO_2eq/MJ; FAME, HVO, vegetable oil: 93.3 g CO_2eq/MJ).

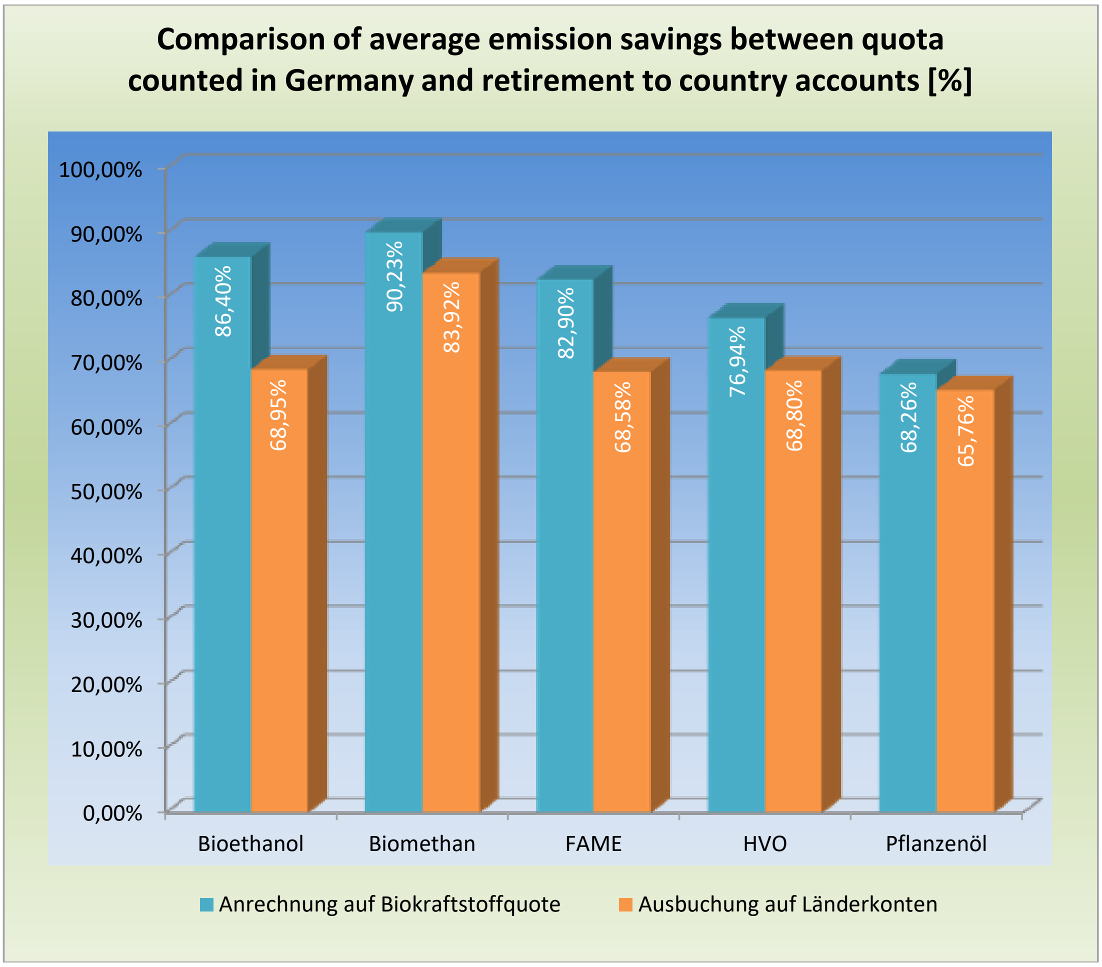


Figure 53

8.3 Retirement to other accounts

Besides retirement to country accounts, the *Nabisy* electronic database provides other retirement options for documented quantities not used as energy in Germany. The following figure shows the change over time for three of these other accounts.

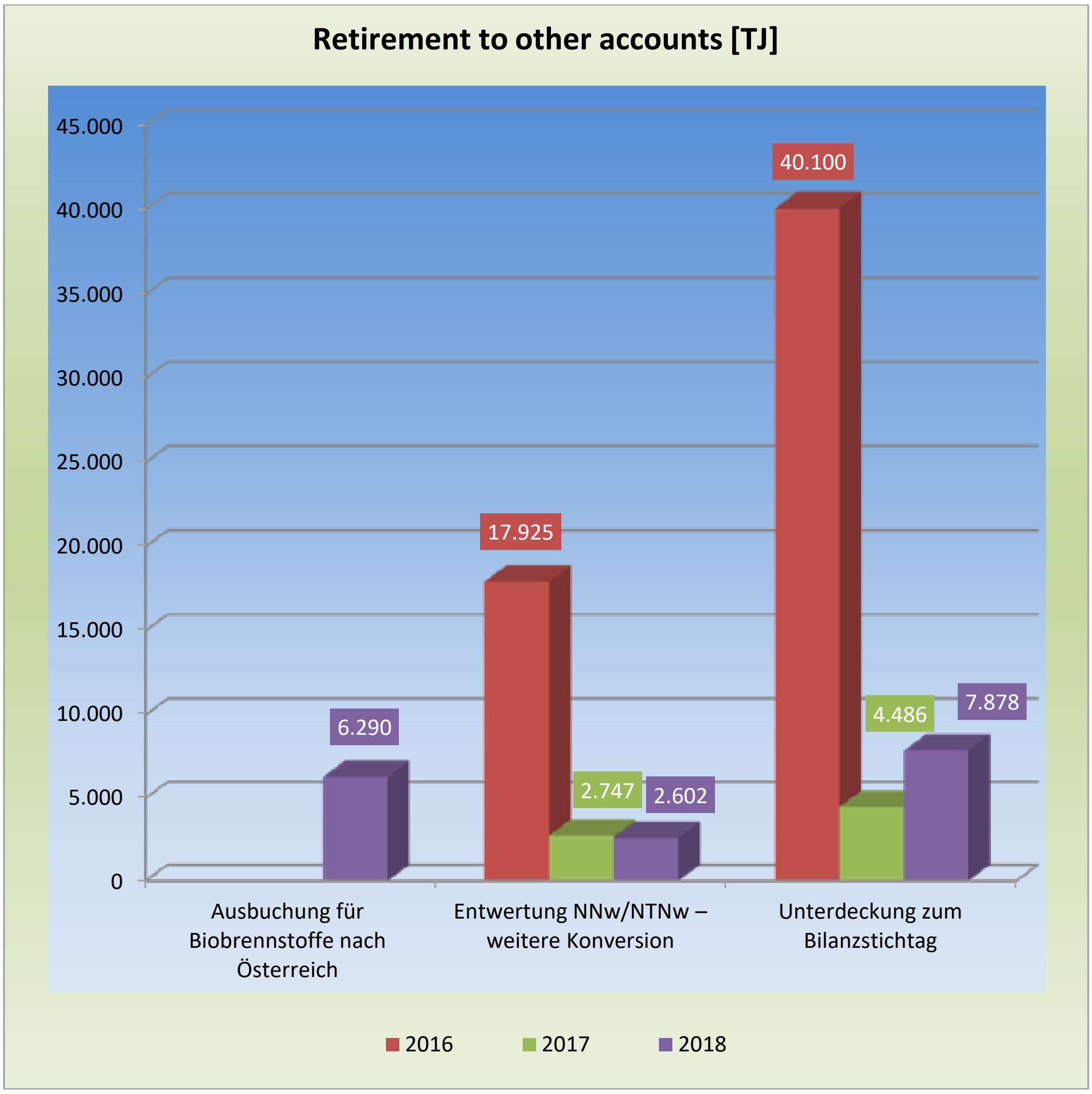


Figure 54

8.4 Quantities counted towards the quota, for *EEG* remuneration or retired

The following figure shows a three-year comparison of biofuels and bioliquids made from **palm oil and rapeseed** either counted towards the quota (Chapter 6), for EEG remuneration (Chapter 7) or retired (Chapter 8). The total amount of palm oil decreased during the reporting year. The quantity produced from rapeseed increased by 22.2%.

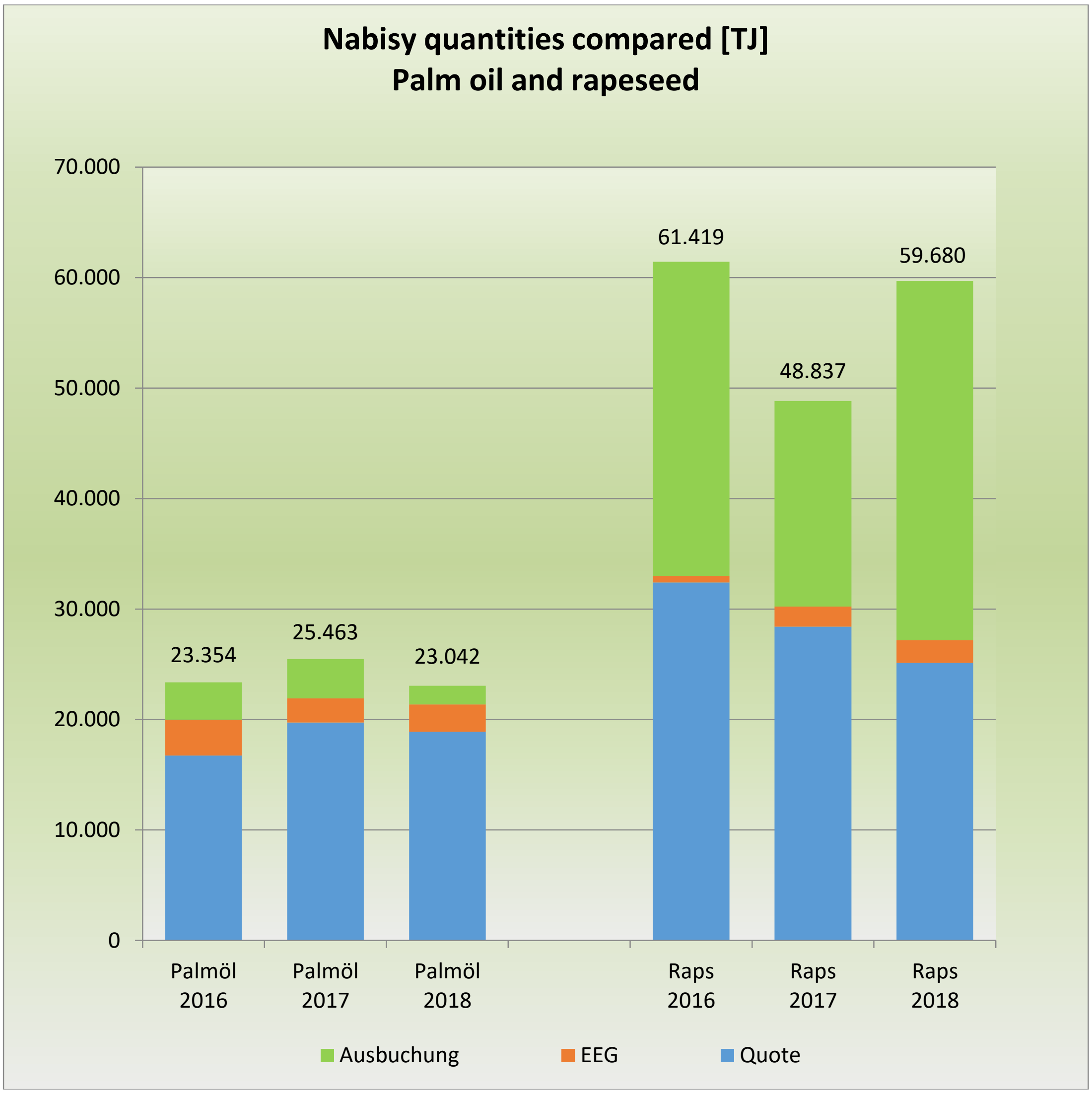


Figure 55

Biofuels and bioliquids made from sugar cane showed a decrease . The amount of sugar beet increased. Neither of these two raw materials was used for remuneration under the *EEG*.

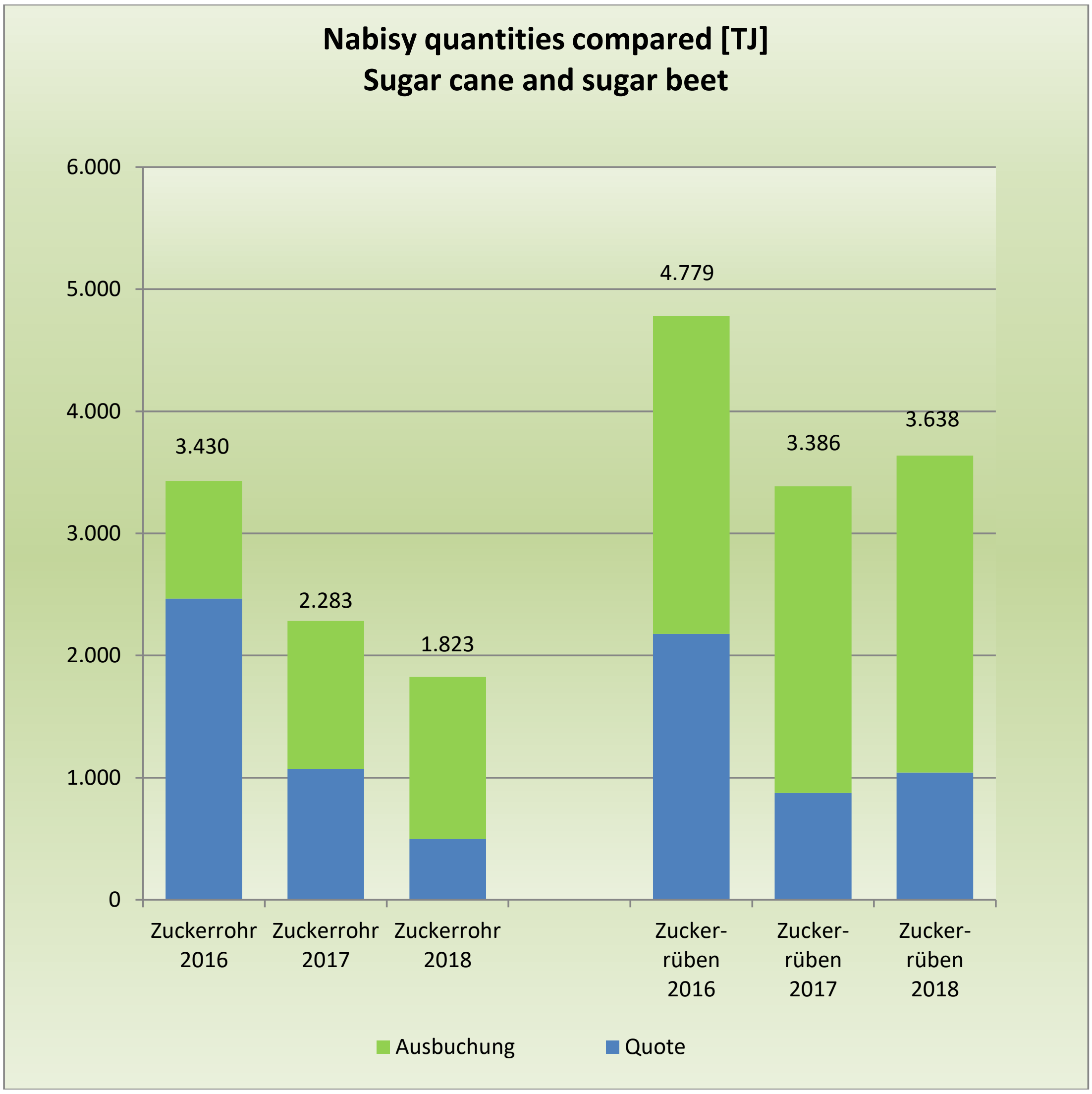


Figure 56

9 Outlook

Parties obliged to provide evidence having put fuels on the market in Germany are required to save 4% of their life-cycle greenhouse gas emissions as against their individual reference value during the 2018 reporting year. This is accomplished primarily by adding biofuels for which they must submit the relevant PoS from the *Nabisy* government database to the competent biofuels quota office. The quota will rise from 4% to 6% with effect from 2020. Since, in addition, it will not be possible to carry forward any previous excess in fulfilling quotas to 2020, this will present a challenge for the parties obliged to meet the quota.

As shown by the present annual report, in the fourth year of the Greenhouse Gas Reduction Quota, the quantity of biofuels put on the market in Germany increased again for the first time.

During the reporting year, the revised Renewable Energy Directive for the period 2021-2030 was adopted (Directive (EU) 2018/2001, known as RED II). It is to be transposed into national law by member states no later than 30 June 2021. It contains numerous new features of relevance to member states, the European Commission, voluntary EU schemes, as well as to all economic operators along the value chain: for instance, solid biomass fuels have been added; sustainability certification will now also apply to the heating and cooling sector; member states will be required to monitor the activities of certification bodies; and the European Commission is to set up a Union database for liquid and gaseous fuels in which will be entered all the transactions made and the sustainability characteristics of those fuels, including their life-cycle greenhouse gas emissions, starting from their point of production to the fuel supplier that places the fuel on the market.

The Union database is intended to minimise the risk of individual consignments being claimed more than once. This presupposes member states accepting only PoS from that database. Otherwise, from our experience, the overall system would not be 'watertight'. This in turn requires national legislation by all member states.

As the Union database will likely not be implemented until after RED II has been transposed into national law, one challenge for member states will be to create a legal basis for the collection of all required data, data sets and for format specifications etc. before these have been finally defined.

As existing monitoring approaches of individual member states differ (direct controls of economic operators or indirect control by supervising certification bodies, or mixed systems), a certain degree of harmonisation will be required to avoid the risk of either overlaps or gaps in monitoring.

10 Background data

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

Fuel type/ Quota year	Bioethanol Figure 28, p. 55			Biomethane Figure 33, p. 59			BtL FTD[2]	FAME Figure 30, p. 57			HVO Figure 32, p. 59			Vegetable oil Figure 34, p. 60		
	2016	2017	2018	2016	2017	2018	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018
Waste/residue	118	46	419	1,373	1,615	1,329	3	32,422	31,508	41,144	269	80	77			
Ethiopian mustard										52						
Barley	1,435	1,665	1,326													
Maize	9,983	14,369	15,484													
Palm oil								9,816	18,373	17,790	6,928	1,361	1,106			5
Rapeseed								32,154	28,381	25,105				246	26	19
Rye	2,028	2,272	1,439													
Silage maize						80				675						
Soya								46	62	1,898						
Sunflower								79	1,631							
Triticale	2,341	1,753	1,956													
from	9,647	7,940	8,622													
Sugar cane	2,466	1,071	498													
Sugar beet	2,176	875	1,042													
Total Figure 26, p. 53	**30,195**	**29,991**	**30,785**	**1,373**	**1,615**	**1,408**	**3**	**74,517**	**79,955**	**86,663**	**7,197**	**1,442**	**1,184**	**246**	**26**	**24**

[1] Differences in 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	Bioethanol			Biomethane			BtL FTD[3]	FAME			HVO			Vegetable oil		
Source material	**2016**	**2017**	**2018**	**2016**	**2017**	**2018**	**2018**	**2016**	**2017**	**2018**	**2016**	**2017**	**2018**	**2016**	**2017**	**2018**
Waste/residue	4	2	16	27	32	27	0.06	868	843	1,101	6	2	2			
Ethiopian mustard										1						
Barley	54	63	50													
Maize	377	543	585													
Palm oil								263	492	476	159	31	25			0.1
Rapeseed								860	759	672				7	1	1
Rye	77	86	54													
Silage maize						2										
Soya								1	2	18						
Sunflower								2	44	51						
Triticale	88	66	74													
Wheat	365	300	326													
Sugar cane	93	40	19													
Sugar beet	82	33	39													
Total	**1,140**	**1,133**	**1,163**	**27**	**32**	**28**	**0.06**	**1,994**	**2,140**	**2,319**	**165**	**33**	**27**	**7**	**1**	**1**

[1] Differences in totals are due to rounding.
[2] Conversion to tonnage on the basis of the quantity indications of the certificates.
[3] No data for 2016 and 2017.

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

Region/ Quota year / Source material	Africa Figure 14, p. 42			Asia Figure 15, p. 43			Australia Figure 16, p. 44			Europe Figure 17, p. 45			Central America Figure 19, p. 47			North America Figure 20, p. 47			South America Figure 21, p. 48		
	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018
Waste/residue	252	287	391	6,641	6,947	12,180	47	46	84	23,888	23,412	27,096	12	11	14	2,876	1,983	2,682	467	562	523
Ethiopian mustard																					52
Barley										1,435	1,665	1,326									
Maize			9							9,983	14,369	15,475									
Palm oil				16,435	17,464	17,867							309	2,270	1,029						5
Rapeseed						17	341	333	3,104	32,059	28,075	22,002				0.1					
Rye										2,028	2,272	1,439									
Silage maize												80									
Soya									10		35	19							46	27	646
Sunflower										79	1,631	1,898									
Triticale										2,341	1,753	1,956									
Wheat										9,647	7,940	8,622									
Sugar cane													464	324	247				2,002	746	251
Sugar beet										2,176	875	1,042									
Total Figure 10, p. 38	252	287	400	23,075	24,411	30,065	388	379	3,198	83,637	82,027	80,954	785	2,606	1,290	2,876	1,983	2,682	2,515	1,335	1,477

[1] Differences in 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		
	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018
Waste/residue	7	8	10	177	186	326	1	1	2	631	616	721	0.3	0.3	0.4	77	53	72	13	15	14
Ethiopian mustard																					1
Barley										54	63	50									
Maize			0.3							377	543	585									
Palm oil				413	462	474							8	61	28						0.1
Rapeseed						0.5	9	9	83	858	751	589									
Rye										77	86	54									
Silage maize												2									
Soya									0.3		1	1							1	1	17
Sunflower										2	44	51									
Triticale										88	66	74									
Wheat										365	300	326									
Sugar cane													18	12	9				76	28	9
Sugar beet										82	33	39									
Total	7	8	11	590	648	800	10	10	86	2,534	2,503	2,490	26	73	37	77	53	72	90	44	42

[1] Differences in totals are due to rounding.
[2] Conversion to tonnage on the basis of the quantity indications of the certificates.

Table 19: Total biofuels per source material[1]

Source material	2016 [TJ]	2017 [TJ]	2018 [TJ]	2016 [kt]	2017 [kt]	2018 [kt]
Waste/residue	34,183	33,249	42,971	906	879	1,145
Ethiopian mustard			52			1
Barley	1,435	1,665	1,326	54	63	50
Maize	9,983	14,369	15,484	377	543	585
Palm oil	16,744	19,734	18,901	422	523	502
Rapeseed	32,400	28,408	25,124	867	760	672
Rye	2,028	2,272	1,439	77	86	54
Silage maize			80			2
Soya	46	62	675	1	2	18
Sunflower	79	1,631	1,898	2	44	51
Triticale	2,341	1,753	1,956	88	66	74
Wheat	9,647	7,940	8,622	365	300	326
Sugar cane	2,466	1,071	498	93	40	19
Sugar beet	2,176	875	1,042	82	33	39
Total	**113,528**	**113,029**	**120,066**	**3,334**	**3,339**	**3,538**

[1] Differences in totals are due to rounding.

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

Type of biofuel	2016 emissions [t CO_2eq/TJ]	2017 emissions [t CO_2eq/TJ]	2018 emissions [t CO_2eq/TJ]	2016 savings [%]	2017 savings [%]	2018 savings [%]
	Figure 38, p. 64 and Figure 36, p. 63			Figure 39, p. 65 and Figure 37, p. 63		
Bioethanol	20.58	14.58	12.69	75.44	82.60	86.40[2]
Biomethane	8.03	7.77	9.19	90.42	90.73	90.23[3]
BtL FTD			8.30			91.27[4]
FAME	17.84	16.10	16.26	78.71	80.79	82.90[5]
HVO	31.66	29.64	21.93	62.22	64.64	76.94[6]
Vegetable oil	35.34	30.09	30.18	57.83	64.09	68.26[7]
Weighted mean of all biofuels	**19.37**	**15.75**	15.32	**76.89**	**81.20**	**83.81**

[1] Up to quota year 2017: Saving compared to fossil fuel reference value for all fuels of 83.8 g CO_2eq/MJ
[2] From quota year 2018: Saving compared to fossil fuel reference value for bioethanol of 93.3 g CO_2eq/MJ
[3] From quota year 2018: Saving compared to fossil fuel reference value for biomethane of 94.1 g CO_2eq/MJ
[4] From quota year 2018: Saving compared to fossil fuel reference value for BtL FTD of 95.1 g CO_2eq/MJ
[5] From quota year 2018: Saving compared to fossil fuel reference value for FAME of 95.1 g CO_2eq/MJ
[6] From quota year 2018: Saving compared to fossil fuel reference value for HVO of 95.1 g CO_2eq/MJ
[7] From quota year 2018: Saving compared to fossil fuel reference value for vegetable oil of 95.1 g CO_2eq/MJ

Table 21: Emissions and emission savings of bioliquids[1]

Type of bioliquid	2016 emissions [t CO_2eq/TJ]	2017 emissions [t CO_2eq/TJ]	2018 emissions [t CO_2eq/TJ]	2016 savings [%]	2017 savings [%]	2018 savings [%]
	Figure 49, p. 79 and Figure 47, p. 78			Figure 50, p. 79 and Figure 48, p. 78		
From pulp industry	1.73	1.8	1.86	98.1	98.02	97.95
FAME	45.25	37.18	34.65	50.27	59.14	61.93
HVO	44.5	44.5		51.1	51.1	
Vegetable oil	34.26	33.73	31.99	62.35	62.93	64.85
Weighted mean of all bioliquids	**5.65**	**5.99**	**6.62**	**93.79**	**93.41**	**92.73**

[1] Saving compared to fossil fuel reference value of 91 g CO_2eq/MJ

Table 22: Types of bioliquids [TJ][1]

Figure 43, p. 75

Type of bioliquid	2016	2017	2018
From pulp industry	28,163	27,279	25,700
FAME	35	829	1,256
HVO	1	30	
Vegetable oil	3,812	3,149	3,432
UCO			
Total Figure 42, p. 75	**32,010**	**31,287**	**30,388**

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

Figure 44, p. 76

Source material	2016	2017	2018
Palm oil	3,231	2,157	2,448
Rapeseed	580	992	824
Shea			159
Total	**3,812**	**3,149**	**3,432**

Table 24: Bioliquid: vegetable oils from palm oil – origin [TJ][1]

Figure 45, p. 76

Origin	2016	2017	2018
Honduras	108	339	249
Indonesia	538	147	267
Colombia		8	419
Malaysia	2,585	1,663	1,512
Total	**3,231**	**2,157**	**2,448**

[1] Differences in totals are due to rounding.

Table 25: Biofuels from source materials originating from Germany [TJ][1]

Fuel type/ Quota year	Bioethanol Figure 29, p. 56			Biomethane			FAME Figure 31, p. 58			Vegetable oil			Total Figure 18, p. 46		
Source material	**2016**	**2017**	**2018**	**2016**	**2017**	**2018**	**2016**	**2017**	**2018**	**2016**	**2017**	**2018**	**2016**	**2017**	**2018**
Waste/residue	56	0.1	124	1,373	1,602	1,316	6,862	6,360	8,186				8,291	7,962	9,626
Barley	1,335	1,468	1,234										1,335	1,468	1,234
Maize	134	71	247										134	71	247
Rapeseed							20,919	14,738	12,187	246	26	19	21,164	14,764	12,206
Rye	1,137	1,513	432										1,137	1,513	432
Silage maize						80									80
Sunflower									4						4
Triticale	60	404	459										60	404	459
Wheat	1,641	1,327	1,519										1,641	1,327	1,519
Sugar beet	1,787	635	585										1,787	635	585
Total	**6,150**	**5,418**	**4,601**	**1,373**	**1,602**	**1,396**	**27,781**	**21,098**	**20,377**	**246**	**26**	**19**	**35,549**	**28,144**	**26,392**

[1] Differences in totals are due to rounding.

Table 26: Biofuels from waste and residues [TJ][1]

Advanced biofuels pursuant to 38th *BImSchV*, Annex 1, No.	**2017**	**2018**
3 (biowaste)	86	191
4 (share of biomass in industrial waste)	58	53
5 (straw)	0.2	
6 (animal manure and sewage sludge)	3	
7 (palm oil mill effluent and empty palm fruit bunches)	80	51
8 (tall oil pitch)	3	
9 (crude glycerine)		0.3
11 (grape marcs and wine lees)	6	1
16 (other non-food materials containing cellulose)		53
Subtotal advanced biofuels	**237**	**350**
Non-advanced biofuels		
Used cooking oils	27,045	35,192
Other	5,967	7,429
Total waste and residues	**33,249**	**42,971**

11 Conversion tables, abbreviations, and definitions

Table 27: 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 28: Densities

Type of biofuel	Tonnes per cubic metre [t/m³]	Megajoule per kilo-gramme [MJ/t]
Biofuel from 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 29: Abbreviations

Abbreviation	Meaning
36th *BImSchV*	36th ordinance implementing the *Bundes-Immissionsschutzgesetz* [Federal Emissions Control Act] (Ordinance implementing the biofuel quota regulations)
38th *BImSchV*	38th ordinance implementing the *Bundes-Immissionsschutzgesetz* Ordinance setting out additional provisions for greenhouse gas reduction for fuels
CHP	Combined heat and power
Biokraft-NachV	*Biokraftstoff-Nachhaltigkeitsverordnung* [Biofuels Sustainability Ordinance]
BioSt-NachV	*Biomassestrom-Nachhaltigkeitsverordnung* [Biomass Electricity Sustainability Ordinance]
BtL FTD	Biomass to liquid Fischer-Tropsch diesel
DE scheme	Certification schemes recognised by the BLE under Sect. 33(1) and (2) of the *BioSt-NachV* and/or the *Biokraft-NachV*
EEG	*Erneuerbare-Energien-Gesetz* [Renewable Energy Act]
EU scheme	Voluntary scheme under Sect. 32(3) of the *BioSt-NachV* and/or the *Biokraft-NachV*
FAME	Fatty acid methyl ester (biodiesel)
HVO	Hydrotreated vegetable oil
Directive 2009/28/EC (Renewable Energy Directive)	Directive 2009/28/EC of the European Parliament and of the Council of 23 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 30: Definition of terms

Term	Meaning
Biofuel from pulp industry	Bioliquids from the pulp industry are by-products of cellulose production in the paper industry rich in energy and lignin.
Bioethanol	Bioethanol (ethyl alcohol) is obtained from renewable raw materials by distillation following alcoholic fermentation or by comparable biochemical methods.
Biomethane	Biogas rich in methane is produced by the fermentation of biomass.
Biomethanol	Like BtL fuel, methanol can be produced from a wide range of biomass types by means of synthesis gas. In addition, methanol can also be produced by converting crude glycerine.
FAME	Fatty acid methyl ester (FAME), known as biodiesel, is produced by transesterification of fats and oils with methanol.
HVO	Hydrotreated vegetable oils are vegetable oils converted to hydrocarbon chains in a hydrogenation plant by means of a chemical reaction using hydrogen.
Vegetable oil	Vegetable oil fuel can be obtained from rapeseed and other oil plants; unlike with biodiesel, no chemical conversion takes place.
UCO	UCO stands for used cooking oils. They can be used as a pure fuel or as a component of FAME.
Blending	The addition of e.g. biofuels to fossil fuels (e.g. a maximum of 7% for diesel).

Table 31: Advanced biofuels

According to the 38th *BImSchV*	According to Directive 2009/28/EC
Annex 1 to point (1) of Sect. 2(6) of the 38th *BIm-SchV* Raw materials for the production of biofuels according to point (1) of Sect. 2(6)	**ANNEX IX, Part A Feedstocks and fuels, the contribution of which towards the target referred to in the first subparagraph of Article 3(4) shall be considered to be twice their energy content:**
1 Algae cultivated on land in ponds or photobioreactors;	(a) Algae if cultivated on land in ponds or photobioreactors.
2 Biomass fraction of mixed municipal waste, but not separated household waste subject to recycling targets under point (a) of Article 11(2) of Directive 2008/98/EC.	(b) Biomass fraction of mixed municipal waste, but not separated household waste subject to recycling targets under point (a) of Article 11(2) of Directive 2008/98/EC.
3 Bio-waste as defined in Article 3(4) of Directive 2008/98/EC from private households subject to separate collection as defined in Article 3(11) of that Directive;	(c) Bio-waste as defined in Article 3(4) of Directive 2008/98/EC from private households subject to separate collection as defined in Article 3(11) of that Directive.
4 Biomass fraction of industrial waste not fit for use in the food or feed chain, including material from retail and wholesale and the agro-food and fish and aquaculture industry; but not the feedstocks listed in part B of Annex IX of Directive 2009/28/EC;	(d) Biomass fraction of industrial waste not fit for use in the food or feed chain, including material from retail and wholesale and the agro-food and fish and aquaculture industry, and excluding feedstocks listed in part B of this Annex.
5 Straw;	(e) Straw.
6 Animal manure and sewage sludge;	(f) Animal manure and sewage sludge.
7 Palm oil mill effluent and empty palm fruit bunches;	(g) Palm oil mill effluent and empty palm fruit bunches.
8 Tall oil pitch;	(h) Tall oil pitch.
9 Crude glycerine;	(i) Crude glycerine.
10 Bagasse;	(j) Bagasse.
11 Grape marcs and wine lees;	(k) Grape marcs and wine lees.
12 Nut shells;	(l) Nut shells.
13 Husks;	(m) Husks.
14. Cobs cleaned of kernels of corn;	(n) Cobs cleaned of kernels of corn.
15 Biomass fraction of wastes and residues from forestry and forest-based industries, i.e. bark, pre-commercial thinnings, saw dust, cutter shavings, black liquor, brown liquor, fibre sludge, lignin and tall oil;	(o) Biomass fraction of wastes and residues from forestry and forest-based industries, i.e. bark, branches, pre-commercial thinnings, leaves, needles, tree tops, saw dust, cutter shavings, black liquor, brown liquor, fibre sludge, lignin and tall oil.
16 Other non-food cellulosic material and	(p) Other non-food cellulosic material as defined in point (s) of the second paragraph of Article 2.
17. Other ligno-cellulosic material except saw logs and veneer logs.	(q) Other ligno-cellulosic material as defined in point (r) of the second paragraph of Article 2 except saw logs and veneer logs.

Annex 1, continued	ANNEX IX, Part A, continued
	(r) Renewable liquid and gaseous transport fuels of non-biological origin.
	(s) Carbon capture and utilisation for transport purposes, if the energy source is renewable in accordance with point (a) of the second paragraph of Article 2.
	(t) Bacteria, if the energy source is renewable in accordance with point (a) of the second paragraph of Article 2.