Newsletter IEA Bioenergy Task 37: 11/2022

Reports and Overviews

Topics:

Task 37 has published two new country reports on Germany and France

Despite the fact that the support of biogas plants has been drastically reduced in **Germany** (EEG 2014) with lower FiT, reduced allowed amount of maize and auctions, Germany is still the leader in numbers of biogas plants and biomethane plants. There are about 8700 biogas plants with a total installed capacity of 5848 MW, producing 28.8TWh/a of electricity. In addition, 232 upgrading plants produce biomethane with a total installed capacity of 621MW. There is the expectation that with the new support system (EEG 2021) the capacity will be increased again. EEG 2021 includes an increased auction volume of 600MW/a for electricity and 150MW/a for biomethane; an increased max. bidding value of 18.4cts/kWhel for existing plants respectively 16.4cts/kWhel for new plants. Also, the flexibility rate of CHP's will be increased. Thanks to high subsidies biogas production has been booming in **France** over the last years. Actually, there are 1308 biogas plants in operation producing 1.5TWhel/a and inject 4.5TWh/a into the gas grid. The focus is clearly on biomethane with about 400 installations in operation. The peak of planned upgrading plants was reached in 2019 with more than 8000 GWh/a. With a new and reduced tariff, the number of planned installations dropped to 5000GWh/a. In total there are 1149 plants under planification with a design capacity of 25.4GWh/a.
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Gasification for production of bio methanol by coupling with anaerobic digestion

Integration between gasification and anaerobic digestion to methanol production
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case stories on combinations of anaerobic digestion of OFMSW and subsequent gasification of the digestate. With a look at the future, the two main streams produced from anaerobic digestion plants (i.e. biogas and digestate) might be used for the production of chemicals and fuels, and gasification may play a role for this further transition towards a low-carbon economy. In particular, the report mainly addressed the production of methanol. In case study 1 where gasification is based on a process of steam/oxygen biomass gasification, the utilization of both oxygen and steam allows to obtain a quasi-autothermal process. In case study 2 where gasification is based on gasification of the anaerobic digestate from the AD plant, the N2 present in the producer gas due to the use of air as a gasifying agent was not removed until the stage of methanol recovery. According to the summary data from the assessment carried out in the two proposed case studies, methanol production appears promising from both a mass/energy balance and environmental point of view. In fact, they can help in exploiting residual feedstocks, which otherwise would be waste requiring to be treated/disposed-off, converting them in a high-value chemical while having a low environmental impact.
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MARCOGAZ: Biomethane acceptance in underground storage facilities

MARCOGAZ has recently prepared a report on the acceptance of biomethane in underground storage facilities (UGS) with a particular focus on aquifers. In the report, the conclusions drawn highlight the significance of oxygen existence in biomethane due the gas treatment process of biogas. The increasing amount of biomethane injection into the storage facilities may require handling of oxygen ingresses due to sensitivity of storage facilities, particularly aquifers. The report stresses that permissible oxygen content is dependent on the specific facility and must be assessed case by case. Furthermore, the technical methods to be removed from biomethane is also explored. The energy transition continues to accelerate the decarbonisation efforts of the gas industry, including the role of UGS facilities and their potential to accommodate larger volumes of renewable gases.
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DNV's forecast about the development and role of hydrogen in the energy transition

DNV's first dedicated hydrogen forecast to 2050, providing new and expanded hydrogen findings from our Energy Transition Outlook forecast model, coupled with the knowledge gained in DNV's projects, research and development. Hydrogen is essential to a clean energy future, but many questions remain around hydrogen's large-scale use as an energy carrier. Renewable and low-carbon hydrogen is crucial for meeting the Paris Agreement goals to decarbonize hard-to-abate sectors. To meet the targets, hydrogen would need to meet around 15% of world energy demand by mid-century. DNV forecasts that global hydrogen uptake is very low reaching 0.5% of global final energy mix in 2030 and 5% in 2050, although the share of hydrogen in the energy mix of some world regions will be double these percentages. Almost all of the world's current 90 Mt/a annual hydrogen production is produced and used for non-energy purposes. These mainly involve the removal of sulfur from refined products and heavy oil upgrading in refineries, the use of ammonia as feedstock in ammonia and methanol production, and hydrogen for the direct reduction of iron. Hydrogen production is fossil-fuel-based and unabated, i.e., without CCS1. This includes about a quarter of ammonia plants that capture their process emissions (only around half their carbon emissions) and provide the recovered CO2 to be used in urea production (carbon capture and utilization — CCU), accounting for some 8 MtH2/yr. The cost of carbon capture for ammonia production is lower than the cost of carbon capture for merchant hydrogen. The cost of dedicated renewables-based electrolysis is presently prohibitively expensive, with a global weighted average of USD 5/kgH2 in 2020. But, in the decade to 2030, we will see a sharp reduction in the cost of electrolysis reducing on average towards USD 2/kgH2.
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Bioenergy Europe and EBA released the Biogas Statistical Report 2022

The joint 2022 report on biogas of Bioenergy Europe and the European Biogas Association focuses on the biogas sector in Europe and its upgraded version, biomethane. The report takes a look at the biogas consumption and production in the EU and provides an in-depth analysis on the sectors state of play. Readers will be able to access state of the art information on the number of biogas plants in the EU countries and the type of feedstock that they use, among other matters. The "Biogas Report 2022" shows that biomethane production has more than doubled over the past five years and increased by 25% last year. The policy brief can be downloaded for free.

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Renewables Global Status Report - REN21 is available

In 2021, renewable energy continued to be impacted by the COVID-19 pandemic and was further influenced by economic and geopolitical developments. Amid these events, renewables experienced yet another year of record growth in power capacity. Investment in renewable power and fuels rose for the fourth consecutive year, and the record increase in global electricity generation led to solar and wind power providing more than 10% of the world's electricity for the first time ever. Total growth in global renewable power capacity accelerated in 2021, adding more than 314 gigawatts (GW). Renewable energy comprised 28.3% of the global electricity mix in 2021, roughly on par with 2020 levels. However, renewable shares in total final energy demand remained low in the buildings, industry and agriculture and transport sectors, where policy support remains insufficient. Renewable power additions need to triple to be on track with major net-zero scenarios. The edition of the *Renewables 2022 Global Status Report* is available to download along with the Key Messages for Decision Makers, the data-pack and a zip file of all of the report's charts and graphs.

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Sustainable Agricultural Soil Management in the EU: How can it be enabled?

The RISE Foundation released a new report focusing on agricultural soil. In the report it endeavors to answer the question, what is holding back a large-scale transition to sustainable agricultural soil management in Europe? Life on earth is entirely dependent on healthy functioning soils. We count on their functioning to produce our food, cycle nutrients manage waterflows, sequester carbon and be the foundation of the planet's biodiversity. Without healthy soils on earth, mankind could not exist. Yet, we have failed to value and protect them. Soils have been deteriorating over several decades and the outlook to 2030 does not show signs of improvement. The report combines an extensive review of the literature on soil health and management with interviews of over 30 private soil management initiatives across Europe. The report outlines the obstacles that block the adoption of sustainable agricultural soil management practices at different scales. They include information-, economic-, technical- and structural barriers. They particularly affect the ability of farmers to change their practices, and in some cases, the willingness of farmers to change. The report seeks to contribute to the debate on how to best frame and encourage improvement in agricultural soil management and discusses how to drive the transition towards a more sustainable agricultural soil management and food system in the EU.

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Fueling clean mobility with bio-LNG

EBA in collaboration with GIE, NGVA Europe and SEA-LNG released a new report on bio-LNG (LBG) application in road transport and in the maritime sector. The objective of the paper is to highlight the environmental advantages of bio-LNG and its importance as the most readily available solution for the sectors' decarbonisation. Additionally, it is crucial to underline the role bio-LNG will play in the future and the regulatory framework needed to support this sustainable fuel's development. EU seems to rely heavily on the deployment of (renewable) electricity however, HDV will not run alone on electricity. The EU production is only 2,780 TWh while in the transport sector alone, energy consumption reaches 3,555 TWh. Even if we look at the future electricity production predicted in the various scenarios, by 2050

Europe will produce approximately 4,500 TWh. These data demonstrate that an electrification of all sectors might be challenging. Ninety-four per cent of the total electric vehicle fleet in the EU are passenger cars. The decarbonisation of long-distance trucks and shipping will require renewable and low-emissions liquid fuels such as liquified biomethane (bio-LNG).
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Gas for Climate publishes biomethane production potentials

The Gas for Climate consortium published an update on biomethane production potentials in the EU, building on the renewed ambition of the EU to accelerate biomethane production and the advancements in technology. The study shows that enough sustainable feedstocks are available in the EU-27 to meet the REPowerEU 2030 target of 35 bcm. In GfC's estimate, up to 41 bcm of biomethane in 2030 and 151 bcm in 2050 could be available. This is significant as the current (2020) EU natural gas consumption is 400 bcm (of which 155 bcm was imported from Russia). To achieve this, significant scaling up is required both in the short- and long-term as today, 3 bcm of biomethane and 15 bcm of biogas are produced in the EU. Whereas Gas for Climate previously estimated the sustainable supply potential in the EU-27 (and UK) at 35 bcm in 2030 and 95 bcm by 2050, for the recent publication, sustainable production potentials were updated to reflect the most recent developments. In the paper, a unified methodology is applied to identify both the short- and long-term potential of biomethane production in the EU, Norway, Switzerland and the UK, based on sustainable feedstocks.
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Report reveals RNG as a solution to decarbonizing transit fleets in Canada

The Canadian Urban Transit Research & Innovation Consortium announced the publication of a research report that studies an alternative solution to carbon intensive, diesel-powered vehicles. This report explores a cleaner and cheaper transit solution using renewable natural gas (RNG) as a fuel to operate compressed natural gas (CNG) buses in five North American transit agency fleets, including Calgary Transit, Hamilton Street Railway, Riverside Transit Agency, TransLink and one more Californian agency. As transit is one of the most common modes of transportation in larger cities, utilizing RNG in transit fleets can contribute to the reduction of greenhouse gas emissions and address climate change, while also maintaining operational costs compared to diesel, battery-electric buses, and hydrogen fuel cell electric buses.
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Best Practices for Reducing Costs of Anaerobic Digestion of Organic Waste

The main target of the current report, prepared for and funded by Environment and Climate Change Canada (ECCC), was to research the best practices for reducing costs of anaerobic digestion (AD) of organic waste and increasing the valorization of biogas and digestate. The research concentrated on the three most common types of AD systems, namely on-farm digesters, stand-alone digesters that process municipal organic waste and co-digestion systems for municipal organic waste treatment at WWTPs. The data collected through the literature search, analysis of interviews and questionnaire responses of almost 100 biogas and RNG industry stakeholders allowed to list the current industry barriers; highlight the major Canadian particularities that influence CAPEX and OPEX; enumerate best practices that can reduce costs and discuss ways to valorize end products. Additionally, the study highlights opportunities for future research.
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Valorisation of biowaste in the United States

IEA Bioenergy Task 36 published a third case study on material and energy valorisation of waste dealing with biogas upgrading to RNG in the USA. RNG deployments have increased significantly in recent years. As of 3/31/2020, there are 119 operational projects with a further 88 under construction. Historically,

amine, membrane, water scrubbing, or pressure-swing adsorption technologies have been used to perform this gas upgrading through the separation of carbon dioxide and methane. The process of biomethanation instead converts the carbon dioxide into additional methane through the addition of hydrogen. Biomethanation offers potential as a grid-scale energy storage technology by utilizing otherwise curtailed low-carbon electricity to produce the hydrogen needed by the organisms. Being a biological process, the hydrogen and carbon dioxide conversion is quickly 'rampable'. There have been several pilot- and demonstration-scale installations of the technology and this case study explores some of the economic and environmental considerations.
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Manual for National Biomethane Strategies

The European Union's 35 bcm biomethane target for 2030 has to be translated into individual contributions by all member states. To assist with the implementation of the REPowerEU Plan, the European Commission published a Biomethane Action Plan setting out measures to be taken at both national and European levels to scale up biomethane production and consumption. The plan includes a recommendation to member states to develop a national biomethane strategy as soon as possible. Gas for Climate has compiled a step-by-step manual to support member states in developing and implementing their national biomethane strategies. The ten steps, from developing a national vision on biomethane and setting initial targets to having a fully implemented national biomethane strategy, are shown below. The steps have a logical flow, but some can be done in parallel. They cover the topics from National Vision to Public Acceptance.
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