

BIOENERGY CARBON CAPTURE AND STORAGE

A key enabler of carbon neutrality by 2050

The EU bioenergy sector is at the edge of technological innovations providing unique and sizeable solutions at a time of climate emergency. Drastic reduction of emissions is required, but it is not enough – there is an increasing need to capture carbon back from the atmosphere. Bioenergy Carbon Capture and Storage (BECCS) can achieve negative emissions by storing the CO₂ resulting from the combustion of sustainable biomass. In order to move from a demonstration to a commercial phase and roll out this technology, BECCS and other negative-emission-technologies need a clear regulatory framework at the EU level and solid financial support. Without financial incentives, the commercial application of these technologies cannot advance.

Bioenergy Europe welcomes the carbon neutrality target by 2050 as endorsed by the European Council on 12 December 2019. Yet, the achievement of such an ambitious goal in 30 years requires unparalleled political and financial mobilization. Despite the large effort and increasing investments in renewables, the gap between emission reductions needed for the containment of temperature rise to 1.5°C, and actual reductions remains an unresolved challenge, both within the EU and globally.

It is therefore necessary to scale up innovations helping to deliver substantial GHG reductions. Against this background, Bioenergy Europe underlines the importance of BECCS as an innovative technology with several pilot projects in place¹. The rationale of this technology is that by binding atmospheric carbon during the growth of biomass and subsequently capturing CO₂ from the biomass conversion process for permanent storage in geological formations, carbon is extracted from the carbon cycle, while at the same time avoiding fossil energy use (and associated CO₂ emissions).

The impact assessment of the 2050 climate strategy (November 2018) demonstrates that

to achieve the EU's carbon neutrality objective, negative emissions are indispensable. The EU cannot achieve the “well below 2°C” climate target without resorting to negative emissions as they help to offset unavoidable emissions like N₂O from the land biosphere. Moreover, on a global scale, BECCS has a climate stabilization role as it extends the global carbon budget.

Another feasible possibility to achieve negative emissions is afforestation leading to an increase of carbon stocks in forests. This option is achievable and must be taken into account. It has to be pointed out, that, in contrary to BECCS, it is not necessarily reliable in the long term as, forests are subject to disturbances (wildfires, insects, storms etc.). In order to deliver the most ambitious scenarios of the EU's strategic vision for 2050 “Clean Planet for all”, both alternatives need to be deployed: capturing carbon through technology is necessary for the EU's 2050 target in addition to carbon sinks in the LULUCF sector. The Intergovernmental Panel on Climate Change's (IPCC) findings are consistent with this assumption: within 116 scenarios of global warming limited to 1.5°C, IPCC included negative emission technologies in 101 scenarios.²

¹ In February 2019, a BECCS pilot was installed at the DRAX demonstration plant near Selby in North Yorkshire. In December 2019, the first BECCS on CHP was inaugurated near Stockholm in Sweden. In Norway, the Oslo Varme waste-to-energy plant (including also bio- component) is in the phase of advanced planning of a CCS installation. On the 4th list of EU Projects of Common Interest (PCI) there are several cross-border carbon dioxide network projects namely: CO2-Sapling Project, CO2 TransPorts, Northern Lights. Athos Project, Ervia Cork.

² IPCC, 2018: Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [V. Masson-Delmotte, P. Zhai, H. O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, T. Waterfield (eds.)]. In Press. (<https://www.ipcc.ch/sr15/>)

The vital interest of the EU is to release the full potential of BECCS. This technology facilitates deep decarbonization of the EU's economy, while at the same time opening the opportunity for green growth. Bioenergy is to date the largest renewable energy source in terms of direct and indirect employment, providing 703.200 jobs. The application of BECCS has the potential to further increase these numbers and provide additional benefits for local communities. BECCS could also facilitate the transition towards carbon neutral economy of coal dependent regions at the same time diversifying their economies.

Sustainable bioenergy

Bioenergy sourced in accordance with sustainability criteria set by the Renewable Energy Directive is a solution to decarbonize the EU's economy. It is a matter of urgency to phase out fossil fuels and replacing them with renewable energy sources such as bioenergy. BECCS provides both clean stable source of energy and long-term storage of CO₂ facilitating decarbonization across the energy sector and energy-intensive industry (both new and existing installations) for which decarbonization solutions are not so manifold.

The need for the EU CCS / BECCS strategy

The European Green Deal provides a window of opportunity for the development of innovative technologies. The initiatives triggered by the Communication should include the full acknowledgment of the role of BECCS as well as other negative emissions solutions such as biochar and set measures for their swift deployment. Clear definitions are needed as to what is considered as BECCS and what is considered as BECCU (Bioenergy Carbon Capture and Utilization). It is necessary to clearly define rules for permanence of the carbon storage in products. Credibility of BECCS will depend on the strong legislative framework which will guarantee its sustainability and minimize possibility of any negative externalities. It should support also its roll out - the key element should be the system of rewarding negative emissions.

Rewarding negative emissions

Bioenergy Europe encourages the European Commission (EC) to develop a mechanism rewarding the achievement of negative emissions by 2023 as outlined in its communication "A new

Circular Economy Action Plan For a cleaner and more competitive Europe" (COM(2020) 98 final). We also encourage the Commission to integrate and communicate the objectives and scope of this forthcoming work already in its climate policy related legislative proposals during 2020-2021.

The mechanism should provide economic incentives for the application of such technologies as well as introduce a monitoring, reporting, and verification system crucial for the transparent quantification of achieved abatements and their monetization. It should promote EU's progress towards circular, sustainable and resource-efficient economy and encourage cost-effective projects entailing high energy efficiency and high carbon capture rates. We call EC to assess different viable policy options to implements such mechanism, whether in the frame of the EU ETS or as a parallel system.

The EU may set an example followed by other major economies. In such case, the EU's regulatory framework would become a global standard encouraging the development of negative emission technologies. World leading bioenergy technology developers and providers already come from Europe, and BECCS would fit well into their portfolios. The EU has an opportunity to become a leader in this field both in delivering negative emissions as well as the technology and take a privileged position in the emerging sector vis-à-vis other major global players.

The need for the EU funding

EU research support tools like Horizon Europe and SET-Plan should increase support for R&D on negative emission technologies, including BECCS. Similarly, the Connecting Europe Facility should prioritize investments in CO₂ transport and storage infrastructure.

Bioenergy Europe (formerly known as AEBIOM) is the voice of European bioenergy. It aims to develop a sustainable bioenergy market based on fair business conditions. Founded in 1990, Bioenergy Europe is a non-profit, Brussels-based international organisation bringing together more than 40 associations and 90 companies, as well as academia and research institutes from across Europe.