

Bioeconomy & Low Carbon Technology Overview for October 2024

Our summary of low carbon technology developments for October 2024 is based on data and information collated by Gifford Consulting and provided on the website: [Gifford Consulting](#)

Highlights by Topic: October 2024

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Ammonia production and utilisation

1. **Ammonia production:** Europe. Ohmium International announced that its modular PEM electrolyser technology has been selected by SwitchH2 BV for a project to build a 300-MW offshore floating green hydrogen and ammonia synthesis station off the coast of Southern Europe. Once completed, the floating station will be capable of producing up to 55,000 tonnes of green hydrogen annually.
2. **Ammonia production:** Germany. Yara International opened its new ammonia import terminal in Brunsbüttel, Germany. Brunsbüttel is located on the North Sea and Kiel Canal, making it an ideal hub for enabling the hydrogen economy in Germany. With the new terminal, Yara has the infrastructure to enable imports of up to three million tons of low-emission ammonia to Europe annually.

Biobased chemicals

3. **Biobased chemicals:** Brazil. Neste and Braskem, the largest producer of thermoplastic resins in the Americas, have reached an agreement for the supply of renewable and recycled feedstocks for polymers and chemicals production. Braskem products based on these feedstocks are expected to be available on the market starting from the fourth quarter of 2024. These products will be sold mainly in South America.
4. **Biobased chemicals:** Finland. UPM is innovating with a series of products made from kraft lignin and has successfully marketed this growing portfolio of sustainable lignin. UPM BioPiva™ is a range of cost-effective, non-toxic and high-purity kraft lignin products used in renewable adhesives and binders as replacements for fossil-based chemicals. The kraft lignin-derived UPM Solargo™ plant biostimulants support the agricultural sector's commitment to reduce conventional fertilizer use while increasing soil health.
5. **Biobased chemicals:** Germany. Evonik Coating Additives is launching innovative biosurfactants specifically designed for coating and ink formulations. The two new products, TEGO® Wet 570 Terra and TEGO® Wet 580 Terra, will transform the paints, coatings and inks industry by combining high performance with low carbon emissions. These biosurfactants are produced by microorganisms in a unique fermentation process. Unlike fossil-based surfactants, they are 100% derived from natural resources. TEGO® Wet 570 Terra and TEGO® Wet 580 Terra are specifically designed for use in waterborne coatings and inks.
6. **Biobased chemicals:** Honeywell and SGP BioEnergy announced they are working together to develop new, scalable technology to convert industrial hemp and other plant-based material into biochemicals that can be used to produce plastics and other everyday items, offering an alternative to chemicals produced from fossil fuels. As part of this collaboration, Honeywell will develop the new technology that enables plant material to be used as feedstock for biochemical production on an expanded scale. SGP BioEnergy will provide the infrastructure, workforce and second-generation feedstock, including industrial hemp, for this initiative through its "READY.GROW." program.
7. **Biobased chemicals:** The Netherlands. Argent Energy officially launched Europe's largest facility dedicated to producing bio-based, technical-grade glycerine at its Port of Amsterdam site. The state-of-the-art refinery will upgrade crude glycerine, a by-product of Argent's waste-based biodiesel process, into 99.7% pure technical-grade glycerine. This project will produce 50,000 tons of bio-based glycerine and provide chemical producers with an alternative to fossil derived glycerine.
8. **Biobased chemicals:** The Netherlands. Avantium N.V was awarded a €3.5 million grant from the EU Horizon Europe program for its participation in the research and development program ICONIC. The ICONIC program aims to convert CO2 into formic acid, a key ingredient for

sustainable protein production. Avantium's Volta Technology platform uses electrochemistry to transform CO₂ into chemical building blocks. In the ICONIC project, Avantium will further scale up the electrochemical cell to convert CO₂ from refinery gases into formic acid. This formic acid will then be used to produce added value products such as proteins for animal feed and alternatives to palm oil.

9. **Biobased chemicals:** United Kingdom. Eonic Technologies closed an equity fundraising round to support the commercialisation of its new CO₂ surfactant technology. Eonic offers a patented process based on a unique catalyst that replaces fossil-based feedstocks with renewable carbon. The company licenses its technology to polyols and surfactant manufacturers that supply global consumer brands and manufacturers.
10. **Biobased chemicals:** USA. Sustainea and Primient announced a co-location partnership for the supply of corn dextrose from Primient's facility in Lafayette, Indiana to Sustainea's first Bio-MEG (monoethylene glycol) plant. Sustainea's facility will be an investment of around \$400 million and will produce a renewable, plant-based alternative to petroleum-based MEG.

Biobased plastics

11. **Biobased plastics:** Belgium. A.P. Moller Holding has launched Vioneo, a new venture dedicated to transforming plastics production. Vioneo will manufacture fossil-free plastic resins and significantly reduce the carbon footprint associated with plastics production. Vioneo has designed a production method utilizing an innovative and proven technology to produce fossil-free polypropylene and polyethylene at scale, using green methanol as a feedstock.
12. **Biobased plastics:** Finland. Fortum Recycling & Waste, a leading waste management and circular solutions company in Finland, has succeeded in producing biodegradable plastic from carbon dioxide (CO₂) emissions from waste incineration at its plant in Riihimäki, Finland. This process is based on carbon capture and utilization.
13. **Biobased plastics:** Finland. Metsä Group's innovation company, Metsä Spring, has started pre-commercial sales of its three-dimensional, wood-based packaging solution Muoto™. Muoto packages can be used in a wide range of applications, from takeaway to industrial packing. During the pre-commercial phase, the availability of products will be limited by volume and packaging type. Metsä Group began the development of Muoto products in 2020 in collaboration with Valmet.
14. **Biobased plastics:** The Netherlands. Avantium N.V announced the launch of the Releaf (Releaf is an EU registered trademark of Avantium) brand name for Avantium's plant-based and recyclable polymer PEF (polyethylene furanoate). Releaf will help change the plastics industry as it provides sustainable and superior solutions for bottles, packaging, and textiles.
15. **Biobased plastics:** USA. Plastipak will purchase the 100% plant-based, recyclable polymer PEF from Avantium's FDCA plant for the use in beverage and food packages, for consumers to use in the USA.
16. **Biobased plastics:** USA. TekniPlex Healthcare announced the launch of innovative bio-based PVC compounds for medical applications, marking a significant advancement in the healthcare materials sector. These new compounds feature performance and composition that match those of conventional polyvinyl chloride (PVC) resins, enabling manufacturers to maintain high standards of functionality while enhancing sustainability.

Biodiesel

17. **Biodiesel:** Brazil. Grupo Potencial announced an investment of \$108.86 million to increase biodiesel output at one of its plants, giving the facility the world's largest production capacity for soy oil-based biofuel. The plant, located in Parana state, will increase its annual biodiesel

production capacity to 1.62 billion litres from 900 million Liters. The plant's current capacity already makes it the largest unit in Brazil, according to Potencial. Expansion work is scheduled to begin in 2025, with completion in 2026.

18. **Biodiesel:** USA. The Iowa Renewable Fuels Infrastructure Program Board approved 126 project applications from Iowa gas stations for new and expanded E15, E85, and biodiesel infrastructure projects. Totalling nearly \$6.35 million dollars, the projects are located across 61 Iowa counties and will allow drivers to save money by providing more access to lower cost and cleaner burning homegrown biofuels.
19. **Biodiesel:** USA. Tidewater Terminals has opened a \$6.1 million biodiesel hub at its Snake River facilities. The facility will provide biodiesel and ethanol for custom blending to serve markets in Eastern Washington, Eastern Oregon and Northern Idaho. BNSF Railway as well as farmers securing biodiesel for their tractors are expected to be amongst the future clients for the expanded facility that can blend up to 2 million gallons of renewable fuels per month.

Biofuels

20. **Biofuels:** Japan. LanzaTech has signed a master license agreement with Sekisui Chemical to deploy technology that converts syngas from municipal solid waste and industrial solid waste into ethanol. Sekisui intends to build multiple facilities in municipalities across Japan which incorporate equipment packages, engineering and advisory services, consumables, and intellectual property provided by LanzaTech. The ethanol output can be converted into ethylene and kerosene for use as SAF.
21. **Biofuels:** Poland. ORLEN Group has initiated sales of HVO100 fuel at two service stations in Germany. The firm is making HVO100 available at two locations: Boizenburg on the Elbe and Achim near Bremen. Sales will soon be expanded to include more stations in Germany. The ORLEN Group is also preparing to begin HVO100 sales in the Czech Republic, where the necessary legal framework is already in place. Wholesale sales in the Czech market are expected to commence in the first quarter of 2025.
22. **Biofuels:** USA. Lummus Technology and Next Wave Energy Partners, LP announced the production of the world's first renewable alkylate. This product, derived from ethanol and produced through a series of Lummus' technologies, is a bio-based, low carbon intensity fuel blending component. Lummus began by taking green ethylene produced from ethanol using the EtE EverGreen™ technology. The green ethylene was then shipped to Lummus' Research and Development Centre in Pasadena, Texas, where it was processed in multiple pilot plants and converted into the renewable alkylate. Next Wave then conducted extensive engine and emissions testing on the renewable alkylate.
23. **Biofuels:** USA. NewEnergyBlue, a designer of biomass refineries that turn agricultural waste into highly decarbonized biofuels and biochemicals, has finalized its purchase of Inbicon biomass-conversion technology from Ørsted. NewEnergyBlue biomass refinery's process design utilizes Inbicon biotechnology to tightly adjust process thermodynamics and precisely control chemical reactions without the use of caustic additives.

Biogas

24. **Biogas:** Australia. Optimal Renewable Gas and Solstice Energy have established a partnership to develop a renewable gas plant at Westbury – the Westbury BioHub. The Westbury BioHub will transform organic waste from within a 200 km radius of the Westbury industrial area into renewable energy as biomethane, and an organic fertilizer. The facility is projected to divert between 86,000 and 150,000 tons of organic waste per year. The project is expected to

produce around 320 terajoules of biomethane annually, enough to supply the equivalent of more than 10,000 homes each year.

25. **Biogas:** Brazil. Geo bio gas&carbon and Brazil-Germany Cooperation for Sustainable Development signed an agreement for developing the first plant in Brazil for the production of sustainable aviation fuel (SAF) from biogas. The objective is to develop, on a commercial scale, a sustainable production model that uses biomass waste as a source of biogenic carbon.
26. **Biogas:** Denmark. Nordzucker supply Danish beet residues to Nature Energy which produces biomethane for sugar production. From 2025, Nordzucker will use it for decarbonising sugar production in its two Danish factories. It is planned to reduce the CO₂ emission in these plants stepwise up to 37,000 tons until 2030.
27. **Biogas:** Finland. Lantmännen identified biogas as a growth technology and is now establishing Lantmännen Biogas AB. Lantmännen has organic residual streams from its own operations, the value of which can be maximized by being used as a raw material for biogas production. Lantmännen currently processes grain and residues from the food industry into sustainable biofuels, green chemicals and raw materials for feed and food production.
28. **Biogas:** France. CMA CGM Group and SUEZ signed a MoU to establish a long-term industrial partnership related to biomethane, to help decarbonize shipping in Europe. The supply by SUEZ will be up to 100,000 tonnes of biomethane per year by 2030. This biomethane would be used by CMA CGM Group for its gas-powered ships.
29. **Biogas:** Ireland. CycleØ Group made a significant investment in new innovative biomethane plants in Ireland. The group, which has a portfolio of hundreds of successful biogas/biomethane installations in more than 40 countries globally, stated its intention to initially build 4 new agri-based plants across Ireland. CycleØ group will equity-finance, build and operate new plants, at 4 sites initially identified in Kildare, Cavan, Galway and Limerick. These plants are expected to generate around 40 GWh each of biomethane in total per annum, enough to heat over 3,000 homes for a year in Ireland.
30. **Biogas:** Ireland. Gas Networks Ireland commenced construction for the new Central Grid Injection (CGI) facility in Mitchelstown. CGI facilities provide injection points for biomethane production sites that may be located remotely from the existing gas network. A key initiative of Gas Networks Ireland, this facility cost around €32m.
31. **Biogas:** Romania. DN AGRAR Group, Romania's largest integrated dairy farm, and BSOG Energy, an energy company specializing in the development of biomethane production projects in Romania, owned by Black Sea Oil & Gas, signed a cooperation agreement for the largest biomethane production project in Romania, with a total capacity of up to 15 MW. DN AGRAR will supply raw materials for biomethane production under a long-term contract.
32. **Biogas:** Spain. Ence, through its subsidiary Ence Biogas, expects to reach a biomethane production of 1TWh in 2030 working with agricultural biomass, livestock and agri-food industry. The company expects to close out 2024 having achieved 14 projects including in Castilla León, Aragon, Catalonia, Castilla-La Mancha and Andalusia.
33. **Biogas:** Spain. Repsol started supplying liquefied biomethane (bio-LNG) to Brittany Ferries' LNG-fuelled vessels Salamanca and Santoña at the LNG-bunkering terminal in Santander, Spain. This is the first test of its kind for the two companies, consisting of the supply of three truck-loads, totalling 60 tons of bio-LNG.
34. **Biogas:** Spain. Schmack Biogas S.r.l., a subsidiary of Japanese Swiss cleantech company Hitachi Zosen Inova AG (HZI), announced that it has been selected by Spanish waste management specialist AGR Biogás (AGR) to deliver its first anaerobic digestion system at La Calahorra. The new La Calahorra plant will provide a long-term biogas solution for hard-to-treat olive pomace

and other agricultural waste. La Calahorra is expected to be the first in a series of biogas projects AGR Biogás develops across the country.

35. **Biogas:** Ukraine. VITAGRO Group injected the first Ukrainian biomethane into the gas transportation system. This is a milestone for Ukraine, unlocking opportunities for the export of eco-friendly biofuel. The VITAGRO plant in the Khmelnytskyi region is supplying biomethane into the GTS at 60-70% of the planned volumes, approximately 6,000 cubic meters daily. By the end of October, production is expected to increase, and by November, the first export of Ukrainian biomethane abroad is expected.
36. **Biogas:** USA. Aemetis Biogas has completed initial construction of a multi-dairy anaerobic digester to process waste from approximately 14,000 dairy cows in Merced County, California. The multi-dairy digester is expected to begin operations by year-end 2024 and produce more than 200,000 MMBtu per year of renewable natural gas. The digester is designed to receive waste from four dairies that are each located within one-half mile from the digester. The project is connected to the 36-mile Aemetis biogas pipeline.
37. **Biogas:** USA. Emvolon reached agreement with Montauk Renewables Inc., (a renewable energy company specializing in the management, recovery and conversion of biogas from waste into renewable natural gas).The agreement focuses on leveraging Emvolon’s patented technology, the initial pilot is a commercial-scale demonstration of recovering and converting biogas into green methanol, which is expected to take place at Montauk’s renewable gas production site at a landfill in Humble, Texas.
38. **Biogas:** USA. PurposeEnergy announced the opening of its Middlebury renewable energy facility. The \$23 million project utilizes patented anaerobic digestion technology to support Vermont’s circular economy goals by minimizing waste and maximizing resource recovery. PurposeEnergy - Middlebury is the state’s first food waste to renewable electricity project awarded under the Vermont Public Utility Commission’s Standard Offer Program. Designed to accommodate the high-strength organic waste from food and beverage manufacturers in the Middlebury Industrial Park, the facility can also accept a wide variety of trucked organic waste from other Vermont businesses.
39. **Biogas:** USA. Synthica Energy broke ground this month on a new Renewable Natural Gas (RNG) facility in Rome, Georgia, just outside of Atlanta. “Synthica Rome” will be the first of its kind in the Greater Atlanta region and is expected to divert nearly 250,000 tons of waste from local landfills each year. Food and beverage manufacturers and other customers will have less distance to transport their pre-consumer waste, lowering their disposal costs and cutting down on emissions, while the plant’s anaerobic digestion technologies will create RNG.
40. **Biogas:** USA. TotalEnergies has broken ground on the Oakmulgee Dairy Farm renewable natural gas (RNG) project in Amelia Court House, Virginia, with its joint venture partner Vanguard Renewables, a portfolio company of Global Infrastructure Partners (GIP), a part of BlackRock. The Oakmulgee Dairy Farm will produce more than 259,000 MMBtu/y of renewable gas using an anaerobic digester and divert more than 105,000 tons of food and beverage waste per year from landfill or incineration. The RNG produced at Oakmulgee will fuel AstraZeneca’s Maryland biopharmaceutical production facilities.

Biojet/SAF

41. **Biojet/SAF:** Argentina. Bahía Energía Group will invest approximately \$200 million in the first bioethanol plant in Buenos Aires and the first SAF plant in the country. The project will be carried out through its company Biosanfe, which will develop the complex for producing biofuels (ethanol, SAF and bio-methanol) from corn.

42. **Biojet/SAF:** Columbia. Ecopetrol began a test production of 20,000 barrels of SAF in October at its Cartagena refinery. The fuel developed includes up to 5% of plant-based raw materials, such as palm oil and used cooking oil. The production of this new fuel is based on the technology and processes that were developed by the Colombian Institute of Petroleum and Energies for the Transition (ICPET).
43. **Biojet/SAF:** Finland. Norwegian e-fuels company Norsk e-Fuel and Fortum agreed to reserve a 14-hectare area for a sustainable synthetic aviation fuel (e-SAF) plant at the Port of Rauma in Finland. This is Norsk e-Fuel's first project outside Norway and is part of the company's long-term strategy to support Europe's net-zero targets by 2050. The project is in its early stages, and Norsk e-Fuel has not yet made a final investment decision. Fortum and Norsk e-Fuel, together with Port of Rauma, will begin planning the area's electrical connections and permit processes for establishing the e-fuel production facility.
44. **Biojet/SAF:** Japan. Neste, ITOCHU and GS Caltex have collaborated to make the first batch of CORSIA-eligible ISCC-certified SAF available for purchase at Narita International Airport in Japan. As part of the collaboration, Neste supplied over 1,000 tons of neat CORSIA-eligible and ISCC-certified Neste MY Sustainable Aviation Fuel™ to the refinery of GS Caltex in Yeosu, South Korea which was blended with conventional jet fuel. This marked the first time SAF was blended locally in South Korea.
45. **Biojet/SAF:** South Africa. Sasol is planning to produce up to 650,000 tons of "green" jet fuel annually at its Secunda and Sasolburg synfuel refineries. The company confirmed plans to start producing large volumes of SAF by using new solar and wind farms in South Africa to process hydrogen and recycled carbon at one or both of its existing synfuel refineries in Mpumalanga and the Free State.
46. **Biojet/SAF:** Sweden. St1 Refinery has started using Honeywell's Ecofining technology to produce SAF. The biorefinery in Gothenburg, Sweden will provide SAF to regional airlines.
47. **Biojet/SAF:** USA. Crysalis has restarted a shuttered 57-acre Metro East ethanol plant and plans to transform it into a plant that produces 5,000 to 10,000 barrels a day of low carbon intensity SAF and SAF feedstock, featuring a carbon intensity score 90% lower than that of traditional fossil-derived jet fuel. Investment is expected to be \$239.5 million.
48. **Biojet/SAF:** USA. Diamond Green Diesel Port Arthur plant was successfully completed in October. The project is expected to be fully operational by the end of 2024. This provides the plant the option to upgrade approximately 50 percent of its current 470 million gallons renewable diesel annual production capacity to SAF. Valero is a joint venture member in Diamond Green Diesel Holdings LLC, which owns two renewable diesel plants located in the U.S. Gulf Coast region with a combined production capacity of approximately 1.2 billion gallons per year, and Valero owns 12 ethanol plants located in the U.S. Mid-Continent region with a combined production capacity of approximately 1.6 billion gallons per year.
49. **Biojet/SAF:** USA. Signature Aviation, the world's largest network of private aviation terminals announced expansion of its blended sustainable aviation fuel (SAF) offering to six new locations across the US following a blended SAF supply agreement with Valero Marketing and Supply Company, a subsidiary of Valero Energy.
50. **Biojet/SAF:** USA. Universal Fuel Technologies (Unifuel) closed a \$3 million funding deal for its Flexiforming technology that cuts SAF production costs by up to 50%, and the related carbon emissions by up to 75%. Unifuel's Flexiforming technology is a chemical process that can convert many sustainable materials, such as ethanol, methanol, renewable naphtha, liquefied petroleum gas (LPG), and others, into high-quality sustainable fuels or chemicals, including SAF. Flexiforming enables an ethanol-to-jet (ETJ) pathway at approximately half the cost of current ETJ processes.

Biomaterials

51. **Biomaterials:** Belgium. AmphiStar, a leader in bio-based surfactant innovation, announced the launch of AmphiCare® and AmphiClean®. Made entirely from organic waste- and side streams, the newly launched products are the first ever fully upcycled biobased surfactants to enter the market. These biosurfactants are produced using biological conversion processes and are derived from local, organic biowaste and side streams from agri-food processing.

Biotechnology

52. **Biotechnology:** USA. IFF announced the launch of its OPTIMASH F200 and OPTIMASH AX enzyme solutions in combination to maximize corn oil recovery at fuel ethanol plants. New IFF in-plant data shows that this combination can deliver up to 15 percent additional corn oil recovery, helping to meet the growing demand for biodiesel, renewable diesel, and animal feed industries. Additionally, IFF has developed a proprietary oil mapping calculator to help ethanol producers optimize dosing for maximum recovery.
53. **Biotechnology:** USA. LanzaTech Global is to expand its biorefining platform capabilities to include operations that produce LanzaTech Nutritional Protein (“LNP”) as the primary product. LNP is a microbial protein that is a nutrient-rich alternative to plant and animal-based proteins. By using a new microbe in its proprietary gas fermentation process, LanzaTech’s biorefining platform can produce a cost-competitive protein solution.

CO2 Removal

54. **CO2 removal:** Finland. Fortum Recycling & Waste has succeeded in producing biodegradable plastic from CO2 emissions from waste incineration at its plant in Riihimäki, Finland. This breakthrough, based on carbon capture and utilization.
55. **CO2 removal:** Global CCS Institute, an international think tank with a mission is to accelerate the deployment of Carbon Capture and Storage (CCS), has released its Global Status of CCS 2024 report which discusses significant year-on-year momentum for CCS projects globally, as governments and industries around the world collaborate to reduce greenhouse gas emissions. Report findings show strong growth in CCS projects across all stages of development, with a total of 628 projects in the pipeline, an increase of 236 projects compared to 2023.
56. **CO2 removal:** Phlair’s new system for CO2 removal employs a pH-swing mechanism powered solely by electricity for efficient CO2 capture and release. The captured CO2 is used by partners for permanent storage or to manufacture CO2-negative chemicals. Building on existing and proven low-capex components from Polymer Electrolyte Membrane (PEM) fuel cells and water electrolysis, Phlair’s solution allows for rapid scalability with high durability. The system also includes a built-in energy storage mechanism, eliminating the need for additional expensive battery storage
57. **CO2 removal:** United Kingdom. The UK Government pledged nearly £22 billion (~ \$28.5B) of funding for carbon capture and storage (CCS) projects. The funding will be rolled out in subsidies for the development of new CCS clusters in the industry-heavy areas of Teesside and Merseyside. Located in the Northeast of the UK, Teesside is also part of the East Coast Cluster by the Northern Endurance Partnership, selected by the UK Government as a priority cluster in phase 1 of the Carbon Capture, Usage, and Storage (CCUS) cluster sequencing process. Divided into three projects, the funding will support the capture of up to 8.5 million tonnes of CO2 emissions released either during hydrogen production, gas power generation, or waste-to-energy burning processes, locking away the captured exhausts into empty gas fields in the North Sea and Liverpool Bay.

58. **CO2 Removal:** USA. Carbon Clean signed a MoU with BCCK, a leader in engineering, procurement, fabrication, installation and field construction services. BCCK and Carbon Clean will collaborate to provide Carbon Clean's semi-modular CaptureX technology to customers across the U.S. Priority sectors include oil & gas production, gas processing, air separation, power generation, landfill gas, biogas, and hydrogen. Carbon Clean's CaptureX technology is a cost-effective alternative to open-plant construction. The solution is 80% modularized and containerized, which significantly cuts installation time and simplifies integration with customers' other operations.

E-Fuels

59. **E-fuels:** The Netherlands. Power2X and terminal storage specialist Advario have partnered to develop a production and storage hub at the Port of Rotterdam for sustainable aviation fuel (e-SAF) and synthetic ultra-low carbon fuels, aiming for an annual output of over 250,000 tonnes. The facility will utilise imported green methanol produced from green hydrogen and biogenic carbon as feedstock as well as locally produced green hydrogen. The e-SAF production will be backed by Advario with its developed advanced storage and logistics sites with a capacity of around 230,000 cubic metres as well as marine and rail facilities.

E-Methanol

60. **e-methanol:** USA. Vast Renewables Ltd has signed a development services agreement with GGS Energy LLC to advance a commercial-scale synthetic fuels project. The project is expected to be located in the Southwest US. It will be Vast's first deployment in the US. The project will use Vast's CSP v3.0 technology to generate heat and electricity to power a co-located refinery that will produce green methanol and/or electrically powered sustainable aviation fuel (e-SAF).

Ethanol

61. **Ethanol:** Brazil. Coamo Agroindustrial Cooperativa is building a corn ethanol production plant in the city of Campo Mourão (PR). With resources from the Climate Fund, the plant will have the capacity to process 1,700 tons of corn per day and produce 765,000 liters of ethanol per day. The project, which has a total value of R\$1.7 billion and will also result in the daily production of 510 tons of animal feed meal (DDGS) and 34 tons of corn oil, co-products generated in the corn ethanol process after the fermentation stage. DDGS is a meal rich in fiber and proteins that can be incorporated into animal feed, and corn oil can be used to produce biodiesel.
62. **Ethanol:** Brazil. Inpasa signed an agreement for the investment of R\$3.4 billion for the expansion of the Sidrolândia (MS) plant and for the completion of the Balsas (MA) plant, which will begin operating in March 2025, in addition to the construction of the biorefinery in Luís Eduardo Magalhães (BA), with operations scheduled for March 2026.
63. **Ethanol:** Brazil. KATZEN International announced the completion and startup of the INPASA Agroindustrial S/A bioethanol plant expansion project in Sinop, Mato Grosso, Brazil. The expansion provides a production capacity to 2.1 billion liters per year, making it the world's largest grain-based "dry mill" bioethanol plant. The KATZEN-designed Sinop plant was constructed by INPASA in 2019 to produce 490 million liters of motor fuel-grade ethanol annually. INPASA commissioned KATZEN to expand the plant in four stages commencing in 2021. The new plant configuration will process 4.6 million tons of locally grown corn to produce 2.1 billion liters per year of ethanol, 1 million tons of DDGS (high value-added protein), 105 thousand tons of corn oil, and 804.1 GWh of renewable electricity.

64. **Ethanol:** USA. ICM, Inc announced the successful startup and commissioning of its FOT Oil Recovery™ system at Elite Octane, LLC’s ethanol facility in Atlantic, Iowa. The plant became operational in 2018 and produces over 150 million gallons of ethanol per year. The recent installation of the FOT Oil Recovery™ system is exceeding anticipated oil recovery and performance targets. Elite Octane was the first facility to install this technology as a standalone system, and it is now one of eight plants that have either installed it or are currently under construction, demonstrating its growing impact in the industry. The turnkey EPC agreement for the project was signed last year, and the FOT Oil Recovery™ system is now fully operational, delivering outstanding results. The technology maximizes distillers corn oil (DCO) recovery through improved separation, reducing fat content in the wet cake and enhancing plant efficiency.

Feedstock

65. **Feedstock:** Global Biomass Resource Assessment is a new tool providing groundbreaking data on current and future sustainable biomass supplies around the world. The results from this new global sustainable supply assessment allows scientists, policymakers, and industry leaders to explore potential sources of biomass.
66. **Feedstock:** Indonesia. When Indonesia boosts its biodiesel blending mandate to 40% from the current 35%, available palm oil supplies will tighten. With blending expected to rise to 16 billion litres next year when the mandate increases, up to 1.7 million metric tons of palm oil annually will be diverted towards biodiesel production and no longer available for exports. Production in 2024/25 is expected to increase by 2.3 million tons.
67. **Feedstock:** Thailand. Bangchak signed a MoU with New Biodiesel to buy used cooking oil collected from the southern provinces for sustainable aviation fuel feedstock. Bankchak recently purchased 45% of New Biodiesel’s parent company, Thanachok Vegetable Oil (2012). It already has agreements with 17 other companies for sourcing UCO but also wants to sign on with smaller restaurants and shops to secure their UCO to supply its 1 million litre per day SAF facility currently under development.
68. **Feedstock:** The Netherlands. VTTI and Connex, a renewable feedstocks trader, joined forces to develop a renewable feedstock or ‘greenstock’ pretreatment facility at VTTI’s terminal in Amsterdam. When complete, the facility will be able to process over 400,000 tons of renewable feedstock per year to enable the production of sustainable fuels. Renewable feedstocks can be stored, blended, and pre-treated at the Greenstock Pretreatment Facility in preparation for the transport and eventual production of renewable diesel. The facility is to be operational by 2027.
69. **Feedstock:** USA. BASF launched xarvio BIOENERGY, an innovative low carbon intensity crops program that lowers, tracks and documents carbon intensity levels in corn grown for ethanol biofuel production in the U.S. xarvio BIOENERGY offers the biofuel production supply chain – growers, retail agronomists and biorefineries – a quality assured and complete, end-to-end solution. The program uses the advanced agronomic intelligence of xarvio FIELD MANAGER to deliver timely, field and field-zone specific agronomic recommendations including seeding rates, fertilizer application, and crop protection strategies directly linked to carbon intensity reduction.
70. **Feedstock:** USA. Terviva announced its investment from Chevron Renewable Energy Group. Together, the two companies expect to scale Terviva’s pongamia-growing operations and drive greater availability of pongamia as a feedstock for renewable fuels production. The new arrangement signals Terviva’s strategic growth and global scalability as well as the advancement of pongamia as a lower carbon resource for biofuel production.

71. **Feedstock:** USA. The US biofuel market is experiencing dynamic growth, making canola cultivation increasingly attractive for farmers in the northern US. All of the key canola-producing states in the US expanded their cultivation areas. North Dakota accounts for the major share of 830,000 hectares. This state is followed by Montana and Washington, each with around 80,000 hectares, and Idaho and Minnesota, each with about 38,000 hectares. Notably, the canola areas in North Dakota, Montana and Washington have all risen to record levels. According to research by Agrarmarkt Informations-Gesellschaft, the growth of canola production in the US is driven by dynamic demand for meal as feed for dairy production and for canola oil as a key feedstock for biofuel production.

Hydrogen

72. **Hydrogen:** Australia. Australia's biggest electricity utility Origin Energy has pulled out of plans to develop a giga-scale renewable hydrogen production plant on Koorangang Island in New South Wales, that was to power the surrounding Hunter region industrial hub and wean it from fossil gas. Origin was "unable to see a current pathway to take a final investment decision" on the Hunter Valley Hydrogen Hub, which it is developing in collaboration with Orica. This announcement follows the July decision by Fortescue Metals to abandon the development of a green hydrogen and ammonia hub in the Northern Territory's Middle Arm industrial hub near Darwin.
73. **Hydrogen:** Australia. bp is now aiming for 2029 for the start date for electricity generation from its \$55 billion Australian Renewable Energy Hub (AREH) near the Pilbara. When bp bought into the then-Asian Renewable Energy Hub in 2022, the timeline was for financial close to be achieved in 2024 and the first power in 2026. Later that shifted to 2028 for either first power, or green hydrogen exports. The current deadlines flag green hydrogen production for local green steel by the early 2030s.
74. **Hydrogen:** Australia. The 10-MW Hydrogen Park, Murray Valley plant in the state of Victoria will be located in the city of Wodonga. The AUD-65.4-million (USD 43.9m/EUR 40.1m) project will be led by Australian Gas Infrastructure Group (AGIG) and is expected to produce 500 tonnes of hydrogen annually for injection into the local gas network at blends of up to 10%. The hydrogen will also be used for future transport refuelling stations.
75. **Hydrogen:** Brazil. Fortescue is planning to build a facility on 121 hectares (298.9 acres) in Sector 2 of Ceara's Export Processing Zone (EPZ) within the Pecem Industrial and Port Complex (CIPP). The plant will be able to produce some 500 tonnes of green hydrogen per day, powered by 1.2 GW of renewable energy. Fortescue expects groundwork to begin by the end of 2024.
76. **Hydrogen:** Brazil. Petrobras will build its first pilot plant for generating renewable hydrogen at the Vale do Açu Thermolectric Plant, in Alto do Rodrigues, Rio Grande do Norte. The project, with a total budget of R\$90 million and carried out in cooperation with the Senai Institute for Innovation in Renewable Energy (Senai ISI-ER), will be carried out by WEG, a Brazilian company and leader in electrification.
77. **Hydrogen:** Denmark. Green Hydrogen Systems (GHS) is implementing cost-cutting and restructuring measures in response to slow market adoption of hydrogen and delays in commercialising its X-Series electrolyser. The company plans to discontinue sales of its A-Series alkaline electrolyser to focus exclusively on the 6MW X-Series system. GHS will continue to manufacture and deliver A-Series orders until has filled its back orders.
78. **Hydrogen:** Finland. Neste has decided to withdraw from investing into a 120 MW electrolyzer project to produce renewable hydrogen at its Porvoo refinery in Finland. The decision follows the completion of the basic engineering phase, which commenced in May 2023. The reasons behind the withdrawal are the company's challenging market conditions and financial

performance. Evaluation of this project has been impacted by the tight limitations on the use of renewable hydrogen in the refinery's processes in fulfilling the Finnish national distribution obligation. These limitations prevent the full economic utilization of an electrolyser of the proposed size.

79. **Hydrogen:** France: Lhyfe started the construction of a 10-MW electrolysis plant in France which will produce 4 tonnes of green hydrogen per day. The Lhyfe Le Cheylas plant will be located in the Auvergne-Rhone-Alpes region of southeastern France and will become operational in early 2026. The company's goal is to use renewable energy and help decarbonise heavy and intensive transport and regional industrial sectors such as metallurgy, microelectronics and chemicals.
80. **Hydrogen:** Germany. Eternal Power announced today that it is developing a multi-phase green hydrogen project in northeastern Germany valued at a total of EUR 800 million (USD 870m) for which it has already signed preliminary offtake contracts worth billions of euros. The company expects to invest EUR 200 million in the first phase of the project, which includes the installation of an 80-MW electrolyser to produce 8,000 tonnes of hydrogen annually from 2028. The EUR-600-million second phase should boost the capacity to 400 MW.
81. **Hydrogen:** Germany. EWE AG and utility SWB AG announced that an electrolyser has been delivered in Bremen as part of a 10-MW green hydrogen project aimed at the decarbonisation of the steel industry in the region. The project, known as Hydrogen for Bremen's industrial transformation (HyBit), envisages the construction of a green hydrogen plant at SWB's site in Bremen-Mittelsbueren. The hydrogen will be mainly used for raw iron production and processing at the Bremen site of steel giant ArcelorMittal SA.
82. **Hydrogen:** Germany. Thyssenkrupp Nucera AG & Co KgaA have been awarded EU funding of up to EUR 36 million (USD 38.7m) for a project to construct a 300-MW plant for green hydrogen production. The production facility will be using the high-temperature electrolysis technology.
83. **Hydrogen:** Germany. Uniper and a major international industrial gas producer signed a nine-year Power Purchase Agreement. Deliveries will start in 2025 with an initial annual volume of 25 GWh. This volume will triple to 75 GWh from 2027 until the end of the contract in 2033. The power agreement will be used to produce green hydrogen which will then be provided to industries.
84. **Hydrogen:** Germany. Zelestra has acquired a majority stake in Rostock, Germany-based multi-tech energy solutions provider East Energy GmbH in an effort to beef up its German unit and complement its organic growth. Zelestra has acquired a 25% stake in East Energy from CropEnergies AG, a German renewable ethanol producer. Additional shares were purchased from East Energy Verwaltungs GmbH, making Zelestra the majority owner of East Energy. East Energy has a pipeline with more than 2 GW of solar photovoltaic, battery energy storage, onshore wind, power-to-X projects, the latter being green hydrogen and e-methanol programmes.
85. **Hydrogen:** Indonesia. Pertamina Power Indonesia, PT Pertamina Geothermal Energy Tbk (PGE), and Genvia have signed a MoU to collaborate on developing green hydrogen production through the integration of advanced solid oxide electrolyzer (SOEL) technology with geothermal heat resources. The agreement includes the assessment of techno-economics of using Genvia's advanced SOEL high-temperature technology to reduce energy consumption in green hydrogen production. The assessment will be conducted on one of PGE's geothermal sites.
86. **Hydrogen:** Indonesia. Sembcorp Industries through its wholly owned subsidiary, Sembcorp Utilities Pte Ltd, and PT PLN Energi Primer Indonesia have entered into a joint development

- agreement for a green hydrogen production facility in Sumatra, Indonesia, capable of producing 100,000 metric tons per annum. The project will be Southeast Asia's largest green hydrogen development initiative, with the goal of creating a regional green hydrogen hub connecting Sumatra, the Riau Islands, and Singapore.
87. **Hydrogen:** Lithuania. MT Group is to build a green hydrogen production and refuelling station to serve the needs of the Port of Klaipeda in Lithuania. The PEM electrolyser at the Port of Klaipeda will produce 500 kg of hydrogen daily, which will be stored in high-pressure stationary tanks. A portion of the green fuel will be used for the port's operations, while another part will be used for rail and road transport, including private vehicles. Plans are also being considered for the future refuelling of commercial ships arriving at the port.
 88. **Hydrogen:** Norway. Nel ASA has secured up-to-EUR-135-million (USD 146.0m) grant from the EU Innovation Fund to support a phased build-out of its next-generation pressurised alkaline technology which is currently in the prototype stage. The pressurised alkaline technology is a fundamental redesign of what it is currently being offered with substantially improved levelized cost of hydrogen (LCOH) production.
 89. **Hydrogen:** Poland. Polenergia SA won a 15-year contract for the supply of green hydrogen to the municipal transport company (MPK) of Poland's southeastern city of Rzeszow. The tender included the supply of fuel for 20 hydrogen-powered buses, which will soon be operating in the capital of the Podkarpacie. Polenergia also has another hydrogen project - H2Silesia, in Poland's southwestern province of Upper Silesia which involves the construction of a green hydrogen plant with a capacity of some 105 MW.
 90. **Hydrogen:** Singapore. Senoko Energy signed a MoU with Gentari, the renewable energy arm of Malaysia's Petronas, to explore sustainable energy solutions in Singapore using hydrogen gas. The first phase of the collaboration will explore reducing carbon emissions by 18,000 tons of carbon dioxide equivalent (tCO₂e) annually. Gentari will supply the hydrogen gas through a 20-year supply agreement which is expected to commence by 2029.
 91. **Hydrogen:** Spain. Cepsa has decided to halt investments in green hydrogen projects in Spain due to the possibility that the country's extraordinary and temporary tax on energy revenues may become permanent. A permanent tax, if approved, will slow down Cepsa's investments planned in Spain and prioritise green hydrogen projects abroad.
 92. **Hydrogen:** Spain. Repsol SA has put on hold its renewable hydrogen investments in Spain, representing a total electrolyser capacity of 350 MW across three projects, due to an unfavourable regulatory environment.
 93. **Hydrogen:** Sweden. The European Commission has approved state aid of EUR 128 million (USD 138.8m) to support a project of Swedish steelmaker SSAB to decarbonise production at its site in Luleå. SSAB plans to switch to a nearly zero-emission system from the current coal-based steel production process, establishing an electric steel mill with the capacity to produce 2.5 million tonnes of green slabs per year.
 94. **Hydrogen:** Sweden. Uniper Sweden, part of the Germany-headed international energy company Uniper SE announced that it decided to halt the development of the SkyFuelH2 project for producing SAF in Sollefteå, citing challenging market developments and rising costs. Uniper assessed that the "combination of a challenging market situation, sharply rising costs, and continued uncertain effects of the regulations intended to support increased demand for sustainable aviation fuel meant that the project was no longer commercially sustainable.
 95. **Hydrogen:** UAE. Masdar and Emsteel have completed a pilot project to demonstrate how green hydrogen could be used to decarbonise the production of steel. The partners have started producing green steel at a demo facility built at Emsteel's manufacturing site in the Industrial City of Abu Dhabi. The plant is the first one of its kind in the Middle East and North

Africa and uses green hydrogen as a replacement of natural gas in the process of extracting iron from iron ore.

96. **Hydrogen:** United Kingdom. Statera Energy has filed a planning application for a 500-MW green hydrogen project in Scotland, with the potential to expand its capacity to 3,000 MW. The Kintore facility in Aberdeenshire is expected to balance the UK's electricity system and allow the deployment of more renewable energy capacity as it will use surplus wind power for the electrolysis process. The project consists of an initial 500 MW of green hydrogen production capacity and is expected to become operational by 2028. When the full potential of the project is reached, it will help save up to 1.4 million tonnes of carbon dioxide (CO₂) emissions annually.
97. **Hydrogen:** USA Nestlé Purina PetCare, in collaboration with The Kenan Advantage Group (KAG) and Nikola Corporation, launched its first zero-tailpipe-emission delivery with the use of a hydrogen fuel cell electric semi-truck.
98. **Hydrogen:** USA. Avina Clean Hydrogen announced that it has received an industrial new construction permit to proceed with its integrated hydrogen production and refuelling facility in Southern California. Once operational, the facility will produce 1,400 metric tons of compressed clean hydrogen per annum, enough to fuel nearly 100 fuel cell heavy-duty trucks and buses daily.
99. **Hydrogen:** USA. Hy Stor Energy LP has scrapped its 1-GW preliminary deal for its Mississippi Clean Hydrogen Hub (MCHH) project with the consequent loss of an order with Norway's Nel for 1 GW of alkaline electrolyzers. This hydrogen hub is to create the largest zero-carbon, off-grid hydrogen production and salt cavern storage hub in the US, which will have the capacity to store more than 70,000 tonnes of green hydrogen in salt caverns. The site is planned to produce and store green hydrogen and deliver it to business, industrial, transportation and utility sectors across Mississippi, neighbouring states and the entire Eastern US.
100. **Hydrogen:** USA. Hyzon, a U.S.-based high-performance hydrogen fuel cell system manufacturer and technology developer announced it has entered into a purchase agreement for North America's first 12 hydrogen-powered refuse Fuel Cell Electric Vehicles (FCEVs) with recycling and innovation pioneer GreenWaste. Hyzon is focusing on deploying its fuel cell technology in heavy-duty commercial vehicles in Class 8 and refuse collection vehicles across North America, as well as new markets such as stationary power.
101. **Hydrogen:** USA. Norway's central bank, Norges Bank, has invested to increase its stake in Plug Power Inc, reporting on Thursday a shareholding of 7.95 % in the US green hydrogen solutions provider. Plug offers solutions for an end-to-end green hydrogen ecosystem. It has so far deployed more than 69,000 fuel cell systems and over 250 fuelling stations.
102. **Hydrogen:** USA. Norwegian hydrogen solutions provider Nel ASA opened its fully automated proton exchange membrane (PEM) electrolyser plant in Wallingford, Connecticut. The project is an expansion of the Wallingford site, which increases its annual capacity from 50 MW to 500 MW. With a capacity of up to 500 MW, this facility aims to improve stack efficiency while reducing costs.
103. **Hydrogen:** USA. RIC Energy has selected a site in Cadiz, Southern California, for its first green hydrogen facility in the United States. The company is planning to build California's largest green hydrogen plant at the Cadiz Ranch in the Mojave Desert. The project will utilise Cadiz's abundant water resources and expansive land to create a self-sufficient, off-grid facility, capable of producing 50,000 kg of hydrogen per day thanks to a local photovoltaic solar array and electricity storage.

Marine fuels

104. **Marine fuels:** Finland. ESL Shipping is building a series of four new, fossil-free handysize vessels that can operate entirely fossil-free by using green hydrogen-based e-methanol or biomethanol. These new 1A ice-class vessels are the top of the market in terms of cargo capacity, technology and innovation. The total value of the four ships is approximately EUR 186 million and ESL Shipping has the option to expand the order.
105. **Marine fuels:** Japan. IINO Kaiun Kaisha (IINO Lines) has placed an order for Japan's first methanol dual-fuel crude oil tanker at the Nihon Shipyard, a joint venture of Imabari Shipbuilding and Japan Marine United Corporation. The unit will use methanol as fuel in addition to conventional fuel oil. It will be equipped with a shaft generator that generates electricity by using the rotation of the main propeller shaft. The use of this fuel will reduce ship-derived air pollutants such as carbon dioxide (CO₂), sulfur oxides (SO_x), nitrogen oxides (NO_x), and particulate matter (PM).
106. **Marine fuels:** Pacific International Lines announced shifting towards LNG dual-fuel for its upcoming container ships, with a focus on bio-methane as a sustainable energy source. The company is of the view that it is absolutely critical that the regulators offer mass balancing approach to carbon reduction, because bio-methane will allow shippers to extend LNG dual-fuelled vessels built today, which will be in use until 2050, by a good 10 years.
107. **Marine fuels:** Singapore. KPI OceanConnect, a global marine fuel trading company, announced plans to expand its biofuel bunkering operations from 70 to 120 ports worldwide by January 2025, driven by increasing demand as Fuel EU Maritime regulations take effect. KPI OceanConnect has already delivered over 300 biofuel orders to more than 80 clients. The company emphasized that Europe remains the most advanced region for biofuel availability, but Asia is catching up as regulations push demand higher.
108. **Marine fuels:** Sweden. Ammonia faces major cost and safety hurdles as a shipping fuel compared to others, such as liquefied natural gas (LNG), methanol, and biofuels. Globally, only 25 ammonia dual-fuel ships have been ordered as of 2024, trailing a fleet of at least 722 LNG-fuelled ships and 62 methanol-fuelled ships as of the same year which includes orders and ships that are already in operation. The greatest risks with ammonia are leakage during bunkering operations and from fuel tanks.
109. **Marine fuels:** The Netherlands. TankMatch and an independent liquid bulk storage provider, Evos, joined forces to deliver methanol bunkering solutions across the Amsterdam–Rotterdam–Antwerp (ARA) region. Evos is planning to expand its terminal capacity to meet the growing demand for methanol storage and bunkering services. The planned expansion includes five new tanks with a total capacity of 13,500 cbm each, along with a dedicated berth to ensure quick and efficient service. The companies will have the option to store bio-, e-, and gray methanol, with options for co-mingled or segregated storage based on quality and biogenic content.
110. **Marine fuels:** Türkiye. Arkas Bunker supplied biofuel for the first time in Türkiye. The Arkas Line's container vessel, Matilde A, successfully received a bunkering of Bio24F—an innovative marine fuel composed of environmentally friendly bio-components derived entirely from waste produced in Türkiye.
111. **Marine fuels:** United Arab Emirates. ADNOC completed its acquisition of a majority stake in Fertiglobe, raising its ownership to 86.2% and contributing to ADNOC's ambition to become a global leader in low-carbon ammonia. As part of ADNOC's plan to become a top global player in low-carbon fuels, Fertiglobe is set to expand its ammonia production capacity to 8.6 million tons annually, focusing heavily on low-carbon ammonia. Fertiglobe recently secured at €397

million offtake agreement under the H2Global initiative. This deal secures the supply of renewable ammonia to Europe at a delivered price of €1,000 per ton until 2033.

Methanol

112. **Methanol.** China. Carbon Recycling International announced the signing of a "landmark agreement" with China's Tianying Group to develop its methanol synthesis technology in its large-scale electro-methanol production project in Liaoyuan, China. This is China's first large-scale project utilizing CRI's proprietary "emissions-to-liquid" (ETL) technology for the production of e-methanol from carbon dioxide (CO₂).
113. **Methanol:** Denmark. European Energy has secured a €50 million EU Innovation Fund grant to build a green methanol facility in Denmark, which will produce over 100,000 tonnes of green methanol annually. The project will reduce CO₂ emissions by 150,000 tonnes per year, advancing the EU's green transition goals. Construction is expected to start in 2026, with operations projected to begin by 2028 or 2029.

Plastic recycling

114. **Plastic recycling:** The Netherlands. Ioniqa Technologies has sought bankruptcy protection, having determined that achieving a positive cash flow from its advanced polyester recycling technology will take too long. In the last decade, the company has made significant progress towards selling technology licensing packages, demonstrating the viability of its advanced plastic recycling technology on an industrial scale and preparing comprehensive technical, process, and economic documentation. However, the advanced recycling sector is challenged by the low cost of virgin plastics derived from fossil oil and a plastic recycling supply chain still in development. Furthermore, the implementation of regulated mandatory standards for meaningful recycling levels are too far out into the future. These factors combined render the large-scale deployment of Ioniqa's advanced recycling technology for a circular PET supply chain economically unfeasible for the company at this time.
115. **Plastic recycling:** The Netherlands. Neste is to enhance its chemical recycling capabilities by collaborating with Tepsa Netherlands on the storage and handling of liquefied waste plastic in Rotterdam. This partnership is focused on the implementation of advanced aggregation tanks and underscores the company's commitment to expanding its liquefied waste plastic processing capabilities. Following successful industrial-scale processing runs, Neste is moving towards using larger quantities of liquefied waste plastic as a raw material at its Porvoo refinery in Finland and turning it into Neste RE™, a high-quality recycled drop-in feedstock for the production of new plastics and chemicals

Policy

116. **Policy:** New Zealand. Air New Zealand has failed to persuade the New Zealand government to require airlines flying in the country to replace some of their fossil fuel with sustainable fuel was part of the reason it ditched its own 2030 climate target. The airline told a conference that by 2030, nearly every overseas port it flies to will require it to fly home with a proportion of sustainable fuel, adding that there is no government commitment to a similar mandate for airlines landing in New Zealand. The airline had previously dropped its ambitious target of cutting emissions by 29% by 2030. The airline confirmed it had kept a separate target, to use 10% sustainable fuel in its planes by 2030.
117. **Policy:** Norway. Statkraft AS intends to divest its renewable energy businesses across several countries to keep a tighter focus on the Nordics, Europe and South America.

118. **Policy:** Sweden. The European Commission has concluded that two Swedish tax exemption schemes for non-food-based biogas and bio-propane used for heating or as motor fuel are in line with EU State aid rules. The Swedish tax exemption schemes aim to increase the use of biogas and bio-propane and reduce the use of fossil fuels and their greenhouse gas (GHG) emissions. The tax exemptions apply to both domestic and imported biomethane.
119. **Policy:** Switzerland. Swiss WorldCargo said it will include the rising costs of SAF due to regulatory environmental requirements in the price index of its existing Airfreight Surcharge (ASC) from January 1, 2025. Starting in 2025, a statutory SAF blending quota of initially 2% will apply for departures from European Union (EU) countries. Countries outside the EU are also planning to introduce or have already introduced mandatory SAF blends.
120. **Policy:** USA. New Energy Risk, a wholly owned division of Paragon Insurance Group, and Ecostrat, a leader in assessing, developing, optimizing, and managing biomass supply chains, today announced a partnership to develop Feedstock Supply Insurance, an insurance offering that aims to mitigate risk in biomass feedstock supply chains. It will do this by effectively capping feedstock costs and securing long-term project debt repayment obligations.

Renewable diesel

121. **Renewable diesel:** Central to success of producing renewable diesel and SAF is the use of catalysts. For example, guard catalysts are essential as they manage contaminants and ensure the longevity of the processing cycle. Given that renewable fuels typically have a higher cloud point than fossil fuels, dewaxing also becomes critical. Dewaxing catalysts that enhance the cold flow properties of renewable fuels through selective isomerization while minimizing yield loss are important.
122. **Renewable diesel:** Czech Republic. The network of ORLEN filling stations has started offering hydrotreated vegetable oil, HVO100, in the Czech Republic. This fuel is made of vegetable oils and waste products from the food and catering industry, including used cooking oil. It can lower GNG emissions by up to 90% compared to conventional fossil fuels.
123. **Renewable diesel:** USA: Rio Tinto has completed the transition from conventional to renewable diesel for all heavy mining equipment at its Kennecott copper mine in Utah, giving the mine one of the lowest carbon footprints of any copper producer in the United States. Kennecott's fleet of 97 haul trucks and heavy machinery equipment at the mine, concentrator, smelter, refinery and tailings are now all fuelled by renewable diesel sourced in the United States. This is expected to reduce the mine's Scope 1 emissions by 450,000 tons.

Textiles

124. **Textiles:** The Lenzing Group, a leading supplier of regenerated cellulose fibers for the textiles and nonwovens industries, announced the acquisition of a minority share in TreeToTextile AB, joining the existing shareholders H&M Group, Inter IKEA Group, Stora Enso, and LSCS Invest. The group of owners is united by the strong belief that sustainably produced fibers will have the power to change the textile industry for the better.

Sector Status Report: October 2024

As the low carbon and energy transition develops the nature and mix of projects and developments will change. Below is an overview of the mix of projects and activities during October 2024 characterised by Technology Development, Infrastructure, Policy and Commercial deployment.

Category	Number of Entries	Examples
Technology Development	30	1. Ohmium's modular PEM electrolyser for green hydrogen production; 2. UPM's sustainable lignin-based products for adhesives and biostimulants; 3. Evonik's biosurfactants for coatings and inks; 4. LanzaTech's syngas-to-ethanol technology for sustainable aviation fuel
Infrastructure	34	1. Yara International's ammonia import terminal in Germany for hydrogen economy support; 2. Central Grid Injection (CGI) facility for biomethane in Ireland; 3. Renewable gas plant at Westbury BioHub, Australia; 4. Multi-dairy anaerobic digester and pipeline in California, USA by Aemetis
Policy	12	1. EU Horizon Europe grant to Avantium for ICONIC project on CO ₂ conversion; 2. Iowa Renewable Fuels Infrastructure Program funding biofuel infrastructure expansion in the USA; 3. UK government's £22 billion funding for CCS projects in Teesside and Merseyside; 4. Swedish tax exemption for biogas and bio-propane use
Commercial Deployment	44	1. Large-scale green hydrogen and ammonia production facility off the coast of Southern Europe; 2. Avantium's plant-based and recyclable polymer PEF, branded as Releaf; 3. Bio-LNG bunkering terminal in Spain by Repsol for Brittany Ferries' LNG-fueled vessels; 4. VITAGRO's biomethane production for Ukrainian gas grid

Company Summary – October 2024

Frequency of mention.

Company	Frequency
Neste	4
Avantium	3
Fortum	3
LanzaTech	2
Nel	2
Orlen	2
Repsol	2
Uniper	2
Optimal Renewable Gas	1
A P Moller	1
ADNOC	1
Aemetis	1
AGIG	1
Air New Zealand	1
AmphiStar	1
Argent Energy	1
Arkas Bunker	1
Avina Clean Hydrogen	1
Bahia Energia Group	1
Bangchak	1
BASF	1
BP	1
Carbon Clean	1
Carbon Recycling International (CRL)	1
Cepsa	1
CMA CGM Group	1
Coamo Agroindustriar Cooperativa	1
Crupo Potencial	1
Total	121

Topics & Themes Summary– October 2024

Frequency of mention

Category	Frequency
Hydrogen	32
Biogas	18
Biojet	10
Biobased chemicals	8
Marine fuels	8
Feedstock	7
Biobased plastics	6
CO2 Removal	5
Policy	5
Biofuels	4
Ethanol	4
Biodiesel	3
Renewable diesel	3
Ammonia production	2
Biotechnology	2
Methanol	2
Plastic recycling	2
Biomaterials	1
e-fuels	1
e-methanol	1
Pyrolysis	1
Recycling plastic	1
Textiles	1
Total	127