



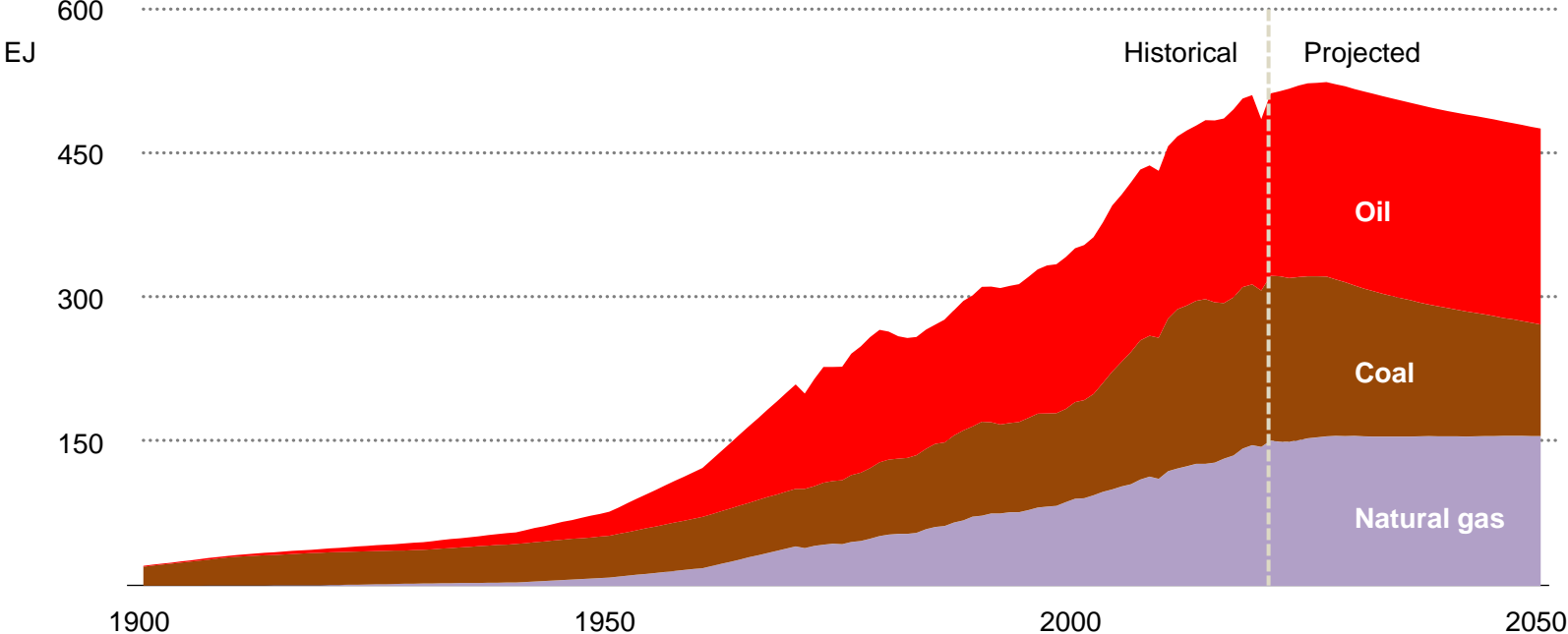
Role of Renewable Gases in Clean Energy Transitions

Dr Ilkka Hannula, 21st November 2023

SEG Annual Conference on Renewable Gases 2023

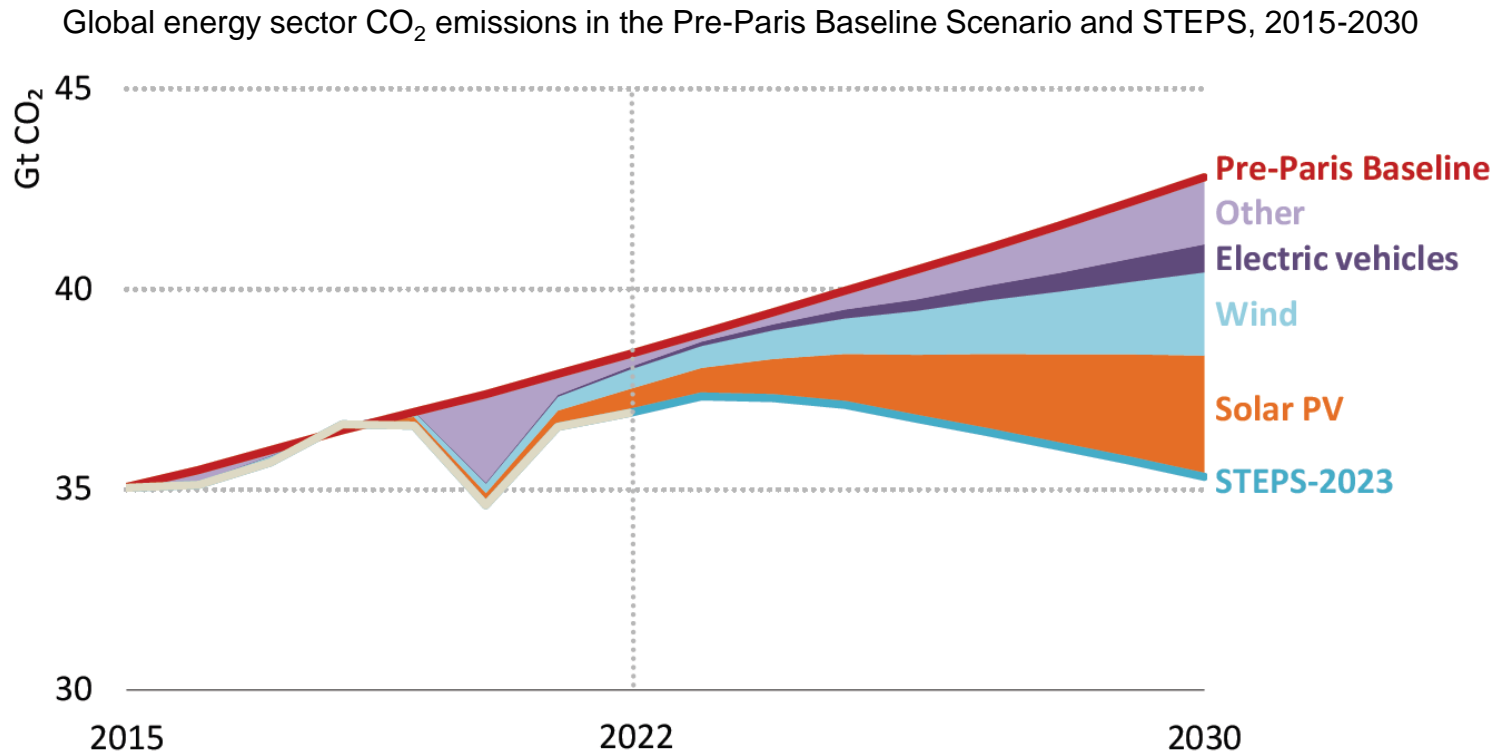
Peak fossil fuel demand is coming this decade

Fossil fuel demand in the Stated Policies Scenario, 1900-2050



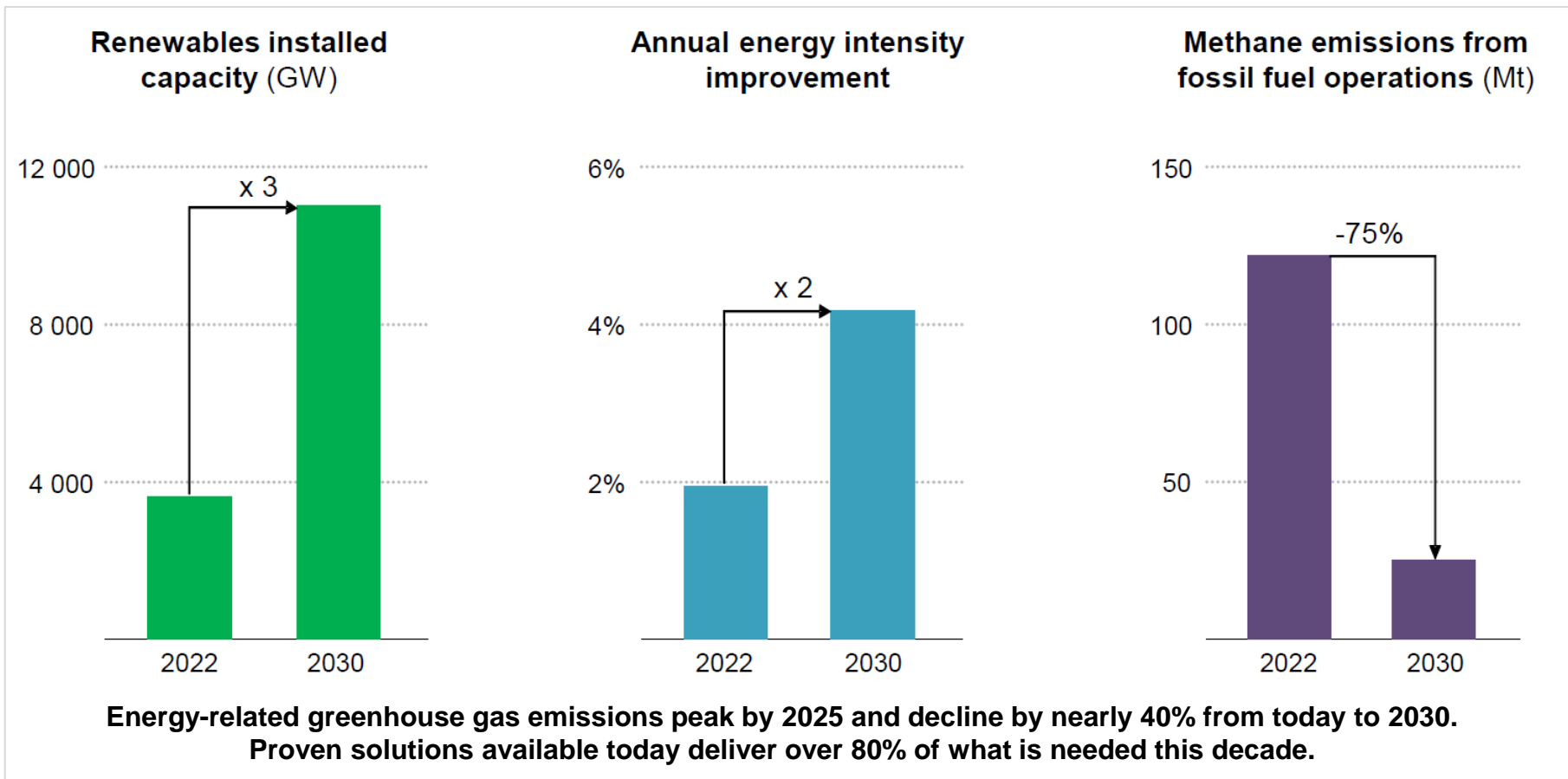
Today's policy settings are now sufficiently strong that they produce a distinct peak in fossil fuel use before 2030

A lot of progress has taken place since the Paris Agreement



Solar PV, wind power and EVs reduce emissions by 6 Gt in 2030 in the STEPS relative to the Pre-Paris Baseline Scenario

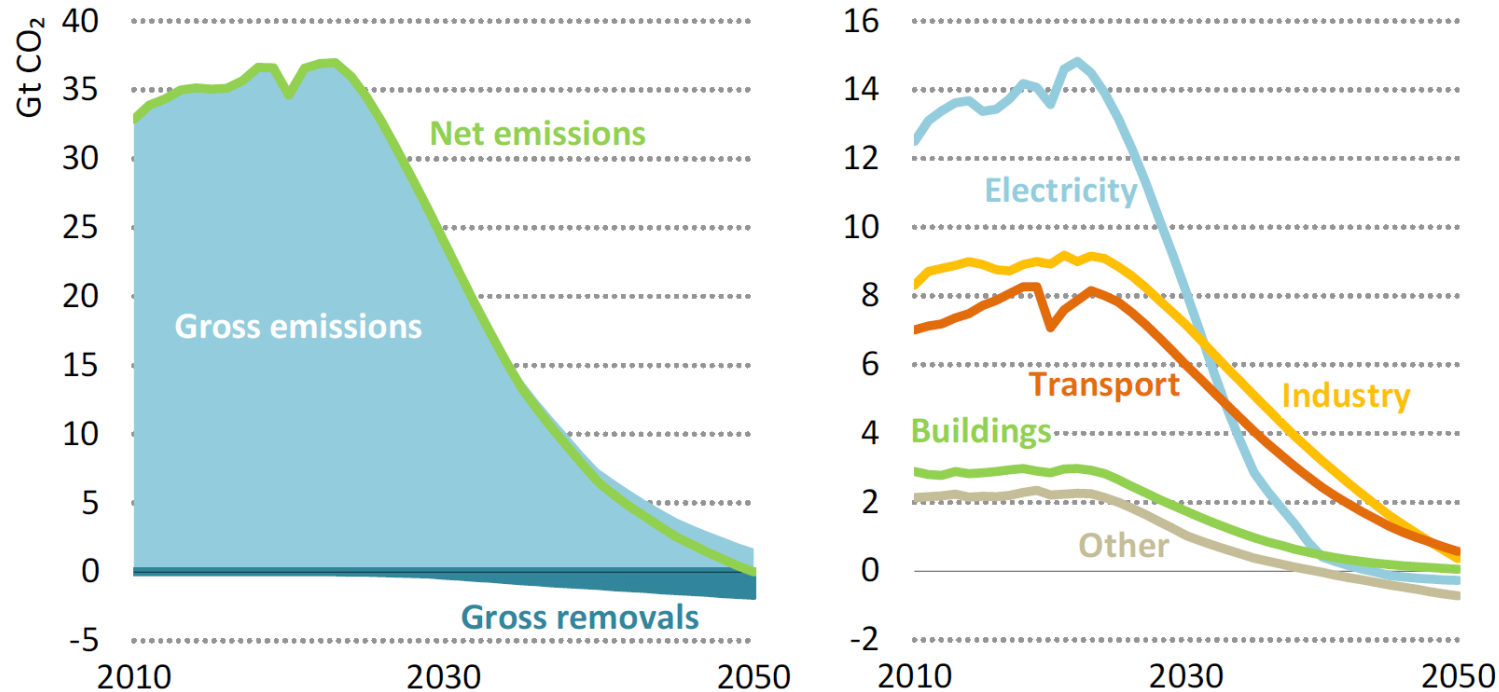
We have the tools to go much faster



Emissions trends to 2050



Energy sector gross emissions and removals, total net CO₂ emissions, and net emissions by sector in the NZE Scenario, 2010-2050.

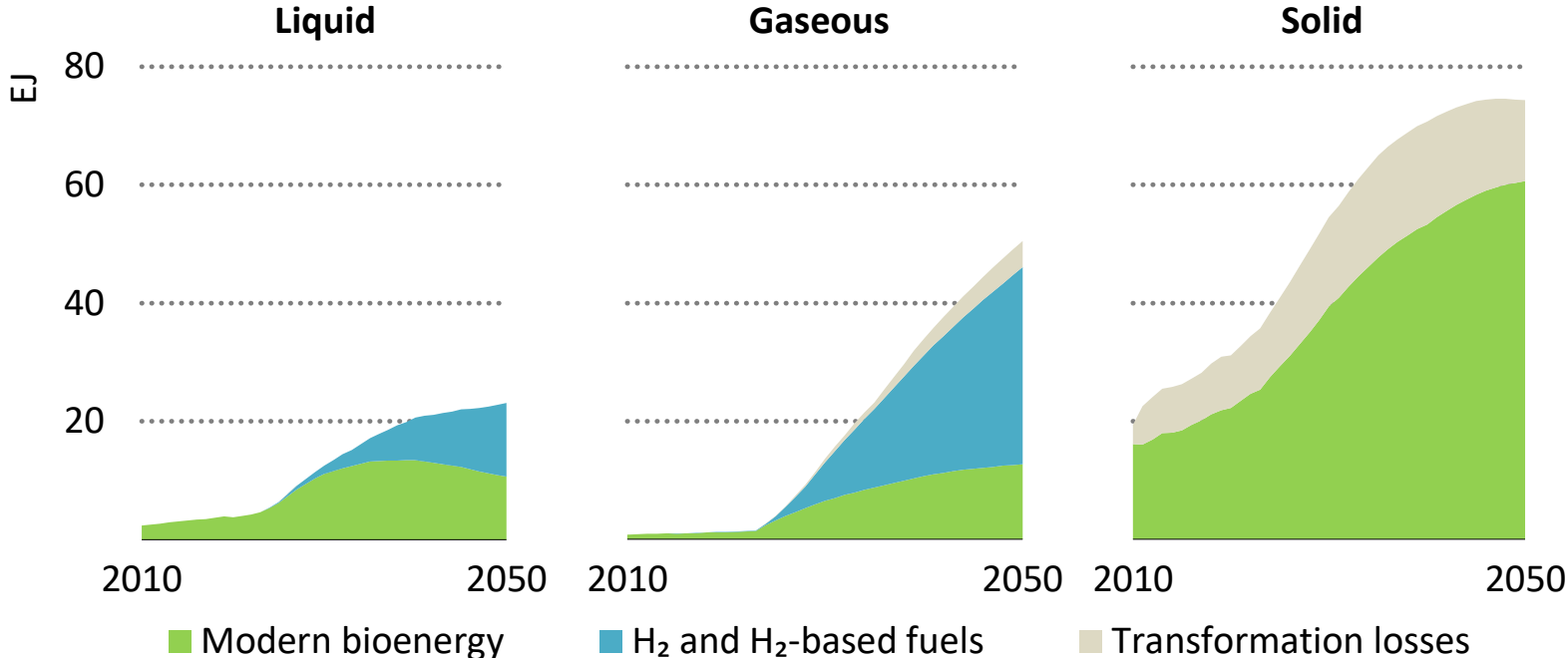


Energy sector CO₂ emissions are reduced 65% by 2035 and reach net zero by 2050, with residual emissions of 1.7 Gt balanced by atmospheric removals of the same magnitude

Low-emissions fuels are critical for achieving net-zero emissions

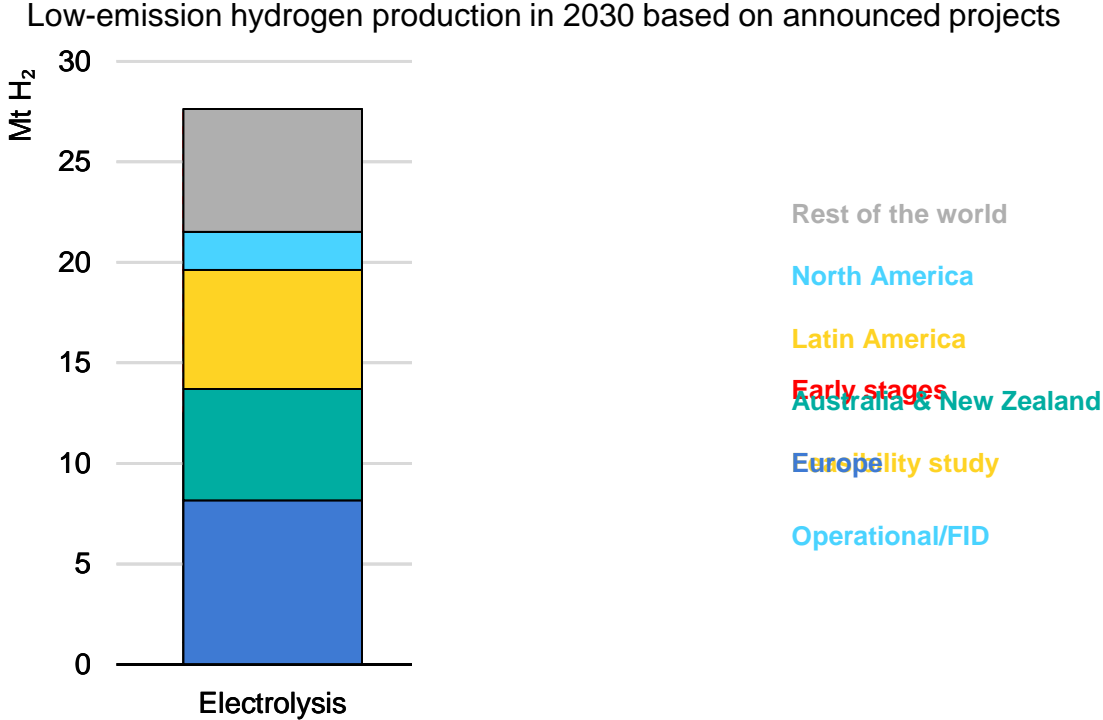


Low-emissions fuel demand in the NZE Scenario, 2010-2050.



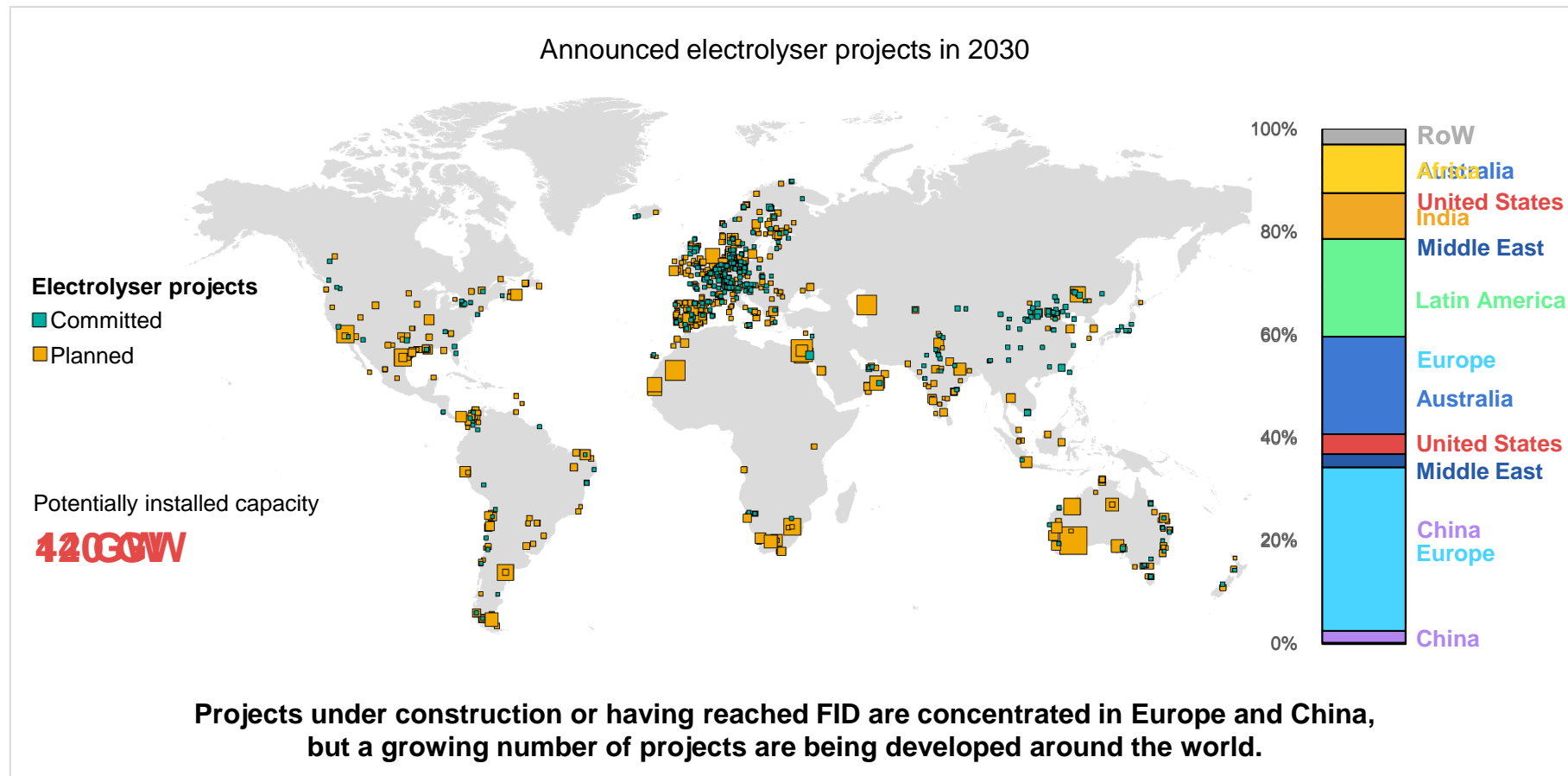
Low-emission fuels are used to substitute for fossil fuels in hard-to-abate sectors and applications where electrification is costly or not yet commercially available.

Low-emission hydrogen production can grow massively by 2030



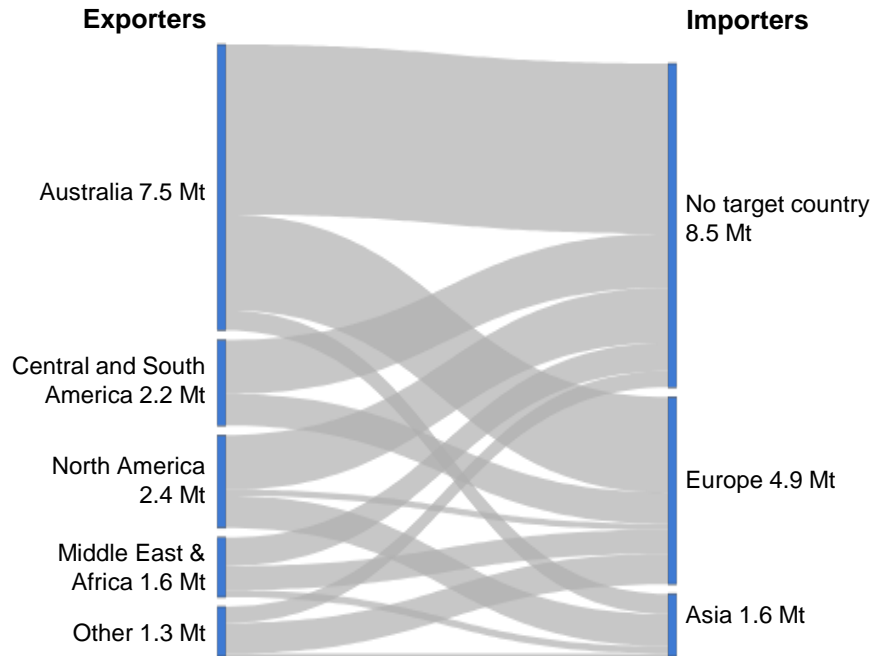
Announced low-emission hydrogen projects of 38 Mt could meet government targets to produce 35 Mt by 2030. However, only 4% have reached final investment decision or are under construction.

Geographical diversity of electrolyser projects is increasing

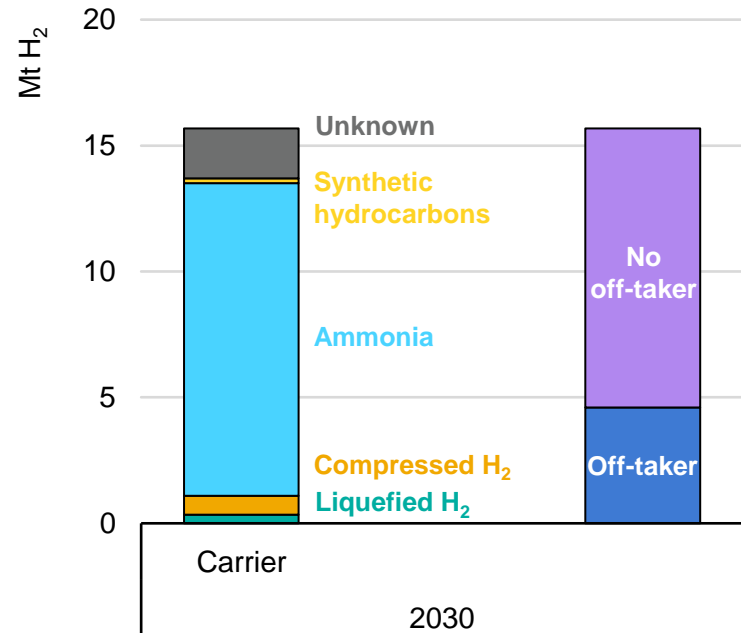


Interest in hydrogen trade is growing, but barriers remain

Announced low-emission hydrogen trade flows in 2030



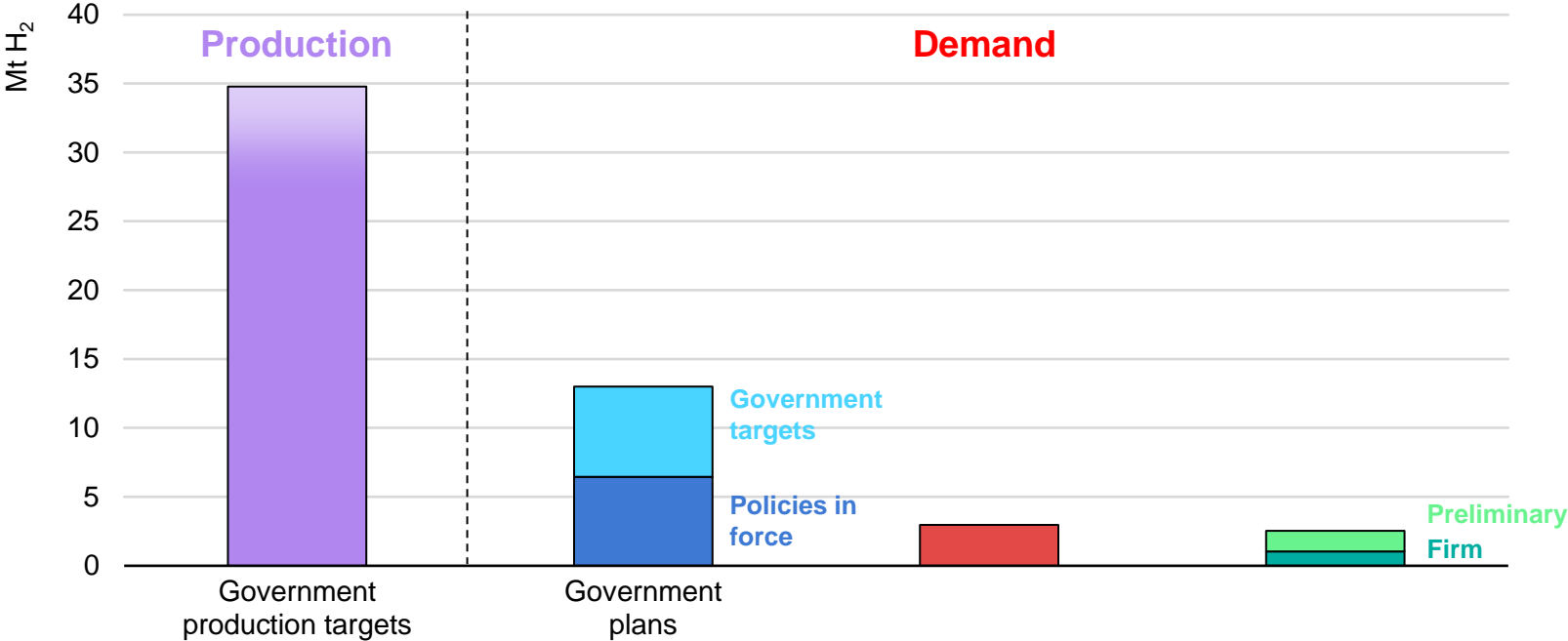
Low-emission hydrogen trade



Planned hydrogen exports could reach 16 Mt by 2030, though almost all projects are at early stages and less than one-third have identified a potential off-taker.

Demand creation is falling behind production ambitions

Low-emission hydrogen production targets compared with potential demand

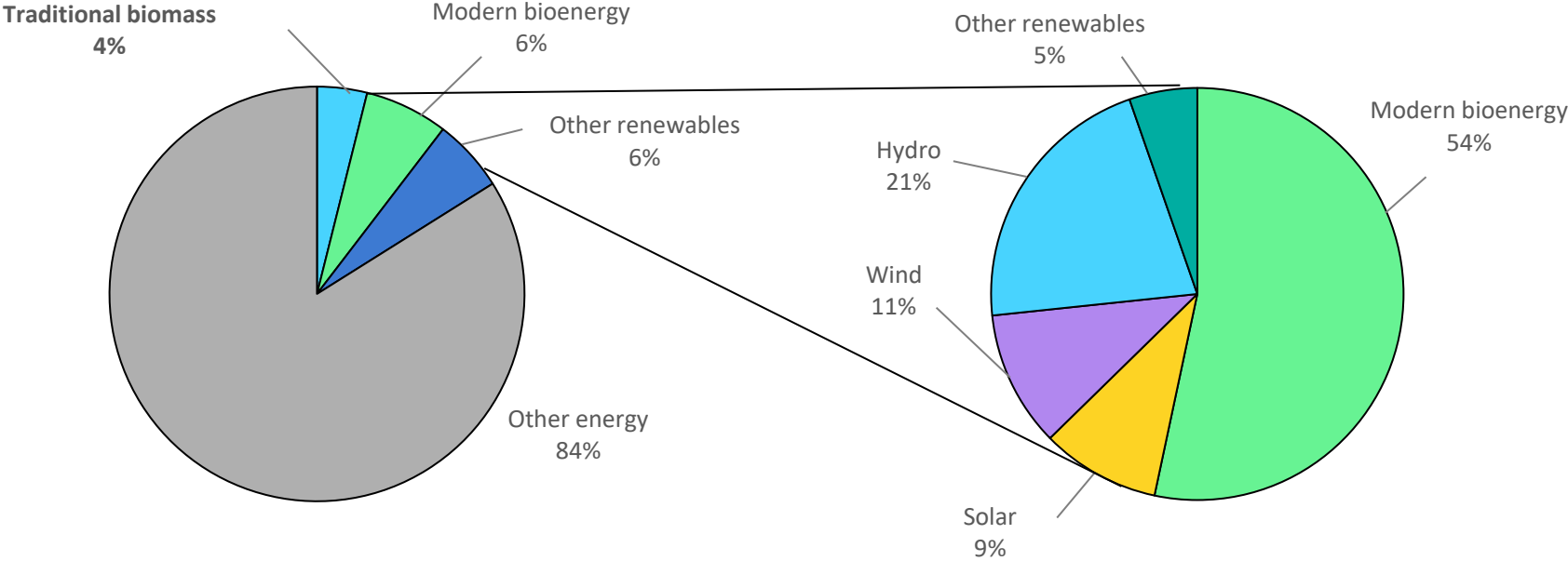


Actions from governments, international co-operation initiatives and the private sector fall short of production ambitions

Modern bioenergy is the giant of renewable energy

Share of total energy supply, 2022

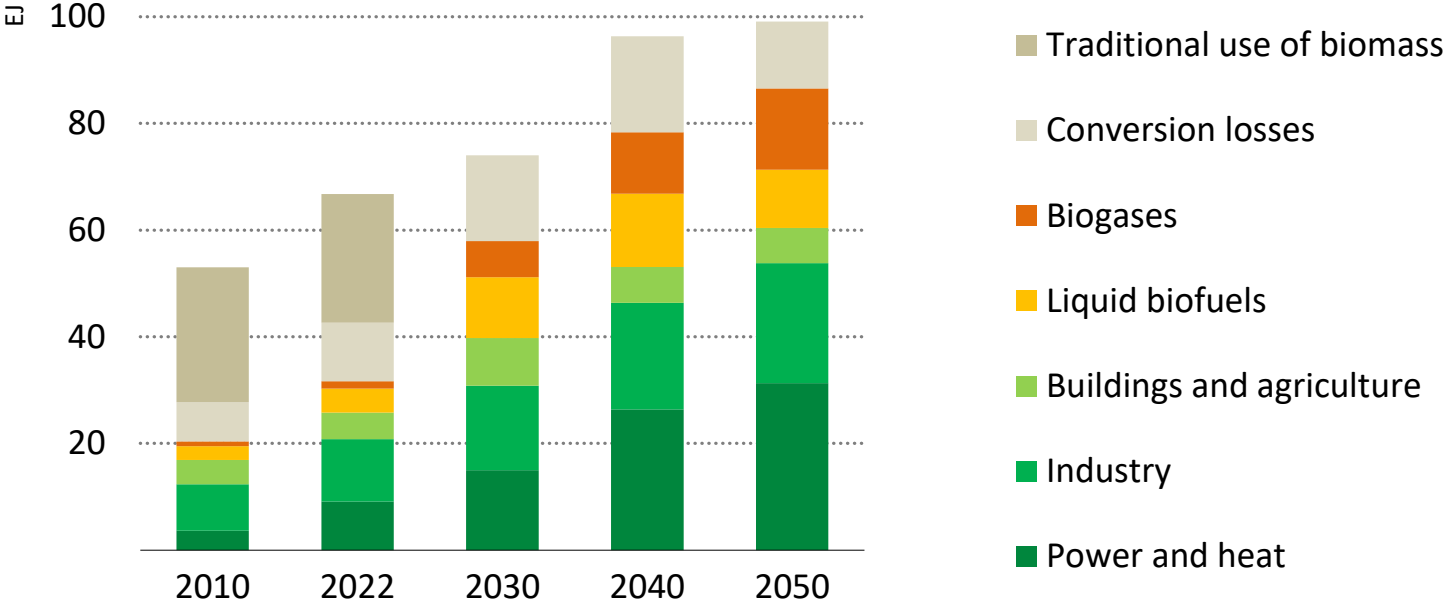
Share of modern renewable energy supply, 2022



Today, more than half of the renewable energy supply comes from bioenergy sources. This share is more than the double of wind and solar combined.

Bioenergy to play a major role in various forms

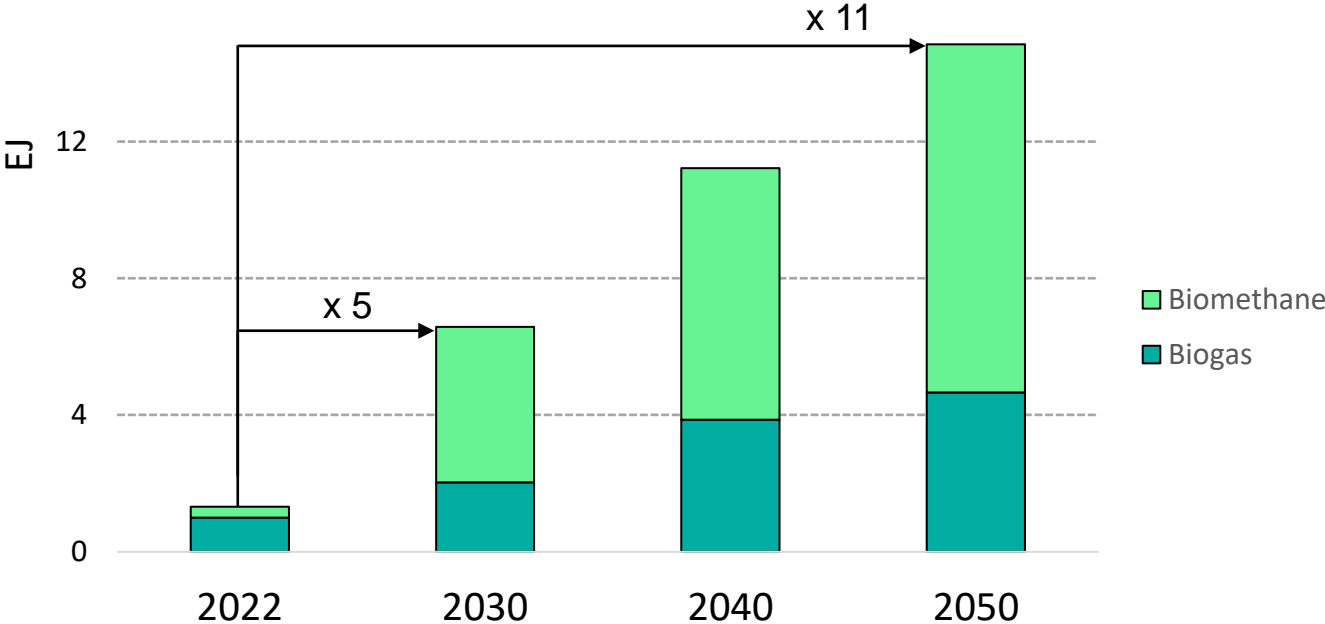
Primary bioenergy use by sector and economic grouping in the NZE Scenario, 2010-2050.



Modern bioenergy use more than doubles to 2050, meeting almost 20% of total energy needs and becoming the second largest source of energy supply. Global demand in 2050 is well below the assessed sustainable potential.

Biogases help decarbonise electricity, industry and buildings

Global biogas and biomethane supply in NZE scenario

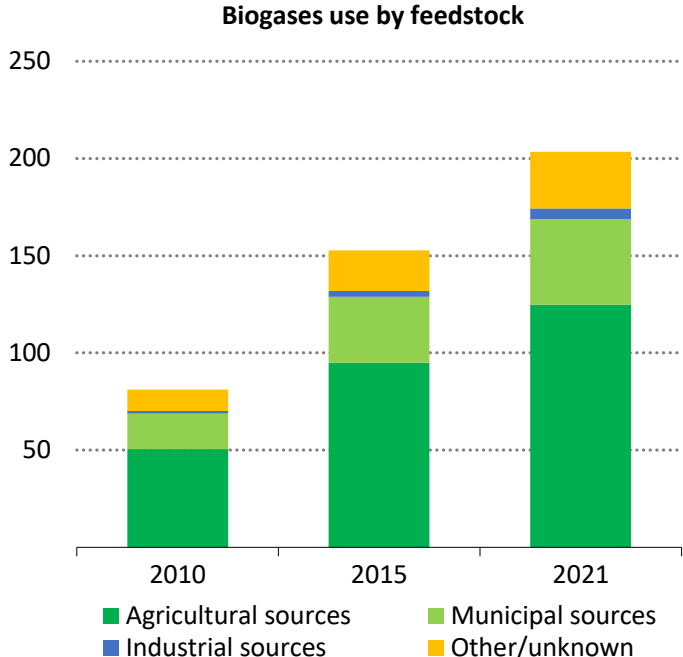
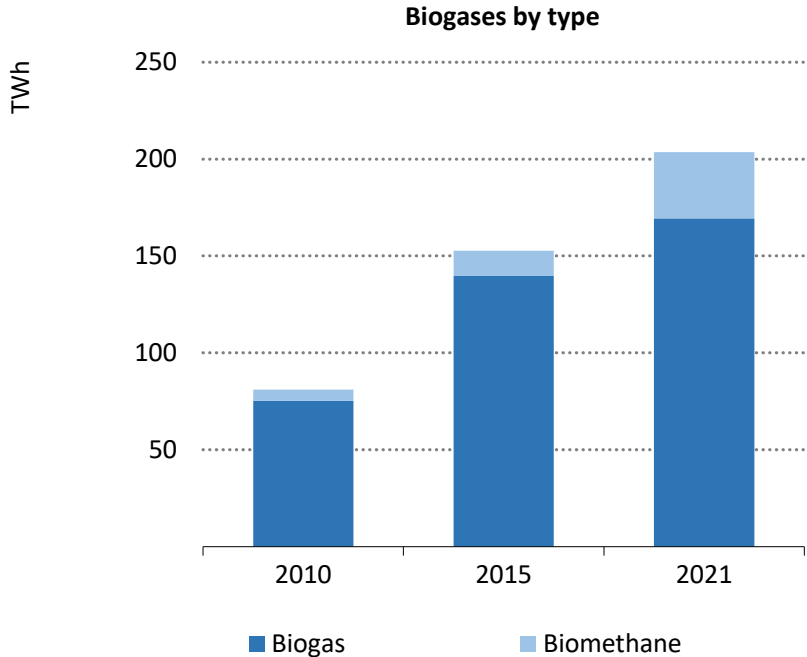


Biogas production can be deployed immediately, contributing to an acceleration of decarbonization in 2030. Biomethane grows to represent 20% share of final gaseous fuel consumption by 2050.

Biogases have seen strong growth in Europe in the past few years



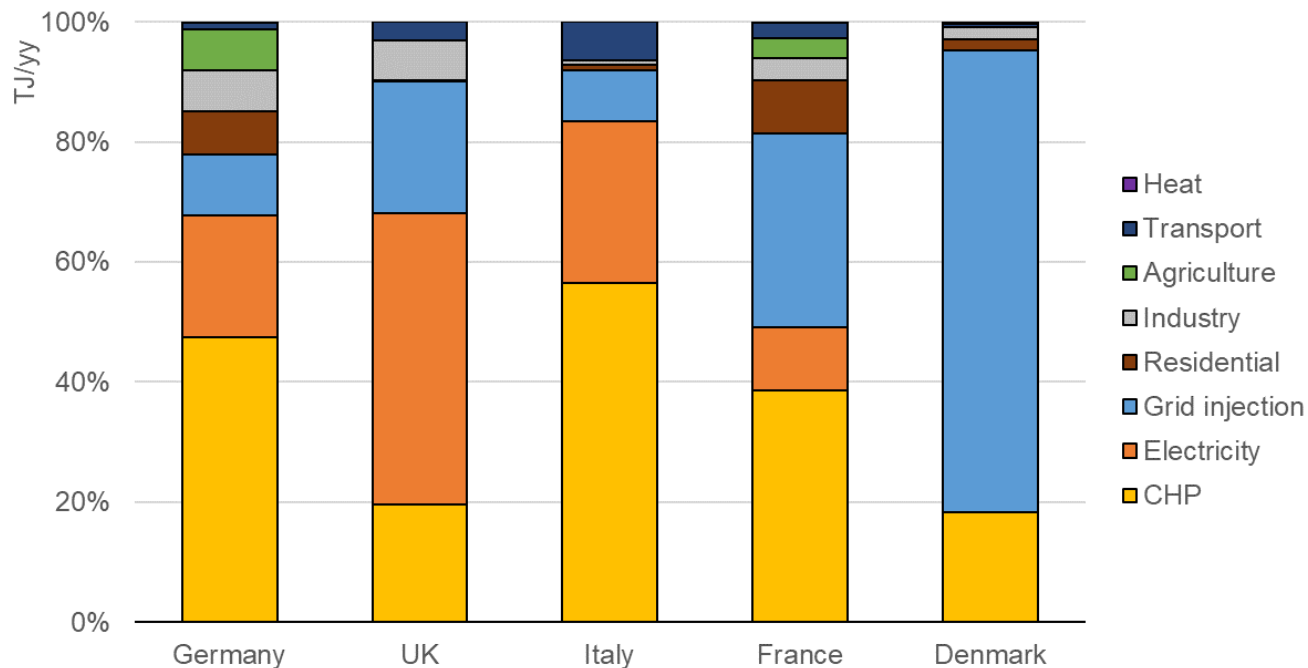
Key indicators of biogases production in the European Union



Biomethane is driving growth in total biogases in the European Union, with most of the production today coming from agricultural sources (mainly energy crops)

Markets are developing differently in Europe

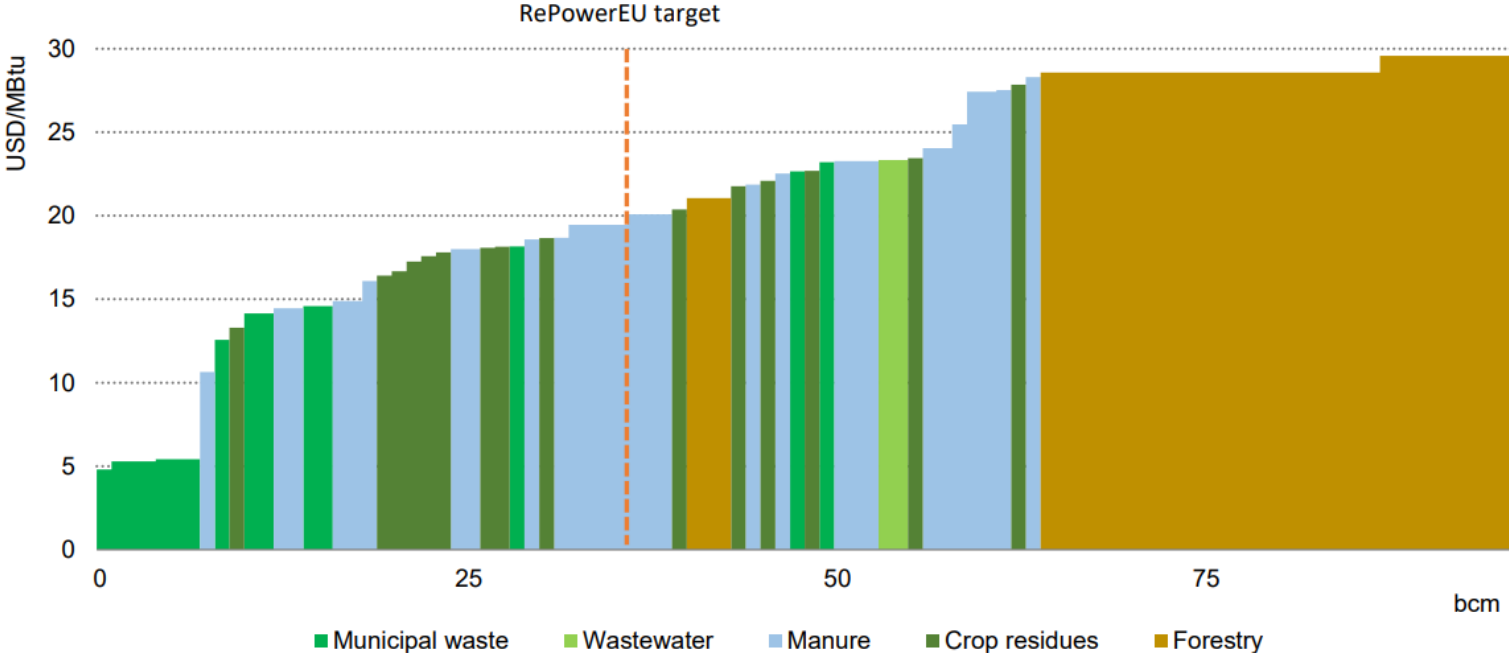
Use of biogas and biomethane by selected countries in Europe in 2022.



Use for electricity and CHP is still the largest use of biogases in the EU, but grid injection of biomethane already plays a major role in Denmark, France and the UK.

Further policy support is needed to meet RePowerEU target

Supply cost curve of biomethane potential in the European Union, 2030



Up to 35 bcm of biomethane could be produced for around USD 25/MBtu. However, this excludes grid connection fees, which in some cases may be significant.

- Reaching net-zero emissions globally by 2050 requires an unprecedented transformation of how energy is produced, transported and used.
- Low-emission fuels are critical for reaching net zero emissions. They provide flexible electricity generation, high temperature heat for industry and low-emission fuels for long-distance transport.
- The production of low-emission hydrogen could grow massively by 2030, but demand policies are lagging behind. Governments need to take bolder action to stimulate demand for low-emission hydrogen, particularly in existing hydrogen uses.
- Biogases are the low-hanging fruit of sustainable bioenergy – and bioeconomy. In the NZE scenario, biogases grow to almost 15 EJ from 1.3 EJ today. However, further incentives are needed to close the competitiveness gap with natural gas.

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