IRENA
International Renewable Energy Agency

Biomethane and the gas crunch

Why it's time to factor in volatility and externalities to reveal the true cost of biomethane

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World Biogas Summit, Birmingham, 16 June 2022

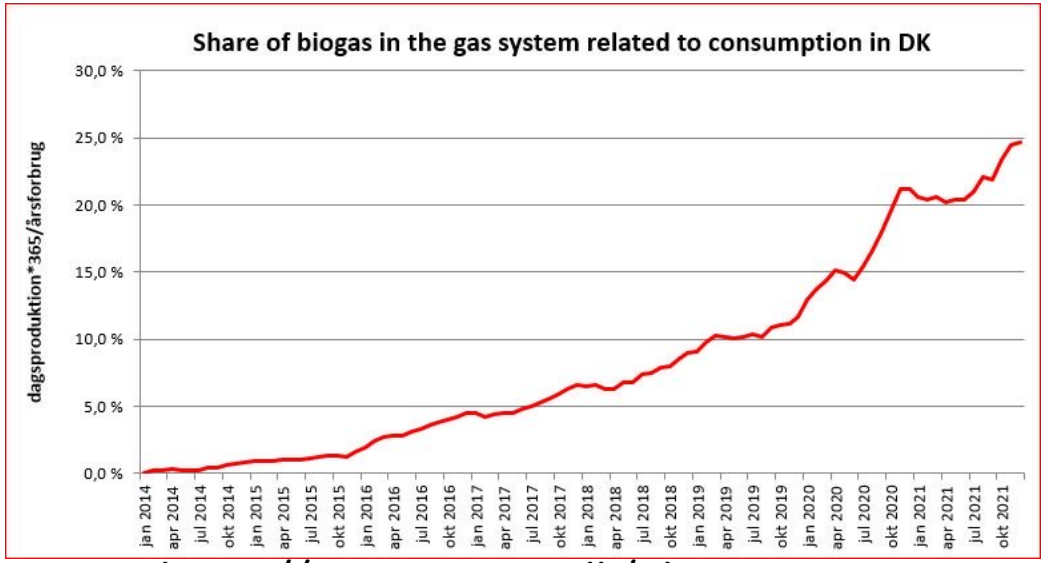
TTF gas price [EUR/MWh]
Currently approx. 80 EUR/MWh week ahead

https://www.advfn.com/stock-market/NYMEX/TTF/historical

Globally approx. 4000 BCM natural gas use
Globally around 1% biogas and biomethane

Europe (EU-27) approx. 450 BCM natural gas
Around 12% indigenous natural gas production

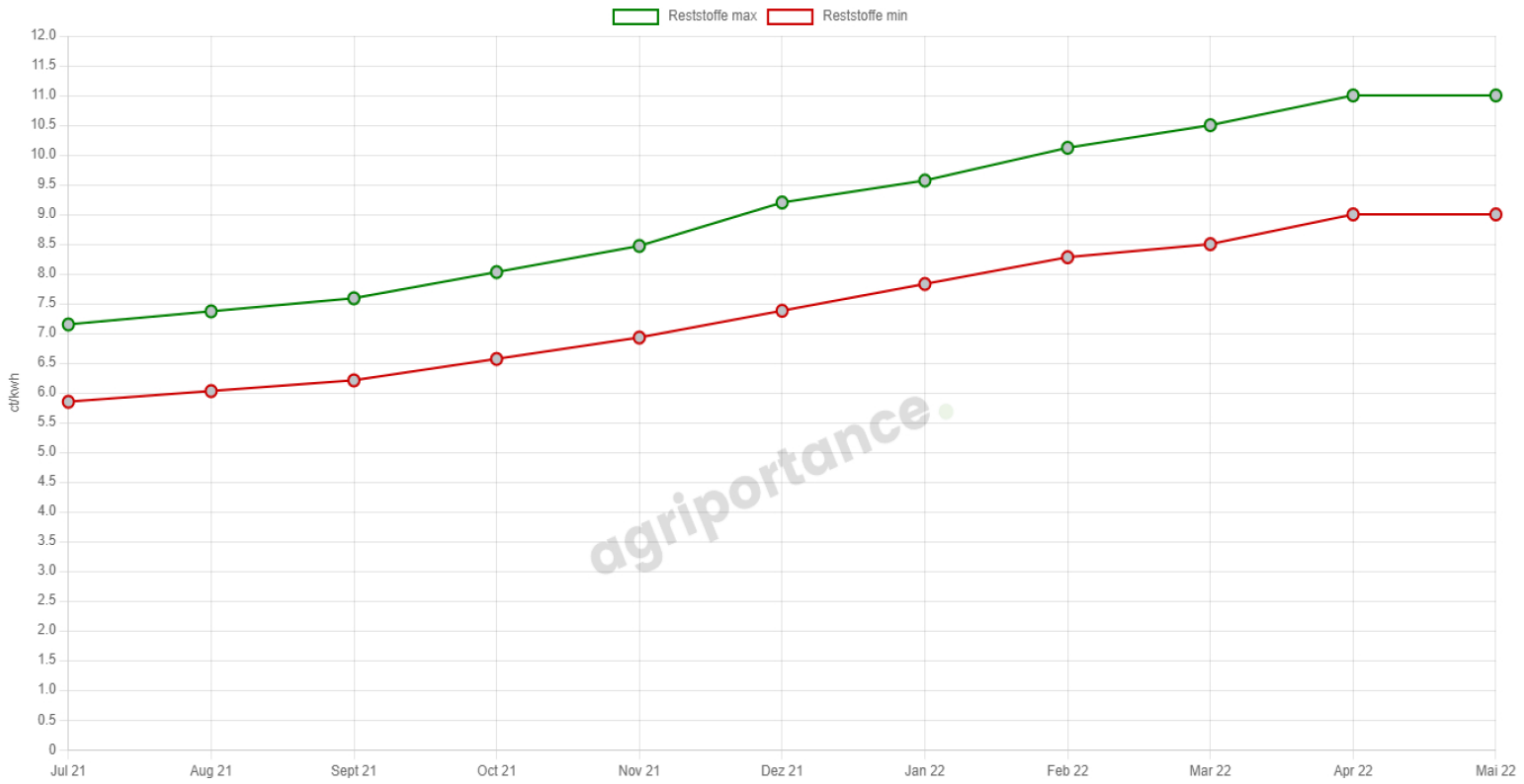
Biogas can alleviate natural gas shortfall:
Denmark 25% biomethane in 2021



https://en.energinet.dk/About-our-news/News/2022/01/07/New-record-biogas

Biomethane price Germany from advanced residues delivery Jan 2023 90-110 EUR/MWh

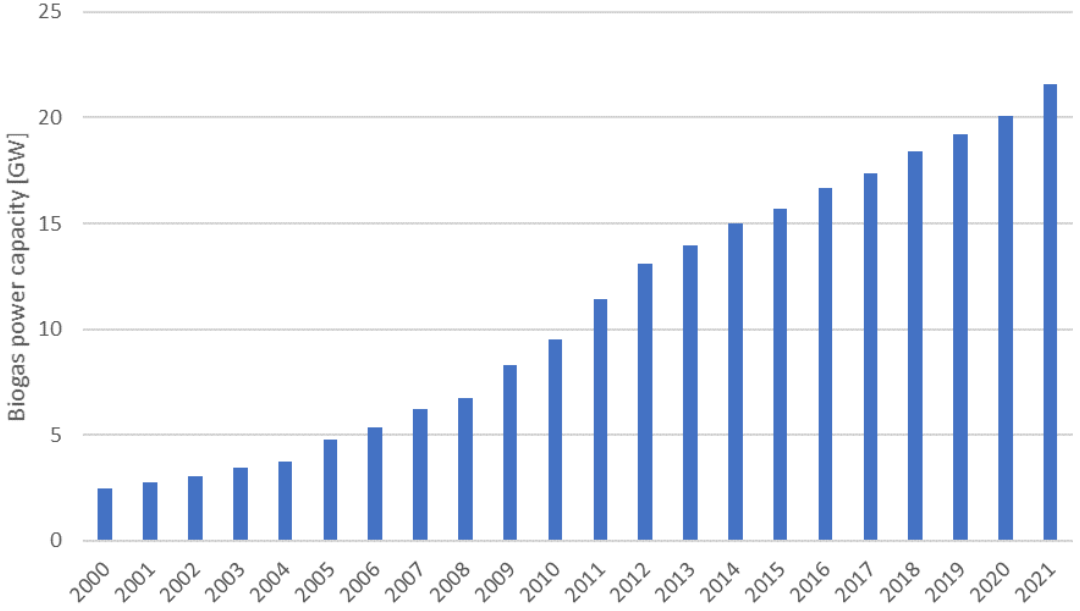
European potential (EU27+UK) 34 BCM biomethane by 2030
Biomethane can be produced starting from €55/MWh

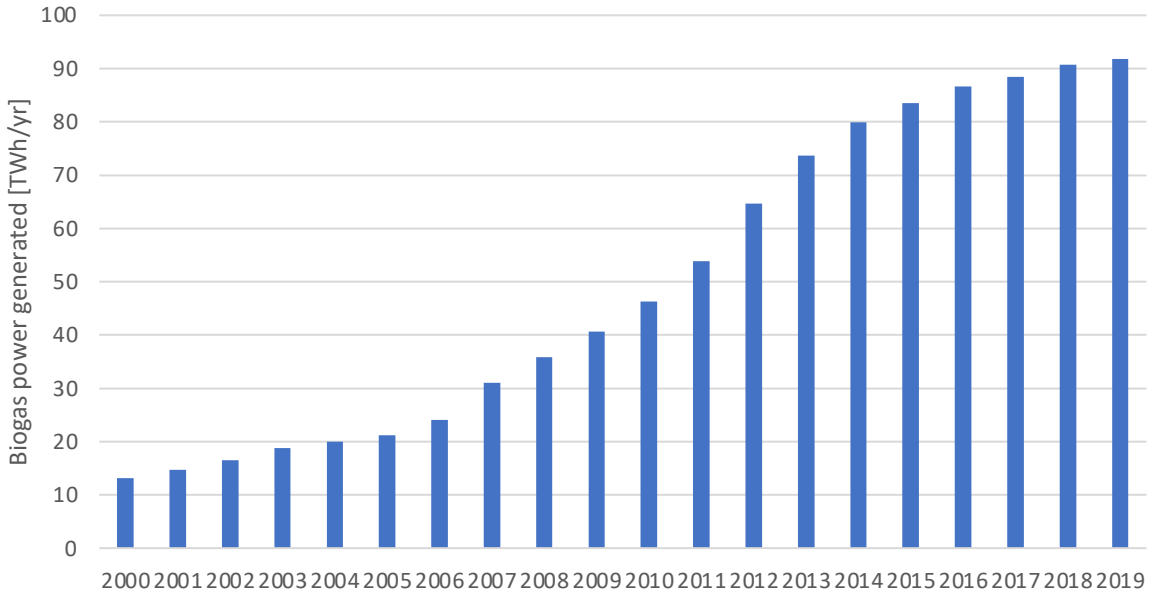


https://agriportance.com/biomethan-preisticker/

Global biogas power capacity & production trend

- Globally 21.6 GW biogas power capacity in 2021 (+5% compared to 2020). 100 TWh power/yr – 0.3% of total
  - US 2.3 GW; China 1.7 GW; Brazil 0.4 GW
  - Germany 7.6 GW biogas; Italy 1.4 GW; France 0.6 GW
- Europe is leading globally, more than half of total volume
  - 1023 biomethane plant, 20 000 biogas plant in total in 2021 – approx. 2% biomethane today in total gas supply





Source: IRENA

Diverse feedstock and applications

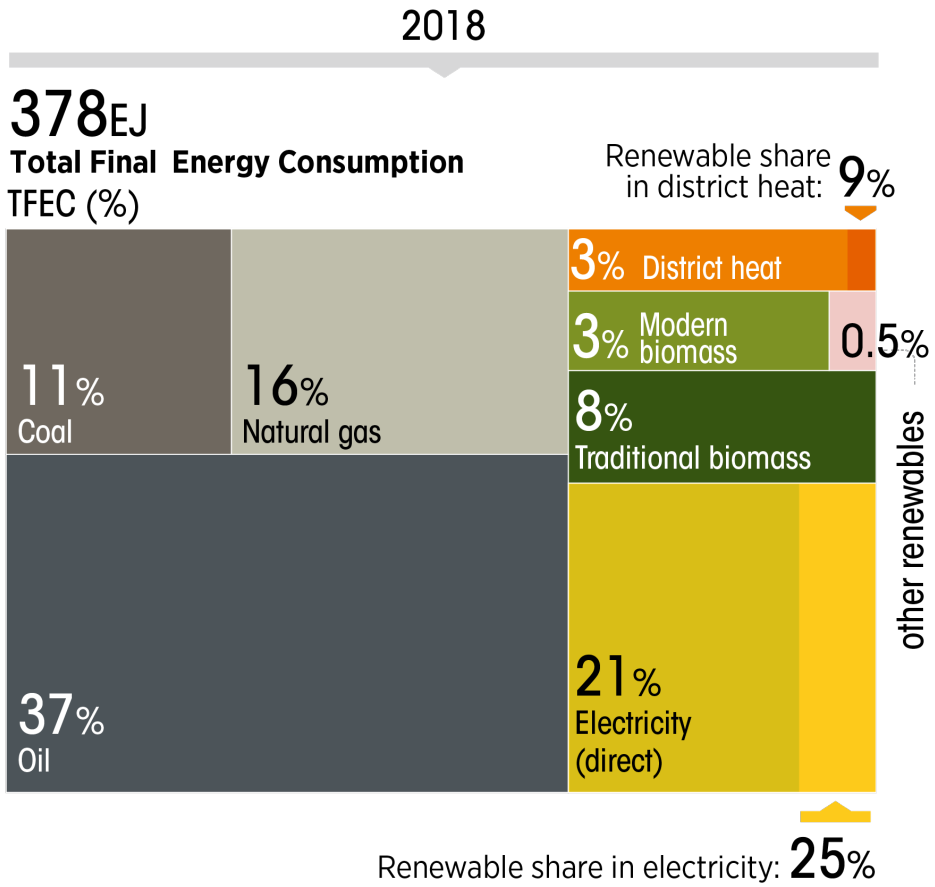
- Kitchen waste
- Manure
- Crop residues
- Sewage sludge
- Landfill gas

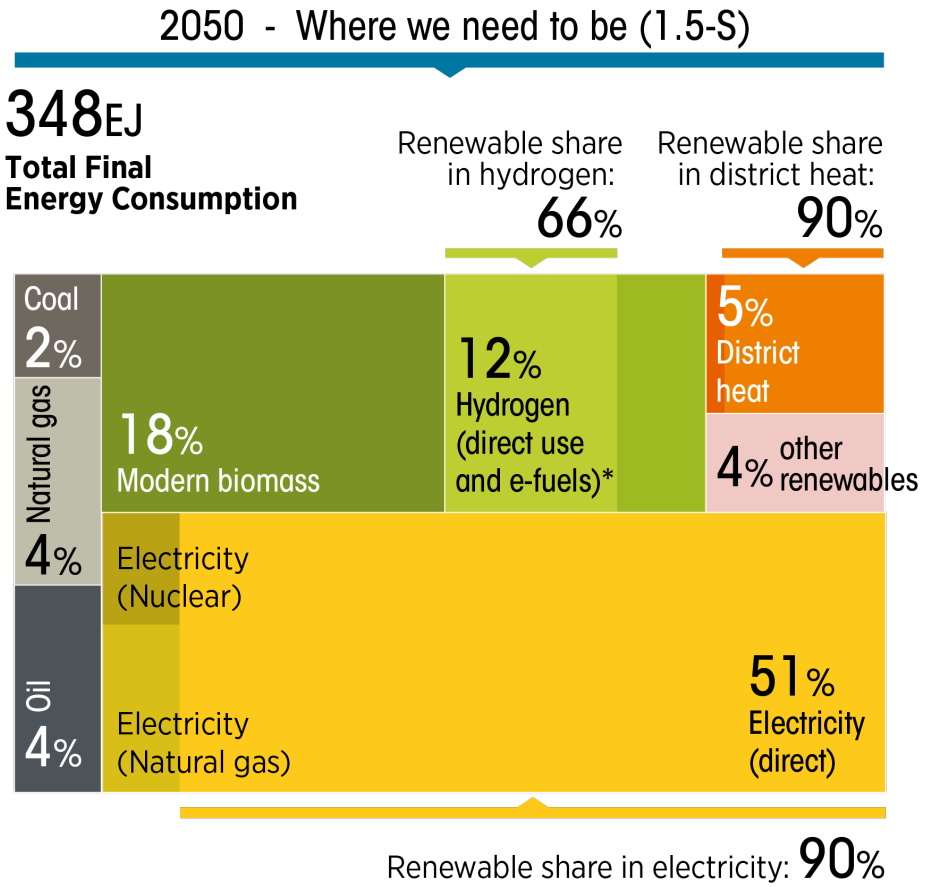
- Direct use for power generation and cooking
  - Microscale digesters China, India etc – about a third of all biogas for cooking
- Upgrading to biomethane for gas grids or transportation (road vehicles, shipping)

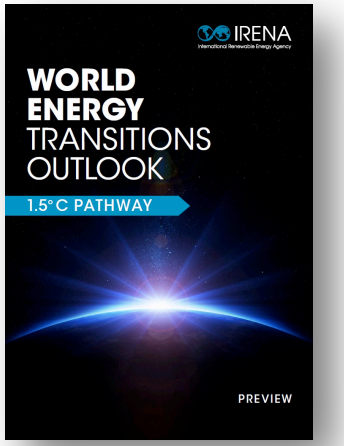
- Total world biogas production 1.43 EJ in 2019 – 38 BCM – equivalent to 1% of natural gas
  - Around 10% converted to biomethane – share is growing
  - Significant growth potential

IRENA's 1.5C scenario: Transitioning to net-zero emissions by mid-century - a key role for bioenergy

- Electricity is the central energy carrier in future energy systems. But both hydrogen and biomass based fuels and feedstocks play a significant role.
- Biomass supply grows from 54EJ to 153EJ by 2050 & biomass accounts for 18% of final energy use.



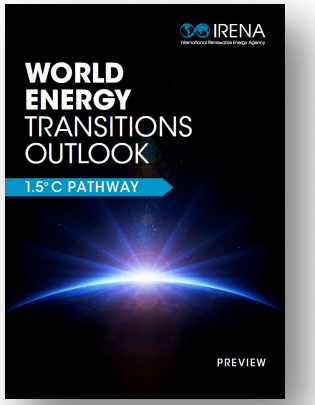




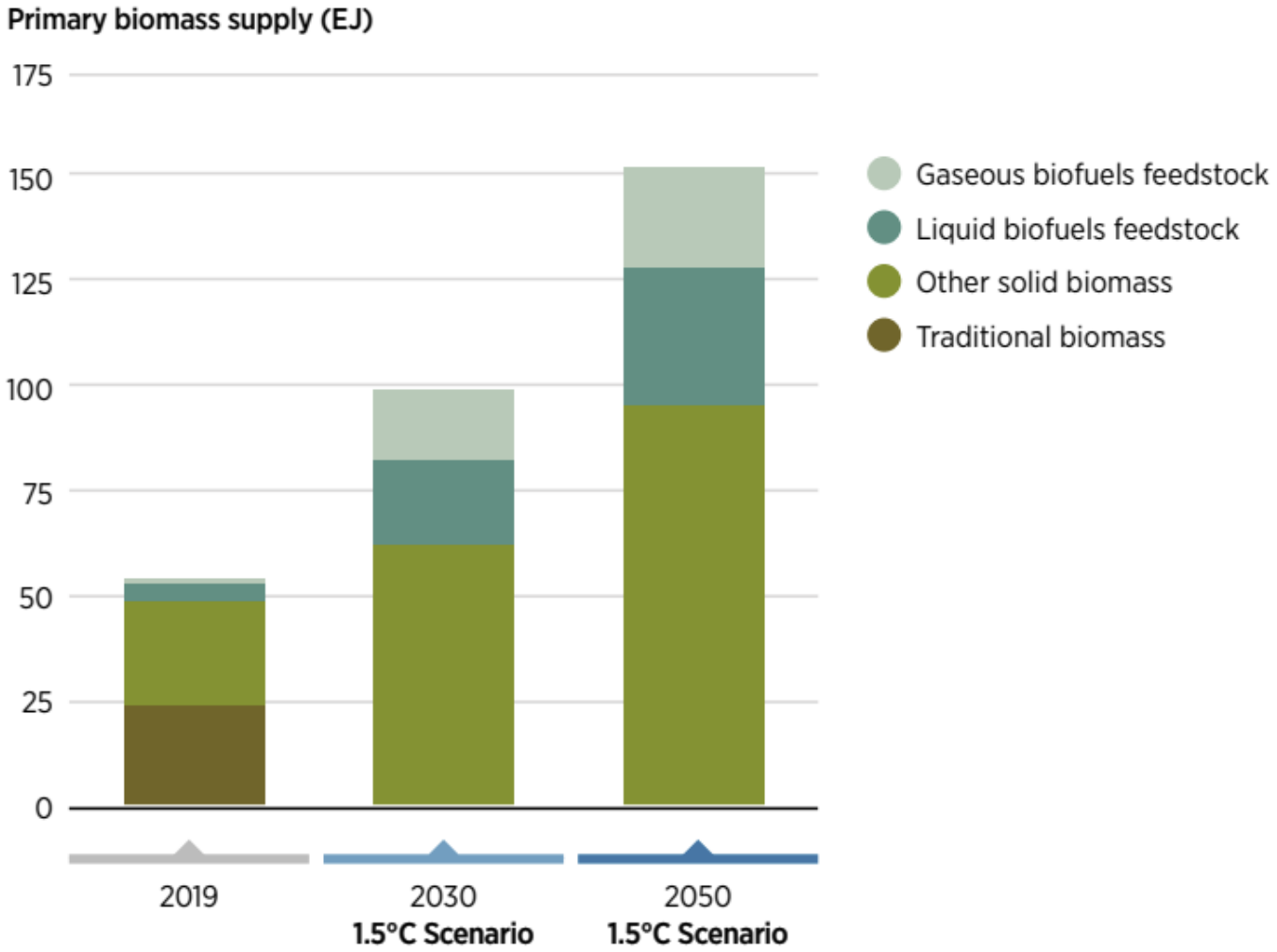
Biomass products used in final energy consumption

BIOMASS PRODUCTS (EJ)	2019	2030	2050
Solid biomass (excluding traditional biomass)	14	23	28
Liquid biofuels	4	16	23
Biogas and biomethane	0.5	6	8
Bioheat[52]	1	5	8
Bioelectricity	2	6	9
Chemical feedstocks	-	4	10

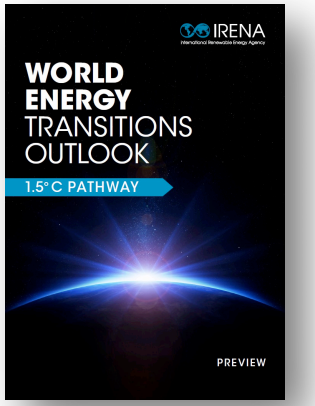
x16



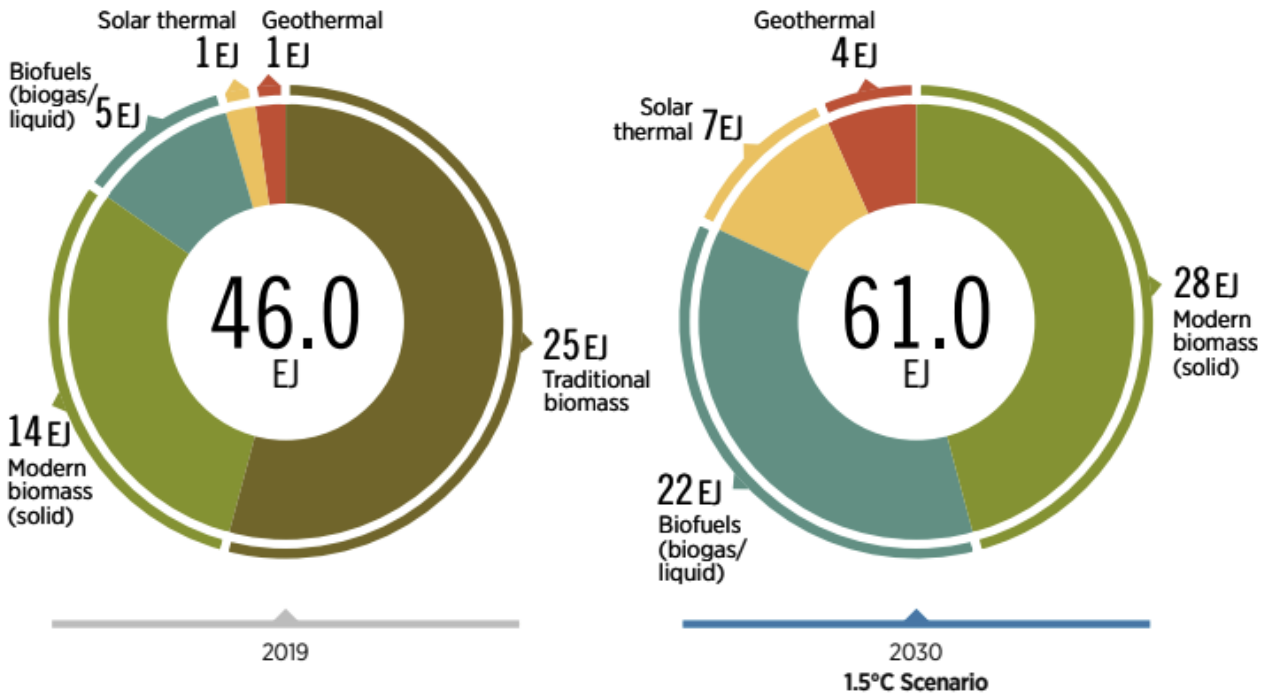
Primary biomass supply in the 1.5°C Scenario



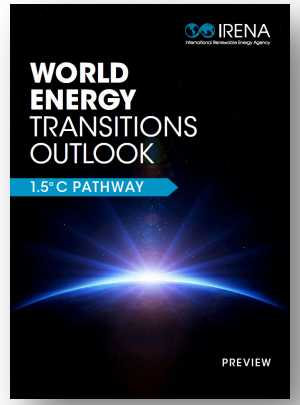
- Biomass supply will need to nearly double by 2030, from 55 EJ to 99 EJ, and rise to 153 EJ by 2050
- Modern biomass will need to increase from 30 EJ (current levels) by a factor of around 3.5 by 2030 and rise more than five-fold by 2050
- Feedstock supply for liquid and gaseous biofuels must also expand2050



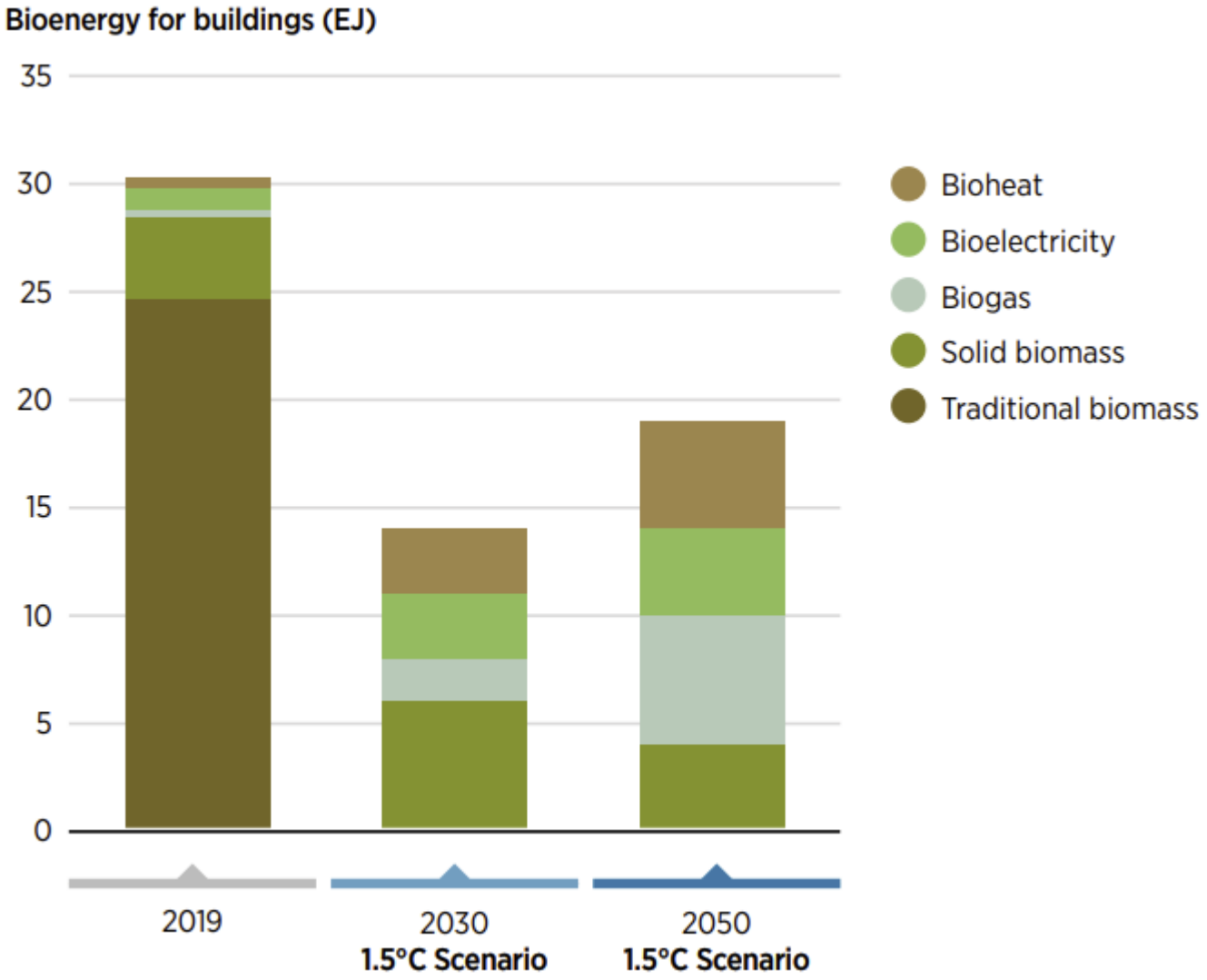
Final energy consumption of renewables in end uses and district heat in 2019, and 2030



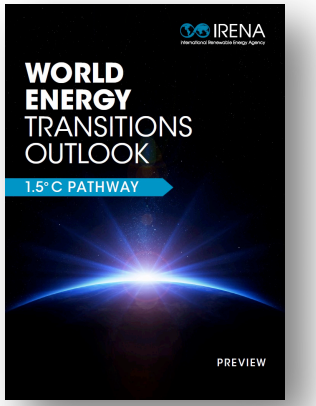
- Direct uses of renewables – including bioenergy, solar thermal and geothermal – provide solutions to decarbonise transport, buildings and industry
- In the 1.5°C Scenario, direct uses of renewable energy grow to 61 EJ in 2030 from 46 EJ in 2019
- By 2030, renewables will contribute approximately 72 EJ in direct electricity consumption, up from 21 EJ in 2019



Trends in bioenergy for buildings in the 1.5°C Scenario



- The modern use of biomass in buildings climbs from 5.7 EJ to 14.5 EJ by 2030 and to 18.2 EJ by 2050
- By 2050, there is a ten-fold growth in the use of bioheat, which rises to 4.6 EJ



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