Bundesanstalt für
Landwirtschaft und Ernährung

Evaluation and progress report for the year 2021

Biomass Electricity Sustainability Ordinance
Biofuel Sustainability Ordinance

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Design
Federal Office for Agriculture and Food (BLE)

Photo/Picture credits
Federal Office for Agriculture and Food (BLE)
Title page image: BLE

Editorial version: December 2022
Database extract version: September 2022

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Foreword

Dear readers,

the 12th evaluation and progress report of the Federal Office for Agriculture and Food (BLE) informs the interested public as well as experts about the development of biofuels placed on the market in Germany.

In 2021, 3.95 million tonnes of biofuels were registered for inclusion in the greenhouse gas reduction quota. These biofuels, certified in accordance with the Biofuel Sustainability Ordinance, saved emissions amounting to 11.1 million tonnes of CO_2 equivalent and thus made an important contribution to achieving Germany's climate protection goals. The average saving compared to fossil fuels was 84.4 percent, which is also the highest value since the introduction of the greenhouse gas reduction quota in 2015.

Within the scope of its tasks, the BLE recognises certification bodies and supervises them through office inspections and audit monitoring. The BLE's monitoring activities continued to be influenced by the coronavirus pandemic in the reporting year 2021. However, it was possible to carry out more on-the-spot checks, especially in Germany.

Please note that in the year under review, the Renewable Energy Directive, which has been in force since 2009, was replaced by a new version. It was implemented nationally in December 2021. Major changes, such as the extension of the sustainability criteria to solid and gaseous biomass fuels for electricity generation, requirements for forestry biomass and adjustments to the GHG calculation will therefore not take effect until the 2022 reporting year. The same applies to the certification of the production and supply chain in the area of electricity generation from solid and gaseous biomass and the obligation to issue sustainability certificates via the Nabisy database.

For the reporting year 2021, we are therefore retaining the previous evaluation and presentation.

The deadline for submitting written notifications and for concluding quota trading agreements was extended by the Directorate General of Customs by two months to 15 June 2022. Accordingly, the required data for the preparation of the report became available later.

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 is part of the EU climate and energy package adopted by the Council on 6 April 2009. This package of binding legislation aims 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 improved energy efficiency, are essential elements of the package of measures to reduce greenhouse gas emissions and to comply with the Kyoto Protocol, the United Nations Framework Convention on Climate Change and other Community and international commitments to reduce greenhouse gas emissions beyond 2012.

The aim of this Directive is thus, among other things, to increase the share of energy from renewable sources within the EU [2], to reduce dependence on fossil fuels and to reduce greenhouse gas emissions.

Each member state must take measures and develop appropriate instruments at national level to achieve the targets set or national targets going beyond them.

The use of energy from renewable sources in the transport sector is considered to be one of the most effective means by which the EU can reduce its dependence on oil imports for transport, where the problem of security of energy supply is most acute, and influence the fuel market [3].

1 The three main objectives of the package are: Reducing greenhouse gas emissions by 20 % (compared to 1990 levels), 20 % of energy in the EU from renewable sources, improving energy efficiency by 20 %

2 by 2020 minimum share of 10 % of final energy consumption in the transport sector, Art. 3 para. 4 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 combustible biofuels:

- The reduction in greenhouse gas emissions achieved through the use of biofuels and combustible biofuels must be at least 50 % (for new installations at least 60 %) [4],

- Biofuels and combustible biofuels must not be produced from raw materials obtained from land of high biodiversity value,

- Biofuels and combustible biofuels must not be produced from raw materials obtained from land with a high carbon content,

- Biofuels and combustible biofuels must not be produced from raw materials obtained from land that was peat bog in January 2008, unless it has been demonstrated that the cultivation and harvesting of the raw material concerned does not require the drainage of previously undrained land.

The implementation of the sustainability criteria for biofuels and combustible biofuels can be implemented as follows according to Commission Communication 2010/C 160/02:

1. through national schemes,

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

3. by complying with the provisions of a bilateral or multilateral agreement concluded by the European Union with third countries to that effect by the Commission.

The European Commission publishes the implementing decisions on the recognition of voluntary schemes (EU schemes) for the area of the Renewable Energy Directive in the Official Journal of the EU. The recognition is valid for a maximum of five years and must then be applied for again. These voluntary schemes are active in the field of sustainable biomass production alongside the certification schemes recognised by the BLE (DE scheme) and national schemes of other member states.

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[4] The emissions accounting of biofuels and combustible biofuels must be carried out in accordance with the methodology pursuant to Art. 19 No. 1 lit. b or c in conjunction with Annex V of Directive 2009/28/EC, which corresponds to Art. 8 para. 2 in conjunction with Annex 1 of the Biofuel Sustainability Ordinance. After the upstream chain has passed on its own emissions, it is calculated by the certified biofuel producers and entered into the sustainability certificate. The fossil fuel equivalent to determine whether a biofuel is sustainable is 83.8 g CO_2eq/MJ.

On 4 August 2010, the Federal Government adopted the National Action Plan for Renewable Energy. On 28 September 2010, it also published its energy concept for an environmentally friendly, reliable and affordable energy supply. The transposition of the Directive into national law in the member states by 5 December 2010, as required by Art. 27 para. 1 of the Renewable Energy Directive, took place through the publication of the Biomass Electricity Sustainability Ordinance of 23 July 2009 (BioSt-NachV) and the Biofuel Sustainability Ordinance of 30 September 2009 (Biokraft-NachV) in the Federal Law Gazette. These sustainability ordinances implement the Renewable Energy Directive and are part of the measures of the National Action Plan and the Federal Government's Energy Concept.
With 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, the European legislator introduced an upper limit of 7 % for the contribution of biofuels produced from food crops (conventional biofuels) and changed the sustainability criterion of increased minimum savings in terms of time to currently 50 % and 60 % for new installations (since 01/01/2017) [5].

On 1 January 2015, the energy biofuel quota in Germany was replaced by the greenhouse gas reduction quota. Since that date, obligated parties have to ensure that the greenhouse gas emissions of the fossil petrol and fossil diesel fuels they place on the market plus the greenhouse gas emissions of the biofuels they place on the market are reduced by a specified percentage compared to their respective individually calculated reference value [6]. The reduction compared to the reference value has been 4 % since 2017 and 6 %from 2020.

As an accompanying measure to the introduction of the greenhouse gas reduction quota, the BLE regularly prepares evaluations for the Commission and the EU schemes, as well as the DE schemes. The evaluation informs the respective scheme about sustainability certificates with particularly low emission values that were entered into Nabisy by their scheme participants. Provided that the emission value stated in the verification is at least 10 % below the so-called

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5 Art. 17 para. 2 Directive 2009/28/EC

6 The reference value against which the greenhouse gas reduction must be made is calculated by multiplying the baseline value by the energetic quantity of fossil petrol and fossil diesel fuel placed on the market by the obligated party plus the energetic quantity of biofuel placed on the market by the obligated party. The greenhouse gas emissions of fossil petrol and fossil diesel fuels are calculated by multiplying the baseline by the energetic quantity of fossil petrol and fossil diesel fuel placed on the market by the obligated party. The greenhouse gas emissions of biofuels are calculated by multiplying the greenhouse gas emissions in kilograms of carbon dioxide equivalent per gigajoule shown in the recognised certificates pursuant to Art. 14 of the Biofuel Sustainability Ordinance by the energetic quantity of biofuel placed on the market by the obligated party.

typical value or a comparable value, it appears as a "particularly low emission value" in this evaluation. The BLE provides data here that must not be confused with the data for this evaluation report. It thus supports the certification schemes in carrying out its own evaluations. The Commission receives a summary of the total number of relevant sustainability credentials in each of the schemes it recognises.

1.2 This report

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

This report provides information on the use of sustainable biomass in Germany in the calendar/quota year 2021. The data on biofuel and combustible biofuel quantities are divided into three areas. These are:

- Biofuels counted towards the greenhouse gas reduction quota (Chapter 6)
- Combustible biofuels reported for conversion to electricity and feed-in under the EEG (Chapter 7)
- Biofuels and combustible biofuels that have not been used for energy purposes in Germany (Chapter 8)

The data basis for the evaluation report is the government database Sustainable Biomass System (Nabisy). This records all biofuel and combustible biofuel volumes relevant to the German market. The first step is for these data to be entered by the certified producers of biofuels or liquid combustible biofuels. They record all the necessary data so that a sustainability certificate can be created. Afterwards, the biofuel is usually traded several times, with all economic operators along the trade chain requiring certification as well as an account in Nabisy to receive or pass on the certificate, which is now called a sustainability sub-certificate. The function is similar to that of online banking.

1.3 Summary of important results and events of the year 2021

- For 138,737 TJ of biofuels [previous year 167,597 TJ], an application was made to count towards the German greenhouse gas reduction quota. This corresponds to 3,950 kilotonnes (kt) of biofuel. Around 41 % (56,285 TJ) of this came from raw material from the EU [previous year: just under 40 % (66,756 TJ)].

- The raw materials of all biofuel types were mainly palm oil (30 % [previous year: 35 %]), waste and residues (29 %, [previous year: 28 %]), rapeseed (16 %, [previous year: 17 %]) and maize (11 %, [previous year: 10 %]).

- The largest share of biofuel - around 61% - was accounted for by biodiesel (FAME) at 84,776 TJ, [previous year 53 %, 89,429 TJ].

- The share of bioethanol increased to 30,656 TJ (22 %), [previous year 29,528 TJ].

- The share of HVO fell to 19,725 TJ (14 %), [previous year 43,893 TJ]

- The most frequently used raw material for biodiesel production was waste and residues, 28,881 TJ (34 % [previous year 37 %]), followed by palm oil at 28,520 TJ (34 % [previous year 25 %]) and rapeseed 22,084 TJ (26 % [previous year 32 %]).

- The most frequently used raw material for bioethanol production was maize, 14,721 TJ (48 % [previous year: 59 %]) rye, 4,077 TJ (13 % [previous year: 7 %]) and wheat, 3,890 TJ (13 % [previous year: 12 %]).

- The use of palm oil in biofuels has increased by 29 % in 2021 compared to the previous year.

- The total greenhouse gas emission saving of all biofuels (pure) was 84.5 % compared to fossil fuels. This means that by using biofuels instead of fossil fuels, around 11.1 million tonnes of CO_2 equivalent were avoided.

- 27,928 TJ of liquid combustible biofuels were converted into electricity. An application was made for remuneration under the Renewable Energy Sources Act (EEG) for feeding the electricity into the grid. 87 % [previous year: 81 %] are thick lye from the pulp industry, 8 % [previous year: 14 %] consisted of vegetable oil.

- The total greenhouse gas emission saving of all combustible biofuels (pure) was 94.1 % compared to fossil fuels. This means that by using combustible biofuels instead of combustible fossil fuels, around 2.4 million tonnes of CO_2 equivalent were avoided.

- 127,441 TJ of the biofuels and combustible biofuels whose sustainability information was registered in Nabisy were derecognised to accounts of other states [previous year 96,554 TJ]. The corresponding sustainability certificates showed significantly higher emissions compared to the documents submitted in Germany.

- The certification bodies recognised by the BLE carried out 3,732 (previous year 3,353) certifications worldwide in the year under review. Of these, 3,683 (previous year 3,272) were in accordance with the requirements of the voluntary schemes and 49 (previous year 81) were in accordance with the requirements of the two DE schemes. These certifications are subject to monitoring by the BLE.

1.4 Methodology

This evaluation and progress report describes the existing processes and measures and analyses the data available to the BLE. In this context, the issues relevant to implementation in Germany, such as e.g. the implementation of Directive 2009/28/EC in other member states and the recognition of voluntary schemes by the European Commission, are also included.

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

The following descriptions refer to the data submitted to the BLE by the economic operators within the scope of its function as the competent authority pursuant to Art. 66 of the Biofuel Sustainability Ordinance (Biokraft-NachV) and Art. 74 of the Biomass Electricity Sustainability Ordinance (BioSt NachV).

Data on the sustainability of supplied biofuels and combustible biofuels must be entered by the economic operators in the government database Sustainable Biomass System (Nabisy) if they are relevant for the German market. Precautionary quantities that are ultimately not used for energy purposes in Germany are included in Nabisy without being attributed to Germany. The economic operator is responsible for the correct accounting. In this way, the entered data are collected in an organised manner and systematically documented.

The information available here is intended to provide the basis for optimisation processes among decision-makers in politics and business.

As far as this is possible on the basis of the available data, the analysis is also intended to examine the effectiveness of the measures.

Where information on the number of Nabisy users or certifications is provided, it should be noted that operators have been counted several times in the case of parallel use of different certification schemes and in the case that operators are both producers and suppliers. It is therefore not possible to draw conclusions about the actual number of companies participating in the measures.

The objectives to be achieved with regard to the measurement of the impact are

- increasing the share of renewable energies in Germany's energy supply in the fuel sector and in electricity production from liquid biomass,
- reducing greenhouse gas emissions through the use of sustainable biomass and
- developing more efficient processes and raw materials for energy production from biomass

and any changes that occurred in the respective calendar year within the framework of BioSt-NachV and Biokraft-NachV are analysed.

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.

Suitable methods were chosen for the determination, measurement and evaluation of the data.

The following data were analysed:

1. Sustainability certificates and sustainability sub-certificates for which crediting against the biofuel quota obligation was applied for in the respective quota year.
- These are predominantly sustainability sub-certificates that have been generated from multiple divisions through the trade chain to the end user. These certificates were identified on the basis of the use notes set by the biofuel quota office.

2. Sustainability certificates and sustainability sub-certificates from the calendar year 2021 that have been registered for remuneration under the EEG.
- These certificates were identified on the basis of the grid operators and the use notes set by the BLE.

3. Sustainability certificates and sustainability sub-certificates that have not been used for energy purposes in Germany.
- These certificates were identified based on the beneficiary account (charge-off account).

The data are considered and evaluated in terms of fuel type, quantity, energy content, source, raw materials used for production and finally the emissions that have been generated. Where graphic representations do not seem appropriate, tables are used.

The focus is primarily on the status as of 31/12/2021 and the development of the implementation of the measure over time (annually) in relation to the baseline values in the form of a statistical comparison.

In this context, the control measures of the BLE or administrative procedures are also analysed, evaluated and optimised.

Differences in the totals in this report are due to rounding.

2. Responsibilities of the BLE

The Federal Office for Agriculture and Food (BLE) is the competent authority in Germany for the implementation of the sustainability criteria of the Renewable Energy Directive in the legally regulated area of sustainability ordinances.

In the field of sustainable bioenergy, the BLE is responsible, among other things, for

- the recognition and monitoring of certification schemes and certification bodies in accordance with the sustainability ordinances,
- the management of data on the sustainability of biofuels or liquid biomass in the web-based government database Sustainable Biomass System (Nabisy) and the issuing of sustainability certificates at the request of the economic operators,
- the regular evaluation of the sustainability ordinances and the annual preparation of a progress report for the Federal Government,
- in the biofuel sector - the provision of data for the biofuel quota office and the main customs offices that are required for the crediting of biofuels to the greenhouse gas reduction quota,
- in the bioelectricity sector - the provision of data for the grid operators, which is necessary for the EEG remuneration and the bonus for renewable raw materials (NawaRo bonus) of the plant operators,
- in the emissions trading sector - the provision of data for the German Emissions Trading Authority DEHSt),
- the regular preparation of reports on particularly low emissions of the sustainability certificates for EU schemes, DE schemes and for submission to the EU Commission,

In addition, the BLE must carry out the following regular measures to implement the sustainability ordinances within the scope of its responsibility pursuant to Art. 74 of BioSt-NachV and Art. 66 of Biokraft-NachV:

- Conducting office audits at the certification bodies generally once a year (office audits) and risk-based and random assessments of the certification bodies' audit activities (witness audits),
- Maintenance and expansion of the BLE website with information and documents in German and English,
- Maintenance and further development of a consistent system for the recognition of certification schemes and bodies and for monitoring compliance with legal regulations,
- Maintenance and further development of the government database Nabisy for documenting the type and source of biofuels and sustainability certificates, documentation and plausibility checks of the data on the sustainability of biofuel deliveries, data exchange with databases of other member states,
- Maintenance and expansion of the information register pursuant to Art. 66 of BioSt-NachV and Art. 60 of Biokraft-NachV,
- Organisation of the meetings of the Sustainable Bioenergy Advisory Council,
- Events with certification schemes, certification bodies and the business community to exchange experience and information,
- Presentations at information events for multipliers such as associations, certification schemes, certification bodies, country representatives and competent authorities of other member states,
- Presence at various trade events and fairs,
- Cooperation and coordination of implementation with the implementing authorities of other member states in the bodies of the REFUREC (Renewable Fuels Regulators Club) and as an observer in the relevant working groups of CA-RES (ConcertedAction-Renewable Energy Sources Directive),
- Training of employees of the BLE's audit service who work as auditors in the field of sustainable biomass production,
- Training of users for the Nabisy web application.

3. Certification schemes

The Renewable Energy Directive and its national implementation through the sustainability ordinances require compliance with the sustainability requirements for biomass as well as for the biofuels and combustible biofuels produced from it by all economic operators along the entire value chain. It is the task of the schemes recognised by the BLE, as well as voluntary schemes recognised by the European Commission or national schemes of other member states, to specify and ensure this.

Certification systems must ensure organisational compliance with the requirements of the Renewable Energy Directive and the national law adopted for its implementation for the production and supply of biomass. Their system documents contain specifications of the requirements for the proof of their fulfilment as well as for the monitoring of the proof.

3.1 Certification schemes recognised by the BLE in accordance with Art. 33 No. 1 and 2 of BioSt-NachV or Biofuels-NachV

On 31/12/2021, the following certification systems were recognised by the BLE:

Table 1: Recognised DE certification schemes

ISCC System GmbH, Köln
REDcert GmbH, Bonn

For the following countries, the BLE has granted recognition to the DE systems as part of their application[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, Georgia, Ghana, Guatemala, Hong Kong, India, Indonesia, Israel, Kazakhstan, Kenya, Ivory Coast, Colombia, Laos, Madagascar, Malaysia, Mauritius, Mexico, Moldova, Mozambique, Nicaragua, Norway, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Russia, Switzerland, Serbia, Singapore, Sudan, South Africa, Republic of Korea, Tanzania, Thailand, Togo, Turkey, Uganda, Ukraine, Uruguay, USA; Uzbekistan, Venezuela, United Arab Emirates and Vietnam.

3.2 Voluntary schemes in accordance with Art. 32 No. 3 BioSt-NachV or Biokraft-NachV

According to the first sentence of the second subparagraph of Art. 18 para. 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 shall include accurate data for the purposes of Art. 17 para. 2.

[7] This does not mean that all these states allow the BLE to carry out on-site monitoring through a witness audit

These data may be used to demonstrate that deliveries of biofuel comply with the sustainability criteria set out in Art. 17 para. 3 to 5 of the Directive. The recognition of these voluntary schemes is valid for a maximum of five years.

According to Art. 41 of BioSt-NachV and Biokraft-NachV, these voluntary schemes are recognised in Germany as long as and to the extent that they are recognised by the EU Commission.

The currently recognised voluntary certification schemes are published on the website of the European Commission under 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 ensure organisational compliance with the requirements according to the sustainability criteria of the Renewable Energy Directive for the production and supply of biomass. They regulate the specifications of the requirements for the proof of their fulfilment as well as for the monitoring of the proof.

In 2021, only data from the national scheme from Austria were available in Nabisy. Companies located on Austrian territory are obliged to register sustainability data in the Austrian database elNa.

3.4 Economic operators

In the area of sustainable bioenergy, all economic operators in the entire value chain work according to the requirements of a certification scheme, a voluntary scheme or a national scheme of other member states, with the exception of the users (plant operators and anyone required to obtain certification). In addition to the sustainability certificate, these must comply with other national regulations in order to receive remuneration from the Renewable Energy Sources Act or credit towards the biofuel quota.

In detail, the following economic operators must be considered:

Growers

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

First gathering points

First gathering points are undertakings and premises (businesses) which gather the biomass required for the production of biofuels for the first time from the businesses who

cultivate and harvest them for the purpose of further trade (e.g. land trade).

Producers

Businesses or private households that generate waste and residual materials.

Collectors

Collectors are businesses and business premises (businesses) that first collect the biomass required for the production of biofuels in the form of biogenic waste and residues from the businesses or private households that generate waste and residues for the purpose of further trade.

Conversion operations

A distinction must be made here between two categories:

a) Businesses and premises that process biomass from sustainable cultivation or from biogenic waste or residues and feed the semi-finished products obtained to a further processing stage for the purpose of biofuel or combustible biofuel production (e.g. oil mills, biogas plants, fat processing plants or other plants whose process step is not sufficient to achieve the quality level required for end use).
b) Businesses and premises bringing liquid or gaseous biomass to the quality level required for end use. (e.g. oil mills, esterification, ethanol, hydrogenation or biogas processing plants).

The business requiring certification along the production and supply chain within the framework of the certification schemes are referred to as **interfaces**. Here, first gathering points and collectors are considered the first interface, and conversion operations, which bring the biomass to the quality level of its use, are considered the **last interface**.

Supplier or dealer in the value chain

Suppliers are economic operators between the first gathering points and the conversion operations or between the final interface and the biofuel distributor or the plant operator who feeds in electricity generated from biofuels. If suppliers are not subject to customs supervision after the last cut, they must be participants in an EU-recognised voluntary scheme.

Plant operators

Plant operators are economic operators who use equipment for the generation of electricity from renewable energies and feed the electricity into the grid, independently of their own property. For this, the plant operators receive an EEG payment from their grid operator upon submission of corresponding sustainability certificates.

Persons required to obtain certification

Economic operators who are required to provide certification are those who are obliged under Art. 37a of the Federal Immission Control Act (Bundesimmissionsschutzgesetz) to achieve a certain minimum reduction in greenhouse gas emissions of their total taxed fuel over the course of a calendar year. To this end, they can put sustainable biofuels on the market.

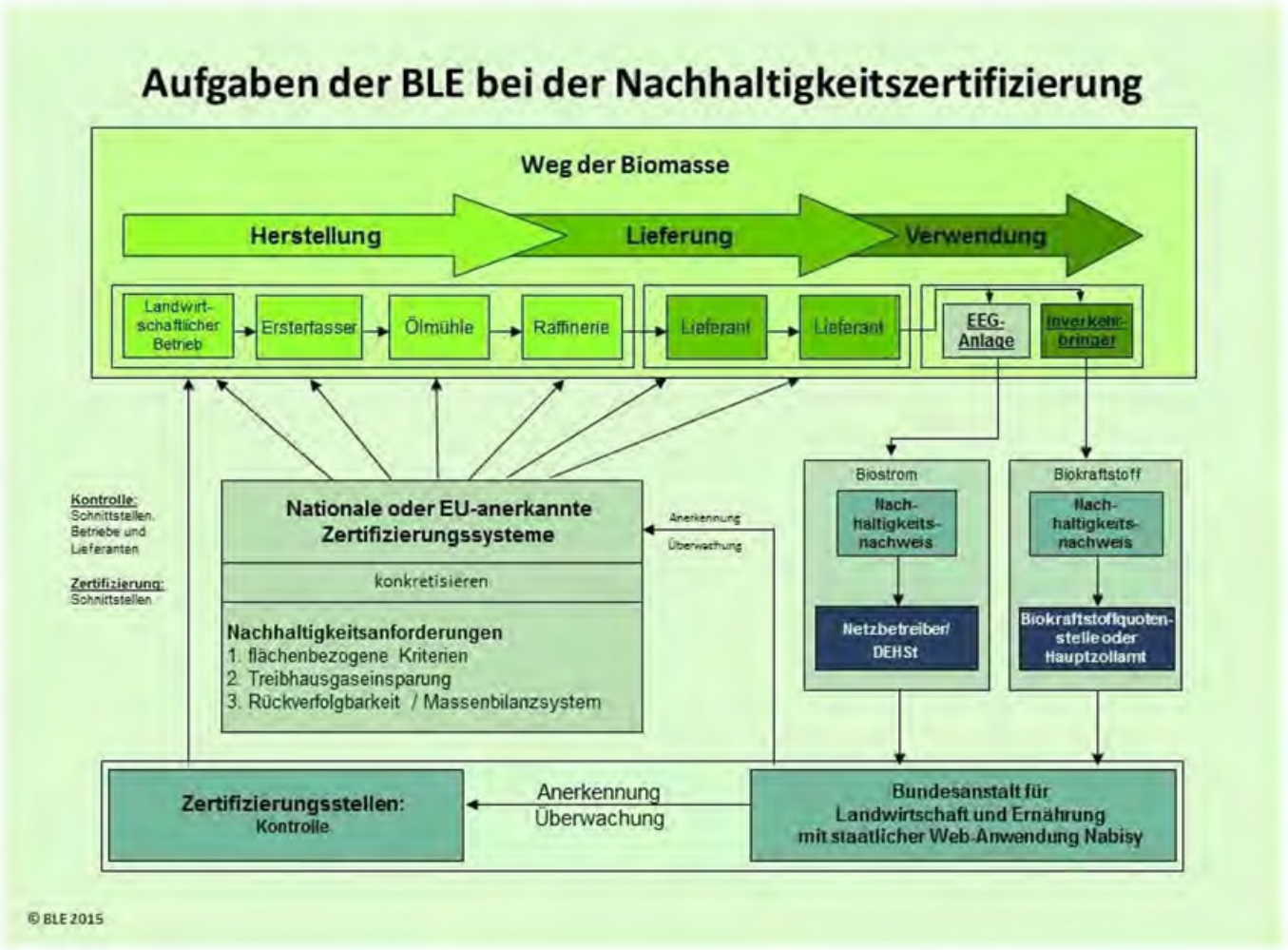
Aufgaben der BLE bei der Nachhaltigkeitszertifizierung
Weg der Biomasse
Herstellung
Lieferung
Verwendung
Landwirt-schaftlicher Betrieb
Ersterfasser
Ölmühle
Raffinerie
Lieferant
Lieferant
EEG-Anlage
Inverkehr-bringer
Kontrolle:
Schnittstellen Betriebe und Lieferanten
Zertifizierung:
Schnittstellen
Nationale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

Abbildung 1

3.4.1 Scheme participants reported to the BLE

Under the sustainability ordinances, voluntary national or international systems that impose requirements on the production of biomass products shall be deemed to be recognised informally by Germany as long as and to the extent that they are recognised by the European Commission. The same applies to national systems in other member states.

Only those participants are included who were reported to the BLE because of the biofuels or combustible biofuels that they produce or trade in which are or may become relevant for the German market and require Nabisy access.

As of the reporting date 31/12/2021, 3,603 participants along the value chain who produced or traded in biofuels or combustible biofuels were registered with the BLE.

The total figures result from all participants reported to the BLE. If a company fills different roles at the same time, e.g. producer of biofuel and supplier according to the last interface and/or it is a participant in several certification schemes, multiple counts may occur.

3.4.2 Suppliers under German customs supervision

If suppliers are under customs supervision after the last interface as defined in Art. 17 para. 3 No. 2 of Biokraft-NachV, they do not necessarily have to be participants in a voluntary scheme recognised by the European Commission. The prerequisite for this exemption is that the mass accounting system of suppliers is subject to regular audits by the main customs offices for reasons of tax monitoring in accordance with the Energy Tax Act or monitoring of the biofuel quota obligation in accordance with the Federal Immission Control Act and that the suppliers document the receipt and transfer of the biofuels with place and date including the details of the sustainability certificate in the electronic database Nabisy.

In the application procedure for access to Nabisy, the BLE has the main customs office responsible for the supplier's registered office confirm that the applicant is actually under customs supervision. As soon as this certificate is available, access is granted to the economic operator.

As of 31/12/2021, 406 suppliers under customs supervision were registered in Nabisy.

3.4.3 Participants in national schemes of other member states

Some of the participants deposited in Nabisy belong to national schemes of their member states. As of the reporting date 31/12/2021, a total of 210 participants (previous year: 136) were reported to the BLE from the national schemes of Austria, Slovakia and Hungary.

4. Certification bodies

Certification bodies are independent natural or legal persons that issue certificates to economic operators along the value chain and monitor compliance with the requirements of the Renewable Energy Directive and the national legislation enacted to implement it, as well as other requirements of the scheme used at all companies in the value chain. Certificates certify that the specific requirements of the Renewable Energy Directive for the production of sustainable biofuels or liquid biofuels are met. In Germany, the BLE is responsible for the recognition and monitoring of certification bodies in the context of sustainable biomass production.

According to Art. 42 No. 1 and 2 and Art. 43 in conjunction with Art. 56 of BioSt-NachV and Biokraft NachV, the BLE recognised the following number of certification bodies on 31/12/2021:

Table 2: Recognised certification bodies

Total certification bodies (as of 31/12/2021)	**28**
of which permanently recognised	**21**
of which provisionally recognised	7

Within the framework of the recognition procedure, certification bodies initially receive provisional recognition which enables them to commence their certification activities. This provisional recognition can only be replaced by a permanent recognition after a subsequent assessment of the certification body's office by the inspection service of the BLE (office audit).

The current list of recognised certification bodies can be viewed at any time at

http://www.ble.de/Biomasse

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BLE assessors carry out witness audits of the certification bodies worldwide, insofar as the countries have allowed the BLE to carry out witness audits on their territory.

In 2021, the BLE monitored 96 (previous year: 111) of the certification audits carried out by the certification bodies. 44 of these audits concerned economic operators in Germany, the remaining 52 audits concerned economic operators in other countries within and outside Europe.

The coronavirus pandemic also had an impact on the monitoring activities of the BLE in 2021 (e.g. through entry bans or contact restrictions). The concept developed at the beginning of the pandemic, which allows a minimum of control activity and thus evaluation of the activities of a certification body even without carrying out on-site inspections, continued to be applied. The duty of care towards the employees was the main focus. The majority of inspections abroad were carried out as remote audits, while inspections in Germany were mostly carried out as on-site inspections. The data exchange portal BSCW (Basic Support for Cooperation Work) proved to be a reliable means of exchanging data with the certification bodies.

Table 3: Permanently recognised certification bodies (as of 31/12/2021)

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
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
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 Konformitätsbewertung mbH	04/02/2015
SicZert Zertifizierungen GmbH	26/03/2015
Auditcert GmbH Umweltgutachterorganisation	25/09/2020

4.1 Certifications under the specifications of certification schemes

In Germany, the transposition of Directive 2009/28/EC into national law provides for a certification obligation for certain economic operators along the value chain for the production of biofuels or combustible biofuels, so-called interfaces. These include first gathering points/collectors, suppliers and all conversion operations.

The BLE is responsible for the recognition and supervision of certification bodies that are based in Germany and decide on certification there.

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

In the reporting year, 49 certificates were issued in accordance with DE system requirements (previous year 81).

Certifications were carried out worldwide according to the specifications of the certification systems recognised by the EU Commission. In the reporting year, 3,683 (previous year: 3,272) initial and recertifications were reported to the BLE for businesses certified according to EU scheme requirements.

5. Government database Nabisy and sustainability certificates

5.1 Sustainable Biomass System (Nabisy)

Commission Decision 2011/13/EU of 12 January 2011 requires member state operators to submit certain information on the sustainability of any supply of biofuels and bioliquids where this may become relevant to the market concerned.

This is done electronically in Germany. For each consignment of biofuels or bioliquids, this information is to be deposited by the economic operators in the web-based state database Nabisy. Sustainability certificates or sustainability sub-certificates contain the data stored in Nabisy on the fulfilment of sustainability criteria and must be passed on in the supply chain.

In the reporting year, 2,312 account (previous year: 2,242) movements were registered. These are exclusively the accounts of businesses from the last interface onwards, as this is where the Nabisy system comes in.

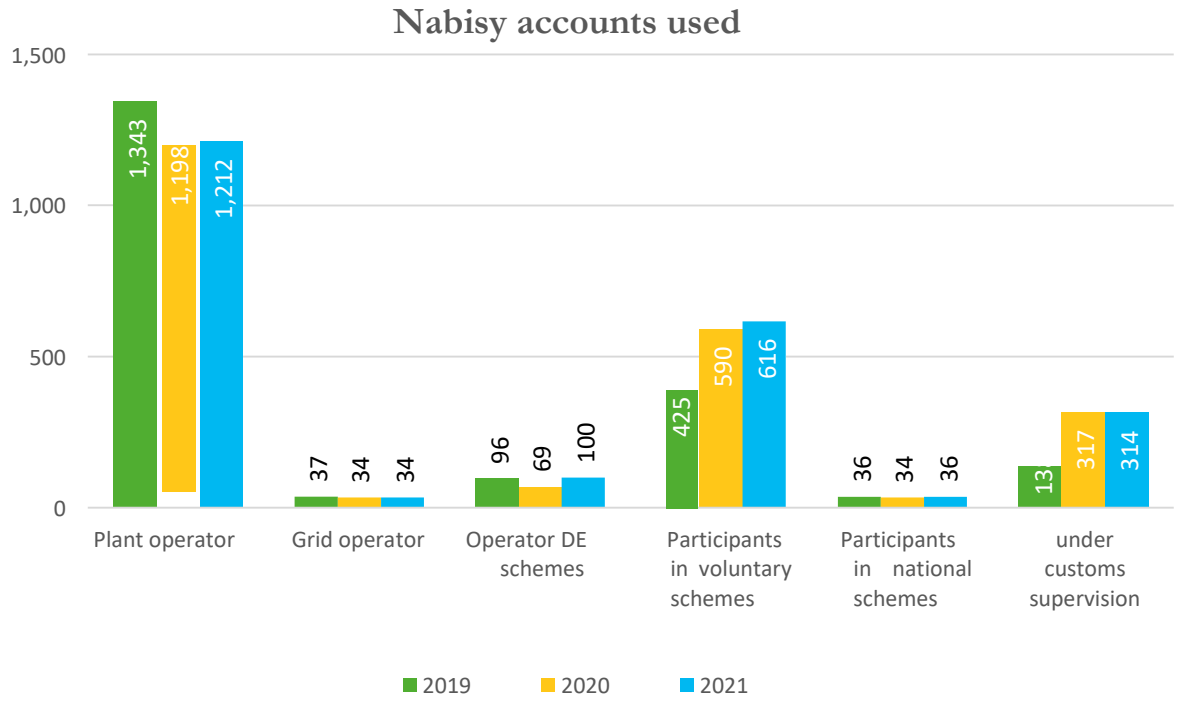


Abbildung 2

5.2 Certificates

A sustainability certificate can only be issued by the producer of a delivery quantity of biofuel or combustible biofuel. He is a so-called "last interface". By issuing the certificate in Nabisy, he ensures that the delivery can be used on the German market. If a later part of the value chain, e.g. a supplier, decides that the goods are to be used outside Germany, the supplier must book the corresponding certificate to the derecognition account of the country in which the use takes place.

The submission of sustainability certificates or sustainability sub-certificates to the customs authority is a prerequisite for the crediting of biofuels towards the greenhouse gas reduction obligation of the distributor. Plant operators can only claim remuneration under the Renewable Energy Sources Act (EEG) and, if applicable, the NawaRo bonus for electricity generated from biomass and fed into the grid if they submit sustainability certificate or sustainability sub-certificate.

Sustainability certificates are issued by certified economic operators who process the liquid or gaseous biomass to the required quality level for use as biofuel or who produce biofuels from the biomass used (issuers). In the sustainability ordinances, these economic operators are referred to as the final interface. This terminology is not used by the voluntary schemes.
Therefore, this report generally refers to the economic operator issuing the sustainability certificate.

A sustainability certificate issued identifies a quantity of biofuel as sustainable. If biofuels or combustible biofuels are traded in the supply chain up to the party required to obtain certification or the plant operator, the respective quantities are passed on according to demand.

In order to be able to map this, it is necessary to split a sustainability certificate accordingly or to rebook it to a customer's supplier account. This results in sustainability sub-certificates.

Nabisy processes sustainability certificates ("basic certificates", which can only be issued by producers) and sustainability sub-certificates s ("follow-up certificates", which are created by every supplier action): rebooking and sharing).

In 2021, 27,107 sustainability certificates (previous year 25,241) were entered into Nabisy by 350 producers worldwide. In some cases, they have several production sites.

Table 4: Sustainability certificates issued

Location of producers	Number of producers	Number of sustainability certificates issued
Germany	150	14,822
European Union	97	10,192
Third countries	103	2,093
Total	**301**	**27,107**

The current templates for sustainability certificates (basic certificate) and sustainability sub-certificates (follow-up certificate) are shown below.

NACHHALTIGKEITSNACHWEIS

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

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

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

1. Allgemeine Angaben zur Biomasse / zum Biokraftstoff:

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

Abbildung 3

Bundesanstalt für
Landwirtschaft und Ernährung

Zusatzinformation zu EU-BM-14-212-10000002-NNW-00000706

Allgemeine Daten

Ausstellungsdatum	11.04.2019
Lieferdatum	31.03.2019
Empfänger	Lieferantitrader 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	56,00

* 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

Abbildung 4

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

Abbildung 5

Bundesanstalt für
Landwirtschaft und Ernährung

Zusatzinformation zu EU-BM-14-Ltr-10000007-999-12345678-NTNw-10007199

Allgemeine Daten

Ausstellungsdatum	23.04.2019
Lieferdatum	31.03.2019
Empfänger	Lieferantvorname 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	97,1 g CO2eq/MJ

Abbildung 6

6. Biofuels

The following graph shows the energy quantities (TJ) of biofuels in Germany for which crediting towards the 2021 greenhouse gas reduction quota was requested.

The data basis is the certification deposited in Nabisy, which is provided with corresponding use notes by the Federal Fiscal Authority.

It should be expressly noted here that statements can only be made about the quantities and energy contents applied for. Based on the available data, it is not possible to say whether all the quantities and energy contents shown actually lead to the quota obligation being taken into account.

In the reporting year 2021, a total of 17 % less biofuels were declared for quota crediting than in the previous year. The share of cultivated biomass fell by 19 %, slightly more than the share from wastes and residues at 12 %.

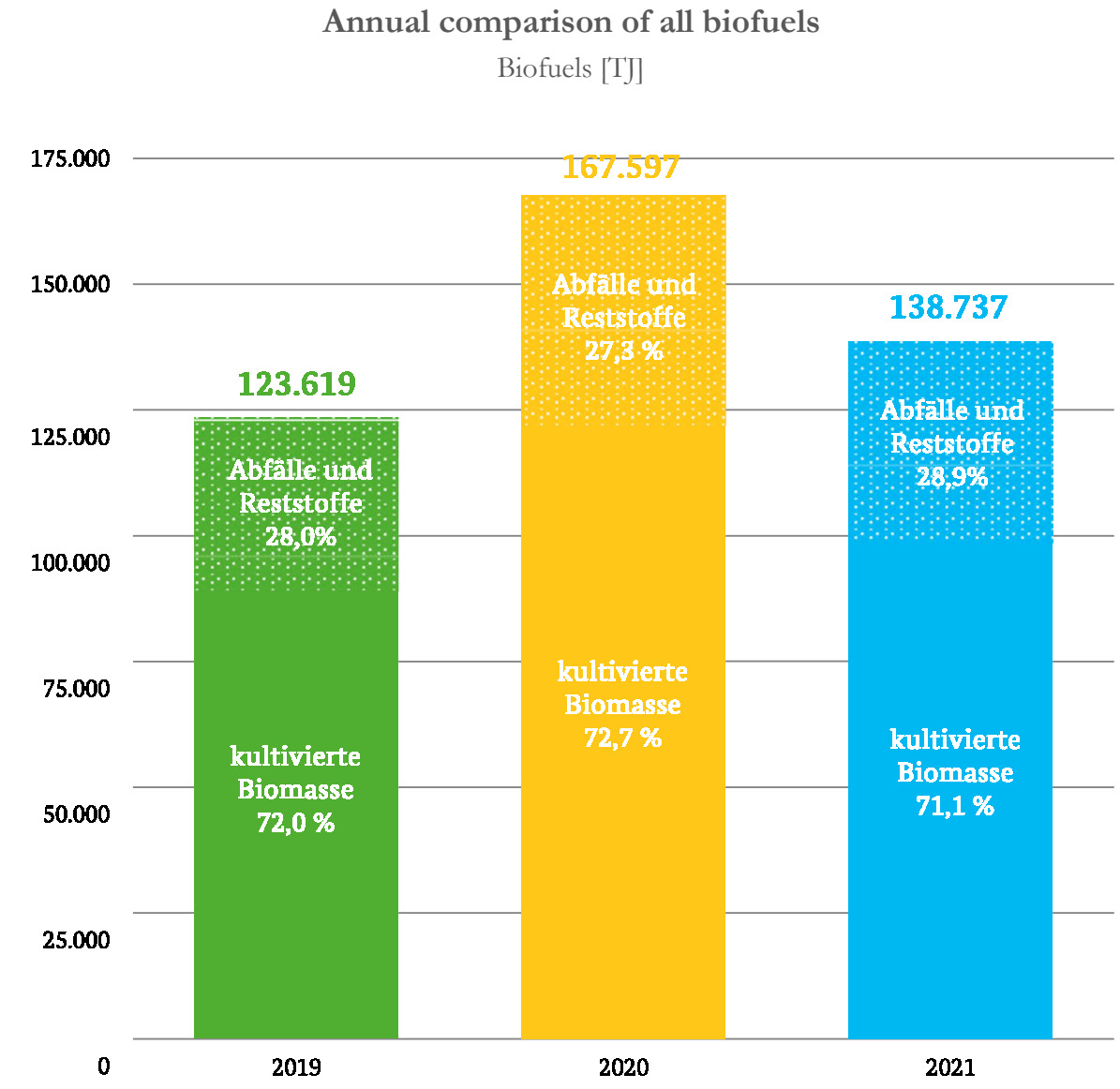


Abbildung 7

6.1 Source of raw materials

The amount of biofuels produced from European raw product decreased by 14 % compared to the previous year. The volume of biofuels of Asian origin decreased by 23 %. Accordingly, Europe still accounts for the largest share of all biofuels at 48 %, followed by Asia with a share of 39 %.

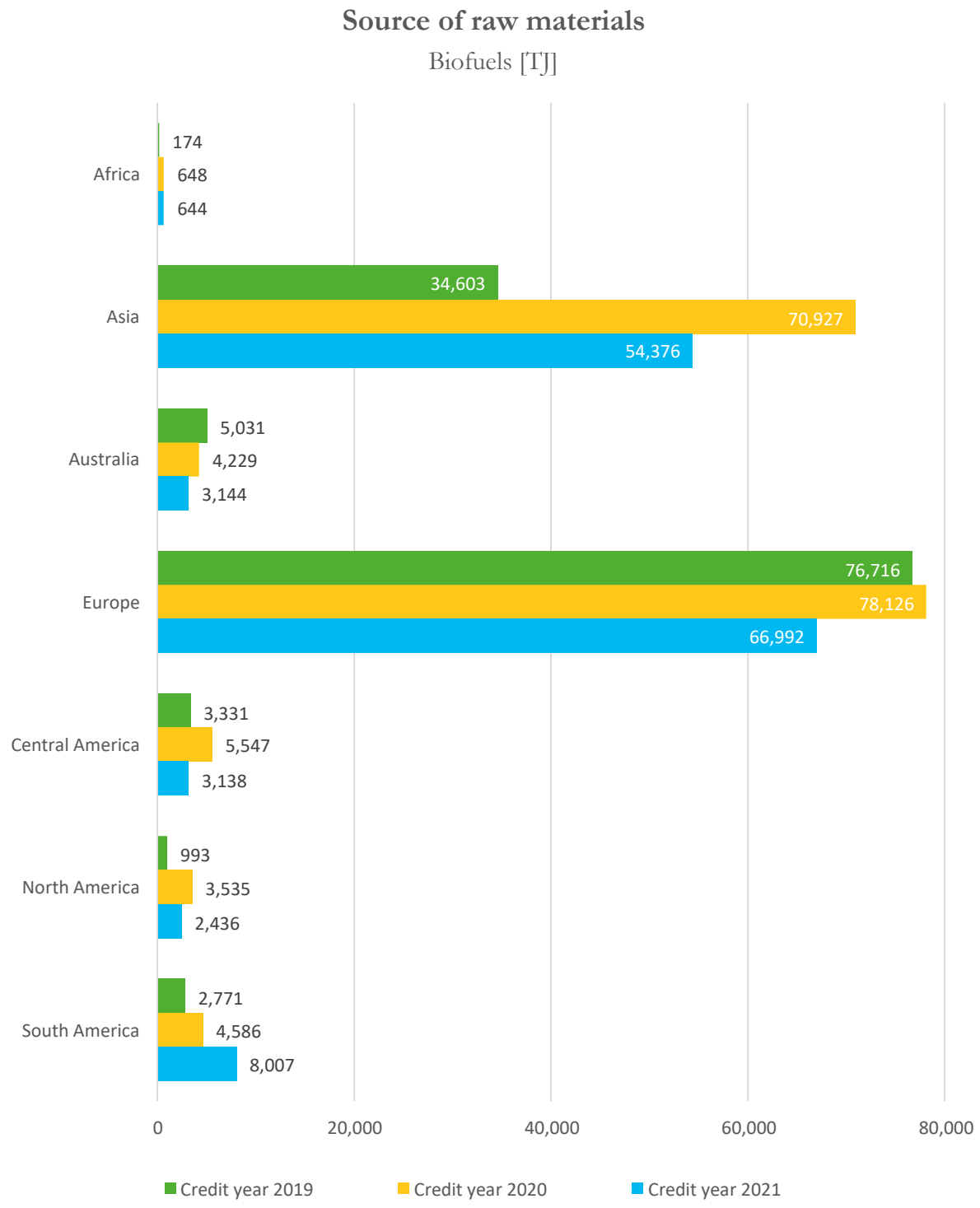


Abbildung 8

While biofuels produced from German raw product recorded a slight increase of 0.9 %, the volume from the other member states fell by 25 % overall. The decline in volumes from Bulgaria (-75 %) and Hungary (-39 %) alone, two countries whose shares are traditionally in the higher range, contributed almost half of the reduction (-6,557 TJ).

The volumes from European countries that are not part of the European Union also declined, but only by 6 %.

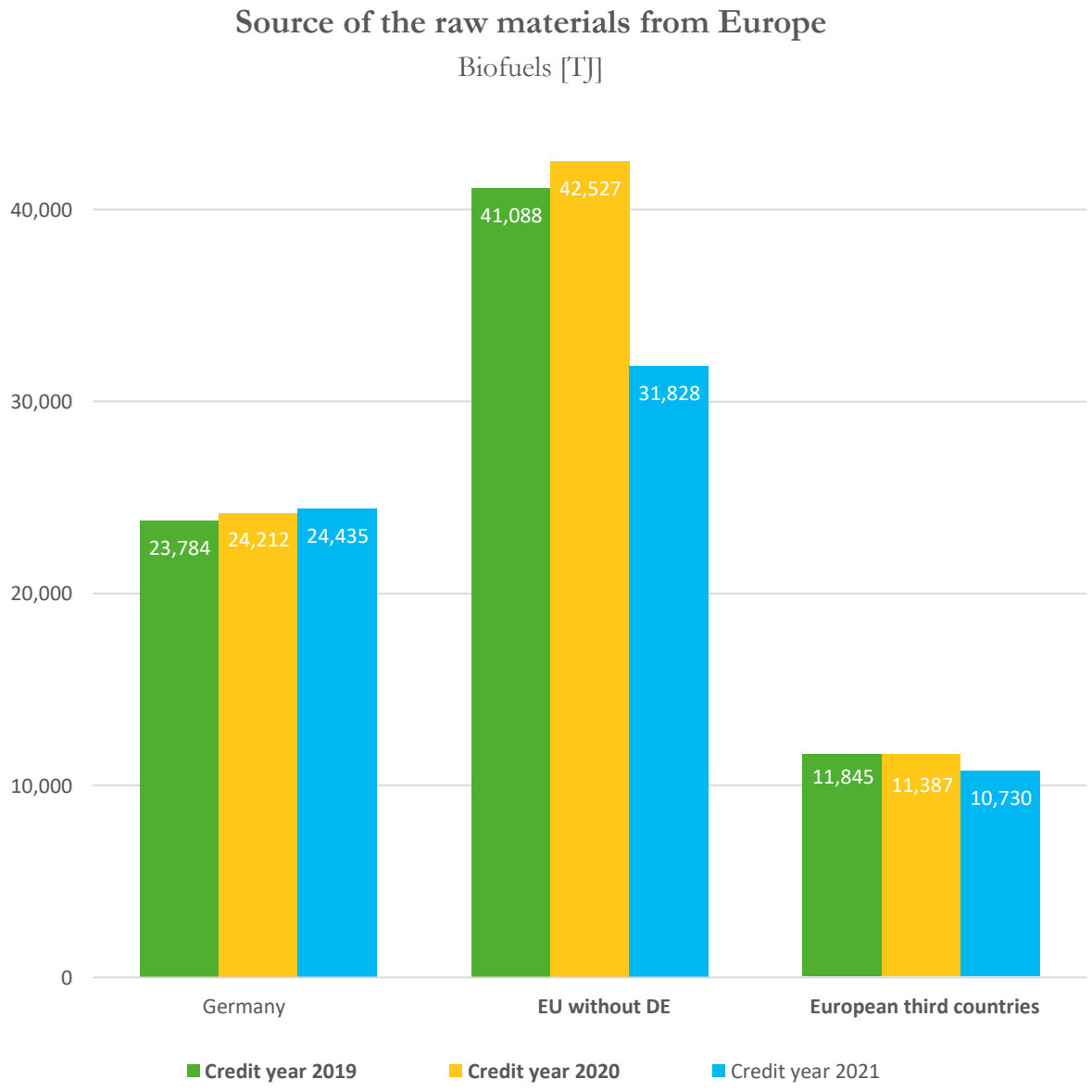
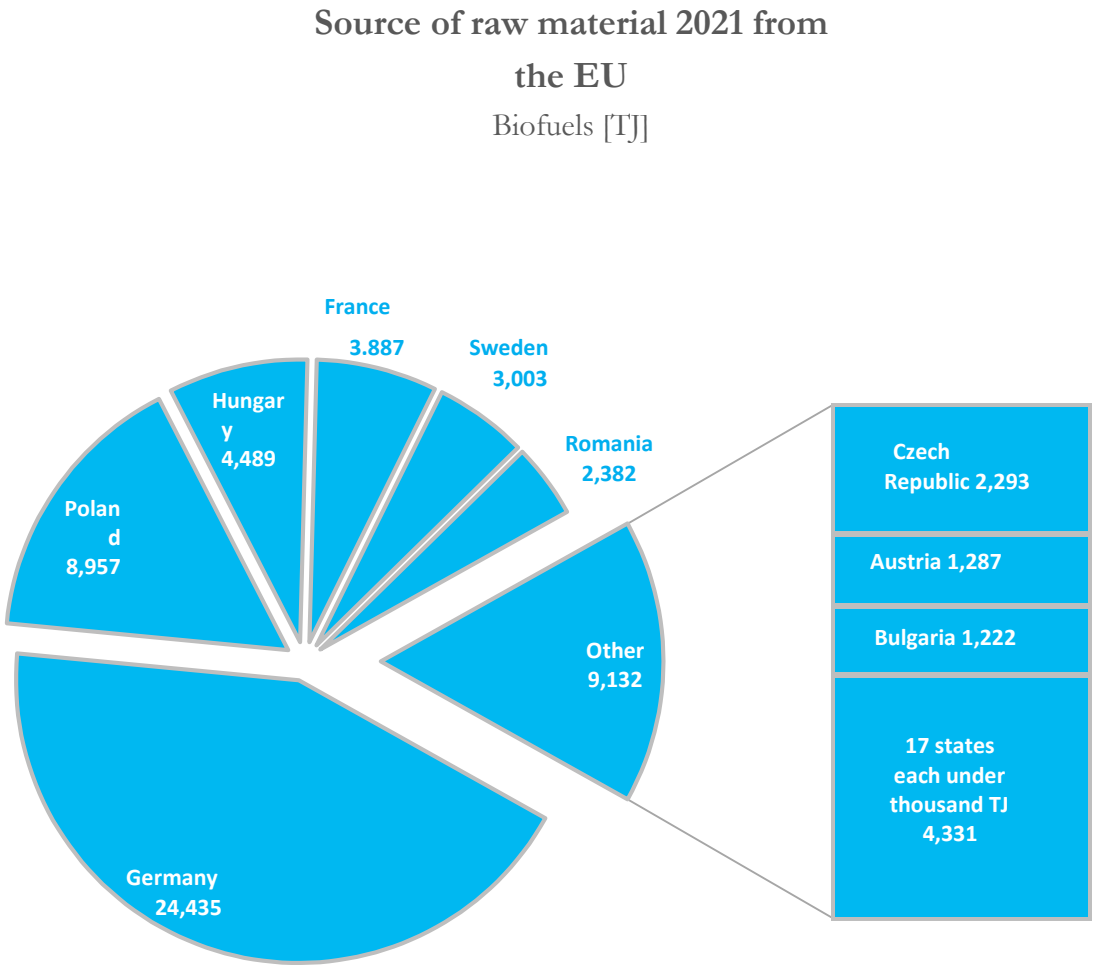


Abbildung 9

Around 43 % of the biofuels whose raw product came from the European Union were of German origin. Poland accounted for 16 % and Hungary for 8 % of biofuels.

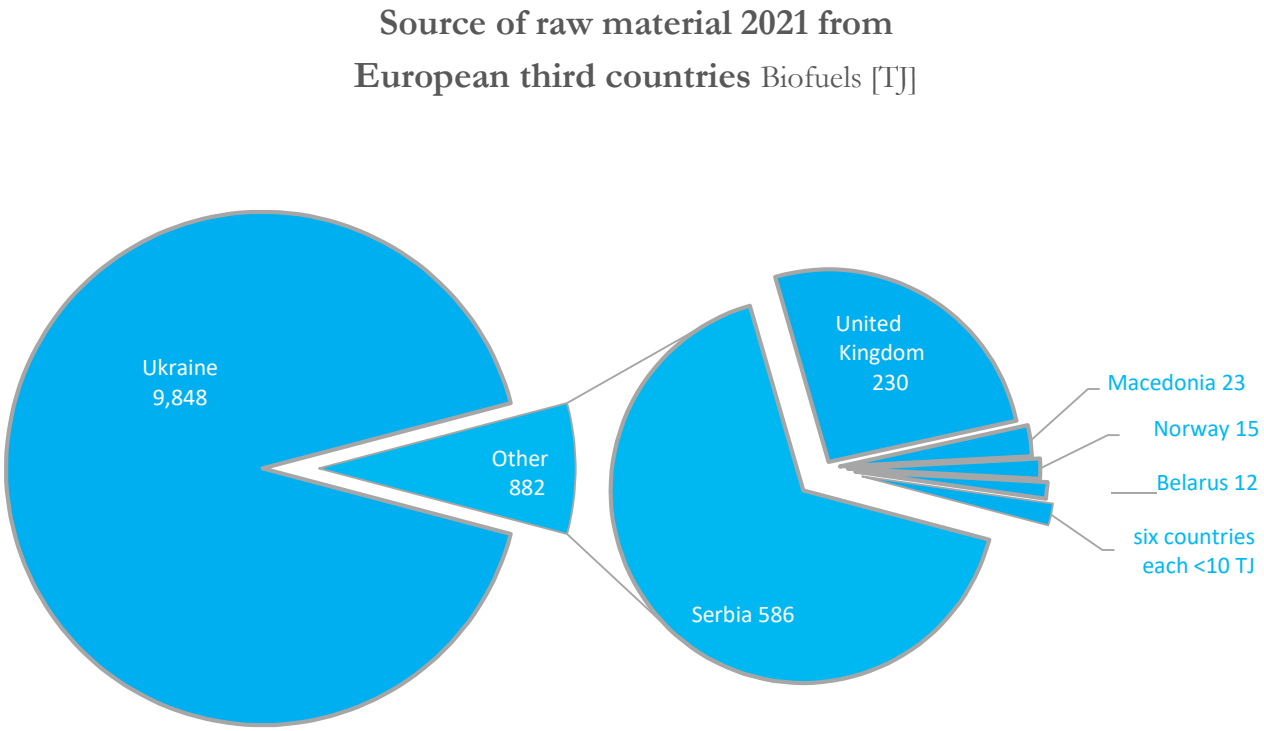


The shares [TJ] of the seventeen combined countries break down as follows:

Finnland	817	Niederlande	802	Belgien	781	Slowakei	695
Lettland	287	Litauen	224	Kroatien	217	Dänemark	201
Spanien	136	Italien	75	Griechenland	24	Zypern	22
Luxemburg	19	Portugal	16	Estland	11	Irland	2
Slowenien	1						

Abbildung 10

As in previous years, the share of biofuels of Ukrainian origin from European third countries was by far the largest (92 %).



The shares [TJ] of the six combined countries break down as follows:

Schweiz	8	Montenegro	3	Albanien	1
Georgien	3	Island	1	Kosovo	< 1

6.2 Raw materials by source and type

Biofuels whose raw product originated in **Africa** have been produced exclusively from wastes and residues since the 2019 quota year. The quota volume 2021 remained at a similar level as in the previous year.

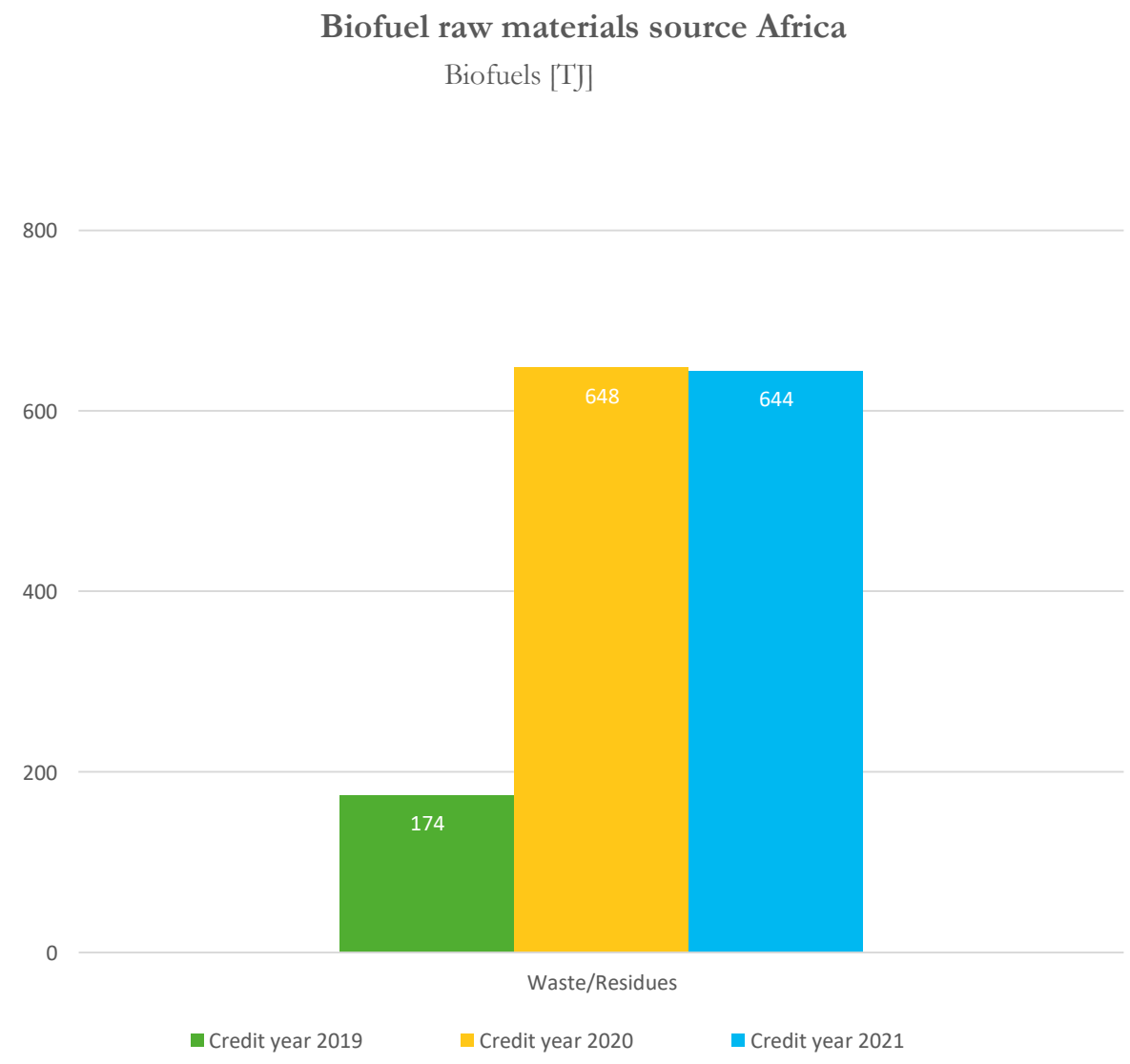


Abbildung 12

The Asian raw products used for biofuel production were palm oil (72 %), waste and residues (28 %) and rapeseed (0.002 %).

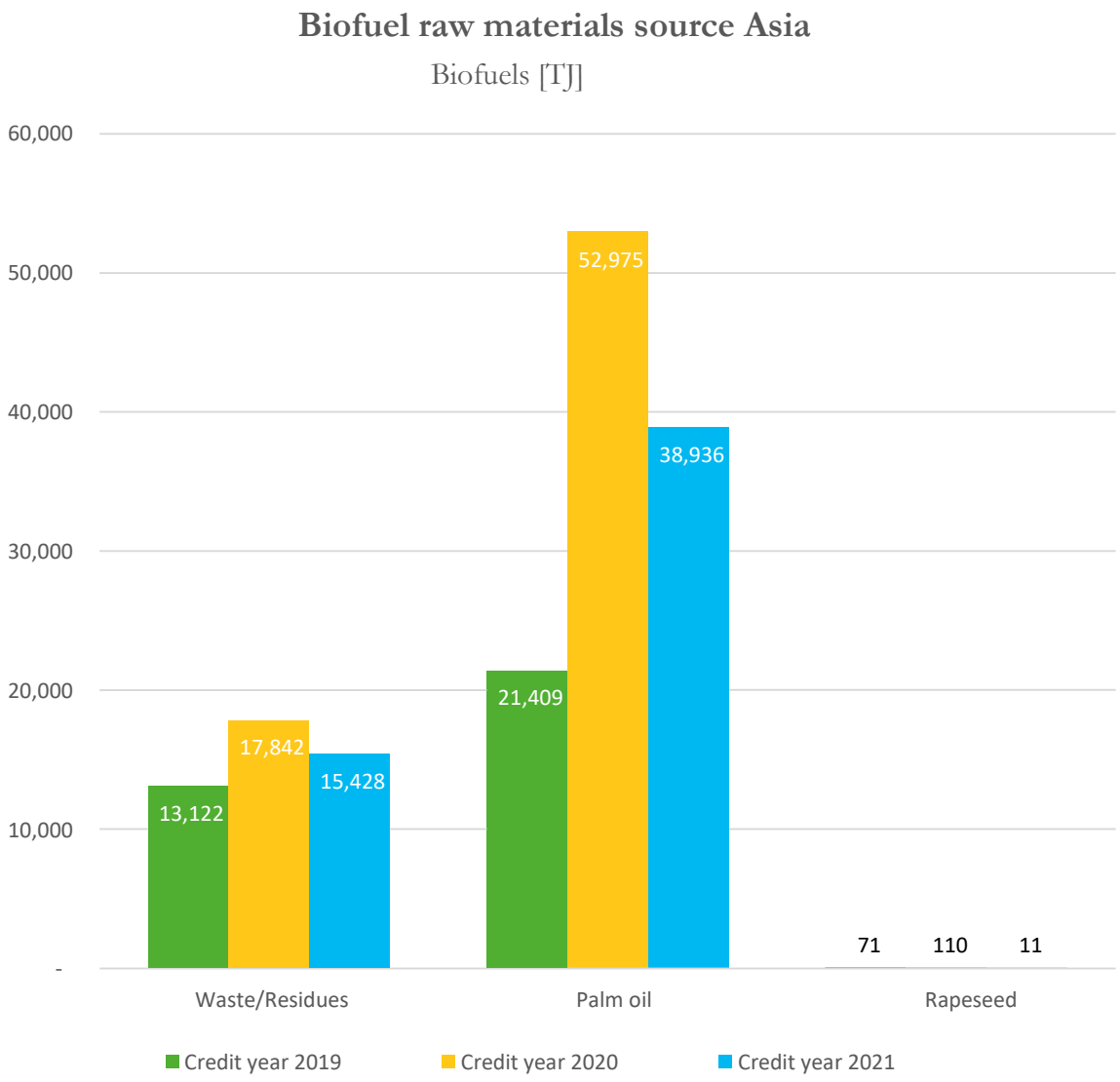


Abbildung 13

The requested volume of biofuels produced from Australian raw product decreased by 26 % in the 2021 reporting year.

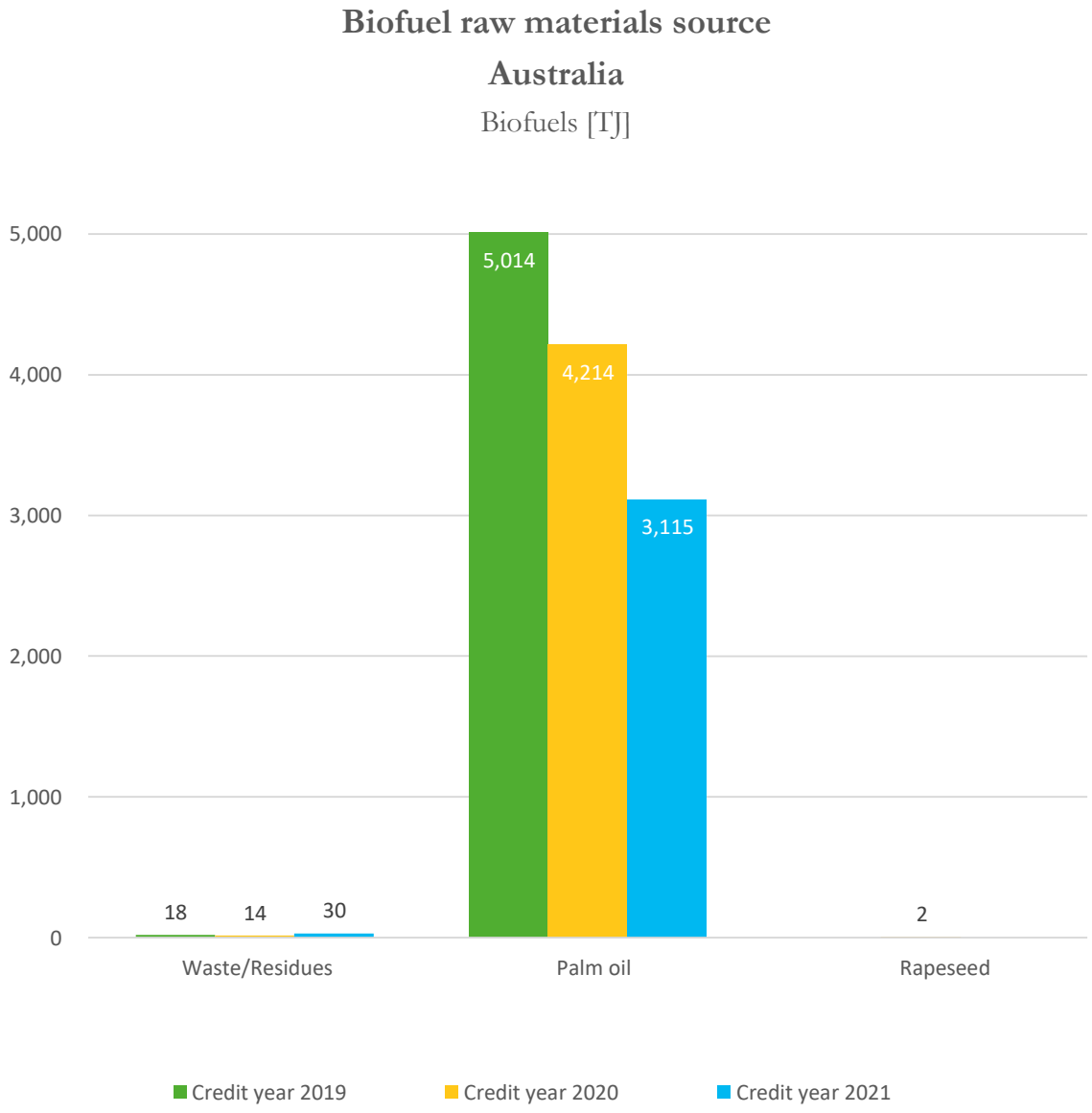


Abbildung 14

The most important biofuel raw products originating from **Europe** were wastes and residues, as well as rapeseed and maize, all of which recorded a decline. Nevertheless, as in the previous year, they formed a share of 82 % of the European total, as the rest of the volume added up also declined (-14 %).

The largest percentage losses compared to the previous year were recorded for biofuels from sunflower (-86 %; -3,960 TJ) and the largest reduction in actual volume for rapeseed (-22 %; -4,905 TJ). The quantities produced from rye and sugar beet, on the other hand, almost doubled (+94 % / +99 %).

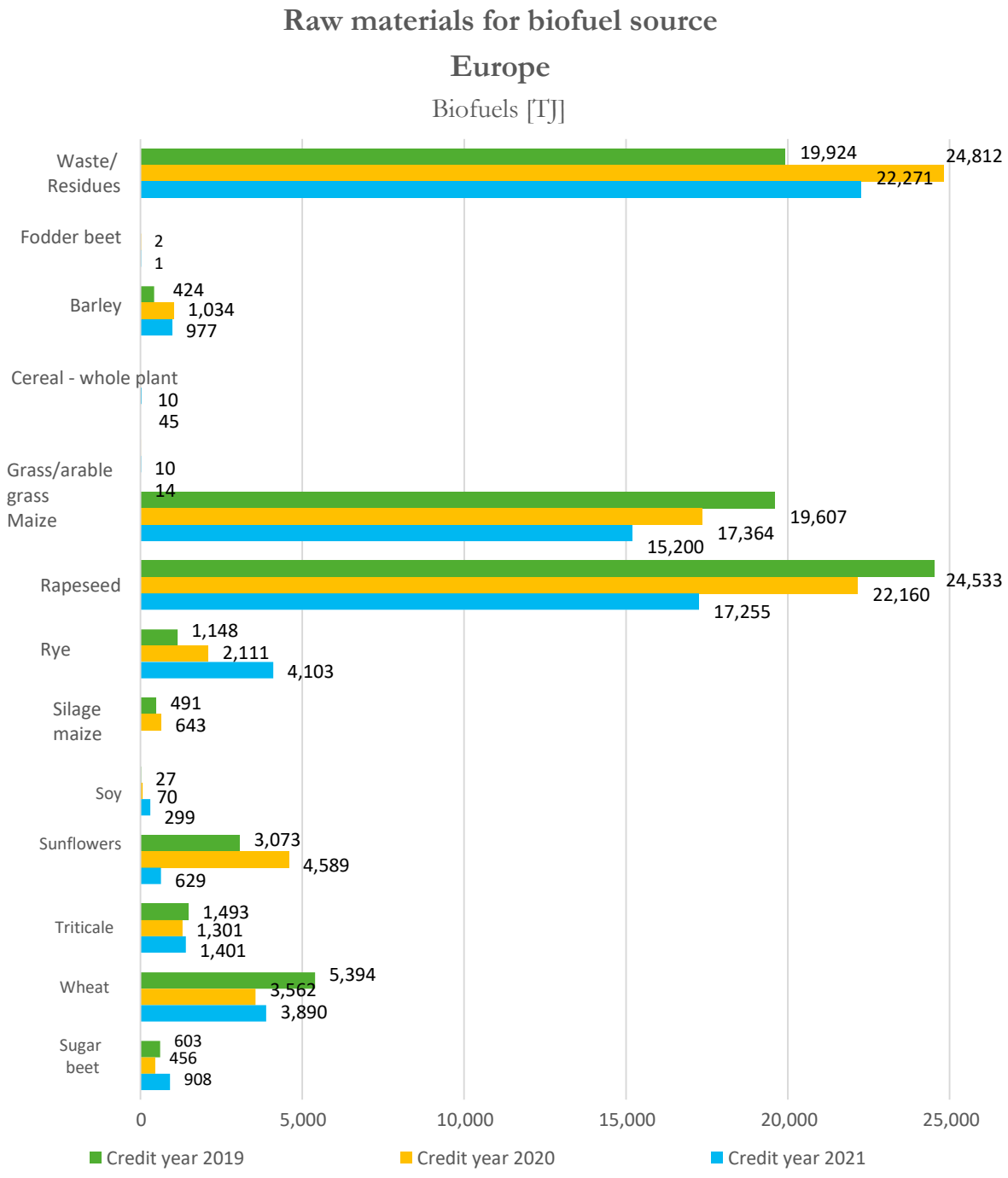


Abbildung 15

The total volume of biofuels whose raw product originated in **Germany** has remained relatively constant at around 24 petajoules over the last three years.

As a result, in the year under review more than one third of the raw materials originating from Europe were cultivated or had accrued in **Germany**.

55 % of the European share from rapeseed came from German areas. Germany accounts for the same proportion of waste and residues from Europe.

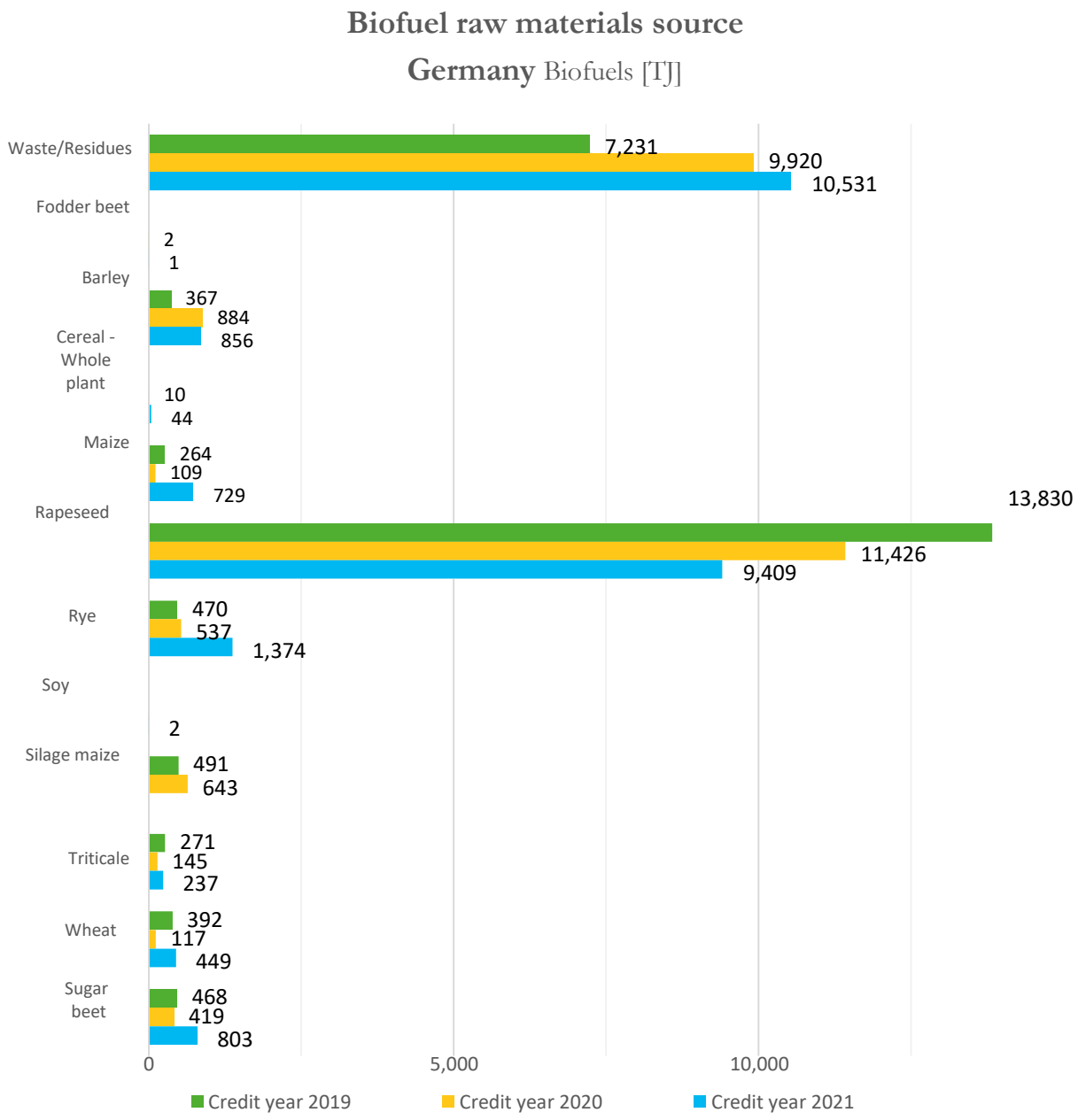


Abbildung 16

Raw product originating from Central America decreased by 43 % compared to the previous year. The Central American palm oil share, whose growing countries were Honduras and Guatemala, had contributed most significantly to this.

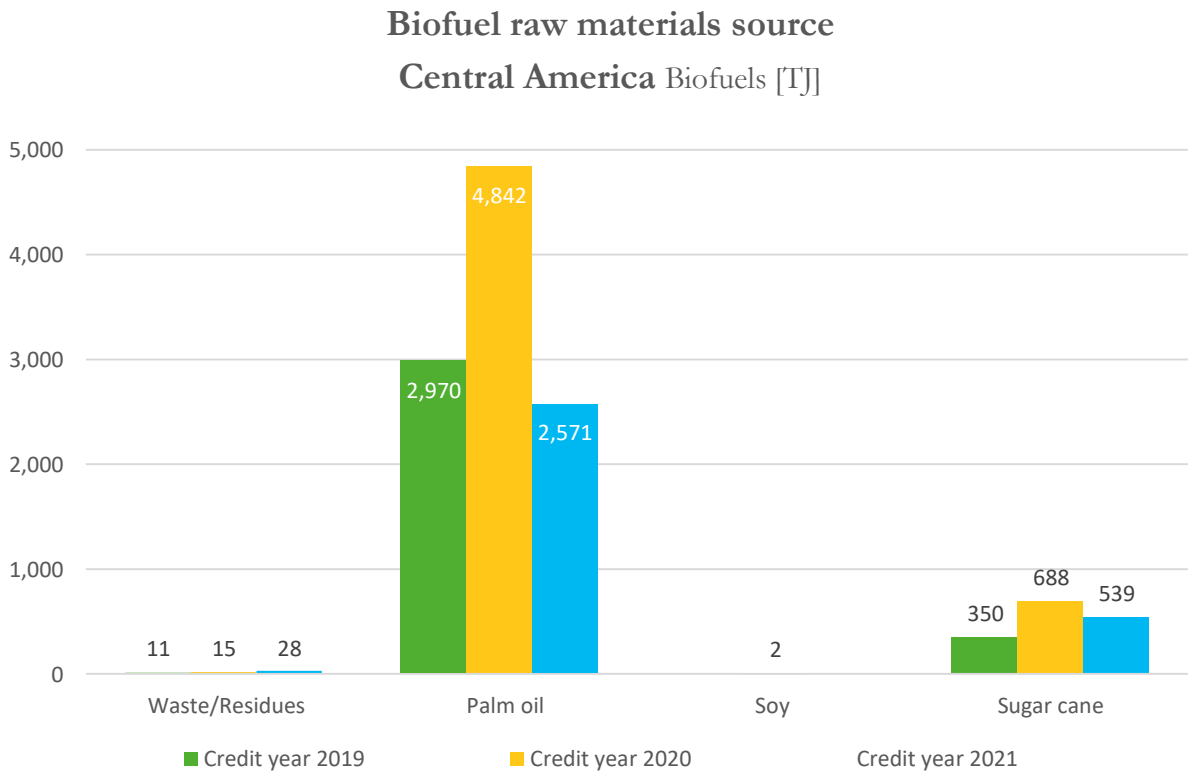


Abbildung 17

In the reporting year, just under a third less biofuel with raw product from **North America** was registered for greenhouse gas reduction quotas. The most significant reduction compared to the previous year was in the raw product waste and residues (-54 %; -904 TJ).

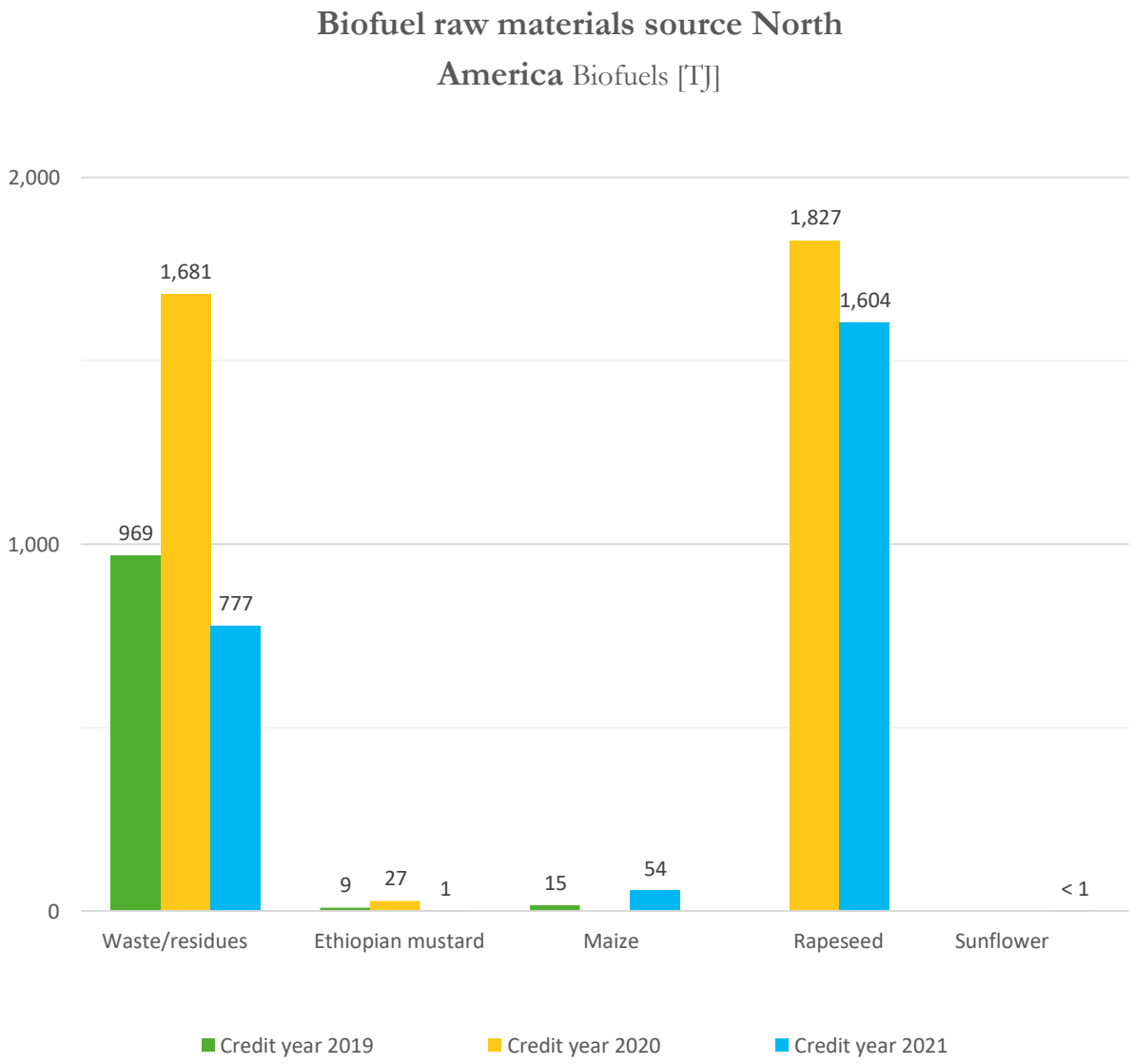


Abbildung 18

Raw product for biofuel production from **South America** increased again compared to the previous year (+75 %; increase previous year +66 %). Since 2019, the volume has increased by 189 %.

This increase resulted in particular from the more than doubling of the volume of soy, whose most important country of cultivation was Brazil (share 84 %).

Slightly lower, but equally significant, was the increase in sugar cane (+77 %), 90 % of which was grown in Peru.

In contrast, the share from palm oil, which came exclusively from Colombia, fell by 82 %.

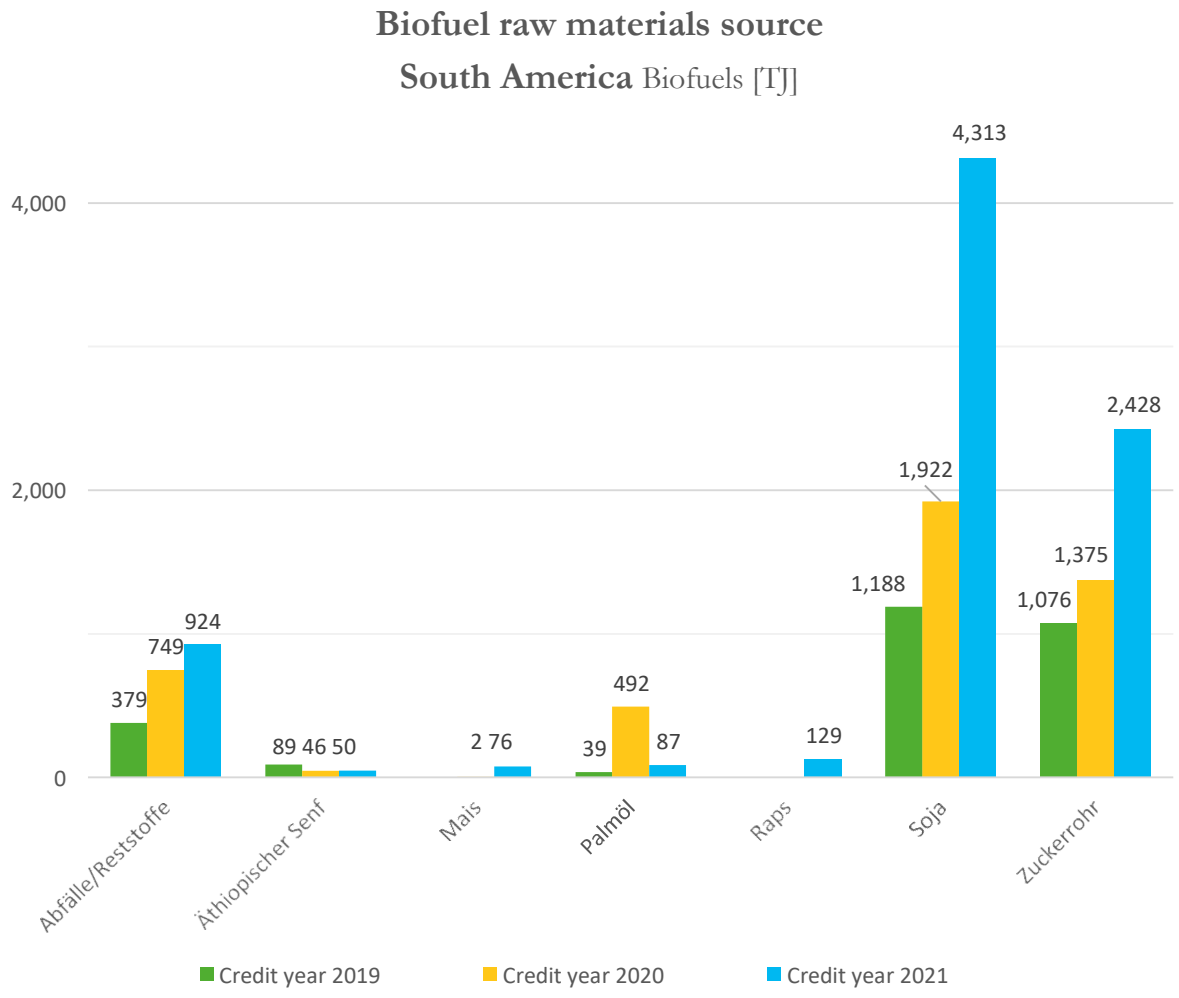


Abbildung 19

6.3 Biofuel types

For 2021, a total of 138,737 terajoules of biofuels were declared for quota crediting. Biodiesel (FAME) accounted for the largest share at 61 %. This is followed by bioethanol (22 %), HVO (14 %) and biomethane (3 %).

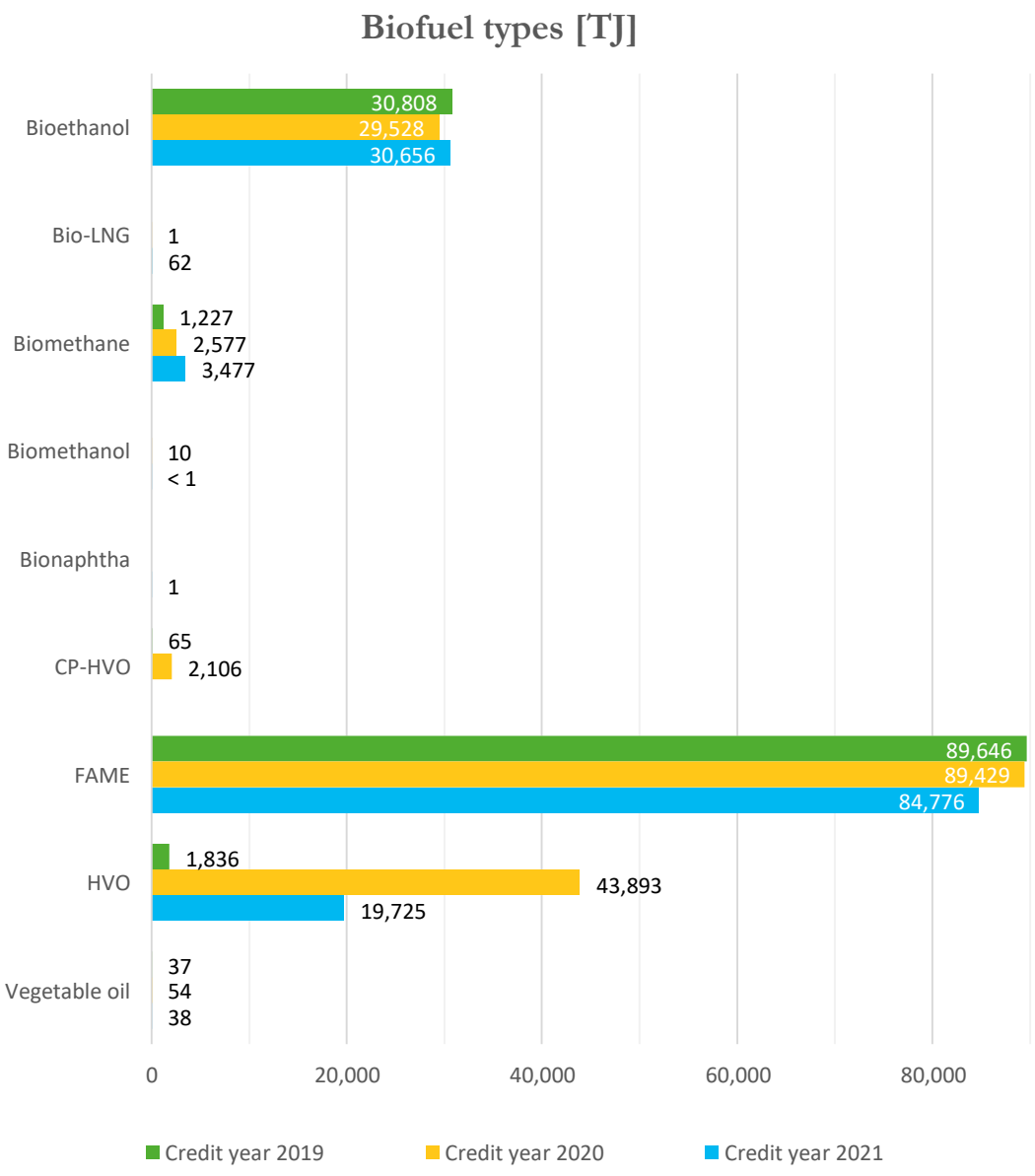


Abbildung 20

The following figure illustrates the distribution of biofuel types in 2021.

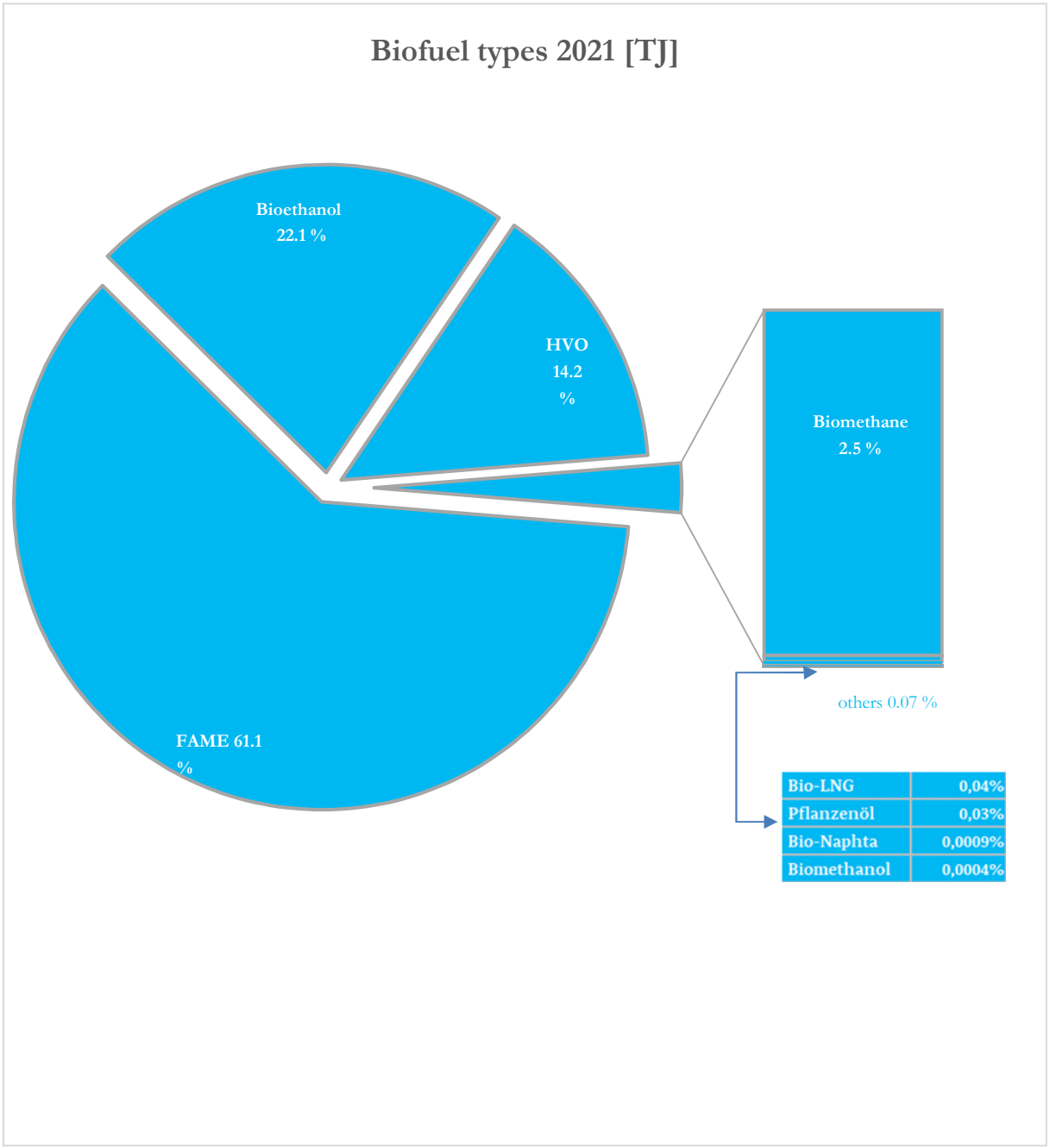


Abbildung 21

Compared to the previous year, 4 % more **bioethanol** was registered towards the greenhouse gas reduction quota. Despite a reduction of 15 %, maize remains the most important raw product (48 %).

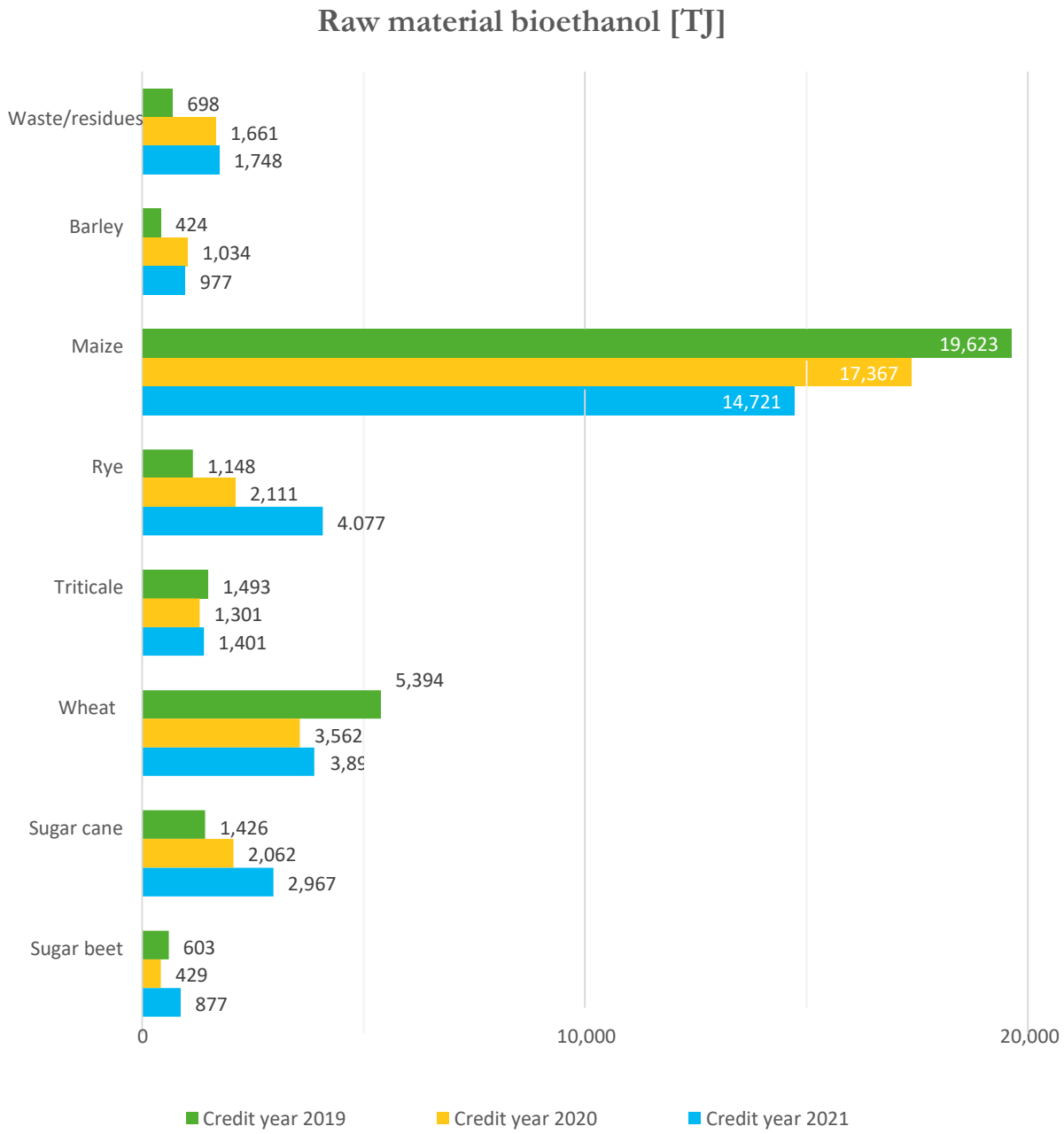


Abbildung 22

The most important raw product originating from **Germany** for the production of **bioethanol** in the reporting year was rye, the quantity of which increased by 151 % compared to the previous year. There were also sharp increases in the raw materials sugar beet (+97 %) and wheat (+285 %).

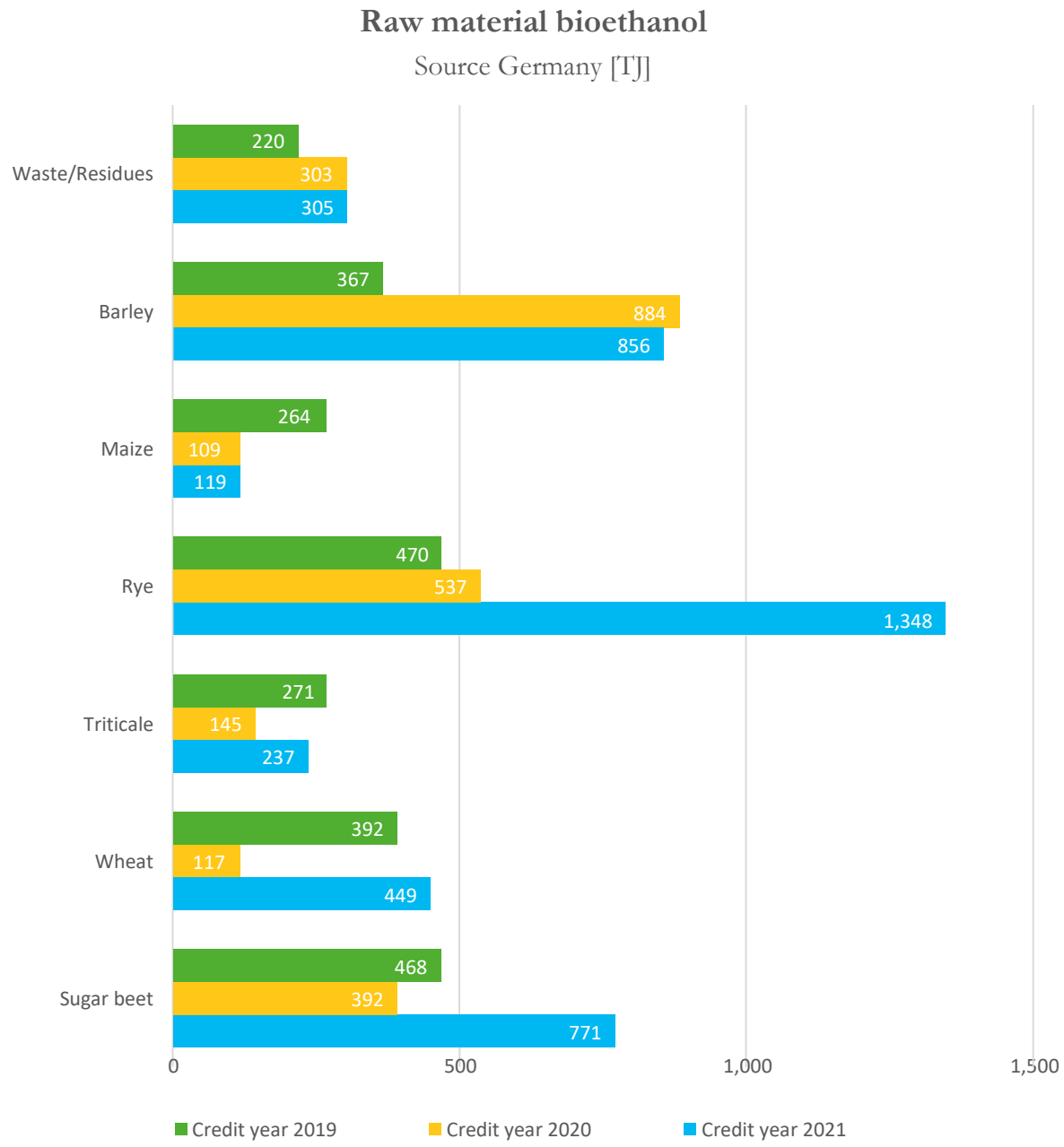


Abbildung 23

The amount of **FAME (biodiesel)** declared for crediting decreased by 5 % compared to the previous year. The largest share was accounted for by waste and residues as well as palm oil with 34 % each and rapeseed with 26 %. In total, the quantities of the raw product palm oil and rapeseed were almost identical in 2020 and 2021. In a three-year comparison, rapeseed with a total of 79,958 TJ is ahead of palm oil with 73,259 TJ.

Sunflower and soy are at a lower volume level. While the quantity of soy more than doubled, sunflowers only accounted for about one sixth of the previous year.

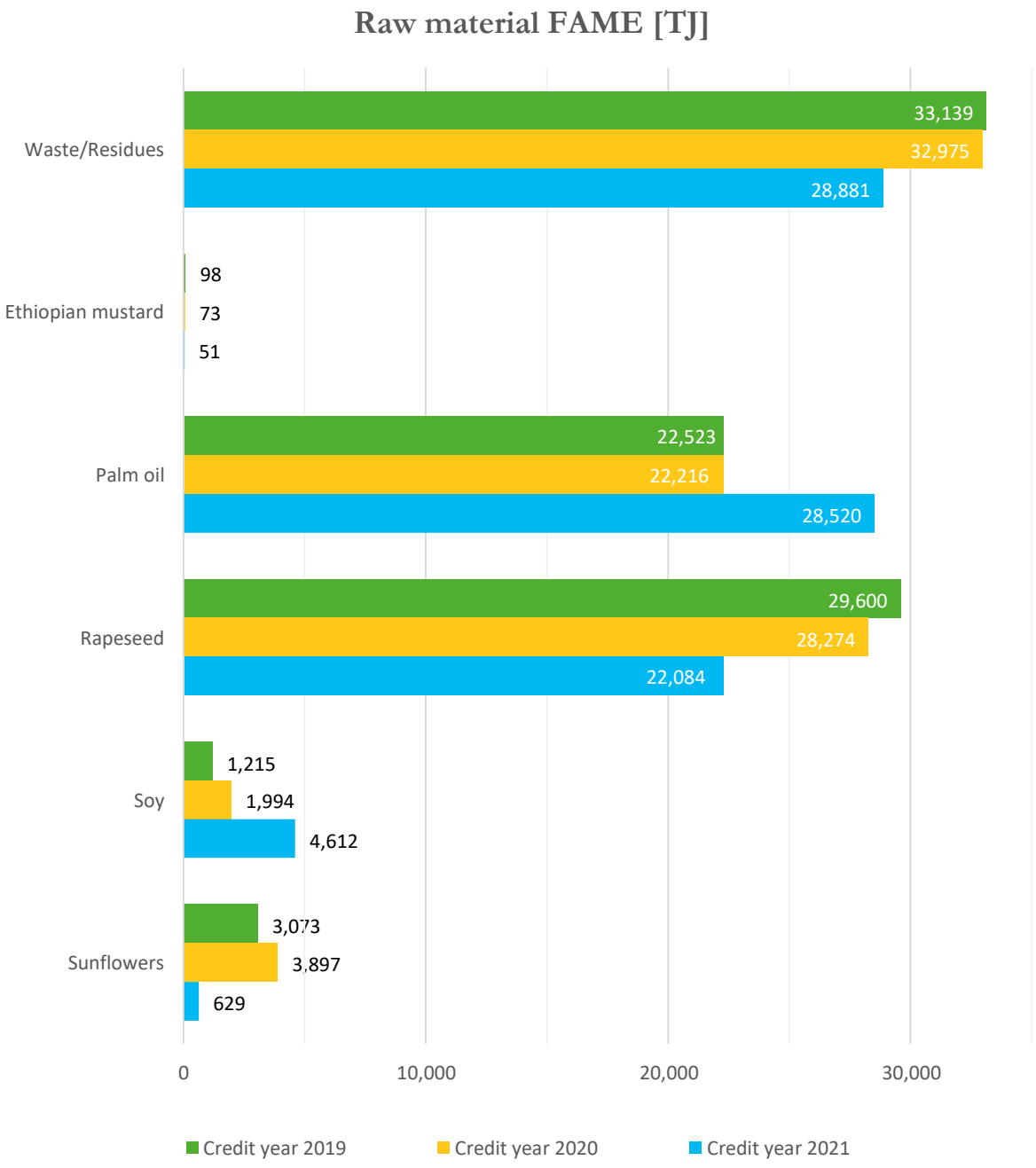


Abbildung 24

The most important of the raw product for **biodiesel production** originating from **Germany** was rapeseed with a share of just under 55 %, followed by waste and residues with 45 %. The shares of soy and sunflower were marginal.

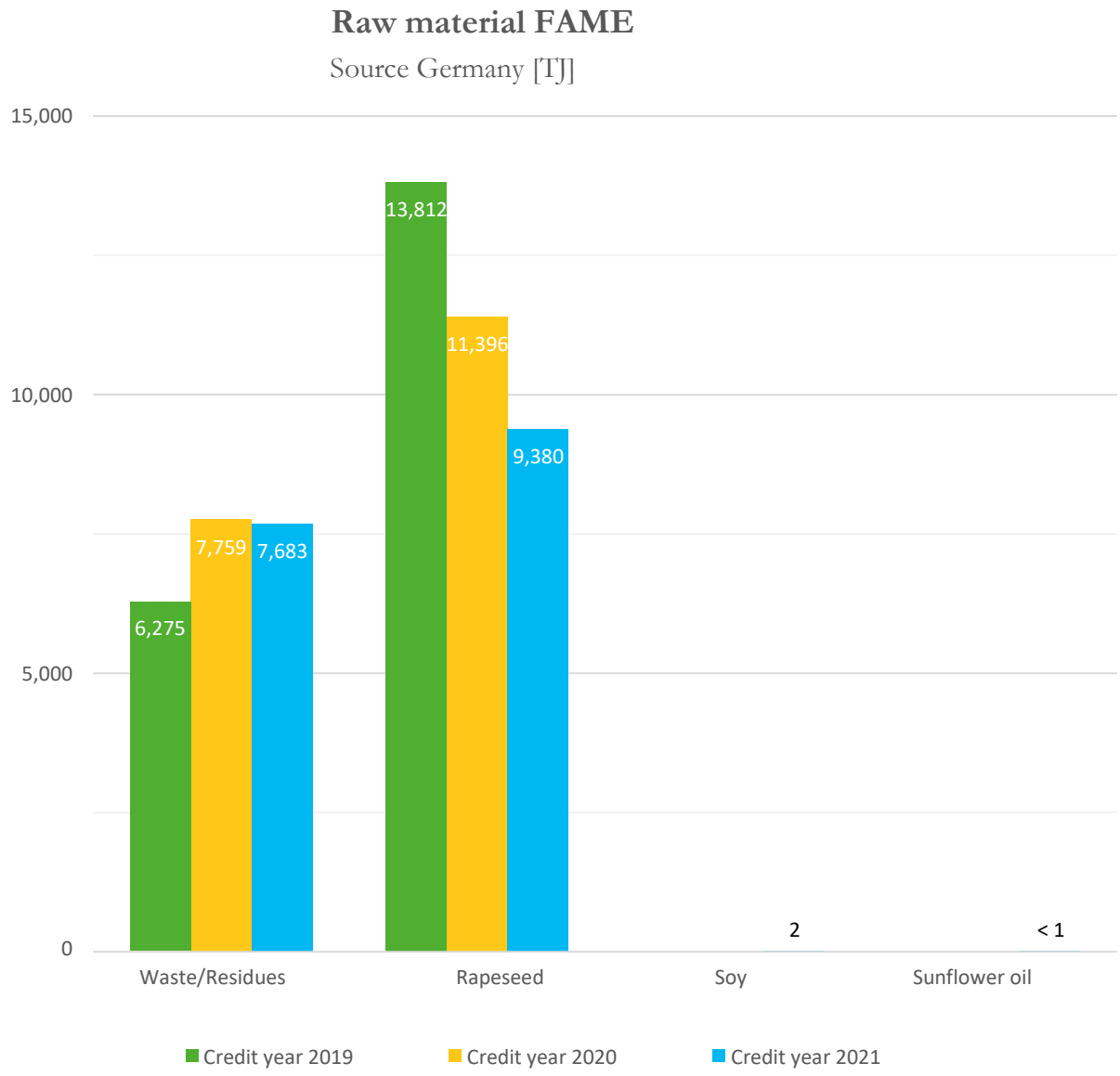


Abbildung 25

After the drastic increase from the previous year, the total volume of **hydrogenated vegetable oils (HVO)** decreased again by 55 % in the reporting year (palm oil -62 % and waste/residual -28 %). The application for quota credit in 2021 was thus about ten times higher than in 2019.

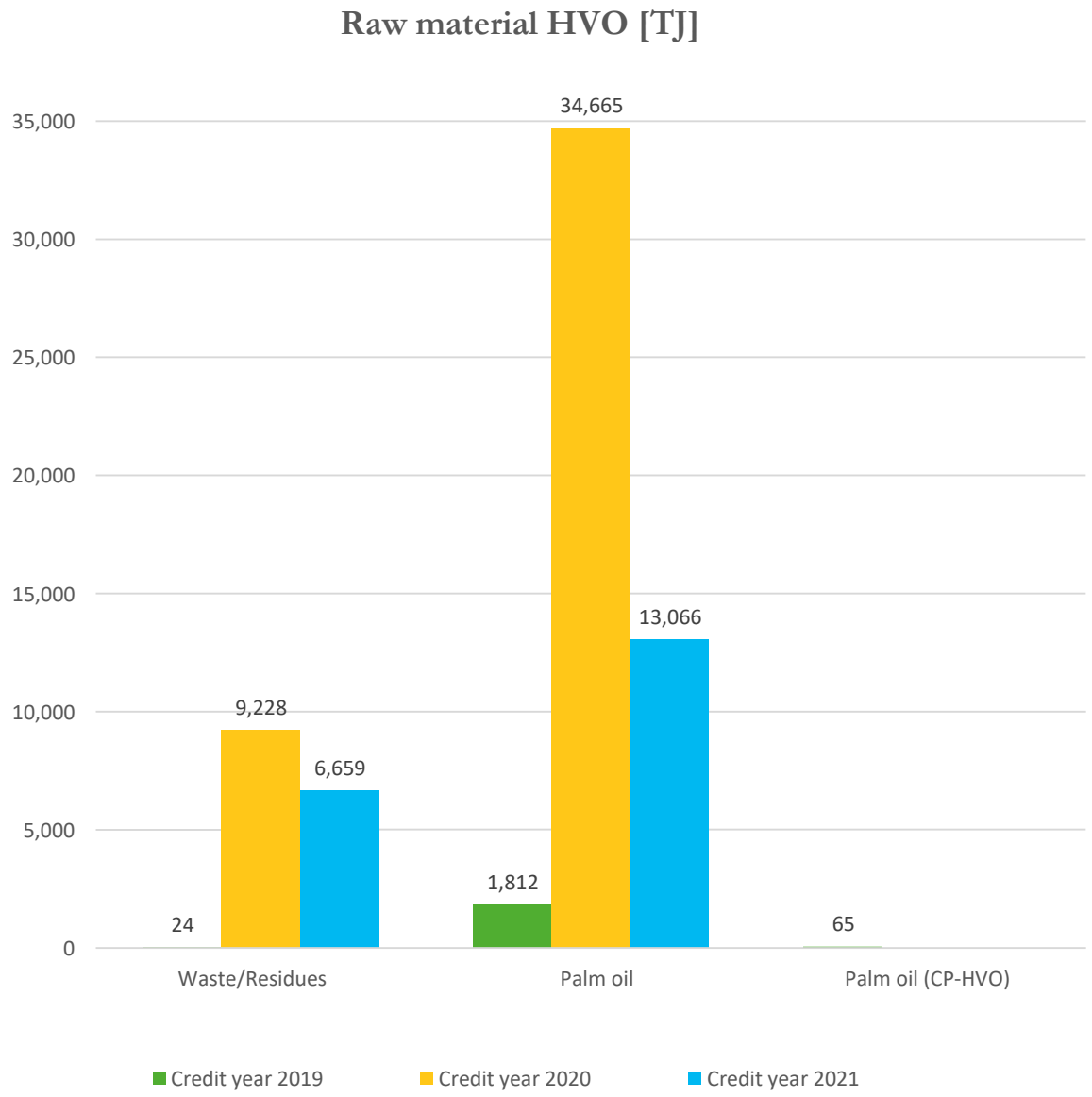


Abbildung 26

Biomethane was largely produced from waste and residual materials. The total quantity for which crediting was applied for increased again (+35 %).

Almost 92 % of all source materials were of German origin. The other quantities came from Poland, the Czech Republic and the Netherlands.

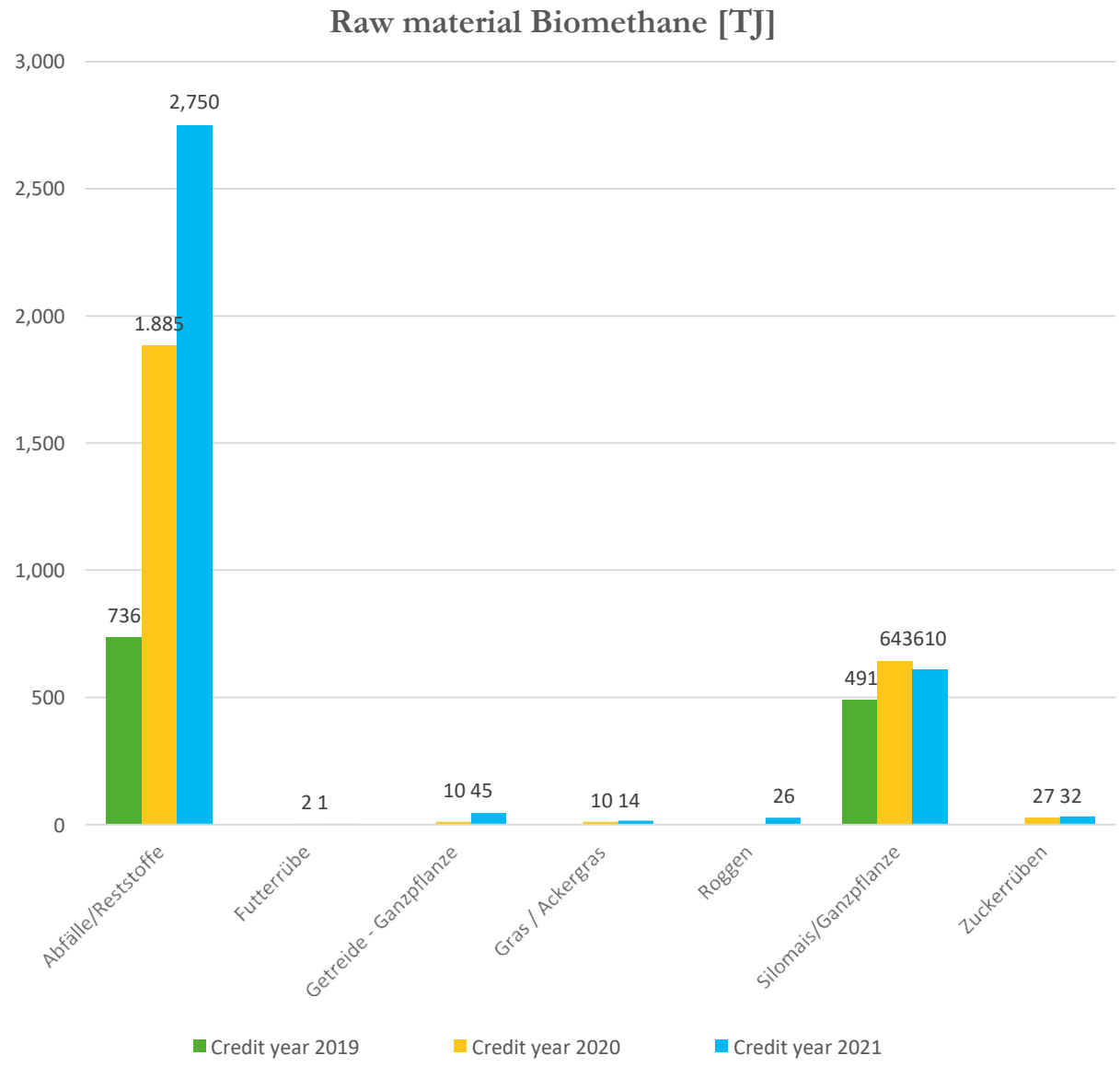


Abbildung 27

The amount of **vegetable oils** registered for crediting decreased by 30 % compared to the previous year. While the share produced from rapeseed increased by 13 %, the share for which palm oil was used decreased by 71 %.

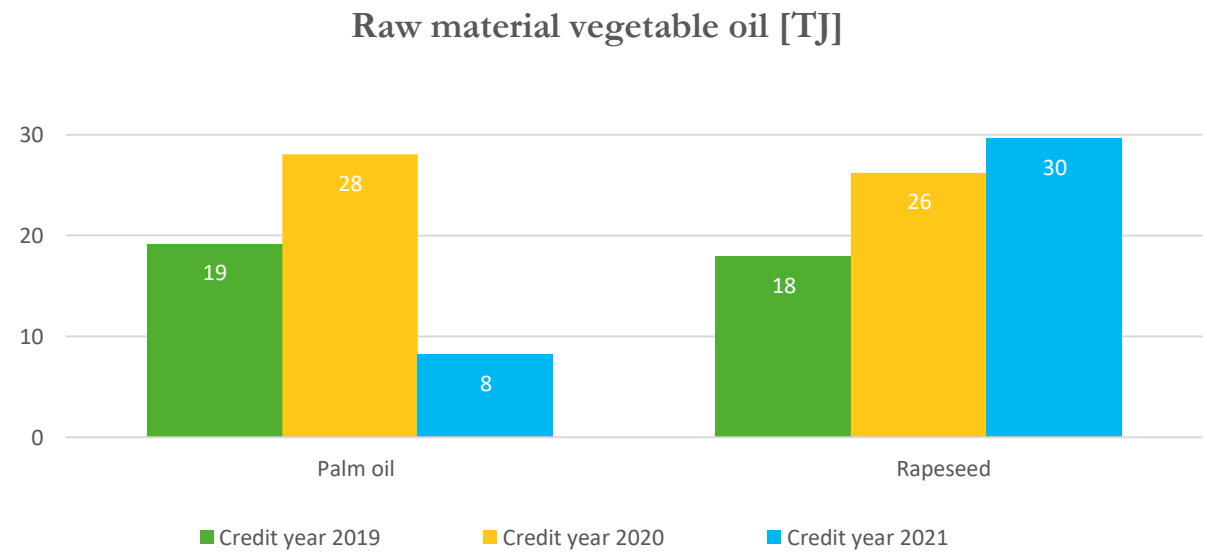


Abbildung 28

Since 2020, liquefied biomethane, i.e. Bio-LNG[8], has also been used to meet quotas.[9]

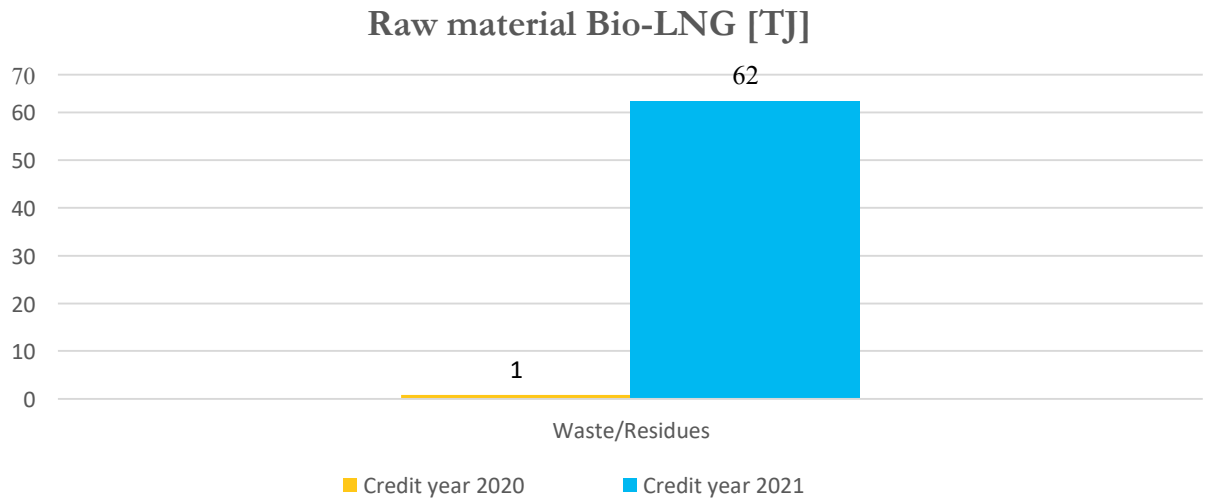


Abbildung 29

8 LNG= Liquefied Natural Gas
9 Value from evaluation report for the year 2020 was corrected

6.4 Greenhouse gas emissions and savings

Reducing greenhouse gas emissions is one of the goals of the Renewable Energy Directive. The emission data must be provided for the product in CO_2 equivalent on the sustainability certificates in accordance with Art. 18 of BioSt-NachV and Biokraft-NachV.

The emissions calculation takes into account the total emissions generated during the manufacturing process for the final product. These are the greenhouse gases carbon dioxide (CO_2), nitrous oxide (N20) and methane (CH4) as specified in the Renewable Energy Directive, expressed in CO_2 equivalent per unit of energy. Emissions accounting is carried out by the certified economic operators along the value chain in accordance with the specified methodology [10].

The following figures show the emissions of the biofuels for which crediting to the biofuel quota was requested.

In calculating the emission savings, the emissions generated during the entire biofuel production process were compared with the individual fossil fuel equivalents in accordance with the 38th German Solvent Ordinance (BlmSchV).

Table 5: Fossil fuel equivalents

Fuel type	Fossil fuel equivalent according to the 38th BlmSchV [g $C0_2$eq/MJ]
Bioethanol	93.3
Bio-LNG	94.1
Biomethane	94.1
Biomethanol	93.3
Bionaphtha	93.3
Btl-FTD	95.1
CP-HVO	95.1
FAME	95.1
HVO	95.1
Vegetable oil	95.1

The emission savings presented below are based on the comparison of pure biofuels and pure fossil fuels. In order to be considered a sustainable biofuel, since the quota year 2018 a saving compared to a fossil fuel of 50 % must be demonstrated. In order to calculate the total savings from blended fuels in Germany, the sum of emissions from biogenic and fossil fuels must be taken as a basis.

10 Cf. footnote 4, page 7

The diagram below shows the emissions that would have been produced if only fossil fuels had been used instead of the amount of biofuel. This means that the use of biofuels saved around 11.1 million tonnes of CO_2 equivalent.

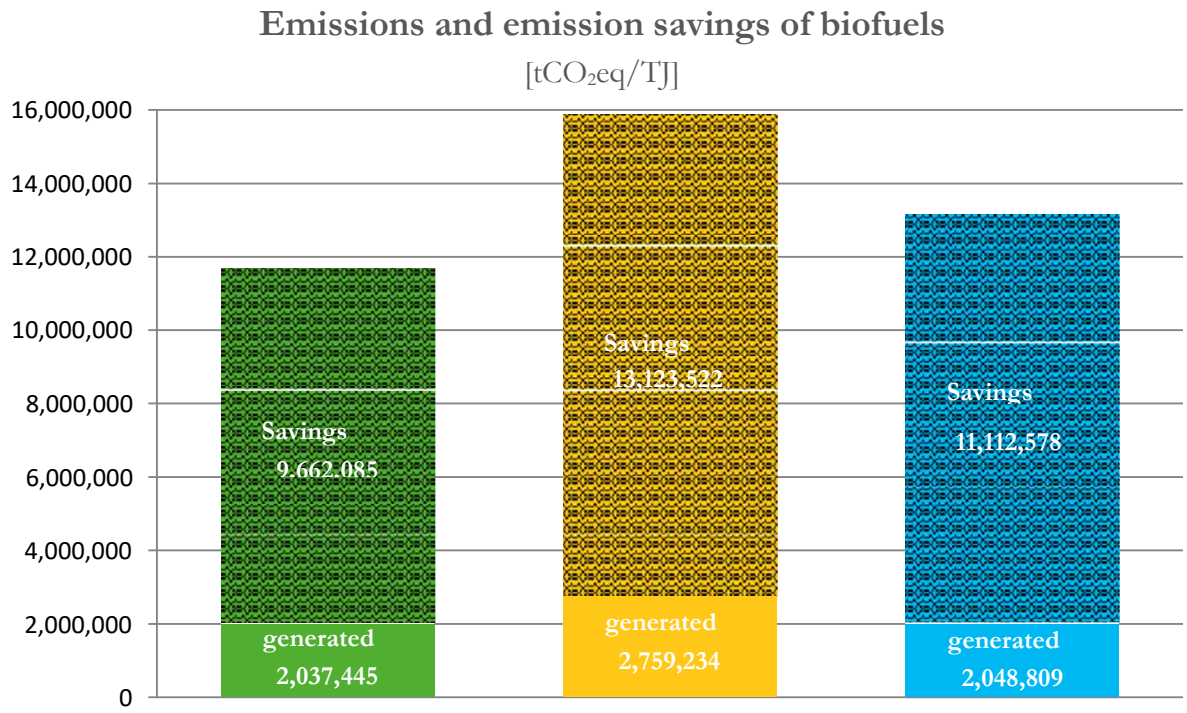


Abbildung 30

The biofuel placed on the market emitted an average of 14.77 tCO_2eq per terajoule in the reporting year, which is less than in previous years.

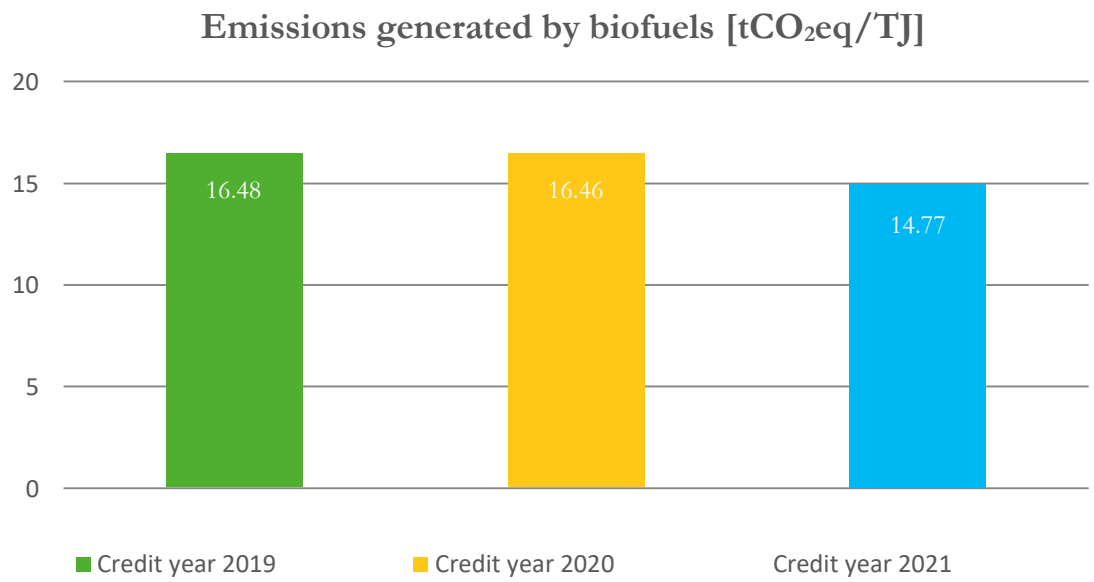


Abbildung 31

The average total emission saving of biofuels compared to fossil fuels increased by 1.82 percentage points.

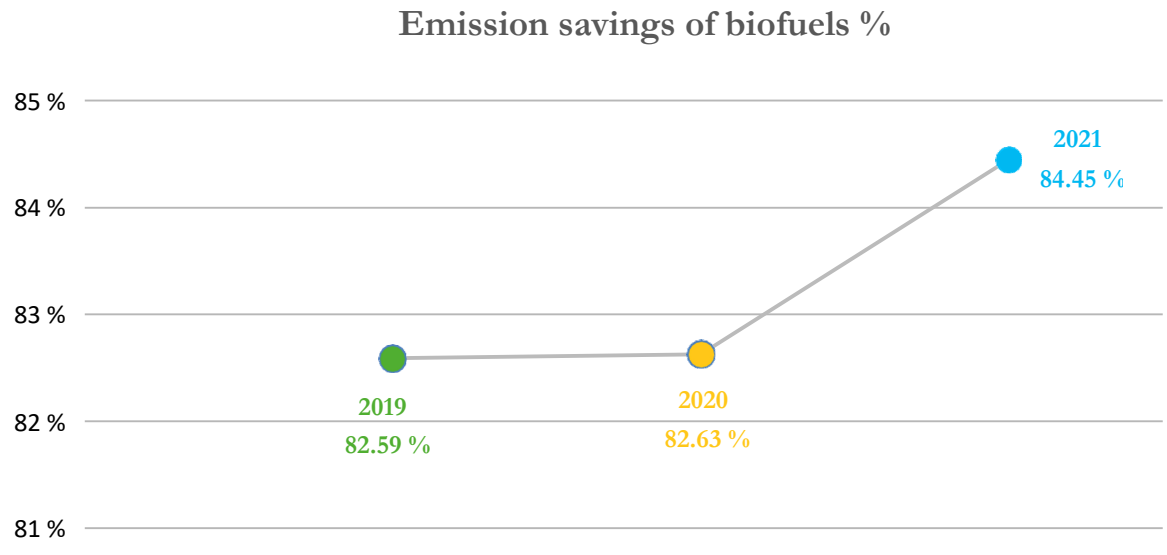


Abbildung 32

Bioethanol accounted for the highest average emissions of the biofuel types in the reporting year. The best value was achieved by biomethane.

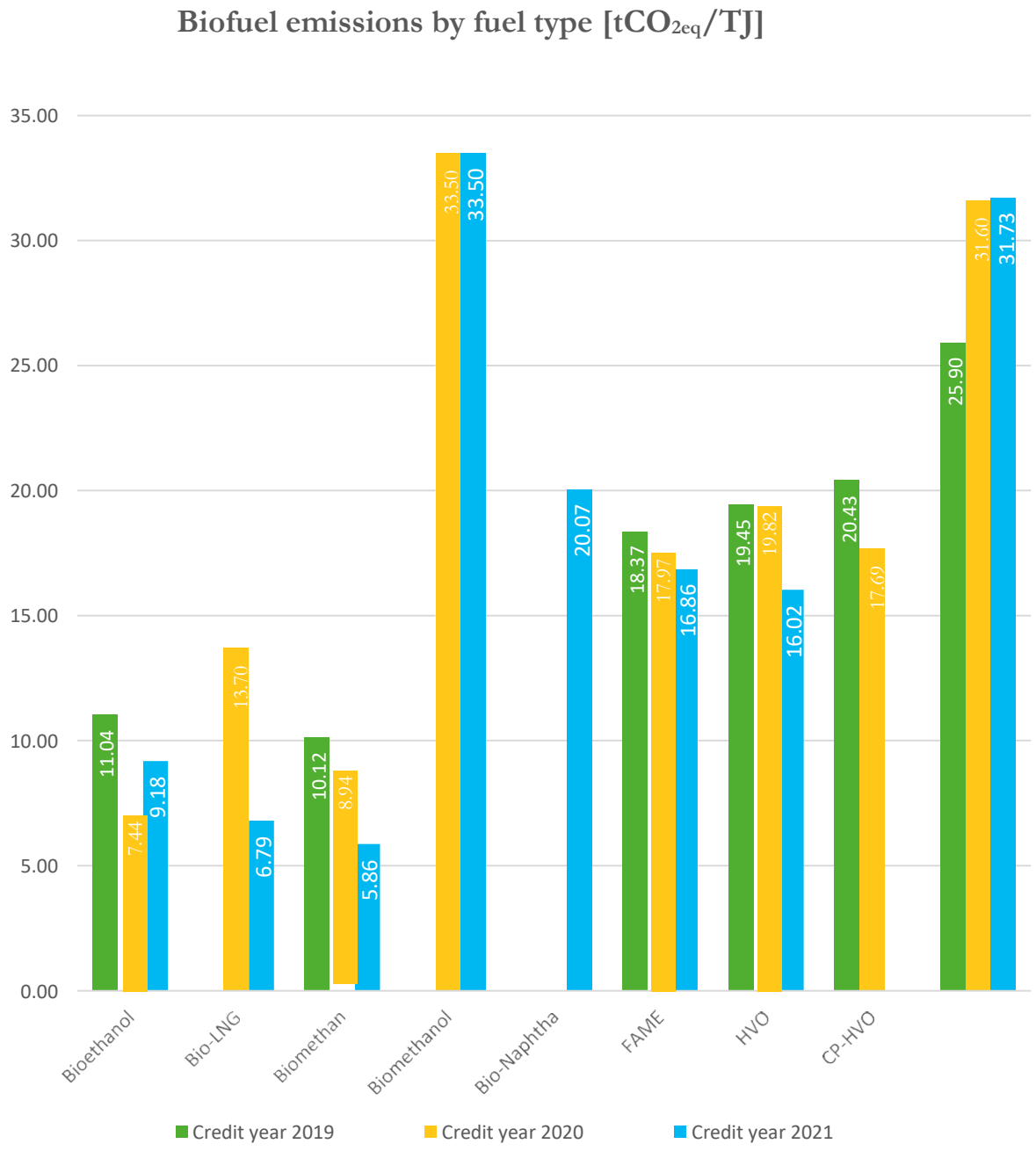


Abbildung 33

Among the biofuels replacing gas and petrol, biomethane achieved the highest savings.

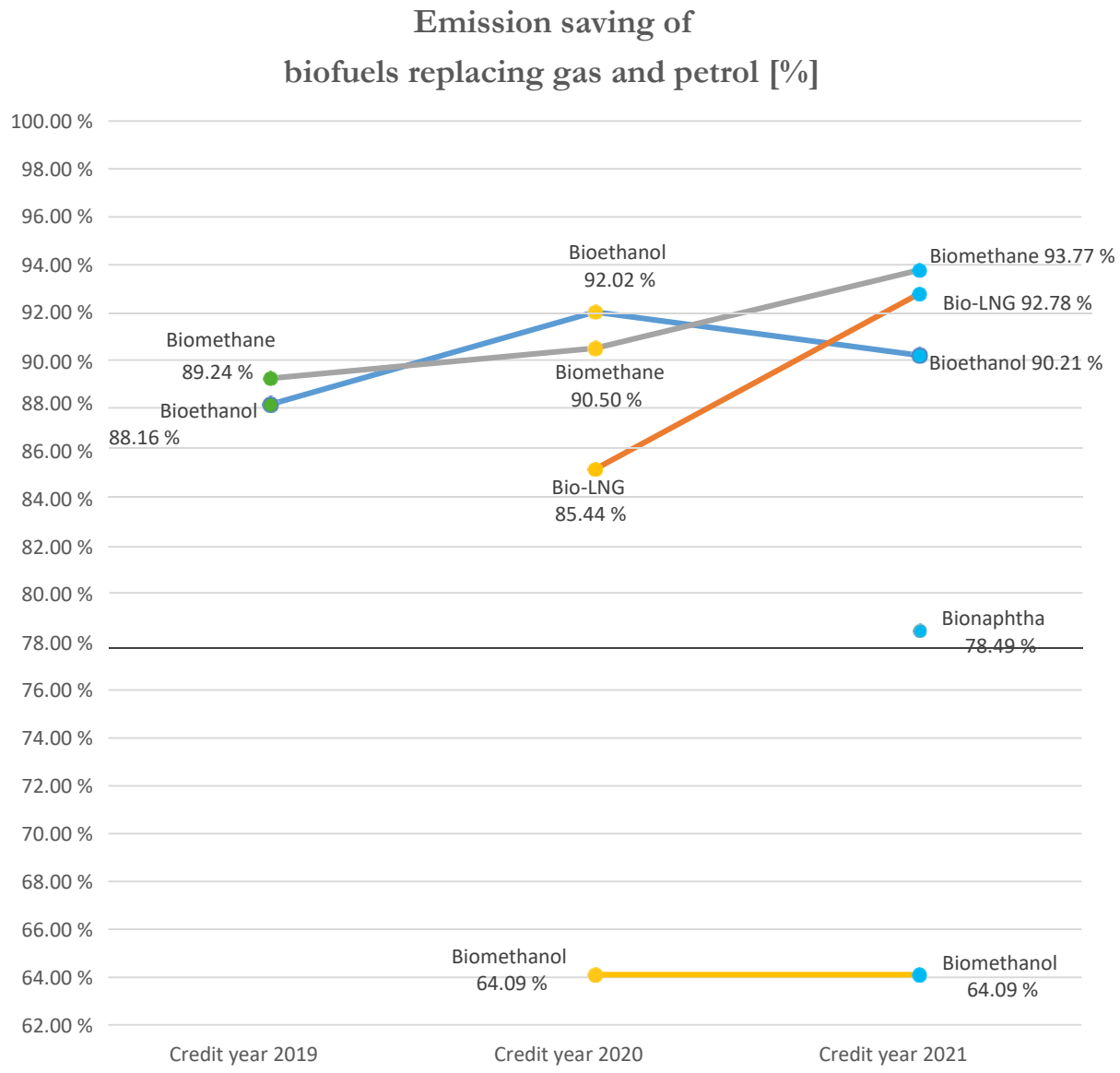


Abbildung 34

The highest saving of biofuels replacing diesel was achieved in the quota year 2021 HVO.

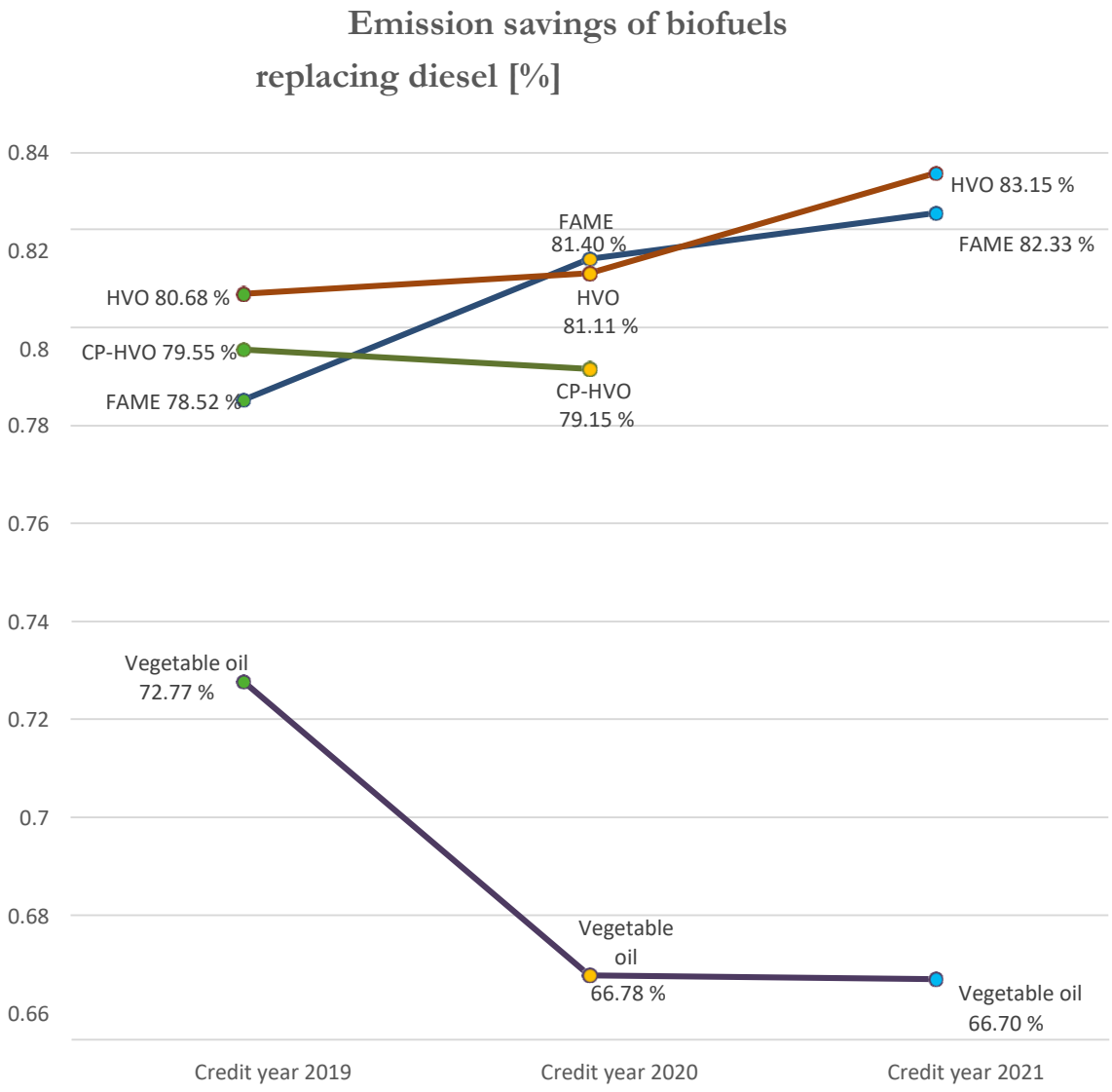


Abbildung 35

Bioethanol produced from triticale had the highest savings of around 95.04 %.

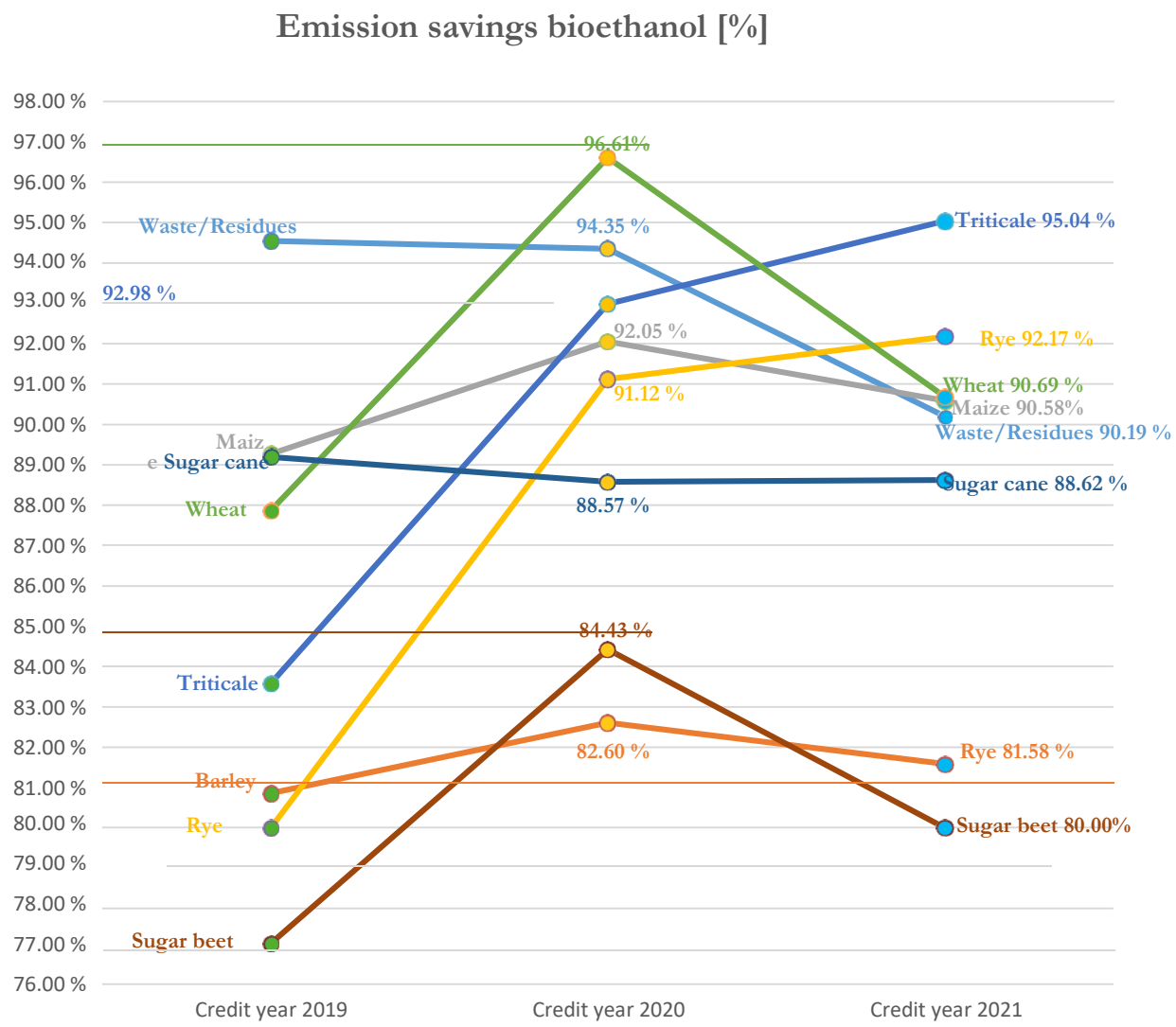


Abbildung 36

Biodiesel/FAME from Ethiopian mustard again achieved by far the highest emission savings of all raw product in the reporting year.

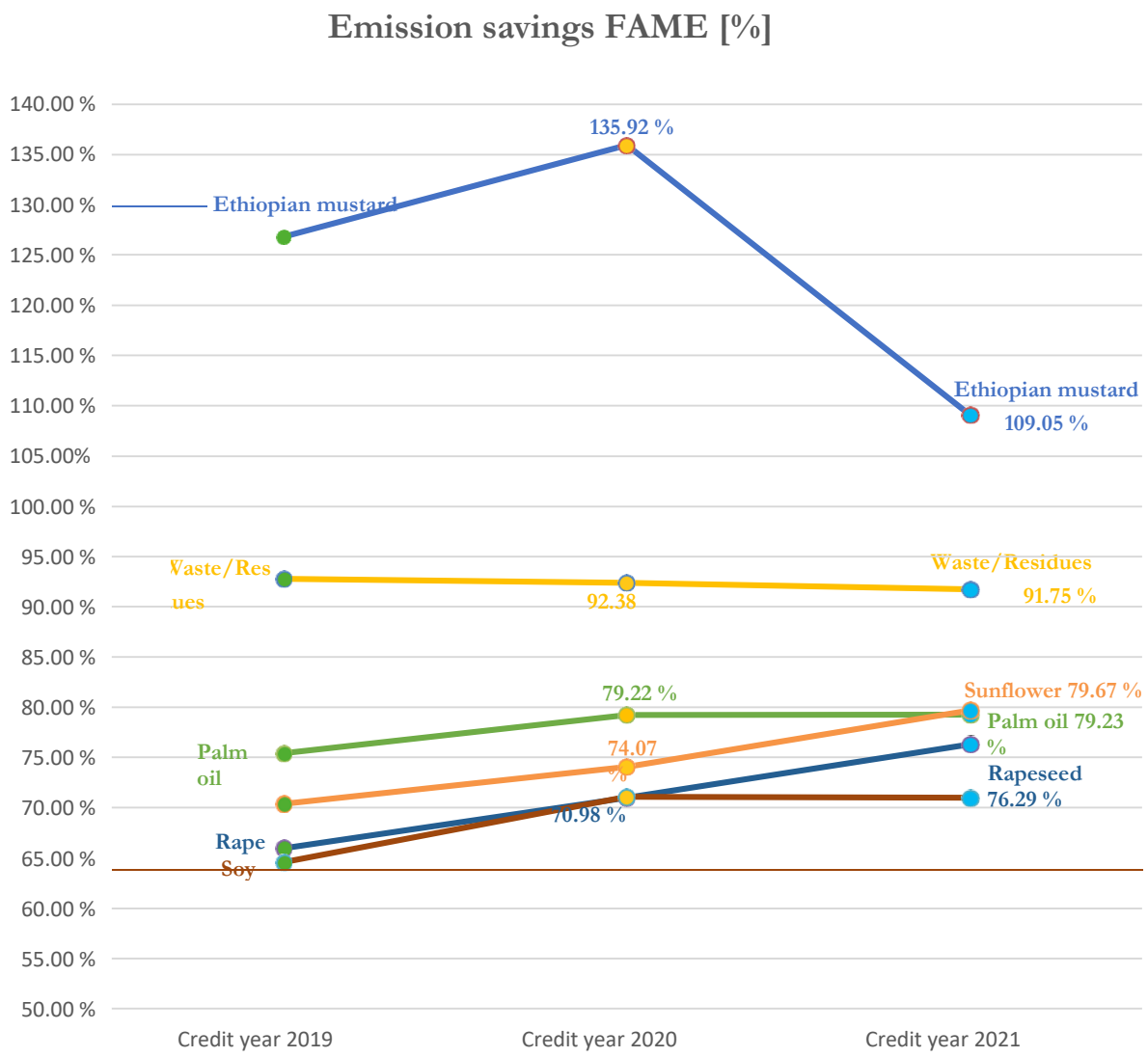


Abbildung 37

6.5 Emission savings of individual biofuel types according to greenhouse gas reduction levels

This section contains tables of emission savings for selected fuel types, raw product and growing regions. The figures were produced according to the percentage energy share within GHG reduction levels.

*Table 6: Emission savings bioethanol by raw material and GHG reduction level - shares in %**

THG-Ein-sparung [%]	Abfälle/ Reststoffe		Gerste		Mais		Roggen		Triticale		Weizen		Zucker-rohr		Zucker-rüben		Gesamt	
	Jahr 2020 1.661 TJ	Jahr 2021 1.748 TJ	Jahr 2020 1.034 TJ	Jahr 2021 977 TJ	Jahr 2020 17.367 TJ	Jahr 2021 14.721 TJ	Jahr 2020 2.111 TJ	Jahr 2021 4.077 TJ	Jahr 2020 1.301 TJ	Jahr 2021 1.401 TJ	Jahr 2020 3.562 TJ	Jahr 2021 3.890 TJ	Jahr 2020 2.062 TJ	Jahr 2021 2.967 TJ	Jahr 2020 429 TJ	877 TJ	Jahr 2020 29.528 TJ	Jahr 2021 30.656 TJ
>55-60					0.05	0.55	0.04	0.02			1.03	0.11			4.95		0.20	**0.28**
>60-65					1.08	0.18						< 0.01			5.53	1.27	0.80	**0.12**
>65-70					0.42	0.86						0.55			7.57	45.73	0.46	**1.79**
>70-75					4.53	3.18		10.85	0.02	7.96	6.81	19.06	0.32	0.04	3.77	< 0.01	3.13	**5.75**
>75-80			100.00	62.21	3.30	6.75	22.33	1.40	6.05	2.58	81.76	19.31		0.57			12.53	**8.03**
>80-85	32.37	41.73		25.47	21.11	9.26	19.52	4.73	20.90	1.21	5.69	0.70	34.24	4.69	0.11	0.59	20.66	**8.88**
>85-90	54.87	14.44			20.48	5.95	16.35	19.06	39.71	4.15	1.86	0.02	64.03	69.32	78.07	17.37	26.99	**13.61**
>90-95	12.76	10.60			49.03	55.85	41.76	6.45	33.33	15.33	2.86	3.08	1.41	25.36		35.04	35.23	**32.83**
>95-100		24.32		0.51		12.84		48.18		28.01		20.86		0.01				**17.91**
>100-105		8.89		10.87		4.59		9.17		38.55		35.00						**10.48**
>105-110		0.03		0.94				0.14		2.21		0.21						**0.18**
>110-115												0.13						**0.02**
>115-120												0.03						**< 0.01**
>120												0.93						**0.12**
Gesamt	E i n h u n d e r t P r o z e n t																	

* Differences in the totals are due to roundings

*Table 7: Emission savings bioethanol by raw material, source and GHG reduction level - shares in %**

THG-Ein-sparung [%]	Mais								Weizen							
	Deutschland		EU		Drittstaaten		Bioethanol aus Mais gesamt		Deutschland		EU		Drittstaaten		Bioethanol aus Weizen gesamt	
	Jahr 2020 109 TJ	Jahr 2021 119 TJ	Jahr 2020 9.287 TJ	Jahr 2021 6.031 TJ	Jahr 2020 7.971 TJ	Jahr 2021 8.571 TJ	Jahr 2020 17.367 TJ	Jahr 2021 14.721 TJ	Jahr 2020 117 TJ	Jahr 2021 449 TJ	Jahr 2020 3.445 TJ	Jahr 2021 3.393 TJ	Jahr 2020 0 TJ	Jahr 2021 47 TJ	Jahr 2020 3.562 TJ	Jahr 2021 3.890 TJ
>55-60			0,06	0,69	0,02	0,46	0,05	0,55			1,27	0,13			1,03	**0,11**
>60-65			1,44	0,42	0,03	0,02	1,08	0,18				< 0,01				**< 0,01**
>65-70			0,35	1,12	0,69	0,69	0,42	0,86		0,27		0,59				**0,55**
>70-75			5,49	7,38	1,73	0,26	4,53	3,18	7,41	55,07	6,67	14,55			6,81	**19,06**
>75-80		9,23	4,37	13,96	0,10	1,63	3,30	6,75	92,22	44,53	79,28	15,66		41,74	81,76	**19,31**
>80-85	31,13	6,31	27,69	21,40		0,76	21,11	9,26	0,36		6,95			58,26	5,69	**0,70**
>85-90	56,06	3,37	25,21	12,66	4,03	1,26	20,48	5,95		0,14	2,30				1,86	**0,02**
>90-95	12,81	54,35	35,40	24,30	93,41	78,08	49,03	55,85			3,53	3,54			2,86	**3,08**
>95-100		26,74		7,75		16,24		12,84				23,91				**20,86**
>100-105				10,32		0,62		4,59				40,12				**35,00**
>105-110												0,24				**0,21**
>110-115												0,15				**0,13**
>115-120												0,04				**0,03**
>120												1,07				**0,93**
Gesamt	E i n h u n d e r t P r o z e n t															

* Differences in the totals are due to roundings

*Table 8: Emission savings FAME by raw material and GHG reduction level - shares in %**

THG-Ein-sparung [%]	Abfälle/Reststoffe		Äthiopischer Senf		Palmöl		Raps		Soja		Sonnenblumen		Gesamt	
	Jahr 2020 32.975 TJ	Jahr 2021 28.881 TJ	Jahr 2020 73 TJ	Jahr 2021 51 TJ	Jahr 2020 22.216 TJ	Jahr 2021 28.520 TJ	Jahr 2020 28.274 TJ	Jahr 2021 22.084 TJ	Jahr 2020 1.994 TJ	Jahr 2021 4.612 TJ	Jahr 2020 3.897 TJ	Jahr 2021 629 TJ	Jahr 2020 89.429 TJ	Jahr 2021 84.776 TJ
50-55										0,04				<0,01
>55-60				2,88	0,14	0,28	0,30	0,62	0,82	4,31			0,15	0,49
>60-65				0,66	0,05	0,07	3,33	3,32	4,95	9,58		0,85	1,18	1,42
>65-70				1,25	1,47	0,89	30,26	36,14	39,00	21,04	0,87	0,02	10,84	10,86
>70-75				0,54	8,62	8,89	57,01	40,23	34,73	50,29	68,04	67,54	23,90	16,71
>75-80		0,04		4,77	52,68	48,63	8,76	9,71	20,32	14,14	31,09	17,47	17,67	19,80
>80-85	<0,01	0,38		6,79	29,96	31,10		0,63	0,17	0,60		0,13	7,45	10,79
>85-90	10,77	19,56		1,98	6,94	10,11		0,86				0,92	5,69	10,30
>90-95	77,45	71,64		24,25			0,11	0,69				3,34	28,59	24,62
>95-100	11,78	8,38		5,37	0,14	0,05	0,03	0,43				1,43	4,39	3,00
>100-105				9,29			0,07	0,39				0,49	0,02	0,11
>105-110			100,00	5,22			0,13	0,24				0,73	0,12	0,07
>110-115				7,29				0,22				2,70		0,08
>115-120				1,60				0,31						0,08
>120				28,11				6,22		0,02		4,38		1,67
Gesamt	E i n h u n d e r t P r o z e n t													

* Differences in the totals are due to roundings

*Table 9: Emission savings FAME by raw material, source and GHG reduction level - shares in %**

THG-Ein-sparung [%]	Abfälle/Reststoffe								Raps							
	Deutschland		EU		Drittstaaten		FAME aus Abfall/ Reststr. gesamt		Deutschland		EU		Drittstaaten		FAME aus Raps gesamt	
	Jahr 2020 7.759 TJ	Jahr 2021 7.683 TJ	Jahr 2020 11.005 TJ	Jahr 2021 8.078 TJ	Jahr 2020 14.210 TJ	Jahr 2021 13.120 TJ	Jahr 2020 33.975 TJ	Jahr 2021 28.881 TJ	Jahr 2020 11.396 TJ	Jahr 2021 9.380 TJ	Jahr 2020 10.329 TJ	Jahr 2021 6.874 TJ	Jahr 2020 6.550 TJ	Jahr 2021 5.830 TJ	Jahr 2020 28.274 TJ	Jahr 2021 22.084 TJ
>55-60									< 0,01	0,02	0,34	0,86	0,74	1,30	**0,30**	**0,62**
>60-65									0,51	0,99	5,84	7,78	4,28	1,83	**3,33**	**3,32**
>65-70									45,82	56,34	27,24	24,74	7,95	17,07	**30,26**	**36,14**
>70-75									52,64	31,89	61,50	37,91	57,52	56,37	**57,01**	**40,23**
>75-80						0,09		0,04	1,02	10,76	4,15	2,44	29,51	16,61	**8,76**	**9,71**
>80-85	0,01	0,01		0,75		0,37	< 0,01	0,38			0,01	1,93		0,12	**< 0,01**	**0,63**
>85-90	3,18	9,98	13,61	19,28	12,70	25,34	10,77	19,56				2,73		0,03		**0,86**
>90-95	69,95	66,88	84,38	75,39	76,18	72,12	77,45	71,64	0,01		0,30	2,20			**0,11**	**0,69**
>95-100	26,86	23,13	2,01	4,58	11,12	2,08	11,78	8,38			0,07	1,31		0,09	**0,03**	**0,43**
>100-105											0,19	0,72		0,63	**0,07**	**0,39**
>105-110											0,36	0,36		0,47	**0,13**	**0,24**
>110-115												0,59		0,12		**0,22**
>115-120												0,75		0,30		**0,31**
>120												15,69		5,06		**6,22**
Gesamt	E i n h u n d e r t P r o z e n t															

* Differences in the totals are due to roundings

*Table 10: Emission savings vegetable oils by raw material and GHG reduction level - shares in %**

THG-Ein-sparung [%]	Palmöl		Raps	
	Jahr 2020 28 TJ	Jahr 2021 8 TJ	Jahr 2020 26 TJ	Jahr 2021 30 TJ
>55-60				0,05
>60-65	71,24	100,00	51,65	41,98
>65-70	6,60		4,98	8,74
>70-75	19,26		43,36	49,24
>75-80	2,91			
Gesamt	Einhundert Prozent			

* Differences in the totals are due to roundings

*Table 11: Emission savings biomethane by raw material and GHG reduction level - shares in %**

GHG savin [%]	Waste/residues		Fodder beet		Cereals Whole plant		Grass/arable grass		Rye		Silage maize		Sugar beet		Total	
	Jahr 2020 1.885 TJ	Jahr 2021 2.750 TJ	Jahr 2020 2 TJ	Jahr 2021 1 TJ	Jahr 2020 10 TJ	Jahr 2021 45 TJ	Jahr 2020 10 TJ	Jahr 2021 14 TJ	Jahr 2020 -	Jahr 2021 26 TJ	Jahr 2020 643 TJ	Jahr 2021 610 TJ	Jahr 2020 27 TJ	Jahr 2021 32 TJ	Jahr 2020 2.577 TJ	Jahr 2021 3.477 TJ
>70-75	0.02					4.22		81.60		80.68					**0.01**	**1.00**
>75-80	8.01	2.86			8.22	17.21	6.94	18.40		19.32	12.04	20.25			**8.92**	**6.25**
>80-85	3.06	0.78			19.35	53.49	93.06				19.61	22.74	22.05	3.17	**7.81**	**5.32**
>85-90	19.29	6.17	23.32	100.00	55.75	25.08					64.11	48.86	14.11	48.46	**30.49**	**14.23**
>90-95	22.05	31.06	76.68		16.68						4.24	8.15	63.84	48.37	**17.98**	**26.43**
>95-100	47.57	57.44													**34.79**	**45.43**
>100-105																
>105-110																
>110-115																
>115-120																
>120		1.69														**1.34**
Total					**One hundred**					percent						

* Differences in the totals are due to roundings

*Table 12: Emission savings of advanced wastes and residues by type and GHG reduction level - shares in %**

GHG savings [%]	Advanced in accordance with the 38th BlmSchV Annex 1[11]																					
	Number2		Number3		Number4		Number5		Number6		Number7		Number9		Number11		Number15		Number16		Total	
	Jahr 2020	Jahr 2021	Jahr 2020	Jahr 2021	Jahr 2020	Jahr 2021	Jahr 2020	Jahr 2021	Jahr 2020	Jahr 2021	Jahr 2020	Jahr 2021	Jahr 2020	Jahr 2021	Jahr 2020	Jahr 2021	Jahr 2020	Jahr 2021	Jahr 2020	Jahr 2021	Jahr 2020	Jahr 2021
>60-65			10.61	0.84																	**0.02**	**0.01**
>65-70																	< 0.01				< **0.01**	
>70-75	< 0.01										0.13	1.20	0.53					0.01			**0.01**	**0.38**
>75-80	< 0.01		89.39	98.90	1.94		9.78	0.44			2.54	0.49	37.29	2.70	100.00		< 0.01	1.17			**0.51**	**1.20**
>80-85	0.92			0.25			3.40	2.60	5.69	3.03	39.87	0.64					100.00	96.22			**6.76**	**16.13**
>85-90	13.39	9.40			1.38	6.28	12.71		17.72	6.28	34.61	48.83		1.33							**14.17**	**17.86**
>90-95	73.63	68.14			27.35	46.89			60.27	47.64	22.85	48.84	62.18	74.94						100.00	**66.21**	**40.23**
>95-100	11.14	22.46			69.33	46.83	74.11	96.96	16.33	22.65				21.03				2.60			**11.57**	**23.68**
>100-105																						
>105-110	0.87																				**0.75**	
>110-115																						
>115-120																						
>120										20.40												**0.51**
Total					**One-hundred percent**																	

* Differences in the totals are due to roundings

[11] See page 99, Table 31

*Table 13: Emission savings non-advanced wastes and residues by type and GHG reduction level - shares in %**

THG-Ein-sparung [%]	Nicht fortschrittlich nach 38. BImSchV Anlage 1[12]					
	Gebrauchte Speiseöle		Sonstige		Gesamt	
	Jahr 2020 29.286 TJ	Jahr 2021 21.172 TJ	Jahr 2020 10.688 TJ	Jahr 2021 9.810 TJ	Jahr 2020 39.974 TJ	Jahr 2021 30.982 TJ
>70-75	0,01				< 0,01	
>75-80			0,14		0,04	
>80-85	0,05	0,08	3,30	8,46	0,92	2,73
>85-90	12,19	18,95	16,68	21,58	13,39	19,78
>90-95	82,17	78,72	50,24	48,97	73,63	69,30
>95-100	5,58	2,26	26,40	19,40	11,14	7,69
>100-105				1,58		0,50
>105-110			3,24	0,01	0,87	< 0,01
Gesamt	E i n h u n d e r t P r o z e n t					

* Differences in the totals are due to roundings

12 See page 99, Table 31

7. Combustible biofuels

Compared to the previous year, 9 % less combustible biofuel was registered for electricity generation and feed-in under the EEG.

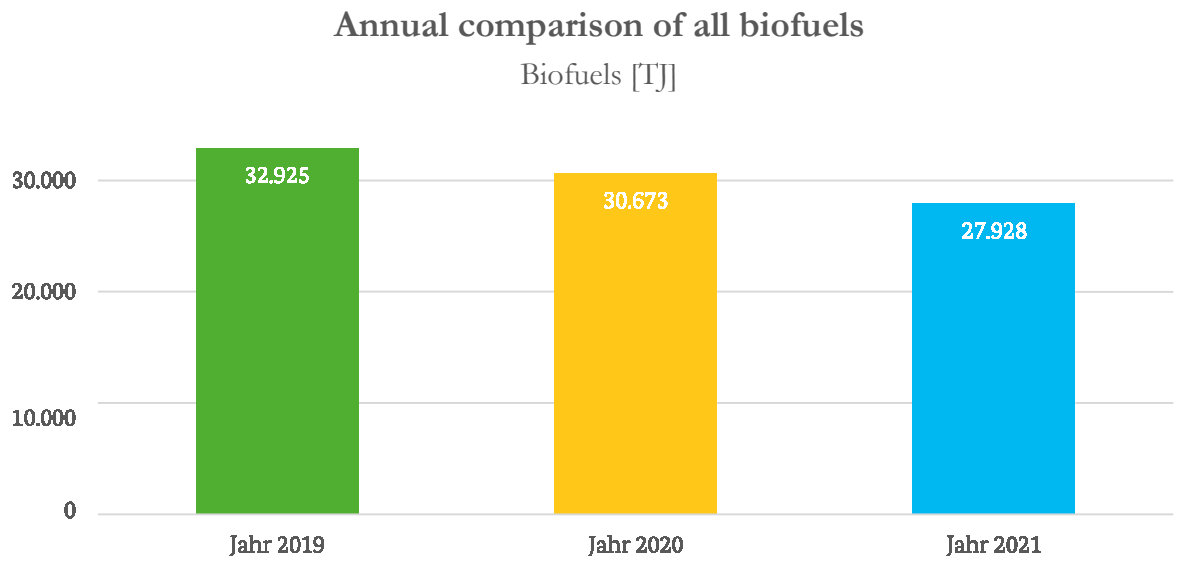


Abbildung 38

7.1 Types of combustible biofuels

With a decrease of over two thousand terajoules compared to 2020, the amount of vegetable oil halved and thus contributed significantly to the reduction in the total amount.

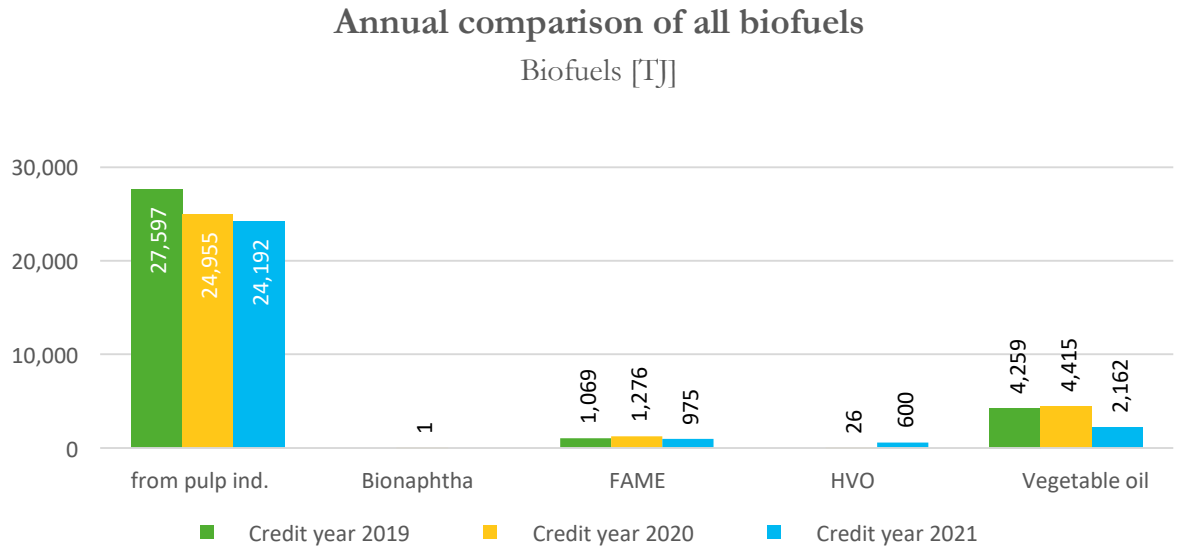


Abbildung 39

7.2 Raw materials and source of vegetable oils used as combustible biofuel

Significantly less palm oil (-49 %) and rapeseed (-70 %) were used.

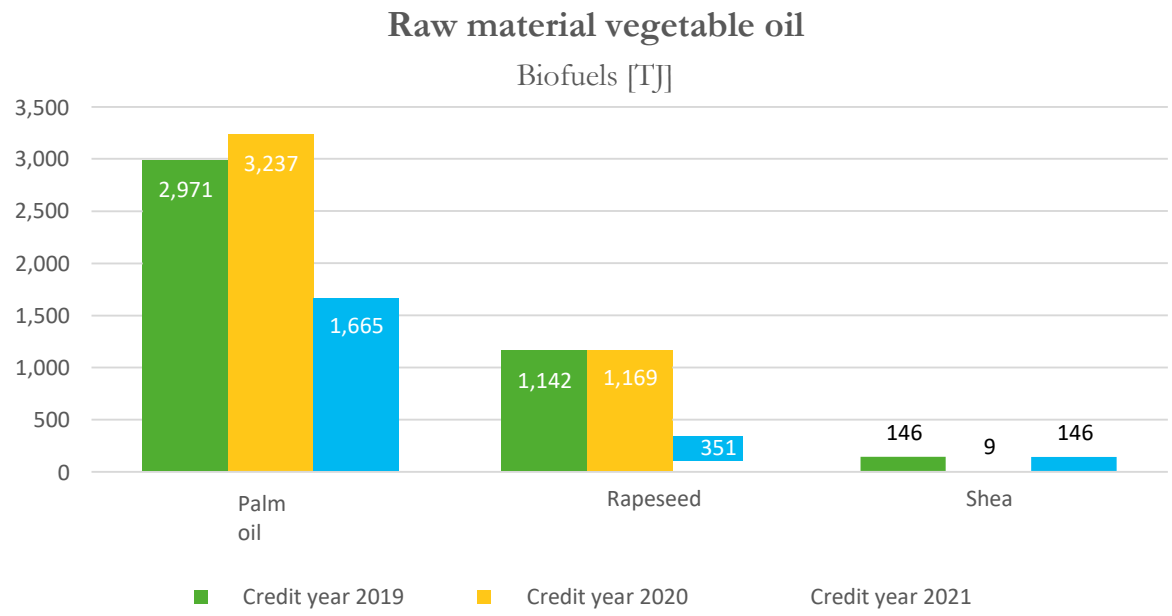


Abbildung 40

All countries of origin of palm oil, except Colombia (+86 %, +85 TJ), recorded a decrease in the quantity accounted for. The most significant reduction was in palm oil from Malaysia (-63 %, -954 TJ).

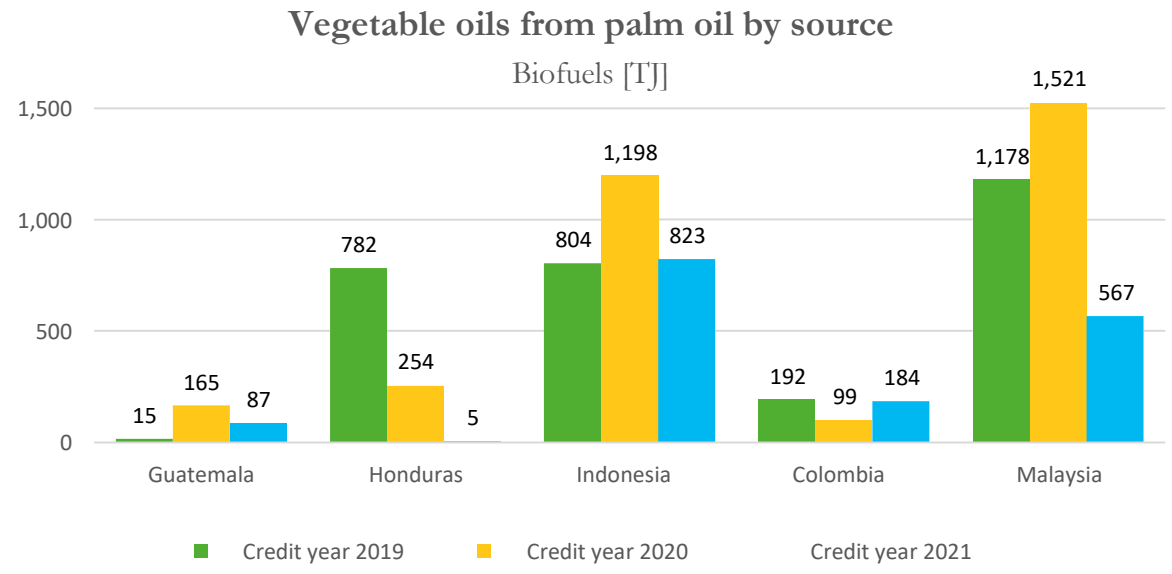


Abbildung 41

7.3 Greenhouse gas emissions and savings

In calculating the emission savings, the total emissions[13] generated in the production of the combustible biofuel were compared to the comparative value for fossil fuels for electricity generation of 91 g CO_2eq/MJ.

Due to the large share of thick liquor from the pulp industry with very low emissions, the total savings in the combustible biofuel sector are traditionally very high.

The emission savings presented below are based on the comparison of pure combustible biofuels and pure combustible fossil fuels.

The use of combustible biofuels for electricity generation saved about 2.4 million tonnes of CO_2 equivalent.

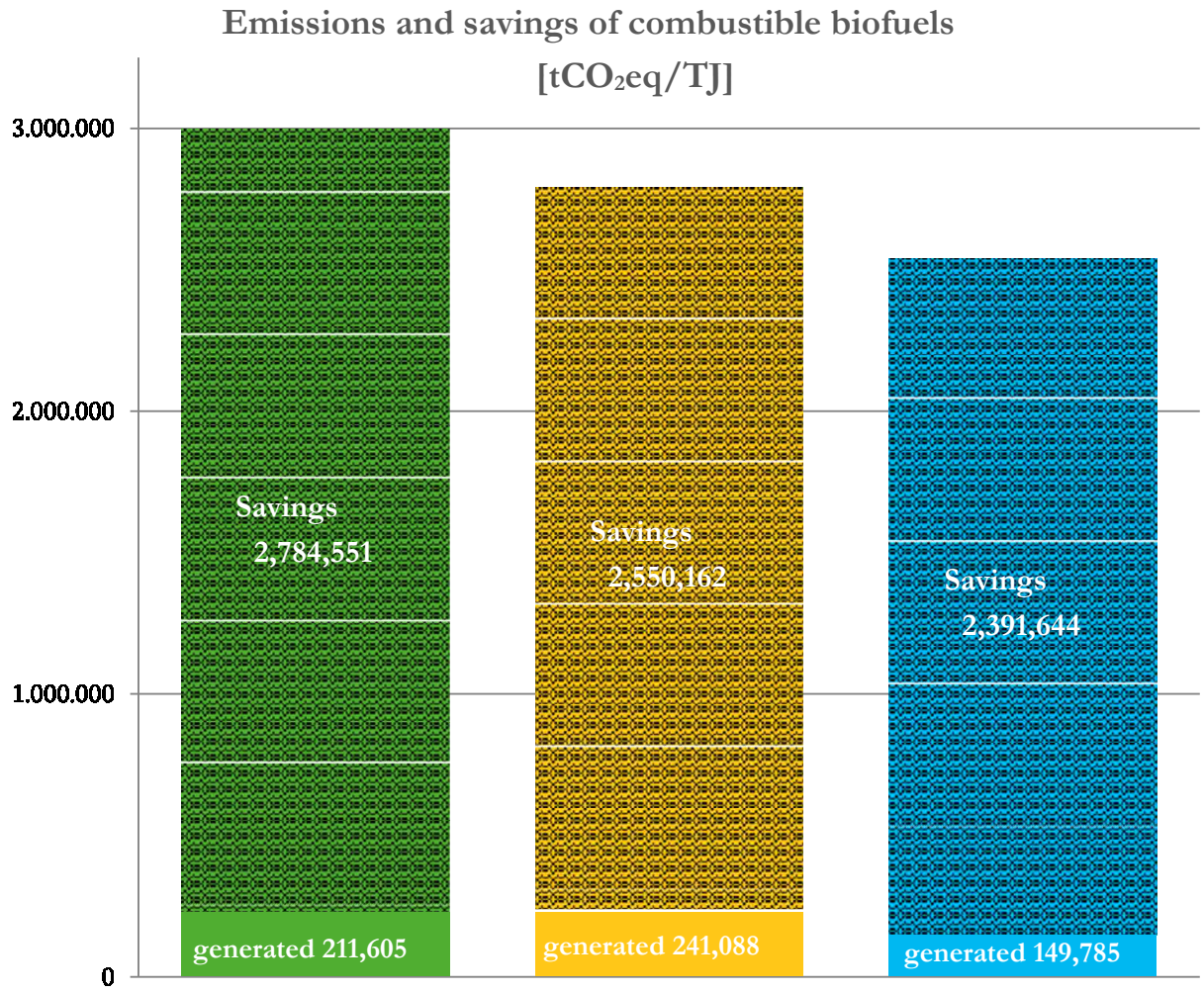


Abbildung 42

[13]Emissions accounting is based on the same methodology as for biofuels, cf. footnote 4 page 7

Average emissions decreased by 2.5tCO_2eq/TJ compared to the previous year.

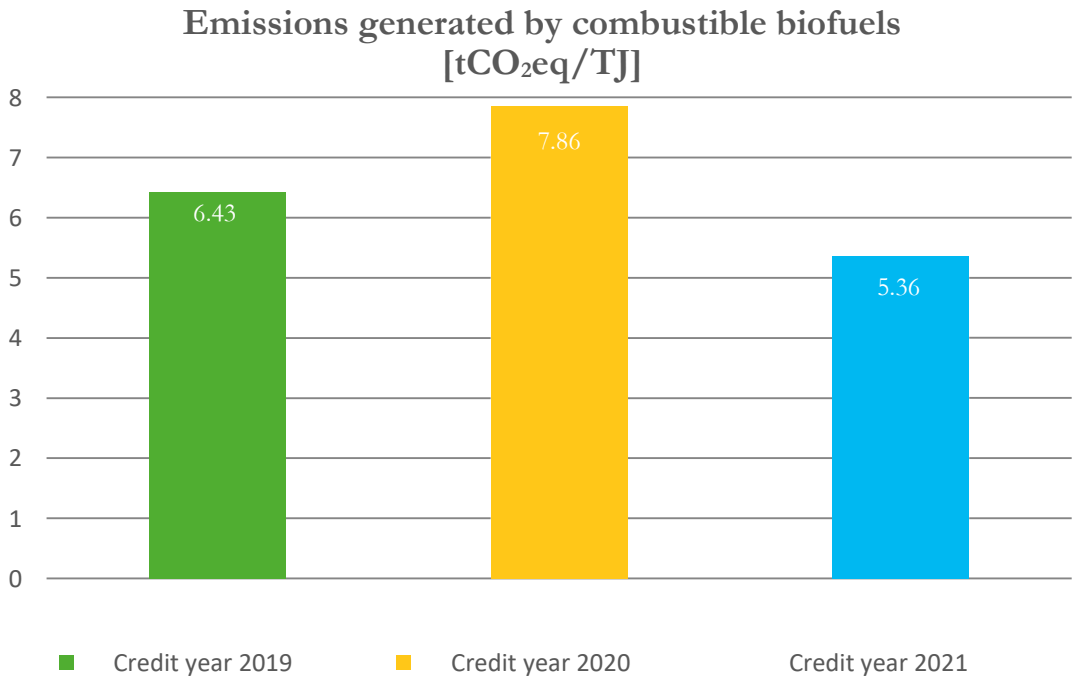


Abbildung 43

Thus, the average emission saving increased by 2.75 percentage points.

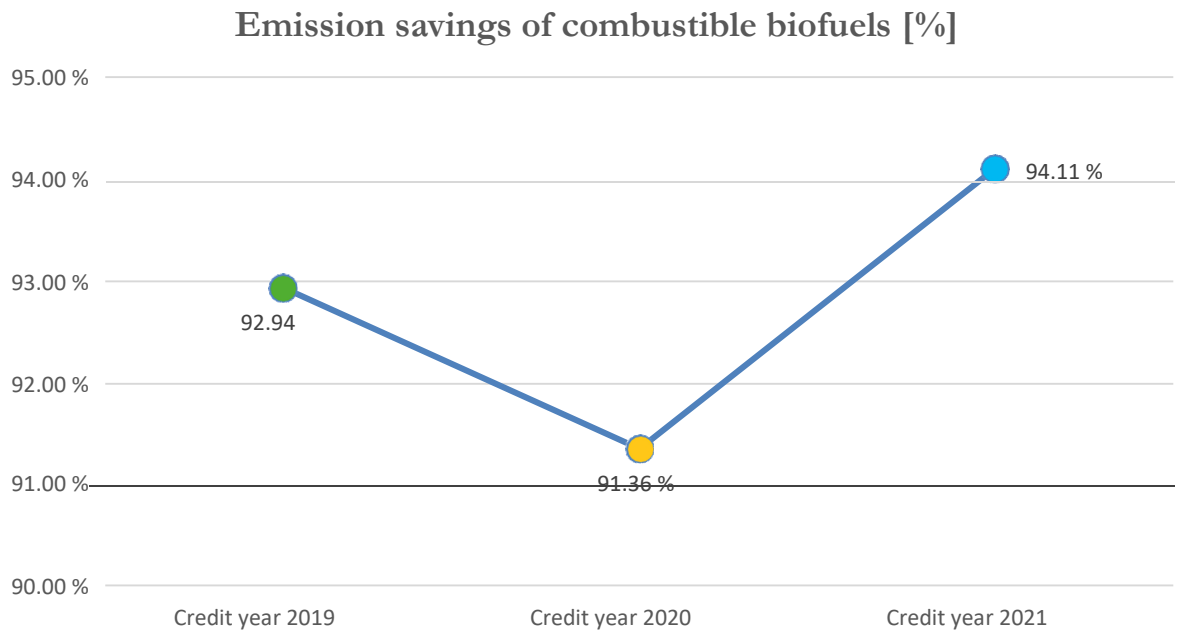


Abbildung 44

FAME and vegetable oils caused significantly more emissions compared to HVO and the biofuels from the pulp industry.

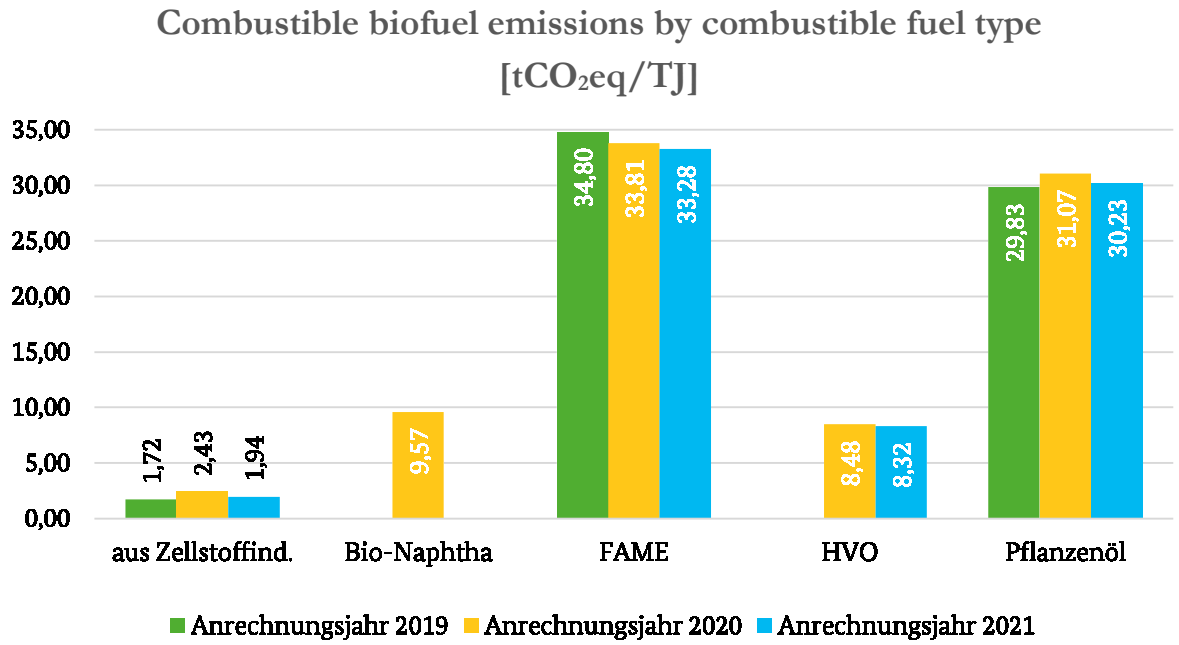


Abbildung 45

The individual biofuel types showed only relatively minor changes in the percentage of emission savings.

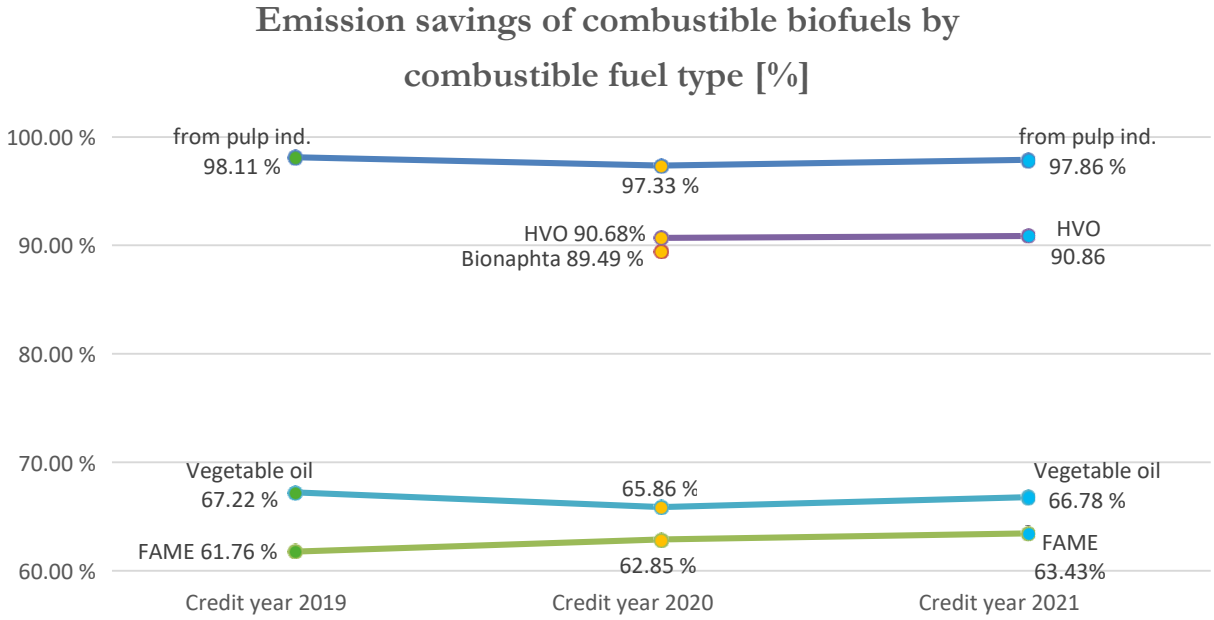


Abbildung 46

8. Derecognition accounts

To enable economic operators to comply with their mass accounting rules, derecognition accounts have been set up in Nabisy for various purposes. These are:

- Country accounts, if the goods leave Germany and the recipient is not registered in Nabisy,

- Derecognition accounts for other purposes, e.g. for use for further conversion or other technical purposes,

- Shortfall as at the balance sheet date, for cases where, at the end of a mass accounting period, existing evidence is not physically matched by sustainable goods.

8.1 Bookings to accounts of other member states and third countries

Biofuels and combustible biofuels that are recorded in the Nabisy database and exported to other countries must be booked out by the economic operators in Nabisy to the account of the respective country. In the reporting year, 127,441 TJ (previous year: 96,554 TJ) of biofuels and combustible biofuels were transferred to accounts of countries inside and outside the European Union.

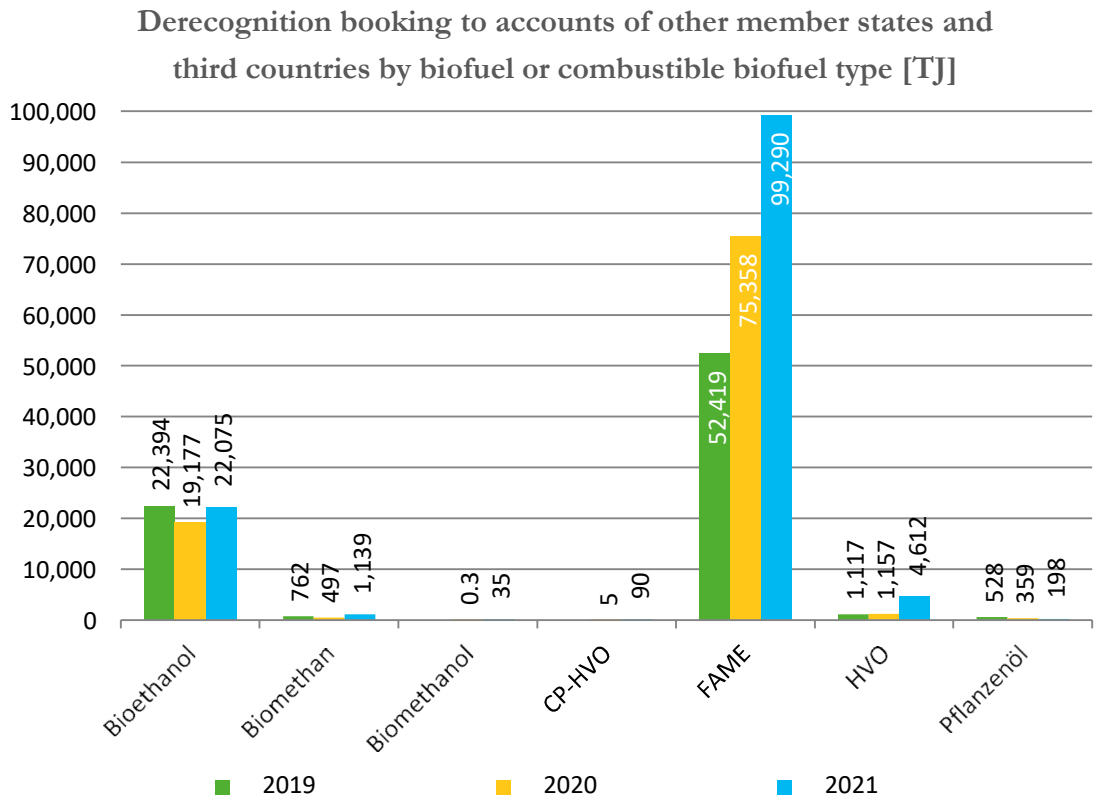


Abbildung 47

The following figure only shows the country accounts to which more than 1,000 TJ were booked in at least one comparison year. A complete overview of the volumes booked out can be found in table 14 on page 81.

The largest volumes of derecognised biofuels and combustible biofuels were booked by the Netherlands (20 %), the United Kingdom (18 %), Austria (13 %), Belgium (12 %) and France (11 %).

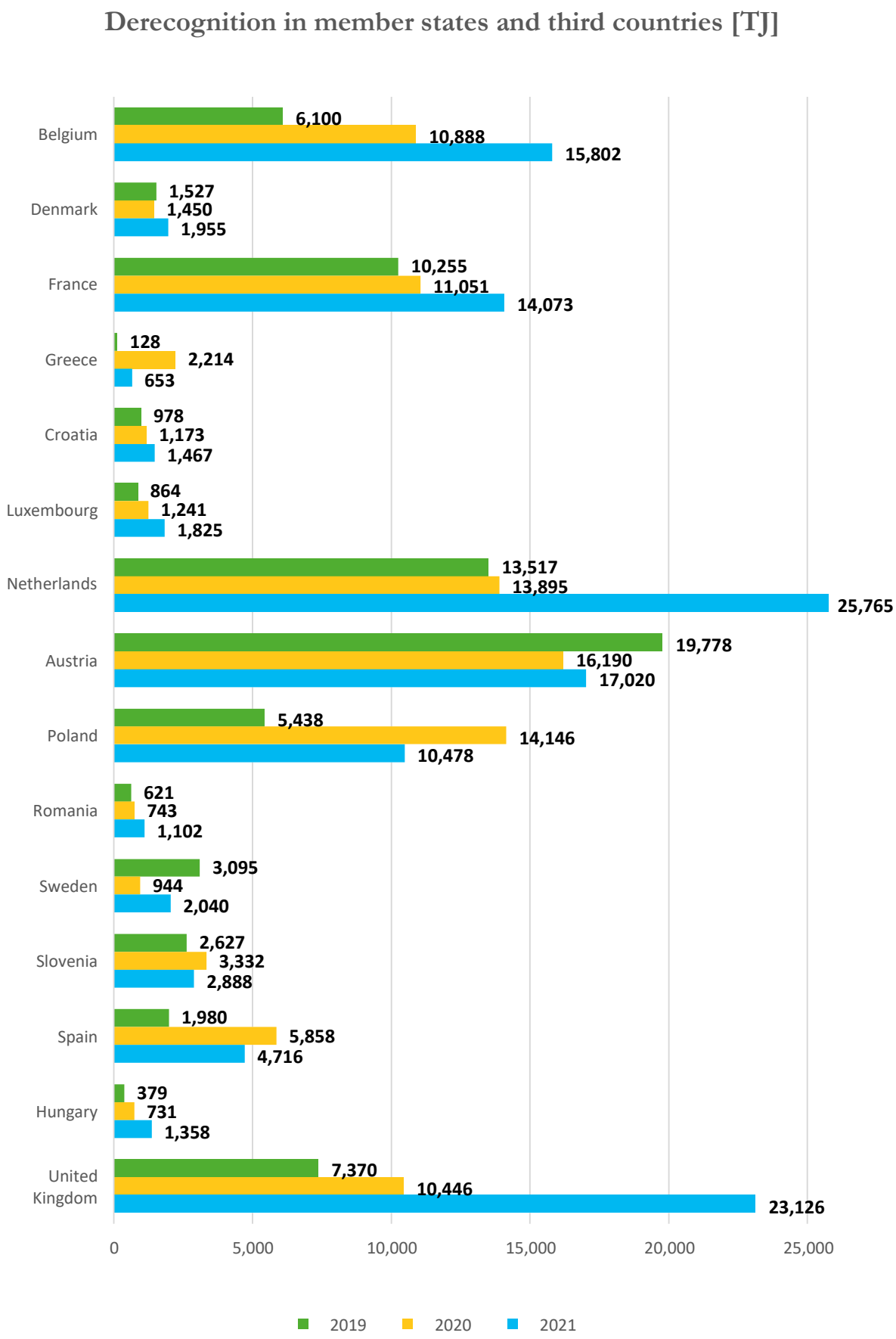


Abbildung 48

*Table 14: Derecognition 2021 of biofuels or combustible biofuels in member states and third countries [TJ]**

Ausbuchungs-konto	Abfälle/ Reststoffe	Gerste	Mais	Mais-keimöl	Palmöl	Raps	Roggen	Soja	Sonnen-blumen	Triticale	Weizen	Zucker-rohr	Zucker-rüben	Gesamt
Belgien	1,915		709	3,750	5,182		3,423	77	24		278	370	74	**15,802**
Bulgarien	2		135		99									**236**
Dänemark	317		777		< 1		47				164	22	627	**1,955**
Estland	162				11									**173**
Frankreich	158	22	2,013	9	8,861	2	1,716	43		< 1	679	527	42	**14,073**
Griechenland			522								107	24		**653**
Irland	183		132								45			**360**
Italien	75		12		728		45	84			1			**945**
Kroatien	42		5	287	459		627	32		2	13		< 1	**1,467**
Lettland					5		8							**13**
Litauen	21		< 1		< 1									**22**
Luxemburg	650	< 1	143	291	403	12	178	39			64	21	25	**1,825**
Niederlande	19,013	19	3,354	26	246	30	326	< 1	151		1,680	650	272	**25,765**
Nordmazedonien					3		4							**8**
Norwegen	26													**26**
Österreich	950	4	727	321	9,681	57	4,413	637		2	154	7	68	**17,020**
Polen	93	43	278	75	9,073	31	554	38		14	69		209	**10,478**
Portugal	217													**217**
Rumänien			193	30	588		212				79			**1,102**
Schweden	1,426		392										222	**2,040**
Schweiz	2		21				7				26			**55**
Serbien				2										**2**
Slowakei	132				89			37			3			**262**
Slowenien	2,344		19	42	262		12	5		29	134		41	**2,888**
Spanien	3,865			191	295		365							**4,716**
Tschechien	50	11	48	23	250	47		85		3	30	< 1	2	**551**
Ungarn	428		82	18	705		44			10	72			**1,358**
Verein. Königreich	21,079	6	1,155	126	342		127		26		109	157		**23,126**
Gesamtergebnis	**53,148**	**104**	**10,721**	**5,192**	**37,561**	**180**	**12,107**	**1,077**	**200**	**61**	**3,729**	**1,779**	**1,581**	**127,441**

* Differences in the totals are due to roundings

8.2 Emission savings with derecognition booking to country accounts

Almost all of the quantities derecognised to country accounts had lower GHG savings than the quantities counted towards the German GHG reduction quota.

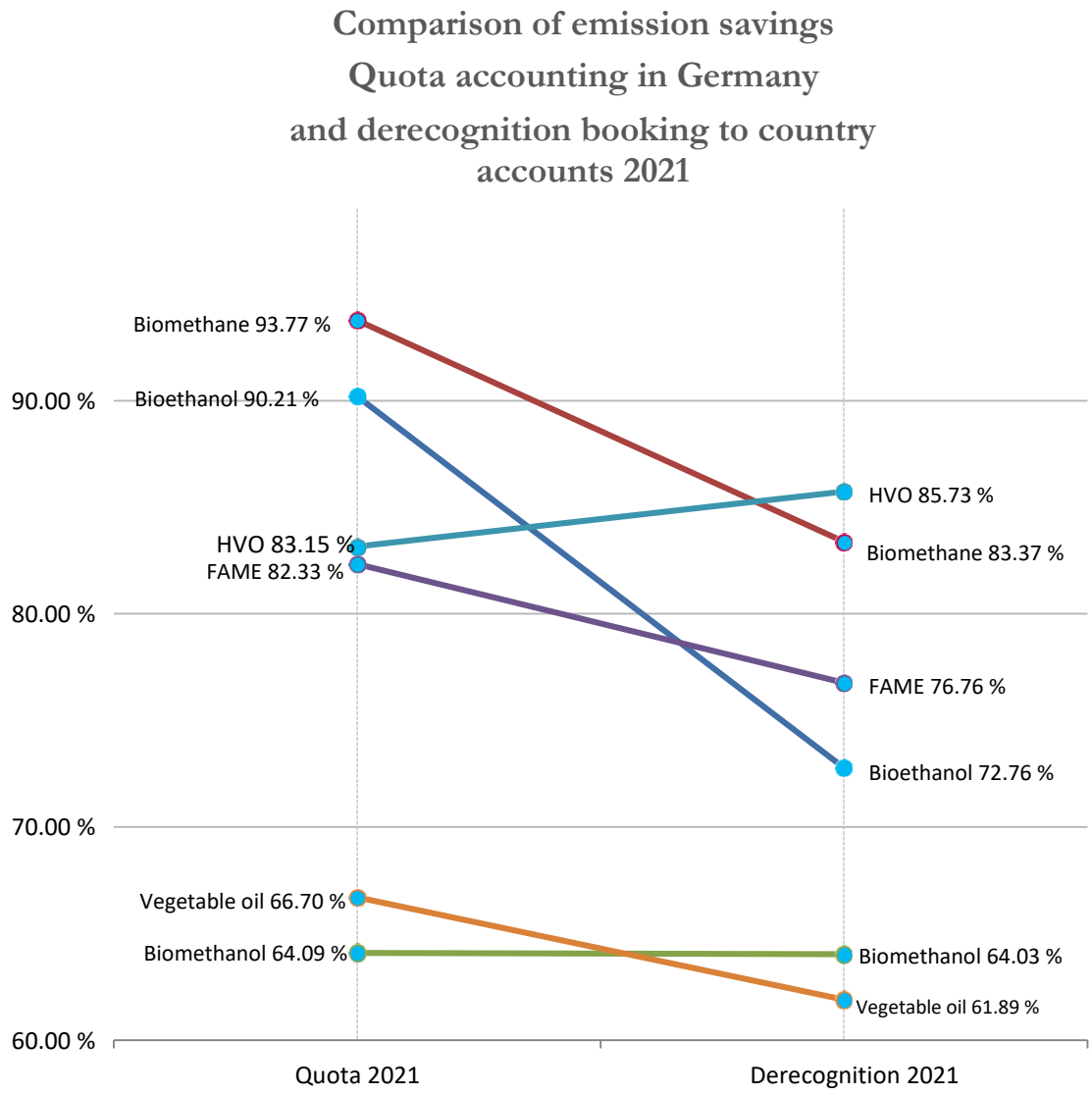


Abbildung 49

8.3 Derecognition bookings to other accounts

In addition to derecognition to country accounts, the Nabisy electronic database has further derecognition options for verified quantities that are not or were not used for energy purposes in Germany. The following figure shows the development in three of these other accounts.

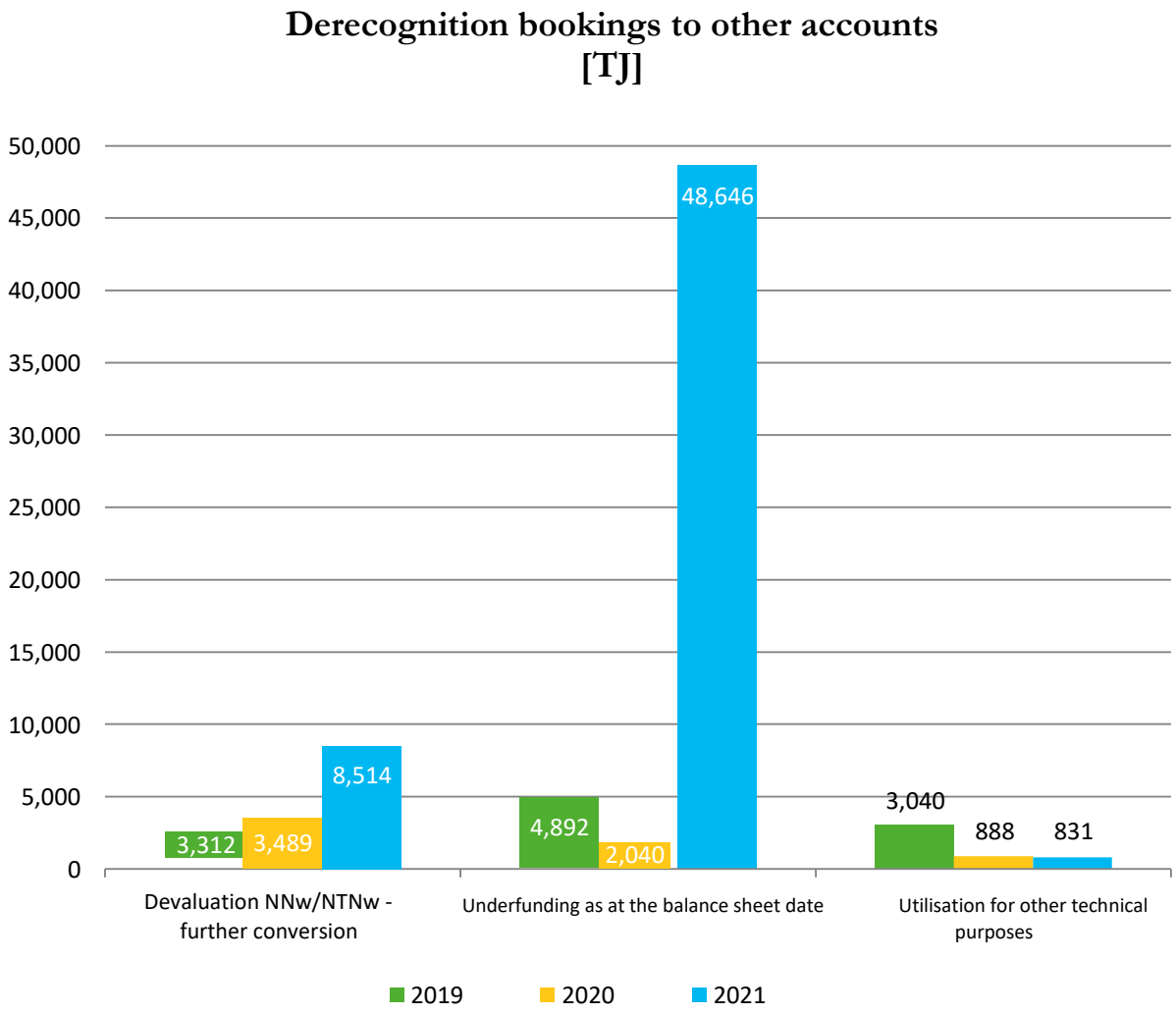


Abbildung 50

9. Prospects

The coronavirus pandemic has had a significant influence on our work in recent years. In 2021, many assessments and monitoring activities could therefore only be carried out as remote assessments. Due to a stabilisation of the pandemic situation, the BLE will again be able to carry out its monitoring tasks predominantly on site.

The national implementation of the Renewable Energy Directive (RED II) will lead to a significant increase in the recognition of certification bodies and economic operators subject to certification. This increases the number of assessments to be carried out at the certification bodies (so-called office audits) as well as the presence of auditors during their certification activities (so-called witness audits). These are primarily certifications of economic operators (interfaces) in the field of sustainable generation of electricity from solid and gaseous biomass.

From the calendar year 2022, the persons required to obtain certification under the Federal Immission Control Act (BlmSchG) must reduce greenhouse gas emissions by 7 % compared to the reference value. Thus, the blending of sustainable biofuel remains an important compliance option for reducing greenhouse gas emissions in the transport sector.

With the implementation of the Emission Trading Ordinance 2030 (EHV 2030) and the Emission Reporting Ordinance 2030 (EBeV 2030), a considerable number of additional economic operators will be required to submit a Nabisy certification and thus to certify their entire production and supply chain in accordance with the sustainability regulations.

More well-trained auditors are needed here in order to create the possibility of certification for all those involved in the economy in a timely manner.

Legal innovations and changes will continue to require the state database Nabisy to undergo a constant process of adaptation, in some cases with extensive programming.

As concerns the EU database (UDB) planned by the EU Commission, data interfaces to the existing national databases will be necessary to ensure a smooth data transfer and to prevent possible multiple offsets of CO_2 savings. Intensive exchange is still necessary for this.

Other member states are expanding their control activities vis-à-vis certification bodies and economic operators, which requires intensive coordination between them. In this context, the control intervals must be harmonised and at the same time an appropriate level of monitoring must be established.

Also with regard to raw materials that can be counted towards the savings targets according to Annex IX of the Renewable Energies Directive, close coordination between the EU Commission and member states is necessary to ensure equal treatment.

10. Background data

*Table 15: Biofuels in TJ raw materials**

Kraftstoffart/ Quotenjahr / Ausgangsstoff	Bioethanol Abbildung 22, S. 49			Bio-LNG		Biomethan Abbildung 27, S. 54			Biomethanol		FAME Abbildung 24, S. 51			HVO Abbildung 26, S. 53			CP-HVO Abbildung 26, S. 53		Pflanzenöl Abbildung 28, S. 55		
	2019	2020	2021	2020	2021	2019	2020	2021	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2019	2020	2021
Athiopischer Senf											98	73	51								
Futterrübe							2	1													
Gerste	424	1.034	977																		
Getreide - Ganzpflanze							10	45													
Gras / Ackergras							10	14													
Mais	19.623	17.367	14.721					610													
Palmöl											22.523	22.216	28.520	1.812	34.665	13.066	65	1.400	19	28	8
Raps											29.600	28.274	22.084					10	18	26	30
Roggen	1.148	2.111	4.077					26													
Silomais/Ganzpflanze						491	643														
Soja											1.215	1.994	4.612								
Sonnenblumen											3.073	3.897	629					694			
Triticale	1.493	1.301	1.401																		
Weizen	5.394	3.562	3.890																		
Zuckerrohr	1.426	2.062	2.967																		
Zuckerrüben	603	429	877				27	32													
Gesamt	30.808	29.528	30.656	1**	62	1.227	2.577	3.477	10	< 1	89.646	89.429	84.776	1.836	43.893	19.725	65	2.106	37	54	38

* Differences in the totals are due to roundings
** subsequently corrected value

*Table 16: Biofuels in kt raw materials**

Kraftstoffart/ Quotenjahr / Ausgangsstoff	Bioethanol			Bio-LNG		Biomethan			Biomethanol		FAME			HVO			CP-HVO		Pflanzenöl		
	2019	2020	2021	2020	2021	2019	2020	2021	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2019	2020	2021
Abfall/Reststoff	26	63	66	< 1	1	15	38	55	< 1	< 1	887	882	772	1	212	153		< 1			
Äthiopischer Senf											3	2	1								
Futterrübe							< 1	< 1													
Gerste	16	39	37																		
Getreide - Ganzpflanze							< 1	1													
Gras / Ackergras							< 1	< 1													
Mais	741	656	556					12													
Palmöl											603	594	763	42	795	300	1	32	1	< 1	< 1
Raps											792	757	591					< 1	< 1	< 1	1
Roggen	43	80	154					1													
Silomais/Ganzpflanze						10	13														
Soja											32	53	123								
Sonnenblumen											82	104	17					16			
Triticale	56	49	53																		
Weizen	204	135	147																		
Zuckerrohr	54	78	112																		
Zuckerrüben	23	16	33				1	1													
Gesamt	1.164	1.116	1.158	< 1	1	25	52	70	< 1	< 1	2.399	2.393	2.267	42	1.007	453	1	48	1	1	1

* Differences in the totals are due to roundings

*Table 17: Biofuels in TJ raw materials and their source**

Region/ Quoten-jahr / Ausgangsstoff	Afrika Abbildung 12, S. 39			Asien Abbildung 13, S. 40			Australien Abbildung 14, S. 41			Europa Abbildung 15, S. 42			Mittelamerika Abbildung 17, S. 44			Nordamerika Abbildung 18, S. 45			Südamerika Abbildung 19, S. 46		
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
Abfälle und Reststoffe	174	648	644	13.122	17.842	15.428	18	14	30	19.924	24.812**	22.271	11	15	28	969	1.681	777	379	749	924
Brassica carinata																9	27	1	89	46	50
Futterrübe											2	1									
Gerste										424	1.034	977									
Getreide - Ganz-pflanze											10	45									
Gras / Ackergras											10	14									
Mais										19.607	17.364	15.200				15	< 1	54		2	76
Palmöl				21.409	52.975	38.936							2.970	4.842	2.571				39	492	87
Raps				71	110	11	5.014	4.214	3.115	24.533	22.160	17.255					1.827	1.604			129
Roggen										1.148	2.111	4.103									
Silomais/Ganzpflanze										491	643										
Soja										27	70	299		2					1.188	1.922	4.313
Sonnenblumen								2		3.073	4.589	629						< 1			
Triticale										1.493	1.301	1.401									
Weizen										5.394	3.562	3.890									
Zuckerrohr													350	688	539				1.076	1.375	2.428
Zuckerrüben										603	456	908									
Gesamt	174	648	644	34.603	70.927	54.376	5.031	4.229	3.144	76.716	78.126**	66.992	3.331	5.547	3.138	993	3.535	2.436	2.771	4.586	8.007

* Differences in the totals are due to roundings
** subsequently corrected value

*Table 18: Biofuels in kt raw materials and their source **

Region/ Quoten- jahr / Ausgangsstoff	Afrika			Asien			Australien			Europa			Mittelamerika			Nordamerika			Südamerika		
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
Abfälle und Reststoffe	5	17	17	351	451	393	< 1	< 1	1	536	665	590	< 1	<1	1	26	41	20	10	20	25
Brassica carinata																<1	1	<1	2	1	1
Futterrübe											< 1	<1									
Gerste										16	39	37									
Getreide - Ganzpflanze											< 1	1									
Gras / Ackergras											< 1	< 1									
Mais										741	656	564				1	<1	2		<1	3
Palmöl				566	1.285	992							79	125	69				1	13	2
Raps				2	3	< 1	134	113	83	656	593	462					49	43			3
Roggen										43	80	155									
Silomais/Ganzpflanze										10	13										
Soja										1	2	8		<1					32	51	115
Sonnenblumen								< 1		82	120	17						<1			
Triticale										56	49	53									
Weizen										204	135	147									
Zuckerrohr													13	26	20				41	52	92
Zuckerrüben										23	17	34									
Gesamt	5	17	17	919	1.739	1.385	135	113	84	2.368	2.368	2.067	93	152	90	27	91	65	86	137	242

* Differences in the totals are due to roundings

Table 19: Biofuels by raw material

Raw material	2019 [TJ]	2020 [TJ]	2021 [TJ]	2019 [TJ]	2020 [TJ]	2021 [TJ]
Waste and residues	34,598	45,761**	40,102	928	1,195	1,047
Brassica carinata	98	73	51	3	2	1
Fodder beet		2	1		<1	<1
Barley	424	1,034	977	16	39	37
Cereals - Whole plant		10	45		<1	1
Grass/ arable grass		10	14		<1	<1
Maize	19,623	17,367	15,331	741	656	568
Palm oil	24,418	58,308	41,594	646	1,423	1,063
Rapeseed	29,618	28,310	22,113	793	757	592
Rye	1,148	2,111	4,103	43	80	155
Silage maize/whole plant	491	643		10	13	
Soy	1,215	1,994	4,612	32	53	123
Sunflowers	3,073	4,591	629	82	120	17
Triticale	1,493	1,301	1,401	56	49	53
Wheat	5,394	3,562	3,890	204	135	147
Sugar cane	1,426	2,062	2,967	54	78	112
Sugar beet	603	456	908	23	17	34
Total	**123,619**	**167,597****	**138,737**	**3,632**	**4,617**	**3,950**

* Differences in the totals are due to roundings
** subsequently corrected value

*Table 20: Biofuels whose raw material originates in Germany [TJ]**

Kraftstoffart/ Quotenjahr / Ausgangsstoff	Bioethanol Abbildung 23, S. 50				Biomethan				FAME Abbildung 25, S. 52				Pflanzenöl			Gesamt Abbildung 16, S. 43		
Abfälle und Reststoffe	220	303	305	48	736	1.858	2.484		6.275	7.759	7.683	10				7.231	9.920	10.531
Futterrübe						2	1										2	1
Gerste	367	884	856													367	884	856
Getreide - Ganzpflanze						10	44										10	44
Mais	264	109	119				610									264	109	729
Raps								4	13.812	11.396	9.380		18	26	30	13.830	11.426	9.409
Roggen	470	537	1.348				26									470	537	1.374
Soja											2							2
Silomais/Ganzpflanze					491	643										491	643	
Sonnenblumen											< 1							< 1
Triticale	271	145	237													271	145	237
Weizen	392	117	449													392	117	449
Zuckerrüben	468	392	771			27	32									468	419	803
Gesamt																		

* Differences in the totals are due to roundings

*Table 21: Biofuels from waste and residues [TJ]**

Biokraftstoffe aus Abfällen und Reststoffen -fortschrittlich gemäß 38. BImSchV Anlage 1 Nr.	Jahr 2019	Jahr 2020	Jahr 2021
2 (Biomasse-Anteil an gemischten Siedlungsabfällen)		< 1	37
3 (Bioabfälle aus privaten Haushaltungen)	106	94	59
4 (Biomasse-Anteil an Industrieabfällen)	476	1.112	3.463
5 (Stroh)		129	302
6 (Gülle und Klärschlamm)		184	228
7 (Abwasser aus Palmölmühlen und leere Palmfruchtbündel)	1	3.290	2.835
9 (Rohglycerin)	36	47	697
11 (Traubentrester und Weintrub)	< 1	< 1	
15 (Biomasse-Anteile an Abfällen und Reststoffen aus der Forstwirtschaft)		1.433	1.495
16 (anderes zellulosehaltiges Non-Food-Material)	129		4
Zwischensumme fortschrittliche Biokraftstoffe	***748***	***6.288***	***9.119***

Biokraftstoffe aus Abfällen und Reststoffen -nicht fortschrittlich gemäß 38. BImSchV	Jahr 2019	Jahr 2020	Jahr 2021
gebrauchte Speiseöle	27.181	29.286	21.172
sonstige	6.668	10.188**	9.810
Zwischensumme nicht fortschrittliche Biokraftstoffe	***33.849***	***39.473****	***30.982***

Abfälle und Reststoffe gesamt	34.598	45.761**	40.102

* Differences in the totals are due to roundings
** subsequently corrected value

*Table 22: Emissions and emission savings of biofuels **

Biokraftstoffart	Emissionen 2019 [t CO_2eq/TJ]	Emissionen 2020 [t CO_2eq/TJ]	Emissionen 2021 [t CO_2eq/TJ]	Einsparung 2019 [%]	Einsparung 2020 [%]	Einsparung 2021 [%]
	Abbildung 33, S. 59 und Abbildung 31, S. 58			Abbildung 34, S. 60 und Abbildung 32, S. 58		
Bioethanol	11,04	7,44	9,18	88,16	92,02	90,21
Bio-LNG		13,70	6,79		85,44	92,78
Biomethan	10,12	8,94	5,86	89,24	90,50	93,77
Biomethanol		33,50	33,50		64,09	64,09
Bio-Naphtha			20,07			78,49
FAME	18,37	17,97	16,86	80,68	81,11	82,33
HVO	19,45	19,82	16,02	79,55	79,15	83,15
CP-HVO	20,43	17,69		78,52	81,40	
Pflanzenöl	25,90	31,60	31,73	72,77	66,78	66,70
gewichteter Mittelwert aller Biokraftstoffe	16.48	16.46	14.77	82.59	82.63	84.45

* Differences in the totals are due to roundings

Table 23: Types of combustible biofuels [TJ]

Fig. 39, p. 73

Types of combustible biofuels	2019	2020	2021
from pulp industry	27,597	24,955	24,192
Bionaphtha		1	
FAME	1,069	1,276	975
HVO		26	600
Vegetable oil	4,259	4,415	2,162
Total	**32,925**	**30,673**	**27,929**

Table 24: Combustible biofuel vegetable oil - raw material [TJ]

Fig. 40, p. 74

Raw material	2019	2020	2021
Palm oil	2,971	3,237	1,665
Rapeseed	1,142	1,169	351
Shea	146	9	146
Total	**4,259**	**4,415**	**2,162**

Table 25: Combustible biofuel vegetable oils from palm oil - source [TJ]*

Fig. 41, p. 74

Source	2019	2020	2021
Guatemala	15	165	87
Honduras	782	254	5
Indonesia	804	1,198	823
Columbia	192	99	184
Malaysia	1,178	1,521	567
Total	**2,971**	**3,237**	**1,666**

* Differences in the totals are due to roundings

*Table 26: Emissions and emission savings of combustible biofuels **

Biobrennstoffart	Emissionen 2019 [t CO_2eq/TJ]	Emissionen 2020 [t CO_2eq/TJ]	Emissionen 2021 [t CO_2eq/TJ]	Einsparung 2019 [%]	Einsparung 2020 [%]	Einsparung 2021 [%]
	Abbildung 45, S. 77 und Abbildung 43, S. 76			Abbildung 46, S. 77 und Abbildung 44, S. 76		
aus Zellstoffindustrie	1,72	2,43	1,94	98,11	97,33	97,86
Bio-Naphtha		9,57			89,49	
FAME	34,80	33,81	33,28	61,76	62,85	63,43
HVO		8,48	8,32		90,68	90,86
Pflanzenöl	29,83	31,07	30,23	67,22	65,86	66,78
gewichteter Mittelwert aller Biobrennstoffe	**6,43**	**7,86**	**5,36**	**92,94**	**91,36**	**94,11**

* Differences in the totals are due to roundings

11. Conversion tables, abbreviations and definitions

Table 27: Conversion of energy units

Energieeinheit	Megajoule [MJ]	Kilowatt-stunde [kWh]	Terajoule [TJ]	Petajoule [PJ]
1 Megajoule [MJ]	1	0,28	0,000001	0,000000001
1 Kilowattstunde [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: Density/energy contents

Biokraftstoffart/ Biobrennstoffart	Tonne pro Kubikmeter [t/m³]	Megajoule pro Kilogramm [MJ/kg]
Biobrennstoff aus Zellstoffindustrie	1,32	7
Bioethanol	0,79	27
Bio-LNG	0,42	50
Biomethan	0,00072	50
Biomethanol	0,80	20
Bio-Naphtha	0,78	38
CP-HVO	0,78	44
FAME	0,883	37
HVO	0,78	44
Pflanzenöl	0,92	37
UCO	0,92	37

Table 29: Abbreviations

Abbreviations	Meaning
36th BimSchV	Thirty-sixth Ordinance on the Implementation of the Federal Immission Control Act (Ordinance on the Implementation of the Biofuel Quota Regulations)
38th BimSchV	Thirty-eighth Ordinance on the Implementation of the Federal Immission Control Act Ordinance laying down further provisions on greenhouse gas reduction in fuels
BHKW	Combined heat and power plant
Biokraft-NachV	Biofuel Sustainability Ordinance
BioSt-NachV	Biomass Electricity Sustainability Ordinance
Btl-FTD	Btl fuel (biomass to liquid) Fischer-Tropsch-Diesel (FTD)
CP-HVO	Co-Processing-Hydrotreated Vegetable Oils
DE scheme	certification scheme recognised by the BLE according to Art. 33 No. 1 and 2 BioSt-NachV or Biokraft- NachV
EEG	Renewable Energy Sources Act
EU scheme	Voluntary scheme in accordance with Art. 32 No. 3 BioSt-NachV or Biokraft-NachV
FAME	Fatty acid methyl ester (biodiesel)
HVO	Hydrotreated Vegetable Oils
LNG	Liquefied Natural Gas
EC Directive 2009/28/EG (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 Oils (used cooking fats and oils)

Table 30: Definitions

Terms	Meaning
Biofuel from pulp industry	Biofuels from the pulp industry are energy and lignin-rich by-products during pulp production in the paper industry.
Bioethanol	Bioethanol (ethyl alcohol) is obtained from renewable raw materials by distillation after alcoholic fermentation or by comparable bio-chemical methods.
Bio-LNG	Liquefied biomethane
Biomethane	Biogas is produced as a methane-rich gas from the fermentation of biomass.
Biomethanol	Methanol, like BtL fuel, can be produced via synthesis gas from a wide range of biomass. In addition, methanol can also be produced by convertion from crude glycerine.
Blending	Adding e.g. biofuels to fossil fuels (e.g. max. 7 % for diesel)
CP-HVO	HVO during joint hydrogenation with mineral oil-based oils in a refinery process
FAME	Biodiesel is the name given to fatty acid methyl ester (FAME), which is produced by the chemical reaction of fats and oils with methanol.
Fischer-Tropsch diesel ("Btl fuel")	synthetic hydrocarbon(s) produced from biomass
HVO	Hydrogenated vegetable oil means vegetable oil, which is converted into hydrocarbon chains in a hydrogenation plant by a chemical reaction with hydrogen
Vegetable oil	Vegetable oil fuel can be made from rapeseed or other oleaginous plants, whereby no chemical conversion takes place as in the case of biodiesel.
UCO	UCO are used cooking fats and oils. They can be used as pure fuel or as a component of FAME.

Table 31: Advanced biofuels

in accordance with the 38th BimSchV	in accordance with EU Directive 2009/28/EC
Annex 1 to Art. 2 para. 6 No. 1 of the 38th BlmSchV Raw materials for the production of biofuels pursuant to Art. 2 para. 6 No. 1	**ANNEX IX Part A Raw materials and fuels whose contribution to the target referred to in the first subparagraph of Art. 3 para. 4 is set at twice their energy content**
1. Algae that have been cultivated on land in tanks or photobio reactors,	a) Algae, if cultivated on land in tanks or photobio reactors;
2. Biomass share of mixed municipal waste, but not separated household waste, for which recycling targets apply according to Art. 11 para. 2 lit. a of Directive 2008/98/EC,	b) Biomass share of mixed municipal waste, but not separated household waste, for which recycling targets apply according to Art. 11 para. 2 lit. a of Directive 2008/98/EC,
3. Biowaste as defined in Art. 3 para. 4 of Directive 2008/98/EC from private households subject to separate collection as defined in Art. 3 para. 11 of Directive 2008/98/EC,	c) Biowaste as defined in Art. 3 para. 4 of Directive 2008/98/EC from private households subject to separate collection as defined in Art. 3 para. 11 of the same Directive,
4. Biomass share of industrial waste unsuitable for use in the food or feed chain, including material from wholesale and retail trade, agro-food industry and fisheries and aquaculture industry, but excluding raw materials listed in Part B of Annex IX to Directive 2009/28/EC,	d) Biomass share of industrial waste unsuitable for use in the food or feed chain, including material from wholesale and retail trade, agro-food industry and fisheries and aquaculture industry, and excluding the raw materials listed in Part B of this Annex.
5. Straw,	e) Straw;
6. Manure and sewage sludge,	f) Manure and sewage sludge;
7. Wastewater from palm oil mills and empty palm fruit bunches,	g) Wastewater from palm oil mills and empty palm fruit bunches,
8. Tall oil pitch,	h) Tall oil pitch,
9. Crude glycerol,	i) Crude glycerol;
10. Bagasse,	j) Bagasse;
11. Grape marc and wine lees,	k) Grape marc and wine lees;
12. Nutshells,	l) Nutshells;
13. Pods,	m) Pods;
14. de-husked maize cobs,	n) de-husked maize cobs;
15. Biomass share of wastes and residues from forestry and forest-based industries, i.e. bark, pre-commercial thinning wood, sawdust, sawdust shavings, black liquor, brown liquor, fibre sludge, lignin and tall oil,	o) Biomass share of wastes and residues from forestry and forest-based industries, i.e. bark, twigs, pre-commercial forestry wood, leaves, needles, tree tops, sawdust, sawdust, black liquor, brown liquor, sludge, lignin and tall oil;
16. other non-food cellulosic material; and	p) other non-food cellulosic material as defined in Art. 2 para. 2 lit. s;

further Annex 1	**further ANNEX IX Part A**
17. other lignocellulosic material except sawnwood and veneer logs.	q) other lignocellulosic material referred to in Art. 2 para. 2 lit. r with the exception of sawnwood and veneer logs; r) liquid or gaseous renewable fuels used in the transport sector that are not biogenic source;
	s) Separation and use of CO_2 for transport purposes, provided that the energy source is renewable in accordance with Art. 2 para. 2 lit. a ;
	t) Bacteria, provided that the energy source is renewable in accordance with Art. 2 para. 2 lit. a.