



Technology Collaboration Programme
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Collaborations, Mergers & Acquisitions

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Municipality in Poland to Treat Organic Waste Using Dry Fermentation

One of the goals of Poland's new energy policy is to harness the potential of renewable energy more effectively. Poland still has only a modest number of waste treatment plants. One of them, operating in Jarocin, already has a Kompogas licence from a third-party provider. The plant treats the organic fraction separated from mixed municipal waste by technical means to produce biogas. In addition to the Polish legislation, the European Union is imposing ever stricter environmental regulations, requiring municipalities in its member states to separate the organic fraction of municipal waste. This has also led to a sharp increase in the volume of biowaste. Given the new need, the local operator, Wielkopolskie Centrum Recyklingu, has decided to also have an additional anaerobic fermentation plant built on the same site. Starting in 2024, the new Kompogas plant being built by Hitachi Zosen Inova on behalf of the German company Eggersmann will treat around 15,000 tonnes of household organic and green waste a year to produce renewable energy and fertiliser. The plant is expected to produce 3.5 million kWh of electricity.

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Hitachi Zosen Inova focuses on the production of bio-LNG in Germany

The German energienker Group and the Swiss cleantech company Hitachi Zosen Inova AG (HZI) have founded a company in Blankenhain, which will build a plant for the production of 3,700 tons of bio-LNG annually from sustainably produced biogas by the end of 2023. The energienker Group has already been successfully operating a fermentation plant at its Blankenhain site in Thuringia since 2011 on the basis of energy crops. The upgraded biogas is fed into the grid. This classic plant concept is now being further developed. To this end, the plant's substrate feed is being converted to almost 100% sustainable feedstocks such as

liquid manure, dung and waste materials from agriculture and food production. On the other hand, the old gas treatment plant will be replaced by a modern amine scrubbing system from HZI and will receive additional systems for methane and CO2 liquefaction as well as for generating its own electricity and heat by means of a combined heat and power plant. The nearly 58 GWh/a of sustainable raw biogas will thus produce around 3,700 metric tons of biogenic liquefied gas annually. In addition, around 4,000 tons of liquid CO2 are produced as a by-product, which replaces fossil-generated CO2 in industry. This upgrading of biogas is accompanied by a considerable greenhouse gas reduction: more than 20,000 annual tons of CO2 equivalents can be claimed and sold in the form of GHG quotas under the new German legislation. Together with the German biogas producer Bioenergie Geest GmbH & Co. KG HZI will build a plant for the production of 2100 tons of bio-LNG annually by the end of 2023.

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Divert, Inc. announces RNG offtake agreement with bp

Divert, Inc. announced a 10-year renewable natural gas (RNG) offtake agreement with bp worth approximately \$175 million. Under the new agreement, bp expects to purchase RNG generated from three Divert facilities in development in California, Pennsylvania, and Washington, which would offset 36,905 metric tons of carbon dioxide per year. The agreement marks one of the largest known RNG offtake agreements from food waste digestion in the U.S. BP provides heat, light, and mobility to customers all over the world, with an ambition to be a net zero company by 2050 or sooner. The bp agreement comes during a period of rapid growth for Divert as the market embraces new ways to address wasted food and decarbonized energy. Divert is uniquely positioned to address these changing tides as the largest anaerobic digestion company of wasted food in the U.S. The company processes more than 232,000 tons of wasted food a year at 10 facilities across the country. In the past two years, Divert has expanded its retail customer base by 40% and added 1,500 retail storefronts to its portfolio of more than 5,200 retail stores across all 50 U.S. states.

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First Bio-LNG plant in Chile to be built

Grupo HAM and CycleØ have received the award for the construction and operation of the first Bio-LNG plant in Chile, which will be located in the Ñuble region, with a capacity to process between 7,500 and 16,500 cubic meters of biogas per day, which represents a reduction, in the heavy transport industry, of more than 19,000 annual tons of CO2, 96% of fine particle emissions and 85% of nitrogen oxide and sulfur emissions, compared to other fuels. This Bio-LNG plant will be possible thanks to the commitment of Lipigas, a relevant player in the Latin American energy market, for an efficient and 100% renewable energy solution. The biogas comes from an anaerobic co-digestion plant for waste from a MaxAgro pig farm, where HAM Chile Spa will build and manage the facilities for its processing, which will have upgrading equipment, developed by FNX Liquid Natural Gas, which will allow the biogas to be purified, which contains 50-60% methane, increasing its quality and obtaining a methane purity of over 99%.

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BP to buy US biogas producer Archea for \$4.1 bln

BP will buy U.S.-based RNG producer Archea Energy Inc for about US\$ 4.1 billion, the companies announced in October 2022, as the British energy major seeks to expand its alternative fuels business. The deal will be the largest ever RNG acquisition, topping Chevron Corp's \$3.15 billion buyout of biodiesel maker Renewable Energy Group Inc earlier

last year. It will also be the largest acquisition BP has made since Chief Executive Bernard Looney took office in early 2020 with a pledge to slash BP's greenhouse gas emissions and oil and gas production while growing its renewables business. Houston, Texas-based Archaea operates 50 RNG and landfill gas-to-energy facilities across the United States, and BP aims to grow Archaea's output five-fold by 2030 to 30,000 barrels of oil equivalent per day (boed), Looney told Reuters. BP already has a large biogas business producing around 11,000 boed.

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Jack Daniel Distillery: Whiskey and Biogas

TC Energy has announced a \$29.3 million (€29.7m) investment in a renewable natural gas (RNG) production facility near the Jack Daniel Distillery in Tennessee, US.

The facility is owned by Lynchburg Renewable Fuels, and will produce RNG with a carbon intensity score that is 50% lower than natural gas - saving up to 16,000 tonnes of CO₂e/year. The plant is expected to be operational in 2024, and will mean a byproduct of the Jack Daniel's distilling process will be broken down to generate methane recovered as biogas. A biogas upgrading plant is intended to remove contaminants to produce pipeline-quality RNG that will be directly connected to a local natural gas utility. Liquid fertiliser will also be produced in the process, processed, stored and distributed to meet local agriculture demand.

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Two companies build the world's largest biomethane liquefaction plant

Two sustainable factories are being built on a single site in Amsterdam. BioValue is constructing a state-of-the-art biogas plant here to process up to 600,000 tons of organic waste. Their partner Titan is building the world's largest Bio-LNG (Liquified Biomethane) installation, capable of producing up to 200,000 tons of LBM per year. The new state-of-the-art biogas plant is strategically located in Amsterdam's western port area. A lot of organic waste is available in the region. Raw materials can also be easily shipped through the port. Once operational, the plant will produce the largest quantities of biogas in the Netherlands.

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Snam4Environment takes over 5 biomethane production plants

IES Biogas from Italy, a subsidiary of Snam4Environment, a Snam group company active in the biomethane sector and in the circular economy, has purchased five agricultural biogas plants with 1MWe capacity each in Veneto and Friuli-Venezia Giulia. The five plants are located in the provinces of Udine, Pordenone, Venice and Padua. The goal of the acquisition, whose total value is about 30 million euros, is to convert the five agricultural biogas plants (which currently produce electricity) to biomethane, reaching the production capacity of about 500 Sm³/h each. By valorizing zootechnical waste, agricultural waste and second-harvest crops, the plants will produce more than 22 million Sm³ per year of biomethane when fully operational. Three of the plants will be connected to the national gas grid for direct feed-in of Bio-CNG, while the other two will be equipped with a liquefaction plant for the production of Bio-GNL intended to supply heavy vehicle fleets for freight distribution.

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Shell acquires Nature Energy in a US\$ 2 billion deal

Shell plc has agreed to acquire 100% of Nature Energy for nearly USD \$2 billion (€ 1.9 billion) from Davidson Kempner Capital Management LP, Pioneer Point Partners and

Sampension. The acquisition will be absorbed within Shell's current capital range, which remains unchanged. The transaction is subject to regulatory approvals and is expected to close in Q1 2023. Nature Energy is cash generative, and the acquisition is expected to be both accretive to Shell's earnings from completion and deliver double digit returns. Based in Denmark, Nature Energy was founded in 1979 as a natural gas distributor. The company established its first biogas plant in Denmark in 2015 and now has 14 operating plants with associated infrastructure, feedstock arrangements, and current 2022 production of around 6.5 mln MMBtu/yr (190bcm RNG). The company also has a pipeline of around 30 new plant projects in Europe and North America. More than a third of these projects are in medium to late development stage in Denmark, the Netherlands and France. Shell has an existing RNG production business in North America, with one operational site and four under construction. Shell is a trader of RNG and has a wide range of RNG and bioLNG customers, including large corporate, road haulers and marine customers. They also operate bio-LNG filling stations in Europe.

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BlackRock is Buying Renewable Natural Gas Producer Vanguard Renewables

The world's biggest asset manager is acquiring Vanguard Renewables, a Boston-area company that works with dairy farmers and food companies to produce renewable natural gas for utilities and energy firms such as Dominion Energy Inc. and Enbridge Inc.

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Things go better together - this also applies to agricultural biogas plants

In the Rhön-Grabfeld district of Germany, community biogas plants operate very efficiently. The initiator of the community plants, Agrokraft GmbH, specifically searched for suitable locations with sufficient heat demand or proximity to the natural gas grid, developed the concepts and promoted the idea to farmers. Five identical plants were built between 2006 and 2011. Agriculture in the Rhön region has a small structure. No single farm could provide the required substrate quantities for the biogas plants, each of which has an output of 600 kW. They not only generate electricity, but also supply larger heat consumers such as the Franken-Therme in Bad Königshofen or a local heating network in Großbardorf, to which around 130 households are connected. Twenty more are currently being added. One of the five plants feeds methane into the natural gas network, enabling it to cover ten percent of the natural gas consumption in the district. The other plants are flexible, meaning they do not generate electricity around the clock, but only during periods of high electricity demand and low output from wind and solar power. One gas and one heat storage facility each make it possible to produce a lot of electricity on demand while continuously supplying a local heating network.

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