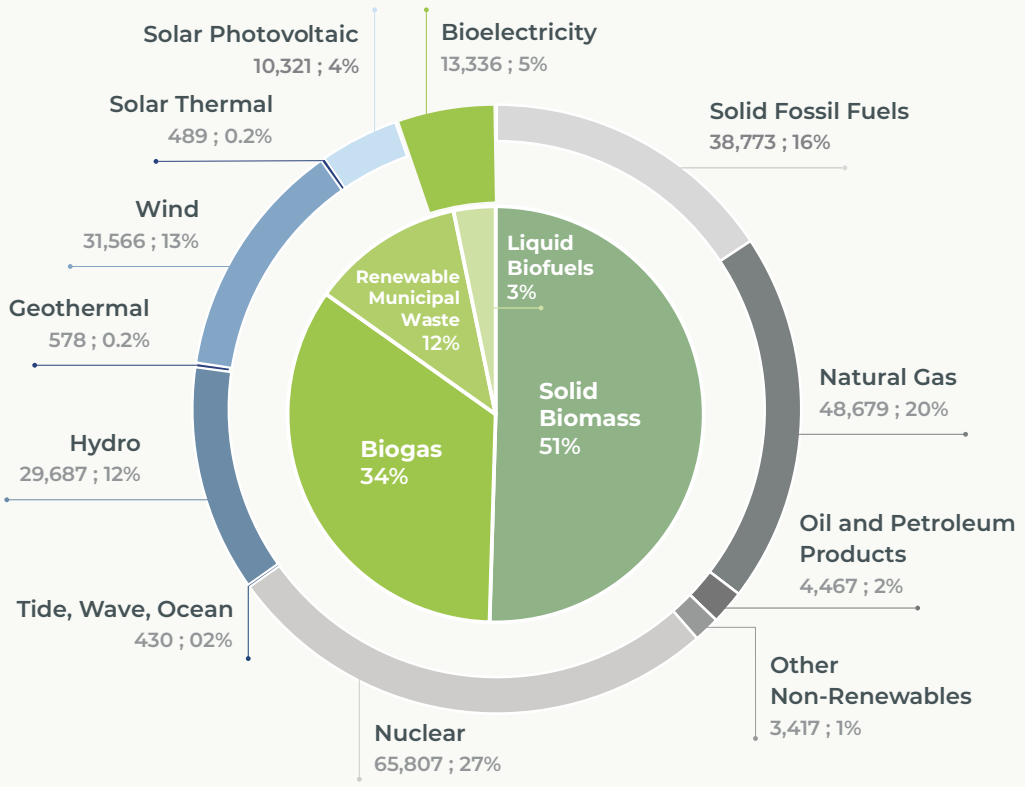
Biopower – an essential component of the 100% renewable energy mix

Reaching the target of a CO_2 reduction of at least 55% by 2030 and net-zero emissions by 2050 requires the mobilisation of the entire renewable energy sector. Two third of the electricity generation in the EU is still provided by non-renewable sources, of which 38 % is provided by carbon intensive fossil fuels. As a result, the carbon intensity of the electricity in the EU remains signifi cant, with huge variations among Member States.

The incremental increase in the share of RES which will eventually lead to a 100% renewable energy mix will be largely covered by variable sources. Bioenergy is an indispensable facilitator of this scenario by substantially contributing to decarbonisation, sector integration and stability of the electricity system.

Gross electricity generation by product type in the EU27 in 2019 (in ktoe and %)



Source: Eurostat and Bioenergy Europe's calculations

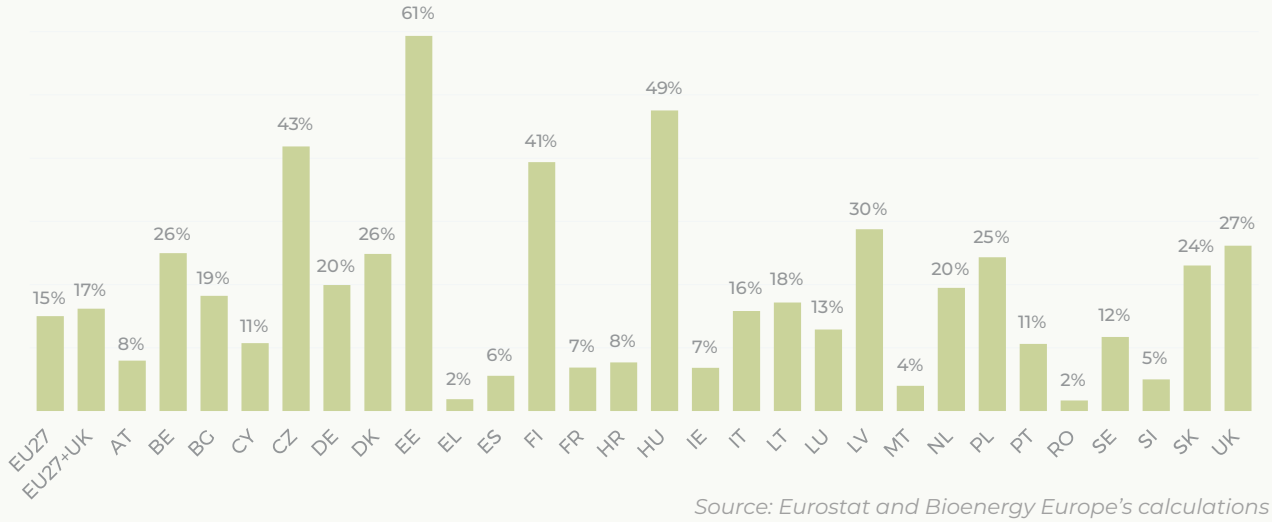
Bioelectricity is the third main source of renewable electricity after hydro and wind, producing 5,3% of the total electricity in the EU27 and 15,4% of the total renewable electricity.

Energy efficiency first

Overall, 72% of electricity generated from bioenergy is produced in combined heat and power plants (CHP), compared to only 28% from conventional thermal sources. CHP is one of the best technologies to improve energy efficiency, support the penetration of renewables, provide more flexibility and implement the vision of the sector integration.

Crucial contributor to meet the renewable energy targets

Share of bioelectricity generation out of total gross electricity generation in EU Member States and UK in 2019 (%)



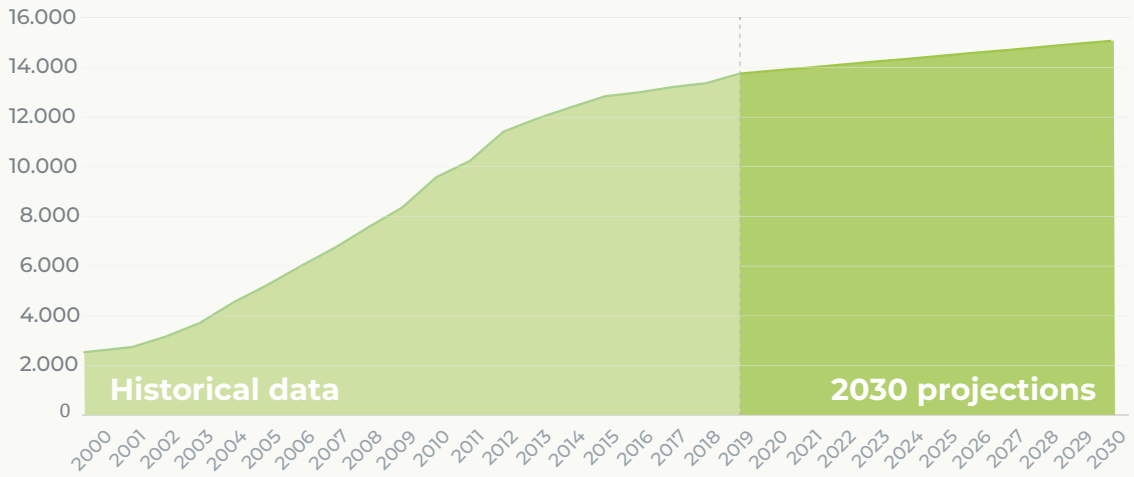
Source: Eurostat and Bioenergy Europe's calculations

The importance of bioelectricity varies among different Member States. The largest producers of bioelectricity in the EU are Germany (4.375 ktoe, 8%), Italy (1.647 ktoe, 7%) and Finland (1.110 ktoe, 19%)

Denmark and Finland vastly increased their share of renewables in the gross final consumption of electricity reaching respectively 65% and 38%, and thereby considerably decreasing the carbon footprint of electricity. Both these countries largely rely on bioelectricity – in 2019 it provided respectively 20,2% and 19,4% of total gross electricity production Such examples prove that bioelectricity is an important component of advanced energy mixes and it is compatible with ambitious climate objectives.

Bioelectricity enabling further RES penetration

EU27 projection for bioelectricity for 2030 based on the NECPs (ktoe)



Source: Eurostat, Bioenergy Europe's calculations, Projection based on the National Energy and Climate Plans (NECPs) submitted by Member States

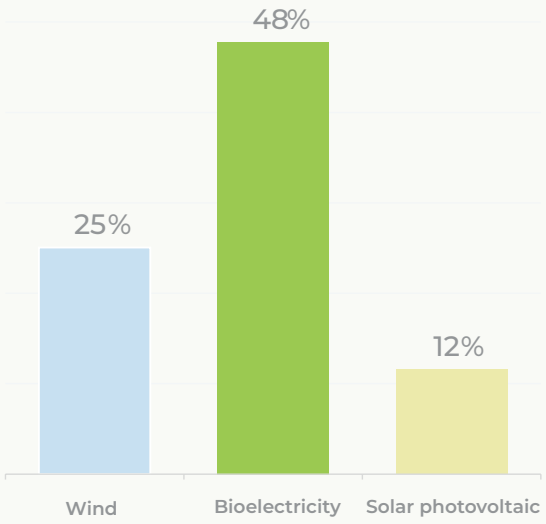
Projections show that bioelectricity should reach nearly 15 Mtoe by 2030 in the EU27. The steep rise of bioelectricity during the past decade and the steady growth during this decade clearly demonstrates that Member States are relying on bioelectricity to decarbonize their economy and for reaching their RES targets. An overall increase of around 1,5 Mtoe is foreseen in the coming decade for EU27 (+10%).

Why will bioenergy remain an important part of the EU power mix?

The load factor* of bioelectricity is nearly twice as high as the average for renewables. Indeed, bioelectricity is dispatchable and allows to adjust its production to stabilise the grid. Our power system, increasingly based on variable renewable sources, will need a dispatchable and fl exible supply of power. Bioelectricity is a readily available solution. Biomass is easily storable and can be used when the wind is not blowing, the sun is not shining or in peaks of demand. It may also deliver negative emissions by the combined use of bioelectricity facilities with Carbon Capture and Storage. Despite the ongoing decarbonisation, the EU will still emit a considerable amount of unavoidable CO_2 by 2050 – negative emission technologies are necessary to off set that amount.

**The load factor represents the percentage of the time equivalent (annual average) during which the unit is operating at its nominal* capacity

Average load factor for some of the main renewable electricity technologies in the EU27 in 2019



Source: Eurostat and Bioenergy Europe's calculations

Recommendations

1. Public investments and efficient support will be needed to facilitate the development of numerous projects. Revised Guidelines on State aid for environmental protection and energy should set an enabling legal framework to support bioelectricity investments.

2. Recognise the role of flexible renewables to stabilise the power system and secure electricity supply, allowing for a full transition to renewables in the power sector (including capacity markets).

3. The recent drop of the solid fossil fuels use was facilitated to a large extent by higher carbon pricing. This trend should continue, and the reform of the EU Emission Trading System should guarantee the increasing price of allowances.

4. Create a level playing field with variable renewables by integrating balancing and transmission costs as well as the value of dispatchability and security of supply in the price of energy, or by rewarding these services.

5. Support research and development in plant and fuel flexibility while investing in technologies and fuels demonstration projects. In this regard, negative emission technologies like BECCS require a robust regulatory framework to flourish. For this process the establishment of Removal Certification Mechanism will be crucial.