



Technology Collaboration Programme
by IEA

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IEA Bioenergy Annual Report 2022

The IEA Bioenergy Annual Report features a report from the Executive Committee and a detailed progress report on each Task. The document also comprises key information such as Task participation, Contracting Parties, budget tables and lists of reports and papers produced by the Technology Collaboration Programme. The Annual Report includes also the summary of a special feature article '*Material and Energy Valorization of Waste as Part of a Circular Model*' prepared by Task 36

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Task 37: The role of biogas and biomethane in pathways to net zero

Task 37 on Biogas has recently published a position paper on pathways to net zero. Biogas from AD can be used locally for heat purposes or for power and heat production (CHP); as an alternative, biogas can be upgraded to bio-methane to replace natural gas. As such, it is one of the means to reduce the consumption of fossil fuels and contribute to the transition towards a net zero energy system. The position paper – developed by members of IEA Bioenergy Task 37 – provides central knowledge and features of biogas and biomethane. The main conclusion is that biogas and biomethane have plenty of options to be used in a pathway to net zero. They provide sustainable flexible systems that play essential roles in circular economy, energy, and environmental systems. The pathway to net zero requires far more than provision of renewable electricity. We must

employ renewable hydrocarbons in the form of liquid and gaseous fuels with minimum carbon intensity. Indeed, production must go beyond energy and employ renewable green hydrogen in the production of chemicals such as ammonia (NH₃) and methanol (CH₃OH), and for steel. We need renewable gases and renewable hydrocarbons for dispatchable electricity, for long term energy storage and for sectors where electricity has limited applications. These applications (termed the hard to abate sectors) include: heavy-duty, long-distance transport (trucks, ships and planes); high temperature industrial heat (food and beverage sector, steel production, glass production); agriculture (renewable fertilizer such as green ammonia and biofertilizer); and chemical production (such as methanol).

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BCBN: 2022 Year in Review

British Columbia Bioenergy Network (BCBN) has published its 2022 Year in Review, reflecting on contributions and highlighting accomplishments in the BC bioenergy sector. It includes highlights of interesting events, political decisions, business cases and reports with the links to download the corresponding publications. It is a comprehensive overview on all biomass activities in British Columbia.

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Biogas is currently the most important source of RES electricity in Germany

In Germany, the share of renewable energy in electricity consumption is set to rise to 80 percent by 2030. At the same time, nuclear and coal are being phased out. When the sun is not shining and the wind is not blowing, biomass becomes the main renewable source of electricity. For example, on November 29, 2022, biomass power generation was 116 GWh, higher than wind (103 GWh) and PV (15 GWh). Flexibly operated biogas plants, known as storage power plants, account for a significant share of residual load coverage in Germany and already reliably generate electricity according to demand. Biogas plants accounted for a significant share of renewable electricity generation in 2021 at just under 13%. The approximately 9,000 plants in Germany have an installed capacity of 6.4 GW, with which they generated 31.3 TWh.

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The Digest's 2023 Multi-Slide Guide to the State of Biogas and RNG in the USA

RNG and its companion product biogas have taken the project and sustainable power sectors by storm - there's project action, fast-developing technology, M&A activity, and policy advances of the first magnitude, in the United States and all around the developed world, What's up, who's in the lead, and how and where and why? The Digest presents a set of slides giving an excellent overview on the biogas development in the USA.

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Bio-LNG for a sustainable Europe

According to the European Environment Agency, transport is responsible for 27 percent of total greenhouse gas emissions in Europe and thus has a significant impact on climate change. The European Commission recently set a target to increase the share of renewable energy in transport to at least 14 percent by 2030, including a minimum 3.5 percent share of advanced biofuels. Goedhart from the Hanze University in the Netherlands shows in his recently published thesis that Bio-LNG is the most readily available solution for decarbonizing transport in Europe, especially for heavy-duty vehicles and shipping. Liquefied biogas (Bio-LNG) could reduce greenhouse gas emissions in the transport sector in Europe by 95 to 174 percent by 2050, depending on the

scenario. His research further shows that bio-LNG production could be between 46 and 405 TWh by 2050. This could give bio-LNG a market share of at least 57 percent in heavy-duty vehicles and 17 percent in the maritime sector.

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ProCycla MT: CSTR Module

The CSTR Module, one of ProCycla's online modeling tools, allows the user to simulate the performance of a continuously stirred tank reactor (CSTR). By providing input parameters related to the reactor and substrate's properties, their free software provides a visual representation of the main variables related to biogas and the digestate composition. The virtual representation of the digester is based on the ADM1 model (Anaerobic Digestion Model No.1).

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The French renewable gas industry needs a new strategy

For several years, the SER (Renewable Energy Union) and the gas network managers have delivered an annual "renewable gas panorama". The new and eighth edition fits on 36 pages. On the occasion of the publication of the "Renewable Gas Panorama 2022", SER and the gas network operators warn of a major risk of slowing down new production projects, particularly in the field of methanization. That's why they call on the public authorities to implement "strong and immediate measures" that will allow investors to ensure a solid trajectory in a difficult and disrupted economic context. In 2022, 150 new methanization sites with injection were commissioned in France for the second year in a row. There are now more than 500 of them, with a combined annual capacity of 9 TWh. As a reminder, the target to be reached in 2023 was 6 TWh. The quantities actually injected into the gas networks amounted to 7 TWh at the end of 2022 (the same level as the United Kingdom, but behind Germany and its 12.8 TWh), compared to 4.3 TWh the previous year. This represents an increase of over 60% in one year. RNG covers 1.6% of natural gas consumption in France. At the end of 2022, 1,705 installations were producing and valorizing renewable gas, of which 514 (30%) were injecting biomethane. However, the largest number of units (994, 58%) are designed to produce electricity and heat. The remaining 197 sites (11.5%) focused on heat production. At the end of November 2022 there were 12,471 light vehicles and 8,856 heavy duty vehicles (+25%) running on CNG/RNG in France. Among the latter: 7,401 buses and coaches (+30%), and 4,193 refuse collection vehicles (15% of the fleet). Nearly 50% of the buses sold in France are models designed to run on natural gas.

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2022 NGVAmerica Annual Report ready for download

NGVAmerica has released its 2022 Annual Report, available for download on ngvamerica.org. The report highlights the national trade organization's 2022 legislative successes, including the multi-year extension of the \$0.50/gallon Alternative Fuel Tax Credit, the introduction of bipartisan and bicameral legislation to create a similar new \$1.00/gallon RNG credit, and the expansion of Clean Fuels Standard program conversations in state capitols across the nation. Federal and state regulatory programs improved through NGVAmerica advocacy efforts are discussed as well as summaries on association outreach to fleets and NGV industry promotion and education activities. Details on NGVAmerica's Technology and Development Committee work to advance gaseous fuels technology development, codes and standards, best practices and other industry safety are also listed.

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[A Methane Target for Midstream Gas Industry](#)

The objective of a new study published by MARCOGAZ was to estimate the figures that could be considered as references for the European gas industry, in order to have a reduction target for methane emissions. The information used for this report was gathered through the answers to a questionnaire from 30 midstream companies from 17 different European countries. In the first part of the analysis, companies reported their methane emissions data for the years 2015 and 2020. In the second part of the analysis, companies provided their best available methane emissions estimations for 2025 and 2030. The comparison between both figures (2015 vs 2020) shows the huge effort that the industry has done in order to reduce Methane Emissions during the last years: 73% of the companies have reduced their emissions during the 5-year period. The average methane emission reduction that each company has achieved was 36% that reduced the total methane emissions of these companies by 36,000 tons.

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[Beyond energy – monetizing biomethane’s whole-system benefits](#)

A new report from the European Biogas Association shows that anaerobic digestion could deliver an additional benefit of 84-175 €/MWh of biomethane produced, while thermal gasification could deliver an additional 80-162 €/MWh. These benefits outweigh the current cost of producing biomethane through these technologies (55-100 €/MWh and 85-110 €/MWh for anaerobic digestion and thermal gasification respectively). Currently, producers of biomethane are primarily rewarded for contributing to renewable energy targets via support or market-based mechanisms. The additional positive externalities that biomethane production delivers are not currently fully rewarded or recognised by society at large. The study, undertaken by Guidehouse, has quantified the value of these benefits for a selection of sustainable feedstocks relevant for anaerobic digestion and thermal gasification biomethane production technologies. The reduction of greenhouse gas (GHG) emissions, such as the recovery of biogenic CO₂ during the production process, is a key value driver. Energy security, job creation and waste processing are also playing an increasingly significant role over the next few decades.

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[Biomass production, supply, uses and flows in the European Union](#)

Biomass is very much center stage in the European Green Deal. Forests, the seas, freshwater and agricultural systems, are expected to simultaneously mitigate climate change, house biodiversity and generate goods. As a result, the biomass produced from these sources is being re-engineered, and new uses for biomass are being invented to offset emissions. Meanwhile, the societal challenges we are all facing are being addressed at a global level and the EU’s pledges to international commitments are resulting in a series of overarching EU-level strategies. The European Union (EU) uses biomass to meet its needs for food and feed, energy, and materials. Understanding biomass supply, demand, costs, and their associated impacts is particularly important for relevant EU policy areas, to facilitate solid and evidence-based policymaking. The role of the European Commission’s Joint Research Centre (JRC) is to provide EU policies with independent, evidence-based, scientific and technical support throughout the whole policy cycle, thereby contributing to coherent policies. To provide a sound scientific basis for well-prepared EC policy making, the JRC was requested by Commission services to periodically provide data, processed information, models, and analysis on EU and global biomass supply and demand and its sustainability.

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The state of renewable energies in Europe

The EurObserv'ER project has released its 21st edition of the annual report. In 2021, renewable energies covered 21.8% of gross final energy consumption in the EU-27. The target set in the 2008 climate and energy package has thus been exceeded and we can only welcome this at a time when it is fashionable to cast doubt on the benefits of European integration. When compared with 2020, 2021 was a bad year for EU renewable electricity output, largely because of the wind deficit that hit the main production areas in North-western Europe. European renewable electricity output in 2021 was 1 085 TWh, which equates to a growth of 1.7%. The figure is only 18.5 TWh higher than in 2020, compared to the 81.8 TWh measured between 2019 and 2020. The good news is that 97% of all new electricity capacity installed in 2021 came from renewable sources (37.4 GW out of a total of 38.6 GW). Photovoltaic is the most representative sector with 25.7 MW installed, i.e. 67% of additional electrical capacity in 2021. Biomass covered 1% of the additional electricity production. The share of renewable heating and cooling in the building stock has grown strongly in recent years. Biomass plays a significant role in several eastern European countries.

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