

Newsletter IEA Bioenergy Task 37: 04/2020 Potentials of biogas and biomethane

Global potential of biogas

According to the World Biogas Association's report, there are currently about 50 million micro-digesters, 132,000 small, medium and large-scale digesters and 700 upgrading plants operating globally. Based on the current estimate of 87 TWh electricity generation, the substrates used are tapping into merely 1.6-2.2% of the potential of AD. The growth potential of the biogas industry is therefore extraordinary and involves every country. The potential to generate energy from currently available and sustainably grown/recovered major feedstocks in the world is 10,100 to 14,000 TWh. This energy can meet close to 6-9% of the world's primary energy consumption or 23-32% of the world's coal consumption¹⁵⁵. When used as electricity, it has the potential to meet 16-22 % of the electricity consumed in the world. If the energy is utilised as biomethane, it can substitute 993 to 1,380 bcm of natural gas, equivalent to 26-37% of the current natural gas consumed. Use of digestate as soil amendment can replace 5-7% of inorganic fertiliser currently in use. It can fertilise 82 million hectares of land, equivalent to the combined arable land in Brazil and Indonesia.

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WEO Report: Outlook for biogas and biomethane

A detailed, bottom-up study of the worldwide availability of sustainable feedstocks for biogas and biomethane, conducted for the WEO special report, shows that the technical potential to produce biogas and biomethane is huge and largely untapped. These feedstocks include crop residues, animal manure, municipal solid waste, wastewater and – for direct production of biomethane via gasification – forestry residues. This assessment considers only those feedstocks that do not compete with food for agricultural land. Biogas and biomethane production in 2018 was around 35 million tonnes of oil equivalent (Mtoe), only a fraction of the estimated overall potential of 730 Mtoe. The report estimates that around 30 Mtoe (~40 billion cubic metres [bcm]) of biomethane – mostly landfill gas – could be produced today. Full utilisation of the sustainable potential could cover some 20% of today's worldwide gas demand. The availability of sustainable feedstocks is set to grow by 40% over the period to 2040. The largest opportunities lie across the Asia Pacific region. The IEA WEO Sustainable Development Scenario (SDS) predicts that the combined market share of biogas and biomethane in total modern bioenergy demand grows from 5% today to 20% in SDS

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EBA Statistical report 2019

The report draws on the latest available biogas and biomethane data to provide an accurate

picture of the European anaerobic digestion landscape for the year 2018. By the end of the year in total 18,202 biogas installations were in operation producing 63,511 GWh of biogas. The Europe-wide installed electric capacity was 11,082 MW. The European biomethane sector continued its dynamic ascent, reaching a total of 610 plants and producing 2.28 bcm of biomethane.

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Household biodigesters installed in Asia, Africa, and Latin America in 2018

In 2018, over 38,000 household biodigesters were installed in 17 countries in Asia, Africa, and Latin America according to a status brief of the Dutch development organization's (SNV). Almost all these digesters are fed by animal manure. Asia delivered most digesters (over 27,000 units), particularly in Nepal, Vietnam, Bangladesh, and Indonesia. Africa surpassed 10,000 digesters, with most units installed in Ethiopia, Kenya, Zambia, and Burkina Faso. Up to 2018, over 868,000 households in 24 countries invested in a biodigester. Of this number, about 315,000 units (36 per cent) have been established without SNV support, most of them in Nepal (over 154,000 units) and Vietnam (over 107,000 units). The most popular size in most countries is four or six cubic meters, comprising the total volume of the digester and gas storage. Most digesters are still constructed in situ, using traditional materials, like sand, gravel, and cement, though companies are beginning to bring pre-manufactured digesters to the market in countries like Kenya, Vietnam, and Nicaragua. Investment costs of the most popular sized biodigester in Asia and Africa range from US\$500 to US\$800.

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Global Bioenergy Statistics 2019

The report of the World Bioenergy Association (WBA) is the 5th in a series of reports focusing on bioenergy developments from around the world. Fossils dominate the energy mix and the dependence continued in recent years. The 1.5% increase in total primary energy supply during 2016 – 17 has been matched by coal, oil and natural gas while renewables are lagging behind (0.7%). This trend appears to continue to 2018 and 2019 as well. In 2017, the gross final energy consumption was 370 EJ – an increase of 2% over the past year. The share of renewable energy in the gross final energy consumption globally was 17.7% in 2017. Among renewable energy sources, bioenergy is the largest. In 2017, bioenergy accounted for 70% of the renewable energy consumption. The share has been decreasing by approx. 0.5% - 1% annually partly due to decreasing use of traditional biomass sources. Almost half of all energy consumption is in the form of **heat** – space heating for residential and commercial establishments and heating demand for industrial processes. One of the most widely used renewable energy source for derived heating is biomass which has a 96% share in the renewable heat market globally. In the **transport** sector, biomass-based fuels (bioethanol, biodiesel etc.) are one of the best options for replacing fossil oil. The share of biofuels in the transport sector in 2017 was about 3% with a total contribution of 3.5 EJ. In 2017, 55.6 EJ of biomass was utilized for energy purposes – 86% of the use was in the form of primary solid biofuels including wood chips, wood pellets, fuelwood for cooking and heating etc. 7% of the biomass was used as liquid biofuels. Biogas, municipal waste, industrial waste had almost equal share at 2 – 3%.

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