Bioeconomy & Low Carbon Technology Overview for February 2025

Our summary of low carbon technology developments for February 2025 is based on data and information collated by Gifford Consulting and provided on the website: Gifford Consulting

Highlights by Topic: February 2025

More information on these articles can be found on our website dashboards.

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Ammonia production

1. **Ammonia production**: Australia. NH3 Clean Energy and Pilbara Ports Authority signed a MoU to develop export infrastructure for 600,000 tonnes per year of clean ammonia from NH3's WAH2 Project via the Port of Dampier. The agreement outlines a yearlong collaboration to establish operational arrangements and binding contracts for ammonia handling and shipping. Ammonia from the WAH2 plant will be transported through a dedicated pipeline to the port's Bulk Liquids Berth, where it will be loaded onto gas carriers for international customers. The same facility is also expected to serve ammonia bunkering operations under NH3's separate agreement with Oceania Marine Energy, which aims to supply ammonia as fuel for bulk carriers transporting iron ore from the Pilbara. Link 16/02/2025

Biobased chemicals

2. **Biobased chemicals**: France. Arkema, a specialist in specialty materials, launched its new range ENCOR bio-based waterborne dispersions designed for textile printing and finishing applications. These binders, with up to 30% bio-based content, and up to 40% carbon footprint reduction compared to traditional textile resins. Link 04/02/2025
3. **Biobased chemicals**: Germany. Max Planck Institute of Colloids and Interfaces has created a material from linalool, the main component of lavender oil, and sulfur that could make sodium-sulfur batteries more durable and powerful. Such batteries could store electricity from renewable sources. It is a crucial question in the energy transition: how can electricity from wind power and photovoltaics be stored when it is not needed? Large batteries are one option. And sulfur batteries, in particular sodium-sulfur batteries offer several advantages over lithium batteries as stationary storage units. The materials used for manufacture are much more readily available than lithium and cobalt, two essential components of lithium-ion batteries. Link 05/02/2025
4. **Biobased chemicals**: Germany. Verbio is constructing the world's first large-scale ethenolysis plant based on rapeseed oil methyl ester. Using ethenolysis, Verbio provides the market with the bio-based speciality chemicals methyl 9-decenoate (9-DAME) and 1-decene, which can be used as key components in a wide range of applications. 9-DAME is a component of detergents and cleaning agents and serves as a raw material for lubricants and polymers. 1-decene is an important basis for products in the field of high-performance lubricants used in modern engines, gearboxes, and wind turbines. The feedstock is converted into renewable specialty chemicals using the innovative catalysts from XiMo, a wholly-owned Verbio subsidiary. Link 03/02/2025
5. **Biobased chemicals**: South Korea. LG Chem is entering the global market with eco-friendly raw materials derived from vegetable oils. The company announced that it will commence the production of bio-acrylic acid in the second quarter of this year. Production capacity shall ramp up to 100 metric tons (MT) of prototype annually. Bio-acrylic acid can be applied to various materials, including cosmetic ingredients that directly contact the skin, super absorbent polymers (SAP) for diapers, adhesives for electronics and vehicles, coating materials, and eco-friendly paints. Link 27/02/2025
6. **Biobased chemicals**: USA. BASF is taking the next step in expanding its sustainable portfolio by offering HySorb® B 6610 ZeroPCF, the first polyacrylate-based superabsorbent polymer (SAP) marketed with a product carbon footprint1 (PCF) of zero for the hygiene industry. The zero PCF is achieved by utilizing renewable energy in addition to the established biomass balance approach (BMB) in the production process at the Antwerp Verbund site. HySorb® B 6610 ZeroPCF is ISCC PLUS-certified. Link 24/02/2025

Biobased plastics

7. **Biobased plastics**: The Netherlands. Avantium developed its proprietary YXY® Technology to produce FDCA (furandicarboxylic acid), the essential component for the fully plant-based and circular polymer PEF (polyethylene furanoate). PEF is branded by Avantium as releaf®. Avantium is currently in the process of starting up the world's first commercial FDCA plant in Delfzijl, the Netherlands. This FDCA Flagship Plant will play a crucial role in Avantium's commercialization and licensing strategy. The commercial FDCA plant allows Avantium to sell FDCA and releaf® directly to offtake partners, while also offering technology licenses at full scale to industrial partners worldwide. Link 16/02/2025

Biodiesel

8. **Biodiesel**: India. The Aemetis plant in India received approval from the local Pollution Control Board (PCB) to restart the production of biodiesel and refined glycerin, enabling the company to fulfil allocations issued by government-owned oil marketing companies (OMCs) and other customers. The company received official notice from the PCB on Saturday, February 22, 2025, allowing the restart of the plant after conducting a review of local air quality. Link 26/02/2025

Biofuels

9. **Biofuels**: Denmark. The FrontFuel demo is intended to both de-risk and lower the technological barriers for e-fuels production by proving that the solid oxide electrolyser cell/SOEC-eREACT™-FT combination can create a synthetic hydrocarbon crude (syncrude) feedstock viable for refining into fuel. As an industry first, this test configuration involved blending biogenic CO2, biogas, and hydrogen to create a synthesis gas (syngas) stream, which is then processed into syncrude. This syncrude represents the early stages of what could become a sustainable jet fuel, setting a strong foundation for bio-/e-Fuels in commercial applications. Link 20/02/2025
10. **Biofuels**: Finland. As a result of Neste's significantly changed market environment and weakened financial performance as well as a comprehensive full potential analysis started in October 2024, Neste has decided to start a performance improvement program. The goal is to secure our strong market position and cost competitiveness in renewable fuels and to enhance Neste's financial performance. The planned organizational changes are expected to lead to a permanent reduction of approximately 600 positions, of which approximately 450 will be in Finland. Link 24/02/2025
11. **Biofuels**: India. Honeywell and AM Green signed a MoU during India Energy Week 2025 to assess the techno-economic feasibility of producing SAF from ethanol, green methanol from various carbon dioxide (CO_2) emission sources, and green hydrogen. The collaboration will benefit Indian farmers by creating demand for ethanol feedstocks. It also aligns with the government's National Green Hydrogen Mission to boost green hydrogen production through green methanol for domestic and export use. Link 16/02/2025
12. **Biofuels**: KKR will acquire an additional 5% stake in Eni's biofuel business, Enilive, for €587.5M (~$614.17M). This transaction increases KKR's total ownership in Enilive to 30% while Eni retains control of the company. This latest investment follows a previous agreement made in October 2024, where KKR agreed to purchase a 25% stake in Enilive, which is expected to close by the end of March this year. Link 19/02/2025
13. **Biofuels**: Malaysia. BAC Renewable Energy signed an agreement with compatriot terminal operator TLP Terminal and Singapore-based bulk liquid storage services provider Dovechem Group to develop a bio-LNG and biomethanol hub. The future hub will be located at TLP Terminal-operated Tanjung Langsat Port, Malaysia. The hub will cater to the growing demand

for ISCC EU-certified bio-LNG from the maritime sector in the biggest bunker market in the world, i.e Singapore & Malaysia combined, which is a major stop in the Far East-Europe shipping route. Link 18/02/2025

14. **Biofuels**: USA. Gevo, Inc. acquired the ethanol production plant and carbon capture and sequestration assets of Red Trail Energy, LLC for an aggregate purchase price of $210 million, subject to customary adjustments, including a working capital adjustment. The acquired assets include the plant, pore space, and we are bringing on their experienced operational personnel. In addition to creating another strategic option for economic and competitively advantaged sustainable aviation fuel facilities, this acquisition is expected to contribute $30 million to $60 million of Adjusted EBITDA to Gevo annually. Link 05/02/2025

Biogas

15. **Biogas**: Denmark. Wärtsilä Gas Solutions has been contracted to supply a biogas upgrading system to Danish bioenergy provider Maabjerg Biogas, a subsidiary of Skovgaard Energy. The plant will have the capacity to upgrade 6,000 Normal Cubic Meters per Hour (Nm3/h) of raw biogas, thereby significantly scaling up Denmark's production and utilization of biogas. Link 27/02/2025
16. **Biogas**: France. Tereos and the Lénéo company, a start-up offering innovative solutions in the field of green energy, have signed an agreement for the creation of a production site for biomethane, fuel and decarbonized products in Morains. The project led by the Lénéo company consists of building a unit on the former Tereos distillery site in Morains capable of producing more than 200 GWh of biomethane or fuel annually. This project, which will allow the maintenance of industrial activity on the Marne site and the creation of 35 jobs, is an investment of more than 60 million euros. Link 21/02/2025
17. **Biogas**: France. TotalEnergies announces the commissioning of BioNorrois, its 8th biomethane production unit in France, located in Fontaine-le-Dun (Normandy). It will inject 153 GWh of biomethane per year into the natural gas transport network operated by GRTgaz. The 150,000 tons of digestate2 produced annually by the unit will be fully utilized by Cristal Union and the Norman cooperative NatUp with partner farms, to support them in their transition to the use of sustainable and locally produced fertilizers. Link 28/02/2025
18. **Biogas**: Germany EnviTec Biogas AG announced that it has acquired liquefied natural gas (LNG) distributor LIQVIS GmbH from compatriot energy major Uniper SE. Founded in 2015, LIQVIS operates a total of 18 LNG filling stations in Germany and France at strategic traffic hubs with particularly high truck traffic. EnviTec Biogas plans to utilize LIQVIS' existing LNG filling station infrastructure to sell bioLNG exclusively, produced at EnviTec's own BioEnergie Park Güstrow, among other locations. Link 04/02/2025
19. **Biogas**: Japan. Anaergia Singapore Pte Ltd. entered a Letter of Intent to supply technology and equipment to JGC Holdings Corporation (JGC) for a renewable natural gas (RNG) project. The equipment to be provided by the Company under the LOI includes Anaergia's feedstock pretreatment solution, anaerobic digestion with its unique digester design for high throughput and efficiency, and digestate management solution. The facility is expected to take in more than 56,000 tons per year of cow manure and more than 5,000 tons per year of food waste. Link 24/02/2025
20. **Biogas**: USA. GreenGasUSA and Darling Ingredients Inc. announced the first renewable natural gas (RNG) deliveries from a project located at Darling Ingredients' rendering facility in Dublin, GA. The project leverages Darling Ingredients' on-site wastewater streams to upgrade biogas to pipeline-quality RNG, reducing Scope 1 emissions while creating a new revenue stream for Darling Ingredients. The Dublin facility injected RNG into the City of Dublin's

natural gas pipeline this month for transport to customers in the voluntary offtake market. Link 21/02/2025

21. **Biogas**: USA. WELTEC BIOPOWER successfully completed the commissioning and handover of a dairy RNG (Renewable Natural Gas / biomethane) plant in Barron County, Wisconsin. the dairy farm produces 2.36 million standard cubic meters of RNG/biomethane annually (86,600 MMBTU per year). This RNG, above gas grid specifications, is processed using advanced membrane-based gas upgrading technology to deliver 272 standard cubic meters per hour (159 SCFM), which is compressed, bottled and transported to a gas grid injection point. Link 28/02/2025

Biojet/SAF

22. **Biojet/SAF**: Australia. Australian Renewable Energy Agency (ARENA) is supporting cleaner Australian skies, with up to A$10.4 million in funding for two projects from its Sustainable Aviation Fuels (SAF) Funding Initiative. ARENA is providing A$8 million in funding to Licella and A$2.4 million to Viva Energy for separate studies to develop renewable fuel alternatives for Australia's airline industry. The two projects are: 1) A$8 million to Australian technology and project developer Licella for the A$26.1 million 'Project Swift – SAF from Sugarcane Residues Feasibility Study' to complete Feasibility and Front-End Engineering Design (FEED) studies assessing the viability of establishing a biorefinery facility in Bundaberg, Queensland utilising Licella's patented Catalytic Hydrothermal Reactor (Cat-HTR™) hydrothermal liquefaction technology. 2) A$2.4 million to Viva Energy for the A$4.9 million 'SAF infrastructure Solutions for the Future project' to recondition an existing tank at its Pinkenba Terminal to enable blended SAF supply into Brisbane Airport for commercial use. Link 28/02/2025
23. **Biojet/SAF**: Blue Biofuels announced the signing of an agreement to acquire 35.5 acres of land in Frostproof, Florida, marking a significant milestone in the company's commercialization efforts. The site will house a cutting-edge production facility designed to produce an initial 3 million gallons of biofuel annually. The infrastructure and available land can support future expansion to 100 million gallons per year of cellulosic ethanol and 100 million gallons per year of Sustainable Aviation Fuel (SAF). Link 06/02/2025
24. **Biojet/SAF**: Canada. Emerging Fuels Technology (EFT) signed a Master License Agreement with Highbury Energy Inc. and a Site License with Wanagekong-Biiwega'iganan Clean Energy Corporation (WBCE Corp) — an Indigenous majority-owned and Indigenous-led joint venture with Highbury — aiming to produce renewable fuels from wood waste biomass feedstocks. Coupled with Highbury's advanced gasification technology, WBCE Corp will deploy EFT's proven Fischer-Tropsch technology at its first biorefinery in Fort Frances, Ontario. The facility will process wood waste from local mills and produce 20 million liters of low-carbon renewable fuels, including low-carbon intensity renewable diesel and SAF. Link 03/02/2025
25. **Biojet/SAF**: Japan. Cosmo Oil Co. Ltd (Cosmo Oil) was selected for a FY2024 subsidy from Japan's Ministry of Economy, Trade and Industry (METI) to support a project developed with Mitsui & Co. (Mitsui) that will utilize LanzaJet technology. Cosmo Oil intends to leverage the company's expertise in plant operations, fuel quality control, and logistics with Mitsui's capabilities in ethanol procurement to develop the project, which will establish a large-scale SAF production facility and create new business opportunities within Japan's growing biofuels sector. Link 25/02/2025
26. **Biojet/SAF**: Japan. Nippon Paper Industries Co. Ltd., Sumitomo Corp., and Green Earth Institute Co. Ltd. reached an agreement to establish a joint venture company, Morisora Bio Refinery LLC, which will focus on the production and sale of bioethanol and biochemicals

derived from woody biomass. The joint venture will construct a semi-commercial plant at Nippon Paper's Iwanuma Mill in Miyagi Prefecture. Using sustainable forest resources from the Tohoku region, such as wood scraps from sawmills, GEI's proprietary low-carbon, cost-efficient bioethanol production process will be used to produce over 1,000 kL of bioethanol annually starting in 2027. Link 24/02/2025

27. **Biojet/SAF**: Malaysia. FatHopes Energy developed an agreement with Topsoe to assess the feasibility of developing a SAF refinery in Malaysia. The partnership aims to utilize waste-based oils, such as used cooking oil, to produce renewable aviation fuels. Under the agreement, Topsoe will provide its HydroFlex technology, catalyst solutions, and engineering expertise to evaluate the project's viability. The feasibility study will determine the strategic potential of establishing an SAF facility in Malaysia. FatHopes Energy will contribute its expertise in sourcing and processing waste-based raw materials, ensuring a steady supply of feedstock for the facility. Link 27/02/2025
28. **Biojet/SAF**: Romania. OMV Petrom announced the start of construction for a sustainable aviation fuel (SAF) and renewable diesel (HVO) production unit at the Petrobrazi refinery. This new facility will position OMV Petrom as the first major producer of sustainable fuels in the Southeast Europe, with an annual capacity of 250,000 tons. The new unit will enable OMV Petrom to integrate the production of SAF and HVO with the existing infrastructure for fuel production, storage, and distribution, thus meeting the region's sustainable mobility needs. The project entails a total investment of 750 million euros, of which 560 million euros are allocated for the construction of the SAF/HVO unit, and 190 million euros for two green hydrogen production facilities. Link 21/02/2025
29. **Biojet/SAF**: Slovakia. MOL Group announced that it has produced a diesel fuel containing hydrotreated vegetable oil (HVO), and sustainable aviation fuel (SAF) at its Slovnaft refinery in Bratislava, Slovakia. HVO was successfully produced at the Bratislava Refinery using oil from cashew nut shells and the biocomponent produced this way was co-processed together with crude oil. Link 18/02/2025
30. **Biojet/SAF**: Spain. Evolgene has developed a new enzymatic technology for obtaining 2G ethanol, an alcohol obtained from cellulosic waste, significantly reducing its production cost compared to first-generation ethanol, which is sourced from food. The Spanish company estimates, that with one tonne of eucalyptus biomass, up to 450 liters of second-generation ethanol can be obtained, according to data audited by the Spanish energy research centre (CIEMAT), Link 10/02/2025
31. **Biojet/SAF**: USA. Comstock Fuels was approved by the Oklahoma State Treasurer's Office to issue up to $152 million in qualified private activity bonds, supporting Comstock's plans for financing and building its first 400,000 barrel per year commercial demonstration facility in a soon-to-be-selected site in Oklahoma. Link 06/02/2025
32. **Biojet/SAF**: USA. Gevo, Inc. and Axens formed a new strategic alliance to accelerate development and commercialization of sustainable aviation fuel ("SAF") using the ethanol-to-jet ("ETJ") pathway. The goal of the alliance is to leverage the most advantaged technologies, which is Axens' best-in-class and commercialized Jetanol™ technology. The alliance brings each partner's complementary value propositions, real-world experience, substantially de-risked technologies, plant integrations, and pre-engineered systems to the ETJ technology. Link 16/02/2025
33. **Biojet/SAF**: USA. Singapore Airlines signed a MoU to procure neat SAF for five years with an option for a five-year extension from Aether Fuels (Aether), when Aether plants begin commercial production, Aether will use waste carbon feedstock to produce the fuel, employing its innovative and proprietary Aether Aurora technology. This method reduces

plant capital cost, increases production efficiency, and achieves higher SAF yields compared to existing techniques Link 06/02/2025

34. **Biojet/SAF**: USA. US DOE s approved the disbursement of a loan guarantee that had been finalized days before Trump took office to Calumet. This opens opportunities for the expansion of a sustainable aviation fuel refinery in Montana. The Montana Renewables refinery in Great Falls opened in late 2022 and produces about 140 million gallons a year of biofuels. The loan will allow it to expand production to 315 million gallons per year, and produce about half of North American SAF, a fuel made from fats from seed oils and tallow that is lower in greenhouse gas emissions than conventional jet fuel. But there have been widespread worries among green energy backers that finalized loans of the department's Loan Programs Office would be clawed back by the Trump administration given efforts by billionaire Elon Musk's Department of Government Efficiency to cut spending. Biden's Inflation Reduction Act boosted LPO's loan authority by $100 billion. Link 17/02/2025
35. **Biojet/SAF**: USA. XCF Global Capital, Inc announced the commencement of commercial production of neat SAF at New Rise Renewables, LLC. In addition, New Rise has entered into an irrevocable corporate purchase order for the sale of over 3 million gallons of neat SAF with an unaffiliated third-party buyer. The first shipments of neat SAF are expected to begin in February 2025, with delivery anticipated to begin in early March. Link 27/02/2025

CO2 removal

36. **CO2 removal**: Austria. Bright Renewables will build a carbon capture and CO2 liquefaction system for EnergieWerk Ilg GmbH in Dornbirn, Austria. Carbon dioxide (CO2) from the waste gas of EnergieWerk's wood-fired power plant will be captured and liquefied for a wide range of industrial uses. The system is to be commissioned at the end of July 2025 and is expected to reduce the plant's CO2 emissions by approximately 80%. Bright Renewables' modular built carbon capture system CarboPac-C will capture and liquefy 600kg/hr of this CO2. The process will generate 3.7 kilotons per year of high-purity, food-grade bioCO2, which can be sold to the food and beverage industry, replacing CO_2 from fossil sources. Link 21/02/2025
37. **CO2 removal**: Sweden. Stockholm Exergi announced that it has been awarded support for bio-CCS, a technology that captures biogenic carbon dioxide before it reaches the atmosphere, through a reverse auction by the Swedish Energy Agency, with granted support of $1.8 billion, to be paid out over up to 15 years. Stockholm Exergi is planning to build a bio-energy with carbon capture and storage (BECCS) facility at its bio-cogeneration plant at Värtan, Stockholm. The facility will bring together the bioenergy-based combined heat and power plant fueled by residues from forestry, sawmill and pulp and paper production. Link 04/02/2025
38. **CO2 removal**: The Netherlands. Avantium N.V, announced that it has entered into an agreement with Climeworks AG, a pioneer in Direct Air Capture (DAC) technology. Under the agreement, Climeworks will acquire another advanced high-throughput adsorption testing unit from Avantium R&D Solutions. This strategic step aims to accelerate the large-scale deployment of DAC technology, a critical component in the fight against climate change by permanently removing carbon dioxide from the air. Link 19/02/2025
39. **CO2 removal**: The Netherlands. Global energy technology company SLB announced that SLB Capturi has completed commissioning and is handing over its modular carbon capture plant at Twence's waste-to-energy facility in Hengelo, Netherlands. The new plant has the capacity to capture up to 100,000 metric tons of CO2 per year, which will be used in applications for the horticulture and food and beverage sectors. The carbon capture plant is based on SLB Capturi's standard, modular Just Catch™ design, which reduces onsite installation and

outfitting work — providing a more cost-efficient and easier-to-deploy option compared with other market alternatives. Link 16/02/2025

40. **CO2 removal**: USA. Bloom Energy Corporation, a global leader in fuel cell electricity generation, and Chart Industries, Inc., a global leader in energy and industrial gas solutions, announced a carbon capture partnership that will use natural gas and fuel cells to generate near zero-carbon, always-on power. As part of the partnership, Chart will use its carbon capture knowledge to process Bloom's high-purity carbon dioxide (CO2) exhaust stream into outputs that are ready for utilization or sequestration. Link 25/02/2025

E-fuels

41. **E-fuels**: Germany. Electrochaea announced its collaboration with global energy technology company Baker Hughes. The two companies worked to finalize the basic engineering design package (BEDP) of Electrochaea's proprietary biocatalyst methanation system integrated with Baker Hughes´s carbon capture solutions. BEDP lays the foundations for large industrial-scale biomethanation applications and meets the growing demand for commercial-scale eMethane production. Plants based on the BEDP are designed to generate 3750 Nm3/h of renewable methane from 3750 Nm3/h CO2 combined with renewable hydrogen from a 75MWe capacity electrolyzer and can be scaled further to hundreds of megawatts to maximize clean energy output. Link 16/02/2025
42. **e-fuels**: Germany. INERATEC is to receive investment for its carbon neutral e-fuel production plant in Frankfurt, as well as further research and development. The Frankfurt plant is set to be Europe`s largest when opening in 2025. The European Investment Bank (EIB) and Breakthrough Energy Catalyst are providing a €70 million funding package through the EU-Catalyst Partnership to INERATEC. The EIB is providing a €40 million venture-debt-loan, backed by the EU`s InvestEU-program, while Breakthrough Energy Catalyst is awarding a grant of €30 million. Link 03/02/2025
43. **E-fuels**: Sweden: Norsk e-Fuel previously announced a collaboration with Prime Capital to produce SAF in Sweden. Supported by the renewable energy company RES, the companies will develop "Project Alby," an industrial-scale e-fuel plant that will play a vital role in reducing the emissions of the European aviation sector. Located approximately 370 km north of Stockholm in the municipality of Ånge, Sweden. The project will utilize the Power-to-Liquid process to convert water into hydrogen, which will then be combined with captured CO_2 to create e-Kerosene. Link 19/02/2025
44. **E-fuels**: USA. Summit Carbon Solutions and Infinium, a leading electrofuels producer, entered an arrangement for the supply of up to 670,000 metric tons of carbon dioxide (CO2) annually at a proposed eFuels facility in North Dakota or South Dakota. By accessing Summit's pipeline network, Infinium will have access to a consistent supply of CO2 — important to the production of ultra-low carbon e-Fuels. These fuels, made by combining captured CO2 with renewable power-derived green hydrogen, are used in the aviation, shipping, and heavy transport sectors, increasing domestic energy production and the supply of high demand eFuels to US and international markets. Link 07/02/2025

E-methanol

45. **E-methanol**: Denmark. Power-to-X has succeeded in producing green hydrogen in its first step to producing e-methanol at its commercial-scale facility. The facility produces hydrogen through the electrolysis of purified water. Green hydrogen will then be synthesized with biogenic CO2 to produce e-methanol using electricity from the facility's own solar park. The fuel is intended for shipping fuel or for green chemistry. PtX plant in Kassø is the world´s first

large-scale commercial e-Methanol production facility with the hydrogen being provided by a 50 mega-watt (MW) electrolyzer plant by Siemens Energy. This will be constructed at Kassø, which is west of Aabenraa in southern Denmark and close to the German border. The project will have access to the low-cost renewable electricity required to make cost-effective e-Fuel through the nearby 300 MW solar park of Kassø, created by European Energy. End users of the e-Methanol will be the shipping company Maersk and the fuel retailer Circle K, among others. Link 16/02/2025

46. **E-methanol**: FinlandP2X Solutions Ltd is getting closer to making a final investment decision on a 40-MW project at home after obtaining a EUR-60-million (USD 62.9m) investment grant from Business Finland. The fresh capital will be directed to a renewable hydrogen and synthetic methanol production project in the Iiksenvaara industrial area in Joensuu, which will primarily serve the marine and aviation industries. The site will be located near the Savon Voima's biopower plant. The e-methanol production process will utilise biogenic CO2 captured from Savon Voima's energy production. The latter will use the waste heat produced by the P2X Solutions' plant and transfer it to the Joensuu district heating network. Link 28/02/2025
47. **E-methanol**: United Kingdom. The initial pilot, the plan is to use 63,000 metric tons of biogenic CO2 per year for the production of e-methanol. This CO2 is to come from biomass on the one hand and from the whisky industry on the other. This results in 9,000 metric tons of hydrogen and 45,000 metric tons of e-methanol per year for the pilot project. In addition to the initially planned production volume of 25 metric tons of hydrogen and the resulting 125 metric tons of e-methanol per day, Link 26/02/2025

Ethanol

48. **Ethanol**: Brazil. Cargill signed a purchase and sale agreement for a 50% stake in SJC Bionergia, which, added to the 50% already owned by Cargill, represents full control of the company. SJC Bioenergia, which was founded in 2006 and, since 2011, has Cargill as one of its partners. The company has 4,500 employees and has two agro-industrial units in the municipalities of Quirinópolis and Cachoeira Dourada, both in Goiás. The company processes sugarcane and corn, producing raw sugar, hydrous and anhydrous ethanol, corn oil and high-protein distillers' dried grains (DDGs), in addition to generating electricity. Link 10/02/2025

Feedstock

49. **Feedstock**: Canada. Greenfield Global Inc. and Alco Energy Canada (formerly IGPC Ethanol Inc), two of Canada's largest fuel ethanol producers, and Grain Farmers of Ontario, the province's largest commodity organization, announced the establishment of Canada's Farms and Fuels Alliance (FFA), a coalition uniting Canada's domestic ethanol industry and agricultural sector. This expert collaboration will champion policies that strengthen Canadian biofuel production, promote fair market opportunities, and drive forward-thinking, sustainable economic growth across rural communities. Link 24/02/2025
50. **Feedstock**: A new study commissioned by the Renewable Carbon Initiative (RCI) and the Biobased Industries Consortium (BIC) reveals that meeting 20% of the total global carbon demand of the chemicals and derived materials sector by 2050 from biomass is achievable and sustainable. This key finding highlights the potential for defossilising the industry, which currently relies on fossil resources for over 90% of its carbon needs. The key result of the study: Yes – meeting 20% of total global carbon demand of the chemicals and derived materials sector in 2050 from biomass is achievable and sustainable. Under the moderate HT scenario, which is the most likely development, the 20% share can be delivered without

compromising food and feed supplies and biofuel demand. Providing much more than 20% of carbon demand from biomass would be unreasonable under existing biofuel policies and only a moderately high-tech agricultural system; stronger high-tech scenarios could provide up to 40%. Link19/02/2025

Hydrogen

51. **Hydrogen**: Australia. bp has put its A$1 billion hydrogen and clean fuel projects at Kwinana refinery on hold, likely due to the country's lack of a biofuel mandate. Link 06/02/2025
52. **Hydrogen**: Australia. The government of the Australian state of Queensland has withdrawn its support for the Central Queensland Hydrogen Project (CQ-H2), which is led by state-owned energy company Stanwell Corporation and targets the installation of nearly 2.9 GW of electrolysers. CQ-H2 is planned to be developed at Aldoga, near Gladstone. It will generate hydrogen through electrolysis using renewable power such as wind and/or solar. Link 04/02/2025
53. **Hydrogen**: Belgium. Construction has begun on Belgium's first green hydrogen project, the 25MW Hyoffwind plant at the Port of Zeebrugge. The facility — being developed by Belgian renewables developer Virya Energy in conjunction with industrial gases company Messer and a company called HyoffGreen — will use 25MW of pressurised alkaline electrolysers made by Belgian manufacturer John Cockerill and be powered by local wind parks. Link 24/02/2025
54. **Hydrogen**: Finland. Worley has been awarded a four-year framework agreement for Owner's Engineering services by Gasgrid Finland Oy for its planned hydrogen pipeline project. Link 27/02/2025
55. **Hydrogen**: France. Haffner Energy announced the commencement of hydrogen production utilizing its proprietary solid biomass thermolysis technology at its Marolles hydrogen production, testing, and training center. This technology enables the production of renewable hydrogen at a lower cost compared to conventional methods, while offering a low carbon footprint. The site's production capacity will be 15 kg of hydrogen per hour (kg/h), with an initial phase temporarily limited to 11 kg/h due to the existing PSA (Pressure Swing Adsorption) purification equipment. This equipment will be replaced in the coming months by a PSA designed to reach a 15 kg/h capacity. The unit already produces hydrogen at 8 bar pressure, ready for commercial distribution starting in the second half of 2025 to serve transportation and industrial markets. Link 27/02/2025
56. **Hydrogen**: Germany. Deutsche Bahn announced that it will build a test centre together with research institute Fraunhofer IFAM to develop and demonstrate the conversion of trains with diesel engines to run on hydrogen at its depot in Bremen. While the rail company is primarily focusing on electrification to decarbonise its networks — with 68% running on renewable electricity at the end of 2023 — it is also considering the use of H2 to continue operations of existing vehicles. Link 03/02/2025
57. **Hydrogen**: Germany. Siemens, China-based Guofu Hydrogen, a leading supplier of integrated solutions for hydrogen energy, and RCT GH Hydrogen, a Germany-based supplier of hydrogen systems and services, signed a MoU to collaborate on advancing the hydrogen value chain.. The agreement establishes Siemens as the preferred supplier and technology partner across the entire value chain of Guofu Hydrogen's expansion plans. Link. 16/02/2024
58. **Hydrogen**: Greece. The EU has approved funding support of 116 million euros to support Motor Oil Hellas to produce hydrogen. Link 18/02/2025
59. **Hydrogen**: Mexico. Aslan Energy Capital signed a MoU with California-based CalYan XGH for the supply of 100,000 tonnes per annum (tpa) of sustainable hydrogen. The supply will originate from Aslan's green hydrogen project in Sonora, Mexico. Located in Caborca, Sonora,

the 35,000-hectare project is strategically positioned with deepwater marine access near Puerto Lobos. Link 18/02/2025

60. **Hydrogen**: Morocco. Germany is backing Morocco's green hydrogen production with a $32 million (€30 million) investment in OCP Group's green hydrogen plant in Jorf. The funding by the German PtX Development Fund is intended to support sustainable fertilizer manufacturing. The PtX Development Fund, with a budget of €270 million, was initiated by the German Federal Ministry for Economic Cooperation and Development and managed by KGAL Investment Management on behalf of KfW. KfW PtX program. The programme supports hydrogen projects in Global South countries to accelerate industrial decarbonization and foster the development of low-carbon value chains. Link 19/02/2025
61. **Hydrogen**: New Zealand. Fabrum, a New Zealand company leading the world in zero-emission transition technologies, unveiled a hydrogen testing facility in partnership with Christchurch Airport to support the development of green hydrogen-powered technologies, primarily in aviation. Fabrum and Christchurch Airport are partners in a hydrogen consortium with Airbus, Fortescue Future Industries (FFI). Fabrum established its advanced liquid hydrogen test facility on land leased from Christchurch Airport in its 400-hectare Kowhai Park energy precinct. Fabrum's facility enables the development of liquefiers, gas management systems, and boil-off gas management technologies. Link 16/02/2025
62. **Hydrogen**: Saudi Arabia. NEOM Green Hydrogen Company (NGHC) has announced significant progress in developing the world's largest green hydrogen plant. The plant, set to be fully operational by 2026, aims to produce up to 600 tons of green hydrogen daily, targeting global export markets. By the end of 2026, the green hydrogen produced will power buses, heavy trucks, and industrial processes. Link 03/02/2025
63. **Hydrogen**: Spain. BP Plc and Spanish utility Iberdrola SA initiated construction of a 25-MW green hydrogen plant in Castellon, in Spain's Valencia region. The project, which represents an investment of more than EUR 70 million (USD 72.6m), is expected to be the largest of its kind in Spain, according to Iberdrola. The plant is projected to produce 2,800 tonnes of green hydrogen annually, which will initially replace some of the grey hydrogen used by the refinery, reducing CO2 emissions by approximately 23,000 tonnes per year. Link 10/02/2025
64. **Hydrogen**: Spain. Enagas completed the conceptual design for the Spanish Hydrogen Backbone and was awarded the basic engineering for the first two compressor stations, and will deploy the Conceptual Public Participation Plan in the coming months. Enagás plans to adopt the final investment decision (FID) at the end of 2027. Link 20/02/2025
65. **Hydrogen**: Sweden. Lhyfe received funding of up to EUR 11 million (USD 11.4m) for the construction of a 10-MW green hydrogen production plant in southern Sweden's Jonkoping County. The electrolysis plant is planned to be built in Vaggeryd, between Stockholm, Gothenburg, and Malmo, and will be capable of producing up to 4.4 tonnes of renewable hydrogen daily. The fuel will be supplied to the refuelling stations of mobility and industrial customers, with some of it to go for heating and production processes. Link 03/02/2025
66. **Hydrogen**: The Netherlands. Evonik signed a term sheet with Dutch energy company VoltH2 to advance green hydrogen production at the Delfzijl chemical park in the Netherlands. VoltH2 will construct a 50 MW electrolyzer near Evonik's hydrogen peroxide (H2O2) plant. Evonik will then source a portion of its hydrogen demand from the electrolyzer, which is estimated to start operations at the end of 2027. VoltH2 will also construct a tube trailer filling station on Evonik's premises, and the hydrogen in these trailers will be made available to VoltH2's other customers. Link 04/02/2025
67. **Hydrogen**: The Netherlands. TotalEnergies signed agreements with Air Liquide to develop two projects in the Netherlands, for the production and delivery of some 45,000 tons a year

of green hydrogen produced using renewable power, generated mostly by the OranjeWind offshore wind farm, developed by TotalEnergies (50%) and RWE (50%). These projects will cut CO2 emissions from TotalEnergies' refineries in Belgium and the Netherlands by up to 450,000 tons a year and contribute to the European renewable energy targets in transport. Link 21/02/2025

68. **Hydrogen**: United Kingdom. In the UK, new research from the University of Sheffield stated that the US and China are leading the G20 in efforts to develop hydrogen fuels. In a study published in the journal Renewable and Sustainable Energy Reviews, academics examined hydrogen legislation, investment, and strategies across G20 nations – key indicators of each country's progress in establishing a hydrogen economy. The investigation found that the US and China are the most advanced across all aspects, followed by the UK, the EU and Canada. Link18/02/2025
69. **Hydrogen**: United Kingdom. The Immingham Green Energy Terminal – a multi-user ammonia and green hydrogen project in the eastern England port – received development consent from the UK Department of Transport. The decision is a boost for Associated Business Ports (ABP), Air Products and Saudi Arabia, where the ammonia will be exported, most likely from the NEOM project, and cracked into green hydrogen. The site is forecasted to produce up to 300 MW of green hydrogen. In addition to handling green ammonia, the 1.1km jetty is being designed to accommodate other cargoes including the import of liquefied carbon dioxide (CO2) from carbon capture and storage projects for sequestration in the North Sea, and features pipelines connecting east and west sites, where hydrogen production units and liquefiers will be located. Link 10/02/2025
70. **Hydrogen**: United Kingdom. Wild Hydrogen announced plans to establish a demonstrator site at Meadow Mill, Eastington, to advance its pioneering carbon-negative hydrogen and biomethane technology. The company's technology enables the production of clean molecules from organic materials, while capturing carbon dioxide to further reduce emissions. Link 19/02/2025
71. **Hydrogen**: USA. Air Products has axed a 35-tonne US green hydrogen plant and exited a hydrogen-based sustainable aviation fuel (SAF) project as part of a $3.1bn write-down. The company said it had cancelled its $500m plans to build a 35-tonne per day liquid green hydrogen plant in Massena, New York, due to US regulations ruling out existing hydroelectric power from lucrative tax credits. Air Products has also terminated its agreement with World Energy for the SAF expansion project in California, due to the "challenging commercial aspects surrounding the expansion project and current operations. Link 26/02/2025
72. **Hydrogen**: USA. Plug Power has confirmed that its 15-tonne-per-day hydrogen plant in Louisiana, US, is on schedule for completion this quarter. Once complete, Plug and Olin Corporation's 50/50 joint venture Hidrogenii will operate the plant, which utilises Olin's by-product hydrogen from chlorine production, making it grey hydrogen. Once operational, Plug's total liquid green hydrogen production capacity will increase to 39 tonnes per day. Plug has said the Louisiana plant will support its plans to deliver hydrogen to key partners such as Amazon and Walmart. Link 26/02/2025
73. **Hydrogen**: USA. Plug Power Inc on Wednesday said it has launched the industry's first spot pricing for green hydrogen, providing buyers with the opportunity to purchase liquid green hydrogen from its plants on-demand and without long-term take-or-pay agreements. The company has signed spot pricing agreements with several industry players, including one of the largest industrial gas companies. S&P Global Platts will each Thursday publish a price for the following week based on Plug's supply and demand at the current time. Customers with a spot agreement will be able to purchase hydrogen at the published price. Link 10/02/2025

Low carbon steel

74. **Low carbon steel**: Australia. Australian Federal Government on Thursday allocated A$1 billion ($636 million) to a fund that will support the manufacture of green iron and its supply chains, including an initial A$500 million to bail out the Whyalla steelworks in South Australia. The A$500 million is part of a broader A$1.9 billion state and federal government package to shore up the steel plant owned by commodities financier Sanjeev Gupta's GFG Alliance. Australia is the world's largest producer of iron ore which earned more than A$100 billion in export income in 2023-24. The wider iron and steel sectors support over 100,000 direct and indirect jobs. Link 21/02/2025

Marine fuels

75. **Marine fuels**: Belgium. A study by Cerulogy on behalf of T&E shows that palm and soy oil would likely make up nearly two-thirds of the biodiesel used to power the shipping industry in 2030 as they represent the cheapest fuels to comply. This poses a serious climate problem, warns T&E, as palm and soy are responsible for two to three times more carbon emissions than even the dirtiest shipping fuels today once deforestation and land clearance are taken into account. The fuel-intensive shipping industry would need vast amounts of farmland. 34 million hectares in 2030 – the total area of Germany – will be needed to produce enough crops to meet the increased biofuels demand from the shipping industry. Link 19/02/2025
76. **Marine fuels**: China. COSCO Energy signed a contract with COSCO Shipping Heavy Industry to build six tankers—two Aframax, two LR2, and two Panamax vessels—all designed for methanol dual-fuel operation or methanol-ready compliance. According to COSCO Energy, methanol-fueled ships can cut annual CO_2 emissions by approximately 24,000 tons, aligning with EU carbon tax and CII regulations. The optimized vessel designs improve energy efficiency and cargo capacity, while integrated smart systems enhance route planning, fuel management, and maintenance operations. Link 21/02/2025
77. **Marine fuels**: Taiwan. Evergreen Marine has placed a $1.4 billion order with Guangzhou Shipyard International for five LNG dual-fuel 24,000 TEU container ships, marking the yard's first contract for vessels of this scale. This deal signals GSI's entry into the ultra-large container ship market. Additionally, Evergreen has ordered six similar vessels from South Korea's Hanwha Ocean for approximately $1.6 billion, bringing the total order value to $3 billion. Link 21/02/2025

Methanol

78. **Methanol**: Italy. MET Development (MAIRE), Eni and Iren Ambiente have started the permitting process for an innovative circular methanol and hydrogen production plant at Eni's refinery in Sannazzaro de' Burgondi (Pavia), Italy. The plant will be developed by MAIRE together with Italian energy producer Eni and Italian utility Iren, leveraging NEXTCHEM's (MAIRE's technology business unit) proprietary NX CircularTM technology, which is completing engineering activities in preparation of the execution phase. This technology allows the plant to convert waste by generating synthesis gas (syngas), which is subsequently used to produce high quality sustainable fuels and chemicals. Once completed, the plant will be able to convert approximately 200,000 tons per year of non-recyclable waste (which will be supplied by Iren's waste management unit Iren Ambiente) into synthesis gas. The synthesis gas will, in turn, be converted to produce up to 110,000 tons annually of circular methanol, an innovative alternative for the decarbonization of the maritime sector. Link 25/02/2025
79. **Methanol**: South Korea. Plagen and Taebaek City signed an agreement to build a 10,000-ton-per-year clean methanol production facility, set to begin operation in 2027. Taebaek will

leverage its abundant forestry byproducts and renewable energy infrastructure to secure raw material supply .Link 28/02/2025

80. **Methanol**: Spain. Magnon Green Energy, a subsidiary of the Ence Group, is planning a renewable fuels facility in Huelva that will integrate biogenic CO_2 capture, an electrolysis plant for green hydrogen production, and methanol synthesis, with an annual capacity of 250,000 tonnes of renewable methanol. The project is intended to support the transition from fossil-based methanol to e-methanol, a fuel that could help decarbonize industries such as maritime and aviation. The facility will be located at Magnon's existing biomass-based renewable electricity plant in Huelva, which generates 137 MW of power and processes 800,000 tonnes of agroforestry waste per year. Link 16/02/2025
81. **Methanol**: Spain. Repsol will invest more than €800 million in the Tarragona Ecoplant, a pioneering project in Europe to produce renewable methanol. The gasification technology, developed by Enerkem, has received funding from the Innovation Fund of the European Union due to its high potential for reducing emissions and the innovative nature of the project. Repsol has approved a historic investment in the Spanish region of Catalonia to build the first plant in Europe to transform urban waste into renewable methanol – a fuel that will help decarbonize transport – as well as circular products. The new plant will have the capacity to process up to 400,000 tons of municipal solid waste per year and turn them into 240,000 tons of renewable fuels and circular products. The renewable methanol originates from organic waste, while the circular products come from non-organic waste, such as non-recyclable plastics. Link 21/02/2025
82. **Methanol**: UAE. TA'ZIZ awarded a $1.7 billion EPC contract to Samsung E&A to construct one of the world's largest methanol plants in Al Ruwais Industrial City, Al Dhafra, Abu Dhabi, aiming to boost the UAE's chemical industry and economic diversification. The 1.8 million tons per annum facility will be the country's first methanol production plant and is set to come online in 2028, powered by clean grid energy. Link 07/02/2025

Packaging

83. **Packaging**: The Netherlands. Avantium N.V., a specialist in renewable and circular polymer materials, signed a joint development agreement with Amcor Rigid Packaging USA to explore the use of Avantium's plant-based polymer PEF – branded as releaf – in rigid containers for various products, including food, beverage, pharmaceutical, medical, home, and personal care. Amcor has committed to a multi-year capacity reservation for PEF from a future industrial-scale facility, based on a technology license from Avantium. This agreement guarantees Amcor preferred access to PEF volumes produced by Avantium's future licensee network. Link 18/02/2025

Pyrolysis

84. **Pyrolysis**: USA. Castlerock Biofuels LLC, operating locally through its subsidiary EME Biofuels, LLC, has announced the selection of Millinocket, Maine as the site for its new sustainable biocrude production facility, leveraging the advanced thermal processing (RTP) technology developed by Ensyn Corporation and its affiliated companies. The plant, to be built on a greenfield site within One North, the former Great Northern paper mill location, will utilize renewable logging residue from local Maine forestry operations to produce up to 20 million gallons of Fast Pyrolysis Bio-Oil annually Link 05/02/2025

Plastic recycling

85. **Recycling plastic**: Germany. Oerlikon Barmag and Evonik have announced their cooperation to promote chemical recycling of Polyethylene terephthalate (PET) waste. Both companies are committed to develop technologies for robust and efficient depolymerisation and purification processes, coupled with an integrated concept for repolymerisation and the associated EPC business models. Link 03/02/2025

Renewable diesel

86. **Renewable diesel**: Ireland. SSE Thermal has made a final investment decision to build Tarbert Next Generation Power Station. SSE Thermal has taken a final investment decision to build Tarbert Next Generation Power Station. The use of sustainable biofuels – specifically Hydrotreated Vegetable Oil (HVO) – provides a lower carbon alternative to traditional fossil fuels and supports the country's long-term decarbonisation efforts. The HVO will be sourced from 100% waste feedstocks and supplied in line with the EU's RED II sustainability requirements. Link 28/02/2025
87. **Renewable diesel**: South Africa. Sasol, Anglo American and De Beers entered into a Joint Development Agreement (JDA) on Tuesday to pilot the production of feedstock for renewable diesel. The JDA is to assess the technical and commercial viability of feedstock production, starting with Solaris and Moringa plantations to generate vegetable oil. Sasol's existing assets can take a variety of feedstocks, enabling them to produce renewable diesel using vegetable oil quicker than greenfield projects and at lower costs. Link 06/02/2025
88. **Renewable diesel**: USA Environmental Information Administration data showed renewable diesel is increasingly replacing petroleum diesel on the U.S. West Coast, where state-level policies are attracting new production capacity and shipments to the region. The fuel continues to mostly be consumed in California but is also making up a substantial share of Oregon's and Washington's smaller distillate pools, according to quarterly data published by California, Oregon, and Washington. Link 20/02/2025

Technology development

89. **Technology Development**: Canada. PyroGenesis Inc. signed a C$1.1 million second contract with the Varennes Carbon Recycling plant, a large biofuel production project currently under construction in Varennes, Quebec. As a result, the overall project contracts with Pyro Green-Gas increase in total to C$3.6 million. Under the terms of the new project, the Company will provide additional engineering, technology services and equipment related to a nitrogen loop system, whereby nitrogen would be fed into the system to regenerate the system. Together, this would target the necessary requirement and quality of the eventual product gas. Link 05/02/2025

Textiles

90. **Textiles**: USA. Carnegie, a provider of sustainable textiles and acoustical management solutions for the commercial industry, announced Carnegie Siltech Plus, a part of the An Ode to Textiles collection. Siltech Plus is the first high-performance coated upholstery fabric on the market that is available in a bio-based version. Siltech Plus features bio-based polyurethane-coated upholsteries made with corn starch. Link 16/02/2025

GIFFORD
CONSULTING

Company Summary – **February 2025**

Frequency of mention

Company	Frequency
Avantium	3
Air Products	2
BP	2
Bright Renewables	2
Evonik	2
Gevo	2
Plug Power	2
TotalEnergies	2
Aemetis	1
Aether Fuels	1
Anaergia	1
ARENA	1
Arkema	1
Aslan	1
Australian Government	1
BAC Renewable Energy	1
BASF	1
Bloom Energy	1
Blue Biofuels	1
Cargill	1
Carnegie	1
Castlerock Biofuels	1
Cerulogy (for T&E)	1
Comstock	1
COSCO Energy	1
Cosmo Oil	1
Darling Ingredients	1
Deutsche Bahn	1
Total	**89**

Topics & Themes/Category Summary– **February 2025**

Frequency of mention

Category	Frequency
Hydrogen	22
Biojet	14
Biogas	7
CO2 Removal	6
Biobased chemicals	5
Biofuels	5
e-fuels	4
Methanol	4
e-methanol	3
Marine fuels	3
Renewable diesel	3
Feedstock	2
Ammonia production	1
Biobased plastics	1
Biodiesel	1
Biofuel	1
Ethanol	1
Low carbon steel	1
MSW to methanol	1
Packaging	1
Pyrolysis	1
Recycling plastic	1
Technology development	1
Textiles	1
Total	**90**