



IEA Bioenergy
Technology Collaboration Programme

Task 42
Biorefining in a circular economy



Country report: Germany 2021

Bioenergie and bio-based products

Heinz Stichnothe, Thünen Institute

Braunschweig, June 2021

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Technology Collaboration Programme

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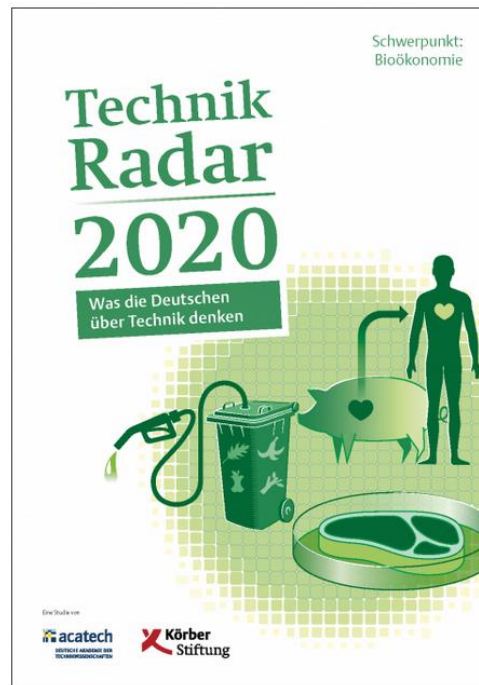
Agenda

- Reports
- Success stories - selection from 2019 - 2021
- Energy and bioenergy in 2019
 - Primary - total and from renewables
 - Electricity
 - Heat
 - Transport
- Biomass utilisation for chemicals and materials in 2019
 - Carbohydrates
 - Plant oil
 - Biolubricants
 - Other biomass
- Employees in the biobased bioeconomy in 2017
- Turnover in the bioeconomy in 2017

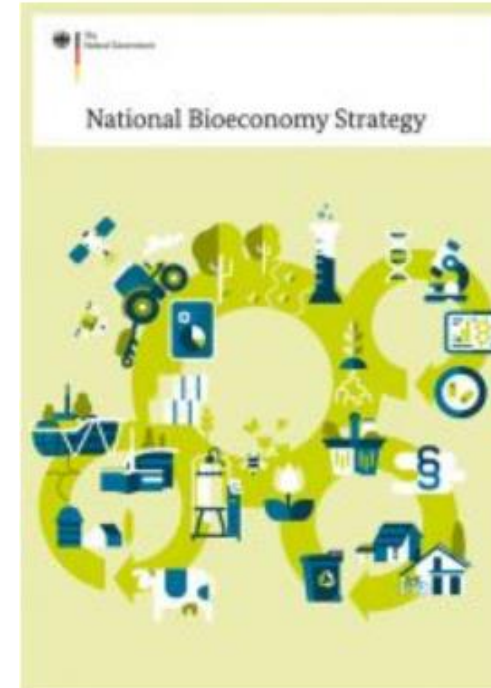
Reports



Update 09/2019



05/2020
(in German only)



Update 08/2020



2021 (in German only)

Success stories



07.05.2021 | **SUCCESS STORY**

CHEMISTRY WASTE BIOTECHNOLOGY/SYSTEMS BIOLOGY

Using bacteria to produce plastic from waste

Polyhydroxybutyrate (PHB) is the plastic that researchers in the PHABIO APP joint project have produced biotechnologically: It is produced from animal waste fats with the help of bacteria and is completely degradable in nature.

→ [Read more](#)



02.12.2020 | **SUCCESS STORY**

CHEMISTRY MICROORGANISMS BIOTECHNOLOGY/SYSTEMS BIOLOGY

High performance without oxygen

Bioelectrochemistry enables economically attractive microbial biofactories. In the future, the proteobacterium *Shewanella oneidensis* could be used in this way for acetoin production.

→ [Read more](#)



19.08.2020 | **SUCCESS STORY**

CHEMISTRY MICROORGANISMS BIOTECHNOLOGY/SYSTEMS BIOLOGY

Cell factory for hot and acidic

The archaeon is to become a platform organism for biotechnology. The research project "HotAcidFACTORY" wants to create the basis for this.

→ [Read more](#)



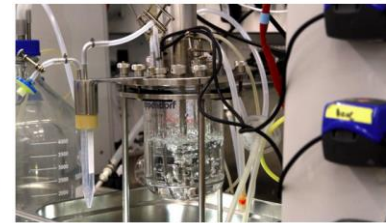
30.03.2020 | **SUCCESS STORY**

CHEMISTRY PLANTS BIOTECHNOLOGY/SYSTEMS BIOLOGY

Versatile composite materials from coffee grounds

Coffee grounds are more than just waste - they are a valuable resource that can be processed into new bio-based composites. A suitable method was developed as part of the idea competition project BioKaVe.

→ [Read more](#)



03.09.2019 | **SUCCESS STORY**

CHEMISTRY MICROORGANISMS BIOTECHNOLOGY/SYSTEMS BIOLOGY

Biotechnological upcycling for plastic waste

Simply recycling plastic? European researchers believe they can do better. By breaking it down and making its building blocks exploitable for bacteria to create valuable resources, a research consortium plans to upcycle plastics.

→ [Read more](#)



12.08.2019 | **SUCCESS STORY**

CHEMISTRY MICROORGANISMS BIOTECHNOLOGY/SYSTEMS BIOLOGY

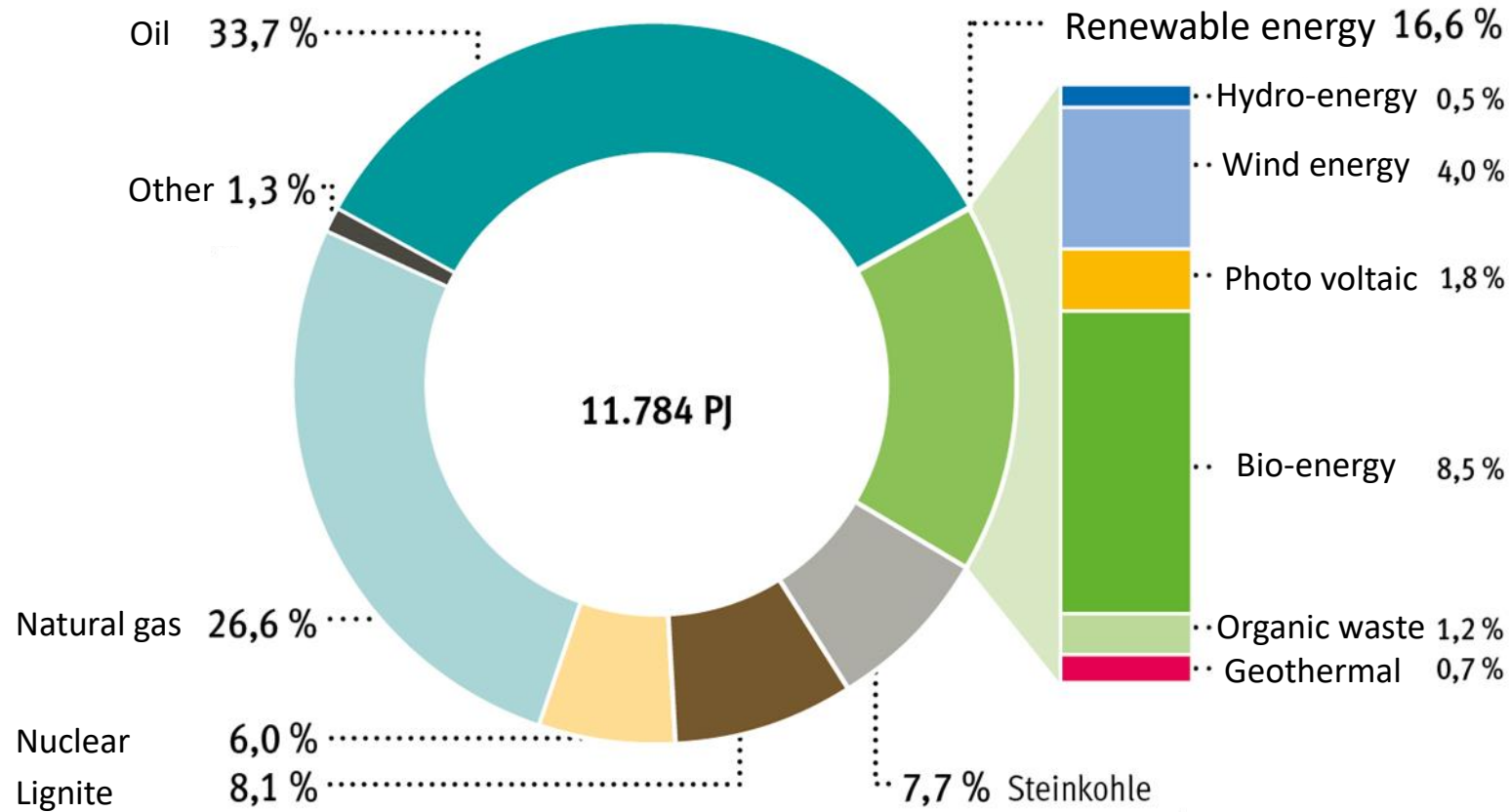
Mussel style superglue

Scientists in Berlin have developed an adhesive protein inspired from mussels and are able to produce the substance from reprogrammed microbes. The adhesive can be used as superglue to treat wounds and bone fractures.

→ [Read more](#)

<https://biooekonomie.de/en/funding/success-stories>

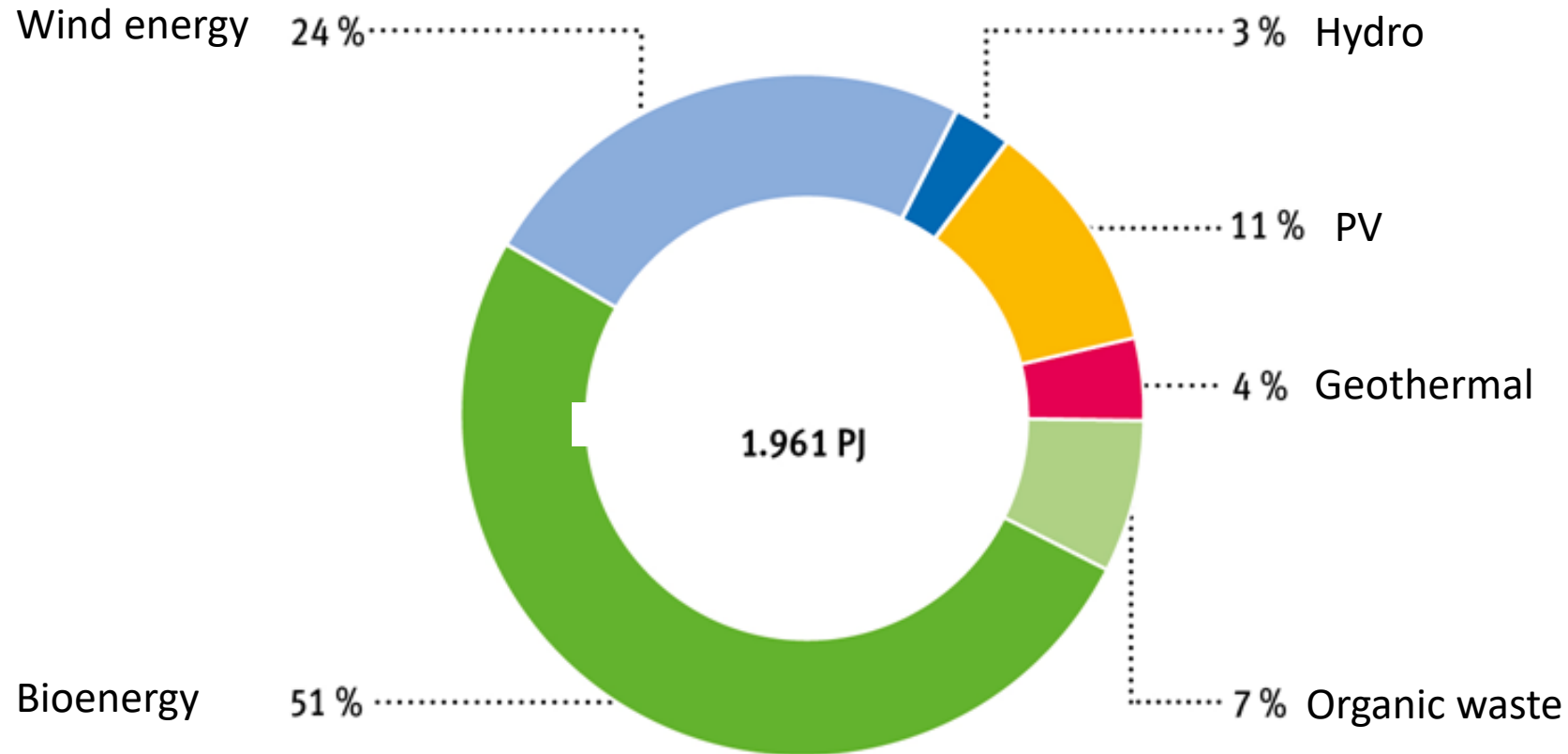
Primary energy consumption



Quelle: FNR nach AGEB, AGEE-Stat (März 2021)
© FNR 2021



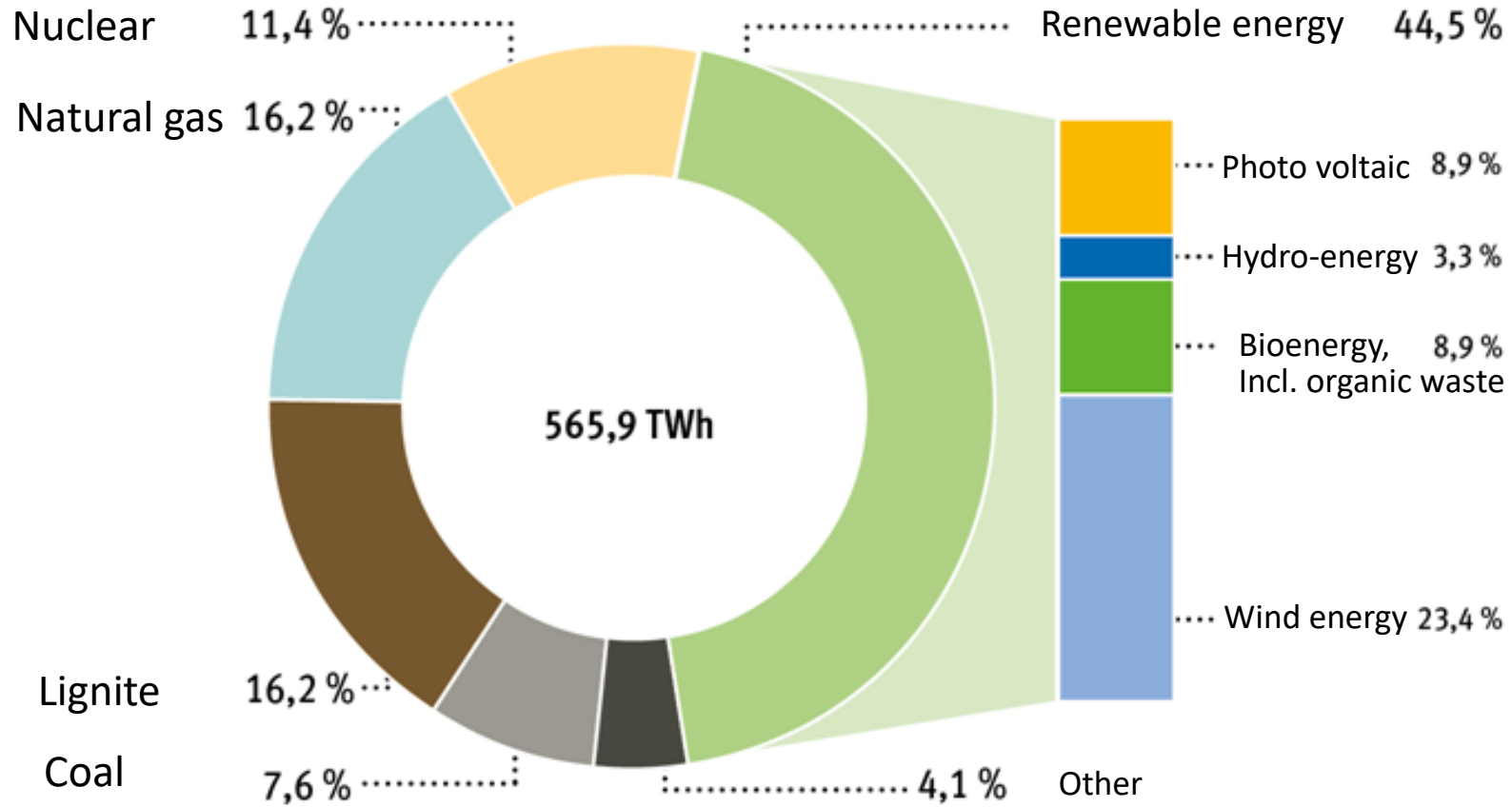
Primary energy consumption of renewable energy in 2020



Quelle: FNR nach AGEE-Stat/AGEB (März 2021)
© FNR 2021



Electricity generation

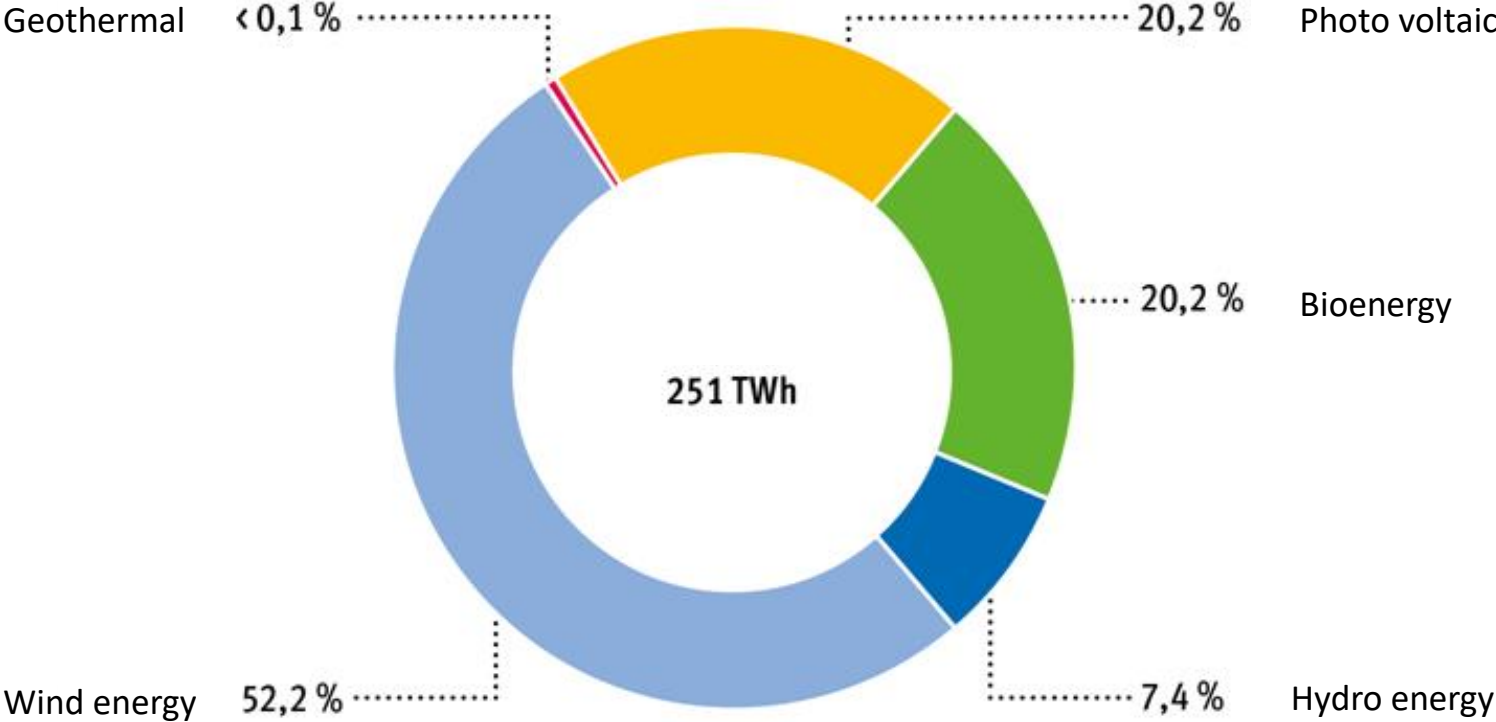


(Bruttostromverbrauch: 544,9 TWh; EE-Anteil: 46,2 %, Stromaustauschsaldo: -21,0 TWh)

Quelle: FNR nach AGEb (Februar 2021)
© FNR 2021



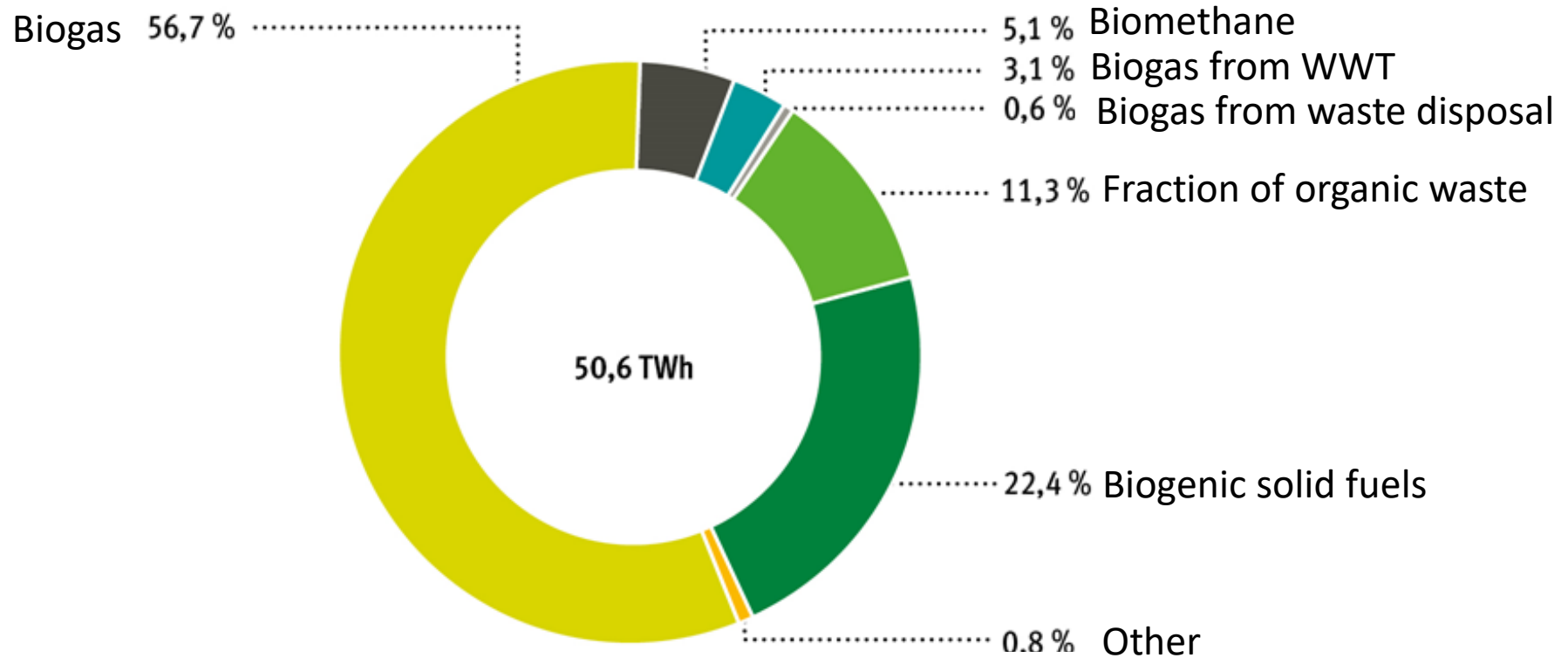
Electricity generation from renewables in 2020



Quelle: BMWi, AGEE-Stat (Februar 2021)
© FNR 2021



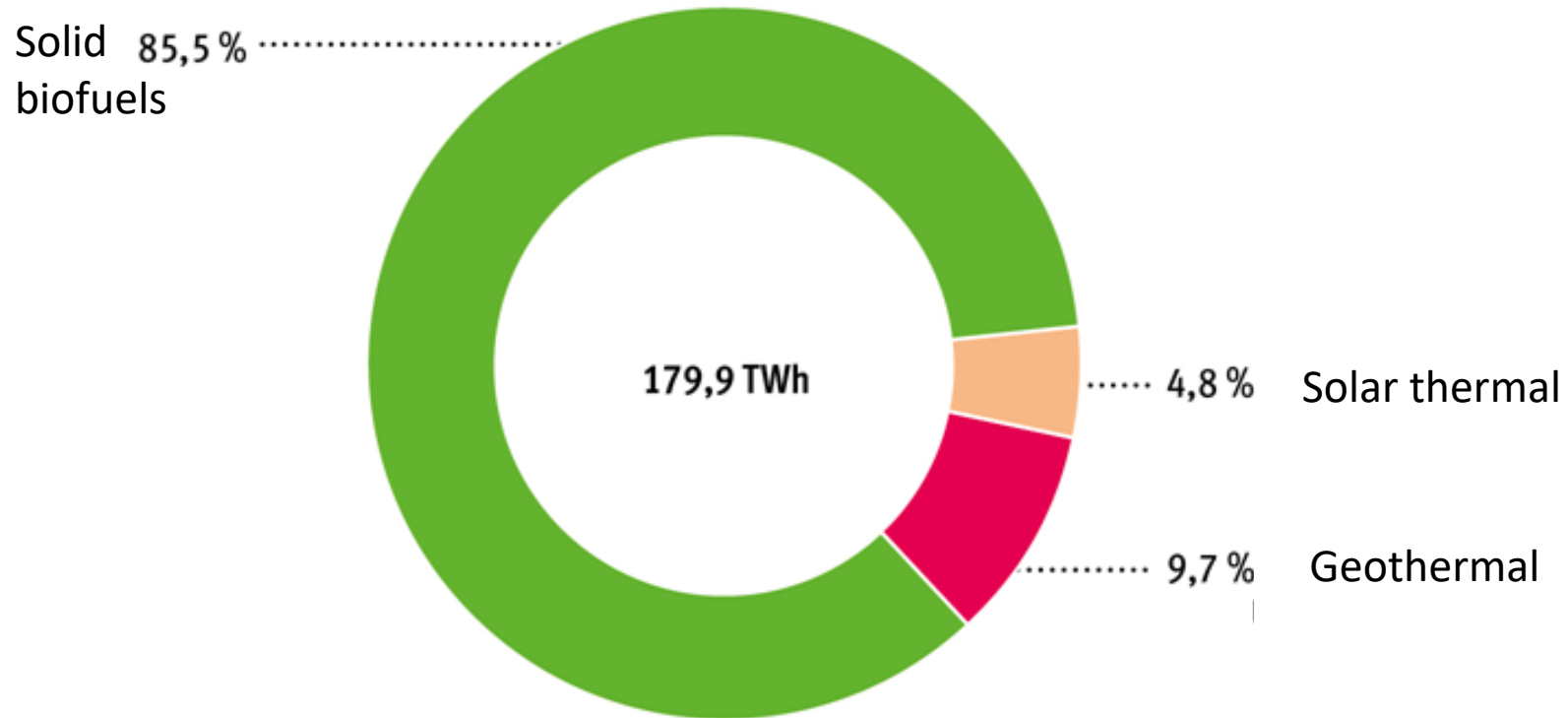
Electricity generation from biomass in 2020



Quelle: BMWI, AGEE-Stat (Februar 2021)
© FNR 2021



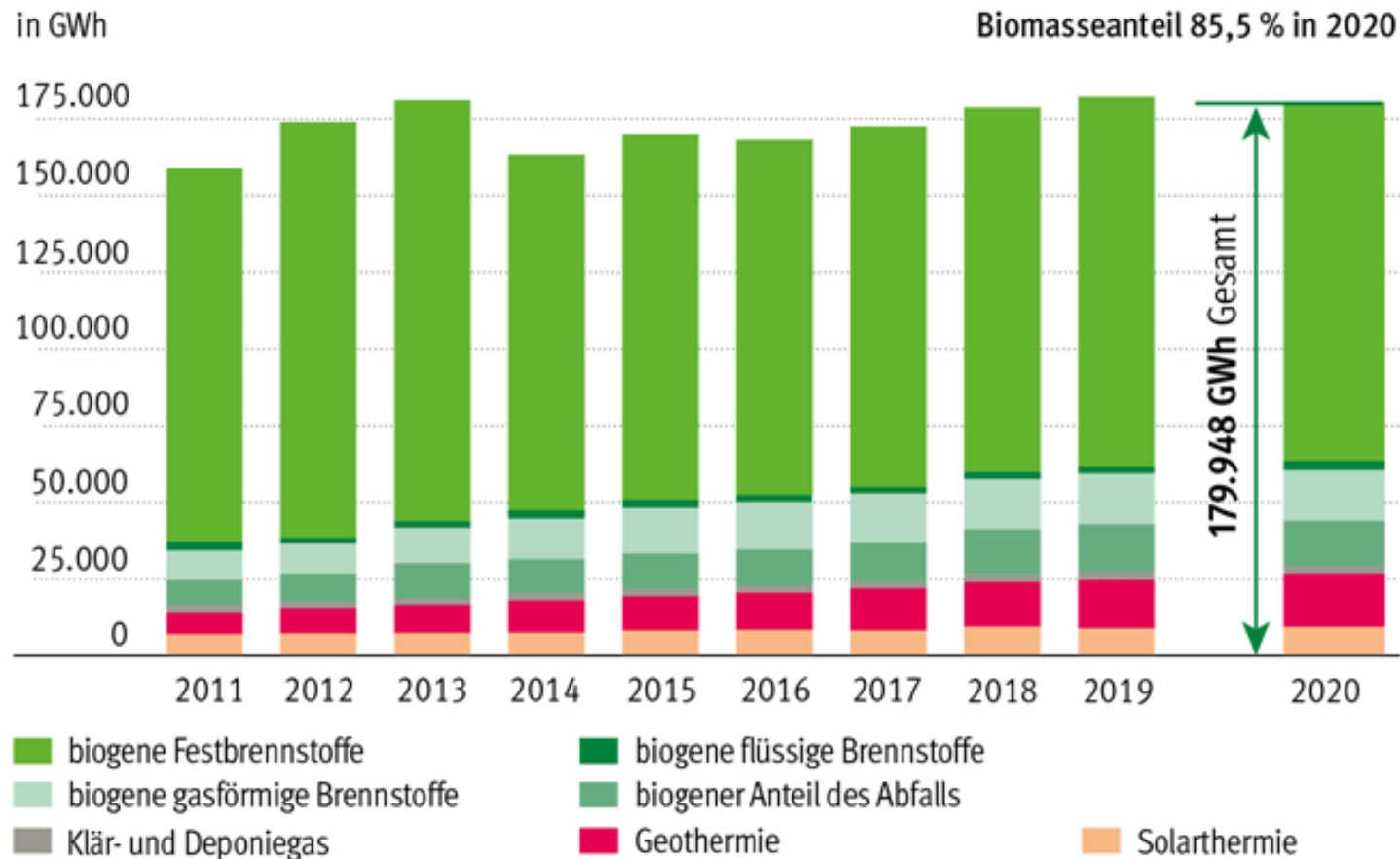
Heat from renewables in 2020



Quelle: BMWi, AGEE-Stat (Februar 2021)
© FNR 2021



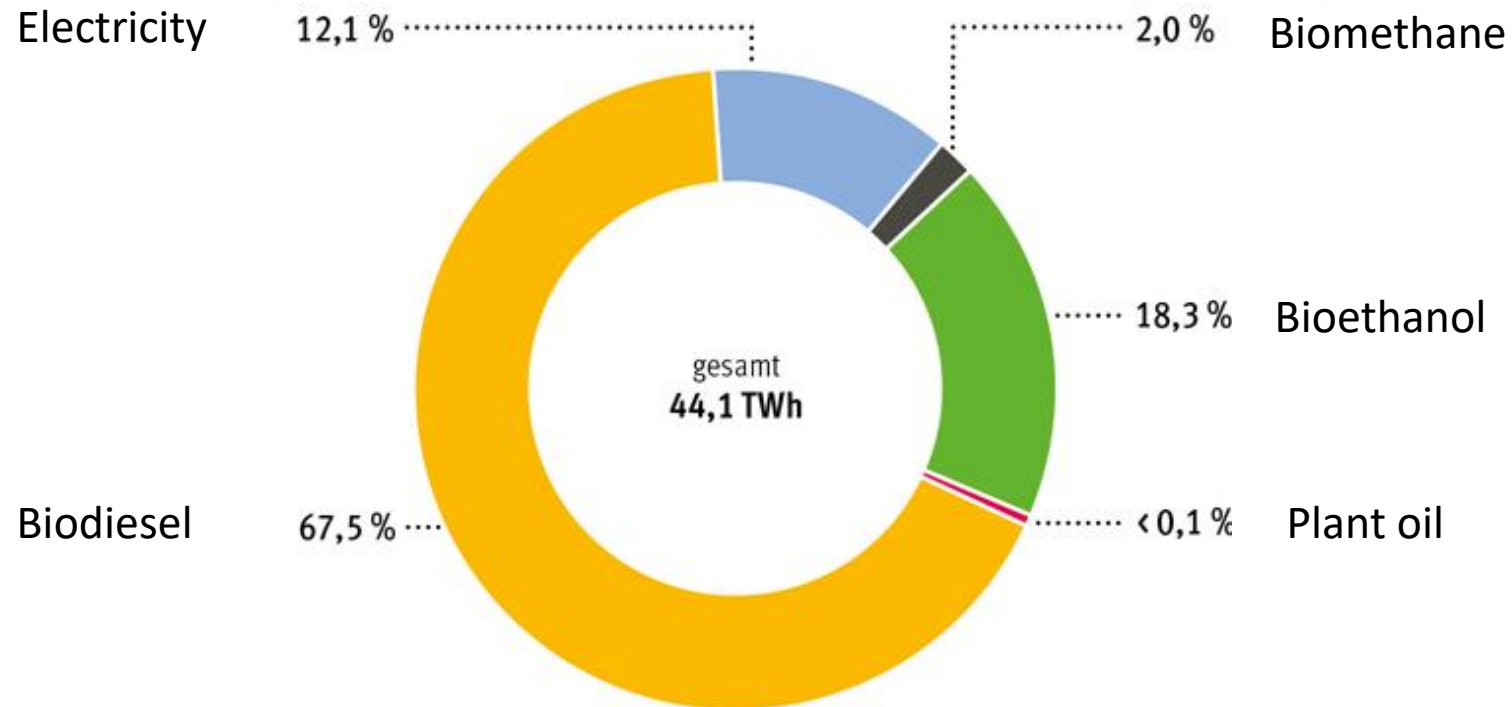
Development of heat generation from renewables



Quelle: BMWI, AGEE-Stat (2021)
© FNR 2021



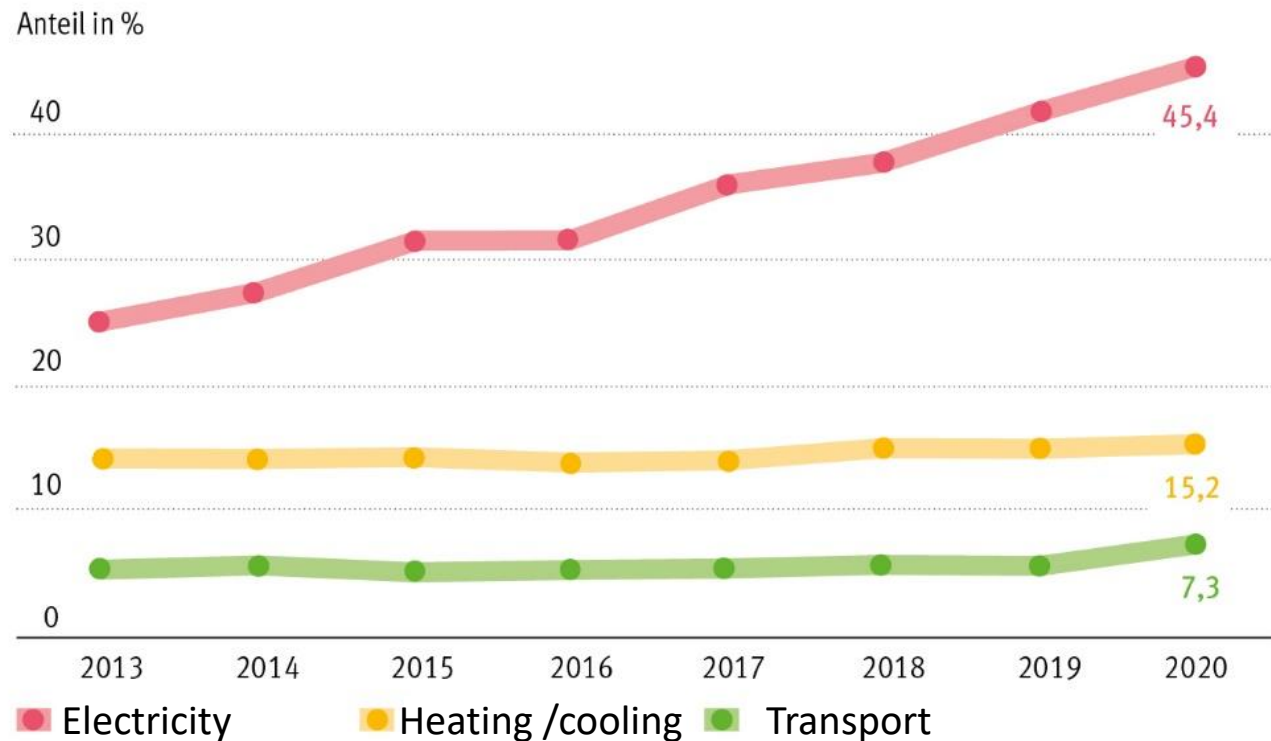
Renewable energy in the transport sector in 2020



Quelle: FNR nach AGEE-Stat (Februar 2021)
© FNR 2021



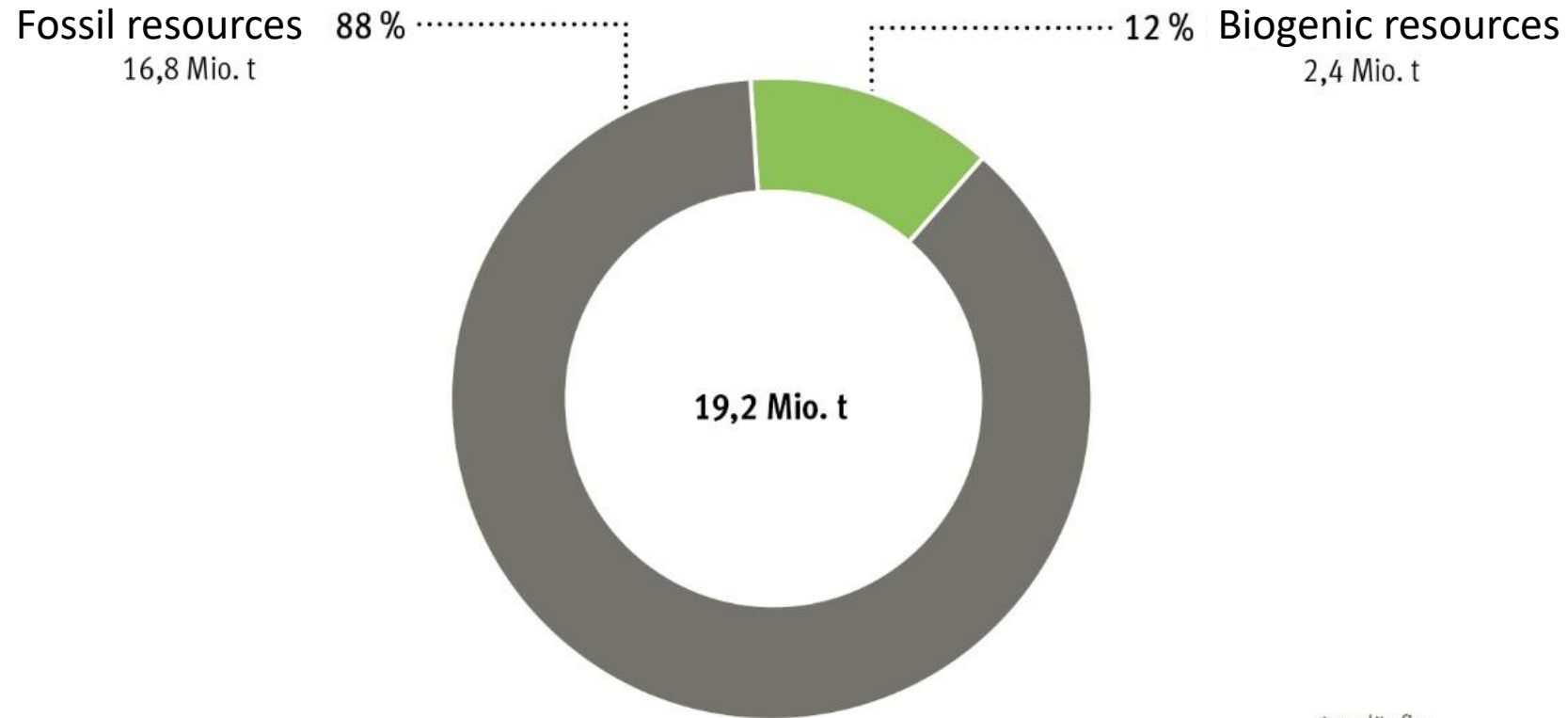
Fraction of renewable energy from total energy consumption from 2013 - 2020



Quelle: BMWI, AGEE-Stat (Februar 2021)
© FNR 2021



Feedstock of the chemical industry in 2019

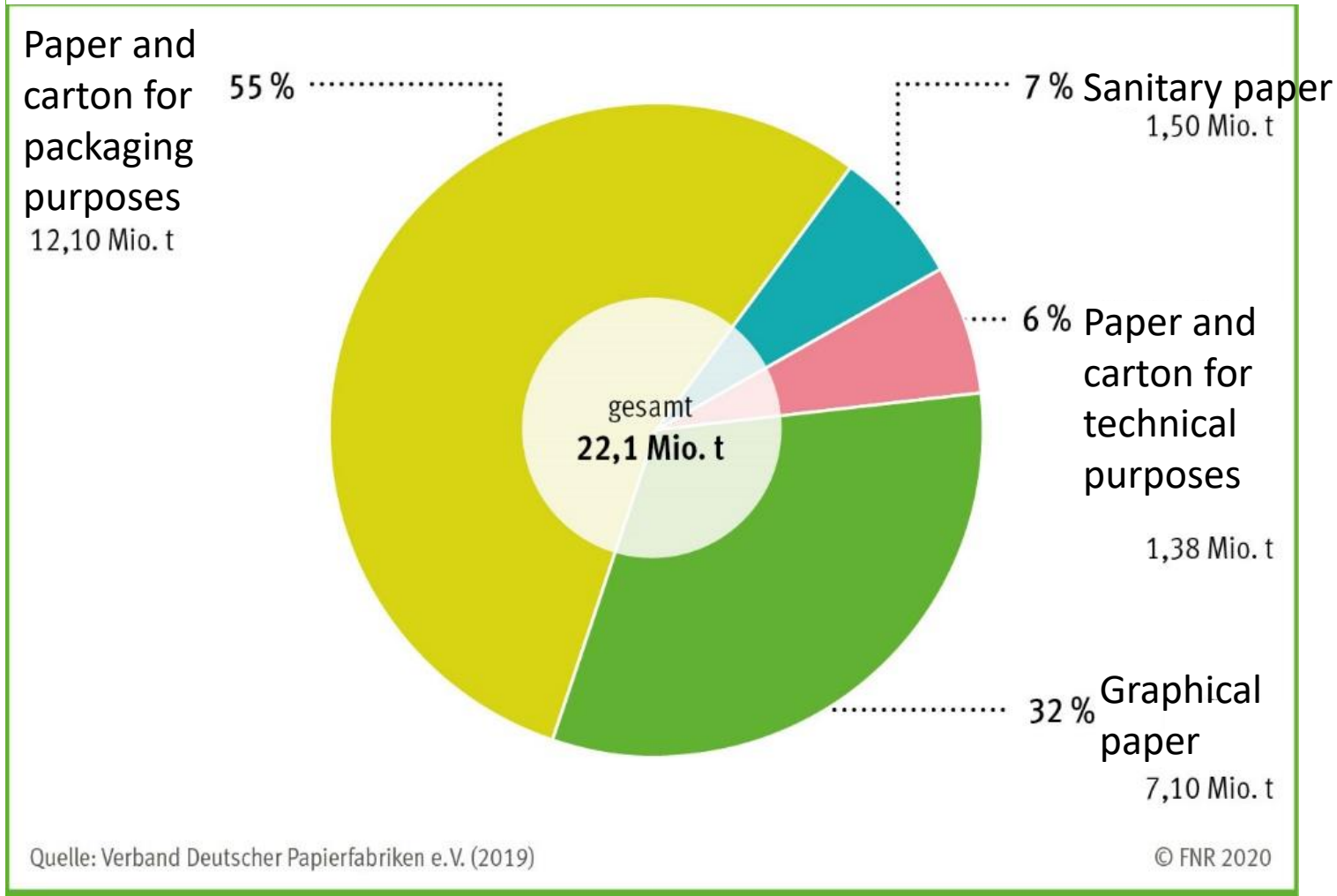


Quelle: FNR, BMEL (2020)
© FNR 2021

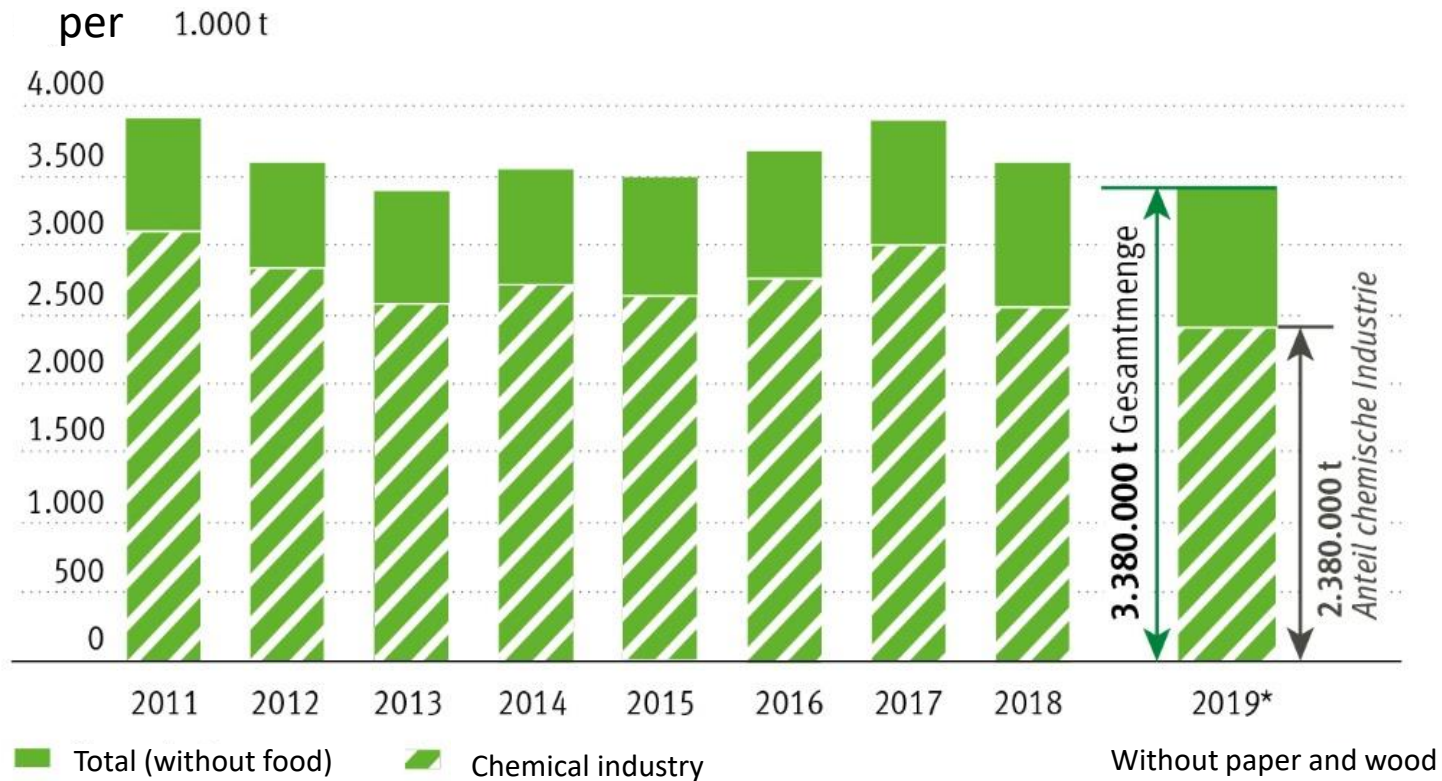
* vorläufig



Production of paper and carton in 2019



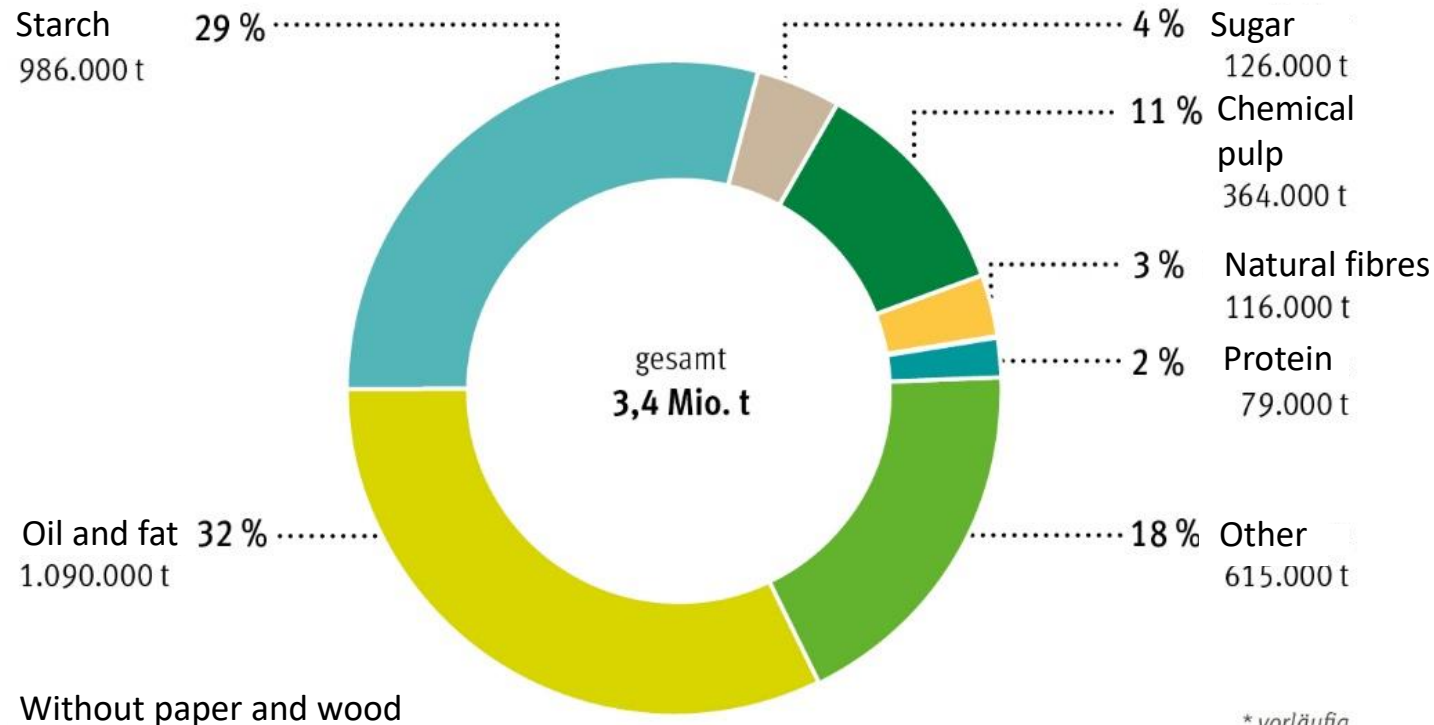
Development: Industrial use of biomass



Quelle: FNR, BMEL (2020)
 © FNR 2021



Industrial use of biomass in 2019

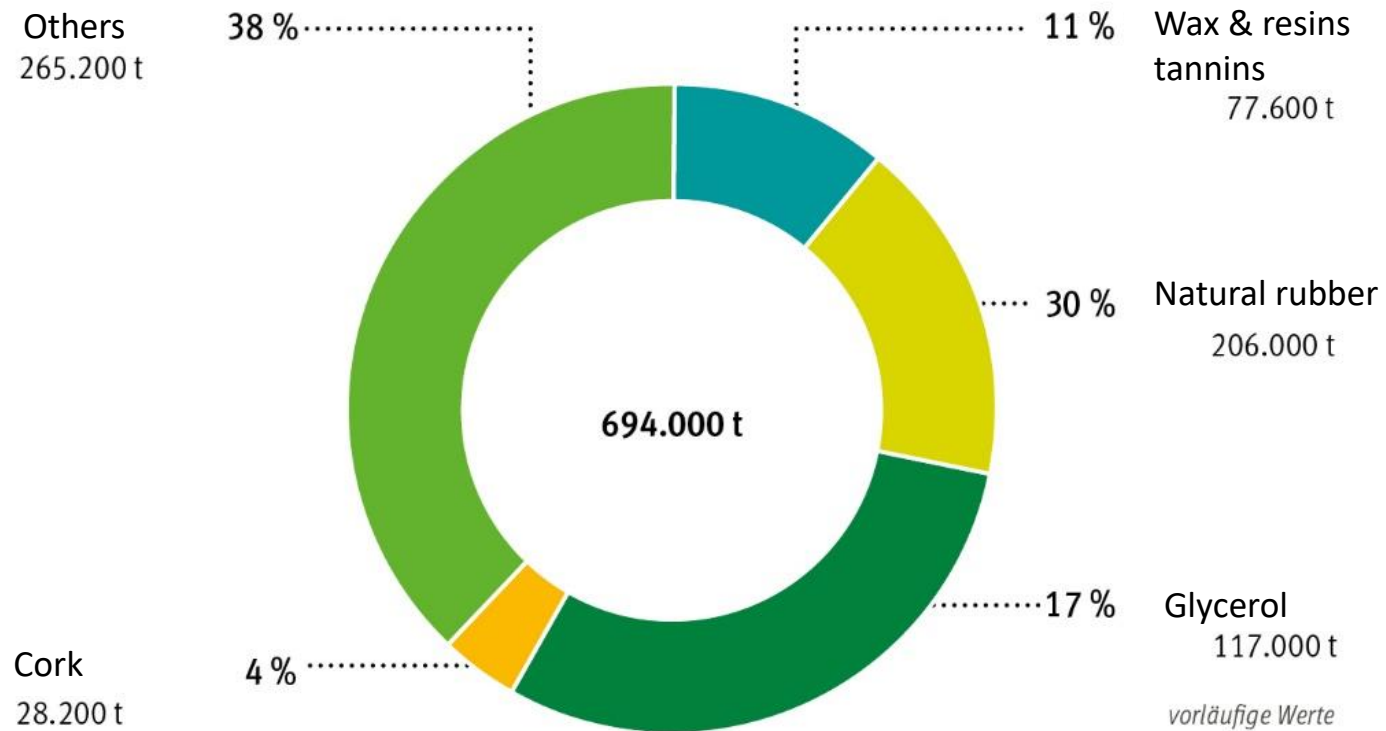


Quelle: FNR, BMEL (2020)
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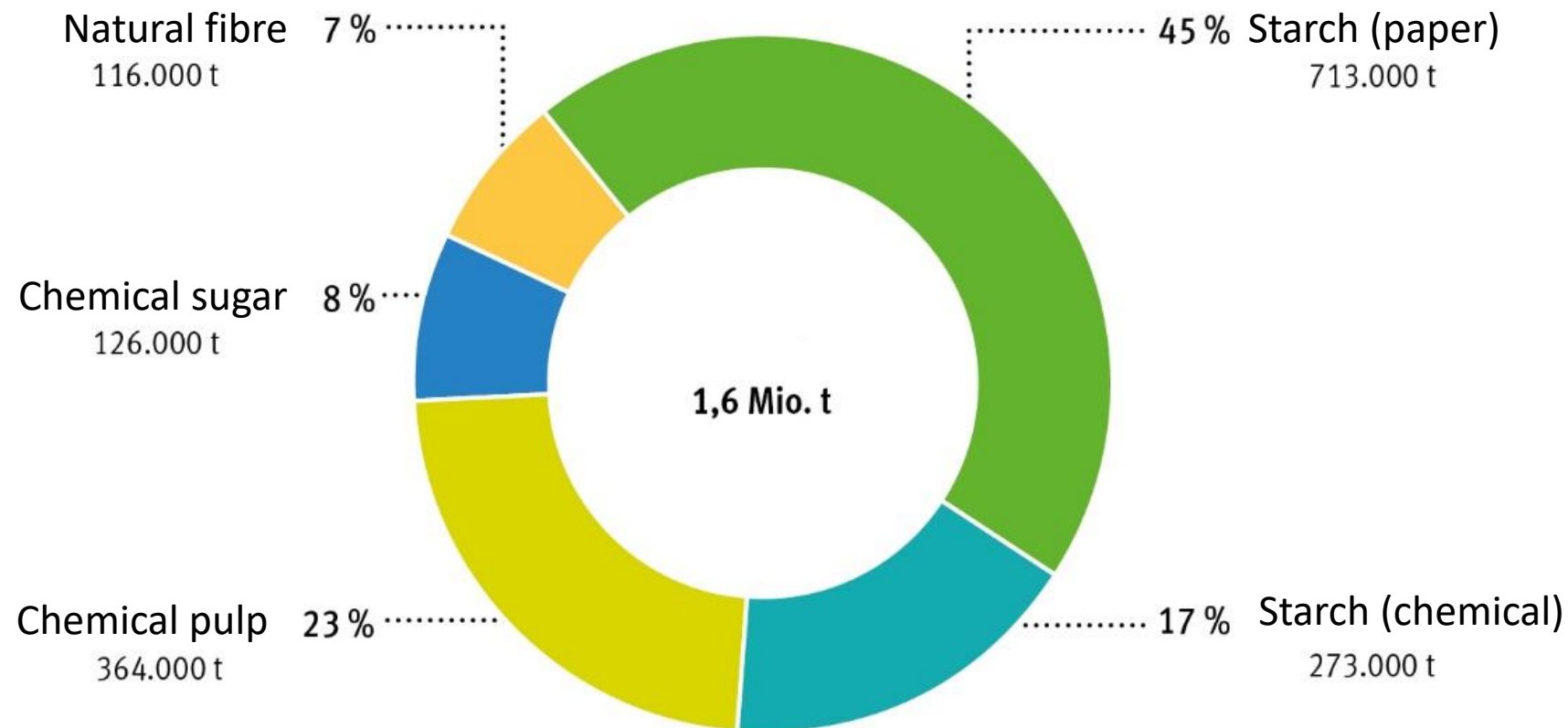
Industrial use of other biomass in 2019



Quelle: FNR, BMEL (2020)
© FNR 2021



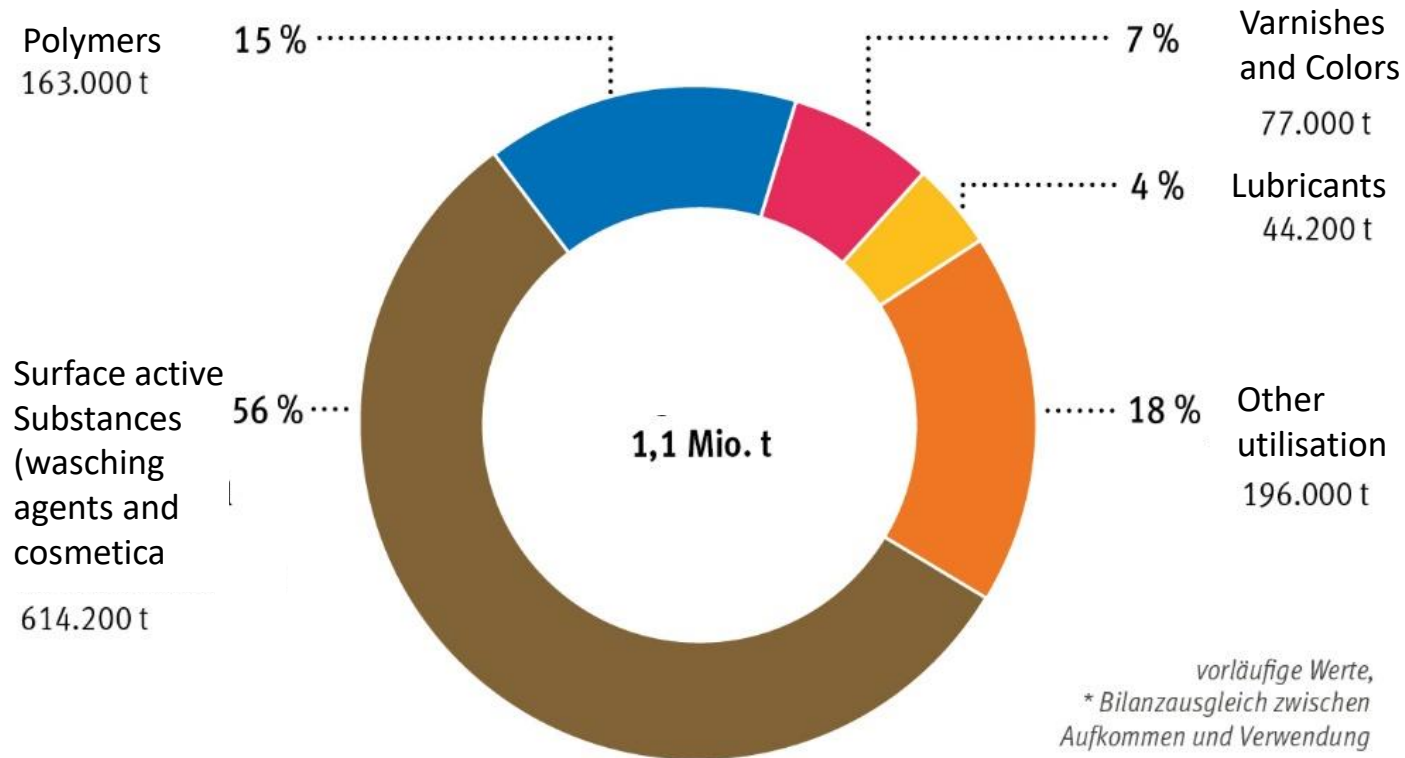
Industrial use of carbohydrates in 2019



Quelle: FNR, BMEL (2020)
© FNR 2021



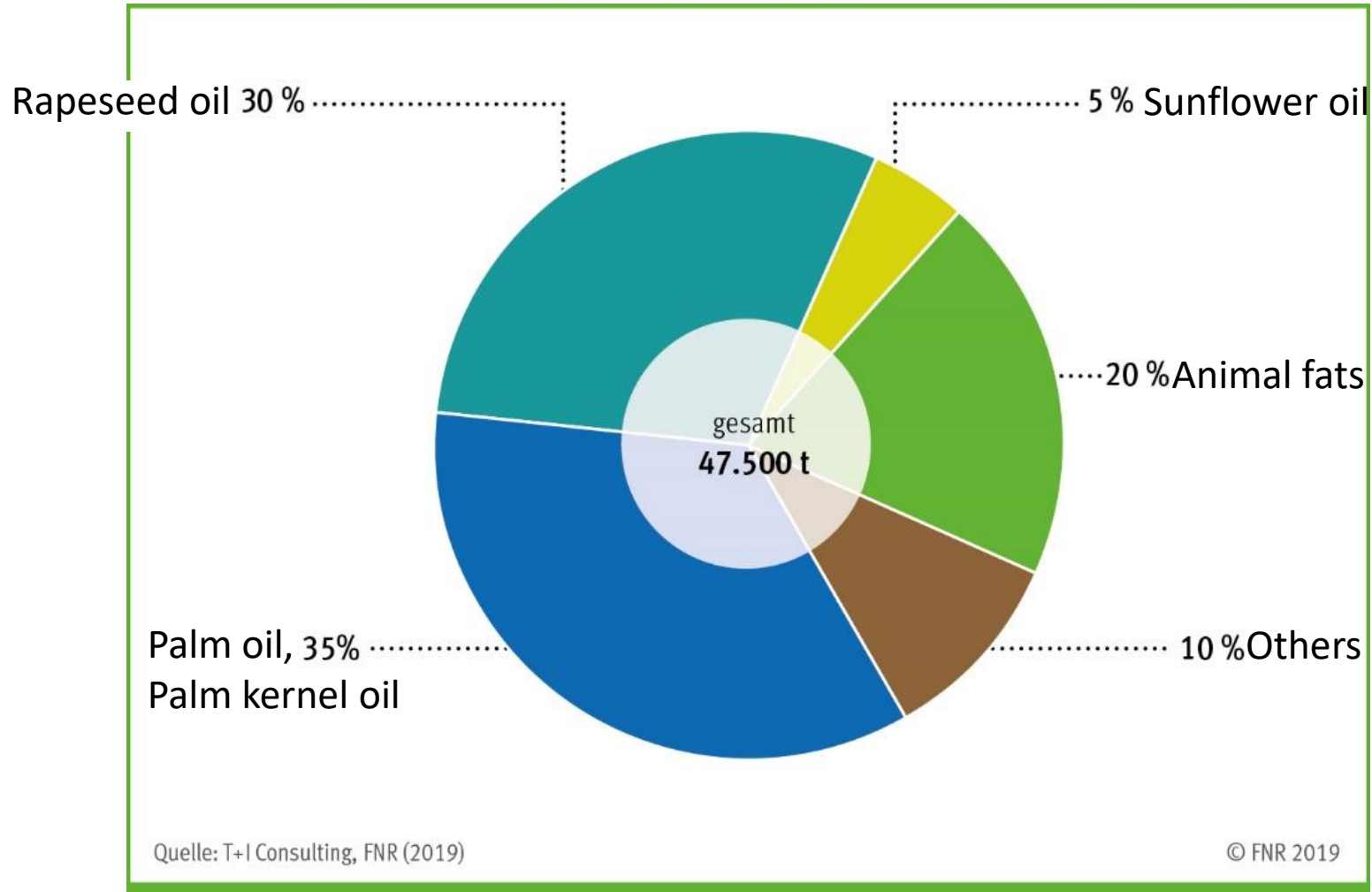
Industrial use of plant oils in 2019



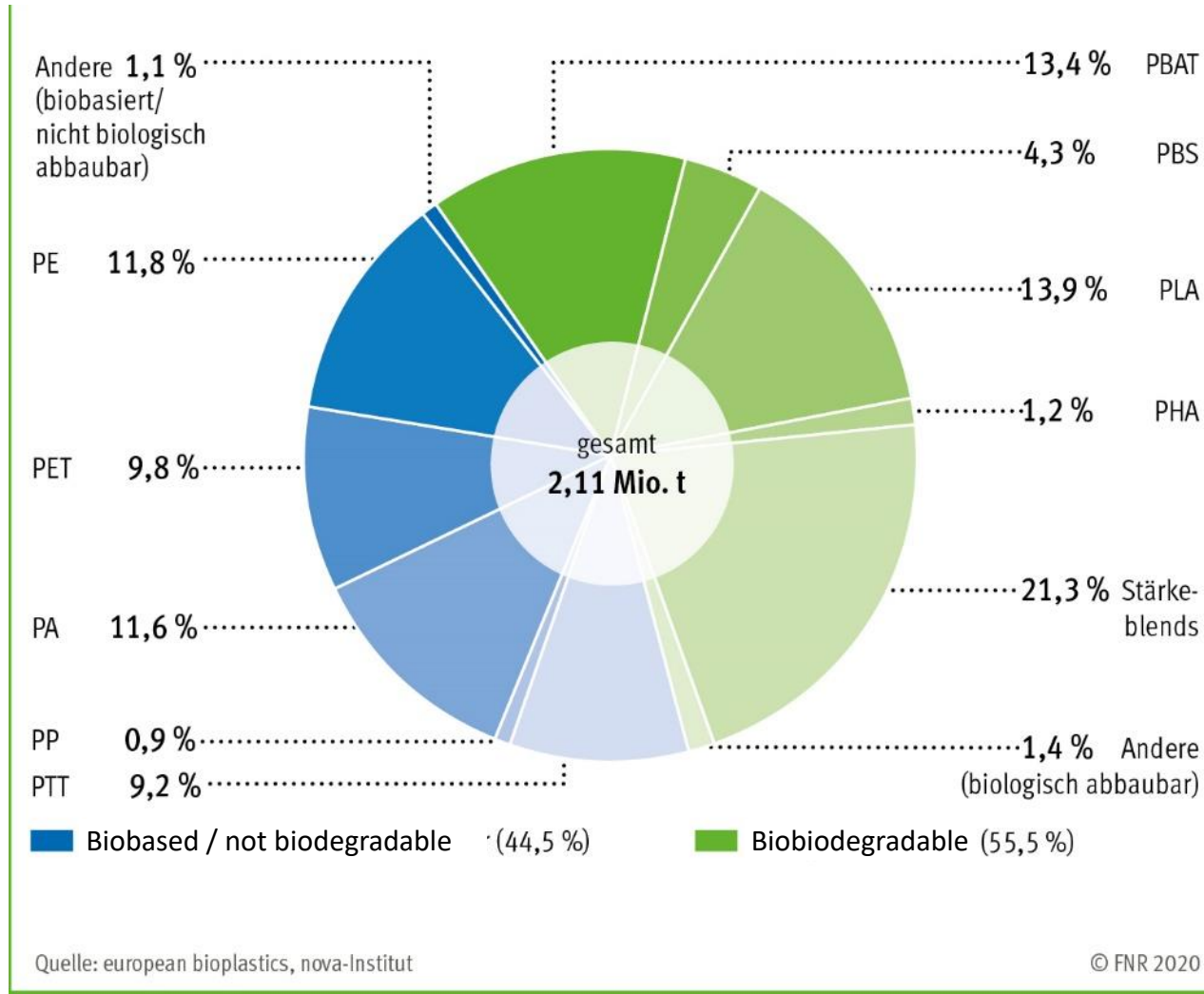
Quelle: FNR, TI-Consulting (2020)
© FNR 2021



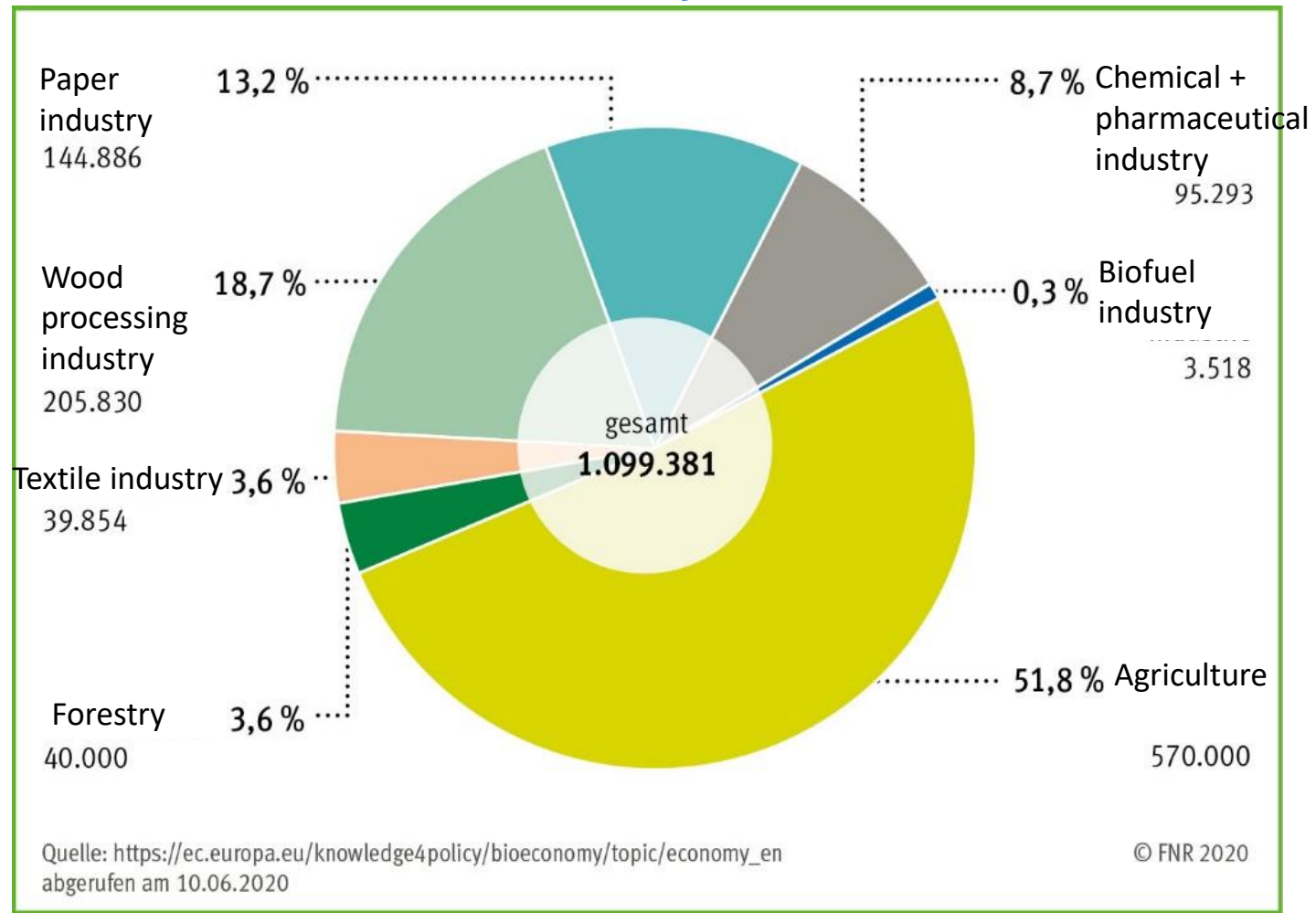
Feedstock for bio-lubricants in 2019



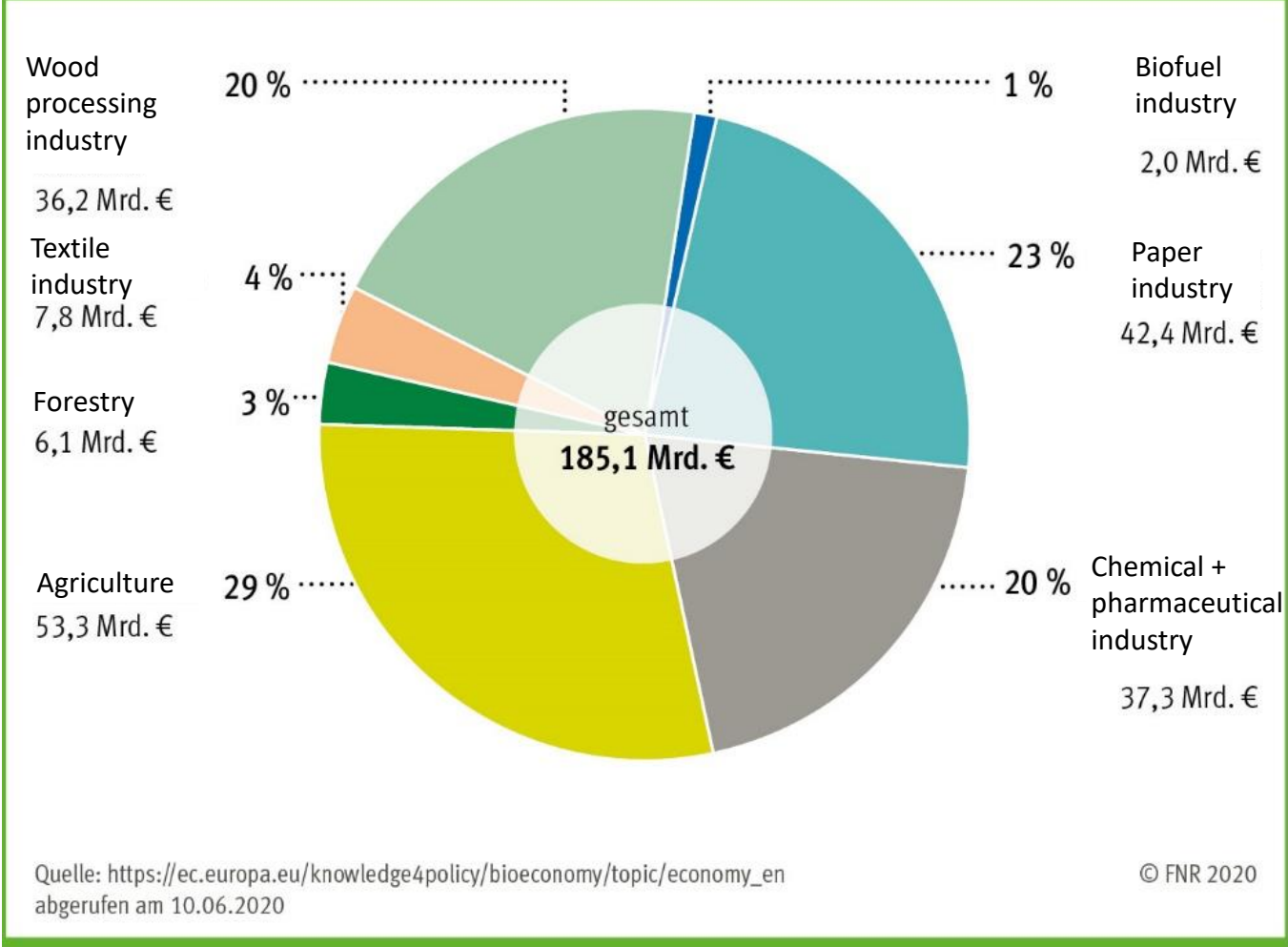
Fraction of biobased polymers in 2019



Employees in the biobased bioeconomy in 2017



Turnover in the biobased bioeconomy in 2017



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www.ieabioenergy.com

<http://task42.ieabioenergy.com>