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Table 15: Biofuels in TJ – source materials¹

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

¹ Differences in totals are due to rounding.² No data for 2016 and 2017.

Table 16: Biofuels in kt – source materials^{1,2}

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

¹ Differences in totals are due to rounding.

² Conversion to tonnage on the basis of the quantity indications of the certificates.

³ No data for 2016 and 2017.

Table 17: Biofuels in TJ – source materials and their origins¹

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

¹ Differences in totals are due to rounding.

Table 18: Biofuels in kt – source materials and their origins^{1,2}

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

¹ Differences in totals are due to rounding.

² Conversion to tonnage on the basis of the quantity indications of the certificates.

Table 19: Total biofuels per source material¹

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

¹ Differences in totals are due to rounding.

Table 20: Emissions and emission savings of biofuels¹

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

¹ Up to quota year 2017: Saving compared to fossil fuel reference value for all fuels of 83.8 g CO₂eq/MJ

² From quota year 2018: Saving compared to fossil fuel reference value for bioethanol of 93.3 g CO₂eq/MJ

³ From quota year 2018: Saving compared to fossil fuel reference value for biomethane of 94.1 g CO₂eq/MJ

⁴ From quota year 2018: Saving compared to fossil fuel reference value for BtL FTD of 95.1 g CO₂eq/MJ

⁵ From quota year 2018: Saving compared to fossil fuel reference value for FAME of 95.1 g CO₂eq/MJ

⁶ From quota year 2018: Saving compared to fossil fuel reference value for HVO of 95.1 g CO₂eq/MJ

⁷ From quota year 2018: Saving compared to fossil fuel reference value for vegetable oil of 95.1 g CO₂eq/MJ

Table 21: Emissions and emission savings of bioliquids¹

Type of bioliquid	2016 emissions [t CO ₂ eq/TJ]	2017 emissions [t CO ₂ eq/TJ]	2018 emissions [t CO ₂ eq/TJ]	2016 savings [%]	2017 savings [%]	2018 savings [%]
From pulp industry	1.73	1.8	1.86	98.1	98.02	97.95
FAME	45.25	37.18	34.65	50.27	59.14	61.93
HVO	44.5	44.5		51.1	51.1	
Vegetable oil	34.26	33.73	31.99	62.35	62.93	64.85
Weighted mean of all bioliquids	5.65	5.99	6.62	93.79	93.41	92.73

¹ Saving compared to fossil fuel reference value of 91 g CO₂eq/MJ

Table 22: Types of bioliquids [TJ]¹

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

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

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

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

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

¹ Differences in totals are due to rounding.

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

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

¹ Differences in totals are due to rounding.

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

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

¹ Differences in totals are due to rounding.

