

# REPORT BIOFUELS





# © 2022 Bioenergy Europe

All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the publisher. For permission requests, write to the publisher, addressed "Attention: Permission use Bioenergy Europe Statistical Report" at the address below, except in the case of brief quotations embodied in critical reviews and certain other noncommercial uses permitted by copyright law.

The full Statistical Report is intended for Bioenergy Europe members only. It is prohibited for non-members to read, copy, use, forward or disclose the reports or any associated attachments to others without consent from Bioenergy Europe. Any unauthorised disclosure, copying, distribution or use of emails or attachments sent in relation to the Statistical Report is strictly prohibited.



### Bioenergy Europe

Place du Champ de Mars 2A 1050 Brussels T : +32 2 318 41 00 info@bioenergyeurope.org www.bioenergyeurope.org

#### Authors

Cristina Calderón (lead author) Jérémie Geelen Jean-Marc Jossart (content & technical guidance)

**Policy Guidance** 

Irene di Padua Daniel Reinemann

Visuals & Promotion

Gaia Weber

Supported by:

SGS



In collaboration with:



# **TABLE OF CONTENTS**

# Index

- 1. Transport sector in Europe .....
- 2. Renewables in transport .....
- 3. Biofuels and bioliquids in Europe ...
- 4. Annex I List of facilities for the gaseous biofuels for transport ......
- 5. Annex II Symbols, abbreviations, a

# List of Figures

Figure 1 Evolution of the final energy consumption in the transport Figure 2 Evolution of energy consumption per transport type in maritime)

Figure 3 Evolution of renewable energy consumption in the transport Figure 4 Evolution of renewable energy consumption in the transport Figure 5 EU27 Member States status in relation to fulfilling the 2 2020 (in %)

Figure 6 Evolution of gross inland energy consumption of biofuels in Figure 7 Biofuels gross inland energy consumption by end-use in 2 Figure 8 Evolution of primary production and final energy consump Figure 9 Share of mass output of ePURE Members' ethanol plants i Figure 10 Share of ePURE Members' ethanol produced from each f Figure 11 Repartition of feedstock for biodiesel production in EU27 Figure 12 Evolution of feedstock for biodiesel production in EU27+U

# List of Tables

Table 1 Final energy consumption in the transport sector in EU27 Table 2 Final energy consumption of different fuels used in the t ktoe) ...... Table 3 Share of renewables in the transport sector in EU27 multipliers (in ktoe) ...... Table 4 Liquid biofuels capacity by EU27 Member States in 2020 Table 5 Primary production and net imports of liquid biofuels in E Table 6 Share of the total use of bioliquids in the transport sector Table 7 Final energy consumption of liquid biofuels and biogas 2020 (in ktoe) ...... Table 8 Advanced biofuel plants in EU27+UK ...... Table 9 Country codes ..... Table 10 Symbols and Abbreviations ..... Table 11 Decimal Prefixes ..... Table 12 General Conversion Factor for Energy .....

	13
	17
	21
production of advanced	liquid and
	29
and conversion factors	32

sector in EU27 (in ktoe) by energy type	
EU27 (in ktoe) including international transport (avia	tion and
	14
ort sector* in EU27 (in ktoe and %)	
ort sector* in EU27 (in ktoe) by fuel type	
020 targets for renewable energies in the transport	sector in
n EU27 (in ktoe)	
020 in EU27 (in ktoe and %)	
tion* of biogasoline and biodiesel in EU27 (in ktoe)	
in Europe in 2021 (in %)	
eedstock type in 2021 (in %)	
'+UK in 2021 (in %)	
JK (in %)	

7 in 2020 (ktoe) transport sector in 2020 in EU27 Member States and UK*	13 (in 15
' Member States in 2020 with and without application	of 20
(1000 tonnes/year)	22
U27 Member States and UK in 2020 (in ktoe)	23
r by type in 2020 in EU27 (in ktoe and %)	24
in the transport sector in EU27 Member States and UK	in
·	26
	29
	32
	33
	33
	33





# ABOUT THE STATISTICAL REPORT

Every year since its debut release in 2007, Bioenergy Europe's Statistical Report has provided an in-depth overview of the bioenergy sector in the EU-27 Member States.

Bioenergy Europe's Statistical Report has been enriched each year with new figures and information, collecting unique data on the developments of the European bioenergy market from a growing number of international contributors.

Bioenergy Europe develops detailed reports that aid industry leaders, decision makers, investors and all bioenergy professionals to understand the situation of bioenergy in Europe.

With more than 150 graphs and figures, readers of Bioenergy Europe's Statistical Report can get accurate and up-to-date information on the EU-27 energy

system such as the final energy consumption of biomass for heat and electricity, the number of biogas plants in Europe, the consumption and trade of pellets, the production capacity of biofuels and other key information to help break down and clarify the complexity of a sector in constant evolution.

In 2017, the Report was rewarded by the European Association Awards for being the 'best Provision of Industry Information and Intelligence', a recognition after a decade of collective work.



# ABOUT **BIOENERGY EUROPE**

A bit of history

Bioenergy Europe is the voice of European bioenergy.

It aims to develop a sustainable bioenergy market based on fair business conditions. Founded in 1990, Bioenergy Europe is a non-profit, Brussels-based international organisation bringing together more than 40 associations and 90 companies, as well as academia and research institutes from across Europe.

### Our vision

Bioenergy Europe will be the leading player in ensuring that sustainable bioenergy is a key pillar in delivering a carbon neutral Europe.



### Our mission

Bioenergy Europe facilitates the development of a sustainable, strong, and competitive bioenergy sector through:

- Promotion towards European policymakers and stakeholders for awareness, acceptance, and reputation of bioenergy.
- Promote the development of consistent, realistic, and sustainable bioenergy scenarios in the heat, electricity, and transport sectors.
- Pro-active proposals to develop more favourable European legislation.
- Market intelligence to support decision making.
- Services to members, including support to advocacy at a national level.
- Tools, including certification schemes, to sustain market growth and credibility.
- Industry collaboration throughout the entire supply chain.
- Promotion of efficient and innovative technologies within the bioeconomy.

## 2018

+ report available to the public, free of charge + emphasis on providing transparent data & sharing knowledge to support private & public initiatives to promote bioenergy + 300 pages

+ updated information on bioelectricity / bioheat market & support schemes in all EU28

+ a seperate report on ENplus®

# 2019/2020/2021

+ Bioenergy Europe publishes 7 focussed reports published throughout the year

# OUR ACTIVITIES

Bioenergy Europe carries a wide range of activities aimed at supporting its members on the latest EU and national policy developments. Bioenergy Europe works to voice their concerns to EU and other authorities, including, advocacy activities in key policy areas as well as the organisation of dedicated working groups.

### Working Groups

Bioenergy Europe's working groups act as a platform for members to discuss common issues and exchange information on the state of play of bioenergy.

There are currently 8 active working groups:

- Agro-biomass;
- Competitiveness;
- Domestic Heating;
- Pellets;
- Sustainability;
- Wood Supply;
- Task Force Carbon Removal;
- Task Force National Advocacy.

### **Certification Schemes**

Thanks to the experience and authority acquired over the last 20 years, Bioenergy Europe has successfully established two international certification schemes to guarantee high quality standard for fuels, namely, ENplus<sup>®</sup>, as well as the latest edition in the certification for sustainable bioenergy: SURE.



### Networks

Bioenergy Europe is the umbrella organisation of both the European Pellet Council (EPC) and the International Biomass Torrefaction Council (IBTC). These networks have been created thanks to the dynamics of Bioenergy





Europe members. Today, these networks bring together bioenergy experts and company representatives from all over Europe and beyond.

The European Pellet Council (EPC), founded in 2010, represents the interests of the European wood pellet sector. Its members are national pellet associations or related organisations from over 17 countries.

EPC is a platform for the pellet sector to discuss issues relating to the transition from a niche product to a major energy commodity. Issues include the standardisation and certification of pellet quality, safety, security of supply, education and training, and the quality of pellet-using devices. EPC manages the ENplus® quality certification.

Launched in 2012, the International Biomass Torrefaction Council (IBTC), aims to build the first platform for companies that have common interests in the development of torrefied Biomass markets. Currently, the IBTC initiative is supported by more than 20 companies worldwide.

IBTC's objective is to promote the use of torrefied biomass as an energy carrier and to assist the development of the torrefaction industry. In this respect, IBTC's key activities are to undertake studies or projects, and to commonly voice its members' concerns to third parties to help to overcome barriers of market deployment.

# OUR MEMBERS\*

As the common voice of the bioenergy sector, Bioenergy Europe, aims to develop a sustainable bioenergy market based on fair business conditions and does so by bringing together national associations and companies from all over Europe – thus representing more than 4000 indirect members, including companies and research centres.

# Associations



Academia





\*Members as of July 2022.

# Companies

UNI. U

UNIVERSITÉ DU

Lutasiewicz



-

Denerg

# ENHANCED VISIBILITY & SPONSORSHIP OPPORTUNITIES

### **Enhanced Visibility**

(Exclusive to Bioenergy Europe Members)

This opportunity entails a free of charge promotion for Bioenergy Europe members only. This offer includes the chance to display your organisation's logo as well as a featured 100-word description, placed in 1 of the 7 annual statistical reports of your choice.



This enhanced visibility opportunity is limited and interested members are required to contact the team via info@bioenergyeurope.org

You can find further information about this opportunity on the Bioenergy Europe website.

## Sponsorship

Bioenergy Europe offers a sponsorship opportunity for the Statistical Report where you will have the opportunity to have the highest level of visibility. In addition to having full page adverts in all 7 statistical reports, you will also have your logos placed on publications, policy briefs, and enjoy content-driven tweets, as well as Linkedin posts, amongst a variety of additional advantages.

You can find more information in regard to the sponsorship on our website or get in touch with our Team at info@bioenergyeurope.org

\*Bioenergy Europe Members receive a 50% discount on this sponsorship package



Bioenergy Europe Place du Champ de Mars 2A 1050 Brussels T : +32 2 318 41 00 info@bioenergyeurope.org



www.bioenergyeurope.org

# Advanced Sustainable Biofuels

Trusted. Independent. Committed.

Leverage our solutions to optimize your biofuel operations and demonstrate sustainability credentials



Solutions



Management

# Contact us

naturalresources@sgs.com
www.sgs.com/biofuels
SGS Natural Resources





Audit & Certification



Commodity Inspection

(	7	
$\overline{\ }$		

Market Intelligence



© SGS Société Générale de Surveillance SA - 2022 - All rights reserved - SGS is a registered trademark of SGS Société Générale de Surveillance SA

# Moving forward together in changing energy markets

Resource efficiency, flexibility and clean solutions are the key for success in changing energy markets. Based on our decades-long experience, we have the know-how to deliver the best solutions based on biomass, waste or on a mixture of different fuels.

Valmet's proven automation solutions help you to optimize your energy production and our network of service professionals is ready to recharge your competitiveness both on-site and remotely. Explore **valmet.com/energy** 









SURE enables all economic operators along the supply chain, from biomass producers to conversion plants, to prove sustainable use of biomass in electricity production.

SUSTAINABLE RESOURCES Verification Scheme (SURE) is a voluntary certification scheme that aims at ensuring the sustainable and responsible use of biomass within the energy sector. SURE's set of criteria is in accordance with the principles of the European Energy Directive (RED II) and enables all economic operators within the bioenergy sector to demonstrate compliance with RED II requirements.

Interested to learn more? Visit our website: www.sure-system.eu



Bureau Veritas, a world leader in Testing, Inspection and Certification, servicing 400,000 clients in 140 countries and employing 78,000+ people. Our

services to the transportation industry cover quality and quantity verification of oil and (bio) fuels for e.g. airline, shipping, car/trucks for our clients that (bio) fuels meet the specification as contracted between counterparties. Our services include barge gauging/draft survey, pre-shipment-, load/discharge inspection, sampling and analysis. Our laboratories are ISO 17025 accredited and offer rapid turnaround times as result of our 24/7 mission. Consult on product characteristics is not uncommon.

At the core of our strategy stands Bureau Veritas' full commitment to sustainability, through our green line of services and solutions. Providing the market with the most advanced technology in order to optimise efficiencies for both clients and society alike. Bureau Veritas proactively supports our clients to comply with the 2030 Agenda for Sustainable Development.

Interested? Reach out on: sales.commodities.nwe@bureauveritas.com



EN*plus*® the world-leading is quality certification scheme for wood pellets that systematically certifies the entire supply chain, from the early stages of production to the delivery process. The ENplus® requirements go beyond those of the international standard ISO 17225-2 to guarantee optimum efficiency. In addition, all actors along the supply chain follow detailed guidelines to ensure consistent quality. In more than ten years of existence, the ENplus<sup>®</sup> scheme has certified more than 1200 companies in 47 countries and has become a widely recognized brand trusted by professionals and consumers alike.

https://enplus-pellets.eu/



www.bureauveritas.com

### 1. Transport sector in Europe



Figure 1 Evolution of the final energy consumption in the transport sector in EU27 (in ktoe) by energy type

\*Including biogas. Source: Eurostat

The final energy consumption in the transport sector in 2020 was 251.969 ktoe, and 90% of it was derived from oil. Please note that this report only focuses on domestic EU transport and both international aviation and shipping are not included in any statistics unless otherwise specified.

	Total	Growth rate (2019-2020)	Solid fossil fuels	Natural gas	Oil and petroleum products*	Biofuels**	Electricity
Total	251.969	-13%	0,35	3.162	228.205	15.825	4.598
Percent Share	-	-	0%	1%	91%	6%	2%
Rail	4.717	-10,66%	0,35	0	1.071	37	3.608
Road	238.218	-11,88%	0	1.780	220.211	15.765	282
Domestic aviation	3.081	-53,49%	0	0	3.081	0	0
Domestic navigation	3.645	-12,94%	0	0	3.626	19	0
Pipeline transport***	1.503	-26,83%	0	1.363	0	0	140
Other transport	806	-12,58%	0	18	214	4	569
International transport	56.992	-33,1%	0	181	85.062	236	0
International maritime bunkers	39.001	-10,51%	0	181	38.548	236	0
International aviation	17.991	-56,8%	0	0	17.991	0	0

Table 1 Final energy	consumption in tl	ne transport sect	or in EU27 in	2020 (ktoe)

\* Excluding biofuel portion.

\*\* Including biogas for transport (160 ktoe)

\*\*\* Excludes the energy used for pipeline distribution of natural or manufactured gas, including hot water and steam from the distributor to end users/

Source: Eurostat

Road transport represents 93% of the total energy consumption for internal transport within the EU27 and is the main mode of transportation for inland freight in all EU Member States with the exception of Lithuania and Latvia where rail transport is more important. Between 2019 and 2020 there was a decrease in the energy consumption of all types of transport due to Covid-19 related lockdown measures and travel restrictions. In absolute terms, road transport and international aviation reported the largest decrease in 2020 compared to 2019, -32.110 and -23.680 ktoe respectively.



Figure 2 Evolution of energy consumption per transport type in EU27 (in ktoe) including international transport (aviation and maritime)

Source: Eurostat

Biofuets were the only transport fuel that experienced a slight increase between 2019-2020. Nevertheless, the decreased use of gesoline and desel during the Covid-19 crisis also limited the consumption of biofuets as they are rormally mixed with focul-based transport fuels to meet blending mandates.

Table 2 Final energy consumption of different fuels used in the transport sector in 2020 in EU27 Member States and UK\* (in Islan)

	-	Solid Total Totals	Ratural gm	OI and petroleum products**	Bulada***	Eachtuny
8427			3.962	228.306		4.598
Growth rate (2018-2018)	-12,95	- 1005	-15,115	-13,85	0.04%	-8.825
#T	7.728		222	6.830	409	266
	7.765		66	6.858	762	139
85	3.215		121	2.886	172	36
CY	617			592	25	0
CZ	6.379		115	5.748	372	141
04	50.966		473	46.198	3.271	958
-	3.937		11	3.630	251	45
	793		16	724	39	6
m.	5.542		18	4.909	200	
65	26.162		313	24.160	1.402	287
	3.662		19	3.395	395	
-	38.219		193	34.672	2.636	717
	1.969		3	1.877	66	23
HO I	4.459		61	4.015	279	104
	3.479		15	3.281	175	
	28.976		967	25.875	1.265	870
17	2.126		29	1.989	103	6
1.00	1.668		0	1.513	142	13
1.00	1.046		1	992	45	
-	203			189	14	
	9.299		58	8.527	528	186
m.	21.779		350	20.116	1.040	273
-	5.009		15	4.713	244	37
80	6.461		0	5.88%	483	93
94	6.620			4.968	1.318	237
9	1.583		3	1.468	93	18
54	2.488		83	2.206		4.3
UM I	41.463	10	0	39.331	1.653	469

"Data for UK for 2018

"Excluding Indust parties.

\*\*\* Brogan for transport included (160 ktost)

Source Europtat

# **EXPERT REVIEW Biofuels - the Future of Transportation**

The challenges facing direct electrification mean a future remains intact for verifiably sustainable road biofuels, despite the European Commission's planned ban on the sale of internal combustion engine vehicles from 2035.

The transformation of road fuels is steadily underway. This year's Bioenergy Europe statistical report demonstrates a significant increase in penetration, with a 1,42% increase of biofuels used in the transportation sector. The report also shows many new investments related to advanced bioethanol (from agri waste) as well as HVO (hydrogenated vegetable oil), SAF (sustainable aviation fuel) and P2X (power-to-X) production plants.

But what will be the impact of the European Commission's recent decision that, as of 2035, passenger cars with internal combustion engines can no longer be sold in Europe? Will this favor investments in SAF projects more than projects for road fuels?

While the direct electrification of vehicles is clearly the most efficient way to decarbonize road transport, 2035 presents a very tight turnaround to achieve such a substantial transition. The challenges facing full electrification are huge: we lack sufficient green electricity to decarbonize all the "hard to abate" sectors – including road transport - and achieving sufficient supply will require a vast expansion of existing electricity grids. Equally, wind and solar power generation patterns do not align with energy consumption, and the storage of electrical energy remains very costly and inefficient.

Even by 2050, there will still be millions of internal combustion engines powering passenger cars on the road, requiring good quality, clean, and low carbon intensity fuels. Today's highly efficient fuel production and distribution infrastructure is therefore likely to remain in place, fed by a continuing expansion in the production of biofuels from low carbon intensity feedstocks such as agricultural and forestry waste, vegetable oils and algae. The largescale production of P2X fuels (e-fuels) from biogenic CO<sub>2</sub> sources and green hydrogen will also be required to enable the energy transition to net zero.

Clearly, it will become increasingly important for companies involved in the biofuels supply chain to optimize their operations and demonstrate sustainability credentials. Which means that market players will need to undertake characterization analysis of their biofeedstock, test their biofuel quality, analyze their C14-isotope biogenic content, determine the CO<sub>2</sub> factor and more. ISCC Plus certification is one of the certification requirements, that allows to demonstrate organization's sustainability credentials and generate additional revenue stream by monetizing its carbon credits.

As the world's leading testing, inspection and certification service provider operating across more than 2,600 offices and laboratories, SGS stands ready to bring trust and integrity to the biofuels supply chain.

### **Arjan Praat**

SGS Natural Resources VP Oil, Gas & Chemicals Analytical Services





### 2. Renewables in transport

### Renewable Energy – Recast to 2030 (RED II)

Directive 2018/2001 on the promotion of the use of energy from renewable sources (REDII) set a 14% target for the share of renewable energy within the final energy consumption in the transport sector by 2030. However, it is important to note that this legislation is currently being reviewed by the EU which will likely result in the target being increased to 25% or higher. In this legislation, special attention is also given to advanced biofuels and biogas produced from feedstocks listed in Part A of Annex IX. Their contribution as a share of final consumption of energy in the transport sector must be at least 0,2% in 2022, at least 1% in 2025 and at least 3,5% in 2030. These targets are also being reviewed and could be increased as well. Additionally, the use of crop-based biofuels has been restricted for all EU countries. Each Member State has a cap for the use of biofuels in the transport sector such that the share of these fuels in their final consumption of energy in the road and rail transport sectors cannot be higher than their 2020 share plus one percentage point, with a maximum share of 7%.



#### Figure 3 Evolution of renewable energy consumption in the transport sector\* in EU27 (in ktoe and %)

\*Multipliers applied. Source: Eurostat SHARES 2020



#### Figure 4 Evolution of renewable energy consumption in the transport sector" in EU27 (in More) by Nuel type

"Billiout multipliers

Source Eurostat SHARES 2020

Despite the popularity of electric vehicles, biofuels are indiguitably the primary source of renewable energy used in the transport sector, representing 90% of total renewable energies and steadily increasing. While there was a slight exception with the 2011 data, this was because that specific year is marked by the implementation of RED I sustainability criteria which resulted in a short-term decrease while producers adjusted to these new criteria. Between 2004, and 2010, the use of biofuels in transport has increased by a factor of 10 while renewable electricity in transport merely doubled since 2004, going from 1.034 kitse to 1.387 kitse in 2020, despite having a lower starting value than biofuels. 2015 data shows that the rail transport consumed the largest portion of renewable electricity out of the total use in this sector (1.512 kitse, more than 79%. While the use of renewable electricity numbers for total use in this sector (1.512 kitse, more than 79%. While the use of renewable electricity for road transportation has experienced significant growth, up 72% in 2019 compared to 2018 values, the absolute figure still remains rather low with only 83 kitse in 2019.





Source: Eurostat SHARES 2019

The 22.268 ktoe of renewables in transport are, in reality, only 17.867 ktoe when multiple counting rules are ignored. Table 3 highlights the raw data of renewables in transport (ktoe as well as percentage of contribution to the total energy used in transport) without applying multipliers in comparison with the official figures calculated using the methodology as defined by the European Commission. Table 3 Share of renewalk a is the transport on 7 Member States in 2020 with and with of multipliers (in blood

	RES in transport of Commission			alliad milliplan
	RES in transport (Html)	Cantribution RES-1 Ni	RES in transport (Html)	Cantribution RES-1 Ni
8427		8.595		6.375
#7	797	10,285	409	5,305
	842	11,095	762	9,045
85	246	9,105	172	5,395
CY	45	7,405	25	4,125
62	577	9,385	374	5.865
04	5.030	9.975	3.347	6.575
04	377	9,575	251	6,395
	94	12,165	4.7	5.975
BL	247	5,345		3.88%
85	2.346	9,535	1.402	5,365
•	5.18	13,445	399	10,285
-	3.4.38	9.215	2.636	6.905
-	126	6,595	66	3,335
HU I	510	11,575	279	6,265
	348	10,195	175	5.025
	2.810	10,745	1.265	4,365
1.7	110	5.575	103	4,845
1.00	212	12,58%	162	8.545
LW	68	6,735	45	4,375
MIT .	21	10,595	76	6.825
	1.159	12,675	528	5.685
PL	1.291	6,585	1.040	4,775
PT .	471	9,705	266	4,875
80	548	8,545	483	7,485
54	2.128	31,855	1.406	21,245
9	173	147,905	93	5,895
54	223	9,265		6,245
um.	2.649	8,865	1.963	4,865

"UK data for 2015

Source Eurostat SHRRES 2020

### 3. Biofuels and bioliquids in Europe





Source: Eurostat





\*Others include final energy consumption in additional sectors (industry, household, agriculture etc.), change in stock, internal energy consumption in the energy sector etc.

Note: For electricity and heat generation it is the 'other biofuels' that are used. Source: Eurostat

With 89% of the biofuels gross inland energy consumption, the transport sector is clearly the prime end-user of bioliquids as demonstrated previously in the report. When we consider the final energy consumption of biofuels, it is again led by the transport sector which accounts for 94%.

The production capacity of liquid biofluets in the EU27 has increased by 3.55 between 2019 and 2020. This increase is due to the category of "other liquid biofluets" (excluding biogesoline and biodiesed), which is the only one to show significant growth (rearly 30%), offsetting the decline in the other two categories represented in the table. When we focus on production within the member states, we see that Germany is the main producer of "other liquid biofluets" with more than 80% of the EU27 production and that the country has seen an increase of almost 38% in its production capacity in this category between 2019 and 2020. However, it is important to note that this category contributes very little to transportation with less than 0.5% being used for that purpose.

### Table 4 Liquid biofuets capacity by EU27 Member States in 2020 (1000 tennes/year)

	Para Regestive	Pure Biodesal	Other Squid Statuets
8427	6.660	21.849	6.578
Growth rate	-3.335	-0.445	29.795
100.00			
-			
-			
	<u> </u>		
		1.000	
-			1.00
-			
-			
-	100	4.237	
			54
	1.855	2.805	40
		87	
-	1.06	100	
		57	
	352	2.212	
17		195	
1.00			
1.00		175	
MT			
	100	2.161	
PL	618	1.577	
81			
80	80	300	0
58	100	450	
54	142		
100	216	413	

"(# data for 2019)

Source Eurostat

Over the past decade, the biofuel import dependency of EU27 has significantly decreased. In early 2000's, the import dependency oscillated around 20%, peaking to almost 30% in 2011. After 2012, the dependency has fallen and now Ructuates around 10%

	1000	1000100	200	Pure Biogenetice		Para Bin	Pure Bindiesed		Other Sport Instants
	Primary production	-	Balast Input Apendency	Primary production	ł	Primary production	ł	Primary production	ł
EU27		2.771	195	2.294	6.34	12.585	1.212	64.7	
Growth rate (2019-3020)	-25	345	255	-25	425	-25	355	20%	275
87	374	120	285	116	-53	198	-19		
	466	245	345	262	-132	209	372		5
86	133		22%		12	123	24		-8
CY	0	28	1105	0	1	0	14		13
62	278	111	30%	4.0	34	229	96		-19
04	3.261	352	10%	351	258	2.8%8	-116	62	110
DH .	2		1085		82		180	2	
	0	39	1005		0		0		39
BL	178	61	265			158			-27
65	1.951	-495	-4.95	275	-766	1.676	-558		7
m	393	54	125			301		92	-45
18	2.337	600	21%	531	24	1.781	576	25	0
-		71	1045				43		28
way .	446	-156	-565	316	-250	130	-9		103
	40	124	77%	1	11	37	71		42
er .	1.453	877	40%	2	12	1.110	297	336	568
67	164	-18	-565		2	744	-48		-12
1.00		143	1025	0	0		0		143
LW	78	-11	-675		13	78	-46		
MIT .	0	15	10.95	0	0		15		0
m	1.778	-963	- 160%		334	1.750	-1.109	28	-208
PL	975	67	65	131	38	842	-25	2	54
PT	295	-39	-195		3		-40		-
80	285	205	425	28	64	257	161		0
54	520	1,248	735	107	67	313	1,248	100	-47
94	0	96	1015		0		87	0	
54	178		-745	67	-34	111	37		
	1000	-	1000	1000	The state		and the second		-

#### Table 5 Primary ( a and UR in 2020 In Month

\* Data for UK for 2015

Note Bended triggentine and blended tradenal are included.

import dependency is calculated as net imports divided by the gross inland consumption. Energy dependency may be negative in the case of red exporter countries.

Source Eurostat



Figure 8 Evolution of primary production and final energy consumption\* of biogasoline and biodiesel in EU27 (in ktoe)

\*Blended biogasoline and blended biodiesel are included. Source: Eurostat

### Table 6 Share of the total use of bioliquids in the transport sector by type in 2020 in EU27 (in ktoe and %)

	Consumption indicator	Energy (in ktoe)	Share of the fuel used in transport (in %)
Piogocolino*	Final energy consumption	2.677	00.2%
Diogasonne	Final energy consumption in transport	2.655	99,2%
<b>Biodiocol*</b>	Final energy consumption	14.024	
Biodiesel	Final energy consumption in transport	13.168	95,0%
Other liquid hiefuels	Final energy consumption	173	
Other liquid bioruels	Final energy consumption in transport	1	0,5%
Diagon	Final energy consumption	2.732	
DIOBAZ	Final energy consumption in transport	178	0,0%
Total	Final energy consumption	19.606	۹CO.
Total	Final energy consumption in transport	16.003	02%

\* Pure and blended included

Source: Eurostat

# EXPERT COMMENT ePURE

The latest data once again confirms what we have known for years: that renewable ethanol is the most cost-effective GHG-abatement solution the EU has. With Europeans continuing to buy and drive cars that run on liquid fuel, there is more than ever a need for a sustainable, renewable, socially inclusive solution. Phasing out sustainable biofuels such as renewable ethanol – as some policymakers want to do – doesn't just go against common sense, it also opens the door for more reliance on fossil fuel. Nobody wants that. Instead, the EU should recognize the proven potential of renewable ethanol to empower Member States and consumers in the drive to carbon neutrality.

## **David Carpintero**

*Director General* ePURE



**O PURE** european renewable ethanol Table 7 Final energy consumption of liquid biofuels and biogas in the transport sector is EU27 Member States and UN is 2020 [in Mose]

	Bogastive'	Robert"	Other liquid biofuets	-
8427	2.455	13.168		178
Growth rate (2019-2020)	-25	25	05	115
#T	55	354		
**	130	572		
86	27	146		
CA.	1	25		
02		307		1
06	690	2.580	1	76
04		172		
	6	33		
<b>R.</b>	63	137		
65		1.316		0
	99	301		
-	555	2.081		
-	1	45		
HU I	84	195	0	
	19			
		1.245	0	0
47	16	87		
1.00	74	129	0	0
1.00	13	32		
MIT .		16		
	226	302		
m.	183	857	0	0
#1	6	237		
80	92	3952	0	
<b>M</b>	97	1,220		
		85	0	0
54	26	129		
UM I	386	1.267	0	0

'Pure and Hended included

Source Europtat

#### Figure 9 Share of mass output of ePURE Members' ethanol plants in Europe in 2021 (in %)



Source: ePURE audited 2021 data

The different end-uses of the output of ethanol biorefineries reflect the industry's promotion of circular economy practices in the production line. In 2020, for every ton of ethanol produced, the equivalent amount is produced for the purposes of animal and non-animal feed or captured CO2. In 2021, we see that more feed was produced by weight, but the difference between those two categories is relatively small (0,7%).

#### Figure 10 Share of ePURE Members' ethanol produced from each feedstock type in 2021 (in %)



#### Source: ePURE audited 2021 data

Even though crop-based biofuels still cover most of the output, a steady growth of in the production of ethanol through ligno-cellulosic, Annex IX-A (REDII) and other feedstocks, going from 7,8% of the production in 2020 to 10,8% in 2021. The feedstock category that experienced the largest decrease in its contribution to the total ethanol production is sugars with a drop of 3,4% compared to last year's level.

#### Figure 11 Repartition of feedstock for biodiesel production in EU27+UK in 2021 (in %)



Source: USDA and Bioenergy Europe's calculations

Regarding the feedstocks used in biodiesel production, the main difference between 2020 and 2021 is the increase in the proportion of 'Used cooking oil' which increased from 19% to 23% of the mix, as well as a reduction in the use of 'Rapeseed oil', from 43% to 39%. The other categories showed only minor variations (±1%). This increase in the use of used cooking oil is also visible in Figure 12 and highlights the biodiesel industry's willingness to implement circular economy practices to replace more "conventional" feedstocks.



#### Figure 12 Evolution of feedstock for biodiesel production in EU27+UK (in %)

Source: USDA and Bioenergy Europe's calculations

# 4. Annex I - List of facilities for the production of advanced liquid and gaseous biofuels for transport

# Table 8 Advanced biofuel plants in EU27-OK

						interior interior
Transport Fue	ris Via Gasificatio	n -				
Germany	Eggenstein- Leopoldshafen	Karlsruhe Institute of Technology (NT) biolog	Operation	786,6-7	2014	628
United Kingdom	Saindon	Advanced Biofuels Solutions GoGreenGas	under construction	791.0	2020	1.500
France	Durkets	Total Bol?tuel, demo	under construction	786,6-7		**
Retherlands	Rottenlarn	Joint Venture of Air Liquide, Nouryon, Enerliam, Part of Rottendam and ShelfW2C	Planned	791,8	2022	220.000
Spain	Etheral	Enerkem and Suez Ecoplanta Molecular Recycling Solutions	Parred	791.8		
Sander	Highes	VaermlandsMetansi ABUaermlandsmetansi Hagfors	Planned	795,9		130.000
Sander	Gatherburg	Remerly Goteborg Energi AB GoB/Ges Phase 1 restart	Parred	795.0		11,200
United Kingdom	Inningham	VelocysRtatto	Planned	795.8		58.000
Raty	Porto Marghera	EniMaste to Hydrogen	Parred	791.8		na.
Retherlands	Alternaar	ThOAmbigo	Parred	186.6-7		1.560
Transport Fuels Via Pyrolytic and Thermolytic Conversion						
Netherlands	Enschede	Twence Hengelo	Operation	781.9	2015	24.000
Finland	(Dell'Industry)	FortumFortum Joensuu	Operation	785, 6-7	2013	50.000
Germany	Eggenstein Leopoldshafen	Karlsruhe Institute of Technology (KIT) bools	Operation	785.6-7	2013	24.000
Finland	Liefesa	Green Fuel Nords;	under construction	785.9	2620	24.000
Samlers	Gaste	Pyrocal (1) of Setta and Praemi	under construction	786,9	2021	24.000
Normality	Amii	Beatin	Panned	195.8	2622	100.000

		Susteen				
Germany		technologies7CR500	Parried	196, 6-7		
Norway	Tuffe	Silva Green Fuel (3V of Stational) and Sodinal	under construction	786.6-7	2021	1.400
Sander	Backhammar	Refullichannar	Operation	781, 6-7	2016	3.200
Sweden	Valluk	RenFuelCalluk	Planned	191, 8	2021	77.000
<b>Alcohol Fuels</b>	from Califulosic Si	ugars .				
Norway	Sarpsborg	Borregaard Industries OvernCall Ethanol	Operation	78,9	1938	15.800
Sweden	Ornskoldsvik	Dorreijoe Fabriker	Operation	191.8	1940	19.000
Finland	Kapaani	St TCalluloria Kajaani	Operation	781, 6-7	2017	8.000
Finland	Outu	Overspolis Ltd.Biorefining Plant	Operation	798, 6-7	2008	5.000
Germany	Straubing	Cariant sunliquid	Operation	781.6-7	2012	1.000
France	Bury-Le-Long	#TF-dural	Operation	788, 6-7	2016	350
Samlers	Orskoldsak	SOUNDBURGINARY Demo Part	Operation	791.8	2004	
Normaliy	Sarpsborg	Borregaard BAU Borefinery Demo	Operation	786, 6-7	2012	110
Romania	Podari	Cariant Romania	under construction	791.0	2021	
Authia	Hallein	AustroCal Hallein	under construction	796.8	2020	30.000
Structure	Langeoldew	Enviral Lanpoldov Site	Planned	781.9		
Poland	jedicze	ORLEN Poludnie (part of ORLEN GROUP) Jedicze Site	Planned	191.9		25.000
Croatia	Stuk	ma .	Planned	791.8		55.000
Finland	Kajaani	St TCalluloria Kajaani 2	Planned	195, 8	2024	40.000
Norway	Petanaari	St Celuloris Petarsaari	Planned	791.8	2024	40.000
Normality	Regeries	St 1Calluloria Follum	Planned	199, 8	2024	40.000
Raty	Crescarttino	Versalis Romer Beta Renewables Bischemtex Racitty) Crescentino restart	Parred	791.8		40.000
Spain	Villaratto	Sainc Energy Limited Contoba	Parred	791.8	2620	25.000
Finland	Haqueri	Kanteleen Voima Nordfual biorefinery	Parred	786,6-7	2021	65.000
Hydrocarbon Fuels from Sugars and Alcohols						
Germany	Leuna	Gobal Boenergies Isobutene demo	Operation	791,6-7	2017	
Poland	Kenzozow	<b>Doberoflogunitos</b> plant	Operation	191.8	2019	22.900
France		895-One (3) of Cristal Union and Gobal	Parred	791.8	2017	

		Boenergies) hobutene commercial				
Other Techno	ringies to Produc	e Advanced Biofuels And R	ecycled Carbo	n Fuels		
Finland	Lappeervanta	UPM Biofuels	Operation	10.0	2015	130.000
Finland	Hamina	St 1Etanolis Hamina	Operation	785,9	2008	1.000
Finland	Varian	St Etanolis Vantaa	Operation	786,9	2009	1.000
Finland	Lates	StriEtanolis Lahti	Operation	785,9	2009	1.000
Finland	<b>Juliusinen</b>	St 1Etanolis Jokisinen	Operation	786.9	2011	7.000
Sweden	Gothenburg	St 1Etanolis Gothenburg	Operation	181, 9	2015	4.000
atheriands.	Farmum	BuildCoBuildCo	Operation	795.8	2009	65.000
Belgium	Gherit	Analo-Mittal Chent Steeland	under construction	786,9	2020	16.000
Sambers	Monsteras	Sidra Califildra methanol	under construction	196,9		5.000
Finland	Kotka	UPM Biofuels	Planned	795.8		500.000

Note: This table was last updated in March 2020, therefore the "Status" might not be fully accurate for 2022.

Source: European Technology and Innovation Platform Bioenergy 211P Bioenergy Working Group 2 - Conversion Processes and 273P-8-54852 project loam. Last update in March 2020.

## 5. Annex II – Symbols, abbreviations, and conversion factors

### Table 9 Country codes

EU27	European Union (27 members) from 2020
AT	Austria
BE	Belgium
BG	Bulgaria
СҮ	Cyprus
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
EL	Greece
ES	Spain
FI	Finland
FR	France
HR	Croatia
HU	Hungary
IE	Ireland
IT	Italy
LT	Lithuania
LU	Luxembourg
LV	Latvia
МТ	Malta
NL	Netherlands
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovak Republic
Other I	Europe
UK	United Kingdom

### **Table 10 Symbols and Abbreviations**

Symbol	Meaning
,	Decimal separator
	Thousand
n.a.	Data not available

#### Table 11 Decimal Prefixes

10 <sup>1</sup>	Deca (da)	<b>10</b> <sup>-1</sup>	Deci (d)
10²	Hecto (h)	10-2	Centi (c)
10³	Kilo (k)	10 <sup>-3</sup>	Milli (m)
10 <sup>6</sup>	Mega (M)	10 <sup>-6</sup>	Micro (μ)
10 <sup>9</sup>	Giga (G)	10 <sup>-9</sup>	Nano (n)
10 <sup>12</sup>	Tera (T)	10 <sup>-12</sup>	Pico (p)
10 <sup>15</sup>	Peta (P)	10 <sup>-15</sup>	Femto (f)
10 <sup>18</sup>	Exa (E)	10 <sup>-18</sup>	Atto (a)

### Table 12 General Conversion Factor for Energy

to	1 MJ	1kWh	1 kg oe	Mcal
from				
1 MJ	1	0,278	0,024	0,239
1 kWh	3,6	1	0,086	0,86
1 kg oe	41,868	11,63	1	10
1 Mcal	4,187	1,163	0,1	1



In collaboration with:





Supported by:







Bioenergy Europe Place du Champ de Mars 2A 1050 Brussels T : +32 2 318 41 00 info@bioenergyeurope.org



www.bioenergyeurope.org