



Technology Collaboration Programme  
by IEA

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## Newsletter IEA Bioenergy Task 37: 01/2024 Reports

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### **IEA: How bioenergy contributes to a sustainable future**

This report of IEA Bioenergy presents an evidence-based assessment of the status of bioenergy around the world. The assessment is based on work conducted by some 200 experts, active within the Tasks of the Bioenergy Technology Collaboration Programme (TCP) of the IEA. The report's goal is to reinvigorate awareness and interest in bioenergy, address concerns that arise in the public debate, and demonstrate the synergies between bioenergy and other renewables. The report also seeks to point out opportunities that can be seized by IEA Bioenergy member countries and also by countries outside the IEA Bioenergy membership. The information provided here is complemented by information from other multilateral initiatives such as IRENA, FAO and the Global Bioenergy Partnership (GBEP). The report is divided into two parts: Part A "Strategic View on Biomass and Bioenergy" deals with bioenergy and its contribution to a sustainable future. Part B "Technologies for Sustainable Bioenergy" describes the status and perspectives of different bioenergy technologies.

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### **Perspectives on biomethane as a transport fuel within a circular economy**

Some of the literature pretends that the life cycle costs of biomethane fueled light vehicles may be 15 to 20% higher than for similar petrol and diesel fueled vehicles, while liquid biomethane

fueled heavy duty trucks may have similar life cycle costs to diesel. However, such an analysis can be two dimensional and limited in the message it conveys. Biomethane production is part of a larger circular economy, energy, and environmental system. An advantage of biogas is that it can be produced from most wet organic wastes or by-products, including food waste, animal by-products, (such as manure), agricultural residues, sewage sludge, industrial biowaste (such as from slaughterhouses and food and beverage processing industries). Biogas production is an element in the environmental management of such wastes; biogas plants can also deliver digestate, which contains most of the nutrients in the feedstock and can be an excellent biofertilizer. In addition, it is possible to utilize the carbon dioxide removed in upgrading biogas to biomethane as a product with added value. Due to the multifunctionality of biomethane solutions, broad assessment methods are needed to grasp the wide spectrum of relevant factors when comparing different technologies. The report of IEA Bioenergy Task 37 discusses them all.

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### **How Wasted Food Turns into Huge Amounts of Greenhouse Gas**

Around a third of human-generated greenhouse gas emissions comes from the global food system, and lost or wasted food. By following specific foods through their entire life cycle, researchers have determined just how much this wasted food adds to emissions through phases such as harvest, transportation and disposal. For a study in Nature Food, Xunchang Fei of Singapore's Nanyang Technological University and his colleagues used 164 countries' food supply data from 2001 to 2017 to estimate emissions across 54 food commodities and four categories: cereals and pulses; meat and animal products; vegetables and fruits; and root and oil crops. The team found this food was responsible for greenhouse gases equivalent to 9.3 billion metric tons of carbon dioxide—about half the global food system's total emissions—in 2017. Four countries (China, the U.S., India and Brazil) contributed 44.3 percent, mainly owing to their dietary habits and large populations. Of the four food categories, meat and animal products were the source of almost three quarters of emissions that occurred during the supply-chain phase for food that was ultimately lost.

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### **Green hydrogen and biogas preferred options to replace natural gas**

Europe has responded to the reductions in Russian pipeline gas flows with a significant increase in LNG regasification capacity. But these interventions have not been sufficient to close the uncontracted gap. There remains substantial uncertainty as to how the European gas market will develop. In a recent survey, Mc Kinsey interviewed more than 70 European gas buyers. More than 57% of buyers expect to reduce their gas usage over the next few years by 10% or more. It is expected that demand reduction will be driven largely by increased energy efficiency, followed by fuel switching. Green hydrogen and biogas (or biomethane) were cited as the most popular choices to replace gas. They were named by 60% of respondents, driven largely by light and heavy industry buyers. However, fewer than 20% expect green hydrogen to be available at affordable prices and sufficient volumes in the next three years.

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### **The role of sustainable biohydrogen**

The European Biogas Association (EBA), in collaboration with biogas experts, has been launching a white paper on the sustainability, affordability and accessibility of biohydrogen to support its production and use in Europe. Alongside biogas and biomethane, biohydrogen will be key to fully reach the energy needs of various sectors and support Europe's climate mitigation strategies. Insights are provided as to the place of biohydrogen within the choice of hydrogen production, categorized by colors according to the feedstocks, power source and techniques used. From green to black there are currently 10 ways to produce hydrogen. Biohydrogen (green H<sub>2</sub>) refers to

hydrogen production from biogenic sources. Dark fermentation, photo fermentation and biophotolysis are examples of a biological process. Thermochemical processes include gasification and steam reforming of biogas or pyrolysis.

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### **New record for biomethane production in Europe**

The EBA/GIE Biomethane Map 2022-2023 shows nearly 30% more biomethane plants compared to the 2021's edition reaching a total of 1,322 biomethane-producing facilities by April 2023.

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### **Biomethane Fuel Offers Negative Carbon Footprint**

Although the EU Commission wants to abolish the internal combustion engine in individual transport through eMobility, biofuels are far from dead, according to a new study. German scientists at the University of Hohenheim have reported that fuels made from agricultural residues can even have a negative CO2 impact on bus and truck journeys. According to the study, biomethane offers a promising and cost-effective alternative to e-mobility, especially in heavy goods transport or for construction and agricultural machinery. "Here, the increased use of biomethane as bio-CNG or bio-LNG (liquefied biomethane) can be an important factor and can lead to a significant reduction in CO2 emissions", says study leader Andreas Lemmer from the State Institute for Agricultural Engineering and Bioenergy.

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### **Map of biomethane injection points in France**

France is among the leaders of biomethane injection in Europe with currently 619 sites and a capacity of approx. 11 TWh or 1bcm of biomethane. The organization "gaz-mobilité" has made an interactive map available on the internet where the injection points can be sorted by region, size, grid operator and type of installation (agriculture, WWTP, etc.). A list of the plants completes the information and a counter of the total number and installed capacity. Based on the same data, Open Data Reseaux Energies has made additional graphs on capacities, new connections, regional development of upgrading plants, etc.

[More \(in French\)](#)

### **EU publishes biomethane country fiches for all Member States**

In September, the European Commission has published the biomethane country fiches for each Member State within the framework of the Biomethane Industrial Partnership, Biomethane country fiches aim at assessing the current level of biogas and biomethane production with sustainable biomethane potential compared to the share of their 2021 natural gas imports. In addition to that, the fiches contain specific key messages for each Member States. The three-page country fiches are published to encourage and support further cooperation between Member States and/or industry stakeholders, also in the light of the ongoing process to update the National Energy and Climate Plans. Next to facts they also contain graphs.

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### **Biomethane Purchase Agreement (BPA): a guide to understanding everything**

OSIRIS and GRTgaz have just published a comprehensive guide to the Biomethane Purchase Agreement (BPA) mechanism. PPAs (Power Purchase Agreements) are widely used in the electricity sector, and are also set to develop in the biogas sector. Different from the traditional guarantees of origin mechanism, PPAs are over-the-counter contracts enabling a company to purchase all or part of the output of a renewable energy producer, in this case a biogas plant. The ten-page document explains the basics of biomethane, before focusing on the different forms of GAP and how they can be used. In their joint document, GRTgaz and OSIRIS list a series

of more or less significant obstacles to the development of GAP, including a lack of standard contracts, unfamiliarity with the system and the complexity of the rules. On certain points, the two organizations call on the government to intervene to facilitate deployment

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### **Economic efficiency calculator for existing biogas plants**

Can I continue to operate my biogas plant economically after the subsidy ends? As part of the ProBiogas project, the German Kuratorium für Technik und Bauwesen in der Landwirtschaft (KTBL) has developed a "Post-subsidy calculator" for biogas plant operators. Operators can use the free and continuously updated tool to calculate whether their existing plant can continue to be operated economically after the end of the 20-year subsidy period in accordance with the German Renewable Energy Sources Act (EEG). Together with the University of Hohenheim and the Lower Saxony Chamber of Agriculture, the KTBL had carried out extensive calculations in ProBiogas using modeled and practical plants for various post-EEG strategies, albeit in 2021 - before the energy crisis. Today, different data would be used. For example, biogas operators can achieve higher heat supply prices today, but these must be offset against increased costs for heating networks and components such as combined heat and power plants. The data stored in the KTBL's post-EEG calculator is continuously updated. The calculator can be downloaded for free.

[More](#) (in German)

### **GBA published 2<sup>nd</sup> edition 2023 of the Biogas Journal in English**

The German Biogas Association (GBA) published the second edition of the Biogas Journal in English. It includes a few highly interesting practical applications like the tempting but challenging digestion of horse manure, or the production of natural fiber-reinforced plastics. The focus is on two country reports of Japan and Serbia.

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### **Irish biomethane could replace a quarter of natural gas on the nation's network**

Ireland has the potential for a biomethane industry, which would replace more than a quarter of natural gas on the network, create significant new Agri-income streams and reduce Ireland's total emissions by almost 4 million tons per year – 6.5% of Ireland's total emissions. These are the main findings from the Biomethane Energy Report, which was launched by Gas Networks Ireland, the operator of Ireland's state-owned gas network. The report is based on findings from responses to a market testing Request for Information (RFI) issued by Gas Networks Ireland to current and future biomethane producers in October 2022. The report identifies 176 projects throughout Ireland that have the overall potential to produce 14.8 terawatt-hours (TWh) of biomethane per annum, amounting to 26% of Ireland's current gas demand. Ireland's biomethane potential as outlined in this report, both in terms of potential project numbers (176) and in terms of volume of biomethane production (14.8 TWh) demonstrate how achievable the Government's target to produce up to 5.7 TWh of biomethane by 2030 is.

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### **Stagnation instead of expansion in the German biogas sector**

Despite its great importance for the success of the energy transition, the expansion of biogas has stagnated. The installed electrical capacity increased by just 49 megawatts in 2022 compared to 2021. The forecast for 2023 now even shows a decline in new plants and newly installed capacity. Around one and a half years after the start of the war in the Ukraine and the resulting gas crisis, the players in the biogas industry are wondering why there is still not much more focus on the use of domestic renewable (bio-)gas sources. Instead of expansion, stagnation prevails. Around 107 new biogas plants were built in 2022 compared to around 30 closures. The total number of biogas plants is thus 9,876 with an installed electrical capacity of 5,895 megawatts (MW). The resulting

electricity production rose marginally to 33.54 terawatt hours (TWh). Also, in the feed-in of biogas upgraded to biomethane little has happened: only four plants were connected to the grid in 2022. At the end of 2022, a total of 242 upgrading plants fed a good one billion cubic meters of biomethane into the natural gas grid.

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### **EU bioenergy sustainability report**

Bioenergy produced from agricultural, forestry and organic waste feedstock continues to be the main source of renewable energy in the EU, accounting for about 59% of renewable energy consumption in 2021. For bioenergy, primary solid biofuels represent the largest share at 70.3 %. Liquid biofuels account for 12.9%, biogas/ bio-methane for 10.1% and renewable share of municipal waste for 6.6%. Twenty-six EU Member States have reported their data on biomass supply. Woody biomass is the main feedstock reported for solid biomass production, accounting for 66% of the total and followed by biomass from organic waste (26%) and agricultural biomass (8%). Germany records a significant production of organic waste biomass (137,675 thousand m3). It also records production of the largest share of forest biomass (66,658 thousand m3) in the EU, followed by Sweden (65,102 thousand m3). Spain records the highest volumes of agricultural biomass (20,844 thousand m3).

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### **EBA Statistical Report 2023 is released**

Biomethane production in Europe grew by almost 20% in 2022 compared to the previous year, according to data from the new edition of the EBA Statistical Report. Europe's biogases production (combined biogas and biomethane) in 2022 amounted to 21 bcm. This is more than Poland's entire inland natural gas demand and represents 6% of the EU's natural gas consumption in 2022. Biomethane production alone grew from 3.5 bcm in 2021 to 4.2 bcm in 2022. In the case of Denmark, the share of biomethane in the gas grid was close to 40%.

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