



## CEM13 Biofuture Platform Initiative

### Bioenergy Essential Facts



#### KEY FACTS AND ROLE OF SUSTAINABLE BIOENERGY IN WORLD ENERGY SCENARIOS

- **Bioenergy is the overlooked giant of renewable energy.** Modern bioenergy supplied 38 EJ of renewable energy in 2021, representing more than half of the total renewable energy supply, and **more than hydro, solar and wind combined.**
- **Modern bioenergy supply needs to increase by 2.5 times globally by 2050** to be on track with the IEA's Net Zero Emissions (NZE) scenario. In the NZE modern bioenergy supply rises to about 100 EJ by 2050 becoming the second largest source of energy supply after solar.
- **The 100 EJ of primary bioenergy use in 2050 is well below global estimates of the sustainable bioenergy potential** used in IPCC scenarios, which have a median of 200 EJ of primary bioenergy in 2050, and reach above 300 EJ in some cases.
- In the IEA NZE Scenario, **modern bioenergy supply increases by 34 EJ in this decade**, representing more than half of the overall increase needed by 2050.
- Modern **solid and gaseous bioenergy accounts for 74% of the total bioenergy supply increase** in 2020–2030.
- **The production of advanced liquid biofuels expands rapidly** in the NZE, growing from less than 1% of total biofuel supply in 2020 to almost 45% in 2030 and 90% in 2050.
- **Significant policy actions are needed to further accelerate biofuel demand.** While biofuel demand grew 5% year-on-year between 2010 and 2019, a much higher average growth of 14% y-o-y is required to be on track with the NZE by 2030.



## EXAMPLES OF SUSTAINABLE BIOENERGY PRODUCTION AND USE

- **The amount of waste used as a feedstock to produce liquid biofuels has increased significantly, driven by supportive legislation.** Waste use has nearly quadrupled over the last decade in the EU to 25% of all biofuels, while in the US waste derived fuels have nearly quintupled since 2010 to 6% of all biofuels.
- California Low Carbon Fuels Standard (LCFS) has **simultaneously incentivised both carbon intensity reductions and increased the amount of low-carbon fuels** in the transport energy mix. While energy supply from low carbon fuels has increased 1.4 times in the period 2011-2021, carbon credits have increased by 14 times. In 2021, 77% of biodiesel and renewable diesel fuel credits under the LCFS were derived from wastes or residues like used cooking oil (UCO), tallow, corn oil extracted from distiller grains and solubles (DGS), and oils from fish processing.
- Increased biofuel demand has stimulated **economic development and new job opportunities in rural communities.** About 2.4 million people were estimated to be employed in the biofuel sector in 2020, with the bulk of these jobs linked to feedstock cultivation and harvesting.
- A **WWF study in South Africa has shown that SAF production could become a pillar of its low-carbon economy** (WWF 2022). Developing this industry would create 46,500 direct jobs and 3,600 indirect jobs during operational phase. Sustainability is ensured by a combination of increasing productivity of existing sugar cane industry, crops suited to local conditions and use of degraded land with invasive alien plants. Feedstock production would additionally provide employment to 20,000 farm workers and possibly even bigger numbers for harvesters.
- **Sustainable Aviation Fuels are ready to take off over the next five years.** The IEA expects SAF demand to grow at least 10 times over the next five years with an upper bound at 40 times, up from 0.1 billion litres today. That would correspond to 1%-4% of total global jet kerosene consumption.
- Waste-based biogas production could provide **approximately 10% of European gas consumption** by 2030, according to a study conducted on behalf of the European Commission.
- **Solid biomass contributes to large GHG savings in the heat sector.** For example, solid biomass and biogenic residues currently supply almost half of all district heat in Finland and more than two thirds in Sweden.
- **Biofuel production is a low-hanging fruit for carbon dioxide removals.** The biggest "negative emissions" plant in the world is a bioethanol plant in the US, currently capturing and storing underground 1 million tonnes of CO<sub>2</sub> per year.
- **Investment in liquid biofuels and biogases nearly doubled to USD 15 billion from 2020 to 2021**, and are set to grow to USD 17 billion in 2022. However, investments still need to double to be on track with the NZE by 2030.
- **The ethanol industry produces significant amount of non-energy co-products** like dry distillers grains and solubles (DDGS), and distillers corn oil (DCO) with a market value in 2021 of USD 9.4 billion in the US alone. One tonne of DDGS is estimated to displace approximately one tonne of supposedly produced animal feed.